AREVA

CoC 1004

STANDARDIZED NUHOMS®

Amendment 10 Application

NON-PROPRIETARY

Technical Specifications Changes
UFSAR Chapter 1 Changes
UFSAR Appendix M Changes
UFSAR Appendix P Changes
Appendix T – 61BTH Part 1 of 2

VOLUME 1 OF 4

TRANSNUCLEAR INC.

ATTACHMENT A

TECHNICAL SPECIFICATIONS

TRANSNUCLEAR, INC.

STANDARDIZED NUHOMS® HORIZONTAL MODULAR STORAGE SYSTEM

CERTIFICATE OF COMPLIANCE NO. 1004

AMENDMENT NO. *10*

DOCKET 72-1004

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1.0 INTRODUCTION

This section presents the conditions which a potential user (general licensee) of the standardized NUHOMS® system must comply with, in order to use the system under the general license in accordance with the provisions of 10 CFR 72.210 and 10 CFR 72.212. These conditions have either been proposed by the system vendor, imposed by the NRC staff as a result of the review of the FSAR, or are part of the regulatory requirements expressed in 10 CFR 72.212.

As referenced in this document, the term "HSM" is applicable to both the Standardized HSM and the HSM-H modules unless the applicability of one of the Technical Specifications contained in this document is limited to a specific HSM model.

As referenced in this document, the term "Transfer Cask" or "TC" is applicable to both the standardized transfer cask and the "OS197" type transfer cask unless the applicability of one of the Technical Specifications contained in this document is limited to a specific transfer cask model.

1.1 General Requirements and Conditions

1.1.1 Regulatory Requirements for a General License

Subpart K of 10 CFR Part 72 contains conditions for using the general license to store spent fuel at an independent spent fuel storage installation at power reactor sites authorized to possess and operate nuclear power reactors under 10 CFR Part 50. Technical regulatory requirements for the licensee (user of the standardized NUHOMS® system) are contained in 10 CFR 72.212(b).

Under 10 CFR 72.212(b)(2) requirements, the licensee must perform written evaluations, before use, that establish that: (1) conditions set forth in the Certificate of Compliance have been met; (2) cask storage pads and areas have been designed to adequately support the static load of the stored casks; and (3) the requirements of 10 CFR 72.104 "Criteria for radioactive materials in effluent and direct radiation from an ISFSI or MRS," have been met. In addition, 10 CFR 72.212(b)(3) requires that the licensee review the FSAR and the associated SER, before use of the general license, to determine whether or not the reactor site parameters (including earthquake intensity and tornado missiles), are encompassed by the cask design bases considered in these reports.

The requirements of 10 CFR 72.212(b)(4) provide that, as a holder of a Part 50 license, the user, before use of the general license under Part 72, must determine whether activities related to storage of spent fuel involve any unreviewed safety issues, or changes in technical specifications as provided under 10 CFR 50.59. Under 10 CFR 72.212(b)(5), the general license holder shall also protect the spent fuel against design basis threats and radiological sabotage pursuant to 10 CFR 73.55. Other general license requirements dealing with review of reactor emergency plans, quality assurance program, training, and radiation protection program must also be satisfied pursuant to 10 CFR 72.212(b)(6). Records and procedural requirements for the general license holder are described in 10 CFR 72.212(b)(7), (8), (9) and (10).

Without limiting the requirements identified above, site-specific parameters and analyses, identified in the SER, that will need verification by the system user, are as a minimum, as follows:

1. The temperature of 70°F as the maximum average yearly temperature with solar incidence *for the 24P, 52B and 61BT DSCs*. The average daily ambient temperature shall be 100°F or less *for the 24P, 52B, 61BT, 32PT, 24PHB, 61BTH, and 24PTH DSCs. For the 32PTH1 DSC, the average daily ambient temperature shall be 106°F or less.*

2. The temperature extremes either of 125°F with incident solar radiation (for the 24P, 52B, and 61BT DSCs) or 117°F with solar incidence (for the 32PT, 24PHB, 24PTH, *61BTH and 32PTH1* DSCs) and -40°F with no solar incidence for storage of the DSC inside the HSM. The 117°F extreme ambient temperature corresponds to a 24 hour calculated average temperature of 102°F *for the 32PT DSC only.*

3. The horizontal and vertical seismic acceleration levels of 0.25g and 0.17g, respectively *for the systems using the Standardized HSMs.*

   The horizontal and vertical seismic acceleration levels for the HSM-H are payload specific as described below:

   - *0.3g horizontal and 0.2g vertical for the 24PTH and 61BTH DSCs,*
   - *0.3g horizontal and 0.25g vertical for the 32PTH1 DSC, and*
   - *1.0g horizontal and 1.0g vertical for the "high-seismic" HSM-H option with 32PTH1 DSC.*

4. The analyzed flood condition of 15 fps water velocity and a height of 50 feet of water (full submergence of the loaded HSM DSC).

5. The potential for fire and explosion should be addressed, based on site-specific considerations.

6. The HSM foundation design criteria are not included in the FSAR. Therefore, the nominal FSAR design or an alternative should be verified for individual sites in accordance with 10 CFR 72.212(b)(2)(ii). Also, in accordance with 10 CFR 72.212(b)(3), the foundation design should be evaluated against actual site parameters to determine whether its failure would cause the standardized NUHOMS® system to exceed the design basis accident conditions.

7. The potential for lightning damage to any electrical system associated with the standardized NUHOMS® system (e.g., thermal performance monitoring) should be addressed, based on site-specific considerations.

8. *If an independent spent fuel storage installation site is located in a coastal salt water marine atmosphere, then any load-bearing carbon steel DSC support structure rail components of any associated HSM-H shall be procured with a minimum 0.20 percent copper content for corrosion resistance.*

9. Any other site parameters or consideration that could decrease the effectiveness of cask systems important to safety.

In accordance with 10 CFR 72.212(b)(2), a record of the written evaluations must be retained by the licensee until spent fuel is no longer stored under the general license issued under 10 CFR 72.210.

1.1.2 Operating Procedures

Written operating procedures shall be prepared for cask handling, loading, movement, surveillance, and maintenance. The operating procedures suggested generically in the FSAR should provide the basis for the user's written operating procedure. The following additional procedure requested by NRC staff should be part of the user operating procedures:

> If fuel needs to be removed from the DSC, either at the end of service life or for inspection after an accident, precautions must be taken against the potential for the presence of damaged or oxidized fuel and to prevent radiological exposure to personnel during this operation. This can be achieved with this design by the use of the purge and fill valves which permit a determination of the atmosphere within the DSC before the removal of the inner top cover and shield plugs, prior to filling the DSC cavity with water (borated water for the 24P or 32PT or 24PHB or 24PTH *or 32PTH1*). If the atmosphere within the DSC is helium, then operations should proceed normally with fuel removal either via the transfer cask or in the pool. However, if air is present within the DSC, then appropriate filters should be in place to preclude the uncontrolled release of any potential airborne radioactive particulate from the DSC via the purge-fill valves. This will protect both personnel and the operations area from potential contamination. For the accident case, personnel protection in the form of respirators or supplied air should be considered in accordance with the licensee's Radiation Protection Program.

1.1.3 Quality Assurance

Activities at the ISFSI shall be conducted in accordance with a Commission-approved quality assurance program which satisfies the applicable requirements of 10 CFR Part 50, Appendix B, and which is established, maintained, and executed with regard to the ISFSI.

1.1.4 Heavy Loads Requirements

Lifts of the DSC in the TC must be made within the existing heavy loads requirements and procedures of the licensed nuclear power plant. The TC design has been reviewed under 10 CFR Part 72 and found to meet NUREG-0612 and ANSI N14.6. However, an additional safety review (under 10 CFR 50.59) is required to show operational compliance with NUREG-0612 and/or existing plant-specific heavy loads requirements.

1.1.5 Training Module

A training module shall be developed for the existing licensee's training program establishing an ISFSI training and certification program. This module shall include the following:

1. Standardized NUHOMS® Design (overview);
2. ISFSI Facility Design (overview);
3. Certificate of Compliance conditions (overview);
4. Fuel Loading, Transfer Cask Handling, DSC Transfer Procedures; and

5. Off-Normal Event Procedures.

1.1.6 Pre-Operational Testing and Training Exercise

A dry run of the DSC loading, TC handling and DSC insertion into the HSM shall be held. This dry run shall include, but not be limited to, the following:

1. Functional testing of the TC with lifting yokes to ensure that the TC can be safely transported over the entire route required for fuel loading, washdown pit (decontamination area) and trailer loading.
2. DSC loading into the TC to verify fit and TC/DSC annulus seal.
3. Testing of TC on transport trailer and transported to ISFSI along a predetermined route and aligned with an HSM.
4. Testing of transfer trailer alignment and docking equipment. Testing of hydraulic ram to insert a DSC loaded with test weights into an HSM and then retrieve it.
5. Loading a mock-up fuel assembly into the DSC.
6. DSC sealing, vacuum drying, and cover gas backfilling operations (using a mock-up DSC).
7. Opening a DSC (using a mock-up DSC).
8. Returning the DSC and TC to the spent fuel pool.

1.1.7 Special Requirements for First System in Place

The heat transfer characteristics of the cask system will be recorded by temperature measurements of the first DSC placed in service. The first DSC shall be loaded with assemblies, constituting a source of approximately 24 kW in HSM (approximately 40.8 kW in HSM-H). The DSC shall be loaded into the HSM, and the thermal performance will be assessed by measuring the air inlet and outlet temperatures for normal airflow. Details for obtaining the measurements are provided in Section 1.2.8, under "Surveillance."

A letter report summarizing the results of the measurements shall be submitted to the NRC for evaluation and assessment of the heat removal characteristics of the cask in place within 30 days of placing the DSC in service, in accordance with 10 CFR 72.4.

Should the first user of the system not have fuel capable of producing a 24 kW heat load (40.8 kW heat load for 24PTH *or 32PTH1* DSC), or be limited to a lesser heat load, as in the case of BWR fuel, the user may use a lesser load for the process, provided that a calculation of the temperature difference between the inlet and outlet temperatures is performed, using the same methodology and inputs documented in the FSAR, with lesser load as the only exception. The calculation and the measured temperature data shall be reported to the NRC in accordance with 10 CFR 72.4. The calculation and comparison need not be reported to the NRC for DSCs that are subsequently loaded with lesser loads than the initial case. However, for the first or any other user, the process needs to be performed and reported for any higher heat sources, up to 24 kW for PWR fuel stored in the 24P or 32PT or 24PHB or 24PTH-S-LC; up to 40.8 kW for PWR fuel stored in the 24PTH-S or 24PTH-L *or 32PTH1,* 19 kW for BWR fuel stored in the 52B, 18.3 kW for BWR fuel stored in the 61BT, *22.0 kW for a Type 1 61BTH, and 31.2 kW for a Type 2 61BTH DSC,* which are the maximum allowed under the Certificate of Compliance for these specific DSCs. The NRC will also accept the use of artificial thermal loads other than spent fuel, to satisfy the above requirement.

1.1.8 Surveillance Requirements Applicability

The specified frequency for each Surveillance Requirement is met if the surveillance is performed within 1.25 times the interval specified in the frequency, as measured from the previous performance.

For frequencies specified as "once," the above interval extension does not apply.

If a required action requires performance of a surveillance or its completion time requires period performance of "once per...," the above frequency extension applies to the repetitive portion, but not to the initial portion of the completion time.

Exceptions to these requirements are stated in the individual specifications.

1.1.9 Supplemental Shielding

Supplemental shielding and engineered features (e.g., earthen berms, shield walls) that are used to ensure compliance with 10 CFR 72.104(a) by each general licensee are to be considered important to safety and must be appropriately evaluated under 10 CFR 72.212(b).

1.1.10 HSM-H Storage Configuration

A minimum of two (2) HSM-Hs are required to be placed adjacent to each other for stability during design basis flood loads.

For the high seismic HSM-H option, a minimum of three (3) HSM-Hs must be connected with each other.

1.2 Technical Specifications, Functional and Operating Limits

1.2.1 Fuel Specifications

Limit/Specification: The characteristics of the spent fuel which is allowed to be stored in the standardized NUHOMS® system are limited by those included in Tables 1-1a, 1-1b, 1-1c, 1-1d, 1-1e, 1-1f, 1-1g, 1-1i, 1-1j, 1-1l, 1-1m, *1-1t, 1-1u, 1-1aa, and 1-1bb.*

Applicability: The specification is applicable to all fuel to be stored in the standardized NUHOMS® system.

Objective: The specification is prepared to ensure that the peak fuel rod cladding temperatures, maximum surface doses, and nuclear criticality effective neutron multiplication factor are below the design limits. Furthermore, the fuel weight and type ensures that structural conditions in the FSAR bound those of the actual fuel being stored.

Action: Each spent fuel assembly to be loaded into a DSC shall have the parameters listed in Tables 1-1a, 1-1b, 1-1c, 1-1d, 1-1e, 1-1f, 1-1g, 1-1i, 1-1j, 1-1l, 1-1m, *1-1t, 1-1u, 1-1aa, and 1-1bb* verified and documented. Fuel not meeting this specification shall not be stored in the standardized NUHOMS® system.

Surveillance: Prior to loading of a spent fuel assembly into a DSC, the identity of each fuel assembly shall be independently verified and documented.

Bases: The specification is based on consideration of the design basis parameters included in the FSAR and limitations imposed as a result of the staff review. Such parameters stem from the type of fuel analyzed, structural limitations, criteria for criticality safety, criteria for heat removal, and criteria for radiological protection. The standardized NUHOMS® system is designed for dry, horizontal storage of irradiated light water reactor (LWR) fuel. The principal design parameters of the fuel to be stored can accommodate standard PWR fuel designs manufactured by Babcock and Wilcox (B&W), Combustion Engineering (CE), and Westinghouse (WE), and standard BWR fuel manufactured by General Electric (GE), Exxon/ANF, *and Framatome ANP*. The NUHOMS®-24P and 52B systems are limited for use to these standard designs and to *reload* designs by other manufacturers as listed in Chapter 3 of the FSAR. The analyses presented in the FSAR are based on non-consolidated, zircaloy-clad fuel with no known or suspected gross breaches.

The NUHOMS®-61BT, 32PT, 24PHB, 24PTH, *61BTH, and 32PTH1* systems are limited for use to these standard designs and to *reload* designs by other manufacturers as listed in Tables 1-1d, 1-1f, 1-1i, 1-1j, 1-1m, *1-1u and 1-1bb*. The corresponding analyses for these systems are presented in Appendix K, M, N, P, *T, and U* respectively of the FSAR.

The physical parameters that define the mechanical and structural design of the HSM and DSC are the fuel assembly dimensions and weight. The calculated stresses given in the FSAR are based on the physical parameters given in Tables 1-1a, 1-1b, 1-1c, 1-1d, 1-1e, 1-1f, 1-1g, 1-1i, 1-1j, 1-1l, 1-1m, *1-1t, 1-1u, 1-1aa and 1-1bb* which represent the upper bound.

The design basis fuel assemblies for nuclear criticality safety are Babcock and Wilcox 15x15 fuel assemblies for the NUHOMS®-24P and 24PHB, General Electric 7x7 fuel assemblies for the NUHOMS®-52B and General Electric 10x10 fuel assemblies for the NUHOMS®-61BT and *61BTH* designs. The nuclear criticality safety for the NUHOMS®-32PT, NUHOMS®-24PTH *and NUHOMS® 32PTH1* designs is based on an evaluation of individual fuel assembly class as listed in Table 1-1e, Table 1-1l *and Table 1-1aa,* respectively.

The NUHOMS®-24P Long Cavity DSC is designed for use with standard Burnable Poison Rod Assembly (BPRA) designs for the B&W 15x15 and Westinghouse 17x17 fuel types as listed in Appendix J of the FSAR. The NUHOMS®-24PHB Long Cavity DSC is designed for use with standard BPRA designs for the B&W 15x15 fuel types listed in Appendix N of the FSAR.

The design basis PWR BPRA for shielding source terms and thermal decay heat load is the Westinghouse 17x17 Pyrex Burnable Absorber, while the DSC internal pressure analysis is limited by B&W 15x15 BPRAs. In addition, BPRAs with cladding failures were determined to be acceptable for loading into NUHOMS®-24P Long Cavity DSC as evaluated in Appendix J of the FSAR. The acceptability of loading BPRAs, including damaged BPRAs into the long cavity versions of the 32PT and 24PTH DSC configurations is provided in Appendix M and Appendix P respectively of the FSAR.

Control Components (CCs), as listed in Table 1-1*e, Table 1-1l and Table 1-1aa* are authorized for storage in the *NUHOMS®-32PT DSC,* NUHOMS®-24PTH *DSC and NUHOMS®-32PTH1 DSCs, respectively. For these DSCs, BPRAs are considered as being representative of all CCs, unless specifically excluded. The acceptability of loading CCs into the NUHOMS®-32PT, NUHOMS®-24PTH and NUHOMS®-32PTH1 DSCs is provided in Appendix M, P and U of the FSAR, respectively.*

The NUHOMS®-24P is designed for unirradiated fuel with an initial fuel enrichment of up to 4.0 wt. % U-235, taking credit for soluble boron in the DSC cavity water during loading operations. Section 1.2.15 defines the requirements for boron concentration in the DSC cavity water for the NUHOMS®-24P design only. In addition, the fuel assemblies qualified for storage in NUHOMS®-24P DSC have an equivalent unirradiated enrichment of less than or equal to 1.45 wt. % U-235. Figure 1-1 defines the required burnup as a function of initial enrichment. The NUHOMS®-52B is designed for unirradiated fuel with an initial enrichment of less than or equal to 4.0 wt. % U-235.

The NUHOMS®-61BT has three basket configurations, based on the boron content in the poison plates as listed in Table 1-1k. The maximum lattice average enrichment authorized for Type A, B and C NUHOMS®-61BT DSC is 3.7, 4.1 and 4.4 wt. % U-235 respectively.

The NUHOMS®-61BTH DSC is designed for unirradiated fuel with a maximum lattice average enrichment of 5.0 wt. % U-235 as shown in Table 1-1t, taking credit for the boron content in the poison plates of the DSC basket, as shown in Table 1-1v for intact fuel and Table 1-1w for damaged fuel. The NUHOMS®-61BTH DSC (similar to 61BT DSC) is designated as Type 1 and Type 2 depending upon the rails used in the basket.

Each 61BTH DSC type is provided with six alternate basket configurations, based on the boron content in the poison plates, as listed in Table 1-1v or Table 1-1w (designated as "A" for the lowest B10 loading to "F" for the highest B10 loading). Three alternate poison materials are allowed: (a) Borated Aluminum alloy, or (b) a Boron Carbide/Aluminum Metal Matrix Composite (MMC), or (c) Boral®.

For the 61BTH DSC, Borated Aluminum, MMC, or Boral® shall be supplied in accordance with UFSAR Sections T.9.1.7.1, T.9.1.7.2, T.9.1.7.3, T.9.1.7.5, T.9.1.7.6.5, and T.9.1.7.7.3, with the minimum B10 areal density specified in Table 1-1v or Table 1-1w. These sections of the FSAR are hereby incorporated into the NUHOMS® 1004 CoC.

The NUHOMS®-32PT is designed for unirradiated fuel with an initial fuel enrichment of up to 5.0 wt. % U-235 as shown in Table 1-1g, taking credit for Poison Rod Assemblies (PRAs), poison plates, and soluble boron in the DSC cavity water during loading operations. The required PRA locations are per Figures 1-5, or 1-6 or 1-7. A 32PT DSC basket may contain 0, 4, 8 or 16 PRAs and is designated a Type A, Type B, Type C or Type D basket, respectively. Each basket type is designed with up to three alternate configurations depending on the configuration of poison plates provided (16, 20 or 24) as shown in Table 1-1g. Table 1-1h specifies the minimum B10 content for poison plates. Specification 1.2.15a defines the requirements for boron concentration in the DSC cavity water for the NUHOMS®-32PT design only.

The NUHOMS®-24PHB is designed for unirradiated fuel with an assembly average initial enrichment of less than or equal to 4.5 wt. % U-235 as shown in Table 1-1i, taking credit for soluble boron in the DSC cavity water during loading operations. Specification 1.2.15b defines the requirements for boron concentration in the DSC cavity water for the NUHOMS®-24PHB design only.

The NUHOMS®-24PTH is designed for unirradiated fuel with an assembly average initial enrichment of less than or equal to 5.0 wt. % U-235, as shown in Table 1-1l, taking credit for soluble boron in the DSC cavity water during loading operations and the boron content in the poison plates of the DSC basket, as shown in Table 1-1p for intact fuel and Table 1-1q for damaged fuel. The 24PTH DSC basket is designated as Type 1, if it is provided with aluminum inserts and Type 2 if it does not contain the aluminum inserts. Each basket type is designed with three alternate configurations, based on the boron content in the poison plates, as listed in Table 1-1r. The specification for the Metal Matrix Composite (MMC) for the 24PTH poison plates is provided in Table 1-1s. Specification 1.2.15c defines the requirements for boron concentration in the DSC cavity water as a function of the DSC basket type for the various fuel classes authorized for storage in the 24PTH DSC for the NUHOMS®-24PTH design only.

The NUHOMS®-32PTH1 is designed for unirradiated fuel with an assembly average initial enrichment of less than or equal to 5.0 wt. % U-235, as shown in Table 1-1aa, taking credit for soluble boron in the DSC cavity water during loading operations and the boron content in the poison plates of the DSC basket, as shown in Table 1-1cc for intact fuel and Table 1-1dd for damaged fuel. The 32PTH1 DSC basket is designated as Type 1 or Type 2, depending upon the rails used in the basket. Each basket type is designed with five alternate configurations, based on the boron content in the poison plates, as listed in Table 1-1ff. Specification 1.2.15d defines the requirements for boron concentration in the DSC cavity water as a function of the DSC basket type for the various fuel classes authorized for storage in the 32PTH1 DSC for the NUHOMS®-32PTH1 design only.

For the 32PTH1 DSC, Borated Aluminum, MMC, or Boral® shall be supplied in accordance with UFSAR Sections U.9.1.7.1, U.9.1.7.2, U.9.1.7.3, U.9.1.7.5, U.9.1.7.6.5, and U.9.1.7.7.3, with the minimum B10 areal density specified in Table 1-1ff. These sections of the FSAR are hereby incorporated into the NUHOMS® 1004 CoC.

The thermal design criterion of the fuel to be stored is that the total maximum heat generation rate per assembly and BPRA or Control Components be such that the fuel cladding temperature is maintained within established limits during normal and off-normal conditions. For the NUHOMS®-24P, 52B and 61BT systems, fuel cladding temperature limits were established based on methodology in PNL-6189 and PNL-4835. For the NUHOMS®-32PT, 24PHB and 24PTH systems, fuel cladding limits are based on ISG-11, Rev. 2 (Reference 3). *For the NUHOMS®-61BTH system,* NUHOMS®-61BT system with Framatome-

ANP 9x9 Version 9x9-2 (FANP9 9x9-2) fuel assemblies, *and the NUHOMS®-32PTH1 system,* fuel cladding limits are based on ISG-11, Rev. 3 (Reference 4).

The radiological design criterion is that fuel stored in the NUHOMS® system must not increase the average calculated HSM or transfer cask surface dose rates beyond those calculated for the 24P, 24PHB, 52B, 61BT, or 32PT canister full of design basis fuel assemblies with or without BPRAs. The design value average HSM and cask surface dose rates for the 24P and 52B canisters were calculated to be 48.6 mrem/hr and 591.8 mrem/hr respectively based on storing twenty four (24) Babcock and Wilcox 15x15 PWR assemblies (without BPRAs) with 4.0 wt. % U-235 initial enrichment, irradiated to 40,000 MWd/MTU, and having a post irradiation time of five years. To account for BPRAs, the fuel assembly cooling required times are increased to maintain the above dose rate limits.

Table 1-1a
PWR Fuel Specifications for Fuel to be Stored in the Standardized NUHOMS®-24P DSC

Title or Parameter	Specifications
Fuel	Only intact, unconsolidated PWR fuel assemblies (with or without BPRAs) with the following requirements.
Physical Parameters (without BPRAs)	
Maximum Assembly Length (unirradiated)	165.75 in (standard cavity) 171.71 in (long cavity)
Nominal Cross-Sectional Envelope	8.536 in
Maximum Assembly Weight	1682 lbs
No. of Assemblies per DSC	≤ 24 intact assemblies
Fuel Cladding	Zircalloy-clad fuel with no known or suspected gross cladding breaches
Physical Parameters (with BPRAs)	
Maximum Assembly + BPRA Length (unirradiated)	
With Burnup > 32,000 and ≤ 45,000 MWd/MTU	171.71 in (long cavity)
With Burnup ≤ 32,000 MWd/MTU	171.96 in (long cavity)
Nominal Cross-Sectional Envelope	8.536 in
Maximum Assembly + BPRA Weight	1682 lbs
No. of Assemblies per DSC	≤ 24 intact assemblies
No. of BPRAs per DSC	≤ 24 BPRAs
Fuel Cladding	Zircalloy-clad fuel with no known or suspected gross cladding breaches
Nuclear Parameters	
Fuel Initial Enrichment	≤ 4.0 wt. % U-235
Fuel Burnup and Cooling Time	Per Table 1-2a (without BPRAs) or Per Table 1-2c (with BPRAs)
BPRA Cooling Time (Minimum)	5 years for B&W Designs 10 years for Westinghouse Designs
Alternate Nuclear Parameters	
Initial Enrichment	≤ 4.0 wt. % U-235
Burnup	≤ 40,000 MWd/MTU
Decay Heat (Fuel + BPRA)	≤ 1.0 kW per assembly
Neutron Fuel Source	≤ 2.23 x 10^8 n/sec per assy with spectrum bounded by that in Chapter 7 of FSAR
Gamma (Fuel + BPRA) Source	≤ 7.45 x 10^{15} g/sec per assy with spectrum bounded by that in Chapter 7 of FSAR

Table 1-1b
BWR Fuel Specifications for Fuel to be Stored in the Standardized NUHOMS®-52B DSC

Title or Parameter	Specifications
Fuel	Only intact, unconsolidated BWR fuel assemblies with the following requirements
Physical Parameters	
Maximum Assembly Length (unirradiated)	176.16 in
Nominal Cross-Sectional Envelope*	5.454 in
Maximum Assembly Weight	725 lbs
No. of Assemblies per DSC	≤ 52 intact channeled assemblies
Fuel Cladding	Zircalloy-clad fuel with no known or suspected gross cladding breaches
Nuclear Parameters	
Fuel Initial Lattice Enrichment	≤ 4.0 wt. % U-235
Fuel Burnup and Cooling Time	Per Table 1-2b
Alternate Nuclear Parameters	
Initial Enrichment	≤ 4.0 wt. % U-235
Burnup	≤ 35,000 MWd/MTU and per Figure 1.1
Decay Heat	≤ 0.37 kW per assembly
Neutron Source	≤ 1.01×10^{8} n/sec per assy with spectrum bounded by that in Chapter 7 of FSAR
Gamma Source	≤ 2.63×10^{15} g/sec per assy with spectrum bounded by that in Chapter 7 of FSAR

*Cross-Sectional Envelope is the outside dimension of the fuel channel.

Table 1-1c
BWR Fuel Specifications for Fuel to be Stored in the Standardized NUHOMS®-61BT DSC

Physical Parameters	
Fuel Design	7x7, 8x8, 9x9, or 10x10 BWR fuel assemblies manufactured by General Electric or equivalent reload fuel that are enveloped by the fuel assembly design characteristics listed in Table 1-1d.
Cladding Material	Zircaloy
Fuel Damage	Cladding damage in excess of pinhole leaks or hairline cracks is not authorized to be stored as "Intact BWR Fuel."
Channels	Fuel may be stored with or without fuel channels
Maximum Assembly Length	176.2 in
Nominal Assembly Width (excluding channels)	5.44 in
Maximum Assembly Weight	705 lbs
Radiological Parameters: No interpolation of Radiological Parameters is permitted between Groups.	
Group 1	
Maximum Burnup	27,000 MWd/MTU
Minimum Cooling Time	5-years
Maximum Lattice Average Initial Enrichment	See Minimum Boron Loading below.
Minimum Initial Bundle Average Enrichment	2.0 wt. % U-235
Maximum Initial Uranium Content	198 kg/assembly
Maximum Decay Heat	300 W/assembly(1)
Group 2	
Maximum Burnup	35,000 MWd/MTU
Minimum Cooling Time	8-years
Maximum Lattice Average Initial Enrichment	See Minimum Boron Loading below.
Minimum Initial Bundle Average Enrichment	2.65 wt. % U-235
Maximum Initial Uranium Content	198 kg/assembly
Maximum Decay Heat	300 W/assembly(1)
Group 3	
Maximum Burnup	37,200 MWd/MTU
Minimum Cooling Time	6.5-years
Maximum Lattice Average Initial Enrichment	See Minimum Boron Loading below.
Minimum Initial Bundle Average Enrichment	3.38 wt. % U-235
Maximum Initial Uranium Content	198 kg/assembly
Maximum Decay Heat	300 W/assembly(1)
Group 4	
Maximum Burnup	40,000 MWd/MTU
Minimum Cooling Time	10-years
Maximum Lattice Average Initial Enrichment	See Minimum Boron Loading below.
Minimum Initial Bundle Average Enrichment	3.4 wt. % U-235
Maximum Initial Uranium Content	198 kg/assembly
Maximum Decay Heat	300 W/assembly(1)
Minimum Boron Loading	
Lattice Average Enrichment (wt. % U-235)	Minimum B-10 Content in Poison Plates
4.4	Type C Basket
4.1	Type B Basket
3.7	Type A Basket
Alternate Radiological Parameters:	
Maximum Initial Enrichment:	See Minimum Boron Loading Above
Fuel Burnup, Initial Bundle Average Enrichment, and Cooling Time:	See Table 1-2q
Maximum Initial Uranium Content:	198 kg/assembly
Maximum Decay Heat:	300 W/assembly(1)

(1) For FANP9 9x9-2 fuel assemblies, the maximum decay heat is limited to 0.21 kW/assembly

Table 1-1d
BWR Fuel Assembly Design Characteristics (1) (2)
for the NUHOMS®-61BT DSC

Transnuclear, ID	**7x7-49/0(5)**	**8x8-63/1(5)**	**8x8-62/2(5)**	**8x8-60/4(5)**	**8x8-60/1(5)**	**9x9-74/2**	**10x10-92/2**	**7x7-49/0(5)**	**7x7-48/1Z(5)**	**8x8-60/4Z(5)**	**9x9-79/2**
GE Designations	GE1 GE2 GE3	GE4	GE-5 GE-Pres GE-Barrier GE8 Type I	GE8 Type II	GE9 GE10	GE11 GE13	GE12	ENC III-A	ENC III(3)	ENC Va & ENC Vb	FANP9 9x9-2
Max Length (in) (Unirradiated)	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2
Nominal Width (in) (excluding channels)	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44	5.44
Fissile Material	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2
Number of Fuel Rods	49	63	62	60	60	66 – Full 8 – Partial	78 – Full 14 – Partial	49	48	60	79
Number of Water Holes	0	1	2	4	1	2	2	0	1(4)	4(4)	2

(1) Any fuel channel thickness from 0.065 to 0.120 inch is acceptable on any of the fuel designs.
(2) Maximum fuel assembly weight with channel is 705 lb.
(3) Includes ENC III-E and ENC III-F.
(4) Solid Zirc rods instead of water holes.
(5) May be stored as damaged fuel.

Table 1-1e
PWR Fuel Specifications for Fuel to be Stored in the NUHOMS®-32PT DSC

PHYSICAL PARAMETERS:	
Fuel Assembly Class	Only intact (including reconstituted) B&W 15x15, WE 17x17, CE 15x15, WE 15x15, CE 14x14 and WE 14x14 class PWR assemblies or equivalent reload fuel manufactured by other vendors that are enveloped by the fuel assembly design characteristics listed in Table 1-1f.
Reconstituted Fuel Assemblies	≤ 32 assemblies per DSC with up to 56 stainless steel rods per assembly or unlimited number of lower enrichment UO_2 rods per assembly.
Fuel Cladding Material	Zircaloy
Fuel Damage	Cladding damage in excess of pinhole leaks or hairline cracks is not authorized to be stored as "Intact PWR Fuel."
Control Components (CCs)	• *Up to 32 CCs are authorized for storage with all fuel assemblies except CE 15x15 class assemblies.* • *Authorized CCs include Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assembly (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs) and Neutron Sources.* • *Design basis thermal and radiological characteristics for the CCs are listed in Table 1-1ee.*
Maximum Assembly plus *CC* Weight	-1365 lbs for 32PT-S100 & 32PT-L100 System -1682 lbs for 32PT-S125 & 32PT-L125 System
CC Damage	*CC*s with cladding failures are acceptable for loading.
THERMAL/RADIOLOGICAL PARAMETERS:	
Fuel Burnup and Cooling Time without *CCs*[1]	Per Table 1-2d, Table 1-2e, Table 1-2f, Table 1-2g, Table 1-2h, and Figure 1-2 or Figure 1-3 or Figure 1-4.
Fuel Burnup and Cooling Time with *CCs*[1]	Per Table 1-2i, Table 1-2j, Table 1-2k, Table 1-2l, Table 1-2m and Figure 1-2 or Figure 1-3 or Figure 1-4.
Initial Enrichment	Per Table 1-1g and Figure 1-5 or Figure 1-6 or Figure 1-7.

[1] *BPRAs are considered as being representative of all CCs.*

Table 1-1f
PWR Fuel Assembly Design Characteristics for the NUHOMS®-32PT DSC

Assembly Class	B&W 15x15	WE 17x17	CE 15x15(3), (4)	WE 15x15	CE 14x14	WE 14x14
DSC Configuration	**Max Unirradiated Length (in)**					
32PT-S100/32PT-S125	165.75(1)	165.75(1)	165.75	165.75(1)	165.75(1)	165.75(1)
32PT-L100/32PT-L125	171.71(1)	171.71(1)	171.71	171.71(1)	171.71(1)	171.71(1)
Fissile Material	UO_2	UO2	UO_2	UO_2	UO_2	UO_2
Maximum MTU/assembly(2)	0.475	0.475	0.475	0.475	0.475	0.475
Maximum Number of Fuel Rods	208	264	216	204	176	179
Maximum Number of Guide/ Instrument Tubes	17	25	9	21	5	17

(1) Maximum Assembly + *CC* Length (unirradiated)
(2) The maximum MTU/assembly is based on the shielding analysis. The listed value is higher than the actual.
(3) CE 15x15 assemblies with stainless steel plugging clusters installed are acceptable.
(4) Control Components are not authorized for storage with CE 15x15 class assemblies.

Table 1-1g
Initial Enrichment and Required Number of PRAs and Minimum Soluble Boron Loading (NUHOMS®-32PT DSC)

Assembly Class	Soluble Boron Loading (ppm)	No PRAs (Type A)			4 PRAs (Type B)		8 PRAs (Type C)		16 PRAs (Type D)	
		Poison Plate Configuration			Poison Plate Configuration		Poison Plate Configuration		Poison Plate Configuration	
		16	20	24	20	24	20	24	20	24
WE 17x17 Fuel Assembly[(1)]	2500	3.40	3.40	3.40	4.00	4.00	4.50	4.50	5.00	5.00
B&W 15x15 Mark B Fuel Assembly[(1)]	2500	3.30	3.30	3.30	3.90	3.90	NE	NE	5.00	5.00
WE 15x15 Fuel Assembly *(without CC)*	2500	3.40	3.40	3.40	4.00	4.00	4.60	4.60	5.00	5.00
WE 15x15 Fuel Assembly (with CC)	*2500*	*3.40*	*3.35*	*3.40*	*4.00*	*4.00*	*4.55*	*4.55*	*5.00*	*5.00*
CE 14x14 Fuel Assembly *(without CC)*	1800	3.35	*NE*	3.50	*NE*	4.00	*NE*	4.35	NE	NE
	2000	3.50	*NE*	3.70	*NE*	4.20	*NE*	4.55	NE	NE
	2100	3.60	*NE*	3.80	*NE*	4.30	*NE*	4.70	NE	NE
	2200	3.70	*NE*	3.90	*NE*	4.40	*NE*	4.80	NE	NE
	2300	3.75	*NE*	4.00	*NE*	4.50	*NE*	4.90	NE	NE
	2400	3.80	*NE*	4.05	*NE*	4.60	*NE*	5.00	NE	NE
	2500	3.90	*3.80*	4.15	*4.60*	4.70	--	--	NE	NE
CE 14x14 Fuel Assembly (with CC)	*1800*	*3.30*	*NE*	*3.45*	*NE*	*3.90*	*NE*	*4.25*	*NE*	*NE*
	2000	*3.45*	*NE*	*3.65*	*NE*	*4.10*	*NE*	*4.50*	*NE*	*NE*
	2100	*3.55*	*NE*	*3.75*	*NE*	*4.20*	*NE*	*4.60*	*NE*	*NE*
	2200	*3.60*	*NE*	*3.80*	*NE*	*4.30*	*NE*	*4.70*	*NE*	*NE*
	2300	*3.65*	*NE*	*3.90*	*NE*	*4.40*	*NE*	*4.80*	*NE*	*NE*
	2400	*3.80*	*NE*	*4.00*	*NE*	*4.50*	*NE*	*4.90*	*NE*	*NE*
	2500	*3.90*	*3.70*	*4.05*	*4.45*	*4.60*	*4.95*	*5.00*	*NE*	*NE*
WE 14x14 Fuel Assembly *(with and without CC)*	1800	3.55	*NE*	3.75	*NE*	4.40	NE	NE	NE	NE
	2000	3.75	*NE*	3.90	*NE*	4.60	NE	NE	NE	NE
	2100	3.80	*NE*	4.00	*NE*	4.75	NE	NE	NE	NE
	2200	3.90	*NE*	4.10	*NE*	4.85	NE	NE	NE	NE
	2300	4.00	*NE*	4.20	*NE*	5.00	NE	NE	NE	NE
	2400	4.10	*NE*	4.30	*NE*	--	NE	NE	NE	NE
	2500	4.15	*4.00*	4.40	5.00	--	NE	NE	NE	NE
CE 15x15 Fuel Assembly	1800	3.00	*NE*	3.15	NE	NE	NE	NE	NE	NE
	2000	3.15	*NE*	3.30	NE	NE	NE	NE	NE	NE
	2100	3.20	*NE*	3.40	NE	NE	NE	NE	NE	NE
	2200	3.30	*NE*	3.50	NE	NE	NE	NE	NE	NE
	2300	3.35	*NE*	3.55	NE	NE	NE	NE	NE	NE
	2400	3.40	*NE*	3.60	NE	NE	NE	NE	NE	NE
	2500	3.50	*3.40*	3.70	NE	NE	NE	NE	NE	NE

NOTES:

(1) With or without *CCs*. *CCs* shall not be stored in basket location where a PRA is required.
NE = Not Evaluated

Table 1-1h
B10 Content Specification for Poison Plates (NUHOMS®-32PT DSC)

DSC Configuration	Poison Plate Specification
32PT-S100 or 32PT-S125 or 32PT-L100 or 32PT-L125	Minimum B10 areal density = 0.007 gm/cm^2

Table 1-1i
PWR Fuel Specification for Fuel to be Stored in the Standardized NUHOMS®-24PHB DSC

Title or Parameter	Specifications
Fuel	Only intact, unconsolidated B&W 15x15 (with or without BPRAs), WE 17x17, WE 15x15, CE 14x14, and WE 14x14 (all without BPRAs) Class PWR fuel assemblies or equivalent reload fuel manufactured by other vendor, with the following requirements
Maximum No. of Reconstituted Assemblies per DSC with Stainless Steel rods	4
Maximum No. of Stainless Steel Rods per Reconstituted Assembly	10
Maximum No. of Reconstituted Assemblies per DSC with low enriched uranium oxide rods	24
Physical Parameters (without BPRAs)	
Maximum Assembly Length (unirradiated)	165.785 in (standard cavity) 171.96 in (long cavity)
Nominal Cross-Sectional Envelope	8.536 in
Maximum Assembly Weight	1682 lbs
No. of Assemblies per DSC	≤ 24 intact assemblies
Fuel Cladding	Zircaloy-clad fuel with no known or suspected gross cladding breaches
Physical Parameters (with BPRAs)	
Maximum Assembly + BPRA Length (unirradiated)	171.96 in (long cavity)
Nominal Cross-Sectional Envelope	8.536 in
Maximum Assembly + BPRA Weight	1682 lbs
No. of Assemblies per DSC	≤ 24 intact assemblies
No. of BPRAs per DSC	≤ 24 BPRAs
Fuel Cladding	Zircaloy-clad fuel with no known or suspected gross cladding breaches
Nuclear Parameters	
Maximum Fuel Initial Enrichment	4.5 wt. % U-235
Maximum Initial Uranium loading per assembly	0.490 MTU
Allowable loading configurations for each 24PHB DSC	As specified in Figure 1-8 or 1-9
Burnup, Enrichment, and Minimum Cooling Time for Configuration 1 (Figure 1-8)	Table 1-2n for Zone 1 fuel; Table 1-2o for Zone 2 fuel; Table 1-2p for Zone 3 fuel
Burnup, Enrichment, and Minimum Cooling Time for Configuration 2 (Figure 1-9)	Table 1-2p for Zone 3 fuel
Minimum Cooling Time for BPRAs	5 years
Total Decay Heat per DSC	24 kW
Decay Heat Limits for Zone 1, 2 and 3 fuel	As specified in Figures 1-8 and 1-9.

Table 1-1j
BWR Fuel Specification of Damaged Fuel to be Stored in the Standardized NUHOMS®-61BT DSC

PHYSICAL PARAMETERS:	
Fuel Design:	7x7, 8x8 BWR damaged fuel assemblies manufactured by General Electric or Exxon/ANF or equivalent reload fuel that are enveloped by the Fuel assembly design characteristics listed in Table 1-1d for the 7x7 and 8x8 designs only.
Cladding Material:	Zircaloy
Fuel Damage:	Damaged BWR fuel assemblies are fuel assemblies containing fuel rods with known or suspected cladding defects greater than hairline cracks or pinhole leaks. Missing cladding and/or crack size in the fuel pins is to be limited such that a fuel pellet is not able to pass through the gap created by the cladding opening during handling and retrievability is assured following Normal/Off-Normal conditions. Damaged fuel shall be stored with Top and Bottom Caps for Failed Fuel. Damaged fuel may only be stored in the 2x2 compartments of the "Type C" NUHOMS®-61BT Canister.
Channels:	Fuel may be stored with or without fuel channels.
Maximum Assembly Length (unirradiated)	176.2 in
Nominal Assembly Width (excluding channels)	5.44 in
Maximum Assembly Weight	705 lbs
RADIOLOGICAL PARAMETERS:	No interpolation of Radiological Parameters is permitted between groups.
Group 1: Maximum Burnup:	27,000 MWd/MTU
Minimum Cooling Time:	5-years
Maximum Initial Lattice Average Enrichment:	4.0 wt. % U-235
Maximum Pellet Enrichment:	4.4 wt. % U-235
Minimum Initial Bundle Average Enrichment:	2.0 wt. % U-235
Maximum Initial Uranium Content:	198 kg/assembly
Maximum Decay Heat:	300 W/assembly
Group 2: Maximum Burnup:	35,000 MWd/MTU
Minimum Cooling Time:	8-years
Maximum Initial Lattice Average Enrichment:	4.0 wt. % U-235
Maximum Pellet Enrichment:	4.4 wt. % U-235
Minimum Initial Bundle Average Enrichment:	2.65 wt. % U-235
Maximum Initial Uranium Content:	198 kg/assembly
Maximum Decay Heat:	300 W/assembly
Group 3: Maximum Burnup:	37,200 MWd/MTU
Minimum Cooling Time:	6.5-years
Maximum Initial Lattice Average Enrichment:	4.0 wt. % U-235
Maximum Pellet Enrichment:	4.4 wt. % U-235
Minimum Initial Bundle Average Enrichment:	3.38 wt. % U-235
Maximum Initial Uranium Content:	198 kg/assembly
Maximum Decay Heat:	300 W/assembly

Table 1-1j
BWR Fuel Specification of Damaged Fuel to be Stored in the Standardized NUHOMS®-61BT DSC

(Concluded)

RADIOLOGICAL PARAMETERS:	
Group 4:	
Maximum Burnup:	40,000 MWd/MTU
Minimum Cooling Time:	10-years
Maximum Initial Lattice Average Enrichment:	4.0 wt. % U-235
Maximum Pellet Enrichment:	4.4 wt. % U-235
Minimum Initial Bundle Average Enrichment:	3.4 wt. % U-235
Maximum Initial Uranium Content:	198 kg/assembly
Maximum Decay Heat:	300 W/assembly
ALTERNATE RADIOLOGICAL PARAMETERS:	
Maximum Initial Lattice Average Enrichment:	4.0 wt. % U-235
Fuel Burnup, Initial Bundle Average Enrichment, and Cooling Time:	See Table 1-2q
Maximum Pellet Enrichment:	4.4 wt. % U-235
Maximum Initial Uranium Content:	198 kg/assembly
Maximum Decay Heat:	300 W/assembly

Table 1-1k
B10 Specification for the NUHOMS®-61BT Poison Plates

NUHOMS®-61BT DSC Basket Type	Minimum B10 *Areal* Density, gm/cm^2	
	Enriched Boron Aluminum Alloy or Boralyn®(1)	Boral® or Metamic®(2)
A	.021	.025
B	.032	.038
C	.040	.048

Note 1: An alternate metal matrix composite with properties equivalent to Boralyn® is acceptable.
Note 2: An alternate metal matrix composite with properties equivalent to Metamic® is acceptable.

Table 1-1l
PWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-24PTH DSC

<u>PHYSICAL PARAMETERS:</u> Fuel Class	Intact or damaged unconsolidated B&W 15x15, WE 17x17, CE 15x15, WE 15x15, CE 14x14 and WE 14x14 class PWR assemblies (with or without control components) that are enveloped by the fuel assembly design characteristics listed in Table 1-1m. Equivalent reload fuel manufactured by other vendors but enveloped by the design characteristics listed in Table 1-1m is also acceptable.
Fuel Damage	Damaged PWR fuel assemblies are assemblies containing missing or partial fuel rods or fuel rods with known or suspected cladding defects greater than hairline cracks or pinhole leaks. The extent of cladding damage in the fuel rods is to be limited such that a fuel pellet is not able to pass through the damaged cladding opening during handling and retrievability is assured following normal and off-normal conditions.
Partial Length Shield Assemblies (PLSAs)	*WE 15x15 class PLSAs with following characteristics are authorized:* • *Maximum burnup, 40 GWd/MTU* • *Minimum cooling time, 6.5 years* • Maximum decay heat, 900 watts
Reconstituted Fuel Assemblies: • Maximum No. of Reconstituted Assemblies per DSC with *Irradiated* Stainless Steel Rods • Maximum No. of *Irradiated* Stainless Steel Rods per Reconstituted Fuel Assembly • Maximum No. of Reconstituted Assemblies per DSC with *unlimited number of* low enriched UO_2 rods *and/or Unirradiated Stainless Steel Rods and/or Zr Rods or Zr Pellets*	 4 10 24
Control Components (CCs)	• Up to 24 CCs are authorized for storage in 24PTH-L and 24PTH-S-LC DSCs only. • Authorized CCs include Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), Control Rod Assemblies (CRAs), *Rod Cluster Control Assemblies (RCCAs),* Axial Power Shaping Assembly Rods (APSRAs), Orifice Rod Assemblies (ORAs), *Vibration Suppression Inserts (VSIs),* Neutron Source Assemblies (NSAs), *and Neutron Sources.* • Design basis thermal and radiological characteristics for the CCs are listed in Table 1-1n.
Nominal Assembly Width	8.536 inches
No. of Intact Assemblies	≤24
No. and Location of Damaged Assemblies	Maximum of 12 damaged fuel assemblies. Balance may be intact fuel assemblies, empty slots, or dummy assemblies depending on the specific heat load zoning configuration. Damaged fuel assemblies are to be placed in Location A and/or B as shown in Figure 1-16. The DSC basket cells which store damaged fuel assemblies are provided with top and bottom end caps to assure retrievability.
Maximum Assembly plus CC Weight	1682 lbs

Table 1-1l
PWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-24PTH DSC (Concluded)

THERMAL/RADIOLOGICAL PARAMETERS: Allowable Heat Load Zoning Configurations for each 24PTH DSC	Per Figure 1-11 or Figure 1-12 or Figure 1-13 or Figure 1-14 or Figure 1-15.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 1 (Without CCs)	Per Table 1-3a for Zone 1 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 2 (Without CCs)	Per Table 1-3b for Zone 2 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 3 (Without CCs)	Per Table 1-3b for Zone 2 fuel and Table 1-3c for Zone 3 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 4 (Without CCs)	Per Table 1-3d for Zone 4 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 5 (Without CCs)	Per Table 1-3c for Zone 3 fuel and Table 1-3d for Zone 4 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 1 (With CCs)	Per Table 1-3e for Zone 1 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 2 (With CCs)	Per Table 1-3f for Zone 2 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 3 (With CCs)	Per Table 1-3f for Zone 2 fuel and per Table 1-3g for Zone 3 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 4 (With CCs)	Per Table 1-3h for Zone 4 fuel.
Burnup, Enrichment, and Minimum Cooling Time for Configuration 5 (With CCs)	Per Table 1-3g for Zone 3 fuel and per Table 1-3h for Zone 4 fuel.
Maximum Initial Fuel Enrichment	5.0 wt. % U-235
Decay Heat	Type 1 Basket: ≤ 40.8 kW for 24PTH-S and 24PTH-L DSCs with decay heat limits for Zones 1, 2, 3 and 4 as specified in Figure 1-11 or Figure 1-12 or Figure 1-13 or Figure 1-14.
	Type 2 Basket: Same as Type 1 Basket except ≤ 31.2 kW/DSC and ≤ 1.3 kW/fuel assembly for 24PTH-S and 24PTH-L DSCs. ≤ 24.0 kW for 24PTH-S-LC DSC with decay heat limits as specified in Figure 1-15.
Minimum Boron Loading in the Poison Plates	Per Table 1-1r

Table 1-1m
PWR Fuel Assembly Design Characteristics for the NUHOMS®-24PTH DSC

Assembly Class		B&W 15x15	WE 17x17	CE 15x15	WE 15x15	CE 14x14	WE 14x14
Maximum Unirradiated Length (in) (1)	24PTH-S	165.75	165.75	165.75	165.75	165.75	165.75
	24PTH-L	171.93	171.93	171.93	171.93	171.93	171.93
	24PTH-S-LC	171.93	N/A(3)	N/A(3)	N/A(3)	N/A(3)	N/A(3)
Fissile Material		UO_2	UO_2	UO_2	UO_2	UO_2	UO_2
Maximum MTU/Assembly(2)		0.49	0.49	0.49	0.49(4)	0.49	0.49
Maximum Number of Fuel Rods		208	264	216	204	176	179
Maximum Number of Guide/ Instrument Tubes		17	25	9	21	5	17

(1) Maximum Assembly + Control Component Length (unirradiated)
(2) The maximum MTU/assembly is based on the shielding analysis. The listed value is higher than the actual.
(3) Not authorized for storage.
(4) The maximum MTU/assembly for WE 15x15 PLSA = 0.33.

Table 1-1n
Thermal and Radiological Characteristics for Control Components Stored in the NUHOMS® -24PTH DSC

Parameter	BPRAs, NSAs, CRAs, *RCCAs, VSIs, Neutron Sources* and APSRAs	TPAs and ORAs
Maximum Gamma Source (γ/sec/DSC)	9.3E+14	9.8E+13
Decay Heat (Watts/DSC)	192.0	192.0

Table 1-1p
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for the NUHOMS® -24PTH DSC (Intact Fuel)

Fuel Assembly Class	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)			
	Minimum Soluble Boron (ppm)	Basket Type		
		1A or 2A	1B or 2B	1C or 2C
CE 14x14 (1)	2100	4.50	4.90	NR
	2200	4.60	5.00	NR
	2300	4.70	NR	NR
	2400	4.80	NR	NR
	2500	4.90	NR	NR
	2600	5.00	NR	NR
WE 14x14 (2)	2100	4.80	5.00	NR
	2200	4.90	NR	NR
	2300	5.00	NR	NR
CE 15x15 (2)	2100	3.90	4.20	4.60
	2200	4.00	4.40	4.70
	2300	4.10	4.50	4.80
	2400	4.20	4.60	4.90
	2500	4.30	4.70	5.00
	2600	4.40	4.80	NR
	2700	4.50	4.90	NR
	2800	4.50	5.00	NR
	2900	4.60	NR	NR
	3000	4.70	NR	NR
WE 15x15 (2)	2100	3.80	4.20	4.60
	2200	3.90	4.30	4.70
	2300	4.00	4.40	4.80
	2400	4.10	4.50	4.90
	2500	4.20	4.60	5.00
	2600	4.30	4.70	NR
	2700	4.30	4.80	NR
	2800	4.40	4.90	NR
	2900	4.50	5.00	NR
	3000	4.60	NR	NR

Table 1-1p
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for the NUHOMS® -24PTH DSC (Intact Fuel)

(Concluded)

Fuel Assembly Class	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)			
	Minimum Soluble Boron (ppm)	Basket Type		
		1A or 2A	1B or 2B	1C or 2C
WE 17x17 (2)	2100	3.80	4.10	4.50
	2200	3.90	4.20	4.60
	2300	4.00	4.30	4.70
	2400	4.00	4.40	4.80
	2500	4.10	4.50	4.90
	2600	4.20	4.60	5.00
	2700	4.30	4.70	NR
	2800	4.40	4.80	NR
	2900	4.50	4.90	NR
	3000	4.60	5.00	NR
B&W 15x15 (2)	2100	3.60	4.00	4.30
	2200	3.70	4.10	4.50
	2300	3.80	4.20	4.60
	2400	3.90	4.30	4.70
	2500	4.00	4.40	4.80
	2600	4.10	4.50	4.90
	2700	4.20	4.60	5.00
	2800	4.20	4.70	NR
	2900	4.30	4.80	NR
	3000	4.40	4.90	NR

Notes:

(1) When CCs that extend into the active fuel region are stored, the maximum assembly average initial enrichment shall be reduced by 0.2 wt. %.

(2) When CCs that extend into the active fuel region are stored, the maximum assembly average initial enrichment shall be reduced by 0.05 wt. % or the soluble boron concentration shall increased by 50 ppm.

NR = Not Required.

Table 1-1q
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for the NUHOMS® -24PTH DSC (Damaged Fuel)

Assembly Class	Maximum Number of Damaged Fuel Assemblies per DSC	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)			
		Minimum Soluble Boron (ppm)	Basket Type		
			1A or 2A	1B or 2B	1C or 2C
CE 14x14 (1)	8	2150	NR	4.80	NR
	12	2150	NR	4.70	NR
	12	2450	4.50	5.00	NR
WE 14x14 (2)	12	2150	4.50	5.00	NR
CE 15x15 (2)	12	2150	NR	NR	4.50
	12	2550	NR	NR	5.00
WE 15x15 (2)	8	2150	NR	NR	4.50
	12	2250	NR	NR	4.50
	8	2550	NR	NR	5.00
	12	2650	NR	NR	5.00
B&W 15x15 (2)	12	2350	NR	NR	4.50
	12	2800	NR	NR	5.00
WE 17x17 (2)	12	2250	NR	NR	4.50
	12	2650	NR	NR	5.00

Notes:

(1) When CCs that extend into the active fuel region are stored, the maximum assembly average initial enrichment shall be reduced by 0.2 wt. %.

(2) When CCs that extend into the active fuel region are stored, the maximum assembly average initial enrichment shall be reduced by 0.05 wt. % or the soluble boron concentration shall increased by 50 ppm.

NR = Not Required.

Table 1-1r
B10 Specification for the NUHOMS®-24PTH Poison Plates

NUHOMS®-24PTH DSC Basket Type[(1)]	Minimum B10 *Areal* Density, gm/cm²	
	Natural or Enriched Boron Aluminum Alloy / Metal Matric Composite (MMC)	Boral®
1A or 2A	.007	.009
1B or 2B	.015	.019
1C or 2C	.032	.040

(1) Basket Type 1 contains aluminum inserts in the R45 transition rails of the basket, Type 2 does not contain aluminum inserts.

Table 1-1s
Specification for the Metal Matrix Composite (MMC) for the NUHOMS®-24PTH Poison Plates

No.	Specification
1	The metal matrix composite shall consist of boron carbide powder in an aluminum alloy matrix.
2	The boron carbide content shall be limited to a maximum 40% by volume.
3	No more than 10 wt % of the boron carbide powder shall be larger than 60 microns.
4	The product shall be at least 98% of theoretical density.
5	The composite final product form shall have the tensile properties: • Minimum yield strength, 0.2% offset: 1.5 ksi • Minimum ultimate strength: 5.0 ksi • Minimum elongation in 2 inches: 1%

Table 1-1t
BWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-61BTH DSC

Physical Parameters:	
Fuel Class	*Intact or damaged 7x7, 8x8, 9x9 or 10x10 BWR assemblies manufactured by General Electric or Exxon/ANF or FANP or reload fuel manufactured by other vendors that are enveloped by the fuel assembly design characteristics listed in Table 1-1u.*
Fuel Damage	*Damaged BWR fuel assemblies are assemblies containing fuel rods with known or suspected cladding defects greater than hairline cracks or pinhole leaks. The extent of damage in the fuel assembly is to be limited such that the fuel assembly will still be able to be handled by normal means and retrievability is assured following normal and off-normal conditions. Missing fuel rods are allowed.*
Reconstituted Fuel Assemblies:	
• *Maximum No. of Reconstituted Assemblies per DSC with Irradiated Stainless Steel Rods*	*4*
• *Maximum No. of Irradiated Stainless Steel Rods per Reconstituted Fuel Assembly*	*10*
• *Maximum No. of Reconstituted Assemblies per DSC with unlimited number of low enriched UO2 rods or Zr Rods or Zr Pellets or Unirradiated Stainless Steel Rods*	*61*
No. of Intact Assemblies	*≤61*
No. and Location of Damaged Assemblies	*Up to 16 damaged fuel assemblies, with balance intact or dummy assemblies, are authorized for storage in 61BTH DSC.* *Damaged fuel assemblies may only be stored in the 2x2 compartments as shown in Figure 1-25. The DSC basket cells which store damaged fuel assemblies are provided with top and bottom end caps to assure retrievability.*
Channels	*Fuel may be stored with or without channels, channel fasteners, or finger springs*
Maximum Initial Uranium Content	*198 kg/assembly*
Maximum Assembly Weight with Channels	*705 lbs*

Table 1-1t
BWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-61BTH DSC
(Concluded)

THERMAL/RADIOLOGICAL PARAMETERS:	
Allowable Heat Load Zoning Configurations for each Type 1 61BTH DSC	*Per Figure 1-17 or Figure 1-18 or Figure 1-19 or Figure 1-20.*
Allowable Heat Load Zoning Configurations for each Type 2 61BTH DSC:	*Per Figure 1-17 or Figure 1-18 or Figure 1-19 or Figure 1-20 or Figure 1-21 or Figure 1-22 or Figure 1-23 or Figure 1-24.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 1	*Per Table 1-4c for Zone 3 fuel.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 2	*Per Table 1-4b for Zone 2 fuel, Table 1-4d for Zone 4 fuel, and Table 1-4e for Zone 5 fuel.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 3	*Per Table 1-4b for Zone 2 fuel.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 4	*Per Table 1-4a for Zone 1 fuel, Table 1-4b for Zone 2 fuel, Table 1-4d for Zone 4 fuel, and Table 1-4e for Zone 5 fuel.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 5	*Per Table 1-4b for Zone 2 fuel and Table 1-4e for Zone 5 fuel.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 6	*Per Table 1-4a for Zone 1 fuel, Table 1-4d for Zone 4 fuel, Table 1-4e for Zone 5 fuel, and Table 1-4f for Zone 6 fuel.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 7	*Per Table 1-4d for Zone 4 fuel and Table 1-4e for Zone 5 fuel.*
Burnup, Enrichment, and Minimum Cooling Time for Heat Load Zoning Configuration 8	*Per Table 1-4b for Zone 2 fuel, Table 1-4c for Zone 3 fuel, Table 1-4d for Zone 4 fuel, and Table 1-4e for Zone 5 fuel.*
Maximum Initial Lattice Average Enrichment	*5.0 wt. % U-235*
Maximum Pellet Enrichment	*5.0 wt. % U-235*
Maximum Decay Heat Limits for Zones 1, 2, 3, 4, 5 and 6 Fuel	*Per Figure 1-17 or Figure 1-18 or Figure 1-19 or Figure 1-20 or Figure 1-21 or Figure 1-22 or Figure 1-23 or Figure 1-24*
Decay Heat per DSC	*≤ 22.0 kW for Type 1 DSC*
	≤ 31.2 kW for Type 2 DSC
Minimum B10 Content in Poison Plates	*Per Table 1-1v or Table 1-1w*

Table 1-1u
BWR Fuel Assembly Design Characteristics[1] for the NUHOMS®-61BTH DSC

Transnuclear ID	***7x7-49/0***	***8x8-63/1***	***8x8-62/2***	***8x8-60/4***	***8x8-60/1***	***9x9-74/2***	***10x10-92/2***	***7x7-49/0***	***7x7-48/1Z***	***8x8-60/4Z***	***8x8-62/2***	***9x9-79/2***	***Siemens QFA***	***10x10-91/1***
Initial Design or Reload Fuel Designation	*GE1 GE2 GE3*	*GE4*	*GE-5 GE-Pres GE-Barrier GE8 Type I*	*GE8 Type II*	*GE9 GE10*	*GE11 GE13*	*GE12 GE14*	*ENC-IIIA*	*ENC-III[2]*	*ENC Va ENC Vb*	*FANP 8x8-2*	*FANP9 9x9-2*	*9x9*	*ATRIUM-10*
Max Length (in) (Unirradiated)	*176.51*	*176.51*	*176.51*	*176.51*	*176.51*	*176.51*	*176.51*	*176.51*	*176.51*	*176.51*	*176.51*	*176.2*	*176.51*	*176.51*
Fissile Material	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2
Maximum No. of Fuel Rods	*49*	*63*	*62*	*60*	*60*	*74*	*92*	*49*	*48*	*60*	*62*	*79*	*72*	*91*

(1) Any fuel channel thickness from 0.065 to 0.120 inch is acceptable on any of the fuel designs.
(2) Includes ENC-IIIE and ENC-IIIF.

Table 1-1v
BWR Fuel Assembly Lattice Average Enrichment v/s Minimum B10 Requirements for the NUHOMS®-61BTH DSC Poison Plates (Intact Fuel)

61BTH DSC Type	Basket Type	Maximum Lattice Average Enrichment (wt% U-235)	Minimum B10 Areal Density, mg/cm^2	
			Borated Aluminum/MMC	Boral®
1	A	3.7	21.0	25.2
	B	4.1	32.0	38.4
	C	4.4	40.0	48.0
	D	4.6	48.0	57.6
	E	4.8	55.0	66.0
	F	5.0	62.4	74.9
2	A	3.7	22.3	26.8
	B	4.1	32.0	38.4
	C	4.4	41.7	50.0
	D	4.6	48.0	57.6
	E	4.8	55.0	66.0
	F	5.0	62.4	74.9

Table 1-1w
BWR Fuel Assembly Lattice Average Enrichment v/s Minimum B10 Requirements for the NUHOMS®-61BTH DSC Poison Plates (Damaged Fuel)

61BTH DSC Type	Basket Type	Maximum Lattice Average Enrichment (wt% U-235)		Minimum B10 Areal Density, mg/cm^2	
		Up to 4 Damaged Assemblies[(1)]	Five or More Damaged Assemblies[(1)] (16 Maximum)	Borated Aluminum/MMC	Boral®
1	A	3.7	2.80	21.0	25.2
	B	4.1	3.10	32.0	38.4
	C	4.4	3.20	40.0	48.0
	D	4.6	3.40	48.0	57.6
	E	4.8	3.50	55.0	66.0
	F	5.0	3.60	62.4	74.9
2	A	3.7	2.80	22.3	26.8
	B	4.1	3.10	32.0	38.4
	C	4.4	3.20	41.7	50.0
	D	4.6	3.40	48.0	57.6
	E	4.8	3.50	55.0	66.0
	F	5.0	3.60	62.4	74.9

Note 1: See Figure 1-25 for the location of damaged fuel assemblies within the 61BTH DSC.

Table 1-1aa
PWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-32PTH1 DSC

PHYSICAL PARAMETERS:	
Fuel Class	Intact or damaged unconsolidated B&W 15x15, WE 17x17, CE 15x15, WE 15x15, CE 14x14, WE 14x14 and CE 16x16 class PWR assemblies (with or without control components) that are enveloped by the fuel assembly design characteristics listed in Table 1-1bb. Reload fuel manufactured by other vendors but enveloped by the design characteristics listed in Table 1-1bb is also acceptable.
Fuel Damage	Damaged PWR fuel assemblies are assemblies containing missing or partial fuel rods or fuel rods with known or suspected cladding defects greater than hairline cracks or pinhole leaks. The extent of damage in the fuel assembly is to be limited such that the fuel assembly will still be able to be handled by normal means and retrievability is assured following normal and off-normal conditions.
Reconstituted Fuel Assemblies:	
• Maximum No. of Reconstituted Assemblies per DSC With Irradiated Stainless Steel Rods	4
• Maximum No. of Irradiated Stainless Steel Rods per Reconstituted Fuel Assembly	10
• Maximum No. of Reconstituted Assemblies per DSC with unlimited number of low enriched UO_2 rods, or Zr Rods or Zr Pellets or Unirradiated Stainless Steel Rods	32
Control Components (CCs)	• Up to 32 CCs are authorized for storage in 32PTH1-S, 32PTH1-M and 32PTH1-L DSCs. • Authorized CCs include Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), Control Rod Assemblies ((CRAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs) and Neutron Sources. • Design basis thermal and radiological characteristics for the CCs are listed in Table 1-1ee.
No. of Intact Assemblies	≤ 32
No. and Location of Damaged Assemblies	Up to 16 damaged fuel assemblies with balance intact fuel assemblies, or dummy assemblies are authorized for storage in 32PTH1 DSC. Damaged fuel assemblies are to be placed in the center 16 locations as shown in Figures 1-26 through 1-28. The DSC basket cells which store damaged fuel assemblies are provided with top and bottom end caps to assure retrievability.
Maximum Assembly plus CC Weight	1715 lbs

Table 1-1aa
PWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-32PTH1 DSC
(Concluded)

THERMAL/RADIOLOGICAL PARAMETERS:		
Allowable Heat Load Zoning Configurations for each 32PTH1 DSC	*Per Figure 1-26 or Figure 1-27 or Figure 1-28.*	
Burnup, Enrichment, and Minimum Cooling Time for Configuration 1	*Per Table 1-5a for Zone 1 fuel, Per Table 1-5d and Table 1-5e for Zone 5 fuel, and Per Table 1-5f for Zone 6 fuel.*	
Burnup, Enrichment, and Minimum Cooling Time for Configuration 2	*Per Table 1-5c for Zone 4 and Zone 3 fuel.*	
Burnup, Enrichment, and Minimum Cooling Time for Configuration 3	*Per Table 1-5b for Zone 2 fuel.*	
Maximum Assembly Average Initial Fuel Enrichment	*5.0 wt. % U-235*	
Maximum Decay Heat Limits for Zones 1, 2, 3, 4, 5 and 6 Fuel	*Per Figure 1-26 or Figure 1-27 or Figure 1-28.*	
Decay Heat per DSC	*≤ 40.8 kW for 32PTH1-S, 32PTH1-M and 32PTH1-L DSCs (Type 1 Basket)*	
	≤ 31.2 kW for 32PTH1-S, 32PTH1-M and 32PTH1-L DSCs (Type 2 Basket)	
Maximum Boron Loading	*Per Table 1-1cc or Table 1-1dd*	

Table 1-1bb
PWR Fuel Assembly Design Characteristics for the NUHOMS®-32PTH1 DSC

Assembly Class		**B&W 15x15**	**WE 17x17**	**CE 15x15**	**WE 15x15**	**CE 14x14**	**WE 14x14**	**CE 16x16**
Max Unirradiated Length (in)(1)	32PTH1-S	165.75	165.75	165.75	165.75	165.75	165.75	165.75
	32PTH1-M	171.93	171.93	171.93	171.93	171.93	171.93	171.93
	32PTH1-L	178.3	178.3	178.3	178.3	178.3	178.3	178.3
Fissile Material		UO_2	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2
Maximum MTU/Assembly(2)		0.49	0.49	0.49	0.49	0.49	0.49	0.49
Maximum Number of Fuel Rods		208	264	216	204	176	179	236
Maximum Number of Guide/ Instrument Tubes		17	25	9	21	5	17	5

Notes:
(1) Maximum Assembly + Control Component Length (unirradiated)
(2) The maximum MTU/assembly is based on the shielding analysis. The listed value is higher than the actual.

Table 1-1cc
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for 32PTH1 DSC (Intact Fuel)

Fuel Assembly Class	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)					
	Minimum Soluble Boron (ppm)	Basket Type				
		1A or 2A	1B or 2B	1C or 2C	1D or 2D	1E or 2E
WE 17x17 Assembly Class(4)	2000	3.40	3.80	3.90	4.10	4.30
	2300	3.70	4.00	4.20	4.40	4.70
	2400	3.70	4.10	4.30	4.50	4.80
	2500	3.80	4.20	4.40	4.60	4.90
	2800	4.00	4.50	4.70	5.00	5.00
	3000	4.20	4.60	4.80	5.00	5.00
CE 16x16 Assembly Class(5)	2000	3.90	4.30	4.50	4.80	5.00
	2300	4.10	4.60	4.80	5.00	5.00
	2400	4.20	4.70	4.90	5.00	5.00
	2500	4.30	4.80	5.00	5.00	5.00
	2800	4.60	5.00	5.00	5.00	5.00
	3000	4.70	5.00	5.00	5.00	5.00
BW 15x15 Assembly Class(5)	2000	3.30	3.60	3.80	4.00	4.20
	2300	3.50	3.90	4.10	4.30	4.60
	2400	3.60	4.00	4.20	4.40	4.70
	2500	3.70	4.10	4.30	4.50	4.80
	2800	3.90	4.30	4.50	4.80	5.00
	3000	4.10	4.50	4.70	5.00	5.00
CE 15x15 Assembly Class(5)	2000	3.50	3.90	4.00	4.20	4.40
	2300	3.80	4.10	4.30	4.60	4.80
	2400	3.90	4.30	4.40	4.70	4.90
	2500	3.90	4.35	4.50	4.80	5.00
	2800	4.20	4.60	4.80	5.00	5.00
	3000	4.30	4.80	5.00	5.00	5.00

Table 1-1cc
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for 32PTH1 DSC (Intact Fuel)
(Concluded)

Fuel Assembly Class	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)					
	Minimum Soluble Boron (ppm)	Basket Type				
		1A or 2A	1B or 2B	1C or 2C	1D or 2D	1E or 2E
WE 15x15 Assembly Class(5)	2000	3.50	3.80	3.90	4.20	4.40
	2300	3.70	4.10	4.20	4.50	4.80
	2400	3.80	4.20	4.40	4.60	4.90
	2500	3.90	4.30	4.50	4.70	5.00
	2800	4.10	4.50	4.70	5.00	5.00
	3000	4.20	4.70	4.90	5.00	5.00
CE 14x14 Assembly Class(6)	2000	3.90	4.40	4.60	4.90	5.00
	2300	4.20	4.70	5.00	5.00	5.00
	2400	4.30	4.80	5.00	5.00	5.00
	2500	4.40	5.00	5.00	5.00	5.00
	2800	4.60	5.00	5.00	5.00	5.00
	3000	4.80	5.00	5.00	5.00	5.00
WE 14x14 Assembly Class(7)	2000	4.20	4.70	4.90	5.00	5.00
	2300	4.50	5.00	5.00	5.00	5.00
	2400	4.60	5.00	5.00	5.00	5.00
	2500	4.70	5.00	5.00	5.00	5.00
	2800	5.00	5.00	5.00	5.00	5.00
	3000	5.00	5.00	5.00	5.00	5.00

Notes:

(1) Not used.
(2) Not used.
(3) Not used.
(4) Reduce Enrichment by 0.05 wt. % U-235 for assemblies with CCs that extend into the active fuel region.
(5) Reduce Enrichment by 0.10 wt. % U-235 for assemblies with CCs that extend into the active fuel region.
(6) Reduce Enrichment by 0.25 wt. % U-235 for assemblies with CCs that extend into the active fuel region.
(7) No reduction in Enrichment required for assemblies with CCs that extend into the active fuel region.

Table 1-1dd
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for 32PTH1 DSC (Damaged Fuel)

Fuel Assembly Class	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)					
	Minimum Soluble Boron (ppm)	Basket Type				
		1A or 2A	1B or 2B	1C or 2C	1D or 2D	1E or 2E
WE 17x17 Assembly Class (without CCs)	2000	3.40	3.70	3.80	4.05	4.25
	2300	3.60	3.95	4.10	4.35	4.65
	2400	3.70	4.05	4.20	4.45	4.75
	2500	3.75	4.15	4.30	4.55	4.85
	2800	4.00	4.40	4.60	4.85	5.00
	3000	4.15	4.55	4.75	5.00	5.00
WE 17x17 Assembly Class (with CCs)	2000	3.35	3.65	3.75	4.00	4.20
	2300	3.55	3.90	4.05	4.30	4.55
	2400	3.65	4.00	4.15	4.40	4.70
	2500	3.70	4.10	4.25	4.50	4.75
	2800	3.95	4.35	4.55	4.80	5.00
	3000	4.10	4.50	4.70	5.00	5.00
WE 16x16 Assembly Class (without CCs)	2000	3.65	4.05	4.20	4.50	4.75
	2300	3.90	4.30	4.50	4.80	5.00
	2400	4.00	4.40	4.60	4.90	5.00
	2500	4.05	4.50	4.70	5.00	5.00
	2800	4.30	4.80	5.00	5.00	5.00
	3000	4.50	4.95	5.00	5.00	5.00
WE 16x16 Assembly Class (with CCs)	2000	3.60	3.95	4.10	4.40	4.65
	2300	3.80	4.20	4.40	4.70	4.90
	2400	3.90	4.30	4.50	4.80	5.00
	2500	4.00	4.40	4.60	4.80	5.00
	2800	4.20	4.70	4.90	5.00	5.00
	3000	4.40	4.85	5.00	5.00	5.00
BW 15x15 Assembly Class (without CCs)	2000	3.30	3.60	3.75	3.95	4.20
	2300	3.50	3.90	4.05	4.30	4.50
	2400	3.60	4.00	4.15	4.40	4.65
	2500	3.65	4.05	4.20	4.50	4.75
	2800	3.90	4.30	4.50	4.75	5.00
	3000	4.05	4.45	4.65	5.00	5.00

Table 1-1dd
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for 32PTH1 DSC (Damaged Fuel) (continued)

Fuel Assembly Class	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)					
	Minimum Soluble Boron (ppm)	Basket Type				
		1A or 2A	1B or 2B	1C or 2C	1D or 2D	1E or 2E
BW 15x15 Assembly Class (with CCs)	2000	3.20	3.50	3.65	3.90	4.10
	2300	3.40	3.80	3.95	4.20	4.40
	2400	3.50	3.90	4.05	4.30	4.55
	2500	3.60	4.00	4.15	4.40	4.65
	2800	3.80	4.20	4.40	4.65	4.90
	3000	3.95	4.40	4.55	4.90	5.00
CE 15x15 Assembly Class (without CCs)	2000	3.35	3.70	3.80	4.05	4.25
	2300	3.60	3.95	4.10	4.30	4.60
	2400	3.65	4.05	4.20	4.45	4.70
	2500	3.75	4.15	4.30	4.55	4.80
	2800	4.00	4.40	4.60	4.85	5.00
	3000	4.15	4.55	4.75	5.00	5.00
CE 15x15 Assembly Class (with CCs)	2000	3.30	3.65	3.80	4.00	4.20
	2300	3.55	3.90	4.05	4.30	4.55
	2400	3.65	4.00	4.15	4.45	4.65
	2500	3.70	4.10	4.25	4.50	4.80
	2800	3.95	4.35	4.55	4.80	5.00
	3000	4.10	4.55	4.70	5.00	5.00
WE 15x15 Assembly Class (without CCs)	2000	3.40	3.75	3.90	4.15	4.30
	2300	3.65	4.00	4.20	4.45	4.70
	2400	3.75	4.10	4.30	4.55	4.80
	2500	3.80	4.20	4.40	4.65	4.90
	2800	4.05	4.45	4.60	4.90	5.00
	3000	4.20	4.60	4.80	5.00	5.00

Table 1-1dd
Maximum Assembly Average Initial Enrichment v/s Neutron Poison Requirements for 32PTH1 DSC (Damaged Fuel)
(Continued)

Fuel Assembly Class	Maximum Assembly Average Initial Enrichment (wt. % U-235) as a Function of Soluble Boron Concentration and Basket Type (Fixed Poison Loading)					
	Minimum Soluble Boron (ppm)	Basket Type				
		1A or 2A	1B or 2B	1C or 2C	1D or 2D	1E or 2E
WE 15x15 Assembly Class (with CCs)	2000	3.35	3.65	3.80	4.00	4.20
	2300	3.55	3.90	4.10	4.35	4.60
	2400	3.65	4.00	4.20	4.45	4.70
	2500	3.70	4.10	4.30	4.55	4.80
	2800	3.95	4.35	4.50	4.80	5.00
	3000	4.10	4.50	4.70	5.00	5.00
CE 14x14 Assembly Class (without CCs)	2000	3.70	4.10	4.30	4.60	4.85
	2300	3.95	4.40	4.60	4.95	5.00
	2400	4.05	4.50	4.70	5.00	5.00
	2500	4.15	4.60	4.80	5.00	5.00
	2800	4.40	4.90	5.00	5.00	5.00
	3000	4.55	5.00	5.00	5.00	5.00
CE 14x14 Assembly Class (with CCs)	2000	3.55	3.95	4.10	4.35	4.60
	2300	3.80	4.20	4.40	4.70	4.90
	2400	3.9	4.30	4.50	4.80	5.00
	2500	4.00	4.40	4.60	4.90	5.00
	2800	4.20	4.65	4.90	5.00	5.00
	3000	4.35	4.85	5.00	5.00	5.00
WE 14x14 Assembly Class (without CCs)	2000	3.75	4.15	4.30	4.60	4.85
	2300	3.95	4.45	4.65	5.00	5.00
	2400	4.05	4.55	4.75	5.00	5.00
	2500	4.15	4.65	4.85	5.00	5.00
	2800	4.40	4.90	5.00	5.00	5.00
	3000	4.60	5.00	5.00	5.00	5.00
WE 14x14 Assembly Class (with CCs)	2000	3.70	4.10	4.20	4.50	4.75
	2300	3.90	4.40	4.60	4.90	5.00
	2400	4.00	4.50	4.65	5.00	5.00
	2500	4.10	4.55	4.80	5.00	5.00
	2800	4.30	4.80	5.00	5.00	5.00
	3000	4.50	5.00	5.00	5.00	5.00

Table 1-1ee
Thermal and Radiological Characteristics for Control Components Stored in the NUHOMS®-32PT and NUHOMS®-32PTH1 DSCs

Parameter	BPRAs, NSAs, CRAs, RCCAs, VSIs, Neutron Sources, and APSRAs	TPAs and ORAs
Maximum Gamma Source (γ/sec/DSC)	1.25E+15	1.3E+14
Decay Heat (Watts/DSC)	256.0	256.0

Table 1-1ff
B10 Specification for the NUHOMS®-32PTH1 Poison Plates

32PTH1 DSC Basket Type	Minimum B10 Areal Density for Boral® (mg/cm^2)	Minimum B10 Areal Density for B-Al[(1)] (mg/cm^2)
1A or 2A	9.0	7.0
1B or 2B	19.0	15.0
1C or 2C	25.0	20.0
1D or 2D	N/A	32.0
1E or 2E	N/A	50.0

Note:
(1) B-Al = Metal Matrix Composites and Borated Aluminum Alloys.

Table 1-2a
PWR Fuel Qualification Table for the Standardized NUHOMS®-24P DSC (Fuel Without BPRAs)

(Minimum required years of cooling time after reactor core discharge)

Burnup (GWd/ MTU)	Initial Enrichment (wt. % U-235)																				
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
10	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
15	5	5	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
20	5	5	5	5	5	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
25		5	5	5	5	5	5	5	5	a	a	a	a	a	a	a	a	a	a	a	a
28				5	5	5	5	5	5	5	5	5	a	a	a	a	a	a	a	a	a
30						5	5	5	5	5	5	5	5	a	a	a	a	a	a	a	a
32							5	5	5	5	5	5	5	5	5	a	a	a	a	a	a
34								.6	5	5	5	5	5	5	5	5	5	a	a	a	a
36									6	6	6	6	5	5	5	5	5	5	5	a	a
38											7	6	6	6	6	6	6	6	5	5	5
40				Not Acceptable								8	8	8	7	6	6	6	6	6	6
41				or								9	9	9	8	8	8	8	8	8	8
42				Not Analyzed									10	9	9	9	9	9	9	8	8
43													10	10	10	10	10	9	9	9	9
44														11	11	11	11	10	10	10	10
45														12	12	11	11	11	11	11	11

a) Minimum Cooling Time 5 years, and Minimum 2350 ppm soluble boron required in the DSC cavity water during loading or unloading.

Notes:

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 wt. % U-235 must be qualified for storage using the alternate nuclear parameters specified in Table 1-1a. Fuel with an initial enrichment greater than 4.0 wt. % U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage.
- Example: An assembly with an initial enrichment of 3.65 wt. % U-235 and a burnup of 42.5 GWd/MTU is acceptable for storage after a ten-year cooling time as defined at the intersection of 3.6 wt. % U-235 (rounding down) and 43 GWd/MTU (rounding up) on the qualification table.

Table 1-2b
BWR Fuel Qualification Table for the Standardized NUHOMS®-52B DSC

(Minimum required years of cooling time after reactor core discharge)

Burnup (GWd/ MTU)	Initial Enrichment (wt. % U-235)																				
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
15	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
25	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
30				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
32					6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5
34						8	8	8	8	8	8	8	8	7	6	6	6	6	6	6	6
35							10	10	10	10	9	8	8	8	8	8	8	8	6	6	6
36							11	11	11	11	11	10	10	10	10	10	10	9	8	8	8
37								13	13	12	12	12	12	11	11	11	11	11	10	10	10
38								15	14	14	14	13	13	13	13	12	12	12	12	12	11
39			Not Acceptable					18	17	17	16	16	16	15	14	14	14	14	13	13	13
40			or						21	21	20	20	19	18	17	17	16	16	16	16	15
42			Not Analyzed							22	22	22	21	21	20	20	20	19	18	17	17
44										24	24	23	23	23	22	22	21	21	21	20	20
45											25	24	24	23	23	23	22	22	22	21	21

Notes:

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 wt. % U-235 must be qualified for storage using the alternate nuclear parameters specified in Table 1-1b. Fuel with an initial enrichment greater than 4.0 wt. % U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage. Fuel with a burnup less than 15 GWd/MTU is acceptable after three years cooling time provided the physical parameters from Table 1-1b have been met.
- Example: An assembly with an initial enrichment of 3.05 wt. % U-235 and a burnup of 34.5 GWd/MTU is acceptable for storage after a nine-year cooling time as defined at the intersection of 3.0 wt. % U-235 (rounding down) and 35 GWd/MTU (rounding up) on the qualification table.

Table 1-2c
PWR Fuel Qualification Table for the Standardized NUHOMS®-24P DSC (Fuel With BPRAs)

(Minimum required years of cooling time after reactor core discharge)

Burnup (GWd/ MTU)	Initial Enrichment (wt. % U-235)																				
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
10	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
15	5	5	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
20	5	5	5	5	5	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
25		5	5	5	5	5	5	5	5	a	a	a	a	a	a	a	a	a	a	a	a
28				5	5	5	5	5	5	5	5	5	a	a	a	a	a	a	a	a	a
30						6	6	6	5	5	5	5	5	a	a	a	a	a	a	a	a
32							6	6	6	6	6	6	5	5	5	a	a	a	a	a	a
34								7	6	6	6	6	6	6	6	6	6	a	a	a	a
36									8	7	7	7	6	6	6	6	6	6	6	a	a
38											8	8	7	7	7	7	6	6	6	6	6
40					Not Acceptable							9	9	8	8	8	7	7	7	7	6
41					or							10	9	9	9	9	8	8	8	8	8
42					Not Analyzed								10	10	9	9	9	9	9	9	9
43													11	11	11	10	10	10	10	9	9
44														12	11	11	11	11	10	10	10
45														13	12	12	12	11	11	11	11

a) Minimum Cooling Time 5 years, and Minimum 2350 ppm soluble boron required in the DSC cavity water during loading or unloading.

Notes:

- BPRA Burnup shall not exceed that of a BPRA irradiated in fuel assemblies with a total burnup of 36,000 MWd/MTU.
- Minimum cooling time for a BPRA is 5 years for B&W designs and 10 years for Westinghouse designs, regardless of the required assembly cooling time.
- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 wt. % U-235 must be qualified for storage using the alternate nuclear parameters specified in Table 1-1a. Fuel with an initial enrichment greater than 4.0 wt. % U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage.
- Example: An assembly with an initial enrichment of 3.65 wt. % U-235 and a burnup of 42.5 GWd/MTU is acceptable for storage after a ten-year cooling time as defined at the intersection of 3.6 wt. % U-235 (rounding down) and 43 GWd/MTU (rounding up) on the qualification table.

Table 1-2d
PWR Fuel Qualification Table for 1.2 kW per Assembly Fuel without BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up GWd/MTU	Assembly Average Initial U-235 Enrichment, wt %																																			
	1.1	1.2	1.4	1.6	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
30	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
32	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
34	7.0	7.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
36	8.0	8.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
38	9.0	9.0	8.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
39	10.0	9.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
40	10.0	10.0	9.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
41	11.0	10.0	10.0	9.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
42	11.5	11.0	10.0	9.0	9.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
43	13.0	11.5	10.5	10.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
44	13.5	12.5	11.5	10.5	10.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
45	14.5	14.0	12.0	11.0	10.0	10.0	10.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- For fuel assemblies reconstituted with up to 10 stainless steel rods, increase the indicated cooling time by 1.5 years. If more than 10 stainless steel rods are present, increase the indicated cooling time by 6 years.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 1.1 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a six-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2e

PWR Fuel Qualification Table for 0.87 kW per Assembly Fuel without BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up GWd/MTU	Assembly Average Initial U-235 Enrichment, wt %																																			
	1.1	1.2	1.4	1.6	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
30	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
32	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
34	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0
36	9.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
38	9.0	9.0	8.5	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
39	10.0	9.0	9.0	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
40	10.0	10.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
41	11.0	10.5	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
42	12.0	11.5	11.0	10.5	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
43	13.0	12.0	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
44	13.0	13.0	12.5	12.0	11.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0
45	14.0	13.5	13.0	12.5	12.5	12.0	12.0	12.0	12.0	10.5	10.5	11.5	10.5	10.5	10.5	10.0	10.0	10.0	9.5	10.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- For fuel assemblies reconstituted with up to 10 stainless steel rods, increase the indicated cooling time by 1.5 years. If more than 10 stainless steel rods are present, increase the indicated cooling time by 6 years.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 1.1 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a eight-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2f
PWR Fuel Qualification Table for 0.7 kW Fuel without BPRAs per Assembly for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up GWd /MTU	Assembly Average Initial U-235 Enrichment, wt %																																		
	1.1	1.2	1.4	1.6	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
30	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
32	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0
34	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
36	10.5	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
38	13.0	13.0	11.5	11.5	11.0	11.0	11.0	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
39	14.0	14.0	13.5	13.0	12.0	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
40	14.5	14.5	14.0	14.0	13.5	13.5	13.0	13.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0	10.0	10.0
41	16.5	16.0	15.5	14.5	14.0	14.0	14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.5	12.5	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
42	18.0	16.5	16.5	16.0	15.5	15.5	14.5	14.5	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	13.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
43	18.5	18.0	18.0	16.5	16.5	16.5	16.5	16.0	16.0	16.0	16.0	15.5	15.5	14.5	14.5	14.5	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
44	20.0	19.0	18.5	18.5	18.0	18.0	18.0	17.5	16.5	16.5	16.5	16.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
45	21.0	21.0	20.0	19.0	19.0	19.0	18.5	18.5	18.0	18.0	18.0	18.0	18.0	18.0	17.5	16.5	16.5	16.5	16.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- For fuel assemblies reconstituted with up to 10 stainless steel rods, increase the indicated cooling time by 1.5 years. If more than 10 stainless steel rods are present, increase the indicated cooling time by 6 years.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 1.1 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a thirteen-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2g
PWR Fuel Qualification Table for 0.63 kW per Assembly Fuel without BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up GWd /MTU	Assembly Average Initial U-235 Enrichment, wt %																																			
	1.1	1.2	1.4	1.6	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
30	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
32	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.0
34	11.0	11.0	11.0	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
36	13.5	13.5	13.0	12.0	12.0	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
38	16.5	15.5	14.5	14.5	14.5	13.5	13.5	13.5	13.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	11.0	11.0	11.0	11.0
39	17.5	17.0	16.5	16.0	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	12.0	12.0	12.0	12.0
40	19.0	18.0	18.0	17.0	16.5	16.5	16.5	16.5	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.0	13.0	13.0	13.0
41	20.5	19.5	19.0	19.0	18.0	18.0	17.5	17.5	17.5	17.0	17.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0
42	22.0	20.5	20.5	19.5	19.5	19.5	19.0	19.0	18.5	18.5	18.5	18.0	18.0	18.0	18.0	18.0	18.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
43	23.0	22.5	22.5	21.5	21.5	21.0	20.0	20.0	19.5	19.5	19.5	19.0	19.0	19.0	19.0	19.0	19.0	19.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
44	24.5	24.5	23.0	23.0	22.0	22.0	22.0	22.0	21.5	21.5	21.5	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
45	25.5	25.5	25.0	24.0	23.0	23.0	23.0	23.0	23.0	22.5	22.5	22.5	22.0	22.0	22.0	22.0	22.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	19.0	19.0

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- For fuel assemblies reconstituted with up to 10 stainless steel rods, increase the indicated cooling time by 1.5 years. If more than 10 stainless steel rods are present, increase the indicated cooling time by 6 years.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 1.1 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a sixteen-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2h
PWR Fuel Qualification Table for 0.6 kW per Assembly Fuel without BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up GWd /MTU	Assembly Average Initial U-235 Enrichment, wt %																																			
	1.1	1.2	1.4	1.6	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0
28	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
30	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
32	10.5	10.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
34	12.0	12.0	12.0	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	9.0	9.0
36	14.5	14.5	14.0	14.0	13.5	13.5	13.0	13.0	13.0	13.0	13.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
38	17.5	17.5	16.5	16.5	16.5	16.0	16.0	15.5	15.5	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
39	19.5	19.0	18.5	18.0	17.0	16.5	16.5	16.5	16.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
40	20.5	20.0	20.0	19.0	19.0	18.5	18.5	18.5	18.0	18.0	18.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0
41	22.5	21.5	21.0	21.0	20.0	20.0	19.5	19.5	19.5	19.0	19.0	19.0	19.0	19.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0
42	24.0	22.5	22.5	21.5	21.5	21.5	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
43	25.0	24.5	24.5	23.5	23.5	23.0	22.0	22.0	22.0	21.5	21.5	21.5	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	19.0	19.0	19.0	19.0	19.0	19.0
44	26.5	26.5	25.0	25.0	24.0	24.0	24.0	24.0	23.5	23.5	23.5	23.0	23.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0
45	27.5	27.5	27.0	26.0	26.0	25.0	25.0	25.0	25.0	24.5	24.5	24.5	24.0	24.0	24.0	24.0	24.0	24.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- For fuel assemblies reconstituted with up to 10 stainless steel rods, increase the indicated cooling time by 1.5 years. If more than 10 stainless steel rods are present, increase the indicated cooling time by 6 years.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 1.1 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a nineteen-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2i

PWR Fuel Qualification Table for 1.2 kW per Assembly Fuel with BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

BU (GWd/MTU)	Initial Enrichment wt % U-235																													
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
25		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
28				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
30						5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
32							5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
34								5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
36									5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
38											5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
39											5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
40			Not Analyzed									5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
41												6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
42												6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5
43													6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5
44														6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
45														6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a six-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2j
PWR Fuel Qualification Table for 0.87 kW per Assembly Fuel with BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

BU (GWd/ MTU)	Initial Enrichment wt % U-235																													
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
25		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
28				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
30						5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
32							6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
34								6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
36									7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
38											7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6
39											7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
40			Not Analyzed									8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
41												8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7
42												9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
43													9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8
44														9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
45														10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a eight-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2k

PWR Fuel Qualification Table for 0.7 kW per Assembly Fuel with BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

BU (GWd/MTU)	Initial Enrichment wt % U-235																													
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
25		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
28				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5
30						6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
32							7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
34								8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7
36									9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8
38											10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9
39											11	11	11	11	11	11	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
40				Not Analyzed								12	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
41												13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11
42												14	14	13	13	13	13	13	13	13	13	13	13	13	12	12	12	12	12	12	12
43													15	14	14	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13
44														16	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14
45														17	17	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a thirteen-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-21
PWR Fuel Qualification Table for 0.63 kW per Assembly Fuel with BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

BU (GWd/MTU)	Initial Enrichment wt % U-235																														
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
25		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
28				7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
30						7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
32							8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
34								10	10	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
36									11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10	10	10	10	10	10	10
38											13	13	13	13	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
39											14	14	14	14	14	14	14	13	13	13	13	13	13	13	13	13	13	13	13	13	13
40			Not Analyzed									15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	14	14	14	14	14
41												16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	15	15	15	15
42												18	18	17	17	17	17	17	17	17	17	17	17	17	16	16	16	16	16	16	16
43													19	19	19	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17
44														20	20	20	20	20	20	20	19	19	19	19	19	19	19	19	19	19	19
45														22	21	21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a seventeen-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2m
PWR Fuel Qualification Table for 0.6 kW per Assembly Fuel with BPRAs for the NUHOMS®-32PT DSC

(Minimum required years of cooling time after reactor core discharge)

BU (GWd/ MTU)	Initial Enrichment wt % U-235																													
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
25		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
28				7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6
30						8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7
32							9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8
34								11	11	11	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
36									12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11
38											15	15	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13
39											16	16	16	16	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
40			Not Analyzed									17	17	17	17	17	17	17	17	16	16	16	16	16	16	16	16	16	16	16	16
41												19	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	17	17	17
42												20	20	20	20	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
43													21	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20	20
44														23	22	22	22	22	22	22	22	22	22	22	22	21	21	21	21	21	21
45														24	24	24	24	24	23	23	23	23	23	23	23	23	23	23	23	23	22

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 2.0 and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 45 GWd/MTU is unacceptable for storage
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a nineteen-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) on the qualification table.

Table 1-2n
PWR Fuel Qualification Table for Zone 1 with 0.7 kW per Assembly, Fuel with or without BPRAs, for the NUHOMS®-24PHB DSC

(Minimum required years of cooling time after reactor core discharge)

BU (GWd/MTU)	Assembly Average Initial U-235 Enrichment (wt %)																								
	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28			5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
30						6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
32							7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
34								8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
36									9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
38											10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5
39											11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
40											12.0	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0
41											13.0	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.0	12.0	12.0
42											14.5	14.5	14.0	14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	13.0
43				Not Analyzed							15.5	15.5	15.5	15.0	15.0	15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.5	14.0	14.0
44											17.0	16.5	16.5	16.5	16.5	16.0	16.0	16.0	16.0	16.0	15.5	15.5	15.5	15.5	15.5	15.5
45													18.0	17.5	17.5	17.5	17.5	17.0	17.0	17.0	17.0	17.0	16.5	16.5	16.5	16.5
46													18.8	18.7	18.5	18.5	18.3	18.2	18.1	18.0	17.9	17.8	17.7	17.6	17.5	17.4
47													20.1	20.0	19.9	19.6	19.6	19.5	19.4	19.2	19.1	19.0	18.9	18.8	18.7	18.7
48													21.4	21.3	21.1	21.0	20.8	20.8	20.7	20.5	20.4	20.3	20.2	20.1	20.0	19.9
49													22.7	22.6	22.4	22.3	22.1	22.1	21.9	21.8	21.7	21.6	21.5	21.4	21.3	21.2
50															23.7	23.6	23.5	23.4	23.3	23.2	23.0	22.9	22.8	22.7	22.6	22.5
51															25.0	24.9	24.8	24.6	24.5	24.4	24.3	24.2	24.0	23.9	23.8	23.7
52															26.3	26.2	26.0	25.9	25.8	25.7	25.6	25.4	25.3	25.2	25.2	25.0
53															27.5	27.3	27.2	27.1	27.0	26.9	26.8	26.7	26.5	26.4	26.4	26.2
54															28.8	28.6	28.5	28.3	28.2	28.1	28.0	28.0	27.8	27.7	27.6	27.5
55															29.9	29.8	29.7	29.6	29.5	29.3	29.2	29.1	29.0	28.9	28.8	28.7

- BU = Assembly average burnup
- Use burnup and enrichment to lookup minimum cooling time in years. For fuel assemblies reconstituted with up to 10 stainless steel rods only, if the lookup cooling time is less than 9.0 years then a minimum cooling time of 9.0 years shall be used. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment greater than 4.5 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 46.5 GWd/MTU is acceptable for storage after a 19.5 years cooling time as defined by 3.7 wt. % U-235 (rounding down) and 47 GWd/MTU (rounding up) on the qualification table.
- See Figure 1-8 for a description of zones.
- For assemblies fuel reconstituted with Zircaloy clad uranium-oxide rods use the assembly average enrichment to determine the minimum cooling time.

Table 1-2o
PWR Fuel Qualification Table for Zone 2 with 1.0 kW per Assembly, Fuel with or without BPRAs, for the NUHOMS®-24PHB DSC

(Minimum required years of cooling time after reactor core discharge)

BU	Assembly Average Initial U-235 Enrichment (wt %)																									
(GWd/MTU)	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
30						5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
32							5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
34								5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
36									5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
38											6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
39											6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5
40											6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
41											6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0
42											7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
43											7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
44											7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
45			Not Analyzed										8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.4
46													8.2	8.1	8.0	8.0	7.9	7.8	7.8	7.7	7.7	7.6	7.6	7.5	7.5	7.4
47													8.7	8.6	8.5	8.4	8.4	8.3	8.2	8.2	8.1	8.0	8.0	7.9	7.9	7.8
48													9.2	9.1	9.0	9.0	8.9	8.8	8.7	8.6	8.6	8.5	8.5	8.4	8.3	8.3
49													9.8	9.7	9.6	9.5	9.4	9.3	9.2	9.2	9.1	9.0	9.0	8.9	8.8	8.7
50															10.2	10.1	10.0	9.9	9.8	9.7	9.6	9.6	9.5	9.4	9.3	9.3
51															10.9	10.8	10.7	10.6	10.5	10.3	10.3	10.2	10.1	10.0	9.9	9.9
52															11.6	11.5	11.3	11.2	11.1	11.0	10.9	10.8	10.7	10.6	10.5	10.5
53															12.4	12.2	12.1	12.0	11.9	11.8	11.6	11.5	11.4	11.3	11.2	11.1
54															13.2	13.1	13.0	12.8	12.7	12.5	12.4	12.3	12.2	12.1	12.0	11.9
55															14.1	13.9	13.8	13.6	13.5	13.4	13.2	13.1	13.0	12.9	12.8	12.6

- BU = Assembly average burnup
- Use burnup and enrichment to lookup minimum cooling time in years. For fuel assemblies reconstituted with up to 10 stainless steel rods only, if the lookup cooling time is less than 9.0 years then a minimum cooling time of 9.0 years shall be used. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment greater than 4.5 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 46.5 GWd/MTU is acceptable for storage after a 8.3 years cooling time as defined by 3.7 wt. % U-235 (rounding down) and 47 GWd/MTU (rounding up) on the qualification table.
- See Figure 1-8 for a description of zones.
- For assemblies fuel reconstituted with Zircaloy clad uranium-oxide rods use the assembly average enrichment to determine the minimum cooling time.

Table 1-2p

PWR Fuel Qualification Table for Zone 3 with 1.3 kW per Assembly, Fuel with or without BPRAs, for the NUHOMS®-24PHB DSC

(Minimum required years of cooling time after reactor core discharge)

BU	Assembly Average Initial U-235 Enrichment (wt %)																									
(GWd/MTU)	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5
10	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
15	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
28			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
30						5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
32							5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
34								5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
36									5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
38											5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
39											5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
40											5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
41											5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
42											6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
43											6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
44											6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
45			Not Analyzed										6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
46													6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
47													6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
48													6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
49													6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
50															6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
51															6.7	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
52															7.0	6.9	6.9	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
53															7.3	7.2	7.2	7.1	7.1	7.0	6.9	6.9	6.9	6.9	6.9	6.9
54															7.7	7.6	7.5	7.4	7.4	7.3	7.3	7.2	7.1	7.1	7.0	7.0
55															8.0	8.0	7.9	7.8	7.7	7.7	7.6	7.5	7.5	7.4	7.3	7.3

- BU = Assembly average burnup
- Use burnup and enrichment to lookup minimum cooling time in years. For fuel assemblies reconstituted with up to 10 stainless steel rods only, if the lookup cooling time is less than 9.0 years then a minimum cooling time of 9.0 years shall be used. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment greater than 4.5 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 5-years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 46.5 GWd/MTU is acceptable for storage after a 6.2 years cooling time as defined by 3.7 wt. % U-235 (rounding down) and 47 GWd/MTU (rounding up) on the qualification table.
- See Figure 1-8 and 1-9 for a description of zones.
- For fuel assemblies reconstituted with Zircaloy clad uranium-oxide rods use the assembly average enrichment to determine the minimum cooling time.

Table 1-2q
BWR Fuel Qualification Table for NUHOMS®-61BT DSC

(Minimum required years of cooling time after reactor core discharge)

BU	Initial Enrichment																														
(GWd /MTU	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4
10	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
20	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
25	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4
28	Not Acceptable or Not Analyzed				6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5
30					7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
32					8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6
34					9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7
36					11	11	11	10	10	10	10	10	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8
38					14	13	13	12	12	12	12	11	11	11	11	11	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9
39					15	14	14	14	13	13	13	12	12	12	12	11	11	11	11	11	10	10	10	10	10	10	10	9	9	9	9
40					16	16	15	15	15	14	14	14	13	13	13	12	12	12	12	12	11	11	11	11	11	10	10	10	10	10	10

This Table provides an alternate methodology as cross referenced in Table 1-1c and 1-1j for determination of fuel assemblies qualified for storage in NUHOMS®-61BT DSC.

- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are conservatively applied in determination of actual values for these two parameters.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an initial enrichment less than 1.4 and greater than 4.4 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 40 GWd/MTU is unacceptable for storage.
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 4 years cooling.
- Example: An assembly with an initial enrichment of 3.75 wt. % U-235 and a burnup of 39.5 GWd/MTU is acceptable for storage after a eleven-year cooling time as defined by 3.7 wt. % U-235 (rounding down) and 40 GWd/MTU (rounding up) on the qualification table.

Table 1-3a
PWR Fuel Qualification Table for Zone 1 Fuel with 1.7 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																															
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34		3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38		4.5	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
39		4.5	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40		4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
41		5.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
42										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
43										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
44										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
45										4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
46										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
47										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
48										5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
49													5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
50													5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
51													5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
52														5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
53														5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
54															5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
55															5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
56															6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0
57																	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
58																	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5
59																	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
60																	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
61																	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
62																	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time.

Note: Page A-*71* provides the explanatory notes and limitations regarding the use of this table.

Table 1-3b
PWR Fuel Qualification Table for Zone 2 Fuel with 2.0 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36		3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38		3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
39		3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
40		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
41		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
42										3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
43										3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
44										3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
45										4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
46										4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
47										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
48										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
49													4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5
50													4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
51													4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
52														4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
53														4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
54															4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0
55															5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
56															5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
57																	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
58																	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
59																	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
60																	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
61																	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
62																	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time.

Note: Page A-*71* provides the explanatory *n*otes and limitations regarding the use of this table.

Table 1-3c
PWR Fuel Qualification Table for Zone 3 Fuel with 1.5 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																															
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34		4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36		4.5	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
38		5.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
39		5.0	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40		5.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
41		5.5	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
42										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
43										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
44										5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
45										5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
46										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
47										5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
48										5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5
49													5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
50													5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
51													6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0
52														6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
53														6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
54															6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5
55															6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
56															7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
57																	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
58																	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5
59																	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	7.0
60																	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
61																	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
62																	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time.

Note: Page A-71 provides the explanatory notes and limitations regarding the use of this table.

Table 1-3d
PWR Fuel Qualification Table for Zone 4 Fuel with 1.3 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																															
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		4.5	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
34		4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
36		5.0	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
38		5.5	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
39		6.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
40		6.0	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
41		6.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
42										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
43										5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
44										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
45										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
46										6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
47										6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
48										6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
49													6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
50													7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
51													7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0
52														7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
53														7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
54															8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
55															8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0
56															8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5
57																	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
58																	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0
59																	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5
60																	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0
61																	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5
62																	11.5	11.5	11.5	11.5	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time for cooling times less than 10 years.

Note: Page A-71 provides the explanatory notes and limitations regarding the use of this table.

Table 1-3c
PWR Fuel Qualification Table for Zone 1 Fuel with 1.7 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																															
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34		3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38		4.5	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
39		4.5	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40		4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
41		5.0	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
42										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
43										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5
44										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
45										4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
46										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
47										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
48										5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0
49													5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
50													5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
51													5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
52														5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5
53														5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
54															5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
55															5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
56															6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
57																	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
58																	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5
59																	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
60																	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
61																	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0
62																	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time.

Note: Page A-71 *provides* the explanatory notes and limitations regarding the use of this table.

Table 1-3f
PWR Fuel Qualification Table for Zone 2 Fuel with 2.0 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																															
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36		3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38		3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
39		3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
40		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
41		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
42										3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
43										3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
44										3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
45										4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
46										4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
47										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
48										4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
49													4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
50													4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
51													4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
52														4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
53														4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0
54															4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0
55															5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
56															5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
57																	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
58																	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
59																	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
60																	6.0	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
61																	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
62																	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time.

Note: Page A-71 provides the explanatory notes and limitations regarding the use of this table.

Table 1-3g
PWR Fuel Qualification Table for Zone 3 Fuel with 1.5 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34		4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36		4.5	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
38		5.0	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
39		5.0	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40		5.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
41		5.5	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
42										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
43										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
44										5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0
45										5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
46										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
47										5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
48										5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
49													5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
50													5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
51													6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0
52														6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
53														6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5
54															6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
55															6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
56															7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
57																	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
58																	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
59																	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
60																	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
61																	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
62																	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time.

Note: Page A-71 provides the explanatory notes and limitations regarding the use of this table.

Table 1-3h
PWR Fuel Qualification Table for Zone 4 Fuel with 1.3 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																															
	0.7	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28		3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30		4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32		4.5	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
34		4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
36		5.0	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
38		5.5	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
39		6.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0
40		6.0	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
41		6.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
42										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
43										5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5
44										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
45										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
46										6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0
47										6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
48										6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
49													6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
50													7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
51													7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0
52														7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
53														7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5
54															8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0
55															8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0
56															8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5
57																	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0
58																	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0
59																	10.0	10.0	9.5	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5
60																	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0
61																	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5
62																	12.0	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0

Note: If *irradiated* stainless steel rods are present in the *reconstituted* fuel assembly, add an additional year of cooling time for cooling times less than 10 years.

Note: Page A-*71* provides the explanatory notes and limitations regarding the use of this table.

Notes: Tables 1-3a through 1-3h:

- Burnup = Assembly Average burnup.
- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an assembly average initial enrichment less than *0.7 wt. % U-235* (or less than the minimum provided above for each burnup) and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 62 GWd/MTU is unacceptable for storage.
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 3-years cooling.
- *WE 15x15 PLSAs* shall be limited to *a minimum assembly average initial enrichment of 1.2 wt. % U-235.*
- See Figures 1-11 through 1-15 for the description of zones.
- For *reconstituted* fuel assemblies with UO_2 rods *and/or Zr rods or Zr pellets and/or stainless steel rods*, use the assembly average equivalent enrichment to determine the minimum cooling time.
- The cooling times for damaged and intact assemblies are identical.
- *Example*: An intact fuel assembly without CCs, with a decay heat load of 1.7 kW or less, an initial enrichment of 3.65 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a 4.0 year cooling time as defined by 3.6 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) in Table 1-3a.

Table 1-4a

BWR Fuel Qualification Table for Zone 1 Fuel with 0.22 kW per Assembly for the NUHOMS®-61BTH DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up, GWD/ MTU	Lattice Average Initial U-235 Enrichment, wt %																																	
	0.9	1.2	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
20	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
23	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
25	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
28	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
30	10.5	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
32				11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.05	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0
34				14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.0	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
36				16.5	16.0	16.0	16.0	16.0	16.0	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	14.5	14.5
38				19.5	19.0	19.0	19.0	19.0	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
39				21.0	21.0	20.5	20.5	20.5	20.5	20.5	20.5	20.0	20.0	20.0	20.0	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
40										22.0	21.5	21.5	21.5	21.5	21.5	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
41										23.5	23.5	23.0	23.0	23.0	23.0	23.0	22.5	22.5	22.5	22.5	22.5	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	21.5
42										24.5	24.5	24.5	24.5	24.5	24.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.05	24.0	24.0	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
43										26.0	26.0	26.0	26.0	26.0	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	24.5
44										27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	26.5	26.5	26.5	26.5	26.5	26.0	26.5	26.0	26.0	26.0
45										29.0	29.0	29.0	29.0	29.0	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.0	28.0	28.0	28.0	28.0	27.5	27.5	27.5	27.5	27.5	27.5
46										30.5	30.5	30.5	30.5	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.0	29.0	29.0
47										31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	30.5	30.5	30.5	30.5	30.5	30.5
48										33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0
49										34.5	34.5	34.5	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.0	33.0	33.0	33.0
50										36.0	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.0	35.0	35.0	35.0	35.0	35.0	35.0	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5
51										37.0	37.0	37.0	37.0	37.0	37.0	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
52										38.5	38.0	38.0	38.0	38.0	38.0	38.0	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.0
53										39.5	39.5	39.5	39.5	39.5	39.5	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.5	39.0	38.5	38.5	38.5
54										41.0	41.0	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.5
55										41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.0	41.0	41.0	41.0	41.0
56										43.0	43.0	43.0	43.0	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5
57										44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
58										45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	44.5	44.5	44.5	44.5
59										46.0	46.0	46.0	46.0	46.0	46.5	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.5	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	45.5
60										47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
61										48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.5	48.0	48.0	48.0	48.0
62										49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5

Not Analyzed

If 10 irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional 5.0 years of cooling time.

Note: The page that follows Table 1-4f provides explanatory notes and limitations regarding the use of this table.

Table 1-4b

BWR Fuel Qualification Table for Zone 2 Fuel with 0.35 kW per Assembly for the NUHOMS®-61BTH DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up, GWD/MTU	Lattice Average Initial U-235 Enrichment, wt %																																
	0.9	1.2	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
23	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
25	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
28	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
30	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
32			6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
34				6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
36				6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
38				7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
39				7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
40										7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
41										8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
42										8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
43										9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0
44										9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5
45										10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
46										11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5
47										12.0	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0
48										12.5	12.5	12.5	12.5	12.5	12.5	12.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.0	10.5	10.5	10.5
49										13.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
50										14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.0	12.0	12.0	12.0
51										15.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.0	13.0	13.0	13.0	13.0	13.0
52										16.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
53										17.5	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0
54										18.5	18.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	16.0	16.0
55										20.5	20.5	19.0	19.0	19.0	19.0	19.0	19.0	19.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	17.0	17.0	17.0	17.0	17.0	17.0
56										21.5	21.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
57										22.5	22.5	22.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	19.0	19.0	19.0	19.0	19.0	19.0
58										22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	20.0	20.0	20.0
59										23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	21.0	21.0	21.0	21.0
60										24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	22.0	22.0	22.0
61										26.5	26.5	26.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	23.0	23.0	23.0	23.0
62										27.5	27.5	27.5	27.5	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0

Not Analyzed

If 10 irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional 5.0 years of cooling time.

Note: The page that follows Table 1-4f provides the explanatory notes and limitations regarding the use of this table.

Table 1-4c
BWR Fuel Qualification Table for Zone 3 Fuel with 0.393 kW per Assembly for the NUHOMS®-61BTH DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up, GWD/MTU	Lattice Average Initial U-235 Enrichment, wt %																																
	0.9	1.2	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
23	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
28	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
30	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
32				5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
34				5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5
36				6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
38				6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
39				6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
40										6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
41										7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0
42										7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
43										7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
44										8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
45										8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0
46										8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5
47										9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
48										10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
49										10.5	10.5	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
50										11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0
51										11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5
52										12.5	12.5	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5
53										13.5	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0
54										14.0	14.0	14.0	13.5	13.5	13.5	13.0	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5
55										15.0	15.0	14.5	14.5	14.5	14.0	14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.0	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.0
56										16.0	16.0	15.5	15.5	15.5	15.0	15.0	15.0	15.0	15.0	14.5	14.5	14.0	14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.0	13.0	13.0	13.0	13.0
57										17.0	16.5	16.5	16.5	16.0	16.0	16.0	15.5	15.5	15.5	15.5	15.5	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.5	14.0	14.0	14.0	14.0	14.0
58										18.0	17.5	17.5	17.5	17.5	17.0	17.0	16.5	16.5	16.5	16.5	16.5	16.0	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.0	15.0	14.5	14.5
59										19.5	18.5	18.5	18.0	18.0	18.0	17.5	17.5	17.5	17.5	17.0	17.0	17.0	17.0	16.5	16.5	16.5	16.0	16.0	16.0	16.0	16.0	16.0	15.5	15.5
60										20.0	19.5	19.5	19.5	19.0	19.0	18.5	18.5	18.5	18.5	18.5	18.5	18.0	17.5	17.5	17.5	17.0	17.0	17.0	17.0	17.0	16.5	16.5	16.5	16.5
61										20.5	20.5	20.5	20.5	20.5	20.0	19.5	19.5	19.5	19.0	19.0	19.0	18.5	18.5	18.5	18.5	18.5	18.0	18.0	18.0	18.0	17.5	17.5	17.5	17.5
62										21.5	21.5	21.0	21.0	21.0	21.0	20.5	20.5	20.5	20.0	20.0	20.0	19.5	19.5	19.5	19.0	19.0	19.0	19.0	19.0	19.0	18.5	18.5	18.5	18.0

Not Analyzed

If 10 irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional 5.0 years of cooling time.

Note: The page that follows Table 1-4f provides the explanatory notes and limitations regarding the use of this table.

Table 1-4d

BWR Fuel Qualification Table for Zone 4 Fuel with 0.48 kW per Assembly for the NUHOMS®-61BTH DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up, GWD/ MTU	Lattice Average Initial U-235 Enrichment, wt %																																	
	0.9	1.2	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
23	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
30	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
32				4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5
34				4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
36				5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
38				5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
39				5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
40										5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
41										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
42										7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
43										7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5
44										8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
45										6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
46										8.5	8.5	8.5	8.5	8.0	8.0	8.5	8.5	8.5	8.5	8.0	8.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0
47										9.0	9.0	9.0	9.0	8.5	8.5	9.0	9.0	9.0	9.0	8.5	8.5	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
48										9.5	9.5	9.0	9.0	9.0	9.0	9.5	9.5	9.0	9.0	9.0	9.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5
49										10.0	10.0	10.0	9.5	9.5	9.5	10.0	10.0	10.0	9.5	9.5	9.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
50										7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
51										8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
52										8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
53										9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
54										9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5
55										10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0
56										10.5	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5
57										11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
58										11.5	11.5	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0
59										12.0	12.0	12.0	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5
60										13.0	12.5	12.5	12.5	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0
61										13.5	13.5	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	10.5
62										14.0	14.0	14.0	14.0	13.5	13.5	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.0	11.0

Not Analyzed

If 10 irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional 5.0 years of cooling time.

Note: The page that follows Table 1-4f provides the explanatory notes and limitations regarding the use of this table.

Table 1-4e
BWR Fuel Qualification Table for Zone 5 Fuel with 0.54 kW per Assembly for the NUHOMS®-61BTH DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up, GWD/ MTU	Lattice Average Initial U-235 Enrichment, wt %																																
	0.9	1.2	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
23	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
32				4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
34				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
36				4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
38				4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
39				5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
40										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
41										5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
42										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
43										5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5
44										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
45										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
46										6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
47										6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0
48										6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
49										6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
50										6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
51										7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
52										7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0
53										7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
54										8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
55										8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5
56										8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
57										9.0	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
58										9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5
59										9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
60										10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0
61										10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5
62										11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0

Not Analyzed

If 10 irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional 5.0 years of cooling time

Note: The page that follows Table 1-4f provides the explanatory notes and limitations regarding the use of this table.

Table 1-4f
BWR Fuel Qualification Table for Zone 6 Fuel with 0.7 kW per Assembly for the NUHOMS®-61BTH DSC

(Minimum required years of cooling time after reactor core discharge)

Burn-Up, GWD/ MTU	Lattice Average Initial U-235 Enrichment, wt %																																
	0.9	1.2	1.5	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
23	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0
32				4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
34				4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
36				4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
38				4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
39				4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
40										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
41										5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
42										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
43	Not Analyzed									5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
44										5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5
45										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
46										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
47	If 10 irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional 5.0 years of cooling time.									6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
48										6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
49										6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
50										6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5
51										6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
52										7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0
53										7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
54										7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5
55										8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
56										8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0
57										8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0
58										9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
59										9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5
60										10.0	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0
61										10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
62										10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5

Note: The page that follows Table 1-4f provides the explanatory notes and limitations regarding the use of this table.

Notes: Tables 1-4a through 1-4f:

- *Burnup = Assembly Average burnup.*
- *Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.*
- *Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.*
- *Fuel with an lattice average initial enrichment less than 0.9 (or less than the minimum provided above for each burnup) or greater than 5.0 wt.% U-235 is unacceptable for storage.*
- *Fuel with a burnup greater than 62 GWd/MTU is unacceptable for storage.*
- *Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 3-years cooling.*
- *See Figure 1-17 through Figure 1-24 for a description of the zones.*
- *For reconstituted fuel assemblies with UO_2 rods and/or Zr rods or Zr pellets and/or stainless steel rods, use the assembly average equivalent enrichment to determine the minimum cooling time.*
- *The cooling times for damaged and intact assemblies are identical.*
- *Example: An intact fuel assembly, with a decay heat load of 0.22 kW or less, an initial enrichment of 3.65 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a 24 year cooling time as defined by 3.6 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) in Table 1-4a.*

Table 1-5a
PWR Fuel Qualification Table for Zone 1 Fuel with 0.6 kW per Assembly for the NUHOMS®-32PTH1 DSC (Fuel without CCs)
(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
25									6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
28									7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0
30									8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
32									10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0
34									12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5
36									14.5	14.5	14.0	14.0	14.0	14.0	13.5	13.5	13.5	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
38									17.5	17.0	17.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.5
39									18.5	18.5	18.5	18.0	18.0	18.0	18.0	18.0	18.0	17.0	17.0	17.0	16.5	16.5	16.5	16.5	16.5	16.5	16.0	16.0	16.0	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.0	15.0	15.0
40									20.0	20.0	20.0	20.0	20.0	20.0	19.0	19.0	18.5	18.5	18.5	18.5	18.5	18.5	17.5	17.5	17.5	17.5	17.5	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	16.0	16.0
41									22.0	21.5	21.5	21.0	21.0	20.5	20.5	20.0	20.0	20.0	20.0	20.0	19.5	19.5	19.5	19.0	19.0	19.0	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
42																					21.0	21.0	20.5	20.5	20.5	20.5	20.0	20.0	20.0	20.0	20.0	20.0	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
43																					22.5	22.5	22.0	22.0	22.0	21.5	21.5	21.5	21.5	21.5	21.5	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0
44																					24.0	23.5	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	22.5	22.5	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
45																					25.5	25.0	25.0	25.0	24.5	24.5	24.5	24.5	24.5	24.0	24.0	24.0	24.0	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
46																					27.0	26.5	26.5	26.0	26.0	26.0	26.0	26.0	26.0	25.5	25.5	25.5	25.5	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	24.5
47																					28.0	28.0	28.0	27.5	27.5	27.5	27.5	27.0	27.0	27.0	27.0	27.0	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
48																					29.5	29.5	29.5	29.0	29.0	29.0	28.5	28.5	28.5	28.5	28.5	28.5	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
49																								30.5	30.5	30.0	30.0	30.0	30.0	30.0	30.0	29.5	29.5	29.5	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
50																								31.5	31.5	31.5	31.5	31.0	31.0	31.0	31.0	31.0	31.0	31.0	30.5	30.5	30.5	30.5	30.0	30.0	30.0	30.0	30.0	30.0
51																								33.0	33.0	32.5	32.5	32.5	32.5	32.5	32.5	32.0	32.0	32.0	32.0	32.0	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
52																									34.5	34.0	34.0	34.0	34.0	33.5	33.5	33.5	33.5	33.5	33.5	33.0	33.0	33.0	33.0	33.0	33.0	32.5	32.5	32.5
53																									35.5	35.5	35.5	35.5	35.0	35.0	35.0	35.0	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.0	34.0	34.0	34.0
54																										36.5	36.5	36.5	36.5	36.5	36.5	36.0	36.0	36.0	36.0	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.0	35.0
55																										38.0	38.0	37.5	37.5	37.5	37.5	37.5	37.0	37.0	37.0	37.0	37.0	37.0	37.0	36.5	36.5	36.5	36.5	36.5
56																										39.0	39.0	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.0	38.0	38.0	38.0	38.0	38.0	37.5	37.5
57																												40.0	40.0	40.0	40.0	40.0	40.0	39.5	39.5	39.5	39.5	39.5	39.0	39.0	39.0	39.0	39.0	39.0
58																												41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	40.5	40.5	40.5	40.5	40.5	40.0	40.0	40.0
59																												42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	41.5	41.5	41.5	41.5	41.5	41.5
60																												43.5	43.5	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	42.5	42.5	42.5
61																												44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.5	44.0	44.0	44.0	44.0	44.0	44.0	44.0	43.5	43.5
62																												45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time for cooling times less than 10 years.

Note: The page that follows Table 1-5f provides the explanatory notes and limitations regarding the use of this table.

Table 1-5b

PWR Fuel Qualification Table for Zone 2 Fuel with 0.8 kW per Assembly for the NUHOMS®-32PTH1 DSC (Fuel without CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																											
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
28									5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
30									6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
32									6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
34									7.5	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
36									8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
38									9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0
39									10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5
40									10.5	10.5	10.5	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
41									11.5	11.5	11.0	11.0	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
42																					10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0
43																					11.5	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5
44																					12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
45																					13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0
46																					14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0
47																					15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.0	14.0	14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	13.0	13.0	13.0	13.0
48																					16.5	16.0	16.0	15.5	15.5	15.5	15.5	15.5	15.0	15.0	15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.5	14.0	14.0	13.5	13.5	13.5
49																								17.0	17.0	16.5	16.5	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	15.5	15.0	15.0	15.0	15.0	15.0	14.5	14.5	14.5
50																								18.0	18.0	18.0	17.5	17.5	17.5	17.5	17.0	17.0	17.0	17.0	17.0	16.5	16.5	16.5	16.5	16.5	16.0	15.5	15.5	15.5
51																								19.0	19.0	19.0	19.0	18.5	18.5	18.0	18.0	18.0	18.0	17.5	17.5	17.5	17.5	17.5	17.0	17.0	17.0	17.0	17.0	17.0
52																									20.0	20.0	20.0	19.5	19.5	19.5	19.5	19.5	19.0	19.0	19.0	19.0	19.0	18.5	18.5	18.5	18.5	18.5	18.5	17.5
53																									21.5	21.0	21.0	21.0	20.5	20.5	20.5	20.5	20.5	20.0	20.0	20.0	20.0	20.0	19.5	19.5	19.5	19.5	19.5	19.0
54																										22.5	22.5	22.0	22.0	21.5	21.5	21.5	21.5	21.0	21.0	21.0	21.0	21.0	20.5	20.5	20.5	20.5	20.5	20.0
55																										23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	22.5	22.5	22.5	22.0	21.5	21.5	21.5	21.5	21.5	21.0
56																										25.0	25.0	24.5	24.5	24.5	24.0	24.0	24.0	24.0	23.5	23.0	23.0	23.0	23.0	23.0	22.5	22.5	22.5	22.5
57																												25.5	25.5	25.5	25.5	25.0	25.0	25.0	25.0	24.5	24.5	24.5	24.5	24.5	23.5	23.5	23.5	23.5
58																												27.0	27.0	26.0	26.0	26.0	26.0	26.0	25.5	25.5	25.5	25.5	25.5	25.0	25.0	25.0	25.0	25.0
59																												27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.0	27.0	27.0	27.0	26.0	26.0	26.0	26.0	26.0	25.5
60																												29.0	28.5	28.5	28.5	28.5	28.0	28.0	28.0	28.0	28.0	28.0	27.5	27.5	27.5	27.5	27.5	27.0
61																												29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.0	29.0	29.0	29.0	29.0	28.0	28.0	28.0	28.0
62																												31.5	30.5	30.5	30.5	30.5	30.5	30.0	30.0	30.0	30.0	30.0	29.5	29.5	29.5	29.5	29.5	29.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time for cooling times less than 10 years.

Note: The page that follows Table 1-5f provides the explanatory notes and limitations regarding the use of this table.

Table 1-5c

PWR Fuel Qualification Table for Zone 3 or Zone 4 Fuel with 1.0 kW per Assembly for the NUHOMS®-32PTH1 DSC (Fuel without CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
30									5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
32									5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0
34									6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
36									6.5	6.5	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
38									7.5	7.0	7.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0
39									7.5	7.5	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
40									8.0	8.0	7.5	7.5	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5
41									8.5	8.5	8.0	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
42																					7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0
43																					7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
44																					8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5
45																					8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0
46																					8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
47																					9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5
48																					10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0
49																								10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5
50																								10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0
51																								11.5	11.5	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5
52																									12.0	12.0	12.0	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0
53																									13.0	12.5	12.5	12.5	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	10.5
54																										13.5	13.5	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0	11.5	11.5	11.5	11.5
55																										14.5	14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.0	12.0
56																										15.5	15.0	15.0	15.0	14.5	14.5	14.5	14.0	14.0	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.0	13.0	13.0
57																												16.0	15.5	15.5	15.5	15.5	15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.0	14.0	14.0	14.0	13.5
58																												17.0	16.5	16.5	16.5	16.0	16.0	16.0	15.5	15.5	15.5	15.5	15.0	15.0	15.0	14.5	14.5	14.5
59																												18.0	17.5	17.5	17.5	17.0	17.0	17.0	16.5	16.5	16.5	16.0	16.0	16.0	16.0	15.5	15.5	15.5
60																												19.0	18.5	18.5	18.0	18.0	18.0	17.5	17.5	17.5	17.5	17.0	17.0	17.0	16.5	16.5	16.5	16.5
61																												20.0	19.5	19.5	19.0	19.5	19.0	18.5	18.5	18.5	18.0	18.0	18.5	18.0	17.5	17.5	17.5	17.5
62																												20.5	20.5	20.5	20.0	20.0	20.0	20.0	19.5	19.5	19.5	19.0	19.0	19.0	18.5	18.5	18.5	18.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time for cooling times less than 10 years.

Note: The page that follows Table 1-5f provides the explanatory notes and limitations regarding the use of this table.

Table 1-5d

PWR Fuel Qualification Table for Zone 5 Fuel with 1.3 kW per Assembly for the NUHOMS®-32PTH1 DSC (Fuel without CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
34									4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
36									5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
38									5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
39									6.0	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
40									6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
41									6.5	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
42																					5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
43																					5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
44																					5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
45																					5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
46																					6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
47																					6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
48																					6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
49																								6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
50																								7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
51																								7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0
52																									7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
53																									7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
54																										8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
55																										8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0
56																										8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5
57																												9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
58																												9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0
59																												10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5
60																												10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0
61																												11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5
62																												11.5	11.5	11.5	11.5	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time for cooling times less than 10 years.

Note: The page that follows Table 1-5f provides the explanatory notes and limitations regarding the use of this table.

Table 1-5e

PWR Fuel Qualification Table for Zone 5 with Damaged Fuel with 1.2 kW per Assembly for the NUHOMS®-32PTH1 DSC

(Fuel without CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
30									4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
32									5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
34									5.5	5.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
36									6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
38									6.5	6.5	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5
39									7.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
40									7.0	7.0	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
41									7.5	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
42																					6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
43																					6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
44																					6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
45																					6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
46																					7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
47																					7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
48																					8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5
49																								8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
50																								8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
51																								9.0	9.0	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5
52																									9.5	9.5	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
53																									9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0
54																										10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
55																										11.0	10.5	10.5	10.5	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0
56																										11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.0	10.5	10.0	10.0	10.0	10.0	9.5	9.5	9.5
57																												11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.0
58																												12.5	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	11.0	11.0	10.5	10.5	10.5
59																												13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.0	12.0	12.0	11.5	11.5	11.5	11.5	11.0	11.0	11.0
60																												13.5	13.5	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5	12.5	12.0	12.0	12.0	12.0	12.0
61																												14.5	14.0	14.0	13.5	14.0	13.5	13.5	13.0	13.0	13.0	13.0	13.0	13.0	12.5	12.5	12.5	12.5
62																												15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.0	14.0	14.0	13.5	13.5	13.5	13.0	13.0	13.0	13.0

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time for cooling times less than 10 years.

Note: *The page that follows Table 1-5f provides the explanatory notes and limitations regarding the use of this table.*

Table 1-5f

PWR Fuel Qualification Table for Zone 6 Fuel with 1.5 kW per Assembly for the NUHOMS®-32PTH1 DSC (Fuel without CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																											
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34									4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36									4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
38									5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
39									5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40									5.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
41									5.5	5.5	5.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
42																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
43																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
44																					5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
45																					5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
46																					5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
47																					5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
48																					5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5
49																								5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
50																								5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
51																								6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0
52																									6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
53																									6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
54																										6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5
55																										6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
56																										7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
57																												7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
58																												7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5
59																												7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	7.0
60																												8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
61																												8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
62																												8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time.

Note: The page that follows Table 1-5f provides the explanatory notes and limitations regarding the use of this table.

Notes: Tables 1-5a through 1-5f

- *Burnup = Assembly Average burnup.*
- *Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.*
- *Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.*
- *For a fuel assembly with Control Components, for a given enrichment and burnup, increase the cooling time obtained from an FQT by one year.*
- *Fuel with an assembly average initial enrichment less than 0.7 (or less than the minimum provided above for each burnup) and greater than 5.0 wt.% U-235 is unacceptable for storage.*
- *Fuel with a burnup greater than 62 GWd/MTU is unacceptable for storage.*
- *Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 3-years cooling.*
- *See Figure 1-26 through Figure 1-28 for a description of the Heat Load Zones.*
- *For reconstituted fuel assemblies with UO_2 rods and/or Zr rods or Zr pellets and/or stainless steel rods, use the assembly average equivalent enrichment to determine the minimum cooling time.*
- *The cooling times for damaged and intact assemblies are identical.*
- *Example: An intact fuel assembly without CCs, with a decay heat load of 1.5 kW or less, an initial enrichment of 3.65 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a 4.0 year cooling time as defined by 3.6 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) in Table 1-5f. If the fuel assembly has CCs, the minimum cooling time is increased by an additional one year, resulting in five year minimum cooling time prior to storage.*

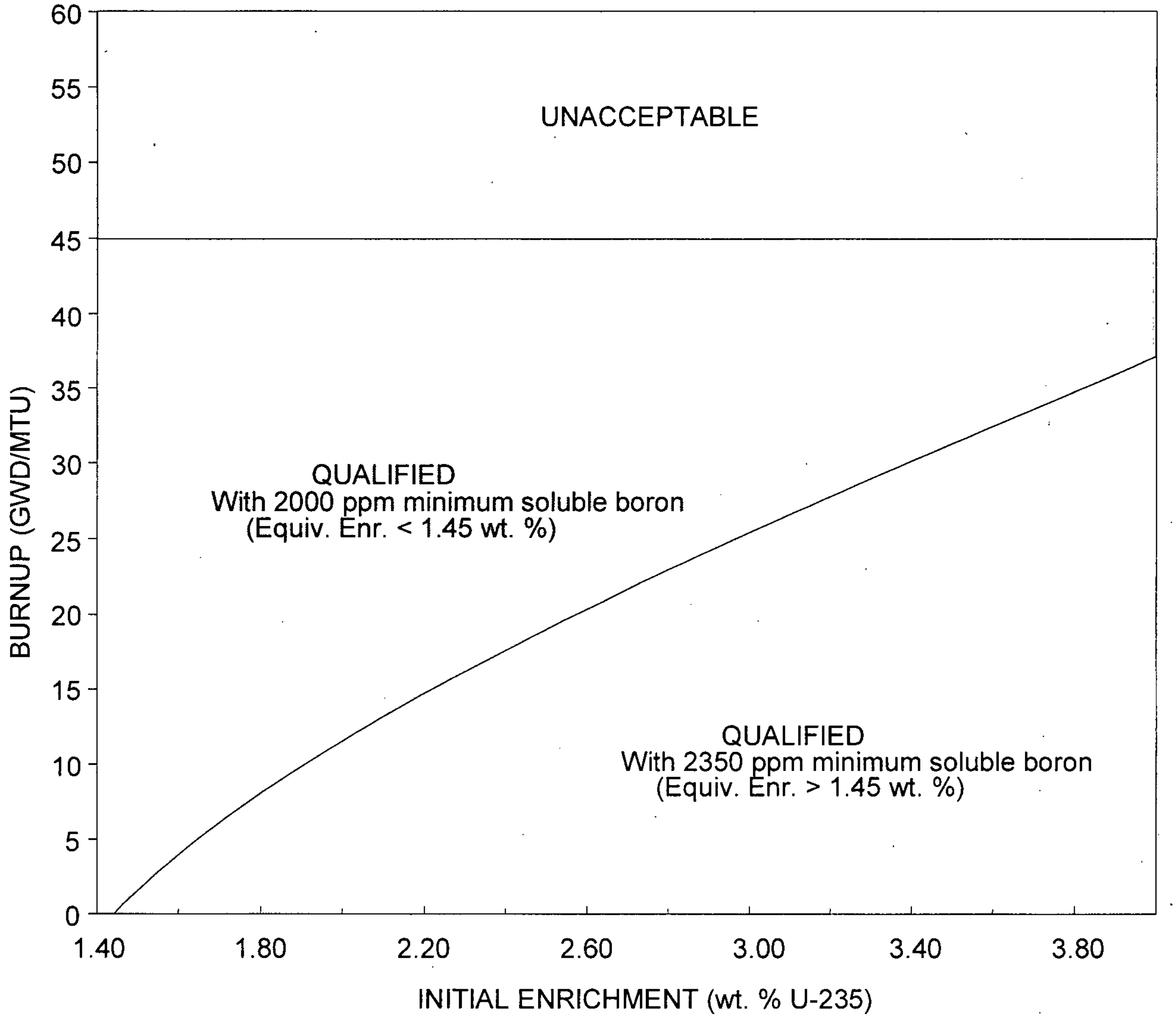

Figure 1-1
PWR Fuel Criticality Acceptance Curve

	0.87	0.87	0.87	0.87	
0.87	0.63	0.63	0.63	0.63	0.87
0.87	0.63	0.63	0.63	0.63	0.87
0.87	0.63	0.63	0.63	0.63	0.87
0.87	0.63	0.63	0.63	0.63	0.87
	0.87	0.87	0.87	0.87	

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Figure 1-2
Heat Load Zoning Configuration 1 for the NUHOMS®-32PT DSC

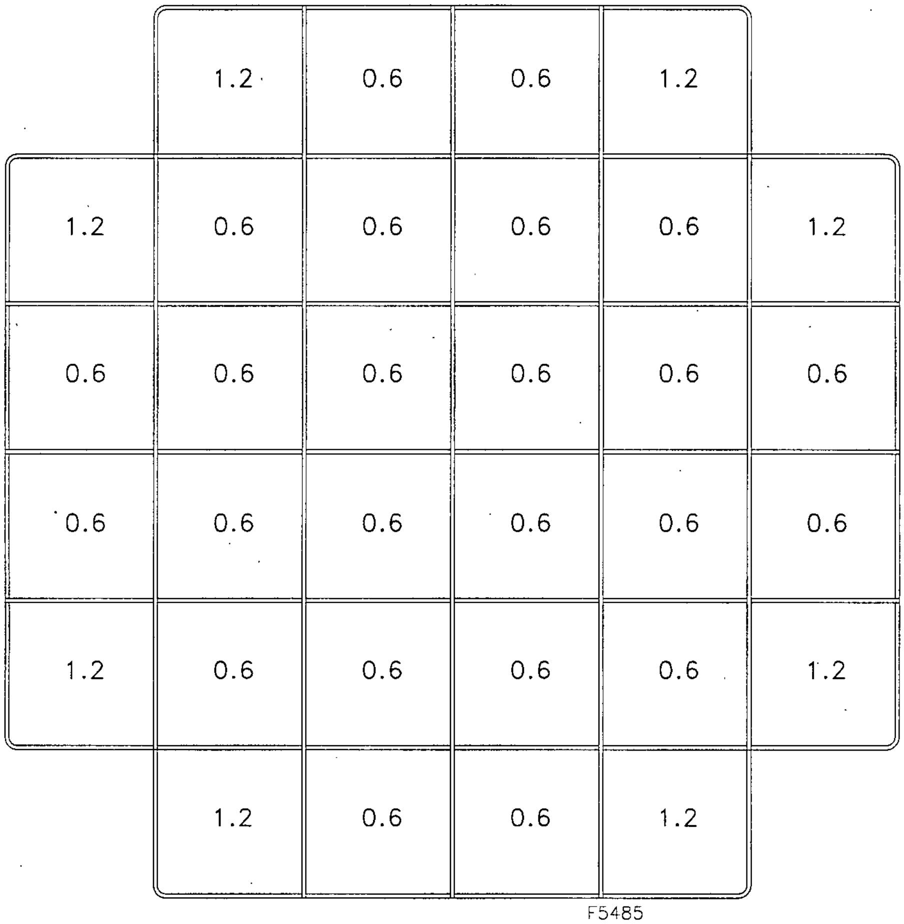


Figure 1-3
Heat Load Zoning Configuration 2 for the NUHOMS®-32PT DSC

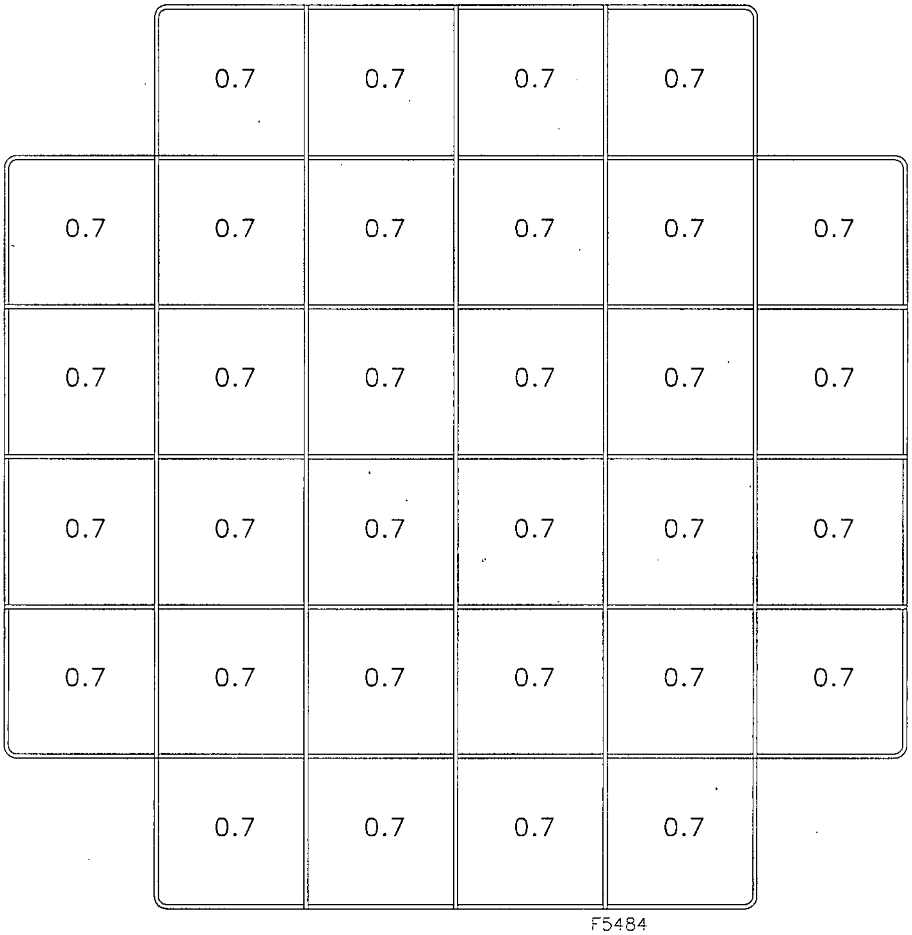


Figure 1-4
Heat Load Zoning Configuration 3 for the NUHOMS®-32PT DSC

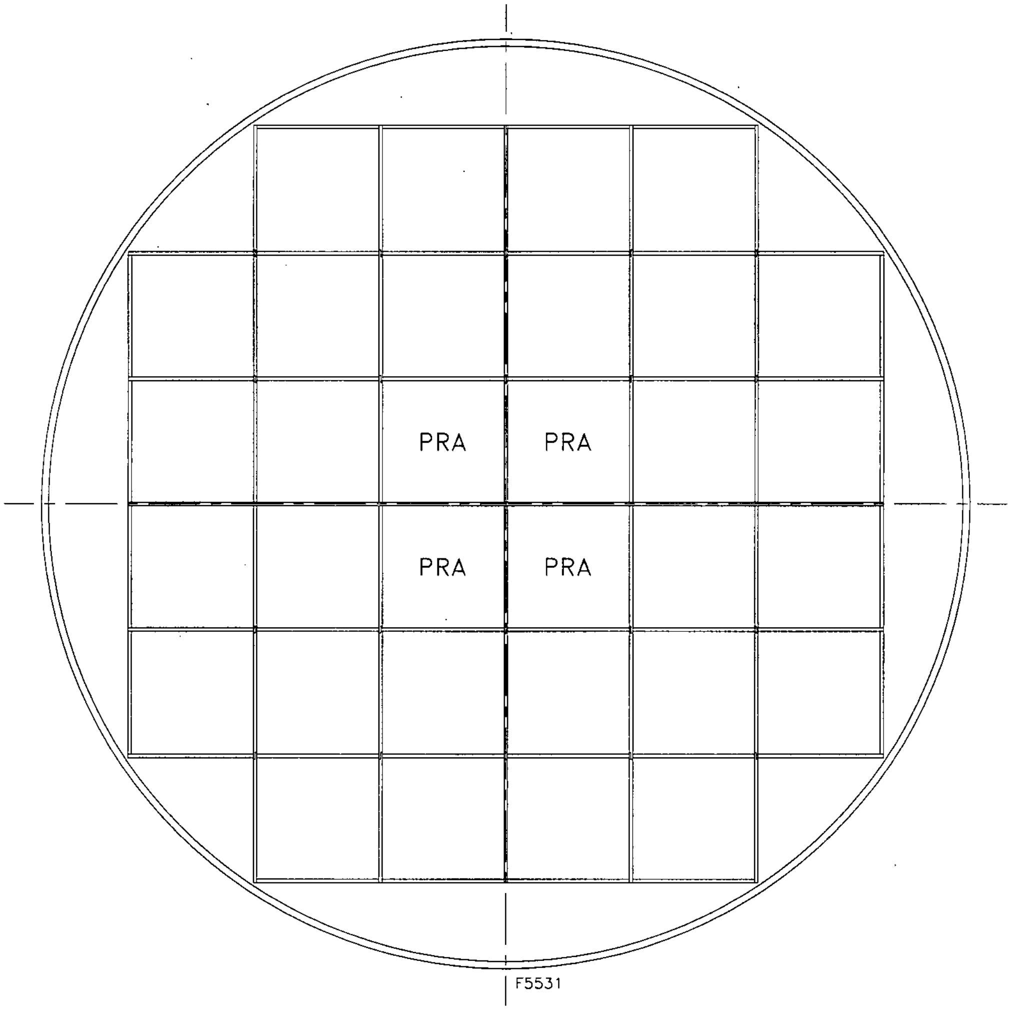
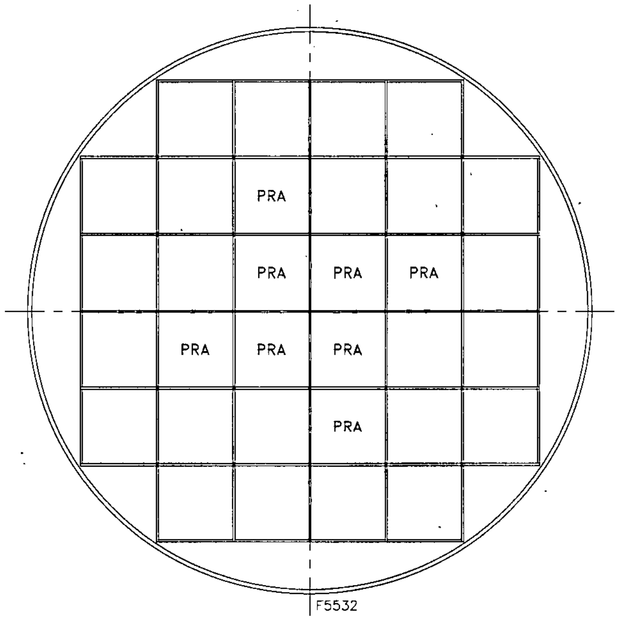


Figure 1-5
Required PRA Locations for the NUHOMS®-32PT DSC Configuration with Four PRAs



Or

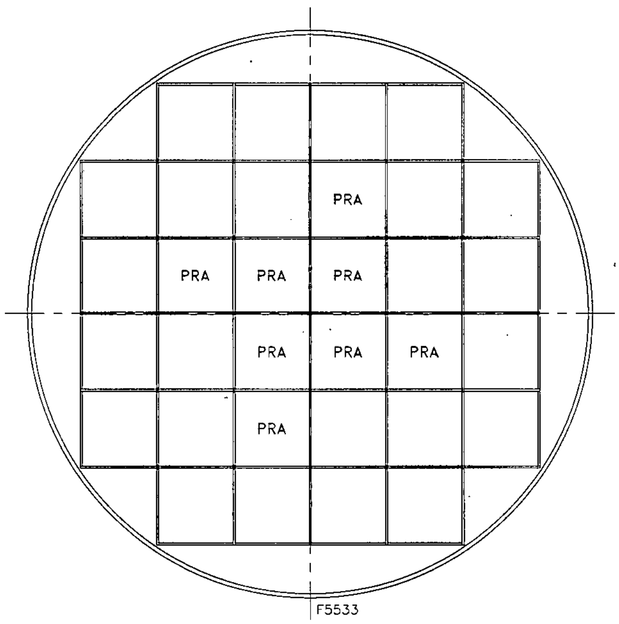


Figure 1-6
Required PRA Locations for the NUHOMS®-32PT DSC Configuration with Eight PRAs

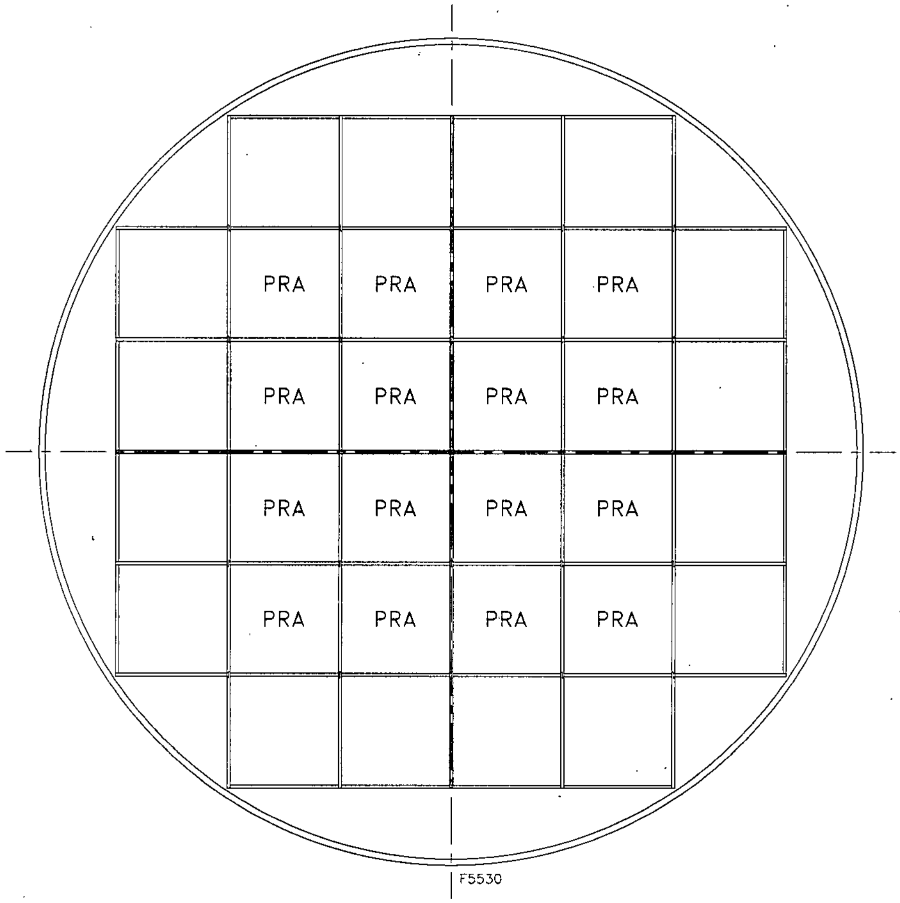
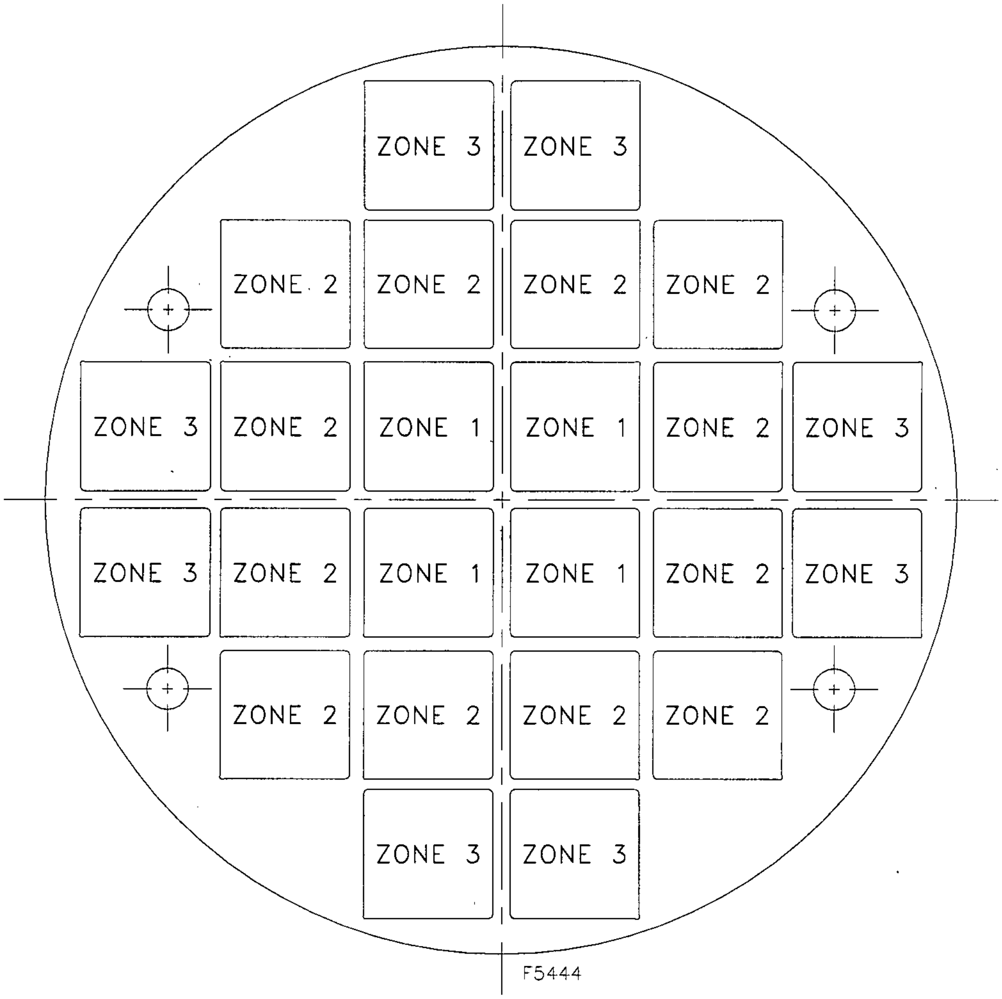
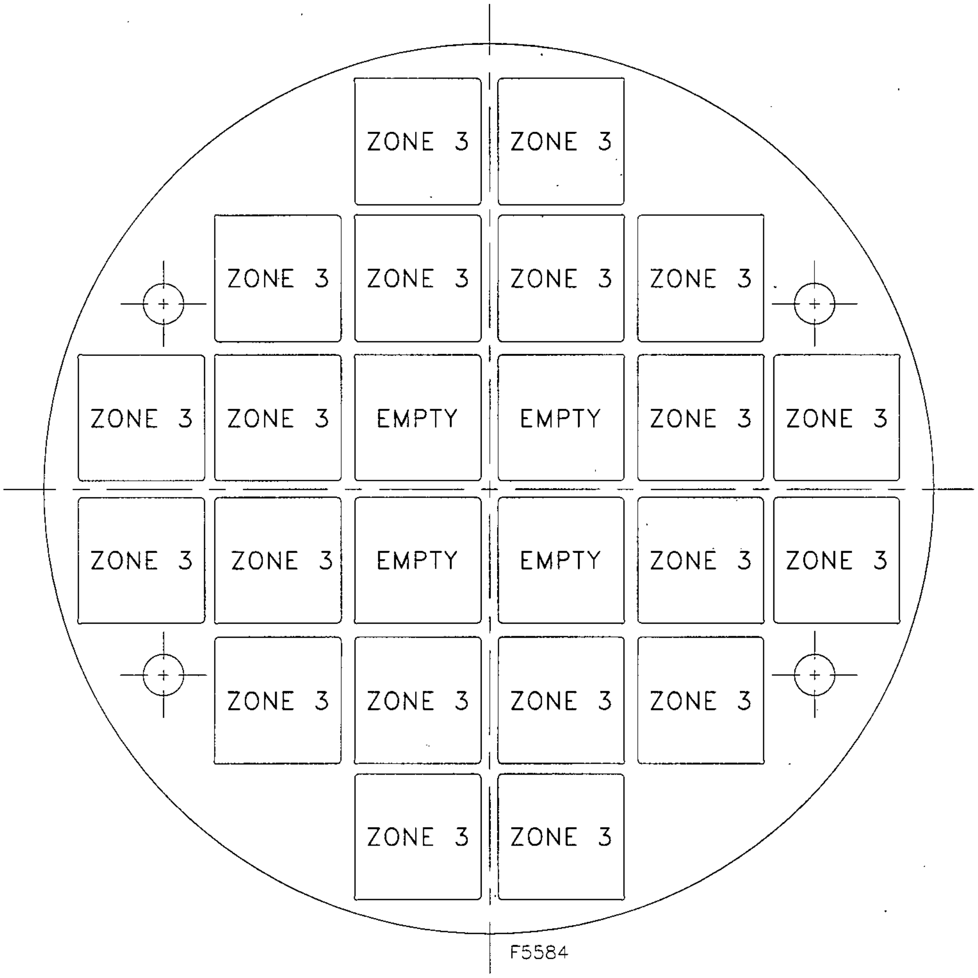


Figure 1-7
Required PRA Locations for the NUHOMS®-32PT DSC Configuration with Sixteen PRAs



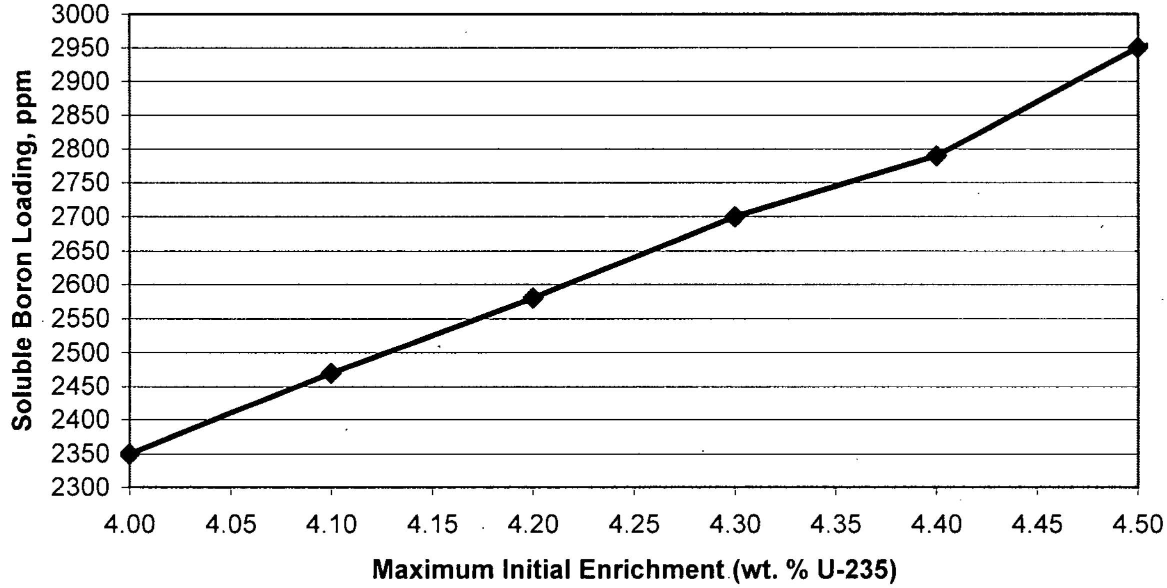
	Zone 1	Zone 2	Zone 3
Maximum Decay Heat (kW/FA)	0.7	1	1.3
Maximum Decay Heat per Zone (kW)	2.8	10.8	10.4

Figure 1-8
Heat Load Zoning Configuration for Fuel Assemblies (with or without BPRAs) Stored in NUHOMS®-24PHB DSC – Configuration 1



	Zone 1	Zone 2	Zone 3
Maximum Decay Heat (kW/FA)	N/A	N/A	1.3
Maximum Decay Heat per Zone (kW)	N/A	N/A	24.0

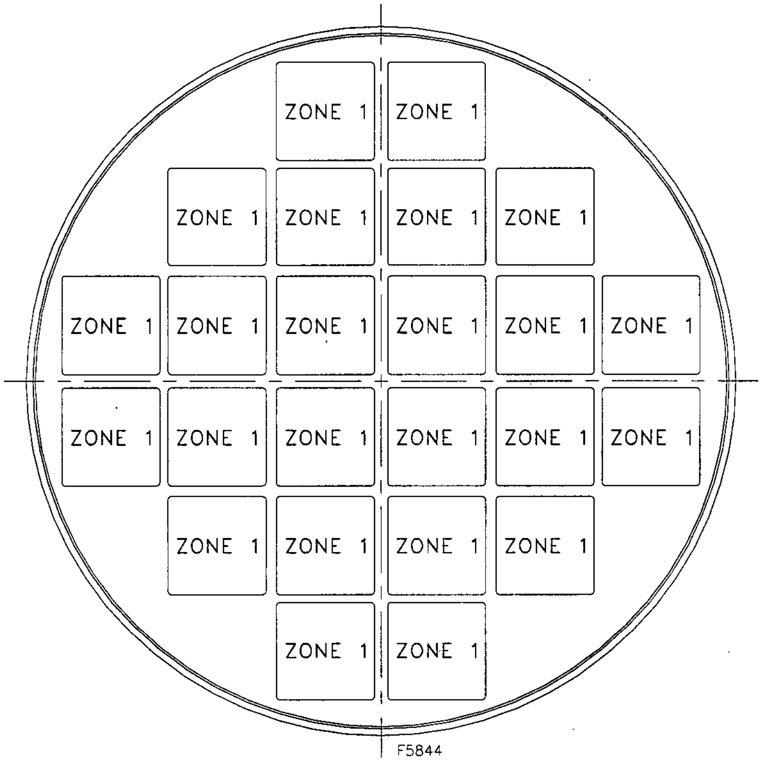
Figure 1-9
Heat Load Zoning Configuration for Fuel Assemblies (with or without BPRAs) Stored in NUHOMS®-24PHB DSC – Configuration 2



Linear Interpolation allowed between points

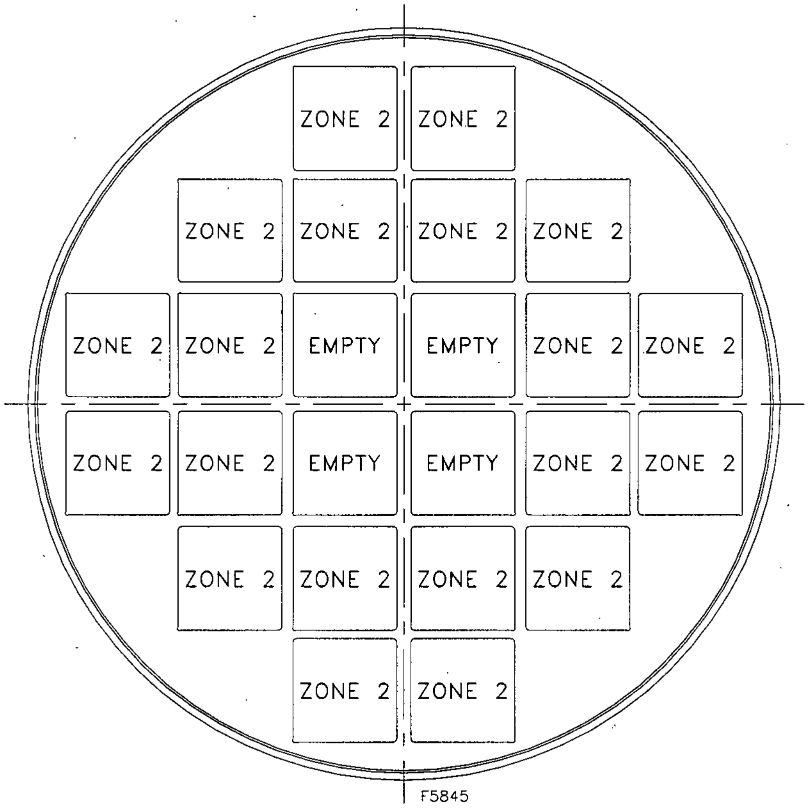
Initial Enrichment	Boron Loading, ppm
≤ 4.0	2350
4.1	2470
4.2	2580
4.3	2700
4.4	2790
4.5	2950

Figure 1-10
Soluble Boron Concentration vs. Fuel Initial U-235 Enrichment for the 24PHB System



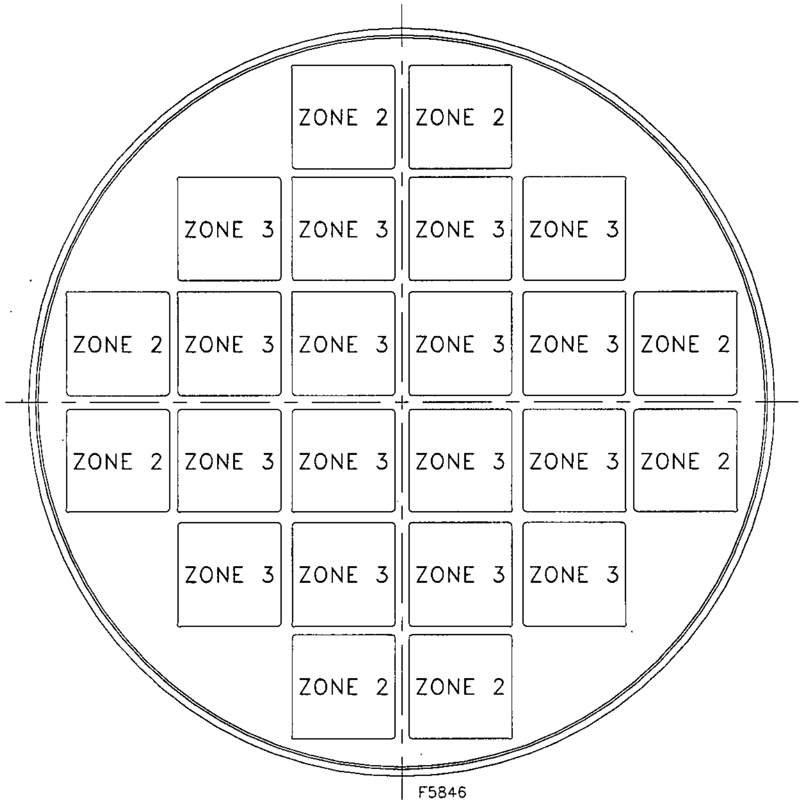
	Zone 1	Zone 2	Zone 3	Zone 4
Maximum Decay Heat (kW/FA)	1.7	N/A	N/A	N/A
Maximum Decay Heat per Zone (kW)	40.8	N/A	N/A	N/A

Figure 1-11
Heat Load Zoning Configuration No. 1 for 24PTH-S and 24PTH-L DSCs (with or without Control Components)



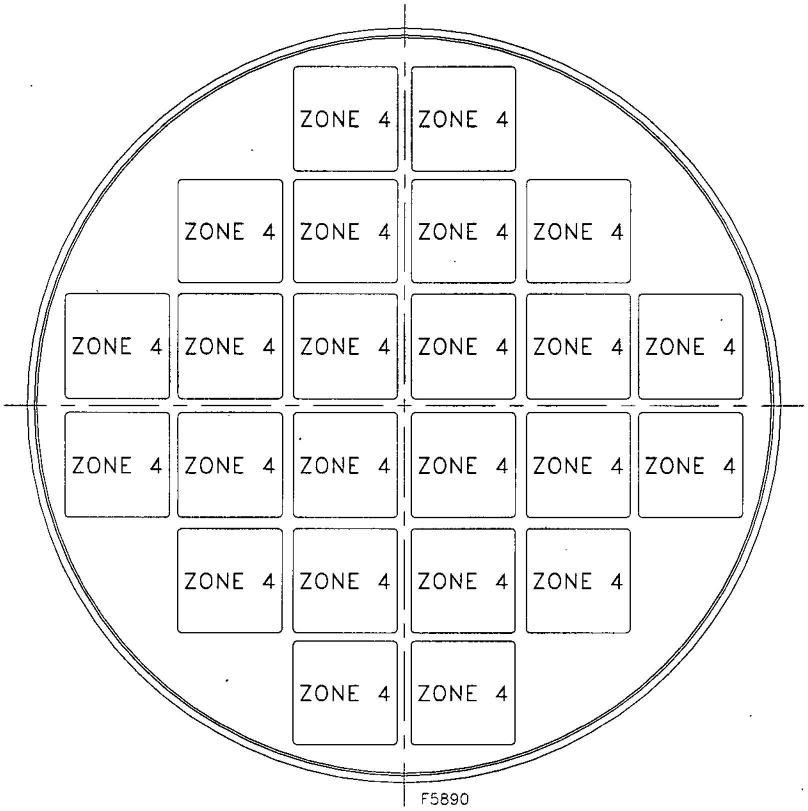
	Zone 1	Zone 2	Zone 3	Zone 4
Maximum Decay Heat (kW/FA)	N/A	2	N/A	N/A
Maximum Decay Heat per Zone (kW)	N/A	40	N/A	N/A

Figure 1-12
Heat Load Zoning Configuration No. 2 for 24PTH-S and 24PTH-L DSCs (with or without Control Components)



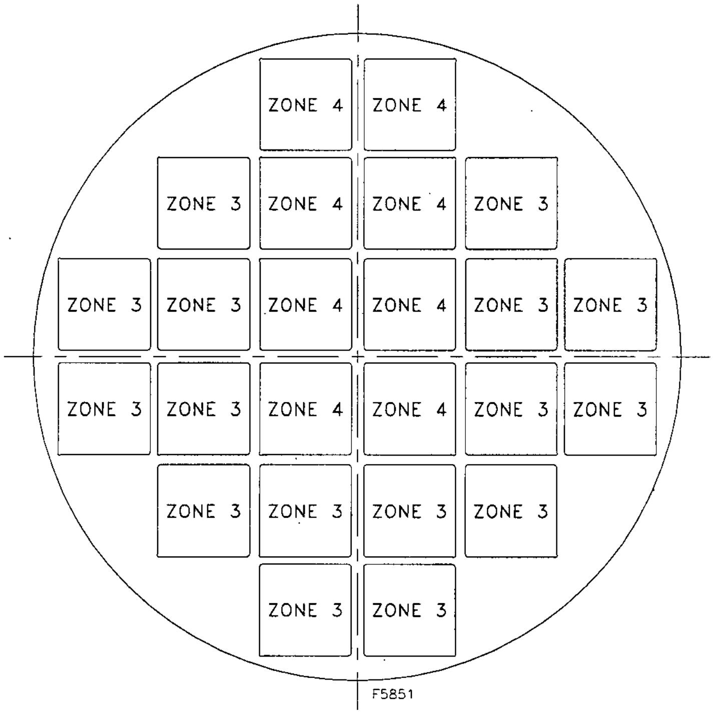
	Zone 1	Zone 2	Zone 3	Zone 4
Maximum Decay Heat (kW/FA)	N/A	2	1.5	N/A
Maximum Decay Heat per Zone (kW)	N/A	16	24	N/A

Figure 1-13
Heat Load Zoning Configuration No. 3 for 24PTH-S and 24PTH-L DSCs (with or without Control Components)



	Zone 1	Zone 2	Zone 3	Zone 4
Maximum Decay Heat (kW/FA)	N/A	N/A	N/A	1.3
Maximum Decay Heat per Zone (kW)	N/A	N/A	N/A	31.2

Figure 1-14
Heat Load Zoning Configuration No. 4 for 24PTH-S and 24PTH-L DSCs (with or without Control Components)

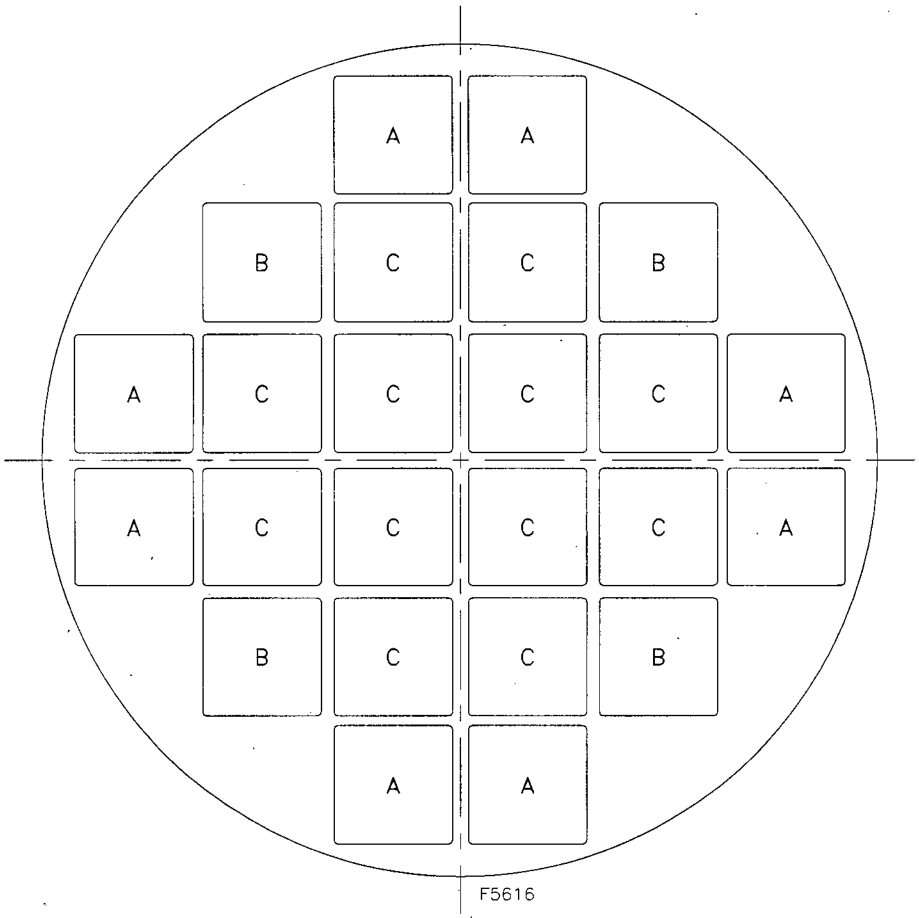


	Zone 1	Zone 2	Zone 3	Zone 4
Maximum Decay Heat (kW/FA)	N/A	N/A	1.5	1.3
Maximum Decay Heat per Zone (kW)	N/A	N/A	Note 1	10.4

Notes:

1. Fuel assemblies with a maximum heat load of 1.5 kW are permitted in Zone 3 as long as the total of 24 kW/canister maximum heat load is maintained.
2. This configuration is applicable to Basket Types 2A, 2B, or 2C only (without aluminum inserts).

Figure 1-15
Heat Load Zoning Configuration No. 5 for 24PTH-S-LC DSC (with or without Control Components)



Notes:

1. Locations identified as "A" are for placement of up to 8 damaged or intact fuel assemblies.
2. Locations identified as "B" are for placement of up to 4 additional damaged or intact fuel assemblies (Maximum of 12 damaged fuel assemblies allowed, Locations "A" and "B" combined).
3. Locations identified as "C" are for placement of up to 12 intact fuel assemblies, including 4 empty slots in the center as shown in Figure 1-12.

Figure 1-16
Location of Damaged Fuel Inside 24PTH DSC

			ZONE 3	ZONE 3	ZONE 3			
	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	
	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	
ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3
ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3
ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3
	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	
	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	
			ZONE 3	ZONE 3	ZONE 3			

	Zone 1	**Zone 2**	**Zone 3**	**Zone 4**	**Zone 5**	**Zone 6**
Maximum Decay Heat (kW/FA)	*NA*	*NA*	*0.393*	*NA*	*NA*	*NA*
Maximum Decay Heat per Zone (kW)	*NA*	*NA*	*22.0*	*NA*	*NA*	*NA*
Maximum Decay Heat per DSC (kW)	*22.0*					

Note: This configuration is not allowed for a Type 1 61BTH DSC with MMC or Boral® Poison Plates.

Figure 1-17
Heat Load Zoning Configuration No. 1 for Type 1 or Type 2 61BTH DSCs

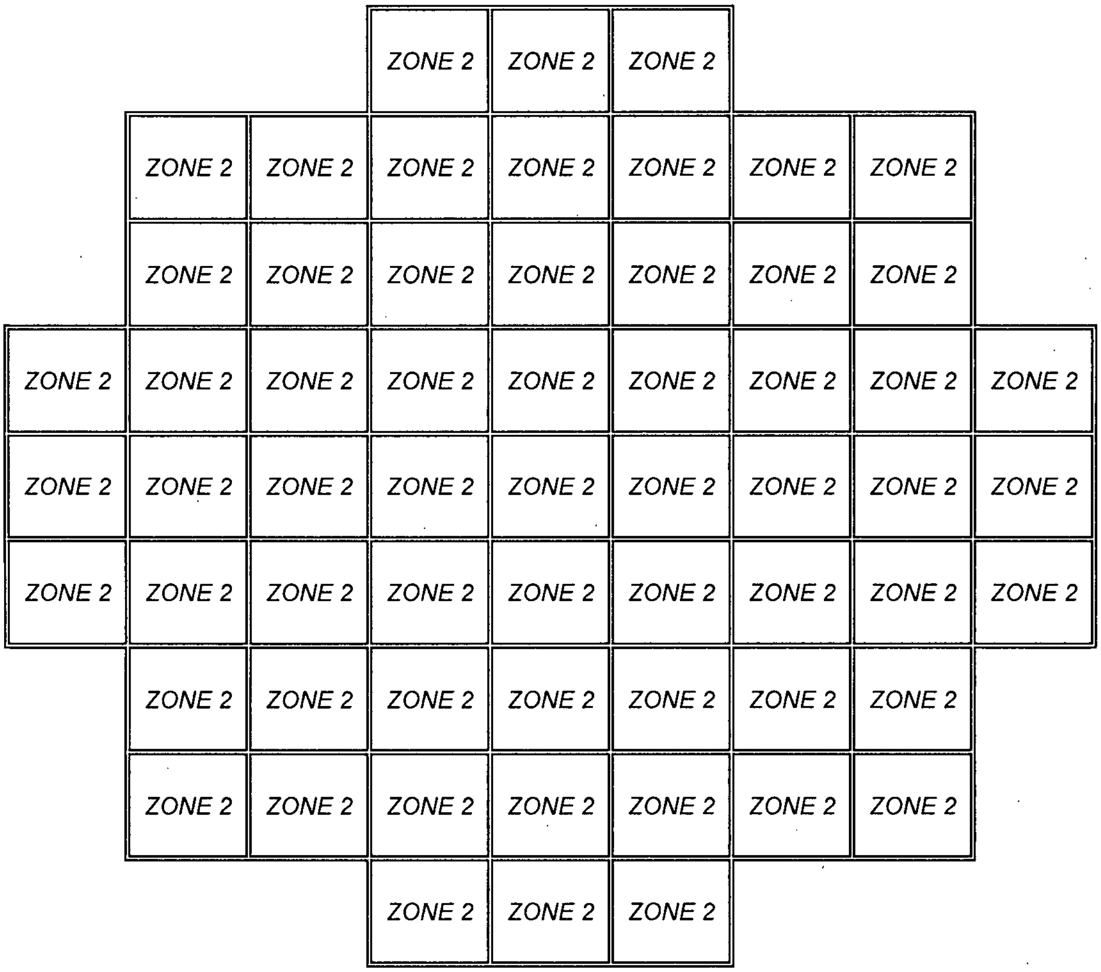
			ZONE 5	ZONE 5	ZONE 5			
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
	ZONE 4	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 4	
ZONE 5	ZONE 4	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 4	ZONE 5
	ZONE 4	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 4	
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
			ZONE 5	ZONE 5	ZONE 5			

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Maximum Decay Heat (kW/FA)	NA	0.35	NA	0.48	0.54	NA
Maximum Decay Heat per Zone (kW)	NA	8.75	NA	11.52	6.48	NA
Maximum Decay Heat per DSC (kW)	22.0(2)					

Note 1: This configuration is not allowed for a Type 1 61BTH DSC with MMC or Boral® Poison Plates.

Note 2: Adjust payload to maintain total DSC heat load within the specified limit.

Figure 1-18
Heat Load Zoning Configuration No. 2 for Type 1 or Type 2 61BTH DSCs



	Zone 1	***Zone 2***	***Zone 3***	***Zone 4***	***Zone 5***	***Zone 6***
Maximum Decay Heat (kW/FA)	*NA*	*0.35*	*NA*	*NA*	*NA*	*NA*
Maximum Decay Heat per Zone (kW)	*NA*	*19.4*	*NA*	*NA*	*NA*	*NA*
Maximum Decay Heat per DSC (kW)	*19.4*					

Note: This configuration does not have any restrictions as to the applicable Basket Poison Plates.

Figure 1-19
Heat Load Zoning Configuration No. 3 for Type 1 or Type 2 61BTH DSCs

			ZONE 5	ZONE 5	ZONE 5			
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
	ZONE 4	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 4	
ZONE 5	ZONE 4	ZONE 2	ZONE 1	ZONE 1	ZONE 1	ZONE 2	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 2	ZONE 1	ZONE 1	ZONE 1	ZONE 2	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 2	ZONE 1	ZONE 1	ZONE 1	ZONE 2	ZONE 4	ZONE 5
	ZONE 4	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 2	ZONE 4	
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
			ZONE 5	ZONE 5	ZONE 5			

	Zone 1	**Zone 2**	**Zone 3**	**Zone 4**	**Zone 5**	**Zone 6**
Maximum Decay Heat (kW/FA)	*0.22*	*0.35*	*NA*	*0.48*	*0.54*	*NA*
Maximum Decay Heat per Zone (kW)	*1.98*	*5.60*	*NA*	*11.52*	*6.48*	*NA*
Maximum Decay Heat per DSC (kW)	*19.4*(2)					

Note 1: This configuration does not have any restrictions as to the applicable Basket Poison Plates.

Note 2: Adjust payload to maintain total DSC heat load within the specified limit.

Figure 1-20
Heat Load Zoning Configuration No. 4 for Type 1 or Type 2 61BTH DSCs

			ZONE 5	ZONE 5	ZONE 5			
	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	
	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	
ZONE 5	ZONE 5	ZONE 5	ZONE 2	ZONE 2	ZONE 2	ZONE 5	ZONE 5	ZONE 5
ZONE 5	ZONE 5	ZONE 5	ZONE 2	ZONE 2	ZONE 2	ZONE 5	ZONE 5	ZONE 5
ZONE 5	ZONE 5	ZONE 5	ZONE 2	ZONE 2	ZONE 2	ZONE 5	ZONE 5	ZONE 5
	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	
	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	
			ZONE 5	ZONE 5	ZONE 5			

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Maximum Decay Heat (kW/FA)	NA	0.35	NA	NA	0.54	NA
Maximum Decay Heat per Zone (kW)	NA	3.15	NA	NA	28.08	NA
Maximum Decay Heat per DSC (kW)	31.2(2)					

Note 1: This configuration is applicable to a Type 2 61BTH DSC only with Borated Aluminum Poison Plates.
Note 2: Adjust payload to maintain total DSC heat load within the specified limit.

Figure 1-21
Heat Load Zoning Configuration No. 5 for Type 2 61BTH DSCs

			ZONE 5	ZONE 5	ZONE 5			
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
	ZONE 4	ZONE 6	ZONE 6	ZONE 6	ZONE 6	ZONE 6	ZONE 4	
ZONE 5	ZONE 4	ZONE 6	ZONE 1	ZONE 1	ZONE 1	ZONE 6	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 6	ZONE 1	ZONE 1	ZONE 1	ZONE 6	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 6	ZONE 1	ZONE 1	ZONE 1	ZONE 6	ZONE 4	ZONE 5
	ZONE 4	ZONE 6	ZONE 6	ZONE 6	ZONE 6	ZONE 6	ZONE 4	
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
			ZONE 5	ZONE 5	ZONE 5			

	Zone 1	**Zone 2**	**Zone 3**	**Zone 4**	**Zone 5**	**Zone 6**
Maximum Decay Heat (kW/FA)	0.22	NA	NA	0.48	0.54	0.70
Maximum Decay Heat per Zone (kW)	1.98	NA	NA	11.52	6.48	11.20
Maximum Decay Heat per DSC (kW)	31.2[(2)]					

Note 1: This configuration is applicable to a Type 2 61BTH DSC only with Borated Aluminum Poison Plates.

Note 2: Adjust payload to maintain total DSC heat load within the specified limit.

Figure 1-22
Heat Load Zoning Configuration No. 6 for Type 2 61BTH DSCs

			ZONE 5	ZONE 5	ZONE 5			
	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	
	ZONE 5	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 5	
ZONE 5	ZONE 5	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 5	ZONE 5
ZONE 5	ZONE 5	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 5	ZONE 5
ZONE 5	ZONE 5	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 5	ZONE 5
	ZONE 5	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 5	
	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	ZONE 5	
			ZONE 5	ZONE 5	ZONE 5			

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Maximum Decay Heat (kW/FA)	NA	NA	NA	0.48	0.54	NA
Maximum Decay Heat per Zone (kW)	NA	NA	NA	12.00	19.44	NA
Maximum Decay Heat per DSC (kW)	31.2[(2)]					

Note 1: This configuration is applicable to a Type 2 61BTH DSC only with Borated Aluminum Poison Plates.
Note 2: Adjust payload to maintain total DSC heat load within the specified limit.

Figure 1-23
Heat Load Zoning Configuration No. 7 for Type 2 61BTH DSCs

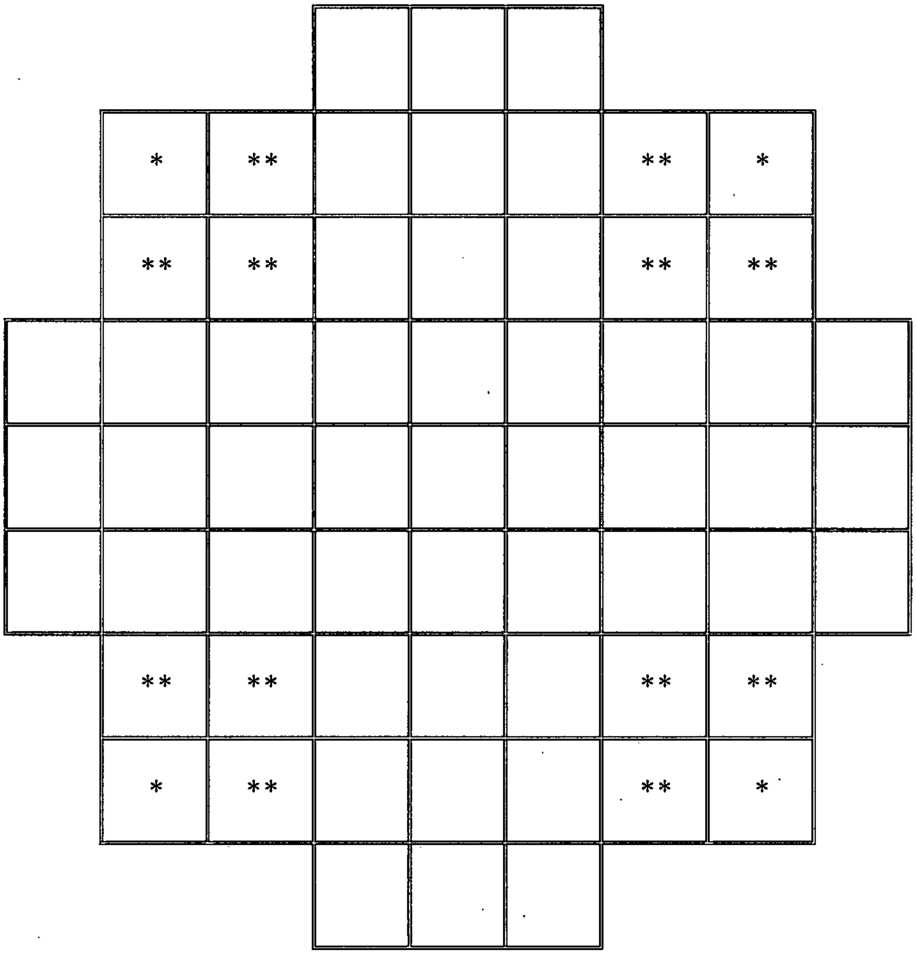
			ZONE 5	ZONE 5	ZONE 5			
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
	ZONE 4	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 4	
ZONE 5	ZONE 4	ZONE 3	ZONE 2	ZONE 2	ZONE 2	ZONE 3	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 3	ZONE 2	ZONE 2	ZONE 2	ZONE 3	ZONE 4	ZONE 5
ZONE 5	ZONE 4	ZONE 3	ZONE 2	ZONE 2	ZONE 2	ZONE 3	ZONE 4	ZONE 5
	ZONE 4	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 3	ZONE 4	
	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	ZONE 4	
			ZONE 5	ZONE 5	ZONE 5			

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Maximum Decay Heat (kW/FA)	NA	0.35	0.393	0.48	0.54	NA
Maximum Decay Heat per Zone (kW)	NA	3.15	6.288	11.52	6.48	NA
Maximum Decay Heat per DSC (kW)	27.4(2)					

Note 1: This configuration is applicable to a Type 2 61BTH DSC only with Borated Aluminum or MMC or Boral® Poison Plates.

Note 2: Adjust payload to maintain total DSC heat load within the specified limit.

Figure 1-24
Heat Load Zoning Configuration No. 8 for Type 2 61BTH DSCs

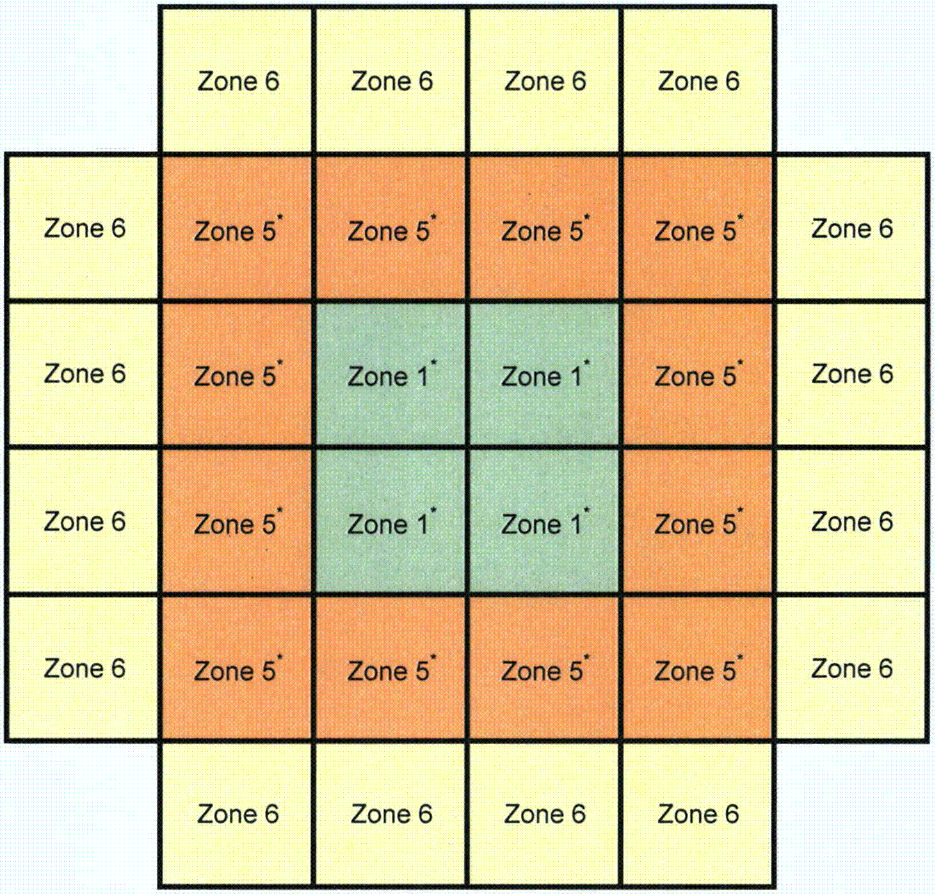


*	Corner Locations See Note 1	**	Interior Locations See Note 2

Note 1: *These corner locations shall only be used to load up to four damaged assemblies with the remaining intact in a 61BTH Basket. The maximum lattice average initial enrichment of assemblies (damaged or intact stored in the 2x2 cells) is limited to the "up to 4 damaged assemblies" column of Table 1-1w.*

Note 2: *If loading more than four damaged assemblies, place first four damaged assemblies in the corner locations per Note 1, and up to 12 additional damaged assemblies in these interior locations, with the remaining intact in a 61BTH Basket. The maximum lattice average initial enrichment of assemblies (damaged or intact stored in the 2x2 cells) is limited to the "Five or More Damaged Assemblies" column of Table 1-1w.*

Figure 1-25
Location of Damaged Fuel Inside 61BTH DSC

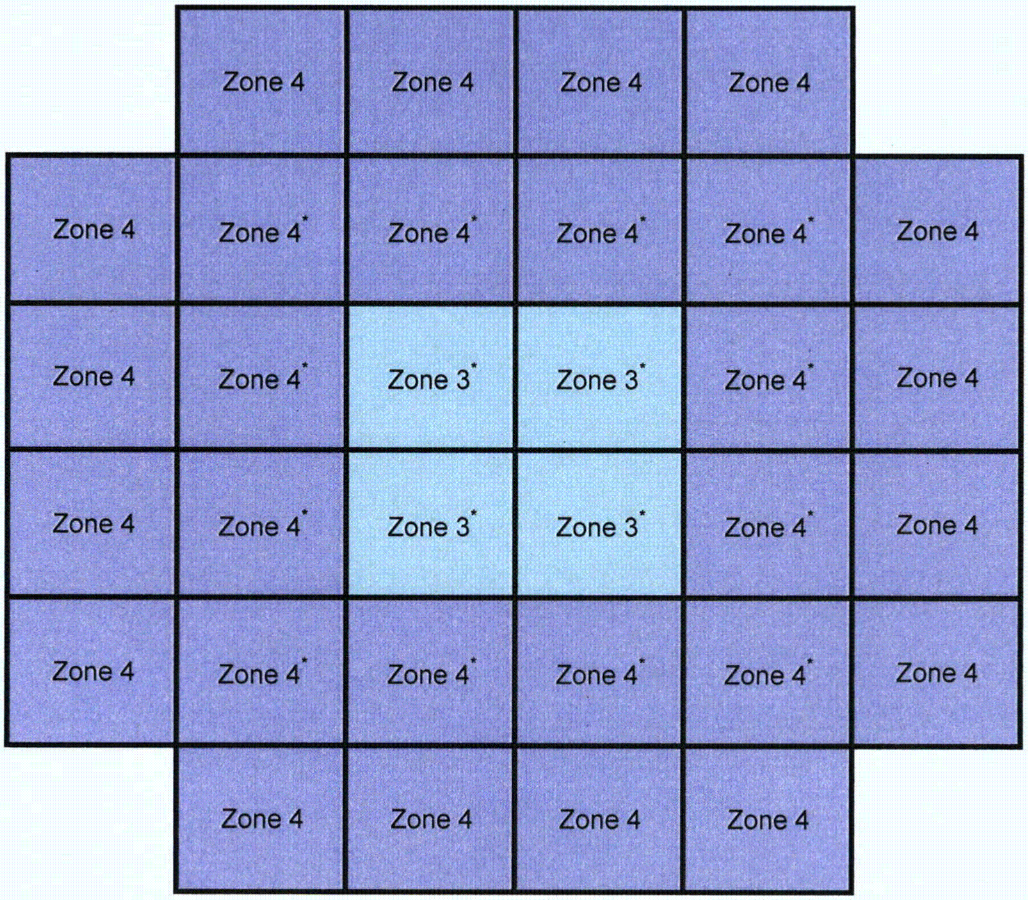


** denotes location where intact or damaged fuel assembly can be stored.*

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Max. Decay Heat / FA (kW)	0.6	N/A	N/A	N/A	1.3(1)	1.5
Max. Decay Heat / Zone (kW)	2.4	N/A	N/A	N/A	15.6	24.0
Max. Decay Heat / DSC (kW)	40.8(2)					

Notes: (1) 1.2 kW per FA is the maximum decay heat allowed for damaged fuel assemblies.
(2) Adjust payload to maintain 40.8 kW heat load.

Figure 1-26
Heat Load Zoning Configuration No. 1 for 32PTH1-S, 32PTH1-M and 32PTH1-L DSCs (Type 1 Baskets)

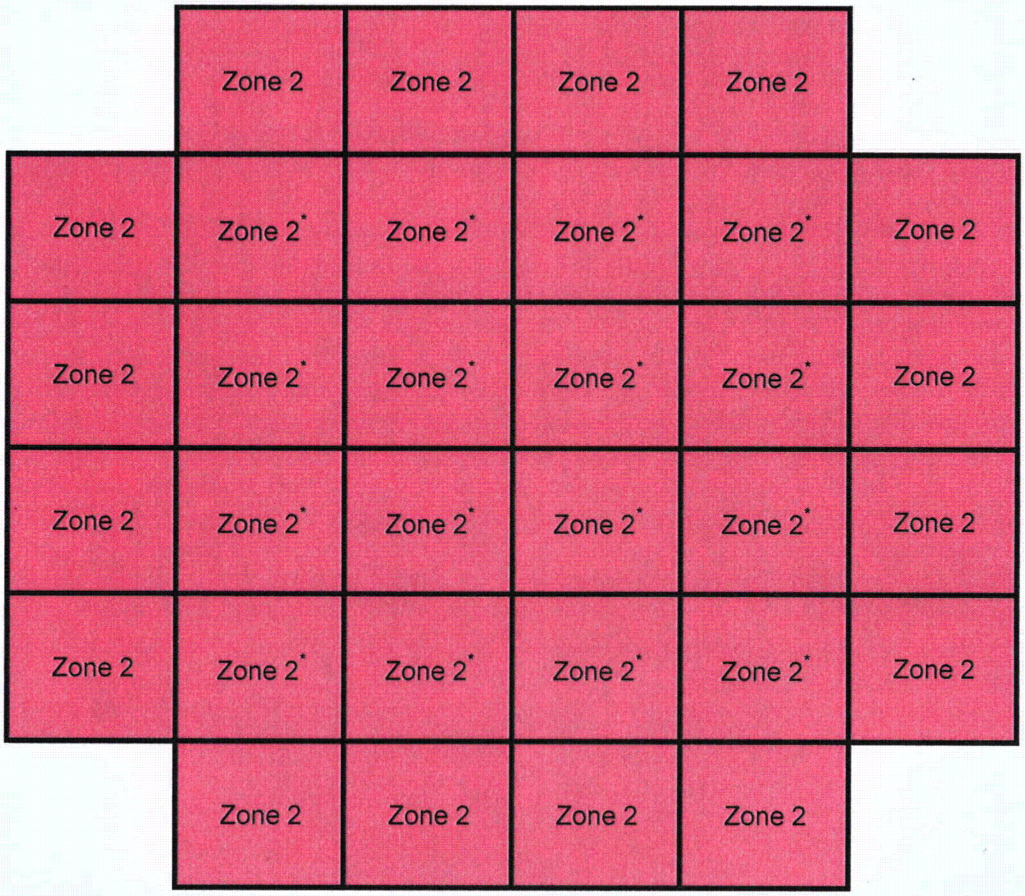


** denotes location where intact or damaged fuel assembly can be stored.*

	Zone 1	*Zone 2*	*Zone 3*	*Zone 4*	*Zone 5*	*Zone 6*
Max. Decay Heat / FA (kW)	*N/A*	*N/A*	*0.96*[2]	*0.98*[2]	*N/A*	*N/A*
Max. Decay Heat / Zone (kW)	*N/A*	*N/A*	*3.84*	*27.44*	*N/A*	*N/A*
Max. Decay Heat / DSC (kW)	*31.2*[1]					

Note: *(1) Adjust payload to maintain 31.2 kW heat load.*
(2) The fuel qualification table corresponding to 1.0 kW/FA shall be used to determine burnup, cooling time, and enrichments corresponding to these heat loads.

Figure 1-27
Heat Load Zoning Configuration No. 2 for 32PTH1-S, 32PTH1-M and 32PTH1-L DSCs (Type 1 or Type 2 Baskets)



** denotes location where intact or damaged fuel assembly can be stored.*

	Zone 1	*Zone 2*	*Zone 3*	*Zone 4*	*Zone 5*	*Zone 6*
Max. Decay Heat / FA (kW)	*N/A*	*0.8*	*N/A*	*N/A*	*N/A*	*N/A*
Max. Decay Heat / Zone (kW)	*N/A*	*24.0*	*N/A*	*N/A*	*N/A*	*N/A*
Max. Decay Heat / DSC (kW)	*24.0[(1)]*					

Note: (1) Adjust payload to maintain 24.0 kW heat load.

Figure 1-28
Heat Load Zoning Configuration No. 3 for 32PTH1-S, 32PTH1-M and 32PTH1-L DSCs (Type 1 or Type 2 Baskets)

1.2.2 DSC Vacuum Pressure During Drying

Limit/Specification:

Vacuum Pressure:	≤3 mm Hg
Time at Pressure:	≥30 minutes following evacuation
Number of Pump-Downs:	2

Applicability: This is applicable to all DSCs. The term "inner top cover" as used in this and other Technical Specifications means either the inner top cover plate or the top shield plug assembly.

Objective: To ensure a minimum water content.

Action: If the required vacuum pressure cannot be obtained:

1. Confirm that the vacuum drying system is properly installed.
2. Check and repair, or replace, the vacuum pump.
3. Check and repair the system as necessary.
4. Check and repair the seal weld between the inner top cover and the DSC shell.

Surveillance: No maintenance or tests are required during normal storage. Surveillance of the vacuum gauge is required during the vacuum drying operation.

Bases: A stable vacuum pressure of ≤3 mm Hg further ensures that all liquid water has evaporated in the DSC cavity, and that the resulting inventory of oxidizing gases in the DSC is well below the 0.25 volume %.

1.2.3 24P and 52B DSC Helium Backfill Pressure

Limit/Specifications:

Helium 2.5 psig ± 2.5 psig backfill pressure (stable for 30 minutes after filling).

Applicability: This specification is applicable to 24P and 52B DSCs only.

Objective: To ensure that: (1) the atmosphere surrounding the irradiated fuel is a non-oxidizing inert gas; (2) the atmosphere is favorable for the transfer of decay heat.

Action: If the required pressure cannot be obtained:

1. Confirm that the vacuum drying system and helium source are properly installed.

2. Check and repair or replace the pressure gauge.

3. Check and repair or replace the vacuum drying system.

4. Check and repair or replace the helium source.

5. Check and repair the seal weld between the inner top cover and the DSC shell.

If pressure exceeds the criterion, release a sufficient quantity of helium to lower the DSC cavity pressure.

Surveillance: No maintenance or tests are required during the normal storage. Surveillance of the pressure gauge is required during the helium backfilling operation.

Bases: The value of 2.5 psig was selected to ensure that the pressure within the DSC is within the design limits during any expected normal and off-normal operating conditions.

1.2.3a 61BT, 32PT, 24PHB, *24PTH, 61BTH and 32PTH1* DSC Helium Backfill Pressure

Limit/Specifications:

Helium 2.5 psig ± 1.0 psig backfill pressure (stable for 30 minutes after filling).

Applicability: This specification is applicable to 61BT, 32PT, 24PHB, *24PTH, 61BTH and 32PTH1* DSC only.

Objective: To ensure that: (1) the atmosphere surrounding the irradiated fuel is a non-oxidizing inert gas; (2) the atmosphere is favorable for the transfer of decay heat.

Action: If the required pressure cannot be obtained:

1. Confirm that the vacuum drying system and helium source are properly installed.
2. Check and repair or replace the pressure gauge.
3. Check and repair or replace the vacuum drying system.
4. Check and repair or replace the helium source.
5. Check and repair the seal weld between the inner top cover and the DSC shell.

If pressure exceeds the criterion, release a sufficient quantity of helium to lower the DSC cavity pressure.

Surveillance: No maintenance or tests are required during the normal storage. Surveillance of the pressure gauge is required during the helium backfilling operation.

Bases: The value of 2.5 psig was selected to ensure that the pressure within the DSC is within the design limits during any expected normal and off-normal operating conditions.

1.2.4 24P and 52B DSC Helium Leak Rate of Inner Seal Weld

Limit/Specification:

$\leq$1.0 x 10-^{4} atm · cubic centimeters per second (atm · cm^{3}/s) at the highest DSC limiting pressure.

Applicability: This specification is applicable to the inner top cover seal weld of the 24P and 52B DSCs only.

Objective:

1. To limit the total radioactive gases normally released by each canister to negligible levels. Should fission gases escape the fuel cladding, they will remain confined by the DSC confinement boundary.
2. To retain helium cover gases within the DSC and prevent oxygen from entering the DSC. The helium improves the heat dissipation characteristics of the DSC and prevents any oxidation of fuel cladding.

Action: If the leak rate test of the inner seal weld exceeds 1.0x10-^{4} (atm · cm^{3}/s):

1. Check and repair the DSC drain and fill port fittings for leaks.
2. Check and repair the inner seal weld.
3. Check and repair the inner top cover for any surface indications resulting in leakage.

Surveillance: After the welding operation has been completed, perform a leak test with a helium leak detection device.

Bases: If the DSC leaked at the maximum acceptable rate of 1.0x10-^{4} atm · cm^{3}/s for a period of 20 years, about 63,100 cc of helium would escape from the DSC. This is about 1% of the 6.3 x 10^{6} cm^{3} of helium initially introduced in the DSC. This amount of leakage would have a negligible effect on the inert environment of the DSC cavity. (Reference: American National Standards Institute, ANSI N14.5-1987, For Radioactive Materials—Leakage Tests on Packages for Shipment," Appendix B3).

1.2.4a 61BT, 32PT, 24PHB, 24PTH, *61BTH and 32PTH1* DSC Helium Leak Rate of Inner Seal Weld

Limit/Specification:

$\leq 1.0 \times 10^{-7}$ reference cubic centimeters per second (cc/s).

Applicability: This specification is applicable to the inner top cover seal weld of 61BT, 32PT, 24PHB, 24PTH, *61BTH and 32PTH1* DSC only.

Objective:

1. To demonstrate that the top cover to be "leak tight", as defined in "American National Standard for Leakage Tests on Packages for Shipment of Radioactive Materials," ANSI N14.5 – 1997.

2. To retain helium cover gases within the DSC and prevent oxygen from entering the DSC. The helium improves the heat dissipation characteristics of the DSC and prevents any oxidation of fuel cladding.

Action: If the leak rate test of the inner seal weld exceeds $1.0\text{x}10\text{-}^{7}$ reference cc/s:

1. Check and repair the inner seal weld.

2. Check and repair the inner top cover for any surface indications resulting in leakage.

Surveillance: After the welding operation has been completed, perform a leak test with a helium leak detection device.

Bases: The 61BT, 32PT, 24PHB, 24PTH, *61BTH and 32PTH1* DSC will maintain an inert atmosphere around the fuel and radiological consequences will be negligible, since it is designed and tested to be leak tight.

1.2.5 DSC Dye Penetrant Test of Closure Welds

Limit/Specification:

All DSC closure welds except those subjected to full volumetric inspection shall be dye penetrant tested in accordance with the requirements of the ASME Boiler and Pressure Vessel Code Section III, Division 1, Article NB-5000. The liquid penetrant test acceptance standards shall be those described in Subsection NB-5350 of the Code.

Applicability: This is applicable to all DSCs. The welds include inner and outer top and bottom covers, and vent and siphon port covers.

Objective: To ensure that the DSC is adequately sealed in a redundant manner and leak tight.

Action: If the liquid penetrant test indicates that the weld is unacceptable:

1. The weld shall be repaired in accordance with approved ASME procedures.

2. The new weld shall be re-examined in accordance with this specification.

Surveillance: During DSC closure operations. No additional surveillance is required for this operation.

Bases: Article NB-5000 Examination, ASME Boiler and Pressure Vessel Code, Section III, Division 1, Sub-Section NB.

1.2.6 Deleted

1.2.7 HSM Dose Rates with a Loaded 24P, 52B or 61BT DSC

Limit/Specification:

Dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 400 mrem/hr at 3 feet from the HSM surface.

b. Outside of HSM door on center line of DSC 100 mrem/hr.

c. End shield wall exterior 20 mrem/hr.

Applicability: This specification is applicable to all HSMs which contain a loaded 24P, 52B or 61BT DSC.

Objective: The dose rate is limited to this value to ensure that the cask (DSC) has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSMs where surveillance is performed, and to reduce off-site exposures during storage.

Action:

a. If specified dose rates are exceeded, the following actions should be taken:

   1. Ensure that the DSC is properly positioned on the support rails.

   2. Ensure proper installation of the HSM door.

   3. Ensure that the required module spacing is maintained.

   4. Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.

   5. Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.

b. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The HSM and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM door is closed.

Basis: The basis for this limit is the shielding analysis presented in Section 7.0, Appendix J, and Appendix K of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).

1.2.7a HSM Dose Rates with a Loaded 32PT DSC Only

Limit/Specification:

Dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 800 mrem/hr on the HSM front surface.

b. 200 mrem/hr on the HSM door centerline.

c. 8 mrem/hr on the end shield wall exterior.

Applicability: This specification is applicable to all HSMs which contain a loaded 32PT DSC.

Objective: The dose rate is limited to this value to ensure that the cask (DSC) has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSMs where surveillance is performed, and to reduce off-site exposures during storage.

Action:

a. If specified dose rates are exceeded, the following actions should be taken:

    1. Ensure that the DSC is properly positioned on the support rails.

    2. Ensure proper installation of the HSM door.

    3. Ensure that the required module spacing is maintained.

    4. Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.

    5. Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.

b. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The HSM and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM door is closed.

Basis: The basis for this limit is the shielding analysis presented in Appendix M of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).

1.2.7b HSM Dose Rates with a Loaded 24PHB DSC Only

Limit/Specification:

Peak dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 500 mrem/hr on the HSM front surface.

b. 20 mrem/hr on the HSM door centerline.

c. 300 mrem/hr on the end shield wall exterior.

Applicability: This specification is applicable to all HSMs which contain a loaded 24PHB DSC.

Objective: The peak dose rate is limited to this value to ensure that the cask (DSC) has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSMs where surveillance is performed, and to reduce off-site exposures during storage.

Action: a. If specified dose rates are exceeded, the following actions should be taken:

1. Ensure that the DSC is properly positioned on the support rails.
2. Ensure proper installation of the HSM door.
3. Ensure that the required module spacing is maintained.
4. Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.
5. Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.

b. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The HSM and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM door is closed.

Basis: The basis for this limit is the shielding analysis presented in Appendix N of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).

1.2.7c HSM-H Dose Rates with a Loaded 24PTH-S or 24PTH-L DSC Only

Limit/Specification:

Peak dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 1300 mrem/hr on the HSM-H front surface.

b. 5 mrem/hr on the HSM-H door centerline.

c. 10 mrem/hr on the end shield wall exterior.

Applicability: This specification is applicable to all HSM-H modules which contain a loaded 24PTH-S or 24PTH-L DSC.

Objective: The peak dose rate is limited to this value to ensure that the cask (DSC) has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSM-H where surveillance is performed, and to reduce off-site exposures during storage.

Action: a. If specified dose rates are exceeded, the following actions should be taken:

1. Ensure that the DSC is properly positioned on the support rails.
2. Ensure proper installation of the HSM-H door.
3. Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.
4. Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.

b. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The HSM-H and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM-H door is closed.

Basis: The basis for this limit is the shielding analysis presented in Appendix P of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).

1.2.7d HSM or HSM-H Dose Rates with a Loaded 24PTH-S-LC DSC Only

Limit/Specification:

Peak dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 500 mrem/hr on the HSM or HSM-H front surface.

b. 70 mrem/hr on the HSM or HSM-H door centerline.

c. 300 mrem/hr on the end shield wall exterior.

Applicability: This specification is applicable to all HSMs or HSM-Hs which contain a loaded 24PTH-S-LC DSC.

Objective: The peak dose rate is limited to this value to ensure that the cask (DSC) has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSMs or HSM-Hs where surveillance is performed, and to reduce off-site exposures during storage.

Action: a. If specified dose rates are exceeded, the following actions should be taken:

1. Ensure that the DSC is properly positioned on the support rails.
2. Ensure proper installation of the HSM or HSM-H door.
3. Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.
4. Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.

b. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The HSM or HSM-H and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM or HSM-H door is closed.

Basis: The basis for this limit is the shielding analysis presented in Appendix P of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).

1.2.7e HSM-H Dose Rates with a Loaded Type 2 61BTH DSC Only

Limit/Specification:

Peak dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 700 mrem/hr on the HSM-H front surface.

b. 5 mrem/hr on the HSM-H door centerline.

c. 10 mrem/hr on the end shield wall exterior.

Applicability: *This specification is applicable to all HSM-H modules which contain a loaded Type 2 61BTH DSC.*

Objective: *The peak dose rate is limited to this value to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSM-H where surveillance is performed, and to reduce off-site exposures during storage.*

Action: *a. If specified dose rates are exceeded, the following actions should be taken:*

1. *Ensure that the DSC is properly positioned on the support rails.*
2. *Ensure proper installation of the HSM-H door.*
3. *Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.*
4. *Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.*

b. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: *The HSM-H and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM-H door is closed.*

Basis: *The basis for this limit is the shielding analysis presented in Appendix T of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).*

1.2.7f HSM or HSM-H Dose Rates with a loaded Type 1 61BTH DSC Only

Limit/Specification:

Peak dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 700 mrem/hr on the HSM or HSM-H front surface.

b. 100 mrem/hr on the HSM or HSM-H door centerline.

c. 20 mrem/hr on the end shield wall exterior.

Applicability: *This specification is applicable to all HSMs or HSM-Hs which contain a loaded Type 1 61BTH DSC.*

Objective: *The peak dose rate is limited to this value to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSMs or HSM-Hs where surveillance is performed, and to reduce off-site exposures during storage.*

Action: *a.* *If specified dose rates are exceeded, the following actions should be taken:*

1. *Ensure that the DSC is properly positioned on the support rails.*
2. *Ensure proper installation of the HSM or HSM-H door.*
3. *Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.*
4. *Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.*

b. *Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.*

Surveillance: *The HSM or HSM-H and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM or HSM-H door is closed.*

Basis: *The basis for this limit is the shielding analysis presented in Appendix T of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).*

1.2.7g HSM-H Dose Rates with a 32PTH1 DSC Only

Limit/Specification:

Peak dose rates at the following locations shall be limited to levels which are less than or equal to:

a. 500 mrem/hr on the HSM-H front surface.

b. 5 mrem/hr on the HSM-H door centerline.

c. 10 mrem/hr on the end shield wall exterior.

Applicability: *This specification is applicable to all HSM-Hs which contain a loaded 32PTH1 DSC.*

Objective: *The peak dose rate is limited to this value to maintain dose rates as-low-as-is-reasonably achievable (ALARA) at locations on the HSM-Hs where surveillance is performed, and to reduce off-site exposures during storage.*

Action:

a. If specified dose rates are exceeded, the following actions should be taken:

1. *Ensure that the DSC is properly positioned on the support rails.*
2. *Ensure proper installation of the HSM-H door.*
3. *Confirm that the spent fuel assemblies contained in the DSC conform to the specifications of Section 1.2.1.*
4. *Install temporary or permanent shielding to mitigate the dose to acceptable levels in accordance with 10 CFR Part 20, 10 CFR 72.104(a), and ALARA.*

b. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: *The HSM-H and ISFSI shall be checked to verify that this specification has been met after the DSC is placed into storage and the HSM-H door is closed.*

Basis: *The basis for this limit is the shielding analysis presented in Appendix U of the FSAR. The specified dose rates provide as-low-as-is-reasonably-achievable on-site and off-site doses in accordance with 10 CFR Part 20 and 10 CFR 72.104(a).*

1.2.8 HSM Maximum Air Exit Temperature with a Loaded 24P, 52B, 61BT, 32PT, 24PHB, 24PTH-S-LC *or a Type 1 61BTH DSC* Only

Limit/Specification:

Following initial DSC transfer to the HSM or the occurrence of accident conditions, the equilibrium air temperature difference between ambient temperature and the vent outlet temperature shall not exceed 100°F when fully loaded with 24 kW heat.

Applicability: This specification is applicable to all HSMs stored in the ISFSI. If a DSC is placed in the HSM with a heat load less than 24 kW, the limiting difference between outlet and ambient temperatures shall be determined by a calculation performed by the user using the same methodology and inputs documents in the FSAR and SER.

Objective: The objective of this limit is to ensure that the temperatures of the fuel cladding and the HSM concrete do not exceed the temperatures calculated in Section 8 of the FSAR. That section shows that if the air outlet temperature difference is less than or equal to 100°F (with a thermal heat load of 24 kW), the fuel cladding and concrete will be below the respective temperature limits for normal long-term operation.

Action: If the temperature rise is greater than that specified, then the air inlets and exits should be checked for blockage. If the blockage is cleared and the temperature is still greater than that specified, the DSC and HSM cavity may be inspected using video equipment or other suitable means. If environmental factors can be ruled out as the cause of excessive temperatures, then the fuel bundles are producing heat at a rate higher than the upper limit specified in the Specification of Section 1.2.1 and will require additional measurements and analysis to assess the actual performance of the system. If excessive temperatures cause the system to perform in an unacceptable manner and/or the temperatures cannot be controlled to acceptable limits, then the cask shall be unloaded within the time period as determined by the analysis.

Surveillance: The temperature rise shall be measured and recorded daily following DSC insertion until equilibrium temperature is reached, 24 hours after insertion, and again on a daily basis after insertion into the HSM or following the occurrence of accident conditions. If the temperature rise is within the specifications or the calculated value for a heat load less than 24 kW, then the HSM and DSC are performing as designed to meet this specification and no further maximum air exit temperature measurements are required. Air temperatures must be measured in such a manner as to obtain representative values of inlet and outlet air temperatures.

Basis: The specified temperature rise is selected to ensure the fuel clad and concrete temperatures are maintained at or below acceptable long-term storage limits.

1.2.8a HSM-H Maximum Air Exit Temperature with a Loaded 24PTH DSC

Limit/Specification:

Following initial DSC transfer to the HSM-H or the occurrence of accident conditions, the equilibrium air temperature difference between ambient temperature and the vent outlet temperature shall not exceed 100°F when fully loaded with 40.8 kW heat for 24PTH-S or 24PTH-L DSC (or 70°F when fully loaded with 24PTH-S-LC DSC).

Applicability: This specification is applicable to all HSM-H modules stored in the ISFSI. If a DSC is placed in the HSM-H with a heat load less than 40.8 kW, the limiting difference between outlet and ambient temperatures shall be determined by a calculation performed by the user using the same methodology and inputs documents in Appendix P of the FSAR.

Objective: The objective of this limit is to ensure that the temperatures of the fuel cladding and the HSM-H concrete do not exceed the temperatures calculated in Appendix P of the FSAR. That section shows that if the air outlet temperature difference is less than or equal to 100°F with a thermal heat load of 40.8 kW for 24PTH-S or 24PTH-L DSC (or 70°F with a thermal heat load of 24.0 kW for 24PTH-S-LC), the fuel cladding and concrete will be below the respective temperature limits for normal long-term operation.

Action: If the temperature rise is greater than that specified, then the air inlets and exits should be checked for blockage. If the blockage is cleared and the temperature is still greater than that specified, the DSC and HSM-H cavity may be inspected using video equipment or other suitable means. If environmental factors can be ruled out as the cause of excessive temperatures, then the fuel bundles are producing heat at a rate higher than the upper limit specified in the specification of Section 1.2.1 and will require additional measurements and analysis to assess the actual performance of the system. If excessive temperatures cause the system to perform in an unacceptable manner and/or the temperatures cannot be controlled to acceptable limits, then the cask shall be unloaded within the time period as determined by the analysis.

Surveillance: The temperature rise shall be measured and recorded daily following DSC insertion until equilibrium temperature is reached, 24 hours after insertion, and again on a daily basis after insertion into the HSM-H or following the occurrence of accident conditions. If the temperature rise is within the specifications or the calculated value for a heat load less than 40.8 kW for 24PTH-S or 24PTH-L DSC (or 24.0 kW for 24PTH-S-LC DSC) then the HSM-H and DSC are performing as designed to meet this specification and no further maximum air exit temperature measurements are required. Air temperatures must be measured in such a manner as to obtain representative values of inlet and outlet air temperatures.

Basis: The specified temperature rise is selected to ensure the fuel clad and concrete temperatures are maintained at or below acceptable long-term storage limits.

1.2.8b HSM-H Maximum Air Exit Temperature with a Loaded 61BTH DSC

Limit/Specification:

Following initial DSC transfer to the HSM-H or the occurrence of accident conditions, the equilibrium air temperature difference between ambient temperature and the vent outlet temperature shall not exceed 90°F when fully loaded with 31.2 kW heat load for a Type 2 61BTH DSC (or 70°F when fully loaded with 22.0 kW heat load for a Type 1 61BTH DSC).

Applicability: *This specification is applicable to all HSM-H modules stored in the ISFSI with a loaded 61BTH DSC. If a 61BTH DSC is placed in the HSM-H with a heat load less than 31.2 kW, the limiting difference between outlet and ambient temperatures shall be determined by a calculation performed by the user using the same methodology and inputs documents in Appendix T of the FSAR.*

Objective: *The objective of this limit is to ensure that the temperatures of the fuel cladding and the HSM-H concrete do not exceed the temperatures calculated in Appendix T of the FSAR. That section shows that if the air outlet temperature difference is less than or equal to 90°F with a thermal heat load of 31.2 kW for a Type 2 61BTH DSC (or 70°F with a thermal heat load of 22.0 kW for a Type 1 61BTH DSC), the fuel cladding and concrete will be below the respective temperature limits for normal long-term operation.*

Action: *If the temperature rise is greater than that specified, then the air inlets and exits should be checked for blockage. If the blockage is cleared and the temperature is still greater than that specified, the DSC and HSM-H cavity may be inspected using video equipment or other suitable means. If environmental factors can be ruled out as the cause of excessive temperatures, then the fuel bundles are producing heat at a rate higher than the upper limit specified in the specification of Section 1.2.1 and will require additional measurements and analysis to assess the actual performance of the system. If excessive temperatures cause the system to perform in an unacceptable manner and/or the temperatures cannot be controlled to acceptable limits, then the cask shall be unloaded within the time period as determined by the analysis.*

Surveillance: *The temperature rise shall be measured and recorded daily following DSC insertion until equilibrium temperature is reached, 24 hours after insertion, and again on a daily basis after insertion into the HSM-H or following the occurrence of accident conditions. If the temperature rise is within the specifications or the calculated value for a heat load less than 31.2 kW for a Type 2 61BTH DSC (or 22.0 kW for a Type 1 61BTH DSC) then the HSM-H and DSC are performing as designed to meet this specification and no further maximum air exit temperature measurements are required. Air temperatures must be measured in such a manner as to obtain representative values of inlet and outlet air temperatures.*

Basis: *The specified temperature rise is selected to ensure the fuel clad and concrete temperatures are maintained at or below acceptable long-term storage limits.*

1.2.8c HSM-H Maximum Air Exit Temperature with a Loaded 32PTH1 DSC

Limit/Specification:	*Following initial DSC transfer to the HSM-H or the occurrence of accident conditions, the equilibrium air temperature difference between ambient temperature and the vent outlet temperature shall not exceed 110°F when fully loaded with 40.8 kW heat load for a 32PTH1 DSC.*
Applicability:	*This specification is applicable to all HSM-H modules stored in the ISFSI with a loaded 32PTH1 DSC. If a 32PTH1 DSC is placed in the HSM-H with a heat load less than 40.8 kW, the limiting difference between outlet and ambient temperatures shall be determined by a calculation performed by the user using the same methodology and inputs documents in Appendix U of the FSAR.*
Objective:	*The objective of this limit is to ensure that the temperatures of the fuel cladding and the HSM-H concrete do not exceed the temperatures calculated in Appendix U of the FSAR. That section shows that if the air outlet temperature difference is less than or equal to 110°F with a thermal heat load of 40.8 kW for 32PTH1 DSC, the fuel cladding and concrete will be below the respective temperature limits for normal long-term operation.*
Action:	*If the temperature rise is greater than that specified, then the air inlets and exits should be checked for blockage. If the blockage is cleared and the temperature is still greater than that specified, the DSC and HSM-H cavity may be inspected using video equipment or other suitable means. If environmental factors can be ruled out as the cause of excessive temperatures, then the fuel bundles are producing heat at a rate higher than the upper limit specified in the specification of Section 1.2.1 and will require additional measurements and analysis to assess the actual performance of the system. If excessive temperatures cause the system to perform in an unacceptable manner and/or the temperatures cannot be controlled to acceptable limits, then the cask shall be unloaded within the time period as determined by the analysis.*
Surveillance:	*The temperature rise shall be measured and recorded daily following DSC insertion until equilibrium temperature is reached, 24 hours after insertion, and again on a daily basis after insertion into the HSM-H or following the occurrence of accident conditions. If the temperature rise is within the specifications or the calculated value for a heat load less than 40.8 kW for 32PTH1 DSC, then the HSM-H and DSC are performing as designed to meet this specification and no further maximum air exit temperature measurements are required. Air temperatures must be measured in such a manner as to obtain representative values of inlet and outlet air temperatures.*
Basis:	*The specified temperature rise is selected to ensure the fuel clad and concrete temperatures are maintained at or below acceptable long-term storage limits.*

1.2.9 Transfer Cask Alignment with HSM or HSM-H

Limit/Specification:

The cask must be aligned with respect to the HSM or HSM-H that the longitudinal centerline of the DSC in the transfer cask is within ±1/8 inch of its true position when the cask is docked with the HSM front access opening.

Applicability: This specification is applicable during the insertion and retrieval of all DSCs.

Objective: To ensure smooth transfer of the DSC from the transfer cask to HSM or HSM-H and back.

Action: If the alignment tolerance is exceeded, the following actions should be taken:

a. Confirm that the transfer system is properly configured.

b. Check and repair the alignment equipment.

c. Confirm the locations of the alignment targets on the transfer cask and HSM or HSM-H.

Surveillance: Before initiating DSC insertion or retrieval, confirm the alignment. Observe the transfer system during DSC insertion or retrieval to ensure that motion or excessive vibration does not occur.

Basis: The basis for the true position alignment tolerance is the clearance between the DSC shell, the transfer cask cavity, the HSM or HSM-H access opening, and the DSC support rails inside the HSM or HSM-H.

1.2.10 TC/DSC Handling Height Outside the Spent Fuel Pool Building

Limit/Specification:

1. When handling a loaded TC/DSC at a height greater than 80 inches outside the spent fuel pool building, a special lifting device that has at least twice the normal stress design factor for handling heavy loads, or a single failure proof handling system shall be used.

2. In the event of a drop of a loaded TC/DSC from a height greater than 15 inches: (a) fuel in the DSC shall be returned to the reactor spent fuel pool; (b) the DSC shall be removed from service and evaluated for further use; and (c) the TC shall be inspected for damage and evaluated for further use.

Applicability: The specification applies to handling the TC, loaded with the DSC, on route to, and at, the storage pad.

Objective:

1. To preclude a loaded TC/DSC drop from a height greater than 80 inches.

2. To maintain spent fuel integrity, according to the spent fuel specification for storage, continued confinement integrity, and DSC functional capability, after a tip-over or drop of a loaded DSC from a height greater than 15 inches.

Surveillance: In the event of a loaded TC/DSC drop accident, the system will be returned to the reactor fuel handling building, where, after the fuel has been returned to the spent fuel pool, the DSC and TC will be inspected and evaluated for future use.

Basis: The NRC evaluation of the TC/DSC drop analysis concurred that drops up to 80 inches, of the DSC inside the TC, can be sustained without breaching the confinement boundary, preventing removal of spent fuel assemblies, or causing a criticality accident. This specification ensures that handling height limits will not be exceeded in transit to, or at the storage pad. Acceptable damage may occur to the TC, DSC, and the fuel stored in the DSC, for drops of height greater than 15 inches. The specification requiring inspection of the DSC and fuel following a drop of 15 inches or greater ensures that the spent fuel will continue to meet the requirements for storage, the DSC will continue to provide confinement, and the TC will continue to provide its design functions of DSC transfer and shielding.

1.2.11 Transfer Cask Dose Rates with a Loaded 24P, 52B, 61BT, or 32PT DSC

Limit/Specification:

Dose rates from the transfer cask shall be limited to levels which are less than or equal to:

a. 200 mrem/hr at 3 feet with water in the DSC cavity.

b. 500 mrem/hr at 3 feet without water in the DSC cavity.

Applicability: This specification is applicable to the transfer cask containing a loaded 24P, 52B, 61BT, or 32PT DSC.

Objective: The dose rate is limited to this value to ensure that the DSC has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable during DSC transfer operations.

Action: If specified dose rates are exceeded, place temporary shielding around affected areas of transfer cask and review the plant records of the fuel assemblies which have been placed in DSC to ensure they conform to the fuel specifications of Section 1.2.1. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The dose rates should be measured as soon as possible after the transfer cask is removed from the spent fuel pool.

Basis: The basis for this limit is the shielding analysis presented in Section 7.0, Appendix J, Appendix K and Appendix M of the FSAR.

1.2.11a Transfer Cask Dose Rates with a Loaded 24PHB DSC

Limit/Specification:

Dose rates from the transfer cask shall be limited to levels which are less than or equal to:

a. 1700 mrem/hr at 3 feet from the top of the Cask at the cover plate edge with water in the DSC cavity.

b. 500 mrem/hr at 3 feet radially from the Cask surface without water in the DSC cavity.

Applicability: This specification is applicable to the transfer cask containing a loaded 24PHB DSC.

Objective: The dose rate is limited to this value to ensure that the DSC has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable during DSC transfer operations.

Action: If specified dose rates are exceeded, place temporary shielding around affected areas of transfer cask and review the plant records of the fuel assemblies which have been placed in DSC to ensure they conform to the fuel specifications of Section 1.2.1. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The dose rates should be measured as soon as possible after the transfer cask is removed from the spent fuel pool.

Basis: The basis for this limit is the shielding analysis presented in Appendix N of the FSAR.

1.2.11b Transfer Cask Dose Rates with a Loaded 24PTH-S or 24PTH-L DSC

Limit/Specification:

Dose rates from the transfer cask shall be limited to levels which are less than or equal to:

a. 500 mrem/hr at 3 feet from the top of the Cask at the cover plate edge with water in the DSC cavity.

b. 600 mrem/hr at 3 feet radially from the Cask surface without water in the DSC cavity.

Applicability: This specification is applicable to the transfer cask containing a loaded 24PTH-S or 24PTH-L DSC.

Objective: The dose rate is limited to this value to ensure that the DSC has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable during DSC transfer operations.

Action: If specified dose rates are exceeded, place temporary shielding around affected areas of transfer cask and review the plant records of the fuel assemblies which have been placed in DSC to ensure they conform to the fuel specifications of Section 1.2.1. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The dose rates should be measured as soon as possible after the transfer cask is removed from the spent fuel pool.

Basis: The basis for this limit is the shielding analysis presented in Appendix P of the FSAR.

1.2.11c Transfer Cask Dose Rates with a Loaded 24PTH-S-LC DSC

Limit/Specification:

Dose rates from the transfer cask shall be limited to levels which are less than or equal to:

a. 20 mrem/hr at 3 feet from the top of the Cask at the cover plate edge with water in the DSC cavity.

b. 250 mrem/hr at 3 feet radially from the Cask surface without water in the DSC cavity.

Applicability: This specification is applicable to the transfer cask containing a loaded 24PTH-S-LC DSC.

Objective: The dose rate is limited to this value to ensure that the DSC has not been inadvertently loaded with fuel not meeting the specifications in Section 1.2.1 and to maintain dose rates as-low-as-is-reasonably achievable during DSC transfer operations.

Action: If specified dose rates are exceeded, place temporary shielding around affected areas of transfer cask and review the plant records of the fuel assemblies which have been placed in DSC to ensure they conform to the fuel specifications of Section 1.2.1. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.

Surveillance: The dose rates should be measured as soon as possible after the transfer cask is removed from the spent fuel pool.

Basis: The basis for this limit is the shielding analysis presented in Appendix P of the FSAR.

1.2.11d Transfer Cask Dose Rates with a Loaded 61BTH DSC

Limit/Specification:

Dose rates from the transfer cask shall be limited to levels which are less than or equal to:

a. 600 mrem/hr at 3 feet from the vertical centerline of the DSC inner top cover plate.

b. 500 mrem/hr at 3 feet radially from the Cask surface without water in the DSC cavity.

Applicability: *This specification is applicable to the transfer cask containing a loaded 61BTH DSC.*

Objective: *The dose rate is limited to this value to maintain dose rates as-low-as-is-reasonably achievable during DSC transfer operations.*

Action: *If specified dose rates are exceeded, place temporary shielding around affected areas of transfer cask and review the plant records of the fuel assemblies which have been placed in DSC to ensure they conform to the fuel specifications of Section 1.2.1. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.*

Surveillance: *For dose rate limit specified in 1.2.11d(a), the dose rate should be measured after the cask is removed from the spent fuel pool, water drained from the DSC cavity, TC/DSC annulus full (within approximately 1 foot of top), top shield plug, DSC inner top cover plate and welding machine with temporary shielding, in place and included in axial shielding.*

For dose rate limit specified in 1.2.11.d(b), the dose rate should be measured before the cask is downended on the trailer to be transferred to the ISFSI.

Basis: *The basis for this limit is the shielding analysis presented in Appendix T of the FSAR.*

1.2.11e Transfer Cask Dose Rates with a Loaded 32PTH1 DSC

Limit/Specification:

Dose rates from the transfer cask shall be limited to levels which are less than or equal to:

a. 400 mrem/hr at 3 feet from the vertical centerline of the DSC inner top cover plate.

b. 300 mrem/hr at 3 feet radially from the Cask surface without water in the DSC cavity.

Applicability: *This specification is applicable to the transfer cask containing a loaded 32PTH1 DSC.*

Objective: *The dose rate is limited to this value to maintain dose rates as-low-as-is-reasonably achievable during DSC transfer operations.*

Action: *If specified dose rates are exceeded, place temporary shielding around affected areas of transfer cask and review the plant records of the fuel assemblies which have been placed in DSC to ensure they conform to the fuel specifications of Section 1.2.1. Submit a letter report to the NRC within 30 days summarizing the action taken and the results of the surveillance, investigation and findings. The report must be submitted using instructions in 10 CFR 72.4 with a copy sent to the administrator of the appropriate NRC regional office.*

Surveillance: *For dose rate limit specified in 1.2.11e(a), the dose rate should be measured after the cask is removed from the spent fuel pool, water drained from the DSC cavity, TC/DSC annulus full (within approximately 1 foot of top), top shield plug, DSC inner top cover plate and welding machine with temporary shielding, in place and included in axial shielding.*

For dose rate limit specified in 1.2.11.e(b), the dose rate should be measured before the cask is downended on the trailer to be transferred to the ISFSI.

Basis: *The basis for this limit is the shielding analysis presented in Appendix U of the FSAR.*

1.2.12 Maximum DSC Removable Surface Contamination

Limit/Specification:

2,200 dpm/100 cm^2 for beta-gamma sources
220 dpm/100 cm^2 for alpha sources.

Applicability: This specification is applicable to all DSCs.

Objective: To ensure that release of non-fixed contamination above accepted limits does not occur.

Action:If the required limits are not met:

a. Flush the DSC/transfer cask annulus with demineralized water and/or scrub it using long handled tools. Repeat surface contamination surveys of the DSC upper surface.

b. If contamination of the DSC cannot be reduced to an acceptable level by this means, direct surface cleaning techniques shall be used following removal of the fuel assemblies from the DSC and removal of the DSC from the transfer cask.

c. Check and replace the DSC/transfer cask annulus seal to ensure proper installation and repeat canister loading process.

Surveillance: Following placement of each loaded DSC/transfer cask into the cask decontamination area, fuel pool water above the top shield plug shall be removed and the top region of the DSC and cask shall be decontaminated. A contamination survey of the upper 1 foot of the DSC shall be taken.

Basis: This non-fixed contamination level is consistent with the requirements of 10 CFR 71.87(i)(1) and 49 CFR 173.443, which regulate the use of spent fuel shipping containers. Consequently, these contamination levels are considered acceptable for exposure to the general environment. This level will also ensure that contamination levels of the inner surfaces of the HSM and potential releases of radioactive material to the environment are minimized.

1.2.13 TC/DSC Lifting Heights as a Function of Low Temperature and Location

Limit/Specification:

1. No lifts or handling of the TC/DSC at any height are permissible at DSC basket temperatures below -20°F inside the spent fuel pool building.

2. The maximum lift height of the TC/DSC shall be 80 inches if the basket temperature is below 0°F but higher than -20°F inside the spent fuel pool building.

3. No lift height restriction is imposed on the TC/DSC if the basket temperature is higher than 0°F inside the spent fuel pool building.

4. When handling a loaded TC/DSC at a height greater than 80 inches outside the spent fuel pool building, a special lifting device that has at least twice the normal stress design factor for handling heavy loads, or a single failure proof handling system shall be used and the basket temperature may not be lower than 0°F.

Applicability: These temperature and height limits apply to lifting and transfer of all loaded TC/DSCs inside and outside the spent fuel pool building.

The requirements of 10 CFR Part 72 apply outside the spent fuel building. The requirements of 10 CFR Part 50 apply inside the spent fuel pool building.

Objective: The low temperature and height limits are imposed to ensure that brittle fracture of the ferritic steels, used in the TC trunnions and shell and in the DSC basket, does not occur during transfer operations.

Action: Confirm the basket temperature before transfer of the TC. If calculation or measurement of this value is unavailable, then the ambient temperature may conservatively be used.

Surveillance: The ambient temperature shall be measured before transfer of the TC/DSC.

Bases: The basis for the low temperature and height limits is ANSI N14.6-1986 paragraph 4.2.6 which requires at least 40°F higher service temperature than nil ductility transition (NDT) temperature for the TC. In the case of the standardized TC, the test temperature is -40°F; therefore, although the NDT temperature is not determined, the material will have the required 40°F margin if the ambient temperature is 0°F or higher. This assumes the material service temperature is equal to the ambient temperature.

The basis for the low temperature limit for the DSC is NUREG/CR-1815. The basis for the handling height limits is the NRC evaluation of the structural integrity of the DSC to drop heights of 80 inches and less.

1.2.14 TC/DSC Transfer Operations at High Ambient Temperatures *(24P, 52B, 61BT, 32PT, 24PHB, 24PTH, or 61BTH DSC only)*

Limit/Specification:

1. The ambient temperature for transfer operations of a loaded TC/DSC *(24P, 52B, 61BT, 32PT, 24PHB, 24PTH, or 61BTH DSC)* shall not be greater that 100°F (when cask is exposed to direct insolation).

2. For transfer operations when ambient temperatures exceed 100°F, a solar shield shall be used to provide protection against direct solar radiation.

Applicability: This ambient temperature limit applies to all transfer operations of loaded TC/DSCs outside the spent fuel pool building.

Objective: The high temperature limit (100°F) is imposed to ensure that:

1. The fuel cladding temperature limit is not exceeded,

2. The solid neutron shield material temperature limit is not exceeded, and

3. The corresponding TC cavity pressure limit is not exceeded.

Action: Confirm what the ambient temperature is and provide appropriate solar shade if ambient temperature is expected to exceed 100°F.

Surveillance: The ambient temperature shall be measured before transfer of the TC/DSC.

Bases: For the NUHOMS®-24P, 52B and 61BT systems, the basis for the high temperature limit is PNL-6189 (Reference 1) for the fuel clad limit, the manufacturer's specification for neutron shield, and the design basis pressure of the TC internal cavity pressure. For the NUHOMS®-32PT, 24PHB and 24PTH systems, the fuel cladding limits are based on ISG-11, Revision 2 (Reference 3). *For the NUHOMS®-61BTH system* and the NUHOMS®-61BT system with FANP 9x9-2 fuel assemblies, the fuel cladding limits are based on ISG-11 Revision 3 (Reference 4).

1.2.14a TC/DSC Transfer at High Ambient Temperatures (32PTH1 DSC Only)

Limit/Specification:

1. *The ambient temperature for transfer operations of a loaded TC/DSC (32PTH1 DSC Only) shall not be greater that 106°F (when cask is exposed to direct insolation).*
2. *For transfer operations when ambient temperatures exceed 106°F, a solar shield shall be used to provide protection against direct solar radiation.*

Applicability: *This ambient temperature limit applies to all transfer operations of a loaded TC/DSC (32PTH1 DSC Only) outside the spent fuel pool building.*

Objective: *The high temperature limit (106°F) is imposed to ensure that:*

1. *The fuel cladding temperature limit is not exceeded,*
2. *The solid neutron shield material temperature limit is not exceeded, and*
3. *The corresponding TC cavity pressure limit is not exceeded.*

Action: *Confirm what the ambient temperature is and provide appropriate solar shade if ambient temperature is expected to exceed 106°F.*

Surveillance: *The ambient temperature shall be measured before transfer of the TC/DSC.*

Bases: *For the NUHOMS®-32PTH1 system, the fuel cladding limits are based on ISG-11 Revision 3 (Reference 4).*

1.2.15 Boron Concentration in the DSC Cavity Water for the 24-P Design Only

Limit/Specification:

The DSC cavity shall be filled only with water having a boron concentration equal to, or greater than:

1) 2,000 ppm for fuel with an equivalent unirradiated enrichment of less than or equal to 1.45 wt. % U-235 per Figure 1-1.

2) 2,350 ppm for fuel with an equivalent unirradiated enrichment of greater than 1.45 wt. % U-235 per Figure 1-1.

Applicability: This limit applies only to the standardized NUHOMS®-24P design. No boration in the cavity water is required for the standardized NUHOMS®-52B or NUHOMS®-61BT system since that system uses fixed absorber plates.

Objective:

1) To ensure a subcritical configuration is maintained in the case of accidental loading of the DSC with unirradiated fuel.

2) To ensure a subcritical configuration is maintained in the case of loading of the DSC with fuel with an equivalent unirradiated enrichment of greater than 1.45 wt. % U-235.

Action: If the boron concentration is below the required weight percentage concentration (gm boron/10^6 gm water), add boron and re-sample, and test the concentration until the boron concentration is shown to be greater than that required.

Surveillance: Written procedures shall be used to independently determine (two samples analyzed by different individuals) the boron concentration in the water used to fill the DSC cavity.

1. Within 4 hours before insertion of the first fuel assembly into the DSC, the dissolved boron concentration in water in the spent fuel pool, and in the water that will be introduced in the DSC cavity, shall be independently determined (two samples chemically analyzed by two individuals).

2. Within 4 hours before flooding the DSC cavity for unloading the fuel assemblies, the dissolved boron concentration in water in the spent pool, and in the water that will be introduced into the DSC cavity, shall be independently determined (two samples analyzed chemically by two individuals).

3. The dissolved boron concentration in the water shall be reconfirmed at intervals not to exceed 48 hours until such time as the DSC is removed from the spent fuel pool or the fuel has been removed from the DSC.

Bases:

1) The required boron concentration is based on the criticality analysis for an accidental misloading of the DSC with unburned fuel, maximum enrichment, and optimum moderation conditions.

2) The required boron concentration is based on the criticality analysis for loading of the DSC with unirradiated fuel, maximum enrichment, and optimum moderation conditions.

1.2.15a Boron Concentration in the DSC Cavity Water for the 32PT Design Only

Limit/Specification: The DSC cavity shall be filled only with water having a minimum boron concentration per Table 1-1g.

Applicability: This limit applies only to the standardized NUHOMS®- 32PT design.

Objective: To ensure a subcritical configuration is maintained in the case of loading of the DSC with design basis fuel.

Action: If the boron concentration is below the required weight percentage concentration (gm boron/10^6 gm water), add boron and re-sample, and test the concentration until the boron concentration is shown to be greater than that required.

Surveillance: Written procedures shall be used to independently determine (two samples analyzed by different individuals) the boron concentration in the water used to fill the DSC cavity.

1. Within 4 hours before insertion of the first fuel assembly into the DSC, the dissolved boron concentration in water in the spent fuel pool, and in the water that will be introduced in the DSC cavity, shall be independently determined (two samples chemically analyzed by two individuals).
2. Within 4 hours before flooding the DSC cavity for unloading the fuel assemblies, the dissolved boron concentration in water in the spent pool, and in the water that will be introduced into the DSC cavity, shall be independently determined (two samples analyzed chemically by two individuals).
3. The dissolved boron concentration in the water shall be reconfirmed at intervals not to exceed 48 hours until such time as the DSC is removed from the spent fuel pool or the fuel has been removed from the DSC.

Bases: The required boron concentration is based on the criticality analysis presented in Appendix M of this FSAR for loading of the DSC with unirradiated fuel, maximum enrichment, and optimum moderation conditions.

1.2.15b Boron Concentration in the DSC Cavity Water for the 24PHB Design Only

Limit/Specification:

- The DSC cavity shall be filled only with water having a boron concentration equal to, or greater than 2,350 ppm for enrichment of less than or equal to 4.0 wt. % U-235 based on the spent fuel assembly with the maximum initial enrichment in the DSC.
- The DSC cavity shall be filled only with water having a minimum boron concentration per Figure 1-10 for initial enrichment of greater than or equal to 4.0 wt. % U-235 based on the spent fuel assembly with the maximum initial enrichment in the DSC.

Applicability: This limit applies only to the standardized NUHOMS®-24PHB design.

Objective: To ensure a subcritical configuration is maintained in the case of accidental loading of the DSC with unirradiated fuel.

Action: If the boron concentration is below the required weight percentage concentration (gm boron/10^6 gm water), add boron and re-sample, and test the concentration until the boron concentration is shown to be greater than that required.

Surveillance: Written procedures shall be used to independently determine (two samples analyzed by different individuals) the boron concentration in the water used to fill the DSC cavity.

1. Within 4 hours before insertion of the first fuel assembly into the DSC, the dissolved boron concentration in water in the spent fuel pool, and in the water that will be introduced in the DSC cavity, shall be independently determined (two samples chemically analyzed by two individuals).

2. Within 4 hours before flooding the DSC cavity for unloading the fuel assemblies, the dissolved boron concentration in water in the spent pool, and in the water that will be introduced into the DSC cavity, shall be independently determined (two samples analyzed chemically by two individuals).

3. The dissolved boron concentration in the water shall be reconfirmed at intervals not to exceed 48 hours until such time as the DSC is removed from the spent fuel pool or the fuel has been removed from the DSC.

Bases: The required boron concentration is based on the criticality analysis for loading of the DSC with unirradiated fuel, initial enrichment, and optimum moderation conditions.

1.2.15c Boron Concentration in the DSC Cavity Water for the 24PTH Design Only

Limit/Specification:

- The DSC cavity shall only be filled with water having a minimum boron concentration which meets the requirements of Table 1-1p, when loading intact fuel. Table 1-1p lists the minimum soluble boron concentration as a function of the fuel assembly class, DSC basket type and the corresponding assembly average initial enrichment values.
- The DSC cavity shall only be filled with water having a minimum boron concentration which meets the requirements of Table 1-1q, when loading damaged fuel. Table 1-1q lists the minimum soluble boron concentration as a function of the fuel assembly class, DSC basket type, the maximum number of damaged fuel assemblies allowed and the corresponding maximum assembly average initial enrichment values.

Applicability: This limit applies only to the NUHOMS®-24PTH design.

Objective: To ensure a subcritical configuration is maintained in the case of accidental loading of the DSC with unirradiated fuel.

Action: If the boron concentration is below the required weight percentage concentration (gm boron/10^6 gm water), add boron and re-sample, and test the concentration until the boron concentration is shown to be greater than that required.

Surveillance: Written procedures shall be used to independently determine (two samples analyzed by different individuals) the boron concentration in the water used to fill the DSC cavity.

1. Within 4 hours before insertion of the first fuel assembly into the DSC, the dissolved boron concentration in water in the spent fuel pool, and in the water that will be introduced in the DSC cavity, shall be independently determined (two samples chemically analyzed by two individuals).

2. Within 4 hours before flooding the DSC cavity for unloading the fuel assemblies, the dissolved boron concentration in water in the spent pool, and in the water that will be introduced into the DSC cavity, shall be independently determined (two samples analyzed chemically by two individuals).

3. The dissolved boron concentration in the water shall be reconfirmed at intervals not to exceed 48 hours until such time as the DSC is removed from the spent fuel pool or the fuel has been removed from the DSC.

Bases: The required boron concentration is based on the criticality analysis in FSAR Appendix P for loading of the DSC with unirradiated fuel, initial enrichment, and optimum moderation conditions.

1.2.15d Boron Concentration in the DSC Cavity Water for the 32PTH1 Design Only

Limit/Specification:

- *The DSC cavity shall only be filled with water having a minimum boron concentration which meets the requirements of Table 1-1cc, when loading intact fuel. Table 1-1cc lists the minimum soluble boron concentration as a function of the fuel assembly class, DSC basket type and the corresponding assembly average initial enrichment values.*
- *The DSC cavity shall only be filled with water having a minimum boron concentration which meets the requirements of Table 1-1dd, when loading damaged fuel. Table 1-1dd lists the minimum soluble boron concentration as a function of the fuel assembly class, DSC basket type, the maximum number of damaged fuel assemblies allowed and the corresponding maximum assembly average initial enrichment values.*

Applicability: *This limit applies only to the NUHOMS®-32PTH1 design.*

Objective: *To ensure a subcritical configuration is maintained in the case of accidental loading of the DSC with unirradiated fuel.*

Action: *If the boron concentration is below the required weight percentage concentration (gm boron/10^6 gm water), add boron and re-sample, and test the concentration until the boron concentration is shown to be greater than that required.*

Surveillance: *Written procedures shall be used to independently determine (two samples analyzed by different individuals) the boron concentration in the water used to fill the DSC cavity.*

1. *Within 4 hours before insertion of the first fuel assembly into the DSC, the dissolved boron concentration in water in the spent fuel pool, and in the water that will be introduced in the DSC cavity, shall be independently determined (two samples chemically analyzed by two individuals).*

2. *Within 4 hours before flooding the DSC cavity for unloading the fuel assemblies, the dissolved boron concentration in water in the spent pool, and in the water that will be introduced into the DSC cavity, shall be independently determined (two samples analyzed chemically by two individuals).*

3. *The dissolved boron concentration in the water shall be reconfirmed at intervals not to exceed 48 hours until such time as the DSC is removed from the spent fuel pool or the fuel has been removed from the DSC.*

Bases: *The required boron concentration is based on the criticality analysis in FSAR Appendix U for loading of the DSC with unirradiated fuel, initial enrichment, and optimum moderation conditions.*

1.2.16 Provision of TC Seismic Restraint Inside the Spent Fuel Pool Building as a Function of Horizontal Acceleration and Loaded Cask Weight

Limit/Specification:

Seismic restraints shall be provided to prevent overturning of a loaded TC during a seismic event if a certificate holder determines that the horizontal acceleration is 0.40 g or greater. The determination of horizontal acceleration acting at the center of gravity (CG) of the loaded TC must be based on a peak horizontal ground acceleration at the site, but shall not exceed *that given in Technical Specification 1.1.1(3).*

Applicability: This condition applies to all TCs which are subject to horizontal accelerations of 0.40 g or greater.

Objective: To prevent overturning of a loaded TC inside the spent fuel pool building.

Action: Determine what the horizontal acceleration is for the TC.

Surveillance: Determine need for TC restraint before any operations inside the spent fuel pool building.

Bases: Calculation of overturning and restoring moments.

1.2.17 61BT DSC Vacuum Drying Duration Limit

Limit/Specifications:

Time limit for duration of Vacuum Drying is 96 hours after completion of 61BT DSC draining.

Applicability: This specification is only applicable to a 61BT DSC with greater than 17.6 kW heat load.

Objective: To ensure that 61BT DSC basket structure does not exceed 800°F.

Action:

1. If the DSC vacuum drying pressure limit of Technical Specification 1.2.2 cannot be achieved at 72 hours after completion of DSC draining, the DSC must be backfilled with 0.1 atm or greater helium pressure within 24 hours.

2. Determine the cause of failure to achieve the vacuum drying pressure limit as defined in Technical Specification 1.2.2.

3. Initiate vacuum drying after actions in Step 2 are completed or unload the DSC within 30 days.

Surveillance: No maintenance or tests are required during the normal storage. Monitoring of the time duration during the vacuum drying operation is required.

Bases: The time limit of 96 hours was selected to ensure that the temperature within the DSC is within the design limits during vacuum drying.

1.2.17a 32PT DSC Vacuum Drying Duration Limit

Limit/Specifications:

1. The limit for duration of Vacuum Drying is 31 hrs for a 32PT DSC with a heat load greater than 8.4 kW and up to 24 kW after initiation of vacuum drying.
2. The limit for duration of Vacuum Drying is 36 hrs for a 32PT DSC with a heat load of up to 8.4 kW after initiation of vacuum drying.

Applicability: This specification is applicable to a 32PT DSC with heat load as described above.

Objective: To ensure the fuel cladding temperature in the 32PT DSC does not exceed 752°F during drying and also to meet the thermal cycling limit of 117°F during drying, helium backfilling and transfer operations.

Action:

1. If the DSC vacuum drying pressure limit of Technical Specification 1.2.2 cannot be achieved at the specified time limits after initiation of vacuum drying, the DSC must be backfilled with 0.1 atm or greater helium pressure within 2 hours.
2. Determine the cause of failure to achieve the vacuum drying pressure limit as defined in Technical Specification 1.2.2.
3. Initiate vacuum drying after actions in Step 2 are completed or unload the DSC within 30 days.

Surveillance: No maintenance or tests are required during the normal storage. Monitoring of the time duration during the vacuum drying operation is required.

Bases: The time limits for the 32PT DSC were selected to ensure that the maximum cladding temperature is within the acceptable limit of 752°F during vacuum drying. These time limits also ensure that the cladding temperature meets the thermal cycling criteria of 117°F during drying, helium backfilling and transfer operations.

1.2.17b 24PHB DSC Vacuum Drying Duration Limit

Limit/Specifications:

1. The limit for duration of Vacuum Drying is 29 hrs for a 24PHB DSC with a heat load greater than 12.0 kW and up to 24 kW after initiation of vacuum drying.
2. The limit for duration of Vacuum Drying is 32 hrs for a 24PHB DSC with a heat load of up to 12.0 kW after initiation of vacuum *drying*.

Applicability: This specification is applicable to a 24PHB DSC with heat load as described above.

Objective: To ensure the fuel cladding temperature in the 24PHB DSC does not exceed 752°F during drying and also to meet the thermal cycling limit of 117°F during drying, helium backfilling and transfer operations.

Action:

1. If the DSC vacuum drying pressure limit of Technical Specification 1.2.2 cannot be achieved at the specified time limits after initiation of vacuum drying, the DSC must be backfilled with 0.1 atm or greater helium pressure within 2 hours.

2. Determine the cause of failure to achieve the vacuum drying pressure limit as defined in Technical Specification 1.2.2.

3. Initiate vacuum drying after actions in Step 2 are completed or unload the DSC within 30 days.

Surveillance: No maintenance or tests are required during the normal storage. Monitoring of the time duration during the vacuum drying operation is required.

Bases: The time limit for the 24PHB DSC were selected to ensure that the maximum cladding temperature is within the acceptable limits of 752°F during vacuum drying. These time limits also ensure that the cladding temperature meets the thermal cycling criteria of 117°F during drying, helium backfilling and transfer operations.

1.2.17c 24PTH DSC Vacuum Drying Duration Limit

Limit/Specifications:

1. If nitrogen is used for blowdown, the time duration of vacuum drying for a 24PTH DSC following blowdown completion shall be less than or equal to:

   - 17 hours for Heat Load Configuration No. 1, 2 and 3
   - 23 hours for Heat Load Configuration No. 4
   - 26 hours for Heat Load Configuration No. 5

2. No time limits apply for vacuum drying of 24PTH DSC if helium is used for blowdown.

Applicability: This specification is applicable to a 24PTH DSC with heat load configuration following blowdown using helium or nitrogen as described above.

Objective: To ensure the fuel cladding temperature in the 24PTH DSC does not exceed 752°F during drying and also to meet the thermal cycling limit of 117°F during drying, helium backfilling and transfer operations.

Action:

1. If the DSC vacuum drying pressure limit of Technical Specification 1.2.2 cannot be achieved at the specified time limits after initiation of vacuum drying, the DSC must be backfilled with 0.1 atm or greater helium pressure within 2 hours.

2. Determine the cause of failure to achieve the vacuum drying pressure limit as defined in Technical Specification 1.2.2.

3. Initiate vacuum drying after actions in Step 2 are completed or unload the DSC within 30 days.

Surveillance: No maintenance or tests are required during the normal storage. Monitoring of the time duration during the vacuum drying operation is required.

Bases: The time limit for the 24PTH DSC were selected to ensure that the maximum cladding temperature is within the acceptable limits of 752°F during vacuum drying. These time limits also ensure that the cladding temperature meets the thermal cycling criteria of 117°F during drying, helium backfilling and transfer operations.

1.2.18 Time Limit for Completion of 24PTH DSC Transfer Operation

Limit Specification:

The time limit for completion of transfer of a loaded and welded 24PTH DSC from the cask handling area to the HSM-H is as follows:

- 9.5 hours for a DSC with Heat Load Zoning Configuration 1, 2 or 3 and with basket types 1A, 1B or 1C.
- 25 hours for a DSC with a basket type 2A, 2B or 2C (without aluminum inserts).
- No time limits apply for a DSC with Heat Load Zoning Configuration 4 with a basket type 1A, 1B, or 1C (with aluminum inserts).

Applicability: This specification is only applicable to a 24PTH-S or 24PTH-L DSC when transferred in OS197FC cask. The time limit is defined as the time elapsed after the initiation of draining of Cask/DSC annulus water and bolting of the transfer cask top cover plate until it is unbolted for insertion of the DSC into the HSM-H.

Objective: To ensure that the fuel cladding temperatures in the 24PTH DSC do not exceed 752°F during transfer operations.

Actions: Initiate one of the following corrective actions within two hours if specified time limits are exceeded.

1. Complete the transfer of the DSC from the transfer cask to the HSM-H, or
2. If the transfer cask is in the cask handling area in a vertical orientation, unbolt the cask top cover plate and fill the cask/DSC annulus with clean water, or
3. If the cask is in a horizontal orientation on the transfer skid, then initiate air circulation in the Cask/DSC annulus by starting one of the blowers provided on the cask transfer skid, or
4. Initiate appropriate external cooling of the cask outer surface by other means to limit the temperature increase or return the cask to the cask handling area, unbolt the cask top cover plate and fill the cask/DSC annulus with clean water.

Surveillance: Monitoring of the time duration following the completion of the DSC sealing until the completion of unbolting of the transfer cask top plate is required.

Bases: The required time limit is based on the transient thermal analysis presented in Appendix P of the FSAR for the transfer of the 24PTH DSC.

1.2.18a Time Limit for Completion of Type 2 61BTH DSC Transfer Operation

Limit Specification:

The time limit for completion of transfer of a loaded and welded Type 2 61BTH DSC from the cask handling area to the HSM-H is as follows:

- *13 hours with a Heat Load Zoning Configuration No. 7.*
- *26 hours with Heat Load Zoning Configuration 5, 6, or 8.*
- *No time limits apply with Heat Load Zoning Configuration No. 1, 2, 3, or 4.*

Applicability: *This specification is only applicable to a Type 2 61BTH DSC when transferred in OS197FC-B Cask. The time limit is defined as the time elapsed after the initiation of draining of Cask/DSC annulus water and bolting of the transfer cask top cover plate until it is unbolted for insertion of the DSC into the HSM-H.*

Objective: *To ensure that the fuel cladding temperatures in the 61BTH DSC do not exceed 752°F during transfer operations.*

Actions: *Initiate one of the following corrective actions within two hours if specified time limits are exceeded.*

1. *Complete the transfer of the DSC from the transfer cask to the HSM-H, or*
2. *If the transfer cask is in the cask handling area in a vertical orientation, unbolt the cask top cover plate and fill the cask/DSC annulus with clean water, or*
5. *If the cask is in a horizontal orientation on the transfer skid, then initiate air circulation in the Cask/DSC annulus by starting one of the blowers provided on the cask transfer skid, or*
6. *Initiate appropriate external cooling of the cask outer surface by other means to limit the temperature increase or return the cask to the cask handling area, unbolt the cask top cover plate and fill the cask/DSC annulus with clean water.*

Surveillance: *Monitoring of the time duration following the completion of the DSC sealing until the completion of unbolting of the transfer cask top plate is required.*

Bases: *The required time limit is based on the transient thermal analysis presented in Appendix T of the FSAR for the transfer of the 61BTH DSC.*

1.2.18b Time Limit for Completion of 32PTH1 DSC Transfer Operation

Limit Specification:

The time limit for completion of transfer of a loaded and welded 32PTH1 DSC from the cask handling area to the HSM-H is as follows:

- *13 hours if the DSC is loaded with fuel assemblies arranged in Heat Load Zoning Configuration No. 1.*
- *No time limit if the DSC with Type 1 Basket is loaded with intact fuel assemblies or 38 hours if it is loaded with damaged fuel assemblies arranged in Heat Load Zoning Configuration No. 2.*
- *14 hours if the DSC with Type 2 Basket is loaded with intact fuel assemblies or 10 hours if it is loaded with damaged fuel assemblies arranged in Heat Land Zoning Configuration No. 2.*
- *No time limits apply with Heat Load Zoning Configuration No. 3.*

Applicability: *This specification is only applicable to a 32PTH1 DSC when transferred in a OS200FC Cask. The time limit is defined as the time elapsed after the initiation of draining of Cask/DSC annulus water and bolting of the transfer cask top cover plate until it is unbolted for insertion of the DSC into the HSM-H.*

Objective: *To ensure that the fuel cladding temperatures in the 32PTH1 DSC do not exceed 752°F during transfer operations.*

Actions: *Initiate one of the following corrective actions within two hours if specified time limits are exceeded.*

1. *Complete the transfer of the DSC from the transfer cask to the HSM-H, or*
2. *If the transfer cask is in the cask handling area in a vertical orientation, unbolt the cask top cover plate and fill the Cask/DSC annulus with clean water, or*
3. *If the cask is in a horizontal orientation on the transfer skid, then initiate air circulation in the Cask/DSC annulus by starting one of the blowers provided on the cask transfer skid, or*
4. *Initiate appropriate external cooling of the cask outer surface by other means to limit the temperature increase or return the cask to the cask handling area, unbolt the cask top cover plate and fill the cask/DSC annulus with clean water.*

Surveillance: *Monitoring of the time duration following the completion of the DSC sealing until the completion of unbolting of the transfer cask top plate is required.*

Bases: *The required time limit is based on the transient thermal analysis presented in Appendix U of the FSAR for the transfer of the 32PTH1 DSC.*

1.3 Surveillance and Monitoring

One of the two alternate surveillance activities listed below (1.3.1 or 1.3.2) shall be performed for monitoring the HSM or HSM-H thermal performance.

1.3.1 Visual Inspection of HSM or HSM-H Air Inlets and Outlets (Front Wall and Roof Birdscreen)

Limit/Surveillance:

A visual surveillance of the exterior of the air inlets and outlets shall be conducted daily. In addition, a close-up inspection shall be performed to ensure that no materials accumulate between the modules to block the air flow.

Objective: To ensure that HSM or HSM-H air inlets and outlets are not blocked for more than *analyzed time period* to prevent exceeding the allowable HSM or HSM-H concrete and or the fuel cladding temperatures.

Applicability: This specification is applicable to all HSMs or HSM-Hs loaded with a DSC loaded with spent fuel.

Action: If the surveillance shows blockage of air vents (inlets or outlets), they shall be cleared. If the screen is damaged, it shall be replaced.

Basis: The concrete temperature could exceed 350°F in the accident circumstances of complete blockage of all vents. Concrete temperatures over 350°F in accidents (without the presence of water or steam) can have uncertain impact on concrete strength and durability. A conservative analysis (adiabatic heat case) of complete blockage of all air inlets or outlets indicates that the concrete can reach the accident temperature limit of 350°F in the time periods specified for HSM. For HSM-H, the time period specified ensures that blockage will not exist for periods longer than that assumed in the Safety analysis presented in Appendix P, *Appendix T and Appendix U* of the FSAR. At the *analyzed time* limit, the fuel cladding temperature remains well below the accident limit of 1058°F.

1.3.2 HSM or HSM-H Thermal Performance

Surveillance: Verify a temperature measurement of the thermal performance, for each HSM or HSM-H , on a daily basis. The temperature measurement could be any parameter such as (1) a direct measurement of the HSM or HSM-H temperatures, (2) a direct measurement of the DSC temperatures, (3) a comparison of the inlet and outlet temperature difference to predicted temperature differences for each individual HSM or HSM-H, or (4) other means that would identify and allow for the correction of off-normal thermal conditions that could lead to exceeding the concrete and fuel clad temperature criteria. If air temperatures are measured, they must be measured in such a manner as to obtain representative values of inlet and outlet air temperatures. Also due to the proximity of adjacent HSM or HSM-H modules, care must be exercised to ensure that measured air temperatures reflect only the thermal performance of an individual module, and not the combined performance of adjacent modules.

Action: If the temperature measurement shows a significant unexplained difference, so as to indicate the approach of materials to the concrete or fuel clad temperature criteria, take appropriate action to determine the cause and return the canister to normal operation. If the measurement or other evidence suggests that the concrete accident temperature criteria (350°F) has been exceeded for more than 24 hours, the HSM or HSM-H must be removed from service unless the licensee can provide test results in accordance with ACI-349, appendix A.4.3, demonstrating that the structural strength of the HSM or HSM-H has an adequate margin of safety.

Basis: The temperature measurement should be of sufficient scope to provide the licensee with a positive means to identify conditions which threaten to approach temperature criteria for proper HSM or HSM-H operation and allow for the correction of off-normal thermal conditions that could lend to exceeding the concrete and fuel clad temperature criteria.

Table 1.3.1
Summary of Surveillance and Monitoring Requirements

Surveillance or Monitoring	Period	Reference Section
1. Fuel Specification	PL	1.2.1
2. DSC Vacuum Pressure During Drying	L	1.2.2
3. DSC Helium Backfill Pressure	L	1.2.3 or 1.2.3a
4. DSC Helium Leak Rate of Inner Seal Weld	L	1.2.4 or 1.2.4a
5. DSC Dye Penetrant Test of Closure Welds	L	1.2.5
6. DELETED	-	-
7. HSM or HSM-H Dose Rates	L	1.2.7 or 1.2.7a, or 1.2.7b or 1.2.7c or 1.2.7d *or 1.2.7e or 1.2.7f or 1.2.7g*
8. HSM or HSM-H Maximum Air Exit Temperature	24 hrs	1.2.8 or 1.2.8a *or 1.2.8b or 1.2.8c*
9. TC Alignment with HSM or HSM-H	S	1.2.9
10. DSC Handling Height Outside Spent Fuel Pool Building	AN	1.2.10
11. Transfer Cask Dose Rates	L	1.2.11 or 1.2.11a or 1.2.11b or 1.2.11c *or 1.2.11d or 1.2.11e*
12. Maximum DSC Removable Surface Contamination	L	1.2.12
13. TC/DSC Lifting Heights as a Function of Low Temperature and Location	L	1.2.13
14. TC/DSC Transfer Operations at High Ambient Temperatures	L	1.2.14 *or 1.2.14a*
15. Boron Concentration in DSC Cavity Water	PL	1.2.15, or 1.2.15a, or 1.2.15b or 1.2.15c *or 1.2.15d*
16. Provision of TC Seismic Restraint Inside the Spent Fuel Pool Building as a Function of Horizontal Acceleration and Loaded Cask Weight	PL	1.2.16
17. Vacuum Drying Duration Limits	L	1.2.17 or 1.2.17a, or 1.2.17b, or 1.2.17c
18. 24PTH DSC Transfer Time	L	1.2.18
19. Type 2 61BTH DSC Transfer Time	*L*	*1.2.18a*
20. 32PTH1 DSC Transfer Time	*L*	*1.2.18b*
21. Visual Inspection of HSM or HSM-H Air Inlets and Outlets OR HSM OR HSM-H Thermal Performance	D	1.3.1 or 1.3.2

LEGEND
PL............. Prior to Loading
L................ During loading and prior to movement to HSM or HSM-H pad
24 hrs......... Time following DSC insertion to HSM or HSM-H
S .... Prior to movement of DSC to or from HSM or HSM-H
AN............. As necessary
D............... Daily (24 hour frequency)

References

1. Levy, I.S., et al., "Recommended Temperature Limits for Dry Storage of Spent Light Water Reactor Zircaloy-Clad Fuel Rods in Inert Gas," Pacific Northwest Laboratory Report, PNL-6189, May 1987.

2. Johnson, A.B., Jr., and E.R. Gilbert, "Technical Basis for Storage of Zircaloy-Clad Spent Fuel in Inert Gases," PNL-4835, September 1983.

3. Interim Staff Guidance No. 11, Revision 2, "Cladding Considerations for the Transportation and Storage of Spent Fuel," July 30, 2002.

4. Interim Staff Guidance No. 11, Revision 3, "Cladding Considerations for the Transportation and Storage of Spent Fuel," November 17, 2003.

The NUHOMS®-24PTH system adds a new canister with three alternate configurations (designated as DSC Type 24PTH-S, -24PTH-L, or -24PTH-S-LC), a new module designated as HSM-H, and a modified version of OS197/OS197H transfer cask designated as OS197FC/OS197H FC.

A detailed description of the 24PTH system, including drawings, authorized payload contents and supporting safety analyses for this system are provided in Appendix P of this UFSAR.

Amendment 8 to CoC also authorized storage of low enrichment and reconstituted fuel in the 32PT DSC. In addition, the authorized contents of the 24PHB DSC were revised to include additional fuel types. A detailed description of the changes implemented to the 32PT and 24PHB DSCs are provided in Appendices M and N, respectively.

TN has added an alternate HSM, designated as HSM Model 152, to the standardized NUHOMS® system. This alternate HSM design provides enhanced shielding features while meeting the heat rejection requirements. A detailed description of the HSM Model 152 and supporting analyses are provided in Appendix R.

Amendment No. 9 to CoC 1004 adds FANP9 fuel to the contents of the 61BT DSC.

Amendment No. 10 to CoC 1004 adds 61BTH system to the Standardized NUHOMS® system. The NUHOMS® 61BTH DSC is designed to store a total of 61 intact (or up to 16 damaged and balance intact) BWR fuel assemblies with a maximum assembly average initial enrichment of 5.0 wt. % U-235, a maximum assembly average burnup of 62 GWd/MTU, and a minimum cooling time of 3.0 years. Eight heat load zoning configurations are authorized and the system is designed to accommodate a decay heat load of up to 31.2 kW per DSC depending upon the specific configuration selected. A detailed description of the 61BTH system, including drawings, authorized payload contents and supporting safety analyses are provided in Appendix T of this UFSAR.

Amendment No. 10 to CoC 1004 also adds the NUHOMS® 32PTH1 system to the standardized NUHOMS® system. The NUHOMS® 3PTH1 DSC is designed to store a total of 32 intact or up to 16 damaged and balance intact) PWR fuel assemblies with a maximum assembly average initial enrichment of 5.0 wt. % U-235, a maximum assembly average burnup of 62 GWd/MTU, and a minimum cooling time of 3.0 years. Three heat load zoning configurations are authorized and the system is designed to accommodate a decay heat load of up to 40.8 kW per DSC depending upon the specific configuration selected. A detailed description of the 32PTH1 DSC, including drawings, authorized payload contents and supporting safety analyses are provided in Appendix U of this UFSAR.

Amendment No. 10 to CoC also expands the storage of Control Components in the 32PT DSC and storage of WE 15x15 Partial Length Shield Assemblies in the 24PTH DSC. Details of the changes implemented to the 32PT and 24PTH DSCs are provided in Appendices M and P, respectively.

Chapters 1 though 8 and Appendices A through H of this FSAR provide the supporting licensing basis for the Standardized NUHOMS®-24P and -52B systems only.

A complete description of the new systems addressed by the above listed amendments, including supporting safety analysis, is located within self-contained Appendices to this FSAR as summarized in the following table:

Amendment No.	Description	Location of Supporting Licensing Basis
3	Addition of the NUHOMS®-61BT DSC to the contents of the Standardized NUHOMS® system	Appendix K
N/A	Addition of the NUHOMS®-24PT2 DSC to the contents of the Standardized NUHOMS® system	Appendix L
4	Addition of low burnup fuel to the contents of the NUHOMS®-24P DSC	Chapter 3
5	Addition of the NUHOMS®-32PT DSC to the Standardized NUHOMS® system	Appendix M
6	Addition of the NUHOMS®-24PHB DSC to the Standardized NUHOMS® system	Appendix N
7	Addition of damaged fuel to the contents of the NUHOMS®-61BT DSC	Appendix K
8	(a) Addition of the NUHOMS® 24PTH system to the Standardized NUHOMS® system	Appendix P
	(b) Revision of the authorized contents of the 32PT DSC to include low enrichment and reconstituted fuel	Appendix M
	(c) Revision of the authorized contents of the 24PHB DSC to include additional fuel types	Appendix N
N/A	Addition of an alternate version of the HSM, designated as HSM Model 152, to the Standardized NUHOMS® system	Appendix R
9	*Addition of FANP9 fuel to the contents of the 61BT DSC*	*Appendix K*
10	*Addition of Control Components to the contents of the 32PT DSC*	*Appendix M*
	Addition of WE 15x15 Partial Length Shield Assemblies to the contents of the 24PTH DSC	*Appendix P*
	Addition of 61BTH system to the Standardized NUHOMS® system	*Appendix T*
	Addition of 32PTH1 system to the Standardized NUHOMS® system	*Appendix U*

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M.1.1 Introduction

The NUHOMS® System provides a modular canister based spent fuel storage and transport system. The system includes DSCs, HSMs, and the TC.

This Appendix M provides the supporting safety analysis for the addition of the 32PT DSC system. Only those features that are being revised or added to the NUHOMS® System are addressed and evaluated in this Appendix. The HSM and TC designs remain unchanged. The NUHOMS®-32PT DSC is similar to the existing 24P DSCs with the following exceptions:

- The basket has a capability to store 32, rather than 24, Pressurized Water Reactor (PWR) fuel assemblies.
- The canister shell thickness is reduced from 0.625 inches to 0.5 inches.
- The canister has been upgraded to provide a leak tight confinement.
- The basket represents a new design.
- The canister shell length and the thickness of the top and bottom end closure assemblies have been modified to accommodate the new basket design and the revised payload.

The NUHOMS®-32PT DSC system is designed to store intact standard PWR fuel assemblies with or without Control Components (CCs). The NUHOMS®-32PT DSC system is designed for a maximum heat load of 24 kW/canister and a maximum of 1.2 kW/assembly when heat load zoning is considered. The fuel which may be stored in the NUHOMS®-32PT DSC is presented in Section M.2.

M.1.2 General Description of the NUHOMS®-32PT DSC

M.1.2.1 NUHOMS®-32PT DSC Characteristics

Each NUHOMS®-32PT DSC consists of a fuel basket and a canister body (shell, canister inner bottom and top cover plates and shield plugs). A sketch of the 32PT DSC components is shown in Figure M.1-1. A set of reference drawings is presented in Section M.1.5.

As shown in Table M.1-1, the 32PT DSC system consists of four design configurations or Types as follows:

- 32PT-S100, Short Canister (186.2 inch length)
- 32PT-L100, Long Canister (192.2 inch length)
- 32PT-S125, Short Canister (186.2 inch length)
- 32PT-L125, Long Canister (192.2 inch length)

These four design configurations allow flexibility to accommodate the payload fuel types described in Section M.2, with and without CCs. Dimensions and estimated weights of the NUHOMS®-32PT DSC are shown in Table M.1-1.

The thickness for the individual plate components of the top and bottom end cover plates has been increased to accommodate the higher internal pressure, while the top and bottom end shield plug thickness has been reduced relative to the 24P DSC configuration. The NUHOMS®-32PT DSC shell thickness is 0.50 inches instead of 0.625 inches as used for the NUHOMS®-24P or – 52B DSC designs. The materials used to fabricate the DSC are shown in the Parts List on Drawings NUH-32PT-1001-SAR, -1002-SAR, -1003-SAR, -1004-SAR, and -1006-SAR.

The confinement vessel for the NUHOMS®-32PT DSC consists of a shell which is a welded stainless steel cylinder with an integrally-welded, stainless steel bottom closure assembly; and a stainless steel top closure assembly, which includes the vent and drain system.

There are no penetrations through the confinement vessel. The draining and venting systems are covered by the seal welded outer top closure plate and vent and siphon port plugs. To preclude air in-leakage, the canister cavity is inerted and pressurized above atmospheric pressure with helium. The NUHOMS®-32PT DSCs are designed and tested to meet the leak tight criteria of ANSI N14.5-1997.

The basket structure consists of a grid assembly of welded stainless steel plates or tubes that make up a grid of 32 fuel compartments. Each fuel compartment accommodates aluminum and/or neutron absorbing plates (which are made of either borated aluminum or metal matrix composites such as Boralyn®, Metamic® or equivalent) that provide the necessary criticality control and heat conduction paths from the fuel assemblies to the canister shell. The space between the fuel compartment grid assembly and the perimeter of the DSC shell is bridged by transition rail structures. The transition rails are solid aluminum segments that support the fuel compartment grid assembly and transfer mechanical loads to the DSC shell. They also provide the thermal conduction path from the basket assembly to the canister shell wall, making it efficient in rejecting heat from its payload. This method of construction forms a robust structure of compartment assemblies which provides for storage of 32 fuel assemblies. The nominal clear dimension of each fuel compartment opening is 8.7 in. x 8.7 in., which provides clearance around the fuel assemblies.

During dry storage of the spent fuel in the NUHOMS®-32PT system, no active systems are required for the removal and dissipation of the decay heat from the fuel. The NUHOMS®-32PT DSC is designed to transfer the decay heat from the fuel to the basket, from the basket to the canister body and ultimately to the ambient via the HSM or TC.

Each canister is identified by a Mark Number as follows: WWW32PT-XXX-YYY-ZZZ, where: XXX is the canister type designation (S100/L100/S125/L125), YYY is the basket type designation , while WWW and ZZZ are designated by TN. Each canister is also marked with the patent number. The basket type designation, YYY, consists of a letter (A, B, C, D to designate 0, 4, 8 or 16 PRAs) and 2 numerals (16, 20 or 24 to designate the configuration of poison plates).

M.1.2.2 Operational Features

M.1.2.2.1 General Features

The NUHOMS®-32PT DSCs are designed to safely store 32 intact standard PWR fuel assemblies with or without CCs. The NUHOMS®-32PT DSC is designed to maintain the fuel cladding temperature below allowable limits during storage, short-term accident conditions, short-term off-normal conditions and fuel transfer operations.

The criticality control features of the NUHOMS®-32PT DSC are designed to maintain the neutron multiplication factor k-effective less than the upper subcritical limit equal to 0.95 minus benchmarking bias and modeling bias under all conditions.

M.1.2.2.2 Sequence of Operations

The sequence of operations to be performed in loading fuel into the NUHOMS®-32PT DSCs is presented in Chapter M.8.

M.1.2.2.3 Identification of Subjects for Safety and Reliability Analysis

M.1.2.2.3.1 Criticality Prevention

Criticality is controlled by geometry, soluble boron in spent fuel pool and by utilizing fixed neutron poison material in the fuel basket. If required, depending on fuel assembly design and initial enrichment, Poison Rod Assemblies (PRAs), as shown in Figure M.1-2 are also used for criticality control. The 32PT basket may contain 0, 4, 8 or 16 PRAs and is called a Type A, Type B, Type C, or Type D, respectively. These features are only necessary during the loading and unloading operations that occur in the loading pool (underwater). However, the PRAs are left in place following the completion of the DSC draining and drying operations which are discussed in M.8.1.3. During storage, with the DSC cavity dry and sealed from the environment, criticality control measures within the installation are not necessary because of the low reactivity of the fuel in the dry NUHOMS®-32PT DSC and the assurance that no water can enter the DSC cavity during storage.

M.1.2.2.3.2 Chemical Safety

There are no chemical safety hazards associated with operations of the NUHOMS®-32PT system.

M.1.2.2.3.3 Operation Shutdown Modes

The NUHOMS®-32PT DSC system is a totally passive system so that consideration of operation shutdown modes is unnecessary.

M.1.2.2.3.4 Instrumentation

No change.

M.1.2.2.3.5 Maintenance Techniques

No change.

M.1.2.3 Cask Contents

The NUHOMS®-32PT DSC system is designed to store 32 intact standard PWR fuel assemblies with or without CCs. Each NUHOMS®-32PT DSC is designed for a maximum heat load of 24 kW/canister and 1.2 kW/assembly if zoning for heat load is used. The fuel that may be stored in the NUHOMS®-32PT DSC is presented in Chapter M.2.

Chapter M.5 provides the shielding analysis. Chapter M.6 covers the criticality safety of the NUHOMS®-32PT DSC system and its contents, listing material densities, moderator ratios, and geometric configurations.

M.2.1 Spent Fuel To Be Stored

There are four design configurations for the NUHOMS®-32PT DSC, two "short" canister configurations (the 32PT-S100 and 32PT-S125), and two "long" canister configurations (the 32PT-L100 and 32PT-L125). The main difference between the –S100/-L100 and –S125/-L125 configuration designs are the thicknesses of shield plugs and DSC cover plates. The basket layout for these two configurations is identical except for the length of the components. Each of the DSC configurations is designed to store 32 intact standard PWR fuel assemblies. The 32PT-L100 and 32PT-L125 are also designed to store 32 intact standard PWR fuel assemblies with or without CCs. The NUHOMS®-32PT DSCs can store intact PWR fuel assemblies and CCs with the characteristics described in Table M.2-1. The CCs include Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), Control rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs), and Neutron Sources. The NUHOMS®-32PT DSC may store PWR fuel assemblies arranged in any of three alternate heat zoning configurations with a maximum decay heat of 1.2 kW per assembly and a maximum heat load of 24 kW per canister. The heat load zoning configurations are shown in Figure M.2-1 through Figure M.2-3. The NUHOMS®-32PT DSC is inerted and backfilled with helium at the time of loading. The maximum fuel assembly weight with a CC is 1682 lbs. which is the same as the NUHOMS®-24P DSC design.

The maximum fuel cladding temperature limit of 400°C (752°F) is applicable to normal conditions of storage and all short term operations from spent fuel pool to ISFSI pad including vacuum drying and helium backfilling of the NUHOMS®-32PT DSC per Interim Staff Guidance (ISG) No. 11, Revision 2 [2.7]. In addition, ISG-11 does not permit thermal cycling of the fuel cladding with temperature differences greater than 65°C (117°F) during DSC drying, backfilling and transfer operations.

The maximum fuel cladding temperature limit of 570°C (1058°F) is applicable to accidents or off-normal thermal transients [2.7].

Calculations were performed to determine the fuel assembly type which was most limiting for each of the analyses including shielding, criticality, heat load and confinement. These evaluations are performed in Chapter M.5, M.6, M.4 and M.7. The fuel assembly types considered are listed in Table M-2-2 It was determined that the B&W 15x15 is the enveloping fuel design for the shielding source term calculation because of its total assembly weight and highest initial heavy metal loading. For criticality safety, the B&W 15x15 assembly is the most reactive assembly type for a given enrichment. This assembly is used to determine the most reactive configuration in the DSC. Using this most reactive configuration, criticality analysis for all other fuel assembly classes is performed to determine the maximum enrichment allowed as a function of number of Poison Rod Assemblies (PRAs). For thermal analysis, the WE 14x14 fuel assembly is limiting, since it results in the lowest fuel conductivity. The confinement analyses is based on B&W 15x15 fuel assembly, since it results in the smaller free volume inside the DSC cavity more than a 14x14 fuel assembly.

All four NUHOMS®-32PT DSC design configurations have the same minimum boron content for the poison neutron plates. The minimum boron-10 content for the poison plates is 0.0070

g/cm^2. The criticality analysis is based on 90% credit or 0.0063 g/cm^2 of B10. The use of 90% credit is allowed because poison material coupons are to be tested via neutron transmission plus statistical analysis of the neutron transmission results. A basket may contain 0, 4, 8, or 16 PRAs and is designated a Type A, Type B, Type C or Type D basket, respectively.

Reconstituted fuel assemblies with up to 56 solid stainless steel rods or unlimited number of lower enrichment UO_2 rods that replace fuel rods are acceptable for the 32PT DSC payload. CE 15x15 fuel assemblies with plugging clusters have also been evaluated.

Through this chapter BPRAs are considered as being representative of all CCs, unless specifically excluded.

For calculating the maximum internal pressure in the NUHOMS®-32PT DSC, it is assumed that 1% of the fuel rods are damaged for normal conditions, up to 10% of the fuel rods are damaged for off normal conditions, and 100% of the fuel rods will be damaged following a design basis accident event. A minimum of 100% of the fill gas and 30% of the fission gases (e.g., H-3, Kr and Xe) within the ruptured fuel rods are assumed to be available for release into the DSC cavity, consistent with NUREG-1536 [2.1].

The maximum design basis internal pressures for the NUHOMS®-32PT DSC are 15, 20 and 105 psig for normal, off-normal and accident conditions of storage, respectively.

M.2.1.1 General Operating Functions

No change.

Table M.2-1
Intact PWR Fuel Assembly Characteristics

PHYSICAL PARAMETERS:	
Fuel Class	Only intact (including reconstituted) B&W 15x15, WE 17x17, CE 15x15, WE 15x15, CE 14x14 and WE 14x14 class PWR assemblies or equivalent reload fuel manufactured by other vendors that are enveloped by the fuel assembly design characteristics listed in Table M.2-2.
Reconstituted Fuel Assemblies	≤ 32 assemblies per DSC with up to 56 stainless steel rods per assembly or unlimited number of lower enrichment UO_2 rods per assembly.
Fuel Cladding Material	Zircaloy
Fuel Damage	Cladding damage in excess of pinhole leaks or hairline cracks is not authorized to be stored as "Intact PWR Fuel."
Control Components (CCs)	• Up to 32 CCs are authorized for storage in 32PT DSC. • Authorized CCs include Burnable poison Rod Assemblies (BPRAs), Thimble Plug Assemblies, (TPAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Sources, Neutron Source Assemblies (NSAs), and Neutron Sources • Design basis thermal and radiological characteristics for the CCs are listed in Table M.2-2a.
Maximum Assembly plus CC Weight	-1365 lbs for 32PT-S100 & 32PT-L100 DSC System -1682 lbs for 32PT-S125 & 32PT-L125 DSC System
CC Damage	CCs with cladding failures are acceptable for loading.
THERMAL/RADIOLOGICAL PARAMETERS:	
Fuel Burnup and Cooling Time without CCs[1]	Per Table M.2-5, Table M.2-6, Table M.2-7, Table M.2-8, Table M.2-9; and Figure M.2-1 or Figure M.2-2 or Figure M.2-3.
Fuel Burnup and Cooling Time with CCs[1]	Per Table M.2-10, Table M.2-11, Table M.2-12, Table M.2-13, Table M.2-14; and Figure M.2-1 or Figure M.2-2 or Figure M.2-3.
Initial Enrichment	Table M.2-3; and Figure M.2-4 or Figure M.2-5 or Figure M.2-6, as applicable.

1 BPRAs are considered as being representative of all CCs.

Table M.2-2
PWR Fuel Assembly Design Characteristics

Assembly Class	B&W 15x15	WE 17x17	CE 15x15[3], [4]	WE 15x15	CE 14x14	WE 14x14
DSC Configuration	**Max Unirradiated Length (in)**					
32PT-S100/32PT-S125	165.75[1]	165.75[1]	165.75	165.75[1]	165.75[1]	165.75[1]
32PT-L100/32PT-L125	171.71[1]	171.71[1]	171.71	171.71[1]	171.71[1]	171.71[1]
Fissile Material	UO_2	UO2	UO_2	UO_2	UO_2	UO_2
Maximum MTU/assembly[2]	0.475	0.475	0.475	0.475	0.475	0.475
Maximum Number of Fuel Rods	208	264	216	204	176	179
Maximum Number of Guide/ Instrument Tubes	17	25	9	21	5	17

(1) Maximum Assembly + CC Length (unirradiated)
(2) The maximum MTU/assembly is based on the shielding analysis. The listed value is higher than the actual.
(3) CE 15x15 assemblies with stainless steel plugging clusters installed are acceptable.
(4) Control Components are not authorized for storage with CE 15x15 class assemblies.

Table M2-2a
Thermal and Radiological Characteristics for Control Components Stored in the NUHOMS®-32PT and NUHOMS®-32PTH1 DSCs

Parameter	BPRAs, NSAs, CRAs, RCCAs, VSIs, Neutron Sources, and APSRAs	TPAs and ORAs
Maximum Gamma Source (γ/sec/DSC)	1.25E+15	1.3E+14
Decay Heat (Watts/DSC)	256.0	256.0

Table M.2-3
Initial Enrichment and Number of PRAs and Minimum Soluble Boron Loading (NUHOMS® -32PT DSC)

Assembly Class	Soluble Boron Loading (ppm)	No PRAs (Type A)			4 PRAs (Type B)		8 PRAs (Type C)		16 PRAs (Type D)	
		Poison Plate Configuration			Poison Plate Configuration		Poison Plate Configuration		Poison Plate Configuration	
		16	20	24	20	24	20	24	20	24
WE 17x17 Fuel Assembly(1)	2500	3.40	3.40	3.40	4.00	4.00	4.50	4.50	5.00	5.00
B&W 15x15 Mark B Fuel Assembly(1)	2500	3.30	3.30	3.30	3.90	3.90	NE	NE	5.00	5.00
WE 15x15 Fuel Assembly (without CC)	2500	3.40	3.40	3.40	4.00	4.00	4.60	4.60	5.00	5.00
WE 15x15 Fuel Assembly (with CC)	2500	3.40	3.35	3.40	4.00	4.00	4.55	4.55	5.00	5.00
CE 14x14 Fuel Assembly (without CC)	1800	3.35	NE	3.50	NE	4.00	NE	4.35	NE	NE
	2000	3.50	NE	3.70	NE	4.20	NE	4.55	NE	NE
	2100	3.60	NE	3.80	NE	4.30	NE	4.70	NE	NE
	2200	3.70	NE	3.90	NE	4.40	NE	4.80	NE	NE
	2300	3.75	NE	4.00	NE	4.50	NE	4.90	NE	NE
	2400	3.80	NE	4.05	NE	4.60	NE	5.00	NE	NE
	2500	3.90	3.80	4.15	4.60	4.70	--	--	NE	NE
CE 14x14 Fuel Assembly (with CC)	1800	3.30	NE	3.45	NE	3.90	NE	4.25	NE	NE
	2000	3.45	NE	3.65	NE	4.10	NE	4.50	NE	NE
	2100	3.55	NE	3.75	NE	4.20	NE	4.60	NE	NE
	2200	3.60	NE	3.80	NE	4.30	NE	4.70	NE	NE
	2300	3.65	NE	3.90	NE	4.40	NE	4.80	NE	NE
	2400	3.80	NE	4.00	NE	4.50	NE	4.90	NE	NE
	2500	3.90	3.70	4.05	4.45	4.60	4.95	5.00	NE	NE
WE 14x14 Fuel Assembly (with and without CC)	1800	3.55	NE	3.75	NE	4.40	NE	NE	NE	NE
	2000	3.75	NE	3.90	NE	4.60	NE	NE	NE	NE
	2100	3.80	NE	4.00	NE	4.75	NE	NE	NE	NE
	2200	3.90	NE	4.10	NE	4.85	NE	NE	NE	NE
	2300	4.00	NE	4.20	NE	5.00	NE	NE	NE	NE
	2400	4.10	NE	4.30	NE	--	NE	NE	NE	NE
	2500	4.15	4.00	4.40	5.00	--	NE	NE	NE	NE
CE 15x15 Fuel Assembly	1800	3.00	NE	3.15	NE	NE	NE	NE	NE	NE
	2000	3.15	NE	3.30	NE	NE	NE	NE	NE	NE
	2100	3.20	NE	3.40	NE	NE	NE	NE	NE	NE
	2200	3.30	NE	3.50	NE	NE	NE	NE	NE	NE
	2300	3.35	NE	3.55	NE	NE	NE	NE	NE	NE
	2400	3.40	NE	3.60	NE	NE	NE	NE	NE	NE
	2500	3.50	3.40	3.70	NE	NE	NE	NE	NE	NE

NOTES:
(1) With or without CCs. CCs shall not be stored in basket location where a PRA is required.
NE = Not Evaluated

Table M.2-19
Additional Design Criteria for NUHOMS®-32PT DSC

The Gross Weight (rounded) of the NUHOMS®-32PT DSC:

32PT-S100	88,200 [1] lbs. / 98,300 [2] lbs.
32PT-S125	90,300 [1] lbs. / 100,400[2] lbs.
32PT-L100	89,200 [1] lbs. / 99,300 [2] lbs.
32PT-L125	91,300 [1] lbs./ 101,400 [2] lbs.
Payload Capacity:	up to 32 intact PWR assemblies (acceptable assemblies listed in Table M.2-2) and up to 32 CCs
Spent Fuel Characteristics:	See Table M.2-1 through Table M.2-3.

(1) Based on fuel weight of 1365 lbs. per assembly.
(2) Based on fuel weight of 1682 lbs. per assembly.

M.5 Shielding Evaluation

The radiation shielding evaluation for the Standardized NUHOMS® System (during loading, transfer and storage) for the 24P and 52B canisters is discussed in Sections 3.3.5, 7.0 and 8.0. The following radiation shielding evaluation specifically addresses the dose rates due to design-basis PWR fuel and Control Components (CCs) loaded in a NUHOMS®-32PT DSC. The shielding analysis is carried out for the four DSC configurations of the NUHOMS®-32PT system described in Section M.2.1. The basket layout for these configurations is identical except for the length of the DSC components. For shielding purposes, the only difference between the 32PT-S100/32PT-L100 and 32PT-S125/32PT-L125 versions is the thickness of the shield plug designs. The 32PT-S100/32PT-L100 versions have somewhat thinner shield plugs than the 32PT-S125/32PT-L125 versions. Each of the configurations is designed to store up to 32 intact standard PWR fuel assemblies. The 32PT-L100 and 32PT-L125 are also designed to store up to 32 intact standard PWR fuel assemblies with or without BPRAs. Therefore, for shielding purposes, the two long-cavity versions bound the short-cavity versions because of the additional gamma source due to the CCs, such as Burnable Poison Rod Assemblies (BPRAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Thimble Plug Assemblies (TPAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs) Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs) and Neutron Sources. Therefore, the shielding evaluation presented herein is performed only for the 32PT-L100 and 32PT-L125 with fuel plus BPRAs. To assure that this evaluation is conservative, the fuel source terms are not adjusted to account for the additional decay required to accommodate the CCs.

The design-basis PWR fuel source terms are derived from the bounding fuel, B&W 15x15 Mark B assembly design as described in Section M.5.2

The NUHOMS®-32PT DSCs can store intact (including reconstituted) PWR fuel assemblies and BPRAs with the characteristics described in Table M.2-1. The NUHOMS®-32PT DSC may store PWR fuel assemblies arranged in any of three alternate heat zoning configurations with a maximum decay heat of 1.2 kW per assembly and a maximum heat load of 24 kW per canister. The heat load configurations are shown in Figure M.2-1, Figure M.2-2 and Figure M.2-3. Note that while the B&W, CE, and Westinghouse fuel designs are specifically listed, storing reload fuel designed by other manufacturers is also allowed provided an analysis is performed to demonstrate that the limiting features listed in Table M.2-1 bound the specific manufacturers replacement fuel. The limiting features are burnup, initial enrichment, cooling time, fissile material type, number of fuel rods, number of guide tube/instrument tube holes, cobalt impurities in the hardware and initial heavy metal.

The design-basis fuel source terms for this evaluation are defined as the source terms from fuel with the burnup/initial enrichment/cooling time combination given in Table M.2-5 through Table M.2-9 (without CCs) and located in the basket as shown in Figure M.2-1, Figure M.2-2 or Figure M.2-3, that gives the maximum dose rate on the surface of the HSM and/or OS197/OS197H Transfer Cask (TC). This approach is consistent with the method used to generate the fuel qualification tables for the Standardized NUHOMS®-24P and -52B canister designs as described in Section 7.2.3.

The Heat Load Zoning Configuration 2 (Figure M.2-2) is the configuration that produces the highest dose rates on the surfaces of the HSM and TCs. These bounding gamma and neutron source terms are then used in the radiation shielding models to conservatively calculate dose rates on and around the NUHOMS®-32PT system. In order to model Heat Load Zoning Configuration 2, all sixteen assemblies in the outer ring of the DSC are modeled with source terms consistent with 1.2 kW. Therefore, the source terms result in fairly conservative dose rates because the shielding analysis is based on a 28.8 kW heat load compared to the 24 kW heat load limit.

The bounding burnup, minimum initial enrichment and cooling time combinations used in this analysis are as follows:

- 30 GWd/MTU, 2.5 wt. % U-235, 8-year cooled – Inner sixteen assemblies in the HSM models,
- 41 GWd/MTU, 3.1 wt. % U-235, 5-year cooled – Outer sixteen assemblies in the HSM and TC models, and
- 45 GWd/MTU, 3.3 wt. % U-235, 23-year cooled - Inner sixteen assemblies in the TC models.

The design-basis source terms for the authorized CCs are taken from Appendix J. The design-basis source terms are based on three bounding CC designs: (1) B&W 15x15 Burnable Absorber Assemblies with up to 2 cycles burnup and 5-year cooled, (2) WE 17x17 Pyrex Burnable Absorber, 2-24 Rodlets with up to 2 cycles burnup and 10-year cooled, and (3) WE 17x17 WABA Burnable Absorber, 3-24 Rodlets with up to 2 cycles burnup and 10-year cooled. The properties used in Appendix J to calculate the design-basis source terms are reproduced in Table M.5-2.

The design basis CC source term that envelops all CCs allowed in the 32PT DSCs is taken from Appendix J for BPRAs with burnups up to 36 GWd/MTU. While Appendix J was developed to specifically address the additional source from a BPRA, this source term is selected as the bounding source term for all CCs. The TPAs and ORAs do not extend into the active fuel region of a fuel assembly. Therefore, they are limited to the source term equivalent to the top plus plenum region source term of a BPRA. However, tube conservative, the full total source term of BPRA is used in the shielding analysis to bound all CCs. The source term energy distribution is shown in Table M.5-12. Any CC to be stored in a 32PT DSC must be bounded by this source term.

Reconstituted fuel assembly is an intact fuel assembly in which one or more enriched fuel rods have been replaced with either stainless steel rods or zircaloy clad rods with depleted, natural or lower than original enriched uranium dioxide as fuel material referred to as "lower enrichment UO_2 rods" in this section.

The replacement rod is of similar outside dimensions as the original fuel rod, displacing the same amount of water in the fuel matrix. The lower enrichment UO_2 rods are of similar design and behavior as the standard fuel rods aside from the uranium enrichment.

Reconstituted fuel assemblies with up to 56 solid stainless steel rods or unlimited number of lower enrichment UO_2 rods that replace fuel rods are also acceptable for the 32PT DSC payload.

The reconstituted rods may be placed at any location in the fuel assembly and the reconstituted assemblies may be placed anywhere in the basket. The cooling time required for reconstituted fuel assembly is increased consistent with the fuel qualification Table M.2-5 through Table M.2-9.

CE 15x15 fuel assemblies with plugging clusters having a nominal mass of 2.3 kg 304L stainless steel (including 0.1 kg Inconel x-750) are evaluated. The material weights in the top, plenum and the incore region (including the weight of the heavy metals) used for the design basis source term calculation bound the CE 15x15 fuel assembly with plugging clusters.

The methodology, assumptions, and criteria used in this evaluation are summarized in the following subsections.

M.5.1 Discussion and Results

The maximum dose rates due to 32 design-basis PWR fuel assemblies with BPRAs in the NUHOMS®-32PT DSC loaded into the Standardized NUHOMS®-HSM are summarized in Table M.5-3 for both the 32PT-S100/32PT-L100 and 32PT-S125/32PT-L125 design configurations. Table M.5-4 provides maximum and surface average dose rates on the HSM loaded with the NUHOMS®-32PT DSC for both the 32PT-S100/32PT-L100 and 32PT-S125/32PT-L125 design configurations. Table M.5-5 provides a summary of the dose rates on and around the TC for canister transfer for 32PT-S100/32PT-L100 and 32PT-S125/32PT-L125 configurations. The dose rates in these tables are for the bounding Configuration 2.

A basket with two alternate poison plate configurations is also considered. One is a 16 poison plate and the second is a 24 poison plate configuration. Since the total weight of the material in the basket is the same as the original poison plate configuration, the results calculated here are also applicable to baskets with these alternate poison plate configurations.

A discussion of the method used to determine the design-basis fuel and CC source terms is included in Section M.5.2. The model specification and shielding material densities are given in Section M.5.3. The method used to determine the dose rates due to 32 design-basis fuel assemblies with CCs in the NUHOMS®-32PT DSC design configurations is provided in Section M.5.4. Thermal and radiological source terms are calculated with the SAS2H/ORIGEN-S modules of SCALE 4.4 [5.1] for the fuel. The shielding evaluation is performed with the DORT [5.2] code with the CASK-81 cross section library [5.3]. Sample input files used for calculating neutron and gamma source terms and dose rates are included in Section M.5.5.1.

M.5.2 Source Specification

Thermal and radiological source terms are calculated with the SAS2H/ORIGEN-S modules of SCALE 4.4 [5.1] for the fuel. The SAS2H/ORIGEN-S results are used to develop the fuel qualification tables listed in Table M.2-5 through Table M.2-14 and the design-basis fuel source terms suitable for use in the shielding calculations. The thermal and radiological source terms for the CCs are taken from Appendix J.

The B&W 15x15 assembly is the bounding fuel assembly design for shielding purposes because it has the highest initial heavy metal loading as compared to the 14x14, other 15x15, and 17x17 fuel assemblies which are also authorized contents of the NUHOMS®-32PT DSC. In addition, the maximum Co59 content of the hardware regions for each assembly type is less than that of the B&W 15x15 Mark B fuel assembly. The neutron flux during reactor operation is peaked in the in-core region of the fuel assembly and drops off rapidly outside the in-core region. Much of the fuel assembly hardware is outside of the in-core region of the fuel assembly. To account for this reduction in neutron flux, the fuel assembly is divided into four exposure "regions." The four axial regions used in the source term calculation are: the bottom (nozzle) region, the in-core region, the (gas) plenum region, and the top (nozzle) region. The B&W 15x15 fuel assembly masses for each irradiation region are listed in Table M.5-6. The light elements that make up the various materials for the various fuel assembly materials are taken from reference [5.4] and are listed in Table M.5-7. The design-basis heavy metal weight is 0.475 MTU. These masses are irradiated in the appropriate fuel assembly region in the SAS2H/ORIGEN-S models. To account for the reduction in neutron flux outside the In-Core regions neutron flux (fluence) correction factors are applied to light element composition for each region. The neutron flux correction factors are given in Table M.5-8.

The original fuel qualification tables are generated based on the decay heat limits for the various heat load zoning configurations shown in Figure M.2-1, Figure M.2-2 and Figure M.2-3. SAS2H is used to calculate the minimum required cooling time as a function of assembly initial enrichment and burnup for each decay heat limit. The total decay heat includes the contribution from the fuel as well as the hardware in the entire assembly. The fuel qualification table for fuel plus CCs also includes 8 watts per CC to account for the design-basis decay heat from the CCs. Because the decay heat generally increases slightly with decreasing enrichment for a given burnup, it is conservative to assume that the required cooling time for a higher enrichment assembly is the same as that for a lower enrichment assembly with the same burnup. The required cooling time for initial enrichments that fall between any two SAS2H runs are assumed to be that of the lower enrichment case results. The method in by which these expanded tables were developed differ slightly than the original method. However, the computer programs used and general approach remain unchanged. The expanded FQT decay times are generated by selecting cooling times such that the design basis source terms remain bounding and all decay heat limits are met.

The original FQT's were developed for U-235 enrichments in the range 2.0-5.0 wt.% and burnup in the range 10-45 GWd/MTU. The FQT's without CCs are expanded to also include fuel with a lower enrichment range of 1.1 to 1.9 wt.% U-235. The FQT's with CCs have not been modified.

Reconstituted fuel assemblies containing up to 56 stainless steel rods that replace fuel rods are also acceptable for the 32PT DSC payload provided the cooling time requirements of the fuel qualification tables are met. Additional discussion of the methodology used to evaluate reconstituted fuel assemblies is provided in Section M.5.2.5.

The design-basis source terms for the authorized CCs are defined as the burnup/initial enrichment/cooling time combination given in the fuel qualification tables that result in the maximum dose rate on the surface of the HSM and OS197/OS197H TC. The cooling times for the expanded fuel qualification table entries are selected so that the design-basis source terms remain bounding. The 1-D discrete ordinates code ANISN [5.5] and the CASK-81 22 neutron, 18 gamma-ray energy group, coupled cross-section library [5.3] is used to determine these design-basis source terms. Finding the burnup/initial enrichment/cooling time combinations from the fuel qualification tables and decay heat load zoning configurations that produce the maximum dose rate on the HSM roof determine the design-basis source term for the HSM shielding calculations. Similarly the design-basis source terms for the OS197/OS197H TC are determined by finding the maximum surface dose rates on the side of the cask. This approach, described in detail in Section M.5.2.4, is consistent with the method used to determine the fuel qualification tables for the Standardized NUHOMS® canister designs described in Section 7.2.3.

The radiological source terms generated in the SAS2H/ORIGEN-2 runs are used in the ANISN evaluations to calculate the surface dose rates. The ANISN models are similar to the appropriate DORT models for the locations of interest. Heat load configuration 2 (Figure M.2-2) produced the bounding total surface dose rate for both the HSM and TC. The HSM design-basis source terms for the outer ring of assemblies (modeled as sixteen assemblies) are from fuel with 41 GWd/MTU burnup, an initial enrichment of 3.1 wt. % U-235 and 5-years cooling. The HSM design-basis source terms for the inner sixteen assemblies are from fuel with 30 GWd/MTU burnup, and initial enrichment of 2.5 wt. % U-235 and 8-years cooling. Note that using this approach in modeling the outer ring of sixteen assemblies with the 1.2 kW source terms for all of the shielding analyses results in fairly conservative dose rates because the shielding analysis is in reality based on a 28.8 kW heat load. The TC design-basis source terms for the outer ring of assemblies (conservatively modeled as sixteen assemblies) are from fuel with 41 GWd/MTU burnup, an initial enrichment of 3.1 wt. % U-235 and 5-years cooling. The TC design-basis source terms for the inner sixteen assemblies are from fuel with 45 GWd/MTU burnup, and initial enrichment of 3.3 wt. % U-235 and 23-years cooling.

A sample SAS2H/ORIGEN-S input file for the In-Core Region for the 41 GWd/MTU, 3.1 wt. % U-235 and 5-years cooling case is listed and commented in Section M.5.5.1.

M.5.2.1 Gamma Source

Four SAS2H/ORIGEN-S runs are required for each burnup/initial enrichment/cooling time combination to determine gamma source terms for the four regions of interest for each fuel assembly; the bottom, in-core, plenum and top regions. The only difference between the runs is in Block #10 "Light Elements" of the SAS2H input and the 81$$ card in the ORIGEN-S input. Each run includes the appropriate Light Elements for the region being evaluated and the 81$$ card is adjusted to have ORIGEN-S output the total gamma source for the in-core region and only the light element source for the plenum and top nozzle regions.

The design-basis source terms for the authorized CC designs are taken from Appendix J of the FSAR. The design-basis CC source terms from Appendix J of the FSAR are based on three bounding BPRA designs 1) B&W 15x15 Burnable Absorber Assemblies with up to 2 cycles burnup and 5-year cooled, 2) WE 17x17 Pyrex Burnable Absorber, 2-24 Rodlets with up to 2 cycles burnup and 10-year cooled, and 3) WE 17x17 WABA Burnable Absorber, 3-24 Rodlets with up to 2 cycles burnup and 10-year cooled.

All other CCs, including BPRA types other than the three analyzed above, must be examined on a case by case basis to demonstrate that they are bounded by the design basis CC source. Specifically, the maximum allowed CC gamma source is 1.24E+15 γ/s/canister for BPRAs, NSAs, CRAs, and BAs and 1.30E+14 γ/s/canister for TPAs.

The SAS2H/ORIGEN-S gamma ray source is output in the CASK-81 energy group structure.

Gamma source terms for the in-core region include contributions from actinides, fission products, and activation product. The bottom, plenum and top nozzle regions include the contribution from the activation products in the specified region only. These results for the 41 GWd/MTU, 3.1 wt. % U-235 and 5-years cooling case are shown in Table M.5-9. The results for the 30 GWd/MTU, 2.5 wt. % U-235 and 8-years cooling case are shown in Table M.5-10. Finally, the results for the 45 GWd/MTU, 3.3 wt. % U-235 and 23-years cooling case are shown in Table M.5-11.

As stated above the design-basis CC source terms are taken from Appendix J of the FSAR and are listed in Table M.5-12.

Gamma source terms for use in the shielding models are calculated by multiplying the assembly sources by the number of assemblies in the region of interest (16) and dividing by the appropriate inner/outer heat load region volume. The appropriate assembly region volumes for both the inner and outer heat load zones are listed in Table M.5-13.

M.5.2.2 Neutron Source Term

One SAS2H/ORIGEN-S run is required for each burnup/initial enrichment/cooling time combination to determine the total neutron source terms for the in-core regions. The results for each burnup/initial enrichment/cooling time combination of interest are summarized in Table M.5-14.

Neutron source terms for use in the shielding models are calculated by multiplying the assembly sources by the number of assemblies in the in-core region of interest (16) and dividing by the appropriate in-core inner/outer heat load region volume. The appropriate assembly region volumes for both the inner and outer heat load regions are listed in Table M.5-13.

M.5.2.3 Axial Peaking

Axial peaking factors for both neutron and gamma sources in PWR fuel are taken from Reference [5.6]. These peaking factors were derived from work performed by the Department of Energy in support of its Topical Report for burnup credit [5.7]. The neutron and gamma peaking factors are shown as a function of the core height in Table M.5-15. These factors are directly applied to each DORT interval in the fuel region. Neutron peaking factors in each zone are equal to the gamma factor raised to the fourth power to correctly account for the variation of neutron source with burnup. The axial source distribution defined in Table M.5-15 introduces some level of conservatism into this calculation because the length average peaking factor of 1.06 is greater than 1.

M.5.2.4 ANISN Evaluation for Bounding Source Terms

As discussed above, the original fuel qualification tables are generated based on the decay heat limits for the various heat load zoning configurations shown in Figure M.2-1, Figure M.2-2 and Figure M.2-3. The expanded fuel qualification table decay times are generated by selecting cooling times such that the design-basis source terms remain bounding and all decay heat limits are met. SAS2H is used to calculate the minimum required cooling time as a function of assembly initial enrichment and burnup for each decay heat limit. To determine which configuration and burnup, wt. % initial enrichment and cooling time combinations result in the bounding dose rates on the surface of the HSM and TC, the total source term, which includes the contribution from the fuel as well as the hardware in the entire assembly (including end fittings) is used to calculate its total ANISN dose rate on the HSM roof and TC radial using the ANISN code.

The CC contribution is fixed and is included in the design basis shielding evaluation as such and therefore is not included in this ANISN evaluation.

ANISN [5.5] determines the fluence of particles throughout one-dimensional geometric systems by solving the Boltzmann transport equation using the method of discrete ordinates. Particles can be generated by either particle interaction with the transport medium or extraneous sources incident upon the system. Anisotropic cross-sections can be expressed in a Legendre expansion of arbitrary order.

The ANISN code implements the discrete ordinates method as its primary mode of operation. Balance equations are solved for the flow of particles moving in a set of discrete directions in each cell of a space mesh and in each group of a multigroup energy structure. Iterations are performed until all implicitness in the coupling of cells, directions, groups, and source regeneration is resolved.

ANISN coupled with the CASK-81 22 neutron, 18 gamma-ray energy group, coupled cross-section library [5.3] and the ANSI/ANS-6.1.1-1977 flux-to-dose conversion factors [5.10] is chosen to generate the ANISN dose rates used to determine the relative strength of the various source terms from fuel assemblies to determine the design basis source terms for the HSM and TC. These design basis source terms are used with DORT to calculate the bounding system dose rates. ANISN provides an efficient method to calculate the design basis source terms.

The surface dose rates for the original fuel qualification tables are calculated using individual ANISN models to perform the evaluation for the fuel assembly parameters in the fuel qualification table. The ANISN model used to calculate the relative dose rates on the HSM surface is similar to the cut through the center of the DORT HSM roof model used for the shielding evaluation (for each configuration). The ANISN model used to generate the relative dose rates on the TC is similar to the cut through the center of the DORT TC side model used for the shielding evaluation. Figure M.5-31 and Figure M.5-32 provide sketches for the ANISN models of the HSM roof and TC centerline, respectively. When modeling 0.63 kW or 0.60 kW source region in Region A (16 assemblies) of Figure M.5-31 and Figure M.5-32, the Region B does not include any source terms. Similarly, when modeling 0.87 kW or 1.2 kW source region in Region B (16 assemblies), of these figures, the Region A does not include any source terms.

M.5.3 Model Specification

M.5.3.1 Material Densities

With the exception of the DSC basket and fuel, all material densities are taken directly from the calculations used to support Section 7 of the FSAR.

The material weight given in Table M.5-6 for the fuel assembly and Table M.5-2 for the CCs are used to calculate material densities for in-core, plenum, top and bottom regions of the fuel assembly. The poison in the CCs is modeled as pure aluminum because it is a relatively light element with little shielding capability. In addition, while the source terms account for 32 CCs the material densities conservatively account for only 24 CCs. For the HSM axial dose rates and all of the TC calculations, only 20% of the steel plates used to form the fuel compartments is modeled in the shielding analysis. All other components of the basket such as the neutron poison material; aluminum plates, etc., have been conservatively neglected for all models. For the lateral HSM DORT shielding model only, the homogenized fuel regions also include all of the steel from the DSC basket inner fuel compartment. The zircaloy is modeled as Zr and the inconel, carbon steel and stainless steel are all modeled as Fe. This assumption has little effect on the dose rate results. The smeared active fuel region volume of the basket is the sum of the inner and outer heat load region volumes given in Table M.5-13.

In order to account for subcritical multiplication, an initial enrichment of ~4.9 wt. % U-235 is used to calculate the amount of U-235 in the shielding models. For an initial enrichment of ~4.9%, there are 23,044 grams of U-235 per assembly and 451,956 grams of U-238.

The material densities used in the various models are summarized in Table M.5-16.

M.5.4 Shielding Evaluation

Dose rate contributions from the bottom, in core, plenum and top regions, as appropriate, from 32 fuel assemblies with CCs are calculated with the DORT Code [5.2] at various location on and around the NUHOMS® -32PT DSCs, HSM, and OS197/OS197H TC.

The radiation shielding evaluation for the Standardized NUHOMS® System during loading, transfer and storage for the 24P and 52B canisters is discussed in Sections 3.3.5, 7.0 and 8.0 of the FSAR. The following shielding evaluation discussion specifically addresses the NUHOMS®-32PT-S100/32PT-L100 and 32PT-S125/32PT-L125 DSCs in an HSM and TC using the design-basis source terms determined in Section M.5.2.

M.5.4.1 Computer Programs

DORT [5.2] determines the fluence of particles throughout one-dimensional or two-dimensional geometric systems by solving the Boltzmann transport equation using either the method of discrete ordinates or a diffusion theory approximation. Particles can be generated by either particle interaction with the transport medium or extraneous sources incident upon the system. Anisotropic cross-sections can be expressed in a Legendre expansion of arbitrary order.

The DORT code implements the discrete ordinates method as its primary mode of operation. Balance equations are solved for the flow of particles moving in a set of discrete directions in each cell of a space mesh and in each group of a multigroup energy structure. Iterations are performed until all implicitness in the coupling of cells, directions, groups, and source regeneration is resolved.

DORT was chosen for this application because of its ability to solve two dimensional, cylindrical, deep penetration radiation transport problems similar to the NUHOMS® System.

M.5.4.2 Spatial Source Distribution

The source components are:

- The neutron sources due to the active fuel regions of the inner sixteen and outer sixteen fuel assemblies,
- The gamma source due to the active fuel regions of the inner sixteen and outer sixteen fuel assemblies,
- The gamma source due to the plenum regions of the inner sixteen and outer sixteen fuel assemblies,
- The gamma source due to the top regions of the inner sixteen and outer sixteen fuel assemblies,
- The gamma source due to the bottom region of the inner sixteen and outer sixteen fuel assemblies,

- The gamma source due to the 32 CCs in the active fuel region,
- The gamma source due to the 32 CCs in the plenum region, and
- The gamma source due to the 32 CCs in the top region.

The U-235 fission spectrum is input into the 1* array of the DORT input file to account for subcritical multiplication, increasing the neutron source in the active fuel region. Axial peaking is accounted for in the active fuel region by inputting a relative flux factor at each node in the 97* array. The flux factor data is discussed in Section M.5.2.3.

M.5.4.3 Cross Section Data

The cross-section data used in this analysis is taken from the CASK-81 22 neutron, 18 gamma-ray energy group, coupled cross-section library [5.3]. CASK-81 is an industry standard cross-section library compiled for performing calculations of spent fuel shipping casks and is distributed by ORNL/RSIC. The cross-section data allows coupled neutron/gamma-ray dose rate evaluation to be made that account for secondary gamma radiation (n,γ).

Microscopic P_3 cross-sections are taken from the CASK-81 library and mixed using the GIP-PC computer program distributed with DORT [5.2] to provide macroscopic cross-sections for the materials in the cask model.

An additional element and material, "fluxdosium," is included in the cross-section data and mixing table in the GIP input file. Fluxdosium is used to provide flux-to-dose rate conversion factors as described in Section M.5.4.4 for use in activity calculations. The presence of fluxdosium in the cross-section data does not affect the actual flux calculations.

M.5.4.4 Flux-to-Dose-Rate Conversion

The flux distribution calculated by the DORT code is converted to dose rates using the same flux-to-dose rate conversion factors as those used in the FSAR from ANSI/ANS-6.1.1-1977. The flux-to-dose rate conversion factors are entered into DORT through the cross section tables as material "fluxdosium".

The dose rate at each node in the DORT models is calculated using the activity calculation feature of DORT. The "cross-section" data for "fluxdosium" is specified for the activity calculations, which determine the gamma and neutron dose rate at each node.

M.5.4.5 Methodology

The methodologies used in this calculation are similar to those previously used to support NUHOMS® storage and transportation applications. The computer codes, basic modeling techniques, and analyses are based in large part on those used to support the Sacramento Municipal Utility Districts storage license at their Rancho Seco Nuclear Generating Station (TAC Number L10017, Materials License Number SNM-2510) and to support the certificate of compliance application for the NUHOMS®-61BT storage system [5.8]. The methodology used herein is summarized below.

Table M.5-1
PWR Fuel Assembly Design Characteristics[3]

Assembly Class	B&W 15x15	WE 17x17	CE 15x15	WE 15x15	CE 14x14	WE 14x14
DSC Configuration	**Max Unirradiated Length (in)**					
32PT-S100	165.75	165.75	165.75	165.75	165.75	165.75
32PT-L100	171.71[1]	171.71[1]	171.71	171.71	171.71	171.71
32PT-S125	165.75	165.75	165.75	165.75	165.75	165.75
32PT-L125	171.71[1]	171.71[1]	171.71	171.71	171.71	171.71
Fissile Material	UO_2	UO_2	UO_2	UO_2	UO_2	UO_2
Maximum MTU/assembly[2]	0.475	0.475	0.475	0.475	0.475	0.475
Maximum Number of Fuel Rods	208	264	216	204	176	179
Maximum Number of Guide/ Instrument Tubes	17	25	9	21	5	17

(1) Maximum Assembly + CC Length (unirradiated)
(2) The maximum MTU/assembly is based on the shielding analysis. The listed value is higher than the actual.
(3) Maximum Co-59 content in the Top End Fitting Region is 15.6 grams per assembly.
Maximum Co-59 content in the Plenum Region is 5.0 grams per assembly.
Maximum Co-59 content in the In-Core Region is 24.7 grams per assembly.
Maximum Co-59 content in the Bottom Region is 12.8 grams per assembly.

Table M.5-3
Dose Rates Due to the 32 PWR Fuel Assemblies with CCs

Dose Rate Location	Configuration 2 32PT-S100/32PT-L100 DSC Design Configuration			Configuration 2 32PT-S125/32PT-L125 DSC Design Configurations		
	Gamma (mrem/hr)	Neutron (mrem/hr)	Total(1) (mrem/hr)	Gamma (mrem/hr)	Neutron (mrem/hr)	Total(1) (mrem/hr)
HSM Roof (centerline)	38.6	0.6	39.2	38.6	0.6	39.2
HSM Roof Birdscreen	1201	16.9	1218	1201	16.9	1218
HSM End Shield Wall Surface	5.4	0.2	5.6	5.4	0.2	5.6
HSM Door Exterior Surface (centerline)	158	36.3	185	77.5	28.1	99.3
HSM Front Birdscreen	780	7.3	788	745	6.8	752
HSM Back Shield Wall	1.45	0.05	1.50	1.37	0.05	1.41
Centerline Top DSC Cover Plate w/3"ns3+1" steel Dry Welding	123	18.7	142	36.7	15.0	51.7
Outer Edge Centerline Top DSC (Peak Annulus)	3834	132	3966	1458	111	1569
Cask Surface (Radial) Contact Normal Condition	784	261	950	784	259	947
3 ft from Cask Surface (Radial) Normal Condition	293	98.3	391	293	97.8	390
Cask Surface (Radial) Contact Accident Condition	1070	3780	4640	1070	3770	4630
Cask Top Axial Surface	94.8	32.6	107	37.7	27.5	48.7
Cask Bottom Axial Surface	758(2)	957(2)	1707(2)	193(3)	770(3)	960(3)

Notes:
(1) Gamma and Neutron peaks do not always occur at same location therefore the total is not always the sum of the gamma plus neutron.
(2) The peak bottom surface dose rate is directly below the grapple ring cut out in the bottom of the cask. The bottom average dose rates, including the grapple area, are 170 mrem/hr gamma, 115 mrem/hr neutron for a total average dose rate of 285 mrem/hr.
(3) The peak bottom surface dose rate is directly below the grapple ring cut out in the bottom of the cask. The bottom average dose rates, including the grapple area, are 48.7 mrem/hr gamma, 92.3 mrem/hr neutron for a total average dose rate of 141 mrem/hr.

Table M.5-12
Design-Basis CC Source Terms

CASK-81 Energy Group	E_{upper} (MeV)	E_{mean} (MeV)	Top Region γ/s/BPRA	Plenum Region γ/s/BPRA	Fuel Region γ/s/BPRA
23	10	9	0.000E+00	0.000E+00	0.000E+00
24	8	7.25	0.000E+00	0.000E+00	0.000E+00
25	6.5	5.75	0.000E+00	0.000E+00	0.000E+00
26	5	4.5	0.000E+00	0.000E+00	0.000E+00
27	4	3.5	3.947E-15	6.520E-14	7.266E-18
28	3	2.75	3.942E+04	2.179E+04	5.495E+05
29	2.5	2.25	1.274E+07	7.040E+06	1.775E+08
30	2	1.83	9.577E+01	8.812E+01	9.153E-05
31	1.66	1.495	7.138E+11	3.946E+11	9.953E+12
32	1.33	1.165	1.690E+12	9.340E+11	2.356E+13
33	1	0.9	6.951E+09	4.180E+09	4.699E+09
34	0.8	0.7	4.155E+09	1.783E+10	2.835E+09
35	0.6	0.5	3.235E+07	3.854E+10	4.508E+08
36	0.4	0.35	7.014E+07	2.431E+10	9.776E+08
37	0.3	0.25	2.060E+08	3.482E+09	2.872E+09
38	0.2	0.15	1.217E+09	3.534E+09	1.697E+10
39	0.1	0.075	8.191E+09	5.176E+09	1.142E+11
40	0.05	0.025	8.484E+10	1.382E+11	1.170E+12
Total			2.509E+12	1.564E+12	3.483E+13

M.6.1 Discussion and Results

Figure M.6-1 shows the cross section of the NUHOMS®-32PT DSC. The NUHOMS®-32PT DSC stainless steel basket consists of a welded plate or tube design. The welded plates or tubes form 32 compartments with sufficient space to accommodate aluminum or poison/aluminum inserts and a PWR fuel assembly. The fuel compartment structure is connected to perimeter transition rail assemblies as shown on the drawings in Section M.1.5. The poison/aluminum plates and aluminum plates are located inside the fuel compartments. The poison plates may be arranged in any of the following configurations: a 20 poison plate configuration (base configuration), as shown in Figure M.6-1; an alternate 16 poison plate configuration, as shown in Figure M.6-13; and another alternate 24 poison plate configuration, as shown in Figure M.6-14. Figure M.6-2 through Figure M.6-4 show the fuel compartments that must contain PRAs for loading configurations that require four, eight or sixteen PRAs. The 20 poison plate basket configuration shown in Figure M.6-1 is analyzed as a Type A/B/C/D basket while the 24 poison plate basket configurations shown in Figure M.6-14 is analyzed as an Alternate Type A/B/C/D basket. The 16 poison plate basket configuration shown in Figure M.6-13 is also analyzed as an Alternate Type A basket.

The analysis presented herein is performed for a NUHOMS®-32PT DSC in the NUHOMS® OS197/197H Transfer Casks (TCs) during normal and accident loading conditions. The NUHOMS® OS197/197H TCs consists of an inner stainless steel shell, lead gamma shield, a stainless steel structural shell and a hydrogenous (liquid) neutron shield. This analysis is applicable to any licensed cask of similar construction. The NUHOMS®-32PT DSC/TC configuration is shown to be sub-critical under normal and accident conditions of loading, transfer and storage.

The criticality analysis determines the most reactive configuration for the basket and assembly location. Then criticality calculations evaluate a variety of fuel assembly types, initial enrichments and PRA configurations. Finally, the maximum allowed initial enrichment for each assembly type/PRA configuration is determined. The maximum allowed initial enrichment for each assembly type/PRA configuration is listed in Table M.6-1. The calculations determine k_{eff} with the CSAS25 control module of SCALE-4.4 [6-1] for each assembly type/PRA configuration and initial enrichment, including all uncertainties to assure criticality safety under all credible conditions.

The results of the evaluation presented include reconstituted fuel assemblies where fuel pins are replaced with up to 56 solid stainless steel rods or an unlimited number of lower enriched UO_2 rods of the same diameter as the fuel pins.

The Control Components (CCs) are also authorized for storage in the 32PT DSC. The authorized CCs are Burnable Poison Rod Assemblies (BPRAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Thimble Plug Assemblies (TPAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppressor Inserts (VSIs), Neutron Source Assemblies (NSAs), and Neutron Sources.

The results of the evaluation demonstrate that the maximum expected k_{eff}, including statistical uncertainty, will be less than the Upper Subcritical Limit (USL) determined from a statistical analysis of benchmark criticality experiments. The statistical analysis procedure includes a confidence band with an administrative safety margin of 0.05.

M.6.2 Package Fuel Loading

The NUHOMS®-32PT DSC is capable of transferring and storing PWR fuel assemblies. Table M.6-2 lists the fuel assemblies considered as authorized contents of the NUHOMS®-32PT DSC.

Table M.6-3 lists the fuel parameters for the PWR fuel assemblies. Reload fuel from other manufacture's with the same parameters are also considered as authorized contents.

For the WE 17x17, BW 15x15, WE 15x15, CE 14x14, and WE 14x14 class assemblies CCs are also included as authorized contents. The only change to the package fuel loading to evaluate the addition of these CCs is replacing the borated water in the water holes with $^{11}B_4C$. Since these CCs displace borated moderator in the assembly guide and or instrument tubes, an evaluation is performed to determine the potential impact of storage of CCs that extend into the active fuel region on the system reactivity. For CCs such as CRAs and BPRAs no credit is taken for the cladding and absorbers; rather the CCs are modeled as $^{11}B_4C$ in the entire tube of the respective design. Thus, the highly borated moderator in the tube is modeled as $^{11}B_4C$. The inclusion of more Boron-11 and carbon enhances neutron scattering causing the neutron population in the fuel assembly to be slightly increased which increases reactivity. Therefore, these calculations bound any CC design that is compatible with WE 17x17, BW 15x15 and WE 14x14 class assemblies. CCs that do not extend into the active fuel region of the assembly do not have any effect on the reactivity of the system as evaluated because only the active fuel region is modeled in this evaluation with periodic boundary conditions making the model infinite in the axial direction. The fuel assembly dimensions reported in Table M.6-3 remain unchanged for the CC cases. The models that include CCs only differ in that the region inside the guide tubes and instrument tube are modeled as $^{11}B_4C$ instead of moderator of PRAs. Additionally, the presences of non-multiplying sources like the NSAs have no impact on criticality calculations.

Since the criticality analysis models simulate only the active fuel height, any CC that is inserted into the fuel assembly such that it does not extend into the active fuel region is considered as authorized for storage without additional calculations as required for control components that extend into the active fuel region. For example, TPAs or ORAs are permitted for storage from a criticality standpoint, without any further calculations that model these CCs, since TPAs or ORAs do not extend into the active fuel region.

Table M.6-4 lists the minimum B_4C contents for PRAs for the various assembly classes. The linear B_4C content per PRA rod used in the KENO V.a model is calculated by multiplying the B_4C density modeled by the cross-sectional area of the poison rod as modeled. Taking the modeled linear B_4C content and dividing by 0.75, to account for the fact that we only take credit for 75% of the B-10 in the analysis, calculates the minimum linear B_4C content per PRA rod specified in Table M.6-4. For example, the modeled B_4C density is 0.756 g/cm^3. For the B&W 15 x15 PRA, the poison in the PRA is modeled with a radius of 0.55 cm. The cross sectional area of the poison is therefore $\pi(0.55)^2$ or 0.950 cm^2. Therefore, the modeled linear B_4C density is 0.72 g/cm and the minimum specified B_4C density is 0.96 g/cm.

M.6.3 Model Specification

The following subsections describe the physical models and materials of the NUHOMS®-32PT DSC as loaded and transferred in the NUHOMS® OS197 or OS197H TC used for input to the CSAS25 module of SCALE-4.4 [6-1] to perform the criticality evaluation. The reactivity of canister under storage conditions is bounded by the TC analysis with zero internal moderator density case. The TC analysis with zero internal moderator density case bounds the storage conditions in the HSM because (1) the canister internals are always dry (purged and backfilled with He) while in the HSM, and (2) the TC contains materials such as steel and lead which provide close reflection of fast neutrons back into the fueled basket while the HSM materials (concrete) are much further from the sides of the DSC and thereby tend to reflect thermalized neutrons back to the canister which are absorbed in the canister materials reducing the system reactivity.

M.6.3.1 Description of Calculational Model

The TC and canister are explicitly modeled using the appropriate geometry options in KENO V.a of the CSAS25 module in SCALE-4.4. Several models are developed to evaluate the fabrication tolerances of the canister, basket, fuel clad outer diameter, fuel assembly locations, fuel assembly type, initial enrichments, PRA locations and storage of CCs with the B&W 15x15, WE 17x17, WE 15x15, CE 14x14 and WE 14x14 assembly classes.

The first model is a full active-fuel height and full radial cross section of the canister and TC with reflective boundary conditions on the ends and sides. The model does not explicitly include the water neutron shield. However, the infinite array of TCs without the neutron shield does contain unborated water between the TCs. KENO plots of these models for each assembly class are included in Section M.6.6.2. This model is used to determine the most reactive fuel assembly for a given enrichment and without any PRAs, most reactive assembly-to-assembly pitch, and to determine the most reactive canister configuration accounting for manufacturing tolerances and fuel assembly clad outer diameter tolerances.

All calculations to determine the most reactive configuration are performed utilizing the configurations containing 20 poison plates. There is no change to the most reactive configuration due to a change in the number and orientation of the poison plates in the basket (16 poison plate and 24 poison plate configurations).

The second model is of the most reactive configuration identified above. This model is used to determine the maximum enrichment allowed for each assembly type as a function of the number of PRAs (none, four, eight and sixteen), and boron loading, as appropriate. In addition, the effect of CCs for the B&W 15x15, WE 17x17, WE 15x15, CE 14x14 and WE 14x14 class assemblies for the various configurations are evaluated.

For all assembly classes, the maximum allowed enrichment is determined with 2500 ppm soluble boron concentration in the pool. For the CE 14x14, WE 14x14, and CE 15x15 assembly classes, the maximum allowed enrichment is also determined for a range of boron loadings in the pool (i.e., 1800-2500 ppm) for the 16 poison plate and 24 poison plate configurations.

Figure M.6-5 is a sketch of each KENO V.a unit showing all materials and dimensions for each Unit and an annotated cross section map showing the assembled geometry units in the radial direction of the most reactive configuration identified in this evaluation. The bounding k_{eff} is calculated with a Westinghouse 17x17 LOPAR/Standard assembly with an initial enrichment of 3.4 wt. % U-235, with no PRAs and 32 BPRAs.

Note that BPRAs are the most relevant CCs for criticality considerations and are utilized in the rest of this chapter to cover all CCs.

plate/tube thickness, minimum fuel compartment width, minimum assembly-to-assembly pitch and uniform maximum planar enrichment. The following analysis uses this configuration to determine the maximum allowed initial enrichment as a function of initial enrichment and PRA configuration for each assembly class. All three poison plate configurations (20 poison plate configuration, 16 poison plate configuration and 24 poison plate configuration) are evaluated in these calculations. Calculations at 2500 ppm boron are performed for all assembly classes. For the CE 14x14, WE 14x14, and CE 15x15 assembly classes, calculations are also performed for a range of boron loadings (1800-2500 ppm) for the 16 poison plate and the 24 poison plate configurations. The most reactive assembly type for each assembly class is used for each evaluation. In addition, for each case the internal moderator density is varied to determine the peak reactivity for the specific configuration. The maximum initial enrichment for each assembly class and PRA configuration are provided in Table M.6-1.

The canister/TC model for this evaluation differs from the actual design in the following ways:

- the boron-10 content in the poison plates is 10% lower than the minimum required,
- the boron-10 content in the PRAs is 25% lower than the minimum required,
- the stainless steel/aluminum transition rails that provide support to the fuel compartment grid are modeled as various solid materials to determine the most reactive condition,
- BPRAs, when modeled, are modeled as solid $^{11}B_4C$ in the guide tubes and instrument tubes,
- the neutron shield and the skin of the TC are conservatively replaced with water between the TCs, and
- the worst case material conditions, as determined in Section M.6.4.2 above, are modeled.

The input file for the case with the highest calculated reactivity is included in Section M.6.6.4.

WE 17x17 Class Assemblies

The most reactive WE 17x17 class assembly is the WE 17x17 LOPAR/standard assembly as demonstrated in Table M.6-6. The results for the WE 17x17 class assembly calculations for the 20 poison plate configuration are listed in Table M.6-13 and Table M.6-14 for cases without and with BPRAs, respectively. The results for the WE 17x17 class assembly calculations for the 16 poison plate configuration are listed in Table M.6-27 and Table M.6-28 for cases without and with BPRAs, respectively. The results for the WE 17x17 class assembly calculations for the 24 poison plate configuration are listed in Table M.6-29 and Table M.6-30 for cases without and with BPRAs, respectively.

B&W 15x15 Class Assemblies

The most reactive B&W 15x15 class assembly is the B&W 15x15 Mark B assembly as demonstrated in Table M.6-6. The results for the B&W 15x15 class assembly calculations for the 20 poison plate configuration are listed in Table M.6-15 and Table M.6-16 for cases without and with BPRAs, respectively. The results for the B&W 15x15 class assembly calculations for the 16 poison plate configuration are listed in Table M.6-31 and Table M.6-32 for cases without and with BPRAs, respectively. The results for the B&W 15x15 class assembly calculations for the 24 poison plate configuration are listed in Table M.6-33 and Table M.6-34 for cases without and with BPRAs, respectively.

CE 15x15 Class Assemblies

The most reactive CE 15x15 class assembly is the CE 15x15 Palisades assembly as demonstrated in Table M.6-6. The results for the CE 15x15 class assembly calculations for the 20 poison plate configuration are listed in Table M.6-17 for cases without BPRAs. BPRAs are not authorized to be stored with CE 15x15 class assemblies.

The addition of plugging cluster assemblies, i.e., steel rods, into each of the eight guide tubes of a CE 15x15 class assembly reduces the maximum reactivity of the payload. The introduction of the steel rods displaces both moderator and soluble boron within the assemblies. The plugging clusters are assumed to extend approximately 1 inch into the top of the assembly's active fuel region, and the resulting change in the maximum reactivity is less than the statistical uncertainties of the calculations. To demonstrate the affect of displacing the borated water on system reactivity, CE 15x15 Palisades cases with the highest fuel enrichments and highest soluble boron loadings (2300, 2400, and 2500 ppm boron) were reevaluated with steel in the guide tubes. Two scenarios were evaluated: full length steel rods and 1 inch long steel rods. The calculated reactivity of the models are shown in Table M.6-44 and Table M.6-45 (the k_{KENO} and 1σ values in columns 2 and 3 are from Table M.6-17). As shown therein, the addition of plugging clusters reduces reactivity of the system regardless of the length of the plugging cluster. These results also apply to the 16 and 24 poison plate configurations.

The results for the CE 15x15 class assembly calculations for the 16 and 24 poison plate configurations as a function of boron loading are listed in Table M.6-41.

Table M.6-1
Maximum Initial Enrichment For Each Configuration, wt. % U-235

Assembly Class	Soluble Boron Loading (ppm)	No PRAs (Type A) Poison Plate Configuration			4 PRAs (Type B) Poison Plate Configuration		8 PRAs (Type C) Poison Plate Configuration		16 PRAs (Type D) Poison Plate Configuration	
		16	20	24	20	24	20	24	20	24
WE 17x17 Fuel Assembly[(1)]	2500	3.40	3.40	3.40	4.00	4.00	4.50	4.50	5.00	5.00
B&W 15x15 Mark B Fuel Assembly[(1)]	2500	3.30	3.30	3.30	3.90	3.90	NE	NE	5.00	5.00
WE 15x15 Fuel Assembly (without CC)	2500	3.40	3.40	3.40	4.00	4.00	4.60	4.60	5.00	5.00
WE 15x15 Fuel Assembly (with CC)	2500	3.40	3.35	3.40	4.00	4.00	4.55	4.55	5.00	5.00
CE 14x14 Fuel Assembly (without CC)	1800	3.35	NE	3.50	NE	4.00	NE	4.35	NE	NE
	2000	3.50	NE	3.70	NE	4.20	NE	4.55	NE	NE
	2100	3.60	NE	3.80	NE	4.30	NE	4.70	NE	NE
	2200	3.70	NE	3.90	NE	4.40	NE	4.80	NE	NE
	2300	3.75	NE	4.00	NE	4.50	NE	4.90	NE	NE
	2400	3.80	NE	4.05	NE	4.60	NE	5.00	NE	NE
	2500	3.90	3.80	4.15	4.60	4.70	--	--	NE	NE
CE 14x14 Fuel Assembly (with CC)	1800	3.30	NE	3.45	NE	3.90	NE	4.25	NE	NE
	2000	3.45	NE	3.65	NE	4.10	NE	4.50	NE	NE
	2100	3.55	NE	3.75	NE	4.20	NE	4.60	NE	NE
	2200	3.60	NE	3.80	NE	4.30	NE	4.70	NE	NE
	2300	3.65	NE	3.90	NE	4.40	NE	4.80	NE	NE
	2400	3.80	NE	4.00	NE	4.50	NE	4.90	NE	NE
	2500	3.90	3.70	4.05	4.45	4.60	4.95	5.00	NE	NE
WE 14x14 Fuel Assembly (with and without CC)	1800	3.55	NE	3.75	NE	4.40	NE	NE	NE	NE
	2000	3.75	NE	3.90	NE	4.60	NE	NE	NE	NE
	2100	3.80	NE	4.00	NE	4.75	NE	NE	NE	NE
	2200	3.90	NE	4.10	NE	4.85	NE	NE	NE	NE
	2300	4.00	NE	4.20	NE	5.00	NE	NE	NE	NE
	2400	4.10	NE	4.30	NE	--	NE	NE	NE	NE
	2500	4.15	4.00	4.40	5.00	--	NE	NE	NE	NE
CE 15x15 Fuel Assembly	1800	3.00	NE	3.15	NE	NE	NE	NE	NE	NE
	2000	3.15	NE	3.30	NE	NE	NE	NE	NE	NE
	2100	3.20	NE	3.40	NE	NE	NE	NE	NE	NE
	2200	3.30	NE	3.50	NE	NE	NE	NE	NE	NE
	2300	3.35	NE	3.55	NE	NE	NE	NE	NE	NE
	2400	3.40	NE	3.60	NE	NE	NE	NE	NE	NE
	2500	3.50	3.40	3.70	NE	NE	NE	NE	NE	NE

NOTES:

(1) With or without CCs. CCs shall not be stored in basket location where a PRA is required.

NE – Not Evaluated

Table M.6-17
CE 15x15 Class Assembly without BPRAs Results (20 Poison Plate Configuration, Variable Soluble Boron Concentration)

Model Description	k_{KENO}	1σ	k_{eff}
Initial Enrichment 3.4 wt% U-235 - No PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9100	0.0009	0.9118
Internal Moderator at 90%TD	0.9188	0.0009	0.9206
Internal Moderator at 80%TD	0.9257	0.0009	0.9275
Internal Moderator at 70%TD	0.9316	0.0011	0.9338
Internal Moderator at 60%TD	0.9267	0.0009	0.9285
Internal Moderator at 50%TD	0.9177	0.0010	0.9197
Internal Moderator at 40%TD	0.8981	0.0009	0.8999

Table M.6-18
WE 15x15 Class Assembly with and without BPRAs Results (20 Poison Plate Configuration, 2500 ppm Soluble Boron Concentration)

Model Description	k_{KENO}	1σ	k_{eff}
Initial Enrichment 3.4 wt% U-235 - No PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9016	0.0009	0.9034
Internal Moderator at 90%TD	0.9149	0.0009	0.9167
Internal Moderator at 80%TD	0.9255	0.0008	0.9271
Internal Moderator at 70%TD	0.9328	0.0009	0.9346
Internal Moderator at 60%TD	0.9364	0.0009	0.9382
Internal Moderator at 50%TD	0.9308	0.0010	0.9328
Internal Moderator at 40%TD	0.9133	0.0008	0.9149
Initial Enrichment 4.0 wt% U-235 - 4 PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9107	0.0009	0.9125
Internal Moderator at 90%TD	0.9229	0.0010	0.9249
Internal Moderator at 80%TD	0.9292	0.0010	0.9312
Internal Moderator at 70%TD	0.9307	0.0009	0.9325
Internal Moderator at 60%TD	0.9278	0.0009	0.9296
Internal Moderator at 50%TD	0.9183	0.0009	0.9201
Internal Moderator at 40%TD	0.8959	0.0008	0.8975
Initial Enrichment 4.6 wt% U-235 - 8 PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9276	0.0009	0.9294
Internal Moderator at 90%TD	0.9325	0.0009	0.9343
Internal Moderator at 80%TD	0.9363	0.0010	0.9383
Internal Moderator at 70%TD	0.9349	0.0008	0.9365
Internal Moderator at 60%TD	0.9251	0.0009	0.9269
Internal Moderator at 50%TD	0.9130	0.0009	0.9148
Internal Moderator at 40%TD	0.8863	0.0010	0.8883
Initial Enrichment 5.0 wt% U-235 - 16 PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.8969	0.0012	0.8993
Internal Moderator at 90%TD	0.8985	0.0011	0.9007
Internal Moderator at 80%TD	0.8967	0.0010	0.8987
Internal Moderator at 70%TD	0.8894	0.0009	0.8912
Internal Moderator at 60%TD	0.8780	0.0009	0.8798
Internal Moderator at 50%TD	0.8567	0.0010	0.8587
Internal Moderator at 40%TD	0.8259	0.0009	0.8277

Table M.6-18
WE 15x15 Class Assembly with and without BPRAs Results (20 Poison Plate Configuration, 2500 ppm Soluble Boron Concentration)

Model Description	k_{KENO}	1σ	k_{eff}
20-Plate Basket, 3.35 w/o U-235, 2500 ppm, No PRAs, with BPRAs			
MD=40%	0.9016	0.0010	0.9036
MD=50%	0.9224	0.0009	0.9242
MD=60%	0.9309	0.0009	0.9327
MD=70%	0.9335	0.0009	0.9353
MD=80%	0.9315	0.0009	0.9333
MD=90%	0.9255	0.0008	0.9271
MD=100%	0.9157	0.0009	0.9175
20-Plate Basket, 4.00 w/o U-235, 2500 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8840	0.0009	0.8858
MD=50%	0.9105	0.0009	0.9123
MD=60%	0.9245	0.0010	0.9265
MD=70%	0.9336	0.0009	0.9354
MD=80%	0.9355	0.0011	0.9377
MD=90%	0.9330	0.0010	0.9350
MD=100%	0.9289	0.0009	0.9307
20-Plate Basket, 4.55 w/o U-235, 2500 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8710	0.0008	0.8726
MD=50%	0.9003	0.0010	0.9023
MD=60%	0.9181	0.0010	0.9201
MD=70%	0.9309	0.0009	0.9327
MD=80%	0.9362	0.0009	0.9380
MD=90%	0.9364	0.0009	0.9382
MD=100%	0.9337	0.0009	0.9355

Table M.6-19
CE 14x14 Class Assembly with and without BPRAs at 2500 ppm Soluble Boron Concentration Results (20 Poison Plate Configuration)

Model Description	k_{KENO}	1σ	k_{eff}
Initial Enrichment 3.8 wt% U-235 - No PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.8905	0.0011	0.8927
Internal Moderator at 90%TD	0.9078	0.0012	0.9102
Internal Moderator at 80%TD	0.9196	0.0009	0.9214
Internal Moderator at 70%TD	0.9292	0.0009	0.9310
Internal Moderator at 60%TD	0.9347	0.0010	0.9367
Internal Moderator at 50%TD	0.9309	0.0010	0.9329
Internal Moderator at 40%TD	0.9165	0.0010	0.9185
Initial Enrichment 4.6 wt% U-235 - 4 PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9103	0.0009	0.9121
Internal Moderator at 90%TD	0.9223	0.0009	0.9241
Internal Moderator at 80%TD	0.9300	0.0010	0.9320
Internal Moderator at 70%TD	0.9371	0.0008	0.9387
Internal Moderator at 60%TD	0.9376	0.0008	0.9392
Internal Moderator at 50%TD	0.9308	0.0009	0.9326
Internal Moderator at 40%TD	0.9155	0.0010	0.9175
Initial Enrichment 5.0 wt% U-235 - 8 PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9133	0.0009	0.9151
Internal Moderator at 90%TD	0.9199	0.0010	0.9219
Internal Moderator at 80%TD	0.9271	0.0011	0.9293
Internal Moderator at 70%TD	0.9294	0.0009	0.9312
Internal Moderator at 60%TD	0.9271	0.0008	0.9287
Internal Moderator at 50%TD	0.9181	0.0010	0.9201
Internal Moderator at 40%TD	0.8976	0.0009	0.8994

Table M.6-19
CE 14x14 Class Assembly with and without BPRAs at 2500 ppm Soluble Boron Concentration Results (20 Poison Plate Configuration)

Model Description	k_{KENO}	1σ	k_{eff}
20-Plate Basket, 3.70 w/o U-235, 2500 ppm, No PRAs			
MD=40%	0.9001	0.0010	0.9021
MD=50%	0.9215	0.0011	0.9237
MD=60%	0.9320	0.0010	0.9340
MD=70%	0.9357	0.0010	0.9377
MD=80%	0.9339	0.0010	0.9359
MD=90%	0.9272	0.0008	0.9288
MD=100%	0.9183	0.0009	0.9201
20-Plate Basket, 4.45 w/o U-235, 2500 ppm, 4 PRAs			
MD=40%	0.8947	0.0010	0.8967
MD=50%	0.9174	0.0009	0.9192
MD=60%	0.9320	0.0008	0.9336
MD=70%	0.9360	0.0009	0.9378
MD=80%	0.9374	0.0010	0.9394
MD=90%	0.9334	0.0008	0.9350
MD=100%	0.9284	0.0010	0.9304
20-Plate Basket, 4.95 w/o U-235, 2500 ppm, 8 PRAs			
MD=40%	0.8834	0.0008	0.8850
MD=50%	0.9096	0.0009	0.9114
MD=60%	0.9259	0.0010	0.9279
MD=70%	0.9318	0.0009	0.9336
MD=80%	0.9355	0.0009	0.9373
MD=90%	0.9350	0.0010	0.9370
MD=100%	0.9314	0.0009	0.9332

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Table M.6-20
WE 14x14 Class Assembly with and without BPRAs at 2500 ppm Soluble Boron Concentration Results (20 Poison Plate Configuration)

Model Description	k_{KENO}	1σ	k_{eff}
Initial Enrichment 4.0 wt% U-235 – No PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9030	0.0011	0.9052
Internal Moderator at 90%TD	0.9148	0.0009	0.9166
Internal Moderator at 80%TD	0.9257	0.0010	0.9277
Internal Moderator at 70%TD	0.9335	0.0011	0.9357
Internal Moderator at 60%TD	0.9374	0.0010	0.9394
Internal Moderator at 50%TD	0.9343	0.0009	0.9361
Internal Moderator at 40%TD	0.9225	0.0010	0.9245
20-Plate Basket, 4.00 w/o U-235, 2500 ppm, No PRAs			
MD=40%	0.9157	0.0010	0.9177
MD=50%	0.9293	0.0010	0.9313
MD=60%	0.9354	0.0013	0.9380
MD=70%	0.9359	0.0011	0.9381
MD=80%	0.9330	0.0011	0.9352
MD=90%	0.9256	0.0010	0.9276
MD=100%	0.9196	0.0011	0.9218
Initial Enrichment 5.0 wt% U-235 - 4 PRAs, w/o BPRAs			
Internal Moderator at 100%TD	0.9098	0.0009	0.9116
Internal Moderator at 90%TD	0.9189	0.0008	0.9205
Internal Moderator at 80%TD	0.9285	0.0009	0.9303
Internal Moderator at 70%TD	0.9348	0.0009	0.9366
Internal Moderator at 60%TD	0.9364	0.0010	0.9384
Internal Moderator at 50%TD	0.9325	0.0010	0.9345
Internal Moderator at 40%TD	0.9185	0.0010	0.9205
20-Plate Basket, 5.00 w/o U-235, 2500 ppm, 4 PRAs			
MD=40%	0.9089	0.0009	0.9107
MD=50%	0.9238	0.0012	0.9262
MD=60%	0.9298	0.0010	0.9318
MD=70%	0.9310	0.0009	0.9328
MD=80%	0.9280	0.0009	0.9298
MD=90%	0.9237	0.0009	0.9255
MD=100%	0.9165	0.0009	0.9183

Table M.6-36
Results for the WE 15x15 Class Fuel Assembly with and without BPRAs (16 Poison Plate Configuration, 2500 ppm Soluble Boron Concentration)

Model Description	k_{KENO}	1σ	k_{eff}
Initial Enrichment 3.4 w/o U-235, No BPRAs			
MD=40%	0.9129	0.0009	0.9147
MD=50%	0.9280	0.0010	0.9300
MD=55%	0.9320	0.0010	0.9340
MD=60%	0.9316	0.0008	0.9332
MD=65%	0.9321	0.0010	0.9341
MD=70%	0.9287	0.0008	0.9303
MD=75%	0.9257	0.0009	0.9275
MD=80%	0.9198	0.0008	0.9214
MD=85%	0.9158	0.0008	0.9174
MD=90%	0.9074	0.0008	0.9090
MD=95%	0.9008	0.0009	0.9026
MD=100%	0.8948	0.0009	0.8966
16-Plate Basket, 3.40 w/o U-235, 2500 ppm, No PRAs, with BPRAs			
MD=40%	0.9039	0.0009	0.9057
MD=50%	0.9236	0.0009	0.9254
MD=60%	0.9317	0.0009	0.9335
MD=70%	0.9343	0.0008	0.9359
MD=80%	0.9309	0.0008	0.9325
MD=90%	0.9237	0.0008	0.9253
MD=100%	0.9136	0.0009	0.9154

Table M.6-37
Results for the WE 15x15 Class Fuel Assembly with and without BPRAs (24 Poison Plate Configuration, 2500 ppm Soluble Boron Concentration)

Model Description	k_{KENO}	1σ	k_{eff}
Initial Enrichment 3.4 w/o U-235, No BPRAs, No PRAs			
MD=40%	0.8847	0.0008	0.8863
MD=50%	0.9035	0.0009	0.9053
MD=60%	0.9106	0.0008	0.9122
MD=70%	0.9096	0.0008	0.9112
MD=80%	0.9040	0.0009	0.9058
MD=90%	0.8949	0.0008	0.8965
MD=100%	0.8805	0.0008	0.8821
Initial Enrichment 4.0 w/o U-235, No BPRAs, 4 PRAs			
MD=40%	0.8803	0.0009	0.8821
MD=50%	0.9049	0.0008	0.9065
MD=60%	0.9194	0.0008	0.9210
MD=70%	0.9234	0.0008	0.9250
MD=80%	0.9224	0.0010	0.9244
MD=90%	0.9174	0.0010	0.9194
MD=100%	0.9092	0.0009	0.9110
Initial Enrichment 4.6 w/o U-235, No BPRAs, 8 PRAs			
MD=40%	0.8756	0.0008	0.8772
MD=50%	0.9022	0.0010	0.9042
MD=60%	0.9234	0.0009	0.9252
MD=70%	0.9321	0.0009	0.9339
MD=80%	0.9352	0.0010	0.9372
MD=90%	0.9327	0.0009	0.9345
MD=100%	0.9270	0.0011	0.9292
Initial Enrichment 5.0 w/o U-235, No BPRAs, 16 PRAs			
MD=40%	0.8161	0.0008	0.8177
MD=50%	0.8525	0.0010	0.8545
MD=60%	0.8754	0.0010	0.8774
MD=70%	0.8927	0.0010	0.8947
MD=80%	0.9008	0.0010	0.9028
MD=90%	0.9056	0.0012	0.9080
MD=100%	0.9046	0.0012	0.9070
24-Plate Basket, 4.55 w/o U-235, 2500 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8608	0.0009	0.8626
MD=50%	0.8940	0.0010	0.8960
MD=60%	0.9136	0.0010	0.9156
MD=70%	0.9279	0.0009	0.9297
MD=80%	0.9352	0.0010	0.9372
MD=90%	0.9378	0.0010	0.9398
MD=100%	0.9349	0.0009	0.9367

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 1800 ppm boron, 16 Poison plates, 3.35 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9051	0.0008	0.9067
MD = 50%	0.9254	0.0009	0.9272
MD = 55%	0.9313	0.0008	0.9329
MD = 60%	0.9349	0.0009	0.9367
MD = 65%	0.9343	0.0011	0.9365
MD = 70%	**0.9352**	**0.0009**	**0.9370**
MD = 75%	0.9329	0.0008	0.9345
MD = 80%	0.9294	0.0008	0.9310
MD = 90%	0.9201	0.0009	0.9219
MD = 100%	0.9074	0.0008	0.9090
CE 14x14 Fort Calhoun, 1800 ppm boron, 24 Poison plates, 3.50 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.8944	0.0008	0.8960
MD = 50%	0.9183	0.0009	0.9201
MD = 55%	0.9227	0.0009	0.9245
MD = 60%	0.9280	0.0010	0.9300
MD = 65%	0.9312	0.0008	0.9328
MD = 70%	**0.9316**	**0.0010**	**0.9336**
MD = 80%	0.9285	0.0009	0.9303
MD = 90%	0.9219	0.0012	0.9243
MD = 100%	0.9119	0.0009	0.9137
CE 14x14 Fort Calhoun, 1800 ppm boron, 24 Poison plates, 4.00 wt% U-235, 04 PRAs, no BPRAs			
MD = 40%	0.8890	0.0010	0.8910
MD = 50%	0.9144	0.0009	0.9162
MD = 60%	0.9295	0.0010	0.9315
MD = 65%	0.9339	0.0011	0.9361
MD = 70%	**0.9359**	**0.0009**	**0.9377**
MD = 75%	0.9342	0.0009	0.9360
MD = 80%	0.9347	0.0009	0.9365
MD = 90%	0.9305	0.0008	0.9321
MD = 100%	0.9227	0.0010	0.9247

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 1800 ppm boron, 24 Poison plates, 4.35 wt% U-235, 08 PRAs, no BPRAs			
MD = 40%	0.8761	0.0009	0.8779
MD = 50%	0.9037	0.0010	0.9057
MD = 60%	0.9213	0.0009	0.9231
MD = 70%	0.9323	0.0010	0.9343
MD = 75%	**0.9338**	**0.0009**	**0.9356**
MD = 80%	0.9329	0.0009	0.9347
MD = 85%	0.9331	0.0011	0.9353
MD = 90%	0.9310	0.0010	0.9330
MD = 100%	0.9292	0.0010	0.9312
CE 14x14 Fort Calhoun, 2000 ppm boron, 16 Poison plates, 3.50 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9055	0.0009	0.9073
MD = 50%	0.9275	0.0009	0.9293
MD = 55%	0.9315	0.0009	0.9333
MD = 60%	0.9329	0.0009	0.9347
MD = 65%	**0.9335**	**0.0008**	**0.9351**
MD = 70%	0.9315	0.0010	0.9335
MD = 75%	0.9290	0.0009	0.9308
MD = 80%	0.9258	0.0008	0.9274
MD = 90%	0.9152	0.0009	0.9170
MD = 100%	0.8999	0.0010	0.9019
CE 14x14 Fort Calhoun, 2000 ppm boron, 24 Poison plates, 3.70 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9011	0.0010	0.9031
MD = 50%	0.9201	0.0010	0.9221
MD = 55%	0.9277	0.0011	0.9299
MD = 60%	0.9310	0.0009	0.9328
MD = 65%	0.9340	0.0010	0.9360
MD = 70%	**0.9342**	**0.0010**	**0.9362**
MD = 80%	0.9284	0.0008	0.9300
MD = 90%	0.9200	0.0010	0.9220
MD = 100%	0.9079	0.0010	0.9099

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 2000 ppm boron, 24 Poison plates, 4.20 wt% U-235, 04 PRAs, no BPRAs			
MD = 40%	0.8944	0.0009	0.8962
MD = 50%	0.9167	0.0010	0.9187
MD = 60%	0.9286	0.0010	0.9306
MD = 65%	0.9347	0.0010	0.9367
MD = 70%	0.9353	0.0010	0.9373
MD = 75%	**0.9362**	**0.0009**	**0.9380**
MD = 80%	0.9337	0.0009	0.9355
MD = 90%	0.9270	0.0008	0.9286
MD = 100%	0.9198	0.0010	0.9218
CE 14x14 Fort Calhoun, 2000 ppm boron, 24 Poison plates, 4.55 wt% U-235, 08 PRAs, no BPRAs			
MD = 40%	0.8819	0.0009	0.8837
MD = 50%	0.9065	0.0009	0.9083
MD = 60%	0.9219	0.0009	0.9237
MD = 70%	0.9301	0.0010	0.9321
MD = 75%	**0.9319**	**0.0009**	**0.9337**
MD = 80%	0.9313	0.0010	0.9333
MD = 85%	0.9315	0.0009	0.9333
MD = 90%	0.9300	0.0009	0.9318
MD = 100%	0.9228	0.0009	0.9246
CE 14x14 Fort Calhoun, 2100 ppm boron, 16 Poison plates, 3.60 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9107	0.0010	0.9127
MD = 50%	0.9287	0.0008	0.9303
MD = 55%	0.9322	0.0008	0.9338
MD = 60%	**0.9348**	**0.0010**	**0.9368**
MD = 65%	0.9344	0.0010	0.9364
MD = 70%	0.9320	0.0009	0.9338
MD = 75%	0.9285	0.0009	0.9303
MD = 80%	0.9241	0.0009	0.9259
MD = 90%	0.9130	0.0009	0.9148
MD = 100%	0.8995	0.0009	0.9013

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 2100 ppm boron, 24 Poison plates, 3.80 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9051	0.0009	0.9069
MD = 50%	0.9262	0.0008	0.9278
MD = 55%	0.9305	0.0010	0.9325
MD = 60%	**0.9346**	**0.0009**	**0.9364**
MD = 65%	0.9336	0.0010	0.9356
MD = 70%	0.9329	0.0009	0.9347
MD = 80%	0.9271	0.0009	0.9289
MD = 90%	0.9185	0.0009	0.9203
MD = 100%	0.9083	0.0009	0.9101
CE 14x14 Fort Calhoun, 2100 ppm boron, 24 Poison plates, 4.30 wt% U-235, 04 PRAs, no BPRAs			
MD = 40%	0.8977	0.0009	0.8995
MD = 50%	0.9202	0.0011	0.9224
MD = 60%	0.9292	0.0009	0.9310
MD = 65%	0.9350	0.0010	0.9370
MD = 70%	**0.9355**	**0.0010**	**0.9375**
MD = 75%	0.9342	0.0009	0.9360
MD = 80%	0.9311	0.0009	0.9329
MD = 90%	0.9269	0.0011	0.9291
MD = 100%	0.9170	0.0009	0.9188
CE 14x14 Fort Calhoun, 2100 ppm boron, 24 Poison plates, 4.70 wt% U-235, 08 PRAs, no BPRAs			
MD = 40%	0.8863	0.0009	0.8881
MD = 50%	0.9114	0.0009	0.9132
MD = 60%	0.9268	0.0010	0.9288
MD = 70%	0.9322	0.0009	0.9340
MD = 75%	0.9328	0.0009	0.9346
MD = 80%	**0.9327**	**0.0010**	**0.9347**
MD = 85%	0.9316	0.0010	0.9336
MD = 90%	0.9301	0.0010	0.9321
MD = 100%	0.9228	0.0012	0.9252

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 2200 ppm boron, 16 Poison plates, 3.70 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9126	0.0009	0.9144
MD = 50%	0.9305	0.0009	0.9323
MD = 55%	0.9330	0.0009	0.9348
MD = 60%	**0.9357**	**0.0010**	**0.9377**
MD = 65%	0.9346	0.0010	0.9366
MD = 70%	0.9330	0.0009	0.9348
MD = 75%	0.9298	0.0009	0.9316
MD = 80%	0.9246	0.0009	0.9264
MD = 90%	0.9131	0.0009	0.9149
MD = 100%	0.8991	0.0009	0.9009
CE 14x14 Fort Calhoun, 2200 ppm boron, 24 Poison plates, 3.90 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9064	0.0009	0.9082
MD = 50%	0.9269	0.0009	0.9287
MD = 55%	0.9334	0.0008	0.9350
MD = 60%	0.9341	0.0009	0.9359
MD = 65%	**0.9357**	**0.0010**	**0.9377**
MD = 70%	0.9356	0.0009	0.9374
MD = 80%	0.9294	0.0010	0.9314
MD = 90%	0.9197	0.0009	0.9215
MD = 100%	0.9050	0.0009	0.9068
CE 14x14 Fort Calhoun, 2200 ppm boron, 24 Poison plates, 4.40 wt% U-235, 04 PRAs, no BPRAs			
MD = 40%	0.8993	0.0009	0.9011
MD = 50%	0.9196	0.0009	0.9214
MD = 60%	0.9319	0.0009	0.9337
MD = 65%	**0.9356**	**0.0009**	**0.9374**
MD = 70%	0.9340	0.0009	0.9358
MD = 75%	0.9316	0.0009	0.9334
MD = 80%	0.9314	0.0009	0.9332
MD = 90%	0.9236	0.0010	0.9256
MD = 100%	0.9163	0.0011	0.9185

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 2200 ppm boron, 24 Poison plates, 4.80 wt% U-235, 08 PRAs, no BPRAs			
MD = 40%	0.8875	0.0009	0.8893
MD = 50%	0.9123	0.0010	0.9143
MD = 60%	0.9262	0.0010	0.9282
MD = 65%	0.9294	0.0009	0.9312
MD = 70%	**0.9326**	**0.0010**	**0.9346**
MD = 75%	0.9318	0.0010	0.9338
MD = 80%	0.9316	0.0009	0.9334
MD = 85%	0.9316	0.0010	0.9336
MD = 90%	0.9284	0.0011	0.9306
MD = 100%	0.9213	0.0009	0.9231
CE 14x14 Fort Calhoun, 2300 ppm boron, 16 Poison plates, 3.75 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9120	0.0009	0.9138
MD = 50%	0.9296	0.0008	0.9312
MD = 55%	0.9330	0.0008	0.9346
MD = 60%	**0.9350**	**0.0010**	**0.9370**
MD = 65%	0.9328	0.0009	0.9346
MD = 70%	0.9289	0.0009	0.9307
MD = 75%	0.9265	0.0009	0.9283
MD = 80%	0.9202	0.0010	0.9222
MD = 90%	0.9094	0.0009	0.9112
MD = 100%	0.8927	0.0009	0.8945
CE 14x14 Fort Calhoun, 2300 ppm boron, 24 Poison plates, 4.00 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9112	0.0009	0.9130
MD = 50%	0.9296	0.0008	0.9312
MD = 55%	0.9330	0.0008	0.9346
MD = 60%	0.9352	0.0009	0.9370
MD = 65%	**0.9358**	**0.0010**	**0.9378**
MD = 70%	0.9349	0.0009	0.9367
MD = 80%	0.9270	0.0010	0.9290
MD = 90%	0.9182	0.0009	0.9200
MD = 100%	0.9071	0.0010	0.9091

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 2300 ppm boron, 24 Poison plates, 4.50 wt% U-235, 04 PRAs, no BPRAs			
MD = 40%	0.9008	0.0009	0.9026
MD = 50%	0.9227	0.0009	0.9245
MD = 60%	0.9325	0.0009	0.9343
MD = 65%	0.9340	0.0008	0.9356
MD = 70%	**0.9343**	**0.0010**	**0.9363**
MD = 75%	0.9332	0.0009	0.9350
MD = 80%	0.9308	0.0010	0.9328
MD = 90%	0.9242	0.0009	0.9260
MD = 100%	0.9139	0.0009	0.9157
CE 14x14 Fort Calhoun, 2300 ppm boron, 24 Poison plates, 4.90 wt% U-235, 08 PRAs, no BPRAs			
MD = 40%	0.8906	0.0008	0.8922
MD = 50%	0.9113	0.0010	0.9133
MD = 60%	0.9265	0.0009	0.9283
MD = 65%	0.9310	0.0011	0.9332
MD = 70%	**0.9329**	**0.0009**	**0.9347**
MD = 75%	0.9323	0.0009	0.9341
MD = 80%	0.9313	0.0009	0.9331
MD = 85%	0.9293	0.0009	0.9311
MD = 90%	0.9279	0.0012	0.9303
MD = 100%	0.9183	0.0010	0.9203
CE 14x14 Fort Calhoun, 2400 ppm boron, 16 Poison plates, 3.80 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9110	0.0009	0.9128
MD = 50%	0.9280	0.0008	0.9296
MD = 55%	**0.9315**	**0.0009**	**0.9333**
MD = 60%	0.9310	0.0009	0.9328
MD = 65%	0.9302	0.0011	0.9324
MD = 70%	0.9278	0.0009	0.9296
MD = 75%	0.9215	0.0008	0.9231
MD = 80%	0.9184	0.0010	0.9204
MD = 90%	0.9047	0.0009	0.9065
MD = 100%	0.8896	0.0009	0.8914

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 2400 ppm boron, 24 Poison plates, 4.05 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9112	0.0010	0.9132
MD = 50%	0.9276	0.0010	0.9296
MD = 55%	0.9319	0.0010	0.9339
MD = 60%	0.9326	0.0010	0.9346
MD = 65%	**0.9335**	**0.0009**	**0.9353**
MD = 70%	0.9306	0.0009	0.9324
MD = 80%	0.9242	0.0010	0.9262
MD = 90%	0.9136	0.0009	0.9154
MD = 100%	0.8999	0.0009	0.9017
CE 14x14 Fort Calhoun, 2400 ppm boron, 24 Poison plates, 4.60 wt% U-235, 04 PRAs, no BPRAs			
MD = 40%	0.9035	0.0009	0.9053
MD = 50%	0.9241	0.0009	0.9259
MD = 60%	0.9323	0.0010	0.9343
MD = 65%	0.9349	0.0009	0.9367
MD = 70%	**0.9355**	**0.0010**	**0.9375**
MD = 75%	0.9352	0.0009	0.9370
MD = 80%	0.9297	0.0009	0.9315
MD = 90%	0.9234	0.0009	0.9252
MD = 100%	0.9116	0.0008	0.9132
CE 14x14 Fort Calhoun, 2400 ppm boron, 24 Poison plates, 5.00 wt% U-235, 08 PRAs, no BPRAs			
MD = 40%	0.8911	0.0010	0.8931
MD = 50%	0.9143	0.0009	0.9161
MD = 60%	0.9260	0.0009	0.9278
MD = 65%	0.9283	0.0010	0.9303
MD = 70%	**0.9315**	**0.0011**	**0.9337**
MD = 75%	0.9301	0.0010	0.9321
MD = 80%	0.9305	0.0009	0.9323
MD = 85%	0.9293	0.0010	0.9313
MD = 90%	0.9247	0.0010	0.9267
MD = 100%	0.9176	0.0010	0.9196

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
CE 14x14 Fort Calhoun, 2500 ppm boron, 16 Poison plates, 3.90 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9141	0.0008	0.9157
MD = 50%	0.9289	0.0009	0.9307
MD = 55%	**0.9321**	**0.0010**	**0.9341**
MD = 60%	0.9315	0.0009	0.9333
MD = 65%	0.9308	0.0010	0.9328
MD = 70%	0.9272	0.0009	0.9290
MD = 80%	0.9162	0.0008	0.9178
MD = 90%	0.9051	0.0008	0.9067
MD = 100%	0.8893	0.0008	0.8909
CE 14x14 Fort Calhoun, 2500 ppm boron, 24 Poison plates, 4.15 wt% U-235, No PRAs, no BPRAs			
MD = 40%	0.9133	0.0009	0.9151
MD = 50%	0.9302	0.0009	0.9320
MD = 55%	0.9333	0.0009	0.9351
MD = 60%	**0.9338**	**0.0010**	**0.9358**
MD = 65%	0.9336	0.0011	0.9358
MD = 70%	0.9338	0.0010	0.9358
MD = 80%	0.9247	0.0009	0.9265
MD = 90%	0.9131	0.0008	0.9147
MD = 100%	0.9001	0.0009	0.9019
CE 14x14 Fort Calhoun, 2500 ppm boron, 24 Poison plates, 4.70 wt% U-235, 04 PRAs, no BPRAs			
MD = 40%	0.9075	0.0009	0.9093
MD = 50%	0.9245	0.0010	0.9265
MD = 60%	0.9335	0.0010	0.9355
MD = 65%	**0.9347**	**0.0009**	**0.9365**
MD = 70%	0.9346	0.0008	0.9362
MD = 75%	0.9320	0.0008	0.9336
MD = 80%	0.9287	0.0010	0.9307
MD = 90%	0.9226	0.0009	0.9244
MD = 100%	0.9098	0.0009	0.9116

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
16-Plate Basket, 3.30 w/o U-235, 1800 ppm, No PRAs, no BPRAs			
MD=40%	0.8897	0.0009	0.8915
MD=50%	0.9161	0.0010	0.9181
MD=60%	0.9296	0.0008	0.9312
MD=70%	0.9356	0.0010	0.9376
MD=80%	0.9377	0.0008	0.9393
MD=90%	0.9328	0.0009	0.9346
MD=100%	0.9258	0.0010	0.9278
24-Plate Basket, 3.45 w/o U-235, 1800 ppm, No PRAs, with BPRAs			
MD=40%	0.8790	0.0010	0.8810
MD=50%	0.9086	0.0011	0.9108
MD=60%	0.9237	0.0010	0.9257
MD=70%	0.9316	0.0009	0.9334
MD=80%	0.9345	0.0009	0.9363
MD=90%	0.9349	0.0010	0.9369
MD=100%	0.9319	0.0008	0.9335
24-Plate Basket, 3.90 w/o U-235, 1800 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8714	0.0011	0.8736
MD=50%	0.8992	0.0010	0.9012
MD=60%	0.9207	0.0009	0.9225
MD=70%	0.9292	0.0010	0.9312
MD=80%	0.9361	0.0009	0.9379
MD=90%	0.9372	0.0009	0.9390
MD=100%	0.9345	0.0009	0.9363
24-Plate Basket, 4.25 w/o U-235, 1800 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8581	0.0009	0.8599
MD=50%	0.8903	0.0010	0.8923
MD=60%	0.9118	0.0009	0.9136
MD=70%	0.9263	0.0009	0.9281
MD=80%	0.9341	0.0010	0.9361
MD=90%	0.9378	0.0010	0.9398
MD=100%	0.9377	0.0011	0.9399

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
16-Plate Basket, 3.45 w/o U-235, 2000 ppm, No PRAs, with BPRAs			
MD=40%	0.8931	0.0009	0.8949
MD=50%	0.9177	0.0008	0.9193
MD=60%	0.9314	0.0009	0.9332
MD=70%	0.9352	0.0010	0.9372
MD=80%	0.9353	0.0009	0.9371
MD=90%	0.9305	0.0009	0.9323
MD=100%	0.9218	0.0009	0.9236
24-Plate Basket, 3.65 w/o U-235, 2000 ppm, No PRAs, with BPRAs			
MD=40%	0.8891	0.0010	0.8911
MD=50%	0.9117	0.0008	0.9133
MD=60%	0.9283	0.0009	0.9301
MD=70%	0.9360	0.0009	0.9378
MD=80%	0.9364	0.0010	0.9384
MD=90%	0.9348	0.0009	0.9366
MD=100%	0.9303	0.0010	0.9323
24-Plate Basket, 4.10 w/o U-235, 2000 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8752	0.0009	0.8770
MD=50%	0.9026	0.0009	0.9044
MD=60%	0.9234	0.0010	0.9254
MD=70%	0.9333	0.0008	0.9349
MD=80%	0.9382	0.0009	0.9400
MD=90%	0.9357	0.0009	0.9375
MD=100%	0.9335	0.0009	0.9353
24-Plate Basket, 4.50 w/o U-235, 2000 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8678	0.0009	0.8696
MD=50%	0.8974	0.0011	0.8996
MD=60%	0.9174	0.0010	0.9194
MD=70%	0.9280	0.0011	0.9302
MD=80%	0.9361	0.0010	0.9381
MD=90%	0.9381	0.0009	0.9399
MD=100%	0.9358	0.0010	0.9378

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
16-Plate Basket, 3.55 w/o U-235, 2100 ppm, No PRAs, with BPRAs			
MD=40%	0.8977	0.0010	0.8997
MD=50%	0.9218	0.0009	0.9236
MD=60%	0.9324	0.0008	0.9340
MD=70%	0.9383	0.0008	0.9399
MD=80%	0.9360	0.0008	0.9376
MD=90%	0.9298	0.0009	0.9316
MD=100%	0.9203	0.0010	0.9223
24-Plate Basket, 3.75 w/o U-235, 2100 ppm, No PRAs, with BPRAs			
MD=40%	0.8911	0.0009	0.8929
MD=50%	0.9178	0.0009	0.9196
MD=60%	0.9310	0.0009	0.9328
MD=70%	0.9364	0.0008	0.9380
MD=80%	0.9374	0.0009	0.9392
MD=90%	0.9338	0.0011	0.9360
MD=100%	0.9297	0.0011	0.9319
24-Plate Basket, 4.20 w/o U-235, 2100 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8796	0.0009	0.8814
MD=50%	0.9067	0.0009	0.9085
MD=60%	0.9229	0.0010	0.9249
MD=70%	0.9329	0.0011	0.9351
MD=80%	0.9353	0.0010	0.9373
MD=90%	0.9347	0.0010	0.9367
MD=100%	0.9330	0.0009	0.9348
24-Plate Basket, 4.60 w/o U-235, 2100 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8683	0.0008	0.8699
MD=50%	0.8994	0.0009	0.9012
MD=60%	0.9189	0.0010	0.9209
MD=70%	0.9296	0.0009	0.9314
MD=80%	0.9358	0.0010	0.9378
MD=90%	0.9378	0.0011	0.9400
MD=100%	0.9339	0.0010	0.9359

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
16-Plate Basket, 3.60 w/o U-235, 2200 ppm, No PRAs, with BPRAs			
MD=40%	0.8950	0.0009	0.8968
MD=50%	0.9198	0.0009	0.9216
MD=60%	0.9317	0.0010	0.9337
MD=70%	0.9349	0.0009	0.9367
MD=80%	0.9342	0.0011	0.9364
MD=90%	0.9258	0.0008	0.9274
MD=100%	0.9177	0.0010	0.9197
24-Plate Basket, 3.80 w/o U-235, 2200 ppm, No PRAs, with BPRAs			
MD=40%	0.8916	0.0010	0.8936
MD=50%	0.9153	0.0010	0.9173
MD=60%	0.9292	0.0010	0.9312
MD=70%	0.9333	0.0010	0.9353
MD=80%	0.9357	0.0010	0.9377
MD=90%	0.9315	0.0010	0.9335
MD=100%	0.9277	0.0009	0.9295
24-Plate Basket, 4.30 w/o U-235, 2200 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8821	0.0010	0.8841
MD=50%	0.9086	0.0009	0.9104
MD=60%	0.9251	0.0009	0.9269
MD=70%	0.9341	0.0010	0.9361
MD=80%	0.9372	0.0009	0.9390
MD=90%	0.9347	0.0009	0.9365
MD=100%	0.9324	0.0009	0.9342
24-Plate Basket, 4.70 w/o U-235, 2200 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8717	0.0009	0.8735
MD=50%	0.9006	0.0010	0.9026
MD=60%	0.9185	0.0011	0.9207
MD=70%	0.9304	0.0009	0.9322
MD=80%	0.9344	0.0010	0.9364
MD=90%	0.9351	0.0010	0.9371
MD=100%	0.9323	0.0009	0.9341

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
16-Plate Basket, 3.65 w/o U-235, 2300 ppm, No PRAs, with BPRAs			
MD=40%	0.9015	0.0010	0.9035
MD=50%	0.9242	0.0009	0.9260
MD=60%	0.9330	0.0010	0.9350
MD=70%	0.9363	0.0009	0.9381
MD=80%	0.9342	0.0009	0.9360
MD=90%	0.9282	0.0009	0.9300
MD=100%	0.9166	0.0010	0.9186
24-Plate Basket, 3.90 w/o U-235, 2300 ppm, No PRAs, with BPRAs			
MD=40%	0.8962	0.0009	0.8980
MD=50%	0.9171	0.0010	0.9191
MD=60%	0.9279	0.0009	0.9297
MD=70%	0.9363	0.0009	0.9381
MD=80%	0.9362	0.0011	0.9384
MD=90%	0.9311	0.0009	0.9329
MD=100%	0.9245	0.0009	0.9263
24-Plate Basket, 4.40 w/o U-235, 2300 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8855	0.0010	0.8875
MD=50%	0.9112	0.0009	0.9130
MD=60%	0.9270	0.0009	0.9288
MD=70%	0.9346	0.0009	0.9364
MD=80%	0.9364	0.0008	0.9380
MD=90%	0.9341	0.0009	0.9359
MD=100%	0.9306	0.0009	0.9324
24-Plate Basket, 4.80 w/o U-235, 2300 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8742	0.0008	0.8758
MD=50%	0.9020	0.0009	0.9038
MD=60%	0.9190	0.0011	0.9212
MD=70%	0.9300	0.0010	0.9320
MD=80%	0.9337	0.0010	0.9357
MD=90%	0.9354	0.0009	0.9372
MD=100%	0.9318	0.0012	0.9342

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(continued)

Model Description	k_{KENO}	1σ	k_{eff}
16-Plate Basket, 3.80 w/o U-235, 2400 ppm, No PRAs, with BPRAs			
MD=40%	0.9044	0.0010	0.9064
MD=50%	0.9259	0.0010	0.9279
MD=60%	0.9348	0.0010	0.9368
MD=70%	0.9371	0.0008	0.9387
MD=80%	0.9351	0.0009	0.9369
MD=90%	0.9276	0.0011	0.9298
MD=100%	0.9174	0.0009	0.9192
24-Plate Basket, 4.00 w/o U-235, 2400 ppm, No PRAs, with BPRAs			
MD=40%	0.9001	0.0009	0.9019
MD=50%	0.9210	0.0010	0.9230
MD=60%	0.9326	0.0011	0.9348
MD=70%	0.9380	0.0009	0.9398
MD=80%	0.9366	0.0009	0.9384
MD=90%	0.9318	0.0009	0.9336
MD=100%	0.9227	0.0010	0.9247
24-Plate Basket, 4.50 w/o U-235, 2400 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8876	0.0008	0.8892
MD=50%	0.9123	0.0008	0.9139
MD=60%	0.9271	0.0010	0.9291
MD=70%	0.9353	0.0010	0.9373
MD=80%	0.9361	0.0010	0.9381
MD=90%	0.9348	0.0010	0.9368
MD=100%	0.9283	0.0011	0.9305
24-Plate Basket, 4.90 w/o U-235, 2400 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8753	0.0009	0.8771
MD=50%	0.9032	0.0010	0.9052
MD=60%	0.9206	0.0010	0.9226
MD=70%	0.9294	0.0009	0.9312
MD=80%	0.9346	0.0011	0.9368
MD=90%	0.9350	0.0009	0.9368
MD=100%	0.9311	0.0010	0.9331

Table M.6-42
CE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

(concluded)

Model Description	k_{KENO}	1σ	k_{eff}
16-Plate Basket, 3.90 w/o U-235, 2500 ppm, No PRAs, with BPRAs			
MD=40%	0.9074	0.0010	0.9094
MD=50%	0.9287	0.0009	0.9305
MD=60%	0.9379	0.0009	0.9397
MD=70%	0.9384	0.0010	0.9404
MD=80%	0.9350	0.0009	0.9368
MD=90%	0.9270	0.0009	0.9288
MD=100%	0.9181	0.0009	0.9199
24-Plate Basket, 4.05 w/o U-235, 2500 ppm, No PRAs, with BPRAs			
MD=40%	0.8995	0.0008	0.9011
MD=50%	0.9206	0.0010	0.9226
MD=60%	0.9312	0.0011	0.9334
MD=70%	0.9351	0.0011	0.9373
MD=80%	0.9332	0.0010	0.9352
MD=90%	0.9286	0.0011	0.9308
MD=100%	0.9212	0.0008	0.9228
24-Plate Basket, 4.60 w/o U-235, 2500 ppm, 4 PRAs, with BPRAs			
MD=40%	0.8923	0.0010	0.8943
MD=50%	0.9143	0.0010	0.9163
MD=60%	0.9266	0.0010	0.9286
MD=70%	0.9359	0.0009	0.9377
MD=80%	0.9369	0.0010	0.9389
MD=90%	0.9342	0.0009	0.9360
MD=100%	0.9278	0.0008	0.9294
24-Plate Basket, 5.00 w/o U-235, 2500 ppm, 8 PRAs, with BPRAs			
MD=40%	0.8799	0.0008	0.8815
MD=50%	0.9052	0.0010	0.9072
MD=60%	0.9211	0.0010	0.9231
MD=70%	0.9310	0.0011	0.9332
MD=80%	0.9341	0.0010	0.9361
MD=90%	0.9326	0.0008	0.9342
MD=100%	0.9288	0.0010	0.9308

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 1800 ppm boron, 16 Poison plates, 3.55 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9125	0.0009	0.9143
MD = 50%	0.9284	0.0010	0.9304
MD = 55%	0.9315	0.0010	0.9335
MD = 60%	0.9312	0.0010	0.9332
MD = 65%	**0.9329**	**0.0011**	**0.9351**
MD = 70%	0.9325	0.0010	0.9345
MD = 80%	0.9253	0.0009	0.9271
MD = 90%	0.9153	0.0010	0.9173
MD = 100%	0.9052	0.0010	0.9072
WE 14x14 ZCA/ZCB, 1800 ppm boron, 24 Poison plates, 3.75 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9034	0.0012	0.9058
MD = 50%	0.9241	0.0010	0.9261
MD = 55%	0.9283	0.0010	0.9303
MD = 60%	0.9304	0.0010	0.9324
MD = 65%	0.9333	0.0012	0.9357
MD = 70%	**0.9351**	**0.0011**	**0.9373**
MD = 75%	0.9337	0.0010	0.9357
MD = 80%	0.9325	0.0011	0.9347
MD = 90%	0.9259	0.0010	0.9279
MD = 100%	0.9183	0.0010	0.9203
WE 14x14 ZCA/ZCB, 1800 ppm boron, 24 Poison plates, 4.40 wt% U-235, 04 PRAs, No BPRAs			
MD = 40%	0.8927	0.0010	0.8947
MD = 50%	0.9158	0.0010	0.9178
MD = 60%	0.9276	0.0010	0.9296
MD = 65%	0.9321	0.0010	0.9341
MD = 70%	0.9328	0.0010	0.9348
MD = 75%	0.9335	0.0010	0.9355
MD = 80%	**0.9348**	**0.0009**	**0.9366**
MD = 85%	0.9332	0.0009	0.9350
MD = 90%	0.9302	0.0009	0.9320
MD = 100%	0.9251	0.0011	0.9273

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 1800 ppm boron, 16 Poison plates, 3.55 wt% U-235, No PRAs, with BPRAs			
MD=40%	0.9095	0.0009	0.9113
MD=50%	0.9241	0.0009	0.9259
MD=60%	0.9302	0.0010	0.9322
MD=70%	0.9299	0.0010	0.9319
MD=80%	0.9266	0.0011	0.9288
MD=90%	0.9192	0.0008	0.9208
MD=100%	0.9100	0.0010	0.9120
WE 14x14 ZCA/ZCB, 1800 ppm boron, 24 Poison plates, 3.75 wt% U-235, No PRAs, with BPRAs			
MD=40%	0.8963	0.0009	0.8981
MD=50%	0.9164	0.0011	0.9186
MD=60%	0.9258	0.0010	0.9278
MD=70%	0.9330	0.0009	0.9348
MD=80%	0.9318	0.0010	0.9338
MD=90%	0.9287	0.0012	0.9311
MD=100%	0.9224	0.0011	0.9246
WE 14x14 ZCA/ZCB, 1800 ppm boron, 24 Poison plates, 4.40 wt% U-235, 04 PRAs, with BPRAs			
MD=40%	0.8900	0.0010	0.8920
MD=50%	0.9097	0.0009	0.9115
MD=60%	0.9226	0.0009	0.9244
MD=70%	0.9280	0.0009	0.9298
MD=80%	0.9295	0.0010	0.9315
MD=90%	0.9271	0.0010	0.9291
MD=100%	0.9253	0.0012	0.9277

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2000 ppm boron, 16 Poison plates, 3.75 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9192	0.0009	0.9210
MD = 50%	0.9305	0.0009	0.9323
MD = 55%	0.9338	0.0010	0.9358
MD = 60%	**0.9351**	**0.0009**	**0.9369**
MD = 65%	0.9337	0.0009	0.9355
MD = 70%	0.9297	0.0009	0.9315
MD = 80%	0.9232	0.0010	0.9252
MD = 90%	0.9119	0.0008	0.9135
MD = 100%	0.8991	0.0009	0.9009
WE 14x14 ZCA/ZCB, 2000 ppm boron, 24 Poison plates, 3.90 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9037	0.0010	0.9057
MD = 50%	0.9235	0.0010	0.9255
MD = 55%	0.9286	0.0011	0.9308
MD = 60%	0.9295	0.0009	0.9313
MD = 65%	**0.9310**	**0.0011**	**0.9332**
MD = 70%	0.9305	0.0010	0.9325
MD = 80%	0.9273	0.0009	0.9291
MD = 90%	0.9183	0.0009	0.9201
MD = 100%	0.9141	0.0009	0.9159
WE 14x14 ZCA/ZCB, 2000 ppm boron, 24 Poison plates, 4.60 wt% U-235, 04 PRAs, No BPRAs			
MD = 40%	0.8969	0.0009	0.8987
MD = 50%	0.9175	0.0009	0.9193
MD = 60%	0.9269	0.0011	0.9291
MD = 65%	0.9309	0.0009	0.9327
MD = 70%	0.9310	0.0011	0.9332
MD = 75%	**0.9315**	**0.0009**	**0.9333**
MD = 80%	0.9304	0.0010	0.9324
MD = 85%	0.9267	0.0009	0.9285
MD = 90%	0.9258	0.0010	0.9278
MD = 100%	0.9191	0.0009	0.9209

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2100 ppm boron, 16 Poison plates, 3.80 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9173	0.0009	0.9191
MD = 50%	0.9284	0.0009	0.9302
MD = 55%	**0.9324**	**0.0009**	**0.9342**
MD = 60%	0.9315	0.0011	0.9337
MD = 65%	0.9292	0.0009	0.9310
MD = 70%	0.9280	0.0010	0.9300
MD = 80%	0.9180	0.0010	0.9200
MD = 90%	0.9086	0.0010	0.9106
MD = 100%	0.8954	0.0010	0.8974
WE 14x14 ZCA/ZCB, 2100 ppm boron, 24 Poison plates, 4.00 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9096	0.0011	0.9118
MD = 50%	0.9260	0.0009	0.9278
MD = 55%	0.9295	0.0010	0.9315
MD = 60%	**0.9329**	**0.0009**	**0.9347**
MD = 65%	0.9321	0.0010	0.9341
MD = 70%	0.9322	0.0009	0.9340
MD = 80%	0.9256	0.0011	0.9278
MD = 90%	0.9193	0.0009	0.9211
MD = 100%	0.9071	0.0010	0.9091
WE 14x14 ZCA/ZCB, 2100 ppm boron, 24 Poison plates, 4.75 wt% U-235, 04 PRAs, No BPRAs			
MD = 40%	0.9021	0.0011	0.9043
MD = 50%	0.9197	0.0009	0.9215
MD = 60%	0.9308	0.0008	0.9324
MD = 65%	0.9340	0.0009	0.9358
MD = 70%	**0.9349**	**0.0010**	**0.9369**
MD = 75%	0.9332	0.0010	0.9352
MD = 80%	0.9316	0.0009	0.9334
MD = 90%	0.9267	0.0011	0.9289
MD = 100%	0.9185	0.0011	0.9207

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2200 ppm boron, 16 Poison plates, 3.90 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9200	0.0009	0.9218
MD = 50%	0.9315	0.0009	0.9333
MD = 55%	0.9330	0.0008	0.9346
MD = 60%	**0.9329**	**0.0010**	**0.9349**
MD = 65%	0.9310	0.0008	0.9326
MD = 70%	0.9276	0.0010	0.9296
MD = 80%	0.9180	0.0009	0.9198
MD = 90%	0.9073	0.0009	0.9091
MD = 100%	0.8936	0.0008	0.8952
WE 14x14 ZCA/ZCB, 2200 ppm boron, 24 Poison plates, 4.10 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9099	0.0010	0.9119
MD = 50%	0.9271	0.0010	0.9291
MD = 55%	0.9314	0.0010	0.9334
MD = 60%	**0.9333**	**0.0011**	**0.9355**
MD = 65%	0.9324	0.0010	0.9344
MD = 70%	0.9331	0.0011	0.9353
MD = 80%	0.9276	0.0010	0.9296
MD = 90%	0.9175	0.0011	0.9197
MD = 100%	0.9062	0.0010	0.9082
WE 14x14 ZCA/ZCB, 2200 ppm boron, 24 Poison plates, 4.85 wt% U-235, 04 PRAs, No BPRAs			
MD = 40%	0.9021	0.0010	0.9041
MD = 50%	0.9226	0.0009	0.9244
MD = 60%	0.9317	0.0012	0.9341
MD = 65%	0.9330	0.0010	0.9350
MD = 70%	**0.9335**	**0.0010**	**0.9355**
MD = 75%	0.9316	0.0010	0.9336
MD = 80%	0.9311	0.0010	0.9331
MD = 90%	0.9254	0.0009	0.9272
MD = 100%	0.9160	0.0011	0.9182

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2200 ppm boron, 16 Poison plates, 3.90 wt% U-235, No PRAs, with BPRAs			
MD=40%	0.9184	0.0008	0.9200
MD=50%	0.9270	0.0009	0.9288
MD=60%	0.9307	0.0009	0.9325
MD=70%	0.8879	0.0009	0.8897
MD=80%	0.9010	0.0010	0.9030
MD=90%	0.9113	0.0010	0.9133
MD=100%	0.9014	0.0010	0.9034
WE 14x14 ZCA/ZCB, 2200 ppm boron, 24 Poison plates, 4.10 wt% U-235, No PRAs, with BPRAs			
MD=40%	0.9049	0.0009	0.9067
MD=50%	0.9202	0.0010	0.9222
MD=60%	0.9305	0.0010	0.9325
MD=70%	0.9304	0.0008	0.9320
MD=80%	0.9090	0.0009	0.9108
MD=90%	0.9223	0.0011	0.9245
MD=100%	0.9161	0.0010	0.9181
WE 14x14 ZCA/ZCB, 2200 ppm boron, 24 Poison plates, 4.85 wt% U-235, 04 PRAs, with BPRAs			
MD=40%	0.9008	0.0010	0.9028
MD=50%	0.9177	0.0010	0.9197
MD=60%	0.9261	0.0011	0.9283
MD=70%	0.9306	0.0009	0.9324
MD=80%	0.9283	0.0009	0.9301
MD=90%	0.9243	0.0011	0.9265
MD=100%	0.9189	0.0009	0.9207

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2300 ppm boron, 16 Poison plates, 4.00 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9222	0.0009	0.9240
MD = 50%	0.9311	0.0008	0.9327
MD = 55%	0.9341	0.0010	0.9361
MD = 60%	**0.9345**	**0.0009**	**0.9363**
MD = 65%	0.9310	0.0009	0.9328
MD = 70%	0.9274	0.0009	0.9292
MD = 80%	0.9183	0.0009	0.9201
MD = 90%	0.9060	0.0010	0.9080
MD = 100%	0.8934	0.0009	0.8952
WE 14x14 ZCA/ZCB, 2300 ppm boron, 24 Poison plates, 4.20 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9140	0.0009	0.9158
MD = 50%	0.9295	0.0010	0.9315
MD = 55%	**0.9344**	**0.0011**	**0.9366**
MD = 60%	0.9336	0.0009	0.9354
MD = 65%	0.9337	0.0009	0.9355
MD = 70%	0.9322	0.0011	0.9344
MD = 80%	0.9256	0.0010	0.9276
MD = 90%	0.9185	0.0010	0.9205
MD = 100%	0.9049	0.0009	0.9067
WE 14x14 ZCA/ZCB, 2300 ppm boron, 24 Poison plates, 5.00 wt% U-235, 04 PRAs, No BPRAs			
MD = 40%	0.9076	0.0009	0.9094
MD = 50%	0.9260	0.0009	0.9278
MD = 60%	0.9323	0.0009	0.9341
MD = 65%	0.9350	0.0009	0.9368
MD = 70%	**0.9356**	**0.0010**	**0.9376**
MD = 75%	0.9333	0.0011	0.9355
MD = 80%	0.9313	0.0010	0.9333
MD = 90%	0.9240	0.0010	0.9260
MD = 100%	0.9157	0.0010	0.9177

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2400 ppm boron, 16 Poison plates, 4.10 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9243	0.0010	0.9263
MD = 50%	0.9343	0.0009	0.9361
MD = 55%	**0.9354**	**0.0010**	**0.9374**
MD = 60%	0.9344	0.0010	0.9364
MD = 65%	0.9318	0.0008	0.9334
MD = 70%	0.9286	0.0009	0.9304
MD = 80%	0.9185	0.0009	0.9203
MD = 90%	0.9060	0.0009	0.9078
MD = 100%	0.8917	0.0008	0.8933
WE 14x14 ZCA/ZCB, 2400 ppm boron, 24 Poison plates, 4.30 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9166	0.0009	0.9184
MD = 50%	0.9305	0.0010	0.9325
MD = 55%	0.9330	0.0010	0.9350
MD = 60%	0.9334	0.0010	0.9354
MD = 65%	**0.9335**	**0.0010**	**0.9355**
MD = 70%	0.9327	0.0011	0.9349
MD = 80%	0.9250	0.0011	0.9272
MD = 90%	0.9147	0.0010	0.9167
MD = 100%	0.9044	0.0010	0.9064

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(continued)

Model Description	K_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2500 ppm boron, 16 Poison plates, 4.15 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9253	0.0010	0.9273
MD = 50%	0.9329	0.0009	0.9347
MD = 55%	**0.9333**	**0.0011**	**0.9355**
MD = 60%	0.9314	0.0010	0.9334
MD = 65%	0.9285	0.0009	0.9303
MD = 70%	0.9250	0.0010	0.9270
MD = 80%	0.9137	0.0009	0.9155
MD = 90%	0.9013	0.0009	0.9031
MD = 100%	0.8859	0.0010	0.8879
WE 14x14 ZCA/ZCB, 2500 ppm boron, 24 Poison plates, 4.40 wt% U-235, No PRAs, No BPRAs			
MD = 40%	0.9191	0.0010	0.9211
MD = 50%	0.9314	0.0010	0.9334
MD = 55%	**0.9353**	**0.0010**	**0.9373**
MD = 60%	0.9332	0.0008	0.9348
MD = 65%	0.9335	0.0010	0.9355
MD = 70%	0.9318	0.0010	0.9338
MD = 80%	0.9226	0.0010	0.9246
MD = 90%	0.9155	0.0010	0.9175
MD = 100%	0.9032	0.0010	0.9052

Table M.6-43
WE 14x14 Class Assembly Final Results with and without BPRAs (16 or 24 Poison Plate Configurations, Variable Soluble Boron Concentration)
(concluded)

Model Description	k_{KENO}	1σ	k_{eff}
WE 14x14 ZCA/ZCB, 2500 ppm boron, 16 Poison plates, 4.15 wt% U-235, No PRAs, with BPRAs			
MD=40%	0.9213	0.0009	0.9231
MD=50%	0.9315	0.0008	0.9331
MD=60%	0.9301	0.0009	0.9319
MD=70%	0.9254	0.0010	0.9274
MD=80%	0.9185	0.0008	0.9201
MD=90%	0.9057	0.0009	0.9075
MD=100%	0.8975	0.0009	0.8993
WE 14x14 ZCA/ZCB, 2500 ppm boron, 24 Poison plates, 4.40 wt% U-235, No PRAs, with BPRAs			
MD=40%	0.9132	0.0010	0.9152
MD=50%	0.9265	0.0010	0.9285
MD=60%	0.9324	0.0011	0.9346
MD=70%	0.9312	0.0010	0.9332
MD=80%	0.9277	0.0009	0.9295
MD=90%	0.9225	0.0010	0.9245
MD=100%	0.9121	0.0010	0.9141

P.1.1 Introduction

The NUHOMS®-24PTH system is designed to store up to 24 intact (including reconstituted) B&W 15x15, WE 17x17, CE 15x15, WE 15x15, CE 14x14, and WE 14x14 class PWR fuel assemblies. WE 15x15 Partial Length Shield Assemblies (PLSAs) are also authorized to be stored in the 24PTH system. The fuel to be stored is limited to a maximum assembly average initial enrichment of 5.0 wt. %, a maximum assembly average burnup of 62 GWd/MTU, and a minimum cooling time of 3.0 years. The long cavity 24PTH-L and 24PTH-S-LC DSC types are also designed to store up to 24 Control Components (CCs) which include Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs) and Neutron Sources. The design characteristics, including physical and radiological parameters of the payload, are described in Chapter P.2.

Reconstituted assemblies containing up to 10 replacement stainless steel rods per assembly or unlimited number of lower enrichment UO_2 rods instead of Zircaloy clad enriched UO_2 rods are acceptable for storage in 24PTH DSC as intact fuel assemblies with a slightly longer cooling time than that required for a standard assembly. The maximum number of reconstituted fuel assemblies per DSC is four.

Provisions have been made for storage of up to 12 damaged fuel assemblies in lieu of an equal number of intact assemblies in cells located at the outer edge of the 24PTH basket. Damaged PWR fuel assemblies are assemblies containing missing or partial fuel rods or fuel rods with known or suspected cladding defects greater hairline cracks or pinhole leaks. The DSC basket cells which store damaged fuel assemblies are provided with top and bottom end caps to assure retrievability.

The NUHOMS®-24PTH system consists of the following new or modified components:

- A 24PTH DSC, with three alternate configurations, described in detail in Section P.1.2, provides confinement, an inert environment, structural support, and criticality control for the 24 PWR fuel assemblies,
- A HSM-H module, described in Section P.1.2, is provided for environmental protection, shielding and heat rejection during storage, and
- OS197-FC transfer cask for onsite transfer of the 24PTH-S and 24PTH-L DSCs. The NUHOMS®-24PTH-S and 24PTH-L DSCs with Types 1A, 1B, 1C baskets can also be transferred in the OS197/OS197H TCs if the total heat load is 31.2 kW or less.

In addition to these new or modified components listed above, the 24PTH-S-LC DSC requires the use of the existing Standardized HSM Model 102 or the new HSM-H for storage and the Standardized Transfer Cask for transfer.

The NUHOMS®-24PTH system requires the use of non-safety related auxiliary transfer equipment described in Section 1.3.2.2 of the FSAR. There is no change to any of these items except for the cask support skid. The cask support skid is modified by adding two industrial grade motor driven redundant blowers with associated ductwork for connecting to the TC ram cover plate opening. This modification provides a reliable source of external air circulation for the OS197FC TC.

Approval of the NUHOMS®-24PTH system components described in Chapter P.1.2 is sought under the provisions of 10CFR 72, Subpart l for use under the general license provisions of 10CFR 72, Subpart K. The 24PTH system components are intended for storage on a reinforced concrete pad.

P.2.1 Spent Fuel To Be Stored

As described in Chapter P.1, there are three design configurations for the NUHOMS®-24PTH DSC; S, L and S-LC. Each of the DSC configurations is designed to store intact (including reconstituted) and/or damaged PWR fuel assemblies as specified in Table P.2-1 and Table P.2-3. The fuel to be stored is limited to a maximum assembly average initial enrichment of 5.0 wt. % ^{235}U. The maximum allowable assembly average burnup is limited to 62 GWd/MTU and the minimum cooling time is 3 years. The 24PTH-L and 24PTH-S-LC DSCs are also designed to store Control Components (CCs) with thermal and radiological characteristics as listed in Table P.2-2. The CCs include Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs), and Neutron Sources.

Partial Length Shield Assemblies (PLSAs) for the Westinghouse 15x15 class, where part of the active fuel is replaced with steel are also included as authorized

Reconstituted assemblies containing up to 10 replacement stainless steel rods per assembly or unlimited number of lower enrichment UO_2 rods are acceptable for storage in 24PTH DSC as intact fuel assemblies. The stainless steel rods are assumed to have two-thirds the irradiation time as the remaining fuel rods of the assembly. The reconstituted UO_2 rods are assumed to have the same irradiation history as the entire fuel assembly. The reconstituted rods can be at any location in the fuel assemblies. The maximum number of reconstituted fuel assemblies per DSC is four.

The NUHOMS®-24PTH DSCs can also accommodate up to a maximum of 12 damaged fuel assemblies placed in cells located at the outer edge of the DSC as shown in Figure P.2-6. Damaged PWR fuel assemblies are assemblies containing missing or partial fuel rods, or fuel rods with known or suspected cladding defects greater hairline cracks, or pinhole leaks. The extent of damage in the fuel rods is to be limited such that a fuel pellet is not able to pass through the damaged cladding during handling and retrievability is assured following normal and off-normal conditions. The DSC basket cells which store damaged fuel assemblies are provided with top and bottom end caps to assure retrievability.

A 24PTH DSC containing less than 24 fuel assemblies may contain either empty slots or dummy fuel assemblies in the empty slots. The dummy assemblies are unirradiated, stainless steel encased structures that approximate the weight and center of gravity of a fuel assembly.

The NUHOMS®-24PTH-S and 24PTH-L DSCs may store up to 24 PWR fuel assemblies arranged in any of the four alternate heat load zoning configurations shown in Figure P.2-1 through Figure P.2-4 with a maximum decay heat of 2.0 kW per assembly and a maximum heat load of 40.8 kW per canister.

The 24PTH-S-LC may store up to 24 B&W 15x15 fuel assemblies arranged in accordance with heat load zoning configuration No. 5 with a maximum decay heat of 1.5 kW per assembly and a maximum heat load of 24.0 kW per DSC, as shown in Figure P.2-5.

The 24PTH DSC basket is designed with 2 alternate options: Type 1 basket, which includes aluminum inserts in the R45 transition rails, and Type 2 basket which does not include any aluminum inserts. Type 1 basket is the preferred option for canisters with high decay heat loads, since the aluminum inserts allow a more direct heat conduction path from the basket edge to the

Table P.2-1
PWR Fuel Specification for the Fuel to be Stored in the NUHOMS®-24PTH DSC

PHYSICAL PARAMETERS:	
Fuel Class	Intact or damaged unconsolidated B&W 15x15, WE 17x17, CE 15x15, WE 15x15, CE 14x14 and WE 14x14 class PWR assemblies (with or without control components) that are enveloped by the fuel assembly design characteristics listed in Table P.2-3. Equivalent reload fuel manufactured by other vendors but enveloped by the design characteristics listed in Table P.2-3 is also acceptable.
Fuel Damage	Damaged PWR fuel assemblies are assemblies containing missing or partial fuel rods or fuel rods with known or suspected cladding defects greater than hairline cracks or pinhole leaks. The extent of cladding damage in the fuel rods is to be limited such that a fuel pellet is not able to pass through the damaged cladding during handling and retrievability is assured following normal and off-normal conditions.
Partial Length Shield Assemblies (PLSAs)	WE 15x15 class PLSAs with following characteristics are authorized: • Maximum burnup, 40 GWd/MTU • Minimum cooling time, 6.5 years • Maximum Decay Heat, 900 Watts
Reconstituted Fuel Assemblies: • Maximum No. of Reconstituted Assemblies per DSC with Irradiated Stainless Steel Rods • Maximum No. of Irradiated Stainless Steel Rods per Reconstituted Fuel Assembly • Maximum No. of Reconstituted Assemblies per DSC with Unlimited Number of Low Enriched UO_2 Rods and/or Unirradiated Stainless Steel Rods and/or Zr Rods or Zr Pellets	 4 10 24
Control Components (CCs)	• Up to 24 CCs are authorized for storage in 24PTH-L and 24PTH-S-LC DSCs only. • Authorized CCs include Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs), and Neutron Sources. • Design basis thermal and radiological characteristics for the CCs are listed in Table P.2-2.
Nominal Assembly Width	8.536 inches
No. of Intact Assemblies	≤24
No. and Location of Damaged Assemblies	Up to 12 damaged fuel assemblies. Balance may be intact fuel assemblies, empty slots, or dummy assemblies depending on the specific heat load zoning configuration. Damaged fuel assemblies are to be placed in Locations A and/or B as shown in Figure P.2-6. The DSC basket cells which store damaged fuel assemblies are provided with top and bottom end caps to assure retrievability.
Maximum Assembly plus CC Weight	1682 lbs

Table P.2-2
Thermal and Radiological Characteristics for Control Components Stored in the NUHOMS® -24PTH DSC

Parameter	BPRAs, NSAs, CRAs, RCCAs, VSIs, Neutron Sources and APSRAs	TPAs and ORAs
Maximum Gamma Source (γ/sec/DSC)	9.3E+14	9.8E+13
Decay Heat (Watts/DSC)	192.0	192.0

Table P.2-3
PWR Fuel Assembly Design Characteristics for the NUHOMS®-24PTH DSC

Assembly Class		B&W 15x15	WE 17x17	CE 15x15	WE 15x15	CE 14x14	WE 14x14
Max Unirradiated Length (in)(1)	24PTH-S	165.75	165.75	165.75	165.75	165.75	165.75
	24PTH-L	171.93	171.93	171.93	171.93	171.93	171.93
	24PTH-S-LC	171.93	NA(3)	NA(3)	NA(3)	NA(3)	NA(3)
Fissile Material		UO_2	UO_2	UO_2	UO_2	UO_2	UO_2
Maximum MTU/Assembly(2)		0.49	0.49	0.49	0.49(4)	0.49	0.49
Maximum Number of Fuel Rods		208	264	216	204	176	179
Maximum Number of Guide/ Instrument Tubes		17	25	9	21	5	17

(1) Maximum Assembly + Control Component Length (unirradiated)
(2) The maximum MTU/assembly is based on the shielding analysis. The listed value is higher than the actual.
(3) Not Authorized.
(4) The maximum MTU/assembly for WE 15x15 PLSA = 0.33.

Table P.2-6

PWR Fuel Qualification Table for Zone 1 Fuel with 1.7 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36									4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38									4.5	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
39									4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40									4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
41									5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
42																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
43																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
44																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
45																					4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
46																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
47																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
48																					5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
49																								5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
50																								5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
51																								5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
52																									5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5
53																									5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
54																										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
55																										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
56																										6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0
57																												6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
58																												6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5
59																												6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
60																												6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
61																												7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
62																												7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time.

Note: Page P.2-34 provides the explanatory notes and limitations regarding the use of this table.

Table P.2-7
PWR Fuel Qualification Table for Zone 2 Fuel with 2.0 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36									3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
39									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
40									4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
41									4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
42																					3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
43																					3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
44																					3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
45																					4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
46																					4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
47																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
48																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
49																								4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5
50																								4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
51																								4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
52																									4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
53																									4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
54																										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0
55																										5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
56																										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
57																												5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
58																												5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
59																												5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
60																												6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
61																												5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
62																												6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time.

Note: Page P.2-34 provides the explanatory Notes and limitations regarding the use of this table.

Table P.2-8
PWR Fuel Qualification Table for Zone 3 Fuel with 1.5 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34									4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36									4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
38									5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
39									5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40									5.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
41									5.5	5.5	5.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
42																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
43																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
44																					5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
45																					5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
46																					5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
47																					5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
48																					5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5
49																								5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
50																								5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
51																								6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0
52																									6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
53																									6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
54																										6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5
55																										6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
56																										7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0
57																												7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
58																												7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5
59																												7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	7.0
60																												8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
61																												8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
62																												8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time.

Note: Page P.2-34 provides the explanatory notes and limitations regarding the use of this table.

Table P.2-9
PWR Fuel Qualification Table for Zone 4 Fuel with 1.3 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/o CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																											
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
34									4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
36									5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
38									5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
39									6.0	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
40									6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
41									6.5	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
42																					5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
43																					5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5
44																					5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
45																					5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
46																					6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
47																					6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
48																					6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
49																								6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
50																								7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
51																								7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0
52																									7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
53																									7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5
54																										8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
55																										8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0
56																										8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5
57																												9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
58																												9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0
59																												10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5
60																												10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0
61																												11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5
62																												11.5	11.5	11.5	11.5	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time, for cooling times less than 10 years.

Note: Page P.2-34 provides the explanatory notes and limitations regarding the use of this table.

Table P.2-10

PWR Fuel Qualification Table for Zone 1 Fuel with 1.7 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																											
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36									4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38									4.5	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
39									4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40									4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
41									5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
42																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
43																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5
44																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
45																					4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
46																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
47																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
48																					5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0
49																								5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
50																								5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
51																								5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
52																									5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5
53																									5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
54																										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
55																										5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
56																										6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
57																												6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
58																												6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5
59																												6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
60																												6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
61																												7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0
62																												7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time.

Note: Page P.2-34 provides the explanatory notes and limitations regarding the use of this table.

Table P.2-11
PWR Fuel Qualification Table for Zone 2 Fuel with 2.0 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																											
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36									3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
38									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
39									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
40									4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
41									4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
42																					3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
43																					3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
44																					3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
45																					4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
46																					4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
47																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
48																					4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
49																								4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
50																								4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
51																								4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
52																									4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
53																									4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0
54																										4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0
55																										5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
56																										5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5
57																												5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
58																												5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
59																												5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
60																												6.0	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
61																												6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
62																												6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time.

Note: Page P.2-34 provides the explanatory notes and limitations regarding the use of this table.

Table P.2-12
PWR Fuel Qualification Table for Zone 3 Fuel with 1.5 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)

(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																											
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
34									4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
36									4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
38									5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
39									5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5
40									5.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
41									5.5	5.5	5.5	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
42																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
43																					4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
44																					5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0
45																					5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
46																					5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
47																					5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
48																					5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
49																								5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
50																								5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
51																								6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0
52																									6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
53																									6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5
54																										6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5
55																										6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
56																										7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0
57																												7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
58																												7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5
59																												7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
60																												8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0
61																												8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
62																												9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time.

Note: Page P.2-34 provides the explanatory notes and limitations regarding the use of this table.

Table P.2-13
PWR Fuel Qualification Table for Zone 4 Fuel with 1.3 kW per Assembly for the NUHOMS®-24PTH DSC (Fuel w/ CCs)
(Minimum required years of cooling time after reactor core discharge)

Burn Up, GWD/ MTU	Maximum Assembly Average Initial U-235 Enrichment, wt. %																																										
	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
25									3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
28									3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
30									4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
32									4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
34									4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
36									5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
38									5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
39									6.0	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0
40									6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
41									6.5	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
42																					5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
43																					5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5
44																					5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
45																					5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
46																					6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0
47																					6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
48																					6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
49																								6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
50																								7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
51																								7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0
52																									7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
53																									7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5
54																										8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0
55																										8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.0
56																										8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5
57																												9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0
58																												9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.0
59																												10.0	10.0	9.5	10.0	9.5	9.5	9.5	9.5	9.5	9.0	9.0	9.0	9.0	9.0	8.5	8.5	8.5
60																												10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	9.0	9.0
61																												11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0	10.0	9.5	9.5	9.5
62																												12.0	11.5	11.5	11.5	11.5	11.0	11.0	11.0	11.0	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0

Note: If irradiated stainless steel rods are present in the reconstituted fuel assembly, add an additional year of cooling time, for cooling times less than 10 years.

Note: Page P.2-34 provides the explanatory notes and limitations regarding the use of this table.

Notes: Tables P.2-6 through P.2-13:

- Burnup = Assembly Average burnup.
- Use burnup and enrichment to lookup minimum cooling time in years. Licensee is responsible for ensuring that uncertainties in fuel enrichment and burnup are correctly accounted for during fuel qualification.
- Round burnup UP to next higher entry, round enrichments DOWN to next lower entry.
- Fuel with an assembly average initial enrichment less than 1.5 (or less than the minimum provided above for each burnup) and greater than 5.0 wt.% U-235 is unacceptable for storage.
- Fuel with a burnup greater than 62 GWd/MTU is unacceptable for storage.
- Fuel with a burnup less than 10 GWd/MTU is acceptable for storage after 3-years cooling.
- WE 15x15 PLSAs shall be limited to a minimum assembly average initial enrichment of 1.2 wt.% U-235.
- See Figure P.2-1 through Figure P.2-5 for a description of the zones.
- For reconstituted fuel assemblies with UO_2 rods and/or Zr rods or Zr pellets and/or stainless steel rods, use the assembly average equivalent enrichment to determine the minimum cooling time.
- The cooling times for damaged and intact assemblies are identical.
- *Example*: An intact fuel assembly without CCs, with a decay heat load of 1.7 kW or less, an initial enrichment of 3.65 wt. % U-235 and a burnup of 41.5 GWd/MTU is acceptable for storage after a 4.0 year cooling time as defined by 3.6 wt. % U-235 (rounding down) and 42 GWd/MTU (rounding up) in Table P.2-6.

Assemblies (TPAs), Rod Cluster Control Assemblies (RCCAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs) and neutron sources; the 24PTH-S DSC will not store CC. For shielding purposes, the 24PTH-L bounds the 24PTH-S DSC because of the additional gamma source due to the CC. Therefore, the shielding evaluation presented herein is not performed for the 24PTH-S DSC. Based on the results of Fuel Qualification Tables described in Section P.5.2, fuel with CC requires one more year of cooling time. To assure that this evaluation is conservative, the fuel source terms are not adjusted to account for the additional decay required to accommodate the CC.

The 24PTH DSCs are also authorized to store Westinghouse 15x15 class Partial Length Shield Assemblies (PLSAs). The PLSAs are similar to regular fuel assemblies except that a portion (axial section) of the active fuel is replaced by stainless steel rods. In essence, a PLSA rod would therefore consist of a fuel section and a steel section. Fuel qualification of these PLSAs, therefore, requires that the combined source term from the irradiated active fuel and steel regions be bounded by the design basis source terms.

Dose rates are calculated for the 24PTH-L DSC within HSM-H. Dose rates are also estimated for the 24PTH-S-LC within a HSM-Model 102. As the HSM-Model 102 provides less shielding than the HSM-H, shielding estimates are not made for the 24PTH-S-LC within HSM-H as the dose rates provided bound this scenario.

The design of the OS197FC TC is identical to the design of OS197/OS197H TC except that the OS197FC TC has a modified top lid. For shielding analysis of 24PTH-S and –L DSCs, OS197FC TC is used to bound the OS197/OS197FC TC also because the design features in the TC radial direction are identical for all three TCs; and OS197FC top axial geometry bounds other TCs.

The design-basis PWR fuel source terms are derived from the bounding fuel, B&W 15x15 Mark B assembly design as described in Section P.5.2.

The NUHOMS®-24PTH DSCs is designed to store PWR fuel assemblies and CC with the characteristics described in Table P.2-1. The 24PTH-S/L DSCs have a maximum decay heat of 2.0 kW per assembly and a maximum heat load of 40.8 kW per canister. Fuel in the 24PTH-S/L DSCs may be stored in four alternate heat zoning configurations as shown in Figure P.2-1 through Figure P.2-4. The 24PTH-S-LC DSC has a maximum decay heat of 1.5 kW per assembly and a maximum heat load of 24 kW per canister. The heat zoning configuration to be used for the 24PTH-S-LC DSC is shown in Figure P.2-5. Note that while the B&W, CE, and Westinghouse fuel designs are specifically listed, storing reload fuel designed by other manufacturers is also allowed provided an analysis is performed to demonstrate that the limiting features listed in Table P.2-1 and Table P.2-3 bound the specific manufacturer's replacement fuel. The limiting features are burnup, initial enrichment, cooling time, number of fuel rods, cobalt impurities in the hardware and initial heavy metal weight.

The design-basis fuel source terms for this evaluation are defined as the source terms from fuel with the burnup/initial enrichment/cooling time combination given in Table P.2-6 through Table

P.2-9 (without CC) and located in the basket as shown in Figure P.2-1 through Figure P.2-5 that give the maximum dose rate on the surface of the HSM and/or TC. This approach is consistent

with the method used to generate the fuel qualification tables for the Standardized NUHOMS®-24P and -52B DSC designs as described in Section 7.2.3, or 32PT DSC design as described in Appendix M. The design basis fuel source term is then added to the design basis CC source term (Table P.5-12) to create the total fuel assemblies plus CC source term used in the calculations.

For the 24PTH-L DSC, Heat Load Zoning Configuration 2 (Figure P.2-2) is the configuration that produces the highest dose rates on the surfaces of the HSM-H and OS197FC TC as that replace damaged fuel rods. Note that lower enriched UO2 rods are of similar design and behavior as the standard fuel rods aside from the uranium enrichment. The reconstituted rods can be at any location in the fuel assemblies and the reconstituted assemblies can be placed anywhere in the basket. Reconstituted fuel has a rather small effect on the dose rate such that for cooling times less than 10 years, 1 year of cooling time is added if reconstituted rods are present. Damaged fuel has essentially no impact on the dose rate as the source term would not be impacted and gross axial source redistribution is not likely. Therefore, shielding analysis results with intact fuel are also applicable to the damaged fuel.

The fuel qualification for the PLSAs is performed such that the resulting source terms are bounded by those for the design basis B&W 15x15 fuel assemblies. The bounding burnup, enrichment and cooling time combination for the PLSA used in the source term evaluation are as follows:

- 40 GWD/MTU, 1.2 wt. % U-235, 6.5 year cooled fuel

The methodology, assumptions, and criteria used in this evaluation are summarized in the following subsections.

P.5.2 Source Specification

Thermal and radiological source terms are calculated with the SAS2H/ORIGEN-S modules of SCALE 4.4 [5.1] for the fuel. The SAS2H/ORIGEN-S results are used to develop the fuel qualification tables listed in Table P.2-6 through Table P.2-13 and the design-basis fuel source terms suitable for use in the shielding calculations. The thermal and radiological source terms for the CCs which are taken from Appendix J, are shown in Table P.5-12.

The B&W 15x15 assembly is the bounding fuel assembly design for shielding purposes because it has the highest initial heavy metal loading and CO-59 content of the hardware regions as compared to the 14x14, other 15x15, and 17x17 fuel assemblies which are also authorized contents of the NUHOMS®-24PTH DSC. The neutron flux during reactor operation is peaked in the in-core region of the fuel assembly and drops off rapidly outside the in-core region. Much of the fuel assembly hardware is outside of the in-core region of the fuel assembly. To account for this reduction in neutron flux, the fuel assembly is divided into four exposure "regions." The four axial regions used in the source term calculation are: the bottom (nozzle) region, the in-core region, the (gas) plenum region, and the top (nozzle) region. The B&W 15x15 fuel assembly masses for each irradiation region are listed in Table P.5-6. The light elements that make up the various materials for the various fuel assembly materials are taken from reference [5.4] and are listed in Table P.5-7. The design-basis heavy metal weight is 0.490 MTU. These masses are irradiated in the appropriate fuel assembly region in the SAS2H/ORIGEN-S models. To account for the reduction in neutron flux outside the In-Core regions neutron flux (fluence) correction factors are applied to light element composition for each region. The neutron flux correction factors which are from Reference [5.15] are given in Table P.5-8.

The relevant design characteristics of the PLSAs important for source term evaluation are shown in Table P.5-6. The calculation of the source terms for the active region portion of the PLSA is identical to that of the design basis fuel assembly outlined above. A neutron flux correction factor is applied to the stainless steel rod section of the PLSA to account for the reduction in the neutron flux at these locations. A flux correction factor is required because these fuel assemblies are irradiated in the peripheral locations of the reactor core and the neutron flux around the steel rods is a few orders of magnitude lower than that around the fuel rods due to absence of any fission source.

A flux correction factor of 0.3 (shown in Table P.5-8) which is 1.5 times that for the plenum region is utilized to determine the source terms from the steel rods of the PLSA. The plenum region flux correction factor is chosen due to the similarities in the proximity to the active fuel region. Further, to account for the small variations in the radial flux distribution, an additional factor of 1.5 is utilized so that the resulting correction factor is conservative. This correction factor, therefore, is applicable to the outer row of the PLSAs that "see" the neutron flux from the adjacent, regular, fuel assemblies in the reactor core. For the other rows of steel rods, where the neutron flux practically drops to zero, this factor is conservative.

Evaluations of the existing data with SAS2H and the 44-group ENDF/B-V library used in the analysis are documented in References [5.11] and [5.12]. These comparisons all show generally good agreement between the calculations and measurements, and show no trend as a function of burnup in the data that would suggest that the isotopic predictions, and therefore neutron and gamma source terms, would not be in good agreement. A similar conclusion is also reached by the results documented in JAERI report [5.13]. In fact, for the case with 46,460 MWd/MTU burnup, the isotopic predictions are all within 2% of those measured. There are ongoing efforts, some of which are documented in Reference [5.10], to obtain more data for burnups above 45 GWd/MTU. There is no reason to expect that the ongoing evaluations of the higher burnup fuel will result in less favorable comparisons. Therefore, the uncertainty in the gamma source term, and associated dose rates, is estimated to be within ±5 %.

As noted in References [5.14] and [5.10], there is no public data for the neutron component currently available that bounds a fuel burnup of up to 62 GWd/MTU. However, as documented in Reference [5.14] and confirmed in the SAS2H analysis, the total neutron source with increasing burnup is more and more dominated by spontaneous fission neutrons. Reviewing the output from the SAS2H runs, the neutron source term is due almost entirely to the spontaneous fission of Cm-244 (~94% of all neutrons both spontaneous fission and (α,n)). After reviewing the measured Cm-244 content compared to the Cm-244 content predicted by SAS2H and the 44-group ENDF/B-V library documented in References [5.11] and [5.12] for burnups up to 46,460 MWd/MTU, it is readily apparent that the calculated values are within ±11 % of the measured values, with most of the predicted values within ±5% of the measured. Finally, there is no entry in the fuel qualification tables. For each qualification table, the burnup/enrichment/cooling time combination that results in the highest dose rate is selected as the design basis source.

The results of the ANISN response function evaluation are given in Table P.5-23 and Table P.5-24 for the 2.0 kW OS197FC TC and HSM-H cases, respectively. The results for the 1.5 kW OS197FC TC and HSM-H cases are given in Table P.5-25 and Table P.5-26, respectively. Note that the 1.5 kW results are assumed to be applicable to the Standardized TC and HSM-Model 102. The maximum dose rate for each table corresponds to the design basis source for that decay heat and shielding configuration.

The results of the ANISN response function evaluation with the PLSAs indicate that they are bounded by the design basis fuel source terms. The dose rate for the DSC with PLSA in the OS197FC TC for is 876 mrem/hour which is below the design basis value of 907 mrem/hour. The dose rate for the DSC with PLSA in the HSM-H is 3.7 mrem/hour which is below the design basis value of 6.1 mrem/hour. Therefore, the source terms for the PLSA are bounded by the design basis source terms.

Note also that the values presented in Table P.5-23 though Table P.5-26 are based upon decay heats rounded to the nearest 0.1 year and not the final decay heats as presented in the fuel qualification tables, which have been conservatively rounded up to the nearest 0.5 year, as the design basis sources were selected prior to the rounding process.

P.5.2.5 Reconstituted Fuel

As explained in Section P.5.2, reconstituted fuel assemblies may contain up to 10 stainless steel rods that replace damaged fuel rods. Because steel rods replace fuel rods, the decay heat of a reconstituted assembly is typically less than the decay heat of an equivalent standard assembly. Conversely, because steel contains Co-59 which activates to form Co-60, for low cooling times a reconstituted assembly typically generates higher dose rates than an equivalent standard assembly. As the half-life of Co-60 is 5.27 years, after 10 years the Co-60 activity has reduced by almost a factor of four and a reconstituted assembly no longer generates higher dose rates than an equivalent standard assembly. To bound this effect, the fuel qualification tables require that for reconstitute rods with cooling times less than 10 years, additional one year of cooling time is required. For cooling times of 10 years or greater, no additional cooling time is required to bound the reconstituted fuel with steel rods.

To quantify this statement, additional SAS2H runs are generated for reconstituted assemblies. For each burnup and enrichment corresponding to a transition point in a fuel qualification table (i.e., the point where the cooling time experiences a change of 0.5 years), reconstituted assembly SAS2H models are developed.

The SAS2H input files for a reconstituted assembly are very similar to the input files for a standard assembly except for the following changes: (1) The number of fuel rods is reduced from 208 to 198, (2) the POWER input variable is adjusted to maintain the correct burnup for the reduced fuel loading, and (3) the light elements change to reflect that 10 fuel rods have been replaced with steel rods. The constituent masses of the reconstituted fuel assembly required for the SAS2H input is provided in Table P.5-6.

Note that a reconstituted rod cannot be irradiated for more than two cycles because the first cycle will always contain fresh, undamaged fuel. To accurately model this behavior, two SAS2H models are generated for each transition point. The first SAS2H model is for only one cycle of irradiation of 10 reconstituted rods, while the second SAS2H model is for three cycles of irradiation of 10 reconstituted rods. By subtracting the single cycle source term of the reconstituted rods from the total source term (fuel and reconstituted rods) for three cycles, the

Table P.5-6
PWR Fuel Assembly Material Mass

Fuel Assembly Region, length	Fuel Assembly Part	Material	Standard Mass (kg)	Reconstituted Mass (kg)
Top Nozzle, 6.23 in.	Top Nozzle/Misc. Steel	SS-304	9.2	9.2
	Hold Down Spring	Inconel-718	1.8	1.8
Plenum, 8.73 in.	Upper Spring	Inconel-718	4.3	4.3
	Upper End Cap	Zircaloy-4	1.0	1.0
	Encompassing Clad.	Zircaloy-4	5.8	5.5
	Upper End Grid	Inconel-718	1.1	1.1
	Stainless Steel Rods	SS304	na	1.7
In-core Region, 142.29 in.	Fuel Stack	UO_2	490	466
	Encompassing Clad.	Zircaloy-4	101.1	96.2
	Encompassing Guide Tube	Zircaloy-4	6.3	6.3
	Spacer Grids	Inconel-718	5.0	5.0
	Grid Supports	Zircaloy-4	0.64	0.64
	Stainless Steel Rods	SS304	na	27.2
Bottom Nozzle, 8.38 in.	Lower End Plug	Zircaloy-4	8.9	8.5
	Encompassing Guide Tube	Zircaloy-4	0.1	0.1
	Lower Guide Tube Plugs	Zircaloy-4	1.4	1.4
	Lower End Fitting	SS 304	8.2	8.2
	Lower End Grid	Inconel-718	1.1	1.1
	Stainless Steel Rods	SS304	na	0.5

Design Characteristics of PLSA	
Description	**Parameter**
Fuel Assembly Class	Westinghouse 15x15
Number of Fuel Rods	204 per assembly
Active Fuel Length	102 inches
Heavy Metal Loading	0.323 MTU per assembly
Number of Stainless Steel Rods	204 per assembly
Length of Stainless Steel Rods	42 inches
Weight of Stainless Steel Rods	108.45 Kg per PLSA or 238.6 lbm per PLSA
Location of Stainless Steel Rods	At the bottom of each fuel assembly
All other design characteristics of the PLSA are identical to the WE 15x15 Class fuel assembly	

Table P.5-8
Flux Scaling Factors By Fuel Assembly Region

Fuel Assembly Region	Flux Factor
Bottom	0.20
In-Core	1.00
Plenum	0.20
Top	0.10

PLSA Stainless Steel Rod Region	(0.2)*1.5 = 0.3

P.6.1 Discussion and Results

Figure P.6-1 shows the cross section of the NUHOMS®-24PTH DSC. The NUHOMS®-24PTH DSC stainless steel basket consists of an "egg-crate" plate design. The fuel assemblies are housed in 24 stainless steel fuel compartment tubes with up to 12 damaged fuel assemblies occupying peripheral locations, as shown in Figure P.2-6. The basket structure, including the fuel compartment tubes, is held together with stainless steel insert plates and the poison and aluminum plates that form the "egg-crate" structure. The basket compartment structure is connected to perimeter rail assemblies, portions of it comprising of aluminum interface. The fuel compartment tube structure is connected to perimeter transition rail assemblies as shown on the drawings in Section P.1.5. The poison/aluminum plates are located between the fuel compartment tubes, as shown in Figure P.6-1.

The analysis presented herein is performed for a NUHOMS®-24PTH DSC in the NUHOMS®-OS197, OS197H, or OS197FC and Standardized Transfer casks (TCs) during normal, off-normal and accident loading conditions. This analysis also bounds all conditions of storage in the HSM (either HSM-H or HSM Model 102). The NUHOMS® TCs are identical for criticality purposes. The OS197FC design is identical to OS197 or OS197H TC with a modified lid design to allow for air circulation for enhanced heat removal. The NUHOMS® Transfer casks consist of an inner stainless steel shell, lead gamma shield, a stainless steel structural shell and a hydrogenous (liquid or solid) neutron shield. This analysis is applicable to any licensed cask of similar construction. The NUHOMS®-24PTH DSC/Cask configuration is shown to be subcritical under normal, off-normal and accident conditions of loading, transfer and storage.

The criticality analysis determines the most reactive configuration for the basket and fuel assembly position. Then criticality calculations evaluate a variety of fuel assembly types, initial enrichments and poison loadings (fixed and soluble poison). Table P.6-2 lists the fuel assemblies considered as authorized contents of the NUHOMS®-24PTH System. Finally, the maximum allowed initial enrichment for each fuel assembly type as a function of basket type (fixed poison loading and aluminum inserts) and soluble boron concentration is determined and is listed in Table P.6-3. Table P.6-10 shows the results of the analysis performed to determine the bounding configuration for Type 1 or Type 2 baskets (with or without aluminum inserts in R45 transition rails). The calculations determine k_{eff} with the CSAS25 control module of SCALE-4.4 [6.1] for each assembly type and initial enrichment, including all uncertainties to assure criticality safety under all credible conditions.

The Control Components (CCs) are also authorized for storage in the 24PTH DSCs. The authorized CCs are Burnable Poison Rod Assemblies (BPRAs), Control Rod Assemblies (CRAs), Rod Cluster Control Assemblies (RCCAs), Thimble Plug Assemblies (TPAs), Axial Power Shaping Rod Assemblies (APSRAs), Orifice Rod Assemblies (ORAs), Vibration Suppression Inserts (VSIs), Neutron Source Assemblies (NSAs), and Neutron Sources.

Additionally, calculations are carried out to determine the most reactive damaged fuel assembly (design basis damaged fuel assembly) configuration for each fuel assembly class. Then criticality calculations evaluate a variety of fuel assembly types, initial enrichments and poison loadings (fixed and soluble poison). Finally, the maximum allowed initial enrichment and the number of damaged assemblies per DSC for each fuel assembly type as a function of soluble boron concentration and fixed poison loading is determined and is summarized in Table P.6-4. The calculations determine k_{eff} with the CSAS25 control module of SCALE-4.4 [6.1] for each damaged assembly type and initial enrichment, including all uncertainties to assure criticality safety under all credible conditions.

The results of the evaluation demonstrate that the maximum expected k_{eff}, including statistical uncertainty, are less than the Upper Subcritical Limit (USL) determined from a statistical analysis of benchmark criticality experiments. The statistical analysis procedure includes a confidence band with an administrative safety margin of 0.05.

required for control components that extend into the active fuel region. For example, TPAs or ORAs are permitted for storage within a fuel assembly without adjusting the maximum initial enrichment or minimum soluble boron content given in Table P.6-3 and Table P.6-4, since TPAs or ORAs do not extend into the active fuel region.

For the WE 15x15 Class Partial Length Shield Assemblies (PLSAs), the effect of a reduced active fuel length (Table P.6-5) is at worst statistically insignificant. As the criticality analysis models are based on an infinitely long fuel assembly, the design basis evaluations for the regular WE 15x15 class assemblies conservatively cover the PLSAs.

Table P.6-2
Authorized Contents for NUHOMS®-24PTH System

Assembly Type(1)	Array
Westinghouse 17x17 LOPAR/Standard	17x17
Westinghouse 17x17 OFA/Vantage 5(2)	17x17
CE 16x16 System 80(3)	16x16
B&W 15x15 Mark B (through B11)	15x15
CE 15x15 Palisades	15x15
Exxon/ANF 15x15 CE	15x15
Exxon/ANF 15x15 WE	15x15
Westinghouse 15x15 Standard/ZC(4)	15x15
CE 14x14 Standard/Generic	14x14
CE 14x14 Fort Calhoun	14x14
Exxon/ANF 14x14 WE	14x14
Westinghouse 14x14 ZCA/ZCB	14x14
Westinghouse 14x14 OFA	14x14

Notes:

(1) Reload fuel from other manufacturers with these parameters are also acceptable.
(2) Includes all Vantage versions (5, +, ++, etc.)
(3) The CE 16x16 System 80 fuel assembly is 178.25 inches long and therefore may not fit in the NUHOMS®-24PTH DSC unless the cavity length is increased. This fuel assembly is included in this analysis to cover for that eventuality.
(4) Includes Partial Length Shield Assemblies (PLSAs)

Table P.6-5
Parameters For PWR Assemblies

Manufacturer[1]	Array	Version	Active Fuel Length (in)	Number Fuel Rods per Assembly	Pitch (in)	Fuel Pellet OD (in)
WE	17x17	LOPAR	144	264	0.496	0.3225
WE	17x17	OFA/Van 5	144	264	0.496	0.3088
CE	16x16	System 80	150	236	0.506	0.3255
B&W	15x15	Mark B2 – B7	141.8	208	0.568	0.3686
B&W	15x15	Mark B8	141.8	208	0.568	0.3686
B&W	15x15	Mark B9	140.6	208	0.568	0.3700
B&W	15x15	Mark B10	142.3	208	0.568	0.3735
B&W	15x15	Mark B11	142.3	208	0.568	0.3715
CE	15x15	Palisades	132	216	0.550	0.3600
Exxon/ANF	15x15	CE	131.8	216	0.550	0.3565
Exxon/ANF	15x15	WE	144[7]	204	0.563	0.3565
WE	15x15	Std/ZC	144[7]	204	0.563	0.3659
CE	14x14	Std/Gen	137	176	0.580	0.3765
CE	14x14	Ft. Calhoun	128	176	0.580	0.3815
Exxon/ANF	14x14	WE	142	179	0.556	0.3505
WE	14x14	ZCA/ZCB	144	179	0.556	0.3659
WE	14x14	OFA	144	179	0.556	0.3444

Table P.6-5
Parameters For PWR Assemblies

(Concluded)

Manufacturer [1]	Array	Version	Clad Thickness (in)	Clad OD (in)	Guide Tube OD (in)	Instrument Tube ID (in)
WE	17x17	LOPAR	0.0225	0.374	24@0.474 1@0.480	24@0.422 1@0.450
WE	17x17	OFA/Van 5	0.0225	0.360	24@0.482 1@0.476	24@0.450 1@0.460
CE	16x16	System 80	0.0250	0.382	5@0.768	5@0.687
B&W	15x15	Mark B2 – B7	0.0265	0.430	16@0.530 1@0.493	16@0.498 1@441
B&W	15x15	Mark B8	0.0265	0.430	16@0.530 1@0.493	16@0.498 1@441
B&W	15x15	Mark B9	0.0265	0.430	16@0.530 1@0.493	16@0.498 1@441
B&W	15x15	Mark B10	0.0250	0.430	16@0.530 1@0.493	16@0.498 1@441
B&W	15x15	Mark B11[2]	0.0240	0.416	16@0.530 1@0.493	16@0.498 1@441
CE	15x15	Palisades	0.0260[3]	0.418[4]	8@0.4135	8@0.3655
Exxon/ANF	15x15	CE	0.0300	0.417	8Guide Bars[5] 1@0.417	1@0.363
Exxon/ANF	15x15	WE	0.0300	0.424	20@0.544 1@0.544	20@0.510 1@0.510
WE	15x15	Std/ZC	0.0242	0.422	20@0.546 1@0.546	20@0.512 1@0.512
CE	14x14	Std/Gen	0.0280	0.440	5@1.115	5@1.035
CE	14x14	Ft. Calhoun	0.0280	0.440	5@1.115	5@1.035
Exxon/ANF	14x14	WE	0.0300	0.424	16@0.541 1@0.480	16@0.507 1@0.448
WE	14x14	ZCA/ZCB	0.0225	0.422	16@0.539 1@0.422	16@0.505 1@0.392
WE	14x14	OFA	0.0243	0.400	16@0.526 1@0.400	16@0.492 1@0.353

NOTES:

(1) Reload fuel assemblies from other manufacturers with these parameters are also acceptable.
(2) Pellet OD ranges from 0.3510 to 0.3600 inches.
(3) Clad thickness ranges from 0.0240 to 0.0295 inches
(4) Clad OD ranges from 0.4135 to 0.4175 inches
(5) Guide Bars are solid Zircaloy-4 approximately 0.40 inches x 0.45 inches
(6) All dimensions shown are nominal
(7) The active fuel length for the PLSA is less than 144".