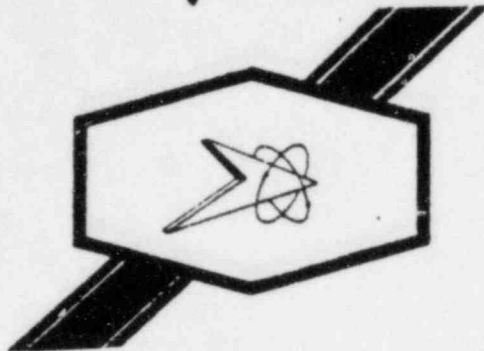


Imperial



TECHNICAL REPORT

NUMBER
81-76

TITLE
Recoatibility of 560/1201 with Nutec 1201
After 1 year simulated Outside Exposure

FOR
Brown & Root
Houston, Texas
CUSTOMER
Houston Lighting & Power
South Texas Project

Submitted by: G.E. Arnold

Approved: W.J. Lomasney

Date: July, 1976

SOUTHERN IMPERIAL COATINGS CORPORATION, INC.
P. O. Box 29077 • New Orleans, Louisiana 70189
Phone: (504) 254-1433

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Recoatability of 560/1201 with Nutec 1201
After 1 year Simulated Outside Exposure

Purpose:

To evaluate the recoatability of Nutec 1201 over the weathered 560/1201 system. To simulate 1 year outside exposure by subjecting panels to 250 hours of exposure in an Atlas Twin Arc Weather-o-meter.

Methods:

Two ASTM A36 carbon steel panels, nos. 48 and 65, measuring 2"x4"x1/4" were sandblasted per SSPC-SP-10 with a profile between 1S70 and 2S70 as read on a Keane-Tator Profile Comparator Disc. The panels were coated with Durazinc 560, steel primer and Nutec 1201 epoxy topcoat, allowing for proper cure times between coats. Application and curing procedures are outlined below. The test specimens were then weathered for 250 hours. Following removal from the weather-o-meter, panel no. 48 was solvent wiped and panel no. 65 was cleaned with a dry cloth. Both panels were then topcoated with Nutec 1201 cured and sent to UNO for DBA testing at the Houston Lighting & Power curve.

Data: A) Application and Curing Data

Coat	Batch No.	Date Applied	DET	°F/%R.H.	Cure Time	°F/%RH
Durazinc 560	5801 5705	5/12/76	2-3 mils	79/78	3 days	75±5°/ 60±10%
Nutec 1201	5786 5655	5/15/76	6-10 mils	74/70	9 days	75±5°/ 60±10%
Nutec 1201	5786 5655	6/9/76	8 mils	88/70	12 days	75±5°/ 60±10%

B) Weathering

Date in weather-o-meter - 5/24/76

Date Removed - 6/5/76

Accumulated hours - 250 hours

Results: See attached UNO report No. 062276.

DEA Solution Composition: Distilled Water

Dry Atmosphere: Sulfate-thiosulfate buffer and water

Table 2.

DEA Test Conditions

Time	Temperature (°F)		Pressure (psig)	Comments
	°C	°F		
0 min	25	77	0	
20	140	284	46	
30	138	280	72	Add I_2
45	137	279	70	
75	135	275	70	
90	120	248	28	
100	102	216	12	
110	102	216	12	
145	102	216	12	
200	99	210	12	
250	99	210	11	
1 day	100	212	13	
2 days	99	210	12	
3 days	100	212	12	

University of New Orleans
Department of Chemistry

DATE 6/12/76

Evaluated

Approved

Report 6/9/76

Manufacturer: _____

University of New Orleans
Department of Chemistry
Date: June, 1976

Product: Electrocoat 8 Steel Panel Graciosa Black

1st Coat: _____

2nd Coat: _____

3rd Coat: _____

1st Coat: _____

Heaton Light and Power

Heaton Corporation, Jackson, Miss.

UNO Log Book No. _____

Sample No.	DBA Photo	Comments
45	_____	No blisters, cracks or delamination on either panels. Both panels have a gray brown discoloration at the bottom 1/2 inch. There is some black discoloration on No. 45.
46	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

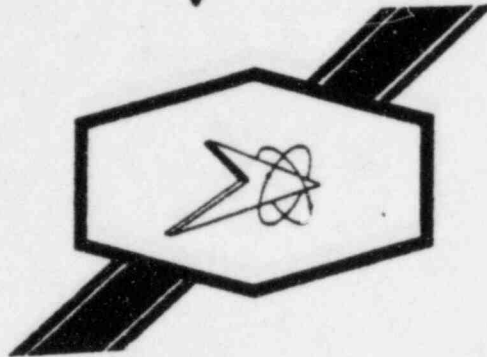
Additional Comments: _____

Inspected: _____

Approved: _____

Report No.: _____

Imperial



TECHNICAL REPORT

NUMBER

95-76

TITLE

DBA: NUTEC 10/11S/11/1201 OVER MAGIC KOTE FORMED CONCRETE

FOR

HOUSTON LIGHTING & POWER

CUSTOMER

Submitted by: Jerry Arnold *JCA*

Approved: W. J. Lomasney *WJL*

Date: 11/11/76

SOUTHERN IMPERIAL COATINGS CORPORATION, INC.
P. O. Box 29077, • New Orleans, Louisiana 70189
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TITLE: DBA: NUTEC 10/11S/11/1201 OVER MAGIC KOTE FORMED CONCRETE

OBJECT: To determine the feasibility of applying Imperial's NUTEC 10/11S/11/1201 system over concrete poured in plywood forms coated with Symon's Magic Kote.

INTRODUCTION: This test was performed at the request of Imperial representatives at the Houston Lighting and Power, South Texas jobsite where Symon's Magic Kote may be used as a plywood form release agent.

SUMMARY: Designed Basis Accident (DBA) testing at the HL&P pressure and temperature curve was performed on concrete coupons formed in Magic Kote treated plywood and coated with the NUTEC 10/11S/11/1201 system. No flaking, blistering, cracking, delamination, or other effects were observed.

PROCEDURE: A 2"x4"x2" concrete specimen, lab panel No. 390, was prepared in a plywood form previously treated with Magic Kote. The concrete mix used was as specified by Bechtel CP956:

30.0 lb	Type II low alkaline Lone Star Cement
	ASTM C150
72.8 lb	Jahncke cement sand ASTM C33
57.6 lb	Jahncke Crescrete 3/8" dry gravel ASTM C33
13.7 lb	Deionized water
2.4 g	Master Builder's MB-VR
	Air Entrainment Admixture
44.4 g	Master Builder's Pozzoloth 122-N
	Water Reducing Admixture

The coupon was then sealed and coated with the NUTEC 10/11S/11/1201 system. For application and curing data see the following panel preparation sheet. The specimen was allowed to fully cure and then tested under DBA conditions at the HL&P curve by Coastal Science Associates.

RESULTS: See attached Coastal Science Associates Report.

REFERENCE: Lab Book #4, Vol. 1, pg. 101

DBA

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED NUTEC 10/11S/11/1201
2. TYPE SUBSTRATE: Concrete (Bechtel Mix) SIZE 2" x 4" x 2"
3. SURFACE PREPARATION (describe): None (Concrete poured in plywood forms treated with Symon's Magic Kote)
4. PRODUCT DATA: SAMPLE NO.(s) 390
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED 5/18/76

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) & R.H.	THICKNESS (ins)	TIME & DATE APPLIED
	NUTEC	10	5606/5607	Spray	---	.004-.005	5/18/76
	NUTEC	11S	5409/5413/ 5700	Squeegee	82/72	.030-.050	5/24/76
	NUTEC	11	5409/5413	Squeegee	82/72	.015-.030	5/24/76
	NUTEC	1201	5786/5655	Spray	86/70	.005-.007	5/25/76

TOTAL FILM THICKNESS .050-.090

6. CURING CONDITIONS: AMBIENT TEMP 70-80 °F REL. HUMIDITY 45-65
MINIMUM CURE 60 DAYS
7. TEST PROCEDURE: DBA (HL&P Curve)
8. TESTING PERFORMED BY: Coastal Science Assoc. DATE SUBMITTED 7/25/76

Coastal Science Associates

TEST REPORT NO. A015072776

Southern Imperial Coatings

Test Report No. 95-76

COASTAL SCIENCE ASSOCIATES

(504) 283-7251

6900 CANAL BOULEVARD • NEW ORLEANS, LOUISIANA 70124

Date: July 27, 1976

Product Identification: Steel Panel x Concrete Block

DBA Test Results:

Houston Lighting and Power; South Texas Project
Am. No. 3, 9/16/74 DBA Pressure Response Figure 6.2-17,
DBA Temperature Response Figure 6.2-18

Sample No.

Comments

390

No flaking, blistering, or cracking on any side. There is a light brown discoloration $\frac{1}{4}$ - $\frac{1}{2}$ " from the bottom of the block. Delamination was not evident but the coating was not removed for a complete check.

Additional Comments:

Approved L. M. C. 2-

Report No. A015072776

COASTAL SCIENCE ASSOCIATES

(504) 283-7251

6900 CANAL BOULEVARD • NEW ORLEANS, LOUISIANA 70124

Date: July 27, 1976

Sample No. 390

DBA Solution Composition:

Sodium borate-thiosulfate buffered at pH 9.5.

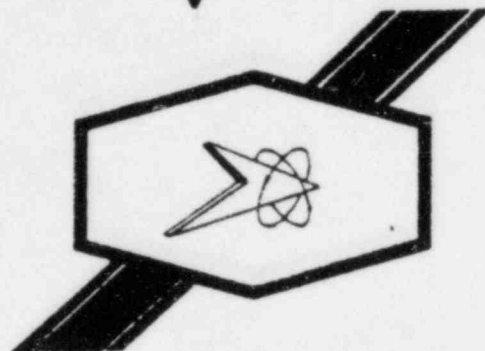
DBA Test Conditions

	<u>Time (min)</u>	<u>Temp. (°F)</u>	<u>Pressure (psig)</u>	<u>Comments</u>
3/76	0	162	7	
	5	230	22	
	8	255	32	
	10	264	39	
	12	279	42	
	14	277	48	
	15	280	50	
	18	277	38	
	20	270	35	
	27	259	36	
	31	266	40	
	36	270	42	
	38	271	41	
	43	262	32	
	48	248	26	
	50	223	25	
	55	230	22	
	95	230	21	
	204	212	18	
7/24/76	1373	208	15	
	1695	207	14	
7/25/76	3352	203	13	
7/26/76	4464	196	12	Remove from heater.

Approved LWyer

Report No. A015072776

Imperial



TECHNICAL REPORT

NUMBER

79-76

TITLE

Topcoatability of Durazinc 560 Primer
After Simulated 2 years Outside Exposure

FOR

Brown & Root
Houston, Texas

CUSTOMER

Houston Lighting & Power
South Texas Project

Submitted by: G. E. Arnold

Approved: W. J. Lomasney

Date: July, 1976

SOUTHERN IMPERIAL COATINGS CORPORATION, INC.
P. O. Box 29077 • New Orleans, Louisiana 70189
Phone: (504) 254-1433

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Topcoatability of Durazinc 560 Primer
After Simulated 2 years Outside Exposure

Purpose:

To determine if extensive weathering of the Durazinc 560 primer has any diverse effects on topcoating with Nutec #1201. To simulate 2 years outside exposure by subjecting panels to 500 hours of exposure in an Atlas Weather-o-meter.

Methods:

Two ASTM A36 carbon steel panels, No. 71 & 72, measuring 2" x 4" x 1/4" were sandblasted per SSPC-SP-10 with a surface profile between 1S70 and 2S70 as read on a Keane-Tator Profile Comparator Disc. The panels were primed with Durazinc 560 allowed to cure three days at ambient temperature and then placed in an Atlas Weatherometer for 500 hours. Upon removal from the weather-o-meter panel 71 was solvent cleaned (DL-6A) and panel 72 was wiped with a dry cloth. Both specimens were topcoated with Nutec #1201, cured, and sent to Coastal Sciences for DBA testing at the Houston Lighting & Power Curve.

DATA: Application and Curing

Product	Batch No.	DET	Date Applied	°F./%R.H.	Cure Time	°F./%R.H.
Durazinc 560	5801/5705	3.0±.5	5/12/76	79/78	3 days	Ambient
Nutec #1201	5786/5655	5-9 mils	6/17/76	76/85	30 days	75±5°/60±1

Weathering

Date in weather-o-meter 5/13/76

Date Removed 6/11/76

Accumulated hours -504 hours

Results: See attached Coastal Sciences Report A009071976

Date: July 19, 1976Product Identification: x Steel PanelBY: Concrete BlockDPA Test Results:

Houston Lighting and Power; South Texas Project
Am. No. 3, 9/16/74 DBA Pressure Response Figure 6.2-17,
DBA Temperature Response Figure 6.2-18

Sample No.Comments71

One size 6 blister at bottom of
numbered side. No other flaking,
cracking or blistering. Brown
discoloration $\frac{1}{2}$ to $\frac{1}{4}$ " from bottom on
both sides.

72

No flaking, blistering or cracking
on either side. Light brown dis-
coloration $\frac{1}{2}$ " from bottom on
both sides.

Additional Comments:

The numbered side was facing away from the walls of the container. Delamination was not evident but the coating was not removed for a complete check.

Approved LAF 2422-Report No. A009071976

COASTAL SCIENCE ASSOCIATES

6900 CANAL BOULEVARD • NEW ORLEANS, LOUISIANA 70124

Date: July 19, 1976

Product Identification:

Steel Panel

Concrete Block

DFA Test Results:

Houston Lighting and Power; South Texas Project
Am. No. 3, 8/16/74 DFA Pressure Response Figure 6.2-17,
DFA Temperature Response Figure 6.2-18

Sample No.

303

All 4 sides

Comments

No flaking, cracking, or blistering.
There is a brown discoloration
1/2" from the bottom on all 4
sides.

Additional Comments:

The numbered side was away from the wall of the container.
Delamination was not evident but the coating was not removed
for a complete check.

Approved

L. M. F. 2

Report No.

A009071976

COOPERATIVE STUDIES • TECHNICAL PROGRAM EVALUATION • POLLUTION ABATEMENT
MARINE COATINGS & TESTING • CHEMICAL PHYSICS CONSULTING

Date: July 19, 1976

Sample No. 71.72.393

DRA Colution Composition:

Sodium borate-thiosulfate solution buffered to pH 9.5.

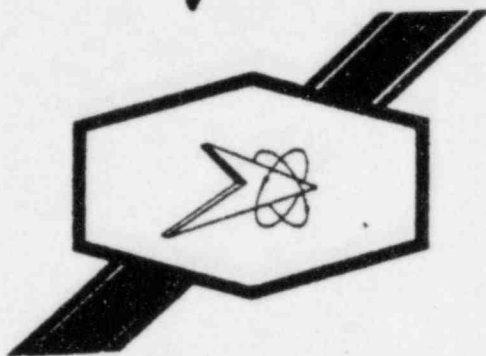
DRA Test Conditions

	<u>Time (min)</u>	<u>Temp. (°F)</u>	<u>Pressure (psia)</u>	<u>Comments</u>
7/14/76	0	163	8	
	3.5	199	14	
	5.5	221	18	
	9	237	26	
	6	257	35	
	18.5	251	37	
	25.5	264	38	
	30	262	37	
	40	265	40	
	47	279	46	
	55	262	40	
	61	262	32	
	69	234	24	
	80.5	244	29	
	98	237	26	
	124	228	22	
	168	228	22	
7/15/76	909	205	14	
	1321	201	14	
7/16/76	2266	201	14	
	3158	203	13	
7/17/76	4036	201	11	Remove from heater.

Approved L. M. 2-

Report No. A009071976

Imperial



TECHNICAL REPORT

NUMBER

80-76

TITLE

Topcoatability of 560/1201 Mist Coat
After Simulated One Year Outside Exposure

FOR

Brown & Root
Houston, Texas

CUSTOMER

Houston Lighting & Power
South Texas Project

Submitted by: G.E. Arnold

Approved: *[Signature]*
W.J. Lomasney

Date: July, 1976

SOUTHERN IMPERIAL COATINGS CORPORATION, INC.
P. O. Box 29077, * New Orleans, Louisiana 70189
Phone: (504) 254-1433

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Topcoatability of 560/1201 Mist Coat
After Simulated One Year Outside Exposure

Purpose:

To study the coatability of Nutec 1201 epoxy topcoat over weathered 560 steel primer/Nutec 1201 mist coat. To simulate one year outside exposure by subjecting panels to 250 hours in an Atlas Twin Arc Weather-o-meter.

Method:

Two ASTM A36 carbon steel panels Nos. 45 & 46, measuring 2" x 4" x 1/4" were sandblasted per SSPC - SP - 10 with an anchor profile between IS70 and 2S70 as read on a Keane-Tator Profile Comparator Disc. The panels were coated with Durazinc 560 primer, cured for 48 hours and placed in the weatherometer for 250 hours. Upon removal, panel no. 45 was solvent cleaned and panel no. 46 was wiped with a dry cloth. Both test specimens were then topcoated with Nutec 1201, cured for 7 days at room temperature, and sent to the University of New Orleans for DBA testing at the Houston Lighting & Power curve.

DATA: A) Application and Curing Data

Coat	Batch No.	Applied	DET	°F/%R.H.	Cure Time	°F/%R.H.
Durazinc #560	5801/5705	5/13/76	3±0.5 mils	79/78	48 hrs.	Ambient
Nutec #1201 mist	5786 5655	5/15/76	1-2 mils	74/70	48 hrs.	75±5/60±10%
Nutec #1201 Full Coat	5786 5655	5/31/76	5-8 mils	88/85	7 days	75±5°/60±10%

B) Weathering

Date in Weather-O-meter - 5/17/76

Date Removed - 5/29/76

Accumulated hours - 250 hours

Results: See Attached UNO report 06976

Manufacturer: _____

University of New Orleans
Department of Chemistry
Date: June 1976 Report _____

Product Identification: _____ Steel Panel _____ Concrete Block

1st Coat: _____

2nd Coat: _____

3rd Coat: _____

DBA Test Results:

Houston Light and Power

UNO Log Book No. _____

Sample No.	DBA Phase	Comments
65	_____	On unnumbered side: No blisters, no cracks, no delamination. Both sides: slight light brown discoloration at bottom. Numbered side - There is a line of 8 size 4 blisters near the bottom of the panel.
48	_____	On the unnumbered side: Within 1/4 inch of the bottom, there is dark gray discoloration and five (5) size 4 medium blisters; two inch long dark brown discolorations; no cracks. On unnumbered side: no cracks, no blisters, no delamination. dark gray discoloration on lower 1/4 inch. Two-inch long black streaks.
_____	_____	_____
_____	_____	_____
_____	_____	_____

Additional Comments:

Evaluated [Signature]

Approved [Signature]

Report No. 612176

IMA Solution Composition: Distilled Water

Dry atmosphere; Borate = Trisacetic Buffer Water

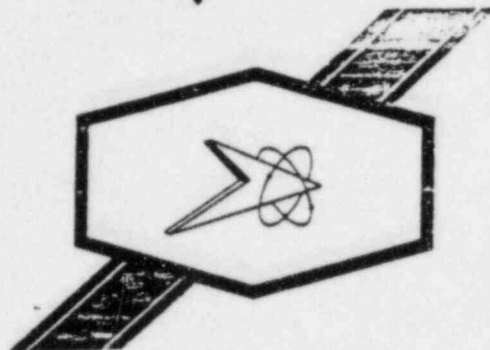
IMA Test Conditions

Time	Temperature (°F)		Pressure (psig)	Comments
	ΔT	ΔT		
0 min.	25	77	0	
25	135	257	50	
30	130	250	76	Add N ₂
45	130	250	77	
75	135	257	75	
90	130	250	50	
100	137	254	15	release pressure
130	105	221	16	
160	100	212	13	
240	98	208	11	
1 day	96	205	11	
2 days	100	212	12	
3 days	100	212	12	

University of New Orleans
Department of Chemistry

End date DATE 6/22/70
 Evaluated [Signature]
 Approved [Signature]
 Report No. 213/110

Imperial



TECHNICAL REPORT

NUMBER

549-81

TITLE

RADIATION TOLERANCE/DBA RESULTS
11S/11/1201/1201
HIGH FILM THICKNESSES OF NUTEC 1201 TOPCOAT
FOR
GENERAL USE
CUSTOMER

Submitted by: Gerald E. Arnold *GA*

Approved: Robert R. Taylor *R. Taylor 2/2/82*

Date: December 9, 1981

SOUTHERN IMPERIAL COATINGS CORPORATION, INC.
P. O. Box 29077, * New Orleans, Louisiana 70189
Phone: (504) 254-1433

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SCOPE:

The purpose of this test was to evaluate the performance of the Nutec concrete coating system with multicoats and high film thicknesses of Nutec 1201 topcoat.

BACKGROUND:

In many cases, additional coats of Nutec 1201 are applied to the original Nutec concrete coating system. Such instances are:

1. Film building to achieve designated minimum thickness requirements;
2. Repair of pinholes;
3. Repair of damaged areas, with resultant overlap;
4. Overlapping adjacent previously coated areas;
5. Recoating for aesthetics (usually a fresh coat is applied to the system just prior to the contractor releasing the area to the client).

When the 11S/11/1201 system is recoated there is the potential for exceeding the specified maximum dry film thickness of 12 mils for Nutec 1201. This test was designed to evaluate the higher film thicknesses of 1201 both in a single coat application and in a two coat application.

SUMMARY:

Four specimens coated with 11S/11/1201/1201 were submitted to Oak Ridge National Laboratories for radiation tolerance testing at exposure levels of 3×10^8 and 1×10^9 rads, and design basis accident testing per the pressurized water reactor (PWR) parameters of 285°F and 48 PSI. Due to equipment malfunctions, the actual maximum temperature and pressure experienced was 340°F and 70 PSI respectively. The results comply with the acceptance criteria of ANSI N101.2 for DBA testing.

PROCEDURE:

Four concrete specimens were coated with the Nutec 11S/Nutec 11/ Nutec 1201 system as described in the attached panel preparation sheets.

Radiation Tolerance/DBA Results

11S/11/1201/1201

Page 2

PROCEDURE (Con't):

Coupons A79 and A81 were first topcoated with the 11S/11/1201 system, weathered in an Atlas Weather-o-meter for 300 hours, used in an Elcometer adhesion test, repaired, and then re-topcoated with Nutec 1201.

All specimens were submitted to ORNL for irradiation at 3×10^8 and 1×10^9 rads and then design basis accident tested. The critical portion of the DBA test (first 28 hours) was performed in the autoclave; the remaining 10 days was conducted in a constant temperature and pressure chamber with 100% relative humidity.

RESULTS:

See attached ORNL results and result summary.

CONCLUSIONS:

The results comply with the requirements of ANSI N5.12 (radiation tolerance) and ANSI N101.2 (DBA), indicating that the higher film thickness of 1201 had no adverse effects on the performance of the Nutec system.

It should be noted that higher film thicknesses of 1201 may result in a slower evaporation rate (of solvent) and a correspondingly longer full cure time.

PANEL PREPARATION

SHEETS

TEST PANEL PREPARATION DATA

Pa

1. PRODUCT TO BE TESTED: Nutec 11S/Nutec 11/Nutec 1201
2. TYPE SUBSTRATE: Concrete 2x4x2"
3. SURFACE PREPARATION (Describe): All faces given rough abrasive blast using G-50 steel grit
4. PRODUCT DATA: SAMPLE NO. (s): A282, A284

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) %R.H.	THICKNESS (ins.)	TIME & DATE APPLIED
1	Nutec	11S	2782/2778/2526	Squeegee	85/71	.025-.045	6/16/81
2	Nutec	11S	2782/2778/2526	Squeegee	86/78	.020-.030	6/17/81
3	Nutec	11	2782/2778/2444	Squeegee	82/75	.004-.008	6/19/81
4	Nutec	1201	2067/2068	Spray	89/81	.008-.012	6/22/81
5	Nutec	1201	2067/2068	Spray	86/65	.008-.010	6/23/81

Side 1	.065-.105
2	.065-.105
3	.065-.105
4	.065-.105

CURING CONDITIONS: AMBIENT TEMP. 65-95 °F REL. HUMIDITY 65-100 % MINIMUM CURE 7 DAYS

TEST PROCEDURE: DBA

TEST PERFORMED BY: ORNL DATE SUBMITTED: 9/25/81

APPROVED BY: *Charles C. Arnold* REPORT NUMBER: 549-81

TEST PANEL PREPARATION DATA

Page 5

1. PRODUCT TO BE TESTED: Nutec 11S/Nutec 11/Nutec 1201
2. TYPE SUBSTRATE: Concrete
3. SURFACE PREPARATION (Describe): Broomed surface blast swept to remove efflorescence, remaining surfaces wire brushed and blown with 100 psi compressed air.
4. PRODUCT DATA: SAMPLE NO. (s): A79

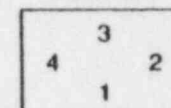
COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) %R.H.	THICKNESS (ins.)	TIME & DATE APPLIED
1	Nutec	11S*	2519/2086/2516	Squeegee	71/73	See Below	3/27/81
2	Nutec	11*	2519/2086/2444	Squeegee	73/64	" "	4/02/81
3	Nutec	1201	2606/2607	Spray	71/54	" "	4/06/81
4	Nutec	1201 (1)	2067/2068	Spray	85/81	" "	7/10/81

Coupon stored until June 14, 1981 at which time coupon was placed in WOM for 300 hrs. exposure.

* Hand mixed

FILM THICKNESS (ins.)	11S	11	1201	1201 (1)	Total
Side 1	.025-.035	.005-.008	.006-.010		.036-.053
Side 2	.025-.035	-	.006-.010	.020-.030	.051-.075
Side 3	.025-.035	.005-.008	.006-.010	.015-.020	.051-.075
Side 4	.025-.035	.005-.008	.006-.010	.010-.015	.046-.068

TOP VIEW OF COUPON



Numbered and broomed surface

TOTAL DRY FIL THICKNESSES RANGE — Side 1. See above totals
Side 2.

Side 3. See above totals
Side 4.

CURING CONDITIONS: AMBIENT TEMP. 65-95 °F REL. HUMIDITY 65-100 % MINIMUM CURE 7 DAYS

TEST PROCEDURE: Adhesion, Weathering, Repair, Topcoatability, DBA

TEST PERFORMED BY: Imperial/Testing, ORNL

DATE SUBMITTED: 9/25/81

APPROVED BY:

Gerald E. Arnold

REPORT NUMBER: 549-81

TEST PANEL PREPARATION DATA

6

1. PRODUCT TO BE TESTED: Nutec 11S/Nutec 11/Nutec 1201
2. TYPE SUBSTRATE: Concrete
3. SURFACE PREPARATION (Describe): Broomed surface blast swept to remove efflorescence, remaining surfaces wire brushed and blown down with 100 psi compressed air.
4. PRODUCT DATA: SAMPLE NO. (s): A81

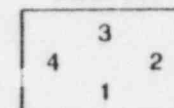
COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) %R.H.	THICKNESS (ins.)	TIME & DATE APPLIED
1	Nutec	11S*	2519/2086/2516	Squeegee	71/73	See below	3/27/81
2	Nutec	11*	2519/2086/2444	Squeegee	73/64	" "	4/02/81
3	Nutec	1201	2606/2607	Spray	71/54	" "	4/06/81
4	Nutec	1201 (1)	2067/2068	Spray	85/81	" "	7/10/81

Coupon stored until June 14, 1981, at which time coupon was placed in WOM for 300 hrs. exposure.

* Drill mixed

FILM THICKNESS (ins.)	11S	11	1201	1201 (1)	Total
Side 1	.025-.035	.005-.008	.006-.010		.036-.053
Side 2	.025-.035	-	.006-.010	.020-.030	.051-.075
Side 3	.025-.035	.005-.008	.006-.010	.015-.020	.051-.075
Side 4	.025-.035	.005-.008	.006-.010	.010-.015	.046-.068

TOP VIEW OF COUPON



Numbered and broomed surface

TOTAL DRY FIL THICKNESSES RANGE — Side 1. See above totals Side 3. See above totals
Side 2. Side 4.

CURING CONDITIONS: AMBIENT TEMP. 65-95 °F REL. HUMIDITY 65-100 % MINIMUM CURE 7 DAYS

TEST PROCEDURE: Adhesion, Weathering, Repair, Topcoatability, DBA

TEST PERFORMED BY: Imperial/Testing ORNL DATE SUBMITTED: 9/25/81

APPROVED BY: Shall E. Arnold REPORT NUMBER: 549-81

NIC#1-A7/81

ORNL
PROCEDURES

Manufacturer: Imperial
New Orleans, Louisiana

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: October 29, 1981

REPORT OF IRRADIATION AND DBA TESTING

The irradiation and design basis accident (DBA) tests are conducted, respectively, in accordance with Bechtel Corporation specifications CP-951 and CP-956 in Standard Specification Coatings for Nuclear Power Plants (or with modifications as noted in Table 2, DBA test conditions). The tests are designed to meet specifications set in both ANSI report N 101.2-1972, Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities, and N 5.12-1974, Protective Coatings (Paints) for the Nuclear Industry. The DBA test spray solution and the test conditions are listed in Tables 1 and 2. After both the DBA and irradiation tests, coatings are examined for signs of chalking, blistering, cracking, peeling, delamination, and flaking, according to ASTM standards where applicable. All test panels are returned to the coating manufacturer.

The irradiation tests are run using a spent fuel assembly, removed from the High-Flux Isotope Reactor at ORNL, as the source of radiation. These fuel assemblies are stored under 20 ft of demineralized water. The fuel is 93% enriched U-235 as U_3O_8 combined with aluminum. The spent fuel assemblies are removed after each 23-megawatt-day period. Irradiation is done using the gamma energy from accumulated mixed fission products. This more readily simulates conditions around a reactor than does a cobalt source. Also, the higher gamma activity affords shorter irradiation time to achieve accumulated doses. The dose rate four days after removal of a fuel assembly from the reactor is 1×10^6 rad/h.

The fuel assembly is 20 in. high. A 20-ft-long, 3-1/2-in.-diameter pipe, with one end capped, is used for air irradiation tests. The capped end is lowered into a 4-in. opening at the center of the fuel assembly. The open end, above water level, is covered with an O-ring-sealed flange to which is attached a steel cable and an air outlet hose. The air inlet is located at the bottom of the pipe. Test specimens are connected to the bottom of the cable and lowered into the radiation field. Also at the center of the fuel assembly is a stainless steel-clad cadmium tube used as a neutron absorber. This prevents contamination of the test specimens by induced radiation.

Evaluated

Ralph L. Apple

Approved

L. T. Cochran

Manufacturer: Imperial
New Orleans, Louisiana

Analytical Chemistry Division ^{Page 9}
Oak Ridge National Laboratory
Date: October 29, 1981

ORNL Log Book No. A9675, A10-8-1

Table 1. DBA Solution composition, distilled water

Reagent	Concentration
Boric acid, H_3BO_3	2000 ppm
Sodium hydroxide, NaOH	Required to adjust pH to 9.5

Table 2. DBA test conditions

Time	Temperature (°F)	Pressure (psig)	Comments
Start	164	—	Autoclave preheated.
20 s	285	48	Solution added at 290°F.
1.5 min	340	70	*
1.5-5 min	285	48	Pressure maintained by relief valve.
5-7 min	285-267	48	Pressure adjusted with N_2 .
13 min	267	48	
13-53 min	267-220	48	Pressure adjusted with N_2 .
53-58 min	220-210	48-0	Pressure released at 0.15 psig/s.
58-167 min	210-150	0	
2.8-27.8 h	150-135	0	End of first part of test.
11 d	135	0	Specimens immersed in a constant-temperature bath.
End of test			

*Gas that evolved from the specimens upon addition of the hot chemical solution resulted in a pressure and subsequent temperature increase exceeding the specifications of the designed temperature-pressure curves.

Evaluated

Ralph L. Doyle

Approved

L. T. Carlson

ORNL
RADIATION/DBA
RESULTS

RECEIVED

12/4/81
IMPERIAL NUCLEAR

OAK RIDGE NATIONAL LABORATORY

OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION



POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

December 1, 1981

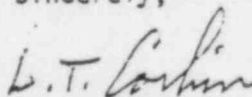
Mr. Gerald E. Arnold
Technical Representative
Imperial Professional Coatings
P. O. Box 29077
New Orleans, Louisiana 70189

Dear Jerry:

Enclosed are combined reports describing test results recently obtained on Imperial protective coatings. Your attention is called to the temperature-pressure anomalies of A9675, A10-8-1.

If we can be of further assistance, please feel free to call on us.

Sincerely,



L. T. Corbin, Section Head
Analytical Chemistry Division

LTC:dmw

Enclosures

Manufacturer: Imperial
New Orleans, Louisiana

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: October 29, 1981

SYSTEM IDENTIFICATION

Steel panel x Concrete block

11S/11/1201/1201

RADIATION TOLERANCE TEST

ORNL Master Analytical Manual Method No. 2 0921; Bechtel Corporation
Specification No. CP-951; ORNL Log Book No. A9675, A10-2-1.

Initial dose rate: 0.9×10^7 rad/h

Test conducted in: x air water

<u>Sample No.</u>	<u>Cumulative dose</u>	<u>Test results</u>
A79	3×10^8 rad	Coatings intact, no defects all areas.
A81	1×10^9 rad	Coatings intact, no defects all areas.

Evaluated

Raymond L. Apple

Approved

L. T. Collins

Manufacturer: Imperial
New Orleans, Louisiana

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: October 29, 1981

SYSTEM IDENTIFICATION

Steel panel x Concrete block

11S/11/1201/1201

DBA TEST

ORNL Master Analytical Manual Method No. 2 0922.
ORNL Log Book No. A9675, A10-8-1.

<u>Sample No.</u>	<u>DBA phase</u>	<u>Test results</u>
A79	spray*	Coatings intact, no defects after one day. Blisters, #4 few, sides B and C at end of test.
A81	spray*	Coatings intact, no defects after one day. Blisters, #4 few, sides B, C, and D at end of test.

*Irradiated.

Evaluated

Ray E. Apple

Approved

L. T. Cochran

Manufacturer: Imperial
New Orleans, Louisiana

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: October 29, 1981

SYSTEM IDENTIFICATION

 Steel panel x Concrete block

11S/11/1201/1201

RADIATION TOLERANCE TEST

ORNL Master Analytical Manual Method No. 2 0921; Bechtel Corporation
Specification No. CP-951; ORNL Log Book No. A9675, A10-1-1.

Initial dose rate: 1.3 x 10⁷ rad/h

Test conducted in: x air water

<u>Sample No.</u>	<u>Cumulative dose</u>	<u>Test results</u>
A282	3 x 10 ⁸ rad	Coatings intact, no defects all areas.
A284	1 x 10 ⁹ rad	Coatings intact, no defects all areas.

Evaluated

Ralph L. Apple

Approved

L. T. Corbin

Manufacturer: Imperial
New Orleans, Louisiana

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: October 29, 1981

SYSTEM IDENTIFICATION

Steel panel x Concrete block

11S/11/1201/1201

DBA TEST

ORNL Master Analytical Manual Method No. 2 0922.
ORNL Log Book No. A9675, A10-8-1.

<u>Sample No.</u>	<u>DBA phase</u>	<u>Test results</u>
A282	spray*	Coatings intact, no defects after one day. Blisters, #4 few, sides A and B at end of test. No other defects.
A284	spray*	Coatings intact, no defects after one day. Single blister, #4, sides A and B at end of test. No other defects.

*Irradiated.

Evaluated

Joseph L. Rye

Approved

L. T. Carlson

SUMMARY OF RESULTS

Panel No.	DRY FILM THICKNESSES (In Mils)					DBA RESULTS	
	Maximum Single Coat 11S	Maximum Total 11S	Maximum 11	Maximum Single Coat 1201	Maximum Total 1201	After Day 1	After Day 11
A79	35	35	8	30	40	No Defect	#4 few Sides 2 & 3 N/D Side 1 & 4
A81	35	35	8	20	40	No Defect	#4 few Sides 2,3,4 N/D Side 1
A282	45	75	8	12	22	No Defect	#4 few Sides 1,2 N/D Side 3 & 4
A284	45	75	8	12	22	No Defect	One #4 on Side 1, 2 N/D Side 3 & 4

Panel No.	Radiation Exposure	Results
A79	3×10^8 rads	No Defects
A81	1×10^9 rads	No Defects
A282	3×10^8 rads	No Defects
A284	1×10^9 rads	No Defects

N/D = No Defect