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MCO ADDITIONAL NRC REQUIREMENTS

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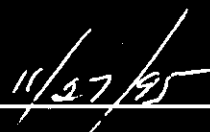
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MULTI-CANISTER OVERPACK

ADDITIONAL NRC REQUIREMENTS

November 1995

Prepared for the U.S. Department of Energy
Office of Environmental Restoration and Waste Management

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**Multi-Canister Overpack
Additional NRC Requirements**

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Multi-Canister Overpack

Additional NRC Requirements

I. Introduction and Purpose

The U.S. Department of Energy (DOE), established in the K Basin Spent Nuclear Fuel Project - Regulatory Policy, dated August 4, 1995 (hereafter referred to as the Policy), the requirement for new Spent Nuclear Fuel Project (SNFP) facilities to achieve "nuclear safety equivalency" to comparable U.S. Nuclear Regulatory Commission (NRC)-licensed facilities. For activities other than during transport, when the Multi-Canister Overpack (MCO) is used and resides in the Canister Storage Building (CSB), Conditioning Facility or K Basins Path Forward Projects, additional NRC requirements will also apply to the MCO based on the safety functions it performs and its interfaces with the SNFP facilities. An evaluation was performed in consideration of the MCO safety functions to identify any additional NRC requirements needed, in combination with the existing and applicable DOE requirements, to establish nuclear safety equivalency for the MCO. The background, basic safety issues and general comparison of NRC and DOE requirements for the SNFP are presented in WHC-SD-SNF-DB-002, Rev. 0, *Spent Nuclear Fuel Project Path Forward Nuclear Safety Equivalency to Comparable NRC-Licensed Facilities*.

II. Scope

In accordance with the Policy, the scope of potentially applicable NRC technical requirements are the design and construction (fabrication) measures (as opposed to also including preoperational or operational measures) mandated by the NRC regulations, for the purposes of this evaluation, Title 10 Code of Federal Regulations, Parts 0 through 199, revised as of January 1, 1995. In addition, NRC guidance (located in NRC public document rooms as of September 18, 1995) that may have direct application to SNFP design and construction activities, was reviewed as a prudent step in implementing the Policy's objectives.

In implementing the Policy, nuclear safety equivalency is being established on a one-time basis with respect to the NRC regulations and guidance, based on the dates in the preceding paragraph. For DOE requirements, used to establish nuclear safety equivalency, that may change in the future (e.g., if DOE 5480.7A was reissued as DOE 5480.7B), those changes would need to be reviewed to ensure that nuclear safety equivalency remained to be preserved through the use of the new order, or the relevant historical DOE requirements, now deleted in the new order, would need to

be specifically identified as a separate SNFP project-specific requirement and implemented accordingly. This latter control must be applied to WHC procedures and instructions as well where such documents were used to establish nuclear safety equivalency.

III. Results

Table 1 lists the MCO additional NRC requirements and identifies the responsible discipline(s) for implementation of the requirements (e.g., civil structural and mechanical) to help facilitation by the end user. Where the table includes a reference(s), this does not imply that the identified additional NRC requirement(s) and related DOE requirements necessarily satisfy the requirements of the reference(s), or even that the SNFP Path Forward must satisfy the requirements of the reference(s). It is simply a notation as to where the basic issue is raised, and where the reader may refer to in WHC-SD-SNF-DB-002, Rev. 0, and NRC regulations and guidance for related information.

Recognizing that the design and safety analysis of the MCO will evolve further and be refined as the engineering progresses, the SNFP may need to revisit the results of this document and make revisions as appropriate with DOE approval.

Table 1
MULTI-CANISTER OVERPACK ADDITIONAL NRC REQUIREMENTS

Responsible Discipline	Additional NRC Requirements	Related DOE/NSC References
1. Civil/Structural and Mechanical	Direct the design contractors to ensure that the containment/confinement integrity of the Multi-Canister Overpack (MCO) and its subcriticality geometry are preserved when the design basis earthquakes for the Canister Storage Building (CSB), Conditioning Facility and K Basins Path Forward Projects (with exception to activities internal to K Basins), as outlined in WHC-SD-SNF-DB-004, October 1995, are imposed on these facilities. Justify the use of alternate seismic response spectra and damping values from those provided in Regulatory Guides 1.60 and 1.61. Note: refer to WHC document WHC-SD-SNF-DB-004, titled <i>Spent Nuclear Fuel Project Seismic Design Criteria, Nuclear Regulatory Commission Equivalency Evaluation Report</i>, October 1995, for details on seismic. (References: Sections 72.24, Contents of application; Technical information, 72.90, General considerations, 72.92, Design basis external natural events, 72.102, Geological and seismological characteristics, 72.122, Overall requirements, and 72.212, Conditions of general license issued; Regulatory Guides 1.60, Design Response Spectra for Seismic Design of Nuclear Power Plants, Revision 1, 1.61, Damping Values for Seismic Design of Nuclear Power Plants, Revision 0, and 3.48, Standard Format and Content for the Safety Analysis Report for an Independent Spent Fuel Storage Installation (Dry Storage), Revision 1; and NRCY-93-087, Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Designs)	DOE 5480.28 and companion stds. DOE 6430.1A SDC 4.1, Rev.12
NOTES: 1) Only the lead responsible disciplines are listed. It is assumed these disciplines will coordinate efforts of additional support disciplines as needed. 2) For the purposes of this report, K Basins Path Forward Projects include: desludging and cleaning of the K Basins fuel, reracking and cold vacuum drying.		

Table 1
MULTI-CAMISTER OVERPACK ADDITIONAL, NRC REQUIREMENTS

Responsible Discipline	Additional NRC Requirements	Related DOE/WHC References
2. Civil/Structural and Mechanical	Direct the design contractors to ensure that the containment/confinement integrity of the MCO and its subcriticality geometry are preserved when a design basis tornado (including translational velocity, rotational velocity and pressure differential) and tornado missile are imposed on the designs of the CSB, Conditioning Facility and K Basins Path Forward Projects (with exception to activities internal to K Basins), taking into consideration the most recent version of Regulatory Guide 1.76, <i>Design Basis Tornado for Nuclear Power Plants</i>, SECY-93-087, <i>Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs</i>, and NUREG/CR-4461, <i>Tornado Climatology of the Contiguous United States</i> (potential revisions to SRP 3.5.1.4, Revision 2, <i>Missiles Generated by Natural Phenomena</i>). (Refer to WHC document WHC-SD-SNP-002, Rev. 0, <i>Spent Nuclear Fuel Project Path Forward Nuclear Safety Equivalency to Comparable NRC-Licensed Facilities</i>, Table 5.c, §§72.24 and 72.122, for related information.) (Reference: Section 72.122, Overall requirements)	DOE 5480.28 and companion stds. DOE 6430.1A SDC 4.1, Rev. 12
3. Civil/Structural and Mechanical	Direct the A/E's to ensure the design of the MCO supports the ability for ready retrieval. (Reference: Section 72.122, Overall requirements)	DOE 6430.1A
4. Mechanical	Use Regulatory Guide 1.26 to assist in assigning the appropriate ASME Section III code classes to the MCO shell, parts and subassemblies, as applicable. (Reference: Regulatory Guide 1.26, <i>Quality Group Classifications and Standards for Water, Steam, and Radioactive-Waste-Containing Components of Nuclear Power Plants</i>, Revision 3)	DOE 6430.1A

Table 1
MULTI-CARTER OVERPACK ADDITIONAL NRC REQUIREMENTS

Responsible Discipline	Additional NRC Requirements	Related DOE/WHC References
5. Mechanical	Direct the design contractors to review the NRC positions in Regulatory Guides 1.84 and 1.85 on ASME Section III code cases before using such code cases for safety class 1 applications for the MCO. The NRC positions on applicable code cases should be used in the design. Where no NRC position is stated in regards to the acceptance of a code case, that code case may be used as approved by the code Committee. (References: Regulatory Guides 1.84 and 1.85 [both Revision 30], <i>Design and Fabrication Code Case Acceptability ASME Section III, Division 1 and Materials Code Case Acceptability ASME Section III, Division 1</i>, respectively)	DOE 6430.1A
6. Programs/Management	Incorporate Westinghouse Hanford Company (WHC) Procurement Clause E13 (Reporting of Safety Defects and Noncompliance) into safety class 1 procurement specifications for the MCO to require reporting by suppliers of defects in items or services. (Note: this procurement clause is located in Appendix A, Revision 1, to WHC-CM-4-2, <i>Quality Assurance Manual</i>.) (Reference: Part 21, <i>Reporting of Defects and Noncompliance</i>)	WHC-CM-4-2, App. A, E13, Rev.1

Table 1
MULTI-CANISTER OVERPACK ADDITIONAL MRC REQUIREMENTS

Responsible Discipline	Additional MRC Requirements	Related DOE/WHC References
7. Programs/Management	Ensure the appropriate quality requirements in existing WHC procedures and instructions remain in effect (e.g., in SNFP-specific documents) for application to MCO activities. These WHC procedures and instructions and the subject requirements are identified in WHC document WHC-SD-SNF-DB-002, Rev. 0, <i>Spent Nuclear Fuel Project Path Forward Nuclear Safety Equivalency to Comparable NRC-Licensed Facilities</i>, Attachment A, Detailed Evaluations, Quality Assurance Criteria. (References: Part 50, Appendix B, <i>Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants</i>, and 10CFR72, Subpart G, <i>Quality Assurance</i>)	10CFR830.120 DOE 4700.1 WHC-CM-4-2 QR 1.0, Rev.4 QR 3.0, Rev.5 QR 4.0, Rev.4 QR 7.0, Rev.4 QR 9.0, Rev.4 QR 10.0, Rev.3 QR 14.0, Rev.5 QI 7.2, Rev.5 WHC-CM-4-46 Section 9.0, Rev.1 WHC-CM-6-1 (manual rev. 8/8/95) WHC-IP-1026 (manual rev. 7/10/95)
8. Programs/Management	Ensure for MCO fabrication that the areas of vendor and subcontractor quality assurance records and control of safety class 1 purchased material, equipment, and services receive emphasis during SNFP audits, surveillances, and assessments. (Reference: IEM 95-29)	WHC Procurement Clauses
9. Programs/Management	Implement the WHC Occurrence Reporting System for the design and fabrication of the MCO. (Reference: Section 50.55(e), <i>Conditions of construction permits</i>)	DOE 5000.3B WHC-CM-1-5, Section 7.1, Rev. 0

Table 1
MULTI-CANISTER OVERPACK ADDITIONAL NRC REQUIREMENTS

Responsible Discipline	Additional NRC Requirements	Related DOE/WHC References
10. Safety Documentation	Use a criticality safety value of 0.95 for k_{∞} for the MCO design, functions and related activities. (References: SRP 9.1.2, Spent Fuel Storage, Revision 3, and WURG-0612, Control of Heavy Loads at Nuclear Power Plants, Resolution of Generic Technical Activity A-36)	DOE 5480.24 WHC-CM-4-29 (manual rev. 4/17/95)
11. Safety Documentation	Impose the requirements of "important to safety," as found in Part 72, and safety class 1 on the MCO. (Structures, systems and components (SSCs) "important to safety", in accordance with Section 72.3, are identified as follows: those SSCs that assure there is not a credible breach of the spent nuclear fuel containment/confinement such that a radioactive release could be postulated to reach the controlled area boundary, defined as 100 meters from the facility release point. Once SSCs "important to safety" have been identified, impose the requirements for safety class 1 SSCs as defined in WHC-CM-4-46, Safety Analysis Manual, Section 9.0, Revision 1, Safety Classification of Structures, Systems, and Components.) (Reference: Sections 72.3, Definitions, and 72.122, Overall requirements)	DOE 6430.1A WHC-CM-4-46 Section 9.0, Rev.1
12. Radiological Protection	Incorporate the requirements of Regulatory Guide 8.8 into the design of the MCO. Example considerations include: the process and configuration associated with welding the MCO shield plug in place, inservice inspection and maintenance, among other MCO-related activities that could impact ALARA. (Reference: Regulatory Guide 8.8, Information Relative to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Reasonably Achievable, Revision 3)	10CFR835 DOE 5480.11 DOE 6430.1A Hanford Site Radiological Control Manual (HSRCM-1)

Table 1
MULTI-CANISTER OVERPACK ADDITIONAL NRC REQUIREMENTS

Responsible Discipline	Additional NRC Requirements	Related DOE/WHC References
13. Radiological Protection	Direct the design contractors to consider the following radiological exposure criteria for the design and safety analyses of the MCO and its interfaces with the CSB, Conditioning Facility and K Basins Path Forward Projects, since the MCO provides a containment/confinement function for the K Basins spent nuclear fuel. • Ensure the Section 20.1301 hourly dose limit of 0.002 rem to the public for any unrestricted area from external sources during normal operations and anticipated occurrences is met. • Ensure during normal operations and anticipated occurrences for any real individual of the public that the following Section 72.104 annual dose equivalent criteria are met: 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other critical organ. • Ensure the Section 72.106 deterministic value of 5 rem is met in safety analyses for the onsite worker at the boundary of the controlled area (defined as 100 meters from the facility release point) in determining safety class 2 and 3 SSCs. (References: Part 20, Standards for Protection Against Radiation, and Sections 72.104, Criteria for radioactive materials in effluents and direct radiation from an ISFSI or NRS; 72.106, Controlled areas of an ISFSI or NRS; and 72.126, Criteria for radiological protection)	10CFR835 DOE 5400.5 DOE 5480.11 DOE 5480.23 DOE 6430.1A DOE-STD-3009-94 HSCM-1 WHC-CM-4-46, Section 9.0, Rev. 1

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