COLORADO
Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

To: Members of the State Board of Health

From: James Jarvis, Regulatory Lead,
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Through: Gary W. Baughman, Director, Hazardous Materials and Waste Management Division GWB

Date: April 29, 2016

Subject: **Request for Rulemaking Hearing**
Proposed Amendments to **6** CCR 1007-1, Part 16, Radiation Safety Requirements for Wireline Service Operations and Subsurface Trace Studies, with a request for the rulemaking hearing to occur in July of 2016

The Division is proposing amendments to regulatory Part 16, titled *Radiation Safety Requirements for Wireline Service Operations and Subsurface Tracer Studies*. Part 16 is a specific rule which applies only to entities using radiation sources for well logging activities.

The regulatory part is being amended to align the current rule language with that of the federal regulations in 10 CFR Part 39 (licenses and radiation safety requirements for well logging).

The proposed changes to Part 16 involve the deletion, modification, and addition of numerous provisions needed for consistency with federal rule.

Further details of the proposed changes are listed in a Statement of Basis and Purpose and Specific Statutory Authority for the proposed rule, which, along with a Regulatory Analysis and supporting information, is available at:
https://www.colorado.gov/pacific/cdphe/radiation-regulations-development-part-16

In late-February, 2016, approximately 185 stakeholders were notified of the proposed rule amendment and were provided the opportunity to comment over a 45 day period. Additionally, two stakeholder meetings were held in March and April in Denver to present and discuss the proposed changes. During the comment period, only one comment was received.

At the May 2016 request for rulemaking, the Radiation Program requests that the Board of Health set a rulemaking hearing for July 20 of 2016.

cc: Deborah Nelson, Administrator, State Board of Health

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STATEMENT OF BASIS AND PURPOSE
AND SPECIFIC STATUTORY AUTHORITY
for Amendments to
6 CCR 1007-1, Part 16, Radiation Safety for Wireline Service Operations and Subsurface Trace Studies

Basis and Purpose.
The Colorado Radiation Control Act, Title 25, Article 11, Colorado Revised Statutes (the Act), requires the State Board of Health to formulate, adopt and promulgate rules and regulations pertaining to radiation control.

Section 25-11-103 of the Act requires the Colorado Department of Public Health and Environment (Department) to develop and conduct programs for evaluation and control of hazards associated with the use of sources of ionizing radiation. Under this authority the Department requires registration of sources of ionizing radiation such as radiation machines and licenses governing the use of radioactive materials.

Section 25-11-104(2) of the Act specifies that Colorado's radiation regulations be consistent with U.S. Nuclear Regulatory Commission (NRC) requirements necessary to maintain compatibility (and status as an Agreement State), and the Suggested State Regulations for Control of Radiation (SSRCR) of the Conference of Radiation Control Program Directors, Inc., except when the Board of Health concludes, on the basis of detailed findings, that a substantial deviation from the SSRCR is warranted. Colorado's current Part 16 regulation - is based on SSRCR model regulation Part "W". Part W – was last amended in 1991 and is not consistent with some language contained in federal rule in 10 CFR Part 39. The proposed Part 16 amendment modifies the rule contents for consistency with federal rule changes.

The Department is proposing an amendment to Part 16 in order to address differences in language and formatting between the federal and state rule. The rule is also being updated to address a limited number of more recent federal rule changes.

The specific proposed amendments to Part 16 involve:

- A change to the title of the rule to "Radiation Safety Requirements for Well Logging", similar to the title of the parallel federal rule;
- The modification of several definitions and the addition of one definition for consistency with federal rules;
- The addition of a previously excluded section pertaining to licensing requirements specific to well logging, and parallel with the requirements contained in 10 CFR Part 39. The specific provisions will require license applicants and those renewing licenses to:
    - Provide specific procedures for initial and on the job training for logging supervisors and assistants;
    - Provide written operating and emergency procedures;
    - Provide a program for annual job performance evaluation/inspections of logging supervisors and assistants; and
    - Provide procedures for performing leak testing and analysis of sources under their license when licensees wish to perform their own testing.

- Make updates to, and add specific requirements pertaining to the well owner agreement for consistency with federal rules;

- A change in the record retention requirements from 2 years to 3 years, consistent with the routine inspection cycle for well logging licensees and federal rule record retention requirements;
- For consistency with federal rules, and as a preventive measure, a requirement is added to have available a more sensitive radiation survey instrument to detect contamination levels encountered in the event of a sealed source rupture while logging;
- Changing the time-span for licensees to conduct a physical inventory of sources from quarterly to semi-annual, consistent with federal rule;
- The introduction of a pre-use visual inspection program requirement for logging equipment, as well as updates to the requirements for the currently required routine semi-annual inspection program, consistent with federal rule;
- Updates to the requirements and language for performing jobsite radiation surveys, consistent with federal rule;
- Updates to the requirements and language for notifications pertaining to incidents, lost, or source abandonment activities, consistent with federal rule and other regulatory parts; and
- Minor updates to the training course content for well logging supervisors and well logging assistants, consistent with federal rule.

It should be noted that while the added or updated provisions may be new to Part 16, the vast majority of licensees operate in areas of federal jurisdiction where these requirements have been in place for a number of years.

Specific Statutory Authority.
These rules are promulgated pursuant to the following statutory provisions: 25-1.5-101(1)(l), 25-11-103, 25-11-104, and 25-1-108, C.R.S.

SUPPLEMENTAL QUESTIONS

Is this rulemaking due to a change in state statute?

_____ Yes, the bill number is _____; rules are ___ authorized ___ required.
__X___ No

Is this rulemaking due to a federal statutory or regulatory change?

__X___ Yes
_____ No

Does this rule incorporate materials by reference?

__X___ Yes
_____ No

Does this rule create or modify fines or fees?

_____ Yes
__X___ No

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REGULATORY ANALYSIS

for Amendments to

6 CCR 1007-1, Part 16, Radiation Safety for Wireline Service Operations and Subsurface Trace Studies

1. A description of the classes of persons who will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule.

The Part 16 rule is a specific regulation containing licensing, technical, and radiation safety requirements for entities that possess a specific radioactive materials license to perform well logging and subsurface tracer studies. Currently, there are 11 such entities specifically licensed by the Colorado radiation program to perform well logging and/or subsurface tracer studies in Colorado. Additionally, there are another 10 entities that are licensed in other out-of-state or federal jurisdictions but work in Colorado under reciprocal recognition. All licensed entities would be required to follow Colorado regulations while working within the state. The majority of well logging licensees in Colorado also operate in other states under the jurisdiction of the U.S. Nuclear Regulatory Commission (NRC). Such federal jurisdictions have regulatory requirements already in place that are equivalent to those being proposed for Part 16 and therefore no impact is expected as a result of the proposed rule changes.

Entities using radioactive materials or radiation producing (x-ray) machines for purposes other than well logging would not be impacted by the proposed rule.

There are no known classes of persons who would specifically benefit from the proposed rule.

2. To the extent practicable, a description of the probable quantitative and qualitative impact of the proposed rule, economic or otherwise, upon affected classes of persons.

The quantitative impact of the proposed rule changes are expected to be very minimal since most licensees licensed for well logging operate in other jurisdictions where the majority of the proposed changes/requirements have been in effect for years or licensees have implemented the requirements of their own accord due to business or other needs. Under the proposed amendments, well logging licensees would be required to provide additional documentation during the 5 year license renewal cycle, such as information or procedures pertaining to in-house source user training, testing, and evaluations; operating and emergency procedures; and source leak testing procedures. Additionally, licensees would potentially be required to update any well owner agreements to more clearly define the responsibilities of the well logging company and well owner/operator in the event of source accidents or loss while performing logging activities. Regarding the well owner agreement, it is believed that most well logging operators already clearly identify such responsibilities as a matter of business practice due to the expense and risks involved in downhole logging.

As a result of the proposed requirement pertaining to having access to a more sensitive radiation survey instrument in the event of a source rupture, some licensees would, as a minimum, need to have an instrument lease retainer or agreement to obtain an appropriate survey instrument on short notice. Such instrument rentals or

retainers are readily available and would run on the order of $1,000 or less. This proposed provision would not expect to impact licensees operating outside of Colorado under federal jurisdiction as they would already possess such instruments or have access to them under current federal requirements. The proposed provision would impact a few licensees who may not operate in federal jurisdictions or do not otherwise possess such an instrument. However, no stakeholders commented on this proposed provision as source rupture occurs very infrequently.

The qualitative impact of the proposed changes will be to bring the rule in better alignment with federal regulations. This is expected to benefit the Department, regulated community, and stakeholders by ensuring that there is consistency in regulatory requirements between state and federal regulations and between Colorado and other agreement states. The added or clarified language throughout the rule is expected to enhance the understanding of the rule requirements and maintain Colorado's requirements consistent with the national regulatory framework for such materials and use.

3. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.

The rule requirements are enforced only by the Department. No other agency is expected to encounter costs as a result of the proposed changes.

The costs to the Department or state revenues are expected to be negligible as a result of the proposed changes. The agency will be required to review some additional documents during licensing and inspection activities as a result of the proposed rule changes, but these are not expected to result in significant staff time expenditures. As with most license applications for new or renewing licensees, staff will spend time reviewing all documents submitted and the complexity of which varies. As most licensees already submit the needed documents due to standard protocols or business practices for their respective companies, the staff is used to reviewing any additional documents submitted by the applicant.

4. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction.

There are no significant anticipated costs as a result of the proposed rule amendments to Part 16.

The benefits of amending the rule will be to address comments and federal rule changes from the NRC such that the rule is made consistent with the national framework of regulating licensed entities that conduct well logging activities involving radioactive materials. The rule amendments will help ensure that Colorado's status as an agreement state is maintained.

Inaction on the proposed rule will result in continued or potential future conflict with federal requirements and may jeopardize Colorado's agreement state status. Inaction would also limit Colorado's consistency within the national regulatory framework for radioactive materials regulation, thus creating potential interstate issues.

5. A determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule.

The purpose of the proposed rule changes is to align the requirements and rule language with federal rules. There are believed to be no less costly or less intrusive methods to achieve the purpose of the proposed changes and maintain consistency with federal rule.

6. Alternative Rules or Alternatives to Rulemaking Considered and Why Rejected.

The proposed rule amendments are needed to achieve consistency with federal rules, some of which are needed for compatibility as an agreement state. There are no alternate rules or alternatives to rulemaking that will achieve the same goals and requirements. While used in conjunction with other regulations, the Part 16 rule is specific to well logging and does not overlap with or duplicate other regulatory requirements or those of other state or federal agencies.

7. To the extent practicable, a quantification of the data used in the analysis; the analysis must take into account both short-term and long-term consequences.

The short and long term consequences of not implementing the proposed requirements will be inconsistency with federal rules and requirements needed to maintain status as an agreement state with NRC.

Another potential long term consequence – should the proposed amendments not be addressed under state regulation – is the possibility of enhanced oversight by NRC and potential loss of status as an agreement state. Such oversight could result in additional short term and potential long term expenditures by the state to address program inadequacies.

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STAKEHOLDER COMMENTS
for Amendments to
6 CCR 1007-1, Part 16, Radiation Safety for Wireline Service Operations and Subsurface Trace Studies

The following individuals and/or entities were included in the development of these proposed rules:

On February 22, 2016, a total of ~185+ stakeholders were notified of the opportunity to comment on the proposed draft rule over an approximate 45 day period. The entities notified represented:
- Approximately 11 radioactive materials licensees specifically licensed in Colorado for well logging activities;
- Approximately 10 out-of-state licensed well logging entities that perform well logging activities under reciprocal recognition;
- Approximately 162 "other stakeholders" who have specifically signed up to receive notification of proposed radiation regulation changes and who represent a wide variety of interests. These stakeholder entities may include: x-ray registrants, radioactive materials licensees; heavy industry; private citizens; private companies; professional organizations; and special interest groups. Only those entities expressing interest in "all" regulations or "industrial uses" of regulations were notified due to the subject matter of the proposed rule; and
- The Colorado Department of Natural Resources/Oil and Gas Conservation Commission (COGCC) and the Colorado Oil and Gas Association were also notified of the proposed rule amendments.

Two stakeholder meetings were also held during the comment period to provide stakeholders the opportunity to discuss and ask questions and provide comments on the proposed rule changes. No stakeholders attended the two meetings either in person or via teleconference. One stakeholder (a non-Colorado reciprocity licensee) provided comments of a technical nature suggesting a minor change to the well logging definition, which was incorporated into the draft rule. The commenter – who performs well logging in multiple jurisdictions - expressed support for aligning the Colorado rule with federal rule as such consistency between states makes operations easier for licensees.

Prior to the stakeholder meetings, the radiation program directly contacted (by phone) each of the 11 in-state licensees to ensure they were aware of the proposed rulemaking as well as giving them an opportunity to ask any specific questions.

The Colorado Radiation Advisory Committee reviewed and discussed the proposed regulation during the January 28, 2016 regular meeting. The committee did not express any specific concerns or issues regarding the proposed rule.

The U.S. Nuclear Regulatory Commission (NRC) reviewed the proposed regulation concurrent with the public comment period. The NRC provided specific comments on the proposed regulatory changes which pertained to alignment of federal rule and Colorado cross-references as well as slight changes in language, wording, or formatting. The NRC comments have been incorporated into the draft being presented to the Board of Health.

This rulemaking does not include a local government mandate. The burden of regulatory conformity to this rule applies to all applicable regulated entities (well logging licensees). EO5 does not apply.

The following individuals and/or entities were notified that this rule-making was proposed for consideration by the Board of Health:

In addition to the notice of opportunity to comment on the proposed rule discussed above, stakeholders were provided with the anticipated rulemaking schedule for both the request for rulemaking and the rulemaking hearing dates. This rulemaking timeline information is also posted on the Department website area specific to the rule changes.

Summarize Major Factual and Policy Issues Encountered and the Stakeholder Feedback Received. If there is a lack of consensus regarding the proposed rule, please also identify the Department's efforts to address stakeholder feedback or why the Department was unable to accommodate the request.

There are believed to be no major factual and policy issues identified as a result of the proposed changes. A minor technical comment relating to a definition has been incorporated into the draft rule.

Please identify health equity and environmental justice (HEEJ) impacts. Does this proposal impact Coloradoans equally or equitably? Does this proposal provide an opportunity to advance HEEJ? Are there other factors that influenced these rules?

The proposed rule changes impact Coloradoans equally and equitabaly. The proposed rule changes are primarily technical in nature and are specific to the requirements for entities performing well logging activities. Due to the purpose and structure of the rule, there is minimal opportunity for specific accommodations for HEEJ since the activities performed are regulated in the same manner. The rule (with or without the proposed changes) addresses matters related to radiation safety and protection of the public and the environment in the performance of well logging activities using sources of radiation. The rule requirements are such that they apply regardless of the location of the work activities.

DRAFT 1 05/06/16

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Hazardous Materials and Waste Management Division

RADIATION CONTROL - RADIATION SAFETY REQUIREMENTS FOR WELL LOGGING~~WIRELINE SERVICE OPERATIONS AND SUBSURFACE TRACER STUDIES~~

6 CCR 1007-1 Part 16

Adopted by the Board of Health July 20, 2016

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

PART 16: RADIATION SAFETY REQUIREMENTS FOR WELL LOGGING~~WIRELINE SERVICE OPERATIONS AND SUBSURFACE TRACER STUDIES~~

16.1 Purpose and ~~S~~scope.

16.1.1 Authority.

Rules and regulations set forth herein are adopted pursuant to the provisions of Sections 25-1-108, 25-1.5-101(1)(l), and 25-11-104, CRS.

16.1.2 Basis and Purpose.

A statement of basis and purpose accompanies this part and changes to this part. A copy may be obtained from the Department.

16.1.3 Scope.

The regulations in this part establish radiation safety requirements for **use of sources of radiation or licensed materials including sealed sources, radioactive tracers, radioactive markers, and uranium sinker bars in well logging in a single well. This part also prescribes radiation safety requirements for persons using sources of radiation or licensed materials in these operations.**~~using sources of radiation for wireline service operations including mineral-logging, radioactive markers, and subsurface tracer studies.~~

16.1.4 Applicability.

The regulations in this part apply to all applicants, licensees or registrants who use sources of radiation for **well logging or** wireline service operations including mineral-logging, radioactive markers, or subsurface tracer studies. The requirements of this part are in addition to, and not in substitution for, the requirements of Parts 1, 2, 3, 4, **8, 10, 17,** and ~~10~~22 of these regulations.

16.1.5 Published Material Incorporated by Reference.

Published material incorporated in Part 16 by reference is available in accord with Part 1, Section 1.4.

16.2 Definitions.

As used in this part, these terms have the definitions set forth as follows.

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

Comment [jsj1]:
EDITORIAL NOTE 1: ALL COMMENTS (SUCH AS THIS ONE) SHOWN IN THE RIGHT SIDE MARGIN OF THIS DOCUMENT ARE FOR INFORMATION PURPOSES ONLY TO ASSIST THE READER IN UNDERSTANDING THE PROPOSED RULE DURING THE DRAFT REVIEW AND COMMENT PROCESS.

THESE COMMENTS ARE **NOT** PART OF THE RULE AND ALL COMMENTS WILL BE DELETED PRIOR TO FINAL PUBLICATION.

EDITORIAL NOTE 2: ALIGNMENT AND FORMATTING CORRECTIONS AND ADJUSTMENTS ARE MADE THROUGHOUT THE RULE AND MAY NOT BE SPECIFICALLY IDENTIFIED WITH A SIDE MARGIN COMMENT.

EDITORIAL NOTE 3: THE ACRONYM "CRCPD" REFERS TO THE CONFERENCE OF RADIATION CONTROL PROGRAM DIRECTORS (CRCPD), INC., WHICH DEVELOPS SUGGESTED STATE REGULATIONS FOR CONTROL OF RADIATION (KNOWN AS SSRCR'S). UNLESS OTHERWISE DETERMINED BY THE BOARD OF HEALTH, COLORADO'S RULES ARE TO BE CONSISTENT WITH BOTH NUCLEAR REGULATORY COMMISSION (NRC) REGULATIONS AND THE SSRCR REGULATIONS. DUE TO DIFFERING RULE LANGUAGE BETWEEN THE NRC RULE(S) AND THE SSRCR, IT MAY NOT BE POSSIBLE TO BE CONSISTENT WITH BOTH NRC AND CRCPD. THESE DIFFERENCES HAVE BEEN IDENTIFIED IN THE SIDE MARGIN NOTES WHEREVER POSSIBLE.

THE SSRCRS MAY BE FOUND ONLINE AT: http://www.crcpd.org/ssrcrs/default.aspx
THE ORIGINAL PART 16 RULE IS BASED ON CRCPD SSRCR PART "W" DATED 1991.

Comment [jsj2]: A change in the title of the rule is proposed. Well logging is a more current term.

The "well logging" term is also more consistent with the title of 10 CFR Part 39 ("Licenses and radiation safety requirements for well logging").

Comment [JJ3]:
This reflects the date of anticipated approval by the Colorado Board of Health and is subject to change. The effective date is approximately 60 days beyond this date, pending additional review and approvals.

Comment [jsj4]: Language added in 16.1.3 and 16.1.4, to be consistent with rule title change, and language of 10 CFR 39.1.

Comment [JJ5]: Cross-reference to additional regulatory parts consistent with 10 CFR Part 39.1. References to Part 8 (x-ray non-healing arts); Parts 10 (notices…); 17 (transportation) and Part 22 (physical security) are added.
NRC RATS 2013-1;NRC Compatibility = D

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

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

"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.

"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 16.22.

"Logging supervisor" means **an**~~the~~ individual who uses sources of radiation or provides personal supervision **in the use of sources of radiation at a temporary jobsite**~~of the utilization of sources of radiation at the well site~~ **and who is responsible to the licensee for assuring compliance with the requirements of the Department's regulations and the conditions of the license**.

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

"Mineral logging" means any logging performed for the purpose of mineral exploration other than oil or gas.

"Personal supervision" means guidance and instruction by the **logging** supervisor who is physically present at the jobsite and watching the performance of the operation in such proximity that contact can be maintained and immediate assistance given as required.

"Radioactive marker" means radioactive material placed subsurface or on a structure intended for subsurface use for the purpose of depth determination or direction orientation. **For purposes of this part, this term includes radioactive collar markers and radioactive iron nails.**

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

"Source holder" means a housing or assembly into which a radioactive source is placed for the purpose of facilitating the handling and use of the source in well-logging operations.

"Subsurface tracer study" means the release of a substance tagged with radioactive material for the purpose of tracing the movement or position of the tagged substance in the well-bore or adjacent formation.

"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.

"Temporary jobsite" means a location where radioactive materials are present for the purpose of performing ~~wireline service operations~~**well logging** or subsurface tracer studies.

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

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

"Well~~-bore~~" means a drilled hole in which ~~wireline service operations~~**well logging** and subsurface tracer studies are performed. **As used in this part, "well" includes drilled holes for the purpose of oil, gas, mineral, groundwater, or geological exploration.**

Comment [jsj6]: "Logging supervisor" definition is updated, consistent with the same definition in 10 CFR 39.2. The proposed language includes the term "sources of radiation" in lieu of "licensed material" since Agreement States regulate both radiation producing machines and radioactive materials.

The added language explicitly expands the responsibilities of the logging supervisor.

The proposed definition differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

Comment [jsj7]: "logging" is added for clarity.

NRC Compatibility = D

Comment [jsj8]: Definition is updated, consistent with the same definition in 10 CFR 39.2. The proposed sentence adds clarification.

The proposed definition differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = D

Comment [jsj9]: Definition added for clarity. The definition is consistent with 10 CFR 39.2.

The phrase is used within Part 16.

There is no equivalent definition in SSRCR W (1991).

NRC Compatibility = D

Comment [jsj10]: Definition updated for clarity. The modified definition is consistent with 10 CFR 39.2.

Well logging is a more broad/general term, whereas wireline is more specific to the use of a wire for lowering the source of radiation downhole. Current logging technologies allow for logging while drilling in which the source is part of the drill or logging tool, whereas wireline activities are typically performed after a hole is drilled. Both technologies are in use.

The proposed definition differs from SSRCR W (1991) but is more consistent with federal rule language.

NRC Compatibility = D

Comment [jsj11]: The definition "well-bore" is modified to "well", and language is added, consistent with the "well" definition in 10 CFR 39.2. Subsequent use of the phrase "well-bore" in 16.2 definitions is changed to "well" for consistency. The proposed definition/language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (for "well" definition) = D

"Well-logging" means all operations involving the lowering and raising of measuring devices or tools which may contain sources of radiation **or are used to detect radioactive materials in** ~~into~~ well~~s bores~~ or cavities for the purpose of obtaining information about the well or adjacent formations **which may be used in oil, gas, mineral, groundwater, or geological exploration**.

"Wireline" means a cable ~~containing one or more~~ **which may or may not contain** electrical conductors which is used to lower and raise logging tools in the well~~bore~~.

"Wireline service operation" means any evaluation or mechanical service which is performed in the well~~bore~~ using devices on a wireline.

16.3 Specific licenses for well logging.

16.3.1 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:

16.3.1.1 The applicant shall satisfy the general requirements specified in 3.9, 3.9.1, 3.9.2, 3.9.4 and 3.9.7 for byproduct, source, and special nuclear material, as appropriate, and any special requirements contained in this part.

16.3.1.2 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:

(1) Initial training;

(2) On-the-job training;

(3) Annual safety reviews (refresher training) provided by the licensee;

(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

(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.

16.3.1.3 The applicant shall submit to the Department written operating and emergency procedures as described in 16.16 that includes the important radiation safety aspects of the procedures.

16.3.1.4 The applicant shall establish and submit to the Department its program for annual inspections of the job performance of each logging supervisor and well logging assistant 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.

16.3.1.5 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.

16.3.1.6 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:

Comment [jsj12]: The definition "well-logging" is updated, consistent with the same definition in 10 CFR 39.2.

The proposed definition differs from SSRCR W (1991) but is more consistent with federal rule.
NRC Compatibility = C

Comment [JJ13]: Section 16.3 numbering was previously omitted from the rule.

Section 16.3 and subsections are added for consistency with 10 CFR 39.13.
NRC Compatibility = H&S

Comment [jsj14]: Cross-references are expanded for consistency with the expanded cross-references in 10 CFR 39.13.
This provision is expanded for consistency with federal rules and differs from SSRCR W which is not current with federal rule.
NRC RATS 2011-2
NRC Compatibility (39.13)= H&S

Comment [jsj15]: The phrase "refresher training" is added for clarity so it is not confused with the annual audit or inspection of logging supervisors and assistants, which is a separate requirement.
Appendix D of NRC NUREG-1556, Vol. 14 similarly clarifies that the safety reviews refer to the annual refresher training.

Comment [jsj16]: The proposed provision differs slightly from that in 10 CFR 39.13. The CFR includes language which allows submission of an outline or summary of the procedures rather than submission of the actual procedures. As a matter of practice, the Radiation Program has and continues to require submission of complete procedures and therefore submission of an outline of procedures is not allowed.
NRC Compatibility = H&S

Comment [jsj17]: The proposed provision includes the well logging assistant which differs slightly from the language in 10 CFR 39.13.

The CFR explicitly specifies the annual inspection of well logging supervisors. However, NRC guidance – including a model/example checklist – includes the well logging assistant. The proposed addition of the logging assistant clarifies that the annual inspection requirement applies to well logging supervisors and well logging assistants.

NRC Compatibility = H&S

(1) Instruments to be used;

(2) Methods of performing the analysis; and

(3) Pertinent experience of the person who will analyze the wipe samples.

~~**PROHIBITION**~~

16.4 ~~Prohibition~~Agreement with well owner or operator.

16.4.1 ~~No licensee shall perform wireline service operations with a sealed source(s) unless, prior to commencement of the operation, the licensee has a written agreement with the well operator, well owner, drilling contractor, or land owner that:~~**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 who will meet the following requirements:**

16.4.1.**1** In the event a sealed source is lodged downhole, a reasonable effort ~~at recovery~~ will be made **to recover it.**~~; and~~

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

16.4.1.3 The radiation monitoring required in 16.22.7 will be performed.

16.4.1.4 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

16.4.~~2~~**1.5** ~~In the event a decision is made to abandon the sealed source downhole, the requirements of 16.25 and of any other State agency having applicable regulations shall be met.~~**If the sealed source is classified as irretrievable after reasonable efforts at recovery have been expended, the requirements of 16.25.4.2(1), 16.25.4.2(2), 16.25.4.2(3) and 16.25.6 must be implemented within 30 days.**

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

16.4.3 A licensee may apply, pursuant to 1.5.1, 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 16.4.1.5.

16.4.4 A written agreement between the licensee and the well owner or operator is not required if the licensee and the well owner or operator is part of the same corporate structure or otherwise similarly affiliated. However, the licensee shall still otherwise meet the requirements in 16.4.1.1 through 16.4.1.5.

EQUIPMENT CONTROL

16.5 Limits on ~~L~~levels of ~~R~~radiation.

Sources of radiation shall be used, stored, and transported in such a manner that the transportation requirements of Part 17 and the dose limitation requirements of Part 4 of these regulations are met.

16.6 Storage ~~P~~precautions.

16.6.1 ~~Each source of radiation, except an accelerator, shall be provided with a storage or transport container. The container shall be provided with a lock, or tamper seal for calibration sources, to~~

Comment [jsj18]: Section title is updated consistent with the title in 10 CFR 39.15.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

Comment [jsj19]:
Section 16.4 (and subsections) are modified, consistent with 10 CFR 39.15

The proposed language prescribes additional requirements beyond those currently specified, although they are generally consistent with prudent radiation safety practices or other requirements of these regulations.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.15) = C

Comment [jsj20]: This provision, consistent with 10 CFR 39.15(c), will allow a licensee alternatives for abandonment procedures on a case by case basis.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.15) = C

Comment [jsj21]: This provision, consistent with 10 CFR 39.15(d), provides and exception when the logging licensee is under the same corporate structure as the well owner.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.15) = C

Comment [jsj22]: Provision amended, consistent with 10 CFR 39.31(b)(1). The proposed language provides more explicit requirements for securing a container in storage.

The phrases "except an accelerator" and "or exposure to" are retained.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.31(b)) = C

~~prevent unauthorized removal of, or exposure to, the source of radiation.~~**The licensee shall store each source of radiation, except an accelerator, in a storage container or transportation package.**

16.6.1.1 The container or package must be locked and physically secured to prevent tampering or removal of radiation sources from storage by unauthorized personnel.

16.6.~~2~~**1.2** Sources of radiation shall be stored in a manner which will minimize danger from explosion or fire.

16.7 Transport ~~P~~precautions.

16.7.1 The licensee shall lock and ~~Transport containers shall be~~ physically secure~~d to~~ the **transport package containing radioactive material in the** transporting vehicle to prevent accidental loss, tampering, or unauthorized removal **of the radioactive material from the vehicle**.

16.8 Radiation ~~S~~survey ~~i~~instruments.

16.8.1 The licensee or registrant 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 4 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.

16.8.2 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 is ruptured. The licensee may own the instruments or may have a procedure to obtain them quickly from a second party.

16.8.~~2~~**3** Each radiation survey instrument shall be calibrated:

16.8.~~2~~**3**.1 At intervals not to exceed 6 months and after each instrument servicing;

16.8.~~2~~**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

16.8.~~2~~**3**.3 So that accuracy within 20 percent of the true radiation level can be demonstrated on each scale.

16.8.~~3~~**4** Calibration records shall be maintained for a period of ~~2~~**3** years **after the date of calibration** for inspection by the Department.

16.9 Leak ~~T~~testing of ~~S~~sealed ~~S~~sources.

16.9.1 Requirements.

Each licensee **who** ~~using~~**uses a** sealed source~~s of radioactive material~~ shall have the source~~s~~ tested for leakage **periodically**. ~~Records of leak test results shall be kept in units of becquerel (Bq) (or microcurie, µCi) and maintained for inspection by the Department for 6 months after the next required leak test is performed or until transfer or disposal of the sealed source.~~**The licensee shall keep a record of leak test results in units of becquerel (Bq) or microcuries (uCi) and retain the record for inspection by the Department for 3 years after the leak test is performed.**

16.9.2 Method of Testing.

Comment [jsj23]: Provision amended, consistent with 10 CFR 39.31(b)(2). The proposed language provides more explicit requirements for securing a transportation package in the transport vehicle.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.31(b)) = C

Comment [jsj24]: Provision added, consistent with 10 CFR 39.33(b). The proposed language requires additional survey instruments to be available (but not necessarily in a licensee's possession) in the event of a source rupture.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.33(b)) = H&S

Comment [JJ25]: Here and throughout other sections of the rule, the record retention requirement is changed from 2 years to 3 years, consistent with federal rule in 10 CFR 39.33(d).

The current inspection frequency for well logging licensees is 3 years. Allowing for a 3 year record retention period brings consistency between the records availability and the inspection cycle.

The current record retention cycle in SSRCR W is 2 years. The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

Comment [JJ26]: The proposed language is updated for consistency with 10 CFR 39.35(a).

The proposed language will require that licensees retain leak test requirements for a period of 3 years rather than the current 1 year period (~6 months beyond the next required leak test). Licensees regulated under Part 16 are inspected at a frequency of 3 years. The proposed change better aligns the record retention period with the inspection frequency to afford the opportunity to inspect these records over a longer period.

The language of the current rule (without the proposed changes) is consistent with SSRCR W.105a (1991). Implementing the proposed language would make the rule consistent with federal rule but would differ from SSRCR W.

NRC Compatibility = C

Comment [jsj27]: The language is updated for consistency with 10 CFR 39.35.

The term "Licensing state" is no longer being used in the regulatory scheme.

NRC Compatibility = C

16.9.2.1 Tests for leakage shall be performed using a leak test kit or method approved by the Department, the ~~U.S. Nuclear Regulatory Commission~~**NRC**, **or** an Agreement State~~, or a Licensing State~~.

16.9.2.2 The **wipe** test sample shall be taken from the nearest accessible point to the surface of the sealed source where contamination is likely to accumulate.

16.9.2.3 The **wipe** test sample shall be analyzed for radioactive contamination.

16.9.2.4 The analysis shall be capable of detecting the presence of 185 Bq (0.005 microcurie**s**) of radioactive material on the **wipe** test sample and must be performed by a person specifically approved by the Department, the ~~U.S. Nuclear Regulatory Commission~~**NRC**, **or** an Agreement State~~, or a Licensing State~~ to perform the analysis.

16.9.3 ~~Interval of Testing~~**Test Frequency**.

16.9.3.1 Each sealed source of radioactive material (except an energy compensation source (ECS)) shall be tested at intervals not to exceed 6 months. In the absence of a certificate from a transferor indicating that a test has been made within 6 months prior to the transfer, the sealed source shall not be used until tested.

16.9.3.2 Each ECS that is not exempt from testing in accordance with 16.9.5 must be tested at intervals not to exceed 3 years. In the absence of a certificate from a transferor indicating that a test has been made within the 3 years prior to the transfer, the ECS shall not be used until tested.

16.9.4 Leaking or Contaminated Sources.

If, for any reason, it is suspected that a sealed source may be leaking, it shall be removed from service immediately and tested for leakage as soon as practical.

16.9.4.1 If the **wipe** test reveals the presence of 185 Bq (0.005 microcurie**s**) or more of removable radioactive material, the licensee shall immediately withdraw the source from use and shall cause it to be decontaminated and repaired, or disposed of, by a licensee authorized by the Department, **the NRC**~~U.S. Nuclear Regulatory Commission~~, **or** Agreement State~~, or a Licensing State~~ to perform these functions.

16.9.4.2 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, ~~U.S. Nuclear Regulatory Commission~~**NRC**, **or** Agreement State~~, or a Licensing State~~ to perform these functions.

16.9.4.3 **The licensee shall submit** ~~A~~**a** report **to the Department within 5 days of receiving the test results. The report must** describe~~ing~~ the equipment involved **in the leak**, the test results, **any contamination which resulted from the leaking source,** and the corrective action taken **up to the time the report is made** ~~shall be filed with the Department within 5 days of receiving the test results~~.

16.9.5 Exemptions **from testing requirements**.

The following sources are exempted from the periodic leak test requirements of 16.9.1 through 16.9.4:

16.9.5.1 Hydrogen-3 (tritium) sources;

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

Comment [jsj28]: The phrase “wipe” is added here and in other sections for technical clarity and consistency with 10 CFR 39.35.

Radioactive sources are most commonly tested for leakage via collection of a wipe test.

NRC Compatibility = C

Comment [jsj29]: The language is updated/rephrased for consistency with 10 CFR 39.35(d).

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

Comment [jsj30]: Section title updated for consistency with 10 CFR 39.35(e).

NRC Compatibility = C

16.9.5.3 Sealed sources of radioactive material in gaseous form;

16.9.5.4 Sources of beta- or gamma-emitting radioactive material with an activity of 3.7 MBq (100 microcuries) or less; and

16.9.5.5 Sources of alpha- or neutron emitting radioactive material with an activity of 0.37 MBq (10 microcuries) or less.

16.10 ~~Quarterly~~Physical ~~i~~inventory.

16.10.1 Each licensee or registrant shall conduct a ~~quarterly~~**semi-annual** physical inventory to account for all sources of radiation **received and possessed under the license**.

16.10.2 Records of inventories shall be maintained for ~~2~~3 years from the date of the inventory for inspection by the Department and shall include**:**

16.10.2.1 ~~t~~The quantities and kinds of sources of radiation;~~,~~

16.10.2.2 ~~t~~The location where sources of radiation are assigned;~~,~~

16.10.2.3 ~~t~~The date of the inventory;~~,~~ and

16.10.2.4 ~~t~~The name of the individual conducting the inventory.

16.10.3 Physical inventory records may be combined with leak test records.

16.11 ~~Utilization~~ Records ~~of material use~~.

16.11.1 Each licensee or registrant shall maintain current records **for each use of sources of radiation which shall include:**~~, which shall be kept available for inspection by the Department for 2 years from the date of the recorded event.~~

~~16.11.2 The records shall show the following information for each source of radiation:~~

16.11.~~2~~1.1 **The** ~~M~~make, model number, and a serial number or a description of each source of radiation used;

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

16.11.~~2~~1.~~2~~3 The identity of the well-logging supervisor **who is responsible for the licensed material and the identity of logging assistants present;** ~~or field unit to whom assigned;~~ and

16.11.~~2~~1.~~3~~4 **The** ~~L~~locations **and date of use of the sources of radiation**~~where used and dates of use~~.

~~16.11.3 In the case of tracer materials and radioactive markers, the utilization record shall indicate the radionuclide and activity used in a particular well.~~

16.11.2 The licensee shall make the records required by 16.11.1 available for inspection by the Department. The licensee shall retain the records for 3 years from the date of the recorded event.

16.12 Design, ~~P~~performance, and ~~C~~certification ~~C~~criteria for ~~S~~sealed ~~S~~sources ~~U~~used in ~~D~~downhole ~~O~~operations.

~~16.12.1 Each sealed source, except energy compensation sources (ECS) and those containing radioactive material in gaseous form, used in downhole operations and manufactured after~~

Comment [JJ31]: Consistent with 10 CFR 39.35(e), the periodic leak test exemption is expanded to low activity neutron sources, based on a prior licensee (stakeholder) inquiry/request.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

Comment [jsj32]: Consistent with 10 CFR 39.37, the periodic physical inventory frequency is changed from a quarterly to a semi-annual requirement and language is modified for clarity.

The proposed language provides for some regulatory relief by requiring an inventory on a less frequent basis.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = H&S

Comment [jsj33]: The provisions of 16.11 (and subsections) have been updated for consistency with 10 CFR 39.39.

The proposed language will require some minor additional actions for licensees using unsealed radioactive materials. Specifically, the disposition of unused materials will be required to be documented under the proposed rule language.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

Comment [jsj34]: Deleted language has been relocated to 16.11.2, consistent with the formatting of 10 CFR 39.39.

Comment [jsj35]: The requirements of this provision have been incorporated into 16.11.1.2 (above).

Comment [jsj36]: Language updated as a result of NRC review comments, consistent with 10 CFR 39.41.

NRC Letter 03/18/16.
NRC Compatibility (39.41) = B

~~December 30, 1986, shall be certified by the manufacturer, or other testing organization acceptable to the Department, to meet the following minimum criteria~~**A licensee may use a sealed source for use in well logging applications if**:

16.12.1.1 **The sealed source is**~~Be of~~ doubly encapsulated ~~construction~~;

16.12.1.2 **The sealed source contains**~~Contain~~ radioactive material whose chemical and physical forms are as insoluble and non-dispersible as practical; and

16.12.1.3 **Meets**~~Satisfies~~ the requirements of 16.12.3.1, 16.12.3.2, or 16.12.3.3, as appropriate.

16.12.2 ~~For sealed sources, except those containing radioactive material in gaseous form, acquired after December 30, 1986, in the absence of a certificate from a transferor certifying that an individual sealed source meets the requirements of 16.12.1, the sealed source shall not be put into use until such determinations and testing have been performed.~~**Reserved**

16.12.3 Each sealed source, except energy compensation sources (ECS) and those containing radioactive material in gaseous form, used in downhole operations ~~after December 30, 1986~~, shall be certified by the manufacturer, or other testing organization acceptable to the Department, as meeting the sealed source performance requirements for oil well-logging:

16.12.3.1 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 United States Of America Standards Institute (USASI) N5.10-1968, “Classification of Sealed Radioactive Sources” (1968), or the requirements in 16.12.3.2 or 16.12.3.3.

16.12.3.2 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 American National Standards Institute / Health Physics Society (ANSI/HPS) N43.6-1997, “Sealed Radioactive Sources Classification” (November 1997).

16.12.3.3 For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications, if the sealed source's prototype has been tested and found to maintain its integrity after each of the following tests:

(1) Temperature test. The test source must be held at **minus** 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.

(2) 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.

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

(4) 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.

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

16.12.4 Certification documents shall be maintained for inspection by the Department for a period of ~~2~~**3** years after source disposal. If the source is abandoned downhole, the certification documents shall be maintained until the Department authorizes disposition.

16.12.5 ~~Use of an energy compensation source (ECS) is subject to this part, except that if the ECS is contained within a logging tool, or other tool components, and contains quantities of licensed material not exceeding 3.7 MBq (100 microcurie), the ECS is only subject to the requirements:~~**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 (100 microcuries).**

16.12.5.1 ~~Of 16.9, 16.10 and 16.11 f~~**F**or well logging applications with a surface casing for protecting fresh water aquifers**, use of the ECS is only subject to the requirements of 16.9, 16.10, and 16.11.**~~; or~~

16.12.5.2 ~~Of 16.9, 16.10, 16.11, 16.12 and 16.25 f~~**F**or well logging applications without a surface casing for protecting fresh water aquifers**, use of the ECS is only subject to the requirements of 16.4, 16.9, 16.10, 16.11, and 16.25.1 through 16.25.5**.

~~16.12.6 Use of a tritium neutron generation target source is subject to this part, except the requirements:~~

~~16.12.6.1 Of 16.12 and 16.25 do not apply for use of a tritium neutron generation target source containing quantities not exceeding 1,110 MBq (30 curie) and in a well with a surface casing for protecting fresh water aquifers; and~~

~~16.12.6.2 Of 16.12 do not apply for use of a tritium neutron generation target source containing quantities exceeding 1,110 MBq (30 curie) or in a well without a surface casing for protecting fresh water aquifers.~~

16.12.6 The requirements in 16.12.1, 16.12.3.1, 16.12.3.2, and 16.12.3.3 do not apply to sealed sources that contain radioactive material in gaseous form.

16.12.7 The requirements in 16.12.1, 16.12.3.1, 16.12.3.2, and 16.12.3.3 do not apply to Energy Compensation Sources (ECS). ECSs must be registered with the Department under 3.12.14 or with NRC or an Agreement State.

16.12.8 Use of a tritium neutron generator target source, containing quantities not exceeding 1,110 GBq (30 curies) and in a well with a surface casing to protect fresh water aquifers, is subject to the requirements of Part 16 except Sections 16.4, 16.12.1 through 16.12.7, and 16.25.1 through 16.25.5.

16.12.9 Use of a tritium neutron generator target source, containing quantities exceeding 1,110 GBq (30 curies) or in a well without a surface casing to protect fresh water aquifers, is subject to the requirements of Part 16 except Section 16.12.1 through 16.12.7.

16.13 Labeling.

16.13.1 **The licensee may not use a** ~~Each~~ source, source holder, or logging tool containing radioactive material **unless the smallest component that is transported as a separate piece of equipment with the radioactive material inside** ~~shall~~ bear**s** a durable, legible, and clearly visible marking or label.~~, which has, as a minimum,~~ **The marking or labeling must contain** the standard radiation caution symbol **specified in 4.27**, without the conventional color requirement**s**, and the following wording:

DANGER* – RADIOACTIVE **MATERIAL**

*or “CAUTION”

~~This labeling shall be on the smallest component transported as a separate piece of equipment.~~

16.13.2 **The licensee may not use a container to store radioactive material**~~Each transport~~ **unless the** container ~~shall have permanently~~**has securely** attached to it a durable, legible, and clearly visible

Comment [jsj37]: Provision 16.12.5 and subsections are updated consistent with 10 CFR 39.53 as a result of NRC review comments.

The updated language makes it more explicit that only ECS sources of 100 uCi or less are permitted to be used.

Language and cross-references are updated at the request of NRC.

NRC Letter 03/18/16.
NRC Compatibility = C

Comment [jsj38]: Section 16.12.6 is replaced by new sections 16.12.6 and 16.12.7 using language consistent with 10 CFR 39.55.

Comment [jsj39]: 16.12.6 and 16.12.7 are added, consistent with 10 CFR 39.41(e), and (f), respectively.

These requirements were previously part of 16.12.1, but were separated for formatting consistency with federal rule.

Comment [jsj40]: Sections 16.12.8, and 16.12.9 replace current 16.12.6 (and subsections). Language is updated consistent with 10 CFR 39.55 to provide additional clarity in the rule.

The proposed language also corrects a unit conversion error – 1,100 MBq (megabecquerel) in the current rule should be 1,100 GBq (gigabecquerel).

The reference to Section 16.4 (well owner agreement) and specific sections in 16.12 and 16.25 are added, consistent with the cross-reference in 10 CFR 39.55.

There is no equivalent language/provision ins SSRCR W(1991), but the proposed language is more consistent with federal rule.

NRC Compatibility (39.55) = C

Comment [jsj41]: Language is updated to be consistent with 10 CFR 39.31(a)(1). The amended language specifies a more explicit prohibition on use of certain items without proper labeling.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.31(a))= D

Comment [jsj42]: This provision is incorporated into the prior paragraph.

Comment [jsj43]: Language is updated to be consistent with 10 CFR 39.31(a)(2). The amended language specifies a more explicit prohibition on use of containers without proper labeling.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.31(a)) = D

label**. The label must contain** ~~which has, as a minimum,~~ the standard radiation caution symbol **specified in 4.27** and the following wording:

DANGER*- RADIOACTIVE **MATERIAL**

NOTIFY CIVIL AUTHORITIES [OR NAME OF COMPANY]

*or "CAUTION"

16.13.3 The licensee may not transport radioactive material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with the requirements of Part 17.

16.13.~~3~~**4** The licensee may use a uranium sinker bar in well logging applications only if it is legibly impressed with the following wording:

CAUTION--RADIOACTIVE--DEPLETED URANIUM

and

NOTIFY CIVIL AUTHORITIES [OR COMPANY NAME] IF FOUND

16.14 Inspection and ~~M~~maintenance.

16.14.1 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.

16.14.1.1 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.

16.14.~~1~~**2** ~~Each licensee or registrant shall conduct, at intervals not to exceed 6 months, a program of inspection and maintenance of source holders, logging tools, source handling tools, storage containers, transport containers, and injection tools to assure proper labeling and physical condition.~~**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.**

16.14.2.~~1~~ ~~If any inspection conducted pursuant to 16.14.1 reveals damage to labeling or components critical to radiation safety, the device shall be removed from service until repairs have been made.~~ **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.**

16.14.3 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 16.16 has been approved either by the Department, NRC, or an Agreement State to perform this operation.

16.14.~~3~~**4** If a sealed source is stuck in the source holder, the licensee shall not perform any operation, such as drilling, cutting, or chiseling, on the source holder unless the licensee is

Comment [jsj44]: Language is updated to be consistent with 10 CFR 39.31(a)(3). The amended language specifies a more explicit prohibition on use of containers without proper labeling. This requirement is consistent with U.S. Department of Transportation (DOT) requirements contained/referenced in Part 17 of the Colorado radiation regulations.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.31(a))= D

Comment [jsj45]: Language in 16.14 updated for consistency with 10 CFR 39.43.

The added provision in 16.14.1 requires a pre-use inspection and is in addition to the semi-annual inspection required by 16.14.2.

The proposed language of 16.14.1, and .2 is not found in SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

Comment [jsj46]: Language is modified, consistent with 10 CFR 39.43(b). The added language includes "uranium sinker bars" which is not in the current Part 16.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

Comment [jsj47]: Language is added, consistent with 10 CFR 39.43(c).

The proposed language specifies that a licensee must have an approved procedure for removing a sealed source from a source holder.

There is no equivalent provision in SSRCR W.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

specifically approved by the ~~U.S. Nuclear Regulatory Commission~~**NRC**, **or** an Agreement State~~, or a Licensing State~~ to perform this operation.

16.14.4**5** The repair, opening, or modification of any sealed source shall be performed only by persons specifically authorized to do so by the Department, the ~~U.S. Nuclear Regulatory Commission~~**NRC**, **or** an Agreement State~~, or a Licensing State~~.

~~16.14.5 Records of inspection and maintenance shall be maintained for a period of 2~~**3** ~~years for inspection by the Department.~~

Comment [jsj48]: Provision is deleted as record retention requirements are specified in 16.14.1.1 and 16.14.2.1.

NRC Compatibility (10 CFR 39.43) = C

REQUIREMENTS FOR PERSONNEL SAFETY

16.15 Training ~~R~~requirements.

16.15.1 **The**~~No~~ licensee or registrant ~~shall~~ **may not** permit any individual to act as a logging supervisor as defined in this part until such individual ~~has~~:

16.15.1.1 ~~Received~~**Has completed**~~, in a course recognized by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State, or a Licensing State, instruction~~**training** in the subjects outlined in Appendix 16A and demonstrated an understanding thereof;

Comment [jsj49]: Language is modified consistent with 10 CFR 39.61(a)

The proposed language provides more prescriptive and/or clarifies training requirements for logging supervisors.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = B

16.15.1.2 ~~Read and~~**Has** received **copies of and** instruction in**:**

(1) **T**~~t~~he regulations contained in ~~this part and~~ the applicable sections of Parts 1, 4, ~~and~~ 10 **and 16** of these regulations or their equivalent~~,~~**;**

(2) ~~conditions of appropriate~~**The** license or certificate of registration **under which the logging supervisor will perform well logging;**~~,~~ and

(3) **T**~~t~~he licensee's or registrant's operating and emergency procedures **required by 16.16**~~, and demonstrated an understanding thereof~~; ~~and~~

16.15.1.3 **Has completed on-the-job training and** ~~D~~demonstrated competence ~~to use~~**in the use of** sources of radiation, ~~related~~ **remote** handling tools, and radiation survey instruments **by a field evaluation**~~which will be used on the job.~~**; and**

16.15.1.4 Has demonstrated understanding of the requirements in 16.15.1.1, and 16.15.1.2 by successfully completing a written test.

16.15.2 ~~No licensee or registrant shall~~**The licensee may not** permit an~~y~~ individual to **act as a logging assistant**~~assist in the handling of sources of radiation~~ until ~~such individual~~**that person** has:

Comment [jsj50]: Language is modified consistent with 10 CFR 39.61(b).

The proposed language provides more prescriptive and/or clarifies training requirements for logging assistants.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.61)=B

16.15.2.1 Has received instruction in the applicable sections of Parts 1, 4, and 10 of these regulations or their equivalent;

16.15.2.~~1~~**2** **Has** ~~Read or~~ received **copies of, and** instruction in**,** the licensee's or registrant's operating and emergency procedures **required by 16.16**~~and demonstrated an understanding thereof~~; and

16.15.2.~~2~~**3** **Has demonstrated understanding of the materials listed in 16.15.2.1, and 16.15.2.2 by successfully completing a written or oral test; and**

16.15.2.4 **Has received instruction in the use** ~~Demonstrated competence to use, under the personal supervision of the logging supervisor, the~~**of** sources of radiation, ~~related~~**remote** handling tools, and radiation survey instruments**, as appropriate for the logging assistant's intended job responsibilities** ~~which will be used on the job~~.

16.15.3 The licensee shall provide safety reviews **(refresher training)** for logging supervisors and logging assistants at least once during each calendar year.

16.15.4 ~~The licensee or registrant shall maintain employee training records for inspection by the Department for 2 years following termination of the individual's employment.~~**The licensee shall maintain a record on each logging supervisor's and logging assistant's training and annual safety review (refresher training).**

16.15.4.1 The training records must include copies of written tests and dates of oral tests given after July 14, 1987.

16.15.4.2 The training records must be retained until 3 years following the termination of employment.

16.15.4.3 Records of annual safety reviews (refresher training) must list the topics discussed and be retained for 3 years.

16.16 Operating and ~~E~~emergency ~~P~~procedures.

~~The~~**Each** licensee~~'s~~ or registrant~~'s~~ **shall develop and follow written** operating and emergency procedures ~~shall include instructions in at least the following~~**that cover**:

16.16.1 Handling and use of sources of radiation to be employed so that no individual is likely to be exposed to radiation doses in excess of the standards established in Part 4 of these regulations;

16.16.2 Methods and occasions for conducting radiation surveys**, including surveys for detecting contamination, as required by 16.22.3 - 16.22.5**;

16.16.3 Methods and occasions for locking and securing sources of radiation;

16.16.4 Personnel monitoring and the use of personnel monitoring equipment;

16.16.5 Transportation to temporary jobsites and field stations, including the packaging and placing of sources of radiation in vehicles, placarding of vehicles, and securing sources of radiation during transportation **to prevent accidental loss, tampering, or unauthorized removal**;

16.16.6 Minimizing **personnel** exposure **including exposures from inhalation and ingestion of licensed tracer materials**~~of individuals in the event of an accident~~;

16.16.7 Procedure for notifying proper personnel in the event of an accident;

16.16.8 Maintenance of records;

16.16.9 Use, inspection and maintenance of source holders, logging tools, source handling tools, storage containers, transport containers, and injection tools;

16.16.10 Procedure to be followed in the event a sealed source is lodged downhole;

16.16.11 Procedures to be used for picking up, receiving, and opening packages containing radioactive material;

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

16.16.13 Maintenance of records generated by logging personnel at temporary jobsites; **and**

16.16.14 ~~Notifying proper persons in the event of an accident; and~~

~~16.16.15~~ 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 16.8.

Comment [jsj51]: The phrase "refresher training" is added here and elsewhere for clarity so it is not confused with the annual audit or inspection of logging supervisors and assistants, which is a separate requirement.

The proposed phrase "refresher training" does not appear in the federal rule or in SSRCR Part W.

Appendix D of NRC NUREG-1556, Vol. 14 similarly clarifies that the safety reviews refer to the annual refresher training.

Comment [jsj52]: Language is modified and added consistent with 39.61(d).

Similar to 16.5.3, the phrase "refresher training" is added for clarity so it is not confused with the annual audit or inspection of logging supervisors and assistants, which is a separate requirement.

The proposed phrase "refresher training" does not appear in the federal rule or in SSRCR Part W.

NRC Compatibility (39.61) = B

Comment [jsj53]: Language is modified for consistency with 10 CFR 39.63.

The current rule section (without proposed changes) associates the requirements in this section to training requirements. The proposed wording instead realigns the requirements for operating and emergency procedures to the license application process (found in new section 16.3) requirements, similar to the approach used in 10 CFR 39.63. The training requirements (of 16.15) also refer to this section explicitly.

NRC Compatibility = C

Comment [jsj54]: Provision 16.16.2 is updated consistent with 10 CFR 39.63(c) at the request of NRC.

NRC Letter 03/18/16.
NRC Compatibility = C

Comment [jsj55]: Provision 16.16.5 is updated consistent with 10 CFR 39.63(g) at the request of NRC

NRC Letter 03/18/16.
NRC Compatibility = C

Comment [jsj56]: Provision 16.16.6 is updated consistent with 10 CFR 39.63(d) at the request of NRC.

NRC Letter 03/18/16.
NRC Compatibility = C

Comment [jsj57]: This provision is deleted as it duplicates the requirement of 16.16.7 earlier in the section.

16.17 Personnel ~~M~~monitoring.

16.17.1 No licensee or registrant shall permit any individual to act as a logging supervisor or to assist in the handling of sources of radiation unless each such individual wears, at all times during the handling of such sources, a personnel dosimeter that is processed and evaluated by an accredited National Voluntary Laboratory Accreditation Program (NVLAP) processor.

16.17.1.1 Each personnel dosimeter shall be assigned to and worn by only one individual.

16.17.1.2 Film badges must be replaced at least monthly. Other types of personnel dosimeter must be replaced at least quarterly.

16.17.1.3 After replacement, each personnel dosimeter must be promptly processed.

16.17.2 The licensee shall provide bioassay services to individuals using licensed materials in subsurface tracer studies if required by the license.

16.17.~~3~~2 Personnel monitoring records shall be maintained for inspection until the Department authorizes disposition.

PRECAUTIONARY PROCEDURES IN LOGGING AND SUBSURFACE TRACER OPERATIONS

16.18 Security.

16.18.1 A logging supervisor must be physically present at a temporary jobsite whenever licensed 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.

16.18.2 During each logging or tracer application, **except when the radiation sources are below ground or in shipping or storage containers,** the logging supervisor or other **individual** designated ~~employee~~**by the logging supervisor** shall maintain direct surveillance of the operation to **prevent**~~protect against~~ unauthorized or unnecessary entry into a restricted area, as defined in Part 1 of these regulations.

16.19 Handling ~~T~~tools.

The licensee shall provide and require the use of tools that will assure remote handling of sealed sources other than low-activity calibration sources.

16.20 Subsurface ~~T~~tracer ~~S~~studies and radioactive markers.

16.20.1 **The licensee shall require all personnel handling radioactive tracer material to use** ~~P~~protective gloves**, and if required by the licensee,** ~~and~~ other appropriate protective clothing and equipment ~~shall be used by all personnel handling radioactive tracer material~~. Precautions shall be taken to avoid ingestion or inhalation of radioactive material **and to avoid contamination of field stations and temporary jobsites**.

16.20.2 ~~No licensee shall cause the injection of~~**A licensee may not knowingly inject** radioactive material into ~~potable~~**fresh water** aquifers ~~without prior written authorization from~~**unless specifically authorized to do so by** the Department and any other appropriate State agency.

16.20.3 The licensee may use radioactive markers in wells only if the individual markers contain quantities of licensed material not exceeding the quantities specified in Part 3, Schedule 3B. The use of markers is subject only to the requirements of 16.10.

16.21 Particle ~~A~~accelerators.

No licensee or registrant shall permit aboveground testing of particle accelerators, designed for use in well-logging, which results in the production of radiation, except in areas or facilities

Comment [jsj58]: This provision added consistent with 10 CFR Part 39.65(b).

The added language will defer to specific license requirements regarding the need for bioassay when handling unsealed materials.

General bioassay/dose monitoring requirements are also currently specified in Part 4 of the regulations, which is used in conjunction with Part 16.

NRC Compatibility = D

Comment [jsj59]: This provision added consistent with 10 CFR Part 39.71(a)

The proposed provision requires the physical presence of the logging supervisor at temporary jobsites.

NRC Compatibility = C

Comment [jsj60]: 16.20.1, and 16.20.2 are modified, consistent with 10 CFR Part 39.45.

To avoid creation of a new subsection and significant rule renumbering, the section title is expanded to include “radioactive markers”, which is addressed in 16.20.3 (below).

The modified language in 16.20.1 requires that protective equipment shall be worn as specified by the licensee.

The language of 16.20.2 potentially expands the types of wells that would be covered by this provision by changing the word “potable” to “fresh” water aquifer. Fresh water aquifers may be used for both drinking and non-drinking purposes.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

Comment [jsj61]: Section 16.20.3 is added consistent with 10 CFR 39.47.
The proposed language limits the types of markers that can be used in wells to those which fall within the exempt quantities specified under schedule 3B of Part 3.
There is no equivalent provision in SSRCR W (1991) but is more consistent with federal rule.
NRC Compatibility = D

controlled or shielded so that the requirements of 4.6 and 4.14 of these regulations, as applicable, are met.

RADIATION SURVEYS CONTAMINATION CONTROL AND SURVEY RECORDS

16.22 Radiation ~~S~~surveys.

16.22.1 ~~Radiation surveys or calculations shall be made and recorded for each area where radioactive materials are stored.~~**The licensee shall make radiation surveys, including but not limited to the surveys required by 16.22.2 through 16.22.5, of each area where licensed materials are used and stored.**

16.22.2 ~~Radiation surveys or calculations shall be made and recorded for the radiation levels in occupied positions and on the exterior of each vehicle used to transport radioactive material. Such surveys and calculations shall include each source of radiation or combination of sources to be transported in the vehicle.~~**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.**

16.22.3 ~~If the sealed source assembly is removed from the logging tool before departing the jobsite, the logging tool detector shall be energized, or a survey meter used, to assure that the logging tool is free of contamination.~~**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.**

16.22.4 **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.**

16.22.4~~5~~ ~~Radiation surveys shall be made and recorded at the jobsite or wellhead for each tracer operation, except those using hydrogen-3, carbon-14, and sulfur-35. These surveys shall include measurements of radiation levels before and after the operation.~~**The licensee shall make a radiation survey at the temporary jobsite before and after each subsurface tracer study to confirm the absence of contamination.**

16.22.~~5~~6 ~~Records required pursuant to 16.22.1 through 16.22.4 shall include the dates, the identification of individual(s) making the survey, the identification of survey instrument(s) used, and an exact description of the location of the survey. Records of these surveys shall be maintained for inspection by the Department for 2 years after completion of the survey.~~**The results of surveys required pursuant to 16.22.1 through 16.22.5 must be recorded and must include:**

16.22.6.1 The date(s) of the survey;

16.22.6.2 The name of the individual(s) making the survey;

16.22.6.3 The identification of the survey;

16.22.6.4 Instrument(s) used; and

16.22.6.5 The location of the survey.

The licensee shall retain records of the surveys for inspection by the Department for 3 years after they are made.

Contamination control.

Comment [JJ62]: Language is updated consistent with 10 CFR 39.67(a). The proposed language clarifies that surveys must be performed in areas where radioactive materials are used and not limited to storage areas only. (SSRCR W includes "storage" but was omitted from the Part 16 rule). The proposed language differs from SSRCR W (1991) but is more consistent with federal rule. NRC Compatibility = C

Comment [JJ63]: Language is updated consistent with 10 CFR 39.67(b). The proposed language eliminates the option for a licensee to perform calculations in lieu of surveys. The proposed language also eliminates the requirement to survey each combination of sources. As proposed, the survey performed is expected to reflect the current configuration and quantity of sources being transported at that time.
The proposed language differs from SSRCR W (1991) but is more consistent with federal rule. NRC Compatibility = C

Comment [JJ64]: Language is updated consistent with 10 CFR 39.67(c). The proposed wording utilizes clearer language.
The proposed language differs from SSRCR W (1991) but is more consistent with federal rule. NRC Compatibility = C

Comment [JJ65]: New language is incorporated consistent with 10 CFR 39.67(d).
The proposed new language provides a precautionary requirement to perform surveys in the event that damage to the source is suspected. This provision does not appear in SSRCR W.
The proposed language differs from SSRCR W (1991) but is more consistent with federal rule. NRC Compatibility = C

Comment [JJ66]: Language is updated consistent with 10 CFR 39.67(e). The proposed language simplifies the requirement for surveys. The temporary jobsite includes all areas where the sources will be or have been used. The proposed language does not provide an exemption for certain isotopes.
The proposed language differs from SSRCR W (1991) but is more consistent with federal rule. NRC Compatibility = C

Comment [jsj67]: Language of 16.22.6 is updated consistent with 10 CFR 39.67(f). Plural language is incorporated for clarity as more than one individual, instrument or dates of surveys may occur.

The proposed language/requirements are effectively the same as the current language.

16.22.7 If the licensee detects evidence that a sealed source has ruptured or radioactive materials have caused contamination, the licensee shall initiate immediately the emergency procedures required by 16.16.

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

16.22.9 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.

16.23 Documents and ~~R~~records ~~R~~required at ~~F~~field ~~S~~stations.

Each licensee or registrant shall maintain **the following documents and records**~~, for inspection by the Department, the following documents and records for the specific devices and sources used~~ at the field station:

16.23.1 ~~Appropriate~~**The** license, certificate of registration, or equivalent document(s) **authorizing the use of sources of radiation**;

16.23.2 Operating and emergency procedures **required by 16.16**;

16.23.3 ~~Applicable~~ **A copy of Parts 1, 4, 10, and 16 and other applicable** regulations;

16.23.4 Records of the latest survey instrument calibrations ~~pursuant to~~**required by** 16.8;

16.23.5 Records of the latest leak test results ~~pursuant to~~**required by** 16.9;

16.23.6 Records of ~~quarterly~~ **physical** inventories required **by** ~~pursuant to~~ 16.10;

16.23.7 Utilization records required **by**~~pursuant to~~ 16.11;

16.23.8 Records of inspection and maintenance required **by** ~~pursuant to~~ 16.14;

16.23.9 Survey records required **by** ~~pursuant to~~ 16.22; and

16.23.10 Training records required **by** ~~pursuant to~~ 16.15.**4**.

16.24 Documents and ~~R~~records ~~R~~required at ~~T~~temporary ~~J~~jobsites.

Each licensee or registrant conducting operations at a temporary jobsite shall ~~have~~**maintain** the following documents and records ~~available at that~~ **at the temporary job**site ~~for inspection by the Department~~ **until the well logging operation is complete**:

16.24.1 Operating and emergency procedures **required by 16.16**;

16.24.2 Survey records required pursuant to 16.22 for the period of operation at the site;

16.24.3 Evidence of current calibration for the radiation survey instruments in use at the site **required by 16.8**;

16.24.4 When operating in the State under reciprocity, a copy of the appropriate license, certificate of registration, or equivalent document(s) **authorizing use of sources of radiation**; and

16.24.5 Shipping papers for the transportation of radioactive material **required by Part 17**.

Comment [jsj68]: Language is added, consistent with 10 CFR 39.69.

The added requirements in 16.22.7 – 16.22.9 provide additional requirements specific to contamination control for subsurface tracer studies not found in the current rule.

These provisions do not appear in SSRCR W.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.69) = C

Comment [jsj69]: The requirement for decontamination of "personnel" is added, consistent with the requirement in 16.4.1.4.

Comment [jsj70]: Language is modified/added, consistent with 10 CFR 39.73.

Part 1 is included as there is reliance on this part for certain words used in Part 16, but not included in the definitions of Part 16.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.73) = C

Comment [jsj71]: The introductory language of 16.23 is updated consistent with 10 CFR 39.73 at the request of NRC.

NRC Letter 03/18/16.
NRC Compatibility = C

Comment [jsj72]: Language is added, consistent with 10 CFR 39.75.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility (39.75) = C

NOTIFICATION

16.25 Notification of ~~I~~incidents, ~~A~~abandonment, and ~~L~~lost ~~S~~sources.

16.25.1 ~~Notification of incidents and sources lost in other than downhole logging operations shall be made in accordance with appropriate provisions of 4.52 of these regulations.~~**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 4.51, 4.52, and 4.53.**

16.25.2 Whenever a sealed source or device containing radioactive material is lodged downhole, the licensee shall~~:16.25.2.1 M~~ **m**onitor at the surface for the presence of radioactive contamination with a radiation survey instrument or logging tool during logging tool recovery operations~~.; and~~

16.25.~~3~~2.2 Notify the Department immediately by telephone and subsequently within 30 days by confirmatory letter if the licensee knows or has reason to believe that a sealed source has been ruptured. This letter shall identify the well or other location, describe the magnitude and extent of the escape of radioactive material, assess the consequences of the rupture, and explain efforts being planned or taken to mitigate these consequences.

16.25.~~4~~3 **If a sealed source becomes lodged in a well, and** ~~W~~**w**hen it becomes apparent that efforts to recover the radioactive source will not be successful, the licensee shall:

16.25.4.1 Notify the Department by telephone of the circumstances that resulted in the inability to retrieve the source; and

(1) Obtain Department approval to implement abandonment procedures; or

(2) That the licensee implemented abandonment before receiving Department approval because the licensee believed there was an immediate threat to public health and safety; and

16.25.~~3~~4.2~~1~~ Advise the well **owner or** operator**, as appropriate,** of the **abandonment procedures under 16.4.1 or 16.4.3;** ~~regulations of the Department regarding abandonment and an appropriate method of abandonment,~~ which shall include:

(1) The immobilization and sealing in place of the radioactive source with a cement plug;

(2) The setting of a whipstock or other deflection device; and

(3) The mounting of a permanent identification plaque at the surface of the well, containing the appropriate information required by 16.25.6~~4~~; **and**

16.25.4.3 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.

16.25.~~5~~3.3 **The licensee shall,** ~~File a written report with the Department~~ within 30 days **after a sealed source has been classified as irretrievable, make a report in writing to the Department.**~~of the abandonment.~~ The licensee shall send a copy of the report to ~~the~~**each** appropriate State **or Federal** agency that issued permits or otherwise approved of the drilling operation. The report shall contain the following information:

16.25.5.1~~(1)~~ Date of occurrence;

16.25.5.2~~(2)~~ A description of the well-logging source involved, including the radionuclide and its quantity, chemical, and physical form;

16.25.5.3~~(3)~~ Surface location and identification of the well;

Comment [JJ73]: Provision modified, consistent with 10 CFR 39.77(b).

The provision adds specificity and clarity regarding notification of the department in the event of loss or theft of radioactive materials and under other circumstances.

The more specific/modified provision does not appear in SSRCR W.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = D

Comment [jsj74]: Current language is consistent with 10 CFR 39.77(a) but was reformatted to a higher level/stand-alone subsection for consistency with NRC rules.

The current rule structure required that the source be lodged "downhole" before the provision would be applicable since 16.25.2 would need to be true before 16.25.2.2 would apply. The revised formatting (e.g., making section 16.25.2.2 into 16.25.3 a "higher level" subsection) mandates that the provision apply regardless of whether a source rupture occurs downhole (or elsewhere) and eliminates a potential conflict with federal rule.

NRC Compatibility = C
NRC Letter dated 03/18/16.

Comment [jsj75]: Language is added, consistent with 10 CFR 39.77(c)

NRC Compatibility = C

Comment [jsj76]: Language is added, consistent with 10 CFR 39.77(c)(2).

NRC Compatibility = C

Comment [jsj77]: The language of subsections (1), (2), and (3) of 16.25.4.2 are retained from the current rule (and SSRCR W- 1991), although they do not appear in 10 CFR 39.77 as shown here. Provisions similar to (1), (2), and (3) appear in 10 CFR 39.15(5) [found in 16.4.1.5]. Section 16.4.1.5 contains cross-references to this section (16.25.4.2).

Retaining these provisions at the point of notification requirements and the application of emergency procedures is the preferred approach.

Comment [JJ78]: Language is added, consistent with 10 CFR 39.77(c)(3).

The provision requires that abandonment procedures be initiated within 30 days or for the licensee to request an extension as applicable.

The provision does not appear in SSRCR W.

The proposed language differs from SSRCR W (1991) but is more consistent with federal rule.

NRC Compatibility = C

Comment [jsj79]: Language is modified/added, consistent with 10 CFR 39.77(d)

NRC Compatibility = C

16.25.5.4~~(4)~~ Results of efforts to immobilize and seal the source in place;

16.25.5.5~~(5)~~ A brief description of the attempted recovery effort;

16.25.5.6~~(6)~~ Depth of the source;

16.25.5.7~~(7)~~ Depth of the top of the cement plug;

16.25.5.8~~(8)~~ Depth of the well;

16.25.5.9~~(9)~~ The immediate threat to public health and safety justification for implementing abandonment if prior Department approval was not obtained in accordance with **16.25.4.1(2)**~~16.25.3.2(1)~~;

16.25.5.10~~(10)~~ Any other information, such as a warning statement, contained on the permanent identification plaque; and

16.25.5.11~~(11)~~ ~~The names of~~ State **and Federal** Agencies receiving a copy of this report.

16.25.~~4~~**6** Whenever a sealed source containing radioactive material is abandoned downhole, the licensee shall provide a means to prevent inadvertent intrusion on the source, unless the source is not accessible to any subsequent drilling operations, and shall provide a permanent plaque[1] for posting the well or well-bore. This plaque shall:

1 An example of a suggested plaque is shown in Appendix 16B.

16.25.~~4~~**6**.1 Be constructed of long-lasting material, such as stainless steel, brass, bronze, or monel;

16.25.~~4~~**6**.2 Be mounted at the surface of the well, unless the mounting of the plaque is not practical;

16.25.~~4~~**6**.3 Be at least 17 cm (7 inches) square and 3 mm (1/8th inch) thick; and

16.25.~~4~~**6**.4 Contain the following information engraved on its face:

Comment [jsj80]: The language of subsections within 16.25.6.4 is updated for consistency with 10 CFR 39.15

(1) The word “CAUTION”;

(2) The radiation symbol **(the color requirement** ~~prescribed~~ in 4.27 **need not be met)**~~without the conventional color requirement~~;

(3) The date **the source was abandoned**~~of abandonment~~;

(4) The name of the well-operator or well-owner**, as appropriate**;

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

(6) **An identification of the**~~The~~ sealed source(s) by radionuclide and **quantity** ~~activity~~;

(7) The ~~source~~ depth **of the source** and the depth to the top of the plug; and

(8) An appropriate warning, depending on the specific circumstances of each abandonment.[2]

2 Appropriate warnings may include: (a) "Do not drill below plug-back depth"; (b) "Do not enlarge casing"; or (c) "Do not re-enter the hole", followed by the words, "before contacting the Colorado Department of Public Health and Environment, Hazardous Materials And Waste Management Division."

16.25.~~5~~**7** The licensee shall immediately notify the Department by telephone and subsequently by confirming letter if the licensee knows or has reason to believe that radioactive material

has been lost in or to an underground potable aquifer. Such notice shall designate the well location and shall describe the magnitude and extent of loss of radioactive material, assess the consequences of such loss, and explain efforts planned or being taken to mitigate these consequences.

PART 16, APPENDIX 16A:

SUBJECTS TO BE INCLUDED IN TRAINING COURSES FOR LOGGING SUPERVISORS

16A.1 Fundamentals of ~~R~~radiation ~~S~~safety **including:**

16A.1.1 Characteristics of radiation

16A.1.2 Units of radiation dose and quantity of radioactivity

16A.1.3 ~~Significance of radiation dose~~**Hazards of exposure to radiation**

~~(1) Radiation protection standards~~

~~(2) Biological effects of radiation dose~~

16A.1.4 Levels of radiation from sources of radiation

16A.1.5 Methods of **controlling and** minimizing radiation dose

(1) Working time

(2) Working distances

(3) Shielding

16A.1.6 Radiation safety practices including prevention of contamination and methods of decontamination

16A.2 Radiation ~~D~~**d**etection ~~I~~**i**nstrumentation ~~T~~**t**o ~~B~~**b**e ~~U~~**u**sed

16A.2.1 Use of radiation survey instruments **to include:**

(1) Operation

(2) Calibration

(3) Limitations

16A.2.2 Survey techniques

16A.2.3 Use of personnel monitoring equipment

16A.3 Equipment ~~T~~**t**o ~~B~~**b**e ~~U~~**u**sed **including:**

16A.3.1 ~~Handling equipment~~**Operation of equipment, including source handling equipment and remote handling tools**

16A.3.2 Sources of radiation

16A.3.3 Storage**,** ~~and~~ control**, and disposal** of ~~equipment~~**sources of radiation**

16A.3.4 ~~Operation and control~~**Maintenance** of equipment

16A.4 The Requirements of ~~P~~**p**ertinent Federal and State Regulations

Comment [jsj81]: For formatting purposes, a page break is inserted at the top of Appendix A.

Comment [jsj82]: Appendix 16A is amended for consistency with 10 CFR Part 39.61(e).

The proposed changes primarily involve minor wording changes and formatting.

NRC Compatibility = B

Comment [jsj83]: Provision 16A.1.3 is updated consistent with 10 CFR 39.61(e).

Language is updated/removed at the request of NRC in correspondence dated March 18, 2016 and differ from that in SSRCR Part W.

NRC Letter 03/18/16.
NRC Compatibility = B

~~16A.5 The Licensee's or Registrant's Written Operating and Emergency Procedures~~

~~16A.6 The Licensee's or Registrant's Record Keeping Procedures~~

16A.5 Case histories of accidents in well logging

Comment [jsj84]: Provision 16.A.5 and 16.A.6 are deleted consistent with 10 CFR 39.61.

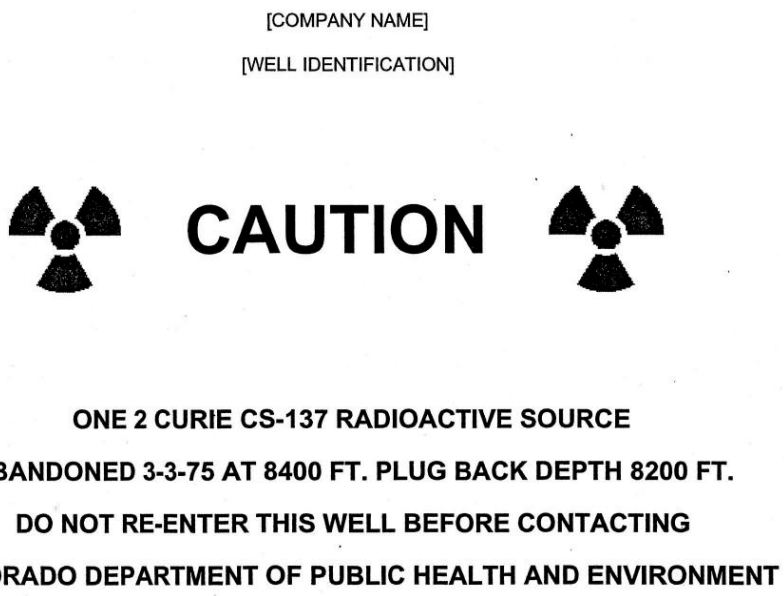
Language is updated at the request of NRC in correspondence dated March 18, 2016 and differs from SSRCR Part W which retains these provisions.

NRC Letter 03/18/16.
NRC Compatibility = B

Comment [jsj85]: For formatting purposes, a page break is inserted at the top of Appendix B.

PART 16, APPENDIX 16B:

EXAMPLE OF PLAQUE FOR IDENTIFYING WELLS CONTAINING SEALED SOURCES CONTAINING RADIOACTIVE MATERIAL ABANDONED DOWNHOLE



The size of the plaque should be convenient for use on active or inactive wells, for example, a 7-inch square. Letter size of the word "CAUTION" should be approximately twice the letter size of the rest of the information, for example, 1/2-inch and 1/4-inch letter size, respectively.

EDITOR'S NOTES

6 CCR 1007-1 has been divided into separate parts for ease of use. Versions prior to 04/01/2007 are located in the first section, 6 CCR 1007-1. Prior versions can be accessed from the All Versions list on the rule's current version page. To view versions effective on or after 04/01/2007, select the desired part of the rule, for example 6 CCR 1007-1 Part 01 or 6 CCR 1007-1 Part 10.

History