
Radiological Work Control Policy and Procedure

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1. PURPOSE

This document defines M&C administrative supplemental guidelines and requirements for establishing best management practices in support of radiological work control in M&C Facilities. There are SBMS procedures covering radiological work activities at ORNL facilities. This administrative guideline supplements those procedures in either further clarifying or implementing SBMS requirements or the implementation of division specific radiological work control practices. This document represents a management graded approach in the conduct of radiological work and does not represent all the actions necessary for the protection of safety and health.

2. SCOPE

This division document applies to M&C personnel and facilities that are involved in radiological work activities. It implements supplement actions associated with the subject areas and procedures in the Radiological Protection Management System for the conduct of radiological work at ORNL and does not apply to: background radiation; radiation doses received as a patient for the purposes of medical diagnosis or therapy; radiation doses received from participation as a subject in medical research programs; or ORNL employees working on non-ORNL managed projects.

3. ENVIRONMENTAL, SAFETY, AND HEALTH CONCERNS

Some work performed in M&C facilities has the potential for causing and/or resulting in personnel contamination or exposure, spreading of contamination, environmental release of contaminated materials, exceeding designated facility limits, or damage to the facility or associated equipment.

4. REFERENCES

Code of Federal Regulation, Appendix B of 40 CFR 302.4
ORNL SBMS Subject Area "[Radiological Protection](#)"
ORNL SBMS Subject Area "[Safety Basis](#)"
ORNL NCSA 113

5. RESPONSIBILITIES

5.1 Division Manager - The division managers, program managers, and office directors (level 2 management) are responsible and accountable for operating in compliance with radiological protection requirements, implementing procedures, providing adequate resources, ensuring that roles and responsibilities are established, and holding staff accountable for their performance..

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- 5.2 **M&C ESH Nuclear Material Management Representative** – is responsible for monitoring and tracking radiological inventories to ensure facility limits are not exceeded.
- 5.3 **M&C Radiation Control Officer (RCO)** – Radiological control officers, as appointed by their respective division directors, serve as radiological program contacts within the research and operating divisions. The radiological control officers serve in a matrix capacity to the manager of the radiological support services of OSSD.
- 5.4 **Line Managers** - Line managers are responsible for ensuring planning and execution of all radiological work in compliance with ORNL requirements and procedures, and for ensuring that all workers under their authority are trained and qualified to conduct radiological work commensurate with their duties and responsibilities.
- 5.5 **Lab Space Manger (LSM)** - is responsible for controlling and tracking radiological material in/out of their assigned space.
- 5.6 **STAFF PERSONNEL** - Radiological workers are expected to work in compliance with work planning and ORNL requirements. Specifically, they shall do the following:
- * Work in compliance with all requirements established for the activity
 - * Comply with all radiological postings encountered in the workplace
 - * Maintain training qualifications necessary to conduct assigned radiological work
 - * Immediately report all radiological incidents that occur in the workplace
 - * Ask questions if they are uncertain of the radiological requirements for their work

6. SUPPLEMENT REQUIREMENTS

6.1 GENERAL ADMINISTRATIVE REQUIREMENTS

- 6.1.1 Operational activities are to be conducted in a safe and compliant manner.
- 6.1.2 Operating personnel shall be trained and competent in their assigned duties.
- 6.1.3. ORNL established radiological practices and procedures are to be followed to ensure radiological work controls, personnel monitoring and radiological limits are implemented.
- 6.1.4. As-Low-As-Reasonably-Achievable (ALARA) measures should be followed to minimize personal radiation exposure.

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- 6.1.5** Radioactive material may not be accepted or transferred into M&C facilities without documentation of isotopic values in curies or grams per M&C Radiological Inventory Control Policy and Requirements, MET-ESH-POL-1.

6.2 Opening and Accepting Containers/Packages

- 6.2.1** Packages received should have an identification associated with it for tracking, monitoring and documentation purposes.
- 6.2.2** All packages/containers received shall have an assigned responsible person (no orphan packages/container accepted into the division).
- 6.2.3** Visually inspect package/container for any sign of damage (e.g. wetness, crushed, seal compromised). If damage is noted, stop procedure and notify Radiation Safety Officer or Radiation Control Technician. If the package/container contains special nuclear material and the tamper indicating device has been damaged, altered, or compromised, contact the division Material Balance Area representative immediately.
- 6.2.4** Each package/container received directly into a Metals and Ceramics Division less than Category 3 Nuclear Facility or a laboratory operated by division R&D personnel tenant within a NNFD Nuclear Facility shall be opened while using engineered controls (ex. using a hood, snorkel, etc.), PPE for respiratory protection or other precautionary measures to address potential airborne contamination release concerns. Exceptions to this requirement are as follows: 1) if the shipper provides information the container(s) is/are new or previously unused, 2) the shipper provides information that the contamination of the inner container(s) or contents is/are below the level of contamination that may become airborne, 3) if ORNL personnel have previously opened the primary container and can give assurance that expulsion or airborne contamination is not a likely event, or 4) if the user has previously utilized the container and the representative Radiological Control Technician (RCT) declares the container can be opened without an expected expulsion or airborne release of contamination.
- 6.2.5** All packages/containers shall have its nuclide contents identified with its abundance. That is, any isotope equal to or greater than 1 mCi is to be tracked and monitored. See M&C Radiological Inventory Control Policy and Requirements, MET-ESH-POL-1

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- 6.2.6** All packages/containers received or shipped with radiological contents shall have it's nuclide data recorded for facility inventory purpose as identified in M&C Radiological Inventory Control Policy and Requirements, MET-ESH-POL-1

6.3 FACILITY RADIOLOGICAL OPERATING LIMITS

- 6.3.1** A maximum radiological inventory expected to be in M&C facilities has been determined to be less than a hazard category 3 facility classification as determine by threshold limits identified in [DOE-STD-1027](#).
- 6.3.2** If the facility total fissionable material inventory is equal to or greater than 15 g FEM, a Fissionable Material Inventory Record must be performed and maintained with a copy sent to the ORNL Nuclear Criticality Safety group.
- 6.3.3** A facility or any single activity involving an inventory of 250 g FEM or more requires Nuclear Criticality Safety Approval.
- 6.3.4** A facility administrative fissionable material operating inventory limit of 500 g FEM for Building 4508 has been determined. Fissionable material operating inventory limits for other M&C facilities will be determined as needed.
- 6.3.5** In keeping with an ALARA concept, non-fissionable material operating inventory values for M&C facilities are to be maintained and monitored against the reportable quantity values identified in appendix B of 40 CFR 302.4
- 6.3.6** Storage time in non- nuclear facilities should be kept to a minimum. Long-term storage is not acceptable (months).
- 6.3.7** In keeping with ALARA no large accumulation of material should be allowed such that background activities are adversely affected.
- 6.3.8** While a large accumulation of material may be acceptable from an ALARA perspective, it may not be permissible from a physical standpoint. Physical storage areas capacity should not be exceeded and should be kept orderly and neat.

7. RECORDS

- 6.1** Associated staff will provide the necessary radionuclide and material identification.

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- 6.2** The Appendix A Radiological Material Inventory Data Work Sheet from the M&C Radiological Inventory Control Policy and Requirements procedure or similar material data sheet should be used to document proposed receipt of radiological material into Metals and Ceramics Division facilities.
- 6.3** LSM will maintain an inventory log to track and reflect a current area inventory balance.
- 6.4** The M&C ESH Nuclear Materials Management Representative will maintain an inventory log to track and reflect a current facility inventory.

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 APPENDIX A

M&C Facility Radioactive Material Operating Limits

Bldg	Location	Fissionable Limit	Non-Fissionable Limit (Ci)	Compliance Directive
4508	Single item or inventory Single item (Rm 242, 244S) Facility Inventory Facility Inventory	250 g FEM 400 g FEM 500 g FEM < 700 g FEM		SBMS NCS NCSA 113 M&C Division NCSA 113
4508	Facility Inventory		C-14 ≤ 10 Co-60 ≤ 10 Cr-51 ≤ 1,000 Fe-55 ≤ 100 Fe-59 ≤ 10 Mn-54 ≤ 10 Mn-56 ≤ 100 Mo-93 ≤ 100 Mo-99 ≤ 100 Ni-57 ≤ 10 Ni-59 ≤ 100 Sc-46 ≤ 10 W-181 ≤ 100 W-185 ≤ 10 Zr-95 ≤ 10	* Division Guide Line 40 CFR 302.4 Appendix B.
4508	Facility Inventory		C-14 < 420 Co-60 < 280 Cr-51 < 22,000 Fe-55 < 5,400 Fe-59 < 600 Mn-54 < 880 Mn-56 < 2,800 Mo-93 < 2,000 Mo-99 < 3,400 Ni-57 < 600 Ni-59 < 11,800 Sc-46 < 700 W-181 < 11,300 W-185 < 1,380 Zr-95 < 700	DOE-STD-1027-92

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**M&C Facility Radioactive Material Operating Limits
(continued)**

Other M&C Facilities	Single item or inventory	< 250 g FEM		
Other M&C Facilities			Same as above	Same as above

* 40 CFR 302.4 is an operating inventory guideline and total facility inventories should not exceed 10% of the category 3 threshold values listed in DOE-STD- 1027-92