

AB 35-1
PDR

PRELIMINARY REGULATORY ANALYSIS

10 CFR Part 39

LICENSES AND RADIATION SAFETY REQUIREMENTS FOR WELL-LOGGING OPERATIONS*

1. STATEMENT OF THE PROBLEM

Existing Commission regulations do not specify detailed safety requirements governing the use of licensed material in well-logging operations. Some general requirements pertaining to well-logging operations are addressed in 10 CFR Parts 20, 30, and 70. Because about 50,000 wells are logged each year (total in both the Agreement States and non-Agreement States) in the oil, gas and mineral industry and about 5,000 workers are involved in these operations, a uniform set of radiation safety requirements in the Commission's regulations appears necessary. At present, the Commission specifies safety requirements for these operations as license conditions for 173 NRC licensees (as of November 1984).

Typical radioactive sources used in well-logging operations include sealed sources containing americium-241 (0.25 curie to 20 curies) and cesium-137 (2 to 3 curies); and millicurie quantities of short-lived tracer materials to label well fluids.

A major problem with the current practice is that radiation safety requirements applicable to the industry are specified as license conditions on a case-by-case basis rather than spelled out in uniform regulations that are applicable to all licensees. This requires duplication of effort and allows for discrepancies in requirements among the specific licenses issued by NRC and the Agreement States. Problems in the consistent and uniform application of these requirements could become a greater concern because, under the NRC's program for the

* 50 FR 13797, April 8, 1985

decentralization of material licensing actions, well-logging licenses are issued by the five NRC Regional Offices instead of NRC Headquarters.

In response to concerns expressed by several States with extensive oil and gas activities, a task force was established by the Conference of Radiation Control Program Directors to develop a set of radiation safety requirements for use of radioactive material in well-logging operations. The task force was composed of representatives from the States, the affected industry, and federal agencies, including the NRC. In keeping with previous practices of the organization, the Conference adopted these requirements as Part W of the "Suggested State Regulations for Control of Radiation" (SSRCR). The States of Arkansas, Kentucky, Oregon, and Texas have already adopted Part W requirements as State regulations without substantive changes. Other Agreement States are also considering adopting Part W requirements. Because many well-logging companies operate in both Agreement and non-Agreement States, compatible NRC requirements are needed to ensure uniformity between NRC and the Agreement State regulations.

Though there are about 50,000 well-logging operations each year, the probability of an accident is very small. Nonetheless, accidents have occurred and additional safety requirements are needed to reduce the likelihood of an accident even further. There were five incidents which occurred between August 1982 and September 1983 involving radioactive sources used in well-logging operations. Three incidents involved the rupture of sources in uncontrolled workshop environments by workers performing machining or drilling operations. Two incidents involved the rupture of sources in well holes during logging tool recovery operations. The cost associated with the cleanup of radioactive material from these incidents is estimated to be in excess of 1.5 million dollars.

2. OBJECTIVES

This regulatory action focuses on the following objectives:

- to provide a comprehensive and consistent set of regulations to ensure radiation safety;

- to maintain compatibility between the NRC and the Agreement States in regulating these operations:
- to reduce the likelihood of an accident involving radioactive material.

3. ALTERNATIVES

The alternatives considered were as follows:

3.1 Maintain the Status Quo

This alternative was not adopted because it would not provide a comprehensive and consistent regulatory framework of safety requirements for well-logging operations. Further, licensees and the public would not have an opportunity to provide comments to the NRC's requirements or any additional amendments. Also, the alternative makes the reciprocity with Agreement States more difficult because the safety requirements could be different.

3.2 Promulgate a New Part in NRC Regulations Based on Part W

This alternative was adopted because:

- it provides a sound regulatory base because Part W was adopted by four Agreement States and used successfully;
- it provides compatibility with the Agreement States safety requirements and thus provides a simple mechanism for reciprocity;
- it provides licensees with the opportunity to suggest modifications of the regulations.
- it provides a single location for safety requirements for using byproduct, source and special nuclear material in well-logging operations.

3.3 Amend Parts 30, 40, and 70 Based on Part W

The alternative was not adopted because:

- the safety requirement would be fragmented and thus, more confusing when used by licensees or NRC licensing reviewers and inspectors;
- many requirements would have to be repeated in two or three Parts.

4. CONSEQUENCES

4.1 Costs

4.1.1 NRC Operations

Anticipated costs to the NRC are expected to be low for this action. An estimated one-time cost of 1/2 professional staff-year (\$50,000) effort will be needed to support this rulemaking activity. Additional costs include the cost of publication of the Federal Register Notices of Proposed and Final Rulemaking.

4.1.2 Other Government Agencies

Agreement States would be asked to review the proposed rule. Each review would require a total estimated staff time of 8 hours. For the 27 Agreement States, the total one-time review effort is estimated at approximately 200 person-hours (\$10,000).

4.1.3 Industry

Approximately 170-180 licensees of the Commission would be affected by this proposed action. The number of licensees is not expected to vary substantively in the near future. Each licensee would be required by the regulation to implement the requirements in the areas of personnel safety, working practices, operating procedures and equipment. The total cost for implementation of all requirements, if they were being implemented for the first time, would be approximately \$1.3 million per year for NRC licensees or approximately \$7,400

per licensee per year as shown in Table 1. However, most requirements are already applied as licensing conditions; thus, the increase in cost to the affected licensees from this action would be approximately \$350,000 per year for NRC licensees or approximately \$2,000 per licensee per year.

4.1.4 Public

There would be no associated cost to the public from this action.

4.1.5 Total Cost

The total cost of the proposed rule is comprised of the sum of NRC costs, the costs of other Government Agencies, and Industry costs. The NRC and other Government Agencies costs are one-time costs that occur at the beginning of the rulemaking cycle; therefore these costs can be added directed into the total cost. However, the Industry costs are presented in terms of cost/licensee/year or annual cost. Thus these costs must be summed over a number of years and added to the NRC and other Agency costs to obtain the total cost. The accepted way to aggregate these annual costs is to use the "present Value Discounting" method (this method is described in NUREG/CR-3568 pp.C.1 - C.5). The Present Value of this stream of annual costs equals (the number of licensees) X (cost per licensee) X (the present value discount factor). In the case, we will assume a real discount rate of 10% and a time period of 20 years, which gives a present value discount factor of 8.51. Therefore, the stream of annual Industry costs equals $180 \times 2000 \times 8.51$ or \$3 million in constant dollars for a time period of 20 years. And the total cost of this rule would be the sum of NRC costs, other agencies costs and the present value of the stream of annual Industry costs, or $\$100,000 + \$10,000 + \$3,000,000 = \$3,110,000$ for 20 years.

4.2 Benefits

4.2.1 NRC Operations

The benefits from this action are:

TABLE 1 Total Industry Cost for Implementing Part 39

Section	Content	Costs				Remarks
		Unit cost (or time)	Freq/yr/unit	No. of units (or units/yr)	Total cost/yr	
39.1 - 39.11	General Provisions	-----	No Cost	-----	-----	1. Administrative procedure. 2. Assumes 2,000 workers operate under NRC licenses.
39.13	Specific License - Internal Inspec- tion.	1 hr/Insp.	1/yr	2000 persons	\$60,000	Assumes \$30/hr.
39.15	Written Agreement	-----	No Cost	-----	-----	Currently required in Parts 30 and 70.
39.31	Labels, etc	-----	No Cost	-----	-----	Currently required in Parts 20 and 71.
39.33	Detection Instruments - High Sensitivity Instruments	\$500/event	--	20 events/yr	\$10,000	1. Survey instruments are currently required by Part 20. 2. Assumes 20 events per year that require consultant with high sensitivity instrumentation (unit cost includes transportation of the consultant).
39.35	Leak Test	\$40/ leak test	2/yr	1800 sources	\$144,000	1. Currently required as license condition. 2. Assumes 180 NRC licensees with an average of 10 sources per licensee.

TABLE 1 (Continued)

Section	Content	Costs				Remarks
		Unit cost (or time)	Freq/yr/unit	No. of units (or units/yr)	Total cost/yr	
39.37	Physical Inventory	6 min/ source	2/yr	1800 sources	\$11,000	1. Currently required as license condition. 2. Assumes \$30/hr.
39.39	Utilization Record	3 min/ use	--	20,000 uses/yr	\$30,000	1. Currently required as license condition. 2. Assumes 20,000 well- logging operations were performed by NRC licensees (\$30/hr).
39.41	Sealed Source Performance - New Source	\$300/ source	0.1 (10 yr life)	1800 sources	\$54,000	1. Most sources manufactured after 1968 comply with the requirement. 2. Assumes 10 years life for each source.
	- Old Source	\$500/source	0.3 (replace in 3 years)	20 sources	\$3,000	1. Assumes 20 cesium sources, which can not meet the requirements, must be replaced.
39.43	Inspection and Maintenance					1. Currently required as license condition.
	- Daily	10 min/day	--	10,000 days/yr	\$50,000	2. Assumes \$30/hr.
	- Semi Annually	30 min/ source	2/yr	1800 sources	\$54,000	
39.45	Tracer Studies - glove, clothing	\$10/study	--	5,000 studies/yr	\$50,000	1. Currently required as license condition. 2. Assumes 25% of the 20,000 well-logging operations involving tracer studies.

TABLE 1 (Continued)

Section	Content	Costs				Remarks
		Unit cost (or time)	Freq/yr/unit	No. of units (or units/yr)	Total cost/yr	
39.49	Sinker Bars	\$10/sinker bars	0.2/yr (5 yr life)	100 sinker bars	\$200	Assume 10% of NRC licensees and 6 sinker bars/licensee.
39.51	Wells without Surface Casing	\$20/event	--	200 events/yr	\$4,000	1. Assumes 1% of 20,000 well logged are uncased.
39.61	Training - formal training	\$1,000/ person	0.25/yr (4 yr period)	2,000 persons	\$500,000	1. Currently required by Parts 19.12 and 30.33(a)(3) and as licensing condition.
	- annual retraining	\$100/ person	1/yr	2,000 persons	\$200,000	2. Assumes 2,000 workers operate under NRC licenses.
[∞] 39.63	Operating and Emergency Procedures	100 hr/ licensee	0.1/yr (10 yr life)	180 licensees	\$108,000	1. Currently required as license conditions. 2. Assumes \$60/hr for developing procedures.
39.65 - 39.67	Monitoring and Survey	-----No Cost-----				Currently required by Part 20.
39.69	Contamination Control (continous monitoring)	10 hr/ event	--	100 events/yr	\$30,000	1. Assumes 100 events of source recovery. 2. Assumes \$30/hr.
39.71	Security	-----No Cost-----				Currently required by Part 20.

TABLE 1 (Continued)

Section	Content	Costs			Remarks	
		Unit cost (or time)	Freq/yr/unit	No. of units (or units/yr)		
39.73 - 39.75	Documents	\$100/ licensee	--	180 licensees	\$18,000	Currently required as license condition.
39.77	Notification, Abandonment	-----	No Cost	-----	-----	Currently required by Parts 20, 30, and 70.
39.91	Exemptions	-----	No Cost	-----	-----	Administrative procedure.
				Total cost	\$1,326,000	
				Already required	\$ 975,000	
				Net cost for implementing the rule	\$ 351,000	

$$\text{Total cost/licensee} = \frac{\$1,326,000}{180} = \$7,400$$

$$\text{Net cost/licensee} = \frac{\$351,000}{180} = \$2,000$$

- providing a comprehensive and consistent set of regulations to assure radiation safety;
- maintaining compatibility between the NRC and the Agreement States in regulating these operations;
- encouraging the Agreement States to adopt similar regulations;
- providing a consistent regulatory program for all 5 NRC Regional Offices in administrative licensing and enforcement programs.

4.2.2 Other Government Agencies

Publication of the proposed and final rules would be cost reimbursable to the Government Printing Office by the NRC.

Agreement States would be able to, with a minimum effort, allow NRC licensees to conduct well-logging operations in their jurisdictions since the Federal and State Regulations would be compatible.

4.2.3 Industry

The benefits to the industry are:

- having a comprehensive set of requirements in the regulations with the opportunity to suggest modifications;
- minimizing the effort required to obtain reciprocity for NRC licensees to operate in Agreement State or vice versa.
- minimizing the likelihood of an accident involving radioactive material.

4.2.4 Public

The public would benefit from a comprehensive and consistent program that would assure radiation safety.

4.3 Impacts on Other Requirements

The existive regulations on the irretrievable well-logging sources (10 CFR 30.56 and 70.60) would be removed. These requirements would be consolidated in this rulemaking.

4.4 Constraints

There are no constraints on this proposed rulemaking.

5. DECISION RATIONAL

An assessment of the costs and benefits of the proposed rule leads to the conclusion that there will be a positive impact from the uniformity of safety requirements for well-logging operations. Costs associated with this action would be negligible. Therefore, the proposed action is recommended.

6. IMPLEMENTATION

No implementation problems are expected. The proposed regulations are similar to the Part W of the Suggested State Regulations which has been developed by representatives from industry, States and Federal agencies, including NRC. Public comments during the proposed rulemaking are expected to be supportive of the intent of these proposed rules.