

Sarah Rich

From: John Richmond, RI
Sent: Friday, November 07, 2008 9:22 AM
To: John Richmond
Subject: Update: Oyster Creek Drywell Shell Coating Issue

Importance: High

quick update:

- 1) I viewed the video. The stain in Bay 11 is there and visible. Video recording was dated 10-23-06, at 02:32. The issue of an inadequate visual examination in 2006 would appear to be a performance deficiency that is licensee identified. At this time, it would also appear to be of very low safety significance [e.g., a Green Issue].
- 2) No NRC inspector has been in Bay 3 this outage (don't know about 2006).
- 3) If we want a direct inspection inside Bay-3, we need to do it within the next few days, or we will lose the opportunity (they'll finish the repairs and close it up).
- 4) AmerGen has decided to re-inspect 4 sand bed bays (Bay 3, 7, 15, & 19), using a different NDE Level-II technician. They expect to complete these additional inspections on Saturday night shift.

From: John Richmond
Sent: Thursday, November 06, 2008 6:20 PM
To: Marsha Gamberoni; Darrell Roberts; Ronald Bellamy; Richard Conte; David Pelton; Mary Baty; James Davis; John White; Brian Holian; James Davis
Cc: Stephen Pindale; Justin Heinly; Jeffrey Kulp; Timothy OHara; Michael Modes; Glenn Meyer; Paul Kaufman; Heather Jones
Subject: Oyster Creek Drywell Shell Coating Issue

Oyster Creek Drywell Sand Bed Issues
Bay 11 Coating Defects
Bay 3 Moisture Barrier Seal Defect
Nov 6

Bay 3 [added this Bay 3 item]

On Oct 31, during a routine moisture barrier seal inspection, AmerGen identified a 4 inch crack in the seal, next to the drywell shell. Some reddish discoloration was observed on the seal in the vicinity of the crack. AmerGen identified numerous seal cracks during this inspection period [7 of 10 bays had seal cracking]. When a portion of the damaged seal was removed for analysis, a small area of exposed drywell shell appeared to have surface corrosion. The drywell shell corrosion is 1 to 2 inches above the floor level, in the sand bed bay. Based on a review of the photos, it's not clear whether the drywell shell was coated with epoxy between the top elevation of the seal and the floor. AmerGen continues to evaluate this issue.

Bay 11 [the story continues]

AmerGen continues to evaluate this issue. Lab results are expected tomorrow. Re-application of an epoxy coating over the affected area is scheduled for tonight. AmerGen reviewed a 2006 video record of the sand bed closeout, and identified what appears to be the same 6 inch rust stain in Bay 11. AmerGen also stated

that a 2007 revision to their visual examination procedure significantly improved guidance to identify coating defects.

AmerGen initiated their repair plan this evening. The one loose blister previously identified by AmerGen was excavated, along with 3 other adjacent bumps identified by NRC inspection. Surface rust, on the drywell shell, was easily recognizable under all 4 locations. The 4 locations are within a 1 to 2 inch oval of each other. The 3 bumps, which AmerGen initially characterized as surface irregularities, were tightly adhered, and were difficult to "pop off" (e.g., the technician said it took a lot of force to dislodge them). The blister was easily removed intact. The exposed drywell shell (4 locations) was lightly sanded, generally resulting in a clean bright metal surface. Under 2 of the locations, the exposed surface had an inverted cone shape, with the point of the cone going into the plate steel. There appeared to be a small pit at the center of the cones.

The original rust stain, about 6 inches long, was scrapped off, and the scrapings collected into a bag for lab analysis. The broken blister, originally described as a carbuncle, was collected mostly intact, also for lab analysis.

AmerGen's coating expert, Jon Cavallo, Corrosion Control Consultants & Labs, described the three layer coating as follows: (1) a clear primer, (2) a reddish brown epoxy layer, applied by roller, and (3) a grayish white epoxy layer applied by roller. Jon believes that the 2 epoxy layers should be 6 to 10 mils each, and that the three layer coating system would therefore be 12 to 18 mils in thickness. As a comparison, Jon said that a normal piece of copy paper is about 3 mils thick, so he expected the total coating thickness to be equivalent to about 3 sheets of paper. Jon believes the lab analysis will adequately determine the coating thickness of the collected scrapings and samples.

John Richmond

From: John Richmond

Sent: Monday, November 03, 2008 7:51 PM

To: Marsha Gamberoni; Darrell Roberts; Ronald Bellamy; Richard Conte; David Pelton; Mary Baty; James Davis; John White

Cc: Stephen Pindale; Justin Heinly; Jeffrey Kulp; Timothy OHara; Michael Modes; Glenn Meyer; Paul Kaufman

Subject: RE: Oyster Creek Drywell Shell Coating Issue

Summary of Conference Call between Exelon and NRC staff, regarding OC Drywell Sand Bed Bay-11 repair plans.

During an interactive discussion (questions and answers), Exelon Stated:

- 1) Detailed plan is still being developed, which will include:
 - a. Opportunities for NRC observations during excavation and examination of the defect
 - b. Chemical analysis to attempt to determine whether the surface stain contains iron
 - c. Will carefully remove top loose layers to help determine whether there is any on-going drywell shell corrosion
 - d. Will excavate an area maybe an inch in diameter, which should include any very close surface irregularities
- 2) No additional extent-of-condition was needed, to determine whether there are any blisters (carbuncles) in any other areas or other sand bed bays. A 100% coating examination had already been performed and no other defect or indication had been identified.
- 3) There is only one blister (about 1/4 inch in diameter), as documented on the VT-1 Examination Record. There are no other blisters or carbuncles, as suggested by the NRC inspection of Nov 2. The inspector's observations must have been "bumps" that are just surface irregularities.

4) The coating has no service life. Epoxy coatings at some nuclear plants have been in-service, without any significant failures, for about 40 years. In non-nuclear industry, epoxy coating service life is typically an economic issue, and those coatings are often in very severe environments.

5) Some type of industry standard adhesion test might be done around the indication, prior to re-applying the new coating. A Dolly Adhesion Test [??] was considered too hard to perform. However, a modified knife edge test might be doable.

6) An ultrasonic test (UT) will be performed (maybe tonight), from the inside of the drywell, at the location of the coating defect.

If I left anything out, please feel free to add it in.

John Richmond

From: John Richmond

Sent: Sunday, November 02, 2008 6:41 PM

To: Marsha Gamberoni; Darrell Roberts; James Clifford; Ronald Bellamy; Richard Conte; Marc Dapas; John White

Cc: David Pelton; Stephen Pindale; Justin Heinly; Jeffrey Kulp; Timothy OHara; Michael Modes; Glenn Meyer; Paul Kaufman

Subject: Oyster Creek Drywell Shell Coating Issue

OC License Renewal Outage Commitments Inspection Drywell Shell (steel liner) Coating Issue

Exterior Drywell Shell in Sand Bed Bay 11

On Oct 31, during a routine coating inspection, AmerGen identified a coating defect. NDE VT Examination Record documented a "Pinhole Carbuncle, 1/4 inch in diameter, with Evidence of Leakage (Rust Line) 6 inches Long. 16 inches right of Opening [access tunnel], 34 inches from Moisture Barrier [floor in sand bed cavity]." The carbuncle was verbally described as a small blister, soft to the touch. The leakage was verbally described as a "bleed through" 6" long tear drop shaped surface stain, brownish in color, and dry to the touch.

A repair work order is being prepared. Repairs are scheduled for Nov 4. Per engineering specification, the coating defect will be removed using mechanical tools, such as pencil grinder, rotary file, flapper wheel, etc [e.g., skill of the craft]. Prepare the substrate and feather the edges, then apply two layers of new coating [Devoe epoxy]. The Issue Report contains additional requirements, not yet in the work order, including (1) document the extent of the damage, and how deep the blister has formed into the coating, (2) verify plate thickness in the area of the coating failure meets acceptance criteria [e.g., do a UT from inside the drywell], and (3) document with pictures as loose coating layers are removed.

The carbuncle, on the exterior surface of drywell shell, is very close to ultrasonic test (UT) location 11A, inside the drywell at elevation 11 ft. 3 in. UT location 11A is a 7x7 array (6"x6" grid). The carbuncle is located about 3 inches from a core plug that is in the 7x7 array. AmerGen estimates that the carbuncle is about 1 inch from the edge of the array. Therefore, it's reasonable to expect that a good UT can be done from inside the drywell at the location of the defect outside the drywell.

Sand Bed Bays 1, 11, and 13 were previously identified as the bays with the most significant corrosion (e.g., thinnest shell). The epoxy coating system was applied in 1992, and was 3 layers thick. The total thickness is believed to be about 25 mils. The first post-installation coating inspection was last outage, in 2006. This is only the second coatings inspection since 1992. In 2006, no coating defects were identified. This outage (2008), only this one coating defect was identified.

All sand bed bays have been NDE UT and VT examined this outage (not all NDE examination records have been prepared). No other potential coating defects were identified. Some cracks in the floor epoxy sealer and in the moisture barrier seal were identified, and are planned to be reworked.

On Oct 29 & 30 (prior to the defect being identified), Tim O'Hara inspected sand bed Bay 1, 5, 11, and 13. Tim's inspection was not a full entry inspection; he did a general visual inspection from the tunnel opening, without entering the cavity. Tim did not identify any issues or concerns in bay 11, and only floor cracks in one other bay were identified.

On Nov 2, I did a full entry inspection of Bay 11 & 13, which also extended partly into Bays 9 & 15. There appears to be 2 or 3 small carbuncles in a cluster, next to the one that's bleeding. The NDE tech, when interviewed, also described a cluster of carbuncles, although the NDE data sheet only described the largest one. I did not identify any other potential indications or problems.

John Richmond
OC NRC Team Room 609-971-4830

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To: John Richmond <John.Richmond@nrc.gov>
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