Craver, Patti

From: Lobel, Richard
Sent: Thursday, October 22, 2009 1:15 PM
To: Craver, Patti
Subject: FW: Crystal River Containment Crack

For FOIA 2010-0010

From: Dennig, Robert NRR
Sent: Thursday, October 08, 2009 9:56 AM
To: Ruland, William; Scott, Michael
Cc: Bettle, Jerome; Heida, Bruce; Karipineni, Nageswara; Lee, Brian; Lobel, Richard; Raval, Janak; Sallman, Ahsan; Walker, Harold
Subject: FW: Crystal River Containment Crack

FYI - see 5.2 Reactor Building

From: Bettle, Jerome NRR
Sent: Thursday, October 08, 2009 9:42 AM
To: Dennig, Robert
Subject: RE: Crystal River Containment Crack

I had not heard about it until Rich forwarded the other email yesterday afternoon. From that email (excerpts below) it sounds as if the news has made the rounds.

> Please note that the Chairman will be onsite this Friday. Additionally, the Florida State DEP Coordinator called the site VP regarding potential contaminated water leaking from a crack in containment. The site VP was able to resolve the misinformation and is considering contacting the local press to dispel any rumors or misconceptions. The Region indicated that they have notified the EDO's office of these developments.
>
> The licensee continues to investigate the crack and has determined that it extends around a large portion of the containment. Functional/operability reviews are continuing and interim evaluations are expected to be available by this Thursday. The Region may be looking for our assistance to review the information provided. The Region has structural experts onsite and DORL continues to be in contact with the Region, Residents and the licensee to monitor the situation.
>
> Crystal River is modifying the SG support outside lift system as a result of the crack in containment. **Tentatively, tomorrow (10/8) at 2pm**, the licensee plans on discussing this modification to the NRC as well as a status update of their efforts (currently an NDE inspection is being performed to quantify the crack to determine what needs to be done for containment to be declared operable. Containment needs to be operable by Mode 4 which is scheduled for December 2009) and plans to resolve this issue. Once the teleconference and bridgeline has been setup, I will forward to everyone.

So it sounds like there will be a phone call today where more details may be revealed.

The containment structure design does not have any rebar or other steel oriented radially to counter any tension forces that would drive delamination. It is interesting to note in the Crystal River USAR the following regarding delamination of the containment structure. It appears they have some history with this issue.

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5.2 REACTOR BUILDING

The reactor building is a concrete structure with a cylindrical wall, a flat foundation mat, and a shallow dome roof. The foundation slab is reinforced with conventional mild-steel reinforcing. The cylinder wall is prestressed with a post-tensioning system in the vertical and horizontal directions. The dome roof is prestressed utilizing a three-way post-tensioning system. The inside surface of the reactor building is lined with a carbon steel liner to ensure a high degree of leak tightness during operating and accident conditions. Nominal liner plate thickness is 3/8 inch for the cylinder and dome and 1/4 inch for the base.

The foundation mat is bearing on competent bearing material and is 12-½ feet thick with a 2 feet thick concrete slab above the bottom liner plate. The cylinder portion has an inside diameter of 130 feet, wall thickness of 3 feet 6 inches, and a height of 157 feet from the top of the foundation mat to the spring line. The shallow dome roof has a large radius of 110 feet, a transition radius of 20 feet 6 inches, and a thickness of 3 feet. The reactor building is shown in Figure 5-2, penetration details in Figure 5-3, and personnel and equipment access opening details in Figure 5-4.

The reactor building has been designed to contain radioactive material which might be released from the core following a Loss-of-Coolant Accident (LOCA). The prestressed concrete shell ensures that the structure has an elastic response to all loads and that the structure strains within such limits so that the integrity of the liner is not prejudiced. The liner has been anchored to the concrete so as to ensure composite action with the concrete shell.

The design and construction of the reactor building has been given a thorough re-evaluation subsequent to the discovery on April 14, 1976, of a delaminated condition in the dome. The upper part (approximately 12 inches thick) of the 3 feet design concrete thickness separated from the lower part of the dome structure parallel to the membrane over an approximate diameter of 105 inches. Extensive analytical and field investigations were conducted to establish an acceptable repair program. This repair program included removal of the upper part of the dome, placement of non-prestressed reinforcing steel mats, installation of radial reinforcement, and placement of concrete to restore the dome to a thickness of 3 feet. Details of the delaminated condition of the dome, re-evaluations of the dome, and the dome repair program are described in the report: "Final Report - Reactor Building Dome Delamination", December 10, 1976.

In several instances, the design criteria and/or construction methods related to the repair program have superseded those contained in Chapter 5. In all such cases, the above referenced report is the preferenced authority applied to the dome repair.

From: Dennig, Robert
Sent: Thursday, October 08, 2009 8:15 AM
To: Bettle, Jerome; Heida, Bruce; Karipineni, Nageswara; Lee, Brian; Lobel, Richard; Raval, Janak; Sallman, Ahsan; Walker, Harold
Subject: FW: Crystal River Containment Crack

FYI. Has this been getting much attention?

From: Paige, Jason
Sent: Monday, October 05, 2009 11:33 AM
To: Mendiola, Anthony; Dennig, Robert; Chan, Terence; Taylor, Robert
Cc: Brown, Eva; Boyce, Tom (NRR); Saba, Farideh; Giitter, Joseph; Howe, Allen; Nelson, Robert
Subject: FW: Crystal River Containment Crack

FYI: See initial email below.

Additional Information and path Forward

From speaking to the licensee, the crack runs vertically, located between the horizontal hoop tendons in containment. Originally CR was planning on cutting out a section 26' by 26' but they are not sure if this will encompass the entire affected area. In 2005, CR passed its integrated leak rate test but noticed that tendons in the affected area had relaxed (indication of an issue) so they retensioned the tendons.

As a precaution, the worst case scenario after CR performs a root cause and operability analysis of containment is that they do not meet their code requirements as stated in their FSAR and will need to submit a license amendment. I'm assuming since they potentially will have to report this issue by October 15th, they will not know if they need a LAR until that date. CRs total outage is scheduled until December 18th but because of numerous issues they have encountered they are 5 to 6 shifts behind in schedule.

Jason

From: Paige, Jason
Sent: Monday, October 05, 2009 10:33 AM
To: Boyce, Tom (NRR); Giitter, Joseph; Howe, Allen; Nelson, Robert
Cc: Saba, Farideh; Brown, Eva
Subject: Crystal River Containment Crack

On Friday, Crystal River was performing hydro demolition to support steam generator removal and replacement activities (the equipment hatch is too small to remove the SGs). From performing the demolition, water was coming out of containment from a crack about 2.5 feet long (see picture). CR has a Design Containment Specialist performing a root cause investigation and identifying necessary future actions by CR to determine if containment will be operable. Currently, CR is in mode 6 so they are not in any tech spec (no action needed by DORL). Before CR can come up in power, they have to perform an analysis of why crack is ok or repair the crack. Also, CR has to demonstrate that containment will be able to support the heavy loads of the attached SG removal equipment and SGs.

Once more information is available, I will forward to you.

Jason Paige, Turkey Point Project Manager
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