

May 12, 1998

**FOR:** The Commissioners  
**FROM:** L. Joseph Callan /s/  
Executive Director for Operations  
**SUBJECT:** RULEMAKING PLAN: ENERGY COMPENSATION SOURCES FOR WELL LOGGING AND CLARIFICATIONS - CHANGES TO 10 CFR PART 39

**PURPOSE:**

To inform the Commission of the staff's Rulemaking Plan to modify well-logging requirements to accommodate the use of new well-logging technology which should reduce the need for licensee exemption requests. The Rulemaking Plan has been revised to reflect Agreement State comments received on the May 28, 1997, draft Rulemaking Plan. Other changes are also being proposed to improve, clarify, and update 10 CFR Part 39 which may also reduce the need for licensee exemptions.

**BACKGROUND:**

In SECY-97-111 (May 28, 1997), the staff provided the Commission with a draft Rulemaking Plan to update Part 39 regulations. This update would incorporate newer technology used by well-logging licensees. This technology employs a low activity radioactive source referred to as an energy compensation source, or ECS. Well-logging licensees have identified concerns with the current well-logging requirements, which were written for high activity sources (i.e., in the curie range) and do not seem appropriate for an ECS.

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The draft Rulemaking Plan was sent to the Agreement States for comment on May 28, 1997 (SP-97-036). Comments were received from the States of Utah, Illinois, and Washington. In general, the three Agreement State commenters agree that the current regulations described in Part 39 need to be revised to reflect the use of ECSs. They provided specific information and comments that are discussed in the attached Rulemaking Plan.

**AGREEMENT STATE IMPLEMENTATION ISSUE:**

Agreement State licensees should benefit from these changes in a manner similar to U. S. Nuclear Regulatory Commission (NRC) licensees. In the course of this rulemaking, the NRC will evaluate each revision to determine its compatibility category or health and safety category in accordance with the new adequacy and compatibility policy approved in the Commission Staff Requirements Memorandum dated June 30, 1997.

**COORDINATION:**

The Office of the General Counsel has no legal objection to the Rulemaking Plan. The Office of the Chief Financial Officer has reviewed the Rulemaking Plan for resource implications and has no objection. The Office of the Chief Information Officer has reviewed the rulemaking plan for information technology and information management implications and concurs in it. However, the plan suggests changes in information collection requirements that must be submitted to the Office of Management and Budget at the same time the rule is forwarded to the Federal Register for publication.

**RESOURCES:**

Resources required to complete the rulemaking and implement the final rule are included in the current budget.

**RECOMMENDATION:**

It is recommended that the staff proceed with implementation of the attached Rulemaking Plan within ten days from the date of this paper.

L. Joseph Callan  
Executive Director for Operations

**Attachments:** 1. [Rulemaking Plan](#)  
2. Agreement State Comments

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ATTACHMENT 1

Rulemaking Plan

ENERGY COMPENSATION SOURCES FOR WELL LOGGING AND  
CLARIFICATIONS - CHANGES TO 10 CFR PART 39

## **Regulatory Problem**

The licensing and radiation safety requirements for well logging are provided in 10 CFR Part 39 (Part 39). The basic regulation was promulgated about 10 years ago. Since then newer technology has been developed that was not envisioned when the rule was written. The NRC staff is proposing to modify the existing regulations, as described below, to account for the newer technology. The change would reduce regulatory burden with minimal impact to public health and safety. In addition, there are other sections that should be changed to improve, clarify, and update Part 39.

The draft Rulemaking Plan was sent to the Agreement States for their comment on May 28, 1997 (SP-97-036). Comments were received from the States of Utah, Illinois, and Washington. These States generally supported the proposal and provided specific information and comments (see the section on Agreement State Implementation Issues).

## **Current Requirements and Proposed Changes**

The principal objective of the proposed rulemaking is to revise Part 39 to accommodate the low activity radioactive sources (i.e., microcurie range) that are now used in some well logging applications. When Part 39 was promulgated, well logging technology required drilling to stop, while parts of the drilling pieces were removed, before lowering a logging tool down a well. More recent technology, referred to as "logging while drilling," allows well logging to be accomplished during drilling. This technology employs a low activity radioactive source, known as an energy compensation source, or ECS. A second innovation separates the ECS and the logging tool from the larger well logging source to allow easier retrieval of the well logging source if the drill stem becomes unretrievable.

The ECS is a low activity source (less than 100 microcuries) compared to the normal 3-to-20 curie sources used in well logging. Because this has been an emerging technology, Part 39, originally promulgated in 1987, has no specific provisions for these low activity sources. Many of the requirements in Part 39, when applied to an ECS, are not necessary to protect public health and safety and the environment and may not be appropriate for an ECS. Because the existing regulations do not allow for variations based on the activity of the source, licensees who use an ECS must meet all the requirements of Part 39. Examples of unnecessary requirements deal with well abandonment (Sections 39.15 and 39.77), leak testing (Section 39.35), design and performance criteria for sealed sources (Section 39.41), and monitoring of sources lodged in a well (Section 39.69). The NRC staff is proposing that only sections dealing with physical inventory (Section 39.37) and records of material use (Section 39.39) should apply for the use of an ECS. Requirements established in other parts of NRC regulations (e.g., Parts 20 and 30) are still applicable to possession of byproduct material and are adequate to protect public health and safety and the environment.

Therefore, the NRC staff is proposing to modify the regulations in Part 39 to define an ECS and provide appropriate regulations for using ECSs in well logging. The most significant change would exempt an ECS from the costly procedures for well abandonment. Well abandonment, in addition to specific reporting and approval requirements, requires that the source be immobilized and sealed in place with a cement plug, that the cement plug be protected from inadvertent intrusion, and that a permanent plaque be mounted at the surface of the well. The NRC staff is proposing to implement less stringent standards for ECSs that are less than 3.7 MBq (100 microcuries). Current ECSs typically use up to 50 microcuries of Am-241. A preliminary assessment has indicated that no significant impact to public health and safety would result from this change. An Environmental Assessment will be prepared for this rulemaking.

The NRC staff is proposing several other changes to improve, clarify, and update Part 39 requirements.

1. Revise requirements for tritium neutron generator target sources containing less than 1,110 GBq [30 curies] of tritium. Tritium neutron generator sources typically contain less than 20 curies of tritium which is less hazardous than the typical cesium or americium sources currently being used in well logging applications. The tritium neutron generator target sources only produce a significant neutron stream when a voltage is applied.

For well logging applications, the NRC staff is proposing that the tritium neutron generator targets be subject to the requirements of Part 39 except (1) for the sealed source design and performance criteria (Section 39.41) and (2) the well abandonment procedures (Sections 39.15 and 39.77) when a surface casing is used (which is standard for oil and gas wells). As discussed below, the potential hazard of these sources does not warrant the existing requirements for well abandonment in the event that the source becomes lost. In addition, the requirements associated with sealed sources for well logging were not intended for tritium neutron generator target sources, but Part 39 does not make clear this intent or distinction.

Based on NRC staffs' preliminary assessment, the 30-curie limit would allow licensees flexibility in designing new sources of this kind while maintaining the tritium within an environmentally safe level. This should be confirmed in the staff's Environmental Assessment. These sources are used for logging oil and gas wells, which use surface casings to protect fresh water aquifers. Hence, the only potential exposure hazard these sources would present is to the workers and such exposure could only occur if the source were ruptured and the tritium were ingested in significant quantities. If a tritium source were lost, it would be contained within thousands of cubic feet of drilling mud. This drilling mud contains hazardous chemicals and is controlled and monitored as part of the drilling operations. Therefore, the NRC staff believes that eliminating costly requirements for these sources will not impact public health and safety.

2. Section 39.77 provides the requirements for notification and procedures for abandoning irretrievable well logging sources. This section specifies that NRC approval must be obtained prior to implementing abandonment procedures. In some circumstances, such as high well pressures that could lead to fires or explosions, the delay required to notify NRC may cause an immediate threat. This section should be modified to allow immediate abandonment without prior NRC approval if a delay could cause an immediate threat to public health and safety. The NRC would be notified after the fact.

3. Section 39.15 provides requirements for abandoning irretrievable sealed sources. This section would be modified to provide performance-based criteria for inadvertent intrusion on the source. This would allow licensees greater procedural latitude while continuing to ensure source integrity. The current requirements may be more restrictive than is necessary for licensees to protect an abandoned source, depending upon the individual well

abandonment. For example, if a significant amount of drilling equipment is abandoned with the well, this equipment may be effective in preventing inadvertent intrusion on the source but might not meet the requirements of Section 39.15.

Paragraph (a)(5)(ii) of Section 39.15 has prescriptive requirements for irretrievable well logging sources, specifying the use of a mechanical device to prevent inadvertent intrusion on the source, at a specific location within the abandoned well. The NRC staff is proposing that licensees "prevent inadvertent intrusion on the source," which would require that the source be protected but allow licensees the flexibility to determine the best method. This proposed change would not affect the requirement in (a)(5)(i) for a well logging source to be immobilized with a cement plug or the requirement in (a)(5)(iii) for a permanent plaque.

4. The NRC issued a generic exemption from the current design and performance criteria for sealed sources in 1989. This exemption allows the use of older sealed sources, that have not demonstrated that they meet current criteria, to be used for well logging. This exemption is currently in use, but is not included in Part 39. The regulations would be modified to make this existing procedure an NRC regulation.

Sealed sources that were manufactured before July 14, 1989, may use design and performance criteria from the United States of America Standards Institute (USASI) N5.10-1968 or the criteria in Section 39.41. The use of the USASI standard is based on an NRC Notice of Generic Exemption issued on July 25, 1989 (54 FR 30883). Sealed sources manufactured after July 14, 1989 had to continue to meet the requirements of Section 39.41. NRC regulations have not incorporated the USASI N5.10-1968 requirements for older sealed sources. The primary difference between the two standards is that the new standard includes a vibration test that was included for consistency with international standards. The USASI standard considered a vibration test and concluded that, to pass the other requirements, the source would be so rugged there was no reason to include a vibration test.

The exemption to allow the use of the USASI standard was to avoid a situation in which well logging licensees might be unnecessarily forced out of business and have to dispose of their sources because the original source manufacturers failed to demonstrate that these sources meet criteria that became effective in 1989. The NRC determined that sealed source models subject to the USASI standard would not adversely affect public health and safety. Because many of these older sealed sources contain radioactive material with half-lives that allow their continued use (i.e., cesium-137 and americium-241 have half-lives of 30 and 458 years respectively), this modification to the regulations is appropriate.

5. Section 39.35 specifies leak testing requirements for sealed sources, and paragraph (e) specifies exemptions from the testing requirements. The existing leak testing requirements would be amended to clarify that they apply to the radiation that is capable of escaping an intact source capsule, rather than the radioactive element or material itself contained within that capsule. For example, although Am-241 emits both alpha and gamma radiation, when encapsulated in stainless steel (e.g. an ECS source) only the gamma radiation can pass through the capsule and therefore such sources would be exempt from leak testing if it contains less than 3.7 MBq (100 microcuries).

6. Sections of Part 39, that contain dates that have passed, would be updated to reduce confusion. Sections 39.33 and 39.49 contain requirements that were dependent upon dates that have passed and are no longer appropriate. For clarity and to avoid confusion, these sections should be updated to remove requirements that are no longer appropriate.

7. Sections 39.15, 39.33, 39.35, and 39.41 of Part 39 will be updated to conform with the agency's metric policy by stating parameter values in dual units with metric units first and with English units in brackets.

#### **Assessment of Impacts on Licensees and Cost Effectiveness**

This rulemaking would provide relief to NRC and Agreement State licensees who use an ECS or a tritium neutron generator target for well logging without a significant impact on health and safety, as NRC staff should confirm in the development of the Regulatory Analysis and Environmental Assessment. Other revisions to Part 39 would reduce confusion regarding generic exemptions, leak testing, and unnecessary dates, and may reduce costs, for NRC and Agreement State licensees.

A review of some typical well abandonments has shown that wells have been abandoned with only the ECS present at costs that range from hundreds of thousands of dollars to over a million dollars. Since NRC resources to amend 10 CFR Part 39 are estimated to be about one staff year, this is a cost effective one-time use of resources.

#### **OGC Analysis**

The principal objective of the proposed rule is to change the current regulations to reflect the use of new technology that allows logging operations to be done concurrently with drilling. This rule would more appropriately regulate low activity energy compensation sources. The rule would modify the abandonment procedures for inadvertent intrusion on the source using performance-based criteria, modify the abandonment procedures for tritium neutron generator target sources to avoid costly abandonments since this hazard does not warrant the use of the existing procedures, and modify well abandonment procedures when an immediate threat to public health and safety is involved. The proposed rule would also update sections of 10 CFR Part 39 that contain dates which have passed and conform Part 39 with the Commission's metric policy. OGC does not believe this action constitutes a "major rule" pursuant to the Small Business Regulatory Fairness Enforcement Act of 1996. OGC believes that the rule does not constitute a backfit pursuant to 10 CFR 50.109; therefore, a backfit analysis is not necessary. However, OGC believes that the NRC staff must develop an environmental assessment pursuant to 10 CFR 51.21 and an OMB Clearance Package. In all other respects, OGC has not identified any potential legal complications or known bases for a legal objection to the rulemaking.

#### **Agreement State Implementation Issues**

Agreement State licensees should benefit from these changes in a manner similar to NRC licensees. In the course of this rulemaking, the NRC will

evaluate each revision to determine its compatibility category or health and safety category in accordance with the new adequacy and compatibility policy approved in the Commission SRM dated June 30, 1997.

In general, the three Agreement State commenters agree that the current regulations described in Part 39 need to be revised to reflect the use of ECSs. Following are the more significant comments and responses.

**Comment:** The State of Illinois argued that ECSs with activities exceeding 100 microcuries for beta/gamma emitters or 10 microcuries for alpha emitters should be leak tested and therefore ECSs should not be given a categorical exemption. The State of Washington commented that tritium sources have been known to leak and that proper monitoring of these sources should be required.

**Response:** The NRC staff intends to define an ECS as having 100 microcuries or less of radioactive material and therefore an ECS will be exempt from the existing leak testing requirements of section 39.35 (see 39.35(e)). If a source has more than 100 microcuries it will not meet the definition of an ECS or the exemption criteria in section 39.35(e). Based on design requirements, ECSs will not include alpha emitters.

The NRC does not, and has not, required leak testing of any tritium sealed sources. Section 39.35(e) specifically exempts all tritium sealed sources used in well logging. At this time, the NRC staff has no additional information that would require NRC to reexamine the existing regulation.

**Comment:** The State of Illinois believes that some degree of protection is necessary for ECSs lost near the surface.

**Response:** The NRC staff intends to build into the regulations separate provisions for ECSs based on whether a surface casing is used or not. Surface casings are used to protect fresh water aquifers from contamination and are extensively used in oil and gas exploration. When surface casings are not used, more rigorous recovery operations will be required (see Section 39.51.)

At this time the staff believes that a surface casing will provide adequate near surface protection. The Environmental Assessment to be prepared will determine if there is a risk that warrants additional measures.

**Comment:** The State of Illinois does not believe that ECSs should be categorically excluded from design and performance criteria for sealed sources. The State of Utah, on the other hand, suggests that ECSs should be exempt from Part 32 (Section 32.210 discusses registration of sealed sources).

**Response:** Although the NRC staffs intends to exclude ECSs from the rigorous design and performance criteria in Part 39, the ECSs will still need to meet the licensing requirements of Section 30.32(g) (which references Section 32.210) which require more general design and performance requirements. The NRC staff believes this is a reasonable requirement for these sources.

**Comment:** Both the States of Illinois and Washington believe that the example that was used in the draft Rulemaking Plan comparing the radioactive sources in ECSs and gas and aerosol detectors as a basis for exempting ECSs is inappropriate.

**Response:** The NRC staff was not trying to justify the exemption based on this comparison, and will remove it from the Rulemaking Plan. The Environmental Assessment, to be prepare as part of this rulemaking, will assess whether ECSs can be safely exempted from the requirements of Part 39.

**Comment:** The State of Illinois commented that neutron generator devices containing tritium targets also require above-ground testing for operability and calibration and can produce radiation levels constituting "High Radiation Areas." The State argues that the revised regulations should allow testing and operation of such devices provided procedures are in place to monitor radiation levels and ensure that adequate safety procedures are in place and implemented.

**Response:** The NRC staff agrees with this concept. Tritium sources will remain subject to Section 39.63 -- Operating and emergency procedures.

**Comment:** The State of Illinois raised some concerns about some sources meeting the USASI standards. They noted an event where a source experienced damage due to vibration within a source holder. Specifically, vibration of a sealed source within a source holder may have led to a loss of containment. Therefore, the assumption that sources built under the USASI standard would be so rugged so as to preclude a public health and safety problem has been called into question. The State also suggested that how sealed sources may be loaded into source holders has not been thoroughly evaluated and suggested that the NRC may wish to consider the source and source holder combination.

**Response:** The NRC staff understands that the problem identified was not related to the USASI standard, but an improperly assembled source holder. There was no loss of containment. The vibration test is not designed to account for an improperly loaded source. Historically, the NRC has not regulated source holders or the well logging devices in which the source holders or sources are placed. The staff also notes that there has been no history of problems with the source and source holder combinations. The staff has concluded that no rule change is necessary, and in any event, the comment is beyond the scope of this rulemaking.

## Supporting Documents

This rulemaking would require a Regulatory Analysis that would identify and estimate the relevant values and impacts likely to result from this action. The Regulatory Analysis would estimate the cost savings to licensees for each of the proposed changes and compare this to the potential impacts to public health and safety. The staff has used a risk informed approach to the burden reductions proposed in this rulemaking. The information provided in the Regulatory Analysis for each change concerning the impact on small entities would be sufficient to support a Regulatory Flexibility Analysis or a certification that the proposed rule would not have a significant economic impact on a substantial number of small entities.

No backfit analysis will be needed because the rulemaking would not affect Part 50 licensees. An OMB Clearance Package will be needed because the

rulemaking is expected to reduce reporting or recordkeeping requirements.

An Environmental Assessment would be needed to show, as NRC staff currently believe, that there is no significant impact to public health and safety in treating an ECS or a tritium neutron generator target with less stringent regulatory requirements than the larger well logging sources and the other changes discussed. This information would be needed in the development of the Regulatory Analysis.

The consolidated regulatory guidance project will incorporate all necessary guidance for well logging licensees into NUREG-1556, "Consolidated Guidance About Materials Licenses, Program Specific Guidance About Well-Logging Licenses." The staff will coordinate the publication dates for the draft and final NUREGs with the publication dates for the draft and final rule. However, the changes proposed in this rulemaking should have a minimal impact to this NUREG.

The change proposed for Section 39.77 allowing flexibility during an emergency for abandoning irretrievable well logging sources may impact the procedures of the NRC Emergency Operations Center. If necessary, appropriate changes will be made during the rulemaking. Other changes that might impact inspection and enforcement procedures will be updated during the rulemaking.

## **Resources**

The estimated resources to complete this rulemaking would be about one staff year divided among RES, NMSS, Region IV, and OGC.

Contractor support will be expended to assist in preparing the Environmental Assessment and the Regulatory Analysis. NRC staff estimates this effort at about \$50,000.

These resources are included in the current budget.

## **Staffing**

### **Project Management**

NMSS - Mark Haisfield

### **Concurring Official**

Carl Paperiello

### **Technical Support**

NMSS - Bruce Carrico

Carl Paperiello

Region IV - Anthony Gaines

Ross Scarano

OGC - Maria Schwartz

Stuart Treby

## **Steering Group**

No steering group will be used on this rulemaking. The working group is identified above.

## **Enhanced Public Participation**

This rulemaking will use the NRC electronic bulletin board on the NRC's web page on the Internet. This bulletin board will be used as a mechanism to enhance public dialogue. This bulletin board allows users to submit comments electronically as well as review comments and questions submitted by others, and provides a mechanism for NRC to respond electronically, where appropriate.

## **EDO or Commission Issuance**

It is recommended that the EDO issue the proposed and final rule. This action does not constitute a significant question of policy, and falls within the EDO's authority. If significant policy issues are raised during the public comment period, a SECY Paper will be prepared for the final rule.

## **Schedules**

Draft Rulemaking Plan for Office concurrence	March 1997
Draft Rulemaking Plan to the Agreement States and CRCPD for comment, and SECY Paper to the Commission for information	June 1997
SECY Paper, including Rulemaking Plan, with disposition of Agreement State comments for Office concurrence	November 1997
SECY Paper, for approval of Rulemaking Plan, to EDO	May 1998
Proposed Rulemaking package to the EDO (And OMB clearance package for submittal to OMB)	9 months following EDO approval of the Rulemaking plan
Final Rule to the EDO	6 months following expiration of the 75-day comment period