From: Benner, Eric NMSS
To: Grobe, Jack; Hiland, Patrick; Boger, Bruce; Leeds, Eric; Giitter, Joseph; Skeen, David; Wilson, George; Virgilio, Martin; Dean, Bill; McCree, Victor; Wert, Leonard; Mamish, Nader
Cc: Manoly, Kamal; Munson, Clifford; Karas, Rebecca; Kammerer, Annie; Khanna, Meena; Li, Yong; Thomas, George; Farzam, Farhad; Love, Earl; Waters, Michael; Ordaz, Vonna; Weaver, Doug
Subject: RE: North Anna ISFSI
Date: Thursday, September 01, 2011 12:16:18 PM
Attachments: North Anna ISFSI Summary.docx

Jack,

Attached is the one pager-developed for the ISFSI which discusses the design for the casks. Additionally, the fuel assemblies are designed to withstand a maximum of 4g axial load and 6g lateral load. Long-term actions are yet to be determined, but we do not believe the casks need to be opened at this time for fuel inspection.

Eric Benner
Chief
Rules, Inspections & Operations Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
301-492-3294
eric.benner@nrc.gov

From: Grobe, Jack NRR
Sent: Thursday, September 01, 2011 10:31 AM
To: Hiland, Patrick; Grobe, Jack; Boger, Bruce; Leeds, Eric; Giitter, Joseph; Skeen, David; Wilson, George; Virgilio, Martin; Dean, Bill; McCree, Victor; Wert, Leonard; Mamish, Nader
Cc: Benner, Eric; Manoly, Kamal; Munson, Clifford; Karas, Rebecca; Kammerer, Annie; Khanna, Meena; Li, Yong; Thomas, George; Farzam, Farhad
Subject: FW: North Anna ISFSI

What was the seismic design for the casks? We seem to only be focusing on the concrete and spacing ... what about the fuel?? Is there a need to open the casks and inspect the fuel? Why or why not?

From: Wilson, George NRR
Sent: Thursday, September 01, 2011 6:23 AM
To: Hiland, Patrick; Grobe, Jack; Boger, Bruce; Leeds, Eric; Giitter, Joseph; Skeen, David
Cc: Benner, Eric; Manoly, Kamal; Munson, Clifford; Karas, Rebecca; Kammerer, Annie; Khanna, Meena; Li, Yong; Thomas, George; Farzam, Farhad
Subject: FW: North Anna ISFSI

ISFSI movement at North Anna

From: Bowman, Gregory RIDO
Sent: Wednesday, August 31, 2011 5:38 PM
To: Wilson, George

Cc: Frazier, Alan
Subject: FW: North Anna ISFSI

FYI – Alan sent the e-mail at the bottom to the Commission TAs a minute ago and got the response below from Commissioner Apostolakis's office. He'll be interested in hearing about the affect of the earthquake on the ISFSI, so you might need to get NMSS tied in, if they aren't already.

From: Baggett, Steven DCM
Sent: Wednesday, August 31, 2011 5:35 PM
To: Frazier, Alan; Batkin, Joshua; Sharkey, Jeffry; Sosa, Belkys; Bubar, Patrice; Nieh, Ho
Cc: Bradford, Anna; Astwood, Heather; Tadesse, Rebecca; Kock, Andrea; Brock, Kathryn; Bowman, Gregory; Sanfilippo, Nathan; McHale, John; Merzke, Daniel
Subject: RE: North Anna ISFSI

Alan,

Thanks, Commissioner Apostolakis will be getting a staff briefing tomorrow on North Anna, the copy of the slides we received do not mention this, can you may sure staff discusses this at the briefing tomorrow afternoon.

He will need to know the design spec for the seismic for the ISFSI.

Thanks

Steve

From: Frazier, Alan | EDO
Sent: Wednesday, August 31, 2011 5:24 PM
To: Batkin, Joshua; Sharkey, Jeffry; Sosa, Belkys; Bubar, Patrice; Nieh, Ho
Cc: Bradford, Anna; Astwood, Heather; Baggett, Steven; Tadesse, Rebecca; Kock, Andrea; Brock, Kathryn; Bowman, Gregory; Sanfilippo, Nathan; McHale, John; Merzke, Daniel
Subject: North Anna ISFSI

Note: The licensee has not made the attached pictures publicly available.

Commissioner's Assistants,

In response to Commission office questions about the impact of last week's earthquake on the North Anna spent fuel casks, North Anna uses the vertical TN-32 metal casks under their 10 CFR Part 72 site specific license as well as the TN-NUHOMS concrete storage modules (horizontal) under a general license. The TN-32 has a bolted closure lid with a pressure monitoring/alarm system, and stands freely on the ISFSI concrete pad. The TN-NUHOMS canister is welded-sealed and rests on horizontal rails inside a rectangle concrete storage module.

The North Anna ISFSI appeared to suffer minor damage (spalling of concrete modules), and the freestanding vertical TN-32 casks slid a few inches on the concrete pad during the quake. No significant displacement of NUHOMS-HD components was observed. Attached is a description of the licensee's post seismic inspection and pictures of cask movements and spalling of horizontal modules. The licensee found that six cask sets (12 casks) were closer than the 16 foot separation distance specified in the FSAR. The Tech Spec

requirement specifying a minimum distance of 16 feet between casks with a heat load greater than 27.1 kW was conservatively established so that the casks do not influence each other thermally. Currently, the two casks with the least separation (15 feet, 3.5 inches) are casks that when loaded in 2000 and 2001, had decay heats of 15.4 kw and 18.0 kw, both well below the 27.1 kw requirement.

Based on information provided by the licensee, the staff agrees there is no immediate safety issue. The casks are designed to be very robust against severe natural phenomena and withstood the earthquake at North Anna. The spent fuel continues to be surrounded by several tons of steel and concrete, and sealed in an inert helium environment. Damage to concrete components appear to be cosmetic, and does not impact structural integrity or radiation shielding capability. Inlet and outlet vents were inspected and no exterior blockage was found . Radiation surveys indicate no changes to cask surface dose rates. Completed thermal performance measurements for all loaded casks found no abnormal temperature differences. The licensee reviewed this event for reportability under 10 CFR 72.75 (significant reduction in effectiveness of any spent fuel storage cask confinement system) and determined that the TN-32 displacement and NUHOMS-HD damage described above was not reportable.

TN-32 vendor Transnuclear was contacted and provided with all available pictures, data, and inspection results. Transnuclear requested that the licensee perform a more detailed inspection and evaluation of the current condition.

Item 10 of the AIT charter requires the AIT to "Assess the extent of any impact or damage to the Independent Spent Fuel Storage Installation from the seismic event." A team of staff experts has been put together to assist the AIT and follow-up on near and long-term actions. Results of the AIT ISFSI walk down will be announced after the AIT has completed its review through normal channels. Based on the results of the AIT and the licensee's assessment, the staff will evaluate whether there are any safety issues that would adversely impact continued operation of the ISFSI.

Please let me know if you have any questions.

Alan L. Frazier
Executive Technical Assistant
Office of the Executive Director for Operations
U.S. Nuclear Regulatory Commission
301-415-1763

North Anna Independent Spent Fuel Storage Installation
Response to Earthquake

Background:

The North Anna Independent Spent Fuel Storage Installation (ISFSI) uses two spent fuel storage systems manufactured by Transnuclear (TN)

1) Twenty seven vertical TN-32 metal casks under a 10 CFR Part 72 site specific license. This system has a bolted closure lid with a pressure monitoring/alarm system, and stands freely on the ISFSI concrete pad. The design/licensing basis for the vertical TN-32 is controlled primarily by the North Anna ISFSI FSAR and NRC license (SNM-2507) and NRC certificate (1021). The FSAR defines the design acceleration values of 0.18g horizontal and 0.12g vertical, and sliding was not predicted to occur at these values.

2) Twenty six TN NUHOMS HD-32PTH horizontal storage modules (13 loaded) under a 10 CFR Part 72 general license. This system uses a welded-sealed canister and rests on horizontal rails inside the horizontal storage module. The design/licensing basis for the TN NUHOMS HD is controlled primarily by the separate TN-NUHOMS FSAR and NRC certificate (1030), as supplemented by additional site-specific evaluations that were performed by North Anna under 10 CFR 72.212. NUHOMS-HD components are designed to acceleration values of 0.3g horizontal and 0.2g vertical.

Event:

The North Anna ISFSI suffered minor damage from the earthquake:

1) Twenty five of the twenty seven TN-32 casks slid up to 4.5 inches on the concrete pad during the quake. Six cask sets (12 casks) were closer than the 16 foot separation distance specified in the FSAR. There was no damage to the pressure monitors in each cask and no pressure monitoring system alarms during or after the earthquake. There were no crack indications observed in the concrete pad or casks.

2) For the TN-NUHOMS modules, some slight damage was identified around the outlet vents and some surface cracking indications were noted. Additionally, some modules showed gaps between them of approximately 1.5" versus the required 1.0" maximum gap.

Preliminary Determination of Safety Significance:

The staff believes there is no immediate safety issue. The cask designs are robust and consider severe natural phenomena. As expected, the casks withstood the earthquake at North Anna. The spent fuel continues to be surrounded by several tons of steel and concrete, and sealed in an inert helium environment. Damage to concrete components appear to be cosmetic, and does not impact structural integrity or radiation shielding capability. Additionally, the fuel assemblies are designed to withstand a maximum of 4g axial load and 6g lateral load. Inlet and outlet vents were inspected and no exterior blockage was found. Radiation surveys indicate no changes to cask surface dose rates. Thermal performance measurements for all loaded casks found no abnormal temperature differences.

Additionally for the TN-32 casks, the requirement specifying a minimum distance of 16 feet between casks with a heat load greater than 27.1 kW was conservatively established so that the casks do not influence each other thermally and to allow for emplacement on the pad by the cask transporter. Currently, the two casks with the least separation (15 feet, 3.5 inches) are casks that had decay heats of 15.4 kW and 18.0 kW when loaded in 2000 and 2001, both well below the 27.1 kW requirement.

Licensee Response:

The licensee is following RG 1.166, "Pre-Earthquake Planning And Immediate Nuclear Power Plant Operator Post-Earthquake Actions" as a guide to perform their post-event assessment and has completed walkdowns of the ISFSIs

The licensee reviewed this event for reportability under 10 CFR 72.75 (significant reduction in effectiveness of any spent fuel storage cask confinement system) and determined that the TN-32 displacement and NUHOMS-HD damage described above was not reportable.

The licensee contacted TN and provided them with all available pictures, data, and inspection results. TN requested that the licensee perform a more detailed inspection and evaluation of the current condition and sent a team to support this inspection.

NRC Response:

Item 10 of the AIT charter requires the AIT to "Assess the extent of any impact or damage to the Independent Spent Fuel Storage Installation from the seismic event." NMSS and Region II will continue to support the AIT and evaluate information related to the ISFSI to determine whether longer-term licensing or inspection actions are warranted for North Anna or generically.