

EnergySolutions's November 15, 2011, Supplemental Information about the Request

This document is an addendum to the initial document sent to Mr. Gregory Suber, NRC, on September 15, 2011, as requested on an e-mail from Mr. Donald Lowman, NRC, on November 4, 2011. EnergySolutions has provided more detail and explanation to the referenced documents below. The red font indicates text from the original reference that EnergySolutions has emphasized in response to the NRC's request for additional citations.

I. NUREG/BR-0006, Rev. 7, Instructions for Completing Nuclear Material Transaction Reports

1. Section 1.2, Regulatory Authority
 - In addition, a licensee who uses 1 kilogram or more of any uranium or thorium source material in enrichment services, **downblending uranium** that has an initial enrichment of the U²³⁵ isotope of 10 percent or more, or in the fabrication of mixed-oxide fuels.

2. Section 1.3, Reporting/Distribution Requirements
 - The nuclear material change data (including burnup, production, measured discards, **category changes**, and decay) must be documented and reported to the NMMSS before or at the same time as the physical inventory taking, unless the NRC has authorized another arrangement.

3. Section 2.1, Instructions for Completing DOE/NRC Form 741 Reports

26g. <u>MATERIAL TYPE</u> —Enter the appropriate SNM or source material type code from the list below. <u>U.S. Code (Domestic transfers)</u>	<u>IAEA Code (Imports/Exports)</u>	<u>Description</u>
10	D	Depleted uranium
20	EG	Enriched uranium
50	P	Plutonium
70	EK	U ²³³
81	N	Normal uranium
833	Pu	Pu ²³⁸
88	T	Thorium
89	To be obtained from IAEA	Uranium in cascade

4. INVENTORY CHANGE TYPE CODES FOR COMPLETING BLOCKS 26c AND 27C OF DOE/NRC FORM 741

<p>EN ED NE ND DE DN EE (22, 71) (22, 71)</p>	<p>Category Change—The quantity of uranium that 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 normal), 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 denotes the resulting material. 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 proceed as directed by the NRC.</p>
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II. NUREG/BR-0007, Rev. 6, Instructions for the Preparation and Distribution of Material Status Reports

1. Section 1.1, Material Status Reports
 - Licensees use DOE/NRC Form 742 to report a summary of activity for a specified material within a given 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 downblended**, and the ending balance.

2. Section 1.2, Regulatory Authority

- In addition, each licensee that possesses, or that had possessed in the previous reporting period, 1 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 U235 isotope of 10 percent or more, or the fabrication of mixed-oxide fuels shall complete and submit DOE/NRC Forms 742 and 742C for all source material that the licensee has received, produced, possessed, transferred, consumed, disposed of, or lost.

3. 2.1 Section A, “Material Accountability”

- 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)

III. NUREG/BR- 0096, Instructions and Guidance for Completing Physical Inventory Summary Reports (NRC Form 327)

1. Section II, DEFINITIONS

- **DEPLETED URANIUM** --- Any uranium-bearing material whose uranium isotopic distribution can be characterized as being (1) less than 0.700 percent by weight in combined U-233 plus U-235, and (2) at least 99.200 percent by weight U-238.
- **ENRICHED URANIUM** --- **Any uranium-bearing material which does not qualify as natural or normal uranium**, and whose combined U-233 plus U-235 isotopic content is 0.725 percent or higher by weight, relative to total uranium element content.
- **MATERIAL-TYPE CODES** --- Number codes for identifying basic material types with respect to source material, special nuclear material, and by-product

materials. The codes are used by the Nuclear Materials Management and Safeguards System (NMMSS) for tracking materials nation-wide. For SNM and uranium SM, there are seven material type codes as follows:

- CODE MATERIAL TYPE

10 Depleted Uranium

81 Normal Uranium

20 Enriched Uranium (*)

89 Uranium in Cascades

70 Uranium-233 (**)

50 Plutonium

83 Plutonium-238 (***)

- NORMAL URANIUM --- Any uranium-bearing material having a uranium isotopic weight distribution that can be described as being (1) 0.700 to 0.724% in combined U-233 plus U-235; and (2) at least 99.200% in U-238. [NOTE: All "natural uranium" having a U-235 isotopic concentration in the range of 0.700 to 0.724 percent is "normal uranium", but not all "normal uranium" is "natural uranium".]

2. Specific Instructions

- Line 2 --- Additions to Inventory (A):

NOTES: (1) For LEU reports, "additions to inventory" should also include any normal, depleted, or high enriched uranium that was blended with LEU (during the current period within the plant to which the 327 form pertains), if the resulting blend is greater than 0.724 weight percent, but less than 20.00 weight percent in combined U-233 plus U-235, relative to total uranium content.

IV. DOE M 470.4-6, NUCLEAR MATERIAL CONTROL AND ACCOUNTABILITY

1. Table I-1. Nuclear Materials

Material Type	SNM, Source, or Other	Reportable Quantity*	Weight Field Used for Element	Weight Field Used for Isotope	Material Type Code
Depleted Uranium (U)	source	kilogram	total U	U-235	10
Enriched Uranium	SNM	gram	total U	U-235	20
Normal Uranium	source	kilogram	total U	—	81
Uranium-233	SNM	gram	total U	U-233	70
Plutonium-2421 (Pu)	SNM	gram	total Pu	Pu-242	40

Plutonium-239-241	SNM	gram	total Pu	Pu-239 + Pu-241	50
Plutonium-2382	SNM	tenth of a gram	total Pu	Pu-238	83
Americium2413 (Am)	other	gram	total Am	Am-241	44
Americium-2433	other	gram	total Am	Am-243	45
Berkelium6 (Bk)	other	microgram	—	Bk-249	47
Californium-252 (Cf)	other	microgram	—	Cf-252	48
Curium (Cm)	other	gram	total Cm	Cm-246	46
Deuterium4 (D)	other	tenth of a kilogram	D2O	D2	86
Enriched Lithium (Li)	other	kilogram	total Li	Li-6	60
Neptunium-237 (Np)3	other	gram	total Np	—	82
Thorium (Th)	source	kilogram	total Th	—	88
Tritium5 (H-3)	other	gram	total H-3	—	87
Uranium in Cascades	SNM	gram	total U	U-235	89

2. Section B DOE M 470.4-6 XI-4, q. Line 22, From Other Materials (2)
The blending of depleted and enriched uranium in the proper proportions will result in normal uranium. Line 22 on the normal uranium MBR will indicate receipts from the depleted and enriched uranium balances. Correspondingly, line 71 on the depleted and enriched uranium MBRs will reflect removals to the normal uranium balance.