
Regulatory Analysis for Enhanced Weapons, Firearms Background Checks, and Security Event Notifications Final Rule

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Abbreviations and Acronyms

ADAMS	Agencywide Documents Access Management System
AEA	Atomic Energy Act of 1954, as amended
AG	U.S. Attorney General
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
B&W	Babcock and Wilcox
CFR	<i>Code of Federal Regulations</i>
COL	combined license
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FR	<i>Federal Register</i>
ISFSI	independent spent fuel storage installation
LLEA	local law enforcement agency
NICS	National Instant Criminal Background Check System
NPUF	non-power production or utilization facility
NRC	U.S. Nuclear Regulatory Commission
NUREG	NRC technical report designation
PERT	program evaluation and review technique
RG	regulatory guide
SAMA	severe accident mitigation alternatives
SNF	spent nuclear fuel
SRM	staff requirements memorandum
SSNM	strategic special nuclear material

Executive Summary

The U.S. Nuclear Regulatory Commission (Commission or NRC) is amending its security regulations to implement the Commission's authority under Section 161A of the Atomic Energy Act of 1954, as amended (AEA), to modify existing requirements for licensee physical security event notifications, and to add new requirements for licensees to report suspicious activities. Collectively, this rule is referred to as the "enhanced weapons rulemaking" (Ref. 1) and was proposed on February 3, 2011 in the *Federal Register* (FR) (76 FR 6200, Ref. 2).

The first part of the rule would provide a process for NRC licensed entities to apply for Section 161A authority, including stand-alone preemption authority or combined preemption authority and enhanced weapons authority. Stand-alone preemption authority allows regulated entities to possess and use weapons that would otherwise be prohibited by State, local, and certain Federal firearms laws. Combined preemption authority and enhanced weapons authority allows a regulated entity to possess and use a certain category of weapon called an "enhanced weapon." All regulated entities that receive Section 161A authority would be required to conduct firearms background checks, conduct training on the firearms background check program, and conduct annual enhanced weapons inventories, if such weapons are approved.

The second part of the rule would reorganize existing physical security event notification requirements into four categories of events based on the security significance of the event (e.g., 15 minutes, 1 hour, 4 hours, and 8 hours). In addition, the rule would add two new categories of physical security events, actual or imminent hostile actions and lost or stolen enhanced weapons, for which NRC notification would be required.

The third part of the rule would add new requirements to report suspicious activities to local law enforcement agencies (LLEA), the Federal Bureau of Investigation (FBI), the NRC, and the Federal Aviation Administration (FAA) (for suspicious activities involving aircraft). These regulations would require licensees to provide information to the NRC and to law enforcement agencies to potentially disrupt or dissuade terrorist attacks and permit the NRC to assess threats against regulated entities.

Benefits and Costs

The benefits and costs of the final rule are presented relative to the status quo regulatory baseline and represent the change in benefits and costs relative to the current regulations. The key findings of the analysis are as follows:

- **Total Cost to Industry.** The final rule is expected to result in a one-time implementation cost of approximately (\$2.43 million)¹ using a 7-percent discount rate and (\$2.50 million) using a 3-percent discount rate. This includes costs for eight licensees at seven sites covered under confirmatory orders (implementing stand-alone preemption authority under Section 161A of the AEA) to transition to comply with the final rule requirements (i.e., to read the final rule and guidance so as to understand how the final rule requirements compare to the confirmatory orders, to review associated procedures and plans, and to revise the procedures and plans, as necessary). This also includes costs

¹ The sign convention used in this analysis is that all favorable consequences for the alternative are positive and all adverse consequences for the alternative are negative. Negative values are shown using parentheses (e.g., negative \$500 is displayed as (\$500)).

for industry to implement the parts of the rule concerning physical security event notifications and suspicious activity reporting.

The final rule is expected to result in an operation cost to industry of approximately (\$134,000) using a 7-percent discount rate and approximately (\$201,000) using a 3-percent discount rate. These operation costs consist of future physical security event notifications and suspicious activity reporting costs. The total net present value of these costs is approximately (\$2.56 million) using a 7-percent discount rate and approximately (\$2.71 million) using a 3-percent discount rate.

The application for either stand-alone preemption authority or combined preemption authority and enhanced weapons authority under Section 161A of the AEA is voluntary. Therefore, a licensee incurring the costs from the Section 161A rule provisions is conditioned on the licensee voluntarily electing and applying for either Section 161A authority. The NRC has not been notified by any NRC licensees of plans to apply for Section 161A authority beyond those covered under the confirmatory order. Therefore, the NRC assumed that no eligible entity beyond those who are covered by existing confirmatory orders will apply for stand-alone preemption authority or combined preemption authority and enhanced weapons authority.

- **Total Cost to the NRC.** The final rule is expected to result in a total one-time cost of (\$11,000) to the NRC to document the withdrawal of the confirmatory orders issued to the eight licensees at seven sites granted stand-alone preemption authority. The NRC total operation cost for both the physical security event notification and suspicious activity reporting provisions will range between (\$157,000) using a 7-percent discount rate and (\$236,000) using a 3-percent discount rate.
- **Benefits.** The final rule implements the Commission's stand-alone preemption authority and its combined preemption authority and enhanced weapons authority under Section 161A of the AEA. The final rule provides a cost-effective path to transition eight licensees at seven sites receiving stand-alone preemption authority via confirmatory orders to the requirements under the final rule. The final rule also modifies mandatory physical security event notification requirements and adds suspicious activity reporting requirements; these provisions apply to all licensees subject to the physical security requirements in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 73. The current regulations concerning physical security event notifications are complex and require event notification on a timeline that does not necessarily align with the inherent security significance. The revised requirements for event notifications allow the licensee to assess an event and notify the NRC commensurate with the security significance of the event. This approach will not impact the NRC's oversight and response functions. The final rule makes the structure of 10 CFR Part 73 physical security event notifications align with that of 10 CFR 50.72 non-emergency notifications and makes the timeliness of event notifications more risk-informed, performance-based, and less burdensome. The final rule also makes generically applicable requirements to report suspicious activities to LLEA, the FBI, the NRC, and the FAA (for suspicious activities involving aircraft). Currently, licensees voluntarily report suspicious activities and reporting has been inconsistent in terms of both the types of data reported and the timeliness of reports. Timely and consistent reporting of suspicious activities offers law enforcement and security personnel the greatest opportunity to disrupt or dissuade malevolent acts against critical infrastructure.

- **Uncertainty Analysis.** The simulation analysis shows that the estimated cost for transitioning seven sites from the stand-alone preemption authority via confirmatory orders to the requirements under the final rule and to withdraw these orders ranges between (\$0.59 million) and (\$0.19 million) with a mean value of (\$0.37 million). The physical security event notification analysis shows that the estimated costs range between (\$1.68 million) and (\$0.56 million) with a mean value of (\$1.06 million). The suspicious activity reporting analysis shows that the estimated costs range between (\$2.31 million) and (\$0.66 million) with a mean value of (\$1.34 million). For the overall final rule, the estimated costs range between (\$4.18 million) and (\$1.61 million) with a mean estimate of (\$2.77 million). Additionally, the regulatory analysis shows that the uncertainty in the time required for licensees to revise their notification procedures, the uncertainty in the industry labor rate, and the uncertainty in the time required for licensees to prepare training materials have significant impact on the estimate.
- **Election of Section 161A authority:** The costs per site to elect to have stand-alone preemption authority or for combined preemption and enhanced weapons authority are detailed in the following table at a 7-percent discount rate. These estimates are provided for completeness only. In estimating the rule's total costs, it is assumed that no additional Section 161A authority is sought.

Cost Category	Power Reactor Sites	Decommissioning Power Reactor Sites	Category I Strategic Special Nuclear Material Sites
Stand-alone Preemption Authority	(\$174,000)	(\$121,000)	(\$194,000)
Combined Preemption and Enhanced Weapons Authority	(\$576,000)	(\$381,000)	(\$650,000)

Decision Rationale

Overall, the benefits of the final regulation include the potential for enhanced public safety and security resulting from increased defensive capability at regulated entities to interdict and neutralize an attack or to deter an attack for those entities that opt to employ stand-alone preemption authority or combined preemption authority and enhanced weapons authority. Also, the draft final rule implements the mandates of Section 161A of the AEA, as described in the Firearms Guidelines. Additionally, the physical security event notification regulations clarify the regulatory requirements and provide in most instances additional time for licensees to notify the NRC consistent with the security significance of the event. Finally, the suspicious activity reporting regulations provide timely and consistent information to the NRC and to law enforcement agencies to potentially disrupt or dissuade terrorist attacks. Based on the NRC's assessment of the costs and benefits of the final rule, including those benefits which are unquantified, the NRC has concluded that the final rule provisions would be justified to protect public health and safety and the common defense and security.

1. Introduction

On February 3, 2011, the U.S. Nuclear Regulatory Commission (Commission or NRC) proposed new regulations to implement the NRC's statutory authority of Section 161A of the Atomic Energy Act of 1954, as amended (AEA) (76 FR 6200). The NRC supplemented the 2011 proposed regulations on January 10, 2013 (78 FR 2218) and on September 22, 2015 (80 FR 57106). The NRC has published a final rule to implement the Section 161A authority, to modify physical security event notification requirements, and to add suspicious activity reporting requirements.

This document presents a regulatory analysis of the NRC's final rule for the enhanced weapons rule, the associated Regulatory Guide (RG) 5.86, "Enhanced-Weapons Authority, Preemption Authority, and Firearms Background Checks" (Ref. 3), the associated RG 5.62, "Physical Security Event Notifications, Reports, and Records" (Ref. 4), and the associated RG 5.87, "Suspicious Activity Reports (U)" (Ref. 5).

The regulatory action adds or modifies regulations under multiple sections of Part 73 of Title 10 of the *Code of Federal Regulations* (10 CFR). The amended regulations implement authority allowed under Section 161A of the AEA. This authority (also referred to as "Section 161A authority") includes stand-alone preemption authority and combined preemption authority and enhanced weapons authority. The amended regulations also modify requirements related to physical security event notifications for those licensees subject to the various 10 CFR Part 73 security requirements. Finally, the amended regulations add requirements for reporting suspicious activities to local law enforcement agencies (LLEA), the Federal Bureau of Investigation (FBI), the NRC, and the Federal Aviation Administration (FAA) (for suspicious activities involving aircraft).

1.1. Background

On August 8, 2005, President George W. Bush signed into law the Energy Policy Act of 2005 (Pub. L. 109-58). Section 653 of the Energy Policy Act amended the AEA by adding Section 161A which granted the Commission new regulatory authority. The NRC worked with the U.S. Attorney General (AG) to publish the Firearms Guidelines on September 11, 2009 (74 FR 46800), and subsequently published Revision 1 to the Firearms Guidelines on June 25, 2014 (79 FR 36100). The Firearms Guidelines describe the NRC's statutory authority and obligations under Section 161A of the AEA.

Section 161A of the AEA specifies that the Commission may authorize the security personnel of a licensee approved by the Commission to transfer, receive, possess, transport, import, and use guns, weapons, ammunition, and devices otherwise prohibited under Federal, State, or local law (or implementing regulations). The Commission may designate the classes of facilities, radioactive material, and other property appropriate for Section 161A authority. This includes stand-alone preemption authority or combined preemption authority and enhanced weapons authority. Stand-alone preemption authority allows regulated entities to possess and use weapons that would otherwise be prohibited by State, local, and certain Federal firearms laws. Enhanced weapons authority allows a regulated entity to possess and use a certain category of weapon called an "enhanced weapon" in the Firearms Guidelines. Enhanced weapons include machine guns, short-barreled shotguns, and short-barreled rifles. Obtaining enhanced weapons requires the prior written permission of the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). The statute requires firearms background checks for the security personnel

of those licensees who apply for Section 161A authority. The enhanced weapons rulemaking implements the statute. The final rule conforms to Revision 1 of the Firearms Guidelines.

The NRC staff prepared a regulatory analysis for the proposed rule, which was published on February 3, 2011 (76 FR 6225). Within the regulatory analysis, the NRC staff analyzed the benefits and costs of implementation of Section 161A of the AEA with the proposed modifications to 10 CFR Part 73 and development of regulatory guidance. Subsequent to the 2011 proposed rule, the NRC supplemented the enhanced weapons rule in January 2013, proposing additional classes of facilities as eligible to apply for Section 161A authority and thus changing the scope and the number of licensees affected. The NRC staff updated the regulatory analysis in the 2013 supplemental proposed rule to reflect the addition of at-reactor independent spent fuel storage installations (ISFSIs) within the classes of facilities eligible to apply for Section 161A authority. In 2015, the NRC further supplemented the rule to conform the proposed regulations to the 2014 revised Firearms Guidelines. The NRC staff updated the regulatory analysis in the 2015 supplemental proposed rule to reflect revised proposed background check requirements.

In this regulatory analysis, the NRC staff provides an analysis of the change in benefits and costs resulting from the final regulations with respect to current regulation. In preparing this regulatory analysis, the NRC staff considered public comments from the 2011 proposed rule and from the 2013 and 2015 supplemental proposed rules.

1.2. Statement of the Problem

This final enhanced weapons rule has three distinct parts. In Part 1 of the final rule, the NRC would amend its regulations to implement the Commission's authority under Section 161A of the AEA. Without implementing regulations, the Commission has granted Section 161A authority through confirmatory orders. This process is unnecessarily burdensome on licensees and the NRC. Additionally, this process lacks the transparency and regulatory certainty provided by regulations. With the experience gained from reviewing initial applications for stand-alone preemption authority, the NRC is now codifying requirements for applications for Section 161A authority. In so doing, the NRC increases clarity and efficiency for licensees submitting Section 161A applications and NRC Staff reviewing such applications. Additionally, the regulations codify requirements to maintain Section 161A authority.

In Part 2, the NRC would amend its regulations to address a physical security event notification timescale that may not reflect the event's actual security significance. Currently, all physical security event notifications must be submitted to the NRC within 1 hour. As a result, at times licensees must provide notification more quickly than necessary, and in other instances notifications are not provided soon enough. The revised regulations would provide a graded approach that takes into account the security significance of the physical security event, which in most cases would provide licensees more flexibility. Additionally, the NRC would add new requirements to notify the NRC following actual or imminent hostile action as well as lost or stolen enhanced weapons. This would ensure licensees provide notification to the NRC of all appropriate physical security events.

In Part 3, the NRC would amend its regulations to address inconsistent reporting and insufficient regulatory clarity concerning suspicious activities. Currently, licensees voluntarily report suspicious activities. Licensee implementation of suspicious activity reporting has been inconsistent in terms of both the types of data reported and the timeliness of reports. Because licensees' timely and consistent submission of suspicious activity reports (SARs) to the NRC

and to law enforcement is an important part of the U.S. government's efforts to disrupt or dissuade malevolent acts against critical infrastructure, it is necessary to make suspicious activity reporting mandatory. Attack planning and preparation generally proceed through several predictable stages, including intelligence gathering and pre-attack surveillance. Reporting suspicious activities that could be indicative of preattack surveillance or reconnaissance efforts, challenges to security systems and protocols, or elicitation of sensitive information, offer law enforcement and security personnel the greatest opportunity to disrupt or dissuade acts of terrorism before they occur. Due to the potential importance of suspicious activity reporting and the current inconsistencies in reporting, the NRC is revising its security regulations to make suspicious activity reporting mandatory.

1.3. Objective

One objective of the enhanced weapons rulemaking is to implement the statutory provisions of Section 161A of the AEA. The enhanced weapons rulemaking adds 10 CFR 73 Subpart B, "Enhanced Weapons, Preemption, and Firearms Background Checks." Only those licensees who apply for Section 161A authority would be required to conduct firearms background checks for their security personnel requiring access to covered weapons (weapons otherwise prohibited by State, local, and other Federal firearms laws). Under the enhanced weapons rule, licensees who receive approval for Section 161A authority would be required to develop a firearms background check program, conduct firearms background checks and conduct firearms background check training. Licensees applying for and receiving combined preemption authority and enhanced weapons authority would also be required to conduct inventories of enhanced weapons.

A second objective of the rulemaking is to amend regulations related to physical security event notifications and reporting of suspicious activities. The rulemaking would remove and reserve the existing 10 CFR 73.71, "Reporting of safeguards events," and Appendix G to Part 73, "Reportable Safeguards Events," and replace these regulations with 10 CFR 73 Subpart T, "Security Notifications, Reports, and Recordkeeping." The rulemaking modifies the timing and process by which licensees would notify the NRC of imminent attacks or threats against power reactors and Category I strategic special nuclear material (SSNM) facilities and would add requirements for the reporting of lost or stolen enhanced weapons, which is currently being reported voluntarily in response to generic communications and guidance.

A third objective of the rulemaking is to increase the flow of information to the law enforcement and intelligence communities concerning suspicious activities at certain NRC licensed facilities to potentially disrupt or dissuade potential terrorist attacks. The rulemaking adds requirements for reporting suspicious activities to law enforcement agencies, the NRC, and FAA (for suspicious activities involving aircraft) that could indicate adversaries conducting preattack reconnaissance or surveillance, challenging licensee security systems, or attempting to elicit sensitive security information.

2. Identification and Analysis of Alternative Approaches

This rulemaking responds to the provisions of Section 161A of the AEA and the direction provided by the Firearms Guidelines. Application for stand-alone preemption or combined preemption authority and enhanced weapons authority under Section 161A of the AEA is voluntary. In addition, licensee compliance with the firearms background checks is conditioned on the application for Section 161A authority. Therefore, this is a voluntary provision for the purposes of this regulatory analysis.

Changes to physical security event notification requirements would change the time period in which licensees would be required to report events to the NRC ranging from 15 minutes to 24 hours. The no action alternative would retain the current time periods and types of events for reporting to the NRC. For both alternatives, licensees would submit event reports and retain event records. Changes concerning suspicious activity reporting would require the reporting of certain events to law enforcement agencies, the NRC, and the FAA (for suspicious activities involving aircraft), which are currently reported voluntarily. The no action alternative would not establish these reporting requirements; consequently, licensee reporting of suspicious activities would not be required but may continue to be reported voluntarily.

This section presents an analysis of the alternatives that the NRC staff considered in meeting the regulatory objectives identified in Section 2. The NRC staff considered the incremental benefits and costs between the status quo and the final rule alternatives.

2.1. Alternative 1: No Action to Implement Section 161A Authority by Rulemaking

Under Alternative 1, the “no action” alternative, the NRC would not implement the Section 161A authority by rulemaking. Under this alternative, the NRC would comply with the mandated obligations of Section 161A of the AEA by issuing confirmatory orders whenever a licensee requests Section 161A authority. The confirmatory order would require those entities covered under the order to perform firearms background checks for their security personnel requiring access to covered weapons. These ordered entities also would be required to develop a firearms background check program, conduct firearms background checks, conduct firearms background check training, and conduct inventories of enhanced weapons, if access to such weapons is sought and approved. Licensees who do not elect the Section 161A authority would not receive the order and would not incur costs under this program.

Seven sites currently have stand-alone preemption authority which the NRC approved using confirmatory orders. Under this alternative, there are no changes in requirements with their existing orders.

Under this alternative, the NRC would not have a systematic, open, and transparent process in place to designate regulated entities eligible to apply for Section 161A authority or for licensees to apply for Section 161A authority. That is, the Commission would need to issue confirmatory orders to designate individual licensees as part of an individual interim class of facilities eligible to apply for Section 161A authority. Although few, if any, additional applicants are currently expected to apply for this authority, if a number of licensees were to apply for Section 161A authority then the development, review, and approval of individual orders by the Commission would likely not be as effective or efficient as equivalent NRC actions via the rulemaking process.

Existing regulations in 10 CFR 73.71, “Reporting of safeguards events,” and Appendix G to Part 73, “Reportable Safeguards Events,” define categories of physical security events and require regulated entities to notify the NRC within a specific time period after the occurrence of the event. Regulated entities also are required to submit reports related to the event to the NRC and maintain records about the events. These regulations also describe the use of NRC Form 366, “Licensee Event Report,” for 10 CFR Parts 50 and 52 licensees to provide written follow-up reports to the NRC. Licensees under 10 CFR Parts 60, 63, 70, and 72 would continue to submit letter reports for such written follow-up reports. Under this alternative, the existing physical security event notification reporting requirements would not be revised.

Current regulations do not require the reporting of suspicious activities to law enforcement, the FAA (for suspicious activities involving aircraft), and the NRC. Licensees currently voluntarily report such suspicious activities consistent with guidance issued by the NRC following the events of September 11, 2001. The NRC staff's assessment of licensee voluntary reporting of suspicious activities over the last decade is that licensee reporting is not consistent. Under this alternative, new regulations would not be established.

2.2. Alternative 2: Issue the Final Rule

Under this alternative, the NRC would implement the final enhanced weapons rule. This change would add the provisions in 10 CFR 73.15, "Authorization for use of enhanced weapons and preemption of firearms laws," 10 CFR 73.17, "Firearms background checks for armed security personnel," and would alter certain provisions, including but not limited to, 10 CFR 73.46, "Fixed site physical protection systems, subsystems, components, and procedures"; 10 CFR 73.51, "Requirements for the physical protection of stored spent nuclear fuel and high-level radioactive waste"; and 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage." Specifically, under this alternative, the NRC would designate classes of facilities, activities, and other property as eligible to apply for Section 161A authority. Licensees falling within these designated classes could apply for Section 161A authority, and if approved, would conduct firearms background checks on their security personnel. Licensees that apply for Section 161A authority would incur incremental costs to establish and maintain firearms background check programs and train staff on the firearms background check process. The NRC would also incur incremental costs to process firearms background checks. In addition, periodic firearms background checks for entities maintaining Section 161A authority would be required at least once every 5 years.

The NRC would receive the NRC Form 754, "Armed Security Personnel Firearms Background Check," submittals and transmit them to the FBI to perform the National Instant Criminal Background Check System (NICS) check. The NRC also would communicate the result of the NICS checks on the individual security officers to the submitting licensee. On an ongoing basis, the NRC would process the firearms background checks that include processing the 5-year renewals of licensee firearms background checks. In addition, the NRC would review the notifications by regulated entities of events that disqualify their security personnel from access to covered weapons.

Eight licensees at seven sites currently have stand-alone preemption authority that the NRC approved through confirmatory orders. The NRC wrote the final rule requirements with these orders in mind to minimize the regulatory burden to these licensees as they transition to the requirements of the final rule. The NRC staff anticipates that few, if any, eligible licensees will seek Section 161A authority beyond those licensees approved by confirmatory orders. However, because there is the potential for States to enact restricting firearms laws in the future, the NRC staff acknowledges that there is uncertainty when estimating future utilization of Section 161A authority. This regulatory analysis evaluates the costs and benefits for eligible licensees in the designated classes that might seek Section 161A authority and incur costs to comply with the associated requirements of this final rule.

For the seven sites covered under confirmatory orders, the staff calculated the incremental costs and benefits associated with complying with the final rule. These requirements include transition activities, such as reviewing the final rule, reviewing internal procedures, and

identifying any changes that must be made to comply with the final rule. This analysis assumes sites would continue their Section 161A authority under the requirements of the final rule.

This alternative would obviate the need for the NRC to issue orders to designate classes of regulated entities eligible to apply for Section 161A authority. This alternative would also obviate the need for the NRC to issue orders approving Section 161A authority. This represents an averted cost to the NRC for granting future Section 161A authority. In addition, the final rule enhances regulatory efficiency because it provides a clear mechanism for regulated entities to apply for and maintain their Section 161A authority, and a consistent basis for NRC staff to review applications and oversee security programs using Section 161A authority. The final rule also enhances openness and transparency to the public, licensees, and other stakeholders in understanding the classes of facilities, radioactive material, and other property the NRC considers appropriate for potential use of Section 161A authority.

Additionally, this alternative would enable several other regulatory revisions. The physical security event notification requirements contained in 10 CFR 73.71 and Appendix G to Part 73 would be restructured to combine all the existing event notification requirements into three new sections of the regulations (10 CFR 73.1200, 73.1205, and 73.1210).

This alternative restructures 10 CFR Part 73 to clarify and simplify the physical security event notification requirements. Physical security events requiring NRC notification would be grouped into several timeliness categories (e.g., 15-minute, 1-hour, 4-hour, and 8-hour notifications), with greater security-significance events requiring quicker notifications. This simplified approach was based on stakeholder comments received on the 2011 proposed rule.

This alternative would also require reporting of actual or imminent hostile actions, which are currently voluntarily reported. Actual hostile acts are events that have an actual impact upon security. Imminent hostile actions are events that could have had a potential impact upon security, or security program failures. Events are also grouped into those affecting facilities and materials, and those affecting shipping activities (i.e., the transportation of radioactive materials and/or special nuclear material (SNM)). Also under this alternative, entities regulated under 10 CFR Parts 50 and 52 would continue to use Form 366 for events requiring a written follow-up report. This form has been updated to enable reporting of events related to enhanced weapons. Regulated entities under this alternative would also continue to create and maintain records of physical security events. Licensees under 10 CFR Parts 60, 63, 70, and 72 would continue to use letter reports for events requiring a written follow-up report.

The physical security event notification portion of the rulemaking applies to all facilities and activities that are subject to the provisions of 10 CFR Part 73. This includes power reactors (operating and decommissioning); ISFSIs; hot cells; Category I, II, and III SNM facilities; and non-power production or utilization facilities (NPUFs).² The final rule would increase the types of physical security events for which notification to the NRC is required for NPUFs. The final rule also applies to future licensed facilities involving a monitored retrievable storage installation or a geologic repository operations area. In addition, the final rule applies to physical security events associated with transportation activities involving shipments of Category I, II, and III SNM; spent nuclear fuel (SNF); and high-level radioactive waste (HLW).

² NPUF is a term that captures all non-power facilities licensed under 10 CFR 50.22 or 10 CFR 50.21(a) or (c), including medical radioisotope irradiation and processing facilities, and research and test reactors.

As mentioned above, this alternative would modify the required timeframes in which events are reported to the NRC Operations Center from within 15 minutes to within 24 hours of discovery, depending on the significance and impact of the event being reported or recorded. Significant security events, such as actual or imminent hostile actions, warrant immediate NRC action and dissemination of this information to other licensees and U.S. government agencies; therefore, licensees would be required to report these events within 15 minutes of discovery. Upon notification of an actual or imminent hostile act, the NRC would rapidly communicate this information to enable licensees and government facilities to immediately increase the response level of their security defenses. Other less serious (but still significant events) would require reporting within 1 hour of discovery. Events involving potential tampering or unauthorized operation of components would require reports within 8 hours of discovery.

Licensees that possess enhanced weapons would be required to notify the NRC within 1 hour after the discovery of stolen or lost enhanced weapons within a licensee's protected area, vital area, material access area, or controlled access area or within 4 hours from the discovery of a stolen or lost enhanced weapon outside of these areas. Licensees would also be required to notify their applicable LLEA of these lost or stolen enhanced weapons within 48 hours. This 48-hour reporting time matches the timeliness in ATF's regulations in 27 CFR Part 478. Licensees would also be required to notify the NRC within 24 hours of the receipt of an adverse inspection or enforcement finding or other adverse notice from ATF regarding the licensee's possession, receipt, transfer, or storage of enhanced weapons. This change would allow the NRC to receive event reports on a timescale that is more appropriate to the nature of the event and thereby allow for more timely NRC response to the event and more timely NRC coordination with other government agencies.

Finally, under this alternative, licensees would be required to report suspicious activities to their LLEA, their local FBI field office, the NRC, and the FAA (for suspicious activities involving aircraft). The rule does not specify the mechanism on how the notification is performed; rather it requires licensees to establish points of contact with these agencies. This additional notification will provide timely and consistent information to the NRC and to law enforcement agencies to potentially disrupt or dissuade terrorist attacks.

Based on historical data, the NRC receives on average 30 physical security events per year. The NRC does not anticipate that this number will change significantly as a result of this rulemaking. The NRC estimates that a 15-minute imminent or actual hostile action event will occur once every 15 years. Additionally, the NRC estimates an average of 2.5 suspicious activity reports will be reported to the NRC per licensee annually based on past experience. Because the rule does not change the threshold for reporting significant facility security challenges to the security program or conditions adverse to security events, costs related to those events are not included in this regulatory analysis. The costs analyzed are those related to the new physical security event notifications for actual or imminent hostile actions, lost or stolen enhanced weapons, and for reporting suspicious activities.

3. Identification of Affected Attributes and Analytical Method

This section evaluates the incremental benefits and costs expected to result from this rulemaking when compared to the no action alternative. In accordance with NUREG/BR-0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission" (Ref. 6), the incremental costs due to any action taken by the licensee, including voluntary actions, which result because of this rulemaking, should be accounted for in the regulatory analysis. The

analysis is presented in two subsections. Section 4.1 identifies attributes that would be affected by the rulemaking. Section 4.2 describes how the benefits and costs are analyzed.

3.1. Identification of Affected Attributes

This section identifies the factors within the public and private sectors that the rulemaking is expected to affect. These factors are classified as attributes using the list of potential attributes provided in Chapter 5 of NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook" (Ref. 7). Each attribute is quantified where possible. An uncertainty analysis is performed to report benefit and cost estimate confidence levels and to identify those variables that most affect the variation in the results distribution. Security-related attributes are considered qualitatively because estimates of occurrences of possible attacks and their successful thwarting are unknown (e.g., the onsite/offsite impacts of accidental discharges from enhanced weapons were qualitatively evaluated in the general public attribute).

The following attributes were evaluated in this regulatory analysis:

- Industry Implementation —
 - For Section 161A authority, if requested, licensees would be required to:
 - Read and understand the regulation;
 - Apply for Section 161A stand-alone preemption authority or combined preemption authority and enhanced weapons authority, including submittal of supporting materials;
 - Develop a Firearms Background Check Plan;
 - Submit an NRC Form 754 information and the fingerprints for each security staff member assigned to duties requiring access to covered weapons and incur associated fees from NICS submittals;
 - Develop and deliver initial training on the firearms background check process;
 - Purchase enhanced weapons (if applicable);
 - Conduct initial weapons qualification and proficiency training on enhanced weapons (if applicable); and
 - Revise physical security event notification procedures for lost or stolen enhanced weapons (if applicable).
 - For physical security event notifications, reports, and recordkeeping, licensees are required to perform the following actions to comply with the new regulations:
 - Read and understand the regulation; and
 - Develop, approve, and train the appropriate security and operations personal on the new procedures, concerning actual or imminent hostile actions.

- For suspicious activity reporting, licensees are required to perform the following actions to comply with the new regulations:
 - Read and understand the regulation; and
 - Develop, approve, and train the appropriate security and operations personal on the new procedures.
- Industry Operation — Operational costs to licensees include:
 - For Section 161A authority, if requested, licensees would be required to:
 - Resubmit their security personnel for periodic firearms background checks every 5 years;
 - Submit information regarding new security staff for firearms background checks on an ongoing basis;
 - Update and provide recurring training on the firearms background check process;
 - Maintain records of staff removed from access to covered weapons;
 - Notify the NRC of events that disqualify their staff from access to covered weapons;
 - Conduct monthly and annual inventories of enhanced weapons and maintain records of these inventories (if applicable);
 - Maintain records relating to the receipt, possession, use, and transportation, and transfer of enhanced weapons (if applicable);
 - Conduct periodic enhanced weapons qualification and proficiency training (if applicable);
 - Submit event reports for physical security events related to enhanced weapons (if applicable); and
 - Maintain records of physical security events related to enhanced weapons (if applicable).
 - For physical security event notifications, reports, and recordkeeping, licensees are required to perform the following actions to comply with the new regulations:
 - Maintain and train new security and operations personal on the new procedures;
 - Submit event reports for physical security events related to actual or imminent hostile actions; and
 - Maintain records of physical security events related to actual or imminent hostile actions.

- For suspicious activity reports, licensees are required to perform the following actions to comply with the new regulations:
 - Maintain and train new security and operations personal on the new procedures; and
 - Make telephone reports for suspicious activities.
- NRC Implementation—NRC implementation actions for all three parts of the final rule would include:
 - Document the withdrawal of the confirmatory orders; and
 - Review and approve new applications for Section 161A authority.
- NRC Operation—The NRC would incur operational costs under the final rule to:
 - Process NRC Form 754 submittals on an ongoing basis for new security personnel or for 5-year renewed firearms background checks;
 - Review notifications of security personnel disqualified from access to covered weapons;
 - Review the written report for notification of a physical security events; and
 - Receive telephone notification of physical security events and suspicious activity reporting.
- Other Government Agencies—The FBI would incur costs as a result of this final rule to process firearms background checks. The FBI would charge fees to regulated entities for the processing of fingerprints. The ATF would incur additional costs to process applications to transfer enhanced weapons to authorized NRC licensees.
- Safeguards and Security Considerations—The final rule complies with Section 161A statutory requirements and provides assurance that public health and safety, and the common defense and security, will be enhanced because of licensees' increased defensive capability to interdict, neutralize, or potentially deter an attack. The benefit of the final rule related to safeguards and security considerations is evaluated qualitatively. The 15-minute notification for actual or imminent hostile actions provide the NRC the ability to rapidly disseminate this information to other NRC licensees and government facilities, military facilities, and critical infrastructure facilities. Such information may permit these entities to increase their defensive security posture in the case of miss-timed or miss-coordinated multi-target terrorist attacks.

The benefit of the licensees' timely and consistent submission of suspicious activity reports to the NRC and to law enforcement is also an important part of the U.S. government's efforts to disrupt or dissuade malevolent acts against critical infrastructure. Attack planning and preparation generally proceed through several predictable stages, including intelligence gathering and pre-attack surveillance. These stages, in particular, offer law enforcement and security personnel the greatest opportunity to disrupt or

dissuade acts of terrorism before they occur. Additionally, licensees' timely and consistent submission of suspicious activity reports to the NRC supports one of the agency's primary mission essential functions of threat assessment for licensed facilities, materials, and shipping activities.

- **Regulatory Efficiency**—The final rule would enhance regulatory efficiency of the physical security event notification requirements by clarifying the process and the types of events to be reported to the NRC. The final rule would enhance regulatory efficiency through the issuance of generically applicable regulations, rather than addressing licensees' application for Section 161A authority via individual NRC orders.
- **General Public**—The use of weapons safety assessment evaluations would minimize the likelihood of an unacceptable human or physical impact arising from the accidental or deliberate discharge of an enhanced weapon. The costs or benefits related to the general public attribute were not analyzed in detail in this analysis because this attribute is not expected to have a significant impact on the results of the regulatory analysis.

Attributes that are not expected to be affected by this rulemaking include: public health (accident and routine); occupational health (accident and routine); offsite property; onsite property; general public; environmental considerations; and other considerations.

3.2. Analytical Method

This section describes the process used to evaluate benefits and costs associated with the final rule. The benefits of the final rule include any desirable changes in affected attributes (e.g., monetary savings, improved safety, improved security) while the costs include any undesirable changes in affected attributes (e.g., monetary costs, increased exposures to radiation, or physical hazards). This regulatory analysis was developed following the guidance contained in NUREG/BR-0058 and NUREG/BR-0053, "United States Nuclear Regulatory Commission Regulations Handbook" (Ref. 8).

The analysis evaluates four attributes—industry implementation, industry operation, NRC implementation, and NRC operation—on a quantitative basis. Quantitative analysis requires a baseline characterization of the affected universe, including characterization of factors such as the number of affected entities and the application process that licensees would use as a result of the final rule. Non-quantitative techniques are used because monetizing the full impact of each attribute is not possible or practical. Monetizing the impact of these attributes would require estimation of factors such as the frequency of accidents and other safety- and security-related events and the consequences of such events. Sections 4.2.1 through 4.2.4 describe the analytical method and assumptions used in the quantitative and non-quantitative analysis of these attributes. Appendices A and B present the analysis calculations, data sources, and assumptions utilized.

To estimate the costs associated with the final rule, the NRC staff used a work breakdown approach to deconstruct the activities for each requirement. For each required activity, the NRC further subdivided the work across labor categories. The NRC staff estimated the required level of effort for each required activity and labor rates for personnel performing these activities to develop cost estimates.

The NRC staff gathered data from a number of sources to develop levels of effort and unit cost estimates. The NRC staff applied several cost estimation methods in this analysis. The professional knowledge and judgment of the NRC staff were used to estimate some of the costs and benefits. Additionally, an engineering build-up method, solicitation of licensee input, and extrapolation techniques were used to estimate costs and benefits.

The NRC staff estimated some of the activities using the engineering build-up method, which used a step-by-step, bottom-up description of task requirements and estimated resources for labor, materials, and other direct costs to estimate a total cost. For example, the NRC staff collected industry wage data and staffing levels based on licensee submittals and weapon and weapon-related costs from vendors.

The NRC staff extrapolated to estimate some cost activities, which rely on past or current costs to estimate the future cost of similar activities. For example, one of the key factors in the estimate of the cost of firearms background checks to a site is how many security personnel would undergo NICS checks. When eight licensees at seven sites received stand-alone preemption authority via confirmatory order, they submitted security personnel information for NICS checks. The staff used that experience to inform the number of security personnel that would undergo NICS checks for different types of sites. For steps in the current and proposed alternative, the NRC staff estimated the level of effort based on similar steps in the process for which data are available.

To evaluate the effect of uncertainty in the model, the NRC staff employed a Monte Carlo simulation, which is an approach to uncertainty analysis where input variables are expressed as distributions. The simulation was run 10,000 times and values were chosen at random from the distributions of the input variables provided in Section 5.2, "Uncertainty Analysis." The result is a distribution of values for the output variable of interest. With a Monte Carlo simulation, it is also possible to determine the input variables that have the greatest effect on the value of the output variable. See Section 5.2 for a detailed description of the Monte Carlo simulation methods and a presentation of the results.

3.2.1. Baseline for Analysis

This regulatory analysis measures the incremental costs of the final rule relative to a "baseline" that reflects anticipated behavior in the event the NRC undertakes no additional regulatory action (Alternative 1, the "no action" alternative). As part of the regulatory baseline used in this analysis, the NRC staff assumes full licensee compliance with existing NRC regulations. This alternative is equivalent to the status quo and serves as a baseline against which other alternatives may be measured. Section 5.1, "Benefits and Costs of the Final Rule," presents the estimated incremental benefits and costs of the final rule relative to this baseline.

3.2.2. Affected Entities

The Section 161A authority portion of the final rule would apply to sites with:

- Operating power reactors;
- New power reactors for which a combined license (COL) already has been issued under 10 CFR Part 52 (e.g., Vogtle Electric Generating Plant Units 3 and 4);
- Decommissioning power reactors;

- Category I SSNM facilities (e.g., Babcock & Wilcox Nuclear Operations Group Inc. (BWXT) and Nuclear Fuel Services (NFS));
- All ISFSI licensees; and
- Licensees shipping SNF (e.g., to a consolidated ISFSI facility).

The NRC staff estimates that licensees at 84 sites would be eligible to apply for Section 161A authority under the final rule. Licensees that do not apply for Section 161A authority would not incur additional benefits or costs as compared to the baseline. This analysis evaluates the benefits and costs that would be incurred by licensees that apply for Section 161A authority. However, in estimating the total costs of the final rule, the analysis assumes no additional Section 161A authority is sought.

For the eight licensees at seven sites covered under confirmatory orders, the staff calculated the incremental costs and benefits associated with complying with the final rule requirements. Activities to comply include transition activities such as reviewing the final rule and their procedures to ensure no changes were necessary to comply with the final rule and notifying the NRC after the transition activities are completed. Thereafter the NRC would withdraw the orders and the sites would continue their Section 161A authority under the final rule.

The physical security event notifications portion and the suspicious activity reporting portion of the final rule would apply to:

- Operating power reactors;
- New power reactors for which a COL already has been issued under 10 CFR Part 52;
- Decommissioning power reactors;
- Category I SSNM facilities;
- Category II and III SNM facilities (physical security event notifications);
- Category II or III SNM enrichment facilities using Restricted Data materials, technology, and information in the enrichment process;
- All ISFSI licensees;
- Licensees shipping Category I SSNM, SNF, and HLW;
- Licensees shipping Category II and III SNM (physical security event notifications only);
- Hot cells;
- Monitored retrievable storage installations;
- Geologic repository operations areas; and
- NPUF licensees.

Appendix A, “NRC Regulated Sites Affected by the Enhanced Weapons Final Rule,” to this analysis presents more information on the sites affected by the final rule, including information on the categorization of the individual sites.

Assumptions Related to Affected Entities

A multiunit site uses the facility’s security personnel to protect each unit in a fungible manner. This also applies to sites with a mixed set of regulated entities. That is, the facility’s staff will use the same weapons to protect an operating power reactor and to protect a decommissioning power reactor co-located at the same site. In particular, at-reactor ISFSIs are by definition associated with a power reactor site, so at-reactor ISFSIs are not treated as separate entities in this regulatory analysis. The regulatory analysis evaluates the incremental costs of the final rule on a site basis rather than on a regulated entity basis. This is because it is typical for each licensee co-located at a site to request Section 161A authority at the same time, since security personnel are typically fungible between facilities at a site. For each type of site included in the analysis, Table 3, “U.S. Commercial Nuclear Power Reactor Sites Affected by the Final Rule,” presents the number of sites and the average number of years that sites are expected to be subject to the final rule (i.e., applicability period).

In estimating benefits and costs, the NRC staff grouped eligible sites with more than one type of reactor under the site category with the longest applicability period. For example, a site with one operating power reactor and one or more decommissioning power reactor(s) is categorized as a “site with only reactors that are in commercial operation” because the applicability period for an operating power reactor exceeds the applicability period for a reactor that is decommissioning. See the discussion titled “Applicability Period of the Final Rule” in Section 3.2.2 for more information.

Eligible Regulated Entities that May Apply for Section 161A Authority

The NRC staff grouped regulated entities eligible to apply for Section 161A authority into the following five groups for this analysis. This is presented in Table 1, “Eligible Regulated Entities that May Apply for Section 161A Authority.”

- Operating power reactor sites—In this category, five sites have requested and received stand-alone preemption authority via confirmatory order. None of the remaining operating power reactor sites in this category has formally expressed interest in applying for Section 161A authority.
- New power reactors proposed or under construction—As of August 2017, none of the sites in this category sought Section 161A authority via confirmatory order nor have they formally expressed interest in applying for Section 161A authority.
- Decommissioning power reactors—As of August 2017, one out of eleven decommissioning sites requested and received stand-alone preemption authority via confirmatory order. None of the remaining decommissioning sites has expressed interest in applying for Section 161A authority.
- Away-from-reactor ISFSIs—As of August 2017, none of the sites in this category sought Section 161A authority via confirmatory order nor have they formally expressed interest in applying for Section 161A authority.

- Category I SSNM facilities—The two sites in this category are fuel fabrication facilities for the U.S. Navy. BWXT applied for and received stand-alone preemption authority via confirmatory order. The remaining Category I SSNM site has not formally expressed interest in applying for Section 161A authority.

Table 1 Regulated Entities that May Apply for Section 161A Authority

Category	Number of Sites	Number of sites that received stand-alone preemption authority via confirmatory order
Power reactor sites (operating & under construction) ^{a,b}	60	5
Decommissioning power reactor sites ^{b,c}	18	1
Away-from-reactor ISFSIs	4	0
Category I SSNM facilities	2	1
Total	84	7

^a Power reactor sites include those sites with units under construction or in operating status. Licensees that have not begun construction are not included.

^b Onsite ISFSIs (at-reactor ISFSIs) are included in these categories.

^c All units on a decommissioning power reactor site are in decommissioning or have been decommissioned.

Regulated Entities Impacted by the Physical Security Event Notifications and Suspicious Activity Reporting Portions of the Final Rule

Multiple categories of regulated entities are subject to the physical security event notification and suspicious activity reporting requirements and would be impacted by the final rule. The staff grouped the affected regulated entities into six groupings shown in Tables 2a and 2b for this analysis.

Table 2a Regulated Entities Affected by the Physical Security Event Notifications

Site Description	No. of sites
Power reactor sites (operating & under construction) ^{a,b}	60
Decommissioning power reactor sites ^{b,c}	18
Away-from-reactor ISFSIs	4
NPUFs	31
Hot cell facilities	1
Category I SSNM facilities	2
Category II and III SNM facilities	4
Total	120

^a Power reactor sites include those sites with units under construction or in operating status. Licensees that have not begun construction are not included.

^b Onsite ISFSIs (at-reactor ISFSIs) are included in these categories.

^c All units on a decommissioning power reactor site are in decommissioning or have been decommissioned.

Table 2b Regulated Entities Affected by the Suspicious Activity Reporting

Site Description	No. of sites
Power reactor sites (operating & under construction) ^{a,b}	60
Decommissioning power reactor sites ^{b,c}	18
Away-from-reactor ISFSIs	4
NPUFs	31
Hot cell facilities	1
Category I SSNM facilities	2
Category II and III SNM enrichment facilities	1
Total	117

- ^a Power reactor sites include those sites with units under construction or in operating status. Licensees that have not begun construction are not included.
- ^b Onsite ISFSIs (at-reactor ISFSIs) are included in these categories.
- ^c All units on a decommissioning power reactor site are in decommissioning or have been decommissioned.

Applicability Period of the Final Rule

The applicability period was derived as follows:

- Power Reactor Licensees**—The staff estimates that the average applicability period for this type of site is 37 years. This estimate is based on the average remaining operating license term across sites of this type and then adding a 15-year decommissioning period. For each site, the NRC staff identified the operating power reactor unit with the latest license expiration date.³ The NRC staff then used that license expiration date to calculate the remaining operating life for the site. For example, for a site where the last unit license expiration date will occur in 2019, the calculated remaining operating life would be two years (i.e., 2018, and 2019). The NRC staff assumed (1) that all operating licenses go to the term of the operating license with the exception of announced early terminations⁴ and (2) assumed that all license renewal applications already under consideration will be granted. Using the calculated remaining operating license term for each site, the average remaining operating license term across all sites was calculated. Finally, a 15-year decommissioning period was added following cessation of commercial operation. For this analysis, the staff assumed that two sites, Peach Bottom and Surry, would apply for and receive a second license renewal for an additional 20-year operating period.

³ Based on information obtained from NRC, NUREG-1350, Volume 29, “2017-2018 Information Digest, “Appendix H: U.S. Commercial Nuclear Power Reactor Operating Licenses - Expiration by Year, 2013-2049” (Ref. 12).

⁴ As of May 2017, early terminations have been announced for Pilgrim in 2018, Palisades in 2018, Three Mile Island Unit 1 in 2019, Oyster Creek in 2019, Indian Point Unit 2 in 2020, Indian Point Unit 3 in 2021, Diablo Canyon Unit 1 in 2024, and Diablo Canyon Unit 2 in 2025. If the licensees for Pilgrim and Oyster Creek carry through with their plans, one or both of these plants may cease commercial operation during the final rule’s 300-day event notification reporting implementation period. Crystal River Unit 3, Fort Calhoun, Kewaunee, San Onofre Units 2 and 3, and Vermont Yankee have already terminated operations. Several other licensees have stated in the press the possibility of early closures; however, for the purpose of this analysis, the staff assumes that these licensees will resolve their financial difficulties and their plants will continue to operate for the remaining term of their license.

- New Power Reactor at Existing Sites—The applicability period for this type of site is estimated to average 75 years. This estimate is based on the average remaining operating license term of the existing reactor(s) at these sites and then adding a 40-year operating life to account for the new reactor(s). An additional 15 years is added for the decommissioning period. For this analysis, the staff did not assume that these licensees would apply for and receive a second license renewal for the new reactors for an additional 20-year operating period.
- Sites with Only Reactors that Are Decommissioning—The applicability period for this type of site is estimated to average 15 years from date of cessation of operations. This estimate is based on information on time periods contained in Irradiated Fuel Transfer Plans submitted, under 10 CFR 50.54(bb), by licensees that shutdown their reactor units earlier than the expiration of their license terms. Kewaunee permanently ceased commercial operation on May 7, 2013 (Ref. 9). The licensee completed transfer of all spent fuel from the spent fuel pool to the ISFSI in June 2017 (Ref. 10). Crystal River permanently ceased commercial operation on February 20, 2013, and transferred fuel from the reactor vessel to the spent fuel pool. The site expects to have all spent fuel transferred from the spent fuel pool to the ISFSI by the end of year 2019 (e.g., transfer within 6 years of ceasing commercial operation) (Ref. 11). Based on these representative plans, it is reasonable to estimate that licensees will transfer all spent fuel to ISFSIs (e.g., dry cask storage) within 15 years of ceasing commercial operation. After spent fuel is transferred out of the spent fuel pool, the provisions of 10 CFR Part 73 related to stand-alone preemption authority or combined preemption authority and enhanced weapons authority for decommissioning power reactors still apply.
- Away-from-reactor ISFSI Facility— The NRC decided on a 40-year time horizon for away from reactor ISFSI facilities based on the current, standard 40-year license renewal term for these facilities. The 40-year analysis period runs from 2018 (the anticipated effective date of the final rule) through 2058.
- Non-Power Production or Utilization Facility— The NRC decided on a 20-year time horizon for NPUFs based on the current, standard 20 year license renewal term. The 20-year analysis period runs from 2018 (the anticipated effective date of the final rule) through 2038.
- Category I SSNM Facilities—The applicability period for this type of site is estimated to be 16 years. This estimate is based on the average of the remaining license periods for NFS (Ref. 13) and BWXT (Ref. 14) and adding 2 years for the decommissioning period (Ref. 15). This is a conservative assumption because the fuel fabrication facilities are smaller in size and use isotopes with shorter half-lives than operating power reactors. Therefore, it is likely that the decommissioning periods for these facilities may be shorter than for operating power reactors.

Table 3 Regulated Entities Affected by the Final Rule

Type of Facility	Number of Sites that applied for Section 161A Authority	Average Applicability Period (years)
Power reactor licensees	5	37
New power reactor sites	0	75
Sites with only reactors that are in decommissioning	1	15
Away-from-reactor ISFSI facilities	0	20
Non-power production or utilization facilities	0	20
Category I SSNM facilities	1	16
Total	7	Not applicable

Sign Conventions

The sign convention used in this analysis is that all favorable consequences for the alternative are positive and all adverse consequences for the alternative are negative. Negative values are shown using parentheses (e.g., negative \$500 is displayed as (\$500)).

Labor Rates

For regulatory analysis purposes, labor rates are developed wherein only variable costs that are directly related to the implementation and operation and maintenance of the proposed requirement are included. This approach is consistent with guidance set forth in NUREG/CR-4627, “Generic Cost Estimates” (Ref. 16), and general cost-benefit methodology. The NRC incremental labor rate is \$131 per hour (2018 dollars).⁵

The estimated mean industry incremental loaded labor rate is \$106 per hour. The NRC staff derived these labor rates based on data developed from the Bureau of Labor Statistics (Ref. 17) for “Security Guards” (Standard Occupational Code 33-9032), “Power Plant Operators, Distributors, and Dispatchers” (Standard Occupational Code 51-8010) and for “Nuclear Power Reactor Operators” (Standard Occupational Code 51-8011). In addition, the NRC staff performed an uncertainty analysis, which is discussed in Section 5.3.

Base Year

The assumed date of implementation of the final rule is year 2018, so the monetized benefits and costs in this analysis are expressed in year 2018 dollars. One-time implementation costs are assumed to be incurred in year 2018. Ongoing and annual costs of operation related to the alternatives are assumed to begin in year 2019 unless otherwise stated and are then discounted into year 2018 dollars.

⁵ The NRC labor rates presented here differ from those developed under the NRC’s license fee recovery program (10 CFR Part 170). The NRC labor rates for fee recovery purposes are set for cost recovery of the services rendered and as such include nonincremental costs (e.g., overhead, administrative, and logistical support costs).

3.2.3. Assumptions

This subsection discusses the analysis of the costs associated with the implementation of the final rule. The analysis employs the following assumptions and considerations:

- All licensees are assumed to be in full compliance with the existing baseline requirements. The costs to comply with the baseline requirements are not expected to change with the final rule. Therefore, this analysis only presents the costs associated with the final rule changes.
- Implementation costs are assumed to be incurred in year 2018.
- Licensees will incur costs over the applicability period, as presented in Table 3, “U.S. Commercial Nuclear Power Reactor Sites Affected by the Final Rule.” The actual time period that each site will be operated will depend on the term of the operating license and on whether the licensee chooses to operate the site for the duration of the licensed period.
- The costs incurred in each year of the analysis are discounted to the present using a 7-percent and 3-percent discount rate, in accordance with NUREG/BR-0058. (See Section 5 for these results.)
- Based on the firearms background check submittals from the seven sites that received Section 161A authority via confirmatory orders, the NRC staff made the following estimates of the number of security personnel at each category of site:
 - On average, each power reactor site employs 320 security personnel. This is based on averaging the number of firearms background check submittals over the five sites that requested Section 161A authority via confirmatory orders.
 - On average, each Category I SSNM site employs 375 security personnel. This is based on the 320 personnel on average estimate at operating power reactor sites plus 50 additional personnel for tactical response teams.
 - On average, each decommissioning site employs 175 security personnel, which is based on the number of firearms background check submittals that requested Section 161A authority via confirmatory orders and the lower staffing levels following cessation of commercial operation. An away-from-reactor ISFSI is assumed to employ the same number of personnel.
 - For the purposes of this analysis, the seven sites that currently have stand-alone preemption authority are treated as a separate cost group. These seven sites have already completed the application process and the initial set of firearms background checks under the confirmatory order. Once the final rule is issued, the eight licensees associated with the seven sites would need to review the final rule and their procedures and make any changes necessary to meet the requirements of the final rule. The NRC would withdraw the orders 300 days after the publication of the final rule in the *Federal Register*; thereafter, the sites would continue their Section 161A authority under the final rule.

3.2.4. Per Site Costs by Cost Category

For purposes of this analysis, the costs incurred under the final rule were categorized as follows:

- Implementation (one-time) costs for the industry;
- Implementation (one-time) costs for the NRC;
- Recurring and annual costs for the industry;
- Recurring and annual costs for the NRC.

The application for stand-alone preemption authority or combined preemption authority and enhanced weapons authority under Section 161A of the AEA is voluntary. Therefore, any incurred costs due to these Section 161A authority (i.e., voluntary costs) are conditioned on the licensees voluntarily electing and applying for these authority. The following subsections describe the derivation of the estimated per site costs for each of the above cost categories.

3.2.4.1. Industry Implementation Costs

As a result of the final rule, regulated entities who apply for Section 161A authority would be required to take the following one-time actions: (1) read and understand the final rule, (2) develop and submit a Firearms Background Check Plan, (3) conduct firearms background checks on security personnel using NRC Form 754, and (4) train security personnel on the firearms background check process. To estimate costs, the NRC staff made the following assumptions that reflect labor and costs a regulated entity would incur as a result of the final rule:

Firearms Background Check Plan

- On average, a site electing to adopt Section 161A authority would incur 32 hours of licensee staff time to read and understand the final rule. This reflects two staff members spending 16 hours each reading the final rule and associated guidance.
- A site electing to adopt Section 161A authority would incur labor costs to develop and submit a Firearms Background Check Plan. The NRC estimates that site personnel would spend on average 1,560 hours to develop, review, and approve for NRC submission a Firearms Background Check Plan. This estimate is informed by public comments on the proposed rule that stated that 9 months would be reasonable to revise and submit a Firearms Background Check once the rule became final.

Firearms Background Check Processing

- A site electing to adopt Section 161A authority would incur labor costs to complete and submit security personnel for firearms background checks using NRC Form 754. The NRC staff estimates that each NRC Form 754 submittal would require 2 hours of licensee staff time.
- A site electing to adopt Section 161A authority would incur a fee for each NRC Form 754 submitted. A \$70 administrative processing fee is charged to the licensee for each FBI

Form FD-258 fingerprint card submitted to the NRC for the completion of the required firearms background checks.

- Based on the experience with the NRC Form 754 submittals related to the confirmatory orders, the NRC estimates that 0.3 percent of the submittals would receive a delayed or denied response, which would result in additional site processing labor of 8 hours per form on average.

Firearms Background Check Training

- On average, a site electing to adopt Section 161A authority would require 60 hours of site staff labor to develop the initial training for the firearms background checks. The training would address the firearms background check process including actions security personnel can take in the event of a delayed or denied NICS result. The NRC staff estimates that the training would last about 45 minutes.
- A site electing to adopt Section 161A authority would deliver initial firearms background check training to all of their security personnel.

Additional Costs for Combined Preemption Authority and Enhanced Weapons Authority

- The NRC staff estimates that site personnel would need to read and understand the rule requirements and the supporting guidance in order to prepare the necessary documents for requesting combined preemption authority and enhanced weapons authority. Documents that would need to be prepared, reviewed, or revised as appropriate are: (1) an enhanced weapons training and qualification plan, (2) the site physical security plan, (3) the safeguards contingency plan, and (4) the weapons safety assessment.
- Review rule requirements and supporting guidance. The NRC staff estimates that site personnel would require 160 hours to read and understand the rule requirements and the supporting guidance in order to prepare the required enhanced weapons authority documents.
- Enhanced weapons training and qualification plan. The NRC staff estimates that site personnel would require 160 hours to prepare and issue this training and qualification plan. The activities that contribute to this estimate are as follows:
 - Site personnel would require 24 hours to research information developed by nationally recognized firearms organizations, standard setting bodies, or from standards developed by Federal agencies, such as the U.S. Department of Homeland Security's Federal Law Enforcement Training Center, the U.S. Department of Energy's National Training Center, and the U.S. Department of Defense; State law-enforcement training centers; or State Division (or Department) of Criminal Justice Services Training Academies.
 - Site personnel would require 120 hours to prepare an initial draft of the enhanced weapons training and qualification plan using information collected.
 - Site personnel would require 16 hours for operations and management review, comment resolution, and concurrence.

- Site physical security plan. The NRC estimates that site personnel would require 132 hours to review, revise, and reissue this plan. The activities that contribute to this estimate consists of 104 hours to review and revise the plan, 20 hours for operations and management review, and 8 hours for comment resolution and concurrence.
- Safeguards contingency plan. The NRC estimates that site personnel would require 160 hours to review, revise, and reissue this plan. The activities that contribute to this estimate consist of 120 hours to review and revise the plan, 20 hours for operations and management review, and 20 hours for comment resolution and concurrence.
- Weapons safety assessment. The NRC estimates that site personnel would require 480 hours to prepare and issue this assessment. The activities that contribute to this estimate are as follows:
 - Site personnel would require 80 hours to collect and develop information necessary to perform the assessment.
 - Site personnel would require 320 hours to perform and document an initial draft of the weapons safety assessment.
 - Site personnel would require 56 hours for operations and management review.
 - Site personnel would require 24 hours for comment resolution and concurrence.
- Sites that receive enhanced weapons authority are assumed to purchase enhanced weapons and ammunition in the first year the final rule is effective (2018). The analysis assumes that the site purchases sufficient weapons for each security staff member on shift plus five spares. Each weapon costs between \$1,164 and \$2,935, with a best estimate of \$2,314. The NRC estimates that the site will buy 1,000 rounds of ammunition with each weapon. A round of ammunition costs between \$0.46 and \$0.51, with a best estimate of \$0.48.
- Initial personnel proficiency training and qualification in use of the enhanced weapons. The NRC estimates that security personnel would become proficient with the weapons following 4 hours of classroom training and fifteen 2-hour firing range sessions. During each firing range session, each person will fire 100 rounds of ammunition and use \$68 of other consumables.

Section 161A Submittal

- A site electing to adopt Section 161A authority would incur costs to assemble and submit the application under oath or affirmation with existing (for stand-alone preemption authority) or modified (for combined preemption authority and enhanced weapons authority) physical security and safeguards contingency plans.

Physical Security Event Notifications

Alternative 2 revises requirements related to physical security event notifications. This alternative also proposes to add new event notification requirements on the theft or loss of enhanced weapons, and actual or imminent hostile actions. The NRC staff made the following

assumptions to estimate the implementation costs associated with the physical security event notification rule changes, which is applicable to all sites listed in Table 2a, “Regulated Entities Impacted by the Physical Security Event Notifications”:

- Each site would update their internal procedures to reflect the final rule and would conduct one-time training of senior reactor operators and supervisors regarding the revised physical security event notifications procedures. The NRC estimates site personnel will require between 8 to 20 hours to familiarize themselves with the rule changes and will require between 8 and 40 hours to revise the procedures and between 4 and 18 hours to review, resolve comments, and issue the revised procedure.
- Each site would require between 10 and 30 hours preparing training materials on the revised event notification procedure and between 10 and 30 hours to train senior reactor operators and supervisors responsible for performing this notification function.

Suspicious Activity Reporting

Alternative 2 introduces a new requirement related to suspicious activity reporting. The NRC staff made the following assumptions to estimate the implementation costs associated with the reporting of suspicious activities, which is applicable to all sites listed in Table 2b, “Regulated Entities Impacted by the Suspicious Activity Reporting”:

- Each site would update their internal procedures to reflect the final rule and would conduct one-time training of senior reactor operators and supervisors regarding the revised suspicious activity reporting procedures. The NRC estimates site personnel will require between 8 to 20 hours to familiarize themselves with the rule changes and will require between 8 and 40 hours to revise the procedures and between 4 and 18 hours to review, resolve comments, and issue the revised procedure.
- Each site would require between 10 and 30 hours preparing training materials on the suspicious activity reporting procedure and between 10 and 30 hours to train senior reactor operators and supervisors responsible for performing this reporting function.

Table 5, “Industry Implementation Costs by Cost Category per Site,” shows the estimated Industry implementation costs for each site for the requirements regarding Section 161A authority, physical security event notifications, and suspicious activity reporting.

Table 4 Industry Implementation Costs by Cost Category per Site

Cost Category	Type of Site		
	Operating and New Reactor Sites	Decommissioning Plant Sites	Category I SSNM Sites
Section 161A Submittal			
Assemble and submit the Section 161A application under oath or affirmation	\$ (25,000)	\$ (25,000)	\$ (25,000)
Applications to terminate Section 161A authorities	\$ (42,000)	\$ (42,000)	\$ (42,000)
Establish procedures for quality finger print card submission			\$ (8,000)
Section 161A submittal subtotal	\$ (68,000)	\$ (68,000)	\$ (76,000)
Stand-alone Preemption Authority			
Read the final rule and guidance to understand regulatory requirements	\$ (3,000)	\$ (3,000)	\$ (3,000)
Develop and issue Firearms Background Check Plan	\$ (37,000)	\$ (37,000)	\$ (37,000)
Develop training module for Section 161A background check process	\$ (17,000)	\$ (17,000)	\$ (17,000)
Train Personnel on Firearms Background Checks	\$ (25,000)	\$ (14,000)	\$ (30,000)
Complete, collect, and submit firearm background check forms (NRC Form 754)	\$ (68,000)	\$ (37,000)	\$ (80,000)
Resolve issues with submitted firearms background check forms	\$ (1,000)	\$ (,000)	\$ (1,000)
Firearms background check form processing fee	\$ (22,000)	\$ (12,000)	\$ (26,000)
Covered weapons subtotal	\$ (174,000)	\$ (121,000)	\$ (194,000)
Combined Preemption Authority and Enhanced Weapons			
Read the final rule and guidance to understand regulatory requirements	\$ (17,000)	\$ (17,000)	\$ (17,000)
Develop and issue the Enhanced Weapons Training and Qualification Plan	\$ (17,000)	\$ (17,000)	\$ (17,000)
Review, revise, and reissue the Site Physical Security Plan	\$ (14,000)	\$ (14,000)	\$ (14,000)
Review, revise, and reissue the Safeguards Contingency Plan	\$ (17,000)	\$ (17,000)	\$ (17,000)
Develop and issue the Weapons Safety Assessment	\$ (51,000)	\$ (51,000)	\$ (51,000)
Initial purchase of enhanced weapons	\$ (338,000)	\$ (196,000)	\$ (391,000)
Initial purchase of enhanced weapon ammunition	\$ (66,000)	\$ (38,000)	\$ (77,000)
Enhanced weapons qualification (labor cost)	\$ (34,000)	\$ (19,000)	\$ (40,000)
Enhanced weapons qualification (consumables)	\$ (22,000)	\$ (12,000)	\$ (26,000)
Enhanced weapons subtotal	\$ (576,000)	\$ (381,000)	\$ (650,000)
Physical Security Event Notifications			
Review, revise, and reissue the site physical security event notification procedure	\$ (4,000)	\$ (4,000)	\$ (4,000)
Develop the physical security event notification training module	\$ (2,000)	\$ (2,000)	\$ (2,000)
Conduct physical security event notification training	\$ (2,000)	\$ (2,000)	\$ (2,000)
Physical security event notification subtotal	\$ (9,000)	\$ (9,000)	\$ (9,000)
Suspicious Activity Reporting			
Review, revise, and reissue the site suspicious activity event notification procedure	\$ (4,000)	\$ (4,000)	\$ (4,000)
Develop the suspicious activity event notification training module	\$ (2,000)	\$ (2,000)	\$ (2,000)
Conduct suspicious activity event notification training	\$ (2,000)	\$ (2,000)	\$ (2,000)
Suspicious activity event notification subtotal	\$ (9,000)	\$ (9,000)	\$ (9,000)
Site total	\$ (834,000)	\$ (587,000)	\$ (937,000)

Stand-Alone Preemption Authority Transition Activities

Eight licensees at seven sites received stand-alone preemption authority via confirmatory orders. No licensees applied for combined preemption authority and enhanced weapons authority via orders. If the final rule is promulgated, these seven sites would be required to transition from the stand-alone preemption authority under the confirmatory orders to the requirements of the published regulation. To estimate costs, the NRC staff made the following assumptions that reflect labor and costs these licensees would incur to conform to the requirements of the final rule.

- Each site that received stand-alone preemption authority via confirmatory orders would incur 60 hours of licensee staff time to read and understand the final rule. This reflects two staff members spending 30 hours each reading the final rule and associated guidance.
- Each site that received stand-alone preemption authority via confirmatory orders would incur 120 hours of licensee staff time to review the licensee's procedures and plans to identify whether any changes are necessary to comply with the final rule.
- On average, site personnel would incur 240 hours of licensee staff time to revise the licensee's procedures and plans to conform to the requirements of the final rule and issue the revised documents.

Table 5 shows the estimated industry implementation costs for these seven sites to transition to the final rule requirements.

Table 5 Industry Implementation Costs for Stand-Alone Preemption Authority Transition Activities

Activity	No. of Transition Sites	Hours per Site	Unit Cost	Transition Costs for all Sites with Stand-Alone Preemption Authority
Transition from Orders to Rule Requirements				
Read the final rule and guidance to understand Section 161A requirements as compared to the confirmatory orders	7	60	\$106	(\$45,000)
Review associated procedures and plans	7	120	\$106	(\$89,000)
Revise and reissue affected procedures and plans	7	240	\$106	(\$178,000)
Establish procedures for quality fingerprint card submission (Category I SSNM facility)	1	80	\$106	(\$8,000)
Transition costs				(\$320,000)

3.2.4.2. NRC Implementation Costs Incurred

Because of the final rule, the NRC would incur costs to review and approve applications for Section 161A authority submitted by licensees who voluntarily elect to apply for stand-alone preemption authority or combined preemption authority and stand-alone preemption authority. The NRC is unaware of any eligible site not currently covered under a confirmatory order that

plans to elect Section 161A authority under this rule. Therefore, the rule’s total costs do not assume any new Section 161A authority is sought. However, for completeness this regulatory analysis estimates the costs the NRC would incur under the final rule were a licensee to apply for Section 161A authority:

- The NRC would incur labor costs to review and approve applications for Section 161A authority. Based on the NRC’s experience processing the seven stand-alone preemption authority orders, the NRC expects that NRC staff would expend 1,040 hours performing the application review and issuing a safety evaluation.
- For sites electing combined preemption authority and enhanced weapons authority, the licensee would submit additional documentation (e.g., a weapons safety assessment) for the use of enhanced weapons on site. The NRC expects to expend an additional 160 hours to review this information and provide input into the safety evaluation.
- When the final rule is effective, any new applications for Section 161A authority will allow the NRC to avert costs related to issuing confirmatory orders. Based on previous NRC experience issuing confirmatory orders, the NRC staff estimates it would save about 400 hours per application. Since the NRC assumed that there will be no new Section 161A authority applications, this averted cost was not included as a calculated benefit in this regulatory analysis.

Table 6 shows the estimated NRC implementation costs incurred per site, by type of site.

Table 6 Estimated NRC Implementation Costs by Cost Category per Site

Cost Category	Implementing Costs by Type of Site (per site)		
	Power Reactor Sites	Decommissioning Power Reactor Sites	Category I SSNM Sites
Time for NRC to review the stand-alone preemption authority submittals and issue a safety evaluation	(\$137,000)	(\$137,000)	(\$137,000)
Time for NRC to review combined preemption authority and enhanced weapons authority submittal	(\$21,000)	(\$21,000)	(\$21,000)

Transition Activities

The NRC would incur 12 hours of labor to document the withdrawal of the orders for each licensee. The estimated costs to perform these transition activities are presented in Table 7.

Table 7 NRC Implementation Costs for Stand-Alone Preemption Authority Transition Activities

Activity	No. of Transition Sites	Hours per Site	Unit Cost	Transition Costs for all Sites with Stand-Alone Preemption Authority
Transition from Orders to Rule Requirements				
NRC documents the withdrawal of the order for each licensee	7	12	\$132	(\$11,000)
Transition costs				(\$11,000)

3.2.4.3. Industry Operation Costs

As a result of the final rule, a licensee would incur costs associated with Section 161A authority, if elected, and physical security event notifications and suspicious activity reporting.

The NRC made the following assumptions, which reflect labor and fees a regulated entity who elects Section 161A authority would incur as a result of the final rule:

Stand-Alone Preemption Authority

- **Annual activities**
 - A site would average 30 hours of staff time each year to update the initial firearms background check training. The update would address changes to the firearms background check process.
 - Site security personnel would receive 0.75 hours of background check training annually.
 - Based on NRC staff experience with security staffing at regulated entities, there is a 5-percent turnover or break in service for security personnel on average each year. Sites would incur costs related to completing, checking, and submitting firearms background checks for replacement staff hired each year to fill vacancies.
 - A licensee would incur fees related to conducting firearms background checks for new employees each year.
- **Five-year recurring activities**
 - A licensee would incur labor costs for resubmitting security personnel for firearms background checks using NRC Form 754 and fingerprints at least every 5 years. The NRC staff assumes that the facility's security staffing level remains constant.
 - A licensee would pay a fee for each firearms background check (NRC Form 754 and fingerprints) submitted for the 5-year resubmittals. The fee charged for each firearms background check is \$70.

Combined Preemption Authority and Enhanced Weapons Authority

- **Annual activities**
 - Sites that receive combined preemption authority and enhanced weapons authority would periodically replace weapons and purchase replacement parts each year to maintain the weapons. The NRC estimated that the average cost for these replacements parts are 1.5 percent of initial cost.
 - Sites that receive combined preemption authority and enhanced weapons authority would be required to conduct monthly and annual inventories of enhanced weapons. The annual check (i.e., the 12th monthly check) requires the checking of the gun's serial number. The NRC estimates that site personnel

will require an average of 5 minutes per weapon to perform the monthly check and 10 minutes per weapon for the annual check.

- Maintaining personnel qualification in use of weapons. The NRC estimates that security personnel would maintain their proficiency with the weapons by practicing at the firing range throughout the year. The NRC estimates that each site security personnel would average 1,500 practice rounds annually. The NRC assumes that security personnel will shoot 100 rounds during each firing range practice session, which includes fifteen 2-hour firing range sessions per year.
 - In addition, licensees will incur costs for annual activities for stand-alone preemption authority listed above (e.g., background check training and the completion of background checks).
- **Five-year recurring activities**
 - The recurring activities for combined preemption authority and enhanced weapons authority are the same as those listed above for stand-alone preemption authority listed above.

Table 8 shows the estimated industry operations recurring costs by cost category and type of site for Section 161A authority.

Table 8 Industry Operations Recurring Costs by Cost Category and Type of Site for Section 161A Authority

Type of Site	Annual Cost (per site)	5 Year Interval Incremental Cost (per site)
Stand-Alone Preemption Authority		
Power Reactor Sites (includes at-reactor ISFSIs)	(\$38,000)	(\$91,000)
Decommissioning Power Sites and Away-from-Reactor ISFSI Sites	(\$25,000)	(\$49,000)
Category I SSNM Sites	(\$44,000)	(\$106,000)
Combined Preemption Authority and Enhanced Weapons Authority		
Power Reactor Sites (includes at-reactor ISFSIs)	(\$77,000)	\$0
Decommissioning Power Reactor Sites and Away-from-Reactor ISFSI Sites	(\$43,000)	\$0
Category I SSNM Sites	(\$89,000)	\$0

Table 9 shows the total industry operations costs for representative sites that may elect Section 161A authority based on the recurring costs presented in Table 8. Because these elections are voluntary, a site can avoid these costs by not electing this authority. The costs in Table 9 are derived by performing a discounted cash flow analysis of the annual operation costs on a per site basis that is aggregated over the applicability period.

Table 9 Industry Operation Costs on a Per Site Basis for Representative Sites that May Elect Section 161A Authority

Site Description	Cost Category	Average Applicability Period (Years)	Undiscounted	7% NPV	3% NPV
Representative Power Reactor Site (includes at-reactor ISFSIs)	Stand-Alone Preemption Authority	37	(\$2,017,000)	(\$754,000)	(\$1,242,000)
	Combined Preemption and Enhanced Weapons Authority		(\$2,757,000)	(\$1,068,000)	(\$1,722,000)
	Total		(\$4,774,000)	(\$1,822,000)	(\$2,964,000)
Representative Decommissioning Power Reactor Site and Away-from-Reactor ISFSI Sites	Stand-Alone Preemption Authority	18	(\$521,000)	(\$326,000)	(\$420,000)
	Combined Preemption and Enhanced Weapons Authority		(\$639,000)	(\$415,000)	(\$523,000)
	Total		(\$1,160,000)	(\$741,000)	(\$943,000)
Representative Category I SSNM Site	Stand-Alone Preemption Authority	16	(\$828,000)	(\$482,000)	(\$643,000)
	Combined Preemption and Enhanced Weapons Authority		(\$1,700,000)	(\$990,000)	(\$1,320,000)
	Total		(\$2,528,000)	(\$1,472,000)	(\$1,963,000)

Physical Security Event Notifications and Suspicious Activity Reporting

The physical security event notification requirements that are new as part of this rule are two types—(1) imminent or actual hostile actions and (2) lost or stolen enhanced weapons. For imminent or actual hostile actions, the NRC staff estimates one such event per 15 years. Additionally, NPUFs are now subject to additional physical security event notification requirements. As a result, the following number of reported events per site annually are assumed:

- 5.88×10^{-4} actual or imminent hostile action notifications
- 0 enhanced weapons related notifications⁶
- 1.3×10^{-1} additional NPUF physical security notifications.

⁶ This is based on the assumption that no additional licensees would apply for combined preemption authority and enhanced weapons authority.

Under new section 10 CFR 73.1200, “Notification of physical security events,” the licensee would notify the NRC Headquarters Operations Center by telephone of various physical security events (e.g., actual or imminent hostile actions, significant facility or transportation security events, facility or transportation security challenges, or facility or transportation security program failures). For these events, a written follow-up report is also required within 60 days in accordance with new section 10 CFR 73.1205, “Written follow-up reports of physical security events.” Parts 50 and 52 licensees submit written follow-up reports to the NRC using NRC Form 366, “Licensee Event Report.” All other classes of licensees submit written follow-up reports by letter format. The NRC estimates that the licensee would require 15 minutes to make the telephone notifications and 80 hours to complete and submit the written follow-up reports. This estimate is based on current licensee experience.

Table 10, “Industry Operation Costs for Physical Security Event Notifications,” shows the estimated industry operations recurring costs for the reporting of physical security event notifications.

Table 10 Industry Operation Costs for Physical Security Event Notifications

Site Description	Cost Category	Undiscounted	7% NPV	3% NPV
All Applicable Sites	Physical Security Event Notifications	(\$24,000)	(\$12,000)	(\$17,000)

The net present value of the new physical security event notification costs for all sites over their applicability period will range between (\$12,000) using a 7-percent discount rate and (\$17,000) using a 3-percent discount rate. Additionally, the time spent by the licensees to write reports for physical security events is factored into these operation costs.

To estimate the incremental recurring and annual costs associated with suspicious activity reporting requirements, the analysis relies on the following assumptions:

- The suspicious activity reporting requirements are currently reported voluntarily by the licensees. Per the NRC staff, the average number of suspicious activities reported by a site is 2.5 per year.
- Under new section 10 CFR 73.1215, “Suspicious activity reports,” if suspicious activities are detected, it is estimated that the licensee would take 30 minutes to report the suspicious activity. No written follow-up report is required for these notifications.

As shown in Table 11, “Industry Operation Costs for Suspicious Activity Reporting,” the net present value of suspicious activity reporting costs for all sites over their applicability period will range between (\$121,000) using a 7-percent discount rate and (\$184,000) using a 3-percent discount rate. Currently, these events are voluntarily reported by the industry in response to generic communications and guidance from the FBI. The NRC staff has used the voluntary industry suspicious activity reporting initiative to estimate the costs and benefits.

Table 11 Industry Operation Costs for Suspicious Activity Reporting

Site Description	Cost Category	Undiscounted	7% NPV	3% NPV
All Applicable Sites	Suspicious Activity Reporting	(\$282,000)	(\$122,000)	(\$184,000)

All consequences of a regulatory change are measured relative to a regulatory baseline, which is how things would be if the proposed alternative were not imposed. Because voluntary reporting for the proposed regulatory action exists, the future role of whether this voluntary reporting will continue indefinitely must be determined. This determination would affect the baseline, which in turn would affect the calculation of incremental costs and benefits. For example, if “full credit” is given to these voluntary actions (i.e., it is assumed that the voluntary reporting will continue in the future), the incremental benefits attributable to these provisions in the final regulation are diminished. Alternatively, if “no credit” is given, the incremental values assigned to the rule are increased. For the purposes of this regulatory analysis, the costs and benefit results are calculated based on giving “no credit” for this voluntary reporting.

3.2.4.4. NRC Operation Costs

The NRC would incur costs to review and receive physical security event notifications, review and receive suspicious activity reports and process background checks. To assess these costs, the analysis relies on the following assumptions:

- On average, the NRC will require 1 hour to review the written report for notification of a physical security event. The NRC estimates for physical security events that there would be 5.88×10^{-4} actual or imminent hostile actions reported per site each year (site-year) and 1.3×10^{-1} additional physical security events reported per NPUF site each year.
- On average, the NRC estimates it will require 15 minutes of NRC staff time to receive a telephone notification of a suspicious activity. As discussed in Section 4.2.4.3, the NRC estimates on average, the number of suspicious activities reported by a site is 2.5 per year.
- On average, the NRC estimates that it will require 15 minutes of NRC staff time to process a background check. There are a total of 550 background checks per year that the NRC will process.

Table 12 provides the net present value of the NRC operation costs aggregated over the applicability period for all sites.

Table 12 NRC Operation Costs as a Result of the Final Rule

Site Description	Undiscounted	7% NPV	3% NPV
All Applicable Sites (Physical Security Event Notifications)	(\$10,000)	(\$6,000)	(\$8,000)
All Applicable Sites (Suspicious Activity Reporting)	(\$348,000)	(\$152,000)	(\$228,000)
Process background checks	(\$514,000)	(\$224,000)	(\$337,000)
Total	(\$358,000)	(\$157,000)	(\$236,000)

4. Evaluation of Benefits and Costs

This section organizes the analytical results into four sections. Section 5.1 presents results on the benefits and costs of the final rule as a whole, as well as disaggregated results for each of the regulatory requirements that comprise the final rule. Section 5.2 evaluates the uncertainties and identifies those uncertain variables that most affect the variation in the results. Section 5.3 discusses disaggregation of the requirements in the final rule. Section 5.4 addresses the applicability of a safety goal evaluation to the final rule.

4.1. Benefits and Costs of the Final Rule

This section discusses the incremental benefit and cost estimates for the final rule.

4.1.1. Summary of Benefits and Costs

Table 13 summarizes the incremental benefits and costs of the final rule as compared to the baseline.

The final rule as a whole (Alternative 2) would result in an estimated cost of between (\$2.73) million at a 7-percent discount rate and (\$2.95) million at a 3-percent discount rate. These costs are associated with four affected attributes—industry implementation and operation and NRC implementation and operation. Section 4.2 provides detail on the incremental activities under the final rule, and estimates the one-time, recurring, and annual costs associated with these activities.

Overall, the benefits of the final regulation include enhanced public safety and security resulting from increased defensive capability to interdict and neutralize an attack or potentially to deter an attack for those entities that opt to employ the voluntary Section 161A authority. Also, the final rule implements the mandates of Section 161A of the AEA, as described in the Firearms Guidelines. The final rule also increases regulatory efficiency as it obviates the need for confirmatory orders if any new Section 161A authority is sought. Additionally, the physical security event notification regulations clarify the regulatory requirements for reporting physical security events by grouping these events into several timeliness categories (e.g., 15-minute, 1-hour, 4-hour, and 8-hour notifications). The suspicious activity reporting requirements also clarify the process and type of events to report to the NRC and other law enforcement agencies.

In so doing, the NRC’s primary mission essential function of threat assessment for licensed facilities, materials, and shipping activities is supported.

Table 13 Summary of Overall Benefits and Costs (Quantitative and Qualitative)

	Benefits	Costs
<p>Alternative 2: Final Rule</p>	<p><u>Stand-Alone Preemption Authority Transition Activities</u></p> <p>Statute Requirement – Section 161A of the AEA provides that the Commission shall, with the approval of the AG, develop and promulgate guidelines for the implementation of this statute. This includes stand-alone preemption authority and combined preemption authority and enhanced weapons authority. The statute also includes provisions for firearms background checks for the security personnel of those licensees who apply for Section 161A authority. The final rule is necessary to implement Section 161A of the AEA.</p> <p>Safeguards and Security Considerations – The regulations in the enhanced weapons rulemaking will comply with statutory requirements and provide assurance that public health and safety and the common defense and security will be enhanced because of licensees’ increased defensive capability to interdict and neutralize an attack, or potentially deter an attack.</p> <p>Regulatory Efficiency – The final rule would result in qualitative enhancements to regulatory efficiency. Publishing the rule would obviate the need for additional enhanced weapons designation and confirmatory orders.</p> <p><u>Physical Security Event Notifications and Suspicious Activity Reporting</u></p> <p>Safeguards and Security Considerations – The changes to both physical security event notification and suspicious activity reporting requirements support the NRC’s primary mission essential functions of threat assessment for licensed facilities, materials, and shipping activities.</p> <p>Regulatory Efficiency – The final rule would result in qualitative enhancements to regulatory efficiency. The changes to the physical security event notification and suspicious activity reporting requirements would clarify the process and types of events reported to the NRC.</p> <p>Other Government Agencies – Reporting suspicious activities to the local FBI and FAA (for suspicious activities</p>	<p><u>Summary</u></p> <p>Implementation Costs: (\$2.44 million) using a 7% discount rate (\$2.52 million) using a 3% discount rate</p> <p>Operation Costs: (\$0.29 million) using a 7% discount rate (\$0.44 million) using a 3% discount rate</p> <p>Total Costs: (\$2.73 million) using a 7% discount rate (\$2.95 million) using a 3% discount rate</p> <p><u>Stand-Alone Preemption Authority Transition Activities</u></p> <p>Industry Implementation Costs: (\$0.37 million) using a 7% discount rate (\$0.44 million) using a 3% discount rate</p> <p>Industry Operation Costs: No incremental operation costs</p> <p>NRC Implementation Costs: (\$0.01 million)</p> <p>NRC Operation Costs: No incremental operation costs</p> <p>Total Implementation Costs: (\$0.38 million) using a 7% discount rate (\$0.46 million) using a 3% discount rate</p> <p>Total Operation Costs: No incremental operation costs</p> <p>Total Stand-Alone Preemption Authority Transition Activities Cost: (\$0.38 million) using a 7% discount rate (\$0.46 million) using a 3% discount rate</p> <p><u>Physical Security Event Notifications</u></p> <p>Industry Implementation Costs: (\$1.04 million)</p> <p>Industry Operation Costs: (\$0.012 million) using a 7% discount rate (\$0.017 million) using a 3% discount rate</p> <p>NRC Implementation Costs: No incremental implementation costs</p> <p>NRC Operation Costs: (\$0.006 million) using a 7% discount rate (\$0.008 million) using a 3% discount rate</p>

	Benefits	Costs
	<p>involving aircraft) field offices will add to the information available about security trends.</p> <p>Other Considerations – Currently, the two types of security event notifications that the rule alternative would require are reported voluntarily by industry in response to generic communications and guidance from the FBI. As a result, the benefits that would be attributed to this provision in the final regulation are diminished. Similarly, the costs calculated in this analysis based on giving “no credit” to the current reporting may be overstated because the existing licensee procedures and processes may already meet the intended regulatory standard.</p>	<p>Total Implementation Costs: (\$1.04 million)</p> <p>Total Operation Costs: (\$0.018 million) using a 7% discount rate (\$0.025 million) using a 3% discount rate</p> <p>Total Physical Security Event Notifications Cost: (\$1.05 million) using a 7% discount rate (\$1.06 million) using a 3% discount rate</p> <p><u>Suspicious Activity Reporting</u></p> <p>Industry Implementation Costs: (\$1.02 million)</p> <p>Industry Operation Costs: (\$0.12 million) using a 7% discount rate (\$0.18 million) using a 3% discount rate</p> <p>NRC Implementation Costs: No incremental implementation costs</p> <p>NRC Operation Costs: (\$0.15 million) using a 7% discount rate (\$0.23 million) using a 3% discount rate</p> <p>Total Implementation Costs: (\$1.02 million)</p> <p>Total Operation Costs: (\$0.27 million) using a 7% discount rate (\$0.41 million) using a 3% discount rate</p> <p>Total Suspicious Activity Reporting Cost: (\$1.29 million) using a 7% discount rate (\$1.43 million) using a 3% discount rate</p>

4.2. Uncertainty Analysis

To determine the robustness of the costs and net benefits of the final rule, the NRC staff examined how the industry and the NRC costs change due to uncertainties associated with the NRC staff’s analytical assumptions and input data. As mentioned in Section 4.2, the NRC used Monte Carlo simulations to examine the impact of uncertainty on the estimated net benefits of the proposed rule. These Monte Carlo simulations were performed using the @RISK® software program.⁷

Monte Carlo simulations forecast uncertainty by replacing the point estimates of the variables used to estimate base case costs and benefits with probability distributions. By defining input variables as probability distributions as opposed to point estimates, the effect of uncertainty on the results of the analysis (i.e., the net benefits) can be effectively modeled.

The probability distributions chosen to represent the different variables in the analysis were bounded by the range referenced input, historical data, and the NRC staff’s professional judgment. When defining the probability distributions in the Monte Carlo simulation, summary

⁷ Information about this software is available online at www.palisade.com.

statistics are needed to characterize the distributions. These summary statistics include the minimum, most likely, and maximum values of a program evaluation and review technique (PERT) distribution.⁸ The PERT distribution was used to reflect the relative spread and skewness of the distribution defined by the three estimates.

Appendix C identifies the data elements, the distribution, and the summary statistics used in the uncertainty analysis.

4.2.1. Uncertainty Analysis Results

The Monte Carlo simulation was performed by repeatedly recalculating the results 10,000 times. For each analysis iteration, the values identified in Appendix C were chosen randomly from the probability distributions that define the input variables. The value of the output variables was recorded for each iteration, and these resulting output variable values were used to define the resultant probability distribution.

For each figure below, 10,000 Monte Carlo simulations were run in which the key variables were changed to assess the effect on costs. The cost distributions illustrated in the following subsections represent the incremental costs from the regulatory baseline (Alternative 1) and provide descriptive statistics concerning the uncertainty distribution. The 5-percent and the 95-percent values that appear as vertical lines with a numerical value at the top, as shown in Figure 1, illustrate the 5-percent and 95-percent values, respectively.

⁸ A PERT distribution is a special form of the beta distribution with a minimum and maximum value specified. The shape parameter is calculated from the defined *most likely* value. The PERT distribution is similar to a triangular distribution, in that it has the same set of three parameters. Technically, it is a special case of a scaled beta (or beta general) distribution. It can generally be considered to be superior to the triangular distribution when the parameters result in a skewed distribution, as the smooth shape of the curve places less emphasis in the direction of skew. Similar to the triangular distribution, the PERT distribution is bounded on both sides, and therefore may not be adequate for some modeling purposes where it is desired to capture tail or extreme events.

4.2.1.1. Stand-Alone Preemption Authority Transition Activities

Figure 1 Industry Stand-Alone Preemption Authority Transition Activities Implementation Costs (7% Discount Rate)

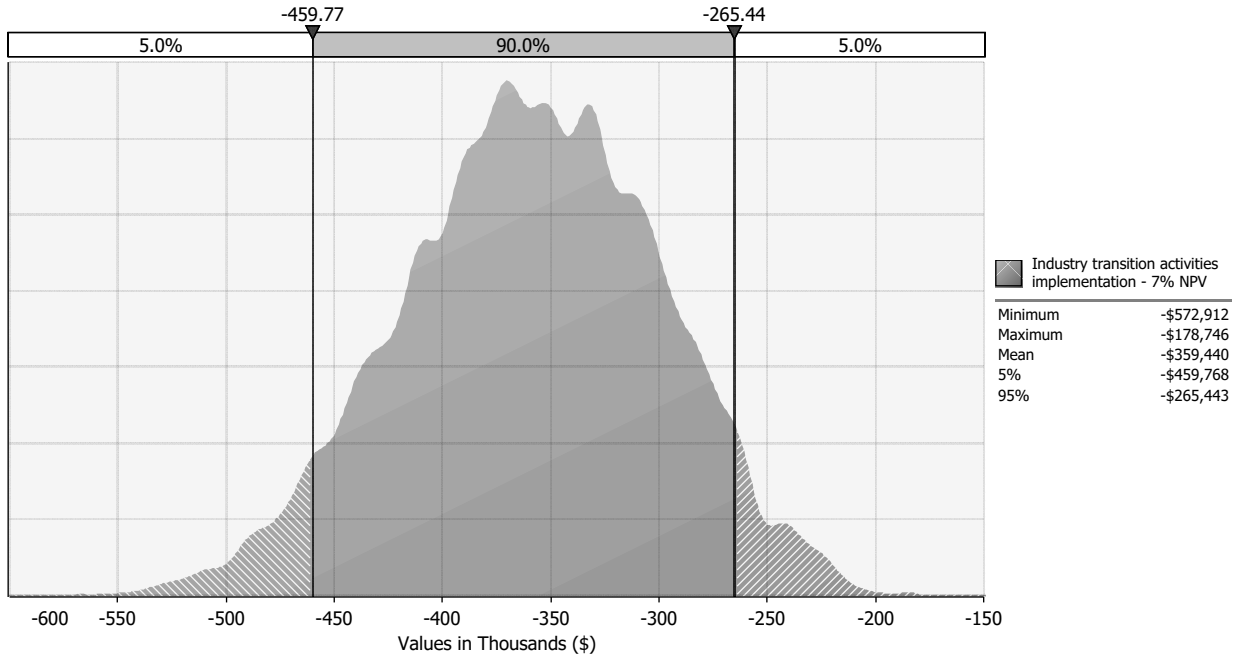


Figure 2 NRC Stand-Alone Preemption Authority Transition Activities Implementation Costs (7% Discount Rate)

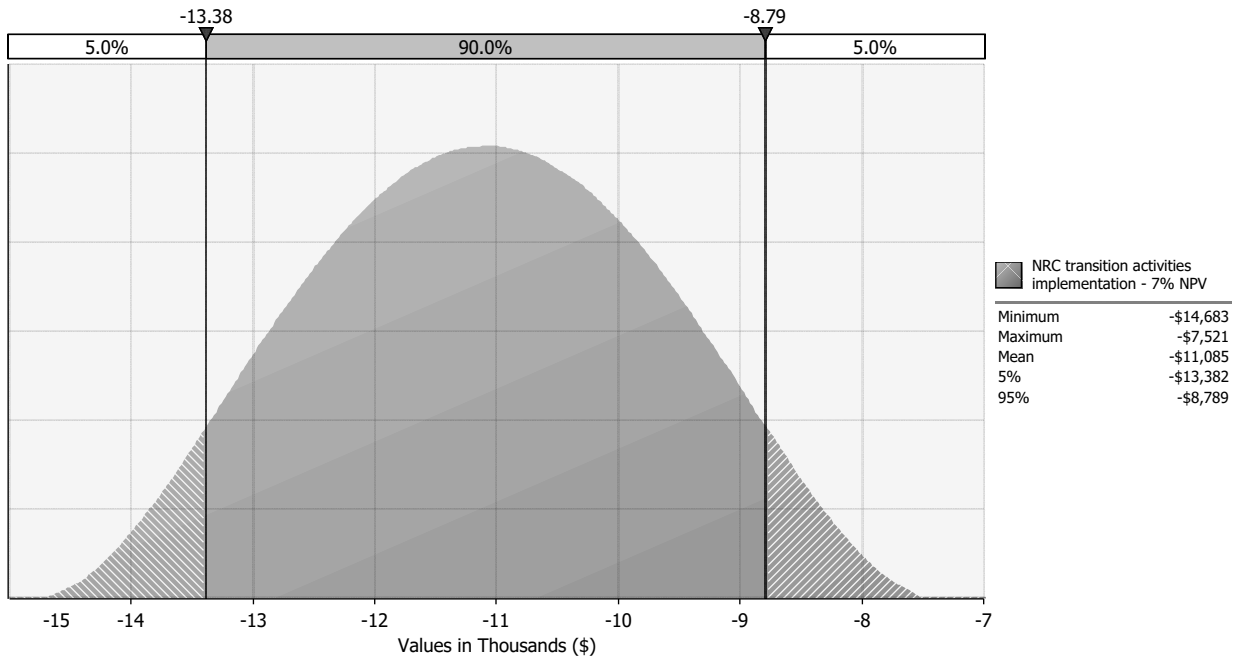


Figure 3 Total Stand-Alone Preemption Authority Transition Activities Implementation Costs (7% Discount Rate)

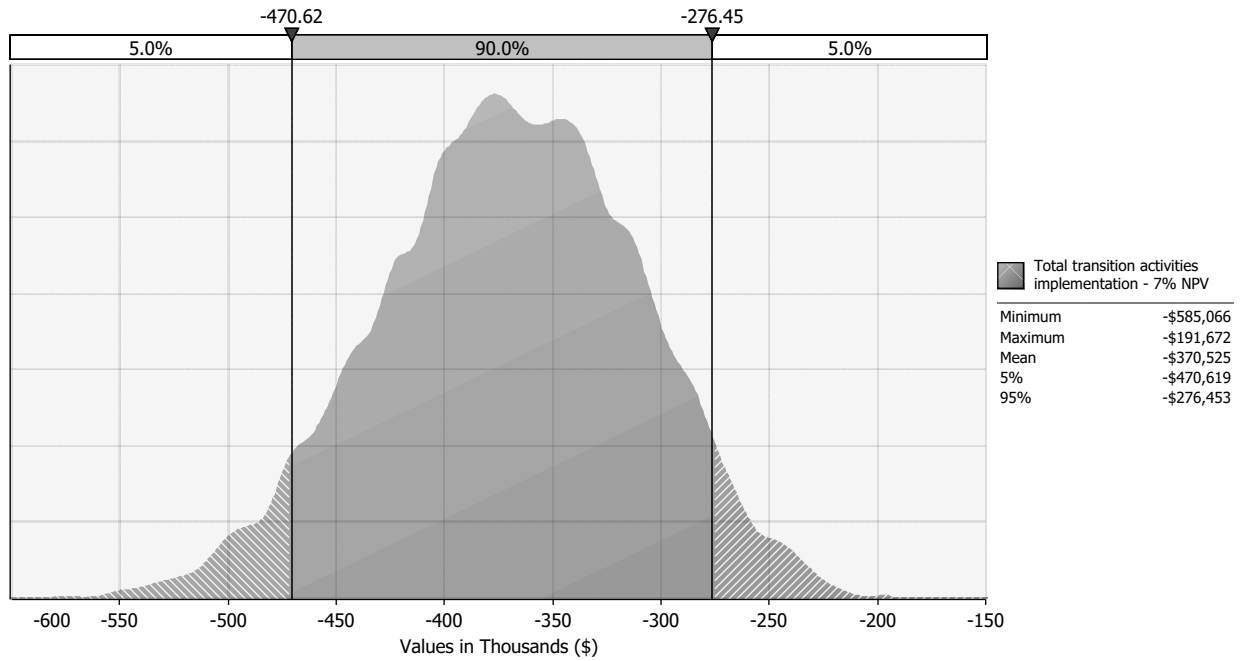
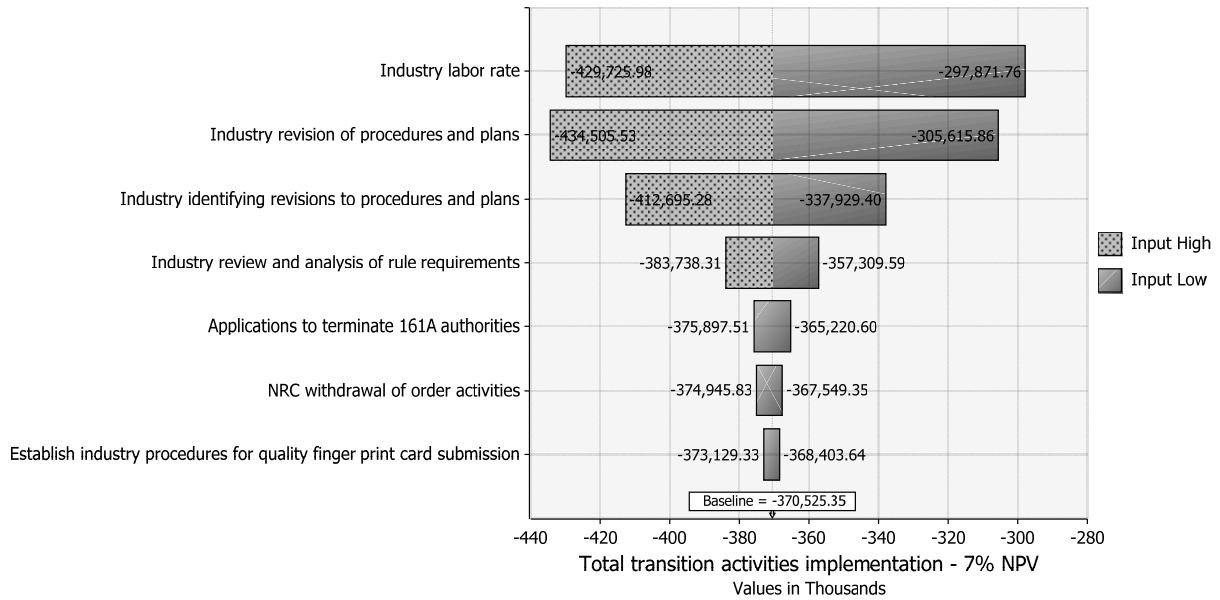


Figure 4 Stand-Alone Preemption Authority Transition Activities Cost Drivers (7% Discount Rate)



To estimate the effect of each uncertain variable on the net benefits, a regression was performed with the net benefits modeled as the dependent variable and the inputs as the independent variables. The result of this regression is called a tornado diagram and it represents in vertical order the variables with the greatest influence on the net benefits. The

tornado diagram also displays the resulting impact on the calculated mean value for each of the input variables.

Figure 4 presents the tornado diagram for the total cost of the final rule using a 7-percent discount rate. As shown in this figure, the cost drivers that have the greatest influence on the total costs are the costs for licensees to review and revise their procedures and plans to conform to the regulation. These variables, which are shown to have a large effect on the resulting net benefits, may deserve more attention and scrutiny than other variables shown to have a smaller or minimal effect.

From an examination of Figures 1 through 4, the simulation analysis shows that the estimated cost for transitioning seven sites from the stand-alone preemption authority via confirmatory orders to the requirements under the final rule and to sunset these orders range between (\$585,000) and (\$192,000) with a mean value of (\$371,000). Examining the range of the resulting output distribution provided in these figures provides confidence in the estimated costs of this final rule provision.

4.2.1.2. Physical Security Event Notification Activities

This section presents the total operating costs over the applicability period.

Figure 5 Industry Physical Security Event Notification Operating Costs (7% Discount Rate)

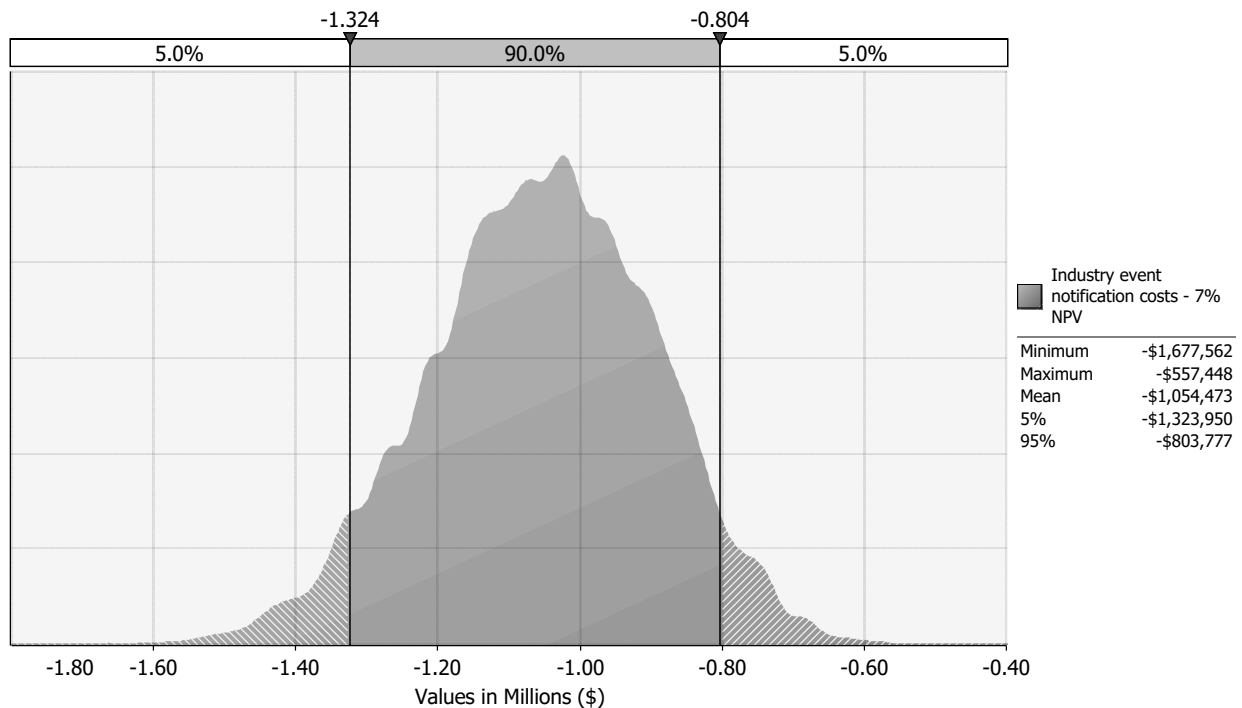


Figure 6 NRC Physical Security Event Notification Operating Costs (7% Discount Rate)

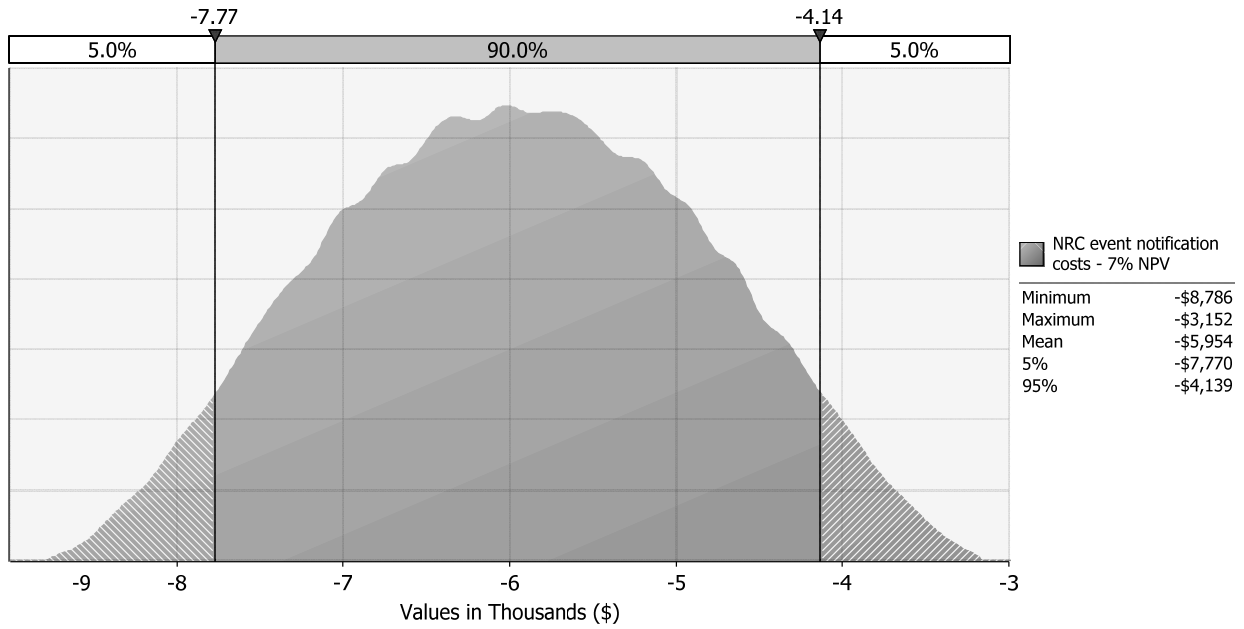


Figure 7 Total Physical Security Event Notification Operating Costs (7% Discount Rate)

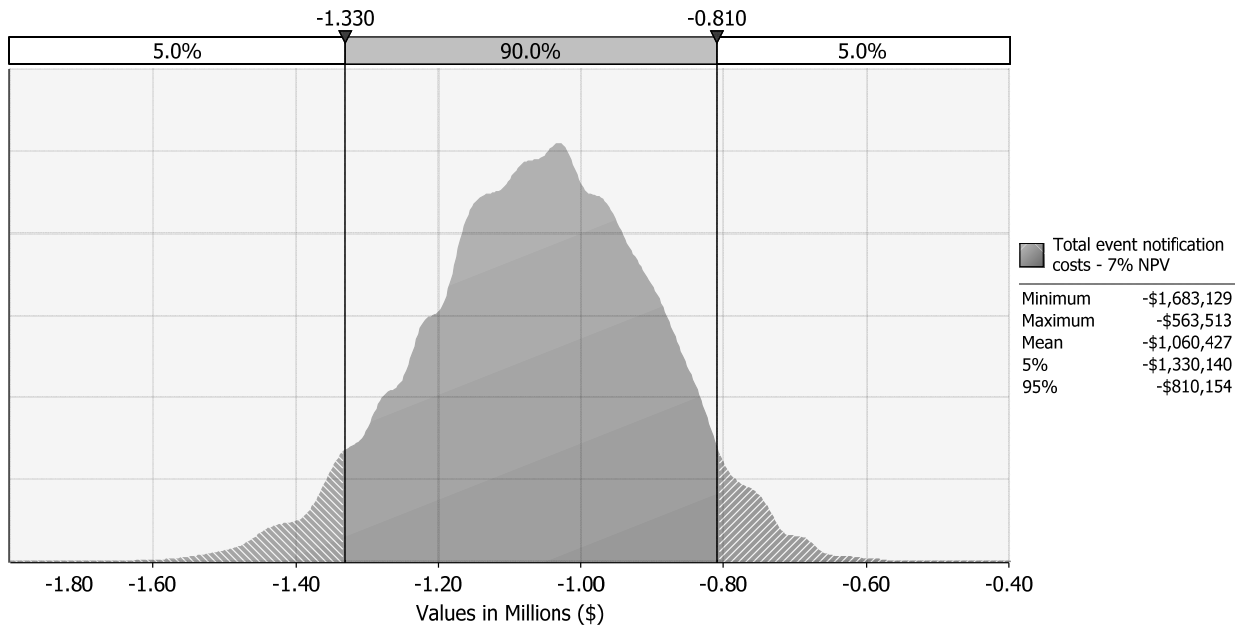
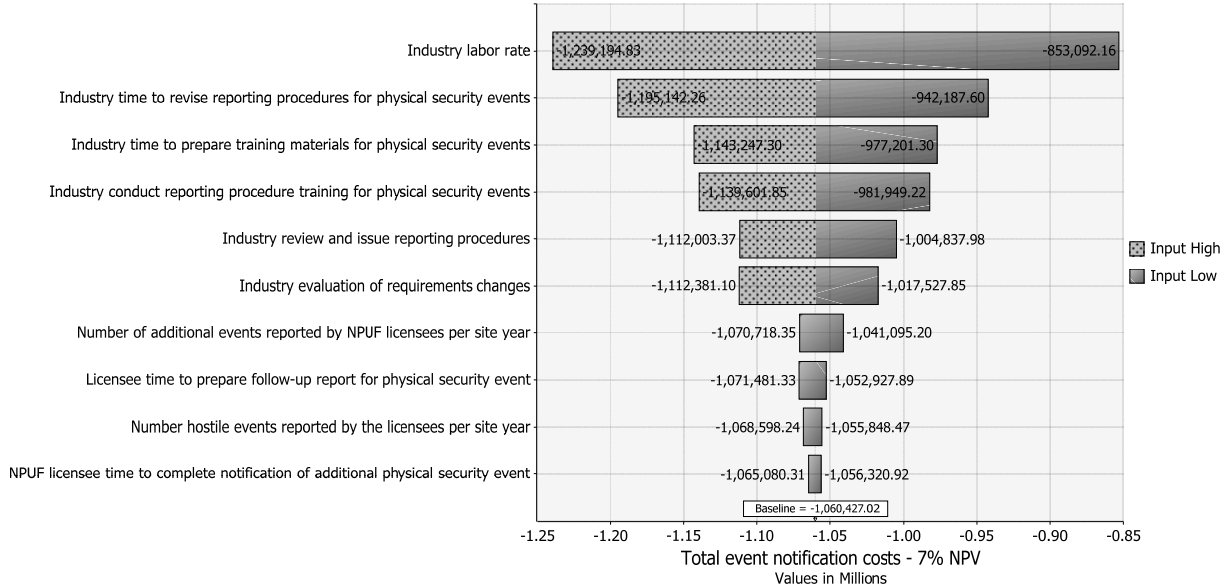


Figure 8 Physical Security Event Notification Cost Drivers



From an examination of Figures 5 through 7, the physical security event notification activities will result in total costs that range between (\$1.68 million) and (\$0.56 million) with a mean value of (\$1.06 million) based on a 7-percent discount rate. Figure 8 presents the most significant cost drivers. The cost drivers that have the greatest influence on these costs are the costs for licensees to write reports on physical security event notifications and industry labor cost.

4.2.1.3. Suspicious Activity Event Notification Activities

This section presents the total operating costs over the applicability period.

Figure 9 Industry Suspicious Activity Reporting Operating Costs (7% Discount Rate)

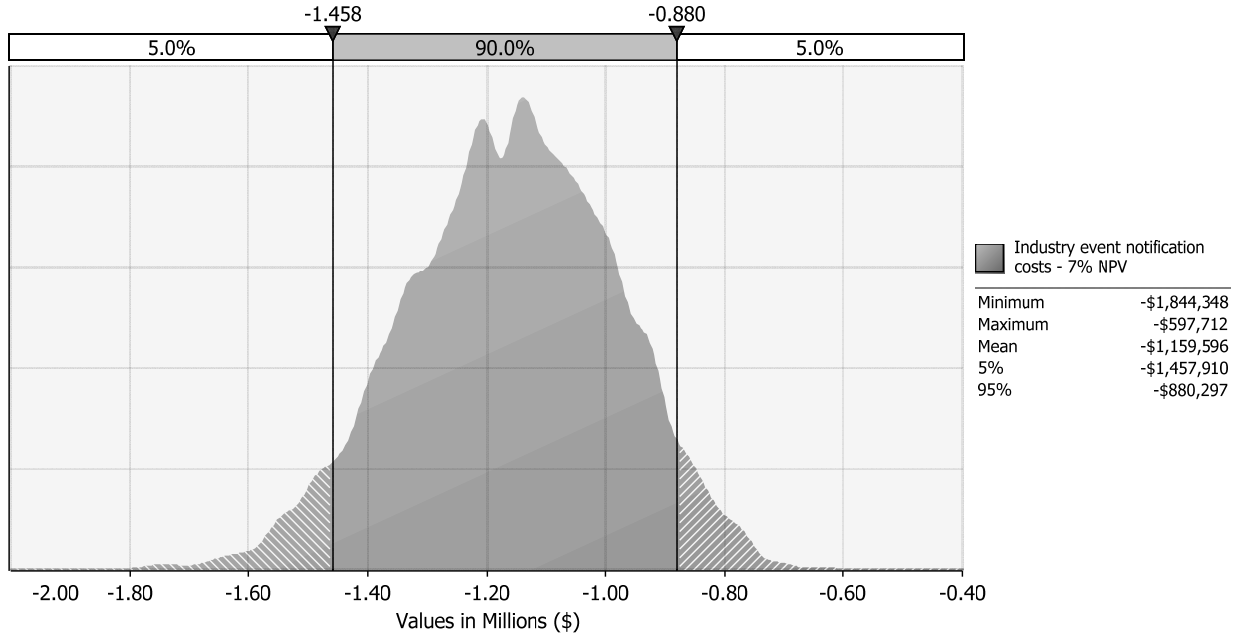


Figure 10 NRC Suspicious Activity Reporting Operating Costs (7% Discount Rate)

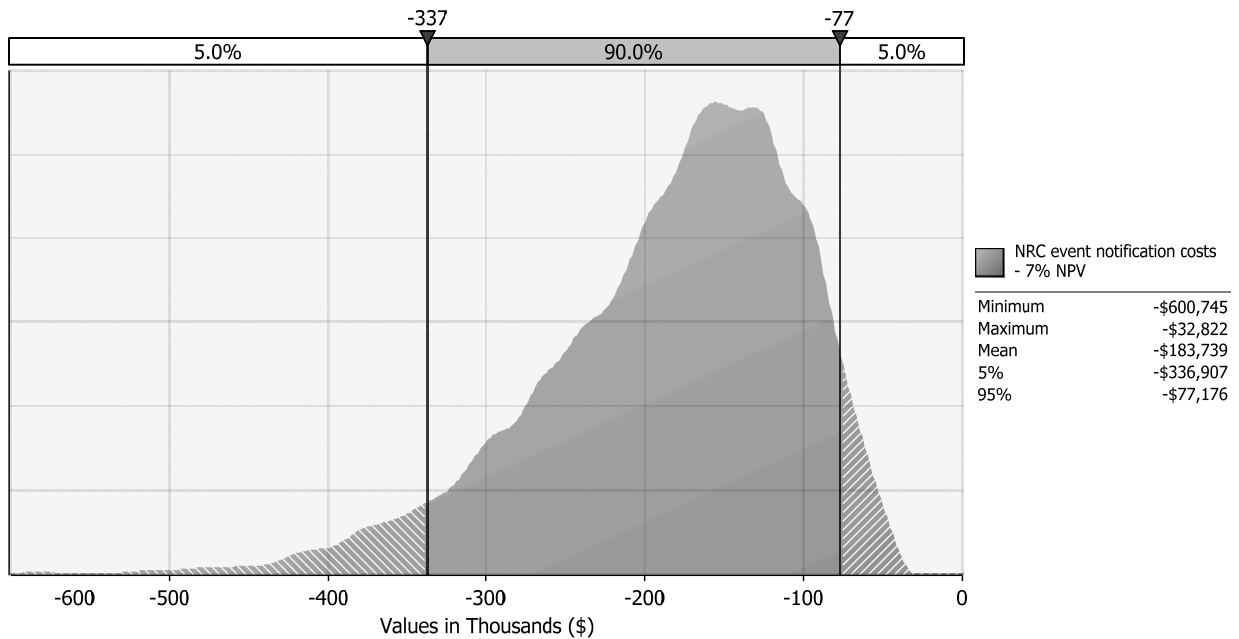


Figure 11 Total Suspicious Activity Reporting Operating Costs (7% Discount Rate)

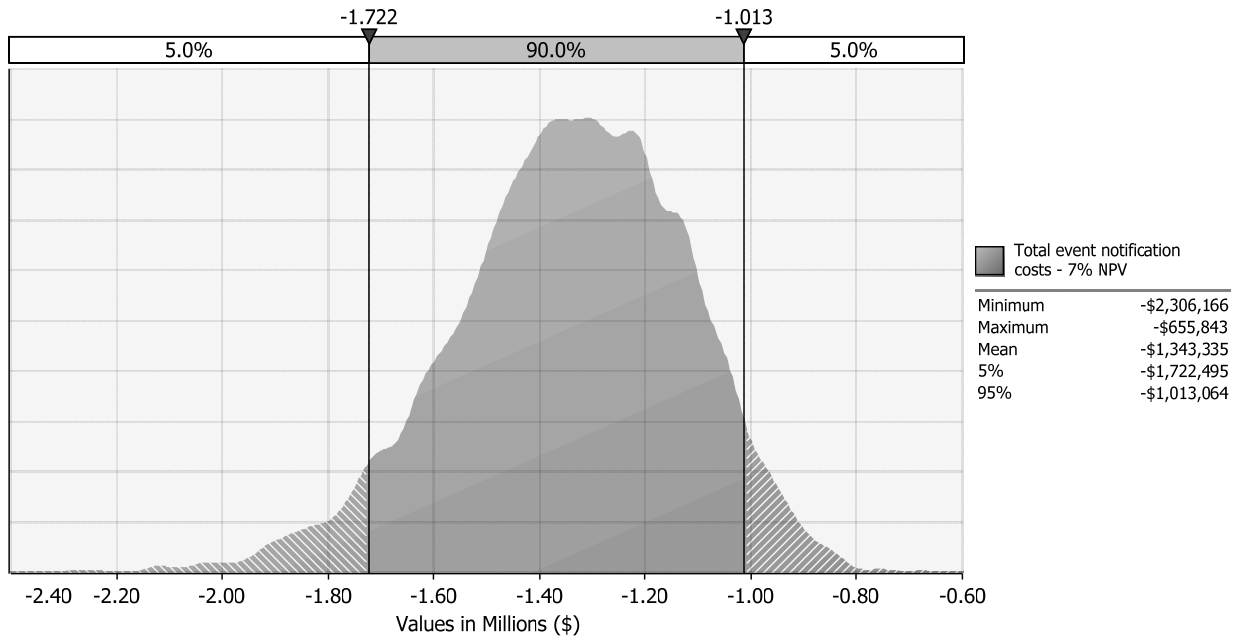
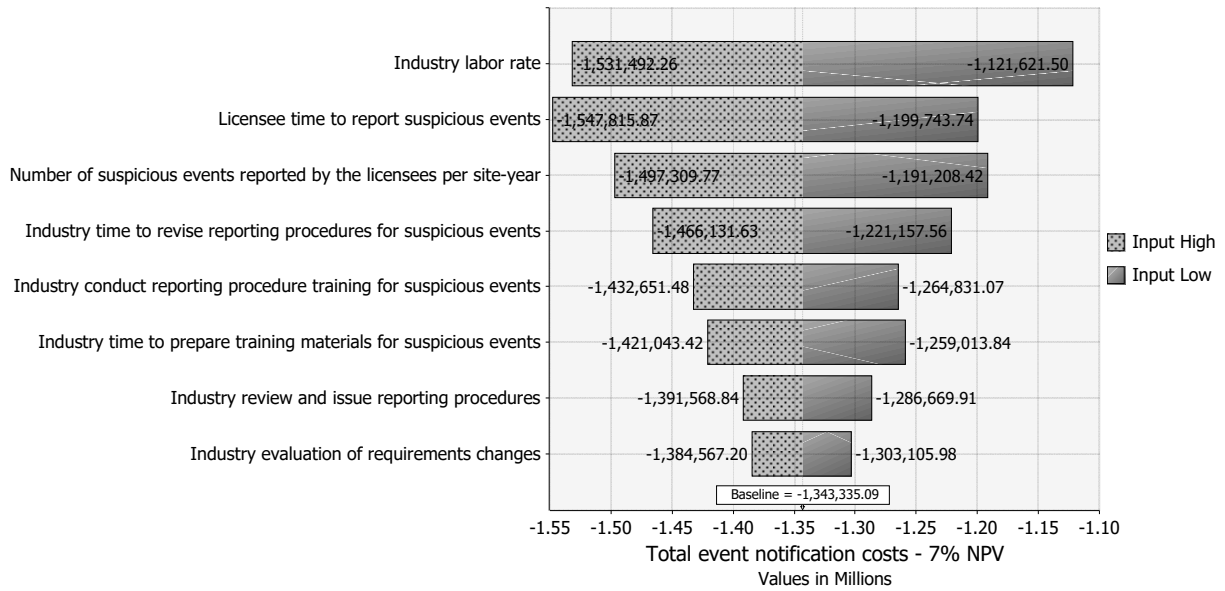


Figure 12 Suspicious Activity Reporting Cost Drivers



From an examination of Figures 9 through 11, the suspicious activity reporting will result in total costs that range between (\$2.31 million) and (\$656,000) with a mean value of (\$1.34 million) based on a 7-percent discount rate. Figure 12 presents the most significant cost drivers. The cost drivers that have the greatest influence on these costs are the industry labor cost and the costs for licensees to review and revise their reporting procedures.

4.2.1.4. Final Rule Net Benefits

The following figures provide a consolidated view of the uncertainty analysis for the entire rule. This view combines the costs and benefits for Section 161A authority, the physical security event notification, and suspicious activity reporting.

Figure 13 Final Rule Implementation Costs (7% Discount Rate)

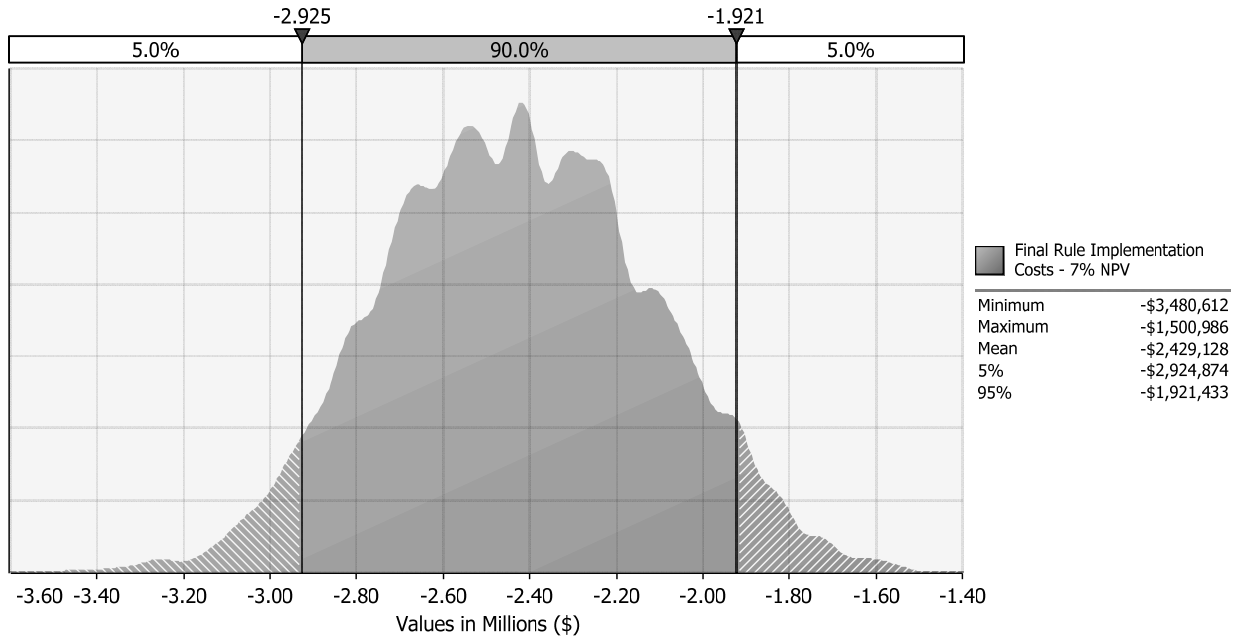


Figure 14 Final Rule Operations Costs (7% Discount Rate)

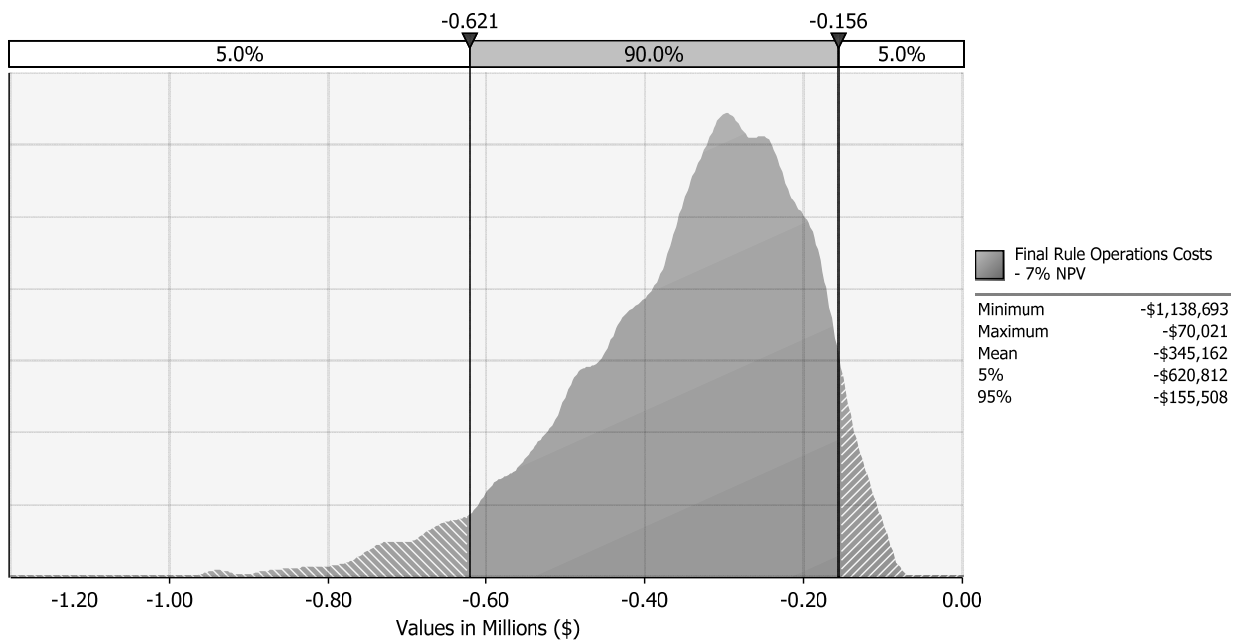
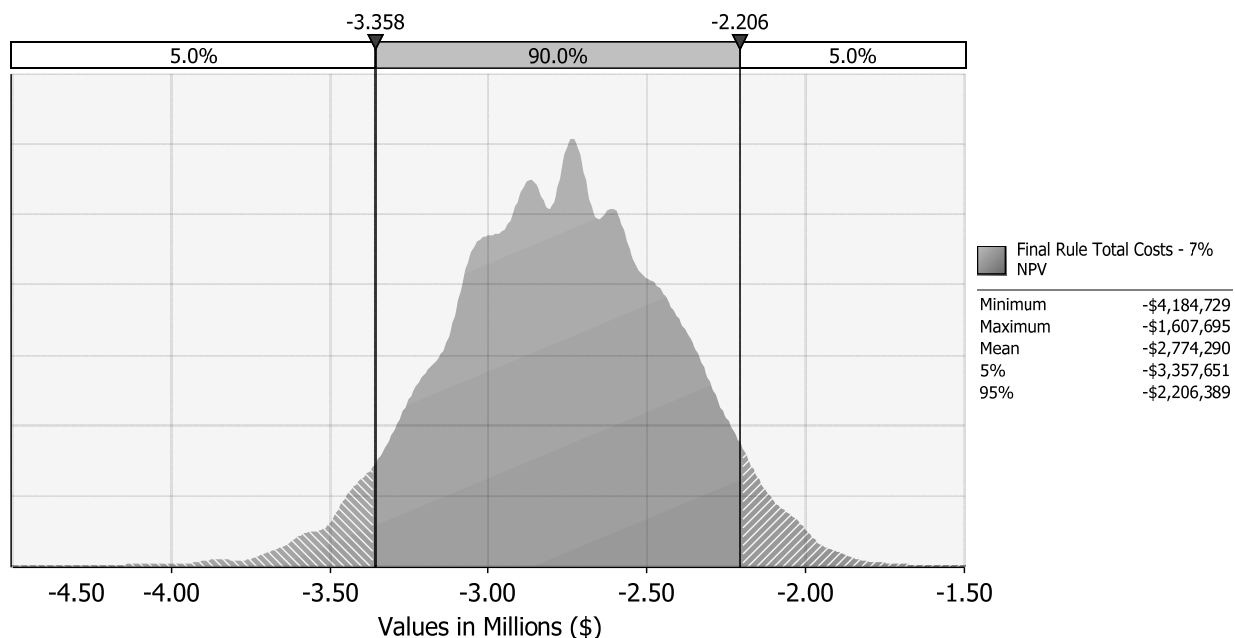


Figure 15 Final Rule Total Costs (7% Discount Rate)



From an examination of Figures 13 through 15, the analysis indicates that the final rule results in a net cost of between (\$4.18 million) and (\$1.61 million) with a mean estimate of (\$2.77 million) based on a 7-percent discount rate.

Figure 16 Final Rule Cost Drivers

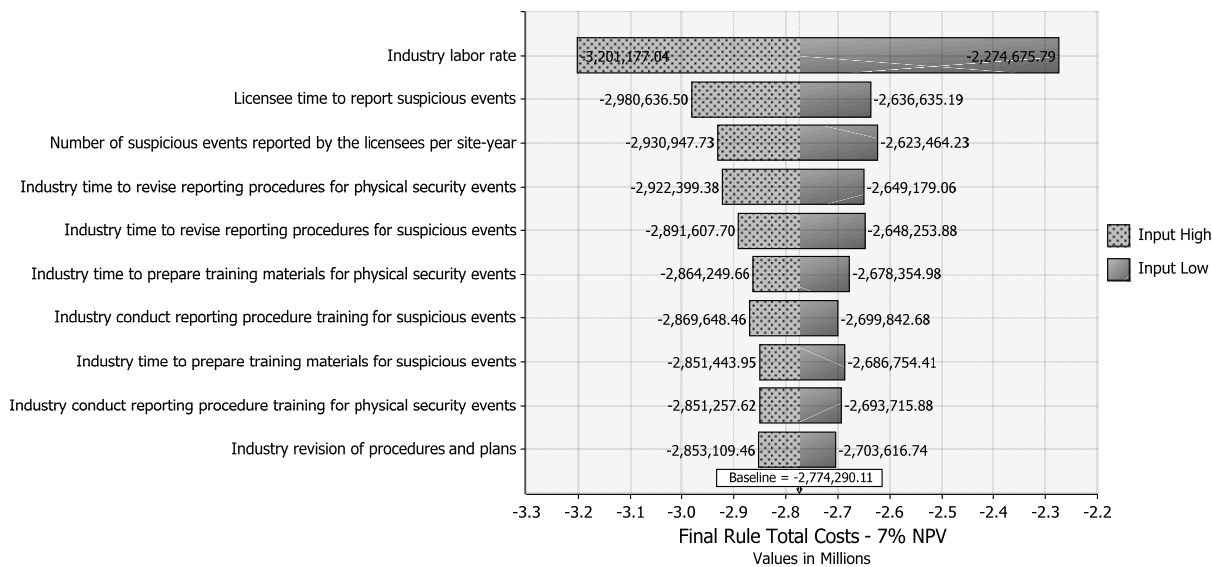


Figure 16 presents the most significant cost drivers. The cost drivers that have the greatest influence on the final rule consist of the industry labor rate and the time for licensees to report suspicious activity events.

4.3. Disaggregation

The final rule has three distinct parts: (1) the portion of the rule related to Section 161A authority, (2) the portion of the rule related to physical security event notification requirements, and (3) the portion of the rule related to suspicious activity reporting requirements. The costs for each are presented separately throughout this analysis. The NRC is unaware of any eligible site not currently covered under a confirmatory order that plans to elect the Section 161A authority under this rule. The costs were estimated for representative sites that are eligible for this authority and are presented separately throughout this analysis.

5. Decision Rationale for Selection of the Proposed Action

This analysis is based on the quantification of costs and averted costs, where possible, and relies on qualitative consideration of the costs and benefits for complying with the statutory requirements of Section 161A of the AEA; the safeguards and security considerations; and the regulatory efficiency considerations. A qualitative analysis is necessary because of the difficulties associated with monetizing: (1) licensees' increased defensive capability to interdict, neutralize, or potentially deter an attack and (2) the impacts of the physical security event notification requirements and suspicious activity reporting.

Two compelling benefits are not quantified, which makes a net cost-beneficial determination based solely on quantitative results not meaningful. The first benefit is that the final rule implements the provisions of Section 161A of the AEA. The staff has concluded that this analysis demonstrates that the final rule implements the Commission's Section 161A authority in a cost-effective manner. Secondly, the final rule provides the potential to enhance public health and safety and the common defense and security because of licensees' increased defensive capability to interdict and neutralize an attack, or to deter an attack through approved weapons and enhanced physical security event and suspicious activity event notification requirements. Based on the NRC's assessment of the costs and benefits of the final rule, including those benefits which are unquantified, the NRC has concluded that the final rule provisions would be justified to protect public health and safety and the common defense and security.

6. Implementation

The NRC staff proposes to make the final rule effective 30 days after publication in the *Federal Register* with no compliance date for licensees who do not intend to apply for Section 161A authority, since application for Section 161A authority is voluntary. However, licensees who have been issued a confirmatory order for Section 161A authority would have 300 days after the date of publication of the final rule in the *Federal Register* to comply (e.g., transition from the requirements of their orders to the requirements of the final rule). Regulated entities affected by the physical security event notifications portion and the suspicious activity reporting portion of the rule also would have a compliance date of 300 days after the date of publication of the final rule.

The proposed implementation schedule is not expected to result in a cumulative impact on affected entities. This is because: (1) no other pending 10 CFR Part 73 regulatory actions exist that would impact the site security professionals responsible for implementing the final rule requirements; (2) the changes to policy, procedures, contracts, and training for those sites that have received stand-alone preemption authority via confirmatory order are minimal; and

(3) because application for Section 161A is voluntary, licensees can choose their own schedule to moderate any cumulative effects of regulatory impact.

7. References

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<https://www.nrc.gov/info-finder/fc/nuclear-fuel-services.html?panel=0#panel0>
14. NRC public website for information related to the BWXT license:
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15. NRC, "Compliance Evaluation Report for Part 76 Certificate Termination for the United States Enrichment Corporation, Paducah Gaseous Diffusion Plant," October 17, 2014. ADAMS Accession No. ML14268A555.
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**Appendix A – NRC Regulated Sites
Affected by the Enhanced Weapons Final Rule**

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Table A-1 NRC Regulated Sites Affected by the Enhanced Weapons Final Rule

Facility Name	Power Reactor	General ISFSI license	Site-Specific ISFSI license	NPUF ^d	Decommissioning Power Reactors		Fuel Cycle Facility	Away-from-reactor ISFSIs
					Sites with no operating reactors	Sites with operating reactors		
Operating or Under Construction (includes decommissioning units & at-reactor ISFSIs)								
Arkansas Nuclear One, Units 1 & 2	X	X						
Beaver Valley Power Station, Units 1 & 2	X	X						
Braidwood Station, Units 1 & 2	X	X						
Browns Ferry Nuclear Plant, Units 1, 2 & 3	X	X						
Brunswick Steam Electric Plant, Units 1 & 2	X	X						
Byron Station, Units 1 & 2	X	X						
Callaway Plant	X	X						
Calvert Cliffs Nuclear Power Plant, Units 1 & 2	X		X					
Catawba Nuclear Station, Units 1 & 2	X	X						
Clinton Power Station, Unit 1	X							
Columbia Generating Station	X	X						
Comanche Peak Nuclear Power Plant, Units 1 & 2	X	X						
Cooper Nuclear Station	X	X						
Davis-Besse Nuclear Power Station, Unit 1	X	X						
Diablo Canyon Nuclear Power Plant, Units 1 & 2	X		X					
Donald C. Cook Nuclear Plant, Units 1 & 2	X	X						
Dresden Nuclear Power Station, Units 1, 2 & 3	X	X				X		
Duane Arnold Energy Center	X	X						
Edwin I. Hatch Nuclear Plant, Units 1 & 2	X	X						
Fermi, Units 1 & 2	X	X				X		
Grand Gulf Nuclear Station, Unit 1	X	X						
H. B. Robinson Steam Electric Plant, Unit 2	X	X	X					
Hope Creek Generating Station, Unit 1	X	X						
Indian Point Nuclear Generating, Units 1, 2 & 3	X	X				X		
James A. FitzPatrick Nuclear Power Plant	X	X						
Joseph M. Farley Nuclear Plant, Units 1 & 2	X	X						

Facility Name	Power Reactor	General ISFSI license	Site-Specific ISFSI license	NPUF ^d	Decommissioning Power Reactors		Fuel Cycle Facility	Away-from-reactor ISFSIs
					Sites with no operating reactors	Sites with operating reactors		
LaSalle County Station, Units 1 & 2	X	X						
Limerick Generating Station, Units 1 & 2	X	X						
McGuire Nuclear Station, Units 1 & 2	X	X						
Millstone Power Station, Units 1, 2 & 3	X	X				X		
Monticello Nuclear Generating Plant, Unit 1	X	X						
Nine Mile Point Nuclear Station, Units 1 & 2	X	X						
North Anna Power Station, Units 1 & 2	X	X	X					
Oconee Nuclear Station, Units 1, 2 & 3	X	X	X					
Oyster Creek Nuclear Generating Station	X	X						
Palisades Nuclear Plant	X	X						
Palo Verde Nuclear Generating Station, Units 1, 2 & 3	X	X						
Peach Bottom Atomic Power Station, Units 1, 2 & 3	X	X				X		
Perry Nuclear Power Plant, Unit 1	X	X						
Pilgrim Nuclear Power Station	X	X						
Point Beach Nuclear Plant, Units 1 & 2	X	X						
Prairie Island Nuclear Generating Plant, Units 1 & 2	X		X					
Quad Cities Nuclear Power Station, Units 1 & 2	X	X						
R.E. Ginna Nuclear Power Plant	X	X						
River Bend Station, Unit 1	X	X						
St. Lucie Plant, Units 1 & 2	X	X						
Salem Nuclear Generating Station, Units 1 & 2	X	X						
Seabrook Station, Unit 1	X	X						
Sequoyah Nuclear Plant, Units 1 & 2	X	X						
Shearon Harris Nuclear Power Plant, Unit 1	X							
South Texas Project, Units 1 & 2	X							

Facility Name	Power Reactor	General ISFSI license	Site-Specific ISFSI license	NPUF ^d	Decommissioning Power Reactors		Fuel Cycle Facility	Away-from-reactor ISFSIs
					Sites with no operating reactors	Sites with operating reactors		
Surry Power Station, Units 1 & 2	X	X	X					
Susquehanna Steam Electric Station, Units 1 & 2	X	X						
Three Mile Island Nuclear Station, Units 1 & 2	X	X				X		
Turkey Point Nuclear Generating Unit No. 3 & 4	X	X						
Virgil C. Summer Nuclear Station, Units 1, 2 & 3	X	X						
Vogtle Electric Generating Plant, Units 1, 2, 3, & 4	X	X						
Waterford Steam Electric Station, Unit 3	X	X						
Watts Bar Nuclear Plant, Units 1 & 2	X	X						
Wolf Creek Generating Station, Unit 1	X							
Decommissioning Power Reactors								
Big Rock Point		X			X			
Crystal River 3					X			
GE EVESR					X			
GE VBWR					X			
Fort Calhoun Station, Unit 1		X			X			
Ft. Saint Vrain			X		X			
Haddam Neck		X			X			
Humboldt Bay 3			X		X			
Kewaunee		X			X			
La Crosse		X			X			
Maine Yankee		X			X			
Rancho Seco			X		X			
San Onofre 1, 2, & 3		X			X			
Savannah, N.S.					X			
Trojan			X		X			
Vermont Yankee		X			X			
Yankee Rowe		X			X			
Zion 1 & 2		X			X			
ISFSI only								
GE-Hitachi Morris (wet storage)			X					X
Idaho National Lab TMI-2 Fuel Debris			X					X

Facility Name	Power Reactor	General ISFSI license	Site-Specific ISFSI license	NPUF ^d	Decommissioning Power Reactors		Fuel Cycle Facility	Away-from-reactor ISFSIs
					Sites with no operating reactors	Sites with operating reactors		
Idaho Spent Fuel Facility			X					X
Private Fuel Storage Facility			X					X
Non-power Production or Utilization Facilities								
Aerotest				X				
Armed Forces Radiobiology Research Institute				X				
Dow Chemical Company				X				
GE-Hitachi				X				
Idaho State University				X				
Kansas State University				X				
Massachusetts Institute of Technology				X				
Missouri University of Science and Technology				X				
National Institute of Standards & Technology				X				
North Carolina State University				X				
Ohio State University				X				
Oregon State University				X				
Pennsylvania State University				X				
Purdue University				X				
Reed College				X				
Rensselaer Polytechnic Institute				X				
Rhode Island Atomic Energy Commission				X				
Texas A&M University (AGN) ^e				X				
Texas A&M University (TRIGA) ^f				X				
U.S. Geological Survey				X				
University of California/Davis				X				
University of California/Irvine				X				
University of Florida				X				
University of Maryland				X				
University of Massachusetts/Lowell				X				
University of Missouri/Columbia				X				
University of New Mexico				X				
University of Texas				X				
University of Utah				X				

Facility Name	Power Reactor	General ISFSI license	Site-Specific ISFSI license	NPUF ^d	Decommissioning Power Reactors		Fuel Cycle Facility	Away-from-reactor ISFSIs
					Sites with no operating reactors	Sites with operating reactors		
University of Wisconsin				X				
Washington State University				X				
Operating Fuel Cycle Facilities								
AREVA							X	
BWXT (Category I)							X	
GNF-A							X	
NFS (Category I)							X	
Westinghouse							X	
Louisiana Energy Services							X	
Hot Cell Facilities								
GE-Hitachi Vallecitos Nuclear Center							X	
Facility-type Total	60	63	15	31	18	6	7	4

Table Notes:

- ^a Site has operating reactor(s) and decommissioning reactor(s). Because the applicability period for an operating reactor exceeds the period for a reactor that already is decommissioning, the site is categorized as a “site with only reactors that are in commercial operation” for purposes of this analysis.
- ^b The Vermont Yankee Nuclear Power Station terminated commercial operation in December 2014; it is categorized as “site with only reactors that are in decommissioning.”
- ^c Oyster Creek Nuclear Generating Station plans to terminate commercial operation in 2019.
- ^d NPUF is the acronym for non-power production or utilization facility. This includes non-power reactors..
- ^e Aerojet-General Nucleonics (AGN) reactor.
- ^f Training, Research, Isotopes, General Atomics (TRIGA) reactor.

Table Sources:

1. NRC, “Operating Nuclear Power Reactors (by Location or Name)” Web page, www.nrc.gov. Data current as of August 10, 2017. Available at: <http://www.nrc.gov/info-finder/reactor/>.
2. NRC, “Locations of Power Reactor Sites Undergoing Decommissioning” Web page, www.nrc.gov. Data current as of August 10, 2017. Available at: <http://www.nrc.gov/info-finder/decommissioning/power-reactor/>.
3. NRC, “NRC Maps of Independent Spent Fuel Storage Installations (ISFSI)” Web page, www.nrc.gov. Data current as of November 14, 2017. Available at <https://www.nrc.gov/reading-rm/doc-collections/maps/isfsi.html>.
4. NRC, 2017-2018 Information Digest (NUREG-1350, Volume 29), Appendix H “U.S. Commercial Nuclear Power Reactor Operating Licenses - Expiration by Year, 2013–2049.” Available at: <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>
5. NRC, “Combined License Applications for New Reactors” Web page, www.nrc.gov. Data current as of August 10, 2017. Available at: <http://www.nrc.gov/reactors/new-reactors/col.html>.

Appendix B – Uncertainty Analysis Variables

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Table B-1 Uncertainty Analysis Variables

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
Number of Security Personnel Requiring NICS Background Checks Per Site						
Power reactor sites	320	PERT	250	320	400	NRC estimate based on experience with Orders. (2148 total NICS checks processed) Cat I SSNM sites are similar to operating power reactors but also have tactical teams (50 staff).
Decommissioning power reactor sites	175	PERT	125	175	200	
Category I Special Nuclear Material Licensees	375	PERT	275	375	450	
Industry (one-time, per site)						
Section 161A Submittal						
Assemble and submit the application under oath or affirmation for stand-alone preemption authority, and physical security and safeguards contingency plans	240 hours	PERT	200 hours	240 hours	360 hours	NRC estimate
Assemble and submit the application under oath or affirmation for combined preemption and enhanced weapons authority, and physical security and safeguards contingency plans	280 hours	PERT	240 hours	280 hours	400 hours	NRC estimate
Applications to terminate 161A authority	400 hours	PERT	350 hours	400 hours	450 hours	NRC estimate
Firearms Background Checks						
Understand the regulations regarding the firearms background checks	32 hours	PERT	16 hours	32 hours	80 hours	NRC estimate. Two staff members per site using 16 hours to read and understand the rule and applicable guidance.
Develop Firearms Background Check Plan	347 hours	PERT	173 hours	347 hours	520 hours	NRC best estimate based on 2 staff months supplemented by professional judgement. Expert opinion estimated 1 to 3 staff-months, which are used for the low and high estimate.
Background Check Training						
Develop training module for Section 161A background check process	160 hours	PERT	140 hours	160 hours	180 hours	NRC estimate.
Initial and recurring background check training to site security personnel	0.75	PERT	0.50	0.75	1.00	NRC estimate. Each training session would entail notifying security personnel about what to

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
						do with the NICS response (denied, delayed, or accepted)
Conducting Firearms Background Checks						
Time for NRC to process background checks.	15 minutes	NONE				Based on OMB supporting statement.
Number of background checks the NRC will process annually.	550	NONE				Based on OMB supporting statement.
Staff and Licensee Time to Prepare Notifications to Licensee Requesting Additional Time for Background Checks						
Fraction of security personnel that receive a delayed or denied response from NICS (initial checks)	0.3%	PERT	0.1%	0.3%	1.0%	NRC estimate based on experience from the confirmatory orders.
Hours of licensee staff time for additional time requests	8 hours	PERT	6 hours	8 hours	16 hours	Estimate based on experience from the confirmatory orders.
Enhanced Weapons Authority						
Enhanced Weapons Submittal						
Review final rule requirements and supporting guidance	160 hours	PERT	80 hours	160 hours	240 hours	NRC estimate. Time for assigned security staff to read and understand the rule and applicable guidance necessary to prepare and revise enhanced weapons documents needed for the licensing submittal.
Enhanced weapons training and qualification plan	160 hours	PERT	144 hours	160 hours	240 hours	NRC estimate. Time for assigned security staff to research information from applicable firearms standards and prepare an enhanced weapons training and qualification plan.
Site physical security plan	132 hours	PERT	80 hours	132 hours	200 hours	NRC estimate. Time for assigned security staff to consider enhanced weapons information, make minor to moderate revisions to the plan, perform operations and management review, resolve comments, and issue the revised plan.
Safeguards contingency plan	160 hours	PERT	136 hours	160 hours	240 hours	NRC estimate. Time for assigned security staff to consider enhanced weapons information, make minor to moderate revisions to the plan,

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
						perform operations and management review, resolve comments, and issue the revised plan.
Weapons safety assessment	480 hours	PERT	456 hours	480 hours	600 hours	NRC estimate. Time for assigned security staff to consider enhanced weapons information to perform this assessment, perform operations and management review, resolve comments, and issue the weapons safety assessment.
Enhanced Weapons and Accessories Cost (per site)						
Number of enhanced weapons purchased by a new or operating power reactor site	138	PERT	128	138	202	NRC estimate. Each site uses rotating 5 shifts, with 2 shifts onsite (e.g., on duty and training shifts). The staff used the costs of procuring M-4 enhanced weapons for 2 shifts with no spares for the low estimate. The staff used the costs of procuring M-4 enhanced weapons for 2 shifts with 10 spares for the best estimate. The high estimate is based on procuring M-4 enhanced weapons for 3 shifts with 10 spares.
Number of enhanced weapons purchased by a decommissioning power reactor site	80	PERT	70	80	115	
Number of enhanced weapons purchased by a Category I SSNM site	160	PERT	150	160	235	
Enhanced weapons price	\$2,314	PERT	\$1,164	\$2,446	\$2935	Vendor data based on bulk buys. Low estimate – Colt M4 Flattop Carbine 5.56MM. Best estimate – Colt .308 Modular Carbine. High cost is 20% more than the Colt .308 Modular Carbine.
5.56x45mm NATO 62 grain S5109 penetrator full metal jacket ammunition (cost per round)	\$0.48	PERT	\$0.46	\$0.48	\$0.51	Vendor data based on bulk buys. Low estimate - Federal Lake City Ammunition at \$0.46 per round. Best estimate - Winchester at \$0.48 per round. High estimate - IMI at \$0.51 per round.
Percentage of initial cost for periodic replacement of weapons including replacement parts (per site)	1.5%	PERT	1.0%	1.5%	5.0%	NRC estimate. NRC estimates that 0.3 to 1.0 percent of the firearm inventory will need replacement or replacement parts. Best estimate is 1.5 percent of initial cost.
Enhanced Weapons Training						

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
Initial qualification classroom training in the use and maintenance of the weapon (hours per individual)	40	PERT	20	40	80	NRC estimate. Assumes a range of twenty to eighty hours of classroom training with a best estimate of forty hours.
Initial firing range qualification training in the use of the weapon (number of firing range sessions per individual)	10	PERT	8	10	20	NRC estimate. Assumes a range of eight to twenty 2 hour firing range sessions with a best estimate of ten 2 hour firing range sessions.
Firing range lane cost	\$20	PERT	\$15	\$20	\$25	NRC estimate based on vendor data. NRA range fees are \$15 - \$20 per hour per lane. Commercial public range fees are \$25 per hour per lane. NRA official silhouette targets B-29 50-foot paper pack of 100 is \$9.99.
Initial qualification training ammunition, firing range, and other consumables (per firing range session)	\$68	PERT	\$68	\$68	\$92	NRC estimate. Low estimate assumes the firing of 100 rounds of ammunition. Best estimates assumes the firing of 100 rounds of ammunition. High estimate assumes the firing of 150 rounds of ammunition. All estimates include firing range lane costs and consumables cost.
Annual firing range practice to maintain weapon proficiency (number of firing range sessions per individual)	15	PERT	4	15	20	NRC estimate. Assumes a range of four to twenty 2 hour firing range sessions with a best estimate of fifteen 2 hour firing range sessions.
Enhanced Weapons Inventory						
Time required to perform monthly weapons inventory (per weapon)	5 min	PERT	4 min	5 min	6 min	NRC estimate. Monthly inventory check may be performed by using a bar code scanner. Estimate 5 min per weapon for monthly check.
Time required to perform annual weapons inventory (per weapon)	10 min	PERT	8 min	10 min	12 min	NRC estimate. Annual inventory check (i.e., the 12th monthly check) requires the checking of the gun's serial number. Estimate 10 minutes per weapon for annual check.
Transition Activities to Final Rule						
Read and understand the final rule and associated guidance to	60 hours	PERT	32 hours	60 hours	80 hours	NRC estimate. Estimates between 32 and 80 hours to evaluate

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
perform transition activities						the changes in reporting requirements.
Review procedures and plans, issued under the confirmatory orders, for required revisions	120 hours	PERT	72 hours	120 hours	240 hours	NRC estimate. The estimate is for a relatively simple procedures and plans revision based on the fact that the final rule generally follows the confirmatory order requirements.
Revise and reissue procedures and plans in order to conform with the final rule requirements	240 hours	PERT	80 hours	240 hours	360 hours	NRC estimate. The estimate is for a relatively simple procedures and plans revision based on the final rule generally follows the confirmatory order requirements.
Establish procedures for quality finger print card submission	80	PERT	75	80	85	Reactor licensee security personnel are already subject to fingerprinting under access authorization; and § 73.57(d)(1) has language on quality of fingerprints, so no new procedures are expected. However, CAT I SSNM licensees do not have similar language in § 25.17(d). Therefore, 1 licensee is impacted.
Physical Security Event Notifications and Suspicious Activity Reporting (affects all sites)						
Revise Reporting Procedures (one-time, on a site basis)						
Evaluate change in reporting requirements	12 hours	PERT	8 hours	12 hours	20 hours	NRC estimate. Estimates between 12 and 20 hours to evaluate the changes in reporting requirements.
Revise reporting procedures	20 hours	PERT	8 hours	20 hours	40 hours	NRC estimate. The estimate is for a routine to a moderately complex procedure revision.
Review and issue revised reporting procedures	10 hours	PERT	4 hours	10 hours	18 hours	NRC estimate. The estimate assumes multiple levels of review and provides time for the resolution of comments.
Prepare training materials for revised reporting procedure	20 hours	PERT	10 hours	20 hours	30 hours	Estimate. Preparation time for a 1 hour course on revised procedure requirements.
Conduct revised reporting procedure training	20 hours	PERT	10 hours	20 hours	30 hours	Estimate. Assumes a 1 hour classroom training sessions attended by 20 trainees.
Industry (recurring, per site)						

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
Physical Security Event Notifications						
Average number of actual or imminent hostile action events reported per site-year	5.88E-04	PERT	4.64E-04	5.88E-04	8.75E-04	For imminent hostile action events, NRC estimated that this event would occur once per 20 years for the low estimate, once in 15 years for the best estimate, and once in ten years for the high estimate.
Average number of additional physical security events reported by NPUF licensees per site year	0.13	PERT	0.06	0.13	0.19	Based on the technical staff, there is a minimum of 2 additional NPUF physical security events per year, average 4 and high of 6.
NPUF licensee time to complete notification of additional physical security events	1.0 hours	PERT	0.75 hours	1.0 hours	1.25 hours	NRC Estimate
Licensee time to prepare a follow-up written report following an actual or imminent hostile actions event	80 hours	PERT	60 hours	80 hours	120 hours	NRC estimate. Best estimate is based on similar event reporting using NRC Form 366.
Suspicious Activity Reporting						
Average number of suspicious activities reported per site-year	2.5	PERT	0.5	2.5	4.0	Estimated average of 2.5 reports per site per year based upon ILTAT review of SIDS data. Low is estimated at average of 0.5 reports per year related to shipment of SSNM, SNF, and HLW. High is estimated as sum of 2.5 reports per site-year, 0.5 reports per year for shipment of SSNM, SNF, and HLW and 2 reports per year that are related to Restricted Data at enrichment facilities.
Licensee time to make the telephone notifications to report suspicious activities to LLEA, the FBI, the NRC, and the FAA (for suspicious activities involving aircraft).	18 min	PERT	10 min	18 min	54 min	This is based on notifications for 118 sites, shipping activities for 10 of the 118 sites and notification for one enrichment facility for which it is part of the 118. Best estimate is 18 per NRC staff, high estimate is 18 x 3 = 54 minutes since a notification can happen simultaneously for a site, a shipping activity and an enrichment facility. Low

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
						estimate from expert opinion.
NRC (one-time)						
NRC Submittal Review (per site)						
Time for NRC to review the stand-alone preemption authority submittals and issue a safety evaluation	1,040 hours	PERT	780 hours	1,040 hours	3,120 hours	NRC estimate based on experience in reviewing and processing the confirmatory order submittals.
Time for NRC to review enhanced weapons submittals	160 hours	PERT	120 hours	160 hours	400 hours	NRC estimate based on experience in reviewing and processing the confirmatory order and other security-related submittals.
Averted NRC labor for not needing to issue a confirmatory order	400 hours	PERT	360 hours	400 hours	600 hours	NRC estimate based on experience issuing the confirmatory orders. Labor to issue a site-specific order to an eligible site who elects to receive Section 161A authority is not required if the rule alternative is selected.
NRC Transition Activities						
Time for the NRC to document the withdrawal of the orders issued to the licensees	12 hours	PERT	8 hours	12 hours	16 hours	NRC estimate.
Enhanced Weapons Application (per site)						
NRC time to review combined preemption and enhanced weapons application	240 hours	PERT	200 hours	240 hours	360 hours	NRC estimate.
NRC (recurring, per site)						
Physical Security Event Notifications and Suspicious Activity Reporting						
Read the physical security event notifications written report following an actual or imminent hostile action (hrs per report)	1.0 hours	PERT	0.8 hours	1.0 hours	4.0 hours	NRC estimate
Receive suspicious activity reports via telephone (hrs per report)	0.30 hours					NRC estimate. Based on experience in the operations center receiving telephone notifications; In agreement with industry notification estimate.

Uncertainty Analysis Variables						
Data Element	Value	Distribution	Low	Best	High	Source or Basis of Estimate
Labor Rates						
Industry	\$106/hr	PERT	\$67/hr	\$106/hr	\$127/hr	Based on the low, average and high of the 2018 loaded labor rates.
NRC	\$132/hr					NRC labor rates for use in 2017 regulatory analyses inflated to 2018 dollars.

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