NORTH ANNA ISFSI PRE-OPERATIONAL INSPECTION

(INSPECTOR NOTES)

Category:	Crane Design *Topic:* Hoist Control Brake
Reference:	ASME B30.2, Sections 2-1.9.1 (b) and 2-1.9.3
Requirement:	Each hoisting unit of the crane shall be equipped with a control brake to control lowering speeds. The control brake may be electrical, mechanical, or hydraulic and shall have the thermal capacity required for the frequency of operation required by the service.
Finding:	This requirement was implemented. Primary braking control was provided by the hoist motor. The hoist motor was equipped with a 5-step full magnetic control via a wound rotor motor and an electrical load brake (Magnetorque). Backup braking control was provided by a mechanical load brake. As lowering speed increased, the mechanical load brake engaged to limit the speed.
Documents Reviewed:	Morris Material Handling/P&H E-Mail to Dominion Nuclear, dated January 7, 2008

Category:	Crane Design *Topic:* Hoist Holding Brakes
Reference:	ASME B30.2, Sections 2-1.9.1 and 2-1.9.2
Requirement:	Each hoisting unit of the crane shall be equipped with at least one holding brake, applied directly to the motor shaft or some part of the gear train. The minimum holding brake torque rating shall be either 100% of the rated load hoisting torque when the hoist is equipped with a mechanical control brake; OR 125% of the rated load hoisting torque when the hoist is equipped with a non-mechanical control brake. When the hoist is equipped with two holding brakes, each holding brake shall have a torque rating of 100% of the rated load hoisting torque. Holding brakes shall be applied automatically when power to the brake is removed.
Finding:	This requirement was implemented. The main hoist was equipped with two holding brakes, each with a rated torque greater than 100% of the hoist motor torque. Each holding brake was applied automatically when power to the brake was removed.
Documents Reviewed:	Morris Material Handling/P&H E-Mail to Dominion Nuclear, dated January 7, 2008

Category:	Crane Design *Topic:* Trolley Brakes
Reference:	ASME B30.2, Section 2-1.9.4 (i)
Requirement:	Each power driven trolley shall be equipped with brakes capable of stopping travel within a distance of 10% of the rated load speed in feet per minute when traveling at full speed under rated load with power off.
Finding:	This requirement was implemented. The spent fuel cask crane was equipped with an operator controlled hydraulic foot brake, capable of stopping trolley travel within the required distance under the conditions specified.
Documents Reviewed:	Morris Material Handling/P&H E-Mail to Dominion Nuclear, dated January 7, 2008

Category:	Crane Design *Topic:* Trolley Bumpers
Reference:	ASME B30.2, Section 2-1.8.3 (a)
Requirement:	A power operated trolley shall be provided with energy absorbing bumpers capable of: a) stopping the trolley when traveling with power off in either direction at a speed of at least 50% of rated load speed; and b) stopping the trolley at a rate of deceleration not to exceed an average of 4.7 feet per second per second (ft/sec/sec) when traveling with power off in either direction at one third of rated load speed.
Finding:	This requirement was implemented. The spent fuel cask crane was equipped with 4 spring bumpers, 1 at each end of the two trolley runways. These bumpers were capable of stopping the trolley within the required rate of deceleration, under the conditions specified.
Documents Reviewed:	Morris Material Handling/P&H E-Mail to Dominion Nuclear, dated January 7, 2008

Category:	Crane Design *Topic:* Wire Rope Rating
Reference:	ASME B30.2, Section 2-1.11.3
Requirement:	The hoisting ropes shall be of a recommended construction for crane service. The total load (rated load plus load block weight) divided by the number of parts of rope shall not exceed 20% of the nominal breaking strength of the rope.
Finding:	This requirement was implemented. The spent fuel cask crane was rated for 125 tons (250,000 pounds) and the main load block weighed 4,750 pounds. The total load was 254,750 pounds. The load block contained 6 sheaves and 12 parts of rope. The total load of 254,750 pounds divided by 12 parts of rope equaled 21,230 pounds. Since the 21,230 pounds cannot be greater than 20% of the nominal braking strength of the rope, the wire rope was required to have a nominal breaking strength of at least 106,146 pounds. The wire rope on the main hoist of the Spent Fuel Cask Crane was 1-1/8" 6X37 IWRC with a steel core. This wire rope had a nominal breaking strength of 65.0 tons or 130,000 pounds.
Documents Reviewed:	Web Rigging Supply - Wire Rope Catalog

Category:	Crane Inspection/Maintenance *Topic:* Crane Inspection - Frequent
Reference:	ASME B30.2; Sect 2-2.1.2
Requirement:	Cranes in regular use shall be subjected to a frequent crane inspection monthly during normal service, weekly to monthly during heavy service, and daily to weekly during severe service. The frequent inspection points should include: a) operating mechanisms for proper operation; b) leakage in lines, tanks, valves, pumps, and other parts of the air or hydraulic systems; c) hooks for cracks, more than 15% of normal throat opening, or more than 10 degrees of twist; d) hook latches for proper operation; e) hoist ropes

including end clamps; and e) the rope reeving system. All limit switches should be checked at the beginning of each work shift by inching, or running at slow speeds, each motion into its limit switch.

Finding: This requirement was implemented. The licensee subjected the Fuel Building Trolley to a frequent crane inspection prior to each use. The inspection points were contained in Attachment 3 of Procedure VPAP-0810, titled Crane Operator's Checklist. The inspection points on the checklist were consistent with the ASME code requirement. Performance of the Crane Operator's checklist was observed during the inspection, with no discrepancies identified.

Documents Reviewed: Procedure VPAP-0810, "Crane and Hoist Program", Revision 16

Category: Crane Inspection/Maintenance *Topic:* Crane Inspection - Periodic

Reference: ASME B30.2; Sect 2-2.1.3

Requirement: Cranes in regular use shall be subjected to a periodic crane inspection annually during normal and heavy service, and quarterly during severe service. The periodic inspection includes checking for: a) deformed, cracked or corroded members; b) loose bolts or rivets; c) cracked or worn sheaves and drums; d) worn, cracked or distorted pins, bearings, shafts, gears, and rollers; e) excessive brake system wear; f) load, wind, and other indicators over their full range for any significant inaccuracies; g) gasoline, diesel, electric, or other power plants for improper performance; h) excessive drive chain sprocket wear and chain stretch; i) deterioration of controllers, master switches, contacts, limit switches and pushbutton stations.

Finding: This requirement was implemented. The licensee subjected the Spent Fuel Cask Crane to a periodic crane inspection annually, in accordance with Procedures 0-MPM-1306-01 and 0-EPM-0406-01. The crane was not equipped with: f) load, wind, and other indicators; g) gasoline, diesel, electric, or other power plants; or h) drive chains and sprockets. As such, these items were omitted from the procedures.

The Spent Fuel Cask Crane mechanical components were inspected in accordance with Procedure 0-MCM-1306-01. Attachment 2 of Procedure 0-MCM-1306-01 contained the mechanical inspection points for the: a) trolley; b) trolley runway rails and rail clamps; c) main hoist, including the wire rope, brakes, and hook; d) auxiliary hoist, including the wire rope, brakes, and hook; and e) operating cab controls and warning devices.

The Spent Fuel Cask Crane electrical components were inspected in accordance with Procedure 0-EPM-0406-01. Section 6.0 of Procedure 0-EPM-0406-01 contained the electrical inspection points for the: a) main hoist motor; b) auxiliary hoist motor; c) trolley motor; d) master controller, and control cabinet.

The inspection scope and acceptance criteria for both mechanical and electrical components were consistent with the requirements of the ASME code. The last annual mechanical inspection was completed on January 8, 2008, in accordance with Procedure 0-MCM-1306-01 and Work Order #00777998. The last annual electrical inspection was completed on January 8, 2008, in accordance with Procedure 0-EPM-0406-01 and Work Order #00778827. No discrepancies were identified during the annual inspections.

Documents Reviewed:	Procedure 0-MPM-1306-01, "Frequent and Periodic Inspections of 1-MH-CRN-15", Revision 15 Procedure 0-EPM-0406-01, "Inspection and Testing of Spent Fuel Cask Crane", Revision 0

Category:	Crane Inspection/Maintenance *Topic:* Hook Inspections
Reference:	ASME B30.10, Sections 10-1.4.2 and 10-1.4.6
Requirement:	Hooks shall be inspected monthly during normal service, weekly to monthly during heavy service and daily to weekly during severe service. Hooks shall be inspected for: a) distortion such as bending, twisting or increased throat opening; b) cracks, severe nicks, or gouges; c) damaged or malfunctioning latch (if provided); and d) hook attachment and securing means. Hooks having any of the following deficiencies shall be removed from service unless a qualified person approves their continue use and initiates corrective action: a) cracks; b) wear exceeding 10% of the original sectional dimension; c) bend or twist exceeding 10 degrees from the plane of an unbent hook; and d) an increase in throat opening of 15% (for hooks without latches).
Finding:	This requirement was implemented. The Spent Fuel Cask Crane hooks were inspected prior to operating the crane in accordance with inspection items #16 and #22 of the Crane Operator's Checklist provided in Attachment 3 of Procedure VPAP-0810. The hooks were visually inspected for excessive wear, twist, and spread prior to use. Performance of the hook inspections was observed during the inspection, with no discrepancies identified. The Spent Fuel Cask Crane hooks were inspected annually in accordance with Attachment 2, Sections 5 and 6 of Procedure 0-MPM-1306-01. The inspection scope and acceptance criteria were consistent with the ASME code. The last annual inspection of the main hook and auxiliary hooks on the Spent Fuel Cask Crane was conducted on January 8, 2008, in accordance with Procedure 0-MCM-1306-01 and Work Order #00777998. No discrepancies were identified.
Documents Reviewed:	Procedure VPAP-0810, "Crane and Hoist Program", Revision 16 Procedure 0-MPM-1306-01, "Frequent and Periodic Inspections of 1-MH-CRN-15", Revision 15

Category:	Crane Inspection/Maintenance *Topic:* Preventive Maintenance Program
Reference:	ASME B30.2; Sect 2-2.3.1
Requirement:	A preventive maintenance program should be established based on the crane manufacturer's or a qualified person's recommendations.
Finding:	This requirement was implemented. The Spent Fuel Cask Crane preventive maintenance program was established under Procedures 0-MPM-1306-01 and 0-EPM-0406-01. The maintenance program was based on annual inspections of the main and auxiliary hoist operation and travel, load blocks, hooks, wire ropes, hoist drums, and hoist and hoist brakes. The inspections also included proper operation and travel of the trolley,

including brakes, lights, and warning devices. Finally, the maintenance program included the semi-annual lubrication schedules. The preventive maintenance program was consistent with the P&H vendor manual.

Documents Reviewed: Procedure 0-MPM-1306-01, "Frequent and Periodic Inspections of 1-MH-CRN-15", Revision 15
Procedure 0-EPM-0406-01, "Inspection and Testing of Spent Fuel Cask Crane", Revision 0

Category: Crane Inspection/Maintenance *Topic:* Wire Rope Inspection - Frequent

Reference: ASME B30.2, Section 2-2.4.1 (a)

Requirement: All ropes should be visually inspected at the start of each shift for: a) distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion; b) general corrosion; c) broken or cut strands; and d) number, distribution, and type of visible broken wires. When such damage is discovered, the rope shall be removed from service or be given a periodic inspection.

Finding: This requirement was implemented. The hoist wire ropes were inspected prior to operating the crane in accordance with inspection items #17 and #23 of the Crane Operator's Checklist provided in Attachment 3 of Procedure VPAP-0810. The wire ropes were visually inspected for distortion, corrosion, and broken strands or wires in accordance with the instructions provided in Attachment 4 of the procedure. The wire rope inspection prior to crane operation was observed during the inspection, with no discrepancies identified.

Documents Reviewed: Procedure VPAP-0810, "Crane and Hoist Program", Revision 16

Category: Crane Inspection/Maintenance *Topic:* Wire Rope Replacement Criteria

Reference: ASME B30.2, Section 2-2.4.2

Requirement: Conditions such as the following should be sufficient reason for questioning continued use of the rope, or increasing the frequency of inspection: a) twelve randomly distributed broken wires in one lay or 4 broken wires in one strand in one lay; b) one outer wire broken at the contact point with the core of the rope which has worked its way out of the rope structure; c) wear of one-third of the original diameter of outside individual wires; d) kinking, crushing, birdcaging or any other damage resulting in distortion of the rope structure; e) evidence of heat damage; and f) reduction in diameter in excess of nominal.

Finding: This requirement was implemented. The Spent Fuel cask crane wire ropes were inspected annually in accordance with Attachment 2, Section 5 of Procedure 0-MPM-1306-01. The criteria for questioning continued use of the rope was consistent with the ASME code. Section 4.4 of Procedure 0-MPM-1306-01 prohibited continued use of the crane until the discrepancy was either corrected or was evaluated by the Crane Program Administrator.

The last annual wire rope inspection was completed on January 8, 2008, in accordance with Procedure 0-MCM-1306-01 and Work Order #00777998. No discrepancies were

identified.

Documents Reviewed: Procedure 0-MPM-1306-01, "Frequent and Periodic Inspections of 1-MH-CRN-15", Revision 15

Category: Crane Operation ***Topic:*** Brake Test Prior to Lift

Reference: ASME B30.2, Section 2-3.2.3 (g)

Requirement: The operator shall check the hoist brakes at least once each shift if a load approaching the rated load is to be handled. This shall be done by lifting the load a short distance and applying the brakes.

Finding: This requirement was implemented. Procedure VPAP-0810, Step 6.3.11 required the operator to check the hoist brakes at least once each shift whenever a load approaching the rated load was handled. This was done by lifting the load a short distance, verifying the brakes engaged automatically when the hoist was stopped, and verifying slippage was minimal.

Documents Reviewed: Procedure VPAP-0810, "Crane and Hoist Program", Revision 16

Category: Crane Operation ***Topic:*** Hoist Limit Switch Tested Each Shift

Reference: ASME B30.2, Chap 2-3.2.4 (a)

Requirement: At the beginning of each shift, the operator shall try out the upper limit device of each hoist under no-load. Care shall be exercised; The block shall be inched into the limit or run in at a slow speed.

Finding: This requirement was implemented. The hoist upper limit switches were inspected prior to crane use in accordance with inspection items #17 and #23 of the Crane Operator's Checklist provided in Attachment 3 of Procedure VPAP-0810. The instructions were to inch, or raise the hoist in the slowest speed, until the upper limit switch stopped upward travel. Testing of the upper limit switches on both hoists was observed during the inspection, with no deficiencies identified.

Documents Reviewed: Procedure VPAP-0810, "Crane and Hoist Program", Revision 16

Category: Crane Operation ***Topic:*** Minimum of Two Wraps of Rope

Reference: ASME B30.2, Sect 2-3.2.3 (h)

Requirement: The load shall not be lowered below the point where two wraps of rope remain on the each anchorage of the hoisting drum unless a lower-limit device is provided, in which case no less than one wrap shall remain.

Finding: This requirement was implemented. Procedure VPAP-0810, Step 6.3.12 prohibited lowering the load below the point where less than two full wraps of rope remained on the drum. During the inspection, the licensee lowered the hook to the lowest point of travel during dry fuel storage operations. At that point, approximately 25 wraps of wire rope remained on the drum.

Documents Reviewed:	Procedure VPAP-0810, "Crane and Hoist Program", Revision 16

Category:	Crane Operation ***Topic:*** Qualification For Crane Operator
Reference:	ASME B30.2, Sections 2-3.1.2 and 2-3.1.6
Requirement:	Qualification to operate a cab operated or remote operated crane, requires the operator to pass a written or oral examination and a practical operating examination specific to the type of crane to be operated. In addition, the operator shall: a) have vision of at least 20/30 Snellon in one eye and 20/50 in the other with or without corrective lenses; b) be able to distinguish colors regardless of their position; c) have sufficient hearing capability for the specific operation with or without hearing aids; d) have sufficient strength, endurance, agility, coordination and reaction speed for the specific operation; e) not be subject to seizures, loss of control or dizziness; and f) have normal field of vision and depth perception.
Finding:	This requirement was implemented. Section 6.1.2 of Procedure VPAP-0810 required a written or oral examination and a practical operating examination for qualification to operate the Spent Fuel Cask Crane. The practical examinations included crane operation using both the cab and the remote controls. Section 6.1.1.e of Procedure VPAP-0810 specified the physical requirements. The physical requirements were consistent with the ASME code. A review of the qualified operator list indicated all crane operators assigned to the ISFSI crew had current qualifications on the Spent Fuel Cask Crane.
Documents Reviewed:	Procedure VPAP-0810, "Crane and Hoist Program", Revision 16

Category:	Crane Operation ***Topic:*** Warning Signals
Reference:	ASME B30.2, Section 2-3.1.7(e)
Requirement:	If a warning device is furnished. It shall be activated each time before traveling, and intermittently when approaching workpersons.
Finding:	This requirement was implemented. Procedure VPAP-0810, Step 6.3.7 required the crane operator to sound the warning signal before traveling, and continuously during travel, when such an operation may cause a hazard to personnel. The crane was equipped with a warning bell that could be operated from the remote control box. During the inspection, the crane operator activated the warning bell prior to trolley movement. In addition, the crane was equipped with a rotating orange beacon that operated whenever the remote control was energized.
Documents Reviewed:	Procedure VPAP-0810, "Crane and Hoist Program", Revision 16

Category:	Drying/Helium Backfill ***Topic:*** Drying Final Pressure
Reference:	CoC 1030, Tech Spec 3.1.1
Requirement:	The 32PTH canister vacuum drying pressure shall be sustained at or below 3.0 torr (3 mm Hg) absolute for a period of at least 30 minutes following evacuation.

Finding: This requirement was implemented. Final canister dryness was achieved using the Vacuum Drying System (VDS) and Sections 5.7 and 5.8 of Procedure 0-OP-4.52. Section 5.7 established the final canister pressure of 3 torr or less and Section 5.8 verified that the final pressure remained below 3 torr for 30 minutes or longer.

Documents Reviewed: Procedure 0-OP-4.52, "NUHOMS Vacuum Drying System Operation", Revision 2

Category: Drying/Helium Backfill *Topic:* Drying Time Limits - Procedure A

Reference: CoC 1030, Tech Spec 3.1.1

Requirement: Procedure A vacuum drying time limits apply when the transfer cask annulus is full and the water temperature is maintained below 180 degrees F.
When the canister decay heat load is less than 23.2 kW, there is no vacuum drying time limit.
When the canister decay heat load is greater than 23.2 kW, AND canister draining is chased with helium, there is no vacuum drying time limit.
When the canister decay heat load is greater than 23.2 kW, AND canister draining is chased with nitrogen, the vacuum drying time limit is 36 hours after the canister is drained.

Finding: This requirement was implemented. The technical specification vacuum drying time limits varied as a function of canister decay heat load, transfer cask annulus water temperature, and helium content inside the canister.

Step 5.8.7 of Procedure 0-OP-4.50 required monitoring the temperature of the water in the transfer cask annulus periodically, starting when the annulus seal was removed in preparation for welding the inner lid. If the annulus water temperature reached 180 degrees, the operator was directed to EITHER drain the annulus OR maintain the annulus less than 180 degrees using feed and bleed. If the operator elected to drain the annulus, Step 5.8.8.c required the operator to apply the Procedure C vacuum drying time limits.

The licensee elected to maintain Procedure A conditions for the duration of the loading. The transfer cask annulus was maintained full of water and below 180 degrees F, and all canister draining was chased with helium. Under these conditions, there were no vacuum drying time limits.

Documents Reviewed: Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3

Category: Drying/Helium Backfill *Topic:* Helium Backfill Final Pressure

Reference: CoC 1030, Tech Spec 3.1.2

Requirement: The 32PTH helium backfill pressure shall be 1.5 to 3.5 psig and stable for 30 minutes after filling after completion of vacuum drying.

Finding: This requirement was implemented. Final helium backfill pressure was established using the Vacuum Drying System (VDS) and Section 5.9 of Procedure 0-OP-4.52. Step 5.9.41 backfilled the canister to a pressure of 16.2 to 18.0 psia, which was within the

technical specification range of 1.5 to 3.5 psig.

Documents Reviewed: Procedure 0-OP-4.52, "NUHOMS Vacuum Drying System Operation", Revision 2

Category: Drying/Helium Backfill ***Topic:*** Helium Pressure Test

Reference: FSAR 1030, Section 8.1.1.3.19a

Requirement: Following initial evacuation, backfill the canister with helium to 16.5 to 18.0 psig and hold for 10 minutes.

Finding: This requirement was implemented. The canister was pressure tested using the Vacuum Drying System (VDS) and Section 5.9 of Procedure 0-OP-4.52. Step 5.9.7 pressurized the canister with helium to between 31.0 and 32.7 psia, which was within the technical specification range of 16.5 to 18.0 psig. Step 5.9.11 held the required pressure for at least 10 minutes.

Documents Reviewed: Procedure 0-OP-4.52, "NUHOMS Vacuum Drying System Operation", Revision 2

Category: Drying/Helium Backfill ***Topic:*** Helium Purity

Reference: FSAR 1030, Section 8.1.1.3.14

Requirement: All helium used in backfilling operations shall be at least 99.99% pure.

Finding: This requirement was implemented. Procedure 0-OP-4.50, Step 3.12 required a minimum of 8 bottles of 99.99% helium to be available at the start of loading. At the time of the inspection, 20 cylinders of helium were connected to the manifold. The cylinder numbers matched Airgas Purchase Order #45559743. The Airgas Certificate of Batch Analysis for the cylinders supplied under PO #45559743 documented that the helium had a purity of 99.999%.

Documents Reviewed: Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3
Airgas Purchase Order #45559743 and associated Certificate of Batch Analysis

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Category: Emergency Planning ***Topic:*** Emergency Plan

Reference: 10 CFR 72.32(c)

Requirement: For an ISFSI that is located on the site of a nuclear power plant licensed for operation, the Emergency Plan required by 10 CFR 50.47 shall be deemed to satisfy the requirements of this section.

Finding: This requirement was implemented. Sections 2.0 and 2.1 of the North Anna Power Station Emergency Plan had been expanded to include the ISFSI. The conditions requiring activation of the Emergency Plan included "Spent Fuel Storage Facility Accident" found on Page 10.8.3 and "Loss of Cask/Fuel Containment Barriers or Accidental Criticality" found on Page 10.8.11.

More specifically, Emergency Plan Implementing Procedure EPIP-1.01, Attachment 1 contained the emergency action levels (EALs) for accidents/events involving the ISFSI.

Condition 12, contained the Condition/Applicability, Indication, and Classification criteria for an Notification of Unusual Event.

Documents Reviewed: North Anna Power Station Emergency Plan, Revision 52
Procedure EPIP-1.01, "Emergency Manager Controlling Procedure," Revision 43

Category: Emergency Planning *Topic:* Emergency Plan Changes

Reference: 10 CFR 72.44(f)

Requirement: Within six months of any changes made to the emergency plan, the licensee shall submit a report containing a description of the changes to the appropriate regional office and headquarters.

Finding: This requirement was implemented. Procedure VPAP-2802, Section 6.10.5.c.2 required that any emergency plan revisions be submitted to the NRC within 30 days following the assigned effective date.

Documents Reviewed: Procedure VPAP-2802, "Notifications and Reports," Revision 28

Category: Fire Protection *Topic:* Fire Protection Plan

Reference: 10 CFR 50.48(a)(1)

Requirement: Each operating nuclear power plant must have a fire protection plan that satisfies Criterion 3 of Appendix A to Part 50. This fire protection plan must describe the overall fire protection program for the facility.

Finding: This requirement was implemented. The North Anna Power Station Fire Protection Program was expanded to include the ISFSI. Procedure VPAP- 2401, Section 6.1.2.a.9 required a monthly inspection of all fire zones, to be documented on Attachment 4 to the procedure. The licensee had submitted and approved change notice (N-2008-001) to revise the North Anna Power Station Appendix R Report to include the ISFSI pad as Fire Zone 72 and the ISFSI haul route as Zone 73.

The licensee developed and implemented Procedure NF-AA-NSF-601 to direct performance of a haul route walkdown prior to transfer operations. The new procedure ensured that all potential fire and explosion hazards along the haul route were identified and mitigated prior to transfer operations.

Documents Reviewed: Procedure VPAP-2401, "Fire Protection Program", Revision 28
Procedure NF-AA-NSF-601, "NUHOMS Transfer Haul Route Walkdown", Revision 0

Category: Fire Protection *Topic:* Offsite Emergency Support

Reference: 10 CFR 72.122(g)

Requirement: Structures systems and components important to safety must be designed for emergencies. The design must provide accessibility to emergency equipment, facilities and services such as hospitals, fire and police departments, ambulance services, and other emergency agencies.

Finding: This requirement was implemented. The licensee had mutual aid agreements with the local fire departments, identified in the documents reviewed. The licensee offered training to the volunteer fire departments at least annually. This training took place on the fire department facilities or at the onsite Information Center. The training discussed all potential fire locations onsite, fire fighting strategies and the licensee's fire fighting capabilities. The discussions included a description of the facilities onsite, including the ISFSI. Several North Anna staff members were part of the volunteer fire departments.

The North Anna Emergency Plan, Revision 33, Page 8.7, Section 8.4, referenced the required emergency training, including the specific training topics that must be covered.

Documents Reviewed: Letter from President Louisa County Volunteer Firefighters Association dated August 6, 2006
Letter from Division Chief, Spotsylvania County Department of Fire, Rescue and Emergency Management, dated September 13, 2006
Letter from Director Caroline County Department of Fire, Rescue and Emergency Management, dated May 23, 2006
Letter from John D. Rayman, North Anna Emergency Preparedness Coordinator, to Chief Douglas Boggs, Department of Fire & Rescue Services, Spotsylvania, Virginia, dated January 9, 2007
Letter from John D. Rayman, North Anna Emergency Preparedness Coordinator, to Mr. Michael Schlemmer, Hazardous Materials Coordinator, Louisa, Virginia, dated January 9, 2007
Letter from John D. Rayman, North Anna Emergency Preparedness Coordinator, to Mr. Edward Fuzy, Hazardous Materials Coordinator, Bowling Green, Virginia, dated January 9, 2007
Emergency Plan Training for Offsite Support Agencies, dated December 19, 2006.

Category: Fuel Selection/Verification *Topic:* Approved Contents

Reference: CoC 1030, Tech Spec 2.1.d

Requirement: The 32PTH canister is authorized for storage of 32 intact fuel assemblies, or up to 16 damaged fuel assemblies with the balance intact assemblies.

Finding: This requirement was implemented. The ISFSI Fuel Assembly and Insert Component Certification memorandum specified that 32 intact spent fuel assemblies had been selected for loading into the first canister. No damaged fuel assemblies had been selected.

Documents Reviewed: Dominion Memorandum dated February 18, 2008, "NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"

Category: Fuel Selection/Verification *Topic:* Approved Spent Fuel Types

Reference: CoC 1030, Tech Spec 2.1.b

Requirement: Spent fuel assemblies authorized for storage in the 32PTH are limited to the fuel types specified in Table 1. Equivalent reload fuel assemblies that are enveloped by the fuel

assembly design characteristics listed in Table 2 for a given fuel assembly class are also acceptable for storage.

Finding: This requirement was implemented. The ISFSI Fuel Assembly and Insert Component Certification memorandum identified the 32 intact Westinghouse 17X17 fuel assemblies selected for loading into the first canister. No equivalent reload assemblies had been selected.

Documents Reviewed: Dominion Memorandum dated February 18, 2008, "NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"

Category: Fuel Selection/Verification *Topic:* Decay Heat Load

Reference: CoC 1030, Tech Spec 2.1.c

Requirement: The maximum heat load for a single fuel assembly, including insert components, is 1.5 kW. The maximum heat load for a 32PTH canister is 34.8 kW for Westinghouse and Babcock and Wilcox (B&W) fuel assemblies, and 33.8 kW for Combustion Engineering (CE) 14X14 fuel assemblies.

Finding: This requirement was implemented. The ISFSI Fuel Assembly and Insert Component Certification memorandum specified that, for the first canister to be loaded, the highest decay heat load for a single fuel assembly, including its integral Burnable Poison Rod Assembly (BPRA), was 809 watts. The first canister was loaded with 32 Westinghouse fuel assemblies with a total decay heat load of 24.689 kW. Both the highest individual fuel assembly decay heat load and the total canister decay heat load were within the Technical Specification limits.

Documents Reviewed: Dominion Memorandum dated February 18, 2008, "NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"

Category: Fuel Selection/Verification *Topic:* Fuel Design Characteristics

Reference: CoC 1030, Tech Spec 2.1.e

Requirement: Spent fuel assemblies authorized for storage in the 32PTH are limited to the design characteristics (dimensions and weights) specified in Table 2.

Finding: This requirement was implemented. The ISFSI Fuel Assembly and Insert Component Certification memorandum specified that the dimensions and weights of the fuel assemblies selected for loading into the first canister were within the design limits of Technical Specification 2.1.e and Table 2.

Documents Reviewed: Dominion Memorandum dated February 18, 2008, "NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"

Category: Fuel Selection/Verification *Topic:* Loading Configurations

Reference: CoC 1030, Tech Spec 2.1.b and c

Requirement: Fuel assemblies may be qualified for four (4) heat load zones designated as Zones 1a, 1b, 2, and 3. Figure 2 shows the heat load zone locations. Table 4 identifies the acceptable combinations of enrichment, burnup and cooling times for each heat load zone.

Finding: This requirement was implemented. The ISFSI Fuel Assembly and Insert Component Certification memorandum specified the following decay heat loading configurations for the first canister to be loaded:

Zone 1a
The maximum allowable decay heat load per fuel assembly was 1,050 watts. The highest fuel assembly decay heat load selected for Zone 1a was 809 watts. The fuel assembly requiring the longest cooling time had a maximum assembly average initial enrichment of 3.87 weight percent Uranium 235 (wt. % U-235) and a burnup of 46.946 Gigawatt Days per Metric Ton Uranium (GWD/MTU). For this combination of initial enrichment and burnup, the minimum cooling time was 10 years. The actual cooling time was 15.2 years.

Zone 1b
The maximum allowable decay heat load per fuel assembly was 800 watts. The highest fuel assembly decay heat load selected for Zone 1b was 783 watts. The fuel assembly requiring the longest cooling time had a maximum assembly average initial enrichment of 4.05 wt. % U-235 and a burnup of 46.934 GWD/MTU. For this combination of initial enrichment and burnup, the minimum cooling time was 15 years. The actual cooling time was 15.2 years.

Zone 2
The maximum allowable decay heat load per fuel assembly was 1,100 watts. The highest fuel assembly decay heat load selected for Zone 2 was 805 watts. The fuel assembly requiring the longest cooling time had a maximum assembly average initial enrichment of 4.06 wt. % U-235 and a burnup of 48.239 GWD/MTU. For this combination of initial enrichment and burnup, the minimum cooling time was 8 years. The actual cooling time was 15.2 years.

Zone 3
The maximum allowable decay heat load per fuel assembly was 1,500 watts. The highest fuel assembly decay heat load selected for Zone 3 was 802 watts. The fuel assembly requiring the longest cooling time had a maximum assembly average initial enrichment of 3.85 wt. % U-235 and a burnup of 49.915 GWD/MTU. For this combination of initial enrichment and burnup, the minimum cooling time was 6 years. The actual cooling time was 15.2 years.

Documents Reviewed: Dominion Memorandum dated February 18, 2008, "NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"

Category:	Fuel Selection/Verification *Topic:* Non-Fuel Assembly Hardware
Reference:	CoC 1030, Tech Spec 2.1.b
Requirement:	Non-Fuel Assembly Hardware (NFAH) stored integral to the assemblies shall be limited to Burnable Poison Rod Assemblies (BPRAs), Thimble Plug Assemblies (TPAs), and Vibration Suppressor Inserts (VPIs). The NFAH stored shall have acceptable combinations of burnup and cooling time described in Table 5. CE 14X14 fuel assemblies are stored without NFAH.
Finding:	This requirement was implemented. The ISFSI Fuel Assembly and Insert Component Certification memorandum identified a maximum BPRA burnup value of 26.825 GWD/MTU. For all NFAH burnup values of less than 30.0 GWD/MTU, Table 5 required a minimum cooling time of 5 years. The minimum cooling time for BPRAs in the first loading was 7.98 years. The ISFSI Fuel Assembly and Insert Component Certification memorandum specified that no Thimble Plug Assemblies (TPAs) or Vibration Suppressor Inserts (VPIs) had been selected for loading into the first canister.
Documents Reviewed:	Dominion Memorandum dated February 18, 2008, "NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"

Category:	Fuel Selection/Verification *Topic:* Spent Fuel Assembly Mis-Loading
Reference:	FSAR 1030, Sect 8.1.1.2.7; CoC 1030, TS Spec 2.2
Requirement:	After all assemblies have been placed in the canister, verify their identities. If any functional or operating limit of Technical Specification 2.1, "Fuel To Be Stored In The 32PTH Canister", is violated, the following actions shall be completed: The affected fuel assemblies shall be placed in a safe condition. Within 24 hours, notify the NRC Operations Center. Within 30 days, submit a special report which describes the cause of the violation and the actions taken to restore compliance and prevent recurrence.
Finding:	This requirement was implemented. Procedure 0-OP-4.50, Step 5.4.8 required entering Technical Specification 2.2 if the post loading verification determined that the canister had not been loaded in accordance with the cask loading map.
Documents Reviewed:	Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3

Category:	General License *Topic:* Cask Design Compatible With Part 50
Reference:	10 CFR 72.212(b)(4)
Requirement:	Prior to use of the general license, determine whether activities related to storage of spent fuel involve a change in the facility technical specifications or require a license amendment for the facility pursuant to Part 50.59(c)(2). Results of this determination must be documented in the 10 CFR 72.212 Evaluation Report.

Finding: This requirement was implemented. Section 3.9 of Technical Report NE-1522 stated that North Anna had operated a site specific ISFSI since June 30, 1998 and the plant systems and programs were already in-place to support operations of the NUHOMS-HD system under a general license. Section 3.9 further discussed the modifications that were made for the ISFSI pad and its associated security and electrical requirements. Additionally, an in-pool drop of the OS187H transfer cask was evaluated and the North Anna Power Station Updated Final Safety Analysis Report (UFSAR) was updated.

The conclusion at the end of Section 3.9 was that there were no items resulting from implementation of the NUHOMS-HD system that required NRC approval or review.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category: General License *Topic:* Dose to the Public - Accident Conditions

Reference: 10 CFR 72.106(a)/(b)/(c)

Requirement: For each ISFSI, a controlled area must be established. Any individual located on or beyond the nearest boundary of the controlled area may not receive from any design basis accident 5 rem Total Effective Dose Equivalent (TEDE) for accident conditions. The minimum distance from the ISFSI to the nearest boundary of the controlled area must be 100 meters. The controlled area may include roads, railroads or waterways as long as arrangements are made to control traffic to protect the public.

Finding: This requirement was implemented. The licensee performed a worst case drop analysis specific to the NUHOMS OS187H transfer cask and 32PTH-HD canister. The analysis considered a cask drop in both the fuel building and decontamination building, and the results were documented in Dominion Calculation PA-0241, Revision 0. Calculation PA-0241 indicated that the resultant dose to the member of the public was 0.082 rem to the whole body and 0.005 rem to the thyroid. This was within the 5 rem Total Effective Dose Equivalent (TEDE) limit for accident conditions.

The distance from the ISFSI perimeter fence to the nearest site boundary was 866 meters. The controlled area was not traversed by public roads, railroads or waterways.

Documents Reviewed: Dominion Calculation PA-0241, "EAB Dose from Drop of a NUHOMS Transfer Cask," dated January 16, 2008.

Category: General License *Topic:* Dose to the Public - Normal Operations

Reference: 10 CFR 72.212(b)(2)(i)(C); 10 CFR 72.104(a)

Requirement: The general licensee shall perform a written evaluation that establishes that the requirements of 10 CFR 72.104, "Criteria for Radioactive Materials in Effluents and Direct Radiation from an ISFSI", have been met. 10 CFR 72.104 requires the annual dose equivalent to any real individual located beyond the controlled area must not exceed 25 mrem to the whole body during normal operations and anticipated occurrences.

Finding: This requirement was implemented, as presented in Technical Report NE-1522, Revision 0, North Anna Independent Spent Fuel Storage Installation, NUHOMS-HD, 10 CFR

72.212 Evaluation, North Anna Power Station, Units 1 and 2, ISFSI pad 2, Section 3.7.c. Calculation PA-0243 was performed to determine the expected maximum annual dose from radiation as a result of normal ISFSI storage operations. The calculation yielded dose rates at the site boundary of 4.2 X 10(-4) mrem per hour from the ISFSI. Using an occupancy rate of 2080 hours per year, based on non-employee occupancy for 40 hours/week, the total dose to a real individual from the ISFSI was 0.9 mrem/year using a 100% occupancy, the total dose to a real individual from the ISFSI was 3.7 mrem/year. Both values are within the 25 mrem per year limit.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0
Calculation PA-0243, "Dose Rate Evaluation of the North Anna ISFSI Based on TN-32 and NUHOMS-HD Storage Systems"

Category: General License ***Topic:*** Evaluation Report Changes

Reference: 10 CFR 72.212(b)(2)(ii)

Requirement: Changes to the approved 72.212 evaluation report shall be made using the requirements of 72.48(c). A copy of the completed 72.48 evaluation shall be retained until spent fuel is no longer stored under the general license issued.

Finding: This requirement was implemented. Technical Report NE-1522, Section 3, specified that future revisions of the 72.212 report will be issued via the 10 CFR 72.48 regulatory review process using Procedure DNAP-3004, as required. Procedure DNAP-3004, Sections 4.2 and 4.3 required completed 72.48 screens and evaluations to be attached to, and retained with, the document they supported. Procedure DNAP-3004, Section 4.3 required a report to be submitted to the NRC every 24 months describing all changes made to the ISFSI for which a 72.48 evaluation had been documented.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0
Procedure DNAP-3004, "Dominion Program for 10 CFR 50.59 and 10 CFR 72.48 - Changes, Tests, and Experiments", Revision 1

Category: General License ***Topic:*** HSM - Storage Pad Soil Liquefaction

Reference: CoC 1030, Tech Spec 4.2.2

Requirement: For sites for which soil-structure interaction is considered important, the license is to perform site-specific analysis considering the effects of soil structure interaction (SSI). Amplified seismic spectra at the location of the HSM-H center of gravity (CG) is to be developed based on the SSI responses. The storage pad location shall have no potential for liquefaction at the site-specific level earthquake.

Finding: This requirement was implemented. Section 7 of Technical Report NE-1522 stated that the storage pad soil structure had been analyzed in Dominion Calculation DCP 05-004, ISFSI Civil Structures Pad # 2. The analysis as provided under ET No. CCE-95-0001 indicated that the soil would not liquefy during the North Anna Power Station Safe Shutdown Earthquake (SSE) under a maximum horizontal acceleration at the base mat of 0.30g. Analysis concurred that liquefaction was not expected at the North Anna Power

Station ISFSI.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0
ISFSI Civil Structures Pad #2/North Anna Power Station/Units 1& 2 Design Change ET No. CCE-95-0001, "Report of Geotechnical Investigation Proposed ISFSI Units 1 & 2, North Anna Power Station, NP-2884; IR7273A", Revision 0

Category: General License *Topic:* HSM Storage Arrays

Reference: CoC 1030, Tech Spec 4.6.1

Requirement: HSM-Hs are placed together in single rows or in back-to-back arrays. An end shield wall is placed on the outside of any loaded outside HSM-H. A rear shield wall is placed on the rear of any single row loaded HSM-H.

Finding: This requirement was implemented. Technical Report NE-1522, Attachment 1, Technical Specification 4.6.1 stated that the HSM-Hs were arranged in one back-to-back, 19 X 2 array with an end shield wall at each end of each row. On a back-to-back array, the rear shield walls were not required. A physical walkdown of the ISFSI pad verified that a 6 X 2 array was in place with the end shield walls installed. At the time of the inspection, the last 26 modules had not been installed.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category: General License *Topic:* Reactor Site Parameters - Fire and Explosion

Reference: CoC 1030, TS 4.6.3.6; FSAR 1030, Sect 4.1.1.1

Requirement: The potential for fires and explosions shall be addressed, based on site-specific considerations. The bounding condition assumed in the fire accident analysis is a 300 gallon diesel fuel fire engulfing the transfer cask for 15 minutes at a temperature of 1,475 degrees F. The bounding condition assumed in the explosion analysis is a blast force of less than 1.0 pounds per square inch (psi). The general license shall determine whether the site fire and explosion hazards are enveloped by the cask design basis. This determination must be documented in the 72.212 evaluation report.

Finding: This requirement was implemented. The potential for fires and explosions was evaluated by North Anna as documented in Technical Report NE-1522, Attachment 2. The evaluation identified and analyzed all on-site and off-site fire and explosion sources that could potentially affect the ISFSI or the haul route. This included gasoline, chemicals, paints, compressed gases, hydrogen farms, etc. The permanently installed explosion sources were determined to be shielded, or at an adequate distance, to prevent blast forces from exceeding 1 psi. Transient explosion sources were administratively controlled. A few of the measures taken were: a) prohibiting gasoline powered vehicles within the ISFSI facility; b) prohibiting propane and natural gas powered vehicles within line of sight to transporter; c) limiting diesel driven vehicles to less than 300 gallons of fuel each; d) separating diesel driven vehicles such that a fire in one vehicle would not affect other vehicles; and e) maintaining all diesel driven vehicles greater than 10 feet from the transporter. Further, the haul path had been walked down previous to the dry

run to support an accurate evaluation of the potential along the haul path. Also noted was the requirement in Procedure NF-AA-NSF-601, for the haul path to be walked down again immediately prior to transfer operations to identify and mitigate any current potential fire and explosion hazards that may have migrated into the area.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0
Procedure NF-AA-NSF-601, "NUHOMS Transfer Haul Route Walkdown", Revision 1

Category: General License ***Topic:*** Reactor Site Parameters - Flood Conditions

Reference: CoC 1030, Tech Spec 4.6.3.2; 10 CFR 72.212(b)(2)

Requirement: The NUHOMS HD System is certified for use at reactor sites with maximum flood levels of 50 feet, and maximum water velocities of 15 feet per second. The user shall verify the site-specific maximum flood levels and water velocities are within the limits of the certification, and shall document that verification in the 72.212 evaluation report.

Finding: This requirement was implemented. Section 2..2.2 of the North Anna Power Station ISFSI SAR stated that the ISFSI was located at 311 feet above mean sea level (msl), leaving a margin of approximately 45 feet above the maximum flood. Flooding was not postulated to reach the ISFSI and flooding velocities were not calculated. Tsunamis and seiches were not considered credible and were not evaluated.

Technical Report NE-1522, Section 3.8.B and Attachment 1, Technical Specification 4.6.3 (2) repeated the North Anna Power Station site specific maximum flood heights and stated that the maximum flood levels were within the limits of the NUHOMS-HD certification.

Documents Reviewed: North Anna Power Station ISFSI SAR, Revision 5
Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category: General License ***Topic:*** Reactor Site Parameters - Normal Temperatures

Reference: CoC 1030, Tech Spec 4.6.3.4; 10 CFR 72.212(b)(2)

Requirement: The NUHOMS HD System is certified for use at reactor sites with normal ambient temperature ranges of 0 degrees F to 100 degrees F. The user shall verify the site-specific normal temperatures are within the range of the certification and shall document that verification in the 72.212 evaluation report.

Finding: This requirement was implemented. From the North Anna Power Station UFSAR, the range of monthly mean temperatures at the site was from 10.0 degrees F to 95.0 degrees F. This data was included in Technical Report NE-1522, Attachment 1, Technical Specification 4.6.3.4.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category:	General License	*Topic:*	Reactor Site Parameters - Roof Snow Loading

Reference: CoC 1030, Tech Spec 4.6.3.3; 10 CFR 72.212(b)(2)

Requirement: The NUHOMS HD System is certified for use at reactor sites where the roof snow loading will not exceed 110 pounds per square foot (psf). The user shall verify the site-specific 100 year roof snow loading is within the limits of the certification, and shall document that verification in the 72.212 evaluation report.

Finding: This requirement was implemented. Technical Report NE-1522, Attachment 1, Technical Specification 4.6.3.(3) stated that, based on the North Anna Power Station ISFSI SAR, the expected annual site snowfall was 15 inches or less with a snow loading of less than 7.8 pounds per square foot (psf). Based on Richmond Weather Service Station Data, the maximum recorded monthly snowfall was 28.5 inches which occurred in January 1940.

The Technical Specification limit of 110 psf is equivalent to 15 feet of snow, which bounds the North Anna Power Station average of 15 inches or maximum of 28.5 inches.

Documents Reviewed: North Anna Power Station ISFSI SAR, Revision 5
Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category:	General License	*Topic:*	Reactor Site Parameters - Seismic Loads

Reference: CoC 1030, Tech Spec 4.6.3.8; 10 CFR 72.212(b)(2)

Requirement: The NUHOMS HD System is certified for use at reactor sites with peak horizontal seismic acceleration loads of 0.30g's and peak vertical seismic acceleration loads of 0.20g's. The user shall verify the site-specific seismic acceleration loads are within the limits of the certification, and shall document that verification in the 72.212 evaluation report.

Finding: This requirement was implemented. The NUHOMS-HD System was designed to withstand a seismic event producing peak accelerations of 0.30g horizontal and 0.20g vertical. Technical Report NE-1522, Attachment 1, Technical Specification 4.6.3 (8) stated that, from the North Anna ISFSI Safety Analysis Report (SAR), the peak ground acceleration during a design basis earthquake was 0.18g horizontal and 0.12 g vertical.

Technical Report NE-1522, Section 3.8.C concluded that the North Anna design basis earthquake was bounded by the NUHOMS-HD design.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category:	General License	*Topic:*	Reactor Site Parameters - Temperature Extremes

Reference: CoC 1030, Tech Spec 4.6.3.5; 10 CFR 72.212(b)(2)

Requirement: The NUHOMS HD System is certified for use at reactor sites with off-normal ambient temperature extremes of minus 20 degrees F without solar insolation and plus 115

degrees F with full solar insolation. The user shall verify the site-specific off-normal ambient temperature extremes are within the limits of the certification, and shall document that verification in the 72.212 evaluation report.

Finding: This requirement was implemented. From the North Anna Power Station UFSAR, the extreme temperature range at the site was -12.0 degrees F to 107 degrees F. This data was included in Attachment 1, Technical Specification 4.6.3.5 in Technical Report NE-1522.

Documents Reviewed: Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category: General License *Topic:* Reactor Site Parameters - Tornado Wind Speeds

Reference: CoC 1030, Tech Spec 4.6.3.1; 10 CFR 72.212(b)(2)

Requirement: The NUHOMS HD System is certified for use at reactor sites with maximum tornado wind speeds of 290 mph rotational and 70 mph translational. The user shall verify the site-specific maximum tornado wind speeds are within the limits of the certification, and shall document that verification in the 72.212 evaluation report.

Finding: This requirement was implemented. Section 2.2.1.1 of the NUHOMS-HD FSAR stated that the design basis tornado intensity used for the HSM-H was a wind speed of 360 mph. This was the sum of a rotational speed of 290 mph and a translational speed of 70 mph. The maximum pressure drop was 3.0 psi and the maximum rate of decrease was 2.0 psi per second.

Section 3.2.2.1 of the North Anna Power Station ISFSI SAR stated that the design basis tornado wind intensity used for the ISFSI was a wind speed of 360 mph. This was the sum of a rotational speed of 300 mph and a translational speed of 60 mph. The maximum pressure drop was 3.0 psi in 3 seconds (1.0 psi per second).

Although the rotational and translational wind speeds differed, the total wind speed of 360 mph and the 3.0 psi pressure drop at the rate of 2.0 psi per second were bounding. Technical Report NE-1522, Attachment 1, Technical Specification 4.6.3.(1) repeated the North Anna Power Station ISFSI SAR wind speed values.

Documents Reviewed: North Anna Power Station ISFSI SAR, Revision 5
Technical Report NE-1522, "North Anna Independent Spent Fuel Storage Installation NUHOMS-HD 10 72.212 Evaluation Report", Revision 0

Category: Heavy Loads and Rigging *Topic:* Safe Load Paths

Reference: NUREG 0612, Sect 5.1.1 (1)

Requirement: Safe load paths should be defined for the movement of heavy loads to minimize the potential for heavy loads, if dropped, to impact irradiated fuel in the reactor vessel and in the spent fuel pool, or to impact safe shutdown equipment. The path should follow, to the extent practical, structural floor members, beams, etc., such that if the load is dropped, the structure is more likely to withstand the impact.

Finding: This requirement was implemented. The spent fuel cask crane used a movable bridge

and a fixed trolley. The crane moved in the north/south direction only and could not pass over the spent fuel pit. This configuration was described in Step 4.28 of Procedure 0-OP-4.50.

Documents Reviewed: Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3

Category: Heavy Loads and Rigging ***Topic:*** Transfer Cask Drop

Reference: CoC 1030, Tech Spec 5.3.2

Requirement: The 32PTH canister will be inspected for damage after any transfer cask drop of 15 inches or more. This will ensure that the canister will continue to provide confinement and the transfer cask will continue to provide its design function regarding canister transfer and shielding.

Finding: This requirement was implemented. Step 4.2 of Procedure 0-OP-4.54 required an engineering analysis of the transfer cask and canister following any cask drop greater than 15 inches. The analysis was required in order to determine continued confinement capability of the canister and to determine the transfer and shielding capability of the transfer cask.

Documents Reviewed: Procedure 0-OP-4.54, "Transfer Cask/Dry Shielded Canister Transfer to ISFSI and Dry Shielded Canister Transfer from Transfer Cask to Horizontal Storage Module", Revision 1

Category: Heavy Loads and Rigging ***Topic:*** Transfer Cask Lifting Heights

Reference: CoC 1030, Tech Spec 5.3.1

Requirement: To ensure that any loaded canister drop is bounded by the station's accident analysis: a) the maximum lift height and handling height of all transfer operations where the loaded transfer cask is in the horizontal position on the trailer shall be 80 inches; and b) for all other configurations, the maximum lift height shall be restricted by the site 10 CFR 50 limits, as determined by an evaluation of the fuel cladding structural integrity for all credible drops.

Finding: This requirement was implemented. The lift height restrictions for the transfer cask and canister lid were stated frequently in Procedure 0-OP-4.50. The maximum lift heights for the transfer cask were 1' 6" above the handrail, 6" above obstructions, and 5' above the floor. The maximum lift height for the canister lid was 4' above the handrail or 7' 6" above the floor.

Documents Reviewed: Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3

Category: Procedures & Tech Specs *Topic:* Cask Maintenance - Annual Inspections

Reference: CoC 1030, Condition 2; FSAR 1030, Section 9.2

Requirement: Written procedures shall be prepared for cask maintenance. The procedures shall require performance of the following transfer cask inspections within one year of each loading or unloading campaign: a) dye penetrant examination of the top trunnion bearing surfaces and accessible welds; b) leak testing of the transfer cask lid, ram access cover, vent and drain cover o-rings, vent and drain quick-connect fittings and neutron shield fittings. If bubble leak testing is performed, no leak indication is allowed. If pressure drop or helium leak testing is used, the maximum allowable leak rate for each component is 1.0 X 10(-3) ref-cc/sec.

Finding: This requirement was implemented. Procedure 0-OP-4.50, Step 5.1.13 required a transfer cask leak test and inspection in accordance with Procedure 0-PT-4.50, within one year of cask loading.

Procedure 0-PT-4.50, Section 6.3 performed a dye penetrant examination of the top trunnion bearing surfaces. Section 6.4 performed a dye penetrant examination of the upper trunnion-to-shell/pad welds. Section 6.5 performed a trunnion dimensional inspection.

Section 6.1 of Procedure 0-PT-4.50 performed a leak check of the transfer cask lid, ram access cover, vent and drain cover o-rings, vent and drain quick-connect fittings and neutron shield fittings. Bubble leak testing was used and the acceptance criteria was zero leakage.

Documents Reviewed: Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3
Procedure 0-PT-4.50, "NUHOMS 0S187H Transfer Cask Leak Test and Inspection", Revision 0

Category: Procedures & Tech Specs *Topic:* Cask Operation

Reference: CoC 1030, Condition 2; Tech Spec 5.2.2

Requirement: Written procedures shall be prepared for cask handling, loading, and movement. The procedures shall control: a) fuel qualification and loading; b) rigging and handling; c) loading operations; d) unloading operations; e) auxiliary equipment operation; f) transfer operations; g) radiation protection; and h) off-normal and accident conditions, responses and corrective actions.

Finding: This requirement was implemented.

Fuel assembly qualification, selection and canister placement was performed in accordance with the NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"; Rigging and handling operations were performed in accordance with Procedures 0-OP-4.10 and VPAP-0810; Cask loading operations were performed in accordance with Procedure 0-OP-4.50; Cask unloading operations were performed in accordance with Procedure 0-OP-4.51; Canister

vacuum drying and helium backfill were performed in accordance with Procedure 0-OP-4.52; Transfer operations were performed in accordance with Procedures 0-OP-4.54 and 0-OP-4.55; Radiation protection and contamination control measures were implemented in accordance with Procedure HP-1061.500; Technical specification dose rate and contamination surveys were performed in accordance with Procedure 0-HSP-ISFSI-002; Off-normal and accident conditions, responses and corrective actions were performed in accordance with Procedure 0-AP-30.

Documents Reviewed: Dominion Memorandum dated February 18, 2008, "NUHOMS Canister DOM-32PTH-010-C ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"
Procedure 0-OP-4.10, "Fuel Building Bridge and Trolley Crane 1-FH-CRN-13", Revision 33
Procedure VPAP-0810, "Crane and Hoist Program", Revision 16
Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3
Procedure 0-OP-4.51, "Unloading a Loaded NUHOMS 32 PTH Dry Shielded Canister", Revision 1
Procedure 0-OP-4.52, "NUHOMS Vacuum Drying System Operation", Revision 2
Procedure 0-OP-4.54, "Transfer Cask/Dry Shielded Canister Transfer to ISFSI and Dry Shielded Canister Transfer from Transfer Cask to Horizontal Storage Module", Revision 1
Procedure 0-OP-4.55, "Transfer Dry Shielded Canister from Horizontal Storage Module to Transfer Cask and Transfer to Decon Bay", Revision 2
Procedure HP-1061.500, "NUHOMS Spent Fuel Cask Preparation/Loading and Transport to ISFSI", Revision 0
Procedure 0-HSP-ISFSI-002, "NUHOMS Dry Spent Fuel Storage System Surveillance", Revision 0
Procedure 0-AP-30, "Fuel Failure During Handling", Revision 11

Category: Procedures & Tech Specs ***Topic:*** Cask Surveillance - HSM Air Vent Inspections

Reference: CoC 1030 Condition 6; TS 5.2.5.b; FSAR, Sect 4.4.2

Requirement: Written procedures shall be prepared for cask surveillance. Site personnel shall conduct a daily visual inspection of the air vents to ensure that the HSM air vents are not blocked for more than 34 hours, and that blockage will not exist for longer than the 36 hours assumed in the safety analysis.

Finding: This requirement was implemented. Procedure 1-LOG-6E required a daily (0730) visual inspection of the inlet and outlet air vents to ensure no blockage was present. This inspection was performed outside the fenced ISFSI area by viewing the storage modules using cameras positioned at either side of the storage modules. The procedure established a limit of 34 hours for removing the blockage.

Documents Reviewed: Procedure 1-LOG-6E, "Outside Logs", Revision 67

Category:	Procedures & Tech Specs *Topic:* Cask Surveillance - HSM Thermal Monitoring
Reference:	CoC 1030, Condition 2; Tech Spec 5.2.5.a
Requirement:	Written procedures shall be prepared for cask surveillance. The air temperature difference between the ambient temperature and the roof vent temperature will be measured 24 hours after canister insertion into the HSM, and again 7 days later. If the air temperature differential is greater than 70 degrees F, the air inlets and exits should be checked for blockage. If after removing any blockage found, the temperature is still 100 degrees F or greater, corrective actions and analysis of existing conditions will be performed in accordance with the site corrective action program to confirm that conditions adversely affecting the concrete or cladding do not exist. If the temperature rise is 100 degrees F or less, the HSM-H and 32PTH canister are performing as designed and no further temperature measurements are required.
Finding:	This requirement was implemented. Procedure O-PT-4.51, Section 6.2 performed the first differential temperature measurement at 24-30 hours of installing the door on the HSM. Section 6.3 performed the second measurement at 7-8 days of installing the door on the HSM. The temperature limits and corrective actions were consistent with the Technical Specification.
Documents Reviewed:	Procedure 0-PT-4.51, "Horizontal Storage Module Thermal Performance Verification", Revision 0

Category:	Quality Assurance *Topic:* Approved QA Program
Reference:	10 CFR 72.140(d)
Requirement:	A Quality Assurance (QA) program previously approved by the Commission as satisfying the requirements of Appendix B to Part 50 will be accepted as satisfying the requirements of Part 72. In filing the description of the QA program required by Part 72.140(c), each licensee shall notify the NRC of it's intent to apply it's previously approved QA program to ISFSI activities. The notification shall identify the previously approved QA program by date of submittal, docket number and date of Commission approval.
Finding:	This requirement was implemented. Virginia Electric and Power Company notified the NRC on May 16, 2007 of its intent to apply their NRC approved 10 CFR Part 50 Appendix B Quality Assurance program to the North Anna Power Station ISFSI. The Letter from Eugene Grecheck of Virginia Electric and Power Company to the Director NRC/SFPO contained the information specified.
Documents Reviewed:	Letter from Eugene Grecheck of Virginia Electric and Power Company to the Director, Spent Fuel Project Office, "Notification Of Intent To Apply Previously Approved 10 CFR Part 50 Quality Assurance Program to Independent Spent Fuel Storage Installation (ISFSI) Activities", dated May 16, 2007

Category: Quality Assurance *Topic:* Procurement Controls

Reference: 10 CFR 72.154(a)/(b)/(c)

Requirement: The licensee shall establish measures to ensure that purchased material, equipment, and services conform to procurement documents. These measures must include provisions for source evaluation and selection, objective evidence of quality furnished by the contractor/subcontractor, inspection at the contractor/subcontractor source and examination of product on delivery.

Finding: This requirement was implemented. The Final Documentation Packages for the OS187H Transfer Cask (S/N 2) and NUHOMS canisters (S/N 007 and 010) were reviewed. Each package contained the Transnuclear and Dominion Certificates of Compliances as well as the fabricating Certificates of Conformance. The certificates referenced the license design drawings, including revisions. The fabricators GE-Hitachi and Hitachi Zozen included certified as-built drawings consistent with designs.

Deviations that resulted in "use-as-is" or "repair" were properly documented and evaluated under 72.48 evaluations. Dominion had approved these deviations under the Supplier Non-Conformance Report (SNCR) process. A total of 17 SNCRs were reviewed; 6 were specific to canister 010, 6 were specific to canister 007, and 5 were specific to the transfer cask. There were no interim CoCs.

Adequate documentation was generated to show compliance with to Purchase Order NAP-0134/SUP-0127 and Purchase Order 7015848.

Documents Reviewed: Transnuclear OS187H Transfer Cask, Serial No. 2, Final Documentation Package, certified July 6, 2007
Transnuclear NUHOMS 32PTH DSC, S/N 007-C, FDP 2/11/08
Transnuclear NUHOMS 32PTH DSC, S/N 010-C, FDP 1/29/08

Category: Radiation Protection *Topic:* Canister Gas Sampling During Unloading

Reference: FSAR 1030, Section 8.2.2.12

Requirement: Once the vent and drain port cover plates are removed, obtain a sample of the canister atmosphere. Confirm acceptable hydrogen concentration and check for presence of fission gas indicative of degraded fuel cladding.

Finding: This requirement was implemented. The licensee had developed Procedure 0-OP-4.51 for unloading a spent fuel canister. Section 5.4 of Procedure 0-OP-4.51 described the process for removing the vent and drain port cover plates and collecting gas samples from the canister. Step 5.4.7 sampled the canister atmosphere for hydrogen and fission gases. Step 5.4.8 directed the operator to take additional measures to minimize exposure to workers and radiological releases to the environment if degraded fuel was suspected.

Documents Reviewed: Procedure 0-OP-4.51, "Unloading a Loaded NUHOMS 32 PTH Dry Shielded Canister", Revision 1

Category: Radiation Protection *Topic:* Canister Unloading - Reflooding

Reference: FSAR 1030, Section 8.2.2.14

Requirement: Fill the canister with water through the drain port with the vent port open. The vented steam and gas should be routed though a monitored and filtered pathway. Monitor the vent pressure and regulate the fill rate to ensure canister pressure does not exceed 15 psig.

Finding: This requirement was implemented. Procedure 0-OP-4.51, Step 5.4.1 reflooded the canister using the Vacuum Drying System (VDS). Spent fuel pool water was introduced through the drain port and the vented steam and gas were exhausted out of the vent port through the installed plant ventilation systems. The exhaust pathway was both monitored and filtered.

During the inspection, the licensee demonstrated the ability of the VDS to control reflooding flow rates to less than 4 gallons per minute (gpm), which is low enough to prevent pressurizing the canister to greater than 15 psig.

Documents Reviewed: Procedure 0-OP-4.51, "Unloading a Loaded NUHOMS 323 PTH Dry Shielded Canister", Revision 1

Category: Radiation Protection *Topic:* Contamination Survey of Canister

Reference: CoC 1030, Tech Spec 5.2.4.d

Requirement: Following placement of each loaded transfer cask into the cask decontamination area and prior to transfer to the ISFSI, the smearable surface contamination levels on the outer top 1 foot surface of the canister shall be less than 2,200 disintegrations per minute (dpm) per 100 square cm from beta and gamma emitting sources and less than 220 dpm/100 square cm from alpha emitting sources. The contamination limits are based on the allowed removable external radioactive contamination specified in 49 CFR 173.443.

Finding: This requirement was implemented. Procedure HP-1061.500, Step 6.5.11.g required a contamination survey of the top one foot of the canister exterior and transfer cask interior immediately following removal of the annulus seal.

Procedure HP-1061.500 Step 6.5.11.h referenced out to Procedure 0-HSP-ISFSI-002 for performance and documentation of the contamination survey. The survey was performed in accordance with Section 6.2, and documented on Attachment 6, of Procedure 0-HSP-ISFSI-002.

Although the technical specification limits for contamination were 2,200 dpm/100 square cm beta/gamma and 220 dpm/100 square cm alpha, the licensee elected to use more conservative limits of 1,000 dpm beta/gamma and 20 dpm alpha.

Documents Reviewed: Procedure HP-1061.500, "NUHOMS Spent Fuel Cask Preparation/Loading and Transport to ISFSI", Revision 0
Procedure 0-HSP-ISFSI-002, "NUHOMS Dry Spent Fuel Storage System Surveillance", Revision 0

Category: Radiation Protection *Topic:* Criticality - Minimum Boron Concentration

Reference: CoC 1030, Tech Spec 3.2

Requirement: The dissolved boron concentration of the spent fuel pool water and the water added to the cavity of a loaded canister shall be at least the boron concentration shown in Table 7 for the basket type and fuel enrichment selected. The boron concentration will be determined within 4 hours prior to commencing LOADING operations and 48 hours thereafter while water is in the canister. The boron concentration will be determined within 4 hours prior to flooding the canister during UNLOADING operations and 48 hours thereafter while water is in the canister. All boron concentrations shall be determined by two independent measurements.

Finding: This requirement was implemented. The fuel assemblies selected for loading into the first NUHOMS canister were Westinghouse 17X17 intact fuel assemblies with a maximum assembly initial enrichment of 4.01 wt. % U-235. The first NUHOMS canister was equipped with a Type C basket. For this configuration, Technical Specification Table 7 required a minimum boron concentration of 2,300 ppm, which was reflected in the ISFSI Fuel Assembly and Insert Component Certification Memorandum.

During loading operations, Procedure 0-OP-4.50, Step 5.1.12 recorded the minimum spent fuel pool boron concentration required by the ISFSI Fuel Assembly and Insert Component Certification memorandum. Procedure 0-OP-4.50, Step 5.4.4 required spent fuel pool boron concentration to be determined by two independent samples every 48 hours thereafter while water is in the canister. Procedure 0-OP-4.50, Step 5.3.3 required two independent samples to determine boron concentration in the spent fuel pool, cask pit, and canister before starting loading operations.

During unloading operations, Procedure 0-OP-4.51, Step 5.1.6 recorded the minimum spent fuel pool boron concentration required by the ISFSI Fuel Assembly and Insert Component Certification memorandum. Procedure 0-OP-4.51, Step 6.3.16 required spent fuel pool boron concentration to be determined by two independent samples within 4 hours prior to re-flooding the canister and every 48 hours thereafter while water is in the canister.

During the demonstration, the independent chemistry samples results for spent fuel boron concentration ranged from 2709 to 2724 ppm.

Documents Reviewed: Procedure 0-OP-4.50, "NUHOMS 323 PTH Dry Shielded Canister Loading and Handling", Revision 3
Procedure 0-OP-4.51, "Unloading a Loaded NUHOMS 323 PTH Dry Shielded Canister", Revision 1
Dominion Memorandum DOM-32PTH-010-C NUHOMS Canister, dated February 18, 2008, "ISFSI Fuel Assembly and Insert Component Certification and Canister Loading Map"

Category:	Radiation Protection	*Topic:*	Criticality - Monitoring and Alarm System

Reference: 10 CFR 72.124.c

Requirement: A criticality monitoring system shall be maintained in each area where special nuclear material is handled, used, or stored which will energize clearly audible alarm signals if accidental criticality occurs. Underwater monitoring is not required, nor is monitoring of dry storage areas where special nuclear material is packaged in its stored configuration. The NRC has defined "packaged" to begin when the canister lid closure weld is complete.

Finding: This requirement was implemented. The criticality monitoring system consisted of 5 area radiation monitors, each with an audible alarm. One area radiation monitor was located on the fuel handling bridge. Four MGP Instrument AMP-100 area radiation monitors were placed in north bay of the decontamination building. Two were placed at elevation 280' and two were placed at elevation 265'. Section 6.2 of Procedure HP-1061.500 required setting the AMP 100 alarm setpoints to 200 mr/hr. The criticality monitoring system was in operation during the inspection.

Documents Reviewed: Procedure HP-1061.500, "NUHOMS Spent Fuel Cask Preparation / Loading and Transport to ISFSI", Revision 0

Category:	Records	*Topic:*	CoC and Related Documents

Reference: 10 CFR 72.212(b)(7)

Requirement: The general licensee shall maintain a copy of the Certificate Of Compliance (CoC) and documents referenced in the certificate. The referenced documents include, as a minimum, the Technical Specifications, Final Safety Analysis Report (FSAR) and the NRC Safety Evaluation Report (SER).

Finding: This requirement was implemented. The licensee provided current copies of the CoC, Technical Specifications, FSAR and the NRC SER. Documents were of the latest amendment, revision number and effective date.

Documents Reviewed: None.

Category:	Records	*Topic:*	Notice of Initial Loading

Reference: 10 CFR 72.212(b)(1)(i)

Requirement: The general licensee shall notify the NRC at least 90 days prior to first storage of spent fuel.

Finding: This requirement was implemented. The notice of initial loading was accomplished on September 21, 2007 via a letter from Virginia Electric and Power Company to the NRC Spent Fuel Project Office. First loading was scheduled for March 3, 2008, making the notification greater than the 90 days required.

Documents Reviewed: Letter from Eugene Grecheck of Virginia Electric and Power Company to the Director Spent Fuel Project Office, "Notification Pursuant To 10 CFR 72 212(b)(1)(i) Prior To First Storage of Spent Fuel Under a General License", dated September 21, 2007

Category: Special Lifting Devices *Topic:* Annual Testing For Continued Compliance

Reference: ANSI N14.6, Section 5.3.1

Requirement: Annually, not to exceed 14 months, special lifting devices shall be subjected to either of the following: 1) a load test equal to 150% of the maximum service load. After sustaining the load for a period of not less than 10 minutes, critical areas, including load-bearing welds, shall be subject to visual inspection for defects and all components shall be inspected for permanent deformation; or 2) In cases where surface cleanliness and conditions permit, the load testing may be omitted and dimensional testing, visual inspection and nondestructive testing of major load-carrying welds and critical areas shall suffice.

Finding: This requirement was implemented. The dry cask handling tools were not included in the Virginia Electric and Power Company (VEPCO) response to NRC Generic Letter 81-07 concerning the control and handling of heavy loads at the North Anna Power Station. The dry cask handling tools were added later under Engineering Transmittal ET-CCE-98-0008. North Anna elected to perform dimensional testing, visual inspection and nondestructive testing of the major load-carrying welds in lieu of load testing.

North Anna Power Station ensured continued compliance through their 10-year In Service Inspection (ISI) program. The last ISI was completed on 10/24/07 in accordance with Procedure 0-PT-4.5. The lifting yoke was disassembled and the components were visually examined for corrosion, cracking, damage, and deformation. Following dimensional testing and magnetic particle examination, the lifting yoke was reassembled.

The short and long lifting tools were visually examined for cracking, wear, structural degradation, and damage. The hex head cap screws were inspected for thread galling, thread engagement, and torque. The short and long lifting tools were then subjected to liquid penetrant testing.

Documents Reviewed: Procedure 0-OP-4.5, "In Service Inspection of Dry Cask Handling Tools", Revision 2
Engineering Transmittal ET-CCE-98-0008, "Inservice Inspection of Dry Cask Handling Tools, Revision 1

Category: Special Lifting Devices *Topic:* Load Testing - Transfer Cask Trunnions

Reference: ANSI N14.6, Section 5.2.1

Requirement: Prior to initial use, each trunnion shall be subjected to a load test equal to 150% of the maximum service load. After sustaining the load for a period of not less than ten minutes, critical areas, including load bearing welds, shall be subject to non destructive testing using the liquid penetrant or magnetic particle methods.

Finding: This requirement was implemented. Both upper transfer cask trunnions were load tested simultaneously on December 8, 2005 by Hitachi Zosen Diesel & Engineering Co., LTD, using Procedure 032-T-PLT. The Proof Load Test Record documented that a load test of 377.03 tons was held for 10 minutes, followed by a liquid penetrant (PT) examination of the critical areas. The results of the PT examination were acceptable, as documented on the Record of Visual Weld/Liquid Penetrant Examination. Both the Proof Load Test

Record and the Record of Visual Weld/Liquid Penetrant Examination were contained in Section 9 of Transnuclear's Final Documentation Package for the OS187H transfer cask.

Documents Reviewed: Final Documentation Package OS187H Transfer Cask Serial No. 2 stamp dated February 12, 2008
Procedure 032-T-PLT, "Proof Load Test Procedure," Revision 4

Category: Special Lifting Devices *Topic:* Special Lifting Device Inspection Prior to Use

Reference: ANSI N14.6, Section 5.3.6

Requirement: Special Lifting Devices shall be visually inspected by operating personnel for indications of damage or deformation prior to each use.

Finding: This requirement was implemented. Procedure 0-OP-4.50, Step 4.25 required inspection of the lifting yoke and lid lifting tools in accordance with Procedure 0-OP-4.38, prior to each cask loading evolution. Section 5.1 of Procedure 0-OP-4.38 required a visual inspection of the lift yoke for: a) corrosion; b) cracks in the paint at welded joints; c) tightness of fasteners; d) lubrication of the yoke arm and pivot pins; e) lifting barrel and lifting barrel pin alignment; f) air system operation; and g) damage or deformation.

Section 5.2 of Procedure 0-OP-4.38 required a visual inspection of the short lifting tool for: a) corrosion; b) tightness of fasteners; c) cracks, wear or deformation of the bolted connections; d) safety head operation; and e) wear, damage, or deformation of the leveling piece and lifting head. Section 5.3 of Procedure 0-OP-4.38 required a visual inspection of the long lifting tool in the same manner as the short lifting tool.

The air operated chain hoist was defined as a tool and was controlled under Procedure VPAP-0214. Attachment 20 of Procedure VPAP-0214 contained the inspection requirements prior to issuing the chain hoist to the field for use. The inspection points included: a) operating mechanisms for proper operation; b) leakage in air lines and regulator; c) hooks for cracks, increased throat opening, and twist; d) hook latches for proper operation; and e) chain for gouges, nicks, corrosion, weld splatter, distorted links, and tightness of fasteners. Inspection of the air operated chain hoist was performed on February 4, 2008.

Documents Reviewed: Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3
Procedure 0-OP-4.38, "Inspection and Maintenance of Dry Storage Cask Lifting Yoke and Lid Lifting Tools", Revision 2
Procedure VPAP-0214, "Tool Room Control", Revision 18

Category: Training *Topic:* Approved Training Program

Reference: 10 CFR 72.44(b)(4)

Requirement: The licensee shall have a training program in effect that covers the training and certification of personnel that meet the requirements of Subpart I before the licensee receives spent fuel at the ISFSI.

Finding: This requirement was implemented. The training program for the NUHOMS system was

developed using the Systematic Approach To Training (SAT) process. The knowledge requirements for each task were identified and incorporated into the classroom training and followed by a written examination. The skill requirements for each task were identified and incorporated into Job Performance Measures (JPMs).

Once the classroom training, written examination, and JPMs were successfully completed, the individual was fully qualified to operate the NUHOMS system for dry fuel storage operations. The training program for the NUHOMS system was approved by the North Anna Supervisor, Operations Support.

Documents Reviewed: Memorandum from Howard Myers (Training) to John Slattery (Operations Support), "NUHOMS Qualification", dated February 15, 2008

Category: Training *Topic:* Certification of Personnel

Reference: 10 CFR 72.190

Requirement: Operations of equipment and controls that have been identified as important to safety in the SAR and in the license must be limited to trained and certified personnel or be under the direct visual supervision of an individual with training and certification in the operation. Supervisory personnel who personally direct the operation of equipment and controls that are important to safety must also be certified in such operations.

Finding: This requirement was implemented. Classroom training on the NUHOMS system was provided by AREVA on May 1-4, 2007. During this same period, EMS Solutions provided classroom training on the E1000 Series Vacuum Drying System (VDS). The classroom training topics included general system operations, transfer cask/canister preparation for loading, transfer trailer operation, canister draining and drying, and transfer cask-to-HSM alignment operations. Individuals were tested on the information presented during the classroom training and all scored greater than 80%.

On May 29-30, 2007 field training on the VDS was provided by EMS Solutions. NUHOMS system pre-operational system checks were performed on December 3-10, 2007 and a full system dry run exercise was performed on February 4-9, 2008. On February 15, 2008 additional training was provided on the NUHOMS system abnormal operations and on the North Anna Safety Analysis Report.

The North Anna Training Review Board (TRB) evaluated the training provided by AREVA and EMS Solutions, the written examinations, the Job Performance Measures (JPMs), and the dry run exercises. The TRB concluded that the individuals who successfully completed this training curriculum were fully qualified and certified to perform dry fuel storage operations at the North Anna Power Station.

Documents Reviewed: Memorandum from Howard Myers (Training) to John Slattery (Operations Support), "NUHOMS Qualification", dated February 15, 2008

Category: Training *Topic:* Dry Run Training Exercise

Reference: CoC 1030, Condition 8

Requirement: A dry run training exercise of the loading, closure, handling, unloading and transfer of the NUHOMS-HD System shall be conducted by each licensee prior to first use of the system to load spent nuclear fuel assemblies. The loading operations shall include: a) fuel loading; b) canister sealing; c) drying and backfilling operations; d) transfer cask downending and transport to the ISFSI; and e) canister transfer into the HSM-H. The unloading operations shall include: a) canister retrieval from the HSM-H; b) flooding the canister; and c) opening the canister.

Finding: This requirement was implemented. Fuel loading was demonstrated during this inspection using a dummy fuel assembly and Sections 5.2 through 5.8 of Procedure 0-OP-4.50. The major steps of the operation included: a) sampling the spent fuel pool water for boron; b) filling the canister with spent fuel pool water; c) raising the transfer cask from the north bay of the decontamination building and lowering it into the cask pit; d) test fitting the dummy fuel assembly into five canister cell locations; e) installing the canister shield plug; f) removing the transfer cask from the spent fuel pool and returning it to the north bay of the decontamination building; and g) removing the annulus seal and performing a contamination survey to determine seal effectiveness.

Canister sealing operations were demonstrated, and canister opening operations were simulated, on August 8-10, 2006 at the Surry Power Station. The demonstration of canister sealing operations included welding and weld testing of the canister inner lid, the vent and drain port cover plates, and the outer lid. The simulation of canister opening was simulated using a videotape of canister lid removal performed at another facility. The lid removal process and equipment contained in the videotape were similar to what Surry and North Anna intended to use. The demonstration results for canister sealing and NRC acceptance of the videotape for canister opening were documented in Inspection Report 05000280/2006004; 05000281/2006004; 7200055/2006001, dated October 26, 2006 (ML0630000110).

Since the contract specialty welding company, equipment, procedures, and personnel were common to both Surry and North Anna, the 2006 canister sealing demonstration and canister opening simulation at Surry were both credited to North Anna.

Canister drying and backfilling operations were demonstrated during this inspection using the EMS 1000 Vacuum Drying System (VDS) and Procedure 0-OP-4.52. The major steps of the operation included: a) pumping the water out of the canister; b) chasing the canister drain down with helium; and c) partial vacuum drying of the canister. The VDS vacuum pump failed during the inspection and complete vacuum drying could not be demonstrated. The NRC inspector reviewed the licensee's documentation for their last internal dry run and determined that the dry run training exercise for vacuum drying, helium pressure testing and final helium backfilling had been conducted satisfactorily.

Transfer cask downending onto the transfer trailer was demonstrated during this inspection using Section 5.3 of Procedure 0-OP-4.54. Transfer cask transport to the

ISFSI, canister transfer into the HSM-H, and canister removal from the HSM-H were demonstrated at the Surry Power Station on June 18-22, 2007 and documented in Inspection Report 05000280/2007006; 05000281/2007006; 7200055/2007001, dated September 4, 2007 (ML072600140 and ML072600147). The North Anna and Surry transfer trailers, transfer casks, and horizontal storage modules (HSMs) were identical in design and function. The transfer procedures were similar and the personnel performing them were shared between the two stations. For these reasons, Virginia Electric and Power Company requested relief from these dry run exercises for the North Anna Power Station in a letter to the NRC dated November 9, 2007. Although, formal approval of the request was not required, The NRC concurred with the basis for not performing these dry run exercises in a letter to Virginia Electric and Power Company dated February 15, 2008.

Reflooding the canister during an unloading operation was demonstrated during this inspection using the VDS and Procedure 0-OP-4.51.

Documents Reviewed:

Procedure 0-OP-4.50, "NUHOMS 32 PTH Dry Shielded Canister Loading and Handling", Revision 3
Procedure 0-OP-4.51, "Unloading a Loaded NUHOMS 32 PTH Dry Shielded Canister", Revision 1
Procedure 0-OP-4.52, "NUHOMS Vacuum Drying System Operation", Revision 2
Procedure 0-OP-4.54, "Transfer Cask/Dry Shielded Canister Transfer to ISFSI and Dry Shielded Canister Transfer from Transfer Cask to Horizontal Storage Module", Revision 1
Letter from Virginia Electric and Power Company to the NRC, dated November 9, 2007
Letter From the NRC to Virginia Electric and Power Company, dated February 15, 2008