REGULATORY ANALYSIS
FOR
AMENDMENT TO
10 CFR 30: RULES OF GENERAL APPLICABILITY TO DOMESTIC LICENSING OF BYPRODUCT MATERIAL
FOR
SECURITY REQUIREMENTS FOR PORTABLE GAUGES

I. STATEMENT OF THE PROBLEM AND OBJECTIVE:

Portable gauges are devices containing licensed material that are used to determine physical properties such as density and moisture content of soil, concrete, and other materials in a field setting. The most typical specifically licensed portable gauge in use today contains two sources of radioactive materials: a sealed gamma source containing 0.30 to 0.37 gigabecquerels (8 to10 millicuries) of cesium-137 (Cs-137) used for density measurement and a sealed neutron source containing 1.48 to 1.85 gigabecquerels (40 to 50 millicuries) of americium-241/beryllium (Am-241/Be) used for moisture content measurement. Other radioactive materials have also been utilized in portable gauges.

There are approximately 1100 U.S. Nuclear Regulatory Commission (NRC) portable gauge specific licensees and an additional 4000 Agreement State specific licensees. Since portable gauge licensees often possess multiple portable gauges under the same license, there are an estimated 22,000 to 25,000 portable gauges in use in the United States. Reports in the NRC's Nuclear Materials Events Database (NMED) reveal that there have been approximately 450 gauges stolen since 1990. It is true that the number of incidents reported per year is small when compared to the total number of gauges in use, that the amount of radioactive material in a portable gauge is relatively small, and that the radioactive material is encapsulated in stainless steel. Nevertheless, unauthorized removal or theft of a portable gauge still poses a concern for public health and safety and/or the environment, especially, if the gauge is abandoned, is inadvertently recycled, or is used inappropriately.

Under the proposed action, NRC would amend its regulations to include specific security requirements for handling portable gauges in order to reduce the opportunity for unauthorized removal or theft of gauges. The final rule would require a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal whenever portable gauges are not under the control and constant surveillance of the licensee.

This rule would apply to a licensee with a portable gauge regardless of the location, situation, and activities involving the portable gauge. At all times, the licensee would be required to either maintain control and constant surveillance of the portable gauge or use a minimum of two independent physical controls to secure the portable gauge.

II. EXISTING REGULATORY FRAMEWORK:

Specific licenses for portable gauges are governed by NRC regulations in 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material." However, other NRC requirements in 10 CFR Parts 2, 19, 20, 21, 71, 150, 170, and 171 also apply to a portable gauge licensee. In addition, all such portable gauge licensees must also comply with other applicable Federal, State, and local regulations (e.g., Department of Transportation regulations, zoning requirements for a storage location, etc.). At present, NRC reviews a licensee's program as described in the license application, and incorporates certain requirements into the license as license conditions. Equivalent State regulations apply to Agreement State portable gauge licensees. Agreement States follow a similar approach as NRC. In addition, certain Agreement States, such as Florida, have specific additional requirements in their regulations for the possession and use of sealed sources in portable gauges. Other States, including Texas and Washington, have issued orders imposing specific additional requirements for their portable gauge licensees.

III. IDENTIFICATION AND PRELIMINARY ANALYSIS OF ALTERNATIVES:

A working group was formed in August 2002, to explore various options and requirements for the rulemaking. Personnel from the Agreement States of Florida and Arkansas participated as members of the working group along with NRC program offices and one Regional representative. The working group has discussed and evaluated various options such as: no action, only issue guidance, require physical controls, prohibit unattended storage of portable gauges in or on vehicles, prohibit unattended storage at locations other than licensed facilities, and require use of a metal enclosure and a lock with a shielded/protected shackle. These options were grouped into three major alternatives.

Alternative (1) -- No rulemaking alternative. Under the no rulemaking alternative, the NRC would rely on the current regulations on domestic licensing of byproduct material and specific guidance on portable gauge licenses. This alternative would require no current resources to conduct a rulemaking. However, resources for reporting, recovery, and investigation of stolen gauges will continue to be expended by the licensee, and local, state, and federal regulatory and law enforcement agencies. Within this alternative, NRC may issue a policy statement or revise existing guidance to emphasize the need for securing portable gauges. Resources for issuing a policy or guidance would be much less than for a rulemaking. It is estimated to be less than 0.5 full-time equivalent (FTE). However, this approach would not be as effective as rulemaking because policy and guidance are not legally binding. In addition, Agreement States are not required to adopt such policy or guidance into their regulatory programs.

Alternative (2) -- Amend NRC regulations to adopt more specific and more prescriptive requirements such as the use of a permanently installed enclosure and locks with shielded/protected shackles to secure specifically licensed portable gauges. Another example would be to prohibit the unattended storage of portable gauges in or on vehicles or at locations other than licensed facilities. These more prescriptive requirements would clearly delineate exactly what is required for the security and control of portable gauges. For these prescriptive requirements, licensees may be required to modify their existing vehicles used for transporting portable gauges and to purchase new locks for securing these gauges. If unattended storage would be prohibited, licensees may be required to return the portable gauge each day to a licensed facility or to an alternate location for storage. Specific requirements would be applied uniformly to licensees without consideration of differing practices and operating situations that may exist. Although alternative (2) provides less degree of flexibility than alternative (3), it is anticipated that it would further reduce the number of stolen gauges than alternative (3).

This alternative would require the development of a proposed rule followed by a final rule. Public involvement would be through the publication of the proposed rule in the Federal Register for notice and comment as provided by the Administrative Procedure Act. The resources needed in the development of a rulemaking would be higher than the current staff resources. NRC staff resources needed for this alternative are estimated to be 1.7 FTE staff years.

Alternative (3) -- Amend NRC regulations in 10 CFR 30.34 to require licensees to use a minimum of two independent physical controls that form tangible barriers to secure specifically licensed portable gauges from unauthorized removal, whenever the portable gauges are not under the control and constant surveillance of the licensee. This alternative would be consistent with the NRC goal of a performance-based regulatory approach. Under this alternative, each licensee would have the flexibility of selecting the two controls that are most suitable for its current practices. If necessary, a licensee could use different controls that are more appropriate for its specific job operations.

Although the term "unauthorized removal" can describe situations other than theft, the estimated benefit of the rulemaking is primarily focused on the reduction of theft of portable gauges. This alternative, similar to alternative (2), would require the development of a proposed rule followed by a final rule. Public involvement would be through the publication of the proposed rule in the Federal Register for notice and comment as provided by the Administrative Procedure Act. The resources needed in the development of a rulemaking would be higher than the current staff resources. NRC staff resources needed for this alternative are estimated to be 1.7 FTE staff years.

IV. ESTIMATION AND EVALUATION OF VALUES AND IMPACTS OF ALTERNATIVES:

The NRC staff has evaluated each attribute listed in Chapter Five of the *Regulatory Analysis Technical Evaluation Handbook*, NUREG/BR-0184. Alternative (1) would have no or minimal impact to the current situation and is considered as a baseline for comparing with other alternatives. Both alternatives (2) and (3) would require controls to reduce the opportunity for unauthorized removal or theft of specifically-licensed portable gauges. Alternatives (2) and (3) would also amend existing regulations through a rulemaking process that would have cost impacts. With the number of stolen gauges expected to decrease, alternatives (2) and (3) would have some positive impacts. Each attribute is summarized in Table 1 below, and then followed by a more detailed discussion on the impacted attributes.

Table 1: List of Attributes and their Impacts

Attribute	Potential Impact for Alternatives (2) and (3)
Public Health (Accident/Event)	May reduce the number of stolen gauges that an individual may be exposed to.
Public Health (Routine)	No impact.
Occupational Health (Accident)	No health impact expected to workers due to stolen gauges or consequent recovery operations.
Occupational Health (Routine)	No impact.
Offsite Property	May reduce the number of stolen gauges that may be abandoned and could potentially damage property.
Onsite Property	No impact.
Industry Implementation	Cost increase to install added controls. Cost avoidance due to reduction in number of stolen gauges requiring recovery operations, replacement, or potential cleanup.
Industry Operation	For alternative (3), slight cost increase due to the use of additional physical controls. For alternative (2), larger cost increase due to the use of more stringent controls and due to the need to return gauges to a storage location each day.
NRC Implementation	Cost associated with rulemaking activities.
NRC Operation	No significant impact to routine inspection due to added controls. Certain cost avoidance due to potential reduction in number of stolen gauges that need investigation and recovery operations.
Other Government	Cost impact to Agreement States due to the need to adopt the essential objectives of the program elements. Certain cost avoidance to various agencies due to potential reduction in number of stolen gauges that need investigation and recovery operations.

Attribute	Potential Impact for Alternatives (2) and (3)
General Public	No significant impact.
Improvements in Knowledge	May improve general knowledge of licensees and the public through rulemaking process where examples and expectations are addressed.
Regulatory Efficiency	May improve general knowledge of licensees will enhance regulatory efficiency.
Antitrust Consideration	No Impact.
Safeguards and Security Consideration	Not a safeguard concern.
Environmental Consideration	Reduction in the number of stolen gauges may also reduce the number of gauges being abandoned in the environment.

COSTS

The two primary costs associated with alternative (2) or (3) are -- (1) implementation cost to the industry in installing the required physical controls for the portable gauges; and (2) resources spent by both NRC and Agreement States on development and implementation of the rule. Additionally, for alternative (2), there would be costs to the industry if a licensee were required to return portable gauges to the licensed facility every day.

Cost for Industry Implementation and Operation -- Both alternatives (2) and (3) would result in a one-time cost increase to the industry in providing physical controls for existing portable gauges and a smaller annual cost increase in providing physical controls for any new gauges. In addition, alternative (2) would have an increased burden on industry resources if unattended overnight storage of portable gauges in or on vehicles or at locations other than licensed facilities were prohibited. It is expected that alternatives (3) would result in a slight increase in cost to industry operations since the industry may alter its current security practice for portable gauges. Alternative (2) is expected to result in greater impact to industry operations due to more stringent security controls and the need to return gauges to a storage location each day.

There are approximately 1100 NRC licenses in non-Agreement States and 4000 State licenses in Agreement States authorizing the use of portable gauges containing radioactive material. Multiple portable gauges may be included on a single license. It is estimated that there are approximately 22,000 to 25,000 specifically licensed gauges in service and that the industry will acquire and put in service an additional 1,000 new gauges every year.

Alternative (2) Cost: For prescriptive requirements, staff assumed that all licensees would be required to install enclosures and a lock with shielded/protected shackle for each existing gauges in service. Based on a survey from several vendors, the unit cost for an enclosure ranges between $100 to $900 with a typical cost of about $300. It is assumed that the cost to install the enclosure onto the vehicle is about $100. The unit cost for a lock is about $15 based on prices from two hardware stores.

As shown in Table 2, the one-time cost for installing the additional controls on the existing portable gauges as required by the prescriptive requirements of alternative (2) would be around nine to ten million dollars. The cost for installing the controls on new gauges would be around $415,000 per year.

Table 2: Cost Summary to Portable Gauge Licensees due to Prescriptive Requirements

One-Time Cost for Adding Enclosure and Lock to 22,000 to 25,000 Existing Gauges					
Unit Cost for An Enclosure		No. Gauges	Additional Cost	No. Gauges	Additional Cost
Typical Cost	$300	22,000	$6,600,000	25,000	$7,500,000
Installation Cost	$100	22,000	$2,200,000	25,000	$2,500,000
Lock	$15	22,000	$330,000	25,000	$375,000
One-time Cost Impact for Existing Gauges Ranges from $9,130,000 to $10,375,000					
Annual Cost for Adding Enclosure and Lock for 1,000 New Gauges					
Unit Cost for An Enclosure		No. Gauges	Additional Cost		
Typical Cost	$300	1,000	$300,000		
Installation Cost	$100	1,000	$100,000		
Locks	$15	1,000	$15,000		
Annual Cost Impact for New Gauges is $415,000					

For prohibiting unattended overnight storage of portable gauges in or on vehicles or at locations other than licensed facilities, the licensee would have to pick up the portable gauges from the licensed facility before going to temporary jobsites and would have to return the gauges to the licensed facility at the end of each day. It is estimated that a licensee could spend an additional 2 to 5 hours each day driving back and forth between the licensed facility and the temporary jobsites. There are also costs associated with wear and tear of the vehicle and gasoline when additional time is spent traveling in the vehicle. Further, such a prohibition may limit the licensee in conducting business located at greater distances. For ease of calculation, only the added time is included in cost impact to the industry due to the storage prohibition of alternative (2), and the estimated cost impact is calculated based on the assumption of an hourly rate of $20 and 250 working days per year. Cost may be lowered if locations other than the licensed facilities (e.g. private residence, motel, or a leased self-storage unit) were permitted for storage.

Table 3: Cost Summary for Prohibiting Unattended Storage in or on Vehicles

Annual Cost for Additional Time Spent Traveling Between Licensed Facility and Jobsites						
Rate	Time	Days	No. Gauges	Additional Cost	No. Gauges	Additional Cost
$20/hr	2 hrs	250	22,000	$220,000,000	25,000	$250,000,000
$20/hr	5 hrs	250	22,000	$550,000,000	25,000	$625,000,000
Annual Cost Impact Ranges from $220,000,000 to $625,000,000						

Annual Cost for Additional Time Spent Transporting Gauges to Storage Facilities and Leasing Cost for a Self-Storage Unit		
Storage Location	Percent Assumed	Cost Range
Licensed Facilities-2 hrs at $20/hr for 250 days	30% of 22,000 to 25,000 gauges	$66,000,000 to $75,000,000
Other Locations-no cost, and no added travel time	50% of 22,000 to 25,000 gauges	0
Other Leased Locations-$30/month for 12 months	20% of 5,100 licensees	$367,200
Annual Cost Impact Ranges from $66,367,200 to $75,367,200		

Table 3 shows the estimated cost impact to the industry of prohibiting unattended overnight storage of portable gauges in or on vehicles. Cost may vary depending on locations allowed for storage. If storage in only licensed facilities is permitted, the potential cost impact for the licensees to transport the gauges back to the licensed facility each day would be around $220 to $625 million per year. If locations other than the licensed facilities are allowed for storage, the cost impact would be around $66 to $75 million dollars.

Alternative (3) Cost: Under this alternative, each licensee would be required to use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal, whenever these portable gauges are not under the control and constant surveillance of the licensee. A wide range of cost increases is anticipated for licensees depending on the type of controls the licensee will utilize.

It is assumed that for 20 percent of the gauges, the licensee would use existing systems and equipment to meet the new security control requirements. Therefore, no cost increase would be incurred by these licensees. It is assumed that for 40 percent of the gauges, the licensee would use an additional independent chain, steel cable, or bolt to secure the transportation case. A unit cost of $15 for a lock and $100 for 40 feet of chain or steel cable is based on a survey from two hardware stores and is used for this analysis. No installation cost is anticipated. For the remaining 40 percent of the gauges, it is assumed that the licensee would install an enclosure and a lock with shielded/protected shackle. Based on a survey from several vendors, the unit cost for an enclosure ranges between $100 to $900 with a typical cost of about $300. It is assumed that the cost to install the enclosure onto the vehicle is about $100.

With the assumed ratios, Table 4 shows the one-time cost impact associated with existing gauges that are currently in service. Table 5 shows the cost impact associated with new gauges that are estimated to come into service per year in the future.

Table 4: One-Time Cost Summary to Portable Gauge Licensees for Adding Two Controls

No Changes Needed for 20% of 22,000 to 25,000 Existing Gauges					
	Unit Cost	No. Gauges	Additional Cost	No. Gauges	Additional Cost
No Change	$0	4,400	$0	5,000	$0
Adding Lock/Chain/Cable for 40% of 22,000 to 25,000 Existing Gauges					
	Unit Cost	No. Gauges	Additional Cost	No. Gauges	Additional Cost
Lock	$15	8,800	$132,000	10,000	$150,000
Chain/Cable	$100	8,800	$880,000	10,000	$1,000,000
Adding Enclosure and Lock for 40% of 22,000 to 25,000 Existing Gauges					
	Unit Cost	No. Gauges	Additional Cost	No. Gauges	Additional Cost
Enclosure	$300	8,800	$2,640,000	10,000	$3,000,000
Installation Cost	$100	8,800	$ 880,000	10,000	$1,000,000
One-time Cost Range from $4,532,000 to $5,150,000					

Table 5: Annual Cost Impact to Portable Gauge Licensees for New Gauges

No Changes Needed for 20% of 1,000 New Gauges			
	Unit Cost	No. Gauges	Additional Cost
No Change	0	200	$0
Adding Lock/Chain/Cable for 40% of 1,000 New Gauges			
	Unit Cost	No. Gauges	Additional Cost
Lock	$15	400	$6,000
Chain/Cable	$100	400	$40,000
Adding Enclosure and Lock for 40% of 1,000 New Gauges			
	Unit Cost	No. Gauges	Additional Cost
Enclosure	$300	400	$120,000
Installation Cost	$100	400	$40,000
Annual Cost Impact $206,000			

Under this alternative, each licensee would also be required to control and maintain constant surveillance of portable gauges whenever portable gauges are not secured with a minimum of two physical controls. This portion of the revised requirements is consistent with the existing requirement in 10 CFR 20.1802; therefore, no cost impact to the licensees is anticipated for such control and surveillance.

Based on the 20 percent, 40 percent, and 40 percent assumed ratio of control methods selected by the licensees as discussed above, the estimated national impact for implementing alternative (3) would range from $4.5 to $5.1 million. There are approximately 5100 affected NRC and Agreement State licensees. Licensees may have as little as one gauge or as many as ten or more gauges, with a national average of about five gauges per licensee. Depending on the security control method selected, each licensee may incur between $0 to $4000 to ensure implementation for all of its licensed portable gauges. Based on the assumptions stated above, an average one-time unit cost on a national basis will be around $200 per gauge with a corresponding national average of about $1000 per licensee assuming five gauges per licensee for implementing alternative (3). Total national annual costs for providing security for new gauges is estimated at $206,000 assuming the same ratio for control methods selected as for the existing gauges.

Cost for NRC Implementation and Operations -- Both alternatives (2) and (3) would result in NRC implementation costs. Specifically, NRC would incur costs to develop a rule and to revise the existing guidance on portable gauges. NRC staff resources needed for developing the proposed rule, completing the final rule, and revising the guidance is estimated to be 1.7 FTE staff years at $77/hr and 1,776 hrs/FTE for an estimated total cost of $232,000. No increase in NRC resources is anticipated for implementation of the revised requirements. The staff also anticipates no significant impact on NRC resources expended on routine inspection for compliance with the new requirements.

Cost for State Implementation --Both alternatives (2) and (3) would result in Agreement States adapting their regulations to the NRC revised rule. The final rule would have compatibility category “C” requirements; therefore, an Agreement State should adopt the essential objectives of the rule. The compatibility category “C” requirements would be needed to avoid conflict, duplication, gaps, or the conditions that would jeopardize an orderly pattern in

the regulation of agreement material on a nationwide basis. Adoption of the essential objectives can be done through promulgating a comparable rule, issuing orders, revising state guidance, or adding or revising individual license conditions. Since each of the 32 Agreement States may choose different implementation mechanisms, it is difficult to estimate the implementation costs for each Agreement State. However, it is anticipated that implementation costs for each state would be much lower than the implementation cost for the NRC because the Agreement States do not need to spend resources in developing and evaluating various alternatives to come up with the revised requirements. It is assumed that 75 percent of the Agreement States would promulgate state regulations with an average expenditure of one quarter FTE, and the remaining Agreement States would use other mechanisms at 0.1 FTE per state on average. The total estimated state implementation costs would be around $680,000 using an assumed hourly rate of $50 and 250 working days per year.

Calculation:

[(32 states x 75% x 0.25 FTE + 32 states x 25% x 0.1 FTE) x $50/hr x 2,000 hrs] = $680,000

BENEFITS

By requiring additional controls, it is expected that both alternatives (2) and (3) would reduce the number of unauthorized removals or thefts of portable gauges. Although the term "unauthorized removal" can describe situations more than "theft," the regulatory analysis took a more conservative approach and only considered the estimated benefit due to the reduction of theft of portable gauges. The primary categories of the benefits attained by reduction in theft of portable gauges are economic benefits and exposure aversion benefits. In addition, there are less tangible benefits. Since incidents involving theft occur in the public domain, incidents to be averted have a significant impact on the public's perception of the risks associated with the use of radioactive material. This, in turn, can improve the credibility of NRC and the Agreement States. Therefore, this rulemaking could further the goal of increasing the confidence of the public.

Summary of Economic Benefits -- Economic benefits result from reduction in costs associated with the theft of portable gauges through reduction in the incidence of theft. These costs are--

To licensees: for event notification, recovery operations, follow-up investigations, corrective actions, and leak testing and servicing of recovered sources/gauges or replacing sources/gauges not recovered;

To NRC: for event notification review, follow-up inspections, and enforcement actions, and for investigation upon discovery of abandoned sources/gauges;

To Agreement States: for event notification review, follow-up inspections, and enforcement actions, and for investigation upon discovery of abandoned sources/gauges;

To local law enforcement and fire departments: for investigation upon discovery of abandoned sources/gauges;

To landfill and municipal incinerator operators: for investigation upon discovery of abandoned sources/gauges; and

To the scrap metal industry: for investigation upon discovery of abandoned sources/gauges and for potential cleanup of contaminated material cause by a melted source.

Savings to Affected Industry -- Both alternatives (2) and (3) are expected to save the industry in costs associated with gauge replacement and/or gauge recovery operations. Reports in the NMED reveal that there were approximately 450 cases of stolen gauges since 1990 with an average of about 50 cases per year for the past five years. The recovery rate is estimated at 40 percent. For each incident, it is assumed that an operator, a radiation Safety Officer, and a manager of a licensee will spend around 40 hours at an average hourly rate of $50 for the reporting, investigation, recovery, and mitigation activities for a stolen gauge incident. The estimated cost would be $2000 per event. Often times, the licensee will typically offer a reward of $500 for the return of a stolen gauge. Since no data is available on how often a reward is paid, it is not included in this analysis. Even for a gauge that is recovered, there is an associated cost (e.g., leak test and servicing) of approximately $50, in order to bring the gauge back to service. A typical gauge costs between $5200 to $8400. For every stolen gauge not recovered, the licensee may need to replace it at a cost of approximately $7000 average per gauge. For the purpose of this analysis, it is assumed that alternative (2) would achieve a 70 percent reduction in stolen gauges while alternative (3) would achieve 50 percent reduction because alternative (2) is expected to be more effective in reducing opportunity for theft by imposing more stringent requirements. The total cost savings per year would be $217,700 for alternative (2) and $155,500 for alternative (3).

Calculations:

Alternative (2) projected savings per year = $70,000 + $700 + $147,000 = $217,700

(50 events/yr x 70% reduction x 40 hrs/event x $50/hr) = $70,000/yr for recovery operations

(50 gauges/yr x 70% reduction x 40% recovery x $50 testing = $700/yr

(50 gauges/yr x 70% reduction x 60% not recovered x $7,000/gauge) = $147,000/yr for replacement.

Alternative (3) projected saving per year = $50,000 + $500 + $105,000 = $155,500

(50 events/yr x 50% reduction x 40 hrs/event x $50/hr) = $50,000/yr for recovery operations

(50 gauges/yr x 50% reduction x 40% recovery x $50 testing = $500/yr

(50 gauges/yr x 50% reduction x 60% not recovered x $7,000/gauge) = $105,000/yr for replacement.

Savings to NRC and the States -- Both alternatives (2) and (3) would result in NRC and Agreement State savings associated with reporting and investigation efforts due to the anticipated lower number of stolen gauges. On average, NRC or an Agreement State spends approximately eight hours at an hourly rate of $77and $50, respectively, for the initial investigation of each stolen gauge. Since follow-up investigation and enforcement action depends heavily on the nature of the incident and the resources spent vary widely, they are not captured for this analysis. Based on the 40 percent recovery rate, it appears that stolen gauges are often abandoned by the thief. NRC or Agreement States are often involved in investigation of the discovery of an abandoned gauge. It is estimated that approximately 4 hours will be spent in investigating an abandoned gauge. With a 70 percent and 50 percent reduction in incidents for alternatives (2) and (3), respectively, there are savings associated with the initial investigation of a stolen gauge and a corresponding savings associated with the discovery of an abandoned gauge. Assuming a split of one-third NRC lead and two-thirds Agreement State lead, the total savings per year would be approximately $19,820 for alternative (2) and $14,160 for alternative (3).

Calculations:

Alternative (2) projected savings per year = $16,529 + $3,304 = $19,824

[(50 events/yr x 70% reduction x 8 hrs x (1/3 x $77/hr + 2/3 x $50/hr)] = $16,520/yr

[(50 events/yr x 70% reduction x 40% recovery x 4hrs x (1/3 x $77/hr + 2/3 x $50/hr)] = $3,304

Alternative (3) projected savings per year = $16,529 + $3,304 = $14,160

[(50 events/yr x 50% reduction x 8 hrs x (1/3 x $77/hr + 2/3 x $50/hr)] = $11,800/yr

[(50 events/yr x 50% reduction x 40% recovery x 4hrs x (1/3 x $77/hr + 2/3 x $50/hr)] = $2,360

Savings to Local Law Enforcement and Fire Departments -- Law enforcement and fire department personnel are likely to be the first responders upon discovery by a member of the

public of an abandoned gauge, which may have been stolen. By reducing the theft of portable gauges, the corresponding rate of abandonment should also be reduced. Therefore, less responses would be needed from law enforcement and fire department personnel. For every abandoned gauge discovered, it is assumed that on an average four fire fighters and two policemen would be at the scene for two hours at $50/hr. For the purpose of this analysis, a 40 percent discovery rate of abandoned gauges is assumed along with a 70 percent reduction for alternative (2) and 50 percent reduction for alternative (3) in stolen gauges. The annual estimated cost savings due to fewer responses by law enforcement and fire department would be $8400 and $6000 for alternatives (2) and (3), respectively.

Calculations:

Alternative (2) projected savings =

50 events x 70% reduction x 40% discovery x 6 people x 2 hrs x $50/hr = $8400.

Alternative (3) projected savings =

50 events x 50% reduction x 40% discovery x 6 people x 2 hrs x $50/hr = $6000.

Potential Cost Savings to Scrap Industry --By reducing the number of stolen gauges, there could be potential cost savings to the scrap metal industry from a reduced possibility that gauges might inadvertently be sent into scrap metal processing. Although quantitative estimates of such savings are not being made in this analysis, some information indicates that avoidance of melting of a gauge could save the scrap metal industry considerable decontamination costs.

In 1995, a joint NRC-Agreement State working group evaluated the issue of the loss of control of radioactive sources. The working group's final report NUREG-1551, "Final Report of the NRC-Agreement State Working Group to Evaluate Control and Accountability of Licensed Devices" (October 1996), included a recommendation to increase the oversight of sources and devices meeting certain criteria. The report also contained cost estimates to the steel industry resulting from the melting of improperly disposed of sources. The cost estimate for decontamination and clean-up from the melting of sources in steel mills was about $12 million per year from 1983 to 1995 based on experience (as reported by the steel industry) but with high uncertainties. The report included both specifically and generally licensed devices for the risk of source meltings in steel mills. The cost estimates reported did not include incidents at large integrated steel mills for which the resultant clean up could cost as much as $100 million for a single incident. There was a more recent incident involving a steel manufacturing

company in Baldwin, Florida that spent approximately $10 million in July 2001 on a clean-up due to melting of a cesium source mixed in with recycled metal scraps.

Since portable gauges have a theft rate of 50 per year and since most stolen gauges would be abandoned by the thief, they are likely to end up in such places as scrap yards and smelters. The radioactive material in the typical portable device to which this rule would apply is similar to the types and quantities of material considered to be contributing to the costs to the steel industry resulting from the inadvertent melting of radioactive sources. Thus, these gauges would be expected to represent a portion of the risk from the loss of control of sources, particularly the significant cost of property damage resulting from the melting of sources. It is noted that the total number of sources in use is increasing, that the relative contribution between generally licensed and specifically licensed sources may have changed, and that the likelihood of a source melting depends on the monitoring effort performed by the metal manufacturers and recyclers. The cost estimates in NUREG-1551 still give an indication of the magnitude of the potential costs for decontamination and clean-up.

However, given the uncertainties involved in estimating the likelihood of portable gauges being sent to scrap metal processing, no cost savings are assumed in this regulatory analysis.

Potential Savings to Landfill and Municipal Incinerator Operators -- A fraction of stolen devices may end up at landfills and municipal incinerators. These facilities currently use monitors to detect the presence of radioactive material in order to prevent the inappropriate disposal of radioactive sources. When a monitor trip occurs, resources are spent to find and identify the source and determine the appropriate means of disposal. If there is a reduction in the number of stolen gauges, the likelihood of such a gauge ending up in these facilities should be reduced, thus reducing any associated costs to the operations.

Other Potential Savings -- Other costs, though less significant, associated with stolen sources also could be reduced by this rulemaking. For example, a stolen gauge may become an “orphaned” source if it is abandoned and its owner cannot be tracked down. By reducing the theft rate, the number of “orphaned” sources could also be reduced. The cost for disposal of orphaned sources often falls on government agencies (e. g., Environmental Protection Agency or Department of Energy, or individuals or organizations). Therefore, there is a potential cost savings to government agencies for managing less “orphaned” sources.

Regulatory Efficiency -- Both alternatives (2) and (3) would require promulgation of an amendment to a rule that would enhance regulatory efficiency. Through the rulemaking process, new requirements for physical controls will be proposed and discussed with specific examples of sufficient controls. There will also be an opportunity for comments from the industry and the public, and the NRC's regulatory expectations for licensee implementation of the rule will be provided in the statements of consideration. All of these steps will increase regulatory consistency, and hence, improve the efficiency of portable gauge licensees in complying with NRC regulations.

Environmental Considerations -- Alternatives (2) and (3) would likely result in the environmental effect of an insignificant reduction in the unnecessary release of radioactive material. Although NMED data show that most of the stolen gauges were abandoned on the roadside or in woods, the potential for a significant release from the radioactive source into the environment is very low because the rate of recovery is high and because the quantity of radioactivity in portable gauge sources is relatively small and robustly encapsulated. Therefore, reducing the number of stolen gauges will only have an insignificant impact on the environment.

Safeguards and Security Considerations -- The goal of this final rule is to enhance the physical control of the portable gauges by reducing the opportunity for unauthorized removal or theft of gauges. Because of the small quantity of radioactive material in a portable gauge, the potential for its malevolent use is small. Unauthorized removal or theft of a large number of gauges would be required to acquire sufficient material to construct a useful radiological dispersion or exposure device. Therefore, there are no safeguards considerations in this rulemaking.

Public Health (Accident) -- Both alternatives (2) and (3) would require improved security controls for portable gauges to reduce the opportunity for unauthorized removal or theft of portable gauges. As a result, the number of stolen gauges would likely be reduced, potentially averting radiation exposure to the public. When a gauge is stolen, it may become available to a member of the general public. Although it is reasonable to assume that a member of the public would not deliberately expose himself or herself or someone else to radiation, in some cases, these individuals might not understand that a gauge is a potential source of radiation. Provided

the radioactive material sealed source remained in the gauge and the shutter mechanism remained closed, no significant radiation exposure could result. If a gauge with a significant source of activity were to end up in the public domain, and a person was unknowingly exposed to the source, a significant exposure could result. However, radiation exposures due to improper handling would not be expected to exceed 1 mSv (100 mrem) in most cases. The improper handling of a limited number of the devices in use could conceivably result in doses on the order of a few rem. However, the likelihood of situations which could result in the highest doses is very low. Nonetheless, as the number of cases of stolen gauges would be reduced, the likelihood of unnecessary accidental exposure to the public would also be reduced.

V. DECISION RATIONALE:

The no-rulemaking alternative is not preferable because efforts such as issuing Information Notices have not significantly decreased the yearly number of reported incidents of stolen gauges. It is true that the number of incidents reported per year is small when compared to the total number of gauges in use, that the amount of radioactive material in a portable gauge is relatively small, and that the radioactive material is encapsulated in stainless steel. Nevertheless, unauthorized removal or theft of portable gauges still poses a concern if the gauge is abandoned in the environment, is recycled in a steel mill, or is used inappropriately. In addition, given the current heightened sensitivity following the events of September 11, 2001, it is necessary to enhance security of portable gauges by reducing the opportunity for unauthorized removal or theft of portable gauges. The adoption of alternative (2) is not preferred because it would create a large burden to the licensees' current operations. Alternative (3) is selected as the preferred option because the added controls would enhance the security of portable gauges by reducing the opportunity for unauthorized removal or theft of portable gauges, and yet at the same time providing flexibility for the licensees in selecting the controls that are must suitable for them.

It is estimated that adoption of this regulatory action will result in a one-time up-front rulemaking development and implementation costs of $232,000 to the NRC and of $680,000 to the Agreement States. No significant impact to NRC or Agreement State resources expended on routine operations is anticipated for this revised requirement. For the industry, there is an

estimated one-time cost of four to five million dollars for installing controls for existing portable gauges currently in service, and an estimated annual cost of $206,000 for installing controls for new gauges as they come into service in the future.

Although the primary benefit of reduced incidents of unauthorized removal or theft of portable gauges is economically based, there are other benefits such as radiation exposure aversion, reduced public concerns, increased public confidence, and enhanced NRC credibility. It is estimated that the economic benefits for the industry would be around $155,500 per year for cost avoidance due to a reduced number of incidents requiring recovery operations and/or replacement of stolen gauges. The estimated savings for NRC and the States would be around $14,160 for the reduced number of incidents requiring investigation or responses. The corresponding savings for local fire department and law enforcement would be around $6000 for the reduced number of incidents requiring responses. In addition, there are potential cost savings associated with the steel industry due to inadvertent melting of sources, with landfill and incinerator facilities for monitoring improperly disposed of sources, and with government agencies for managing “orphaned” source.

VI. IMPLEMENTATION:

The regulatory action is not expected to present any significant implementation problems. A number of control methods may be utilized by the licensee to best fit its situation. NRC and the Agreement States could monitor compliance through current operations.