

**NOT  
MEASUREMENT  
SENSITIVE**

**DOE G 410.2-1  
XX-XX-20XX**

# **Nuclear Material Disposition**

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**U.S. Department of Energy  
Office of Nuclear Materials Integration**

## **FOREWORD**

This Guide describes acceptable, but not mandatory means for complying with requirements. Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with associated rule or directives.

## **CONTENTS**

(optional; Table of Contents generated with final revisions)

## ACRONYMS

DOE	Department of Energy
DL	Discard Limit
IDES	Item Descriptor
LMMO	Lead Materials Management Organization
LRIS	Location Reporting Identification Symbol
MTC	Material Type Code
NDU	No Defined Use
NNSA	National Nuclear Security Administration
NS	National Security
ONMI	Office of Nuclear Materials Integration
PVD	Programmatic Value Determination
RU	Restricted Use
SFMB	Surplus Fissile Material Baseline
SR	Strategic Reserve
ToS	Termination of Safeguards
WAC	Waste Acceptance Criteria

## 1. INTRODUCTION

This document provides a roadmap for implementing the requirements for disposition of nuclear material as outlined in the U.S. Department of Energy (DOE) Order 410.2, *Management of Nuclear Materials*, and DOE Order 474.2, *Nuclear Material Control and Accountability*. This Guide provides the basic framework for the nuclear material disposition process, includes information related to the Programmatic Value Determination (PVD) process, and identifies Discard Limits (DL) for specific low-equity nuclear materials.

Disposition planning and coordination are complex processes that are typically accomplished using an iterative approach, and often include cooperation between two or more DOE sites. Of particular interest are accountable nuclear materials that are judged to have “No Defined Use” (NDU) at the site that currently holds them. Information from a variety of sources, including process knowledge, past experience, and guidance from Office of Nuclear Material Integration (ONMI), support the determination of an appropriate disposition path for nuclear material that is no longer needed at a particular site, in accordance with applicable law and DOE Orders and policy. Available disposition pathways for nuclear material fall into the following broad categories: use at another DOE site or by a non-DOE government agency; retention for future use (i.e., National Asset Material); sale or other authorized transfer, or disposal as waste, perhaps at a different location. Appendix A provides definitions for terms related to the material disposition process.

## **2. DISPOSITION PROCESS OVERVIEW**

The disposition process consists of a number of steps which are illustrated in Figure 1. Each step of the process is discussed in the following sections. The steps are:

- Material identification for disposition (Section 3)
- Comparison to an existing Discard Limit (Section 4)
- Request for Programmatic Value Determination (Notification to ONMI and the appropriate Program Office) (Section 5 and Appendix B)
- Analysis by ONMI and the appropriate Program Office (Section 6)
- Transfer to an appropriate site (Section 7)
- Determination of Programmatic Value (including DLs) (Section 8)
- Disposition to waste management systems (Section 9)

## **3. MATERIAL IDENTIFIED FOR DISPOSITION (NOT NEEDED AT A SITE)**

The disposition process is initiated when a Program “owner” (i.e., the program with current responsibility for use and/or management of the material), the DOE Field Element (i.e., site office), and holding site work together to make the determination that a material is no longer needed at a particular site. If there is a pre-identified need for the material at another site, the two sites should work together to transfer the material as discussed in Section 7.

Generally, these inventories will be designated as NDU by the owner site in their annual Nuclear Materials Inventory Assessments and Nuclear Materials Management Plans. However, decisions can be made at any time during the year.

Following the determination that the material is no longer required at the holding site or at a separate site, the holding site should notify ONMI and the appropriate Program Office via the Programmatic Value Determination Request (Appendix B). The form in Appendix B provides basic material characterization information to assist ONMI and the Program Office with determining whether the material has a use at another site or outside DOE.

In most cases, the notification should be initially made to the Program prior to notification to ONMI. However, the notification to ONMI and the Program may be completed in parallel if there is a need to expedite the approval process.

DOE and NNSA also oversee disposition programs for legacy materials that have been removed from certain uses, e.g., weapons-usable fissile materials. The PVD process allows DOE to evaluate the potential use of the inventory within policy restrictions and assures that inventories are not permanently degraded before such use has been evaluated.

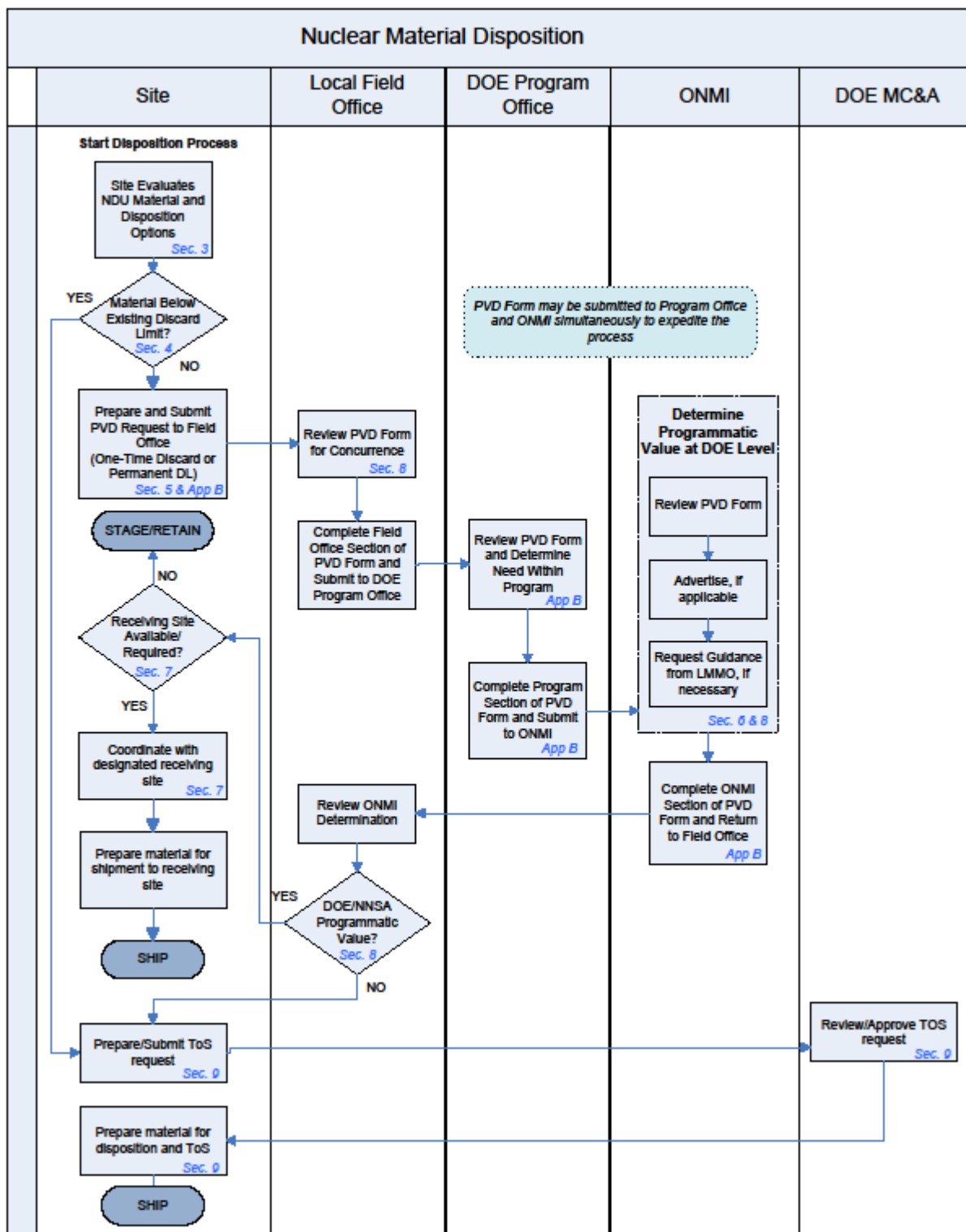


Figure 1. Nuclear Material Disposition

#### **4. DL EXISTS & MATERIAL DOES NOT EXCEED APPROVED LIMIT**

A DL is a threshold quantity of nuclear material, by form and concentration, at or below which the material may be discarded to waste management systems. If the concentration does not exceed an existing DL for the isotope and material form, no request to ONMI or the program office for a Programmatic Value Determination is necessary. The material can be considered to have no programmatic value, and the site can pursue Termination of Safeguards (ToS) on the material and proceed with the waste disposition process in accordance with DOE site office oversight as appropriate. For information related to the ToS process, refer to DOE O 474.2 *Admin Chg 3, Nuclear Material Control and Accountability*.

Section 8 includes discussion of the process to revise an existing DL or to establish a new DL.

#### **5. REQUEST FOR PROGRAMMATIC VALUE DETERMINATION**

Proper material characterization is paramount for selecting the appropriate disposition path. To begin the material characterization assessment and to notify ONMI, the Program, and (if applicable) the Lead Material Management Organization (LMMO), the site and Local Field Office should complete the Programmatic Value Determination Request in Appendix B, and submit the completed form to ONMI and the appropriate Program Office. Guidelines for form completion are provided in the instructions at the end of the form.

The characterization information will be used by the ONMI and, if designated, the LMMO to analyze the DOE need for the material, as discussed in Section 6. The site should evaluate the material and provide a recommendation, if known, in the space provided on the form. The site recommendation provides a beginning point for ONMI in the Programmatic Value Determination. The characterization of the material should be detailed enough to convey the following:

- Material form and quantity
- NMC&A Category and Attractiveness Level (per DOE Order 474.2)
- Material composition (physical and chemical form, constituents, impurities, and assay)
- Security classification
- Potential programmatic uses
- National Asset candidacy
- Previous decisions, including announcements under National Environmental Policy Act, policy mandates, or legal or international commitments
- Any other information that the site considers relevant to the disposition determination



The information provided on the form will be used by ONMI for communicating the availability of the material, if necessary (Section 6). ONMI may forward the request to a designated LMMO for assistance in determining the disposition path for the material. The form also provides an opportunity for a site to request/propose a DL for the material type and form which is discussed in Section 8.

In some cases a DL based on concentration is not relevant because the site has neither the capability to convert the material into a usable form nor the opportunity to transfer the material to another site for conversion. Most commonly this situation exists for secondary isotopes contained within items that are processed for disposition, e.g., spent fuel that is processed to recover highly-enriched uranium but that contains minor quantities of other accountable isotopes. If those isotopes are normally discarded to waste streams during the processing, a DL concentration of “any” may be considered. Other isotopes may have programmatic value in only a very pure form but be a commodity in excess supply at lower purities, and may be assigned a DL concentration near to “100%.”

Additional material characterization may be required to support disposition planning, depending on the requirements of the receiving site. The characterization of the material also provides information needed to ensure compliance with relevant packaging and transportation requirements and to establish handling operations required to prepare the material for shipment (such as activity, fissile content, physical and chemical forms, isotopic constituents and other material associated quantities, and other health, safety and security requirements).

## **6. ANALYZE DOE NEEDS**

Upon receipt of the Programmatic Value Determination Request, ONMI and the Program will review the data and evaluate the need for the material within DOE. ONMI may request assistance from a LMMO to support this activity. Various data sources will be used during the evaluation, including the required documentation outlined in DOE O 410.2. The Program Office will review Programmatic requirements to determine whether the material is required for ongoing mission-related activities.

If there is a need for the material within DOE, ONMI or the Program Office may recommend transferring the material to a more suitable location or retaining that material at its current location. Even if there is no immediate use for a material within the Complex, ONMI may decide that it should be retained because it is rare, unique, and/or highly valuable. At the discretion of ONMI, a request may be made to the Office of the Secretary of the DOE for the material to be characterized as National Asset Material. The National Asset Material will be assigned to the appropriate DOE Headquarters organization, funding will be identified, a location for storage will be identified, and material will be transferred to that location (if necessary). For materials that are recommended to be characterized as a National Asset but denied that status, ONMI will reevaluate whether the material has Programmatic Value.

If no need for the material is identified in the analysis discussed above, ONMI may communicate the availability and potential disposition of the material. During this process, a use for the

material may be identified either within DOE or another government organization. If applicable, ONMI will coordinate with the appropriate program for other uses of the material (e.g., for down-blending, for commercial use, or isotope production). If no need for the material is identified following this analysis, ONMI will then make a determination on whether the material should be retained or can be disposed.

## **7. TRANSFER TO ANOTHER PROGRAM OR SITE**

Accurate projections of nuclear material requirements allow various organizations and Programs to plan for and integrate nuclear material lifecycle projects across DOE. Transfers of ownership are coordinated through the Material Forecast and Allotment Request which is submitted to ONMI on an annual basis. Transfers of material quantities that are below the threshold quantity of material discussed in the Annual Call for Nuclear Material Forecast and Allotment Request and DOE O 410.2 may be transferred without notification to ONMI. For later years, a planned transfer to another program or site may be identified as a disposition pathway in the annual Nuclear Materials Inventory Assessment.

The process of shipping material will vary depending on the material and the specific requirements at a given site for authorizing and receiving shipments of nuclear material. The shipping and receiving sites will work together to obtain necessary approvals and to ensure that all requirements are met.

## **8. PROGRAMMATIC VALUE DETERMINATION**

Once ONMI has analyzed DOE needs and advertised the material, if necessary, ONMI will make a Programmatic Value Determination for the material.

The Programmatic Value Determination is a process in which ONMI determines whether the material has value to DOE. All nuclear materials must be determined to have No Programmatic Value prior to disposal to waste-management systems. The Programmatic Value Determination includes determining the appropriate disposition path (e.g., potential use, to be retained as a National Asset, or categorized as waste).

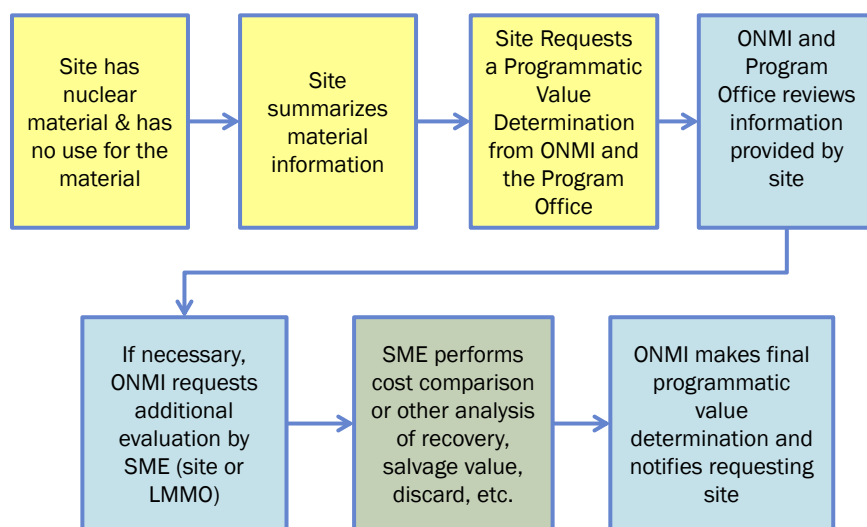
Following are factors to be considered in determining programmatic value and designating disposal paths:

- Market and/or strategic value (replacement)
- Cost to maintain or store the material
- Cost to ship to another facility
- Population (number of items) of current and future inventory

- Cost to recover and process for reuse (e.g., capability exists or new equipment capability will be required)
- Waste facility availability and waste acceptance criteria(WAC)
- Cost to dispose
- Environmental, safety, and health concerns
- Benefits of disposal (e.g., eliminations of risks and recapture of storage space)
- MC&A/security requirements
- Other applicable factors

When a cost comparison of continued storage, recovery, salvage value, and/or discard is needed to perform the Programmatic Value Determination, ONMI may request the appropriate LMMO or other subject matter expert(s) to assist with cost analysis.

The Programmatic Value Determination process summary is shown in Figure 2.



**Figure 2. PVD Process Overview**

### 8.1. DISCARD LIMITS (DL)

A DL is a threshold quantity of nuclear material at or below which the material may be discarded to waste-management systems. A DL may be established at the site or complex level. When a DL has been set for a material, it is typically based on the concentration of the isotope or element of interest in the material. Appendix C provides information for concentration calculation. The DL for a specific nuclear material may also be a function of the material quantity, form, concentration, location, and other factors including process capabilities at the site and elsewhere within DOE. Therefore, despite the cost evaluation, there may be certain items or lots that

should be discarded if they are small and there is no justification for running a recovery process. Certain items can be discarded even at higher quantities or at higher safeguards attractiveness levels if there is no practical process available to convert inventories into a usable form. Those considerations should be described in the PVD request.

Because process waste streams containing nuclear materials are routinely generated from the production and processing of nuclear materials (e.g., receipt, storage, dismantlement/disassembly, chemical recovery, stabilization, and down-blending), DLs enable prompt disposal of those wastes. DLs are also useful during site cleanup to allow disposal of legacy materials with no programmatic value and of materials which are expended in place during tests or experiments. A DL approved for one site does not necessarily constitute approval of the same DL for another site.

It is important to note that DLs do not override Department Of Transportation, WAC, or Nuclear Criticality Safety requirements related to discard of the material.

## **8.2. ESTABLISHING SITE DISCARD LIMITS**

To revise a site DL or establish a new site DL, the site should complete the Programmatic Value Determination Request form and submit it to the ONMI and the Program Office. The form should be submitted to the Program Office prior to ONMI. However, the form can be submitted to both offices simultaneously if the Programmatic Value Determination needs to be expedited. The process of requesting a DL is the same process required to request a Programmatic Value Determination for a single item or group of items. However, the approval of a DL enables the site to move forward with the discard of multiple or recurring items in the future without the need to request a new Programmatic Value Determination each time. When a site requests a new or revised DL, ONMI may request the appropriate LMMO or other subject matter expert to assist with cost analysis. Upon receipt of a recommendation by the DOE site that serves as the steward and custodian of a specific material, ONMI provides guidance establishing the appropriate DLs. It may be necessary to reassess an existing DL if new technologies become available or processing conditions change.

Site DLs have been established at some sites for some material forms. An existing site DL serves as the Programmatic Value Determination that the material has no value. Materials that do not exceed an established site DL can be considered to have no Programmatic Value without any further request from the site for approval from ONMI.

## **8.3. COMPLEX-WIDE ESTABLISHED DISCARD LIMITS**

Site approved DLs may be used as the beginning point for establishment of complex-wide DLs. In establishment of complex-wide DLs, ONMI evaluate inventories of the material at sites across the complex in order to determine whether the current DL meets the needs of all sites. If a revised complex-wide DL is necessary, ONMI, in consultation with relevant site and program

representatives, will implement the complex-wide limit. DLs should not be recommended by a site that is not contracted to manage and operate the DOE processing facilities for the material.

With release of this document, the following complex-wide DLs are approved for the following specific material and are in effect. ONMI will maintain a list of complex-wide DLs that have been proposed since the most recent version of this Guidance and will cooperate with sites developing site-specific DLs to determine whether a site-specific DL could be expanded or similarly applied at other site(s).

1. Depleted uranium (DU) and normal uranium (NU) forms per the table below:

DU/NU DISCARD CRITERIA				
MATERIAL	IDES CODE*	DISCARD LIMIT CONCENTRATION		MASS (kg U) Per Item or Lot
Metal	M44	< 99.80% U	OR	< 10
U-Mo Metal	M74	< 88.00% U		
U-Nb Metal	M74	< 94.00% U		
Oxide	C00	< 80.00% U		
UF <sub>4</sub>	C28	< 98.70% UF <sub>4</sub>		
UF <sub>6</sub>	C28	< 99.50% UF <sub>6</sub>		
SOLUTION	S00	< 400 gU/L	OR	< 5

2. An enriched uranium material form for which the concentration of U-235 in the matrix is no more than 0.1%.
3. A weapons grade plutonium material form for which the concentration of plutonium in the matrix is no more than 0.1%.
4. The following Attractiveness Level E Materials:

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\*Item Description (IDES) Codes are a standard set of codes used for reporting purposes to generically describe nuclear material forms, which provide consistent descriptions of nuclear material items across the DOE Complex. Please refer to the Nuclear Materials Inventory Assessment (NMIA) Guidance for IDES key and descriptions.

- a. Pu 239 – Pu 241
  - b. Uranium enriched >20%
5. Material expended in place in experiments (unrecoverable).

Note: Low Enriched Uranium (LEU) is by definition Attractiveness Level E, but often has programmatic value. Discard of LEU materials with concentrations greater than 0.1% requires a Programmatic Value Determination, unless a site-specific discard limit has been approved.

Materials that meet one of the complex-wide DLs can be considered to have no Programmatic Value without any further approval from the Program or ONMI. For these materials, a site can proceed with the ToS and discard process, in accordance with applicable law, DOE Orders and policies.

## **9. WASTE DISPOSITION**

In addition to performing characterization and any additional processing steps required to meet waste acceptance criteria and packaging and transportation requirements, nuclear material proposed to be disposed of to waste-management systems must have a determination of No Programmatic Value (as discussed in Section 8 and meet other waste acceptance criteria). One of the criteria for ToS is that nuclear materials must be reviewed by the cognizant program office and ONMI (see Figure 1) to determine that the material is of No Programmatic Value to DOE. If the material does not exceed an existing DL (as discussed in Section 8), a PVD has already been made. Guidance for completing the ToS process can be found in *DOE O 474.2 Admin Chg 3, Nuclear Material Control and Accountability*.

## APPENDIX A

### Definitions

The definitions that apply to DOE Order 410.2 are set forth in Attachment 6 of the Order. The definitions for certain words and terms applicable to this document also are provided below.

**Defined Use** - Nuclear material that is actively being used by a DOE program or being held for future programmatic use, including strategic reserve and National Asset materials. Defined Use may also include material that may require processing or material suitable for storage that is compatible with the site's mission(s).

**Disposal** - Emplacement of waste in a manner that assures isolation from the biosphere with little or no maintenance and no intent of retrieval. Retrieval would require deliberate and detectable action to gain access after emplacement.

**Disposition** - The process of preparing for and/or placing nuclear materials in their life-cycle end state. Disposition may include consumption in DOE or non-DOE programs, transfer or sale to domestic or foreign programs, storage, or disposal as waste.

**Discard Limit** - A threshold quantity of nuclear material below which the material may be discarded as waste. The discard limit for a specific nuclear material may be a function of the material quantity, form, concentration, location, and other factors.

**Lead Materials Management Organization (LMMO)** - A DOE Headquarters organization or field element designated by ONMI to develop plans, integrate, conduct special studies, and coordinate the management, safe and secure packaging, storage, stabilization, and consolidation or disposition of a specific nuclear material(s).

**Life-Cycle Management** - All activities related to the acquisition/production, general characterization, utilization, recycle, storage, and disposition of DOE-owned or DOE-managed accountable nuclear materials.

**Material Management Plans** - Periodic evaluations of current and projected mission needs; material characterization/identification; material packaging, storage, and disposition; and impacts on site and DOE operations and budgets. The three levels of materials management plans addressed in DOE Order 410.2 include: Site Nuclear Materials Management Plans prepared by the sites, Material-Specific Management Plans to be prepared by the applicable LMMO, and DOE National Strategic Plan for Management of Nuclear Materials to be prepared by ONMI and the Nuclear Materials Advisory Board.

**National Asset Material** - A nuclear material that has no current programmatic use, but is judged to be unique or difficult to reproduce, and is set aside because of a significant chance that it will be required for future programmatic use.

**No Defined Use** - No Defined Use nuclear material is not in active use, not needed for current use by an approved DOE program, and not being held for potential future use by an approved

DOE program. This includes nuclear materials being stabilized for long-term storage or discard, material in program accounts being held for disposition (e.g., Nuclear Energy plutonium at the Hanford site, ARIES material and any material destined for MOX), and depleted, normal, and enriched uranium in a nuclear materials management account that will be transferred to Materials Disposition (MD) and blended for sale. It also includes material in Environmental Management accounts, such as plutonium-bearing residues that eventually may be discarded.

**Nuclear Materials** - A collective term for materials so designated in the DOE Order 410.2. These materials are americium-241, americium-243, berkelium, californium-252, curium, deuterium, enriched lithium, neptunium-237, plutonium-238, plutonium-239-241, plutonium-242, thorium, tritium, depleted uranium, normal uranium, enriched uranium, uranium in cascades, and uranium-233.

**Office of Nuclear Materials Integration (ONMI)** - NNSA Office responsible for nuclear materials management policy, guidance, and integration of DOE complex-wide management, consolidation, and/or disposition of nuclear materials.

**Packaging** - A receptacle and any other components important to the safe performance of the package. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, service equipment for filling, emptying, venting and pressure relief, and devices for cooling or absorbing mechanical shocks. The conveyance, tie-down system, and auxiliary equipment may sometimes be designated as part of the packaging.

**Package** – Packaging plus its content as presented for transport.

**Reserve** - A quantity of nuclear material set aside for a specific reason, such as a strategic reserve for defense applications or a programmatic reserve for an identified program use.

**Storage** - The operations by which nuclear material is retained and secured with the intent of retrieval for processing, use, or disposition.

**Special Nuclear Material (SNM)** - (1) Plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material, which pursuant to 42 U.S.C. 2071 (Section 51 of the Atomic Energy Act of 1954, as amended), has been determined to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing, not including source material.

**Termination of Safeguards (ToS)** - Process by which DOE Order 474.2 requirements for nuclear material accountability and control are removed and physical protection requirements for the nuclear material are transferred to the waste management or decontamination and decommissioning organization receiving the material.

**Waste** - Radioactive solid, liquid, or gaseous material of negligible programmatic and/or economic value and having a documented waste declaration.



## APPENDIX B

### Programmatic Value Determination Request

For [Instructions](#) on completing this form, [click here](#)

1. <b>Form ID Number:</b> Click here to enter text.							
<b>PART I</b>		<b>be completed by site/facility contractor</b>					
2. <b>Site and LRIS Code:</b> Click here to enter text.							
3. <b>Contact Name:</b> Click here to enter text.							
4. <b>Phone:</b> Click here to enter text.							
5. <b>Email:</b> Click here to enter text.							
6. <b>Material Description:</b> Click here to enter text.							
<b>7. Material Summary</b>							
Item or Material Description	Item Count	IDES	Net Weight (kg)	Category	Attractiveness Level	Element Weight (kg)	Isotope Weight (kg)
8. <b>Material composition:</b> Click here to enter text.							

<b>9. Is material classified?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> If yes, please provide classification level and category: <a href="#">Click here to enter text.</a>	
<b>10. Other relevant information:</b> <a href="#">Click here to enter text.</a>	
<b>11. Recommended disposition path, if known:</b> <a href="#">Click here to enter text.</a>	
<b>12. Is the material potentially a National Asset?</b> YES <input type="checkbox"/> NO <input type="checkbox"/>	
<b>13. Material recommended for determination of No Programmatic Value?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> If yes, provide justification: <a href="#">Click here to enter text</a>	
<b>14. References:</b> <a href="#">Click here to enter text.</a>	
<b>15. Is this a request for a new or revised Discard Limit (DL)?</b> YES <input type="checkbox"/> [ NEW <input type="checkbox"/> or REVISED <input type="checkbox"/> ]	NO <input type="checkbox"/>
<b>16. Requested Discard Limit:*</b> <a href="#">Click here to enter text.</a>	

*\*Enter N/A for one-time discard requests.*

**Attachment 1. General Characterization Attributes**

Item Identifier	MTC	Element Units: __	Isotope Units: ____	Assay	Net Weight Units: ____	Concentration	IDES	NS	SFMB	RU	USE	User_ PROG	DISP_GRP_ID

Assay = the % enrichment of the isotope in the element

Concentration = the % of the isotope or element in the net weight of the material matrix – specify isotope or element: \_\_\_\_\_

<b>PART II</b>	<b>To be completed by Local Field Element</b>
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Material recommended for determination of holding Programmatic Value ☐

Material recommended for determination of No Programmatic Value ☐

Field Element: \_\_\_\_\_

Field Element Representative (print name): \_\_\_\_\_

Phone Number: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**PART III**

**To be completed by the Program**

YES Material determined to have Programmatic Value ☐

NO Material determined to have NO Programmatic Value ☐

If yes, provide disposition path: \_\_\_\_\_

Determination made by (print name): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Submit form to: [insert email address for submittal]

**PART IV**

To be completed by ONMI

Material determined to have Programmatic Value: YES ☐ NO ☐

If yes, provide disposition path: \_\_\_\_\_

Determination made by (print name): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **Instructions**

### **PART I**

**For a one-time Programmatic Value Determination Request, numbers 15 and 16 are not required.**  
**For a Discard Limit (DL) related request, provide all information requested.**

- 1) **Form ID Number:** This is a unique identifier for tracking purposes. It is comprised of the site's RIS code along with the date and time to create a single alpha-numeric number for each form completed. See below for example.
  - Form ID Number: RIS Code-Two Digit Month-Two Digit Day- Four Digit Year-Military Time
  - Example: ALA-03-27-2014-1353
- 2) **Site and LRIS Code:** Material Location
- 3) **Contact Name:** Responsible site representative
- 4) **Phone:** Contact phone number
- 5) **Email:** Contact email
- 6) **Material Description:** Briefly describe the material.
- 7) **Material Summary:** Using the table provided, summarize the materials and items for which the Programmatic Value Determination is being requested.
- 8) **Material Composition:** Describe the physical and chemical characteristics of the material. Note any contamination or impurities and possibly include a brief discussion of how the material is generated. Discuss any analytical data and process knowledge that are relevant to the Programmatic Value Determination.
- 9) **Is material classified?** If the material is classified check "yes" and provide the classification (e.g., UNC, SRD). If the material is not classified, check "no".
- 10) **Other relevant information:** List any other important information that will help ONMI or the Program Office determine if that material has programmatic value.
- 11) **Recommended Disposition Path:** If there is a known or recommended disposition path, list it in this section.
- 12) **Is the Material Potentially a National Asset:** If the material is unique or difficult to reproduce, and if there is a significant chance that it will be required for future programmatic use, check "yes." Otherwise, check "no."
- 13) **Material recommended for determination of No Programmatic Value?** If the material is recommended to have No Programmatic Value, check "yes." Otherwise, check "no." If yes, provide justification for determination. State why the material is thought to have No Programmatic Value (small quantity, no on-going production, legacy inventory, no recovery method available/practical, inherent nature of the material, impurities, etc.)
- 14) **References:** List attachments that support this request (e.g., meeting notes, correspondence, analytical data, process knowledge interviews, technical papers, etc.).

**15) Is this a request for new or revised Discard Limit:** *Not required for one-time discard request.* If this is a material that is or will be regularly disposed of at your site, you may request a new or revised DL so that future approval is not required for like items.

**16) Requested Discard Limit:** *Not required for one-time discard request.* If relevant, enter the desired DL value. Include a cost comparison of continued storage, recovery, and discard, if relevant and known.

**Attachment 1: General Characterization Attributes:** List item-level material attributes from your Material Control & Accountability database with a description the Program Office can understand (e.g. DOE Part Number, Item Designation as marked on the unit, or MC/Type and serial number; or narrative description)

#### **PART II – Local Field Element**

**Material Recommended for Determination of No Programmatic Value:** If the material is recommended to have No Programmatic Value, check “yes.” Otherwise, check “no.”

**Field Element:** Field Element Location/Name

**Field Element Representative:** Responsible Field Office representative

#### **PART III – Program**

**Material Determined to have Programmatic Value:** If the material is determined to have Programmatic Value, check “yes.” Otherwise, check “no.”

**Disposition Path:** If material is determined to have Programmatic Value, list disposition site/path here.

#### **PART IV – ONMI**

**Material Determined to have Programmatic Value:** If the material is determined to have Programmatic Value, check “yes.” Otherwise, check “no.”

**Disposition Path:** If material is determined to have Programmatic Value, list disposition site/path here.

## APPENDIX C

### Concentration

The concentration of an isotope or element in a material is often needed for the Programmatic Value Determination. When a Discard Limit has been set for a material, the limit is usually based on the concentration of the isotope or element of interest in the material.

Concentration is the ratio (percent) of a specific isotope or element to the overall material weight (net weight) that is being considered for recovery, transfer, or discard.

### Assay

The nuclear material assay is the determination of the isotopic breakdown. It is expressed in terms of the ratio (Percent) of a given isotope to the total element, e. g.  $\text{u-235}/\text{Total U}$ ,  $\text{PU240}/\text{Total Plutonium}$ , etc. For example:

#### Example 1

During uranium processing at the Y-12 National Security Complex (NSC), small quantities of the isotope U-235 remain in a material called reduction sand. A typical can of reduction sand has a net weight of 10,000 g. If there are 20 grams of U-235 in the can of reduction sand, the concentration is:

$$20 \text{ g}/10,000 \text{ g} = 0.002 = 0.2\%$$

The site discard limit for the Y-12 NSC for reduction sand is 2%. Since the actual concentration of U-235 in the material is less than the DL, the material can be considered to have no Programmatic Value, per Section 8.2.

Other than to determine that uranium is enriched in U-235, the percent enrichment (assay) of the U-235 in the uranium is not part of the calculation to determine the concentration of U-235 in the reduction sand. The percent enrichment may be important for other reasons, such as category and attractiveness level and for compliance with relevant packaging and transportation requirements.

#### Example 2

An experimental device was constructed that contained 37.5 grams of thorium in a polyethylene matrix weighing a total of 442 grams. Upon termination of the project, the device was prepared for disposal. The concentration of the thorium in the polyethylene is:

$$37.5 \text{ grams}/442 \text{ grams} = 0.0848 = 8.5\%$$

There is not an established discard limit for thorium, so the site requesting the Programmatic Value Determination should complete the Programmatic Value Determination Form and submit it to ONMI.



Example 3

**Attachment 1. General Characterization Attributes**

Item Identifier	Detail MTC	Element Units: __	Isotope Units: ____	Assay	Net Weight Units: ____	Concentration	IDES	NS	SFMB	RU	USE	User_ PROG	DISP_GRP_ID
ABC	52	100	7	Pu240 7%	1000g	.7%							
			92	Pu239 92%	1000g	9.2%							
DEF	38	100	93	U-235 93%	1000g	9.3%							
			7	U-238		.7%							

Assay = the ratio (Percent) of a given isotope to the total element, e. g. u-235/Total U, PU240/Total Plutonium, etc.

Concentration = the ratio (percent) of a specific isotope or element to the overall material weight (net weight).