# Contractor Requirements Document (Supplemented) Form

**CRD M 470.4-6 Chg 1 (Supplemented Rev. 0)**  
**Title:** Nuclear Materials Control and Accountability

<table>
<thead>
<tr>
<th>Applicable Contractor(s):</th>
<th>PHMC ☒</th>
<th>PNNL ☐</th>
<th>RCC ☒</th>
<th>OccMed ☐</th>
<th>Other ☐</th>
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</table>

## Section A – Headquarters CRD:

**DOE M 470.4-6 Chg 1, NUCLEAR MATERIALS CONTROL AND ACCOUNTABILITY, Attachment 2**

## Section B – Clarifications

- **General Clarifications:** None
- **Specific Clarifications:** None

## Section C – Supplemental Requirements

**General Supplemental Requirements:**

1. Prime Contractors shall prepare and maintain a Material Control and Accountability Plan (MCAP), separate from other plans and manuals, which describes their MC&A program. Separate, sub-contract specific MCAP(s) shall be developed for any lower tier sub-contractors for work involving accountable nuclear material and identified by a Reporting Identification Symbol (RIS) different than the Prime's RIS. Each MCAP shall be approved by the DOE-RL.

2. For all revisions to a facility's MCAP that require RL approval, submit with the revised MCAP a description of the important change(s) proposed, and how the changes link to DOE requirements.

3. Establish and implement procedures to review submission of Contractor accounting data to NMMSS, and review NMMSS generated data against Contractor accounting data for accuracy. Error rate goals for transaction and inventory data should be below 2% per annum.

4. Receivers’ confirmation and verification/accountability measurements shall be accomplished in accordance with Table II-4 of DOE M 470.4-6 Chg 1 for Category I, II, and III SNM. Precision and accuracy goals shall be met for measurement of shipments and receipts.

5. For facilities having different reporting identification symbols (RISs), receiver’s measurements shall not be required for Category IV quantities of SNM, source, and other nuclear material. This requirement applies only to items with a valid intact TID (to include items that are considered to be inherently tamper indicating).

6. Contractors shall specify in their MCAP the scope and content of the measurement and measurement control programs used to determine Category III or IV inventories.

7. Develop and implement criteria and systems to acquire supporting data necessary to establish and maintain a technically sound basis for holdup values. Holdup inventory shall be measured, where feasible, or estimated on the basis of throughput, process data, modeling, engineering estimates, or other technically justifiable factors on a regular basis. Holdup values shall be reviewed at each MBA’s inventory frequency to determine if current values are acceptable or if re-measurement/re-estimation is required. This review shall be documented.

8. Reviews required by DOE M 470.4-6 Chg 1 for new facilities, etc. shall be documented. This requirement in itself is not intended to require an Operational Readiness Review (ORR).

9. Develop and maintain procedures for periodic assessment of MC&A system vulnerabilities and for identifying cost-effective actions to improve the MC&A system and correct deficiencies. Internal audits...
of the facility's MC&A function shall be conducted by an organization independent of MC&A to assess compliance with internal plans and procedures. The frequency of these assessments shall be no greater than the time between the periodic surveys conducted by RL, or as otherwise directed.

10) Develop, maintain, and implement procedures for periodic self-assessments of Category III and IV MBAs by SAS and Operations Management, or a third party representative. Results shall be documented in a self-assessment report.

11) Prepare and implement an annual "unannounced" inspection plan for Category III MBAs not in protected areas and Category IV MBAs that are not in either protected areas or limited areas. Inspections shall focus on inventory, accountability, and control practices, and be appropriately coordinated with other reviews/inspections with regards to timing.

12) A NM inventory difference (ID) report shall be prepared and submitted with a narrative explanation bi-monthly. Report formats shall provide for ease in current period and cumulative ID interpretation, analysis, and trending.

13) Establish "authorized locations" for the purpose of defining diversion.

14) NM other than SNM (except separated Np-237 and Americium 241, 243) shall be treated as Category IV, Attractiveness Level E material. Contractors shall specify in their MCAP how those materials will be accounted for and controlled.

15) Establish, maintain and implement an MC&A training plan (this plan may be a component of the MCAP). The plan shall specify the requirements to ensure that personnel performing MC&A functions are trained and qualified to perform their duties and responsibilities and are knowledgeable of requirements and procedures related to their functions. The basis for qualifying and maintaining qualification for MC&A personnel shall be documented in the MCAP.

16) Where descriptive guidance for material attractiveness and category determination do not exist or are unclear, contractors shall formally recommend attractiveness levels to RL for concurrence.

17) Each contractor must have and require compliance with one or more written procedures for implementing the MCAP. Written procedures shall be reviewed and approved by appropriate management prior to use.

18) Safeguards records shall be retained, as a minimum, in accordance with records retention guidelines and requirements specified in the Contractor's contract. Where minimum retention periods are determined to be not adequate, longer retention periods shall be identified and included in the Contractor's MCAP. Records, for which no specific retention requirement exists, shall be retained until at least the next RL survey in which these records are reviewed. Records include, but are not limited to, documentation of measurement data, transfers, transfer checks, and all information related to monitoring and assessment activities. Contractors shall maintain historical records of NM transactions, including shipper/receiver data, inventory differences, and inventory related documents.

19) Category III and IV SNM and Category IV non SNM in Category I or II MBAs, shall be inventoried on the same schedule as the MBA in which it resides. Source and other NM outside Category I and II MBAs shall be inventoried every two years.

20) RL Form 430, *Nuclear Materials Inventory* (available from Hanford's Intranet Site Forms database), or its equivalent, shall be prepared and signed no later than 15 calendar days after reconciliation has been completed.

21) For Category I or II MBAs, NM movements shall not resume following completion of an inventory, until the inventory has been reconciled, and a preliminary determination has shown that the inventory difference does not exceed the warning limit. No movements of nuclear material are allowed within or into/out of Category I or II MBAs from the start of the physical inventory until reconciliation is complete.
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except for measurements, reasons of safety, or as otherwise approved by DOE-RL.

22) When conducting required inventories of NM, an inventory tagging system shall be used to the maximum extent practical to provide added assurance that all materials have been inventoried. Each facility's program for conducting physical inventories shall include procedures for ensuring that areas are inspected to assure no accountable materials are present that are not reflected in the accounting records. Replica or empty containers that may be confused/substituted for actual material containers shall be marked as such where possible.

23) Contractors shall define in their MCAPs the most likely physical inventory anomalies (e.g., missing item or material, item in an incorrect location, extra item or material, item with incorrect information in database, item that fails verification/confirmation measurement acceptance criteria, etc.), and the general approach used to respond to those anomalies. As required by DOE M 470.4-6 Chg 1 the definition of a defect shall be defined as it relates to sampling plans and confirmatory/verification measurements. A defect may be considered a type of an inventory anomaly.

24) The material quantity threshold, and rationale, that would call for inventory verification/confirmation measurements shall be specified in the MCAP.

25) The program for evaluating all non-SNM inventory differences, including those involving missing items, shall be documented in the MCAP.

26) The basis for Category IV MBA inventory difference control limits shall be included in the MCAP.

27) Material Balance Reports (MBRs) shall be submitted to RL within 15 calendar days after the end of the reporting period. These submissions may be made in electronic format. In addition, a hard copy or electronic copy of "Inventory Listing by MBA and Location" shall be provided to RL monthly.

28) Contractors shall establish a program for trend analysis of current and historical control indicator data. The results shall be documented and maintained in an auditable file.

29) Specific requirements shall be developed and included in the MCAP for tracking, documenting, and evaluating inventory differences, and are to include as a minimum: 1) NM, non SNM, 2) control limits, and 3) investigation.

30) Material control anomalies shall be reported as indicated below and documented on the MC&A Fact Sheet (Exhibit B). It should be noted that reporting requirements included in this SCRD do not preclude the requirements of reporting incidents outlined in occurrence notification orders, directives, and/or instructions in accordance with the Contractors contract.
   a. RL shall be notified when a RL shipment of Category I, II, or III quantities of SNM, or a container from the shipment does not arrive at the intended destination on schedule and/or the location is unknown. The RL Safeguards representative shall be notified immediately.

   b. The loss, apparent loss, or accidental loss of Category I and II quantities of NM shall be investigated and reported immediately as indicated below. See DOE’s SAS Glossary of Terms and Exhibit A, Definition of Terms, for the definitions of “apparent loss” and “accidental loss”, respectively.
   i. During day-shift work hours, the RL Safeguards representative shall be verbally notified. During other hours, the RL-SES Duty Officer shall be notified through the Patrol Operations Center (373-3800).
   ii. The initial verbal notification shall be confirmed in writing within 24 hours using the MC&A Fact Sheet (see Exhibit B).
   iii. A final incident report describing assessment actions, conclusions, and steps taken or planned for corrective action shall be submitted to the Director, Security and Emergency
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Services within 15 working days.

c. For the loss, apparent loss, or accidental loss of Category III and IV quantities of materials, RL shall be notified within 24 hours (48 hours if an accidental loss), and a final report shall be submitted within 15 working days using the MC&A Fact Sheet.

d. When unauthorized access to NM may have occurred due to an unsecured facility (e.g., unlocked/unlatched door to an MBA or within an MBA), RL-SES and other required personnel shall be notified immediately. During off-shift hours, weekends, and holidays, immediate telephone notification shall be made to the RL-SES Duty Officer through the Patrol Operations Center (373-3800). When such an incident occurs, the assigned custodian of the NM involved shall be notified immediately, and a physical inventory of the NM involved shall be taken based on the requirements stated below. Verification of intact TIDs is one means for inventory verification of NM.

   i. For Category I and II quantities of SNM, or where there is evidence of forced or unauthorized entry, or any other unforeseen circumstances, the custodian shall immediately conduct a physical inventory verification and reconciliation, regardless of the time in which the incident was discovered.

   ii. For Category III quantities of SNM (excluding uranium enriched to less than 20 percent U-235), the custodian shall conduct a physical inventory verification and reconciliation on the same day of the discovery. When an incident is discovered off-shift, or a non-work day, the verification may be conducted the next calendar day.

   iii. For incidents involving Category IV quantities of SNM, or reportable quantities of NM (other than SNM), the physical inventory verification shall be conducted on the same day of the discovery. When an incident occurs off-shift, the verification shall be done on the next regular day shift.

   iv. Oral certification of the inventory results shall be made to RL-SES immediately upon inventory reconciliation. During off-shift hours, weekends, and holidays, the oral notification of inventory results shall be made to the RL-SES Duty Officer through the Patrol Operations Center (373-3800). Written certification shall be given no later than 72 hours after the inventory reconciliation, unless otherwise directed by RL-SES. The MC&A Fact Sheet Report shall be used (Exhibit B).

31) The material surveillance program for Category IV quantities of NM shall be defined in the Contractor's MCAP.

32) Facility waste monitoring equipment must be capable of detecting specific amounts of SNM as identified in the MCAP.

33) Daily Administrative Checks (DAC) for each Category I MBA (or multiple MBAs where roll up to a Category I quantity of SNM is credible) shall be defined in the contractor's MCAP, including the scope and extent of the checks.

34) Interim storage locations for Safeguards terminated nuclear materials shall be reviewed for adequate material controls and/or physical security to protect against unauthorized access and use until final disposition or burial of the nuclear material.

35) Nuclear material safeguards measures shall be maintained and/or implemented for SNM of attractiveness level D or higher that has been removed from inventory as waste and for which a vulnerability resulting in an unacceptable level of risk has been identified.

36) The scope and extent of the access control and material surveillance testing shall be specified in the
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<th>Requirement</th>
<th>Description</th>
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<tbody>
<tr>
<td>37)</td>
<td>Confirmation/verification measurement requirements for internal transfers shall be specified in the MCAP.</td>
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</tbody>
</table>

**Specific Supplemental Requirements:** None
Exhibit A
Definition of Terms

The following definitions supplement and clarify (in some cases) those provided in DOE M 470.4-7.

a. **Accidental Loss.** A loss that occurs when a known quantity of NM is inadvertently and irretrievably lost as a result of an operational mishap. Quantities reported as accidental loss must be determined by measurement or estimated on the basis of measurement.

b. **Authorized Location.** Locations which have been designated, approved, and documented for the use and/or storage of NM, and to which an item or quantity of NM may be placed for this purpose. This placement must be supported by approved transfer documents and/or inventory records. An authorized location may only be located within the boundary of an approved Material Balance Area (MBA) or in an approved transport vehicle. NM in-transit between MBAs shall not be left in any location not documented as an authorized location, nor in any location other than that stated on the transfer documentation.

c. **Discrepancy Indicators.** Occurrences that could indicate a potential system problem or a discrepancy involving NM. Examples are, broken seals, unsecured repositories, differences between inventory record and observations, measurement or descriptive differences on transfers, abrupt custodian termination or departure, measurement/Quality Control (QC) results indicative of an out-of-control situation, inventory difference in quantities where the book inventory is larger than the physical inventory by an amount which is in excess of the established control limits.

d. **Rollup.** The accumulation of lower category quantities of special nuclear material to obtain a higher category quantity either from within one location or from more than one location within a single security area. For successful rollup, sufficient quantities of NM must be available with reasonable accessibility and accumulation be deemed credible as supported by a security analysis (e.g. VA).

e. **Theft.** The intentional, unauthorized removal of NM from its authorized location to a location from which recovery by security forces would be unlikely.
Exhibit B
MC&A FACT SHEET REPORT

Program/Project/Facility___________________           NUMBER________________________
Date of Event __________________
Time__________________

1. Event Description
(a) Nature of event
(b) Location of event of occurrence _______________________________
(c) MBA custodian in charge of material ___________________________
(d) Item identification _______________ Chemical/Physical Form _____
(e) Material quantity _______________ Dollar Value $____________
(f) Material last known to be on hand ____________________ (Date, Where)

2. Apparent cause of event
Any willful theft/diversion indicated? Yes /___/ No /___/

3. Description of event

4. Actions taken or planned

5. Inventory difference? (Determined by a complete physical inventory of the MBA., state if not applicable)
Date re-inventory was performed ___________________
Will be performed ________________________________

6. Tentative Disposition
/__/ No further action required
/__/ Additional investigation required, schedule attached

7. Signatures

______________________________                _________
Originator                                                                                    Date

______________________________                _________
Approval Manager                                                                    Date