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9. CONDUCT OF OPERATIONS

This chapter describes the organization and general plans for operating the TMI-2 ISFSI. The organization section includes a brief description of the responsibilities of key personnel. The preoperational testing program is described. The training program for the facility staff is described. Procedures that govern routine operations and maintenance and the records developed as a result of those operations are also discussed.

9.1 Organizational Structure

9.1.1 Corporate Organization

The Deputy Manager for Idaho Cleanup Project (DM/ICP), Office of Environmental Management (EM) is authorized to be the license holder for the TMI-2 ISFSI (License SNM-2508). This authority was delegated and responsibility was assigned to the DM/ICP by the Secretary of Energy pursuant to 10 CFR 72.16(b) in a delegation order. As the facility owner and licensee, DOE retains ultimate responsibility for the safe operation of the facility and for compliance with all license conditions.

9.1.2 Corporate Functions, Responsibilities, and Authorities

The DM/ICP Manager is the authorized DOE representative having direct authority and responsibility for compliance with the TMI-2 ISFSI License. The DM/ICP is responsible for overall executive management of the NRC-licensed ISFSIs, has signature authority for the TMI-2 ISFSI license, and is the person ultimately responsible for compliance with the facility's license conditions and overall facility nuclear safety. The DM/ICP shall take any measures needed to ensure acceptable performance of the staff in operating, maintaining, and providing technical support to the facility to ensure nuclear safety and compliant operations. The responsibilities of the personnel reporting directly to the DM/ICP, as depicted in Figure 9.1-1, are described below.

The actual day-to-day execution of programs and operations associated with the NRC-licensed ISFSIs is performed by a contractor. The DM/ICP and staff provide management direction and oversight of contractor performance in accordance with DOE-ID's Quality Assurance (QA) Program and commitments herein.

ISFSI support services are provided by the DOE-ID Office of Nuclear Engineering (NE). The DOE-ID Office of Operations Support (NE) is independent of the facility line management and is responsible for environmental protection, safety, health, quality assurance, and security. This Office provides DOE-ID oversight of the contractor for licensed activities independent of the ICP organization. The DOE-ID Office of Administration Support has responsibility for developing appropriate revisions to the contract.

9.1.2.1 Applicant's In-House Organization

This section contains the description of DOE-ID's organization, as depicted in Figure 9.1-1. The responsibility for DOE-ID's role of providing direction to the contractor for spent fuel management lies with the DM/ICP.

The ICP NRC Licensed Facilities Program (NLFP) Team supports and coordinates directly with the DM/ICP as the license holder on all license activities. The NLFP team is managed administratively by the Assistant Manager for Facility and Material Disposition (AM/FMD). The AM/FMD is a senior line manager charged, among other responsibilities unrelated to the license, with NLFP personnel management and budgetary oversight of NLFP ensuring the availability of an adequate number of trained/certified federal staff and resources to support the management and oversight of license activities.

The NLFP Supervisor is the formal liaison with the DM/ICP (License Holder) on all matters pertaining to the TMI-2 ISFSI License and the contractor's execution of its requirements. The NLFP Supervisor is also accountable to the AM/FMD for funds management and personnel performance. The NLFP Supervisor leads a team of subject matter experts overseeing the NLFP contractor's execution of license requirements. The team consists of a Facility Director as a work lead, a License Manager, a Physical Security Manager and an Information Security Manager, all of whom have direct access to the DM/ICP (License Holder) on issues affecting the safety and surety of TMI-2 ISFSI operations.

The NLFP Supervisor is accountable for the programmatic and operational oversight of the TMI-2 ISFSI, the maintenance of license requirements in the contract (delegated by the DM/ICP), the supervision and mentoring of NLFP Managers, and ensuring the incorporation of an Integrated Safety Management System (ISMS) into the activities. The Supervisor is the primary point of contact between the federal staff and the DM/ICP, the NRC, and the contractor organizations. The NLFP Supervisor provides senior management with independent critical assessments and technical evaluations of licensing activity and program progress. The NLFP Supervisor is the Contracting Officer Representative (COR) Alternate, accountable to the COR for meeting License requirements and maintaining regulatory compliance. The NLFP Supervisor is also tasked with the management of stakeholder interactions at the request and direction of the DM/ICP.

The NLFP Facility Director, as the work lead for the NLFP, reports to the NLFP Supervisor and ensures the day-to-day compliance with safety, quality, regulatory and environmental compliance requirements through a full complement of oversight, on-site inspections and visits, federal support staff coordination, and daily facility and contractor interface. The NLFP Facility Director serves in an *ex officio* capacity on the TMI-2 ISFSI Safety Review Committee. The NLFP Facility Director develops the facility oversight plans, schedules and staffs the surveillances and assessments, and reviews and integrates the results reporting outcomes and trending to the Supervisor in close cooperation with the NLFP License Manager. The NLFP Facility Director ensures that on-the-ground implementation of emergency response plans, physical protection plans, and other management processes are consistent with NLFP plans through close coordination with other

NLFP Managers. As needed, an alternate for the NLFP Facility Director, authorized to act in the NLFP Facility Director's absence, is designated in writing and meets the training and qualification requirements specified below for the NLFP Facility Director.

The NLFP License Manager reports to the NLFP Supervisor and ensures contractor compliance with and overall maintenance of the TMI-2 ISFSI License. The NLFP License Manager coordinates the preparation of required routine, formal and informal program documents, license applications (and amendments) and other communications for the Supervisor's clearance and transmittal to the NRC, and prepares timely responses to NRC requests for the Supervisor. The NLFP License Manager works closely with the NLFP Facility Director, ensuring mutual interpretation and application of license requirements in the field. The NLFP License Manager leads the development and execution of the master oversight program for the entire team ensuring timely execution and documentation of oversight activities by all staff.

The NLFP Physical Security Manager reports to the NLFP Supervisor and provides physical security oversight and management of the contractor for maintenance of security plans and requirements, working with both the NLFP contractor and the DOE's Idaho Site contractors to ensure continuity of operations. As the lead for emergency management, the Physical Security Manager is responsible for the oversight of design, development, execution, and assessment of surveys, drills, exercises and events related to security and emergency management.

The NLFP Information Security Manager reports to the NLFP Supervisor and, as the Classification Officer for the NLFP, ensures all information developed, used, and/or transmitted by the federal and contractor staff is appropriately managed. The Information Security Manager serves as the communications technology requirements point-of-contact and subject matter expert for federal and contractor personnel. The NLFP Information Security Manager serves as the lead for all training from the NLFP team.

The responsibility for oversight of the contractor's Quality Assurance (QA) Program for the NRC-licensed ISFSIs as well as the DOE-ID QA oversight program of the ISFSI operations is delegated through the DOE-ID Deputy Manager for Operations Support to the DOE-ID Director, Quality and Safety Division, and from there, to the Supervisor, QA Program, who serves as the NLFP QA Manager. The roles and responsibilities of the NLFP QA Manager are further described in Chapter 11 of this SAR. As with the NLFP Team, the NLFP QA Manager has direct access to the DM/ICP on issues related to the safety and surety of ISFSI operations.

9.1.2.2 Interrelationships with Contractors and Suppliers

The DOE utilizes a contractor for the TMI-2 ISFSI activities. The authority for the management and operation of the facility is contractually delegated and the responsibility for compliance with license requirements and applicable regulations is contractually assigned to the contractor. To exercise DOE's ultimate responsibility, DOE will: (1) retain responsibility for and perform independent audits of the contractor's

TMI-2 ISFSI QA Program (both the achievement of quality by contractor management and the verification of quality by contractor QA personnel), (2) ensure the license requirements for the facility are included in the contract, (3) assess the performance of the contractor against the terms of the contract, (4) retain the responsibility to budget funds necessary and sufficient to safely operate the facility, and (5) retain the authority to revise the contract in the event contract deficiencies are found relative to proper implementation of license requirements.

The key relationships between the NLFP Team, NLFP QA Manager, and the contractor are also depicted in Figure 9.1-1.

9.1.2.2.1 ISFSI Oversight Program

The NLFP Facility Director is the day-to-day management DOE-ID employee responsible for the compliance of TMI-2 ISFSI operations. The NLFP Facility Director shall verify or audit the TMI-2 ISFSI for compliance with regulatory requirements and license basis commitments and apprise DOE-ID management of TMI-2 ISFSI status based on observations.

The NLFP Facility Director or alternate shall perform surveillances of the contractor's ALARA Committee and the ISFSI Safety Review Committee and shall be an ex officio member (and is a quorum requirement) of these committees when they meet to review ISFSI matters to ensure these committees' functions are satisfactory and to report to DOE-ID management as needed. (See Section 9.1.3.1.1 for the duties of the ISFSI Safety Review Committee.)

The NLFP Facility Director or alternate shall review the results of management assessments performed for the following contractors' programs: training, security, emergency, quality assurance, and radiation protection.

The NLFP Facility Director or alternate shall review and concur with all of the following:

- All 72.48 evaluations and TS Basis evaluations (TS 5.5.1) for the TMI-2 ISFSI
- 10 CFR 72.44(e) – Physical Protection Plan evaluations, 10 CFR 72.44(f) – Emergency Plan evaluations, and evaluations of changes to DOE-ID's other essential programs (TS 5.5.2)
- Changes to TS Bases
- All changes to the SAR
- 10 CFR 72.70 SAR update
- Nuclear Material Status Reports (submitted electronically)
- Annual environmental report
- Other reports which may be submitted to NRC in response to conditions or events which are not submitted by the DM/ICP.

9.1.2.3 Applicant's Technical Staff

The DOE Idaho Operations Office has a technical staff representing several areas of expertise with the wide variety of projects and activities at the INL. This staff is available to assist the management and oversight of the DOE activities at the TMI-2 ISFSI. Staff assigned to assist the management and oversight in the areas of security, radiation protection, emergency preparedness, and QA are trained and qualified in accordance with Licensing Management Procedures, or perform work directly under the supervision of the NLFP Team.

9.1.3 Operating Organization, Management, and Administrative Control System

The operating organization, line management, and administrative control systems are provided by DOE's contractor personnel. The DOE and its contractor commit to provide the NRC with ready access to the TMI-2 ISFSI, personnel, and records that NRC considers necessary to carry out its responsibilities.

DOE-ID (EM) has assigned responsibility and delegated authority for the management and operation of the facility to the contractor. DOE-ID policy requirements for operating the TMI-2 ISFSI are assigned to the contractor through the contract. Specifically, the contract requires the contractor to manage and operate the TMI-2 ISFSI in compliance with all applicable:

- Human health and safety regulations,
- Environmental regulations,
- NRC regulations and license conditions, and
- Quality assurance requirements.

DOE-ID (EM) commits to providing a contractor with management and staff for routine operation and maintenance of the TMI-2 ISFSI and support organizations to implement DOE's program commitments in QA, security, training, radiological protection, environmental monitoring, and spent fuel accountability.

9.1.3.1 Onsite Organization

The contractor corporate structure provides the necessary organizations for managing and operating the TMI-2 ISFSI. The following organizational descriptions document the organizations necessary to manage the TMI-2 ISFSI.

The contractor's Chief Executive Officer (CEO) is responsible for overall management of contractor activities and is accountable for complying with the contract conditions. The contractor CEO delegates authorities for daily management to the Program Manager. Authorities are delegated and resources are provided to manage the TMI-2 ISFSI in the areas of emergency preparedness, engineering, environmental management, operations, maintenance, QA, radiological control, safety and health, security, training, and transportation. In addition to the interfaces shown on Figure 9.1-1, personnel assigned to the above functions maintain interfaces with their functional counterparts at DOE-ID.

The TMI-2 ISFSI Manager reports to the ISFSI Program Manager. Support staff for essential positions within the contractor's NRC Licensed Facilities organization report to the General Services Manager for services (e.g., Engineering, Document

Control, Records Management, Training, Licensing, etc.) provided for the TMI-2 ISFSI. The ISFSI Program Manager also reports to the DOE-ID NLFP Facility Director. This interface is the primary operations interface between DOE-ID (EM) and its contractor for the TMI-2 ISFSI.

The contractor's QA Manager assigned to the TMI-2 ISFSI reports to a level equal to or above the reporting level of the ISFSI Program Manager. The QA Manager assigned to the TMI-2 ISFSI also interfaces with the DOE-ID ISFSI QA Manager who is responsible for the TMI-2 ISFSI QA Program (see Chapter 11).

9.1.3.1.1 ISFSI Safety Review Committee

Reporting to and chartered by the contractor's CEO is the ISFSI Safety Review Committee. This committee is comprised of senior technical personnel and management personnel with extensive nuclear experience in various areas.

The purpose of this committee is to evaluate the performance of staff level safety review committees, to review performance indicators (such as audit findings, reportable events and conditions, Technical Specification violations); to review 10 CFR 72.48 evaluations (and associated procedure or design changes); to review changes to the Technical Specification Bases, SAR, Emergency Response Plan, and Physical Protection Plan; to approve license amendment requests; and to review preparations for major changes in operation (such as removing fuel from the ISFSI). The ISFSI Safety Review Committee shall also perform special reviews at the direction of the DOE-ID NLFP Facility Director.

Core members, appointed in writing by the chartering senior executive, provide the needed technical expertise in engineering, radiological safety, criticality safety, nuclear facility operations, and nuclear quality assurance; their technical qualifications are described in section 9.1.4.1 below. Other members may be appointed as considered appropriate by the chartering senior executive.

A quorum shall include 3 core members, the technical disciplines appropriate for the matters under review, and the DOE-ID NLFP Facility Director. The DOE-ID NLFP Facility Director is informed of all appointments to the Safety Review Committee.

9.1.3.2 Personnel Functions, Responsibilities, and Authorities

The daily management of the ISFSI operation is provided by the TMI-2 ISFSI Manager. The TMI-2 ISFSI Manager reports to the ISFSI Program Manager. Assuring requirements are satisfied in the operation of the ISFSI is the responsibility of the TMI-2 ISFSI Manager.

Personnel assigned to TMI-2 ISFSI operations report to the TMI-2 ISFSI Manager. Other personnel from the INL that may be assigned to work at the ISFSI will report to the TMI-2 ISFSI Manager while at the ISFSI site. The TMI-2

ISFSI Manager is responsible for maintaining the Operations log. This log will be used to note the performance of all significant on-site activities and conditions.

TMI-2 staff-level committees include an ALARA Committee and staff level safety review committee(s) or board(s) responsible to review changes to license basis documents and any associated evaluations.

9.1.4 Personnel Qualification Requirements

The following DOE-ID positions require minimum qualifications and training for the management and oversight of the TMI-2 ISFSI:

- NLFP QA Manager
- NLFP Facility Director and designated alternate.

The following contractor positions require minimum qualifications and training for the operation of the TMI-2 ISFSI:

- ISFSI Safety Review Committee members
- ISFSI Program Manager
- TMI-2 ISFSI Manager and designated alternate
- TMI-2 Facility Safety Officer and designated alternate
- Certified ISFSI Operator
- QA Manager

9.1.4.1 Minimum Qualification Requirements

In all of the positions below where an academic degree is required, the requirement for a degree may be replaced with an additional five years' experience in the technical area (but not necessarily at supervisory level) specified for that position (for a total of ten years' experience).

The DOE-ID NLFP QA Manager shall have a minimum of a Baccalaureate degree in an engineering or physical science field and five years' experience in nuclear QA and certification as lead auditor. The minimum training for this position shall include 72.48 process, QA program indoctrination, NRC requirements, and the TMI-2 ISFSI License Basis (consisting of the identification of and orientation to the license and design basis documents).

The DOE-ID NLFP Facility Director shall have a minimum of a Baccalaureate degree in an engineering or physical science field and five years' experience in nuclear facility operations. The minimum training for this position shall include 72.48 process, QA Program indoctrination, Technical Specifications, NRC requirements, and the TMI-2 ISFSI License Basis. The designated alternate for the NLFP Facility Director shall meet the same minimum qualifications and training requirements.

The Chair, Members, and Alternates of the ISFSI Safety Review Committee (SRC) shall have a minimum of a Baccalaureate degree in an engineering or physical science field and five years' experience in one or more of the following technical areas at nuclear facilities:

- Radiological Safety
- Nuclear Safety (with at least two years' experience in criticality safety analysis)
- Nuclear Facility Operations
- Nuclear QA
- Engineering

The minimum training for the Chair, Members, and Alternates of the ISFSI SRC shall include the 72.48 process, QA program indoctrination, Technical Specifications, NRC requirements, and the TMI-2 ISFSI License Basis.

The ISFSI Program Manager shall have a minimum of a Baccalaureate degree in an engineering or physical science field and five years' supervisory experience in nuclear facility operations. No minimum training requirements are associated with this position.

The TMI-2 ISFSI Manager shall have a minimum of a Baccalaureate degree in an engineering or physical science field and five years' supervisory experience in nuclear facility operations or equivalent for education and experience as approved by the ISFSI Program Manager, and written concurrence from the NLFP Facility Director. The minimum training for this position shall include 72.48 process, TMI-2 ISFSI License Basis, Radiation Worker, Emergency Response, and TMI-2 Facility Qualification training. The designated alternate for the TMI-2 ISFSI Manager shall meet the same minimum qualifications and training requirements.

The TMI-2 Facility Safety Officer shall have a minimum of a Baccalaureate degree in an engineering or physical science field and five years' supervisory experience in radiation protection for nuclear facility operations. The minimum training for this position shall include the ISFSI Radiation Protection Program. The designated alternate for the TMI-2 Facility Safety Officer shall meet the same minimum qualifications and training requirements.

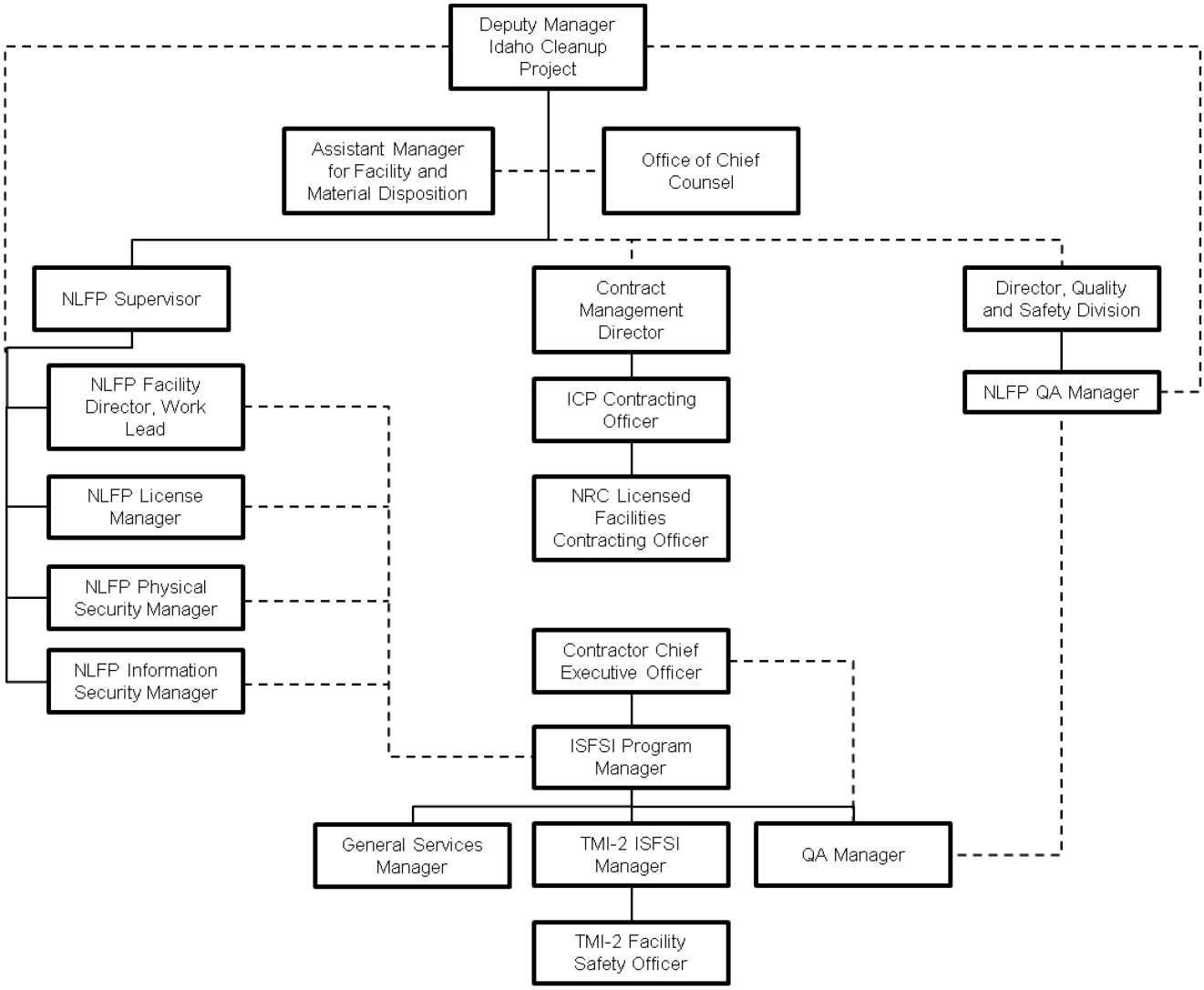
The minimum qualifications for the position of Certified ISFSI Operators are successful completion of the biennial medical examination and training and certification in accordance with the requirements in section 9.3.

The minimum qualifications for the QA Manager assigned to the TMI-2 ISFSI are a Baccalaureate degree in an engineering or physical science field and five years' experience in nuclear operations QA. No minimum training requirements are associated with this position.

9.1.4.2 Qualifications of Personnel

The resumes or other appropriate documentation of personnel occupying the positions listed in section 9.1.4.1 will be kept on file to demonstrate compliance with the minimum requirements described in section 9.1.4.1.

Figure 9.1-1. TMI-2 ISFSI Organization



9.1.5 Liaison with Outside Organizations

Despite the fact that the TMI-2 ISFSI is a DOE-owned facility located on the INL with several other DOE-owned facilities and DOE-managed programs, the external regulation of the TMI-2 ISFSI by the NRC sets this facility apart in some respects. The INL is a large, remotely located site and has its own large security police force, a fire department, medical staff, emergency response teams, and full-time INTEC shift plant supervision. Thus, the INL infrastructure will be considered to serve equivalent functions as independent local agencies (similar to local city or county) do for typical commercial licensed sites.

9.2 Preoperational Testing and Operation

Prior to loading the ISFSI with the TMI-2 canisters, a series of preoperational, startup and performance tests will be developed and implemented. The tests will include functional tests of the in-plant operations, the on-site transport operations, and DSC insertion and retrieval (operations at the ISFSI). These tests are intended to verify that the storage system components (e.g., DSC, HSM, transfer cask, transfer equipment, etc.) operate safely and effectively.

9.2.1 Administrative Procedures for Conducting Test Programs

Test procedures will be developed as part of the spent fuel storage system. Approval of procedures, performance of tests, evaluation of test results, and incorporation of any needed system modifications or procedure changes (based on the results of the tests) will be performed by the contractor using administrative controls existing at the INL.

9.2.2 Test Program Description

The testing program to be conducted utilizes a DSC loaded with mock-up fuel, the transfer cask and associated transfer equipment, and an HSM. The tests will simulate, as nearly as possible, the actual operations involved in preparing a DSC for storage and ensure that they can be performed safely during actual emplacement of TMI-2 core debris in the ISFSI. Verification of ALARA practices, which are not completely achievable during dry runs, will take place during the initial fuel loading. Guidelines for such tests are provided in the following paragraphs.

1. An actual DSC will be utilized for preoperational testing. The DSC will be loaded into the transfer cask to verify fit and adequacy of the cask/DSC annulus seal. Additionally, the DSC may be used in operational testing of the transfer equipment and HSM.

2. Functional testing is to be performed with the transfer cask and lifting devices. These tests are to ensure that the transfer cask can be safely lifted from the trailer, to the upending skid, to the cask work area.

3. The transfer cask will be placed on the transport trailer, which will then be transported to the ISFSI along a predetermined route and aligned with an HSM. Compatibility of the transport trailer with the transfer cask, verification of the transfer route to the ISFSI, and maneuverability within the confines of the ISFSI will be verified.

4. The transfer trailer will be aligned and docked with the HSM. The hydraulic ram will be functionally tested and then used to insert a DSC loaded with test weights into the HSM, and then retrieve it. A weighted DSC will also be loaded into and retrieved from the HSM with the DSC overpack. This testing will be completed after initiation of the loading operations, but prior to the shutdown of the TAN Hot Shop. Until such time, the TAN Hot Shop will be used for recovery of a challenged DSC. Transfer of the DSC to the HSM should verify that the support skid positioning system and the hydraulic ram system operate safely for both insertion and retrieval of a DSC.

In addition, since a vented system is proposed to address concerns over radiolysis in the TMI-2 canisters, monitoring will be performed at three phases of the loading and storage campaign. First, a representative sample of canisters will be monitored in their current storage location in the TAN pool for generation of off-gases. Second, a sample of actual TMI-2 core debris will be dried and tested for potential release of fissile material. This will aid in the design of the canister dewatering and drying system. Third, each individual DSC (containing up to 12 TMI-2 canisters) will be monitored during storage at the ISFSI for internal build-up of hydrogen and radiological releases in accordance with the corresponding Technical Specifications.

The HEPA filter design for the DSCs will also be tested prior to operation of the ISFSI. This testing will be done in accordance with typical industry testing and acceptance methods for HEPA filters.

9.2.3 Test Discussion

Implementation of the test program is discussed in the paragraphs which follow.

1. The purpose of the preoperational tests is to ensure that a DSC can be properly and safely placed in the TAN hot cell, loaded with TMI-2 fuel, transported to the ISFSI, inserted in the HSM, and retrieved from the HSM. Proper operation of the DSC, transfer cask, and transfer equipment, as well as the associated auxiliary equipment (e.g., automatic welding equipment and vacuum drying system), provides such assurance.

   The purpose of the TMI-2 canister demonstration test program is to ensure that the TMI-2 canisters can be properly and safely dried and stored in the ISFSI.

2. Detailed procedures will be developed and implemented by contractor personnel who are responsible for ensuring that the test requirements are satisfied.

3. The expected results of the preoperational tests are the successful completion of the following: placement of a DSC into the transfer cask, loading of the DSC with TMI-2 canisters, transporting the transfer cask loaded with a DSC and test weights to the ISFSI, and transfer of a DSC to/from the HSM. The tests are deemed successful if the expected results are achieved safely and without damage to any of the components or associated equipment. The expected results of the TMI-2 canister demonstration test program are the successful completion of canister drying and successful ongoing DSC vent performance.

4. Should any equipment or components require modification in order to achieve the expected results, it will be retested to confirm that the modification is adequate. Should any preoperational procedures change in order to achieve the expected results, the changes will be incorporated into the appropriate operating procedures.

5. INTEC operations are not affected by testing of the ISFSI. Testing operations can generally be conducted concurrently with plant operation. All normal prerequisites for safe handling of components will be satisfied, and normal safety and radiological practices will be employed.

9.3 Training Program

This section of the SAR comprises DOE's TMI-2 ISFSI Training Program and is submitted pursuant to Subpart I of 10 CFR Part 72. The requirements of this TMI-2 ISFSI Training Program are implemented by contractor procedures providing for the administration of training programs. A management assessment of the contractor's implementation of this training program shall be performed biennially. Changes which do not decrease the effectiveness of this program will be documented with biennial SAR updates.

The objective of this TMI-2 ISFSI Training Program is to use a systematic approach to training to provide competent contractor personnel to perform all functions related to the operation of the TMI-2 ISFSI. The application of the systematic approach to training will use a graded approach, with the training of Certified ISFSI Operators subject to the most rigorous application.

This training program ensures that qualified individuals will be available to perform planned and unplanned tasks while protecting the health and safety of plant personnel and the public. DOE, through its contractor, commits to maintain additional training to support the emergency plan, physical protection plan, quality assurance plan, and administrative and safety requirements, as required. Procedures and lesson plans used to implement this training program will be developed and maintained by the contractor.

9.3.1 Administration

The Training Supervisor is responsible for the administration of training programs and for maintaining up-to-date records on the status of contractor trained personnel, training of new employees, and refresher or upgrade training of present personnel.

The TMI-2 ISFSI Manager is responsible for ensuring that training requirements are specified for personnel assigned to support the TMI-2 ISFSI. In this role, the ISFSI Manager or designee will approve all TMI-2 specific lesson plans.

The TMI-2 ISFSI Manager is responsible for ensuring that training requirements have been satisfied for personnel assigned to the TMI-2 ISFSI.

9.3.2 Records

The following records on the status of trained personnel will be maintained for a minimum of five years in accordance with Section 9.4.2 below:

- Results of each Certified ISFSI Operator’s biennial medical examination.
- The completed records of certification.

9.3.3 Instructor Qualifications and Development

The contractor shall provide for and document the qualification and training of Training Staff.

9.3.4 Development of Training Material

The contractor shall maintain procedures providing for the analysis of jobs, design of initial and continuing training, development of instructional material, implementation (conduct of training), and evaluation (examinations, boards, performance demonstration, etc.) The development of training material shall be performed by qualified and trained staff. The contractor shall maintain all training materials, both academic lesson plans and On-the-Job training (OJT) guides, developed in accordance with this training program.

9.3.5 Training Improvement

The contractor shall provide for and document the evaluation of training programs in order to ensure the continued improvement of training material and the conduct of training.

9.3.6 Waivers of Training Requirements

Applications for waivers of training requirements shall be approved by the TMI-2 ISFSI Manager. Successful completion of equivalent training programs may be used as a basis for waiver from academic training requirements. This training should be comparable in content, performance criteria, and duration. Any information used in the evaluation for a waiver should be verified. Previous work experience may be used as a basis for waiver from OJT requirements.

9.3.7 Frequency of Training

Training requirements must be completed within the period specified in the sections below for General Employee Training and Certified ISFSI Operator Training; however, a grace period of 25% is allowed. Not completing the retraining requirements within the specified frequency will require completion of the initial training course in order to have qualification reinstated.

9.3.8 General Employee Training

General employee training will be provided to all qualified or certified ISFSI operators and their direct supervision. Topics required for certified operators may be included in the generalized training.

The GET training program is composed of an initial training course and required annual retraining.

A score of <80% on the examination will require a retest. Individuals who write or review lesson plans or tests are excused from taking GET exams.

The GET course shall consist of material dealing with:

- Physical description of the TMI-2 ISFSI (Structural characteristics)
- Heat transfer design characteristics, including engineering principles of passive cooling
- Applicable regulations and standards
- Radiological shielding
- General ISFSI information on access control
- 10 CFR 19.12

The annual retraining for GET will be composed of the topics covered in the initial GET course. Additional topics may be added as needed.

9.3.9 Certified ISFSI Operator Training

Operations such as DSC preparation and handling, fuel loading, transfer cask preparation and handling, and transfer trailer loading are performed under DOE authorization. Procedures and training for these operations are governed by DOE requirements.

The training for Certified ISFSI Operators and supervisor shall provide for initial training and testing of personnel who operate equipment identified as important to safety and will also provide for retraining, proficiency testing, and requalification as required. Certified ISFSI Operators will be actively maintained during transport and HSM loading and unloading operations. During the extended storage period, qualifications will be required for HSM and DSC monitoring activities. During periods when Certified ISFSI Operators are not required, the appropriate lesson plans will be retained as records.

TMI-2 ISFSI equipment and controls that have been identified as important to safety in this SAR and in the license shall be operated by either personnel who have been trained and certified in accordance with this section or who are under the direct visual supervision of a trained, certified individual. Only qualified individuals will operate equipment, machinery, and cranes.

Instructors designated to teach the Certified ISFSI Operator Program shall possess subject matter expertise for a particular subject or topic. Instructors initially qualified will maintain qualifications by instructing classes, and administering or grading examinations and OJT guides, and preparing, reviewing, or revising Certified ISFSI Operator instructional material.

Each individual will be given instructions regarding the hazards and safety precautions applicable to the type of work to be performed, general workplace hazards, and the procedures for protecting themselves from injury. These instructions are normally given during pre-job briefs prior to operations.

The Certified ISFSI Operator Training Program will consist of lesson plans and associated examinations in, but not limited to, the following topics, as applicable to personnel job functions:

A. Fuel Characteristics
   - configuration of TMI-2 Canisters (3 types)
   - contents of TMI-2 Canisters
   - condition of TMI-2 core debris

B. Equipment, Component, and Design Description
   - Dry Shielded Canister (DSC)
   - Horizontal Storage Module (HSM)
   - Transfer Cask (TC)
   - alignment of the cask skid with the HSM
   - assembly of the hydraulic ram system
   - normal and off-normal operation of the hydraulic ram
   - maintenance of the vent and purge system

C. Major Licensed Operations

D. Regulations, Procedures, and Limitations
   - administrative control of Certified ISFSI Operator actions
   - description of events and sequence of operations (ISFSI Overview)
   - Technical Specifications

E. Safety Concepts
   - accident analysis from the TMI-2 ISFSI SAR for off normal operations and accidents
   - confinement barriers/systems
   - criticality prevention

The Certified ISFSI Operator Training Program will include operational training (OJT) involving actual and/or mock control manipulations of the following, as applicable. Manipulations will include Certified ISFSI Operator responses, instrumentation, indications, abnormal situations and corrective measures, prerequisites, and procedures. Actual manipulation and operations are preferred to mock manipulations to the extent practicable based upon equipment availability.

- transfer trailer
- hydraulic ram
- vent and purge system.

Biennial retraining applicable to active and ongoing TMI-2 ISFSI operations will be conducted as necessary for ISFSI operators and supervisory personnel who operate equipment or controls that have been identified as important to safety in this SAR and in the license. Any OJT required for recertification will be repeated biennially. The classroom material and written examinations associated with the OJT will be presented and completed prior to the OJT. Additionally, classroom material will be presented as needed in order to convey pertinent modifications, procedure changes, regulatory changes, or other significant material in a timely manner.

Certification as a TMI-2 ISFSI Certified ISFSI Operator is contingent upon meeting the following criteria: obtaining a score of $\geq$80% on all Certified ISFSI Operator academic examinations; and satisfactory performance of all OJT practical evaluations. A score of < 80% on any certification academic examination will require retesting. A score of < 80% on the retest will constitute

cause for dismissal from the Certified ISFSI Operator or Supervisor Training Program. A score of < 80% on any three initial academic examinations will constitute cause for dismissal from the Certified ISFSI Operator or Supervisor Training Program. Failure to demonstrate satisfactory performance of the OJT practical examinations will require retesting. Failure to demonstrate satisfactory performance of a second OJT practical examination will constitute cause for dismissal from the Certified ISFSI Operator Training Program.

The evaluation criterion for initial certification of Certified ISFSI Operators shall not be waived; nor shall the evaluation criterion be waived for two or greater consecutive recertification cycles.

The physical condition and general health of certified personnel will be verified by physical examination before initial certification and biennially thereafter. These physical examinations consider conditions which might cause impaired judgement or motor coordination. In addition, if an employee's behavior or condition creates a hazard to health or safety, then stop work may be imposed.

9.3.10 Technical Support Positions

Training for the applicable support positions will include the administrative and management controls associated with ensuring compliance with the TMI-2 ISFSI license conditions.

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9.4 Normal Operations

The ISFSI provides for independent storage of TMI-2 core debris separate from the existing INL facilities. With the exception of some limited physical monitoring, maintenance of the DSC vent systems, and security systems, the ISFSI functions as a passive system once the TMI-2 core debris has been placed in dry storage. Placement of TMI-2 core debris in the ISFSI requires specific procedures that are separate from those of normal operations.

9.4.1 Procedures

Detailed written procedures will be developed and maintained for the applicable ISFSI operations, maintenance, surveillance, and testing and are described in Sections 5.1.1 and 5.1.2. Procedure changes in Section 5.1.1 are subject to DOE Unreviewed Safety Question analysis as they are conducted under the parameters and cognizance of the TAN SAR under DOE regulation. However, any procedure changes that could have an impact or bearing on the design basis or the safety basis of TMI ISFSI components, performance specifications, or requirements in the TMI SAR or Technical Specifications shall also be subject to 10 CFR 72.48. Such applicable activities will be clearly denoted in the Section 5.1.1 procedures. The procedures listed in Section 5.1.2 shall be subject to 10 CFR 72.48. All TMI ISFSI procedures will be developed, reviewed, revised, approved, and controlled by the contractor in accordance with approved administrative procedures.

The format and content of written procedures include:

- Introduction (includes purpose and scope)
- precautions and limitations
- prerequisites
- instructions (sequence, forms to be completed, acceptable conditions, actions if conditions aren't acceptable, approvals)
- records

Maintenance of the written procedures shall be in accordance with Sections 11.5 and 11.6 as implemented by established contractor procedures. The contractor document control system provides written requirements for review, approval, revision, and controlled distribution of the written procedures.

9.4.2 Records

The following TMI-2 ISFSI records will be maintained:

- QA records relating to design, construction, testing, surveillance, operation, and maintenance of the ISFSI
- Decommissioning records
  (1) Records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site

  (2) As-built drawings and modifications of structures and equipment in restricted or inaccessible areas

  (3) A list contained in a single document of all areas designated and formerly

designated as restricted areas and all areas outside of restricted areas that require documentation due to spread of contamination

(4) Records of the cost estimate performed for decommissioning

- Security records
  (1) Records of changes to the Physical Protection Plan made without prior NRC approval

  (2) The Physical Protection Plan and the Safeguards Contingency Matrix

  (3) Other security records as specified in the Physical Protection Plan

- Training records as specified in the TMI-2 ISFSI Training Plan (Section 9.3.2)
- Changes, Tests and Experiments made without prior NRC approval, including the safety evaluations
- Spent fuel material records, including current inventory and material control and accountability procedures
- Emergency preparedness records as specified in the TMI-2 ISFSI Emergency Response Plan
- ISFSI Safety Review Committee records
- Records required by the operating, maintenance, and testing procedures described in Section 9.4.1.

9.5 Emergency Planning

The TMI-2 ISFSI Emergency Planning requirements are maintained in the TMI-2 ISFSI Emergency Response Plan (ERP). The ERP does not cover detailed security related planning for the ISFSI. These events are accounted for in the TMI-2 ISFSI Physical Protection Plan.

The TMI-2 ISFSI ERP describes the overall process developed to respond to and mitigate any consequences of emergencies that might arise at the TMI-2 ISFSI. The plan incorporates a number of emergency elements, including: (a) demonstrating hazards and credible events that could result in emergency situations; (b) preparing for those situations with a trained emergency response organization; (c) maintaining emergency equipment and facilities; (d) determining protective actions; (e) maintaining standards and techniques for notifications, classification, consequence assessment, reentry, medical support, and program administration; (f) providing timely and accurate public information; and (g) identifying the diverse elements involved in recovery and reentry.

All emergency assistance off site with respect to the TMI-2 ISFSI is obtained from DOE-ID and contractor personnel at the INL. There are no credible accidents at the TMI-2 ISFSI which would require emergency assistance off site with respect to the INL site boundary.

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9.6 Decommissioning Plan

The Conceptual Plan for Decommissioning the TMI-2 ISFSI is included as an enclosure to the TMI-2 ISFSI License Application. This decommissioning plan describes the proposed program (approaches, elements, and cost estimates) for decommissioning the TMI-2 ISFSI.

9.6.1 Decommissioning Program

The tentative selection of decommissioning alternatives is based on providing decontamination and removal of radioactivity from the site and leaving the basemat intact for unlimited use. DECON is the preferred decommissioning alternative. The program includes preparation (engineering and planning, filing a decommissioning plan with the NRC, and site preparation), decommissioning operations and license termination, and site restoration. The program is described in more detail in the Conceptual Plan for Decommissioning the TMI-2 ISFSI.

Near the end of operations at the TMI-2 ISFSI, a decommissioning plan will be developed to provide specific details of decommissioning based on the technologies that exist at that time. The DOE expects to develop decommissioning and decontamination technologies during the ISFSI license period and will select and define the appropriate approaches at the time of decommissioning.

9.6.2 Cost of Decommissioning

The Conceptual Plan for Decommissioning the TMI-2 ISFSI contains cost estimates for decommissioning the TMI-2 ISFSI. The DOE Office of Environmental Management has included the TMI-2 ISFSI decommissioning program in its overall cost estimate for the Environmental Management Program at the INL. DOE will request appropriate funding from Congress at the time of decommissioning.

9.6.3 Decommissioning Facilitation

Decommissioning of a NUHOMS® ISFSI can be performed in a manner consistent with that for decommissioning other INL facilities. The NUHOMS® 12T DSCs can be retrieved from the HSMs and transferred to an on-site facility where the TMI-2 canisters will be unloaded and placed in a 10 CFR Part 71 licensed transportation cask for shipment off-site to a federal facility.

All components of the NUHOMS® system are manufactured of materials similar to those found at existing plants (e.g., reinforced concrete, carbon steel, and stainless steel). These components can, therefore, be decommissioned by the same methods in place to handle those materials at the INL. Any of the components that may be contaminated can be cleaned and/or disposed of using the decommissioning technologies available at the time of decommissioning.

The NUHOMS® system is a dry containment system that effectively confines all contamination within the DSC. When the DSC is removed from the HSM, the freestanding HSM can be manually decontaminated for any radioactive material, dismantled, and removed from the site. It is possible that a thin layer of material comprising the inner wall of the HSM could become activated by the neutron flux

after an extended period of time. The specific activity of the HSM inner wall surfaces may be measured at the time of decommissioning and compared with the existing guidelines to determine whether the values are below those acceptable for free release. Disposal procedures can be developed which comply with existing requirements at the time of decommissioning.

The NUHOMS® DSCs are manufactured from carbon and stainless-steel material which can be decontaminated. If the activity levels are reduced below the level for free release of the material, the steel could be sold for scrap and shipped off-site. If the activity levels cannot be reduced, the steel material can be disposed of in accordance with requirements existing at the time of decommissioning. Other NUHOMS® components (transfer equipment, vacuum drying equipment, etc.) are expected to be decontaminated and made available for use at other NUHOMS® facilities.

Removal of the TMI-2 canisters from the DSC can be accomplished as described in Chapter 5. The transfer of the TMI-2 canisters from the DSC can be made by use of an existing fuel pool or dry cask transfer in a hot cell.

9.6.4 Recordkeeping for Decommissioning

Records that support decommissioning will be treated as quality assurance records. The Conceptual Plan for Decommissioning the TMI-2 ISFSI identifies the types of records that will be maintained to facilitate the ISFSI decommissioning.

9.7 Physical Protection Program

The purpose of the TMI-2 ISFSI physical protection program is to establish and maintain a physical protection program that has the capabilities for the protection of spent fuel stored in the TMI-2 ISFSI, in accordance with Subpart H, "Physical Protection," of 10 CFR Part 72 and applicable portions of 10 CFR Part 73.

The TMI-2 ISFSI physical protection program is described in the Physical Protection Plan for the TMI-2 ISFSI. This plan includes, as appendices, the TMI-2 ISFSI Security Training and Qualification Plan and the TMI-2 ISFSI Safeguards Contingency Plan.

This Physical Protection Plan for the TMI-2 ISFSI contains Safeguards Information, is controlled and protected in accordance with 10 CFR 73.21 and 10 CFR 2.790, and has been submitted for NRC review under separate cover.

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9.8 Aging Management

To provide reasonable assurance that the structures, systems, and components (SSCs) of the TMI-2 ISFSI will continue to perform their intended functions for the period of extended operation (PEO), DOE-ID performed certain aging management activities (AMAs) in support of the renewal of the ISFSI license. These activities involved performing a scoping evaluation to identify those SSCs that required an aging management review (AMR) and performance of those AMRs. The result of the AMRs determined whether in-scope SSCs required a time-limited aging analysis (TLAA) or an aging management program (AMP) to provide reasonable assurance of functionality through the PEO. The process used to perform these AMAs is described in NUREG-1927, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel" [9.1] and NEI 14-03, "Format, Content, and Implementation Guidance for Dry-Cask Storage Operations-Based Aging Management" [9.2]. DOE-ID's license renewal application (LRA) [9.3] provides additional details, including technical bases for the AMAs at the TMI-2 ISFSI.

The first activity in addressing aging management for an ISFSI is to identify the in-scope SSCs based on safety classification and function, as described in NUREG-1927, Section 2.0. Once the TMI-2 ISFSI SSCs that were in-scope for aging management were identified, an AMR was performed to identify the aging effects and aging mechanisms requiring management for each SSC, as described in Section 3.0 of NUREG-1927, augmented by the information in Section 3 of NEI 14-03.

The first step of the AMR for each SSC was to identify the applicable materials subject to aging, along with their service environments. Then, the aging effects and mechanisms requiring management for each SSC were identified. Lastly, either a TLAA or an AMP was developed for each in-scope SSC. The subsections below describe the performance and results of the scoping evaluation, AMRs, TLAAs, and AMPs applicable to the TMI-2 ISFSI SSCs.

9.8.1 Scoping Evaluation Methodology

The scoping evaluation performed for the TMI-2 ISFSI license renewal followed the guidance in NUREG-1927, Section 2.0. An SSC is in-scope for aging management if it meets either of the following two criteria:

1. The SSC is classified as Important to Safety (ITS).
2. The SSC is classified as Not-Important-To-Safety (NITS) but, according to the design bases, its failure could prevent fulfillment of a function that is ITS.

NUREG-1927, Section 2.4.2.1 also addresses scoping as it relates to fuel assemblies and other contents stored in the dry storage system (DSS). For simplicity, the TMI-2 LRA used Section 2.4.2.1 of NUREG-1927 to identify a third scoping criterion to address spent nuclear fuel (SNF) assemblies and other contents stored in the DSS (i.e., the payload):

3. Payload contents, including the TMI-2 canisters and the TMI-2 core debris, if relied upon in the safety analysis to maintain geometric configuration.

The scoping evaluation was performed in two phases. The first phase of the scoping evaluation was performed at the SSC major component level based on a review of safety classifications and design bases functions described herein, as well as design documents such as drawings. DSS contents were also considered in this phase. A major component was considered in-scope if it met one of the three scoping criteria. The second phase of the scoping evaluation was performed on an SSC subcomponent level using the Updated Final Safety Analysis Report (UFSAR) and design drawings to make a final determination on in-scope SSCs that would require AMRs. SSC subcomponents not meeting one of the three scoping criteria were scoped out for the AMR.

9.8.2 Results of Aging Management Scoping Evaluation – Major Components

The results of the first phase of the scoping evaluation are shown in Table 9.8-1, which shows both in-scope and out-of-scope major components and DSS contents.

The major in-scope components for aging management and the scoping criterion met are as follows:

- The Dry Shielded Canisters (DSCs) – Criterion 1
- The Horizontal Storage Modules (HSMs), except HSM-15 – Criterion 1
- The Transfer Cask (TC) – Criterion 1
- The ISFSI Basemat and Approach Slab – Criterion 2
- The TMI-2 Canisters – Criterion 3.

9.8.2.1 Dry Shielded Canister (DSC)

The DSC is scoped in as a major component because it performs or supports the following intended functions throughout the PEO:

- Confinement
- Radiation shielding
- Heat-removal capability
- Structural integrity
- Retrievability.

Detailed descriptions of the specific design functions performed by the DSC in the above areas may be found in Sections 3.1 through 3.4 of this UFSAR (Section 3.4.1, in particular) and Chapter 8.

9.8.2.2 Horizontal Storage Module (HSM)

The HSM is scoped in as a major component because it performs or supports the following intended functions throughout the PEO:

- Radiation shielding
- Heat-removal capability
- Structural integrity
- Retrievability.

Detailed descriptions of the specific design functions performed by the HSM in the above areas may be found in Sections 3.1 through 3.4 of this UFSAR (Section 3.4.2, in particular) and Chapter 8.

9.8.2.3 Transfer Cask (TC)

The TC is scoped in as a major component because it is classified as an ITS component and supports retrieval of the DSC from the HSM. The TC is not used during normal storage operations and has no other storage intended function, besides retrievability throughout the PEO. However, it is used for both structural support (protecting the DSC) and radiation shielding during transfer operations.

Detailed descriptions of the specific design functions performed by the TC may be found in Sections 3.1 through 3.4 of this UFSAR (Section 3.4.4, in particular), Chapter 5, and Appendix E.

9.8.2.4 ISFSI Basemat and Approach Slabs

The ISFSI basemat and approach slabs are scoped in because they support retrievability of the DSC from the HSM. Detailed descriptions of the specific design functions performed by the ISFSI basemat and approach slabs may be found in Section 3.4.3 of this UFSAR.

9.8.2.5 TMI-2 Canister

The TMI-2 Canister is scoped in because it performs or supports the following intended functions throughout the PEO:

- Shielding
- Criticality prevention
- Decay heat removal
- Structural integrity.

Detailed descriptions of the specific design functions performed by the three types of TMI-2 Canisters may be found in Sections 3.1 through 3.4 of this UFSAR (Section 3.1.1, in particular) and Chapter 8.

9.8.3 Results of Aging Management Scoping Evaluation – Subcomponents

In the second phase of the scoping evaluation, the design functions performed or supported by each of the subcomponents of the major components were evaluated. Subcomponent SSCs were scoped in if they performed or supported one or more of the intended functions performed by the associated major component. This phase of the scoping evaluation was primarily conducted from a review of the fabrication drawings and bill of materials.

Table 9.8-2 lists the in-scope subcomponent SSCs for each in-scope major component and the intended function performed or supported by the subcomponent. Subcomponents of in-scope major components not listed in Table 9.8-2 are out of scope for aging management.

9.8.4 Aging Management Reviews – Materials and Environments

9.8.4.1 Materials

The major components and subcomponents of SSCs that are in-scope for aging management are fabricated from the following materials:

- Reinforced concrete
- Carbon steel
- Stainless steel
- Carbon/boron steel
- Alloy steel
- Quenched carbon steel
- Ferritic steel
- Inconel 625
- Boron carbide
- BORAL®
- E70XX weld filler
- Polyurethane plastic
- Elastomeric (neoprene) seal material
- Zinc-rich inorganic coating
- Cementitious grout
- Silicone sealant (Chemical grout)
- Lightweight concrete (LICON).

9.8.4.2 Environments

The ambient environment at the TMI-2 ISFSI is described in detail in Chapter 2. A review of the information presented in Chapter 2 was performed to assess the environmental conditions to which the in-scope SSCs are normally exposed. The environments to which the TMI-2 ISFSI in-scope SSCs are exposed depend on the characteristics of the TMI-2 ISFSI site environment, as well as the SSC location within the DSS.

The environments considered in the AMR are the environments that the TMI-2 ISFSI in-scope SSCs and associated subcomponent SSCs normally experience. Environmental stressors that are conditions not normally experienced (such as extreme heat or cold), or that may be caused by a design or fabrication condition, are considered event driven and are not aging related. Such event-driven situations would be evaluated and corrective actions, if any, implemented at the time of the event.

The HSMs contain the DSCs, which are ventilated to the HSM internal space through HEPA filters. The DSCs contain the TMI-2 Canisters, which are ventilated to the DSC internal space.

The five service environments for the major components of SSCs that are in-scope for aging management include:

1. **Outdoor** – An environment exposed to all local ambient weather conditions at the INL Site, including seasonal and daily temperature and humidity variations, exposure to sunlight, wind, and precipitation. The HSM exterior surfaces, including hardware, access doors, roof bolt protective covers, etc. are exposed to the Outdoor Environment.

2. **Sheltered** – This is a protected ambient environment with no direct exposure to sunlight, wind, or precipitation. The sole source of moisture is natural humidity and small amounts of wind-blown rain entering through the vent holes in the rear access door. Temperature inside the Sheltered Environment is a function of outdoor temperature and, to a lesser extent, any heat produced by the TMI-2 core debris inside the DSCs. The DSC exterior surfaces are exposed to the Sheltered Environment. The Sheltered Environment on the DSC shell exterior surface may range from ambient air temperature to slightly above ambient. SSCs located in the Sheltered Environment are also exposed to neutron and gamma radiation fields. However, sources of heat and radiation inside the DSC will decrease over the PEO due to radioactive decay of the TMI-2 core debris.

3. **Internal DSC** – The Internal DSC Environment is that located within the DSC cylindrical storage cavity. The TMI-2 Canister exterior surfaces, the inside surfaces of the DSC shell and interior shell assembly subcomponents (e.g., inner top and bottom cover plates and top shield plug) are exposed to the Internal DSC Environment. This environment communicates with the Sheltered Environment via a combination of four HEPA filters on the DSC vent port and a single HEPA filter on the DSC purge port. The ventilation and off gas system for the NUHOMS®-12T storage system is completely passive and is designed to allow diffusion of small amounts of hydrogen generated inside the DSC through the HEPA filter vents. This environment experiences neutron and gamma fluence higher than the Sheltered Environment. The environment inside the DSC is nearly ambient since it is vented, and decay heat levels are low.

4. **Internal TMI-2 Canister** - The Internal TMI-2 Canister Environment is that located within the TMI-2 Canister storage cavity. This environment is even more protected from outdoor ambient conditions than either the Sheltered or Internal DSC Environments. The TMI-2 Canister interior structure, the inside surfaces of the TMI-2 Canister shell and interior TMI-2 Canister subcomponents are exposed to the Internal TMI-2 Canister Environment. It is a similar environment to the Internal DSC Environment, except that it is exposed to slightly higher temperatures and higher neutron and gamma fluence.

5. **Embedded or Encased -** This environment applies for materials that are embedded or encased (sealed) inside another material. This includes, but is not limited to, items such as concrete reinforcing bars, anchorages, and shield plugs between the inner and outer DSC cover plates. In addition, it includes the BORAL® neutron poison material enclosed between the inner and outer skin on the TMI-2 Fuel Canister, and Boron Carbide pellets encased in the TMI-2 Knockout and TMI-2 Filter Canister poison rod tubes. Embedded or Encased Environments are exposed to radiation. The heat load source decreases over the PEO.

Tables 9.8-3 through 9.8-5 provide the combinations of materials and environments considered in the AMR for each in-scope subcomponent SSC, except for the TC. See FSAR Section 9.8.5.3 for additional information on aging management of the TC.

9.8.5 Results of Aging Management Reviews

After the materials and environments for in-scope major component and subcomponent SSCs were identified, the potential applicable aging effects and mechanisms requiring management for each were determined. Those aging effects and mechanisms were then reviewed with respect to the materials and service conditions for each subcomponent to determine which required aging management at the TMI-2 ISFSI during the PEO. Then, a determination as to whether a TLAA or other engineering evaluation or alternately an AMP was employed to address or manage the aging effect. The subsections below summarize the results of the AMRs for each major component.

9.8.5.1 Results of AMR – DSC

The potential aging effects and related aging mechanisms that were evaluated in the AMR for the in-scope DSC subcomponent SSCs are:

a) Potential Aging Effect: Loss of material

Associated Potential Aging Mechanisms:
- General corrosion
- Crevice corrosion
- Pitting corrosion
- Galvanic corrosion
- Microbiologically induced corrosion
- Adhesive, abrasive, and erosive wear

b) Potential Aging Effect: Cracking

Associated Potential Aging Mechanisms:
- Stress corrosion cracking
- Thermal fatigue
- Hydrogen damage

c) Potential Aging Effect: Change in material properties

Associated Potential Aging Mechanisms:

- Intergranular corrosion
- Creep
- Thermal aging
- Irradiation embrittlement
- Hydrogen damage

The AMR conducted for the DSC evaluated the likelihood of the above potential aging mechanisms to cause the related potential aging effect for the DSC subcomponent SSCs and determined that the following aging effect and causative aging mechanisms required a TLAA or AMP for the DSC:

Aging Effect: Loss of material

Aging Mechanisms:

- General, crevice, pitting, and galvanic corrosion
- Adhesive wear

In addition, as a defense-in-depth aging management function, the zinc-rich primer on the Sheltered Environment steel SSCs is included to assess loss of coating integrity due to blistering, cracking, flaking, peeling, or physical damage.

See Sections 9.8.6.1 and 9.8.7 for summary descriptions of the TMI-2 ISFSI DSC AMPs and TLAAs, respectively.

9.8.5.2 Results of AMR – HSM

The potential aging effects and related aging mechanisms that were evaluated during the AMR for the in-scope HSM subcomponents are:

a) Potential Aging Effect: Loss of concrete material via spalling or scaling

Associated Potential Aging Mechanisms:

- Freeze-thaw cycles
- Aggressive chemical attack
- Fatigue
- Irradiation
- Reaction with aggregates
- Shrinkage

b) Potential Aging Effect: Concrete cracking

Associated Potential Aging Mechanisms:

- Freeze-thaw cycles
- Aggressive chemical attack
- Fatigue

- Irradiation
- Reaction with aggregates
- Shrinkage
- Elevated temperatures

c) Potential Aging Effect: Reduction of concrete strength and modulus

Associated Potential Aging Mechanisms:
- Irradiation
- Aggressive chemical attack
- Reaction with aggregates
- Leaching of calcium hydroxide
- Elevated temperatures
- Creep

d) Potential Aging Effect: Loss of material of embedded SSCs

Associated Potential Aging Mechanism:
- Corrosion

e) Potential Aging Effect: Increase in concrete porosity and permeability

Associated Potential Aging Mechanism:
- Leaching of calcium hydroxide

f) Potential Aging Effect: Reduction of concrete pH

Associated Potential Aging Mechanisms:
- Aggressive chemical attack
- Leaching of calcium hydroxide

g) Potential Aging Effect: Premature degradation of concrete repair chemical grout fillers and sealants

Associated Potential Aging Mechanism:
- Ultra-violet (UV) exposure
- Irradiation

In addition, as a defense-in-depth aging management function, the silane water repellent coating on the concrete is included to assess for physical damage on the steel coatings and inhibition of moisture penetration on HSM concrete SSCs and rebar corrosion on HSM steel SSCs.

h) Potential Aging Effect: Loss of material in HSM steel SSCs

Associated Potential Aging Mechanisms:
- General corrosion
- Crevice corrosion
- Pitting corrosion

i) Potential Aging Effect: Loss of strength in HSM steel SSCs

Associated Potential Aging Mechanisms:
- Irradiation
- Fatigue

j) Potential Aging Effect: Cracking in HSM steel SSCs

Associated Potential Aging Mechanisms:
- Irradiation
- Fatigue
- Stress corrosion cracking

In addition, as a defense-in-depth aging management function, the zinc-rich primer on the coated steel HSM SSCs is included to assess loss of coating integrity due to blistering, cracking, flaking, peeling, or physical damage.

The AMR conducted for the HSM evaluated the likelihood of the above potential aging mechanisms to cause the related potential aging effect for the HSM SSCs and determined that the following aging effects and aging mechanisms required a TLAA or AMP for the HSM:

a) Aging Effect: Loss of concrete material via spalling or scaling

Associated Aging Mechanisms:
- Freeze-thaw cycles
- Shrinkage

b) Aging Effect: Concrete cracking

Associated Aging Mechanisms:
- Freeze-thaw cycles
- Shrinkage

c) Aging Effect: Reduction of concrete strength and modulus

Associated Aging Mechanism:
- Leaching of calcium hydroxide

d) Aging Effect: Loss of material from embedded SSCs

Associated Aging Mechanism:
- Corrosion

e) Aging Effect: Increase in concrete porosity and permeability

Associated Aging Mechanism:
- Leaching of calcium hydroxide

f) Aging Effect: Reduction of concrete pH

Associated Aging Mechanism:
- Leaching of calcium hydroxide

g) Aging Effect: Premature degradation of concrete repair chemical grout fillers and sealants

Associated Aging Mechanisms:
- Ultra-violet (UV) exposure
- Irradiation

In addition, as a defense-in-depth aging management function, the silane water repellent coating on the concrete is included to assess for physical damage on the steel coatings and inhibition of moisture penetration on HSM concrete SSCs and rebar corrosion on HSM steel SSCs.

h) Aging Effect: Loss of material in HSM steel SSCs

Associated Aging Mechanism:
- General, crevice, and pitting corrosion

In addition, as a defense-in-depth aging management function, the zinc-rich primer on the coated steel HSM SSCs is included to assess loss of coating integrity due to blistering, cracking, flaking, peeling, or physical damage.

See Sections 9.8.6.2 and 9.8.7 for summary descriptions of the TMI-2 ISFSI HSM AMPs and TLAAs, respectively.

9.8.5.3 Results of AMR – TC

The TMI-2 UFSAR describes the use of a TC to move DSCs into and out of the HSMs. Thus, the TC is required to retrieve a DSC and is in-scope for aging management under the renewed TMI-2 ISFSI license. DOE-ID does not possess a TC (either an MP187 or OS197 as authorized by the design basis) associated with the TMI-2 ISFSI license at the INL Site. Because use of an MP187 TC aged over 20 years is prohibited by a TMI-2 ISFSI license

condition, no AMR was performed for the MP187 TC design. The AMR for the OS197 TC design is incorporated by reference (IBR) from the renewal application for Standardized NUHOMS® 10 CFR 72 Certificate of Compliance (CoC) 1004 [0]. Specifically, the following portions of the document "Renewal Application for the Standardized NUHOMS® System, Certificate of Compliance No. 1004, Revision 3," dated September 29, 2016, are IBR into the TMI-2 ISFSI licensing basis:

- Sections 1.2.2.3, 3.3.3, 3.4, 3.4.1, 3.4.2, 3.4.3, 3.7 and Appendices 1A-1K, 2C (pertaining to the OS197 TC); Appendix 2E (Table 2E-3 only); Appendix 3B (pertaining to the OS197 TC); and Appendix 6A (Section 6A.7 only).

DOE-ID will acquire access to an OS197 TC when one is needed at the TMI-2 ISFSI via an important-to-safety purchase order. A determination will be made at that time as to the method of obtaining access, but in all cases, it will be developed under a procurement process using a DOE-ID Quality Assurance program. Suitable procurement documents will specify the design, operating, and maintenance requirements for the TC for use in retrieving the TMI-2 DSCs from the HSM, consistent with applicable license requirements and commitments. Furthermore, if use of the TC used to retrieve the DSC requires the use of TC spacers, the spacers shall have been fabricated less than 20 years prior to their use at the TMI-2 ISFSI. DOE-ID will ensure compliance with these procurement requirements under the DOE-ID Quality Assurance program.

9.8.5.4 Results of AMR – Basemat and Approach Slab

The one aging effect evaluated for the ISFSI basemat and approach slab is differential settlement. Differential settlement can be because of subgrade consolidation or movement of soils upon which the structures are founded. The results of the AMR revealed that the potential aging mechanism that could cause differential settlement is not credible at the TMI-2 ISFSI for the duration of the PEO. Therefore, no TLAA or AMP is required.

9.8.5.5 Results of AMR – TMI-2 Canister

The aging effects and related aging mechanisms that were evaluated during the AMR for the in-scope TMI-2 Canister subcomponent SSCs are:

a) Aging Effect: Loss of material

Associated Aging Mechanisms:

- General corrosion
- Crevice corrosion
- Pitting corrosion
- Galvanic corrosion
- Microbiologically induced corrosion
- Wear

b) Aging Effect: Cracking

Associated Aging Mechanisms:
- Stress corrosion cracking
- Thermal fatigue

c) Aging Effect: Change in Material Properties

Associated Aging Mechanisms:
- Intergranular corrosion
- Creep
- Thermal aging
- Irradiation embrittlement

Each of the above combinations of aging effect and aging mechanism was evaluated to determine the appropriate AMA for each TMI-2 Canister subcomponent SSC. The results of the AMR revealed that there are no credible aging effects requiring management for the TMI-2 Canisters at the TMI-2 ISFSI for the duration of the PEO. Therefore, no TLAAs or AMPs are required.

9.8.6 Aging Management Programs

The AMRs for the DSC and HSM resulted in the need to develop AMPs to manage the aging effects and mechanisms for the subcomponents comprising these major components. No other AMRs of in-scope components resulted in the need for AMPs. The AMPs summarized in the following subsections address the scope of the AMPs, the parameters monitored or inspected, the detection of aging effects, and the acceptance criteria (AC). DOE-ID will develop, implement, and maintain AMP implementing procedures for the duration of the PEO.

9.8.6.1 DSC Aging Management Program

DOE-ID will develop and maintain procedures to implement the DSC subcomponent AMPs shown in Table 9.8-7.

9.8.6.2 HSM Aging Management Program

DOE-ID will develop and maintain procedures to implement the HSM subcomponent AMPs shown in Table 9.8-8.

9.8.6.3 OS197 Transfer Cask Aging Management Program

The OS197 TC AMP was approved as part of the renewal of the Standardized NUHOMS® 10 CFR 72 and is IBR into this FSAR. Table 12.3-5 of Revision 17 to the Standardized NUHOMS® UFSAR [9.5] is repeated as Table 9.8-9. This AMP is supported by additional information also IBR into the TMI-2 ISFSI licensing basis found in Section 6A.7 of Appendix 6 to Revision 3 of the CoC 1004 renewal application [9.4].

A future OS197 TC supplier may choose to provide a new OS197 TC or an OS197 TC aged less than the 20-year TMI-2 ISFSI initial licensing period. Thus, the selected OS197 TC SSCs may, or may not require implementation of the AMP described in Table 9.8-9. Because it is unknown until the time of procurement whether the OS197 TC provided under that procurement will require any aging management activities, if any are required, they will be coordinated with the OS197 TC supplier. As discussed in Section 9.8.5.3, requirements for the supplier to perform all required maintenance, tests, and inspection activities (including AMPs) of the OS197 TC prior to use at the TMI-2 ISFSI will be included in the procurement documents. Further, procedures for operation of the OS197 TC will be developed or revised as appropriate, prior to use by the entity performing DSC transfer operations. Such procedures will comply with all applicable requirements in the TMI-2 ISFSI renewed license, technical specifications, and UFSAR.

9.8.7 Time-Limited Aging Analyses

9.8.7.1 DSC TLAA

A TLAA as documented in Section 8.3.2 evaluates the effects of cyclic thermal loading (fatigue) on the mechanical properties of DSC materials of the TMI-2 ISFSI and remains applicable during the PEO.

9.8.7.2 HSM TLAA

A TLAA as documented in Section 8.1.1.5.D evaluates the effects of irradiation on the mechanical properties of HSM concrete materials of the TMI-2 ISFSI and remains applicable during the PEO.

9.8.7.3 OS197 TC TLAA

The OS197 TC TLAAs approved as part of the renewal of the Standardized NUHOMS® 10 CFR 72 CoC are IBR into this FSAR. These TLAAs are summarized in Appendix 3B to Revision 3 to the Standardized NUHOMS® CoC 1004 renewal application [9.4].

9.8.8 Tollgate Assessments

Industry guidance on the preparation of ISFSI LRAs is contained in NEI 14-03 [9.2]. NEI 14-03 introduces the concept of "tollgates" and "tollgate assessments," and provides specific guidance in Section 3.6.5 and Appendix A of the document. DOE-ID performs tollgate assessments during the PEO of the TMI-2 ISFSI, spanning the period from March 19, 2019 through March 19, 2039, or the date the last licensed material is removed from the ISFSI, whichever occurs sooner.

DOE-ID may choose to integrate the tollgate assessment into existing ISFSI assessment programs, while continuing to meet the underlying intent of the tollgate concept. Tollgate assessments for the TMI-2 ISFSI will be performed as shown in Table 9.8-6.

Table 9.8-1
Results of Component-Level and Contents Scoping Evaluation

TMI-2 ISFSI SSC/Contents	Criterion 1	Criterion 2	Criterion 3	In-Scope
Dry Shielded Canister(1)	Yes	N/A	N/A	Yes
Horizontal Storage Module (except HSM-15)(2)	Yes	N/A	N/A	Yes
Overpack HSM (HSM-15)(3)	No	No	N/A	No
Transfer Cask	Yes	N/A	N/A	Yes
Dry Film Lubricant	No	No	N/A	No
Handling and Transfer Equipment(4)	No	No	N/A	No
ISFSI Basemat and Approach Slab	No	Yes	N/A	Yes
Other Transfer Equipment(5)	No	No	N/A	No
Auxiliary Equipment(6)	No	No	N/A	No
Miscellaneous Equipment(7)	No	No	N/A	No
TMI-2 Core Debris	N/A	N/A	No	No
TMI-2 Canisters(8)	N/A	N/A	Yes	Yes

Notes:

(1) DSC includes (but is not limited to) the DSC shell, top/bottom cover plates, purge and vent block, grapple ring and HEPA filters. (See Section 2.3.2.1 of [9.3])

(2) HSM includes HSM-1 through HSM-30, excluding HSM-15. Subcomponents include (but are not limited to) the HSM reinforced concrete walls, roof, and end shield walls; DSC steel structure support assembly; HSM accessories (DSC seismic retainer, shielded door assemblies and door supports); and associated attachment/installation hardware (tie rods, bolts, nuts, washers, embedment assemblies, mechanical splices) (See Section 2.3.2.2 of [9.3]).

(3) Overpack HSM includes all of HSM-15 and its internal DSC overpack liner (See Section 2.3.3.1 of [9.3]).

(4) Handling and Transfer equipment includes (but is not limited to) cask rigging, cask bottom/top spacers, and TC lifting yoke (See Section 2.3.3.2 of [9.3]).

(5) Other Transfer Equipment includes (but is not limited to) a hydraulic ram system (HRS), a Transfer Trailer, a prime mover for Transfer Trailer towing, cask support skid, auxiliary equipment mounted on the skid and skid positioning system (SPS) (See Section 2.3.3.3 of [9.3]).

(6) Auxiliary Equipment includes, but is not limited to, a vacuum drying system (VDS) and an automated welding system (AWS) (See Section 2.3.3.4 of [9.3]).

(7) Miscellaneous Equipment includes (but is not limited to) ISFSI security fence and gate(s), lighting, lightning protection, communications, monitoring, and alarm systems (See Section 2.3.3.5 of [9.3]).

(8) The three TMI-2 Canister types include the TMI-2 Fuel Canister, TMI-2 Filter Canister, and TMI-2 Knockout Canister (See Section 2.3.2.3 of [9.3]).

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
DRY-SHIELDED CANISTER (DSC)											
219-02-1000	1	DSC BASKET ASSEMBLY	1	SPACER DISC, 1 1/4" PLATE	2	NO	YES	NO	NO	NO	NO
219-02-1000	1	DSC BASKET ASSEMBLY	2	TOP SPACER DISC, 1 1/4" PLATE	2	NO	YES	NO	NO	NO	NO
219-02-1000	1	DSC BASKET ASSEMBLY	3	SUPPORT ROD, Ø 1-1/2" ROD	2	NO	YES	NO	NO	NO	NO
219-02-1000	1	DSC BASKET ASSEMBLY	4	PIPE SLEEVE – LONG, 2.00 NPS SCHEDULE 80	2	NO	YES	NO	NO	NO	NO
219-02-1000	1	DSC BASKET ASSEMBLY	5	PIPE SLEEVE – SHORT, 2.00 NPS SCHEDULE 80	2	NO	YES	NO	NO	NO	NO
219-02-1000	1	DSC BASKET ASSEMBLY	6	END SLEEVE	2	NO	YES	NO	NO	NO	NO
219-02-1001	1	DSC SHELL ASSEMBLY	1	CYLINDRICAL SHELL, 5/8" PLATE	1	YES	YES	NO	YES	YES	YES
219-02-1001	1	DSC SHELL ASSEMBLY	2	OUTER BOTTOM COVER	1	NO	YES	NO	NO	YES	YES
219-02-1001	1	DSC SHELL ASSEMBLY	3	BOTTOM SHIELD PLUG	1	NO	YES	NO	NO	NO	NO
219-02-1001	1	DSC SHELL ASSEMBLY	4	GRAPPLE RING, 1" PLATE	1	NO	NO	NO	NO	NO	YES
219-02-1001	1	DSC SHELL ASSEMBLY	5	GRAPPLE RING SUPPORT, 3/4" PLATE	1	NO	NO	NO	NO	NO	YES
219-02-1001	1	DSC SHELL ASSEMBLY	6	INNER BOTTOM COVER 3/4" PLATE	1	YES	YES	NO	NO	YES	NO
219-02-1002	1	DSC BASKET-SHELL ASSEMBLY	5	SUPPORT RING 3/4" PLATE	1	YES	NO	NO	NO	NO	NO
219-02-1002	1	DSC BASKET-SHELL ASSEMBLY	6	VENT PORT SHIELD BLOCK, 1-3/4" PLATE	1	NO	YES	NO	NO	NO	NO
219-02-1003	1	DSC MAIN ASSEMBLY	2	TOP SHIELD PLUG, PLATE 3 1-1/4" THICK PLATE	1	YES	YES	NO	NO	YES	NO
219-02-1003	1	DSC MAIN ASSEMBLY	3	TOP COVER PLATE	1	YES	YES	NO	NO	YES	NO
219-02-1003	1	DSC MAIN ASSEMBLY	4	PURGE PORT BLOCK	2	NO	YES	NO	NO	NO	NO
219-02-1003	1	DSC MAIN ASSEMBLY	9	TOP SHIELD PLUG PLATE 1 & 2	1	NO	YES	NO	NO	NO	NO
219-02-1010	2	DSC PURGE PORT FILTER ASSEMBLY	1	FILTER HOUSING	1	YES	YES	NO	NO	NO	NO
219-02-1010	2	DSC PURGE PORT FILTER ASSEMBLY	5	HEPA TYPE FILTER W/GASKET	1	YES	NO	NO	NO	NO	NO
219-02-1010	2	DSC PURGE PORT FILTER ASSEMBLY	10	DUAL C-SEALS, EG & G PRESSURE SCIENCE (FILTER HOUSING)	1	YES	NO	NO	NO	NO	NO
219-02-1010	2	DSC PURGE PORT FILTER ASSEMBLY	14	SCREW, CAP SOCKET HD, 1/2 - 13 UNC - 2A X 0.75" LONG	1	YES	NO	NO	NO	NO	NO
219-02-1010	2	DSC PURGE PORT FILTER ASSEMBLY	16	SCREW, CAP SOCKET HD, 1 – 8 UNC – 2A X 3.00" LONG	1	YES	NO	NO	NO	NO	NO
219-02-1010	2	DSC PURGE PORT FILTER ASSEMBLY	20	DUAL C-SEALS, EG&G PRESSURE SCIENCE	1	YES	NO	NO	NO	NO	NO
219-02-1010	2	DSC PURGE PORT FILTER ASSEMBLY	22	LOCK WASHER	1	YES	NO	NO	NO	NO	NO
219-02-1011	2	DSC VENT PORT FILTER ASSEMBLY	1	FILTER HOUSING	1	YES	YES	NO	NO	NO	NO
219-02-1011	2	DSC VENT PORT FILTER ASSEMBLY	5	HEPA TYPE FILTER W/GASKET	1	YES	NO	NO	NO	NO	NO
219-02-1011	2	DSC VENT PORT FILTER ASSEMBLY	10	DUAL C-SEALS, EG & G PRESSURE SCIENCE (FILTER HOUSING)	1	YES	NO	NO	NO	NO	NO
219-02-1011	2	DSC VENT PORT FILTER ASSEMBLY	14	SCREW, CAP SOCKET HD, 1/2 - 13 UNC - 2A X 0.75" LONG	1	YES	NO	NO	NO	NO	NO

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	**Drawing Revision**	**Component**	**Item Num.**	**Item Description**	**Scoping Criterion**	**Confinement**	**Radiation Shielding**	**Sub-Criticality**	**Heat-Removal Capability**	**Structural Integrity**	**Retrievability**
219-02-1011	2	DSC VENT PORT FILTER ASSEMBLY	16	SCREW, CAP SOCKET HD, 1 – 8 UNC – 2A X 3.00" LONG	1	YES	NO	NO	NO	NO	NO
219-02-1011	2	DSC VENT PORT FILTER ASSEMBLY	20	DUAL C-SEALS, EG&G PRESSURE SCIENCE	1	YES	NO	NO	NO	NO	NO
219-02-1011	2	DSC VENT PORT FILTER ASSEMBLY	22	LOCK WASHER	1	YES	NO	NO	NO	NO	NO
Fabrication Specification 219-02-107	1	DSC ASSEMBLY	N/A	WELD FILLER METAL	1	YES	NO	NO	NO	YES	YES
Fabrication Specification 219-02-107	1	DSC ASSEMBLY	N/A	INORGANIC ZINC-RICH COATING	2	NO	NO	NO	NO	YES	NO
HORIZONTAL STORAGE MODULE (HSM)											
219-02-5100	1	HSM ISFSI GENERAL ARRANGEMENT	5100-203	BOLT, 3/4-10 UNC-2A X 2" LONG	1	NO	NO	NO	NO	YES	NO
219-02-5100	1	HSM ISFSI GENERAL ARRANGEMENT	5100-301	NUT, 1 1/8-7 UNC-2B	1	NO	NO	NO	NO	YES	NO
219-02-5100	1	HSM ISFSI GENERAL ARRANGEMENT	5100-305	NUT, 1 1/2-6 UNC-2B	1	NO	NO	NO	NO	YES	NO
219-02-5100	1	HSM ISFSI GENERAL ARRANGEMENT	NOTE 10	GROUT - SHIELD WALL PANELS	1	NO	YES	NO	NO	NO	NO
219-02-5100/ WORK ORDER (WO) 642973	1	HSM ISFSI GENERAL ARRANGEMENT	NOTE 8	LIFTING STRAND LOOP POCKET FILL	2	NO	NO	NO	NO	YES	NO
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	5101-204	BOLT, 3/4 – 10 UNC – 2A X 2-3/4” LONG	1	NO	NO	NO	NO	YES	YES
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	5101-206	BOLT, 3/4 – 10 UNC – 2A X 3-1/4” LONG	1	NO	NO	NO	NO	YES	YES
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	5101-208	BOLT, 1 1/4 – 7 UNC – 2A X 3-1/2” LONG	1	NO	NO	NO	NO	YES	NO
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	5101-210	BOLT, 1-1/4 – 7 UNC – 2A X 4-1/4” LONG	1	NO	NO	NO	NO	YES	NO
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	5101-307	NUT, 1-5/8 –5 ½ UNC–2B	2	NO	NO	NO	NO	YES	NO
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	5101-311	NUT, 1-1/4 –7 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	NOTE 16	GROUT - LIFTING STRAND LOOP POCKET FILL	2	NO	NO	NO	NO	YES	NO
219-02-5101	1	STANDARD MODULE MAIN ASSEMBLY	NOTE 2B	WELD FILLER MATERIAL (CATEGORY B COMPONENTS)	1	NO	NO	NO	NO	YES	YES

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
219-02-5101/ WO 635917	1	STANDARD MODULE MAIN ASSEMBLY	Field Design Changes: FDC 7682, FDC 7715	TMI-2 ISFSI HSM ROOF BOLT PROTECTIVE COVER	2	NO	NO	NO	NO	YES	NO
219-02-5103	1	HSM STANDARD MODULE BASE UNIT	NOTE 5	REINFORCEMENT BARS, OTHER THAN #4	1	NO	NO	NO	NO	YES	NO
219-02-5103	1	HSM STANDARD MODULE BASE UNIT	NOTES 1&14	CONCRETE	1	NO	YES	NO	YES	YES	NO
219-02-5103	1	HSM STANDARD MODULE BASE UNIT	NOTES 8&18	GROUT – MOUNTING HOLES & EMBEDMENT VOIDS	2	NO	NO	NO	NO	YES	NO
219-02-5104	2	HSM ROOF SLAB	NOTE 15	SLOW-RISE POLYURETHANE FOAM FORMULA SPRAY FOAM	2	NO	NO	NO	NO	YES	NO
219-02-5104	2	HSM ROOF SLAB	NOTE 15 / FDC 7715	WATER RESISTANT POLYURETHANE FOAM MATERIAL, 6-1/2" X 6-1/2" X 1/8" THICK (NOT ADHESIVE)	2	NO	NO	NO	NO	YES	NO
219-02-5104	2	HSM ROOF SLAB	NOTE 5	REINFORCEMENT BARS, OTHER THAN #4	1	NO	NO	NO	NO	YES	NO
219-02-5104	2	HSM ROOF SLAB	NOTES 1&11	CONCRETE	1	NO	YES	NO	YES	YES	NO
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-101	FRONT MOUNTING PLATE, 1" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-102	REAR MOUNTING PLATE, 1" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-103	STIFFENER PLATE, 1/2" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-104	STIFFENER PLATE, 1/2" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-105	SUPPORT PLATE, 1-1/2" THICK X 7" LONG	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-106	CANISTER STOP PLATE, 1-1/8" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-107	SUPPORT RAIL, W12 X 96	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-109	STIFFENER PLATE, 1/2" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-110	RAIL EXTENSION PLATE, 3/4" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	5105-111	CROSS BEAM, W6 X 25	1	NO	NO	NO	NO	YES	YES
219-02-5105	1	HSM DSC SUPPORT STRUCTURE	NOTE 2	WELD FILLER MATERIAL	1	NO	NO	NO	NO	YES	YES
219-02-5105/ Fabrication Specification 219-02-115	1	HSM DSC SUPPORT STRUCTURE	NOTE 5	COATING	2	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-101	PLATE ½" THICK	1	NO	YES	NO	NO	YES	YES

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-102	ROLLED PLATE 3/8" THICK	1	NO	YES	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-103	PLATE 1-½" THICK	1	NO	YES	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-105	MOUNTING PLATE 1" THICK	1	NO	YES	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-118	PLATE ¾" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-120	PLATE ½" THICK	2	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-121	PLATE ½" THICK	2	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-125	DOOR, PLATE 1-1/2" THICK	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-126	SPACER, PLATE 1-1/2" THICK	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-127	HEAVY DUTY HINGE (REAR ACCESS DOOR)	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-130	ANGLE, L8" X 8" X 1" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-131	STIFFENER PLATE, ½" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-135	PLATE, ¾" THICK	2	NO	NO	NO	NO	NO	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-137	PLATE, ¾" THICK	1	NO	NO	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-139	TUBE STEEL, 5" X 5" X 3/8" THICK	2	NO	NO	NO	NO	NO	YES

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-140	PLATE, 4-½" SQUARE X 1/4" THICK	2	NO	NO	NO	NO	NO	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-141	SEISMIC RETAINER, TUBE STEEL, 4" X 4" X ½" THICK X 1'-0" LONG	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-148	REAR DSC SUPPORT STRUCTURE LUG PLATE, 2" X 4" X 1" THICK	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-149	SHIELD WALL TIE PLATE, 3/4" THICK	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-154	RICHMOND DOWEL BAR SPLICER (DB-SAE) WITH 1-9/16–8 UN THREAD AND #11 BAR	2	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-155	WASHER PLATE, 1/2" THICK	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-157	WASHER PLATE, 1/2" THICK	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-158	RICHMOND DOWEL BAR SPLICER (DB-SAE) WITH 1-9/16–8 UN THREAD AND # 11 BAR	2	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-251	SHIELD WALL CAST-IN-PLACE BOLT, 1 1/8–7UNC – 2A X 1' – 0" LONG	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-307	NUT, 1 ½" – 6 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-308	COUPLING NUT, 1 ½" – 6 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-310	NUT, 1 ¼" – 7 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-311	COUPLING NUT, 1 ¼" – 7 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-313	NUT, 2 – 4 ½ UNC – 2B	1	NO	NO	NO	NO	YES	NO

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-314	COUPLING NUT, 2 – 4 ½ – 7 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-316	NUT, ¾ - 10 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-317	COUPLING NUT, ¾ - 10 UNC – 2B	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-452	WASHER PLATE 6” SQ X 1” THICK	2	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-506	STUD, 1 ½” – 6 UNC – 2A	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-509	STUD, 1 ¼” – 7 UNC – 2A	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-512	STUD, 2 – 4 ½ UNC – 2A	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-515	STUD, ¾ - 10 UNC – 2A	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-544	SHIELD WALL SUPPORT STUD, 1 1/2–6UNC–2A	1	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-553	ROOF ATTACHMENT BOLT, ROD Ø 1–5/8”	2	NO	NO	NO	NO	YES	NO
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-619	NELSON STUD, TYPE S3L, Ø ¾” X 3–3/16” LONG	1	NO	NO	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	5107-643	NELSON STUD, TYPE H4L Ø 1/2” X 4–1/8” LONG	2	NO	NO	NO	NO	NO	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NOTE 1/ NOTE 18	WELD FILLER MATERIAL (ATTACHES DSC SUPPORT STRUCTURE)	1	NO	NO	NO	NO	YES	YES
219-02-5107	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NOTE 11	CONCRETE FILL	1	NO	YES	NO	NO	NO	NO

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	**Drawing Revision**	**Component**	**Item Num.**	**Item Description**	**Scoping Criterion**	**Confinement**	**Radiation Shielding**	**Sub-Criticality**	**Heat-Removal Capability**	**Structural Integrity**	**Retrievability**
219-02-5107/ Fabrication Specification 219-02-115	1	HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NOTES 2-3, 9-10, 13	COATING	2	NO	NO	NO	NO	YES	NO
219-02-5108	0	HSM END MODULE SHIELD WALL	NOTE 1/ NOTE 9	REINFORCEMENT BARS	1	NO	NO	NO	NO	YES	NO
219-02-5108	0	HSM END MODULE SHIELD WALL	NOTE 1/ NOTE 9	CONCRETE	1	NO	YES	NO	NO	YES	NO
TMI-2 KNOCKOUT CANISTER											
02-1150946-C	3	KNOCKOUT CANISTER UPPER HEAD WELDMENT	1	1150946C POISON TUBE ASSEMBLY	3	NO	NO	YES	NO	YES	NO
02-1150946-C	3	KNOCKOUT CANISTER UPPER HEAD WELDMENT	2	1150946C TOP END CAP	3	NO	NO	YES	NO	YES	NO
02-1150946-C	3	KNOCKOUT CANISTER UPPER HEAD WELDMENT	3	1150946C BOTTOM END CAP	3	NO	NO	YES	NO	YES	NO
02-1150946-C	3	KNOCKOUT CANISTER UPPER HEAD WELDMENT	4	1150946C PIPE 1" ∅ SCHEDULE 160	3	NO	NO	YES	NO	YES	NO
02-1150946-C	3	KNOCKOUT CANISTER UPPER HEAD WELDMENT	5	1150946C B_4C PELLET	3	NO	NO	YES	NO	NO	NO
02-1150968-D	2	KNOCKOUT CANISTER BOTTOM SUPPORT PLATE ASSEMBLY	1	1150968D BOTTOM SUPPORT PLATE ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1150968-D	2	KNOCKOUT CANISTER BOTTOM SUPPORT PLATE ASSEMBLY	2	1150950E BOTTOM SUPPORT PLATE	3	NO	YES	YES	YES	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	1	1154027F KNOCKOUT CANISTER INTERNALS ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	2	1155233D POISON TUBE A	3	NO	NO	YES	NO	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	3	1150946C POISON TUBE B	3	NO	NO	YES	NO	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	4	1150968D BOTTOM SUPPORT PLATE ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	5	1150939D INTERMEDIATE SUPPORT PLATE A	3	NO	NO	YES	NO	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	7	1150937D SUPPORT RING	3	NO	NO	YES	NO	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	9	1150954D SEAL PLATE	3	NO	NO	YES	NO	YES	NO
02-1154027-F	4	KNOCKOUT CANISTER INTERNALS ASSEMBLY	14	1154090C CENTER TUBE	3	NO	NO	YES	NO	YES	NO

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
02-1154034-F	3	KNOCKOUT CANISTER INTERNALS & SHELL ASSEMBLY	1	1154034F INTERNALS & SHELL ASSEMBLY	3	NO	YES	YES	NO	YES	NO
02-1154034-F	3	KNOCKOUT CANISTER INTERNALS & SHELL ASSEMBLY	2	1150945C SHELL (KNOCKOUT & FILTER CANISTER)	3	NO	YES	YES	NO	YES	NO
02-1154034-F	3	KNOCKOUT CANISTER INTERNALS & SHELL ASSEMBLY	3	1154027F KNOCKOUT CANISTER INTERNALS ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154041-F	3	KNOCKOUT CANISTER ASSEMBLY	1	1154041F KNOCKOUT CANISTER ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154041-F	3	KNOCKOUT CANISTER ASSEMBLY	2	1154045D BOTTOM HEAD ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154041-F	3	KNOCKOUT CANISTER ASSEMBLY	3	1154046F KNOCKOUT CANISTER UPPER HEAD WELDMENT	3	NO	YES	YES	YES	YES	NO
02-1154045-D	5	KNOCKOUT & FILTER CANISTER LOWER HEAD ASSEMBLY	1	1154045D CANISTER LOWER HEAD ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154045-D	5	KNOCKOUT & FILTER CANISTER LOWER HEAD ASSEMBLY	2	1150917D CANISTER LOWER HEAD (KNOCKOUT & FILTER CANISTER)	3	NO	YES	YES	YES	YES	NO
02-1154046-F	6	FILTER & KNOCKOUT CANISTER SKIRT	1	1154046F KNOCKOUT CANISTER HEAD WELDMENT	3	NO	YES	YES	YES	YES	NO
02-1154046-F	6	FILTER & KNOCKOUT CANISTER SKIRT	3	1150943E KNOCKOUT CANISTER UPPER HEAD	3	NO	YES	YES	YES	YES	NO
02-1155233-D	2	KNOCKOUT CANISTER POISON TUBE ASSEMBLY	1	1155233D KNOCKOUT CANISTER POISON TUBE ASSEMBLY	3	NO	NO	YES	NO	YES	NO
02-1155233-D	2	KNOCKOUT CANISTER POISON TUBE ASSEMBLY	2	1155233D TUBE 2-1/8” OD X 0.065” THICK WALL	3	NO	NO	YES	NO	YES	NO
02-1155233-D	2	KNOCKOUT CANISTER POISON TUBE ASSEMBLY	3	1155233D BOTTOM END PLUG	3	NO	NO	YES	NO	YES	NO
02-1155233-D	2	KNOCKOUT CANISTER POISON TUBE ASSEMBLY	4	1155233D TOP END PLUG	3	NO	NO	YES	NO	YES	NO
02-1155233-D	2	KNOCKOUT CANISTER POISON TUBE ASSEMBLY	5	1155233D B_4C PELLET	3	NO	NO	YES	NO	NO	NO
02-1161301-D	1	KNOCKOUT CANISTER ASSEMBLY SAR	UFSAR	NOTE 3: WELD FILLER METAL	3	NO	NO	NO	NO	YES	NO
TMI-2 FILTER CANISTER											
02-1150949-D	5	FILTER CANISTER POISON TUBE ASSEMBLY	1	1150949D POISON TUBE ASSEMBLY	3	NO	NO	YES	NO	YES	NO
02-1150949-D	5	FILTER CANISTER POISON TUBE ASSEMBLY	2	1150949D; TUBE 2-1/8” OD X 0.065” THICK WALL	3	NO	NO	YES	NO	YES	NO
02-1150949-D	5	FILTER CANISTER POISON TUBE ASSEMBLY	3	1150949D; BOTTOM END PLUG	3	NO	NO	YES	NO	YES	NO
02-1150949-D	5	FILTER CANISTER POISON TUBE ASSEMBLY	4	1150949D; TOP END PLUG	3	NO	NO	YES	NO	YES	NO
02-1150949-D	5	FILTER CANISTER POISON TUBE ASSEMBLY	5	1150949D; B_4C PELLET	3	NO	NO	YES	NO	NO	NO

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
02-1150959-D	4	FILTER CANISTER UPPER HEAD WELDMENT	1	1150959D UPPER HEAD WELDMENT	3	NO	YES	YES	YES	YES	NO
02-1150959-D	4	FILTER CANISTER UPPER HEAD WELDMENT	5	1150958D FILTER CANISTER UPPER HEAD	3	NO	YES	YES	YES	YES	NO
02-1154018-F	5	FILTER CANISTER ASSEMBLY	1	1154018F FILTER CANISTER ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154018-F	5	FILTER CANISTER ASSEMBLY	2	1150959D UPPER HEAD WELDMENT	3	NO	YES	YES	YES	YES	NO
02-1154018-F	5	FILTER CANISTER ASSEMBLY	3	1154045D BOTTOM HEAD ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154020-E	3	FILTER CANISTER SUB-ASSEMBLY	1	1154020E FILTER CANISTER SUB-ASSEMBLY	3	NO	YES	YES	NO	YES	NO
02-1154020-E	3	FILTER CANISTER SUB-ASSEMBLY	3	1150945C SHELL	3	NO	YES	YES	NO	YES	NO
02-1154020-E	3	FILTER CANISTER SUB-ASSEMBLY	6	1150949D POISON TUBE ASSEMBLY	3	NO	NO	YES	NO	YES	NO
02-1161299-D	1	FILTER CANISTER ASSEMBLY SAR	UFSAR	NOTE 3: WELD FILLER METAL	3	NO	NO	NO	NO	YES	NO
TMI-2 FUEL CANISTER											
02-1095753-E	2	FUEL CANISTER NEUTRON POISON SHROUD	1	18163E100 TUBE ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1095753-E	2	FUEL CANISTER NEUTRON POISON SHROUD	2	18163E100-1 OUTER SKIN	3	NO	YES	YES	YES	YES	NO
02-1095753-E	2	FUEL CANISTER NEUTRON POISON SHROUD	3	18163E100-2 INNER SKIN	3	NO	YES	YES	YES	YES	NO
02-1095753-E	2	FUEL CANISTER NEUTRON POISON SHROUD	4	18163E100-3 BORAL®	3	NO	YES	YES	YES	YES	NO
02-1150998-E	2	FUEL CANISTER BOTTOM PLATE ASSEMBLY	1	1150998E FUEL CANISTER BOTTOM PLATE ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1150998-E	2	FUEL CANISTER BOTTOM PLATE ASSEMBLY	2	1150992E BOTTOM PLATE	3	NO	YES	YES	YES	YES	NO
02-1150999-F	4	FUEL CANISTER LOWER ASSEMBLY	1	1150999F FUEL CANISTER LOWER ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1150999-F	4	FUEL CANISTER LOWER ASSEMBLY	2	1095753E BORAL® SHROUD ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1150999-F	4	FUEL CANISTER LOWER ASSEMBLY	3	1154014F FUEL CANISTER BULKHEAD	3	NO	YES	YES	YES	YES	NO
02-1150999-F	4	FUEL CANISTER LOWER ASSEMBLY	5	1150983C FUEL CANISTER SHELL	3	NO	YES	YES	YES	YES	NO
02-1150999-F	4	FUEL CANISTER LOWER ASSEMBLY	6	1154045D LOWER HEAD ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1150999-F	4	FUEL CANISTER LOWER ASSEMBLY	7	1150998E BOTTOM PLATE ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1150999-F	4	FUEL CANISTER LOWER ASSEMBLY	9	1150999F CONCRETE MIX	3	NO	YES	YES	YES	YES	NO
02-1154026-F	6	FUEL CANISTER HEAD WELDMENT	1	1154026F FUEL CANISTER HEAD WELDMENT	3	NO	YES	YES	YES	YES	NO
02-1154026-F	6	FUEL CANISTER HEAD WELDMENT	2	1150989F FUEL CANISTER UPPER HEAD	3	NO	YES	YES	YES	YES	NO
02-1154026-F	6	FUEL CANISTER HEAD WELDMENT	4	1150993C SHOCK ABSORBER SUPPORT	3	NO	NO	NO	NO	YES	NO
02-1154026-F	6	FUEL CANISTER HEAD WELDMENT	5	1150995C IMPACT PLATE "D"	3	NO	NO	NO	NO	YES	NO
02-1154026-F	6	FUEL CANISTER HEAD WELDMENT	7	1150994C IMPACT PLATE "C"	3	NO	NO	NO	NO	YES	NO
02-1154026-F	6	FUEL CANISTER HEAD WELDMENT	12	1154021C FUEL CANISTER BOLT	3	NO	NO	NO	NO	YES	NO

Table 9.8-2
In-Scope Subcomponents for Aging Management

IN-SCOPE SUBCOMPONENT IDENTIFICATION						INTENDED FUNCTION					
Drawing Number	Drawing Revision	Component	Item Num.	Item Description	Scoping Criterion	Confinement	Radiation Shielding	Sub-Criticality	Heat-Removal Capability	Structural Integrity	Retrievability
02-1154070-F	3	FUEL CANISTER ASSEMBLY	1	1154070F FUEL CANISTER ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154070-F	3	FUEL CANISTER ASSEMBLY	2	1150999E FUEL CANISTER LOWER ASSEMBLY	3	NO	YES	YES	YES	YES	NO
02-1154070-F	3	FUEL CANISTER ASSEMBLY	3	1154026F FUEL CANISTER UPPER HEAD WELDMENT	3	NO	YES	YES	YES	YES	NO
02-1161300-D	B1	FUEL CANISTER ASSEMBLY SAR	UFSAR	NOTE 3: WELD FILLER METAL	3	NO	NO	NO	NO	YES	NO

Table 9.8-3
Materials and Environments for DSC AMRs

Component	Item Description	Materials	Service Environments
DSC BASKET ASSEMBLY	SPACER DISC, 1 1/4" PLATE	CARBON STEEL	INTERNAL DSC
DSC BASKET ASSEMBLY	TOP SPACER DISC, 1 1/4" PLATE	CARBON STEEL	INTERNAL DSC
DSC BASKET ASSEMBLY	SUPPORT ROD, Ø 1-1/2" ROD	CARBON STEEL	INTERNAL DSC/ENCASED
DSC BASKET ASSEMBLY	PIPE SLEEVE – LONG, 2.00 NPS SCHEDULE 80	CARBON STEEL	INTERNAL DSC
DSC BASKET ASSEMBLY	PIPE SLEEVE – SHORT, 2.00 NPS SCHEDULE 80	CARBON STEEL	INTERNAL DSC
DSC BASKET ASSEMBLY	END SLEEVE	CARBON STEEL	INTERNAL DSC
DSC SHELL ASSEMBLY	CYLINDRICAL SHELL, 5/8" PLATE	CARBON STEEL	SHELTERED/ INTERNAL DSC
DSC SHELL ASSEMBLY	OUTER BOTTOM COVER	CARBON STEEL	SHELTERED/ ENCASED
DSC SHELL ASSEMBLY	BOTTOM SHIELD PLUG	CARBON STEEL	ENCASED
DSC SHELL ASSEMBLY	GRAPPLE RING, 1" PLATE	CARBON STEEL	SHELTERED
DSC SHELL ASSEMBLY	GRAPPLE RING SUPPORT, 3/4" PLATE	CARBON STEEL	SHELTERED
DSC SHELL ASSEMBLY	INNER BOTTOM COVER 3/4" PLATE	CARBON STEEL	INTERNAL DSC/ ENCASED
DSC BASKET-SHELL ASSEMBLY	SUPPORT RING 3/4" PLATE	CARBON STEEL	INTERNAL DSC
DSC BASKET-SHELL ASSEMBLY	VENT PORT SHIELD BLOCK, 1-3/4" PLATE	CARBON STEEL	INTERNAL DSC
DSC MAIN ASSEMBLY	TOP SHIELD PLUG, PLATE 3 1-1/4" THICK PLATE	CARBON STEEL	INTERNAL DSC/ ENCASED
DSC MAIN ASSEMBLY	TOP COVER PLATE	CARBON STEEL	SHELTERED/ ENCASED
DSC MAIN ASSEMBLY	PURGE PORT BLOCK	CARBON STEEL	INTERNAL DSC
DSC MAIN ASSEMBLY	TOP SHIELD PLUG PLATE 1 & 2	CARBON STEEL	INTERNAL DSC
DSC PURGE PORT FILTER ASSEMBLY	FILTER HOUSING	CARBON STEEL	SHELTERED/ INTERNAL DSC
DSC PURGE PORT FILTER ASSEMBLY	HEPA TYPE FILTER W/GASKET	STAINLESS STEEL WITH ELASTOMERIC (NEOPRENE) SEAL	SHELTERED/ INTERNAL DSC
DSC PURGE PORT FILTER ASSEMBLY	DUAL C-SEALS, EG & G PRESSURE SCIENCE (FILTER HOUSING)	INCONEL X-750 OR EPDM ELASTOMER	INTERNAL DSC
DSC PURGE PORT FILTER ASSEMBLY	SCREW, CAP SOCKET HD, 1/2 - 13 UNC - 2A X 0.75" LONG	STAINLESS STEEL	ENCASED/ INTERNAL DSC
DSC PURGE PORT FILTER ASSEMBLY	SCREW, CAP SOCKET HD, 1 – 8 UNC – 2A X 3.00" LONG	STAINLESS STEEL	SHELTERED
DSC PURGE PORT FILTER ASSEMBLY	DUAL C-SEALS, EG&G PRESSURE SCIENCE	INCONEL X-750	INTERNAL DSC
DSC PURGE PORT FILTER ASSEMBLY	LOCK WASHER	CARBON STEEL OR STAINLESS STEEL	SHELTERED/ INTERNAL DSC
DSC VENT PORT FILTER ASSEMBLY	FILTER HOUSING	CARBON STEEL	SHELTERED/ INTERNAL DSC
DSC VENT PORT FILTER ASSEMBLY	HEPA TYPE FILTER W/GASKET	STAINLESS STEEL WITH ELASTOMERIC (NEOPRENE) SEAL	SHELTERED/ INTERNAL DSC
DSC VENT PORT FILTER ASSEMBLY	DUAL C-SEALS, EG & G PRESSURE SCIENCE (FILTER HOUSING)	INCONEL X-750 OR EPDM ELASTOMER	INTERNAL DSC
DSC VENT PORT FILTER ASSEMBLY	SCREW, CAP SOCKET HD, 1/2 - 13 UNC - 2A X 0.75" LONG	STAINLESS STEEL	ENCASED/ INTERNAL DSC
DSC VENT PORT FILTER ASSEMBLY	SCREW, CAP SOCKET HD, 1 – 8 UNC – 2A X 3.00" LONG	STAINLESS STEEL	SHELTERED
DSC VENT PORT FILTER ASSEMBLY	DUAL C-SEALS, EG&G PRESSURE SCIENCE	INCONEL X-750	INTERNAL DSC
DSC VENT PORT FILTER ASSEMBLY	LOCK WASHER	CARBON STEEL OR STAINLESS STEEL	SHELTERED/ INTERNAL DSC
DSC ASSEMBLY	WELD FILLER METAL	CARBON STEEL	SHELTERED/ INTERNAL DSC
DSC ASSEMBLY	INORGANIC ZINC-RICH COATING	ZINC-RICH INORGANIC COATING	SHELTERED/ INTERNAL DSC

Table 9.8-4
Materials and Environments for HSM AMRs

Component	Item Description	Materials	Service Environments
HSM ISFSI GENERAL ARRANGEMENT	BOLT, 3/4-10 UNC-2A X 2" LONG	CARBON, CARBON/BORON, OR ALLOY STEEL	OUTDOOR
HSM ISFSI GENERAL ARRANGEMENT	NUT, 1 1/8-7 UNC-2B	CARBON STEEL	OUTDOOR
HSM ISFSI GENERAL ARRANGEMENT	NUT, 1 1/2-6 UNC-2B	CARBON STEEL	OUTDOOR
HSM ISFSI GENERAL ARRANGEMENT	GROUT - SHIELD WALL PANELS	CEMENTITIOUS GROUT	OUTDOOR
HSM ISFSI GENERAL ARRANGEMENT	LIFTING STRAND LOOP POCKET FILL	SILICONE SEALANT (CHEMICAL GROUT)	OUTDOOR
STANDARD MODULE MAIN ASSEMBLY	BOLT, 3/4 – 10 UNC – 2A X 2-3/4" LONG	CARBON, CARBON/BORON, OR ALLOY STEEL	OUTDOOR
STANDARD MODULE MAIN ASSEMBLY	BOLT, 3/4 – 10 UNC – 2A X 3-1/4" LONG	CARBON, CARBON/BORON, OR ALLOY STEEL	OUTDOOR
STANDARD MODULE MAIN ASSEMBLY	BOLT, 1 1/4 – 7 UNC – 2A X 3-1/2" LONG	CARBON, CARBON/BORON, OR ALLOY STEEL	SHELTERED
STANDARD MODULE MAIN ASSEMBLY	BOLT, 1-1/4 – 7 UNC – 2A X 4-1/4" LONG	CARBON, CARBON/BORON, OR ALLOY STEEL	SHELTERED
STANDARD MODULE MAIN ASSEMBLY	NUT, 1-5/8 –5 ½ UNC–2B	CARBON STEEL	SHELTERED
STANDARD MODULE MAIN ASSEMBLY	NUT, 1-1/4 –7 UNC – 2B	CARBON STEEL	SHELTERED
STANDARD MODULE MAIN ASSEMBLY	GROUT - LIFTING STRAND LOOP POCKET FILL	CEMENTITIOUS GROUT	OUTDOOR
STANDARD MODULE MAIN ASSEMBLY	WELD FILLER MATERIAL (CATEGORY B COMPONENTS)	E70XX ELECTRODE (WELD FILLER COMPATIBLE WITH CARBON STEEL)	SHELTERED
STANDARD MODULE MAIN ASSEMBLY	TMI-2 ISFSI HSM ROOF BOLT PROTECTIVE COVER	STAINLESS STEEL	OUTDOOR
HSM STANDARD MODULE BASE UNIT	REINFORCEMENT BARS, OTHER THAN #4	CARBON STEEL	EMBEDDED
HSM STANDARD MODULE BASE UNIT	CONCRETE	CONCRETE	OUTDOOR
HSM STANDARD MODULE BASE UNIT	GROUT – MOUNTING HOLES & EMBEDMENT VOIDS	CEMENTITIOUS GROUT	OUTDOOR
HSM ROOF SLAB	SLOW-RISE POLYURETHANE FOAM FORMULA SPRAY FOAM	POLYURETHANE (PLASTIC)	EMBEDDED
HSM ROOF SLAB	WATER RESISTANT POLYURETHANE FOAM MATERIAL, 6-1/2" X 6-1/2" X 1/8" THICK (NOT ADHESIVE)	POLYURETHANE (PLASTIC)	EMBEDDED
HSM ROOF SLAB	REINFORCEMENT BARS, OTHER THAN #4	CARBON STEEL	EMBEDDED
HSM ROOF SLAB	CONCRETE	CONCRETE	OUTDOOR
HSM DSC SUPPORT STRUCTURE	FRONT MOUNTING PLATE, 1" THICK	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	REAR MOUNTING PLATE, 1" THICK	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	STIFFENER PLATE, 1/2" THICK	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	STIFFENER PLATE, 1/2" THICK	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	SUPPORT PLATE, 1-1/2" THICK X 7" LONG	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	CANISTER STOP PLATE, 1-1/8" THICK	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	SUPPORT RAIL, W12 X 96	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	STIFFENER PLATE, 1/2" THICK	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	RAIL EXTENSION PLATE, 3/4" THICK	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	CROSS BEAM, W6 X 25	CARBON STEEL	SHELTERED
HSM DSC SUPPORT STRUCTURE	WELD FILLER MATERIAL	E70XX ELECTRODE (WELD FILLER COMPATIBLE WITH CARBON STEEL)	SHELTERED
HSM DSC SUPPORT STRUCTURE	COATING	INORGANIC ZINC PRIMER WITH EPOXY ENAMEL TOP COAT	SHELTERED

Table 9.8-4
Materials and Environments for HSM AMRs

Component	Item Description	Materials	Service Environments
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE ½“ THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	ROLLED PLATE 3/8” THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE 1-½” THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	MOUNTING PLATE 1” THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE ¾” THICK	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE ½” THICK	CARBON STEEL	SHELTERED/ EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE ½” THICK	CARBON STEEL	SHELTERED/ EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	DOOR, PLATE 1-1/2" THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	SPACER, PLATE 1-1/2" THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	HEAVY DUTY HINGE (REAR ACCESS DOOR)	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	ANGLE, L8” X 8” X 1” THICK	CARBON STEEL	SHELTERED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	STIFFENER PLATE, ½” THICK	CARBON STEEL	SHELTERED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE, ¾” THICK	CARBON STEEL	OUTDOOR/ EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE, ¾” THICK	CARBON STEEL	SHELTERED/ EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	TUBE STEEL, 5” X 5” X 3/8" THICK	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	PLATE, 4-½” SQUARE X 1/4” THICK	CARBON STEEL	EMBEDDED

Table 9.8-4
Materials and Environments for HSM AMRs

Component	Item Description	Materials	Service Environments
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	SEISMIC RETAINER, TUBE STEEL, 4" X 4" X ½" THICK X 1'-0" LONG	CARBON STEEL	SHELTERED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	REAR DSC SUPPORT STRUCTURE LUG PLATE, 2" X 4" X 1" THICK	CARBON STEEL	SHELTERED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	SHIELD WALL TIE PLATE, 3/4" THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	RICHMOND DOWEL BAR SPLICER (DB-SAE) WITH 1-9/16–8 UN THREAD AND #11 BAR	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	WASHER PLATE, 1/2" THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	WASHER PLATE, 1/2" THICK	CARBON STEEL	OUTDOOR
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	RICHMOND DOWEL BAR SPLICER (DB-SAE) WITH 1-9/16–8 UN THREAD AND # 11 BAR	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	SHIELD WALL CAST-IN-PLACE BOLT, 1 1/8–7UNC – 2A X 1' – 0" LONG	CARBON, CARBON/BORON, OR ALLOY STEEL	OUTDOOR/ EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NUT, 1 ½" – 6 UNC – 2B	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	COUPLING NUT, 1 ½" – 6 UNC – 2B	QUENCHED CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NUT, 1 ¼" – 7 UNC – 2B	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	COUPLING NUT, 1 ¼" – 7 UNC – 2B	QUENCHED CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NUT, 2 – 4 ½ UNC – 2B	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	COUPLING NUT, 2 – 4 ½ – 7 UNC – 2B	QUENCHED CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NUT, ¾ - 10 UNC – 2B	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	COUPLING NUT, ¾ - 10 UNC – 2B	QUENCHED CARBON STEEL	EMBEDDED

Table 9.8-4
Materials and Environments for HSM AMRs

Component	Item Description	Materials	Service Environments
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	WASHER PLATE 6" SQ X 1" THICK	CARBON STEEL	SHELTERED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	STUD, 1 ½" – 6 UNC – 2A	FERRITIC STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	STUD, 1 ¼" – 7 UNC – 2A	FERRITIC STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	STUD, 2 – 4 ½ UNC – 2A	FERRITIC STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	STUD, ¾ - 10 UNC – 2A	FERRITIC STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	SHIELD WALL SUPPORT STUD, 1 1/2–6UNC–2A	FERRITIC STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	ROOF ATTACHMENT BOLT, ROD Ø 1–5/8"	CARBON, CARBON/BORON, OR ALLOY STEEL	SHELTERED/ EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NELSON STUD, TYPE S3L, Ø ¾" X 3–3/16" LONG	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	NELSON STUD, TYPE H4L Ø 1/2" X 4–1/8" LONG	CARBON STEEL	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	WELD FILLER MATERIAL (ATTACHES DSC SUPPORT STRUCTURE)	E70XX ELECTRODE (WELD FILLER COMPATIBLE WITH CARBON STEEL)	SHELTERED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	CONCRETE FILL	CONCRETE	EMBEDDED
HSM ERECTION HARDWARE AND MISCELLANEOUS STEEL DOORS & FABRICATED FASTENERS	COATING	INORGANIC ZINC PRIMER WITH EPOXY ENAMEL TOP COAT	SHELTERED
HSM END MODULE SHIELD WALL	REINFORCEMENT BARS	CARBON STEEL	EMBEDDED
HSM END MODULE SHIELD WALL	CONCRETE	CONCRETE	OUTDOOR

Table 9.8-5
Materials and Environments for TMI-2 Canister AMRs

Component	Item Description	Materials	Service Environments
TMI-2 KNOCKOUT CANISTER			
KNOCKOUT CANISTER UPPER HEAD WELDMENT	1150946C POISON TUBE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER UPPER HEAD WELDMENT	1150946C TOP END CAP	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER UPPER HEAD WELDMENT	1150946C BOTTOM END CAP	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER UPPER HEAD WELDMENT	1150946C PIPE 1" ∅ SCHEDULE 160	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER UPPER HEAD WELDMENT	1150946C B_4C PELLET	BORON CARBIDE	ENCASED
KNOCKOUT CANISTER BOTTOM SUPPORT PLATE ASSEMBLY	1150968D BOTTOM SUPPORT PLATE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER BOTTOM SUPPORT PLATE ASSEMBLY	1150950E BOTTOM SUPPORT PLATE	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1154027F KNOCKOUT CANISTER INTERNALS ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1155233D POISON TUBE A	STAINLESS STEEL	ENCASED
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1150946C POISON TUBE B	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1150968D BOTTOM SUPPORT PLATE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1150939D INTERMEDIATE SUPPORT PLATE A	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1150937D SUPPORT RING	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1150954D SEAL PLATE	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER INTERNALS ASSEMBLY	1154090C CENTER TUBE	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER INTERNALS & SHELL ASSEMBLY	1154034F INTERNALS & SHELL ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS & SHELL ASSEMBLY	1150945C SHELL (KNOCKOUT & FILTER CANISTER)	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER INTERNALS & SHELL ASSEMBLY	1154027F KNOCKOUT CANISTER INTERNALS ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER ASSEMBLY	1154041F KNOCKOUT CANISTER ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER ASSEMBLY	1154045D BOTTOM HEAD ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER ASSEMBLY	1154046F KNOCKOUT CANISTER UPPER HEAD WELDMENT	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
KNOCKOUT & FILTER CANISTER LOWER HEAD ASSEMBLY	1154045D CANISTER LOWER HEAD ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
KNOCKOUT & FILTER CANISTER LOWER HEAD ASSEMBLY	1150917D CANISTER LOWER HEAD (KNOCKOUT & FILTER CANISTER)	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER & KNOCKOUT CANISTER SKIRT	1154046F KNOCKOUT CANISTER HEAD WELDMENT	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER & KNOCKOUT CANISTER SKIRT	1150943E KNOCKOUT CANISTER UPPER HEAD	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
KNOCKOUT CANISTER POISON TUBE ASSEMBLY	1155233D KNOCKOUT CANISTER POISON TUBE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED

Table 9.8-5
Materials and Environments for TMI-2 Canister AMRs

Component	Item Description	Materials	Service Environments
KNOCKOUT CANISTER POISON TUBE ASSEMBLY	1155233D TUBE 2-1/8" OD X 0.065" THICK WALL	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER POISON TUBE ASSEMBLY	1155233D BOTTOM END PLUG	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER POISON TUBE ASSEMBLY	1155233D TOP END PLUG	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
KNOCKOUT CANISTER POISON TUBE ASSEMBLY	1155233D B_4C PELLET	BORON CARBIDE	ENCASED
KNOCKOUT CANISTER ASSEMBLY SAR	NOTE 3: WELD FILLER METAL	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
TMI-2 FILTER CANISTER			
FILTER CANISTER POISON TUBE ASSEMBLY	1150949D POISON TUBE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FILTER CANISTER POISON TUBE ASSEMBLY	1150949D; TUBE 2-1/8" OD X 0.065" THICK WALL	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FILTER CANISTER POISON TUBE ASSEMBLY	1150949D; BOTTOM END PLUG	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FILTER CANISTER POISON TUBE ASSEMBLY	1150949D; TOP END PLUG	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FILTER CANISTER POISON TUBE ASSEMBLY	1150949D; B_4C PELLET	BORON CARBIDE	ENCASED
FILTER CANISTER UPPER HEAD WELDMENT	1150959D UPPER HEAD WELDMENT	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER CANISTER UPPER HEAD WELDMENT	1150958D FILTER CANISTER UPPER HEAD	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER CANISTER ASSEMBLY	1154018F FILTER CANISTER ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER CANISTER ASSEMBLY	1150959D UPPER HEAD WELDMENT	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER CANISTER ASSEMBLY	1154045D BOTTOM HEAD ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER CANISTER SUB-ASSEMBLY	1154020E FILTER CANISTER SUB-ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER CANISTER SUB-ASSEMBLY	1150945C SHELL	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FILTER CANISTER SUB-ASSEMBLY	1150949D POISON TUBE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
FILTER CANISTER ASSEMBLY SAR	NOTE 3: WELD FILLER METAL	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
TMI-2 FUEL CANISTER			
FUEL CANISTER NEUTRON POISON SHROUD	18163E100 TUBE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FUEL CANISTER NEUTRON POISON SHROUD	18163E100-1 OUTER SKIN	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FUEL CANISTER NEUTRON POISON SHROUD	18163E100-2 INNER SKIN	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FUEL CANISTER NEUTRON POISON SHROUD	18163E100-3 BORAL®	BORAL®	ENCASED
FUEL CANISTER BOTTOM PLATE ASSEMBLY	1150998E FUEL CANISTER BOTTOM PLATE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
FUEL CANISTER BOTTOM PLATE ASSEMBLY	1150992E BOTTOM PLATE	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
FUEL CANISTER LOWER ASSEMBLY	1150999F FUEL CANISTER LOWER ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER

Table 9.8-5
Materials and Environments for TMI-2 Canister AMRs

Component	Item Description	Materials	Service Environments
FUEL CANISTER LOWER ASSEMBLY	1095753E BORAL® SHROUD ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER/ ENCASED
FUEL CANISTER LOWER ASSEMBLY	1154014F FUEL CANISTER BULKHEAD	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FUEL CANISTER LOWER ASSEMBLY	1150983C FUEL CANISTER SHELL	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER/ ENCASED
FUEL CANISTER LOWER ASSEMBLY	1154045D LOWER HEAD ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FUEL CANISTER LOWER ASSEMBLY	1150998E BOTTOM PLATE ASSEMBLY	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
FUEL CANISTER LOWER ASSEMBLY	1150999F CONCRETE MIX	LICON	INTERNAL TMI-2 CANISTER/ ENCASED
FUEL CANISTER HEAD WELDMENT	1154026F FUEL CANISTER HEAD WELDMENT	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FUEL CANISTER HEAD WELDMENT	1150989F FUEL CANISTER UPPER HEAD	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FUEL CANISTER HEAD WELDMENT	1150993C SHOCK ABSORBER SUPPORT	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
FUEL CANISTER HEAD WELDMENT	1150995C IMPACT PLATE "D"	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
FUEL CANISTER HEAD WELDMENT	1150994C IMPACT PLATE "C"	STAINLESS STEEL	INTERNAL TMI-2 CANISTER
FUEL CANISTER HEAD WELDMENT	1154021C FUEL CANISTER BOLT	INCONEL 625	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FUEL CANISTER ASSEMBLY	1154070F FUEL CANISTER ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FUEL CANISTER ASSEMBLY	1150999E FUEL CANISTER LOWER ASSEMBLY	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER
FUEL CANISTER ASSEMBLY	1154026F FUEL CANISTER UPPER HEAD WELDMENT	STAINLESS STEEL	INTERNAL DSC /INTERNAL TMI-2 CANISTER
FUEL CANISTER ASSEMBLY SAR	NOTE 3: WELD FILLER METAL	STAINLESS STEEL	INTERNAL DSC/ INTERNAL TMI-2 CANISTER

Table 9.8-6
TMI-2 ISFSI Tollgates

TOLLGATE	DUE DATE	ASSESSMENT
1	3/19/2024	Evaluate information from the following sources and perform a written assessment of the aggregate impact of the information, including but not limited to applicable and relevant trends, corrective actions required, and the effectiveness of the AMPs with which they are associated: • Results, if any, of research and development programs focused specifically on aging-related degradation mechanisms identified as potentially affecting DSS ISFSIs • Relevant domestic and international OE including research results on aging effects/mechanisms (including non-nuclear on an opportunistic basis) • Relevant results of domestic and international ISFSI and DSS performance monitoring • Relevant results of domestic and international ISFSI and DSS inspections Topics of particular interest for the TMI-2 ISFSI tollgate assessment should include, the following: • Reinforced concrete degradation in general, and degradation of NUHOMS® HSMs in particular • Deterioration of carbon steel and coatings
2	3/19/2029	Evaluate additional information gained from the sources listed in Tollgate 1 along with any new relevant sources and perform a written assessment of the aggregate impact of the information. This evaluation should be informed by the results of Tollgate 1. The aging effects and mechanisms evaluated at this Tollgate, and the time at which it is conducted, may be adjusted based on the results of the Tollgate 1 assessment.
3	3/19/2034	Same as Tollgate 1, as informed by the results of Tollgates 1 and 2
4	3/19/2039	Same as Tollgate 1, as informed by the results of Tollgates 1, 2, and 3

Table 9.8-7
DSC Aging Management Program

SSCs	Environment	Number of SSCs	Frequency	Inspection Type	Trending	Acceptance Criteria (AC)	Corrective Actions
The DSC shell, and in particular: crevice locations (i.e., where the shell sits on the support rail); fabrication welds of the confinement boundary and the associated heat affected zone (HAZ) (i.e., longitudinal and circumferential welds on the cylindrical shell including coatings) – Normally Non-Accessible Areas	Sheltered	2 DSCs (DOE12T-002 and DOE12T-004)	Baseline AMP inspection to be performed no later than two years after the effective date of the renewed license, then at 10-year intervals (with a 2-year grace period)*	Remote Visual (IWA-2210, VT-3 Inspection)	Same DSCs, Frequency decreased to 5 ± 1 year if exceed AC or evidence of adverse steel degradation	VT-3: ASME Section XI, Subarticle IWB-3514.1 and Section 10.2 of ASTM D7167 for coatings with limits on blistering, cracking, flaking, rusting and physical damage. VT-1 (as required): ASME Section XI, Subarticle IWB-3514.1 and -No indications of pitting or crevice corrosion (localized corrosion); -No indications of galvanic corrosion as evidenced by red-orange corrosion products emanating from crevice locations (e.g., support rail plate-to-DSC shell interface); -No indications of corrosion products near crevices; -No indications of corrosion products on or adjacent to confinement boundary welds; -Section 10.2 of ASTM D7167 for coatings with limits on blistering, cracking, flaking, rusting, and physical damage	Step 1: Perform VT-1 inspection on flaw indications if the VT-3 AC is exceeded or if it is required based on prior inspection results and resulting corrective actions dispositioned per deficiency tracking system in STI-NLF-QA-016 (See [9.3] Section A1.7). Step 2A: If the VT-1 examination reveals a localized corrosion flaw exceeds the allowable flaw size in the IWB-3514.1 acceptance standards, then procedures in [9.3] Section **Error! Reference source not found.** are followed. Step 2B: If the VT-1 examination reveals coating degradation does not meet AC or VT-1 AC are exceeded (i.e., other VT-1 AC limits indicated), then procedures in [9.3] Section **Error! Reference source not found.** are followed. If aging effects are confirmed, this may include more frequent inspections and performing inspections in inaccessible locations.

Table 9.8-7
DSC Aging Management Program

SSCs	Environment	Number of SSCs	Frequency	Inspection Type	Trending	Acceptance Criteria (AC)	Corrective Actions
DSC SSCs (Steel including Coatings) in rear of HSM including the Vent and Purge Port HEPA Filters and Housings, and Vent and Purge Port Filter Housing attachment fasteners and portions of Outer Top Cover plate, closure weld and HAZ – Accessible Areas	Sheltered	2 DSCs (DOE12T-002 and DOE12T-004)	5 Years – synchronized with SR 3.1.1.1 with Baseline AMP inspection occurring after the effective date of the renewed license	Direct Visual (IWA-2210, VT-3 Inspection)	Same surfaces every five years	VT-3: ASME Section XI, Subarticle IWB-3514.1 and Section 10.2 of ASTM D7167 for coatings with limits on blistering, cracking, flaking, rusting and physical damage. VT-1 (as required): ASME Section XI, Subarticle IWB-3514.1 and -No indications of pitting or crevice corrosion (localized corrosion); -No indications of galvanic corrosion as evidenced by red-orange corrosion products emanating from crevice locations (e.g., support rail plate-to-DSC shell interface); -No indications of corrosion products near crevices; -No indications of corrosion products on or adjacent to confinement boundary welds; -Section 10.2 of ASTM D7167 for coatings with limits on blistering, cracking, flaking, rusting, and physical damage	Step 1: Perform VT-1 inspection on flaw indications if the VT-3 AC is exceeded or if it is required based on prior inspection results and resulting corrective actions dispositioned per deficiency tracking system in STI-NLF-QA-016 (See [9.3] Section **Error! Reference source not found.**). Step 2A: If the VT-1 examination reveals a localized corrosion flaw exceeds the allowable flaw size in the IWB-3514.1 acceptance standards, then procedures in [9.3] Section **Error! Reference source not found.** are followed. Step 2B: If the VT-1 examination reveals coating degradation does not meet AC or VT-1 AC are exceeded (i.e., other VT-1 AC limits indicated), then procedures in [9.3] Section **Error! Reference source not found.** are followed. If aging effects are confirmed, this may include more frequent inspections and performing inspections in inaccessible locations.
DSC SSCs (Steel including Coatings) including on upper surface of the DSC shell (i.e., where atmospheric particulates would settle); Outer Bottom Cover plate, Grapple Ring Assembly plates, their welds and HAZs; Portions of the Outer Top Cover plate, HAZ and associated closure weld – Inaccessible Areas	Sheltered	As required per scheduled inspection findings and STI-NLF-QA-016 corrective actions	In accordance with Corrective Actions, [9.3] Section A1.7	Direct or Remote Visual or both	In accordance with Corrective Actions, [9.3] Section A1.7	Via the TMI-2 ISFSI corrective action program STI-NLF-QA-016, to ensure the aging effect is adequately managed and that the SSCs intended function is maintained during the PEO	Further evaluation and disposition per deficiency tracking provided by STI-NLF-QA-016, including more frequent inspections and if detection of evidence of loss of material from localized corrosion (pitting or crevice corrosion), the expanded corrective action standard outlined in [9.3] Section **Error! Reference source not found.**.
* The interval "clock" starts as of the due date of the prior inspection. For example, if the ten-year inspection is due on 01/01/2025 and performed on 05/30/2026 (within the two-year grace period), the next inspection is still due on 01/01/2035 and must be performed no later than 01/01/2037.							

Table 9.8-8
HSM Aging Management Program

SSCs	Environment	Number of SSCs	Frequency	Inspection Type	Trending	Acceptance Criteria (AC)	Corrective Actions
HSM SSCs (Concrete including Fillers/Sealants) – Normally accessible areas	Outdoor	All 29 HSMs	Baseline AMP inspection to be performed no later than two years after the license renewal effective date, and at 5-year intervals thereafter (with a 1-year grace period)*	Direct Visual (ACI 349.3R, Section 3.5.1)	All HSMs	ACI 349.3R – Second Tier (including Section 5.2.4 for Sealants, Chemical Grouts)	Disposition per deficiency tracking system in STI-NLF-QA-016 (See [9.3] Section A2.7). For any concrete conditions exceeding 2nd tier criteria, a technical evaluation of degradation assessing whether ASR is an apparent or root cause.
HSM SSCs (Steel including Coatings) – Normally accessible areas	Outdoor	All 29 HSMs	Baseline AMP inspection to be performed no later than two years after the license renewal effective date, and at 5-year intervals thereafter (with a 1-year grace period)*	Direct Visual (IWA-2210, VT-3 Inspection on Steel Hardware)	All HSMs	VT-3: ASME Section XI, Subarticle IWF-3400 and Section 10.2 of ASTM D7167 for coatings with limits on blistering, cracking, flaking, rusting and physical damage and with flaws defined by any of the following: -Corrosion and material wastage (loss of material) -Crevice and pitting corrosion (loss of material) -Worn, flaking, or oxide-coated surfaces (loss of material) -Corrosion stains on adjacent components and structures (loss of material) -Stains caused by leaking rainwater	Disposition per deficiency tracking system in STI-NLF-QA-016 (See [9.3] Section A2.7), including a more detailed VT-1 visual examination of flaws identified
HSM SSCs (Silane Coating)	Outdoor	Two Areas on two HSMs (1 Vertical and 1 Horizontal Surface) and 1 vertical surface on HSM End Shield Wall	Baseline AMP inspection to be performed no later than 1 year after the license renewal effective date, and at 1-year intervals thereafter (with a 3-month grace period)*	RILEM Tube Test (Test Method II.4)	Same surfaces each year	ACI 349.3R – Second Tier (≥ 80% water repellency)	Reapply water repellent coating and re-test water repellency using RILEM Tube Test (Test Method II.4)

Table 9.8-8
HSM Aging Management Program

SSCs	Environment	Number of SSCs	Frequency	Inspection Type	Trending	Acceptance Criteria (AC)	Corrective Actions
HSM SSCs – Normally non-accessible (Protective Bolt Covers and Polyurethane Gasket and Filler and surrounding concrete, Attachment Bolt, Nut and Washer Plate)	Sheltered	Two Bolt Cover Assemblies – If no evidence of adverse concrete degradation	Baseline AMP inspection on the first set of Roof Protective Bolt Cover assemblies are to be performed within the first year after the license renewal effective date. The 2nd, 3rd, 4th, and 5th sets of baseline inspections are due in the subsequent 1-year intervals. A grace period of 3 months may be applied for the due date of each baseline and AMP inspection*	Direct Visual (IWA-2210, VT-3 Inspection on Steel Hardware) with Direct Visual on remaining SSCs (ACI 349.3R, Section 3.5.1)	New set of Two Each Year on Rolling Five Year Basis (i.e., Repeat Set One on Year 6, Set Two on Year 7, etc.)	ACI 349.3R – Second Tier (including Section 5.2.4 for Polyurethane components) For steel components, VT-3: ASME Section XI, Subarticle IWF-3400 and as applicable Section 10.2 of ASTM D7167 for coatings with limits on blistering, cracking, flaking, rusting and physical damage and with flaws defined by any of the following: -Corrosion and material wastage (loss of material) -Crevice and pitting corrosion (loss of material) -Worn, flaking, or oxide-coated surfaces (loss of material) -Corrosion stains on adjacent components and structures (loss of material) -Stains caused by leaking rainwater	Disposition per deficiency tracking system in STI-NLF-QA-016 (See [9.3] Section A2.7), including for steel components a more detailed VT-1 visual examination of flaws identified. For any concrete conditions exceeding 2nd tier criteria, a technical evaluation of degradation assessing whether ASR is an apparent or root cause.
HSM SSCs (Concrete) – Normally non-accessible areas	Sheltered	2 HSMs (HSM-16 and HSM-5)	Baseline AMP inspection to be performed no later than two years after the license renewal effective date, then at 10-year intervals thereafter, with a 2-year grace period*	Remote Visual (ACI 349.3R, Section 3.5.1)	Same HSMs, decreased to 5 ± 1 year if exceed AC or evidence of adverse concrete degradation	ACI 349.3R – Second Tier	Disposition per deficiency tracking system in STI-NLF-QA-016 (See [9.3] Section A2.7), including if aging effects are confirmed, it may warrant more frequent inspections or performing inspections in inaccessible locations. For any concrete conditions exceeding 2nd tier criteria, a technical evaluation of degradation assessing whether ASR is an apparent or root cause.

Table 9.8-8
HSM Aging Management Program

SSCs	Environment	Number of SSCs	Frequency	Inspection Type	Trending	Acceptance Criteria (AC)	Corrective Actions
HSM SSCs (Steel including Coatings) – Normally non-accessible areas	Sheltered	2 HSMs (HSM-16 and HSM-5)	Baseline AMP inspection to be performed no later than two years after the license renewal effective date, then at 10-year intervals thereafter, with a 2-year grace period*	Remote Visual (IWA-2210, VT-3 Inspection on Steel Hardware)	Same HSMs, decreased to 5 ± 1 year if exceed AC or evidence of adverse steel degradation	Article IWF-3000 and Subarticle IWA-3100 (Section 10.2 of ASTM D7167 for coatings with limits on blistering, cracking, flaking, rusting and physical damage)	Disposition per deficiency tracking provided by STI-NLF-QA-016 (See [9.3] Section A2.7), including if aging effects are confirmed, it may warrant more frequent inspections or performing inspections in inaccessible locations.
HSM SSCs – Inaccessible Areas including the Seismic Retainer, backside of HSM Shield Door and HSM Shield Door opening	Sheltered	As required per scheduled inspection findings and STI-NLF-QA-016 corrective actions	In accordance with Corrective Actions, [9.3] Section A2.7	Direct or Remote Visual or both	In accordance with Corrective Actions, [9.3] Section A2.7	Via the TMI-2 ISFSI corrective action program STI-NLF-QA-016 to ensure the aging effect is adequately managed and that the SSCs intended function is maintained during the PEO	Further evaluation and disposition per deficiency tracking provided by STI-NLF-QA-016 (See [9.3] Section A2.7), including more frequent inspections.
* The interval “clock” starts as of the prior inspection due date. For example, if a 5-year inspection is due on 01/01/2025 and performed on 05/30/2025 (within the 1-year grace period), the next inspection is still due on 01/01/2030 and must be performed no later than 01/01/2031.							

Table 9.8-9
OS197 Transfer Cask Aging Management Program

AMP Element	AMP Activity
Scope of Program	This program visually inspects and monitors the accessible TC subcomponent surfaces, including cask cavity surfaces (e.g., inner liner), and the OS197L supplemental shielding subcomponents, to ensure they are intact and free from loss of material due to general, crevice or pitting corrosion and loss of material due to wear.
Preventative Actions	The program is a condition-monitoring program. Demineralized water shall be used to fill the neutron shield, rather than municipal water. The neutron shield shall be drained before storage to prevent damage due to freezing and mitigate corrosion. When not in use the TC should be stored in a building or container that prevents direct exposure to precipitation. Tarpaulins, if used, should not be in contact with the TC surface to prevent accumulation of condensation. After fuel is loaded in the DSC and the cask is raised above the pool water surface, the cask is rinsed off with demineralized water.
Parameters Monitored or Inspected	Surface condition: wear, corrosion, and coating. Signs of leakage for the liquid neutron shield.
Detection of Aging Effects Method or Technique:	Visual inspection per VT-3. Any area of the TC exhibiting evidence of possible crevices, pits, water stains or discoloration during the VT-3 examinations is subjected to a VT-1 examination per IWA-2211. Fasteners are inspected for threaded parts condition, corrosion, and signs of wear or other degradation. PT Exams of the upper and lower trunnion bearing surface and the accessible upper and lower trunnion welds. VT-3 exam is also performed to detect any signs of neutron shield leakage (TC with liquid neutron shield only) with VT-1 employed if there are any signs of corrosion.
Frequency:	VT-3: once per five years VT-1 if indications of possible deterioration during VT-3 inspection PT: once per five years Liquid neutron shield: once per five years
Sample Size: Data Collection:	Each TC. Records of inspection. Photos or videos. Records of any required corrective actions.
Timing of Inspections:	At frequency defined above. If the TC has not been used for more than 5 years, TC aging management is not required, but the inspection must be performed prior to next use of the TC.
Monitoring and Trending	A baseline inspection is performed as part of the monitoring and trending activities so that the inspection results can be used for subsequent trending.
Acceptance Criteria	• VT-3 and VT-1 examinations in accordance with Section XI IWA-2213 and IWA-2211, respectively. If corrosion on any of the transfer cask subcomponents or wear of the inner liner thickness are detected, the finding is entered into the licensee's corrective action program to determine, based on engineering evaluation, the extent and impact of the corrosion on the ability of the TC to perform its intended function. • PT exam acceptance of the trunnion bearing surfaces and accessible welds per ASME Section III, NC-5350. • Acceptable coatings are free of peeling or delamination. Blistering, cracking, flaking, rusting, and physical damage will be evaluated to determine acceptability.
Corrective Actions	Unsatisfactory degradation is entered in a corrective action program for resolution. Deficiencies are either corrected or are evaluated to be acceptable for continued service through engineering analysis. Extent of condition investigation per the licensee's corrective action program may trigger additional inspections via a different method, increased inspection frequency and/or expanded inspection sample size.
Confirmation Process	Confirmatory actions, as needed, are implemented as part of the CoC holder or licensee's corrective action program, as applicable.
Administrative Controls	Administrative controls under the CoC holder or licensee's QA procedures and corrective action program provide a formal review and approval process. Licensee individual events and conditions not rising to the level of NRC reportability based on the criteria in 10 CFR 72 are communicated to the CoC holder.
Operating Experience	The overall effectiveness of these inspections/activities in maintaining the condition and functionality of the casks is supported by the continued use of the transfer casks and their continued compliance with the certificate of compliance.

9.9 References

9.1 U.S. Nuclear Regulatory Commission, NUREG-1927, Revision 1, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel," June 2016, NRC Accession Number ML16179A148.

9.2 Nuclear Energy Institute, NEI 14-03, Revision 2, "Format, Content and Implementation Guidance for Dry Cask Storage Operations-Based Aging Management," December 2016, Washington D.C.

9.3 U.S. Department of Energy-Idaho Office, "TMI-2 Independent Spent Fuel Storage Installation Application for 10 CFR 72 Specific License Renewal, Special Nuclear Materials License Number SNM-2508 (Docket No. 72-20)," Revision 3, May 2019, NRC Accession Number ML19150A336.

9.4 AREVA TN Americas, "Renewal Application for the Standardized NUHOMS® System, Certificate of Compliance No. 1004, Revision 3," September 29, 2016, NRC Accession Number 16279A371 (Submittal Enclosure 3, Proprietary Version) and ML16279A372 (Submittal Enclosure 4, Public Version).

9.5 TN Americas LLC, "Updated Final Safety Analysis Report (UFSAR) for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel," Revision 17, March 2018, Docket No. 72-1004, NRC Accession Number 18079A008 (Proprietary Version) and ML18079A007 (Public Version).

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