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Regulatory Analysis for Proposed Rule - Transportation of Spent Nuclear Fuel in 10 CFR Part 73

U.S. Nuclear Regulatory Commission
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EXECUTIVE SUMMARY

The U. S. Nuclear Regulatory Commission (NRC) is proposing to amend its security regulations pertaining to the transport of irradiated reactor fuel (for purposes of this rulemaking, the terms "irradiated reactor fuel" and "spent nuclear fuel" are used interchangeably). This proposed rulemaking would: (1) establish generically applicable security requirements similar to those imposed by Commission orders after the terrorist attacks of September 11, 2001; (2) establish the acceptable performance standards and objectives for the protection of spent nuclear fuel (SNF) shipments from theft, diversion, or radiological sabotage; (3) ensure that the acceptable performance standards and objectives for SNF shipments apply to all licensees authorized to possess or transport SNF; and (4) address, in part, the requests for NRC rulemaking raised by the Nevada petition for rulemaking (PRM-73-10).

The analysis presented in this document examines the benefits and costs of the proposed security requirements. The key findings of the analysis are as follows:

- *Total Cost to Industry*. The total annual cost of the proposed rule to industry is $92,000, and total one-time costs are $6,600. The total present value of the costs to industry is $0.7 million (using a 7-percent discount rate) and $0.8 million (using a 3-percent discount rate) over a 10-year analysis period. The rule's costs result from the additional requirements based on insights gained from post-order security assessments.

- *Costs to NRC*. There are no annual costs for the NRC associated with the proposed rule. The total one-time cost for updating existing guidance resulting from the additional requirements is $5,000.

- *Decision Rationale*. Although the NRC did not quantify the benefits of this rule, the staff did qualitatively examine benefits and concluded that the rule would provide security-related benefits. The requirements in the proposed rule would establish acceptable performance standards and objectives for the protection of SNF shipments from theft, diversion, or radiological sabotage. The additional security requirements in the proposed rule provide a substantial increase in the protection of the common defense and security and the public health and safety from SNF in transit. The costs of the proposed rulemaking are justified compared to the qualitative benefits.

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
FR	Federal Register
LLEA	Local Law Enforcement Agency
NRC	Nuclear Regulatory Commission
NUREG	Nuclear Regulatory Commission technical report designation
NUREG/BR	NUREG brochure
OMB	Office of Management and Budget
SECY	A paper addressing policy, rulemaking, or adjudicatory matters submitted to the Commission for consideration in a document style and format established specifically for the purpose.
SGI	Safeguards Information
SNF	Spent Nuclear Fuel

1. INTRODUCTION

The NRC is proposing to amend 10 CFR Part 73 to specify additional security requirements for licensees who transport SNF. The purpose and scope of 10 CFR Part 73 is to prescribe requirements for the establishment and maintenance of a physical protection system which will have capabilities for the protection of special nuclear materials at fixed sites and in transit.

This proposed rulemaking will update 10 CFR 73.37 in light of the post-September 11, 2001, terrorist attacks. It would establish generically applicable security requirements similar to the post-September 11, 2001, Commission orders. The proposed rulemaking would establish the acceptable performance standards and objectives for the protection of SNF shipments from theft, diversion, or radiological sabotage. The proposed amendments would apply to those licensees who transport SNF or deliver SNF to a carrier for transport. The proposed rule would also add new requirements not derived directly from the security order requirements but developed as a result of insights gained by performing post-order security assessments of potential SNF transportation vulnerabilities.

In addition, the proposed rulemaking would consider, in part, the State of Nevada June 22, 1999, petition for rulemaking (PRM-73-10).

This regulatory analysis has been prepared in accordance with the Regulatory Analysis Guidelines (RA Guidelines) of the NRC, NUREG/BR-0058, Revision 4, September 2004. This regulatory analysis evaluates the consequences associated with the "Physical Protection of Irradiated Reactor Fuel in Transit" proposed rule. This document presents background material, rulemaking objectives, alternatives, input assumptions, and analysis of the consequences of the proposed rule.

1.1 Statement of the Problem and Reasons for Rulemaking

After the attacks of September 11, 2001, the NRC reevaluated its security requirements for SNF in transit. From this effort, additional measures were identified that would improve security. The additional security measures deemed immediately necessary were issued as orders and supplemented existing regulations. The orders are not publically available, because they contain detailed security requirements that are designated as Safeguards Information (SGI). The proposed revisions of the regulations are based on the NRC efforts undertaken since the events of September 11, 2001, including issuance of additional security requirements by orders, insights gained from implementation of the orders, insights gained by performing security assessments of potential security vulnerabilities associated with SNF transportation, and consideration of a petition for rulemaking submitted by the State of Nevada (PRM-73-10).

1.2 Background

On June 15, 1979, the NRC published in the *Federal Register* (44 FR 34466) an interim final rule that established its first requirements for the physical protection of SNF in transit. The interim final rule added 10 CFR 73.37, "Physical Protection of Shipments of Irradiated Reactor Fuel in Transit" to 10 CFR Part 73. After considering public comments, the agency affirmed the interim final rule on June 3, 1980 (45 FR 37399), which requires licensees to put in place a physical protection system for SNF shipments that meets the following objectives: (1) minimize the possibilities for radiological sabotage of SNF shipments, especially within heavily populated

areas; and (2) facilitate the location and recovery of SNF shipments that may have come under the control of unauthorized persons. The regulation also provides for: (1) the early detection and assessment of attempts to gain unauthorized access to or control over SNF shipments; (2) the notification to the appropriate response forces of any sabotage events; and (3) the impeding of attempts at radiological sabotage of SNF shipments in heavily populated areas or attempts to illicitly move such shipments into heavily populated areas.

After September 11, 2001, the NRC reevaluated its security requirements for spent nuclear fuel in transit and identified additional measures to improve security. The additional security measures deemed immediately necessary were issued as orders and supplemented existing regulations.

1.3 NRC Orders

The NRC issued EA-02-109, "Issuance of Order for Interim Safeguards and Security Compensatory Measures for the Transportation of SNF Greater than 100 Grams" on October 3, 2002. The orders were issued to licensees who had shipped or received SNF within the previous three years and who planned to ship or receive SNF in the foreseeable future. The specifics of the orders are protected as SGI; as such, their details cannot be discussed in this document. In general, the security requirements resulted in enhancements in the following areas: preplanning and coordination with the Local Law Enforcement Agency (LLEA) and States' law enforcement agencies, improved communications among movement control personnel; the development of normal and contingency procedures, a minimum number of weapons for escorts, and more thorough background investigations of individuals associated with the SNF shipment.

1.4 Regulatory Objectives

The NRC's objectives for the proposed rulemaking are to: (1) establish generically applicable security requirements similar to those previously imposed by Commission orders issued after September 11, 2001; (2) establish the acceptable performance standards and objectives for the protection of SNF shipments from theft, diversion, or radiological sabotage; (3) ensure that the acceptable performance standards and objectives for SNF shipments apply to all licensees authorized to possess or transport SNF; and (4) address, in part, the requests for NRC rulemaking raised in PRM-73-10.

2. IDENTIFICATION OF ALTERNATIVE APPROACHES

The NRC considered two alternatives for the proposed rule, described below.

2.1 Alternative 1: No-Action

Alternative 1 is the No-Action Alternative. Under the No-Action Alternative, the NRC would make no changes to the current regulations. Licensees who are subject to the NRC security orders would continue to comply with these orders. This alternative fails to reflect new requirements developed as a result of insights gained by performing security assessments of potential security vulnerabilities associated with SNF transportation, and from implementation of the security orders. Thus, this alternative would be inconsistent with the requirements that the NRC has determined are needed to establish acceptable performance standards and objectives for the protection of SNF shipments from theft, diversion, or radiological sabotage.

In addition, this alternative would place an administrative burden on the NRC. Unlike the requirements of a rule which apply to all applicable licensees, the orders apply only to the licensees that were specifically sent the orders and would not apply to new licensees, unless orders are specifically sent to them as well. Thus, the NRC would be required to issue orders to each new licensee seeking to transport SNF, making this alternative less efficient and effective than developing the proposed regulation. As such, the No-Action Alternative would be inconsistent with NRC's organizational excellence objectives of ensuring that its actions are efficient, effective, realistic, and timely.

The No-Action Alternative would also be inconsistent with NRC's openness strategy. This alternative would not allow for the accurate and timely sharing of information with the public about NRC's regulatory activities relative to SNF shipment security. Nor would this alternative provide for fair, timely, and meaningful stakeholder involvement in NRC's development of SNF transit requirements.

2.2 Alternative 2: Rulemaking to Amend Regulations to Enhance SNF Transit Security

Under Alternative 2, NRC would enhance the physical security of SNF shipments. These changes would include revisions to 10 CFR §§ 73.37 and 73.72 and the creation of a new 10 CFR § 73.38, as described in the proposed rule.

This alternative would be consistent with NRC's organizational excellence objectives of ensuring that its actions are efficient, effective, realistic, and timely. The rulemaking alternative is more efficient and effective than the continued issuance and reissuance of orders. It would also be consistent with NRC's openness strategy, as it provides for stakeholder involvement in NRC's development of SNF transit requirements.

The NRC has estimated the qualitative benefits and costs of this alternative, as described in Sections 3 and 4 of this regulatory analysis. The preferred approach is Alternative 2 (Rulemaking) for the reasons discussed in Section 5.

See Appendix 2 for a table that outlines the sections of rule changes in the proposed rule.

3. ANALYSIS OF VALUES AND IMPACTS

This section describes the analysis to identify and evaluate the values and impacts resulting from the proposed rule.

The Main Analysis (post orders) is presented in Subsection 3.3. The Main Analysis identifies the incremental costs of the proposed rule compared to the costs associated with the No-Action Alternative. Some licensees are currently complying with the security orders under the No-Action Alternative and have incurred costs associated with the orders.

A second analysis, the Pre-order Analysis, is presented in Subsection 3.4. The Pre-order Analysis identifies the costs of implementing the orders as well as the incremental costs of the proposed rule. The difference between the Main Analysis and the Pre-order Analysis is the cost associated with implementing the orders.

3.1 Identification of Affected Attributes

A list of potential attributes that may be affected by rulemaking is provided in Chapter 5 of NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook." The baseline for this analysis assumes full compliance with existing requirements and any future orders the Commission may issue. The following attributes would be affected by the proposed rule:

- *Regulatory Efficiency* – The proposed rule would enhance regulatory efficiency by placing in the regulations generically applicable security requirements similar to those previously imposed by Commission orders.

- *Safeguards and Security Considerations* – The proposed rule would establish the acceptable performance standards and objectives for the protection of SNF in transit that would provide high assurance that the transport of SNF is not inimical to the common defense and security and does not constitute an unreasonable risk to the public health and safety.

- *Public Health (Accident)* – The proposed rule would reduce the risk that public health would be affected by radiological releases resulting from radiological sabotage.

- *Occupational Health (Accident)* – The proposed rule would reduce the risk that occupational health would be affected by radiological releases resulting from radiological sabotage.

- *Industry Implementation* – The proposed rule would require licensees to revise their Transportation Physical Security Plans, Safeguards Contingency Plans, and Training and Qualification Plans.

- *Industry Operation* – The proposed rule would require licensees to modify their operations due to additional security activities beyond those currently required.

- *NRC Implementation* – As part of the proposed rule, NRC plans to update existing guidance, NUREG-0561 "Requirements of Physical Protection of Irradiated Reactor Fuel in Transit."

- *NRC Operation* – The proposed rule would require the NRC Operations Center to receive additional notifications.

- *Offsite Property* – The proposed rule would reduce the risk that offsite properties would be affected by radiological releases resulting from radiological sabotage.

- *Other Government* – The proposed rule would require additional State and LLEA interaction with licensees and the NRC.

- *Improvements in Knowledge* – The proposed rule would result in an increase in the information on SNF shipments.

- *Environmental Considerations* – The proposed rule would result in a decrease of the potential risk of environmental contamination that could result from theft, diversion, or radiological sabotage of SNF shipments.

The proposed rule would not be expected to affect the following attributes:

- *Public Health (Routine)*
- *Occupational Health (Routine)*
- *General Public*
- *Antitrust Considerations*

3.2 Analytic Methodology

This section describes the process used to evaluate the incremental values (benefits) and impacts (costs) associated with the proposed rule relative to the No-Action Alternative. The benefits include desirable changes in affected attributes, *e.g.*, monetary savings and improved safety and security. The analysis relies upon a qualitative evaluation of the benefits associated with improved safety and security of spent nuclear fuel transport.

The costs include undesirable changes in affected attributes, *e.g.*, increased monetary costs and radiation exposure levels. Industry implementation and operating costs are evaluated quantitatively, as are the NRC implementation and operating costs. Quantitative analysis requires a baseline characterization. This analysis includes: (1) the average number of shipments affected; (2) the nature of current activities; (3) the types of new or modified systems and procedures that would be implemented, or would no longer be implemented; and (4) the number of hours and costs entailed in conforming to written procedures.

Licensees may, however, respond differently to the orders. Their responses are dependent on site-specific characteristics, such as: (1) site physical attributes; (2) current contingency, security, training, and qualification plan contents; and (3) organizational and management structure. Costs are also dependent upon the number of anticipated shipments and the number of States each shipment would pass through, which would require additional efforts in terms of planning and coordination. Because individual licensee information, in a large part, is considered “safeguards information” (under § 73.21), this analysis only examines licensees in the aggregate by making general assumptions.

In accordance with OMB guidance and NUREG/BR-0058, Rev. 4, the results of the analysis are calculated using both 3-percent and 7-percent real discount rates. The NRC seeks public comments on the accuracy of the assumptions used in this regulatory analysis and on the validity of the results.

3.3 Main Analysis (Post Orders)

The Main Analysis identifies the incremental impacts of Alternative 2 relative to the No-Action Alternative.

3.3.1 Baseline for the Main Analysis

The baseline for the Main Analysis is the No-Action Alternative which would keep the current regime of security orders in place. Thus, the incremental costs represented in the Main Analysis are those that are in addition to costs incurred to comply with the security orders. The baseline assumes full compliance with existing NRC requirements, including current regulations and orders, consistent with NUREG/BR-0058, “Regulatory Analysis Guidelines of the U.S.

Nuclear Regulatory Commission," Rev. 4, which states that, "in evaluating a new requirement..., the staff should assume that all existing NRC requirements have been implemented." It is also assumed that no additional Commission orders would be issued during the analysis period and that there are no new licensees seeking to transport SNF.

3.3.2 Main Analysis Assumptions

Costs are expressed in 2010 dollars and are modeled either on an annual recurring cost basis or on a one-time implementation basis. The analysis calculates costs over a 10-year period, with the annual costs in each year beyond 2010 discounted back at a 7-percent and 3-percent discount rate, in accordance with NUREG/BR-0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," Rev. 4.

The NRC assumes an industry labor cost of $100 per hour, State labor cost of $50 per hour, and an NRC labor cost of $119 per hour.

The licensee activities in the Main Analysis, which are in addition to compliance with security orders, are those that would be required in the proposed rule and are associated with lessons learned since issuing the security orders. These include licensee activities to document and preplan coordinating activities, to perform more thorough background investigation compared to what is required under the orders, to provide cancellation notices, and to maintain records. The assumptions used to represent these activities are listed in Appendix 1.

An assumption is made in the Main Analysis that the NRC would update existing guidance documents, at a one-time cost of $5,000.

3.4 Pre-order Analysis (Orders and Lessons Learned)

The Pre-order Analysis identifies the incremental costs of the proposed rule relative to a baseline prior to the issuance of Commission orders for the protection of SNF. This is done for the sake of transparency to provide decision-makers and stakeholders a measure of the cost of the total rule, even though the orders are already in effect and licensees have incurred costs to comply with those orders. The Pre-order Analysis is meant to demonstrate the impact of the rule assuming the orders were not in effect and takes into consideration the cost of implementing the orders as well as the costs of regulatory changes based on lessons learned.

3.4.1 Pre-order Analysis Assumptions

To represent the cost of implementing the orders, the NRC assumes 20 SNF shipments per year which is based on historical data. The 20 shipments would consist of 10 shipments via highway and 10 via railway. No shipments occur via water. All of the shipments pass through or cross, on average, five States per shipment. Five of the shipments would originate in U.S. ports annually due to international shipment of SNF. These shipments would then be shipped from port via highway or railway. An assumption is made that five shipments would incur difficulties annually, each of which would require revisions to the shipping schedule, and that one shipment would be canceled over a 3-year period. The 20 shipments would impact 18 licensees per year on average, as two licensees are assumed to ship twice each year. Also, the NRC estimates that one shipment in a 3-year period would incur an "event" which would require reporting and investigation. The NRC assumes an industry labor cost of $100 per hour, State labor cost of $50 per hour, and an NRC labor cost of $119 per hour.

Licensees would bear the largest share of this rule's costs in the Pre-order Analysis. These costs include establishing a communication program (which includes maintaining two distinct means of communication), an armed transit personnel program, and a video surveillance program for equipping various modes of SNF transit.

It is assumed that industry uses contractors to ship SNF and that only two security support companies are used industry-wide. The two security support companies would incur a one-time implementation cost to cover background investigations, for a total of 10 personnel. It is assumed that industry will incur annual background investigation costs as a result of each licensee losing and gaining one employee per year due to attrition. New employees must undergo background investigations.

In regards to 10 CFR 73.38(g), this analysis assumes that eight research and test reactor licensees as well as two other licensees would have to develop and implement written background investigation procedures. It will take all ten of these parties 70 hours to develop and implement these procedures.

The NRC incurs annual costs in the Pre-order Analysis, estimated to be $5,000 per year, due to handling advance notifications and potential theft investigations.

States also incur annual costs, estimated to be $10,000 per year, for advance notifications and preplanning and coordinating activities.

The benefits in the Pre-order Analysis are expressed in qualitative terms. These benefits are associated with safeguards and security considerations, and the decreased risk of a security-related event, such as an act of sabotage or a terrorist attack. Increasing the security of SNF decreases this risk and increases the common defense and security of the nation. The health of the public and occupational workers is positively impacted by the decreased risk of a security-related accident or event. The risk of damage to offsite properties decreases. Finally, public confidence in the NRC and its licensees could increase because the proposed rule would establish in the regulations the minimum performance standards and objectives for the protection of SNF shipments from theft, diversion, or radiological sabotage.

4. Results

This section presents results of benefits and costs that are expected to be derived from the proposed rule. To the extent that the affected attributes could be analyzed quantitatively, the costs have been calculated and are presented below. The benefits are expressed only on a qualitative basis.

The benefits of this proposed rule are associated with safeguards and security considerations and the decreased risk of a security-related event, such as theft, diversion, or radiological sabotage of SNF and subsequent use for malevolent purposes. By increasing the transportation security of SNF, the risk of security-related events decreases, and the common defense and security of the nation increases. Other qualitative values that are positively affected by the decreased risk of a security-related event include public and occupational health due to an accident or event and the risk of damage to onsite and offsite property. In addition, regulatory efficiency is enhanced by the rule.

The results of the cost for the Main Analysis are summarized in Table 4-1. The Rulemaking Alternative costs between $0.7 million and $0.8 million (7-percent and 3-percent discount rate,

respectively). The Rulemaking Alternative would result in $92,446 of additional annual costs when compared to the No-Action Alternative, due to implementing proposed rule provisions derived from insights gained while implementing the orders.

Table 4-1: Net Impact of Alternatives 1 and 2

Regulatory Alternative	10-year total 3% discount rate ($)	10-year total 7% discount rate ($)
1. No-Action	0	0
2. Rulemaking	800,243	660,962

Alternative 1: There are no costs associated with the No-Action Alternative. No changes would be made to the regulations. The Part 73 licensees would continue to operate under Commission orders. Costs have already been incurred by licenses carrying out the current orders.

Alternative 2: The Rulemaking Alternative would impose a new annual cost to the industry of $92,446. This cost is derived from lessons learned after the orders were implemented. There are no major contributing savings under the Rulemaking Alternative, other than the decreased risks in theft, diversion, or radiological sabotage of radioactive materials. The NRC would realize savings from not issuing new orders and updating orders for new and existing licensees.

Table 4-2 summarizes the Main Analysis costs by entity. Over a 10-year analysis period, these costs range between $0.7 and $0.8 million (7-percent and 3-percent discount rate, respectively). Almost all of the costs are incurred by industry. The NRC incurs a small one-time cost. The States incur no additional costs. The itemized assumptions for the Main Analysis are listed in Summary Table #1 in Appendix 1.

Table 4-2: Summary of Costs for Main Analysis by Entity

	One-time Start up Costs($)	Annual Cost ($)	Total Cost with 3% discount rate ($)	Total Cost with 7% discount rate ($)
Industry	6,660	92,446	795,243	655,962
NRC	5,000	0	5,000	5,000
States	0	0	0	0
Total	11,660	92,446	800,243	660,962

Table 4-3 summarizes the Pre-order Analysis by entity, using a baseline to compare against that is prior to the issuance of Commission orders. Over a 10-year analysis period, these costs range between $6.9 and $8.4 million (7-percent and 3-percent discount rate, respectively). Almost all of the costs are incurred by industry. The NRC and States incur annual costs of $4,760 and $10,000 per year, respectively. The itemized assumptions for the Pre-order Analysis are listed in Summary Table #2 in Appendix 1. Security during shipping accounts for

the majority of industry costs, at $580,000 annually. Other costs include non-LLEA armed response, preplanning and coordination activities, documentation, advance notification and cancellations, recordkeeping, background checks, and investigations.

Table 4-3: Summary of Costs for Pre-order Analysis by Entity

	One-time Start up Costs ($)	Annual Cost ($)	Total Cost with 3% discount rate ($)	Total Cost with 7% discount rate ($)
Industry	77,660	955,162	8,225,386	6,786,318
NRC	5,000	4,760	45,604	38,432
States	0	10,000	85,302	70,236
Total	82,660	969,922	8,356,291	6,894,986

5. DECISION RATIONALE AND IMPLEMENTATION

Two alternatives were evaluated in this Regulatory Analysis. Alternative 1 (No-Action Alternative) would maintain the regulations as currently written, continue to retain requirements in orders and issue new orders and reissue existing orders as needed.

Alternative 2 (Rulemaking Alternative) would amend NRC regulations to: (1) establish generically applicable security requirements similar to those previously imposed by Commission orders issued after September 11, 2001; (2) establish the acceptable performance standards and objectives for the protection of SNF shipments from theft, diversion, or radiological sabotage; (3) ensure that the acceptable performance standards and objectives for SNF shipments apply to all licensees authorized to possess or transport SNF; and (4) address, in part, the requests for NRC rulemaking raised by Nevada petition PRM-73-10.

Specifically, the rule would require the following: (1) armed guards throughout the rail and road route; (2) procedures for normal and contingency responses; (3) the training of personnel; (4) continuous and active monitoring of the SNF shipment by a movement control center; (5) shipment preplanning and coordination with States; (6) constant visual surveillance by armed escort; (7) two-way redundant communication capabilities; (8) a minimum of two weapons for armed guards; (9) additional NRC notifications; (10) armed escort instructions on the use of deadly force; and (11) background investigations for individuals granted unescorted access to SNF shipments.

Alternative 2 would reduce the risk of damage from radiological sabotage of SNF shipments, which could have grave consequences to the environment, offsite property, and public health. Alternative 2 would have a significant qualitative benefit associated with improving regulatory efficiency and increasing public confidence. There are relatively low costs associated with the proposed rule because of the baseline assumption of full compliance with previously issued orders. The large majority of costs have already been incurred under the baseline condition. Therefore, the Rulemaking Alternative is the preferred approach. The proposed rule is planned for publication in the *Federal Register* in 2010.

6. REFERENCES

NUREG/BR-0058, “Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission,” Rev. 4.

NUREG 0725, “Public Information Circular for Shipments of Irradiated Reactor Fuel,” Rev. 14.

NUREG 0561, “Physical Protection of Shipments of Irradiated Reactor Fuel,” Rev. 1.

NUREG/BR-0184, “Regulatory Analysis Technical Evaluation Handbook, Final Report,” Office of Nuclear Regulatory Research, January 1997.

Appendix 1

10 CFR § 73.37 (b)(1)(i) - Non-LLEA Armed Escort Deadly Force Instruction

The licensee or the licensee's agent must ensure that each non-LLEA armed escort will prevent or impede attempted acts of radiological sabotage by using force sufficient to counter the force directed at that person, including the use of deadly force when there is a reasonable belief that the use of deadly force is necessary in self-defense or in the defense of others, or any other circumstances as authorized by applicable State or Federal law. Licensees have normally relied upon LLEAs to escort SNF. In the past 30-years, the NRC is aware of rare situations in which there was a non-LLEA armed escort. A best estimate is there would be about 45 in a total of 1285 shipments involving a non-LLEA armed escort. There is no data to determine whether there would be any increase in the future.

Hours of staff time per licensee	8
Cost of staff per hour	$100
Number of people requiring instruction	2
Cost of instruction per licensee	$1,600
Number of hours for a training manager to prepare, provide the training, and document training per licensee	12
Cost of training manager per hour	$100
Cost for training	$1,200
Subtotal	$2,800
Percentage of shipments affected (45/1285)	x 0.035
Total annual cost of non-LLEA armed escort	**($98)***

***This $98 per year is immaterial and assumed to be zero in the analysis.**

10 CFR § 73.37(b)(1)(vii) - Document the Preplanning and Coordination Activities

The current regulations do not require the coordination of law enforcement escorts, the sharing of movement control information, or the coordination of safe haven locations. The proposed revisions would require licensees to preplan and coordinate spent fuel shipment information with the States through which transport will occur and to document these activities.

Hours of staff time to preplan and coordinate, per shipment	40
Cost of staff time per hour	$100
	$4000
Number of annual shipments	X 20
Total annual cost for preplanning and coordination activities	**($80,000)**

10 CFR § 73.37(b)(2)(v) - Cancellation Notice

Although the current regulations require the NRC and the State to receive advanced notifications of shipments, there is no provision requiring the notification of a cancellation of a previously approved advance notification. This is a rare occurrence. It is assumed that one shipment will be canceled over a 3-year period.

Hours of staff time per call	1
Cost of manager's time per hour	$100
	$100
Number of cancellations per year	X .33
Total annual cost of cancellation notices	**($33)**

10 CFR § 73.37(b)(2)(i-ii) - Written Advance Notices

The current regulations do not require the coordination of law enforcement escorts, the sharing of movement control information, or the coordination of safe haven locations. The proposed revisions would require licensees to preplan and coordinate spent fuel shipment information with the States through which transport will occur and to document these activities.

The licensee must coordinate with all States that shipments pass through. For the purposes of the Regulatory Analysis, we are assuming an average of five states would require advance notification. Thus, 20 annual shipments would require 100 written advance notices to States and each of the 20 shipments would require an advance notice to the NRC.

Hours of staff time	0.50
Cost of staff time per hour	$100
Number of notifications	120
Total annual cost of advance notifications	**($6,000)**

10 CFR § 73.37(b)(3)(v) - Security Procedures

The licensee shall develop, maintain, revise, and implement written transportation physical protection procedures. These procedures are needed to protect SNF during transport and to provide an adequate response to various emergencies that may occur during shipment.

Preparation of the security plan and procedures necessary to implement the security program.

Hours of staff time to prepare and update procedures (per license per year)	150
Cost of staff time per hour	$100
Impacted Licensees	18
Total annual cost of staff time for procedures	**($270,000)**

10 CFR §§ 73.37(b)(1)(vi), (2)(v), (3)(iv-vi), (4)(iii), and 10 CFR § 73.38(i) - Records

Although there are record requirements in 10 CFR § 73.70, the SNF regulations in 10 CFR § 73.37 do not have any recordkeeping requirements. As such, the proposed rulemaking would require new recordkeeping requirements. These records would include a copy of the preplanning and coordination activities, advance notification, and any revision or cancellation notice. These records are to be maintained for 3 years in accordance with 10 CFR § 73.70. Records in 10 CFR § 73.38(i) are to be kept for 5 years.

Number of Shipments	20
Cost of staff (clerical) time per hour	$50
Hours of staff time to maintain records per shipment	3.275
Total Annual Cost for Recordkeeping	**($3,275)**
Implementation cost of additional file cabinets, etc, for all licensees	$1,000
Total Implementation Cost for Recordkeeping (one-time cost)	**($1,000)**

10 CFR § 73.37(c)(d) - Shipping Costs

Industry has averaged 20 shipments of SNF via road and rail (collectively) per year over the last 5 years. For purposes of the regulatory analysis, an assumption of 20 shipments per year is used. NRC regulations define the modes of transport to be by "road," "rail," and "sea." Road and sea modes would incur equal costs; shipping by rail would be lower. Nevertheless, for this regulatory analysis, zero shipments by sea are assumed.

Industry has indicated that it is more cost effective to hire contractors to conduct SNF shipments. The below mentioned costs take into consideration all the internal costs that contractors incur to be compliant with NRC orders and the proposed regulation.

Ship by Road

Number of shipments	10
Average trip transit costs, including rental	$3,000
Average trip communication costs	$2,000
Contractor cost	$25,000
Total annual cost by road	($300,000)

Ship by Rail

Number of shipments	10
Average trip transit costs, including rental	$1,000
Average trip communication costs	$2,000
Contractor cost	$25,000
Total annual cost by rail	($280,000)
Total annual cost for shipping	($580,000)

10 CFR § 73.37(f)- Event Investigations

Although licensees are required by 10 CFR 73.71 to notify the NRC of any safeguards events and to submit a report concerning the event, there is no specific requirement for an investigation. This requirement is being added to address this issue. It is assumed that any safeguards events would be rare. It is assumed that one would occur every 3 years.

Hours of staff time per investigation	40
Hours of staff to write report	40
Cost of staff time per hour	$100
Number of investigations per year (1/3)	X 0.33
Total annual cost of event investigation	**($2666)**

10 CFR § 73.38(d) - Background Investigation

Section 73.38(d) is being added to the Part 73 to implement an access authorization program that requires background investigations of individuals involved with the transportation of SNF.

Number of hours to conduct a background check (this includes labor associated with criminal history records; verification of true identity; employment history evaluation; verification of education and military history; credit history evaluation; local criminal history review; and character and reputation determination.)	6
Cost of manager time per hour	$100
	$600
Cost of credit history	$20
Cost of taking fingerprints	$10
Cost for fingerprint submission	$36
Cost of background check	$666
Number of individuals needing background checks (per year)	X 18
Total annual cost of background checks	**($11,988)**

The implementation cost for two companies providing support assumes 10 background investigations up front, as a one-time cost.

Total Implementation Cost for Background Investigations **($6,660)**

10 CFR § 73.38 (g) Procedures for Background Investigations

Licensees shall develop, implement, and maintain written procedures for conducting background investigations for persons who are applying for unescorted access authorization for spent nuclear fuel in transit. Licensees shall develop, implement, and maintain written procedures for updating background investigations for persons who are applying for reinstatement of unescorted access authorization. Licensees shall develop, implement, and maintain written procedures to ensure that persons who have been denied unescorted access authorization are not allowed access to spent nuclear fuel in transit or information relative to spent nuclear material in transit. Licensees shall develop, implement, and maintain written procedures for the notification of individuals who are denied unescorted access. The procedures must include provisions for the review, at the request of the affected individual, of a denial or termination of unescorted access authorization. The procedure must contain a provision to ensure that the individual is informed of the grounds for the denial or termination of unescorted access authorization and allow the individual an opportunity to provide additional relevant information.

The implementation cost is estimated to be a 70-hour effort at $100 per hour labor cost for each of the eight research and test reactors and two other licensees who would need to prepare these procedures, assuming all other licensees would have existing procedures.

Total Implementation Cost for Background Investigations Procedures ($70,000)

10 CFR § 73.72 - Advance Notification

The current regulations in 10 CFR 73.72(a)(4) require NRC notification, by phone, 2 days before the shipment commences. The proposed rule would require two additional notifications of the NRC, one to be made 2 hours before the shipment commences, and the other to be made when the shipment reaches its final destination. These additional notifications would allow the NRC to monitor SNF shipments and to maximize its readiness in case of a safeguards event. The NRC estimates each phone call to take 18 minutes for a total of 36 minutes of notifications per shipment.

Staff time to phone in advance notification per shipment (hours)	0.6
Cost of staff time per hour	$100
Number of shipments per year	20
Total annual cost of advance notifications	**($1,200)**

Summary Table # 1 Post Orders

Licensee

Description	Section	One time Cost ($)	Total Annual Cost ($)	Present Value 10 years at 3% ($)	Present Value 10 years at 7% ($)
Document the Preplanning and Coordination Activities	**73.37(b)(1)**	0	80,000	682,416	561,887
Cancellation Notice	**73.37(b)(2)(v)**	0	33	281	232
Records		0	425	3,625	2,985
Background Investigations	**73.38(d)**	6,660	11,988	108,920	90,859
Totals		6,660	92,446	795,243	655,962

NRC

Description	Section	One time Cost ($)	Total NRC Annual Cost ($)	Present Value 10 years at 3% ($)	Present Value 10 years at 7% ($)
Update Guidance		5,000		5,000	5,000
Totals		5,000	0	5,000	5,000

States

Description	Section	One time Cost ($)	Total State Annual Cost ($)	Present Value 10 years at 3% ($)	Present Value 10 years at 7% ($)
Totals		0	0	0	0

Summary Table # 2 Pre Orders

Licensee

Description	Section	One time Cost ($)	Total Annual Cost ($)	Present Value 10 years at 3% ($)	Present Value 10 years at 7% ($)
Document the Preplanning and Coordination Activities	73.37(b)(1)(vii)	0	80,000	682,416	561,887
Written advance notices to NRC/States	73.37(b)(2)(i-ii)	0	6,000	51,181	42,141
Cancellation Notice	73.37(b)(2)(v)	0	33	281	232
Security Procedures	73.37(b)(3)(v)	0	270,000	2,303,155	1,896,367
Records	73.37(b)(2)(vi), 73.38(i),73.38(g)	1,000	3,275	28,936	24,002
Shipping	73.37(c)(d)	0	580,000	4,947,518	4,073,677
Background Investigations	73.38(d)	6,660	11,988	108,920	90,859
Develop Procedures	73.38(g)	70,000	0	70,000	70,000
Advance Notification Requirements	73.72	0	1,200	10,236	8,428
Event Investigations	73.37(f)	0	2,666	22,742	18,725
Totals		77,660	955,162	8,225,386	6,786,318

NRC

Description	Section	One Time Cost ($)	Total Annual Cost ($)	Present Value 10 years at 3% ($)	Present Value 10 years at 7% ($)
Written advance notices to NRC/States	73.37(b)(2)(i-ii)	0	1,190	10,151	8,358
Update Guidance	n/a	5,000	0	5,000	5,000
Event Investigations	73.37(f)	0	3,570	30,453	25,074
Totals		5,000	4,760	45,604	38,432

States

Description	Section	One Time Cost ($)	Total Annual Cost ($)	Present Value 10 years at 3% ($)	Present Value 10 years at 7% ($)
Document the Preplanning and Coordination Activities	73.37(b)(1)(i-v)	0	7,500	63,977	52,677
Written advance notices to NRC/States	73.37(b)(2)(i-ii)	0	2,500	21,326	17,559
Totals		0	10,000	85,302	70,236

Appendix 2

Cross Reference of Proposed Regulations with Existing Regulations

THE PROPOSED REGULATION	EXISTING REGULATION
73.37 (a)(1)	73.37 (a)(1)
73.37 (a)(2)	73.37 (a)(2)
73.37 (b)(1)(i)-(iii)	New (no existing equivalent)
73.37 (b)(1)(iv)(A)	73.37(b)(8)
73.37 (b)(1)(iv)(B)	New (no existing equivalent)
73.37 (b)(1)(iv)(C)	New (no existing equivalent)
73.37 (b)(1)(iv)(D)	New (no existing equivalent)
73.37 (b)(1)(v)	73.37(b)(6)
73.37 (b)(1)(vi)	73.37(b)(7)
73.37 (b)(1)(vi)(A)	New (no existing equivalent)
73.37 (b)(1)(vi)(B)	73.37(b)(7)
73.37 (b)(1)(vi)(C)	73.37(b)(7)
73.37 (b)(1)(vii)	New (no existing equivalent)
73.37 (b)(2)	73.37 (b)(1) & 73.37(f)
73.37 (b)(2)(i)	73.37 (f)(1)
73.37 (b)(2)(ii)	73.37(f)(2)
73.37 (b)(2)(iii)	73.37(f)(3)
73.37 (b)(2)(iv)	73.37(f)(4)
73.37 (b)(2)(v)	73.37(f)(4)
73.37 (b)(2)(vi)	73.70
73.37 (b)(3)(i)	New (no existing equivalent)
73.37 (b)(3)(ii)	73.37(b)(4)
73.37 (b)(3)(iii)	73.37(b)(4)
73.37 (b)(3)(iv)	73.37(b)(5)
73.37 (b)(3)(v)	New (no existing equivalent)
73.37 (b)(3)(vi)	73.37(b)(3)
73.37 (b)(3)(vii)(A)	73.37(b)(10)
73.37 (b)(3)(vii)(B)	73.37(b)(11)
73.37 (b)(3)(vii)(C)	73.37(b)(9)
73.37 (b)(4)(i)	73.37(b)(2)
73.37 (b)(4)(ii)	73.37(b)(2)
73.37(b)(4)(iii)	73.37(b)(2)
73.37(b)(4)(iv)	73.37(b)(3)
73.37(c)	73.37(c)
73.37(c)(1)	73.37(c)(1)
-------(none-paragraph deleted)---	73.37 (c)(2)
73.37(c)(2)	New (no existing equivalent)
73.37(c)(3)	73.37(c)(3)
73.37(c)(4)	73.37(c)(4)
73.37(c)(5)	73.37(c)(5)
73.37(c)(6)	New (no existing equivalent)
73.37(d)	73.37(d)
73.37(d)(1)	73.37(d)(1)

THE PROPOSED REGULATION	EXISTING REGULATION
-------(none-paragraph deleted)---	73.37(d)(2)
73.37(d)	73.37(d)
73.37(d)(2)	New (no existing equivalent)
73.37(d)(3)	73.37(d)(3)
73.37(d)(4)	New (no existing equivalent)
73.37(e)	73.37(4)
73.37(e)(1)	73.37(e)(1)
73.37(e)(2)	New (no existing equivalent)
73.37(e)(3)	73.37(e)(2)
73.37(e)(4)	73,37 (e)(3)
73.37(f)	New – incorporates 73.71 reporting provisions
73.37(g)	73.37 (g)
73.38	New-incorporates background investigations
73.72(a)(1)	73.72(a)(1)
73.72(a)(4)(i)-(iii)	73.72(a)(4)
73.72(a)(5)	73.72(a)(5)
-------(none-exemption deleted from existing)	73.72(b)
73.72(b)	New (no existing equivalent-new exemption)