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RICHMOND, VIRGINIA 23261

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Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION
INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)
SUMMARY OF FACILITY CHANGES, TESTS AND EXPERIMENTS

Pursuant to 10 CFR 72.48(b)(2), enclosed is a summary description of Independent Spent Fuel Storage Installation changes, tests and experiments, including a summary of the regulatory/safety evaluations, that were implemented at North Anna Power Station during 2001.

If you have any questions, please contact us.

Very truly yours,



D. A. Heacock
Site Vice President

Enclosure

cc: Director, Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

SAFETY EVALUATION LOG
INDEPENDENT SPENT FUEL STORAGE INSTALLATION
2001

S.E. #	Unit	Document	System	Description	SNSOC Date
97-SE-MOD-03	1,2	DCP 95-006-3		Station Modifications for the Independent Spent Fuel Storage Installation (ISFSI)	3-3-97
01-SE-MOD-01	ISFSI	DCP 01-002 ISFSI SAR IN 01-002		Modifications are being made to TN-32 protective cover to reduce the possibility of water intrusion, which can lead to o-ring degradation. In addition, the overpressure system is being modified to relocate the pressure-sensing instrumentation from under the protective cover to an instrument box mounted on the side of the cask for easier access.	6-21-01
01-SE-PROC-04	ISFSI	0-OP-4.44		Addresses checking and torquing TN-32-cask lid bolts at the ISFSI – verifies that the lid o-rings are sufficiently compressed to provide sealing of the cask IAW the ISFSI SAR & TN-32 TSAR.	3-12-01
01-SE-OT-06	ISFSI	ISFSI SAR Chg IN 2000-001 Transnuclear Calc 1049-137		Addresses a change to the TN-32 TSAR tornado missile analysis which removes any assumed missile protection due to the protective cover.	3-12-01
01-SE-OT-08	ISFSI	ISFSI SAR Chg IN 2001-001		Deletes the requirement for fire extinguishers to be placed inside the security fences at the ISFSI, and instead requires that fire extinguishers be placed at the ISFSI inside the perimeter fence.	3-22-01
01-SE-OT-17	ISFSI	UFSAR IN 2001-003		Updates the TN-32 cask lid bolt analysis to reflect a range of torque values, a change in lubricant, & allow the use of an alternative o-ring jacket material.	5-31-01
01-SE-OT-21	ISFSI	TS CHG ISFSI-003		Changes references from VEPCO in North Anna ISFSI Material License & TS to Dominion Generation Corporation as a result of the pending license transfer	6-28-01

97-SE-MOD-03

Description

DCP 95-006-3: Station Modifications for the Independent Spent Fuel Storage Installation (ISFSI)
This is a 10 CFR 72.48 safety evaluation.

Summary

This design change adds a helium and vacuum drying system, work platforms and associated instrumentation to the decontamination building. The change will also demolish cask area pumpdown equipment in the spent fuel pool. The station modifications are required for the preparation of the spent fuel cask for storage at the ISFSI.

The design change is not safety related. Failure of any component installed under DCP 95-006-03 will not impair any safety-related equipment. An unreviewed safety question does not exist as a result of this activity. The design change does not affect any of the accidents evaluated in the Safety Analysis Report. The margin of safety of any part of the Technical Specifications has not been reduced.

01-SE-MOD-01

Description

North Anna ISFSI SAR Change Request IN 2001-002

DCP 01-002

This is a 10 CFR 72.48 safety evaluation. Modifications are being made to the TN-32 protective cover to reduce the possibility of water intrusion which can lead to O-ring degradation. Also, the overpressure system is being modified to relocate the pressure-sensing instrumentation from under the protective cover to an instrumentation box mounted on the side of the cask for easier access.

Summary

This is a 10 CFR 72.48 safety evaluation.

Several TN-32 cask low pressure alarms have been received at Surry which required removal of the protective cover for troubleshooting. TN-32 casks are also used at North Anna. Surry RCE S-2000-0872 was prepared to determine the cause of the alarms and to develop appropriate corrective actions. Some of the conclusions made by the RCE team regarding the TN-32 seal degradation are given below:

- 1) The Conax connectors on the TN-32 dry storage casks protective covers leaked and permitted water to be accessible to the external surface of the TN-32 main lid O-ring.
- 2) Water, accessible to the main lid O-ring of the TN-32, created the conditions for galvanic corrosion of the aluminum jacket of the O-ring to occur. The galvanic corrosion led to through-wall degradation of the aluminum jacket of the secondary seal.

Several of the approved Surry corrective actions required design modifications to the protective cover and overpressure system of the TN-32 casks. Such actions are summarized below:

S-2000-0872-3) Develop a design change to the TN-32 dry storage cask protective cover that permits the pressure sensing instrumentation to exist external to the protective cover.

S-2000-0872-5) Complete implementation of the protective cover design change for TN-32 casks currently in production and TN-32 casks on the storage pad.

In accordance with the above corrective actions Transnuclear, Inc. and NAF's Nuclear Spent Fuel developed modifications to the TN-32 cask protective cover and overpressure (OP) system that will reduce the possibility of water ingress and that will relocate the pressure-sensing instrumentation to a more easily accessible location without impacting the ability of the casks to contain the spent fuel safely. These modifications are being completed at Surry and the changes have been incorporated into the design of casks currently being fabricated for both Surry and North Anna Power Stations. The modifications are also appropriate for the TN-32 casks on the North Anna ISFSI storage pad and will be implemented via DCP 01-002.

The sole function of the TN-32 OP system is to monitor the pressure between the primary and secondary seals. The cask cavity pressure is established at approximately 2.2 bar and the OP system pressure is established at approximately 5.5 bar. The OP system is not classified as important-to-safety. Failure of the OP system has no impact on any design functions or safety analyses including those related to confinement, thermal effects, shielding, or fuel retrievability. If OP system tubing was damaged to the extent that helium was leaking out, a low pressure alarm would be initiated and the cask would continue to perform its design functions. The protective cover will be modified to include a sealable bolt-on access plate that is both airtight and watertight. The access plate will have a through-wall fitting that connects to the OP system on the inside of the protective cover and connects to tubing on the outside of the protective cover. The tubing on the outside of the protective cover will contain a valve near the access plate. Downstream of the valve, the tubing will be mounted along the side of the cask and contain an isolation valve. The purpose of this

valve is to isolate the OP system from the pressure instrumentation to permit periodic testing of the pressure instrumentation without affecting OP system pressure.

A "T" connection will be installed downstream of the isolation valve. The stem of the "T" will lead to a line with a valve, then to a quick-connect fitting. The purpose of this branch is to connect to a test rig to conduct periodic testing of pressure sensing instrumentation (with isolation valve closed), to measure OP system pressure (isolation valve open), or to fill the OP system (isolation valve open).

Tubing on the other end of the "T" will branch into two lines. Each of these lines will connect to a pressure-sensing device. The pressure sensing instrumentation will be housed in an instrumentation box connected to a bracket that is fixed to the cask.

A penetration in the instrumentation box exists for electrical connections to the pressure sensing devices.

In addition to the connection through the access plate for the OP system, another connection through the access plate is needed which, on the inside of the access plate, openly communicates to the atmosphere within the protective cover. The external connection to this fitting will connect to tubing that also is mounted along the side of the cask and has an isolation valve. A quick-connect fitting is located downstream of the isolation valve. The purpose of this line is to allow additional testing.

The valve from the stem on the OP tank will remain in place to permit lid seal system leak testing. Flexible metallic tubing will connect to this valve and terminate at the connection for the OP system instrumentation on the interior of the access plate. Also, with this design in place, pressure switch ports on the OP tanks, if they exist, shall be seal-welded, or otherwise made to be leak-tight.

The Conax connector opening on the protective cover, if it exists, is to be seal-welded on the external and internal surfaces of the protective cover.

The instrumentation box is NEMA-4 qualified to ensure environmental protection for the pressure-sensing devices and valves. The box is located 90° from the trunnions on the same side of the cask as the nameplate to ensure that the box does not interfere with the transporter during cask movement. The bottom of the box is located at a height that allows easy access. The bracket allows clearance between the instrumentation box and the side of the cask to permit Operations personnel to slip the belly band of the cask transporter underneath the box during transport operations. For transport, a temporary tiedown strap will limit movement of the instrumentation box. Permanent straps will be installed at the ISFSI.

The clearance between the cask and the sides of the Decontamination building dry cask preparation platform was evaluated to ensure that there would be no interference with the box. With the flaps of the platform raised, the opening is octagonally shaped with a minimum dimension from center to side of 60" (Drawing N-95006-3-S-001). The diameter of the cask, excluding trunnions is 97.75", the instrumentation box is 7" deep, and the bracket sets the center of the box off the side of the cask 1". The box is 20" wide. Then the maximum radius of the cask from the center to the edge of the box is,

$$\sqrt{\left(\left(\frac{97.75''}{2}\right) + 1'' + 7''\right)^2 + 10''^2} = 57.75''$$

Therefore, there is clearance to lift the cask with the instrumentation box attached.

To incorporate the design modifications, Figure 1.2-1, Figure 2.3-1, Drawing 1049-70-1, and Table 8.1-1 of the TN-32 TSAR Revision 9A must be changed to show the access plate and associated penetrations. Such changes will be made via North Anna ISFSI SAR change request IN 2001-002.

An unreviewed safety question does not exist for the following reasons:

1. The change will not increase the consequences or probability of accidents evaluated in the ISFSI SAR. Accidents that were reviewed are included in North Anna ISFSI SAR Sections A.1.5, "Cask Sliding and Tip Over Accidents"; 8.2.9, "SSSC Drops"; 8.2.10, "Loss of Confinement Barrier"; and TN-32 TSAR sections; 11.2.8, "Hypothetical Cask Drop and Tipping Accidents"; and 11.2.9, "Loss of Confinement Barrier." In addition to these accidents, the effects on thermal, criticality, shielding, and structural analyses were considered. This change will not increase the probability of occurrence of any analyzed accident. Changes to the overpressure system and protective cover have no effects on the thermal, criticality, or structural analyses of the North Anna ISFSI SAR or the TN-32 TSAR. Table 1.2-1 of Revision 9A of the TN-32 TSAR lists the protective cover as "important to safety" due to its use in the missile analysis. However, North Anna ISFSI SAR change IN 2000-001 and its associated safety evaluation removed the missile protection safety function from the protective cover by providing additional analyses for Type B missiles. The protective cover is modeled in the shielding analyses, but the cover provides no neutron shielding and gamma shielding that is negligible compared to the axial shielding of the cask. Furthermore the modification will not change any shielding properties of the protective cover since the access plate is of the same material and thickness as the rest of the cover. The exposed tubing of the OP system will be more vulnerable to damage from debris in high winds; however, the OP system merely performs seal monitoring and provides no safety function. Therefore, a failure of the OP system will not lead to one of the analyzed accidents. Since the North Anna ISFSI SAR assumes, for the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no accident associated with these modifications which would produce an increase in consequences. The confinement boundary is not affected by these modifications.
2. The change will not create the possibility for an accident of a different type than was analyzed in the ISFSI SAR. The protective cover provides environmental protection and the overpressure system performs the non-safety-related function of monitoring the cask seals. The modifications cannot form a precursor to another accident scenario.
3. The change does not increase the consequences or probability of malfunctions of equipment related to safety evaluated in the ISFSI SAR. Malfunctions that were considered are those that compromise the cask's ability to maintain its confinement boundary and structural integrity in addition to its ability to transfer heat, maintain subcritical margin of stored fuel, and provide shielding. Modifications to the protective cover and overpressure system will not affect the cask confinement boundary, structural integrity, or thermal performance. The protective cover is modeled in the shielding analyses, but the cover provides no neutron shielding and gamma shielding that is negligible compared to the axial shielding of the cask. Furthermore the modification will not change any shielding properties of the protective cover since the access plate is of the same material and thickness as the rest of the cover. The exposed tubing of the OP system will be more vulnerable to damage from debris in high winds; however, the OP system merely performs seal monitoring and provides no safety function. Therefore, a failure of the OP system will not lead to one of the analyzed accidents. The consequences of a malfunction of equipment identified above are the release of radioactive material to the environment. These consequences are evaluated in the North Anna ISFSI SAR. Since the North Anna ISFSI SAR assumes, for the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no malfunction which would produce an increase in consequences. The confinement boundary is not affected by these modifications.
4. The change will not create the possibility for malfunction of equipment of a different type than was analyzed in the ISFSI SAR. The protective cover provides environmental protection and the overpressure system performs the non-safety-related function of monitoring the cask seals. The modifications cannot form a precursor to another accident scenario.
5. The change does not reduce the margin of safety of any part of the Technical Specifications as described in the bases section. The confinement vessel will continue to meet structural design requirements as stated in Sections 2 and 3 of the TN-32 TSAR. There is no change to any safety limit, and therefore, no change in any margin of safety for this cask. The TN-32 cask will continue to perform as designed.
6. The change does not involve a significant unreviewed environmental impact. The change has no environmental effect. The TN-32 cask will continue to perform as designed and in accordance with Technical Specifications requirements.

7. The change does not involve a significant increase in occupational exposure. Installation of the modified protective covers onto previously loaded casks at the site will require personnel to work in a radiation area. However, the design modifications will allow personnel to access the cask pressure switches without removing the protective cover and standing at the top of the cask where the dose rate is high.

01-SE- PROC-04

Description

0-OP-4.44

This is a 10 CFR 72.48 safety evaluation.

This safety evaluation addresses checking and torquing TN-32 cask lid bolts at the ISFSI.

Summary

This is a 10 CFR 72.48 safety evaluation.

As documented in Surry PIs S-2001-0290, S-2001-0329, and S-2001-519, some lid bolts on TN-32 spent fuel casks were found to require less-than-expected force to detension. In some instances, bolts were found to be only hand-tight. By procedure, the lid bolts are torqued to a value between 880 and 980 ft-lbs when the cask is loaded. One of the affected casks was TN-32.08. The as-found bolt torque measurements are summarized as follows:

- 40 of 48 bolts experienced movement at less than 400 ft-lbs torque
- In one quadrant, 11 of 12 bolts experienced movement at less than 400 ft-lbs torque
- In the same quadrant, 3 adjacent bolts were found to be hand-tight.

An independent analysis by Key Technologies, Inc. of the TN-32.08 lid seal bearing load showed that the as-found bolt torque was sufficient to prevent liftoff of the lid during a design basis tipover event. Thus safety analysis requirements were met.

The RCE associated with PI S-2001-0290 will address the issues related to bolting of TN-32 cask lids and will recommend corrective actions that apply to all TN-32 casks at Surry and North Anna. For the interim, Operations personnel will perform a check of cask lid bolts at the North Anna ISFSI. While checking the bolt status, the operators will verify that the lid bolts are torqued to a value of at least 400 ± 50 ft-lbs.

Completion of the Activity Screening Checklist reveals that a safety evaluation is required to address two issues:

1. **Normally, lid bolts are torqued to the final value in the Decontamination Building.** The North Anna UFSAR section 9.1.4.9.1 says, "The [spent fuel] cask is then lifted from the cask loading area and returned to the Decontamination Building. The lid bolts are tightened according to vendor specifications, and vacuum drying of the fuel cavity is completed and tested. The cavity is backfilled with helium to design pressure, and the lid seals are tested." Chapter 8 of the TN-32 TSAR Revision 9A also describes a general sequence of operations in which the bolts are installed prior to placement of the cask at the ISFSI.

The Surry ISFSI SAR allows maintenance and associated removal of the protective cover to be performed at the ISFSI pad. Ensuring that the lid bolts are torqued to an adequate value is considered maintenance which can be safely performed at the ISFSI.

2. **Though a minimum torque is not specified in the TN-32 TSAR, standard practice is to torque to 930 ± 50 ft-lbs.** Applying a torque of this magnitude requires the Hi-Torque apparatus to be moved to the ISFSI and requires the operators to spend extensive time at the top of the cask. While the TSAR does not specify a minimum torque value, the North Anna ISFSI SAR states that the bolt preload must be sufficient to overcome the following force components:

- a. the seating force required for the lid seals,
- b. the force exerted on the lid due to the maximum design cask internal pressure (100 psig),
- c. the combined weights of the fuel and cask internals.

TN has provided analysis that shows a torque of 325 ft-lbs significantly overcomes the force components above, and is also the torque below which the moment due to the tipover accident inertial

load will be greater than the bolt preload moment (TN letter E-18761). Therefore a value of 400 ± 50 ft-lbs was chosen to ensure that the bolt preload continues to meet TSAR design and safety analyses while minimizing the time spent and dose received by the operators.

An unreviewed safety question does not exist for the following reasons:

1. **The change will not increase the consequences or probability of accidents evaluated in the UFSAR.** Accidents that were reviewed are included in North Anna ISFSI SAR Sections A.1.5, "Cask Sliding and Tip Over Accidents"; 8.2.9, "SSSC Drops"; 8.2.10, "Loss of Confinement Barrier"; and TN-32 TSAR; 11.2.8, "Hypothetical Cask Drop and Tipping Accidents"; and 11.2.9, "Loss of Confinement Barrier." In addition to these accidents, the effects on thermal, criticality, shielding, and structural analyses were considered. This change will not increase the probability of occurrence of any analyzed accident. As described above, 400 ± 50 ft-lbs of torque is sufficient to maintain sealing. Therefore, the cask confinement system is not affected. The cask will not be moved thus the probability of occurrence of a drop accident is not increased with this change. Since the North Anna ISFSI SAR assumes, for the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no accident associated with this change which would produce an increase in consequences.
2. **The change will not create the possibility for an accident of a different type than was analyzed in the UFSAR.** This change will ensure that the lid bolts maintain the compression of the lid seal O-ring and that all the design and safety requirements are met. The change cannot form a precursor to another accident scenario. No primary sealing function is affected.
3. **The change does not increase the consequences or probability of malfunctions of equipment related to safety evaluated in the UFSAR.** Malfunctions that were considered are those that compromise the cask's ability to maintain its confinement boundary and structural integrity in addition to its ability to transfer heat, maintain subcritical margin of stored fuel, and provide shielding. This change will not increase the probability of occurrence of any equipment malfunctions. 400 ± 50 ft-lbs of torque is sufficient to maintain sealing. Therefore, the cask confinement system is not affected. Since the North Anna ISFSI SAR assumes, for the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no malfunction which would produce an increase in consequences. The confinement boundary is not affected by these modifications. No primary sealing function is affected.
4. **The change will not create the possibility for malfunction of equipment of a different type than was analyzed in the UFSAR.** This change will verify that the lid bolts maintain the compression of the lid seal O-ring during normal and accident conditions and that all the design and safety requirements are met. The change cannot form a precursor to another accident scenario.
5. **The change does not reduce the margin of safety of any part of the Technical Specifications as described in the bases section.** The confinement vessel will continue to meet structural design requirements as stated in Sections 2 and 3 of the TN-32 TSAR. There is no change to any safety limit, and therefore, no change in any margin of safety for this cask. The TN-32 cask will continue to perform as designed.
6. **The change does not involve a significant unreviewed environmental impact.** The change has no environmental effect. The TN-32 cask will continue to perform as designed and in accordance with Technical Specifications requirements.
7. **The change does not involve a significant increase in occupational exposure.** The North Anna ISFSI SAR estimates the annual total dose received for all cask operations and maintenance to be 6.73 man-rem. For this procedure, a conservative projected dose to be received is 0.130 man-rem per cask. This dose does not represent a significant increase in occupational exposure.

01-SE-OT-06

Description

ISFSI SAR Change Request IN 2000-001

Transnuclear Calculation 1049-137

This safety evaluation addresses a change to the TN-32 TSAR tornado missile analysis which removes any assumed missile protection due to the protective cover.

Summary

This is a 10 CFR 72.48 safety evaluation.

This safety evaluation addresses the need to remove the protective cover from a TN-32 cask to perform maintenance, surveillance, troubleshooting, or modification of the cask pressure monitoring system. If troubleshooting indicates a need to perform repairs that cannot be done at the ISFSI, the cask will be transported to the station in accordance with approved procedures.

The protective cover provides environmental protection for the cask overpressure (OP) system. The analyses for tornado missiles Types B and C contained in Revision 9A of the TN-32 TSAR assume the cover is in place. Type B represents an armor piercing shell and Type C is a 1" diameter steel sphere. Section 2.3.3.2 of the NRC Safety Evaluation Report for the TN-32 TSAR Revision 9A states that "the stresses for the three design basis missiles must not exceed the allowable stress limits of the applicable sections of the ASME code." Transnuclear has performed analyses which show that stresses on the lid as a result of the impact of a Type B or C missile on a cask without the protective cover installed remain within the allowable limits.

The protective cover is assumed to be in place for the shielding analyses, however the TSAR allows the cask to be transported to the ISFSI without the protective cover installed and sets no time limit for installing the protective cover. The protective cover provides essentially no neutron shielding and minimal additional gamma shielding as the cask lid provides the primary gamma shielding for the top of the cask. Although there is a slight increase in the top gamma dose rate with the removal of the protective cover, the dose rates experienced will be considerably less than the design basis values used for calculation of offsite and occupational doses.

An unreviewed safety question does not exist for the following reasons:

1. **The change will not increase the consequences or probability of accidents evaluated in the UFSAR.** Accidents that were reviewed are included in North Anna ISFSI SAR Sections A.1.5, "Cask Sliding and Tip Over Accidents"; 8.2.9, "SSSC Drops"; 8.2.10, "Loss of Confinement Barrier"; and TN-32 TSAR; 11.2.8, "Hypothetical Cask Drop and Tipping Accidents"; and 11.2.9, "Loss of Confinement Barrier." In addition to these accidents, the effects on thermal, criticality, shielding, and structural analyses were considered. This activity implements a revised missile analysis that allows the removal of the protective cover at the ISFSI pad. This change will not increase the probability of occurrence of any analyzed accident. The cask confinement system is not affected and operations affecting the cask lid will not be conducted at the ISFSI pad. This activity allows certain operations to be performed at the pad and does not require the cask to be moved thus the probability of occurrence of a drop accident is not increased with this change. Section 2.3.3.2 of the NRC SER for the TN-32 TSAR Revision 9A states that "the stresses for the three design basis missiles must not exceed the allowable stress limits of the applicable sections of the ASME code." The revised missile analyses show that stresses on the lid as a result of the impact of a Type B or C missile on a cask without the protective cover installed are within the allowable limits. The protective cover is assumed in place in the shielding analyses, however the TSAR allows the cask to be transported to the ISFSI without the protective cover installed and does not provide a time limit for installing the protective cover. The protective cover provides essentially no neutron shielding and minimal additional gamma shielding over the cask lid. Although there is a slight increase in the top gamma dose rate with the removal of the protective cover, the dose rates experienced will be considerably below the design basis values used for calculation of offsite and occupational doses. Since the North Anna ISFSI SAR assumes, for

the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no accident associated with removing the protective cover which would produce an increase in consequences. Removal of the protective cover in no way affects the confinement function of the cask.

2. **The change will not create the possibility for an accident of a different type than was analyzed in the UFSAR.** This safety evaluation concludes that removal of the cover will not affect the conclusions of the tornado missile analyses. Therefore the removal of the protective cover for the short duration anticipated will not form a precursor to another or different accident scenario than currently analyzed in the UFSAR. **The change does not increase the consequences or probability of malfunctions of equipment related to safety evaluated in the UFSAR.** Malfunctions that were considered are those that compromise the cask's ability to maintain its confinement boundary and structural integrity in addition to its ability to transfer heat, maintain subcritical margin of stored fuel, and provide shielding. Removal of the protective cover will not affect the cask confinement boundary, structural integrity, or thermal performance. The missile evaluation performed by Transnuclear shows that this change does not result in stresses on the lid in the event of missile impact to exceed the allowable stress limits. The cask will not be moved, thus the probability of occurrence of a drop accident is not increased with this change. The consequences of a malfunction of equipment identified above are the release of radioactive material to the environment. These consequences are evaluated in the North Anna ISFSI SAR. Since the North Anna ISFSI SAR assumes, for the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no malfunction which would produce an increase in consequences. Removal of the protective cover in no way affects the confinement function of the cask.
3. **The change will not create the possibility for malfunction of equipment of a different type than was analyzed in the UFSAR.** Transnuclear has demonstrated that allowable stress limits will not be exceeded due to missile impacts with the protective cover removed. The protective cover only provides environmental protection to the OP system and minimal additional gamma shielding. Removal of the protective cover for the short duration anticipated does not form a precursor to another accident scenario.
4. The change does not reduce the margin of safety of any part of the Technical Specifications as described in the bases section. **The confinement vessel will continue to meet structural design requirements as stated in Sections 2 and 3 of the TN-32 TSAR. All design criteria as identified in Section 2 of the NRC SER for the TN-32 cask continue to be met. There is no change to any safety limit, and therefore, no change in any margin of safety for this cask. The TN-32 cask will continue to perform as designed.**

01-SE-OT-08

Description

ISFSI SAR Change Request IN 2001-001

This change deletes any requirement for fire extinguishers to be placed inside the security fences at the ISFSI, and instead requires that fire extinguishers be placed at the ISFSI inside the perimeter fence.

Summary

This change deletes any requirement for fire extinguishers to be placed inside the security fences at the ISFSI, and instead requires that fire extinguishers be placed at the ISFSI inside the perimeter fence. Placing fire extinguishers inside the security fence means that monthly checks by Fire Safety personnel will require the support of Security and RP personnel, and dose to the personnel. This level of effort is not needed because of the lack of fire sources inside the security fence. Placing fire extinguishers at the cask alarm panel inside the perimeter fence will meet fire safety requirements, and make it easier for personnel to check them.

This change to the requirements for the placement of fire extinguishers at the ISFSI will not affect the probability of occurrence for fires at the ISFSI. The location and amount of combustibles at the ISFSI is not being changed. This change will not increase the consequences of a fire at the ISFSI. The fire analyses in the ISFSI SAR and the TN-32 Topical Safety Analysis Report do not take credit for fire suppression systems. This change will not create the possibility for a fire of a different type because new combustible sources are not being added to the ISFSI.

The margin of safety in the thermal analysis of the TN-32 cask is not affected, because this analysis does not take credit for fire suppression systems.

An unreviewed safety question does not exist from this change because there will be no affect on the function of casks at the ISFSI.

01-SE-OT-17

Description

ISFSI SAR Change Request IN 2001-003

This is a 10 CFR 72.48 safety evaluation.

The lid bolt analysis presented in Appendix A.1 of the North Anna ISFSI SAR will be updated to reflect a range of torque values, a change in lubricant, and allow the use of an alternative O-ring jacket material.

Summary

This is a 10 CFR 72.48 safety evaluation.

RCE S-2001-0290 was prepared to determine the reason TN-32 cask lid bolts were found to require less than expected torque to loosen and to develop appropriate corrective action. As TN-32 casks are also used at North Anna, it is appropriate to implement the same corrective actions. Several approved corrective actions require a change to the lid bolt analysis presented in the North Anna ISFSI SAR. Such actions are summarized below:

S-2001-0290-R2) Modify the loading and handling procedure for the TN-32 cask, 0-OP-FH-062 [North Anna procedure 0-OP-4.35] to specify the use of High Purity Loctite N-5000 Antisieze lubricant (or its equivalent under a former manufacturer) for the lid bolts. The bolt threads and the bottom of the bolt head are to be lubricated.

S-2001-0290-R5) Modify the Surry ISFSI SAR to include the new bolt analysis, which reflects an increase in the allowable bolt torque and uses an appropriate nut factor for Loctite High Purity N-5000 Antiseize lubricant.

S-2001-0290-R6) Increase the final nominal torque in the TN-32 cask loading and handling procedure, 0-OP-FH-062 [North Anna procedure 0-OP-4.35] to a value greater than 930 ft-lbs. but within the bolt analysis limits to provide additional margin in bolt preload above the point where metal-to-metal contact is made.

In addition, corrective action 5 of RCE S-2000-0872 states in part, "Evaluate use of O-rings on TN-32 dry storage casks that have a jacket material other than aluminum..." The intent of this corrective action is to choose a metal that would reduce the potential for galvanic corrosion, which would, in turn, reduce the possibility of secondary seal failure.

In accordance with the above corrective actions Transnuclear, Inc. and NAF's Nuclear Spent Fuel developed changes to the TN-32 cask lid bolt analysis that incorporate the following parameters:

1. Change the analysis from using a maximum torque value of 980 ft-lbs to incorporating a range of torque from 880 ft-lbs. to 1230 ft-lbs.
2. Change the lubricant assumed in the analysis from Neolube to Loctite High Purity N-5000 Antiseize.
3. Allow the use of aluminum-jacketed or silver-jacketed O-rings.

The original lid bolt analysis presented in the TN-32 TSAR, and incorporated by reference in the ISFSI SAR, was revised by ISFSI SAR change in 1998. The new analysis presented in ISFSI SAR change IN 2001-003 reflects that which is presented in TN-32 FSAR Revision 0, as reviewed and accepted by the NRC, and bounds the analysis currently contained in the North Anna ISFSI SAR. In the case of the tipover analysis, the new analysis utilizes a more conservative g load. Furthermore, the new analysis demonstrates that, with these changes, the TN-32 casks will continue to meet all design criteria and all code allowable stress limits.

The North Anna ISFSI SAR section 3.3.2.1 states, "The confinement function of the SSSCs is achieved by totally enclosing the spent fuel assemblies within a double-seal rigid metal vessel." Appendix A.1 of the North Anna ISFSI SAR states, "The [TN-32] lid and lid penetration covers are sealed with metallic o-ring

seals." The SAR does not specify the material of the O-ring or O-ring jacket. The use of a silver-jacketed O-ring as an alternative to an aluminum-jacketed O-ring is an enhancement that does not affect any safety analyses, other than that contained in the TN-32 TSAR and ISFSI SAR as discussed above, and does not conflict with any licensing basis. Furthermore, the silver jacket may be considered a material upgrade due to its increased resistance to galvanic corrosion.

An unreviewed safety question does not exist for the following reasons:

1. **The change will not increase the consequences or probability of accidents evaluated in the ISFSI SAR.** Accidents that were reviewed are included in North Anna ISFSI SAR Sections A.1.5, "Cask Sliding and Tip Over Accidents"; 8.2.9, "SSSC Drops"; 8.2.10, "Loss of Confinement Barrier"; and TN-32 TSAR sections; 11.2.8, "Hypothetical Cask Drop and Tipping Accidents"; and 11.2.9, "Loss of Confinement Barrier." This change will not increase the probability of occurrence of any analyzed accident. The revised bolt analysis demonstrates that the code allowable stresses on the bolts are not exceeded for both normal and accident conditions. The North Anna ISFSI SAR section 3.3.2.1 states, "The confinement function of the SSSCs is achieved by totally enclosing the spent fuel assemblies within a double-seal rigid metal vessel." Appendix A.1 of the North Anna ISFSI SAR states, "The [TN-32] lid and lid penetration covers are sealed with metallic o-ring seals." The SAR does not specify the material of the O-ring or O-ring jacket. The use of a silver-jacketed O-ring as an alternative to an aluminum-jacketed O-ring is an enhancement that does not affect any safety analyses, other than that contained in the TN-32 TSAR AND ISFSI SAR as discussed above, and does not conflict with any licensing basis. Furthermore, the silver jacket may be considered a material upgrade due to its increased resistance to galvanic corrosion. The change will not affect the sealing ability or confinement function of the cask. Since the North Anna ISFSI SAR assumes, for the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no accident associated with this change which would produce an increase in consequences.
2. **The change will not create the possibility for an accident of a different type than was analyzed in the ISFSI SAR.** This change does not impact the ability of the lid bolts to maintain the compression of the lid seal O-ring. All design and safety requirements will continue to be met. The change cannot form a precursor to another accident scenario.
3. **The change does not increase the consequences or probability of malfunctions of equipment related to safety evaluated in the ISFSI SAR.** Malfunctions that were considered are those that compromise the cask's ability to maintain its confinement boundary and structural integrity in addition to its ability to transfer heat, maintain subcritical margin of stored fuel, and provide shielding. This change will not increase the probability of occurrence of any equipment malfunctions. The revised bolt analysis demonstrates that the code allowable stresses on the bolts are not exceeded for both normal and accident conditions. The North Anna ISFSI SAR section 3.3.2.1 states, "The confinement function of the SSSCs is achieved by totally enclosing the spent fuel assemblies within a double-seal rigid metal vessel." Appendix A.1 of the North Anna ISFSI SAR states, "The [TN-32] lid and lid penetration covers are sealed with metallic o-ring seals." The SAR does not specify the material of the O-ring or O-ring jacket. The use of a silver-jacketed O-ring as an alternative to an aluminum-jacketed O-ring is an enhancement that does not affect any safety analyses, other than that contained in the TN-32 TSAR AND ISFSI SAR as discussed above, and does not conflict with any licensing basis. Furthermore, the silver jacket may be considered a material upgrade due to its increased resistance to galvanic corrosion. The change will not affect the sealing ability or confinement function of the cask. The consequences of a malfunction of equipment identified above are the release of radioactive material to the environment. These consequences are evaluated in the North Anna ISFSI SAR. Since the North Anna ISFSI SAR assumes, for the loss of confinement accident, that all fuel stored in the cask fails, including cladding and fuel pellets, there is no malfunction which would produce an increase in consequences.
4. **The change will not create the possibility for malfunction of equipment of a different type than was analyzed in the ISFSI SAR.** This change does not impact the ability of the lid bolts to maintain the compression of the lid seal O-ring. All design and safety requirements will continue to be met. The change cannot form a precursor to another equipment malfunction scenario.
5. **The change does not reduce the margin of safety of any part of the Technical Specifications as described in the bases section.** The confinement vessel will continue to meet structural design

requirements as stated in Sections 2 and 3 of the TN-32 TSAR. There is no change to any safety limit, and therefore, no change in any margin of safety for this cask. The TN-32 cask will continue to meet all code allowable stress limits and will perform as designed.

6. **The change does not involve a significant unreviewed environmental impact.** The change has no environmental effect. The TN-32 cask will continue to perform as designed and in accordance with Technical Specifications requirements.
7. **The change does not involve a significant increase in occupational exposure.** The sequence of cask operations will not change as a result of this lid bolt analysis revision and there will be no significant impact on occupational exposure.

01-SE-OT-21

Description

Technical Specification Change Request No. ISFSI-003

References to Virginia Electric and Power Company in the North Anna Independent Spent Fuel Storage Installation (ISFSI) Material License and Technical Specifications will be changed to Dominion Generation Corporation as a result of the pending license transfer being prepared as part of the Dominion's functional separation into regulated and unregulated entities.

Summary

Virginia Electric and Power Company (VEPCO) is transferring the licenses for its nuclear facilities to Dominion Generation Corporation pursuant to electric industry restructuring laws in the Commonwealth of Virginia, which require electric utilities in Virginia to separate generation from transmission and distribution functions. VEPCO's generation facilities will be transferred to Dominion Generation Corporation, while VEPCO will retain its transmission and distribution assets and functions. Consequently, conforming changes to the Material License and accompanying Technical Specifications for North Anna are necessary to reflect the transfer of ownership of the North Anna ISFSI to Dominion Generation Corporation. The proposed changes delete references to Virginia Electric and Power Company and variations thereof and replace them with references to Dominion Generation Corporation and variations thereof as the new owner and operator of North Anna ISFSI and make minor changes that support the license transfers. No physical modifications are being made to ISFSI systems or components nor are any changes in day-to-day operation of the ISFSI being affected. The personnel responsible for the safe operation of the ISFSI will not change as a result of the license transfer. Therefore, the proposed changes are solely administrative in nature and will not adversely affect nuclear safety or safe operation of the ISFSI. Consequently, an unreviewed safety question does not exist.