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Code of Record: DOE Standard Canister (DOESC)

August 2022

Devin D Imholte

Changing the World's Energy Future

INL is a U.S. Department of Energy National Laboratory operated by Battelle Energy Alliance, LLC

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Idaho National Laboratory
Idaho Falls, Idaho 83415

http://www.inl.gov

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Code of Record

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Executive Summary

The United States Department of Energy (DOE) Spent Nuclear Fuel (SNF) Packaging Demonstration seeks to develop and demonstrate the designs, technology, processes, and regulatory framework for packaging DOE SNF for road-ready dry storage (RRDS); and establish the processes that will be used in a future production facility. The Packaging Demonstration will utilize the DOE Standard Canister (DOESC) for packaging select DOE-managed SNF types for interim storage, transportation and disposal as part of RRDS. Placing DOE-managed SNF into RRDS is part of the strategic framework for SNF on the Idaho National Laboratory (INL) site. To comply with DOE, INL and Nuclear Regulatory Commission (NRC) requirements, this Code of Record establishes the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC), Section III, Division 3 as the Code that will govern DOESC and internal support structure construction[i], with certain clarifications. This Code of Record establishes a rationale for proceeding without construction certification of the DOESC (i.e., "N-stamping) and the extent to which a Registered Professional Engineer is required for the DOE Spent Fuel Packaging Demonstration. Given the (i) standard industry practice to pursue independent licensure of commercial storage casks and transportation packages by the NRC in lieu of ASME certification and (ii) guidance provided by 10 CFR 830, DOESC construction activities need not be certified (i.e., "stamped") to the ASME BPVC. However, additional quality assurance requirements will apply as outlined in this Code of Record.

[i] This COR uses the ASME BPVC definition of *construction* as it relates to DOESC activities, including: materials, design, fabrication, examination, inspection, testing, and certification.

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1. Scope

This Code of Record (COR) identifies the codes and standards required for Department of Energy Standard Canister (DOESC) construction (see Definitions) activities at the Idaho National Laboratory (INL) site and other (e.g., vendor) locations.

The DOESC is a standardized canister system designed for containing U.S. Department of Energy (DOE)-managed spent nuclear fuel (SNF) in a road-ready dry storage (RRDS) configuration. Thus, it is intended for SNF interim storage, transportation and/or disposal at a geological repository.

This COR specifically applies to the DOESC's components and internal support structures (ISSs) that will be managed under the DOE SNF Packaging Demonstration (Project 33411, i.e., "Packaging Demonstration").[1] This project will demonstrate loading and storage of multiple DOESCs at DOE nuclear facilities located within the Idaho Nuclear Technical and Engineering Center (INTEC) Complex (e.g., Irradiated Fuel Storage Facility, CPP-603 and Dry Spent Fuel Cask Storage Pad, CPP-2707).

Compliance with identified codes and standards is needed for a dry storage overpack (see Definitions) or a transportation overpack loaded with an over-canister (see Definitions) containing multiple DOESCs to receive a Certificate of Compliance (CoC) from the U.S. Nuclear Regulatory Commission (NRC). NRC certification is required for transportation of the DOESC on U.S. public highways, and is an imperative characteristic of a RRDS configuration. Besides ensuring regulatory compliance of the DOESC, generating this COR initiates Packaging Demonstration conformity with:

- 10 CFR 72.24 (c)(4) for storage cask(s) using DOESC(s) loaded with SNF for interim storage within an independent spent fuel storage installation (ISFSI), and
- 10 CFR 71.31 (c) for transportation package(s) (e.g., transportation overpack) containing DOESC(s) loaded with SNF.

This COR is based on the most current NRC regulatory guidance outlined in NUREG-2216, NUREG-2215, DOE guidance, and INL procedures. This COR may be revised, cancelled or otherwise modified to adapt to updated guidance from NRC, DOE, or INL.

In addition to identifying applicable construction codes and standards for the DOESC, this COR (i) establishes engineering design processes per 10 CFR 830.122 (f)(1), (ii) addresses DOESC Registered Professional Engineer (RPE) stamp requirements, and (iii) addresses DOESC 10 CFR 851 compliance.

2. Limitations

The Packaging Demonstration is a collaboration across INL contractors Battelle Energy Alliance (BEA) and the Idaho Environmental Coalition (IEC) – collectively referred to as INL. INL is

responsible for several activities within the Packaging Demonstration, including DOESC construction activities (i.e., the canister and ISSs). Therefore, the regulatory requirements within the scope of this COR are limited to the construction of the DOESC. Over-canister, storage overpack and/or transportation overpack construction activities will be subject to codes and standards determined by the vendor. Any over-canister containing DOESCs will have to meet the same requirements of 10 CFR 71, 10 CFR 72 and other regulatory requirements, as applicable.

Additional activities will be required beyond those listed in this COR for receiving an NRC CoC, and to allow for a code-compliant execution of the Packaging Demonstration. These activities (e.g., development of an in-service inspection program) and their associated codes and standards will be considered and met by the vendor/contractor who will construct the auxiliary structures, over-canister, transportation overpack, and/or storage overpack that will contain DOESC(s). Therefore, it is important to recognize the limitations of this COR, which does not provide a comprehensive list of requirements for demonstrating compliance with applicable codes and standards or for licensing transportation or storage of DOESC(s) loaded with SNF by the NRC.

This COR is not applicable to (i) structures, systems or components (SSCs) fabricated for DOESC mock-up and research activities or (ii) SSCs that will be constructed to support fabrication (e.g., weld machines, leak test equipment, lifting fixtures, etc.) that will not be part of the NRC CoC. These engineering activities will be executed per LWP-10000, “Engineering Initiation” and LWP-20000, “Conduct of Research”, as applicable.[2,3]

This COR does not supersede any of the INL Engineering Standards as outlined in STD-139, “INL Engineering Standards”.[4]

3. Background

3.1 Department of Energy Standard Canister (DOESC)

In the 1990s and early 2000s, the DOE National Spent Nuclear Fuel Program (NSNFP) identified the option for placing DOE-managed SNF into a multi-purpose canister and began designing and developing a Standard canister system that is now referred to as the DOESC. The DOESC design aimed to provide a Standard and easy-to-handle unit that is sufficiently durable for interim dry storage casks, robust enough for transportation packages, and meets the waste form requirements for disposal at the Yucca Mountain Nuclear Waste Repository, without triggering the necessity of DOE SNF repackaging. Although standardized, the DOESC design includes four variations in two parameters: outer diameter (OD) (18” – small, 24” – large) and overall length (10’ – short, 15’ – long) (Figure 1).

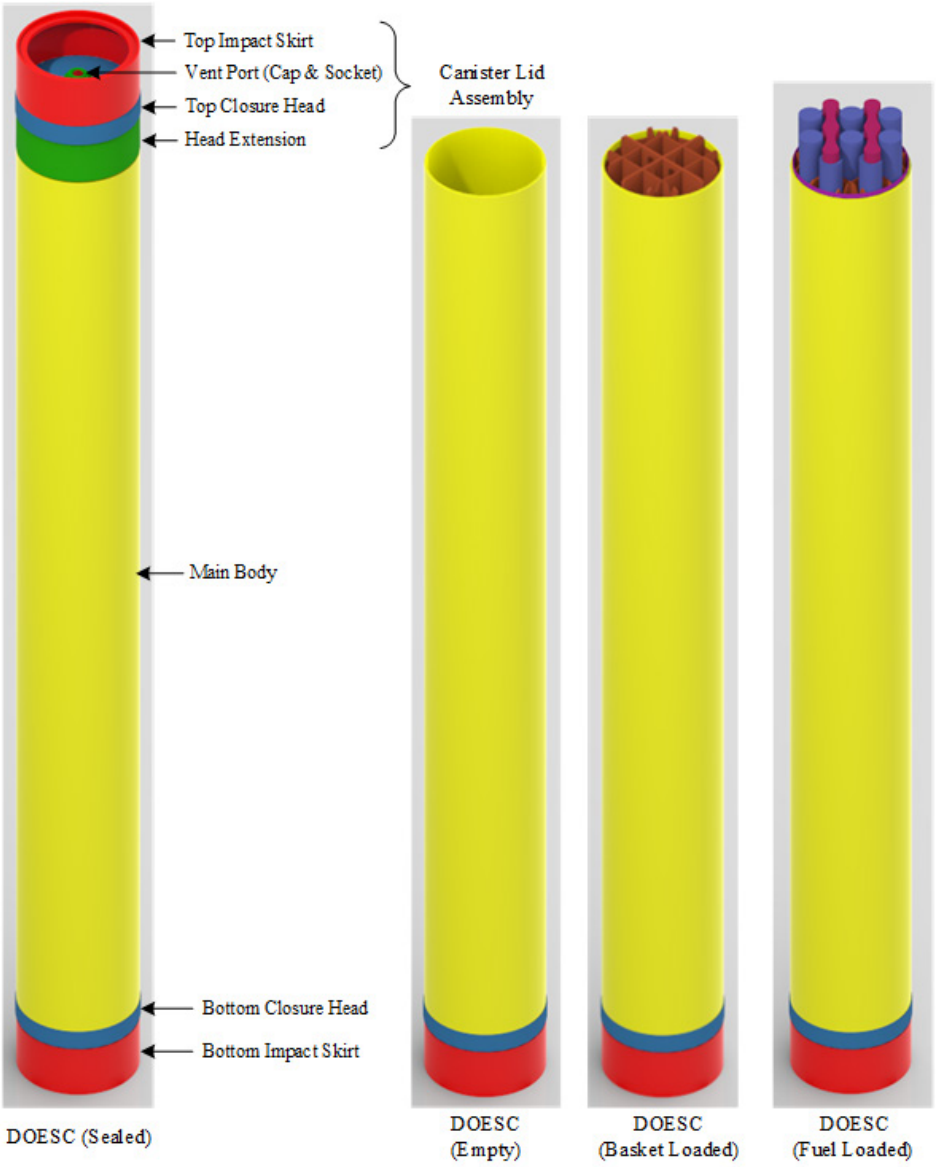

Figure 1: DOESC - 18" OD, 15 ft. Length Canister - Loaded with Peach Bottom Unit 1 Core 2 SNF

3.2 DOE SNF Packaging Demonstration

DOE manages over 300 different types of SNF stored at four different sites in the U.S. Over 250 of these SNF types are found at the Idaho National Laboratory (INL) site. In recent years, efforts resumed to ensure that DOE-managed SNF stored at the INL site could be placed into a RRDS configuration to make a good faith effort towards satisfying the 1995 Settlement Agreement.[5]

Leveraging the extensive DOESC work that was accomplished by NSNFP through 2010, the Packaging Demonstration plans to demonstrate the DOESC capabilities for DOE-managed SNF interim dry storage of certain types of SNF.

Given the uncertainties in the disposition of SNF in the U.S., no demonstration of transportation or disposal is included within the scope of the Packaging Demonstration. However, the project aims to meet generic SNF repository requirements.

The Packaging Demonstration will develop INL's capabilities for packaging DOE-managed SNF into standard canisters (i.e., DOESCs), loading the canisters into a commercial vendor modular system, and transferring the modular system to a cask pad at the INL site. It will demonstrate loading, sealing, inspection, and operation of such systems, and confidently establish timelines and throughput rates, thus establishing a pathway for RRDS of all DOE-managed SNF. Additional information on the Packaging Demonstration can be found elsewhere.[1,6,7,8,9]

3.3 Historical Code of Record for the DOESC

Design and testing efforts for the DOESC have been ongoing for more than 20 years. These design efforts have not maintained consistent codes and standards, due to evolving consensus standards and requirements for SNF systems during this period. The original DOESC Preliminary Design Specification established American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC) Section III, Divisions 1 (Metallic Nuclear Pressure Vessel Components) and 3 (Containments for Transportation and Storage of SNF and High Level Radioactive Waste) as the applicable codes for design, fabrication and testing.[10,11] The original release of Division 3 in 1997 only governed transportation packages, which is why Division 1 remained the DOESC consensus standard to provide a design basis for dry storage. The original strategy to achieve DOESC code compliance relied on the development and acceptance of ASME Code Cases. These Code Cases permitted alternatives (e.g., remote ultrasonic weld examination and forgoing hydrostatic pressure tests) to Code-mandated examination (NDE), non-destructive testing (NDT) and other construction practices due to radiological hazards associated with SNF loaded within the DOESC.

In 2004, Foster Wheeler Environment Corporation (FWENC) received a site-specific license from the NRC for receipt, possession, storage and transfer of SNF within the Idaho Spent Fuel (ISF) Facility.[12] The ISF Facility used the "ISF Canister Assembly", based on the original DOESC design, as one of its SNF storage systems.[15] The FWENC design established ASME BPVC Section III, Division 1, Class 1 as the consensus standard for its DOESC construction. However, the ISF Facility was never built.

FWENC took advantage of ASME Code Case N-595-2, which allowed for the following deviations from Division 1, Subsection NB for DOESC construction:

- Waived the required pressure test for closure welds made after SNF loading (i.e., NB-6000) and replaced with helium leak test

- Waived the required helium leak testing of all closure welds and the need to meet a 1E-04 std-cc/sec maximum leak rate limit

- Permitted extension of the Certification Mark (i.e., "N-stamp") from the manufacturing location to the fuel loading site without a "site-specific" implementation survey

- Permitted "N-stamping" prior to fuel loading and closure

N-595-2 (including subsequent revisions 3, 4) was eventually annulled after being incorporated into ASME BPVC, Section III, Division 3 as Subsection WC (Storage Containments). However, as of 2022, the NRC has yet to officially approve any subsection of Division 3 for the construction of transportation packages or storage casks containing SNF the same way it has for Division 1.[16] Since granting FWENC a license using Code Case N-595-2, the NRC has listed Code Case N-595 (all revisions) as an unapproved Code Case.[18]

Given the evolution of the relevant codes and standards, this COR seeks to establish a contemporary strategy for DOESC construction within the Packaging Demonstration.

3.3.1 ASME Construction Certification ("N-Stamping")

ASME Nuclear Construction Certification (colloquially termed "N-stamping") requirements have been a recurring point of discussion since the initial design efforts of the DOESC.[10,11] Certification, if required, will have an impact on the pool of suitable vendor/subcontractor candidates that can perform DOESC construction activities. For instance, to stamp a newly constructed component, the entity performing the construction needs a Certificate of Authorization issued by ASME through a rigorous qualification procedure. ASME offers different Certificates of Authorization for different applications (e.g., unfired pressure vessels, nuclear pressure vessels, core support structures, etc.). For nuclear components, the Certificate Holder affixes their Certification Mark (i.e., their ASME-issued "N stamp") to a constructed component to demonstrate compliance with the ASME rules. For nuclear pressure vessels and assemblies, the term "N stamp" has been historically used to broadly refer to Certification Marks that are applied to SSCs fabricated in accordance with ASME BPVC Section III. Today, there are several Certification Marks under Section III, including:

- N-1 for vessels constructed under Section III, Division 1, Class 1;

- N-CC for core supports structures constructed under Section III, Division 2, Class CC

- N3 or NPT for transportation and storage containments and ISSs constructed under Section III, Division 3

Further, N-stamped components can only be constructed of materials sourced by Material Organizations with an active Quality System Certificate (QSC), which is another type of certification issued by ASME.[19] Thus, it is important to recognize the additional requirements introduced by requiring certification (i.e., N-stamping) of the DOESC or associated components to achieve strict code compliance.

There are currently >30 active CoCs for NRC-licensed transportation and storage packages and >5 DOE-licensed packages for SNF.[20,21] Of these, none are certified to any edition of the ASME BPVC according to the documented CoCs and safety analysis reports that detail these designs. In other words, commercial vendors do not N-stamp their storage or transportation packages. Instead, they pursue NRC licensure through a CoC or ISFSI license while using the ASME BPVC as a Code of Record for materials, design, analysis, testing, examination and fabrication "to the maximum practical extent."

3.3.2 Historical ASME Certification of the DOESC

One noteworthy study exploring the several possible pathways for achieving regulatory acceptance of the DOESC was recently completed.[22] These pathways include: (i) an uncertified DOESC, (ii) certifying the DOESC using the current ASME Code and associated Code Cases, and (iii) certifying the DOESC with updated Code Cases. The pathways are graphically represented in Figure 2. As mentioned above, Option #1 (No ASME Certification) is standard industry practice.

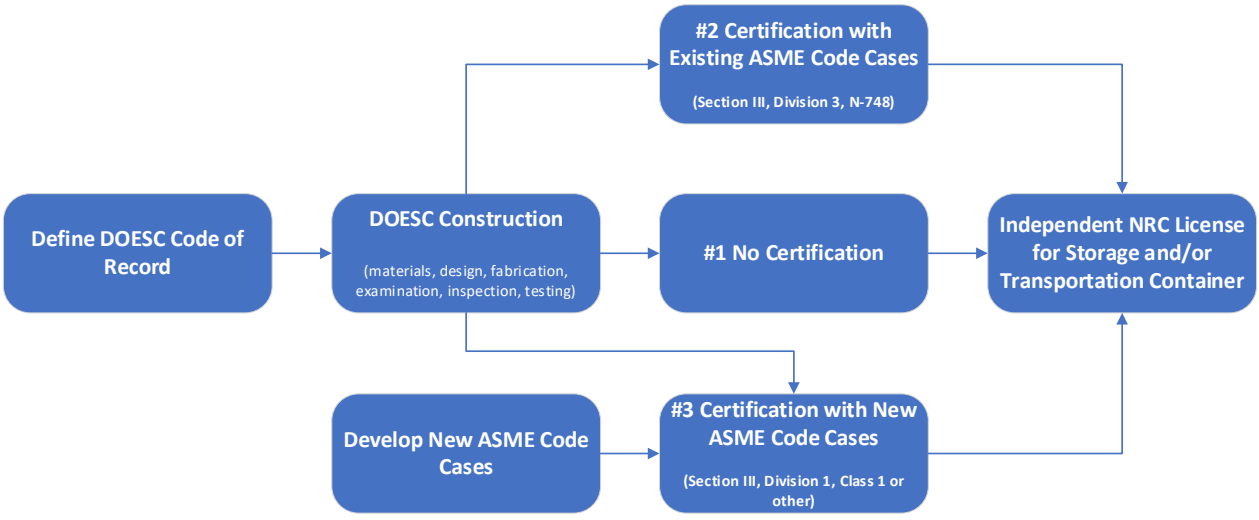

Figure 2: DOESC Licensure Pathways (Adapted from Petersen and Eidelpes, 2022[22])

Previous DOESC designs considered obtaining a Certification Mark per ASME BPVC Section III, Division 1, Class 1 (i.e., N-1 stamp) for SSCs with containment function (i.e., the canister shell). [10,11,12,13] However, FWENC did not require an ASME Certification Mark for non-containment SSCs: baskets, impact plates and shield plugs (i.e., components placed within the canister with functions other than containment).[15] Instead, an NRC-approved quality assurance program (QAP) was cited as the governing standard for these components.[15] Limited documentation indicates that ASME certification was required for the DOESC as a defense-in-depth strategy for storage, transportation and disposal.[23]

The FWENC strategy appears to be a graded approach for construction of the DOESC and its internal components. Certifying the safety/containment SSCs to a consensus standard indicates independent verification of design adequacy under normal and hypothetical accident conditions. Specifying less rigorous certification standards for non-safety SSCs provides flexibility for fabrication, which could be important for the variety of SNF that will need to be packaged.

It is worth noting that regarding Option #2 (Figure 2), there is a potential pathway to achieve an ASME Certification Mark under Division 3 (i.e., N3 stamp) using Code Case N-748. This Code Case permits eddy current weld examination in lieu of dye penetrant examination for performing the Code-required surface examination of closure welds. N-748 did not exist during the original NSNFP or FWENC DOESC design efforts. N-748 is very valuable given the prospects for remote fuel loading and welding that are likely for DOE SNF.

3.4 Nuclear Regulatory Commission Certificate of Compliance

The NRC issues CoCs for transportation packages and interim dry storage casks that comply with 10 CFR 71 and 10 CFR 72, respectively[ii]. NRC has released Nuclear Regulatory Reports (NUREGs) that provide guidance for NRC staff for reviewing license applications and granting CoCs. NUREG-2216 provides guidance to NRC reviewers of transportation container license applications per 10 CFR 71.[24] NUREG-2215 provides guidance to NRC reviewers of storage container license applications per 10 CFR 72.[25] The NRC does not require license applicants to meet a particular code or standard, and may issue CoCs for transportation and storage containers without meeting an entire code or standard. However, NUREG-2215 (Section 17.4.4) recommends a nominal code or standard be defined by the license application for construction.

The DOESC is intended for use within an NRC or DOE-licensed transportation package and storage cask. However, the scheme for its use is different from SNF

[ii] Per 49 CFR 173.7 (d), DOE also may license their own transportation packages between DOE shipment and receipt facilities. Given the likelihood of disposal being managed by the NRC (e.g., 10 CFR 60, 63) and to permit maximum flexibility with interim storage and transportation, NRC licensure will be considered in this COR.

managed from commercial plants and other nuclear facilities. Commercial storage and transportation packages typically use an over-canister (See Definitions) that directly contains SNF from light water reactors. The cladding of the SNF is typically the first containment barrier (i.e., bare fuel is not exposed within the over-canister, and the cladding and over-canister are each credited as containment boundaries for SNF transport). The guidance provided by NUREG-2215 and NUREG-2216 are typically applicable to the transportation package, storage cask and over-canister. The CoC covers a given over-canister design, along with a specified SNF payload (i.e., "waste form"). However, the DOESC is designed to contain failed and damaged fuel, which means its fuel does not necessarily have such containment. The DOESC is therefore unique in that it is a hermetically sealed waste form that will likely be loaded into an over-canister. Furthermore, this DOESC was designed to maintain subcriticality under selected 10 CFR 71.73 hypothetical scenarios, such as a 9-m free drop followed by an impact on an essentially unyielding surface.[26] This DOESC design strategy results in a much more robust waste form than what is typical in commercial nuclear storage and transportation practice. Regardless, the DOESC's COR will consider the guidance provided by NUREG-2215 and NUREG-2216 since it is providing a level of containment for SNF.

3.4.1 NUREG-2215, Spent Fuel Dry Storage Casks

NUREG-2215 does not require a particular consensus code or standard for construction of storage casks. Historically, the NRC has issued CoCs for storage casks using ASME BPVC Section III, Division 1, Class 1 (Subsection NB, Reactor Pressure Boundary Components) while allowing for alternatives to some provisions of Class 1.

3.4.2 NUREG-2216, Transportation Packages for SNF

While NRC has yet to officially endorse Division 3 for storage casks, NUREG-2216 recommends ASME Codes to govern construction of transportation packages, including Section III, Division 1, Section VIII, Division 1 and Section III, Division 3.

4. Standards and Codes for the DOESC

Considering the industry practice to pursue NRC licensure of storage and transportation packages without ASME certification, the DOESC shall follow this practice while meeting DOE safety requirements (Section 5.1). Explicit construction standards for materials, design, analysis, fabrication, examination, and testing are provided in Section 4.2.

A robust QAP for nuclear applications is needed for DOESC components per 10 CFR 71, Subpart H and 10 CFR 72, Subpart G. ASME's Nuclear Quality Assurance (NQA-1) Certification (separate from the discussed ASME BPVC Certification program) is offered by

ASME to QAPs under organizations that supply items/services that perform safety functions for nuclear facilities. The NRC has endorsed NQA-1, with certain exceptions, for satisfying the requirements of 10 CFR 50, Appendix B, and 10 CFR 71, Subpart H and 10 CFR 72, Subpart G by extension.[27] Therefore, DOESC construction activities shall adhere to the NQA-1 as specified in PDD-13000, "Quality Assurance Program Description" and PLN-6599, "DOE Spent Nuclear Fuel Packaging Demonstration".[1,28]

4.1 Regulatory Requirements

4.1.1 Federal Regulations

- 10 CFR 71, Packaging and Transportation of Radioactive Material
- 10 CFR 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste
- 49 CFR Subchapter C, Hazardous Material Regulations
- 10 CFR 830, Nuclear Safety Management

4.1.2 Department of Energy Directives

- DOE O 414.D, Quality Assurance
- DOE O 420.1C, Facility Safety
- DOE O 460.1D, Hazardous Materials Packaging and Transportation Safety

4.1.3 NRC Regulatory Guides

- NUREG-2215, Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities Final Report
- NUREG-2216, Review Plan for Transportation Packages for Spent Fuel and Radioactive Material

4.2 DOESC Design Codes and Standards

4.2.1 Materials

- ASME BPVC Section III, Division 3, Subsections WB-2000, WC-2000 and WD-2000[29]

4.2.2 Design and Analysis[iii]

- ASME BPVC Section III, Division 3, Subsections WB-3000, WC-3000 and WD-3000 (2015 ed.)[29]
- ASME NQA-1, Nonmandatory Appendix 3A-1[30]

4.2.3 Fabrication, Examination, Inspection, Testing

- ASME BPVC Section III, Division 3, Subsections WB, WC and WD (2015 ed.) [29]
- ASME Section III Code Case N-748[31]
- Level of Rigor for Weld Examination System Qualification: Intermediate Rigor (Limited Performance Demonstration) per ASME BPVC Section V, Article 14[32]

4.2.4 Certification

- No ASME Fabrication Certification required

4.2.5 Inservice Inspection

- Defined per Transportation and/or Storage Container vendor Design Specification in accordance with NUREG-2215, NUREG-2216 and IMC-2690[33]

4.2.6 Fire Protection

- INL STD-139-01, General Fire Protection[4]

4.2.7 Electrical

- INL STD-139-26, Electrical Design[4]

4.3 Construction/Fabrication Alternatives to DOESC Codes, Standards and Criteria

NUREG-2215 and NUREG-2216 recommend establishing alternatives to established codes and standards when requesting licenses or CoCs from the NRC. Proposed alternatives to the codes and standards established in Section 4.2 may be used when authorized by the Used Fuel Management Department Manager.

[iii] Per NUREG-2215 and NUREG-2216, analysis in this context applies to structural, thermal and criticality control analyses of the DOESC as it applies to its containment and confinement safety functions. Additional analysis (e.g., Shielding Evaluation) are not applicable to the DOESC or this COR.

Deviating from Section 4.2 shall demonstrate that[per NUREG-2215[25], 17.4.4, "Design Features" Guidance]:

- The proposed alternatives would provide an acceptable level of quality and safety, or
- Compliance with the specified requirements of Section 4.2 would result in undue performance without a compensating increase in the level of quality and safety.

Any deviations shall be documented as a revision to this COR. Nonconforming SSCs shall be managed per LWP-13830, "Control of Nonconforming Items".[34]

5. Pressure Safety and RPE Stamp Compliance

5.1 DOE Worker Pressure Safety

The majority of DOESC construction activities will occur outside DOE nuclear facilities. However, SNF loading and closure weld activities ("assembly activities") will have to be performed within DOE nuclear facilities per 10 CFR 830, "Nuclear Safety." Once sealed, the DOESC is considered a pressure vessel per LRD-14704[35], LRD-14101[36] and LWP-14105[37], which are the implementing INL documents of 10 CFR 851, "Worker Safety and Health Program." 10 CFR 851 establishes the requirements for worker safety and health at DOE sites such as INL, including pressure safety. However, 10 CFR 851 is not applicable to DOESC assembly activities that affect nuclear safety under 10 CFR 830, per LRD-14101, Appendix B. Per 10 CFR 830, DOESC assembly activities and associated safety basis will be documented in a nuclear facility's Safety Analysis Report (SAR), such as SAR-114, "Safety Analysis Report for the Irradiated Fuel Storage (ISF) Facility"[38]. These activities will not be addressed by 10 CFR 851, Appendix A, Subpart 4, "Pressure Safety."

5.2 Use of Registered Professional Engineer (RPE) Stamp

LWP-10010, "Use of Registered Professional Engineers" identifies when the use of an RPE is required for INL engineering activities.[39] The DOESC will be designed by INL, but likely fabricated by an external vendor and handled/loaded by the Idaho Cleanup Project contractor. The DOESC will be a part of a license application to the NRC for a transportation and/or storage overpack. Ultimately, the DOESC(s) will be disposed of at a geological repository. As a result, the DOESCs could be used by an external agency and/or business entity en route to disposal.

Since INL will be generating engineering deliverables for the DOESC that will be used by an external agency and/or business entity, the use of an RPE is required.

Per the guidance of LWP-10500, "Managing the Configuration of Structures, Systems and Components"[40], INL Form 431.500-1[41] will list all documents that detail the DOESC design that will require an RPE stamp.

6. Definitions

Certificate of Authorization (ASME): A document issued by ASME that authorizes the use of an ASME Certification Mark and appropriate designator for a specified scope of activity (NCA-9000). [42]

Certificate of Compliance (NRC): The certificate issued by the NRC under 10 CFR 71 subpart D, which approves the design of a package for the transportation of radioactive material; or the certificate issued by the NRC that approves the design of a spent fuel storage cask in accordance with 10 CFR 72 subpart L.

Certificate Holders (ASME): An organization holding a Certificate of Authorization or Quality Assurance Program Certificate issued by ASME. This does not include the holder of a Quality System Certificate or Owner's Certificate (NCA-9000). [42]

Certification Mark ("N-stamp"): an ASME symbol identifying a product as meeting Code requirements (NCA-9000). [42]

Certifying Engineer (ASME): an engineer or technically competent professional qualified in accordance with the requirements of Mandatory Appendix XXIII as required by Section III, Subsection NCA (NCA-9000). [42]

Containments/Containment Materials: Items such as containment shells and heads; reinforcement around openings and penetrations such as leak testing and drainage ports, and structural reinforcements required by design to maintain structural integrity [WA-9000].[31]

Construction (ASME): All-inclusive term relating to pressure vessel materials, design, fabrication, examination, inspection, testing, and certification, and overpressure protection. In the context of this COR, overpressure protection is not applicable and not addressed by this COR.

Material Organization (ASME): An organization certified by holding a Quality System Certificate issued by ASME to provide materials or services in accordance with the requirements of Section III (NCA-9000).[42]

Over-canister: A hermetically sealed enclosure typically used to directly contain commercial pressurized water reactor or boiling water reactor fuel assemblies within an NRC-licensed storage cask and/or transportation package. In the context of the Packaging Demonstration and this COR, this enclosure will directly contain DOESC(s).

Overpack: An all-inclusive term for "transportation package" or "storage cask" as used in 10 CFR 71 and 10 CFR 72, respectively. An outer container that works with an over-canister to meet storage requirements (a storage overpack) or transportation regulatory requirements (a transportation overpack).

7. Acronyms

ASME – American Society of Mechanical Engineers

BEA – Battelle Energy Alliance

BPVC – Boiler and Pressure Vessel Code

CFR – Code of Federal Regulations

CoC – Certificate of Compliance

COR – Code of Record

DOE – Department of Energy

DOESC – Department of Energy Standard Canister

IEC – Idaho Environmental Coalition

INL – Idaho National Laboratory

ISF – Idaho Spent Fuel (Facility)

ISFSI – Independent Spent Fuel Storage Installation

ISS – Internal Support Structure

NRC – Nuclear Regulatory Commission

NSNFP – National Spent Nuclear Fuel Program

NUREG – NRC Nuclear Regulatory Reports

QAP – Quality Assurance Program

QSC – Quality System Certificate

RPE – Registered Professional Engineer

RRDS – Road-Ready Dry Storage

SNF – Spent Nuclear Fuel

SSC – Structure, System or Component

8. Ownership

The Used Fuel Management Department Manager is the owner of this COR. The Design Authority and Cognizant System Engineer for the DOESC, or their designees, are responsible for the overall development and maintenance of the COR.

9. References

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