

# Instructions for the Preparation and Distribution of Material Status Reports

(DOE/NRC Forms 742 and 742C)

Effective Date: January 1, 2009

Issued by the

U.S. Nuclear Regulatory Commission  
Office of Nuclear Material Safety and Safeguards  
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## **ABSTRACT**

NRC regulations require each licensee who is authorized to possess special nuclear material (SNM) or obligated source material to prepare and submit, in computer-readable format, reports concerning SNM received, produced, possessed, transferred, consumed, disposed of, or lost. This NUREG contains the reporting instructions for licensees to follow in making these reports.

### **Paperwork Reduction Act Statement**

The information collections contained in this NUREG are covered by DOE/NRC Forms 742 and 742C, which were approved by the Office of Management and Budget, approval numbers 3150-0004 and 3150-0058.

### **Public Protection Notification**

If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

**CONTENTS**

Abstract..... iii

Abbreviations..... vii

1 Introduction..... 1

    1.1 Material Status Reports ..... 1

    1.2 Regulatory Authority..... 2

    1.3 Preparation and Submittal of DOE/NRC Form 742  
        and 742C in Computer-Readable Format..... 3

    1.4 Documentation and Distribution..... 4

    1.5 Reconciliation..... 4

2 Instructions for Completing DOE/NRC Form 742,  
Material Balance Report@..... 5

    2.1 Section A, AMaterial Accountability@..... 6

    2.2 Section B, AForeign Obligations@..... 12

    2.3 Section C, ACertification@..... 12

3 Instructions for Completing DOE/NRC Form 742C,  
APhysical Inventory Listing@..... 12

    3.1 Licensees Reporting Under 10 CFR 74.13 and 150.17 ..... 12

    3.2 Licensees Reporting Under 10 CFR Part 75..... 16

v  
**Appendices**

NUREG/BRB0007, Rev. 6

A	Composition Code Instructions.....	<b>AB1</b>
B	DOE/NRC Form 742, A Material Balance Report, @ (Blank) and DOE/NRC Form 742C, A Physical Inventory Listing @ (Blank).....	<b>BB1</b>
C	Obligation Codes.....	<b>CB1</b>
D	Glossary.....	<b>DB1</b>
E	IAEA Inventory Change Type Codes.....	<b>EB1</b>



## ABBREVIATIONS

CFR	Code of Federal Regulations
DOD	Department of Defense
DOE	Department of Energy
FA	Facility Attachment
IAEA	International Atomic Energy Agency
ICT	inventory change type
ID	inventory difference
KMP	key measurement point
MBA	material balance area
MMDDYYYY	month, day, year
NMMSS	Nuclear Materials Management and Safeguards System
NOL	normal operating losses
NRC	Nuclear Regulatory Commission
NSI	National Security Information
PIL	Physical Inventory List
Pu	plutonium
RIS	reporting identification symbol
SAMS	Safeguards Management Software
SNM	special nuclear material
TFA	Transitional Facility Attachment
U	uranium
U.S. GOVT	United States Government
WT%	weight percent (of isotope)





# U.S. NUCLEAR REGULATORY COMMISSION INSTRUCTIONS FOR THE PREPARATION AND DISTRIBUTION OF MATERIAL STATUS REPORTS

## DOE/NRC FORMS 742, AMATERIAL BALANCE REPORT,@ AND 742C, A PHYSICAL INVENTORY LISTING@

### 1 INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE) jointly use a Nuclear Materials Management and Safeguards System (NMMSS). This system is the U.S. national database used by DOE and NRC for tracking certain nuclear material.

Common reporting forms and formats are used to minimize the reporting burden on licensees<sup>1</sup> required to provide nuclear material data to one or both agencies in accordance with current regulations or contractual obligations. In this manner, licensees can file one report to meet the reporting requirements of both NRC and DOE. Compliance with specific reporting requirements is monitored by the agency that requires the specific data. NRC regulations require that the reports be submitted in computer-readable form. A licensee may use any blank blocks on the paper DOE/NRC forms for other business purposes.

DOE requires all NRC licensees to report to NMMSS all receipts, transfers, and inventories of U.S. GOVT-owned, loaned, or leased material in their possession. A DOE/NRC Form 742, AMaterial Balance Report,@ and a DOE/NRC Form 742C, APhysical Inventory Listing,@ must be filed to report quantities of 0.5 or greater of the reporting unit specified as specified in DOE Orders Series 470 (DOE Order 470.4 ASafeguards and Security Program@ and DOE M 470.4-6 ANuclear Material Control and Accountability@).

#### 1.1 Material Status Reports

The DOE/NRC Form 742 AMaterial Balance Report@ and 742C APhysical Inventory Listing@ are the means for submitting material balance and inventory data to the NMMSS. The information must be completed in accordance with the instructions in this NUREG and must be submitted in computer-readable format. Instructions for creating the computer-readable submittal are found in NMMSS Report D-24, APersonal Computer Data Input for NRC Licensees.@

The DOE/NRC Form 742 is used to report a summary of activity for a specified material within a time period. The report conveys activities such as the beginning balance, shipments and receipts involving other facilities, how much material has decayed, how material has been down-blended, and the ending balance. This information is useful to validate a facility=s ending inventory.

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<sup>1</sup>The term Alicensee@ here denotes an NRC or Agreement State licensee or an NRC certificate holder.

The DOE/NRC Form 742C is used to report a facility's inventory as of a specified date. The report lists, for each material type category, the amount of material in the facility's possession or in-transit to the facility at the time of the inventory process. The form can show each individual batch or summarize totals of Alike@ batches. The totals for each material type category must match the ending balance in the corresponding material balance report.

The NMMSS relies heavily on the quality of the data reported by the facilities involved in nuclear activities. The data submitted to the NMMSS are subject to evaluation according to the restrictions placed on nuclear activity by the policies of various governing agencies of the United States. The NMMSS accepts the data after being verified as acceptable within the restrictions of the system.

## **1.2 Regulatory Authority**

NRC regulations require each licensee who possessed during a reporting period special nuclear material (SNM) in a quantity totaling 1 gram or more of contained U<sup>235</sup>, U<sup>233</sup>, or plutonium, to prepare and submit in computer-readable format reports concerning SNM received, produced, possessed, transferred, consumed, disposed of, or lost. The reporting periods for facilities subject to 10 CFR Part 74.51 are October 1 to March 31 and April 1 to September 30 of each year. These reports must be filed within 30 days of the end of the period covered by the report, unless an alternate date is authorized by the NRC. Reports for facilities subject to Parts 74.19(c), 74.31(c)(5), 74.33(c)(4), or 74.33(c)(6) are to be made and filed within 60 days of the start of the physical inventory taking, unless an alternate date is authorized by the NRC. If licensees are reporting pursuant to 10 CFR Part 75, reports are to be dispatched as soon as possible but no later than 30 days from the start of the physical inventory taken as part of the licensee's MC&A procedures. All other licensees, including those subject to Part 150.17, shall submit a report no later than March 31 of each year.

A separate DOE/NRC Form 742 and 742C must be completed for each material type (E1, E2, E3, E4, 50, 70, 83, 89) of SNM for which a reportable quantity is possessed or a reportable inventory change has occurred during the period. Reportable quantities, for SNM, are defined as 1 gram or more, for source material the reportable quantity is 1 kilogram or more. For reporting purposes, quantities of 0.5 or more are to be rounded up to the next whole unit.

Also, each Federal or State licensee, who possessed during a reporting period 1 kilogram or more of foreign obligated source material (material type 10, 81, and 88) must submit a statement of foreign obligated source material inventory. A DOE/NRC Form 742 may be used. The reporting period is October 1 to September 30 of each year (unless an alternate period is authorized by the NRC). The reports must be filed as specified in Facility Attachments (FAs) if the licensee is reporting pursuant to the 10 CFR Part 75 for all source material and SNM.

In addition each licensee who possesses, or had possessed in the previous reporting period, one kilogram or more of uranium or thorium source material pursuant to the operation of enrichment services, downblending uranium that has an initial enrichment of the U<sup>235</sup> isotope of 10 percent or more, or in the fabrication of mixed-oxide fuels shall complete and submit DOE/NRC Form 742 and 742C's concerning all source material that the licensee has

received, produced, possessed, transferred, consumed, disposed of, or lost. These reports are to be submitted within 30 days of September 30 of each year or with the licensee=s annual material balance reports required under Parts 72, 74, and 150.

SNM and source reports shall be submitted for each Reporting Identification Symbol (RIS) account including all holding accounts.

Refer to the DOE Orders Series 470.4 ASafeguards and Security Program,@ and DOE M 470.4-6 ANuclear Material Control and Accounting@ for U.S. GOVT-owned material holdings.

### **1.3 Preparation and Submission of DOE/NRC FORM 742 and 742C in Computer-Readable Format**

NMMSS Report D-24 provides instructions for preparing DOE/NRC Form 742 and 742C in computer-readable format as required for submittal. The Safeguards Management Software (SAMS) is a miniature version of the NMMSS. This software allows the user to import and export data, make edit checks, generate various reports, and create material balance, inventory data, and transaction data. It has the capability to export data into the required NMMSS predefined computer-readable format outlined in the NMMSS Report D-24. The SAMS program may be obtained from the NMMSS operator free of charge.

Proprietary information must be included in all reporting forms when necessary to provide an adequate response. An application to withhold such information from public disclosure may be made, and will be disposed of, in accordance with the provisions of 10 CFR 2.390. If any of this information is of particular sensitivity, a request may be made that the information not be physically transmitted to the International Atomic Energy Agency (IAEA). Such a request must refer to, and conform with, 10 CFR 75.12.

There are several methods for submitting data to the NMMSS:

#### **(1) Telephonic Transfers to the NMMSS**

A licensee may submit the DOE/NRC Form 742 and 742C electronically by using a modem. To establish an electronic connection with the NMMSS, licensees must contact the NMMSS security officer to request establishment of a connection with the direct link. If the facility is a valid facility for the type of link requested (classified or unclassified), the security officer provides the requester with the appropriate forms to complete.

Upon receipt of the completed forms, the security officer creates a user ID and password and establishes an account for the facility. The user ID and password are then forwarded to the user facility along with a password acknowledgment form. The licensee signs the acknowledgment form and returns it to the security officer, who then activates the user ID and password.

#### **(2) Data Submittals on computer media**

DOE/NRC Form 742 and 742C should be submitted in computer-readable format unless reporting per 10 CFR 40.64(b). NMMSS Report D-24 provides instructions on packaging, data format requirements, acceptable media types, and mailing address for submittal of data on computer media.

(3) New or Modified Methods of Transferring Electronic Data

New or modified methods of transferring electronic DOE/NRC Form 742 and 742C data to NMMSS may be authorized by the NRC. Authorization to use additional methods for the transfer of this data may be confirmed by contacting the NMMSS operator=s program administrator.

#### **1.4 Documentation and Distribution**

The completed DOE/NRC Form 742 and 742C must be submitted to the NMMSS operator. Before submitting data, confirm the address of NMMSS and the method of providing data by calling the NMMSS operator. Note that the specific documentation and distribution instructions depend on whether the DOE/NRC Form 742 or 742C contains classified or unclassified information.

Any DOE/NRC Form 742 or 742C which is classified must be documented and handled in accordance with all pertinent security requirements. All other submissions that are not classified are considered to be proprietary material control and accounting information and may be requested to be withheld as defined by 10 CFR 2.390. Each person who is to receive a copy of the report must be verified as a qualified recipient prior to distribution. Please confirm the address prior to sending documents to NMMSS or other recipients. Also please formally provide classification guidance to NMMSS after a decision to classify, declassify, or make any change in previously submitted guidance. When submitting ASafeguards Information@, a Concise Note Form 740M must be submitted stating that the submission is ASafeguards Information@ and should be handled in accordance with 10 CFR 73.21.

Distribute the completed report as follows:

\$ Submit one copy of the completed report and all supporting sub-schedules and lists to NMMSS. All RIS holders are encouraged to review their RIS information yearly and notify NMMSS that the data is correct or make changes.

\$ Retain one copy for your file.

#### **1.5 Reconciliation**

Every report period, a reconciliation shall be performed of the data the licensee has reported to NMMSS to the projected balances that have been developed by NMMSS. Generated balances are provided in reports obtained from the NMMSS operator. This process shall be considered complete when the licensee resolves any differences between the reported and the

generated balances including those listed for foreign obligated materials. The reconciliation should be completed within 30 calendar days of when the licensee was notified of the discrepancy and include all accounts held by the licensee including holding accounts.

Facilities should ensure that their DOE/NRC Form 742C weight totals equal their DOE/NRC Form 742 weight totals for each material type. The DOE/NRC Form 742C totals should be an arithmetic sum of the weights listed on the Batch Data lines of the DOE/NRC Form 742C. Generally DOE/NRC Form 742 and 742C totals should be in agreement with values maintained and used at the site. However, if reported DOE/NRC Form 742 and 742C values differ from site maintained values due to such issues as rounding because of different units of measurement/reporting, then the site should submit a concise note explaining the difference.

## 2 INSTRUCTIONS FOR COMPLETING DOE/NRC FORM 742

DOE/NRC Form 742, A Material Balance Report, should be completed in accordance with the instructions in this NUREG and in NMMSS Report D-24, A Personal Computer Data Input for NRC Licensees, as appropriate. NMMSS Report D-24 provides instructions and examples for preparation of required electronic submittals to the NMMSS.

The following numbered instructions correspond to the numbered blocks and lines on DOE/NRC Form 742 to be completed by licensees.

25672. NAME AND ADDRESS - Leave blank.

2. LICENSE NUMBER(S) - Leave blank.

3. REPORTING IDENTIFICATION SYMBOL (RIS) - Enter the RIS which has been assigned and under which the source or special nuclear material being reported is or was held. Submit a separate report for each RIS and any holding account.

4. REPORT PERIOD - Enter the inclusive dates. The beginning date for the reporting period must be the next consecutive date after the ending date of the previous report.

5. MATERIAL TYPE - Enter the appropriate material type code for the material being reported, as follows:

<u>CODE</u>	<u>DESCRIPTION</u>
10	Depleted uranium (U)
E1	Uranium enriched greater than normal but less than 5%
E2	Uranium in enrichment of 5% or more but less than 20%
E3	Uranium in enrichment of 20% or more but less than 80%
E4	Uranium in enrichment of 80% or more
50	Plutonium (Pu)
70	U <sup>233</sup>
81	Normal uranium

83 <sup>2</sup>	Pu <sup>238</sup>
88	Thorium
89	Uranium in cascade

Complete a separate DOE/NRC Form 742 for each SNM or source material type even in cases where two or more types are combined.

When U<sup>235</sup> and U<sup>233</sup> are mixed, report the total element weight of the mixture in the element weight column of both the U<sup>235</sup> report and the U<sup>233</sup> report, and reflect this fact in a concise note (DOE/NRC Form 740M) for each report.

## 2.1 Section A, **AMaterial Accountability@**

PROCESS CODE - Enter processing code A, C, or D. The process codes C and D may be used to modify report data for only the current processing period.

- A Initial entry of data
- C Replacement of data. Data may be replaced at any time prior to the close of the processing period in which the initial entry was made.
- D Deletion of data. Data may be deleted at any time prior to the close of the processing period in which the initial entry was made.

Modification of reported material balance reports may be done for the current processing periods. The Process codes to be used are **AC@** for replace and **AD@** for delete.

- \$ Submitting a Form with RIS, report period, material type, and sequence number and process code **AC@** will be the unique identifier for the line to be replaced.
- \$ Submitting a Form with RIS, report period, material type, and sequence number and process code **AD@** will be the unique identifier for the line to be deleted.
- \$ Submitting a Form with RIS, report period, and material type with no sequence number and a process code of **AD@** will delete all matching records.
- \$ Submitting a Form with the RIS, report period, and a process code of **AD@** will delete the entire material balance within the reporting dates.

SEQUENCE NUMBER - All detail lines that contain data must have a sequence number. Enter a numerical value in sequential order beginning with the number one. Do not repeat or skip numbers.

Use columns A and B to enter all numeric data by element and isotope weight.<sup>3</sup>

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<sup>3</sup>Report as Pu<sup>238</sup> if the contained Pu<sup>238</sup> is greater than 10% of total Pu by weight. Otherwise, report as plutonium.

### COLUMN A - ELEMENT WEIGHT<sup>3</sup>

Enter the total element weight of the SNM or source material being reported. If Pu<sup>238</sup>, report to the nearest 0.1 gram. Report all other SNM to the nearest gram and all other source material to the nearest kilogram.

Note: Optionally, if using XML format, reporting of source material to three decimal places may be done, however both shipper and receiver must report to the same decimal place. If three decimal reporting is being used, then the reporting unit is to the nearest thousandth of a kilogram. For example, 1655 grams may be reported by both the shipper and receiver as 1.655 kilograms. However, for consistency the licensee must continue to report to the same decimal place for that material type. If at any time, during the stated material balance period, source material has been reported to the third decimal on a transaction, the corresponding material balance report must be reported to the same decimal place for consistency.

### COLUMN B - ISOTOPE WEIGHT<sup>3</sup>

In the case of enriched uranium or U<sup>233</sup>, enter the weight of the isotope U<sup>235</sup> or U<sup>233</sup> as appropriate; in the case of plutonium, enter the weight of the isotopes Pu<sup>239</sup> and Pu<sup>241</sup>, and in the case of Pu<sup>238</sup>, enter the weight of the isotope Pu<sup>238</sup>. If Pu<sup>238</sup>, report to the nearest 0.1 of a gram. If depleted uranium, enter the weight of the isotope U<sup>235</sup> to the nearest kilogram. Make no entry for other source material.

8. BEGINNING INVENTORY - U.S. GOVT-OWNED - Enter the inventory of U.S. GOVT-owned special nuclear material or source material as of the beginning of business on the first day of the period covered by the report. The quantities reported on line 8 (columns A and B) must agree with the reconciled quantities on line 80 (Ending Inventory) on the report submitted for the previous reporting period.
9. BEGINNING INVENTORY - NOT U.S. GOVT-OWNED - Enter the inventory of Not-U.S. GOVT-owned special nuclear material or source material as of the beginning of business on the first day of the period covered by the report. The quantities reported on line 9 (columns A and B) must agree with the reconciled quantities on line 81 (Ending Inventory) of the report submitted for the previous reporting period.

### RECEIPTS

11. PROCUREMENT FROM DOE - Enter quantities of special nuclear material (or source material) which have been purchased from DOE during the reporting period and reported to the NRC on DOE/NRC Form 741. This may be done by listing individual receipts for each individual RIS as reported on DOE/NRC Form 741 or a total of receipts for each individual RIS during the reporting period. SNM or source material quantities entered

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<sup>3</sup>Round up Fractions of 0.5 or greater. If the quantity to be entered is less than 0.5 of the reporting unit, round down to the next whole reporting unit.

on line 11 are not entered on line 30.

13. PROCUREMENT FOR THE ACCOUNT OF DOE - Enter quantities of special nuclear material (or source material) which have been purchased for the account of DOE during the reporting period and reported to the NRC on DOE/NRC Form 741. This may be done by listing individual receipts for each individual RIS as reported on DOE/NRC Form 741 or a total of receipts for each individual RIS during the reporting period. SNM or source material quantities entered on line 13 are not entered on line 30.
14. DOD RETURNS - USE A - Leave blank.
15. DOD RETURNS - USE B - Leave blank.
16. DOD RETURNS - OTHER USES - Leave blank.
21. PRODUCTION - Enter the calculated net quantity of plutonium or U<sup>233</sup> produced in the fuel and/or blanket material of a reactor during the reporting period. For licensees reporting under 10 CFR Part 75, if the fuel from which the plutonium or U<sup>233</sup> produced was removed or discharged from the reactor during this reporting period, enter the discharged quantity on line 21 directly after the word AProduction. @ Uranium mines and mills should account for uranium mined/milled as production for the reporting period.
22. FROM OTHER MATERIALS - Enter increases resulting from the introduction of another material into the material balance being reported. If the added quantity is the result of blending, burnup, or enrichment, identify the balance supplying the material by entering the appropriate inventory change type (ICT) code from the following list:

EN	Enriched to normal
ED	Enriched to depleted
NE	Normal to enriched
ND	Normal to depleted
DE	Depleted to enriched
DN	Depleted to normal
EE	Enriched (low/high) to enriched (high/low)

EE can be low enrichment to high or high to low (i.e., any combination of the E1 through E4 material type codes).

Enrichment facilities, not subject to Part 75 requirements, may use 22 as an entry indicating a change type or as directed by the NRC. This can be any combination of material types (10, 20, 81, and 89) but must be reported on each corresponding form for each material type.



30. RECEIPTS REPORTED TO NRC ON DOE/NRC 741 (not listed elsewhere) - Enter the SNM or source material received from others and reported on Form DOE/NRC 741 and not listed elsewhere on this form. This may be done by listing individual receipts by RIS as reported on DOE/NRC Form 741 or a total of receipts from each individual RIS during the report period.
34. RECEIPTS - MISC. - A DOE/NRC Form 741 reporting the cumulative miscellaneous receipts (ICT 34) must be completed. This requirement includes nuclear material removed from inventory but now returned to inventory, if not accounted for elsewhere.
37. PROCUREMENT BY OTHERS - Leave blank.
38. DONATED MATERIAL - FROM U.S. GOVT TO OTHERS - Enter the amount of material received as a donation from the U.S. GOVT.
39. DONATED MATERIAL - FROM OTHERS TO U.S. GOVT - Enter the amount of material received as a donation by others to the account of the U.S. GOVT.
40. TOTAL - Enter the sums of columns A and B (lines 8 through 39).

#### REMOVALS

41. EXPENDED IN SPACE PROGRAMS - Leave blank.
42. SALES TO U.S. GOVT - Enter quantities of SNM or source material which have been sold to the U.S. GOVT during the reporting period and have been reported to NRC on DOE/NRC Form 741. This may be done by listing individual shipments by RIS as reported on DOE/NRC Form 741 or a total of shipments to each individual RIS during the reporting period. (SNM or source material quantities entered on line 42 are not entered on line 51.)
43. SALES TO OTHERS FOR THE ACCOUNT OF U.S. GOVT - Enter quantities of special nuclear material which have been sold for the account of the U.S. GOVT during the reporting period and have been reported to NRC on DOE/NRC Form 741. This may be done by listing individual shipments by RIS as reported on DOE/NRC Form 741 or a total of shipments to each individual RIS during the reporting period. (SNM or source material quantities entered on line 43 are not entered on line 51.)
44. DOD - USE A - Leave blank.
45. DOD - USE B - Leave blank.
46. DOD - Other USES - Leave blank.

47. EXPENDED IN U.S. GOVT TESTS - Leave blank.
48. ROUTINE TESTS - Leave blank.
49. SHIPPER - RECEIVER DIFFERENCE - Leave blank.
51. SHIPMENTS REPORTED TO NRC/DOE on DOE/NRC 741 (not listed elsewhere) - Enter the quantities of special nuclear material or source material shipped to others and reported to the NRC on DOE/NRC Form 741 but not listed elsewhere on this form. This may be done by listing individual shipments by RIS as reported on DOE/NRC Form 741 or a total of shipments to each individual RIS during the reporting period.
54. SHIPMENTS - MISC. - A DOE/NRC Form 741 reporting the cumulative miscellaneous shipments (ICT 54) must be completed. Facilities reporting pursuant to 10 CFR Part 75 should also include transfers to burials on this line rather than on line 74.
58. DONATED MATERIAL - TO U.S. GOVT BY OTHERS - Enter the amount of nuclear material removed by a donation to the U.S. GOVT.
59. DONATED MATERIAL - TO OTHERS BY THE U.S. GOVT - Enter the amount of nuclear material removed from a U.S. GOVT account by donation to others.
65. ROUNDING ADJUSTMENT - Enter the quantity of nuclear material that is removed (as a positive number) or added (as a negative number) to the inventory as a result of rounding activities encountered by the licensee.
71. DEGRADATION TO OTHER MATERIALS - Enter decreases resulting from the introduction of other material into the material balance being reported. If the decreased quantity is the result of blending, burnup, or enrichment, identify the balance losing the material by entering the appropriate code from the list in line 22 above.
72. DECAY<sup>4</sup> - Enter the amount of radioactive decay which occurred during the reporting period for plutonium and Pu<sup>238</sup>. When the SNM being reported is plutonium (material type 50), enter the amount of radioactive decay of the isotope Pu<sup>241</sup> if the decay is 1 gram or more.
- When the SNM being reported is Pu<sup>238</sup>, enter the amount of radioactive decay of the isotope Pu<sup>238</sup> if the decay is 0.1 gram or more.
73. FISSION AND TRANSMUTATION - Enter the calculated quantities of SNM lost by
- 
- 4Round up Fractions of 0.5 or greater. If the quantity to be entered is less than 0.5 of the reporting unit, round down to the next whole reporting unit.

fission and transmutation in a reactor.

74. NORMAL OPERATIONAL LOSSES/MEASURED DISCARDS - Normal operational losses (NOLs) and measured discards are material that has been discarded, whether in the form of solids, liquids, or gases, as determined by measurement or by estimate on the basis of measurement.

All material that leaves the inventory through the process of normal operational losses/measured discards must be accounted for on a DOE/NRC Form 741 (if not previously reported in the period covered by this report). To account for these discards, the following established RIS types are to be used.

If the discard is to a lagoon or pond (L), append an L to the receiver=s RIS. Measured discards to atmosphere or ground should be documented as an onsite transfer with the licensee RIS as shipper and receiver. If the material goes off the inventory into a holding area (refer to Holding Account in the glossary) for later removal to a burial site, append an H to the receiver=s RIS. When the material is eventually shipped to a burial site, the transfer series on the Form 741 will show the shipper=s RIS with an H appended and the appropriate V series RIS in the receiver=s block. Alternately, the licensee may return the material from the holding account to the primary RIS and then ship the material from the primary RIS. Such activities must also be documented on a DOE/NRC form 741. Remove discards from inventory only when the material has been disposed of (a) by transfer to an authorized recipient or holding area as provided in the regulations in 10 CFR Part 40 or 74; (b) as authorized pursuant to 10 CFR 20.2002 (Commission-approved disposal methods); (c) as provided in 10 CFR 20.2003 (the disposal of licensed material by release into sanitary sewage systems) or 10 CFR 20.2004 (treatment or disposal by incineration) or 10 CFR 20.1302 (concentrations in effluents to unrestricted areas); or (d) as provided in corresponding regulations of Agreement States. Note: the establishment of AL@ or AH@ accounts requires prior NRC approval.

75. ACCIDENTAL LOSSES - Accidental loss is the irretrievable and inadvertent loss of a known quantity of SNM or source material as the result of an operational accident, as determined by measurement or by estimate on the basis of measurement.
76. APPROVED WRITE-OFFS - Leave blank.
77. INVENTORY DIFFERENCE - Inventory difference (ID) is the difference between physical inventory and book inventory after the book has been adjusted for all receipts and removals. A negative entry reports a gain. A positive entry reports a loss.

Reactors should not report an inventory difference to NMMSS. At the time of physical inventory, the value assigned to an SNM item (assembly, rod, fragment, sealed container, etc.) should be recorded identically on both the book inventory and the physical inventory. At a reactor, unlike facilities that process SNM for some end use, adjustments

to the values assigned to items (representing nuclear loss, decay, production rounding, etc.) are explainable and should be reported as such.

80. ENDING INVENTORY - U.S. GOVT-OWNED - Enter the ending inventory which is U.S. GOVT-owned as of the end of the last day of the period covered by this report.
81. ENDING INVENTORY - NOT U.S. GOVT-OWNED - Enter the ending inventory which is Not U.S. GOVT-owned as of the last day of the period covered by this report.
82. TOTAL - Enter the sums of lines 41 through 81. The totals reported on this line must agree with those on line 40.
83. BIAS ADJUSTMENT - The ID bias adjustment is that quantity of material which should be added to or subtracted from the ID quantity on line 77 to produce the best estimate of an unbiased ID. The adjustment represents the algebraic summation of the impact of measurement system biases on each component of the measured plant material balance. Include on this line the sum of the bias adjustments for the ID for the current period. Any prior period adjustments should also be included on this line. Do not include bias adjustments that have already been applied to the source data in the material balance equation.

Note: the total ending inventories must match the total inventory reported on DOE/NRC Form 742C for a material type.

## 2.2 Section B, AForeign Obligations@

The total amount of obligated nuclear material on hand as of the end of the reporting period must be accounted for by material type. It may not exceed the physical inventory.

The following column entries are required:

1. COUNTRY OF OBLIGATION - Enter the unique obligated code for each category of nuclear material. The codes are listed in Appendix C. An updated listing is available from the NMMSS operator.
2. ELEMENT WEIGHT - Enter the element weight (Pu, U, or Th) of the obligated special nuclear material or source material in the reporting units specified for column A of Section A of the form (see Section 2.1 of this NUREG).
3. ISOTOPE WEIGHT - Enter the appropriate isotope weight; if enriched uranium or U<sup>233</sup>, enter weight to the nearest gram of U<sup>235</sup> or U<sup>233</sup>, as appropriate. If plutonium, make no entry.
4. TOTAL WEIGHT - Enter the totals for columns 2 and 3. These totals represent the

total obligated material at the facility. Total weight of obligated nuclear material may not exceed the total element and isotope weight reported on line 82.

### **2.3 Section C, ACertification@**

SIGNATURE, TITLE, AND DATE - The report, if submitted as a hard copy, shall be signed by an authorized representative of the licensee. If submitted electronically, each licensee must establish internal procedures to ensure that the information provided in the report is accurate and that the report has been prepared and issued only by the authorized licensee personnel.

### **3 INSTRUCTIONS FOR COMPLETING DOE/NRC FORM 742C, APHYSICAL INVENTORY LISTING@**

DOE/NRC Form 742C describes the status of the nuclear material reported on lines 80 and 81 of DOE/NRC Form 742, as of the end of the reporting period. There are two separate sets of procedures for filing DOE/NRC Form 742C, one for licensees required to report pursuant to 10 CFR 74.13 or 150.17 and the other licensees required to report under 10 CFR Part 75.

The instructions for completing the form are presented separately for the two categories of licensees.

#### **3.1 Licensees Reporting Under 10 CFR 74.13 or 150.17**

The following numbered instructions correspond to the numbered blocks or lines to be completed by licensees on DOE/NRC Form 742C, APhysical Inventory Listing@ (PIL). Source material with no foreign obligation and that is not utilized in enrichment services, downblending of uranium that has an initial enrichment of the U<sup>235</sup> isotope of 10 percent or more, or in the fabrication of mixed-oxide fuels is exempt from this requirement.

1. NAME AND ADDRESS - Leave blank.
2. REPORTING IDENTIFICATION SYMBOL (RIS) - Enter the RIS of the reporting facility.
3. INVENTORY DATE - Enter the ending date of the reporting period for the Material Balance Report.
4. LICENSE NUMBER(S) - Leave blank.
5. BATCH DATA - The basic reporting entity is the batch, defined as Aa portion of nuclear material handled as a unit for accounting purposes at a key measurement point and for which the composition and quantity are defined by a single set of specifications or measurements. The nuclear material may be in bulk form or contained in a number of separate items.@

A batch may have only one value for:

- \$ batch name
- \$ number of items
- \$ composition/facility code
- \$ key measurement point
- \$ measurement basis
- \$ scrap program
- \$ owner code

In general, all of the data for one batch will be entered on one line of block 5 of the DOE/NRC Form 742C. An exception is when a single discrete item contains more than one material (e.g., irradiated fuel containing both uranium and plutonium); in this case, a separate line should be used for the data for each material, and all data common to all materials in the batch should be entered on the first line.

5a. MATERIAL TYPE CODE

Enter the appropriate special nuclear material type code, as follows:

Code	Description
10	Depleted uranium
E1	Uranium enriched greater than normal but less than 5%
E2	Uranium in enrichment of 5% or more but less than 20%
E3	Uranium in enrichment of 20% or more but less than 80%
E4	Uranium in enrichment of 80% or more
50	Plutonium
70	U <sup>233</sup>
81	Normal uranium
83	Pu <sup>238</sup>
88	Thorium
89	Uranium in cascade

5b. COMPOSITION/FACILITY (COMP/FAC) CODE - Enter the appropriate code from the following table.

Code <sup>5</sup>	Description
860	In reactors and critical assemblies
861	In cooling basins
862	In conversion and fabrication processes
863	In recovery processes
864	Material not in process
865	Unirradiated scrap awaiting recovery
866	Unirradiated scrap awaiting disposal

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<sup>5</sup> See Appendix A for more detailed code instructions. Enrichment facilities, not subject to the requirements in Part 75, are authorized to continue using the inventory composition codes that have been authorized for use by the NRC.

899                    Inventory total line

- 5c. ELEMENT WEIGHT - Enter the element weight as instructed for columns A and B of Section A of DOE/NRC Form 742 (see Section 2.1 of this NUREG).
- 5d. ISOTOPE WEIGHT - Enter the isotope weights as instructed for columns A and B of Section A of DOE/NRC Form 742 (see Section 2.1 of this NUREG).
- 5e. DOE PROJECT NO. - Make no entry unless reporting U.S. GOVT-owned material. See DOE Orders Series 470 for guidance.
- 5f. SCRAP PROGRAM - Leave blank.
- 5g. WEIGHT PERCENT ISOTOPE - Leave blank.
- 5h. OWNER CODE - This code describes the ownership of the material at the time it was in the shipper's possession. Enter the appropriate code from the list below.

G U.S. Government-owned

J Not-U.S. Government-owned

Note: Refer to Glossary, Appendix D, for further description of U.S. Government-owned

- 5i. SEQUENCE NUMBER - Enter the line number. Number lines consecutively beginning with number 1. Do not repeat or skip numbers.
- 5j. BATCH NAME - No entry required. Can be used as licensee desires.
- 5k. NO. OF ITEMS - No entry required. Can be used as licensee desires.
- 5l. KEY MEASUREMENT POINT - Leave blank.
- 5m. MEASUREMENT I.D. - Leave blank.
- 5n. ENTRY STATUS - Leave blank.
- 5o. MATERIAL BALANCE AREA (MBA) - Leave blank.
- 5p. SITE IDC - Leave blank.
- 5q. PROCESS CODE - Enter processing code A, C, or D. The process codes C and D may be used to modify report data for only the current processing period.

A Initial entry of data

- C Replacement of data. Data may be replaced at any time prior to the close of the processing period in which the initial entry was made.
- D Deletion of data. Data may be deleted at any time prior to the close of the processing period in which the initial entry was made.

Modification of reported material balance reports may be done for the current processing periods. The Process codes to be used are AC@ for replace and AD@ for delete.

- \$ Submitting a Form with RIS, report period, material type, and sequence number and process code AC@ will be the unique identifier for the line to be replaced.
- \$ Submitting a Form with RIS, report period, material type, and sequence number and process code AD@ will be the unique identifier for the line to be deleted.
- \$ Submitting a Form with RIS, report period, and material type with no sequence number and a process code of AD@ will delete all matching records.
- \$ Submitting a Form with the RIS, report period, and a process code of AD@ will delete the entire material balance within the reporting dates.

6. TOTALS - Enter the total inventory reported in the above categories for Element Weight (5c), Isotope Weight (5d), and the next sequential Sequence Number. This total elemental weight and isotope weight must agree with the sum of the quantities entered on lines 80 and 81 on the DOE/NRC Form 742 for each individual material type being reported.
7. SIGNATURE - The report, if submitted as hard copy, shall be signed by an authorized representative of the licensee. Otherwise, each licensee must establish internal procedures to ensure that the information provided in the report is accurate and that the report has been prepared and issued only by authorized licensee personnel.
8. TITLE - Enter the title of the person submitting the report (required for paper submission only).
9. DATE - Enter the date the report was submitted (required for paper submission only).

Submit the data as specified in Section 1.3.

Refer to the DOE Orders Series 470.4 ASafeguards and Security Program,@ and DOE M 470.4-6 ANuclear Material Control and Accounting@ for U.S. GOVT-owned material holdings. Reporting data for U.S. GOVT-owned inventory in an expanded level of detail, that is a DOE reporting requirement, also meets inventory reporting requirements of NRC. The total of GOVT-owned inventory on which inventory data is reported must agree with the quantity entered on line 80 (ENDING INVENTORY-U.S. GOVT - OWNED) on the DOE/NRC Form 742.



### 3.2 Licensees Reporting Under 10 CFR PART 75

The instructions in this section apply only to facilities which have been notified by letter from the NRC, as provided in 10 CFR 75.11, that they have been identified under the U.S./IAEA Safeguards Agreement. Facilities that are required to submit initial inventory reports under 10 CFR 75.32 and for which a physical inventory is not performed shall prepare DOE/NRC Form 742 according to the instructions in Section 2.1, completing lines 2, 3, 4, 80, 81, and 82. The information in the initial inventory report may be based upon the licensee's book record. Facilities reporting under this section must file subsequent Material Balance Reports based upon a physical inventory and are required to attach a completed DOE/NRC Form 742C, A Physical Inventory Listing@ (PIL). Such reports are required with respect to each physical inventory taken as part of the material accounting and control procedures required by 10 CFR 75.21. Unless otherwise specified by license conditions, such reports shall be dispatched as soon as possible and in any event within 30 days of the start of the physical inventory.

After completion of Form 742C, prepare the submittal in computer-readable format following the instructions in NMMSS Report D-24.

The following numbered instructions correspond to the numbered blocks or columns to be completed by licensees on the PIL.

1. NAME AND ADDRESS - Leave blank.
2. REPORTING IDENTIFICATION SYMBOL (RIS) - Enter the RIS of the reporting facility.
3. INVENTORY DATE - Enter the ending date for the period covered by the Material Balance Report.
4. LICENSE NUMBER(S) - Leave blank.
5. BATCH DATA - The basic reporting entity is the batch, defined as Aa portion of nuclear material handled as a unit for accounting purposes at a key measurement point and for which the composition and quantity are defined by a single set of specifications or measurements. The nuclear material may be in bulk form or contained in a number of separate items.@

A batch may have only one value for:

- \$ batch name
- \$ number of items
- \$ composition/facility code
- \$ key measurement point
- \$ measurement basis
- \$ scrap program
- \$ owner code

In general, all of the data for one batch will be entered on one line of block 5 of the

DOE/NRC Form 742C. One exception is when if a single discrete item contains more than one material (e.g., irradiated fuel containing both uranium and plutonium); in such a case, a separate line should be used for the data for each material, and all data common to all materials in the batch entered should be on the first line.

5a. MATERIAL TYPE - Enter the appropriate special nuclear material type code, as follows:

Code	Description
10	Depleted uranium
20 <sup>6</sup>	Enriched uranium
50	Plutonium
70	U <sup>233</sup>
81	Normal uranium
83	Pu <sup>238</sup>
88	Thorium
89	Uranium in cascade

5b. COMPOSITION/FACILITY (COMP/FAC) CODE - Enter the appropriate code from the list developed during the formulation and negotiation of the facility attachment or transitional facility attachment.

5c. ELEMENT WEIGHT - Enter the weight of the contained special nuclear material or source material in the same units as specified for Section A of DOE/NRC Form 742 (see Section 2.1 of these instructions).

5d. ISOTOPE WEIGHT - Enter the isotope weight. If enriched uranium or U<sup>233</sup>, enter the weight to the nearest gram of U<sup>235</sup> or U<sup>233</sup>, as appropriate. If plutonium, enter the sum of Pu<sup>239</sup> and Pu<sup>241</sup> to the nearest gram. If Pu<sup>238</sup>, enter the weight of the isotope Pu<sup>238</sup> to the nearest 0.1 gram. For depleted uranium, enter the U<sup>235</sup> isotope weight to the nearest kilogram. Make no entry for other source material.

Note: Optionally, If using XML format, reporting of source material to three (3) decimal places may be done, however both shipper and receiver must report to the same decimal place. If three (3) decimal reporting is being used, then the reporting unit is to the nearest thousandth of a kilogram. For example, 1655 grams may be reported by both the shipper and receiver as 1.655 kilograms. However, the licensee must continue to report to the same decimal place for consistency.

5e. DOE PROJECT NO. - Make no entry unless reporting U.S. GOVT-owned material. See DOE Order Series 470 for guidance.

<sup>6</sup>If reporting enriched uranium (material type 20), enter the appropriate enrichment level code in lieu of "A20", as follows:

Code	Description
E1	Greater than normal but less than 5%
E2	5% or more, but less than 20%
E3	20% or more, but less than 80%
E4	80% or more

- 5f. SCRAP PROGRAM - Make no entry unless reporting U.S. GOVT-owned material. See DOE Order Series 470 for guidance.
- 5g. WEIGHT PERCENT ISOTOPE - Enter the weight percent of the isotope U<sup>235</sup> if uranium enriched or depleted in U<sup>235</sup>. If plutonium, enter the weight percent of the isotope Pu<sup>240</sup>. If Pu<sup>238</sup>, enter the weight percent of the isotope Pu<sup>238</sup>. Report weight percent to at least two, but not more than four, decimal places, depending on the accuracy of the measurement method (for example, XX.XXXX%). For U<sup>233</sup>, enter the parts per million of U<sup>232</sup>. This column does not apply for normal uranium or thorium. Use separate lines to report material of different enrichments.

- 5h. OWNER CODE - This code describes the ownership of the material at the time it was in the shipper's possession. Enter the appropriate code from the list below.

G U.S. Government-owned  
 J Not-U.S. Government-owned

Note: Refer to Glossary, Appendix D, for further description of U.S. Government-owned

- 5i. SEQUENCE NUMBER - Enter the line number. Use consecutive numbers beginning with number 1. Do not repeat or skip numbers.
- 5j. BATCH NAME - Enter a unique identifier for the batch as defined in block 5. If the batch is a discrete item with a unique identifying serial number or name (e.g., a fuel assembly, sealed source, or uranium hexafluoride (UF<sub>6</sub>) cylinder), enter the identification number of the batch name. Note that the same batch name must not appear twice in the same report for the same material type.
- 5k. NO. OF ITEMS - If the batch is composed of a number of discrete items, enter the number of items. If the batch is bulk material, or if the number of items is not meaningful, enter 1. If more than one line is used to report data on the batch, enter the number of data items on each line.
- 5l. KEY MEASUREMENT POINT - Enter the code for the appropriate inventory key measurement point, as specified in the FA or Transitional Facility Attachment (TFA).
- 5m. MEASUREMENT I.D. - Fill in the three sections of this data field as follows.

- 5m1. MEASUREMENT BASIS: Enter the pertinent code from the following:

N if batch data are based on measurements made in an IAEA material balance area (MBA) (RIS) other than the reporting MBA (RIS)

L if batch data are based on measurements made in another IAEA MBA (RIS) and have been previously reported by the reporting MBA (RIS) in a DOE/NRC Form 741, ANuclear Materials Transaction Report@ or a DOE/NRC Form 742C, APhysical Inventory Listing@

- M if batch data are based on measurements made in the reporting IAEA MBA (RIS) and the data were not previously reported
- T if batch data are based on measurements in the reporting IAEA MBA (RIS) and have been previously reported for that MBA (RIS) in a DOE/NRC Form 741 or 742C
- 5m2. OTHER MEASUREMENT POINT - If the batch data are based on measurements made at a different KMP from the one specified above, enter the identification of the key measurement point at which the measurements were made.
- 5m3. MEASUREMENT METHOD - In some cases, the FA or TFA may provide codes for identifying the measurement method used. In such cases, enter the appropriate code.
- 5n. ENTRY STATUS - Enter an AN@.
- 5o. MBA - Leave blank.
- 5p. SITE IDC - Leave blank.
- 5q. PROCESS CODE - Enter processing code A, C, or D. The process codes C and D may be used to modify report data for only the current processing period.
- A Initial entry of data
- C Replacement of data. Data may be replaced at any time prior to the close of the processing period in which the initial entry was made.
- D Deletion of data. Data may be deleted at any time prior to the close of the processing period in which the initial entry was made.
- Modification of reported material balance reports may be done for the current processing periods. The Process codes to be used are AC@ for replace and AD@ for delete.
- \$ Submitting a Form with RIS, report period, material type, and sequence number and process code AC@ will be the unique identifier for the line to be replaced.
- \$ Submitting a Form with RIS, report period, material type, and sequence number and process code AD@ will be the unique identifier for the line to be deleted.
- \$ Submitting a Form with RIS, report period, and material type with no sequence number and a process code of AD@ will delete all matching records.
- \$ Submitting a Form with the RIS, report period, and a process code of AD@ will delete the entire material balance within the reporting dates.
6. TOTALS - Enter the total inventory reported in the above categories for Element Weight (5c), Isotope Weight (5d), and the next sequential Sequence Number. This total must agree with the sum of the quantities entered on lines 80 and 81 on the

DOE/NRC Form 742.

7. SIGNATURE - The form, if submitted as hard copy, must be signed by an authorized representative of the licensee. Otherwise, each licensee must establish internal procedures to ensure that the information provided in the report is accurate and that the report has been prepared and issued only by the authorized licensee personnel.
8. TITLE - Enter the title of the person who signed the report (required for paper submission only).
9. DATE - Enter the date the report was signed (required for paper submission only).

**APPENDIX A**

**COMPOSITION CODE INSTRUCTIONS**

860 In Reactors and Critical Assemblies

Enter this code for SNM or source material in reactors, test piles, and critical assemblies, and SNM being used for radiation studies. Use code 864 to report excess, spare, or transiently used fuel elements.

861 In Cooling Basins

Enter for irradiated SNM or source material in cooling basins held for future recovery or disposal (including reactor-produced SNM). Use this code also for spent fuel in dry storage.

862 In Conversion and Fabrication Processes

Enter for SNM or source material in conversion or fabrication processes which change its chemical or physical form. Sealed sources, unopened receipts, and ultimate products maintained under tamper-safing are not considered *Ain process*.<sup>@</sup> This code may also be used to reflect uranium within an enrichment plant (i.e., cascade).

863 In Recovery Processes

Enter for SNM or source material in a recovery process (i.e., nuclear material in the process of being separated from original fuel and other reactor products and nuclear material in the process of being removed from undesired materials and converted to usable forms).

864 Materials Not in Process

Enter for SNM or source material in all unopened receipts, sealed sources, and ultimate products maintained under tamper-safing.

865 Unirradiated Scrap Awaiting Recovery

Enter for SNM or source material in unirradiated scrap material which is awaiting in-house or offsite recovery.

866 Unirradiated Scrap Awaiting Disposal

Enter for SNM or source material in unirradiated scrap material which is awaiting transfer to an authorized disposal facility.

899 Inventory Total Line

Enter, for a given material type, the cumulative total reported.

**APPENDIX B**

**DOE/NRC FORM 742, AMATERIAL BALANCE REPORT,@ (BLANK) AND**

**DOE/NRC FORM 742C, APHYSICAL INVENTORY LISTING@ (BLANK)**



**APPENDIX C**  
**OBLIGATION CODES**

Table 1

<u>Obligation Code</u>	<u>Country/Entity</u>
31	Australia
32	Canada
33	EURATOM
34	Japan
35	People=s Republic of China
37	Switzerland
38	Argentina
39	Brazil
40	Chile
81	Australia/Japan
82	Canada/Japan
83	Euratom/Japan
84	Australia/Euratom/Japan
85	Canada/Euratom/Japan
86	China/Japan
87	Australia/Canada
88	Australia/Euratom/Canada
91	Australia and EURATOM
92	Canada and EURATOM
WR	Former Soviet Union Weapons Material

NOTE: *EURATOM*CAs of January 2008, an organization consisting of the following member countries: Austria, Belgium, Bulgaria, Cyprus, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom.

For any other obligation codes, contact the NMMSS for further instructions.

**APPENDIX D**

**GLOSSARY**

## GLOSSARY

*Accountability* CThe determination of, and current record maintenance of, special nuclear material (SNM) and source material quantities associated with transfers, measured discards, inventories, and inventory differences that might result from theft, diversion, or other unidentified loss mechanisms.

*Agreement State* CA State that has signed an agreement with the Nuclear Regulatory Commission under which the state regulates the use of byproduct, source and small quantities of special nuclear material in that state.

*Book Inventory* CThe algebraic sum of the most recent physical inventory of the material balance area and of all inventory changes that have occurred since the physical inventory was taken.

*Concise Note* CAdditional nuclear material transaction, material balance, or inventory data supplied, in free text format, by facilities engaged in the import and/or export of nuclear materials, by facilities selected under the provisions of the Agreement between the United States of America and the IAEA for the application of safeguards in the U.S./IAEA Safeguards Agreement, by any facility that would like to transmit any additional explanatory nuclear material information, or by any facility reporting what has been identified as safeguards information.

*EURATOM* CAs of January 2008, an organization consisting of the following member countries: Austria, Belgium, Bulgaria, Cyprus, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom.

*Foreign obligated nuclear material* CSource material or special nuclear material which is subject to the terms and conditions of an Agreement that the U.S. Government has entered into with another government or group of governments.

*Highly enriched uranium (HEU)* CUranium enriched to 20 percent or greater in the isotope uranium-235.

*Holding Account* CHolding accounts are typically identified by four character reporting identification symbols (RIS) ending in the letter AH@ assigned by NRC. Also some enrichment facilities have holding accounts identified by three character RISs beginning with the letter AV@. Regardless of the RIS, these accounts usually acquired inventory from the shipment of licensed material from the primary RIS in use at the licensee. Typically these accounts have been used by a small number of licensees for nuclear materials not expected to be immediately processed, reprocessed, or disposed of. However the licensed nuclear materials in holding accounts are still in the licensee=s possession and must be included in inventories reported to NMMSS.

*Inventory difference (ID)* The arithmetic difference between a book inventory and the corresponding physical inventory that closes the material balance period. It is calculated by subtracting the ending inventory (EI) and removals from inventory (R) from the beginning inventory (BI) and additions to inventory (A) during the period between physical inventories. Mathematically ID can be expressed as:

$$ID = (BI + A - R) - EI$$

where  $(BI + A - R)$  is the book inventory.

*Inventory reconciliation* The adjustment of the book record quantity of both elements and fissile isotopes to reflect the results of a physical inventory. In a broad sense, inventory reconciliation involves the activities of calculating (1) the ID for the material balance period in question, (2) the uncertainty value associated with the ID, (3) the active inventory for the period, and (4) any bias adjustment and/or prior period adjustment associated with the ID value.

*Low-enriched uranium (LEU)* Uranium enriched below 20 percent in the isotope uranium-235.

*Material balance period* The time span to which a material or physical inventory pertains.

*Nuclear Materials Management and Safeguards System (NMMSS)* The national database and information system for select nuclear materials controlled by the U.S. Government. This system was created to support national safeguards and management objectives in domestic and international programs. The system stores data on nuclear material transactions and inventories, and produces a wide range of printed reports for use by DOE and NRC and those the licensees they regulate. The system is used to satisfy the nuclear materials information requirements of agreements between the U.S. and foreign entities. In addition, the system provides the reporting interface between facilities selected under the provisions of the U.S./IAEA Safeguards Agreement.

*Physical inventory* A physical determination of the quantity of nuclear material on hand at a given time. The methods of physical inventory and the associated measurements vary, depending on the material to be inventoried and the process involved. A book inventory between physical inventory takings can be determined based on the physical inventory quantity from the prior period together with all subsequent inventory changes associated with the determination of that book inventory. The primary purpose of a physical inventory is to confirm the absence of (or to detect) a loss, theft, or diversion of SNM.

*Report Period* The report period is inclusive of defined dates (e.g., Oct. 01, 2005 through Sept. 30, 2006.) Reports for a reporting period, such as inventory, material balance, and related transactions reports must assure that there are not any

undocumented dates between the previous and current submittals.

*Reporting identification symbol (RIS)* CA unique combination of three or four letters which is assigned to each reporting organization by the NRC for the purpose of identification in the NMMSS database.

*Shipper-receiver difference (SRD)* CThe difference between what a shipper claims was contained in a shipment of SNM and what the receiver claims was received, where both the shipper=s and receiver=s values are based on measurement.

*Source material* C Uranium or thorium, or any combination thereof, in any physical or chemical form; or ores that contain by weight one-twentieth of one percent (0.05%) or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material.

*Special nuclear material (SNM)* CPlutonium, uranium-233, and uranium enriched in the isotope 233 or 235.

*U.S. Government owned* C Government owned nuclear material is material that, while used by a licensee as part of their activities, is actually an asset owned by a federal government agency such as DOE. These materials may be bulk materials, discrete radiation sources, or finished products. Such materials may represent a lease or loan arrangement with a government agency. Government owned materials are typically represented by a "G" owner code on shipping information (i.e. DOE/NRC Form 741) and inventory documentation (DOE/NRC 742 /and 742C). One way a licensee can make a determination that nuclear material in their possession is government owned, is to review the licensee's DOE/NRC Form 741 form documentation listing the original receipt of the material. If such material is government owned, it will have a "G" owner code entered on the licensee's portion of the form.

**APPENDIX E**  
**INVENTORY CHANGE TYPE CODES**





## IAEA INVENTORY CHANGE TYPE CODES

The accounting entry type codes used on Material Balance Reports (MBRs) consist of two digits. In the following pages the number(s) in parentheses following the alphabetic code represent the MBR line for which the transaction entries correspond. The standard inventory changes and other entry type are listed below. In MBRs, corresponding the same codes denote consolidated entries; i.e., the sums of all individual operations with the same code over the material balance period. In addition, MBRs include entries related to inventory data and adjustments not reported on transaction reports.

MBR Code (Line Number)	EXPLANATION
RF <b>(11, 13, 30, 38, 39)</b>	Nuclear material imported into the United States (Receipt Foreign)
RD <b>(11, 13, 30, 38, 39)</b>	Domestic receipt of nuclear material from another domestic RIS (Receipt Domestic)
RN <b>(11, 13, 30, 38, 39)</b>	Domestic receipt of nuclear material from activity not subject to 10 CFR Part 75
NP <b>(21)</b>	Production of fissionable material in a reactor (Pu, U <sup>233</sup> )
SF <b>(42, 43, 51, 58, 59)</b>	Export of nuclear material out of the United States
SD <b>(42, 43, 51, 58, 59)</b>	Domestic transfer of nuclear material from another Domestic RIS
SN <b>(42, 43, 51, 58, 59)</b>	Domestic transfer of nuclear material from a facility subject to 10 CFR Part 75
LD <b>(74)</b>	Normal operational loss/measured discard; i.e., loss of a measured or estimated (on the basis of measurement) quantity of nuclear material from processing which has been disposed of in such a way that it is not suitable for further nuclear use
EN ED NE ND DE DN EE <b>(22, 71)</b>	Category Change - The quantity of uranium which has changed category as a result of blending, enrichment, depletion, or burnup. The first letter denotes the original, the second letter the resulting category (E=enriched, N=natural (or Anormal@), D=depleted uranium, EE=change of enrichment). The material type codes should be those for both the original and the resulting material. The weight data should be provided both for the originating and for the resulting category. These entries should be consolidated into the material balances for both categories. For any of these changes line pairing is required, one line denotes the original material and the other denoting the resulting material.

<b>(22, 71)</b>	Enrichment facility may use the 22-71 combination to report changes in material type associated with enrichment activities for material types 10, 20, 81, and 89 or as directed by the NRC.
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MBR Code (Line Number)	EXPLANATION
MF <b>(77)</b>	Inventory difference: this should be calculated as the difference between the book inventory and the ending physical inventory. Must not be used by Reactors
PB <b>(N/A)</b>	Beginning physical inventory: it should be equal to the ending physical inventory of the previous MBR relating to the same material
BA <b>(83)</b>	The algebraic sum of the beginning physical inventory and of the inventory changes over the period, adjusted to take account of the shipper-receiver differences
PE <b>(N/A)</b>	The sum of all measured and derived batch quantities of nuclear material on hand on the date of the physical inventory taking. These entries should be consolidated
RAXX <b>(N/A)</b>	<p>Applicable to licensees subject to the 10 CFR Part 75 only - The quantity that has to be added to the rounded sum to make it equal to the sum of the rounded terms. A rounding adjustment is made to an entry in the MBR of which the IAEA has been informed differently through Inventory Change Reports (ICRs) and Physical Inventory Lists (PILs), in order to bring the MBR entry into agreement with the corresponding figures established on the basis of ICRs and PILs. In the case of the book inventory and the inventory difference (ID) or material unaccounted for (MUF), the following formulae should be used respectively.</p> $RABA = PB + ICR_{MBR} - DI - BA, \text{ and}$ $RAMF = BA - PE - MF$ <p>where <math>ICR_{MBR}</math> is the sum of the consolidated inventory changes as reported in the MBR, taken with the appropriate sign if they represent decreases. All other notations are as defined for this data element.</p> <p>No rounding adjustment is needed for the beginning physical inventory.</p> <p>The rounding adjustment should be coded RAXX where XX stands for the code of the entry to which the rounding adjustment pertains, e.g., RALN means a rounding adjustment</p>

	to the consolidated entry on the nuclear loss.
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**MATERIAL BALANCE REPORT  
AND PHYSICAL INVENTORY LISTING  
EXAMPLES**

EXAMPLE 1: SHIPPER INITIAL REPORT (YYY-XXX, 000001, A-A)

On March 31, 2008, shipper YYY transferred to receiver XXX four fabricated fuel elements. This shipment also contains enriched uranium that is Obligated to Australia. This information is shown on the DOE/NRC Form-741 as follows:

Line Number	Country of Obligation	Material Type	Obligated Element weight	Obligated isotope weight
1	31	20	50,397 g	2,335 g

<u>Line</u>	<u>Identification</u>	<u>Element</u>	<u>Isotope</u>
1.	FAB FUEL ELE-1	377,609 g	18,111 g
2	FAB FUEL ELE-2	42,114 g	1,344 g
3	FAB FUEL ELE-3	377,855 g	18,122 g
4	FAB FUEL ELE-4	41,992 g	1,340 g

EXAMPLE 1-b: RECEIVER ACKNOWLEDGEMENT (YYY-XXX, 000001, A-B zero line)

On April 1, 2008, receiver XXX acknowledged receipt of the shipment and accepted the shipper's weights without further measurement.

This transaction was reported as an "A-B, zero line."

EXAMPLE 1-c: SHIPPER REPORTS A CORRECTION (YYY-XXX, 000001, A-C)

On May 16, 2008, the shipper corrected the quantity of obligated material and weights of fuel elements number 2 and 4.

EXAMPLE 1-d: RECEIVER REPLY ACCEPTING CORRECTION (YYY-XXX, 000001, A-D)

On April 23, 2008, the receiver acknowledges correction and applies the corrected information.

EXAMPLE 2-m: FACILITY REPORTS ON-SITE CHANGES (XXX-XXX, 000031, A-M)

On March 31, 2008, facility reports a change to its inventory consisting of the fission, decay and production of nuclear material along and the resulting changes to the foreign obligated nuclear material.

EXAMPLE 2-m-a: FACILITY REPORTS CORRECTIONS TO ITS ON-SITE CHANGES (XXX-XXX, 000031, A, A-M)

On March 31, 2008, facility reports a correction to its inventory change. This change applies to the production of nuclear material and the resulting changes to the foreign obligated nuclear material.

EXAMPLE 3-a: SHIPPERS INITIAL REPORT (YYY-RRRR, 000001, A-A)

On March 31, 2008, the facility reports the export of two fuel assemblies to a foreign customer.

EXAMPLE 4-a: SHIPPER INITIAL REPORT (RRRR-XXX, 000001, A-A)

On March 31, 2008, the U.S. facility submits the form documenting the foreign facility shipment of three fuel assemblies to the U.S. facility.

EXAMPLE 4-b: RECEIVER REPORTS RECEIPT (RRRR-XXX, 000001, A-B)

On April 5, 200, 2008, the U.S. facility reports the receipt, and information, on the three fuel assemblies it received from the foreign shipper.

EXAMPLE 5-a: SHIPPER INITIAL REPORT (XXX-VVV, 000001, A-A)

On March 31, 2008, shipper XXX transferred some uranium to a waste company for disposal.