Regulatory Analysis for Final Rule
Expansion of the National Source Tracking System

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1. INTRODUCTION

The National Source Tracking System (NSTS) was established in a final rule published in the *Federal Register* on November 8, 2006 (71 FR 65686). Under the NSTS program, licensees who possess International Atomic Energy Agency (IAEA) Category 1 and 2 sources are required to report information on the manufacture, transfer, receipt, disassembly, and disposal of nationally tracked sources. The implementation date for the NSTS was January 31, 2009 (72 FR 59162).

The U.S. Nuclear Regulatory Commission (NRC) published a proposed rule on April 11, 2008 (73 FR 19749), to amend its regulations to expand the existing NSTS to require additional licensees to report information on manufacture, transfer, receipt, disassembly, and disposal of nationally tracked sources. In that proposed rule, the NRC supported a regulatory change to require licensees who possess sealed sources containing greater than or equal to 1/10th of IAEA Category 3 threshold levels. Public comments on that proposed rule, and NSTS operating experience over the past four months, contributed to a re-evaluation by the NRC and a decision to add Category 3 sources to those required to be reported to the NSTS. A final rule is planned for publication consistent with that decision.

The purpose of this regulatory analysis is to evaluate the action of the final rule and other regulatory alternatives considered for expansion of the NSTS. The NRC considers the regulatory analysis process an integral part of its statutory mission to ensure adequate protection of public health and safety, and to protect the environment from civilian uses of byproduct, source, and special nuclear materials. This document presents background material, describes the objectives of the final rule, outlines the alternatives considered by the NRC, and evaluates the values and impacts of each of the regulatory alternatives.

1.1 Background

As a result of the September 11, 2001, attacks in the U.S., the NRC has undertaken a comprehensive review of nuclear material security requirements, with particular focus on radioactive material of concern. This material, including Cobalt-60, Cesium-137, Iridium-192, and Americium-241, has the potential to be used in a radiological dispersal device (RDD) or a radiological exposure device (RED) in the absence of proper security measures. NRC's review of source security requirements has taken into consideration the changing domestic and international threat environments and related U.S. Government-supported international initiatives in the nuclear security area, particularly activities conducted by the IAEA. The NRC has worked with international agencies in developing international guidance for the safety and security of radioactive materials of concern as embodied in the IAEA *Code of Conduct on the Safety and Security of Radioactive Sources* (Code of Conduct).

The IAEA source categorization scheme includes five categories. These categories are based on the potential for sources to cause deterministic health effects to persons exposed to them. Sources in Category 1 are considered to be the most dangerous because they can pose a very high risk to human health if not managed safely and securely. At the lower end of the categorization system, sources in Category 5 are the least dangerous; however, even these sources could give rise to doses in excess of the dose limits if not properly controlled. Based on analysis of potential health effects, the IAEA Categories represent quantities of radioactive material in sealed sources as follows:

Category 1: greater than or equal to the Category 1 threshold, which for Cobalt-60 (Co-60) is 810 curies (Ci). These sources are typically used in practices such as panoramic irradiators and radiation therapy devices.

Category 2: less than the Category 1 threshold and equal to or greater than the Category 2 threshold, which is 1/100th of the Category 1 threshold. For Co-60, the Category 2 lower threshold is 8.1 Ci, or two orders of magnitude lower than Category 1. These sources are typically used in practices such as industrial gamma radiography.

Category 3: less than the Category 2 threshold and equal to or greater than the Category 3 threshold, which is 1/10th of the Category 2 threshold. For Co-60, the Category 3 lower threshold is 0.81 Ci, or one order of magnitude lower than Category 2. These sources are typically used in practices such as fixed industrial gauges involving high activity sources.

Category 4: less than the Category 3 threshold and equal to or greater than the Category 4 threshold, which is 1/100th of the Category 3 threshold. For Co-60, the Category 4 lower threshold is 0.0081 Ci or two orders of magnitude lower than Category 3.

Category 5: less than the Category 4 threshold down to IAEA exempt quantities.

The scope of IAEA's Code of Conduct is limited to Categories 1 through 3, i.e., those having the highest potential to cause permanent injury or death when used in a malevolent manner. In particular, the Code of Conduct recommends that each IAEA Member State develop a national source registry of radioactive sources that should include Category 1 and 2 radioactive sources as described in Annex 1 of the Code of Conduct. The recommendation covers 16 radionuclides that should be included in the source registry.

The U.S. Government has formally notified the Director General of the IAEA of its strong support for the current Code of Conduct. Although the Code of Conduct does not have the stature of an international treaty and its provisions are non-binding on IAEA Member States, the U.S. Government has endorsed the Code of Conduct and is working toward implementation of its various provisions. This rulemaking reflects the Code of Conduct recommendations related to the source registry and which are consistent with NRC responsibilities under the Atomic Energy Act.

As a result, NRC issued a final rule published in the *Federal Register* on November 8, 2006 (71 FR 65686), establishing a national system for source tracking for Category 1 and 2 sources. In that rulemaking, specific rationale was provided for establishing tracking and inventory requirements for Category 1 and 2 sources. It was noted that a U.S. Department of Energy/NRC analysis of potential health effects from use of sources in a RDD or a RED identified radionuclide "quantities of concern" to be in a range similar to the IAEA Category 2 threshold values. Therefore, to allow alignment between domestic and international efforts to increase safety and security of radioactive sources, NRC adopted the IAEA Category 2 values and used them as a threshold in its rulemaking decision regarding sources requiring tracking and inventory management in a national source tracking system.

Under the existing NSTS, about 1,300 NRC and Agreement State licensees who possess IAEA Category 1 and 2 sources are required to report information on the manufacture, transfer, receipt, disassembly, and disposal of nationally tracked sources. This information is to be used

to support the NSTS and will provide the NRC with a life cycle account for nationally tracked sources and, thus, improve accountability and control over them. The final rule to establish the NSTS reflected those IAEA Code of Conduct recommendations that are consistent with NRC's responsibilities under the Atomic Energy Act, including protection of public health and safety. As noted above, the implementation date for the NSTS was January 31, 2009.

1.2 Objectives of the Final Rule to Expand the NSTS

In the final rule to expand the NSTS, the NRC considered the need to enhance its tracking and inventory management of Category 3 (or lower) sources to improve accountability and control of these sources and to provide additional protection against aggregation of these sources to higher activity levels (Category 1 or Category 2).

The primary issue in this rule has been the extent to which the NSTS should be expanded to include tracking of sources by additional licensees beyond those licensees who possess Category 2 sources. The regulatory analysis supporting the proposed rule evaluated an expansion of NSTS to include an additional 1,000 licensees who have sources at activity levels corresponding to Category 3. This is the new requirement in the NSTS expansion final rule.

The regulatory analysis for the proposed rule also evaluated an expansion of NSTS to include an additional 3,500 licensees who have Category 3 sources and have 1/10th of Category 3 sources. This would have added the 1,000 licensees who have Category 3 sources, and 2,500 licensees who have sources at activity levels from Category 3 threshold to 1/10th of this value.

In determining whether to expand the NSTS to Category 3 or 1/10th of Category 3 sources, NRC has considered balancing the secure handling and use of the materials without discouraging their beneficial use in academic, medical, and industrial applications. Radioactive materials provide critical capabilities in the oil and gas, electrical power, construction, and food industries. Radioactive materials are used to treat millions of patients each year in diagnostic and therapeutic procedures, are used in a variety of military applications, and are used in technology research and development involving academic, government, and private institutions. These materials are as diverse in geographical location as they are in functional use.

The support for expanding the NSTS to include Category 3 sources is partly due to the IAEA having defined Category 3 sources as dangerous sources. A dangerous source could, if not under control, expose unsuspecting people to radiation that would cause severe deterministic effects. The Code of Conduct states that "every state should establish a national register of radioactive sources." Most IAEA Member States are working to implement tracking systems for Category 1 and 2 sources. A second concern of the NRC staff in supporting expansion of the NSTS to include Category 3 sources is due to the issue of aggregation of sources, in that only a few of the sources at the high end of Category 3 would be needed to reach an aggregate activity level equal to or greater than Category 2. The major categories of licensees who possess Category 3 sources are those working with fixed industrial gauges (level gauges, conveyor gauges, thickness gauges, blast furnace gauges, dredger, pipe gauges), licensees who conduct well-logging operations, medical facilities with brachytherapy machines, and some radiographers with relatively low activity sources. The NRC staff considers the aggregation threat to be plausible for Category 3 sources because their industrial use is so wide-spread. Adding Category 3 sources to the NSTS with its inventory and tracking requirements will

provide adequate accountability and control of these sources to substantially reduce the threat due to aggregation.

The same threat of aggregation was considered by the NRC staff in the NSTS expansion proposed rule for licensed sources below the Category 3 threshold, to a threshold level equal to or greater than 1/10th of Category 3. This threat would require aggregation of about 10-12 high-end Category 4 sources to create the equivalent of a Category 2 source. Following the consideration of public comments on the proposed rule, the 1/10th of Category 3 quantity of radioactive material is not considered a feasible lower level from which to expand the NSTS at this time. Instead, through a different rulemaking, the NRC is planning to require licensees to obtain a Specific License (SL), instead of a general license as is currently the requirement, to possess radioactive material above 1/10th of Category 3 activity level. The NRC staff believes the new SL requirements, as proposed in rulemaking, for the high-end Category 4 sources are adequate to protect against aggregation of these sources to reach a Category 2 level.

There are significant costs to the NRC, licensees, and Agreement States to implement the requirements of this final rule by November 30, 2012. The NRC will incur most of the costs in its work to support implementation and operating and maintenance (O&M) of the system for Category 3 sources. Implementation costs include NRC preparing a standard license condition for use by Agreement States as necessary, so that there is consistency among State licensees in their response to the new requirements by November 30, 2012. The O&M costs include NRC entering data into the NSTS because a large number of licensees are expected to find it much simpler and at a lower cost to simply provide their source transaction data to the NRC by facsimile (i.e., fax). This is the current experience with the NSTS. This experience suggesting long-term use of faxes by licensees as the method to submit source transaction data to the NRC has been factored into this regulatory analysis.

The assumption in this regulatory analysis supporting the NSTS expansion final rule is that 10 percent of licensees with Category 3 sources will use the electronic NSTS to enter transaction data. The large majority of source transactions, about 75 percent, are assumed to be sent to the NRC by fax and the other 15 percent are assumed to be entered into the NSTS directly using a batch file. The use of the batch file would be used only by manufacturers of sources, and only by a few manufacturing firms. Currently, only a few source transactions have been sent to the NRC by over-night mail delivery. The method of mailing transaction data to the NRC is not considered in this regulatory analysis for the final rule because telephone costs to fax the information are lower than the over-night mail delivery. The conclusion reached by NRC based on experience to date with licensees entering Category 1 and Category 2 source data into the NSTS is that fewer number of licensees are expected to use the electronic NSTS, and this will increase the planned O&M costs of the system because it is more expensive for NRC to manually enter data into the NSTS, received from licensees primarily by fax, than to rely on licensees to enter the data themselves to update the system with their source transactions. The error rate of data entry using the fax as the source of data is likely to be higher than if licensees submit the data using the electronic NSTS. The NRC plans to work with licensees who are required to enter transaction data of nationally tracked sources to improve the efficiency of the tracking system for all concerned.

The expanded NSTS is being implemented under NRC's statutory authority to protect public health and safety. Expanding the existing NSTS is part of a comprehensive radioactive source control program of the NRC for radioactive materials of concern.

2. IDENTIFICATION OF ALTERNATIVE APPROACHES

This regulatory analysis supporting the NSTS expansion final rule evaluates the values and impacts of three regulatory alternatives. Alternatives 2 and 3 each have one sub-set which is also analyzed as an alternative. The following sections describe these alternatives.

2.1 Alternative 1: No Action

Under Alternative 1, NRC would not expand the NSTS to additional licensees possessing Category 3 (or lower) sources. Thus, the NSTS lower threshold level would remain as it is today at greater than or equal to Category 2 quantities of radioactive material and no additional licensees would be required to report transaction information associated with the manufacture, transfer, receipt, disassembly, and disposal of nationally tracked sources.

2.2 Alternative 2: Expand the NSTS to Include Category 3 sources

Under Alternative 2, NRC would expand the NSTS to include specific licensees who possess Category 3 sources. This means that all specific licensees who possess such sources would be required to follow the requirements in the existing NSTS in 10 CFR 20.2207(h), including initial and annual inventory management, tracking transaction reports, and assigning a unique serial number to each source, beginning November 30, 2012, and would be required to perform their reconciliation of Category 3 inventory data, pursuant to 10 CFR 20.2207(g), for the first time by January 31, 2014.

Alternative 2A is analyzed as a sub-set of Alternative 2. Under Alternative 2A, specific licensees who possess Category 3 sources would only be required to report to the NRC their source inventory reconciliation data on an annual basis. This would be an annual reporting requirement instead of a continuous requirement to report following each source transaction.

2.3 Alternative 3: Expand the NSTS to Include 1/10th of Category 3 sources

Under Alternative 3, the NSTS requirements would be lowered to include specific licensees who possess sources equal to or greater than 1/10th of the Category 3 threshold. This would add specific licensees who possess sources at the high end of Category 4. The source transaction reports would be the same as those under Alternative 2 and would need to begin November 30, 2012.

Alternative 3A is analyzed as a sub-set of Alternative 3. Under Alternative 3A, specific licensees who possess radioactive material equal to or greater than 1/10th of Category 3 would only be required to report to the NRC their source inventory reconciliation data on an annual basis.

3. ANALYSIS OF VALUES AND IMPACTS

The sections below describe the analysis conducted to identify and evaluate the values and impacts expected to result from the implementation of expanding the NSTS to additional licensees. Section 3.1 identifies the attributes that the expanded NSTS is expected to affect. Section 3.2 describes the methodology used to analyze the values and impacts associated with expanding the NSTS, and the input assumptions. Section 3.3 discusses the results of the analysis.

3.1 Identification of Affected Attributes

This section identifies the attributes, within the public and private sectors, that the expanded NSTS is expected to affect, using the list of potential attributes provided in Chapter 5 of NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook," dated January 1997, and in Chapter 4 of NUREG/BR-0058, Rev. 4, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," dated September 2004. The basis for selecting attributes is presented below.

Expanding the NSTS is expected to affect the following attributes:

- *Public Health (Accident/Event)*. Expanding the NSTS to Category 3 sources would provide a life cycle account for these sources, which will improve accountability and control over the sources which should have a positive effect on public health.

- *Offsite Property*. Expanding the NSTS to Category 3 sources, with improved accountability and control over the sources, should lower the likelihood of potential severe offsite property damage, including possible relocation and emergency response.

- *Industry Implementation*. Expanding the NSTS to Category 3 sources will require licensees who possess these lower activity sources to implement new procedures to track each source and its location. As a result, licensees will incur one-time implementation costs under this final rule. Under the reporting of end-of-year inventory positions, the implementation cost would no longer apply since licensees are currently required to perform inventory reconciliation on an annual basis.

- *Industry Operation*. Expanding the NSTS to Category 3 sources will increase licensees' O&M expense. Under the reporting of end-of-year inventory positions, a much smaller increase in O&M expense would occur for the licensees.

- *NRC Implementation*. Expanding the NSTS to Category 3 sources will require the NRC to incur one-time costs related to NSTS version control and documentation activities, for NRC procedural changes to maintain the NSTS, and to revise guidance documents to reflect the lower tracking activity level below Category 2.

- *NRC Operation*. Along with the implementation costs, NRC also will incur additional operation and maintenance costs by expanding the NSTS to Category 3 sources.

- *Agreement States and Other Government*. Under the final rule, other Federal agencies and State and local governments (e.g., Department of Homeland Security and

Agreement States) would have access to and benefit from the information contained in the expanded NSTS. This information may allow them to better monitor the location of nationally tracked sources and focus resources on licensees based on their possession of nationally tracked sources. This regulatory analysis includes implementation and annual operating expense for Agreement States because their assistance is required by the NRC in the process of adding licensees to the NSTS.

- *Improvements in Knowledge*. Expanding the NSTS to Category 3 sources will allow NRC, Agreement States and other regulatory agencies to better understand the location of nationally tracked sources.

- *Regulatory Efficiency*. Expanding the NSTS to Category 3 sources will improve accountability among all regulatory agencies and will improve regulatory efficiency by implementing applicable features of the IAEA's Code of Conduct.

- *Safeguards and Security Considerations*. Expanding the NSTS to Category 3 sources will provide a life cycle account for those nationally tracked sources, and will enhance NRC's ability to protect public health and safety. Lowering the NSTS tracking threshold to include Category 3 sources will improve regulatory oversight and licensee accountability of these sources which the IAEA has defined as dangerous sources and are a security concern if there is minimal control regarding authorized possession.

- *Other Considerations*. Expanding the NSTS to Category 3 sources will increase public confidence in NRC's regulation of inventories of radioactive materials.

Expanding the NSTS is *not* expected to affect the following attributes:

Public Health (Routine)	*Onsite Property*	*General Public*
Occupational Health (Accident)	*Antitrust Considerations*	*Environmental Considerations*
Occupational Health (Routine)		

3.2 Methodology and Input Assumptions

Methodology

The same methodology is used in this regulatory analysis supporting the final rule as was used in the regulatory analysis supporting the proposed rule. The methodology analyzes the values and impacts associated with different regulatory alternatives to implement the expanded NSTS. The values include any desirable changes in the affected attributes. These values are described on a qualitative basis in section 1.2. The impacts include any undesirable changes in the affected attributes, primarily due to additional costs to licensees and regulators. This regulatory analysis presents a cost analysis supporting the final rule. The balance of this section identifies the most significant input assumptions in the cost analysis.

The baseline of the analysis is Alternative 1, the no-action alternative, for which there are no costs. Alternatives 2 and 3, and 2A and 3A, are evaluated based on the net impacts of their costs compared to the no-action alternative.

Input Assumptions

The general assumptions in this regulatory analysis are:

- Labor rates are $100 per hour, consistent with most recent (i.e., 2008) analysis of NRC labors for use in regulatory analyses. In the regulatory analysis for the proposed rule, labor rates were assumed to be $87 per hour to match the analysis done for the NSTS rule.
- The analysis is over a 10 year period. In the regulatory analysis for the proposed rule, the analysis was over a 3 year period. After reviewing public comments submitted on the proposed rule, the NRC staff believes that 10 years better represents the time period during which licensees, Agreement States and the NRC will be adjusting their processes and behavior to implement an expanded NSTS. Beyond 10 years, it is assumed there are no incremental burdens associated with the expansion of the NSTS.
- As in the proposed rule, the final rule will require specific licensees who manufacture, transfer, receive, disassemble, or dispose a nationally tracked source to: (a) perform a one-time function to report its initial inventory to NSTS by a certain date, (b) perform each year an end-of-year reconciliation and verification of the licensee's data compared to data in NSTS reports, (c) complete and submit a National Source Tracking Transaction Report (NRC Form 748) after each transaction of a particular source, beginning November 30, 2012, (d) correct any errors in previously filed reports within 5 business days of the discovery, and (e) assign a unique serial number to each nationally tracked source if the licensee is a source manufacturer. The number of specific licensees is assumed constant over the 10 year analysis period.
- As in the proposed rule, this regulatory analysis assumes that 80 percent of specific licensees are in Agreement States and 20 percent of specific licensees are NRC licensees.

The detailed assumptions in this regulatory analysis are identified below.

Number of Specific Licensees that Possess Nationally Tracked Sources

The major categories of specific licensees are those who possess Category 3 (or lower) sources used in devices for the following industrial and medical applications:

- fixed industrial gauges, such as level gauges, conveyor gauges, thickness gauges, blast furnace gauges, dredger gauges, and pipe gauges
- well-logging
- brachytherapy – high, medium and low dose range
- radiography

Based on information presented in the proposed rule and NRC staff's best judgment, NRC estimates that there are approximately, including both NRC and Agreement State licensees:

- 1,000 specific licensees who possess Category 3 sources of radioactive material
- 2,500 specific licensees who possess sources with quantities of radioactive material that are below the Category 3 threshold and equal to or greater than 1/10th of this value

Thus, there are a total of 1,000 specific licensees affected by Alternative 2 and a total of 3,500 specific licensees affected by Alternative 3.

Neither of these alternatives considers licensees who possess generally licensed devices which contain Category 3 sources of radioactive material or greater than 1/10th of this value.

Number of Nationally Tracked Sources

Based on information recently collected by the NRC staff and staff's best judgment, NRC estimates that specific licensees possess approximately:

- 5,200 nationally tracked sources that contain Category 3 quantities of radioactive material
- 8,850 nationally tracked sources that contain below the Category 3 threshold but equal to or greater than 1/10th of this value. The proposed rule assumed there were 11,500 nationally tracked sources in this range of activity. This is about a 25 percent reduction in the number of sources in this range of activity for the final rule compared to the proposed rule. The lower number of sources at 1/10th of Category 3 is consistent with information that the staff provided to the Commission for the end of fiscal year 2008 estimated sealed source inventories.

Thus, there are a total of 5,200 nationally tracked sources that fall within Alternative 2 and a total of 14,050 nationally tracked sources that fall within Alternative 3. Neither of these alternatives considers sources contained in generally licensed devices.

The sources in sealed source devices decay as a function of time. Source manufacturers not only produce sources to replace these decayed sources but also produce new sources based on market demand. Several comments were received during the proposed rule public comment period that the assumption representing the production by manufacturers was too low in the regulatory analysis for the proposed rule.

This regulatory analysis supporting the final rule increases the annual production of new Category 3 sources by manufacturers compared to the assumptions in the proposed rule. New source production of Category 3 sources increases from about 6,200 per year used in the proposed rule to 8,000 per year in this final rule. Because the number of sources decreased 25 percent in this final rule compared to the proposed rule for 1/10th of Category 3 sources, as noted previously to match information provided to the Commission for 2008 sealed source inventories, new source production of these sources decreases in this final rule to 5,850 per year compared to 11,700 per year in the proposed rule. The assumptions for annual source production rates were increased in three of four source application categories, as follows:

- replacement of fixed gauge sources was changed to every 5 years instead of every 10 years assumed in the proposed rule, based on the use of Cs-137 and Co-60;
- replacement of well logging sources was changed to every 5 years instead of every 10 years assumed in the proposed rule, based on the use of Am-241;
- replacement of brachytherapy sources was changed to every 3 months instead of every 4 months assumed in the proposed rule, based on the use of Ir-192; and
- replacement of radiography sources was kept the same in the final rule compared to the proposed rule, at once every 4 months, based on the use of Ir-192 and Co-60.

Tables 3-1 and 3-2 summarize the number of Category 3 and 1/10th of Category 3 nationally tracked sources per year, respectively.

When the financial results are calculated later in this analysis, the impact of Alternative 2 is determined by the number of sources in Table 3-1. The impact of Alternative 3 is determined by the addition of sources in Tables 3-1 and 3-2 to represent the impact of NSTS expansion from Category 2 to 1/10th of Category 3.

Table 3-1
Number of Licensees, Category 3 Sources and Source Replacements Per Year.

	Number of licensees	Nuclides	Number of sources	Change rate per year	Replacements per year
Fixed gauges	510	Co-60 Cs-137	2,670	0.2	539
Well logging	110	Am-241	560	0.2	112
Brachytherapy	280	Ir-192	1,450	4	5,800
Radiography	100	Ir-192 Co-60	520	3	1,560
Total	1,000		5,200		8,011

Table 3-2
Number of Licensees, 1/10th Category 3 Sources and Source Replacements Per Year.

	Number of licensees	Nuclides	Number of sources	Change rate per year	Replacements per year
Fixed gauges	1,390	Co-60 Cs-137	6,000	0.2	1,200
Well logging	290	Am-241	1,750	0.2	350
Brachytherapy	770	Ir-192	1,000	4	4,000
Radiography	50	Ir-192 Co-60	100	3	300
Total	2,500		8,850		5,850

Number of National Source Tracking Transaction Reports

To determine the number of source transactions (and therefore, the number of source transaction reports) it is first necessary to estimate the nature of the transactions that would be made under the requirements of the expanded NSTS. The nature of transactions depends upon assumptions regarding material flow balancing of replacement, manufacturing, transfer and receipt, disassembly, and disposal of sources.

An assumption also needs to be made regarding the method of submittal of the transaction reports. The four options in the proposed rule to submit transaction reports included the on-line NSTS, transmittal to the NRC of a computer readable file (i.e., a batch file), transmittal to the NRC by facsimile, or transmittal to the NRC by U.S. mail. Another assumption needs to be made regarding the amount of time licensees spend on each transaction report.

The approach used in estimating the number of source transactions considers the licensee and source types and the half-life of the radionuclides used in those sources. In general, the assumption is that the longer the half-life of the radionuclide, the less frequently the source is replaced and therefore the fewer transactions. Also, well-logging sources and fixed gauge sources usually are changed infrequently for reasons other than radionuclide decay based on their general location in a facility and because damage to the source does not generally occur.

The NSTS requires that transactions be reported when a source is manufactured, transferred, received, disassembled, or disposed. In estimating the number of transactions of each type, simplifying assumptions are made that: new source production (i.e., manufacture) is approximately the same as the number of replacements; the number of source transfers and receipts are equal to each other; there is disassembly of sources when no longer serviceable; sources decay and are no longer usable; and there is some disposal of sources at licensed low-level waste burial.

The following assumptions are made for the number of transactions and the number of reports that need to be submitted for tracking sources on an annual basis, for Category 3 sources. The number of transactions and reports per year are shown in Table 3-3 for Category 3 sources. The input assumptions for sources below Category 3 and equal to or greater than 1/10th of Category 3 are the same as those described below for Category 3 sources, except for the initial estimate of 5,850 replacement sources instead of 8,011 replacement sources. The number of transactions and reports per year are shown in Table 3-4 for 1/10th of Category 3 sources.

Manufacturers: The number of sources replaced each year has increased in this regulatory analysis for the final rule compared to the proposed rule, to 8,011 at Category 3 level. The proposed rule assumed that 100 percent of the transactions submitted by manufacturers were done using a computer readable file. The assumption in this regulatory analysis is that 25 percent of the transactions submitted by manufacturers are done using a computer readable file, and 75 percent of the transactions are produced by sending the information to the NRC by fax. All other assumptions in the proposed rule for manufacturers' transaction reports are the same in this regulatory analysis. For example, it is assumed that 50 transactions would be completed on each of the computer readable files sent to the NRC and, as a result, manufacturers submit 40 reports per year to the NRC using a computer

readable file (i.e., 8,011 sources per year, multiplied by 25 percent of total submitted by computer readable file, divided by 50 transactions per report). For the manufacturers using the fax to enter the transaction data, it is assumed that 50 transactions are reported on each fax, so 120 reports are sent by fax each year (i.e., 8011*.75/50).

Transfers: Source transfers include those that manufacturers distribute to end-users, and sources that are returned to the manufacturer. As in the proposed rule, it is assumed that 90 percent of sources are returned to the manufacturer. Thus, with 8,011 replacement sources, source transfer transactions total 15,221 (8,011 + 0.9*(8011)). The assumption in this regulatory analysis is that 10 percent of these transactions are reported using a computer readable file, 15 percent of these transactions are reported using the on-line NSTS, and 75 percent of these transactions are reported by sending the information by fax. With 4 transfer transactions on each computer readable file and on each fax, and 10 transfer transactions on each on-line NSTS report, the number of transfer reports produced per year is 228 using the on-line NSTS, 381 using a computer readable file, and 2,854 using a fax.

Receipts: As in the proposed rule, it is assumed that the number of source receipt transactions is equal to the number of source transfer transactions, and the reporting method is the same for transfers and receipts, so all of the numbers above for transfers also apply to source receipts.

Disassembly As in the proposed rule, it is assumed that all of the sources returned to the manufacturer are first disassembled by the end-user. The total number of disassembly transactions per year is 7,210 (90 percent of 8,011). The assumption in this regulatory analysis is that 10 percent of these transactions are reported using a computer readable file, 15 percent are reported using the on-line NSTS, and 75 percent are reported by sending the information by fax. With 4 transfer transactions on each computer readable file, on each fax, and on each on-line NSTS report, the number of transfer reports produced per year is 270 using the on-line NSTS, 180 using a computer readable file, and 1,352 using a fax.

Disposal As in the proposed rule, it is assumed that 5 percent of replacement sources each year are disposed in a low level waste facility. The total number of disposal transactions per year is 401 (5 percent of 8,011). The assumption in this regulatory analysis is that 10 percent of these transactions are reported using a computer readable file, 15 percent are reported using the on-line NSTS, and 75 percent are reported by sending the information by fax. With the same assumptions as above for the number of transactions on each media type, the number of disposal reports produced per year is 15 using the on-line NSTS, 10 using a computer readable file, and 75 using a fax.

Table 3-3
Number of Category 3 Source Transactions and Source Reports Per Year.

		Reports per year				
	Transactions per Year	NSTS On-line	Computer readable	Fax	Mail	Total
Manufacture	8,011	0	40	120	0	160
Transfer	15,221	228	381	2,854	0	3,463
Receipt	15,221	228	381	2,854	0	3,463
Disassembly	7,210	270	180	1,352	0	1,802
Disposal	401	15	10	75	0	100
Total	46,063	742	991	7,255	0	8,988

Table 3-4
Number of 1/10th Category 3 Source Transactions and Source Reports Per Year.

		Reports per year				
	Transactions per Year	NSTS On-line	Computer readable	Fax	Mail	Total
Manufacture	5,850	0	29	88	0	117
Transfer	11,115	167	278	2,084	0	2,529
Receipt	11,115	167	278	2,084	0	2,529
Disassembly	5,265	197	132	987	0	1,316
Disposal	293	11	7	55	0	73
Total	33,638	542	724	5,298	0	6,564

National Source Tracking System Account Set-Up

To use the on-line NSTS reporting system, a licensee must first establish an account with the NRC and after that the licensee is provided a password that allows access to the system. This account set-up function took substantially more time and resources for licensees with Category 1 and 2 quantities of radioactive material than originally planned. Similar difficulties during initial account set-up may occur with the licensees who possess Category 3 quantities of radioactive material during the implementation period of the NSTS expansion final rule, but those process difficulties are expected to be fully resolved after the initial implementation period. The assumptions below represent NRC's best estimate of the annual average over a 10 year period for the labor required by licensees to perform account set-up. Note that account set-up is not required of licensees who decide to submit source transfer information to the NRC using a fax as the method of data entry. The assumption is that the batch upload from manufacturers will directly update the NSTS so this feature is assumed to require account set-up.

Account Set-up

The assumptions used for licensees' required time and resources to set-up an account to use the NSTS have increased in this regulatory analysis for the final rule compared to the proposed rule.

The proposed rule assumed that all affected licensees (i.e., 1,000 with Category 3 sources and 2,500 with 1/10 of Category 3 sources) would be required to establish an account on the NSTS; this assumption has been changed. This regulatory analysis for the final rule assumes that fewer licensees go through the account set-up process, but that for those licensees the required time and resources is higher than that assumed in the proposed rule. This regulatory analysis assumes that the licensees who use the electronic NSTS to submit source transaction data, or who submit a computer readable batch file as the basis for source transaction data, are required to go through an account set-up through credentialing. This regulatory analysis assumes that 10 percent of licensees who must report Category 3, or 1/10th of Category 3 source transactions, will be required to go through account set-up because they use either the on-line NSTS or a batch file to upload the transaction data to NSTS.

For the licensees who go through an account set-up, the proposed rule assumed 30 minutes labor effort to establish an account, and 8 hours training to learn how to use the system. The proposed rule also assumed that 50 licensees would spend 20 hours labor to modify existing software programs based on NSTS requirements.

This regulatory analysis for the final rule assumes that each licensee who goes through an account set-up (i.e., 100 licensees with Category 3 sources) uses 16 hours labor effort to establish an account, and 16 hours training to learn how to use the system. This analysis also assumes that 50 licensees would modify existing software programs to align with NSTS requirements, and that this would require 80 hours programming time for each licensee. In addition, this regulatory analysis assumes a $1,000 one-time travel cost for each of the 800 licensees who setup an account, for training or other expenses.

Initial Inventory of Nationally Tracked Sources

Under existing regulations, licensees are required to conduct an inventory of their sealed sources. For example, well loggers must conduct an inventory under 10 CFR 39.37, brachytherapy users must conduct an inventory under 10 CFR 35.67, and radiographers must conduct an inventory under 10 CFR 34.29. This final rule would require licensees to report their initial inventory of Category 3 nationally tracked sources to the NSTS by November 30, 2012.

Initial inventory — The labor effort assumption for establishing initial inventory that was used in the proposed rule is unchanged in this regulatory analysis for the final rule. That is, all 1,000 licensees with Category 3 sources, and all 2,500 licensees with sources below Category 3 down to 1/10th of Category 3, would spend a one-time effort of 30 minutes each to verify, update and report initial inventory to NSTS. The material cost of mailing the initial inventory information to the NRC, which was included in the proposed rule, is not included in this regulatory analysis for the final rule.

Annual Inventory Reconciliation of Nationally Tracked Sources

As noted above, licensees are required under existing regulations to conduct inventories of their sealed sources. The final rule would require each licensee with a Category 3 source to reconcile and verify its inventory of nationally tracked sources against the data in the NSTS, beginning no later than January 31, 2014 and every year thereafter. As part of the verification process, the licensee would be required to resolve any discrepancies between the NSTS and the actual inventory by filing the necessary transaction report(s).

Annual inventory — The labor effort assumption to reconcile and verify annual inventory information that was used in the proposed rule is unchanged in this regulatory analysis for the final rule. That is, licensees would use 1 hour labor each year performing this function. No material costs are considered in this regulatory analysis for the final rule.

National Source Tracking Transaction Reports

The assumptions to determine the number of reports prepared annually by licensees was discussed earlier. The licensee time to prepare each report was not included in that discussion and is addressed here. This represents the amount of time it would take each licensee to complete and submit a National Source Tracking Transaction Report (i.e., NRC Form 748).

Time for reports — Some of the assumptions used to represent licensees' time to submit reports have increased in this regulatory analysis for the final rule compared to the proposed rule. The time to prepare a report using the on-line NSTS was increased from 10 minutes per report to 15 minutes per report. The time to prepare a computer readable file was kept the same as the proposed rule, equal to 5 minutes per file. The time required to prepare a fax of the report was increased from 15 minutes per report to 30 minutes per report. The cost to fax a report was kept the same in this regulatory analysis as the proposed rule, equal to $0.15 per fax.

Nationally Tracked Source Unique Serial Numbers

The final rule would require each licensee who manufactures a nationally tracked source after the effective date of the rule to assign a unique serial number to each nationally tracked source. Serial numbers may be composed only of alpha-numeric characters.

Serial numbers — The labor effort assumption for assigning unique serial numbers to sources is unchanged in this regulatory analysis compared to the proposed rule. That is, all replacement sources require 2 minutes labor time each by licensees to assign the serial number to the source.

Costs to Agreement States

Agreement States will need to issue legally binding requirements to their licensees to require the licensees to report to the expanded NSTS beginning November 30, 2012. The process to accomplish this may be different in each of the States, but the end result is to have consistent requirements among all Agreement State and NRC licensees. To accomplish this, the NRC staff will prepare a template of license conditions that may be used by Agreement States, if necessary. The proposed rule is Compatibility Category "B"; therefore, an Agreement State should adopt program elements essentially identical to those of NRC. The NRC program elements in this category are those that apply to activities that have direct and significant transboundary implications. The expanded NSTS is a national system and all licensees must begin reporting at the same time and using the same requirements for the system to be useful. Since each of the 36 Agreement States may choose different implementation mechanisms and have different numbers of licensees, it is difficult to estimate the costs for each Agreement State to implement the final rule. Since legally binding requirements need to be essentially word-for-word compatible, the writing of rule text is expected to be relatively straightforward but the implementation of rule requirements will have challenges as has been the case in the implementation of the NSTS among licensees with Category 1 and Category 2 sources.

Regulations — This one-time labor effort was increased from 0.15 full time equivalent (FTE) used in the proposed rule to 0.25 FTE in this final rule. The one-time cost to implement legally binding requirements is assumed to be 0.25 FTE for each of the 36 Agreement States, at an average annual salary of $76,000/FTE.

Inspections — This annual labor effort was also increased from the proposed rule, from an assumed 1 hour to 3 hours for each inspection. This includes time to prepare for the inspection, to conduct the inspection and to document the findings of the inspection. Thus, the annual inspection work is assumed to require 3 hours for each licensee, with 800 total licensees in Agreement States affected by the final rule. Also, a one-time cost of $480,000 (equal to 6 hours labor for each affected licensee) was included to represent the cost to change inspection procedures in all of the Agreement States.

Costs to the NRC

The NRC staff will prepare a standard license condition, for use by Agreement States as necessary, so that there is consistency among State licensees in their response to the new requirements by November 30, 2012. The NRC will also need to perform one-time credentialing work for each new licensee added to the NSTS, annual computer software maintenance costs for expanding the NSTS to include licensees with Category 3 sources, and annual costs for inspection activity.

License Condition A one-time cost to the NRC is assumed of $4,800 to implement this final rule consistently among Agreement States. This is comprised of $3,200 (about 32 hours labor) to prepare a template of a standard license condition for this rule for use by Agreement States as necessary, and $1,600 (about 16 hours labor) to prepare responses to expected questions from Agreement States that may be raised during the interim period after the final rule is effective and before the legal requirements are in State regulations.

Credentialing This regulatory analysis assumes higher costs than were assumed in the proposed rule for the effort to establish system credentials for new licensees with accounts on the NSTS. In the proposed rule, the cost to the NRC to credential each user was assumed to be $300 per user, with 2 users per licensee. This cost has been increased to $800 per user, with the same 2 users per licensee. Two new costs were added to the NRC costs for credentialing. Both new costs are one-time costs equal to $500,000 each. These are to perform NSTS software revision and version control, and to provide credentialing training to licensees.

Maintenance This annual NSTS computer maintenance cost assumption is substantially reduced in this regulatory analysis for the final rule. The annual maintenance cost used in the proposed rule regulatory analysis was $2 million per year. Based on operating experience to date, the NRC estimates annual maintenance cost of $600,000 to support the expansion to Category 3. The assumption for annual maintenance cost to support an expansion to 1/10th of Category 3 is assumed to be $900,000. The proposed rule regulatory analysis assumed $2 million and $5 million annual maintenance cost for Category 3 and 1/10th of Category 3, respectively.

Inspections The time to perform inspections was increased from 1 hour per NRC licensee used in the proposed rule to 3 hours per licensee in this final rule. This annual inspection is done for each of the estimated 200 NRC licensees with Category 3 sources affected by the final rule. Also, a one-time cost of $120,000 (equal to six hours labor for each affected licensee) was included to represent the cost to change NRC inspection procedures.

Appendix 1 lists the detailed input assumptions for Alternatives 2 and 3 that are used in this regulatory analysis supporting the final rule and that were used to support the proposed rule.

Appendix 2 lists the detailed input assumptions for Alternatives 2A and 3A which would require only inventory reporting on an annual basis.

3.3 Results

This section presents the net impacts (i.e., costs) that are expected to be incurred due to promulgation of the NSTS expansion final rule. The results are shown by the following six attributes discussed in section 3.1:

- Industry implementation
- Industry operation
- NRC implementation
- NRC operation
- Agreement States implementation
- Agreement States operation

The final rule is expected to provide values in other attributes, such as Public Health, Offsite Property, Improvements in Knowledge, Regulatory Efficiency, and Safeguards and Security Considerations, but these are not quantified because there is no verifiable data at this time to support input assumptions. The value in averting an event involving a significant RDD or RED is substantial, has been documented in terms of economic consequences and deterministic health effects, and is believed to far exceed the costs associated with alternatives considered in this final rule.

The net impacts of regulatory alternatives are presented in constant 2008 dollars, for both implementation and annual operating expenses, calculated over a 10-year analysis period. The annual operating costs are shown as present value 2008 dollars using 3 percent and 7 percent discount rates consistent with guidance in Regulatory Analysis Guidelines of the U.S. NRC (NUREG/BR-0058, Revision 4).

Summary of Results

Table 3.3-1 presents the net impact of the rule for each of the four alternatives, at 3 percent and 7 percent discount rates.

Table 3.3-1: Net Impact of Alternatives 2, 2A, 3, and 3A
(**Dollar Amounts in Thousands**).

Regulatory Alternative	10-year total at 3% discount rate	10-year total at 7% discount rate
2 NSTS expansion (Category 3)	13,720	11,883
2A Inventory only (Category 3)	4,642	4,284
3 NSTS expansion (1/10 of Category 3)	33,469	29,056
3A Inventory only (1/10 of category 3)	12,805	11,713

The primary cost elements under Alternative 2 are:

- About 50 percent of the total cost will be incurred by the NRC in its implementation and annual O&M expense associated with an expanded scope NSTS for Category 3 sources. This is equal to about $6.6 million over 10 years, due to $1.3 million one-time implementation cost and $5.3 million over 10 years for annual O&M costs.
- About 40 percent of the Alternative 2 total cost will be incurred by licensees, equal to about $5.2 million over 10 years. Industry operating costs are the bulk of these total costs, equal to $4.4 million over 10 years. One-time implementation cost for Industry is estimated to be $870,000 for NSTS account set-up and the initial inventory reporting. For the 100 licensees that are assumed to set-up accounts on the expanded NSTS, this represents $8,700 per licensee.
- The cost to Agreement States is equal to about $1.8 million over 10 years. About 70 percent of these costs are due to one time costs to implement the final rule in State regulations.

In Alternative 2, the NRC staff assumed that a small number of licensees would use the on-line NSTS. This is based on current experience with the NSTS for licensees who must report their Category 1 and Category 2 source transaction data. NRC's objective, however, is to improve the efficiency of licensees' use of NSTS such that about 50 percent of licensees use the on-line system. This was the assumption in the regulatory analysis for the NSTS Expansion proposed rule (73 FR 19749). The NRC staff performed a sensitivity analysis to support the conclusions in this final rule regulatory analysis, assuming that 50 percent of licensees with Category 3 sources reported their source transaction data using the NSTS, and the other 50 percent of licensees would report their data using the computer readable batch file. In this case, the total costs would be 18 percent lower than the costs derived for Alternative 2, primarily because of the lower annual costs by licensees in using the system and the NRC in maintaining the system. Over the 10-year analysis period at 3 percent discount rate, the total costs in this sensitivity analysis were $11.2 million compared to the $13.7 million for Alternative 2.

For alternative 2A whereby licensees are reporting end-of-year inventory positions, the costs to Industry, NRC and Agreement States over 10 years are similar, ranging from an estimated $1.2 million to $1.8 million.

Alternative 3 would require NSTS expansion from Category 2 down to 1/10th of Category 3 quantities of radioactive material. The major contributing costs under Alternative 3 are:

- About 50 percent of the total cost will be incurred by the NRC. The estimated total cost to the NRC is $16.4 million.
- About 35 percent of the total cost will be incurred by licensees, equal to about $11.6 million.
- The cost to Agreement States is equal to about $5.4 million over 10 years, with most of these costs due to implementing the final rule in State regulations.

For alternative 3A which would require end-of-year inventory reporting, the costs to Industry, NRC and Agreement States over 10 years range from $3.4 million to $5.0 million.

Table 3.3-2 provides the estimated costs, by attribute, over the 10-year analysis period, for Alternatives 2 and 3.

Table 3.3-2: Estimated Values and Impacts by Attribute, Alternatives 2 and 3
(**Dollar Amounts in Thousands**).

Attribute	Alternative 2 10-year Total Cost		Alternative 3 10-year Total Cost	
	3% Discount	7% Discount	3% Discount	7% Discount
Industry Implementation	870	870	2,445	2,445
Industry Operation	4,413	3,634	9,145	7,530
NRC Implementation	1,284	1,284	2,990	2,990
NRC Operation	5,292	4,357	13,404	11,037
Agreement States Implementation	1,164	1,164	3,048	3,048
Agreement States Operation	696	573	2,436	2,006
Total	13,720	11,883	33,469	29,056

Table 3.3-3 provides the estimated costs, by attribute, over the 10-year analysis period, for Alternatives 2A and 3A, the regulatory approaches that would require licensees to prepare initial and annual inventory reconciliations of their source inventories.

Table 3.3-3: Estimated Values and Impacts by Attribute, Alternatives 2A and 3A
(**Dollar Amounts in Thousands**).

Attribute	Alternative 2A 10-year Total Cost		Alternative 3A 10-year Total Cost	
	3% Discount	7% Discount	3% Discount	7% Discount
Industry Implementation	470	470	1,645	1,645
Industry Operation	1,081	890	3,380	2,783
NRC Implementation	1,220	1,220	2,770	2,770
NRC Operation	599	493	1,584	1,304
Agreement States Implementation	924	924	2,208	2,208
Agreement States Operation	348	287	1,218	1,003
Total	4,642	4,284	12,805	11,713

4. BACKFIT ANALYSIS

The proposed regulatory action includes new reporting requirements and does not impose any backfits on systems, structures, or components of a facility. That is, the proposed regulatory action does not contain any provisions involving backfitting, as defined at 10 CFR 50.109, 70.76, 72.62, and 76.76. Therefore, a backfit analysis is not required.

5. DECISION RATIONALE AND IMPLEMENTATION

The assessment of costs and benefits discussed previously provides a sound basis for decision-making that leads the NRC to the conclusion that the final rule, if implemented, would improve source tracking to provide additional assurance to prevent the occurrence of malicious use of sealed sources. The assessment provides a disclosure of information supporting the conclusion and alternate approaches to the regulatory objectives. Together, the set of amendments in the NSTS expansion final rule will ensure that licensees in possession of sealed sources greater than or equal to Category 3 will provide source transaction information to the NSTS to provide the NRC with a life cycle account for nationally tracked sources and, thus, will improve source accountability and control over these sources.

The cost of Alternative 2, the preferred approach supporting the NSTS expansion final rule to lower the threshold of NSTS to Category 3 quantities of radioactive material, is about 40 percent of the cost of Alternative 3 which would lower the NSTS tracking threshold to 1/10th of Category 3. There is support for expanding the NSTS to include Category 3 sources because the IAEA defines Category 3 sources as dangerous sources. A second reason supporting expansion of the NSTS to include Category 3 quantities of radioactive material is because it is plausible that these individual sources could be aggregated to reach a Category 2 activity level since only a few are needed, at the high end of Category 3 activity, to aggregate to Category 2. The NRC gave careful consideration to Alternative 3 and the threat of aggregating sources as low as 1/10th of Category 3, but at this time this is not considered a feasible lower level from which to expand the NSTS.

Alternatives 2A and 3A were also considered. These would only require an end-of-year inventory reconciliation by licensees as a method to provide source security. Although the costs of these alternatives are much less than Alternatives 2 and 3, on the order of about one-third the total costs, these alternatives will not provide the timely information needed to guard against and prevent the aggregation of sealed sources for potential malevolent applications, which is the objective of this final rule.

For the reasons discussed in the previous paragraphs, Alternative 2 is superior to Alternatives 3, 2A and 3A. Over the 10-year analysis period, the cost of Alternative 2 is about $13.7 million, at 3 percent discount rate.

Appendix 1 Detailed Input Assumptions for NSTS expansion, Alternatives 2 and 3

Table 3-1 lists the number of affected licensees, sources and annual source production rates for Alternatives 2 and 3.

Table 3-3 lists the number of annual source transactions and the number of reports that will need to be completed by licensees beginning November 30, 2012, for Alternatives 2 and 3.

The input assumptions for the percentage of source transactions submitted to NRC based on the method of submittal, and the number of source transactions in each report for each method of submittal, are shown below for Alternatives 2 and 3. In the tables below, when a cell has two entries separated by a semi-colon, the two entries represent input assumptions for Alternatives 2 and 3, respectively.

Percentage of source transactions for each method of submittal

	Final rule					Proposed rule			
	On-line NSTS	Batch file	Fax	Mail		On-line NSTS	Batch file	Fax	Mail
Manufacture	0	25	75	0		0	100	0	0
Transfer	15	10	75	0		50	50	0	0
Receipt	15	10	75	0		50	50	0	0
Disassembly	15	10	75	0		0	100	0	0
Disposal	15	10	75	0		100	0	0	0

Number of source transactions in each report for each method of submittal

	Final rule					Proposed rule			
	On-line NSTS	Batch file	Fax	Mail		On-line NSTS	Batch file	Fax	Mail
Manufacture	N/A	50	50	N/A		N/A	50	N/A	N/A
Transfer	10	4	4	N/A		2	50	2	2
Receipt	10	4	4	N/A		2	50	2	2
Disassembly	4	4	4	N/A		N/A	50	N/A	N/A
Disposal	4	4	4	N/A		2	N/A	N/A	N/A

Licensee time (minutes) to prepare information for each method of submittal

	Final rule					Proposed rule			
	On-line NSTS	Batch file	Fax	Mail		On-line NSTS	Batch file	Fax	Mail
Manufacture	N/A	5	30	N/A		N/A	5	N/A	N/A
Transfer	15	5	30	N/A		10	5	15	15
Receipt	15	5	30	N/A		10	5	15	15
Disassembly	15	5	30	N/A		N/A	5	N/A	N/A
Disposal	15	5	30	N/A		10	N/A	N/A	N/A

Licensee time for NSTS Account Set-up, Inventory reconciliation and source serial number costs

	Final rule		Proposed rule
NSTS initial set-up and credentialing			
Number of licensees opting to set up an account	100; 350		1000; 3500
Time (hours) to accomplish credentialing	16		0.5
Time (hours) in training to credential account	16		8
Travel and other expenses to credential account ($)	1,000		0
Number of licensees making computer program changes	50		50
Time (hours) to make computer program changes	80		80
Initial inventory of nationally tracked sources			
Number of licensees who must prepare inventory	1000; 3500		1000; 3500
Time (minutes) to prepare the initial inventory	30		30
Annual inventory reconciliation of tracked sources			
Number of licensees who reconcile inventory	1000; 3500		1000; 3500
Time (minutes) to prepare annual reconciliation	60		60
Assign unique serial numbers to each tracked source			
Number of sources assigned numbers each year	8011;16861		6233; 17910
Time (minutes) to assign numbers to source	2		2

Agreement State costs to expand NSTS

	Final rule		Proposed rule
Implement NRC regulations into conforming requirements by 11/30/12			
Number of Agreement States	36		34
Cost to each State to establish conforming requirements ($)	19,000		11,400
Perform annual inspections			
Number of licensees inspected each year	800; 2800		800; 2800
Time (hours) to prepare for and perform the NSTS inspection	3		1

NRC costs to expand NSTS

	Final rule		Proposed rule
Implement regulations and annual operating costs for expanded NSTS			
Number of licensees requiring credentialing	100; 350		1000; 3500
Number of users per licensee require credentialing	2		2
Cost ($) to credential each user	800		300
One-time credentialing training and NSTS software revisions	1,000,000		0
Annual operating cost to support NSTS expansion ($)	600000		2000000; 5000000
One-time cost for standard license condition template	4800		0
Perform annual inspections			
Number of licensees inspected each year	200; 700		200; 700
Time (hours) to prepare for and perform the NSTS inspection	3		1

Appendix 2 Detailed Input Assumptions for NSTS expansion, Alternatives 2A and 3A

Table 3-2 lists the number of affected licensees, sources and annual source production rates for Alternative s 2A and 3A.

Under Alternatives 2A and 3A, licensees are not required to perform any source transaction reports. The only licensee costs under these alternatives are those associated with initial inventory, annual inventory reconciliation, and assigning unique serial numbers to sources. In the tables below, when a cell has two entries separated by a semi-colon, the two entries represent input assumptions for Alternatives 2A and 3A, respectively.

Licensee time for initial inventory and annual inventory reconciliation and source serial number costs			
	Final rule		Proposed rule
Initial inventory of nationally tracked sources			
Number of licensees who must prepare inventory	1000; 3500		1000; 3500
Time (minutes) to prepare the initial inventory	30		30
Annual inventory reconciliation of tracked sources			
Number of licensees who reconcile inventory	1000; 3500		1000; 3500
Time (minutes) to prepare annual reconciliation	60		60
Assign unique serial numbers to each tracked source			
Number of sources assigned numbers each year	8011;16861		6,233; 17910
Time (minutes) to assign numbers to source	2		2

Under Alternatives 2A and 3A, the only costs to Agreement States are those associated with implementing the NRC final rule and performing annual inspections of licensees.

Agreement State costs to expand NSTS			
	Final rule		Proposed rule
Implement NRC regulations into conforming requirements by 11/30/12			
Number of Agreement States	36		34
Cost to each State to establish conforming requirements ($)	19,000		11,400
Perform annual inspections			
Number of licensees inspected each year	800; 2800		800; 2800
Time (hours) to prepare for and perform the NSTS inspection	3		1

Under Alternatives 2A and 3A, the only costs to the NRC are those associated with performing annual inspections of licensees.

NRC costs to expand NSTS			
	Final rule		Proposed rule
Perform annual inspections			
Number of licensees inspected each year	200; 700		200; 700
Time (hours) to prepare for and perform the NSTS inspection	3		1