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March 24, 2025
E-63865

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: ANUH-01.0150, Standardized Advanced NUHOMS® Updated Final Safety Analysis Report (UFSAR), Revision 13, and 10 CFR 72.48 Summary Report for the Period 3/24/23 to 3/24/25, Docket 72-1029

Reference: Letter from Prakash Narayanan to NRC Document Control Desk, "ANUH-01.0150, Standardized Advanced NUHOMS® Updated Final Safety Analysis Report (UFSAR), Revision 12, and 10 CFR 72.48 Summary Report for the Period 11/18/21 to 3/23/23, Docket 72-1029," November 17, 2021 (E-62023)

Pursuant to 10 CFR 72.248, TN Americas LLC (TN) has updated ANUH-01.0150, the Standardized Advanced NUHOMS® UFSAR, last updated by the referenced submittal, and herewith submits UFSAR Revision 13 replacement pages for docketing. This update incorporates changes implemented by TN for the time period of 3/24/23 to 3/24/25. No amendments to CoC 1029 became effective during this timeframe.

I certify that this submittal accurately presents changes made since the last submittal (Reference).

The enclosure to this letter provides new and replacement UFSAR pages, including a List of Effective Pages that identifies the Revision 13 pages. The changed areas are marked as follows:

- New or changed pages show "Rev. 13" and "3/25" in the header.
- Changed areas are indicated using single revision bars in the margin.
- Newly inserted text is shown by italics.

Regarding the summary report required to be submitted pursuant to 10 CFR 72.48(d)(2), TN made no changes in facilities or spent fuel storage cask design, no changes in procedures, and no tests or experiments pursuant to paragraph (c)(2) of 10 CFR 72.48 during the period 3/24/23 to 3/24/25.

Should you have any questions regarding this submittal, please do not hesitate to contact Mr. Douglas Yates at 434-832-3101, or by email at Douglas.Yates@orano.group.

Sincerely,

Prakash Narayanan
Chief Technical Officer

cc: John Nguyen (NRC DFM)

Enclosure:

Replacement Pages for ANUH-01.0150, Standardized Advanced NUHOMS® UFSAR, Revision 13 (Public)

# Enclosure to E-63865

# Replacement Pages for ANUH-01.0150, Standardized Advanced NUHOMS® UFSAR, Revision 13

# (Public)

ANUH-01.0150
Revision *13*

**NON-PROPRIETARY**

# UPDATED FINAL SAFETY ANALYSIS REPORT

# FOR THE

# STANDARDIZED ADVANCED NUHOMS®

# HORIZONTAL MODULAR STORAGE SYSTEM

# FOR IRRADIATED NUCLEAR FUEL

By

TN Americas LLC[1]
Columbia, MD

*March 2025*

[1] TN Americas LLC, formerly AREVA TN, and Transnuclear, Inc. (herein referred to as TN Americas LLC, AREVA TN, Transnuclear, Inc., Transnuclear, or TN)

**REVISION LOG SHEET**

| UFSAR Revision | Date | Record of Changes/FCNs | Changed Pages |
|---|---|---|---|
| 0 | 3/19/03 | None | All |
| 1 | 3/21/05 | FCNs 721029-39, 40, 62, 65, 81, 89, 92, 124, 126, 165, 169 & 175 | See List of Effective Pages |
| 2 | 8/17/06 | FCNs 721029-182, 185, 103 R-1, 162 R-1, 166, 173 R-1, 176 R-1,177 and 204 | See List of Effective Pages |
| 3 | 8/15/08 | FCNs 721029-202, 205, 206, 208, 215, 220, 222 R1, 232, 239, 246, 257, 272 | See List of Effective Pages |
| 4 | 8/12/10 | FCNs 721029-275, 280 R-1, 285, 294, 303, 311, 312 R-1, 316 | See List of Effective Pages |
| 5 | 8/13/12 | FCNs 721029-339, 348 R-1, 351 R-1, 352, 353, 354, 356, 364 | See List of Effective Pages |
| 6 | 8/13/14 | FCN 721029-385 | See List of Effective Pages |
| 7 | 8/11/16 | FCN 721029-374 R-1, 378 R-1, 386 R-1, 394, 407 R-1, 414, 415, 416 R-1, 417 | See List of Effective Pages |
| 8 | 8/13/18 | FCN 721029-418, 419 R-1, 420 R-1, 421, 422 | See List of Effective Pages |
| 9 | 3/12/19 | FCN 721029-424 | See List of Effective Pages |
| 10 | 3/12/21 | FCN 721029-423, 425, 426, 429 R-1 | See List of Effective Pages |
| 11 | 11/17/21 | FCN 721029-432 R-0, 435 R-1 | See List of Effective Pages |
| 12 | 3/23/23 | FCNs 721029-438, 440 R-1, 441, 443 | See List of Effective Pages |
| *13* | *3/24/25* | *FCN 721029-444, 445, 446* | *See List of Effective Pages** |

* *Some flowcharts within Chapters 8, A.8, and B.8 were reformatted for visual clarity and legibility and are, therefore, included as part of Revision 13. No flowchart information was changed.*

Revision 2 of this UFSAR incorporates changes implemented due to the approval of CoC 1029 Amendment 1, effective May 16, 2005. It also incorporates modifications implemented per 10 CFR 72.48 from March 21, 2005 through August 15, 2006.

Revision 3 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from August 16, 2006 through August 15, 2008. This revision also includes a full list of effective pages.

Revision 4 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from August 16, 2008 through August 12, 2010.

Revision 5 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from August 13, 2010 through August 13, 2012.

Revision 6 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from August 14, 2012 through August 13, 2014.

Revision 7 of this UFSAR incorporates changes implemented due to the approval of CoC 1029 Amendment 3, effective February 23, 2015. It also incorporates modifications implemented per 10 CFR 72.48 from August 14, 2014 through August 11, 2016.

Revision 8 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from August 12, 2016 through August 13, 2018.

Revision 9 of this UFSAR incorporates changes implemented due to the approval of CoC 1029 Amendment 4, effective March 12, 2019.

Revision 10 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from March 13, 2019 through March 12, 2021.

Revision 11 of this UFSAR incorporates changes implemented due to the approval of renewed CoC 1029 Amendments 0, 1, 3, and 4, effective October 27, 2021. This revision also incorporates modifications implemented per 10 CFR 72.48 from March 13, 2021 through November 17, 2021.

*Revision 12 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from November 18, 2021 through March 23, 2023.*

*Revision 13 of this UFSAR incorporates modifications implemented per 10 CFR 72.48 from March 24, 2023 through March 24, 2025.*

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## 2.2 Design Criteria for Environmental Conditions and Natural Phenomena

The 24PT1-DSC and AHSM form a self-contained, independent, passive system, which does not rely on any other systems or components for its operation. The criterion used in the design of the 24PT1-DSC and AHSM ensures that their exposure to credible site hazards does not impair their safety functions.

The design criteria satisfy the requirements of 10 CFR Part 72 [2.1]. They include the effects of normal operation, natural phenomena and postulated man-made accidents. The criteria are defined in terms of loading conditions imposed on the 24PT1-DSC. The loading conditions are evaluated to determine the type and magnitude of loads induced on the 24PT1-DSC. The combinations of these loads are then established based on the conditions that can be superimposed. The load combinations are classified by Service Level consistent with Section III of the ASME Boiler and Pressure Vessel Code [2.7]. The stresses resulting from the application of these loads are then evaluated based on the rules for a Class I nuclear component prescribed by Subsection NB of the Code for the 24PT1-DSC Shell Assembly important to safety components. Subsections NG and NF of the Code apply to the 24PT1-DSC Basket Assembly. The AHSM loads and load combinations are developed in accordance with the requirements of ANSI 57.9 [2.10] and ASCE 7-95 [2.8]. The AHSM component stresses are evaluated based on the applicable ACI and AISC standards specified.

### 2.2.1 Tornado and Wind Loadings

The Advanced NUHOMS® System is designed to resist the most severe tornado and wind loads specified by NRC Regulatory Guide 1.76 [2.2] and NUREG-0800 [2.3], Section 3.5.1.4. The AHSM is designed to safely withstand tornado missiles as defined by 10 CFR 72.122(b)(2). Extreme wind effects are much less severe than the specified design basis tornado wind forces, which are used in load combinations specifying extreme wind for the design of the AHSM.

There are no credible wind loads applied to the 24PT1-DSC as the AHSM and transfer cask provide the required environmental protection. The case of the canister inside the AHSM is evaluated in Chapter 3 for the associated pressure drop condition.

Since the Advanced NUHOMS® System on-site transfer cask (TC) is used infrequently and for short durations, the possibility of a tornado funnel cloud enveloping the TC/24PT1-DSC during transit to the AHSM is a low probability event. Nevertheless, the TC is designed for the effects of tornadoes, in accordance with 10 CFR 72.122 which includes design for the effects of worst case tornado winds and missiles (evaluated in References [2.14] and [2.15]).

*Administrative controls, as described in Section 8.1.1.5, are required for short-duration outdoor dry storage system (DSS) handling activities (ODHAs) for which deterministic tornado wind/missile analyses have not been performed, or other weather-related design requirements exist. These controls, coupled with the low probability of tornado events, give confidence in weather conditions being acceptable during ODHAs. Such ODHAs may also be associated with infrequently performed maintenance or inspections (e.g., aging management inspections).*

*The analyzed configuration for the TC includes the loaded TC in the horizontal orientation secured to the transfer skid which is installed on the transfer trailer operating within the Technical Specification 5.3.1 height restrictions associated with the cask drop safety analysis. The Top Cover Plate and Bottom Cover Plate components are installed and bolted. This configuration applies during transfer operations on the haul path and ISFSI apron where the loaded transfer trailer is qualified for stability and the TC is qualified for structural integrity (i.e., stresses and penetration resistance) under DBT loading.*

#### 2.2.1.1 Applicable Design Parameters

The design basis tornado (DBT) intensities used for the AHSM are obtained from NRC Regulatory Guide 1.76. Region I intensities are utilized since they result in the most severe loading parameters. The maximum wind speed is 360 mph which is the sum of the rotational speed of 290 mph plus the maximum translational speed of 70 mph. The radius of the maximum rotational speed is 150 feet, the pressure drop across the tornado is 3.0 psi, and the rate of pressure drop is 2.0 psi per second.

minimum of 30 minutes at 3 torr or less in accordance with Chapter 12 requirements.

28. Open the valve on the vent port and allow helium to flow into the cavity to pressurize the 24PT1-DSC in accordance with the limits specified in Chapter 12.

29. Close the valves on the helium source.

NOTE: If during drying and backfilling the system is inadvertently vented, re-evacuation and backfilling with helium will be required.

8.1.1.4 24PT1-DSC Sealing Operations

1. Disconnect the VDS from the 24PT1-DSC. Seal weld the prefabricated covers over the vent and siphon ports and perform a dye penetrant weld examination.

2. Install the automated welding machine onto the outer top cover plate and place the outer top cover plate with the automated welding system onto the 24PT1-DSC. Verify proper fit up of the outer top cover plate.

3. Tack weld the outer top cover plate to the 24PT1-DSC shell. Place the outer top cover plate weld root pass. Perform dye penetrant examination of the root pass weld.

4. Weld out the outer top cover plate to the shell and perform dye penetrant examination on the weld surface.

5. Open the cask drain port valve and remove the remaining water from the cask/24PT1-DSC annulus.

6. Remove the automated welding machine from the 24PT1-DSC.

7. Rig the cask top cover plate and lower the cover plate onto the cask.

8. Bolt the cask cover plate into place, tightening the bolts to the required torque in a star pattern.

8.1.1.5 Transfer Cask Downending and Transfer to ISFSI

*The following weather-related administrative controls are based on NEI 22-02 Revision 2, "Guidelines for Weather-Related Administrative Controls for Short Duration Outdoor Dry Cask Storage Operations," and NRC Regulatory Guide 3.77 Revision 0, "Weather-Related Administrative Controls at Independent Spent Fuel Storage Installations."*

*Note: Although the administrative controls covered here are in this section on transfer cask downending and transfer, as discussed herein they apply to any short-term operations where weather conditions must be considered.*

*Background and general requirements:*

*For short-duration operations that are necessary to transfer spent fuel to the ISFSI, administrative controls are required if these outdoor dry storage system (DSS) handling activities (ODHAs) are performed with equipment configurations for which deterministic tornado wind/missile analyses have not been performed, or other weather-related design requirements exist.*

*These administrative controls provide one way that general licensees can continue to comply with weather conditions associated with normal and off-normal operation, maintenance, testing, and accident conditions, including normal and off-normal winds, accident winds, hurricane winds, hurricane missiles, tornado winds, tornado missiles, and tornado pressure drops.*

*While recognizing that the types and durations of these activities, and the equipment involved, are defined by the combination of the dry storage system design and licensing basis and site-specific facility configuration and procedures, a discussion is provided at the end of this section regarding what is, and what is not, analyzed for tornado hazards, in the current generic licensing basis.*

*Such ODHAs may also be associated with infrequently performed maintenance or inspections (e.g., aging management inspections). Note that the licensing basis of some structures, systems and components (SSCs) used during an ODHA may have safe operating wind speed limits below the values associated with severe weather (e.g., a crane).*

*The presence of a safe condition and forecast (defined below) ensures that an SSC's important to safety (ITS) design criteria are not exceeded when administrative controls are used in lieu of engineering analysis during an ODHA. Any time that the safe condition and forecast conditions cannot be met during ODHAs, the storage system SSCs must be placed in a safe and analyzed condition as soon as practicable.*

*Implementing procedures should contain specific steps to document the satisfactory execution of the weather check (e.g., log or checklist) before and, if required, periodic checks during the ODHAs, depending on their expected duration.*

*The expected duration of ODHAs should be based on operating experience, benchmarking, dry runs or a combination of these, while considering the time required to perform compensatory actions to place SSCs in an analyzed condition before severe weather occurs.*

*Each licensee must individually determine what, if any, short duration outdoor DSS activities are conducted at its site and the timeframes involved. General Licensees will develop, revise, or review existing procedures to establish administrative controls that confirm a safe condition and forecast before commencing outdoor DSS activities and for implementing compensatory measures should those conditions be lost during such activities.*

*Weather-forecast Resources:*

*Weather forecasts should be obtained using the National Weather Service (NWS). General licensees can use other resources with justification that the resource provides information that is equivalent to or more representative for the site than the NWS information in terms of timeliness and accuracy.*

*The NWS Active Alerts web page has several useful links to determine if a safe condition and forecast is in effect for the site for the upcoming time periods of interest, including, but not limited to:*

- *Warnings by State*
- *Latest Warnings*
- *Thunderstorm/Tornado Outlook*
- *Hurricanes*

*In addition, monitoring of weather conditions below the threshold of severe weather may be necessary to ensure SSCs ITS are not exposed to weather conditions that may exceed their design and licensing basis.*

*On-site meteorological data and use of one of several mobile phone and internet-based applications (e.g., the Weather Channel) can be used to augment the NWS forecast resources and allow receipt of notifications in real time for the site area to confirm a safe condition and forecast. Such measures are defense-in-depth only.*

*Prior to starting ODHAs:*

*Immediately prior to initiating an ODHA, the general licensee should determine if a safe condition and forecast is in effect for the site that encompasses the expected duration of the ODHA.*

*A safe condition and forecast is considered to be the absence of (1) forecasted weather for wind speeds (gusts or sustained) that could exceed an SSC's ITS design criteria and (2) a hazardous weather outlook indicating a risk of severe storms that could generate at the site, for example, tornado winds, missiles or pressure differentials, or hurricane winds or missiles, that could exceed an SSC's ITS design criteria, for the expected duration of the ODHA.*

*Even though near-term weather forecasts are highly reliable, the procedures or instructions should also include checking the future radar projections for the plant site. Based on these additional checks, outdoor activities should be prohibited if a licensee independently determines that severe weather is likely at any time over the expected duration of the outdoor activity. Additionally, the responsible personnel should decide if an advisory or other weather forecast information (e.g., temperature, wind, etc.) should prohibit such operations based on the particular circumstances of that advisory or other forecast information.*

*During the ODHA:*

*Depending on the expected duration of the DCS activity, the procedures or instructions should include additional checks of the weather forecast one or more times during the activity.*

*Licensees should decide if, and how frequently, additional weather forecast checks should be performed and include that frequency in procedures or instructions. In establishing the frequency of any weather checks performed during the activity, the licensee should also consider the time required to perform "response actions" to place the DSS in an analyzed condition before the severe weather occurs.*

*After the ODHA:*

*The ODHA duration should be reassessed based upon operating experience, including equipment malfunctions, and expected delays, before each DSS loading campaign.*

*Analyzed and Unanalyzed Configuration Information:*

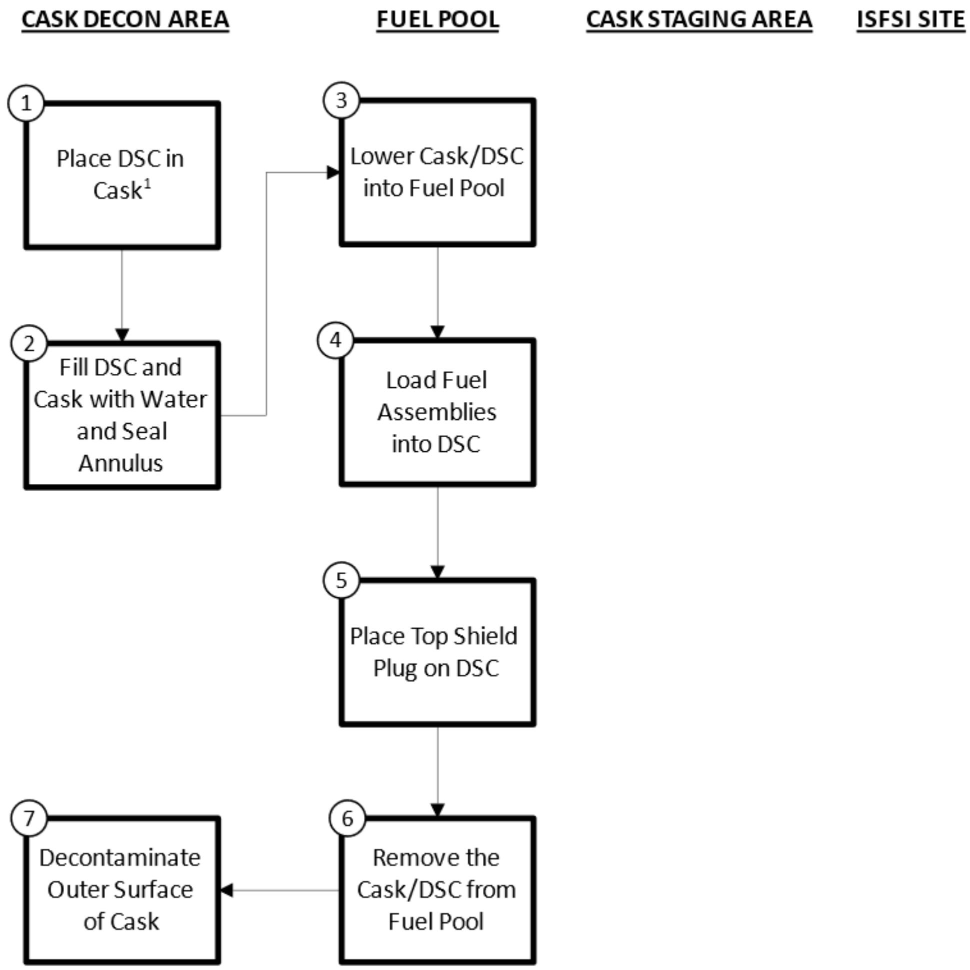
*To assist licensees, information is provided here regarding what is, and what is not, analyzed for tornado hazards, in the current generic licensing basis contained in this Standardized Advanced NUHOMS® System UFSAR:*

- *Transfer casks (TCs) are analyzed for tornado hazards while in a horizontal orientation secured to the transfer skid which is installed on the transfer trailer, with the bolted top and bottom cover plate assemblies installed.*
- *The horizontal storage modules (HSMs) are analyzed for tornado hazards with the door and all door-bolts installed, with an adjacent shield wall or an empty HSM with its door and all door-bolts installed. (CoC 1029 HSM designs require "snug tight" condition, which means tightened sufficiently to prevent removal of the nuts without a wrench.)*
- *Based on this, there are known short duration operations in the operating procedures herein which are not analyzed for tornado hazards, as follows:*
  - *The short duration from when the TC is being transferred to the ISFSI, including removal of the TC lid in order to insert the dry shielded canister into the HSM, until the HSM door is installed.*
  - *The duration when the bottom cover plate is removed either to allow access for the ram during DSC insertion or retrieval activities, or when the air circulation system is deployed.*

*Although not explicitly covered in this UFSAR, it is known that greater than class C (GTCC) waste may be stored in radioactive waste canisters (RWCs), co-located and adjacent to CoC 1029 systems on ISFSI pads. Those situations also introduce the following non-analyzed condition:*

- *The short duration from the HSM door being removed in order to insert a GTCC RWC into the HSM until the HSM door is installed, if adjacent to a loaded system (the DSC of the loaded system is vulnerable to tornado missiles through the HSM opening).*
  - *Note that if an end shield wall was installed on the end of the loaded Part 72 array, before the GTCC-RWC HSM was placed, that shield wall provides adequate protection and administrative controls would not be required.*
  - *Also note that storage of any other low-level waste at the ISFSI would need careful consideration regarding this.*

1. Verify liquid neutron shield, if used, is filled. Re-attach the transfer cask lifting yoke to the crane hook, as necessary. Ready the transfer trailer and cask support skid for service.




[1] Including Failed Fuel Cans, as Required

**Figure 8.1-1**

**Advanced NUHOMS® System Loading Operations Flow Chart**

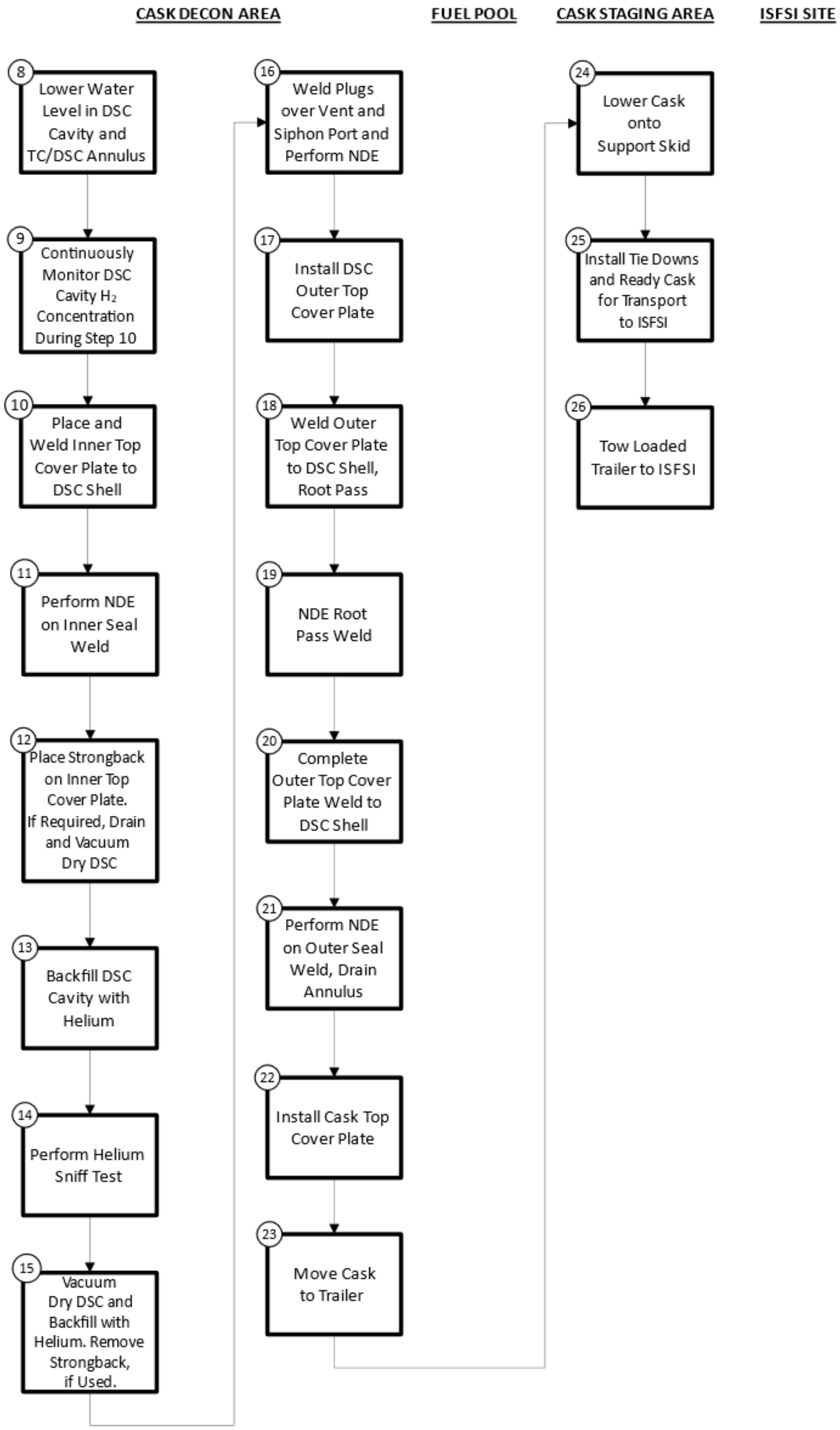



**Figure 8.1-1**
**Advanced NUHOMS® System Loading Operations Flow Chart** (continued)

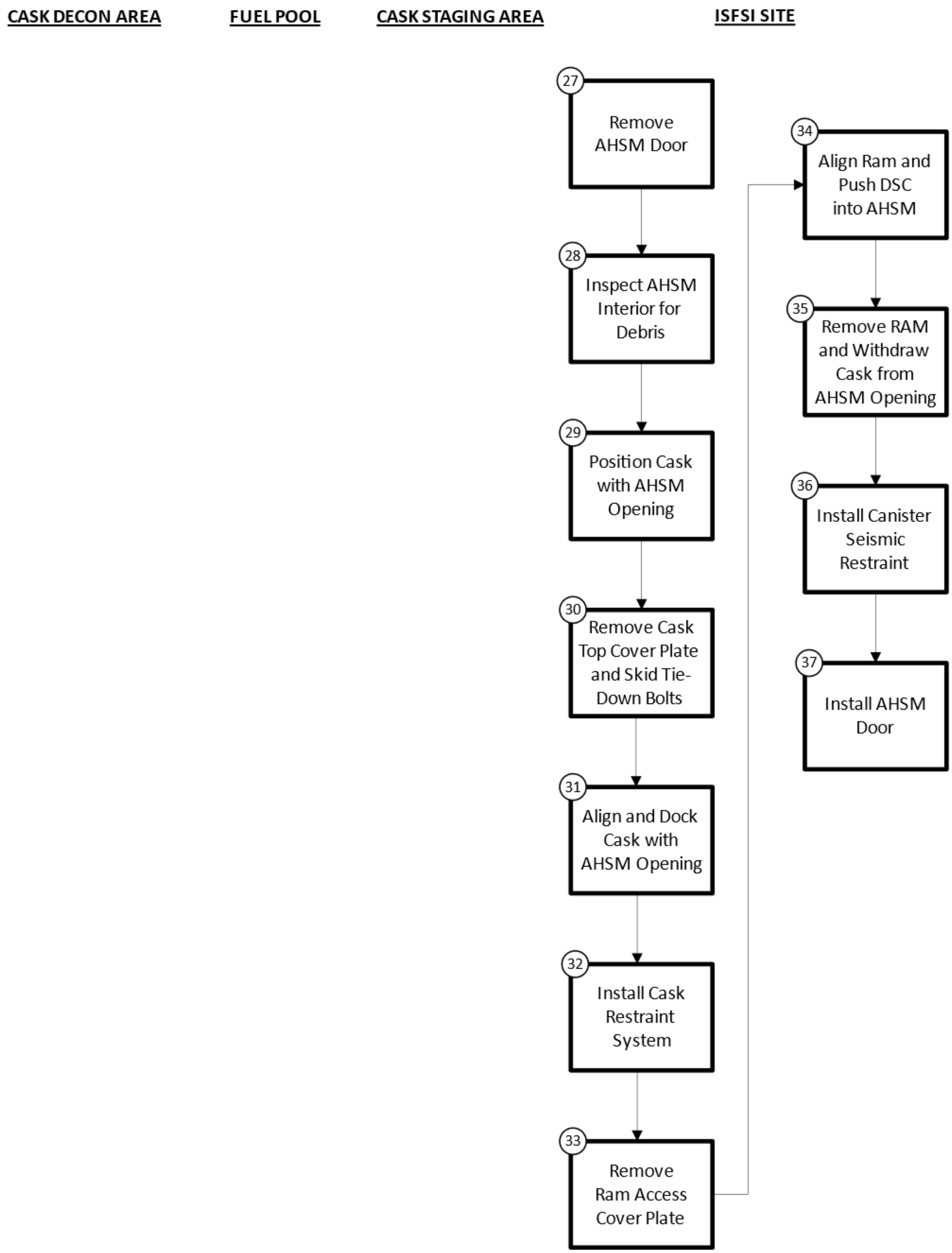



**Figure 8.1-1**
**Advanced NUHOMS® System Loading Operations Flow Chart** (concluded)

## 8.2 Procedures for Unloading the 24PT1-DSC

The following section outlines the procedures for retrieving the 24PT1-DSC from the AHSM and for removing the fuel assemblies from the 24PT1-DSC. These procedures are provided as a guide and are not intended to be limiting if the licensee determines that alternate means are available to accomplish the same operational objective. A process flow diagram for the Advanced NUHOMS® System retrieval is presented in Figure 8.2-1.

### 8.2.1 24PT1-DSC Retrieval from the AHSM

*Note: Ensure the administrative controls detailed in Section 8.1.1.5 are being implemented.*

CAUTION: Verify that the requirements of Chapter 12 lifting controls are met prior to the next step. The maximum lifting height and ambient temperature requirements must be met during transfer from the AHSM to the fuel building.

1. Ready the transfer cask, transfer trailer, and support skid for service and tow the trailer to the AHSM.

2. Remove AHSM door and seismic restraint. Remove the transfer cask top cover plate. Back the trailer to within a few inches of the AHSM.

3. Using the skid positioning system align the transfer cask with the AHSM and position the skid until the transfer cask is docked with the AHSM access opening.

4. Using optical survey equipment verify alignment of the transfer cask with respect to the AHSM. Install the transfer cask restraints.

5. Install and align the hydraulic ram with the transfer cask.

6. Extend the ram through the transfer cask into the AHSM until it is inserted in the 24PT1-DSC grapple ring.

7. Activate the arms on the ram grapple mechanism to engage the grapple ring.

8. Retract ram and pull the 24PT1-DSC into the transfer cask.

9. Retract the ram grapple arms.

10. Disengage the ram from the transfer cask.

11. Replace the cask ram access cover plate and remove the transfer cask restraints.

12. Using the skid positioning system, disengage the transfer cask from the AHSM.

13. Install the transfer cask top cover plate and ready the trailer for transfer.

14. Replace the door and seismic restraint on the AHSM.

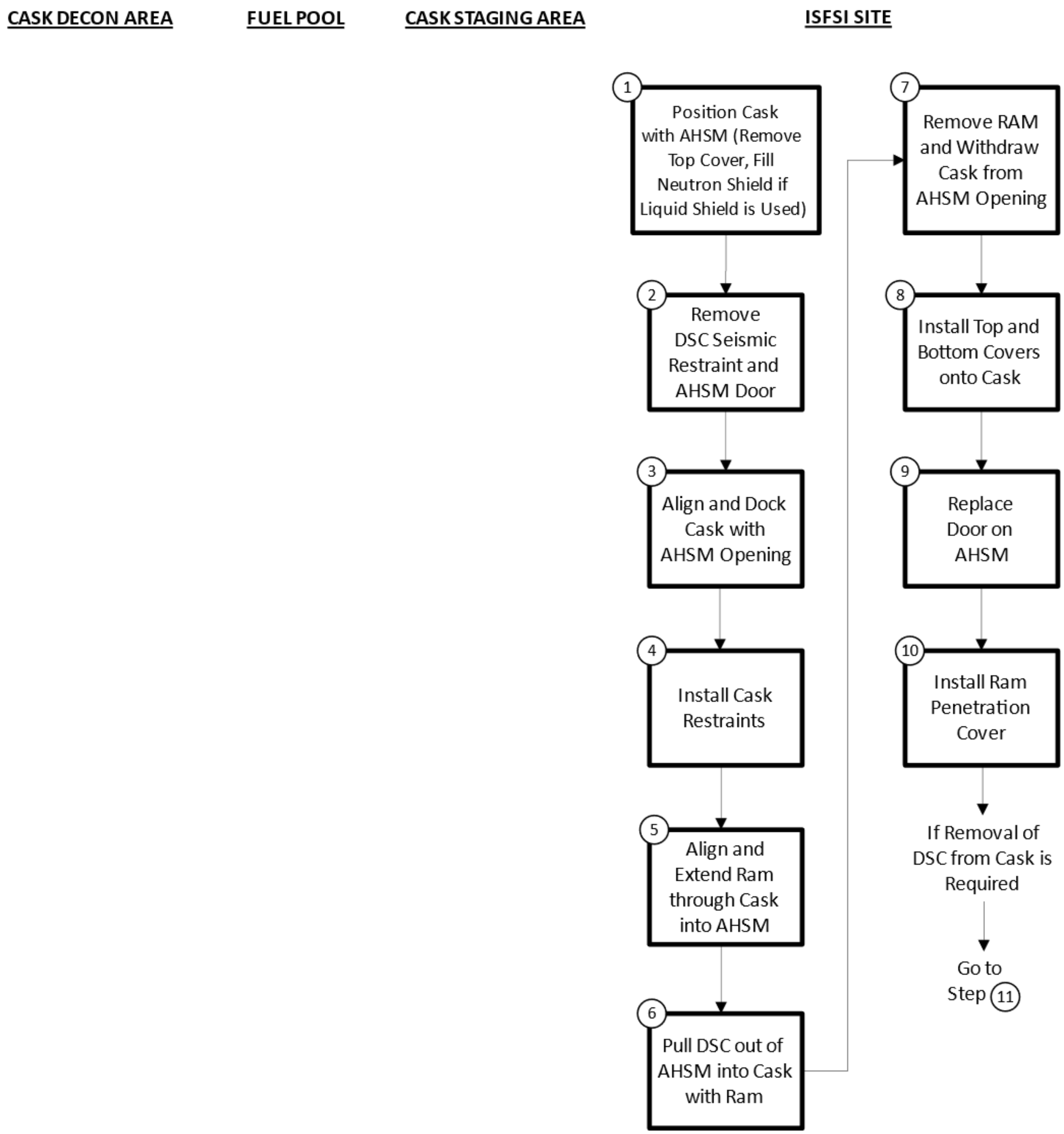



**Figure 8.2-1**
**Advanced NUHOMS® System Retrieval Operations Flow Chart**

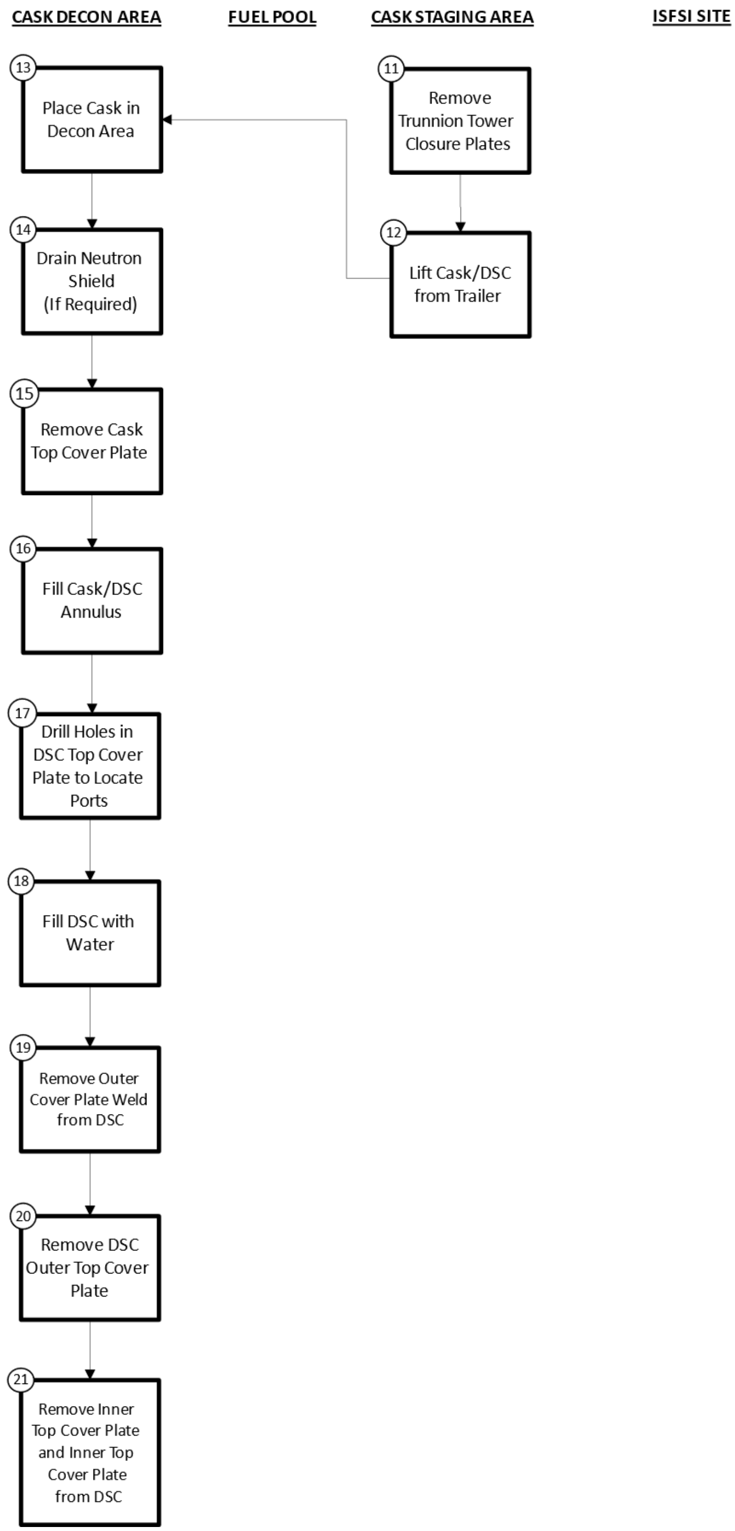



**Figure 8.2-1**
**Advanced NUHOMS® System Retrieval Operations Flow Chart** (continued)

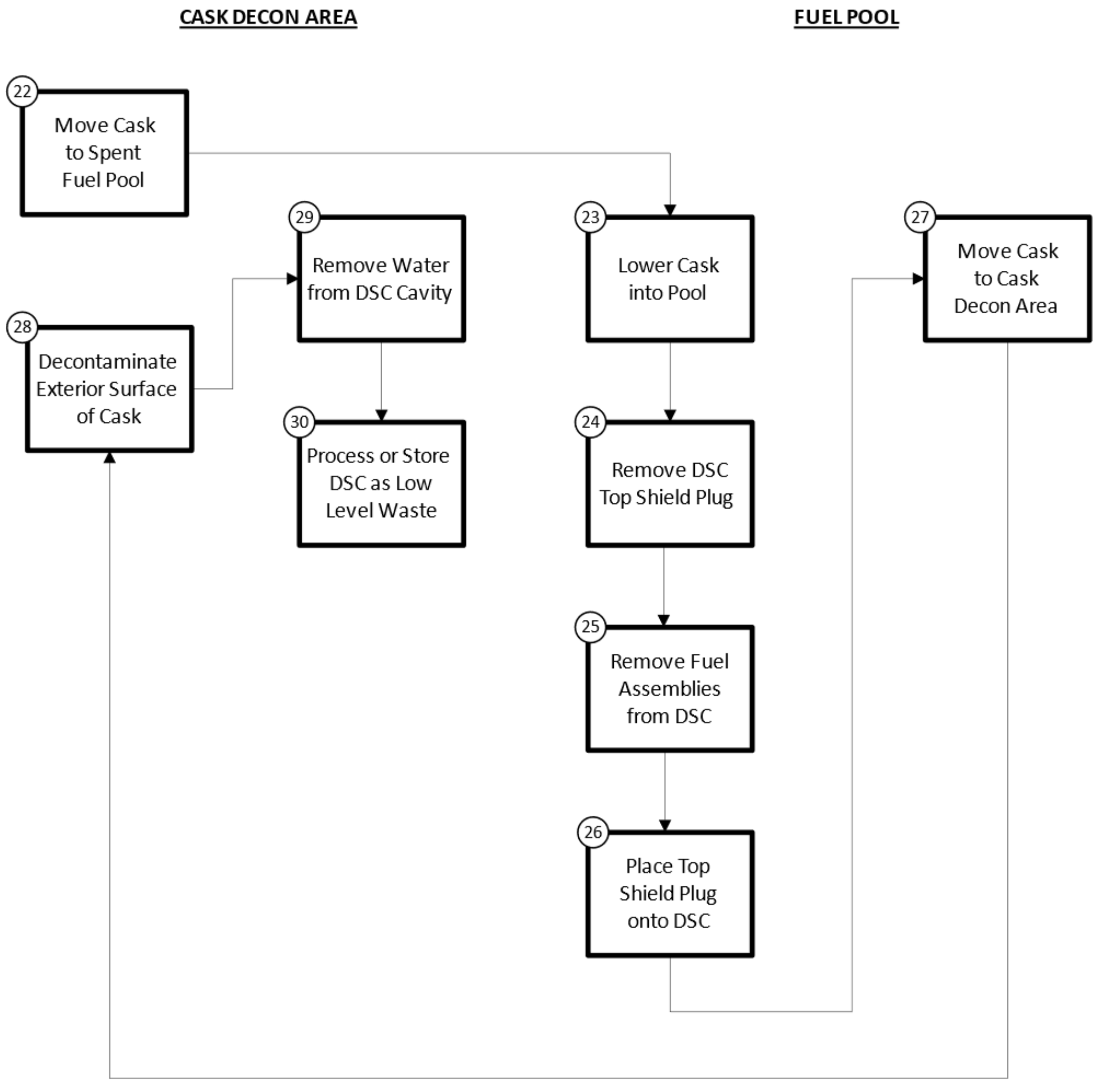



**Figure 8.2-1**
**Advanced NUHOMS® System Retrieval Operations Flow Chart** (concluded)

## 15.3 Aging Management Program

Aging effects that could result in the loss of in-scope SSCs' intended safety function(s) are managed during the extended storage period. Many aging effects are adequately managed for the extended storage period using TLAA, as discussed in Section 15.2. An AMP is used to manage those aging effects that are not managed by TLAA. The AMPs that manage each of the identified aging effects for all in-scope SSCs include the following:

- DSC Aging Management Program
- HSM Aging Management Program
- Basemat Aging Management Program
- High Burnup Fuel Aging Management Program

*Note: Aging Management Program inspections may require short duration ODHAs that place the system in an unanalyzed condition for tornado hazards (e.g., removal of HSM door to collect a sample from the DSC). The administrative controls identified in Section 8.1.1.5 shall be in place for these types of AMP inspection activities.*

### 15.3.1 DSC Aging Management Program

#### 15.3.1.1 DSC AMP – Scope of Program

This program visually inspects and monitors the external surfaces of the DSC (the term DSC applies to the 24PT1, 24PT4, and 32PTH2 DSC types) subcomponents listed in Table 15-3. The table also lists the material and environments for each subcomponent along with the aging mechanisms and aging effects to be managed. The following aging effects and mechanism will be managed via this AMP:

- Stainless Steel
  - Loss of material due to pitting, crevice, and galvanic corrosion
  - Cracking due to stress corrosion cracking

#### 15.3.1.2 DSC AMP – Preventive Actions

The program is a condition-monitoring program that does not include preventive actions.

#### 15.3.1.3 DSC AMP – Parameters Monitored or Inspected

The DSC AMP consists of visual inspections to monitor for material degradation. There are no accessible areas of the DSC available for direct visual inspection since it is sheltered inside the HSM.

The following normally non-accessible areas will undergo remote visual inspection for loss of material and cracking:

- Portions of the DSC surfaces, welds and heat affected zones (HAZs), and crevice locations near the DSC support rails are inspected for discontinuities and imperfections. Localized corrosion (e.g., pitting and crevice corrosion), cracking, or discolorations, if any, are documented. Appearance and location of atmospheric deposits on the DSC surfaces are recorded.

- Portions of the DSC support structure and attachment hardware
- External surfaces of the base unit's side and rear walls
- Components embedded in concrete

15.3.2.4 <u>HSM AMP – Detection of Aging Effects</u>

A minimum of one HSM will be selected for the baseline and subsequent inspections. The selection is to be based on the time in service or the DSC selected for aging management inspections.

As appropriate, direct or remote visual inspections utilizing ACI 349.3R [15.11], Section 3.6.1 are conducted for HSM concrete in both outdoor and sheltered environments, allowing for detection of aging effects from Table 15-4. Direct or remote visual inspections are utilized for general inspections for HSM steel components depending on whether these components are accessible or normally non-accessible, respectively. Visual examinations are performed for steel surfaces, detecting aging effects from Table 15-4 while identifying and assessing discontinuities and imperfections on the surface of components. As much of the HSM steel surfaces as can be reasonably accessed is examined to ascertain their general condition.

Inspection of the normally, non-accessible internal surfaces of the HSM concrete may be performed using a video camera, fiber-optic scope, or other remote inspection technology via existing access points of the HSM. The remote inspection system is qualified and demonstrated to have sufficient resolution capability and enhanced lighting to resolve the acceptance criteria identified in Section 15.3.2.6.

For HSM concrete, crack maps *should be* developed. Dimensioning is documented in photographic records by inclusion of a tape measure/crack gauge, a comparator, or both.

Within the HSM cavity, certain surface areas may be inaccessible for direct visual and remote inspection. This AMP addresses detection of aging effects for inaccessible areas indirectly by monitoring the inspection findings within accessible and normally non-accessible areas. Therefore, inaccessible area inspections may only be necessitated because of the licensee's corrective action program to ensure the aging effect is adequately managed and that the component's intended safety function is maintained during the PEO.

The baseline AMP visual inspection is to be conducted within two years prior to 20 years of the first loaded DSC being placed in storage. Subsequent inspections are to be conducted every 5 years ± 1 year following the baseline inspection.

15.3.2.5 HSM AMP – Monitoring and Trending

The inspections and monitoring activities in this AMP are performed periodically in order to identify areas of degradation. Conditions adverse to quality that are noted during the inspection and monitoring activities, such as non-conformances, failures, malfunctions, deficiencies, and deviations, are entered into the licensee's corrective action program. Visual inspections appropriately consider cumulative OE from previous inspections and assessments in order to monitor and trend the progression of aging effects over time. Data taken for these inspections is to be monitored by comparison to past site data taken, as well as comparison to industry OE, including data gathered by the AMID as discussed in NEI 14-03 [15.4].

For HSM concrete, crack maps*, if developed,* are monitored and trended as a means of identifying progressive growth of defects that may indicate degradation due to specific aging effects, such as rebar corrosion. Crack maps*, if developed,* and photographic records are compared with those from previous inspections to identify accelerated degradation of the concrete during the PEO.

As described in Section 15.3.2.4, a minimum of one HSM is to be selected for the baseline inspection and subsequent inspections. If the baseline HSM is not available for subsequent inspections or is no longer in service (e.g., the stored DSC has been shipped off-site), another HSM is to be selected for a new baseline inspection.

15.3.2.6 HSM AMP – Acceptance Criteria

The criteria below are derived from design basis codes and standards that include ACI 349.3R [15.11]. The criteria are directed at the identification and evaluation of degradation that may affect the ability of the HSM to perform its intended safety function. Licensees who are not committed to ACI 349.3R, and elect to use site-specific criteria for concrete structures, should describe the criteria and provide a technical basis for deviations from those acceptance criteria in ACI 349.3R. Should the inspection acceptance criteria be exceeded, the identified issue requires further evaluation and is entered into the licensee's corrective action program.

- Steel
  - Loss of material due to general, pitting, crevice, and galvanic corrosion
- Stainless Steel
  - Loss of material due to pitting and crevice corrosion
  - Cracking due to stress corrosion cracking

Metallic Components

Visual inspections are utilized for general inspections for HSM steel components. For metallic surfaces, any of the following indications of relevant degradation detected are evaluated:

- General, pitting, crevice, and galvanic corrosion (loss of material)
- Corrosion stains on adjacent components and structures (indicating loss of material)

15.3.3.3 Basemat AMP – Parameters Monitored or Inspected

The Basemat AMP consists of visual inspections to monitor for material degradation.

The following accessible areas of the basemat will undergo direct visual inspection for the aging effects listed in Table 15-5:

- The aboveground exposed surface of the basemat

The inaccessible areas of the basemat include:

- Below-grade surfaces off the basemat
- External surfaces of the basemat under the HSM base unit walls
- Components embedded in concrete

15.3.3.4 Basemat AMP – Detection of Aging Effects

Direct visual inspections utilizing ACI-349.3R [15.11], Section *3.6.1* are to be conducted of the above-grade portions of the concrete basemat, allowing for detection of aging effects from Table 15-5.

For basemat concrete, crack maps *should be* developed. Dimensioning is documented in photographic records by inclusion of a tape measure/crack gauge, a comparator, or both.

Potential degradation of the below-grade portion of the concrete pad is assessed by results of groundwater sampling at a minimum of three locations in the area of the ISFSI.

The baseline AMP visual inspection and groundwater sampling is to be conducted within two years prior to 20 years of the first loaded DSC being placed in storage. Subsequent inspections are to be conducted every 5 years ± 1 year following the baseline inspection.

15.3.3.5 Basemat AMP – Monitoring and Trending

The inspections and monitoring activities in this AMP are performed periodically in order to identify areas of degradation. Conditions adverse to quality that are noted during the inspection and monitoring activities, such as non-conformances, failures, malfunctions, deficiencies, and deviations are entered into the licensee's corrective action program. Visual inspections appropriately consider cumulative OE from previous inspections and assessments in order to monitor and trend the progression of aging effects over time. Data taken for these inspections is to be monitored by comparison to past site data taken, as well as comparison to industry OE, including data gathered by the AMID as discussed in NEI 14-03 [15.4].

For basemat concrete, crack maps*, if developed,* are monitored and trended as a means of identifying progressive growth of defects that may indicate degradation due to specific aging effects, such as rebar corrosion. Crack maps*, if developed,* and photographic records are compared with those from previous inspections to identify accelerated degradation of the concrete during the PEO.

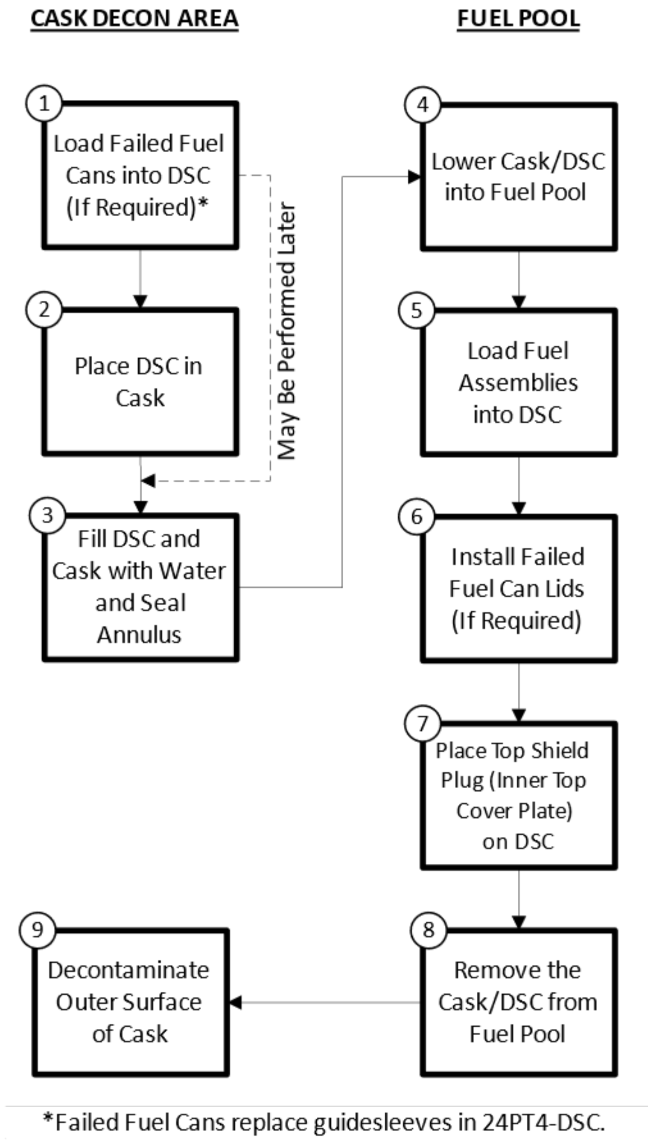



**Figure A.8.1-1**
**Advanced NUHOMS® System Loading Operations Flow Chart**

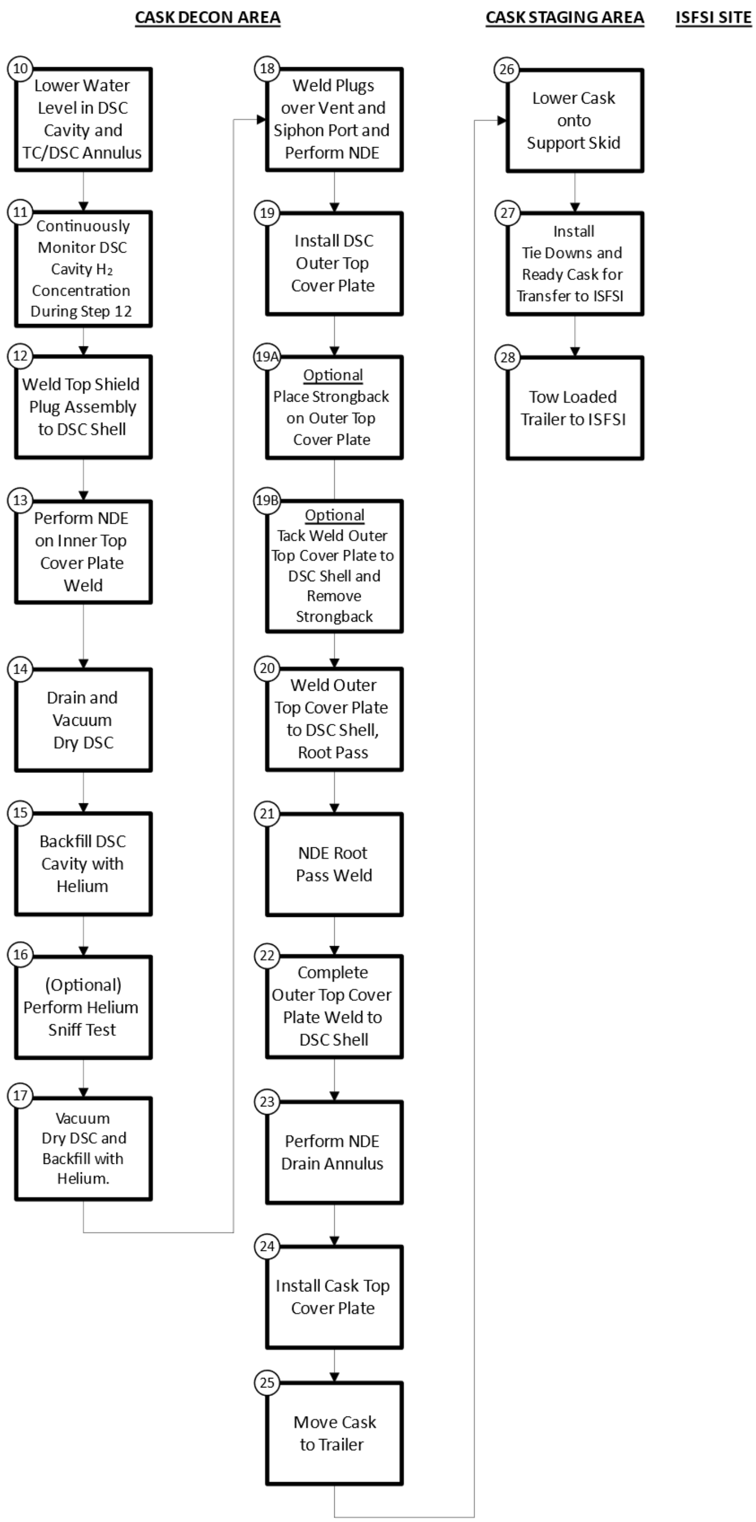



**Figure A.8.1-1**
**Advanced NUHOMS® System Loading Operations Flow Chart**
(continued)

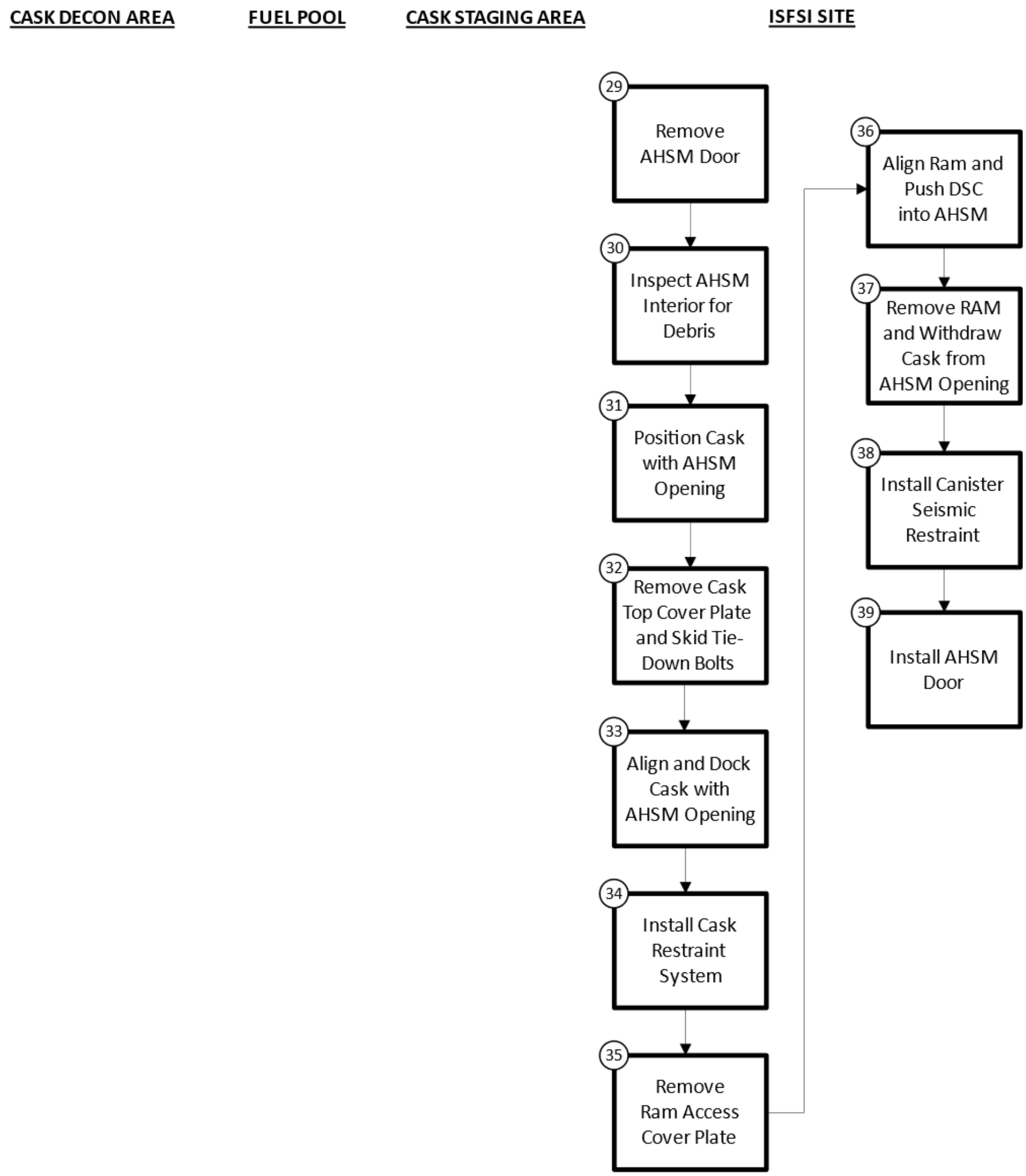



**Figure A.8.1-1**
**Advanced NUHOMS® System Loading Operations Flow Chart**
(concluded)

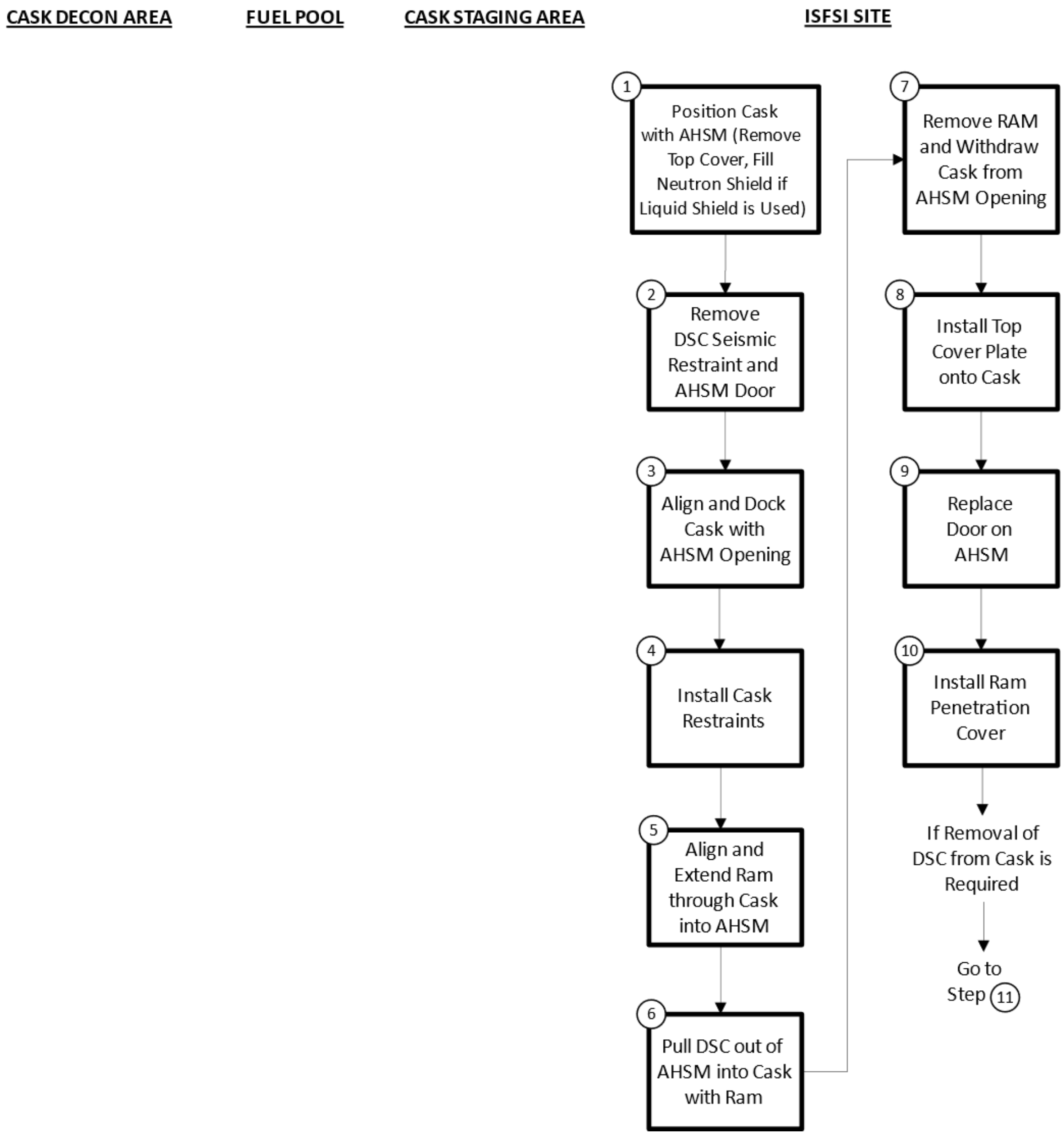



**Figure A.8.2-1**
**Advanced NUHOMS® System Retrieval Operations Flow Chart**

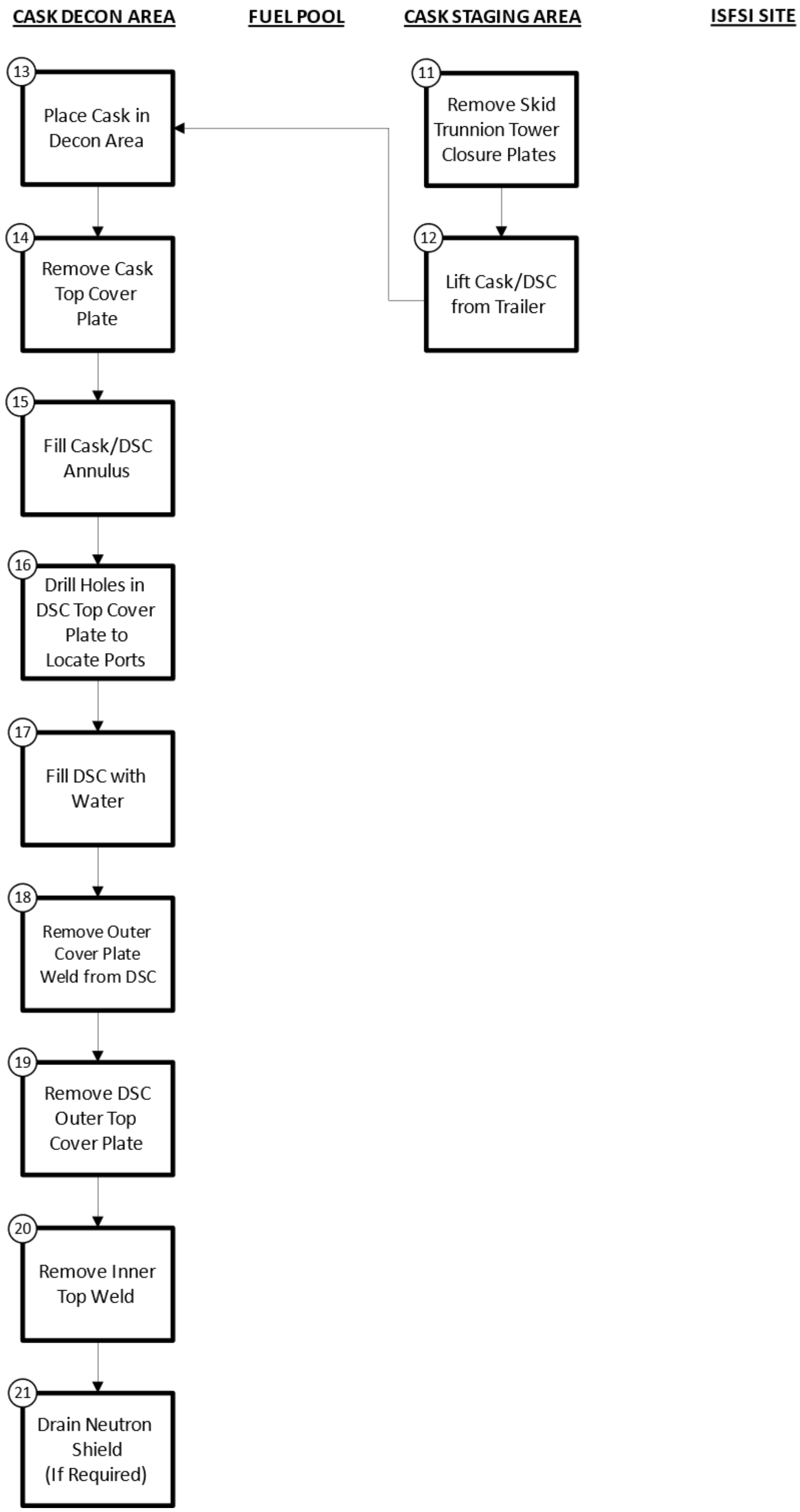



**Figure A.8.2-1**
**Advanced NUHOMS® System Retrieval Operations Flow Chart**
(continued)

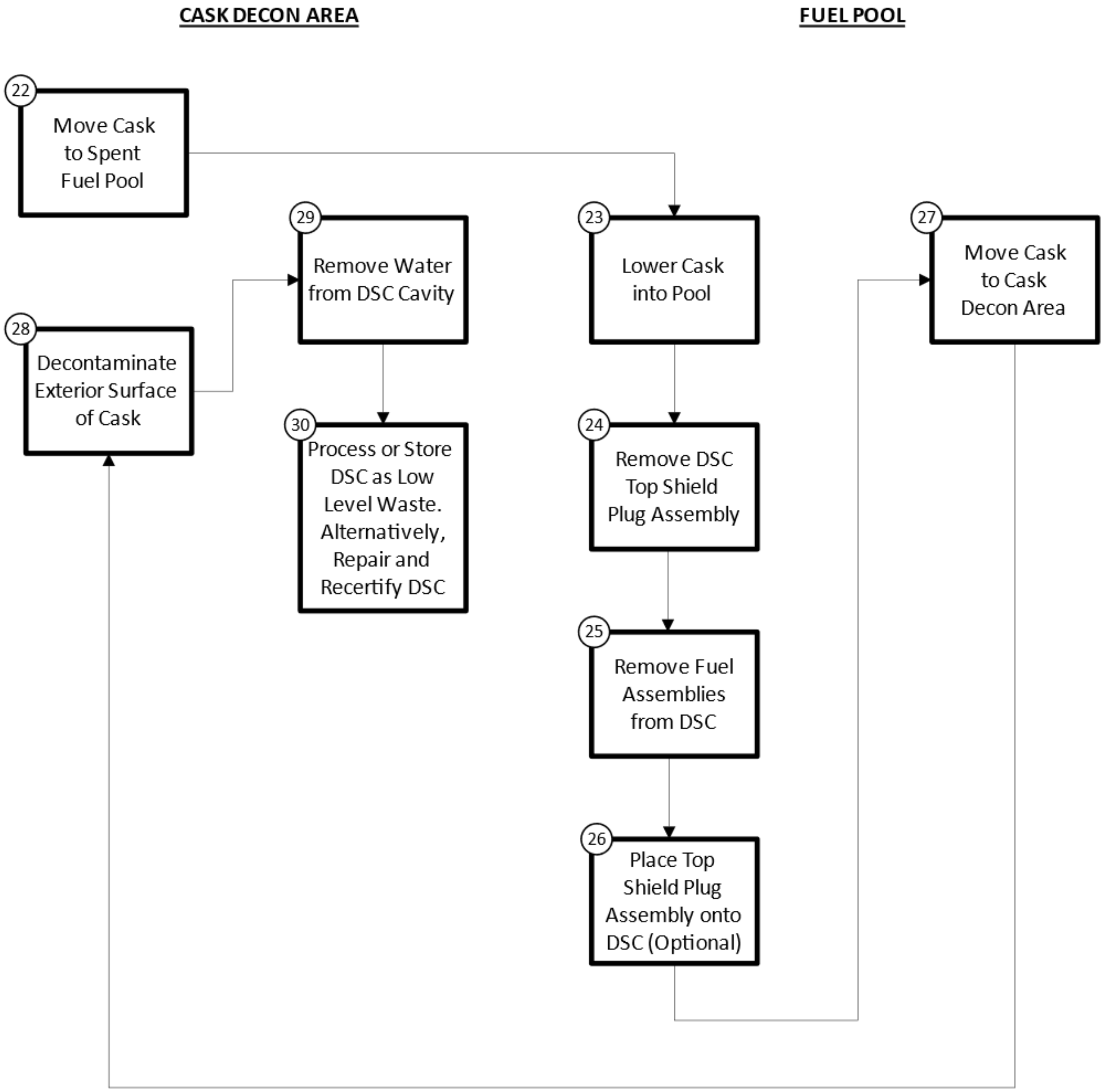



**Figure A.8.2-1**
**Advanced NUHOMS® System Retrieval Operations Flow Chart**
(concluded)

12. Verify that the TC dose rates are compliant with limits specified in Technical Specification 5.2.4.f.

B.8.1.1.5 TC Downending and Transfer to ISFSI

***NOTE:*** *Ensure the administrative controls detailed in Section 8.1.1.5 are being implemented.*

**NOTE:** Alternate Procedure for Downending of the TC: Some plants have limited floor hatch openings above the TC/trailer/skid, which limit crane travel (within the hatch opening) that would be needed in order to downend the TC with the trailer/skid in a stationary position. For these situations, alternate procedures are to be developed on a plant-specific basis, with detailed steps for downending.

1. Re-attach the TC lifting yoke to the crane hook, as necessary. Ready the transfer trailer and TC support skid for service.
2. Move the scaffolding and seismic restraint, if used, away from the TC as necessary. Engage the trunnions with the lifting yoke and lift the TC over the TC support skid on the transfer trailer.
3. The transfer trailer should be positioned so that TC support skid is accessible to the crane with the trailer supported on the vertical jacks.
4. Position the TC lower trunnions onto the transfer trailer support skid pillow blocks.
5. Move the crane forward while simultaneously lowering the TC until the TC upper trunnions are just above the support skid upper trunnion pillow blocks.
6. Inspect the positioning of the TC to insure that the TC and trunnion pillow blocks are properly aligned.
7. Lower the TC onto the skid until the weight of the TC is distributed to the trunnion pillow blocks.
8. Inspect the trunnions to ensure that they are properly seated onto the skid and install the trunnion tower closure plates, if required.

B.8.1.1.6 32PTH2 DSC Transfer to the AHSM-HS

1. Prior to transferring the TC to the ISFSI or prior to positioning the TC at the AHSM-HS designated for storage, remove the AHSM-HS door using a portable crane, inspect the cavity of the AHSM-HS, removing any debris and ready the AHSM-HS to receive a 32PTH2 DSC. The doors on adjacent AHSM-HSs should remain in place.

   **CAUTION:** The insides of empty modules have the potential for high dose rates due to adjacent loaded modules. Proper ALARA practices should be followed for operations inside these modules and in the areas outside these modules whenever the door from the empty AHSM-HS has been removed.

2. Inspect the AHSM-HS air inlet and outlets to ensure that they are clear of debris. Inspect the screens on the air inlet and outlets for damage.
3. Using a suitable vehicle, transfer the TC from the plant's fuel/reactor building to the ISFSI along the designated transfer route.

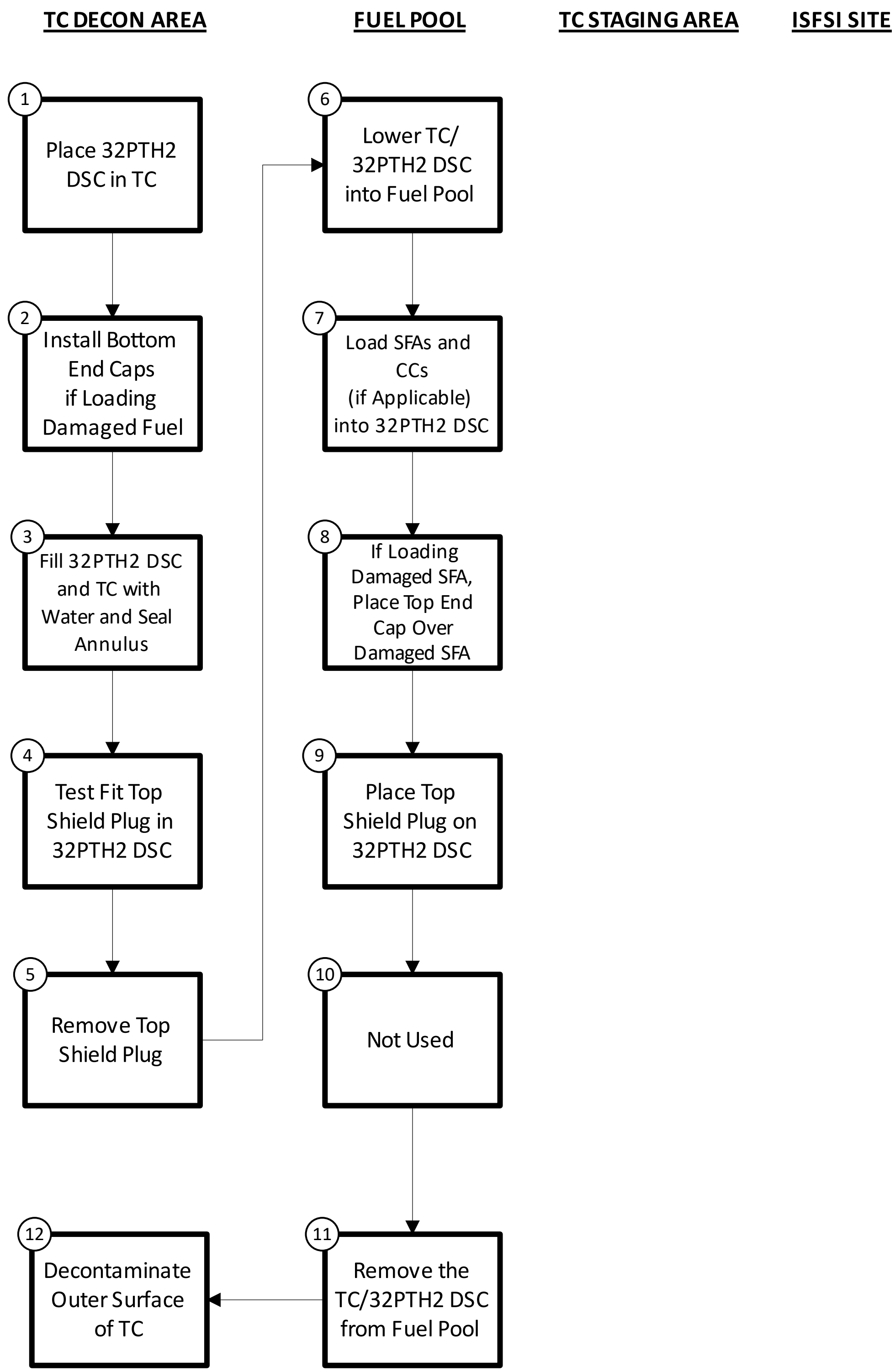



**Figure B.8.1-1**
**NUHOMS® 32PTH2 System Loading Operations Flow Chart**
(Part 1 of 3)

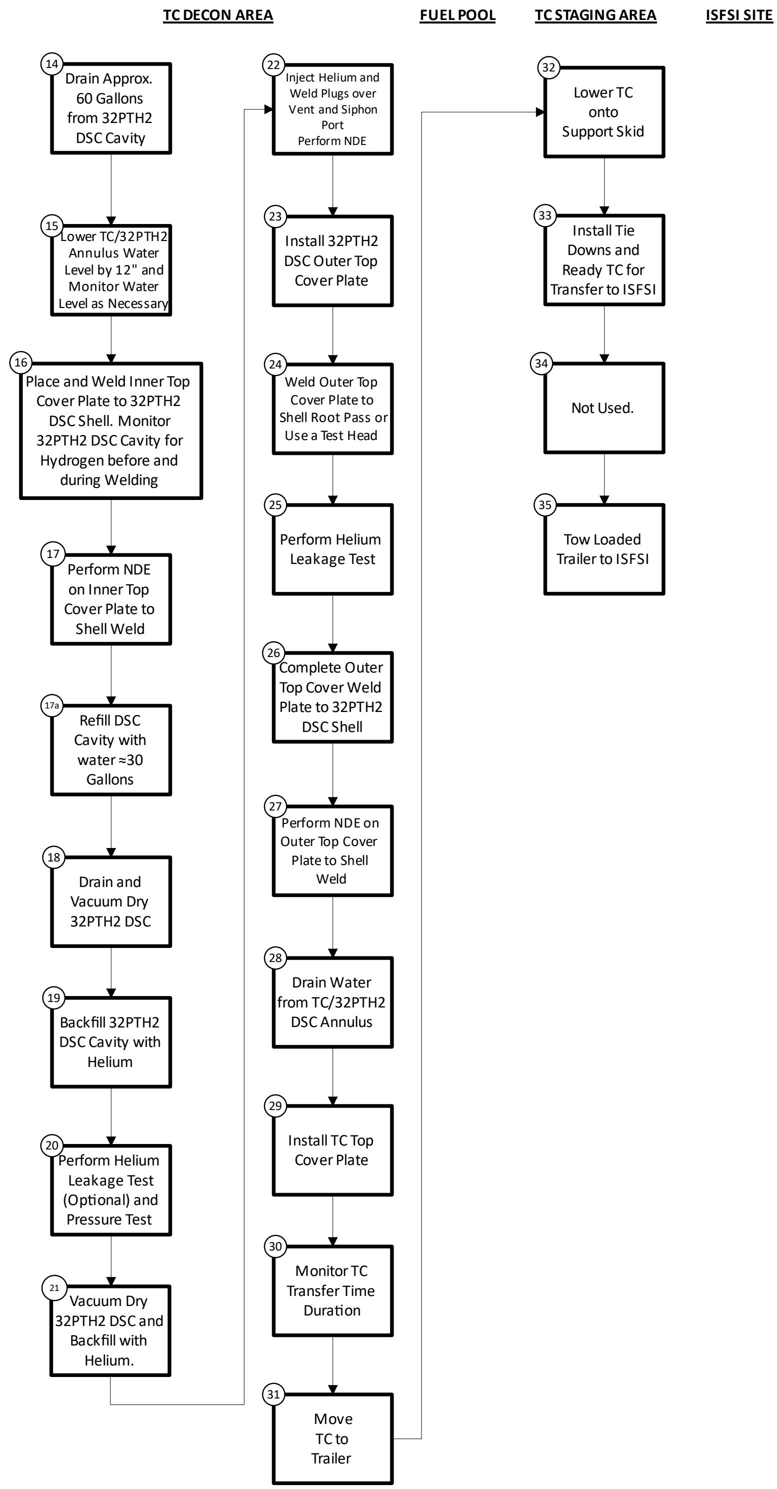



**Figure B.8.1-1**
**NUHOMS® 32PTH2 System Loading Operations Flow Chart**
(Part 2 of 3)

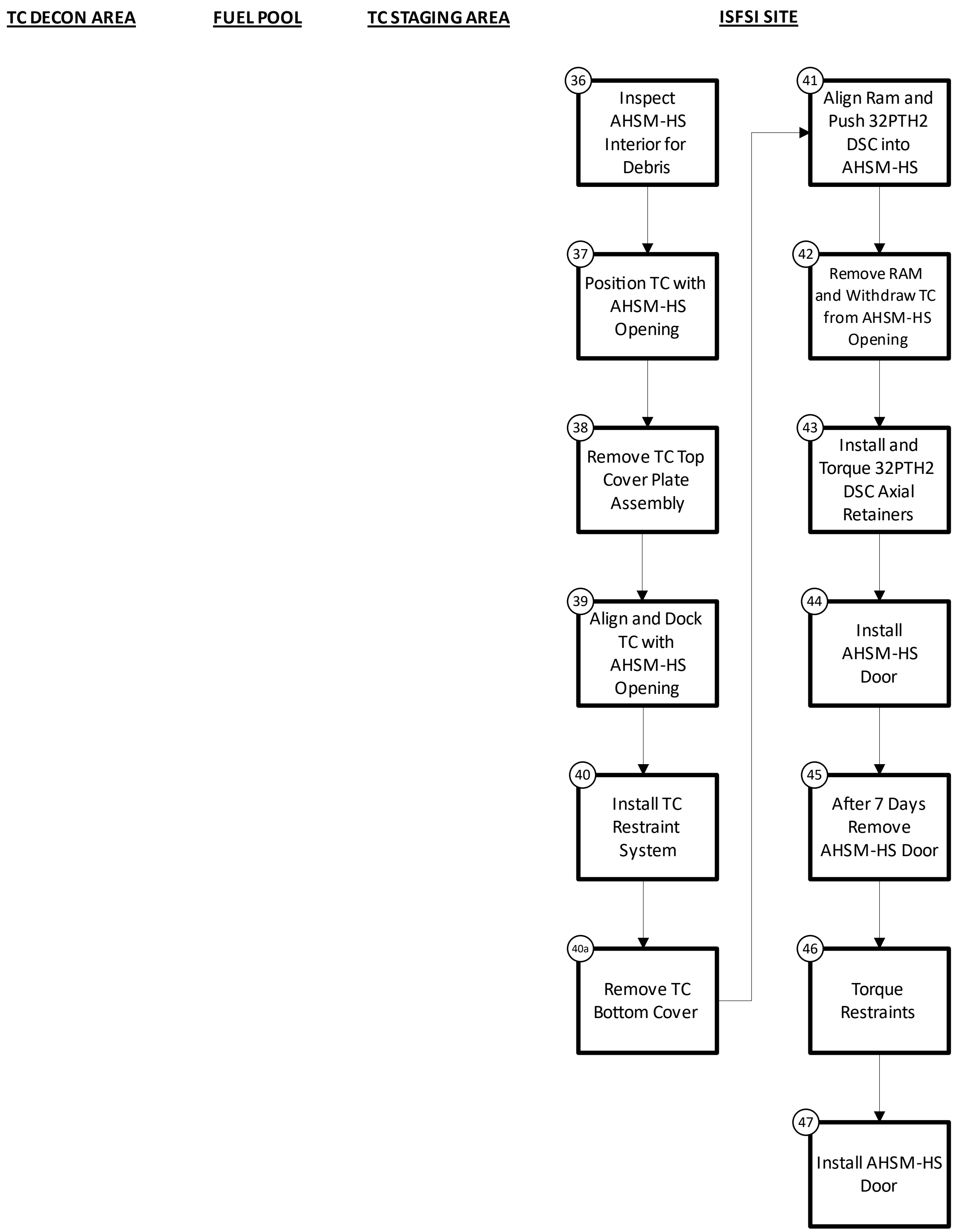



**Figure B.8.1-1**
**NUHOMS® 32PTH2 System Loading Operations Flow Chart**
(Part 3 of 3)

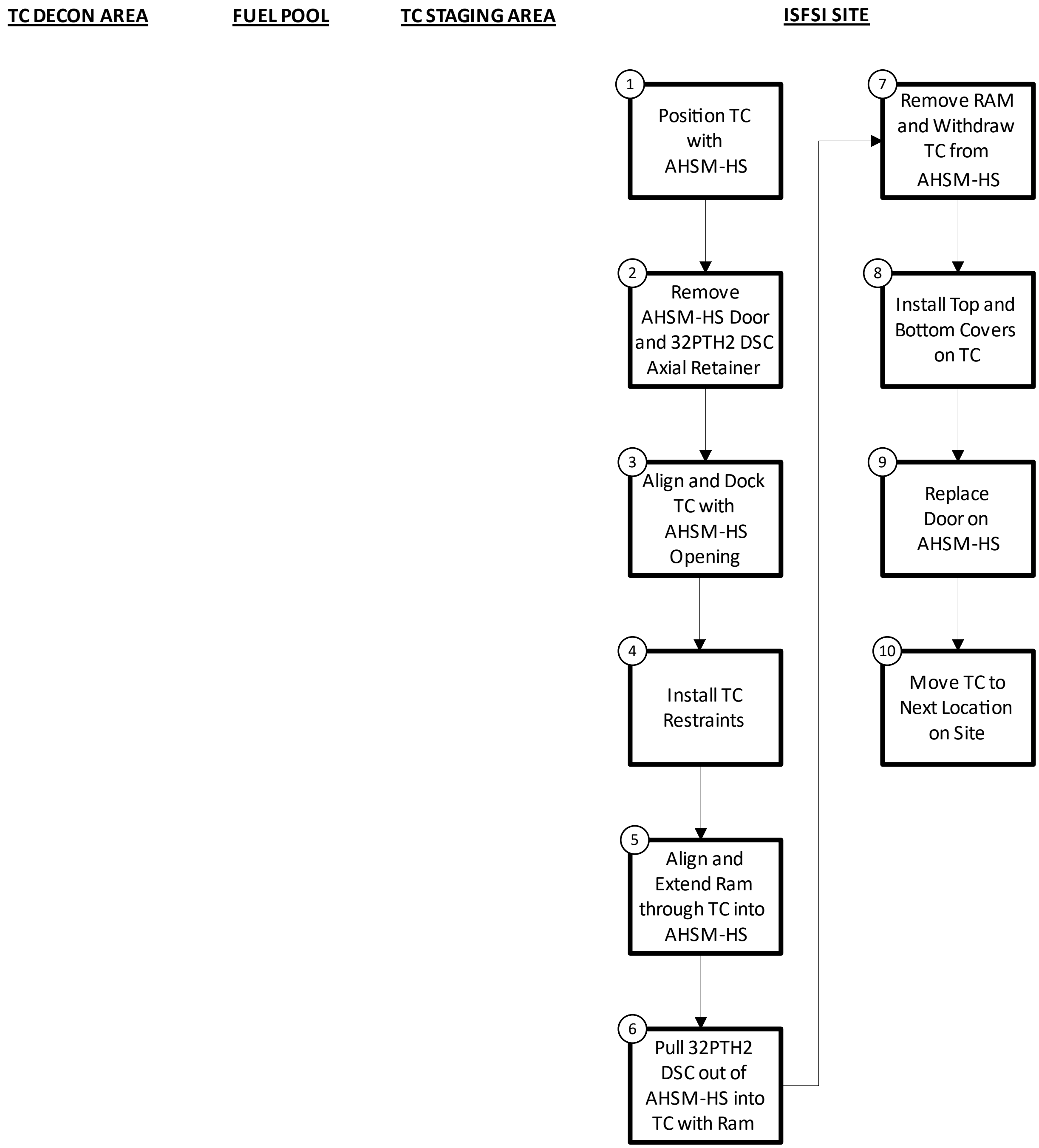



**Figure B.8.2-1**
**NUHOMS® 32PTH2 System Retrieval Operations Flow Chart**
(Page 1 of 3)

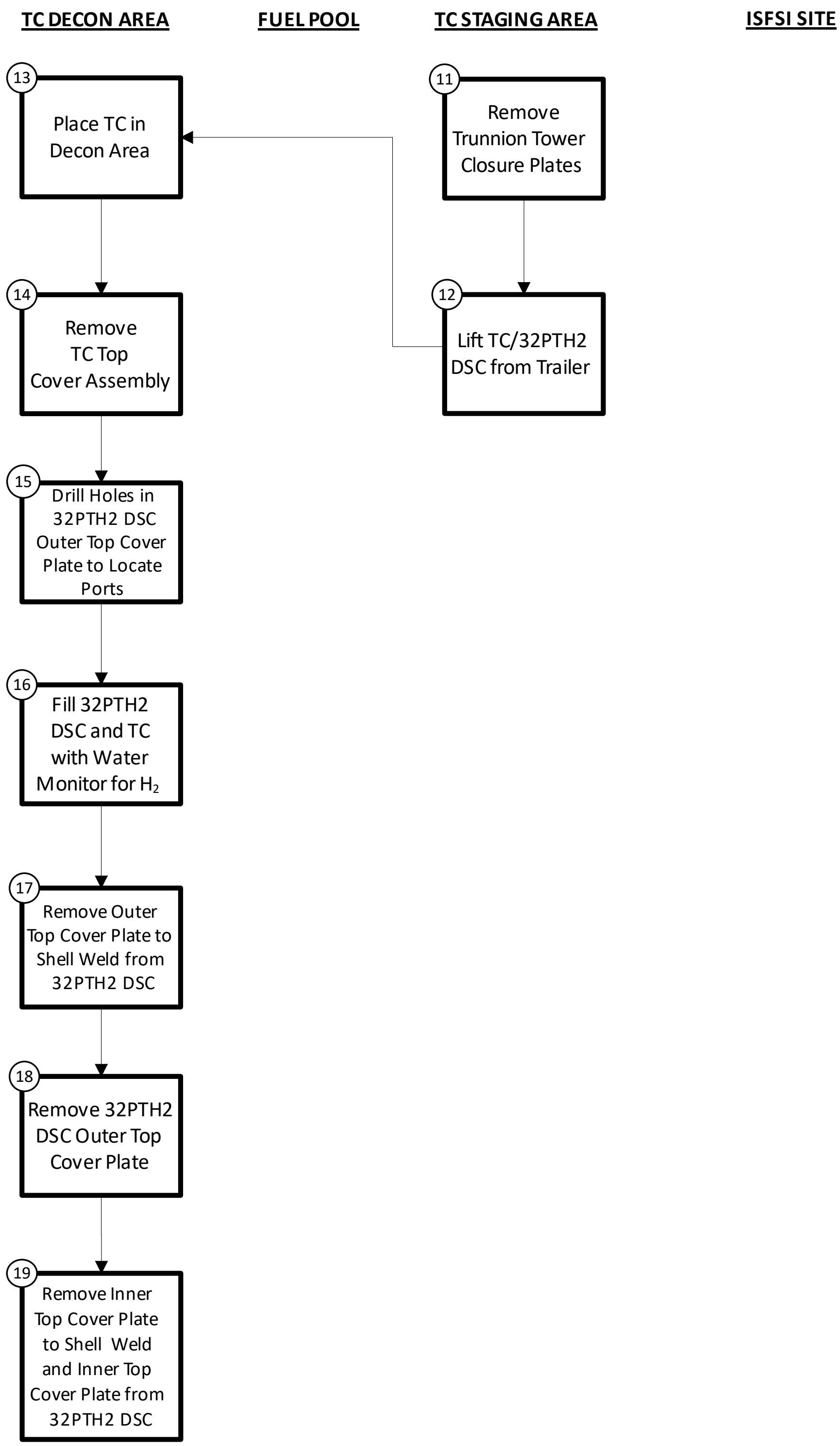



**Figure B.8.2-1**
**NUHOMS® 32PTH2 System Retrieval Operations Flow Chart**
(Part 2 of 3)

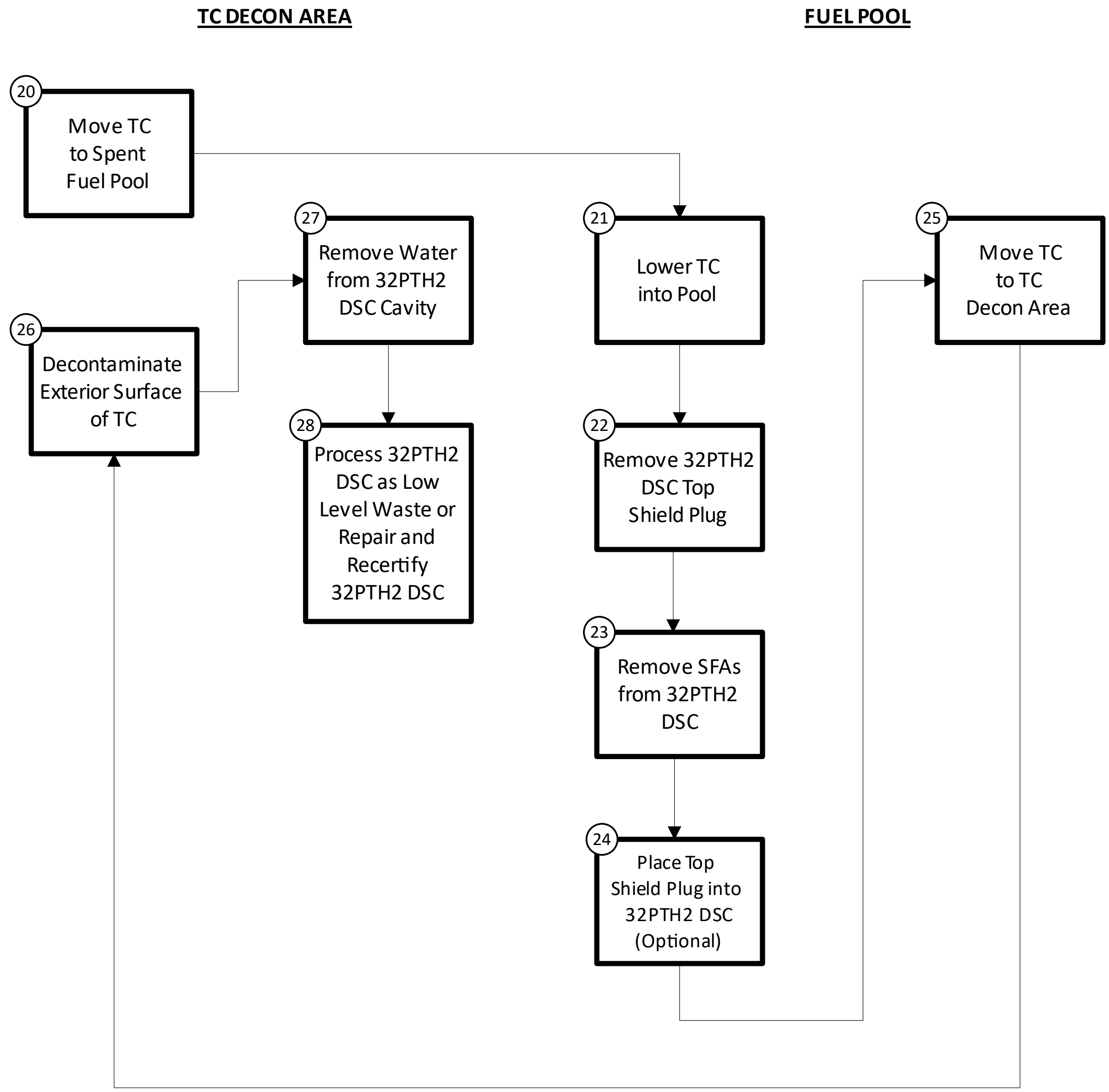



**Figure B.8.2-1**
**NUHOMS® 32PTH2 System Retrieval Operations Flow Chart**
(Page 3 of 3)