

# UPDATE ON CONTAINMENT COATINGS ADHESION DATA COLLECTION

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# BACKGROUND

- USNRC has requested that Industry provide data confirming that visually-acceptable, aged DBA-qualified containment coatings remain DBA-qualified and will not fail during normal and accident conditions
- EPRI/NUCC has initiated a program entitled, “Evaluation of Coating Failures and the Potential Influence of Aging”

# BACKGROUND

- As part of the EPRI/NUCC effort, containment coating adhesion and visual inspection data is being collected by a team of three Industry coatings experts:
  - Jon R. Cavallo, CCC&L Inc.
  - Daniel Cox, SCE – SONGS
  - Garth Dolderer –FPL
- Testing is performed on coatings on both concrete and steel substrates

# BACKGROUND

- Three plants have been visited to date:
  - San Onofre Nuclear Generating Station (SONGS) Unit 3
  - Waterford Unit 3
  - McGuire Unit 1
- Oconee Unit 2 is scheduled to be visited in May 2007

# COATING SYSTEMS TESTED

- SONGS Unit 3
  - Steel substrate – Mobil 78-W-3 (2 coats)
  - Concrete substrate – 46-X-29 surfacer, 84-W-9 topcoat

# COATING SYSTEMS TESTED

- Waterford Unit 3
  - Steel substrate – Carboline CZ-11 primer, Phenoline 305 topcoat
  - Steel substrate – Ameron Dimetcote EZ primer, Amercoat 90 topcoat
  - Steel substrate – Ameron Amerlock 400NT (2 coats)
  - Concrete substrate – Ameron 110AA surfacer, Amercoat 66 topcoat

# COATING SYSTEMS TESTED

- McGuire Unit 1
  - Steel substrate – Mobil Mobil-Zinc 7 primer, 89 topcoat
  - Concrete substrate (wall) – Mobil 46-X-29 surfacer, 89 topcoat
  - Concrete substrate (floor) – Mobil 46-X-29 surfacer, 76 topcoat

## PULL-OFF (AND KNIFE) ADHESION TEST RESULTS ON VISUALLY SOUND COATINGS – SONGS UNIT 3

Sound Concrete (Floor 46-X-29 / 84-W-9)	300 psi (10)	300 psi (10)	700 psi (10)
Sound Concrete (Wall 46-X-29 / 84- W-9)	500 psi (10)	500 psi (10)	>1000 psi (10)
Degraded Concrete (46-X-29 / 84-W-9)	None Identified		
Sound Steel (Structural 78-W-3)	>1000 psi (8)	700 psi (10)	>1000 psi (10)
Sound Steel (Liner 78-W-3)	500 psi (10)	500 psi (10)	>1000 psi (10)

## PULL-OFF (AND KNIFE) ADHESION TEST RESULTS ON VISUALLY SOUND COATINGS – WATERFORD UNIT 3

Sound Concrete (Wall 110AA / 66)	400 psi (10)	550 psi (8)	320 psi (8)
Degraded Concrete (110AA / 66)	None Identified		
Sound Steel (Liner CZ-11 / 305)	290 psi (10)	330 psi (10)	310 psi (10)
Sound Steel (Structural EZ / 90))	>1000 psi (8)	625 psi (6)	410 psi (4)
Degraded Steel (Liner repair 400 NT)	600 psi (10)	750 psi (10)	700 psi (10)
Degraded Steel (Liner CZ-11 / 305)	300 psi (8)	200 psi (6)	200 psi (4)

## PULL-OFF (AND KNIFE) ADHESION TEST RESULTS ON VISUALLY SOUND COATINGS – McGUIRE UNIT 1

Sound Concrete (Floor 46-X-29, 76)	>1000 psi (10)	300 psi (10)	400 psi (8)
Degraded Concrete (Floor 46-X-29, 76)	200 psi (6)	200 psi (6)	200 psi (6)
Sound Concrete (Wall 46-X-29, 89)	500 psi (10)	200 psi (10)	300 psi (10)
Degraded Concrete (Wall 46-X-29, 89)	400 psi (10)	400 psi (10)	400 psi (10)
Sound Steel (Liner MZ-7, 89)	700 psi (10)	>1000 psi (10)	800 psi (10)
Degraded Steel (Liner MZ-7, 89)	600 psi (10)	700 psi (8)	500 psi (10)

# CONCLUSIONS TO DATE

- Aged, visually intact DBA-qualified coatings for various manufacturers, exhibiting no visual anomalies, continue to exhibit system pull-off adhesion at or in excess of the originally specified (ANSI N5.12 and ASTM D5144) minimum value of 200 psi
- No direct correlation between pull-off adhesion test (ASTM D4541) results and knife adhesion test (ASTM D6677) results