AREVA

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E-37735

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

Subject: Revision 8 to the Application for Amendment No. 13 to the Standardized NUHOMS® System (Docket No. 72-1004; TAC No. L24519)

Based on discussions with NRC staff, this submittal provides changed updated final safety analysis report (UFSAR) pages for the CoC 1004 Amendment 13 application, which reflect changes to clarify the hydrogen monitoring safety limit of 2.4% and flammability limit of 4.0%.

Enclosure 1 provides a listing of the UFSAR pages included in this submittal. Enclosure 2 provides the changed UFSAR pages, which are annotated as Revision 8. All Amendment 13 changes are indicated by revision bars in the right margin and italics for inserted text. The new changes are shaded to distinguish them from previous Amendment 13 changes. Certain pages are included due to shifted information, for continuity, but have no changes.

Should the NRC staff require additional information to support review of this application, please do not hesitate to contact Mr. Don Shaw at 410-910-6878 or me at 410-910-6820.

Sincerely,

Paul A Triska

Paul Triska
Vice President, Technical Services

cc: B. Jennifer Davis (NRC SFST)

Enclosure:

1. Listing of UFSAR Pages Associated with Revision 8 to Amendment 13
2. UFSAR Pages Associated with Revision 8 to Amendment 13

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Enclosure 1 to E-37735

Listing of UFSAR Pages Associated with Revision 8 to Amendment 13

UFSAR Pages

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K.8-19
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Enclosure 2 to E-37735

UFSAR Pages Associated with Revision 8 to Amendment 13

9. Disconnect the VDS from the DSC.

CAUTION: An additional step is required to address Bulletin 96-04 concerns (5.5). This step provides for continuous hydrogen monitoring during the welding of the top inner cover plate as described in step 11 (5.4) and for compliance with Technical Specification 5.2.6. Insert a ¼ inch tygon tubing of sufficient length through the vent port such that it terminates just below the DSC shield plug. Connect the tygon tubing to a hydrogen monitor to allow continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner cover plate. Optionally, other methods may be used for continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner top cover plate, to comply with the Technical Specification. Ensure that the DSC internal pressure remains atmospheric during welding of the inner top closure plate.

10. Cover the cask/DSC annulus to prevent debris and weld splatter from entering the annulus.

11. Ready the automated welding machine and tack weld the inner top cover plate to the DSC shell. Complete the inner top cover plate weldment and remove the automated welding machine.

CAUTION: For DSCs with spacer discs coated with aluminum, continuously monitor the hydrogen concentration in the DSC cavity using the tygon tube arrangement described in step 9 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% (5.4) *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with 2-3 psig helium (or any other inert medium) via the ¼" tygon tubing to reduce the hydrogen concentration safely below the 2.4% limit. This step is optional for DSCs with spacer discs which have been coated with electroless nickel.

12. Perform dye penetrant weld examination of the inner top cover plate weld in accordance with the Technical Specification 5.2.4.b requirements.

13. Place the strongback so that it sits on the inner top cover plate and is oriented such that:

- the DSC siphon and vent ports are accessible
- the strongback stud holes line up with the TC lid bolt holes.

14. Lubricate the studs and, using a crossing pattern, adjust the strongback studs to snug tight ensuring approximately even pressure on the cover plate.

18. Obtain a sample of the DSC atmosphere, if necessary (e.g., at the end of service life). Fill the DSC with water from the fuel pool (and meeting the requirements of Technical Specification 3.2.1, if required) through the siphon port with the vent port open and routed to the plant's off-gas system.

CAUTION:

(a) The water fill rate must be regulated during this reflooding operation to ensure that the DSC vent pressure does not exceed 20.0 psig.

(b) To address Bulletin 96-04 concerns (5.5), and for compliance with Technical Specification 5.2.6, provide for continuous hydrogen monitoring of the DSC cavity atmosphere (Reference step 5.1.1.3.9) during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* hydrogen concentration is not exceeded (5.4). Purge with 2-3 psig helium (or any other inert medium) as necessary to maintain the hydrogen concentration safely below this limit.

19. Place welding blankets around the cask and scaffolding.

20. Using plasma arc-gouging, a mechanical cutting system or other suitable means, remove the seal weld from the outer top cover plate and DSC shell. A fire watch should be placed on the scaffolding with the welder, as appropriate. The exhaust system should be operating at all times.

21. The material or waste from the cutting or grinding process should be treated and handled in accordance with the plant's low level waste procedures unless determined otherwise.

22. Remove the top of the tent, if necessary.

23. Remove the exhaust hood, if necessary.

24. Remove the DSC outer top cover plate.

25. Reinstall tent and temporary shielding, as required. Remove the seal weld from the inner top cover plate to the DSC shell in the same manner as the top cover plate. Remove the inner top cover plate. Remove any remaining excess material on the inside shell surface by grinding.

26. Clean the cask surface of dirt and any debris which may be on the cask surface as a result of the weld removal operation. Any other procedures which are required for the operation of the cask should take place at this point as necessary.

4. Decontaminate the exposed surfaces of the DSC shell perimeter and remove the inflatable cask/DSC annulus seal.

5. Connect the cask drain line to the cask, open the cask cavity drain port and allow water from the annulus to drain out until the water level is approximately twelve inches below the top edge of the DSC shell. Take swipes around the outer surface of the DSC shell and check for smearable contamination in accordance with the Technical Specification 5.2.4.d limits.

6. Drain approximately 1100 gallons of water (as indicated on a rotometer) from the DSC back into the fuel pool or other suitable location using the VDS or an optional liquid pump.

7. Disconnect hose from the DSC siphon port.

8. Install the automatic welding machine onto the inner top cover plate and place the inner top cover plate with the automatic welding machine onto the DSC. Verify proper fit-up of the inner top cover plate with the DSC shell.

9. Check radiation levels along surface of the inner top cover plate. Temporary shielding may be installed as necessary to minimize personnel exposure.

10. Insert a ¼ inch tygon tubing of sufficient length through the vent port such that it terminates just below the DSC shield plug. Connect the tygon tubing to a hydrogen monitor to allow continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner cover plate, in compliance with Technical Specification 5.2.6. Optionally, other methods may be used for continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner top cover plate, to comply with the Technical Specification.

11. Cover the cask/DSC annulus to prevent debris and weld splatter from entering the annulus.

12. Ready the automatic welding machine and tack weld the inner top cover plate to the DSC shell. Install the inner top cover plate weldment and remove the automatic welding machine.

    CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the tygon tube arrangement described in step 10 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% (8.4) *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with 2-3 psig helium (or any other inert medium) via the ¼" tygon tubing to reduce the hydrogen concentration safely below the 2.4% limit.

19. Obtain a sample of the DSC atmosphere, if necessary (e.g., at the end of service life). Fill the DSC with water from the fuel pool through the siphon port with the vent port open and routed to the plant's off-gas system.

    CAUTION:

    (a) The water fill rate must be regulated during this reflooding operation to ensure that the DSC vent pressure does not exceed 20.0 psig.

    (b) Provide for continuous hydrogen monitoring of the DSC cavity atmosphere during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* is not exceeded (8.4) *and in compliance with Technical Specification 5.2.6.* Purge with 2-3 psig helium as necessary to maintain the hydrogen concentration safely below this limit.

20. Place welding blankets around the cask and scaffolding.

21. Using plasma arc-gouging, a mechanical cutting system or other suitable means, remove the seal weld from the outer top cover plate and DSC shell. A fire watch should be placed on the scaffolding with the welder, as appropriate. The exhaust system should be operating at all times.

22. The material or waste from the cutting or grinding process should be treated and handled in accordance with the plant's low level waste procedures unless determined otherwise.

23. Remove the top of the tent, if necessary.

24. Remove the exhaust hood, if necessary.

25. Remove the DSC outer top cover plate.

26. Reinstall tent and temporary shielding, as required. Remove the seal weld from the inner top cover plate to the DSC shell in the same manner as the top cover plate. Remove the inner top cover plate. Remove any remaining excess material on the inside shell surface by grinding.

27. Clean the cask surface of dirt and any debris which may be on the cask surface as a result of the weld removal operation. Any other procedures which are required for the operation of the cask should take place at this point as necessary.

28. Engage the yoke onto the trunnions, install eyebolts into the top shield plug and connect the rigging cables to the eyebolts.

8. Install the automatic welding machine onto the inner top cover plate and place the inner top cover plate with the automatic welding machine onto the DSC. Verify proper fit-up of the inner top cover plate with the DSC shell.
9. Check radiation levels along surface of the inner top cover plate. Temporary shielding may be installed as necessary to minimize personnel exposure.

   CAUTION: Insert a 1/4 inch tygon tubing of sufficient length through the vent port such that it terminates just below the DSC shield plug. Connect the tygon tubing to a hydrogen monitor to allow continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner cover plate, in compliance with Technical Specification 5.2.6. Optionally, other methods may be used for continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner top cover plate, to comply with the Technical Specification.

10. Cover the cask/DSC annulus to prevent debris and weld splatter from entering the annulus.
11. Ready the automatic welding machine and tack weld the inner top cover plate to the DSC shell. Install the inner top cover plate weldment and remove the automatic welding machine.

    CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the tygon tube arrangement described in step 9 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% [8.4] *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with 2-3 psig helium (or any other inert medium) via the 1/4 inch tygon tubing to reduce the hydrogen concentration safely below the 2.4% limit.

12. Perform dye penetrant weld examination of the inner top cover plate weld in accordance with the Technical Specification 5.2.4.b requirements.
13. Connect the VDS to the DSC siphon and vent ports.
14. Install temporary shielding to minimize personnel exposure throughout the subsequent welding operations as required.

14a. In accordance with Technical Specification 5.2.4.a, verify that the NS is filled before the draining operation in Step 15 is initiated and continually monitored during the first five minutes of the draining evolution to ensure the NS remains filled.

15. Engage the helium supply and open the valve on the vent port and allow helium gas to force the water from the DSC cavity through the siphon port.
16. Once the water stops flowing from the DSC, close the DSC siphon port and disengage the gas source.

16a. Verify that the TC axial surface dose rates are compliant with limits specified in Technical Specification 5.2.4.e. The configuration for determining the TC axial dose rates shall be in accordance with Technical Specification 5.2.4.e.

17. Connect the hose from the vent port and the siphon port to the intake of the vacuum pump. Connect a hose from the discharge side of the VDS to the plant's radioactive waste system or spent fuel pool. Connect the VDS to a helium source.

18. Open the valve on the suction side of the pump, start the VDS and draw a vacuum on the DSC cavity. The cavity pressure should be reduced in steps of approximately 100 mm Hg, 50 mm Hg, 25 mm Hg, 15 mm Hg, 10 mm Hg, 5 mm Hg, and 3 mm Hg. After pumping down to each level, the pump is valved off and the cavity pressure monitored. The cavity pressure will rise as water and other volatiles in the cavity evaporate. When the cavity

use of prudent housekeeping measures and monitoring of airborne particulates. Procedures may require personnel to perform the work using respirators or supplied air.

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. A sampling of the atmosphere within the DSC will be taken prior to inspection or removal of fuel.

If the work is performed outside the fuel/reactor building, a tent may be constructed over the work area, which may be kept under a negative pressure to control airborne particulates. Any radioactive gas release will be Kr-85, which is not readily captured. Whether the krypton is vented through the plant stack or allowed to be released directly depends on the plant operating requirements.

Following opening of the DSC, the cask and DSC are filled with water prior to lowering the top of cask below the surface of the fuel pool to prevent a sudden inrush of pool water. Cask placement into the pool is performed in the usual manner. Fuel unloading procedures will be governed by the plant operating license under 10CFR50. The generic procedures for these operations are as follows:

15. Locate the DSC siphon and vent port using the indications on the top cover plate. Place a portable drill press on the top of the DSC. Position the drill with the siphon port.

16. Place an exhaust hood or tent over the DSC, if necessary. The exhaust should be filtered or routed to the site radwaste system.

17. Drill a hole through the DSC top cover plate to expose the siphon port quick connect.

18. Drill a second hole through the top cover plate to expose the vent port quick connect.

19. Obtain a sample of the DSC atmosphere, if necessary (e.g., at the end of service life). Fill the DSC with water from the fuel pool (and meeting the requirements of Technical Specification 3.2.1, if required) through the siphon port with the vent port open and routed to the plant's off-gas system.

    CAUTION:

    (a) The water fill rate must be regulated during this reflooding operation to ensure that the DSC vent pressure does not exceed 20.0 psig.

    (b) Provide for continuous hydrogen monitoring of the DSC cavity atmosphere during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* is not exceeded [8.4] *and in compliance with Technical Specification 5.2.6.* Purge with 2-3 psig helium as necessary to maintain the hydrogen concentration safely below this limit.

20. Place welding blankets around the cask and scaffolding.

21. Using plasma arc-gouging, a mechanical cutting system or other suitable means, remove the seal weld from the outer top cover plate and DSC shell. A fire watch should be placed on the

CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the tygon tube arrangement described in step 9 during the inner top cover plate or the top shield plug assembly (for the optional 24PHBL "shifted shielding" configuration) welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% (5.4) *(60.0% of flammability limit of 4.0%) and in compliance with Technical Specification 5.2.6.* If this limit is exceeded, stop all welding operations and purge the DSC cavity with 2-3 psig helium (or any other inert medium) via the ¼" tygon tubing to reduce the hydrogen concentration safely below the 2.4% limit.

12. Perform dye penetrant weld examination of the inner top cover plate or the top shield plug assembly (for the optional 24PHBL "shifted shielding" configuration) weld in accordance with the Technical Specification 5.2.4.b requirements.

13. Place the strongback so that it sits on the inner top cover plate and is oriented such that:

- the DSC siphon and vent ports are accessible
- the strongback stud holes line up with the TC lid bolt holes.

Steps 13 and 14 are optional for the optional 24PHBL "shifted shielding" configuration.

24. Helium leak test the inner top cover plate weld for leakage in accordance with ANSI N.14.5 to a sensitivity of $1x10^{-5}$ atm-cm^3/sec. This test is optional.

30. Remove the Strongback, if used. Decontaminate as necessary, and store.

N.8.1.4 24PHB DSC Sealing Operations

1. Disconnect the VDS from the DSC. Seal weld the prefabricated plugs over the vent and siphon ports, inject helium in blind space and perform a dye penetrant weld examination in accordance with the Technical Specification 5.2.4.b requirements. Use of an optional test head is acceptable to perform the helium leak test of the inner top cover plate and vent/siphon port welds in accordance with Technical Specification 5.2.4.c. If an optional test head is not used, proceed to Step 2.

2. Install the welding machine onto the outer top cover plate and place the outer top cover plate with the welding system onto the DSC. Manual welding is also acceptable. Verify proper fit up of the outer top cover plate with the DSC shell.

3. Tack weld the outer top cover plate to the DSC shell. Place the outer top cover plate weld root pass.

4. Helium leak test the inner top cover plate and vent/siphon port plate welds using the leak test port in the outer top cover plate in accordance with Technical Specification 5.2.4.c limits. Verify that the personnel performing the leak test are qualified in accordance with SNT-TC-1A [8.1]. Alternatively, this can be done with a test head in N.8.1.4 step 1.

CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the flexible tube arrangement or other alternate methods described in Step 9 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% [8.2 and 8.3] *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with approximately 2-3 psig helium (or any other inert medium) via the 1/4 inch flexible tubing to reduce the hydrogen concentration safely below the 2.4% limit.

12. Perform dye penetrant weld examination of the inner top cover plate weld in accordance with the Technical Specification 5.2.4.b requirements.

13. Connect the VDS to the DSC siphon and vent ports.

14. Install temporary shielding to minimize personnel exposure throughout the subsequent welding operations as required.

14a. In accordance with Technical Specification 5.2.4.a, verify that the NS is filled before the draining operation in Step 15 is initiated and continually monitored during the first five minutes of the draining evolution to ensure the NS remains filled.

15. Engage helium supply and open the valve on the vent port and allow helium to force the water from the DSC cavity through the siphon port.

16. Once the water stops flowing from the DSC, close the DSC siphon port and disengage the gas source.

16a. Verify that the TC axial surface dose rates are compliant with limits specified in Technical Specification 5.2.4.e. The configuration for determining the TC axial dose rates shall be in accordance with Technical Specification 5.2.4.e.

17. Connect the hose from the vent port and the siphon port to the intake of the vacuum pump. Connect a hose from the discharge side of the VDS to the plant's radioactive waste system or spent fuel pool. Connect the VDS to a helium source.

    CAUTION: During the vacuum drying evolution, personnel should be in the area of loading operations, or in nearby low dose areas in order to take proper action in the event of a malfunction.

18. Open the valve on the suction side of the pump, start the VDS and draw a vacuum on the DSC cavity. The cavity pressure should be reduced in steps of approximately 100 mm Hg, 50 mm Hg, 25 mm Hg, 15 mm Hg, 10 mm Hg, 5 mm Hg, and 3 mm Hg. After pumping down to each level, the pump is valved off and the cavity pressure monitored. The cavity pressure will rise as water and other volatiles in the cavity evaporate. When the cavity pressure stabilizes, the pump is valved in to complete the vacuum drying process. It may be necessary to repeat some steps, depending on the rate and extent of the pressure increase. Vacuum drying is complete when the pressure stabilizes for a minimum of 30 minutes at 3 mm Hg absolute or less as specified in Technical Specification 3.1.1.

during the first five minutes of the draining evolution to ensure the NS remains filled.

(c) Provide for continuous hydrogen monitoring of the DSC cavity atmosphere during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* is not exceeded [8.2 and 8.3] and in compliance with Technical Specification 5.2.6. Drain appropriate amount of water from the DSC cavity before cutting operations to ensure that sufficient free volume exists in the DSC cavity for H_2 concentration limit. Purge with 2-3 psig helium (or any other inert medium) as necessary to maintain the hydrogen concentration safely below this limit.

20. Place welding blankets around the cask and scaffolding.

21. Using plasma arc-gouging, a mechanical cutting system or other suitable means, remove the seal weld from the outer top cover plate and DSC shell. A fire watch should be placed on the scaffolding with the welder, as appropriate. The exhaust system should be operating at all times.

22. The material or waste from the cutting or grinding process should be treated and handled in accordance with the plant's low level waste procedures unless determined otherwise.

23. Remove the top of the tent, if necessary.

24. Remove the exhaust hood, if necessary.

25. Remove the DSC outer top cover plate.

26. Reinstall tent and temporary shielding, as required. Remove the seal weld from the inner top cover plate to the DSC shell in the same manner as the top cover plate. Remove the inner top cover plate. Remove any remaining excess material on the inside shell surface by grinding.

27. Clean the cask surface of dirt and any debris which may be on the cask surface as a result of the weld removal operation. Any other procedures which are required for the operation of the cask should take place at this point as necessary.

28. Engage the yoke onto the trunnions, install eyebolts into the top shield plug and connect the rigging cables to the eyebolts.

29. Visually inspect the lifting hooks or the yoke to insure that they are properly positioned on the trunnions.

29a. If the neutron shield is to remain filled during Step 30, in accordance with Technical Specification 5.2.4.a, verify that the NS is filled before the draining operation in Step 30 is initiated and continually monitored during the first five minutes of the draining evolution to ensure the NS remains filled.

12. Ready the automatic welding machine and tack weld the inner top cover plate to the DSC shell. Install the inner top cover plate weldment and remove the automatic welding machine.

    CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the arrangement or other alternate methods described in step 10 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% [8.3 and 8.4] *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with 2-3 psig helium via the tubing to reduce the hydrogen concentration safely below the 2.4% limit.

13. Perform dye penetrant weld examination of the inner top cover plate weld in accordance with the Technical Specification 5.2.4.b requirements.

14. If loading a Type 2 61BTH DSC or if using a suction pump rather than blowdown to remove water, skip to Step 16; otherwise, place the strongback so that it sits on the inner top cover plate and is oriented such that:

    - The DSC siphon and vent ports are accessible
    - The strongback stud holes line up with the TC lid bolt holes

15. Lubricate the studs and, using a crossing pattern, adjust the strongback studs to snug tight ensuring approximately even pressure on the cover plate.

16. Remove purge lines and connect the VDS to the DSC siphon and vent ports.

17. Install temporary shielding to minimize personnel exposure throughout the subsequent welding operations as required.

17a. In accordance with Technical Specification 5.2.4.a, verify that the NS is filled before the draining operation in Step 18 is initiated and continually monitored during the first five minutes of the draining evolution to ensure the NS remains filled.

18. a. If using blowdown method to remove water, engage helium supply (up to 10 psig for Type 1 DSC or 15 psig for Type 2 DSC) and open the valve on the vent port and allow helium to force the water from the DSC cavity through the siphon port.

    b. If using water pump to remove water without blowdown pump water from DSC.

19. Once the water stops flowing from the DSC, close the DSC siphon port and disengage the gas source or turn off the suction pump, as applicable.

19a. Verify that the TC actual surface dose rates are compliant with the limits specified in Technical Specification 5.2.4.e. The configuration for determining the TC axial dose rates shall be in accordance with Technical Specification 5.2.4.e.

20. Connect the hose from the vent port and the siphon port to the intake of the vacuum pump. Connect a hose from the discharge side of the VDS to the plant's radioactive waste system or spent fuel pool. Connect the VDS to a helium source.

NOTE: Proceed cautiously when evacuating the DSC to avoid freezing consequences.

21. Open the valve on the suction side of the pump, start the VDS and draw a vacuum on the DSC cavity. The cavity pressure should be reduced in steps of approximately 100 mm Hg, 50 mm Hg, 25 mm Hg, 15 mm Hg, 10 mm Hg, 5 mm Hg, and 3 mm Hg. After pumping down to each level (these levels are optional), the pump is valved off and the cavity pressure monitored. The cavity pressure will rise as water and other volatiles in the cavity evaporate. When the cavity pressure stabilizes, the pump is valved in to complete the vacuum drying process. It may be necessary to repeat some steps, depending on the rate and extent of the pressure increase. Vacuum drying is complete when the pressure stabilizes for a minimum of 30 minutes at 3 mm Hg absolute or less as specified in Technical Specification 3.1.1.

    Note: The user shall ensure that the vacuum pump is isolated from the DSC cavity when demonstrating compliance with Technical Specification 3.1.1 requirements. Simply closing the valve between the DSC and the vacuum pump is not sufficient, as a faulty valve allows the vacuum pump to continue to draw a vacuum on the DSC. Turning off the pump, or opening the suction side of the pump to atmosphere are examples of ways to assure that the pump is not continuing to draw a vacuum on the DSC.

    CAUTION: Radiation dose rates are expected to be high at the vent and siphon port locations. Use proper ALARA practices (e.g., use of temporary shielding, appropriate positioning of personnel, etc.) to minimize personnel exposure.

22. Open the valve to the vent port and allow the helium to flow into the DSC cavity.

23. Pressurize the DSC with helium (up to 10 psig for Type 1 DSC or 15 psig for Type 2 DSC).

24. Helium leak test the inner top cover plate weld for a leak rate of 1×10^{-4} atm-cm^3/sec. This test is optional.

25. If a leak is found, repair the weld, repressurize the DSC and repeat the helium leak test.

26. Once no leaks are detected, depressurize the DSC cavity by releasing the helium through the VDS to the plant's spent fuel pool or radioactive waste system.

27. Re-evacuate the DSC cavity using the VDS. The cavity pressure should be reduced in steps of approximately 10 mm Hg, 5 mm Hg, and 3 mm Hg. After pumping down to each level, the pump is valved off and the cavity pressure is monitored (these levels are optional). When the cavity pressure stabilizes, the pump is valved in to continue the vacuum drying process. Vacuum drying is complete when the pressure stabilizes for a minimum of 30 minutes at 3 mm Hg absolute or less in accordance with Technical Specification 3.1.1 limits.

    Note: The user shall ensure that the vacuum pump is isolated from the DSC cavity when demonstrating compliance with Technical Specification 3.1.1 requirements. Simply closing the valve between the DSC and the vacuum pump is not sufficient, as a faulty valve allows the vacuum pump to continue to draw a vacuum on the DSC. Turning off the pump, or opening the suction side of the pump to atmosphere are examples of ways to assure that the pump is not continuing to draw a vacuum on the DSC.

28. Open the valve on the vent port and allow helium to flow into the DSC cavity to pressurize the DSC between 14.5 to 16.0 psig for 61BTH Type 1 and 18.5 to 20.0 psig for 61BTH Type 2 and hold for 10 minutes. Depressurize the DSC cavity by releasing the helium through the VDS to the plant spent fuel pool or radioactive waste system to about 2.5 psig in accordance with Technical Specification 3.1.2.b limits.

    CAUTION: Radiation dose rates are expected to be high at the vent and siphon port locations. Use proper ALARA practices (e.g., use of temporary shielding, appropriate positioning of personnel, etc.) to minimize personnel exposure.

29. Close the valves on the helium source.

30. Remove the strongback, if installed in step 14 above, decontaminate as necessary, and store.

T.8.1.4 DSC Sealing Operations

CAUTION: During performance of steps listed in Section T.8.1.4, monitor the cask/DSC annulus water level and replenish as necessary to maintain cooling.

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. A sampling of the atmosphere within the DSC will be taken prior to inspection or removal of fuel.

If the work is performed outside the fuel/reactor building, a tent may be constructed over the work area, which may be kept under a negative pressure to control airborne particulates. Any radioactive gas release will be Kr-85, which is not readily captured. Whether the krypton is vented through the plant stack or allowed to be released directly depends on the plant operating requirements.

Following opening of the DSC, the cask and DSC are filled with water prior to lowering the top of the cask below the surface of the fuel pool to prevent a sudden inrush of pool water. Cask placement into the pool is performed in the usual manner. Fuel unloading procedures will be governed by the plant operating license under 10CFR50. The generic procedures for these operations are as follows:

14. Locate the DSC siphon and vent port using the indications on the outer top cover plate. Place a portable drill press on the top of the DSC. Position the drill with the siphon port.

15. Place an exhaust hood or tent over the DSC, if necessary. The exhaust should be filtered or routed to the site radwaste system.

    CAUTION: Radiation dose rates are expected to be high at the vent and siphon port locations. Use proper ALARA practices (e.g., use of temporary shielding, appropriate positioning of personnel, etc.) to minimize personnel exposure.

16. Drill a hole through the DSC top cover plates to expose the siphon port quick connect.

17. Drill a second hole through the top cover plates to expose the vent port quick connect.

18. Obtain a sample of the DSC atmosphere. Fill the DSC with water from the fuel pool through the siphon port with the vent port open and routed to the plant's off-gas system.

    CAUTION:

    (a) The water fill rate must be regulated during this reflooding operation to ensure that the DSC vent pressure does not exceed 20.0 psig.

    (b) *Per Technical Specification 5.2.6,* provide for continuous hydrogen monitoring of the DSC cavity atmosphere during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* is not exceeded [8.3]. Purge with 2-3 psig helium as necessary to maintain the hydrogen concentration safely below this limit.

19. Place welding blankets around the cask and scaffolding to keep dose rates ALARA.

20. Using *a mechanical cutting system or* plasma arc-gouging, or other suitable means, remove the seal weld from the outer top cover plate and DSC shell. A fire watch should be placed on

5. Connect the cask drain line to the cask, open the cask cavity drain port and allow water from the annulus to drain out until the water level is approximately twelve inches below the top edge of the DSC shell. Take swipes around the outer surface of the DSC shell and check for smearable contamination in accordance with the Technical Specification 5.2.4.d limits.

   CAUTION: Radiation dose rates are expected to be high at the vent and siphon port locations. Use proper ALARA practices (e.g., use of temporary shielding, appropriate positioning of personnel, etc.) to minimize personnel exposure.

5a. In accordance with Technical Specification 5.2.4.a, verify that the NS is filled before the draining operation in Step 6 is initiated and continually monitored during the first five minutes of the draining evolution to ensure the NS remains filled.

6. Drain approximately 900 gallons of water (as indicated on a flowmeter) from the DSC back into the fuel pool or other suitable location, if not drained in Section U.8.1.2, Step 16. Consistent with ISG-22 [8.5] guidance, helium at 1-3 psig is used to backfill the DSC with an inert gas (helium) as water is being removed from the DSC. Only helium may be used to assist in the removal of water.

7. Not used.

8. Install the automatic welding machine onto the inner top cover plate and place the inner top cover plate with the automatic welding machine onto the DSC. Optionally, the inner top cover plate and the automatic welding machine can be placed separately. Verify proper fit-up of the inner top cover plate with the DSC shell.

9. Check radiation levels along surface of the inner top cover plate. Temporary shielding may be installed as necessary to minimize personnel exposure.

10. Insert a 1/4-inch tubing of sufficient length and adequate temperature resistance through the vent port such that it terminates just below the DSC shield plug. Connect the flexible tubing to a hydrogen monitor to allow continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner cover plate, in compliance with Technical Specification 5.2.6. Optionally, other methods may be used for continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner top cover plate, to comply with the Technical Specification.

11. Cover the cask/DSC annulus to prevent debris and weld splatter from entering the annulus.

12. Ready the automatic welding machine and tack weld the inner top cover plate to the DSC shell. Install the inner top cover plate weldment and remove the automatic welding machine.

    CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the arrangement or other alternate methods described in Step 10 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% [8.2 and 8.3] *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with approximately 2-3 psig helium via the tubing to reduce the hydrogen concentration safely below the 2.4% limit.

13. Perform dye penetrant weld examination of the inner top cover plate weld in accordance with the Technical Specification 5.2.4.b requirements.

use of prudent housekeeping measures and monitoring of airborne particulates. Procedures may require personnel to perform the work using respirators or supplied air.

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. A sampling of the atmosphere within the DSC will be taken prior to inspection or removal of fuel.

If the work is performed outside the fuel/reactor building, a tent may be constructed over the work area, which may be kept under a negative pressure to control airborne particulates. Any radioactive gas release will be Kr-85, which is not readily captured. Whether the krypton is vented through the plant stack or allowed to be released directly depends on the plant operating requirements.

Following opening of the DSC, the cask and DSC are filled with water prior to lowering the top of cask below the surface of the fuel pool to prevent a sudden inrush of pool water. Cask placement into the pool is performed in the usual manner. Fuel unloading procedures will be governed by the plant operating license under 10CFR50. The generic procedures for these operations are as follows:

14. Locate the DSC siphon and vent port using the indications on the top cover plate. Place a portable drill press on the top of the DSC. Position the drill with the siphon port.

15. Place an exhaust hood or tent over the DSC, if necessary. The exhaust should be filtered or routed to the site radwaste system.

    CAUTION: Radiation dose rates are expected to be high at the vent and siphon port location. Use proper ALARA practices (e.g., use of temporary shielding, appropriate positioning of personnel, etc.) to minimize personnel exposure.

16. Drill a hole through the DSC top cover plate to expose the siphon port quick connect.

17. Drill a second hole through the top cover plate to expose the vent port quick connect.

18. Obtain a sample of the DSC atmosphere. Fill the DSC with water from the fuel pool or an equivalent source which meets the requirements of Technical Specification 1.2.15d. Fill through the siphon port with the vent port open and routed to the plant's off-gas system.

    CAUTION:

    (a) The water fill rate must be regulated during this reflooding operation to ensure that the DSC vent pressure does not exceed 20.0 psig.

    (b) Per Technical Specification 1.1.11, provide for continuous hydrogen monitoring of the DSC cavity atmosphere during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* is not exceeded [8.2 and 8.3]. Purge with 2-3 psig helium as necessary to maintain the hydrogen concentration safely below this limit.

19. Place welding blankets around the cask and scaffolding to keep dose rates ALARA.

5. Drain approximately the number of gallons of water shown in the table below (as indicated on a flowmeter) from the DSC back into the fuel pool or other suitable location. Consistent with ISG-22 [8.5] guidance and Technical Specification 3.1.1, helium at 1-3 psig is used to backfill the DSC with an inert gas (helium) as water is being removed from the DSC. Only helium may be used to assist in the removal of water.

DSC	Gallons of Water
32PT	750
61BT	1100

Alternatively, if a slow helium purge is used while monitoring for hydrogen, less than these amounts of water may be drained, because this approach will prevent buildup of flammable gas to a flammability limit.

6. Disconnect hose from DSC siphon port.

7. Install the automatic welding machine onto the inner top cover plate and place the inner top cover plate with the automatic welding machine onto the DSC. Optionally, the inner top cover plate and the automatic welding machine can be placed separately. Verify proper fit-up of the inner top cover plate with the DSC shell.

8. Check radiation levels along surface of the inner top cover plate. Temporary shielding may be installed as necessary to minimize personnel exposure.

9. Insert tubing of sufficient length and adequate temperature resistance through the vent port such that it terminates just below the DSC shield plug. Connect the tubing to a hydrogen monitor to allow continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner cover plate, in compliance with Technical Specification 5.2.6. Optionally, other methods may be used for continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner top cover plate, to comply with the Technical Specification.

10. Cover the cask/DSC annulus to prevent debris and weld splatter from entering the annulus.

11. Ready the automatic welding machine and tack weld the inner top cover plate to the DSC shell. Install the inner top cover plate weldment and remove the automatic welding machine.

    CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the arrangement or other alternate methods described in Step 9 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% [8.2 and 8.3] *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with approximately 2-3 psig helium via the tubing to reduce the hydrogen concentration safely below the 2.4% limit.

compliance with Technical Specification 5.2.6. Optionally, other methods may be used for continuous monitoring of the hydrogen atmosphere in the DSC cavity during welding of the inner top cover plate, to comply with the Technical Specification.

11. Cover the TC/DSC annulus to prevent debris and weld splatter from entering the annulus.

12. Ready the automated welding machine and tack weld the inner top cover plate to the DSC shell. Install the inner top cover plate weldment and remove the automated welding machine.

    CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the arrangement or other alternate methods described in step 10 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% [8.3 and 8.4] *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with 2-3 psig helium via the tubing to reduce the hydrogen concentration safely below the 2.4% limit.

13. Perform dye penetrant weld examination of the inner top cover plate weld in accordance with the Technical Specification 5.2.4b requirements.

14. Remove purge lines and connect the VDS to the DSC siphon and vent ports.

15. Install temporary shielding to minimize personnel exposure throughout the subsequent welding operations as required.

16. a. If using blowdown method to remove water, engage helium supply (up to15 psig) and open the valve on the vent port and allow helium to force the water from the DSC cavity through the siphon port.

    b. Alternately a suction pump may be used (separately or in combination with helium pressure above) to remove water from DSC.

17. Once the water stops flowing from the DSC, close the DSC siphon port and disengage the gas source or turn off the suction pump, as applicable.

18. Connect the hose from the vent port and the siphon port to the intake of the vacuum pump. Connect a hose from the discharge side of the VDS to the plant's radioactive waste system or spent fuel pool. Connect the VDS to a helium source.

    NOTE: Proceed cautiously when evacuating the DSC to avoid freezing consequences.

19. Open the valve on the suction side of the pump, start the VDS and draw a vacuum on the DSC cavity. The cavity pressure should be reduced in steps of approximately 100 mm Hg, 50 mm Hg, 25 mm Hg, 15 mm Hg, 10 mm Hg, 5 mm Hg, and 3 mm Hg. After pumping down to each level (these levels are optional), the pump is valved off and the cavity pressure monitored. The cavity pressure will rise as water and other volatiles in the cavity evaporate. When the cavity pressure stabilizes, the pump is valved in to complete the vacuum drying process. It may be necessary to repeat some steps, depending on the

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. A sampling of the atmosphere within the DSC will be taken prior to inspection or removal of fuel.

If the work is performed outside the fuel/reactor building, a tent may be constructed over the work area, which may be kept under a negative pressure to control airborne particulates. Any radioactive gas release will be Kr-85, which is not readily captured. Whether the krypton is vented through the plant stack or allowed to be released directly depends on the plant operating requirements.

Following opening of the DSC, the cask and DSC are filled with water prior to lowering the top of the cask below the surface of the fuel pool to prevent a sudden inrush of pool water. Cask placement into the pool is performed in the usual manner. Fuel unloading procedures will be governed by the plant operating license under 10 CFR 50. The generic procedures for these operations are as follows:

14. Locate the DSC siphon and vent port using the indications on the outer top cover plate. Place a portable drill press on the top of the DSC. Position the drill with the siphon port.

15. Place an exhaust hood or tent over the DSC, if necessary. The exhaust should be filtered or routed to the site radwaste system.

    CAUTION: Radiation dose rates are expected to be high at the vent and siphon port locations. Use proper ALARA practices (e.g., use of temporary shielding, appropriate positioning of personnel, etc.) to minimize personnel exposure.

16. Drill a hole through the DSC top cover plates to expose the siphon port quick connect.

17. Drill a second hole through the top cover plates to expose the vent port quick connect.

18. Obtain a sample of the DSC atmosphere. Fill the DSC with water from the fuel pool through the siphon port with the vent port open and routed to the plant's off-gas system.

    CAUTION:

    (a) The water fill rate must be regulated during this reflooding operation to ensure that the DSC vent pressure does not exceed 20.0 psig.

    (b) Per Technical Specification 5.2.6, provide for continuous hydrogen monitoring of the DSC cavity atmosphere during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* is not exceeded [8.3]. Purge with 2-3 psig helium as necessary to maintain the hydrogen concentration safely below this limit.

19. Using a mechanical cutting system, plasma arc-gouging, or other suitable means, remove the seal weld from the outer top cover plate and DSC shell and remove the outer top cover plate.

the hydrogen atmosphere in the DSC cavity during welding of the inner top cover plate, to comply with the Technical Specification.

11. Cover the cask/DSC annulus to prevent debris and weld splatter from entering the annulus.

12. Ready the automated welding machine and tack weld the inner top cover plate to the DSC shell. Install the inner top cover plate weldment and remove the automated welding machine.

    CAUTION: Continuously monitor the hydrogen concentration in the DSC cavity using the arrangement or other alternate methods described in Step 10 during the inner top cover plate cutting/welding operations. Verify that the measured hydrogen concentration does not exceed a safety limit of 2.4% [8.2] and [8.3] *(60.0% of flammability limit of 4.0%)*. If this limit is exceeded, stop all welding operations and purge the DSC cavity with approximately 2-3 psig helium via the tubing to reduce the hydrogen concentration safely below the 2.4% limit.

13. Perform dye penetrant weld examination of the inner top cover plate weld in accordance with the Technical Specification 5.2.4b requirements.

14. Remove purge lines and connect the VDS to the DSC siphon and vent ports.

15. Install temporary shielding to minimize personnel exposure throughout the subsequent welding operations as required.

16. a. If using blowdown method to remove water, engage helium supply (up to 15 psig) and open the valve on the vent port and allow helium to force the water from the DSC cavity through the siphon port.

    b. Alternately a suction pump may be used (separately or in combination with helium pressure above) to remove water from DSC.

17. Once the water stops flowing from the DSC, close the DSC siphon port and disengage the helium source or turn off the section pump, as applicable.

18. Connect the hose from the vent port and the siphon port to the intake of the vacuum pump. Connect a hose from the discharge side of the VDS to the plant's radioactive waste system or spent fuel pool. Connect the VDS to a helium source.

    NOTE: Proceed cautiously when evacuating the DSC to avoid freezing consequences.

19. Open the valve on the suction side of the pump, start the VDS and draw a vacuum on the DSC cavity. The cavity pressure should be reduced in steps of approximately 100 mm Hg, 50 mm Hg, 25 mm Hg, 15 mm Hg, 10 mm Hg, 5 mm Hg, and 3 mm Hg. After pumping down to each level (these levels are optional), the pump is valved off and the cavity pressure monitored. The cavity pressure will rise as water and other volatiles in the cavity evaporate. When the cavity pressure stabilizes, the pump is valved in to complete the vacuum drying process. It may be necessary to repeat some steps, depending on the rate and extent of the pressure increase. Vacuum drying is complete when the pressure

b. Per Technical Specification 5.2.6, provide for continuous hydrogen monitoring of the DSC cavity atmosphere during all subsequent cutting operations to ensure that a safety limit of 2.4% *(60.0% of flammability limit of 4.0%)* is not exceeded [8.2] and [8.3]. Purge with helium at 2.5 psig ± 1.0 psig as necessary to maintain the hydrogen concentration safely below this limit.

19. Using a mechanical cutting system, plasma arc-gouging, or other suitable means, remove the seal weld from the outer top cover plate and DSC shell and remove the outer top cover plate.

20. Remove the seal weld from the inner top cover plate to the DSC shell in the same manner as the top cover plate. Remove the inner top cover plate. Remove any remaining excess material on the inside shell surface by grinding.

21. Clean the cask surface of dirt and any debris which may be on the cask surface as a result of the weld removal operation. Any other procedures which are required for the operation of the cask should take place at this point as necessary.

22. Engage the yoke onto the trunnions, install eyebolts into the top shield plug and connect the rigging cables to the eyebolts.

23. Visually inspect the lifting hooks or the yoke to ensure that they are properly positioned on the trunnions.

24. The cask should be lifted just far enough to allow the weight of the TC to be distributed onto the yoke lifting hooks. Inspect the lifting hooks to ensure that they are properly positioned on the trunnions.

25. Install suitable protective material onto the bottom of the TC to minimize cask contamination. Move the cask to the fuel pool.

26. Prior to lowering the cask into the pool, adjust the pool water level, if necessary, to accommodate the volume of water which will be displaced by the cask during the operation.

27. Position the cask over the designated area in the fuel pool.

28. Lower the cask into the pool. As the cask is being lowered, the exterior surface of the cask and lifting yoke should be sprayed with clean demineralized water.

29. Lower the cask into the fuel pool leaving the top surface of the cask approximately one foot above the surface of the pool water. Verify correct connections of the annulus seal and annulus/neutron shield tanks if used.

30. Fill the top of the DSC with water as needed and continue lowering the cask into the pool.

31. Disengage the lifting yoke from the cask and lift the top shield plug from the DSC.

32. If the DSC contains damaged fuel assemblies, remove the top end caps. Remove the fuel from the DSC and place the fuel into the spent fuel racks.