

PROCEDURES FOR PREPARING FORECASTS

1. GENERAL.

- a. Forecasts shall be submitted on DOE F 5660.1, "Forecast of Nuclear Material Requirements," (see page 10) for specified nuclear materials. Computer-generated facsimiles of this form are acceptable. Nuclear materials to be forecast and the reporting units to be used are as follows:

<u>Material Type</u>	<u>Material To Be Forecast</u>	<u>Reporting Units</u> ¹
Enriched Uranium	U-235 isotope	kilogram
Plutonium	Total Pu	kilogram
Uranium-233	U-233 isotope	kilogram
Heavy Water (D ₂ O)	D ₂ O equivalent	kilogram
Plutonium-238	Pu-238 isotope	gram
Tritium	Tritium	gram
Normal Uranium	Total U	metric ton
Depleted Uranium	Total U	metric ton
Plutonium-242	Pu-242 isotope	gram
Americium-243	Am-243 isotope	gram
Curium	Curium	gram
Neptunium-237	Np-237 isotope	kilogram

- b. Projects with entries (blocks 25-74) less than the following threshold quantities shown below may be omitted from the forecast:

Threshold Quantities

<u>Material</u>	<u>Unit</u>
Enriched Uranium	2 kg U-235
Plutonium	2 kg Pu
Uranium-233	1 kg U-233
Heavy Water (D ₂ O)	500 kg D ₂ O (equivalent)

¹Rounding procedure: Fractions of 0.5 or greater shall be rounded up and fractions of less than 0.5 shall be rounded down. Abbreviations used throughout the Order are: metric ton (MT), kilogram (kg), and gram (g)n).

²Deuterium quantities should be converted to heavy water equivalent quantities by multiplying the deuterium quantities by 4.98.

Threshold Quantities (Continued)

<u>Material</u>	Unit
Plutonium-238	100 gm Pu-238
Tritium	10 gm Tritium
Normal Uranium	10 MT U
Depleted Uranium	10 MT U
Plutonium-242	100 gm Pu-242
Americium-243	1 gm Am-243
Curium	1 gm Cm
Neptunium-237	1 kg Np-237

c. Forecasts shall be accompanied by relevant assumptions upon which entries are based.

2. INSTRUCTIONS FOR COMPLETING DOE F 5660.1 The specific instructions shown below correspond to the item numbers on DOE F 5660.1.

- a. Blocks 1-10. Enter the 10-character alphanumeric project number. Material in projects prefixed with "M", "I", and "E" designators should not be included in the forecasts.
- b. Project Title. Enter the title of the project number noted in blocks (1-10). The project title should agree with the project number contained in the official DOE Project Number-Title Index (Nuclear Materials Management and Safeguards System T-141 report).
- c. Block 11. Enter the appropriate material type code applicable to all of the items on the page. List only one material type on each DOE F 5660.1. If more space is required, continue on another DOE F 5660.1, repeating material type, project number, and title.

<u>Material Type</u>	Code
U-235	1
Pu	2
U-233	3
Pu-238	4
D ₂ O	5
Tritium	6
Other (specify)	7

Forecasts for Pu-242, Am-243, Np-237, curium, normal and depleted uranium should use Code 7 "Other" with the material noted, as appropriate. If forecasts are required for nuclear materials not listed above, the materials should be identified under Code 7, "Other".

- d. Entry Type and Block 12. Enter the appropriate entry type and entry type code shown below for all entries applicable to a line. Entry type codes should be arranged in numerical order. Several lines may have the same entry type because of different material assays. Multiple entries for the same entry type code should be listed in decreasing materials assay.

Entry Type	<u>Code</u>
Beginning Inventory	1
Withdrawal	2
Unirradiated Return	3
Irradiated Return	4
Transfer In	5
Transfer Out	6
Burnup, Losses, and Expended in Nuclear Tests	7
Formation	8
Launch	9
Ending Inventory	10

- e. Definitions of Entry Types.

- (1) Beginning Inventory. The actual inventory at the beginning of the current fiscal year of the forecast period reported by project number. All quantities assigned to the project should be included in this inventory without regard to physical location.
- (2) Withdrawal. Receipt of nuclear material by a user project from a supply project. (The receipt of nuclear material from an "E" or "M" project by a user project is considered a withdrawal.)
- (3) Return. Removal of nuclear material from a user project to a supply project. The removal of material from any user project to an "E" or "M" project number (see Chapter VI) is also considered a return. Returns are further described as either unirradiated or irradiated material.
- (4) Transfer In. A receipt of nuclear material by a user project from any source other than a supply project. Includes material obtained from other user projects, Federal agencies, foreign countries, or private ownership. Footnote the project number and

location from which the material is to be obtained. Material obtained from another contractor or location without a change in project number is not considered a transfer in.

- (5) Transfer Out. A removal of nuclear material from a user project to any destination other than a supply project. Includes material provided to other user projects, other Federal agencies, foreign countries, domestic companies for private use, and "I" projects. Footnote the project number and location to which the material will be transferred. Material sent to another contractor or location without a change in project number is not a transfer out.
- (6) Burnup, Losses, and Expended in Nuclear Tests. Removals from inventory as a result of processing, fabrication, irradiation, decay, weapon tests, operational losses, and discards.
- (7) Information. Material produced as a result of irradiation of other materials, e.g., U-233 or Pu produced in reactors. Tritium produced in D₂O reactor moderator is excluded.
- (8) Launch. Material removed from inventory as a result of rocket launch into space, e.g., Pu-238 for electrical generation.
- (9) Ending Inventory. Inventory for a project at the end of each fiscal year (regardless of location or assay) calculated by adding receipts to the beginning inventory and subtracting all removals.

f. Blocks 13-15 and 16-18

- (1) Enter assay for materials under each entry type, as required. Assays are not required for Entry Type 0 "Ending Inventory". Assays shall be entered for materials as follows:

<u>Material</u>	<u>Assay Data</u>
U-235	Wt % U-235 to nearest 0.1%
Pu	Wt % Pu-240 to nearest 0.1%
U-233	Ppm U-232 in uranium
D ₂ O	Do not enter assay data
Pu-238	Wt % Pu-238 to nearest 0.1%
Tritium	Do not enter assay data
Normal U	Do not enter assay data
Depleted U	Do not enter assay data
Pu-242	Wt % Pu-242 to nearest 0.1%
Am-243	Wt % Am-243 to nearest 0.1%
Curium	Do not enter assay data
Np-237	Do not enter assay data

(2) Single assays shall be shown in blocks 16-18. Ranges of assays may be shown by using blocks 13-15 for the lower assay and blocks 16-18 for the upper assay. Ranges of assays should be used for withdrawals only when absolutely necessary (i.e., only where specific assays cannot be identified). Assay ranges for withdrawals will be interpreted as meaning that any material within the indicated assay range is acceptable. Materials with only slight differences in assay (e.g., one percent U-235, Pu-240, or Pu-238) may be combined and reported as a single quantity with a single weighted average or major assay. Small quantities of materials that individually are less than a reportable quantity may be combined as a single quantity with a single weighted average assay. Weight percent should be shown for entries identified as burnup, losses, and expended in nuclear tests (entry type code 7). For material consumed in a reactor, enter the weight percent of the material loaded into the reactor before irradiation. Assays should be "right adjusted", i.e., entries start at right and work left. A range of 5 to 50 ppm U-232, for example, would be shown as:

5	50
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For weight percent, the right-hand column is used for tenths of a percent,

- g. Block 19. For withdrawals, enter a code representing the chemical form of the material required from nuclear materials supply projects as follows (generally, only standard form material will be provided):

<u>Code</u>	<u>Form</u>
1	Hexafluoride
2	Nitrate
3	Metal
4	Oxide
5	Other

- h. Blocks 20-21 Special assay codes should be entered for irradiated U-235 return; and D₂O withdrawals and returns, as follows:

Irradiated U-235

Code	<u>% U-236</u>
01	< 1
02	1 < 2
03	2 < 3
04	3 < 4
05	4 < 5
06	5 < 6
07	6 < 7
08	7 < 8
09	8 < 9
10	9 < 10
11	10 < 11
12	11 < 12
13	12 < 13
14	13 < 14
15	> 14

D₂O Withdrawals and Returns

Code	<u>Microcuries Tritium/Milliliter</u>
50	< 0.00005
51	0.00005-30
52	> 30

- i. Blocks 22-24. Enter the three-character classification code established by American National Standards Institute in ANSI N15.1-1970, Classification of Unirradiated Uranium Scrap, to identify returns of unirradiated and irradiated enriched uranium (U-235), normal uranium, depleted uranium, and U-233; for returns of unirradiated and irradiated plutonium, Pu-238, and Pu-242, enter the three-character classification code in ANSI N15.10-1987, Unirradiated Plutonium Scrap-Classification. Although the American National Standards Institute codes were established for unirradiated scrap, in this instance, they should also be applied to irradiated materials. Care should be taken to select the most appropriate American National Standards Institute Code to describe the material. (Although ANSI N15.1-1970 has expired, it should continue to be used until it is updated. Copies of ANSI N15.1-1970 can be obtained from the Office of Nuclear Weapons Management.

- j. Blocks 25-29 On the line reflecting beginning inventory (Entry Code 1), enter the actual beginning inventory for the project, regardless of location, as of the first day of the current fiscal year to which the forecast applies. Entries should be right adjusted.
- k. Blocks 30-34 Enter actual quantities for each entry type (except beginning inventories that are entered in blocks 25-29) for the first quarter of the fiscal year in which the forecast is prepared.
- l. Blocks 35-39 Enter appropriate quantities for each entry type (except beginning inventories) for the remainder of the current fiscal year (totals for the second, third, and fourth quarters).
- m. Blocks 40-74 Enter quantities for each entry type (except beginning inventories) for each of the fiscal years. In the blank "FY" insert the two-character number reflecting the appropriate fiscal year, e.g., 95, 96. Eleven entries should be made to reflect consecutive fiscal years of the forecast period.

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PAGE _____
DATE _____

1 2 3 4 5 6 7 8 9 10
PROJECT NO.:

C	K	C	O	2	O	4	O	1	A
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MATERIAL TYPE:

1

 1. U-235 2. Pu 3. U-233 4. Pu-238 5. D₂O 6. Tritium 7. _____
(Other)

PROJECT TITLE: BNL High Flux Beam Reactor REPORTING ORGANIZATION: Brookhaven National Laboratory (CZD)
U-235 in Kg

ENTRY TYPE	C O D E	WT% OR PPM RANGE						WITHDRAWALS FORM CODE	SPEC. ASSY CODE	RE- TURNS FORM CODE	CURRENT FY <u>94</u>			FY <u>95</u>	FY <u>96</u>	FY <u>97</u>	FY <u>98</u>	FY <u>99</u>	FY <u>00</u>	FY <u>01</u>					
		LOWER		UPPER OR SINGLE		ACTUAL BEGINNING INVENTORY	1ST QTR. ACTUAL				2,3,4 QTRS. (TOTAL) FORECAST														
		TYPE	12	13	14	15	16				17	18	19	20	21	22	23	24	(25-28)	(30-34)	(35-38)	(40-44)	(45-48)	(50-54)	(55-58)
Beginning Inventory (1)	1					93	2							6											
Beginning Inventory (2)	1					93	2							121											
Beginning Inventory (3)	1					88	8							8											
Beginning Inventory (4)	1					80	8							180											
Unirradiated Returns (5)	3					93	2				B10			0	1	1	1	1	1	1	1	1	1	1	
Irradiated Returns (6)	4	76	6	81	0			10			B10			0	0	30	30	30	30	30	30	30	30	30	
Transfers In (7)	5					93	2							0	25	25	25	25	25	25	25	25	25	25	
Burnup & Losses (8)	7					93	2							2	9	11	11	11	11	11	11	11	11	11	11
Ending Inventory	0													313	328	311	294	277	260	243	226	209			
() See notes on attached page.																									

ENTRY TYPE	C O D E	WT% OR PPM RANGE						WITHDRAWALS FORM CODE	SPEC. ASSY CODE	RE- TURNS FORM CODE	FY <u>02</u>	FY <u>03</u>	FY <u>04</u>	FY <u>05</u>	FY	FY	FY	FY	FY	FY	FY	FY		
		LOWER		UPPER OR SINGLE		(25-28)	(30-34)																(35-38)	(40-44)
		TYPE	12	13	14	15	16				17	18	19	20	21	22	23	24	(25-28)	(30-34)	(35-38)	(40-44)	(45-48)	(50-54)
Unirradiated Returns	3					93	2				B10			1	1	1	1							
Irradiated Returns	4	76	6	81	0			10			B10			30	30	30	30							
Transfers In	5					93	2							25	25	25	25							
Burnup & Losses	7					93	2							11	11	11	11							
Ending Inventory	0													192	175	158	141							

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FORECAST OF NUCLEAR MATERIAL REQUIREMENTS

Attachment I-1
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