

JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 3

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 3

This notice applies to Construction Procedure No. 35-1195- CCP-40 Revision 3.

This change will be incorporated in the next revision of the procedure.

Change the procedure as follows:

Replace the following pages with the attached:

Page 5 of 13
Page 12 of 13

Reason for change: Change in requirements

This change approved by:

Reviewed by:

Mark Weller 11-13-81
Originator Date

DC N/A 11/16/81
Brown & Root Quality Assurance Date

Reviewed by:

C. T. Adams 11/16/81
TUGCO Quality Assurance Date

C. J. Rankin 11/17/81
Construction Project Manager Date

11/18/81
Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 6

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 2

This notice applies to Construction Procedure No. 35-1195- CCP-40 Revision 3

This change will be incorporated in the next revision of the procedure.

Change the procedure as follows:

Replace the following pages with the attached:

Page 6 of 13
Page 7 of 13
Page 11 of 13
Page 13 of 13

Add Attachment 3

Reason for change: Change in requirements

This change approved by:

Mark Wells 11-12-81
Originator Date

Reviewed by:

N/A 11/12/81
Brown & Root Quality Assurance Date

Reviewed by:

D.C. [Signature] 11/13/81
Construction Project Manager Date

Reviewed by:
[Signature] 11/12/81
TUSCO Quality Assurance Date

11/16/81
Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 4

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 1

This notice applies to Construction Procedure No. 35-1195- CCP-40 Revision 3.

This change will be incorporated in the next revision of the procedure.

Change the procedure as follows:

Replace the following pages with the attached:

Page 7 of 13
Page 10 of 13
Page 11 of 13

Reason for change: Additional requirements

This change approved by:

Reviewed by:

Mark Wells 11/10/81
Originator Date

N.A. Root 11/10/81
Brown & Root Quality Assurance Date

Reviewed by:

[Signature] 11/10/81
TUGCO Quality Assurance Date

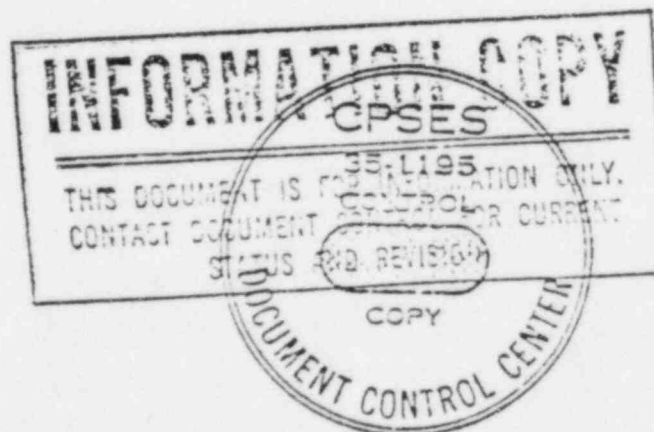
[Signature] 11-11-81
Construction Project Manager Date

11/11/81
Effective Date



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	ARMS INDEXED	
			EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	1 of 13
TITLE: PROTECTIVE COATING OF CONCRETE SURFACES	ORIGINATOR:	<i>M. K. ...</i> 11-2-81 DATE		
	REVIEWED BY:	<i>W. A. ...</i> 11/3/81 DATE <i>C. J. ...</i> 11/2/81 DATE		
	APPROVED BY	<i>D. J. ...</i> 11/4/81 CONSTRUCTION PROJECT MANAGER DATE		

0.1	<u>TABLE OF CONTENTS</u>	DCN #1
1.0	<u>INTRODUCTION</u>	DCN #2
1.1	PURPOSE	DCN #3
1.2	SCOPE	
1.3	GENERAL DISCUSSION	
2.0	<u>DEFINITIONS OF TERMS, ABBREVIATIONS AND SYMBOLS</u>	
2.1	TERMS	
2.2	ABBREVIATIONS	
2.3	SYMBOLS	
3.0	<u>SPECIAL ITEMS AND OPERATIONS</u>	
3.1	QUALIFICATION OF PERSONNEL	
3.2	SAFETY REQUIREMENTS	
3.3	INSTRUMENTS AND THEIR USE	
3.4	DOCUMENTATION	
3.5	RECEIVING, STORAGE, AND DISPENSING OF COATING MATERIALS	
4.0	<u>PROCEDURE FOR COATING</u>	
4.1	PREPARATION OF SUBSTRATES AND COATING MATERIAL	
4.2	PREPARATION OF COATING MATERIALS	
4.3	APPLICATION OF SURFACER AND FINISH COATING	
4.4	FINAL ACCEPTANCE TESTING	
4.5	HOLD POINTS	
5.0	<u>SUPPORTING INFORMATION</u>	
5.1	ATTACHMENTS	
5.2	REFERENCES	



BROWN & ROOT, INC. CPSES		PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195		CCP-40	3	11/4/81	2 of 13
1.0	<u>INTRODUCTION</u>				
1.1	PURPOSE				
1.1.1	The purpose of this procedure is to establish the methods by which the surfacer and finish coats are to be applied to concrete surfaces in accordance with specification, drawing, and manufacturer's requirements.				
1.2	SCOPE				
1.2.1	The scope of this procedure covers the surface preparation and coating of cementitious surfaces inside the reactor building and radiation area as delineated by Reference 1.				
1.3	GENERAL DISCUSSION				
1.3.1	All coating materials addressed by this procedure shall be as manufactured by Imperial Professional Coating of New Orleans, Louisiana. The coating system will consist of a surfacer coat of NUTEC #11S, touch-up with NUTEC #11S or NUTEC #11, and a finish coat of Reactic #1201. In order to prevent finish coat damage, the finish coat will normally be applied as close as possible to turn-over of the area to the owner or as required due to the setting of equipment or other items which would make an area inaccessible. Any permanent equipment located in the area to be coated will be adequately protected from contamination caused by surface preparation or coating application.				
2.0	<u>DEFINITIONS OF TERMS, ABBREVIATIONS AND SYMBOLS</u>				
2.1	TERMS				
2.1.1	Substrate - The uncoated surface to which a coating is applied.				
2.1.2	Pinhole - A minor discontinuity in the coating film which exposes the primer or substrate.				
2.2	ABBREVIATIONS				
2.2.1	(NONE)				
2.3	SYMBOLS				
2.3.1	(NONE)				

BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-40	3	11/4/81	3 of 13

3.0 SPECIAL ITEMS AND OPERATIONS

3.1 QUALIFICATION OF PERSONNEL

- 3.1.1 Coating Application Personnel shall be qualified per previous experience and/or demonstrated ability. In addition, each applicator shall have been certified by the Paint Dept. Superintendent or his representative per technical data and demonstrated ability. Application procedures shall be in compliance with this procedure. This shall be verified by completing a form similar to Attachment 1 which will be executed by the B&R Paint Superintendent or his representative. A coating manufacturer's representative will be available for technical supervision upon initial painting effort.

3.2 SAFETY REQUIREMENTS

- 3.2.1 All appropriate health, safety, and fire protection requirements pertaining to surface preparation and coating application shall be followed. It shall be the responsibility of the Safety Department representative who will be present to randomly monitor safety during coating application.

3.3 INSTRUMENTS AND THEIR USE

- 3.3.1 The Painting Foreman and General Foreman shall have access to and be familiar with the use of thermometers, wet film gauges, and psychrometers for measuring relative humidity. Viscosity measuring devices will not be used. Wet film gauges will be randomly used during coating application; readings will be limited to the minimum necessary to control coating thickness.

3.4 DOCUMENTATION

- 3.4.1 Records shall be maintained on Attachment 1 listed in Section 5.1. After completion, the original will be forwarded to the Brown & Root Document Control Center for filing and distribution to the various parties listed on the distribution list.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	4 of 13

3.5 RECEIVING, STORAGE AND DISPENSING OF COATING MATERIALS

3.5.1 Receiving and Storage

3.5.1.1 Upon receipt of a shipment of coating materials, the B&R QC Representative accepting shipment shall be responsible for completing all necessary receiving inspection documentation. General receiving procedures shall be in accordance with Brown & Root Construction Procedure CP-CPM 8.1. It shall then be segregated from "Non-Q" materials and stored in the Paint Storage Building where temperatures will be maintained between 40°F and 100°F. Rises in air temperature up to 120°F is acceptable for as long as fourteen days. (Accumulative). Infrequent dips (for periods not to exceed 24 hours) in air temperature in storage areas as low as 33°F is acceptable; however, prior to application the coatings shall be brought back into the 50° - 90° range. Temporary storage may be required at the Receiving Warehouse due to receiving or other problems.

3.5.2 Dispensing

3.5.2.1 When coating materials are needed in the field, they shall be transferred from the controlled storage area to temporary storage in the field. If damage occurs in transit from storage area, material will be consigned to "Non-Q" storage; damage shall mean a broken seal.

4.0 PROCEDURE FOR COATING

4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

4.1.1 Preparation for Surfacers

4.1.1.1 Normal surface preparation shall consist of water blasting with 4,000 P.S.I. to 10,000 P.S.I. Additionally, surface preparation may be accomplished by the use of approximately 2,500 P.S.I. water blasting with sand injection, acid etching with an Imperial recommended solution, or straight sand blasting. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds T.S.P. per gallon of water, or use of an Imperial recommended detergent.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	5 of 13

Following surface preparation, the surface shall be free of construction dust, laitance, and loose deposits. If cleaning does not remove oil and grease, the contaminated concrete surface will be chipped away and patched before coating. All T.S.P. cleaned areas will be flushed with clean water. Holes or voids in the concrete surface that exceed 1/2" in depth shall be repaired with dry-pack or epoxy grout. Detrimental surface irregularities such as projections, fins, or ridges shall be reduced by bush-hammering, power grinding, or stoning. Wood particles of "fuzz" remaining after water blasting is acceptable. Recommended surface preparation shall include power tools which are capable of removing laitance and curing membranes from concrete surfaces.

- 4.1.1.2 Markings on concrete - Before application of 11S, 11 or 1201, all markings (ink, pencil, chalk, or felt tip markers) on wall and floors shall be solvent wiped in accordance with SSPC-SP-1 using DL-6A or commercially available MEK or Xylo1. Marking paint (surveyor marks) shall be completely removed by solvent wiping, water blasting, sandblasting, or power tool cleaning.
- 4.1.1.3 Repair of embedded foreign objects - Embedded foreign objects such as nails, rebar chairs, bolts, wood, or plastic shall be repaired per the following guidelines before application of NUTEC 11S surfacer.
1. Objects protruding from the surface shall be ground or cut smooth until the object is flush with the concrete surface prior to application of 11S.
 2. If the object is loosely adhered in the concrete, it shall be removed (in case of wood splinters or wood "fuzz" an attempt shall be made to remove by high pressure water blasting). Refer to section 4.1.1.1.
 3. Smooth objects such as steel or plastic shall be roughened to provide adequate anchor pattern for the 11S surfacer. Metal objects shall be power tool cleaned to remove dust and mil scale and solvent wiped to remove any grease or oil.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	6 of 13

4. Metal objects larger than one square inch shall be coated with an inorganic zinc primer in accordance with CCP-30.

5. Objects which are recessed to a depth greater than 1/2" shall be repaired using a "dry pack" or epoxy grout.

4.1.1.4 Surface appearance - Surface smoothness or "glossy" appearance in concrete walls will not be detrimental to the performance of NUTEC 11S, provided the surface is free of water, oil, grease, laitance, efflorescence, curing membranes or other contaminants as outlined in this procedure.

4.2 PREPARATION OF COATING MATERIALS

4.2.1 Surface Coat

4.2.1.1 The surfacer, NUTEC #11S, is packaged, in a three component kit consisting of a base, curing agent, and sand filler. The base and curing agent shall be thoroughly mixed first. If necessary, box the mixture to assure that all the base and cure has been used. The sand filler shall then be slowly added under constant agitation and mixed until a smooth blend is achieved. The patching material, NUTEC #11, is prepared the same way. Partial mixes for Nutec #11S shall be in accordance with Attachment 2.

4.2.2 Finish Coat

4.2.2.1 The finish coat, REACTIC #1201, is a two component epoxy top-coat consisting of a base and cure. These shall be thoroughly mixed under constant agitation until a homogenous blend is achieved. Partial mixes of Reactic #1201 shall be in accordance with Attachment 3. Minimum induction times shall be as follows:

TEMPERATURE °F

INDUCTION TIMES

50-59
60-79
80-89
90-99
100

45 min.
35 min.
15 min.
05 min.
NONE



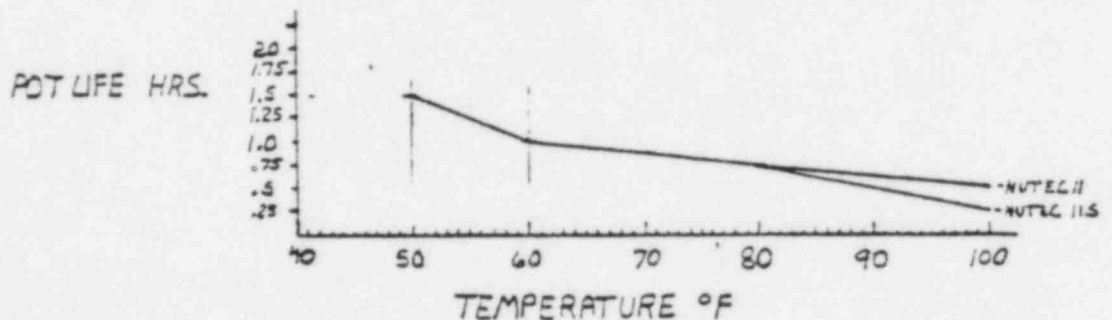
BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	7 of 13

4.3 APPLICATION OF SURFACER & FINISH COATING

4.3.1 Surfacers Coat

4.3.1.1 Coating material shall be applied using a bottom feed conventional pressure pot-mastic gun arrangement. To facilitate application on areas such as floors and for repair work, trowel, squeegee or float application without the use of the mastic arrangement may be used. Concrete surface shall be allowed to cure a minimum of 28 days prior to application of material. Tie holes, and spalled concrete as defined in CEI-20 and patched per CCP-12 may be coated after 48 days cure. Material shall be applied until the concrete surface is completely covered, with extra material being added to large holes or depressions. A single blade rubber squeegee is then used to smooth out the material. Care shall be taken to eliminate as many pinholes as possible by use of a back and forth motion. Application parameters shall be as follows:

1. Minimum and maximum values of surface and ambient temperatures shall be 50°F and on the rise up to 100°F. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in the chart below.



2. Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no condition shall NUTEC 11S be applied to a surface containing free standing water. Free standing water may be identified by:



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	8 of 13

- a. Reduced viscosity of 11S during application, and excessive sagging from bug holes.
 - b. Wet rings around bug holes.
 - c. Failure of 11S to adhere to the substrate during the squeegeeing or trowelling process.
 - d. Visible signs of surface water.
 - e. Running hand over the surface resulting in moisture on the hand.
 - f. Product instability resulting in white streaks.
3. Thickness of surface for level 1 service may vary between 10 and 35 mils, depending on the surface roughness. For areas other than level 1, the recommended dry film thicknesses for surfacer is 10-60 mils.
 4. Tack free times shall be as follows:

<u>TEMPERATURE °F</u>	<u>#11</u>	<u>#11S</u>
50-59	6 hrs.	8 hrs.
60-79	4 hrs.	6 hrs.
80-99	2 hrs.	4 hrs.
100	1 hr.	2 hrs.

5. Curing time shall be as follows:

<u>TEMPERATURE °F</u>	<u>CURING TIME BEFORE TOPCOATING WITH 1201</u>
50-59	72 hrs.
60-79	48 hrs.
80-99	24 hrs.
100	12 hrs.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-40	3	11/4/81	9 of 13

TEMPERATURE OF

FULL CURE 11, 11S

50-59	10 days
60-69	8 days
70-79	7 days
80-89	6 days
90-100	5 days

No appreciable cure takes place below 50°F, therefore, maintain area coated above 50°F. Infrequent dips in temperature to 40°F is permissible; however, duration below 50°F shall be added to cure time.

6. NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (this does not refer to a two pass application method). Dry time will vary with film thickness. At thicknesses greater than 35 mils, a minimum of 24 hours shall be allowed prior to applying a full coat of NUTEC 11.

7. NUTEC 11S may be recoated with #11S or #11 as soon as it has set to touch. #11S and #11 may be subjected to personnel foot traffic after 24 hours cure and lay down of material after full cure.

8. Thinning of #11S is not normally required; however, at lower temperatures, it is permissible to thin up to 5% by volume with Imperial's DL-54 thinner.

4.3.1.2 Imperial coatings may be applied in the following sequential order: #11S/1201/11S/1201 or 11S/1201/11/1201. Millage requirements per coat are as follows:

Service Level 1

NUTEC 11S	10-35 Mils
NUTEC 11	3-20 Mils
Reactic 1201	3-12 Mils

Areas other than Service Level 1

NUTEC 11S	10-60 Mils
NUTEC 11	3-20 Mils
Reactic 1201	3-12 Mils

4.3.1.3 Repair and recoating of NUTEC 11S - Remove all loose coating and concrete by sanding or wire brushing and feather edge adjacent to the coating. The area shall then be blown off with compressed air, washed with water or DL-54 thinner (Non-Q) and coated with NUTEC 11S or NUTEC 11 until the desired film thickness is achieved.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	10 of 13

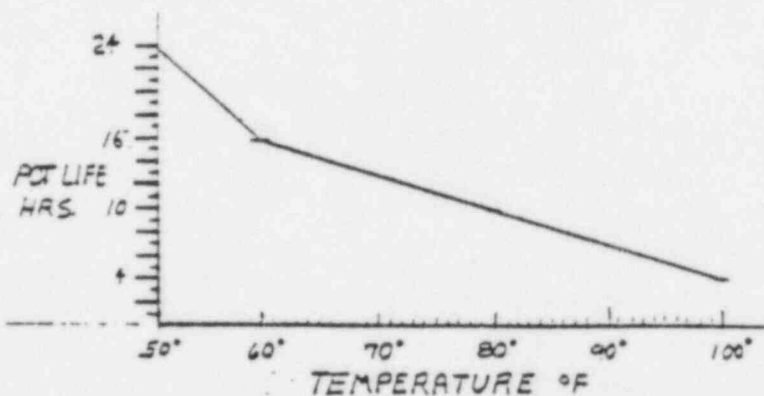
- 4.3.1.4 Repair of Pinholes, blowholes, or overworked areas - Remove any contaminants by compressed air or clean water. Apply NUTEC 11 to the defective area and work back and forth to fill in area. NUTEC #11S surfacer may be smoothed by spraying a mist of Imperial DL-54 thinner on the #11S film 15-30 minutes after its application. By using a trowel or squeegee, the solvent can be worked over the surface to smooth or polish the film, thus eliminating the defects due to overworking of the 11S.
- 4.3.1.5 Mudcracking - Area shall be repaired by means of grinding, sanding, or wire brush. The area will then be blown down with compressed air and then wiped with DL-54 thinner.
- 4.3.1.6 Repair of Sags and Runs - Inside containment, runs or sags shall be abraded down to adjoining thickness. Outside containment, if coating is sound, sags and runs will not be repaired.
- 4.3.1.7 Repair of Embedded Foreign Particles - Embedded foreign particles shall be removed by abrading. In pinholes and discontinuities exist, then area shall be repaired in accordance with Section 4.3.1.4.
- 4.3.1.8 Treatment of Rust Stains - Remove residue, though not necessarily the stain, with bristle brush and water or Imperial Thinner #DL-54.
- 4.3.1.9 Treatment of Interfaces with Other Coatings - Interfaces with projecting coated items shall be constructed by abutting the 11S up to the projecting item. Interfaces with flush mounted coated items shall be constructed by feathering the 11S into the coated item.
- 4.3.1.10 Repair of Scorched Areas - If the concrete is not damaged, scorched areas shall be repaired by abrading the surface until the discolored area is removed. Visual inspection of the area shall be conducted to assure the area is acceptable. The area should then be coated with 11 or 11S as appropriate.
- 4.3.1.11 Coating of Expansion Joints - Expansion joints will not be coated. Coatings will be feathered back at the edges.

BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	11 of 13

4.3.2 Finish

4.3.2.1 Finish coat shall be applied by brush, roller, conventional or airless spray methods. If brush or roller application is used, care must be taken to ensure a smooth uniform finish surface. The material shall be allowed to become "tack free" before any other construction operations proceed which could create contamination by dust or other foreign matter. Pinhole criteria shall be in accordance with NACE T-6F-3, condition "B". Any runs or sags having a detrimental effect on the coating system shall be removed and repaired. The following application parameters shall govern:

1. The permissible range of surface and ambient temperature shall be 50°F and on the rise up to 100°F. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be deducted from the cure time. Application shall not begin unless the surface temperature is at least 5°F above the dew point. If increased workability is desired, Reactic #1201 may be thinned up to 30% by volume with Imperail DL-6A thinner. It is normally advisable to use more thinner at lower temperatures and when using conventional spray equipment.



2. Thickness of the 1201 topcoat for Level 1 Service shall be a minimum of 3 mils and a maximum of 12 mils. For all areas other than Level 1, the millage shall be as specified in Section 4.3.1.2.
3. Coating materials shall be applied as a heavy, wet coat in even, parallel passes, overlapping each pass approximately 50%.

BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	12 of 13

4. Recoating time of REACTIC #1201 is 24 hours.

5. Tack free time is as follows:

<u>TEMPERATURE °F</u>	<u>TACK FREE TIME</u>
50	8 hrs.
60	4 hrs.
80	2 hrs.
100	1 hr.

6. Full cure time is as follows:

<u>TEMPERATURE °F</u>	<u>FULL CURE TIME</u>
50-59	11 days
60-79	8 days
80-99	7 days
100	5 days

#1201 may be subjected to personnel foot traffic after 24 hours at or above surface temperature of 80°F. At temperature durations below 50°F little or no curing will take place, therefore, after coating, maintain temperatures above 50°F.

- 4.3.2.2 Repair of Runs and Sags - Any run or sag showing evidence of cracking must be removed. All other runs and sags need not be repaired --- except inside containment. They will be abraded until the total DFT is 12 mils or less.
- 4.3.2.3 Repair of Embedded Foreign Particles - Embedded foreign particles shall be removed by abrading. The area shall then be given a light overcoat of #1201. Any loose particles shall be removed by brushing, vacuum, or compressed air.
- 4.3.2.4 Repair of Pinholes and Discontinuities - Any loose particles shall be removed by brushing, vacuum or compressed air. The pinholes and discontinuities shall then be repaired by use of a brush or squeegee.
- 4.3.2.5 Repair of Scratches and Damaged Areas - Any scratches or damaged areas shall be abraded by hand or power tool cleaning or spot blasting until loosely adherent particles are removed. If the damaged area extends to concrete substrate and is ½" or less in diameter, the damaged area may be coated with Reactic #1201. If the damaged area extending to concrete substrate is greater than ½" in diameter but 2 sq. inches or less in an area, the area may be repaired with NUTEC #11 with a topcoat of Reactic #1201. Damaged areas to concrete substrate larger than the above values shall be repaired with the normal coating system.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	13 of 13
4.3.2.6	Treatment of Rust Stains - If the topcoat surface is contaminated with rust stains, then area shall be cleaned by use of bristle brush and water or solvent wiping with Thinner DL-6A. Any remaining stains not acceptable from a cosmetic viewpoint will be covered by a light overcoat of REACTIC #1201.			
4.4	FINAL ACCEPTANCE TESTING			
4.4.1	After coating system cure, final inspection, and resolution of all discrepancies are completed, the QC Inspector shall document the final acceptance by completing and signing the Final Acceptance Record and will transmit a copy of this record to the B&R Paint Superintendent as soon as possible after final acceptance is made.			
4.5	HOLD POINTS			
4.5.1	On-site receipt of coating material.			
4.5.2	Substrates before and following preparation.			
4.5.3	Mixing and preparation of coating material for application.			
4.5.4	Film characteristics after drying and curing.			
4.5.5	Control of ambient conditions and surface temperatures during all phases of the coating work.			
5.0	<u>SUPPORTING INFORMATION</u>			
5.1	ATTACHMENTS			
	1. Painter Qualification Record			
	2. Table for Partial Mixes of NUTEC 11S			
	3. Table for Partial Mixes of Reactic #1201			
5.2	REFERENCES			
	1. Gibbs & Hill Specification 2323-AS-31 "Protective Coatings" Latest Revision			
	2. Steel Structures Paint Council, Vol. 2, Second Edition			
	3. Imperial Data Sheets NUTEC #11S and REACTIC #1201, Dated 7/77			
	4. NACE Publication T-6F-3			

BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-40	3	11/4/81	1 of 1

ATTACHMENT 1

Painter Qualification Record

GENERAL DATA

Date _____ Report Number _____

TECHNICAL DATA

Name of Painter _____

Summary of Field Experience _____

Experience with following Product Types _____

Application Test for Specified Substrate _____

Additional Qualifications (School) _____

Signature _____
Applicator's Field Supervisor

Distribution: Painting Supt.
QC Department
TUGCO QA Vault (Original)



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-40	3	11/4/81	1 of 1

ATTACHMENT 3
TABLE FOR PARTIAL MIXES OF REACTIC #1201

		Base		Cure		Maximum Permissible Thinner	
Gal.	Qts.	lbs.	oz.	lbs.	oz.	qts.	oz.
0	1	2	9.6	0	5.4	0	5.6
0	2	5	3.2	0	12.8	0	19.2
0	3	5	14.4	1	3.2	0	28.8
1	0	10	8	1	8	1	6.4
1	1	13	1.6	1	14.4	1	16
1	2	15	11.2	2	4.8	1	25.6
1	3	18	4.8	2	11.2	2	3.2
2	0	20	14.4	3	1.6	2	12.8
2	1	23	8	3	0	2	22.4
2	2	26	3.2	3	14.4	3	0
2	3	28	12.8	4	3.2	3	9.6
3	0	31	6.4	4	9.6	3	19.2
3	1	34	0	5	0	3	28.8
3	2	36	9.6	5	6.4	4	6.4
3	3	39	3.2	5	12.8	4	16
4	0	41	12.8	6	3.2	4	25.6
4	1	44	8	6	8	5	3.2
4	2	47	0	6	14.4	5	12.8
4	3	49	11.2	7	14.8	5	22.4
5	0	52	4.8	7	11.2	6	0



Comanche Peak

TEXAS UTILITIES SERVICES INC.

P. O. BOX 1002 • GLEN ROSE, TEXAS 76043

CPP-6206

December 21, 1981

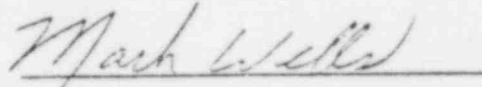
Mr. Jerry Arnold
Imperial Professional Coatings
P.O. Box 29077
New Orleans, Louisiana 70189

COMANCHE PEAK STEAM ELECTRIC STATION
CCP-40 VENDOR REVIEW

Dear Mr. Arnold,

Please find enclosed for review and comment one copy of construction procedure CCP-40 Rev. 3.

After your review please send all questions and/or comments to me directly. If further information is needed please advise.



Mark Wells
Architectural Engineer

MW/sgf

TXX-4201

06/22/84

Allegation No. 6

Procedure No. CCP-40, Rev. 5, page 5 of 13, paragraph 4.1.1.3 states: "Repair of embedded foreign objects such as nails, rebar chairs, bolts, wood or plastic shall be repaired per the following guidelines before application of Nutec lls surfacer." Have these systems been DBA qualified?

Evaluation of Validity

The application of Nutec lls over repaired embedded objects has not been DBA qualified, but this fact is without safety significance. The surface area of foreign objects embedded in concrete is negligible in proportion to the total area of any given concrete surface receiving coatings.

In any event there is substantial evidence that objects such as nails, rebar chairs, bolts, wood or plastic embedded in concrete does not affect the adhesion characteristics of Nutec lls.

1. Observations made in Imperial's labs over the years while preparing concrete coupons for DBA tests. The concrete blocks were formed in plywood, lattice like forms which occasionally transferred wood particles and splinters to the concrete surface. No failures were ever attributed to the wood in the concrete. Refer to attached Imperial letter dated March 8, 1984, Subject: Wood Splinters in Concrete.
2. Qualitative tests conducted by Imperial. These tests found that Nutec lls adhered to both rebar chairs (rubber and polyethylene). Refer to attached Imperial's letter dated March 8, 1984, Subject: Rebar Chairs.
3. Elcometer Adhesion tests performed at Comanche Peak. Results averaged well above the required minimum of 200 psi. Refer to attached Interoffice Memo dated June 19, 1978, Subject: Adhesion Test of Embedded Wood in Concrete. It is noteworthy that the mode of failure in five of the six adhesion dollies tested was concrete failure.

4. DBA data from Imperial. (Report No. 462-1-81 attached).

The purpose of the test was to evaluate the feasibility of applying Nutec 11S surfacer to steel embedded in concrete (i.e., Richmond inserts, steel embeds). These tests demonstrate adequate coating performance under DBA conditions.

Safety Significance

None

Generic Implications on Other Systems or Contractors

Not applicable

AG

Box 20077 New Orleans, Louisiana 70189 U S A 504-254-1433

IMPERIAL

PROFESSIONAL COATINGS

March 08, 1984

Mr. Jerry Firtel
c/o Tom Kelly - Civil Engineering
Comanche Peak Nuclear Station
P.O. Box 1002
Glen Rose, Texas 76043

SUBJECT: Wood Splinters in Concrete

Dear Jerry:

Attached is a copy of my letter of April 19, 1978 dealing with wood "splinters" embedded in concrete. I still concur with the opinion expressed in the 1978 letter based on the following:

1. Good sound painting practices. The surface preparation that was recommended is sufficient to remove loose particles. All that remains is intact, embedded material.
2. Visual inspection of embedded wood in concrete surfaces at Comanche Peak before and after surface preparation.
3. The small amount of surface area involved. The embedded material in question is not large pieces of wood, rather small hair-like splinters. The amount of wood in contact with the Nutec 11S surfacer is minimal compared with the concrete surrounding it.
4. Observations made in the lab over the years while preparing concrete coupons for DBA tests. Imperial's concrete blocks were formed in plywood, lattice-like forms which occasionally transferred wood particles and splinters to the concrete surface. No failures were ever attributed to wood in the concrete.

Jerry, if you have any questions please don't hesitate to call me.

Sincerely,

Jerry Arnold

cc: Jerry Firtel (Ebasco-NY)
Project Files
Reading Files

#6

Box 29077 New Orleans, Louisiana 70189 U.S.A. 504-254-1433

IMPERIAL

PROFESSIONAL COATINGS

March 08, 1984

Mr. Jerry Firtel
c/o Tom Kelly - Civil Engineering
Comanche Peak Nuclear Station
P.O. Box 1002
Glen Rose, Texas 76043

SUBJECT: Rebar Chairs

Dear Jerry:

My recommendation for handling rebar chairs in the past has been to use a mechanical tool such as a 3-M Roto Peen to cut the protruding tips flush with the concret surface while at the same time imparting a profile to insure adherence of the Nutec 11S.

Several years ago I conducted some qualitative tests on rebar chairs for another job site. I applied 11S to two types of rebar chairs; rubber and polyethylene. I found that the Nutec 11S adhered better to the rubber tips and Nutec 11S would adhere to polyethylene chairs with a rough profile. Because of the geometry of the rebar chairs Elcometer Adhesion tests are not feasible. I believe that jobsite adhesion tests would substantiate my findings.

Sincerely,

Jerry Arnold

cc: Jerry Firtel (Ebasco-NY)
Project Files
Reading Files

INTEROFFICE MEMO

IM-14473

TO: Pat Clarke

DATE: June 19, 1978

FROM: H. D. Hash, Jr.

SUBJECT: CPSES, Job No. 35-1195
Adhesion Test of Embedded Wood in Concrete

As embedded wood particles in concrete has become an increasing problem in surface preparation of concrete substrate, the following adhesion tests were performed in Room #197 E1. 810' Upper Auxiliary.

Testing Nutec #11, Reactic #1201 over existing wood particles:

Test #1

a. 900 PSI	Concrete Failure	
b. 750 PSI	Concrete Failure	
c. 800 PSI	Concrete Failure	Test #1 Avg PSI-816 PSI

Test #2

a. 650 PSI	Coating Failure
b. 800 PSI	Concrete Failure
c. 600 PSI	Concrete Failure

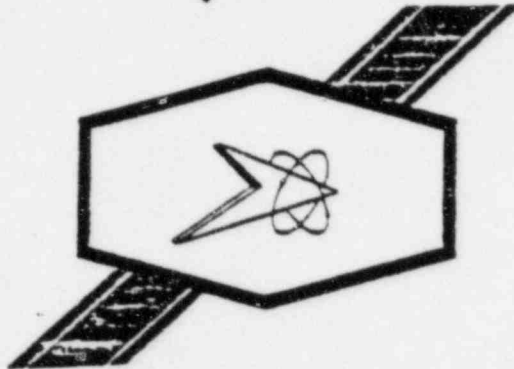
Test #2 Avg. PSI- 683 PSI

The overall test average of this room is 749 PSI, which exceeds the values recommended by Imperial Coatings VBR-7494, April 19, 1978. This should substantiate Imperial's opinion that embedded splinters and wood fuzz which cannot be removed by water blasting, will not be detrimental to the performance of the concrete coating system.

H. D. Hash, Jr.
H. D. Hash, Jr.
Level III Coating Inspector

cc: U. D. Douglas
-D. Sutton
O. B. Jones

Imperial



TECHNICAL REPORT

NUMBER

462-1-81

TITLE
REVISION

DESIGN BASIS ACCIDENT TEST RESULTS -NUTEC 11S OVER
CLEAN-N-STRIP AND ABRASIVE BLASTED STEEL

FOR

GENERAL USE

CUSTOMER

Submitted by: GERALD ARNOLD *SEA*

Approved:

ROBERT R. TAYLOR *RTS 2/19/82*

Date:

JANUARY 22, 1982

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

The information contained in this report, based upon our experience, is offered without charge as part of our service to customers. It is intended for use by persons having technical skill, at their own discretion and risk. We assume no liability in connection with its use. This information is not intended as a license to operate under, nor a recommendation to infringe, any patent covering any material or use.

Dupe 8511060158

SCOPE: The purpose of this test was to evaluate the feasibility of applying Nutec #11S surfacer to steel imbedded in concrete (i.e. Richmond inserts, Steel Imbeds) in Service Level I areas of nuclear power plants.

SUMMARY: Design Basis Accident test results from Oak Ridge National Laboratories indicate loss of adhesion on 11S coated specimens and #2 few blisters on 11S/1201 coated specimens which had previously been cleaned to bright metal with a 3M Clean-n-Strip cup wheel.

On the other hand no defects were observed on the 11S surfacer over abrasive blasted steel. Mixed results were obtained on 11S/1201 specimens which had been abrasive blasted. Two of four faces looked excellent; whereas the two remaining faces exhibited some blistering.

Of the eight 11S/abrasive blasted steel interfaces, five exhibited no defects and one contained very few #6 blisters (75% passing). Of the two faces which Oak Ridge National Laboratories reported as #2M, one appears marginal.

PROCEDURES: Eight 2" x 4" x 1/4" carbon steel panels were prepared for coating:

- a. Four were cleaned to bright metal with a 3M Clean-n-Strip cup wheel.
- b. Four were abrasive blasted per SSPC-SP-10, near white blast, with a working mix of G-80, G-70, G-40 steel grit to achieve a surface profile of 2.0 mils.

Nutec #11S was applied to all eight panels over a two day period (one face of each panel a day). Nutec 1201 was then applied to two Clean-n-Strip panels and two blasted panels. Details of the application and curing are outlined on the attached panel preparation sheets.

The coated panels were then submitted to Oak Ridge National Laboratories for Design Basis Accident testing, with maximum 385°F. and 70 psig parameters.

The tested panels were evaluated by ORNL personnel immediately upon removal from the autoclave and reinspected by Imperial following shipment of the panels back to New Orleans.

CONCLUSIONS:

Based on the test results, application of Nutec 11S is not recommended (for surfaces greater than two square inches) over clean-n'-strip prepared steel in containment areas which would be exposed to the temperature and pressure conditions observed in this test.

Application of Nutec 11S is recommended for overlap on steel imbeds (maximum 2 inches overlap) and over imbedded steel objects (up to six square inches), which have been abrasive blasted or prepared with power tools which impart a surface profile (i.e., roto peen).

Of the eight abrasive blasted faces coated with Nutec 11S, five exhibited no defects and one contained only very few #6 size blisters. Oak Ridge also reported one face of panel 7829 (rear) as having #2 medium blisters. Imperial evaluated the panels thoroughly and believes that ORNL mistakenly evaluated the same face (front side) twice. Imperial has reevaluated the rear of panel 7829 to only few #4 blisters. The front side of panel 7829 was borderline.

Therefore, of the eight abrasive blasted faces tested, Imperial finds that seven comply with the ANSI N101.2 acceptance criteria (no larger than #4 few blisters) and the eight face is borderline. This amounts to an 87.5% success rate.

NOTE: Technical reports #353-80 and #413-80 relate Elcometer adhesion test data of Nutec 11S over abrasive blasted and power tool cleaned steel surfaces. These reports are recommended for review, especially for Service Level II and Balance of Plant service, when DBA testing is not required, that is, where the coating system will not be subjected to Loss of Coolant Accident conditions.

PANEL PREPARATION SHEETS

DEA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED: NUTEC #11S
2. TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2" x 4" x 1/4"
3. SURFACE PREPARATION (Describe): Clean-n-Strip cleaned to bright metal
4. PRODUCT DATA: SAMPLE NO.(s): 7822
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED: N/A

<u>COAT</u>	<u>PRODUCT</u>	<u>PRODUCT CODES</u>	<u>BATCH #</u>	<u>APPLICATION METHOD</u>	<u>CONDITIONS R/M(°F)&R.H.</u>	<u>THICKNESS (ins.)</u>	<u>TIME & DATE APPLIED</u>
Front	NUTEC	#11S	2417 2102 2103	Squeegee	86/73	.022-.027	9/25/8
Back	NUTEC	#11S	2417 2102 2103	Squeegee	84/76	.021-.027	9/26/8

6. CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS

7. TEST PROCEDURE: DEA

8. TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED: Harold C. Arnold

TEST REPORT NO. 462-81

DBA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

PRODUCT TO BE TESTED: Nutec #11S
TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2 x 4 x 1/4"
SURFACE PREPARATION (Describe): Clean-n-Strip cleaned to bright metal

PRODUCT DATA: SAMPLE NO.(s): 7823
DATE AND TIME CURING COMPOUND OR PRIMER APPLIED N/A

<u>LOC</u>	<u>PRODUCT</u>	<u>PRODUCT CODES</u>	<u>BATCH #</u>	<u>APPLICATION METHOD</u>	<u>CONDITIONS R/M(°F)&R.H.</u>	<u>THICKNESS (ins.)</u>	<u>TIME & DATE APPLIED</u>
Front	NUTEC	#11S	2417 2102 2103	Squeegee	86/73	.022-.027	9/25/80
Back	NUTEC	#11S	2417 2102 2103	Squeegee	84/76	.021-.027	9/26/80
		--					

CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS

TEST PROCEDURE: DBA

TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED BY: _____
DATE: 1/22/82
PREPARED BY: Maurine Lee
DATE: 1/16/81
TEST REPORT NO.: 462-1-81

DBA AND RADIATION TOLERANCETEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED: NUTEC #115
2. TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2" x 4" x 1/4"
3. SURFACE PREPARATION (Describe): Clean-n-Strip cleaned to bright metal.
4. PRODUCT DATA: SAMPLE NO.(s): 7824
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED: N/A

<u>COAT</u>	<u>PRODUCT</u>	<u>PRODUCT CODES</u>	<u>BATCH #</u>	<u>APPLICATION METHOD</u>	<u>CONDITIONS R/M(°F) & R.H.</u>	<u>THICKNESS (ins.)</u>	<u>TIME & DATE APPLIED</u>
Front	NUTEC	#115	2417 2102 2103	Sugeegee	86/73	.018-.026	9/25/80
Back	NUTEC	#115	2417 2102 2103	Squeegee	84/76	.018-.025	9/26/80
	NUTEC	#1201	1958/1959	Spray	74/78	F- .003-.004 B- .006-.007	10/1/80

Total Dry Film Thickness Range - Front .021 -.030
Back .024 -.032

6. CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS

7. TEST PROCEDURE: DBA

8. TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED: Harold C. Currier

TEST REPORT NO. 462-81

DBA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED: NUTEC #11S
2. TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2" x 4" x 1/4"
3. SURFACE PREPARATION (Describe): Clean-n-Strip cleaned to bright metal
4. PRODUCT DATA: SAMPLE NO. (s): 7825
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED: N/A

<u>COAT</u>	<u>PRODUCT</u>	<u>PRODUCT CODES</u>	<u>BATCH #</u>	<u>APPLICATION METHOD</u>	<u>CONDITIONS R/M (°F) & R.H.</u>	<u>THICKNESS (ins.)</u>	<u>TIME & DA APPLIE</u>
Front	NUTEC	#11S	2417 2102 2103	Squeegee	86/73	.021-.026	9/25
Back	NUTEC	#11S	2417 2102 2103	Squeegee	84/76	.018-.024	9/26
	NUTEC	#1201	1958/1959	Spray	74/78	F- .003-.004 B- .004-.006	10/1

Total Dry Film Thickness Range - Front .024-.030
Back .022-.030

6. CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS

7. TEST PROCEDURE: DBA

8. TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED: Harold E. Arnold
TEST REPORT NO. 462-81

DBA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED: NUTEC #11S
2. TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2" x 4" x 1/4"
3. SURFACE PREPARATION (Describe): Abrasive blasted per SSPC-SP-10, near white blast, with a surface profile of 2.0 mils as read on a Keane-Tator Profile Comparator Disc.
4. PRODUCT DATA: SAMPLE NO.(s): 7826
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED: N/A

<u>COAT</u>	<u>PRODUCT</u>	<u>PRODUCT CODES</u>	<u>BATCH #</u>	<u>APPLICATION METHOD</u>	<u>CONDITIONS R/M(°F)&R.H.</u>	<u>THICKNESS (ins.)</u>	<u>TIME & DA APPLIED</u>
Front	NUTEC	#11S	2417 2102 2103	Squeegee	86/73	.020-.050	9/25/
Back	NUTEC	#11S	2417 2102 2103	Squeegee	84/76	.024-.030	9/26/

6. CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS

7. TEST PROCEDURE: DBA

8. TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED: Frank C. Anstett

TEST REPORT NO. 462-81

DBA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED: NUTEC #115
2. TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2" x 4" x 1/4"
3. SURFACE PREPARATION (Describe): Abrasive blasted per SSPC-SP-10, near white blast, with a surface profile of 2.0 mils as read on a Keane-Tator Profile Comparator Disc.
4. PRODUCT DATA: SAMPLE NO.(s): 7827
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED: N/A

<u>COAT</u>	<u>PRODUCT</u>	<u>PRODUCT CODES</u>	<u>BATCH #</u>	<u>APPLICATION METHOD</u>	<u>CONDITIONS R/M(°F)&R.H.</u>	<u>THICKNESS (ins.)</u>	<u>TIME & DATE APPLIED</u>
Front	NUTEC	#115	2417 2102 2103	Squeegee	86/72	.018-.026	9/25/8
Back	NUTEC	#115	2417 2102 2103	Squeegee	84/76	.021-.027	9/26/8

6. CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS

7. TEST PROCEDURE: DBA

8. TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED: Donald E. Carter

TEST REPORT NO. 462-61

DBA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED: NUTEC #115
2. TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2" x 4" x 1/4"
3. SURFACE PREPARATION (Describe): Abrasive blasted per SSPC-SP-10, near white blast, with surface profile of 2.0 mils as read on a Keane-Tator Profile Comparator Disc.
4. PRODUCT DATA: SAMPLE NO.(s): 7828
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED: N/A

<u>COAT</u>	<u>PRODUCT</u>	<u>PRODUCT CODES</u>	<u>BATCH #</u>	<u>APPLICATION METHOD</u>	<u>CONDITIONS R/M(°F)&R.H.</u>	<u>THICKNESS (ins.)</u>	<u>TIME & DATE APPLIED</u>
Front	NUTEC	#115	2417 2102 2103	Squeegee	86/73	.022-.027	9/25/
Back	NUTEC	#115	2417 2102 2103	Squeegee	84/76	.015-.020	9/26/
	NUTEC	#1201	1958 1959	Spray	74/78	F- .003-.004 B- .006-.007	10/1/

Total Dry Film Thickness Range - Front .025-.031
Back .021-.027

6. CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS
7. TEST PROCEDURE: DBA
8. TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED: Donald E. Arnold

TEST REPORT NO. 462-81

DBA AND RADIATION TOLERANCETEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED: NUTEC #115
2. TYPE SUBSTRATE: ASTM A-36 Carbon Steel SIZE: 2" x 4" x 1"
3. SURFACE PREPARATION (Describe): Abrasive blasted per SSPC-SP-10, near white blast, with a surface profile of 2.0 mils as read on a Keene-Lator Surface Profile Comparator.
4. PRODUCT DATA: SAMPLE NO.(s): 7829
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED: N/A

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) & R.H.	THICKNESS (ins.)	TIME & DATE APPLIED
Front	NUTEC	#115	2417 2102 2103	Squeegee	86/73	.022-.027	9/25/
Back	NUTEC	115	2417 2102 2103	Squeegee	84/76	.020-.050	9/26/
	NUTEC	#1201	1958 1959	Spray	74/78	F- .002-.003 B- .006-.007	10/1/

Total Dry Film Thickness Range - Front .024-.030
Back .026-.057

6. CURING CONDITIONS: AMBIENT TEMP. 80-90 °F REL. HUMIDITY 70-80
MINIMUM CURE 17 DAYS
7. TEST PROCEDURE: DBA
8. TESTING PERFORMED BY: Oak Ridge National Laboratories DATE SUBMITTED 10/13/80

APPROVED: Harold E. Arnold
TEST REPORT NO. 462-81

ORNL PROCEDURES

Manufacturer: Imperial
New Orleans, LA

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: 11/13/80

Report of Irradiation and DBA Testing

The irradiation and design basis accident (DBA) tests are conducted, respectively, in accordance with Bechtel Corp. *Standard Specification Coatings for Nuclear Power Plants*, specs. CP-951 and CP-956 (or with modifications as noted in Table 2, DBA test conditions). The tests are designed to meet the specifications set in both A.N.S.I. 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 the irradiation tests, the 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 (HFIR) at ORNL, as the source of radiation. These fuel assemblies are stored under 20 feet 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 the 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 rads/hr.

The fuel assembly is 20 inches high. A 20-foot long, 3-1/2-inch diameter pipe, with one end capped, is used for the air irradiation tests. The capped end is lowered into the four-inch opening of the center of the fuel assembly. The open end, above the 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. The 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 Calvin F. Hinkle

Approved L. T. Anderson

Manufacturer: Imperial
New Orleans, LA

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: 11/13/80

ORNL Log Book No. A 7562; A10-29-80

Table 1. DBA solution composition, distilled water

Reagent	Concentration
Boric acid, H_3BO_3	6200 ppm
Hydrazine, NH_2NH_2	50 ppm
Trisodium phosphate, $Na_3PO_4 \cdot 12H_2O$	Required to adjust pH to 9.7

Table 2. DBA test conditions

Time	Temperature (°F)	Pressure (psig)	Comments
Start	214		Autoclave preheated.
58 s	385	68	Steam injected.
10 min	385	70	Pressure maintained by relief valve.
4 min	385-340	70	
6 h	340	70	
20 s	220	30	Spray solution added at 75°F.
20 min	220-250	30	Adjusted pressure with N_2 .
4 days	250	30	
20 s	170	-15	Fresh spray solution added after draining autoclave.
25 min	170-200	10	
3 days	200	10	

Evaluated

Approved

[Signature]
[Signature]

TEST RESULTS

OAK RIDGE NATIONAL LABORATORY

OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION



POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

November 13, 1980

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

Dear Jerry:

The enclosed report contains test results recently obtained on the Imperial protective coatings. This test was designed to encompass the 385 and the 340°F envelope curves.

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

Sincerely,

L. T. Corbin
L. T. Corbin, Section Head
Analytical Chemistry Division

LTC:dmw

Enclosures

Manufacturer: Imperial
New Orleans, LA

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: 11/13/80

System Identification

x Steel panel Concrete block

11S (clean n'strip)

DBA Test Results

ORNL Master Analytical Manual Method No. 2-0922.
ORNL Log Book No. A 7562; A10-29-80

<u>Sample No.</u>	<u>DBA phase</u>	<u>Comments</u>
7822	spray	Front: loss of adhesion. Rear: loss of adhesion.
7823	spray	Front: blisters, #2 few. * Rear: blisters, #2 few.

* Following shipment back to Imperial,
inspection revealed areas of delamination
on both sides.

SEA

Evaluated *Robert P. Rapp*
Approved *L. T. Conklin*

Manufacturer: Imperial
New Orleans, LA

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: 11/13/80

System Identification

x Steel panel Concrete block

11S/1201 (clean n'strip)

DBA Test Results

ORNL Master Analytical Manual Method No. 2 0922.
ORNL Log Book No. A 7562; A10-29-80

<u>Sample No.</u>	<u>DBA phase</u>	<u>Comments</u>
7824	spray	Front: blisters, #2 few. Rear: blisters, #2 few.
7825	spray	Front: blisters, #2 few. Rear: blisters, #2 few.

Evaluated Ralph L. Rye

Approved W. T. Cortina

Manufacturer: Imperial
New Orleans, LA

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: 11/13/80

System Identification

x Steel panel Concrete block

115

DBA Test Results

ORNL Master Analytical Manual Method No. 2 0922.
ORNL Log Book No. A 7562; A10-29-80

<u>Sample No.</u>	<u>DBA phase</u>	<u>Comments</u>
7826	spray	Front: coatings intact, no defects. Rear: coatings intact, no defects.
7827	spray	Front: coatings intact, no defects. Rear: coatings intact, no defects.
--	--	--

Evaluated

Approved

Robert L. Ryle
Le T. R. Ryle

Manufacturer: Imperial
New Orleans, LA

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: 11/13/80

System Identification

x Steel panel Concrete block

115/1201

DBA Test Results

ORNL Master Analytical Manual Method No. 2 0922.
ORNL Log Book No. A 7562; A10-29-80

<u>Sample No.</u>	<u>DBA phase</u>	<u>Comments</u>
7828	spray	Front: coatings intact, no defects. Rear: blisters, #6 few.
7829	spray	Front: blisters, #2 medium. * Rear: blisters, #2 medium.

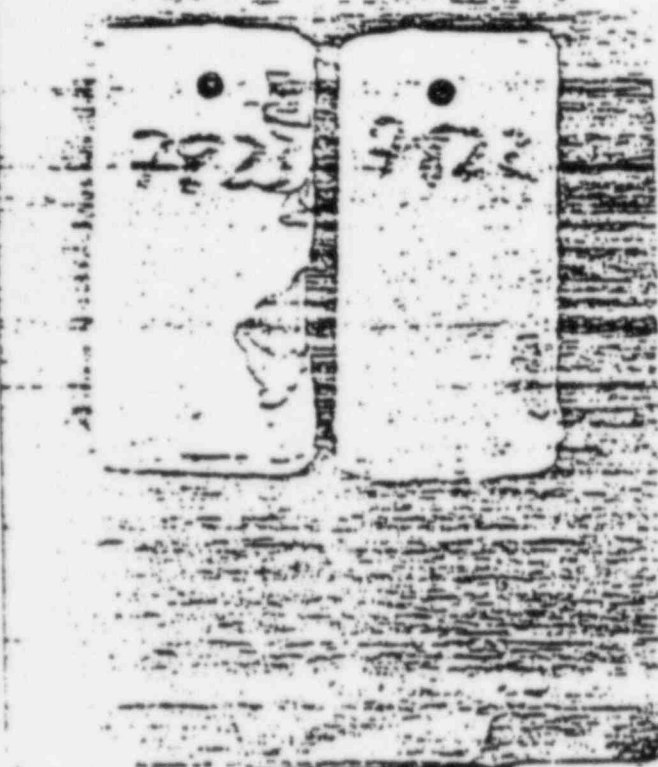
* *Imperial inspection of panels*

Front: #2-#4, few-medium (borderline)

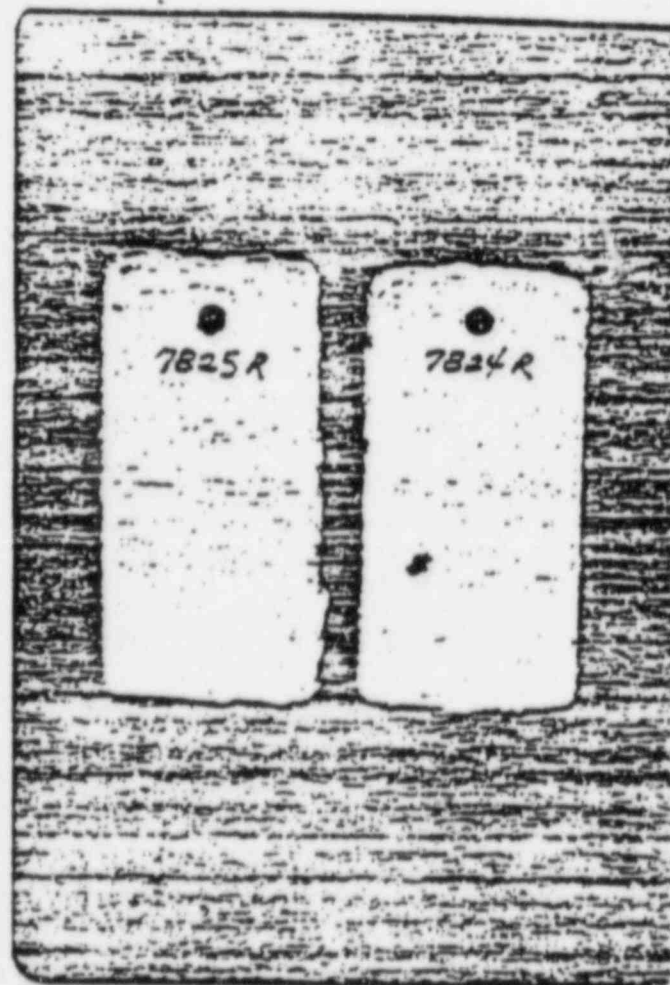
Rear: #4 few

Evaluated *Paul L. Apple*

Approved *L. T. Corbin*



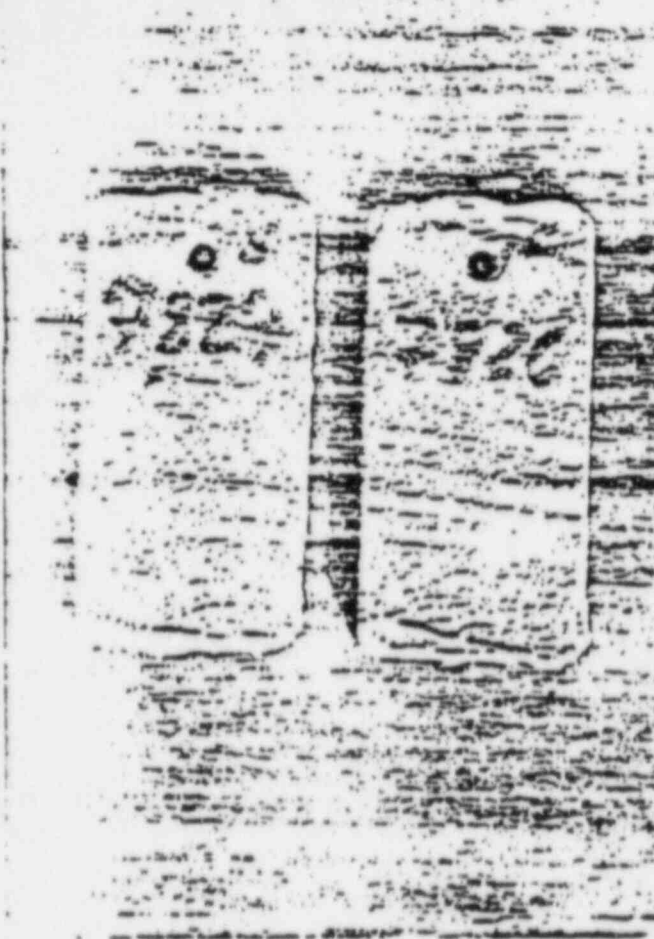
7822-7823



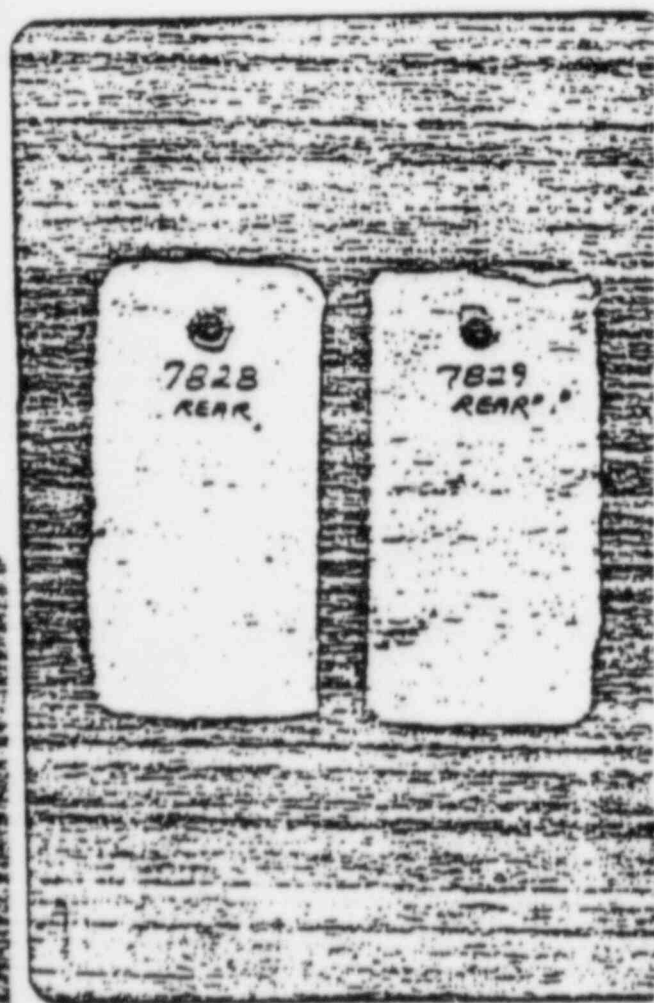
7824-7825 R



7824-7825



7826-7827

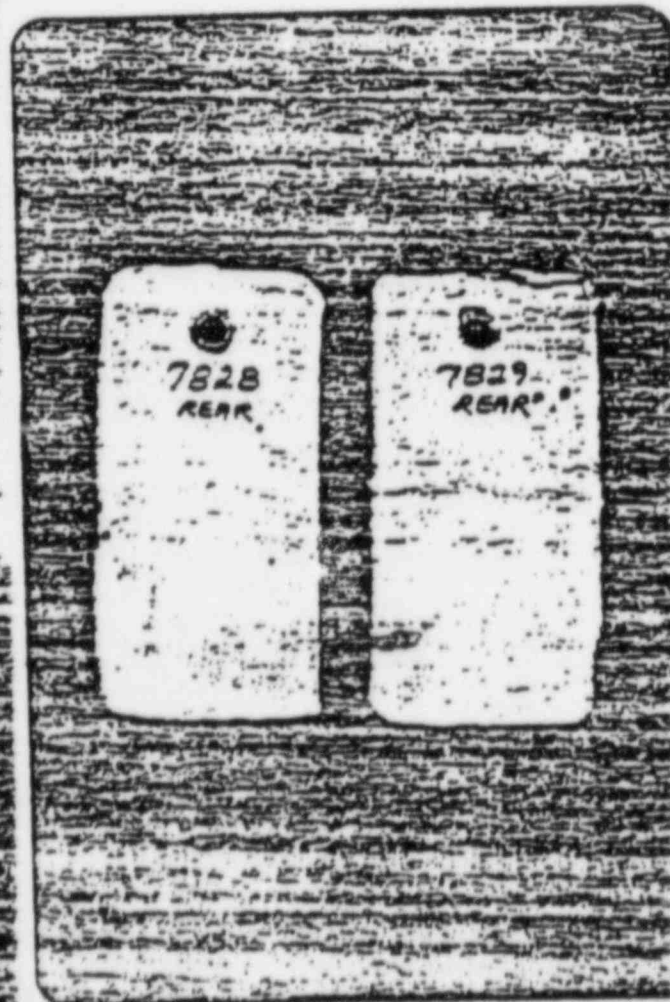


7828-7829 R

7826-7829

Technical Report 462-81

7826-7827



7828-7829 R



7826-7829

TXX-4249

August 10, 1984

QUESTIONS RELATIVE TO ALLEGATION NO. 6

- a) How much area is involved? Provide the basis for the area. Identify the NCR/DCA that places this item in the CEL.

Response:

- a) The information requested is not available. These areas are not on the exempt log.

BNL/CPSES TRT ALLEGATION DATA FILE (L2) - ALLEGATION NUMBER 06 - CONCERNING 06 NUTECH IIS OVER FOREIGN OBJECTS DBA PERMITTED BY CCP-40 REV. 5 PARA 4.1.1.3 OVER NAILS, REBAR CHAIRS, WOOD, ETC., BUT NOT DBA TESTED

--- ACTION ITEMS ---

1. VERIFY ACCURACY OF AREA FIGURE FROM LICENSEE.
- 2.
- 3.

BNL/CPSES TRT ALLEGATION DATA FILE (L2) - ALLEGATION NUMBER 07 - CONCERNING CONCRETE COATING REPAIR WON'T FIX CRACKS REPAIR METHOD PER NCR C83-01986 WILL NOT SUCCEED IN REMEDYING CAUSE OF CRACKS AND FLAKING IN COATING

--- ACTION ITEMS ---

1. PASS ON TO QA / ACTION TO FIX PROCEDURES PER IMPL
2. VERIFY LICENSEE'S RESPONSE
- 3.

BNL/CPSES TRT ALLEGATION DATA FILE (L2) - ALLEGATION NUMBER 08 - CONCERNING ZINC OVER ZINC RESIDUE ADHESION CCP-30 REV. 11 PARA 4.1.3 ALLOWS THIS BUT ADHESION AND GALVANIC PROTECTION FAILURES WILL RESULT

--- ACTION ITEMS ---

- 1.
- 2.
- 3.

BNL/CPSES TRT ALLEGATION DATA FILE (L2) - ALLEGATION NUMBER 09 - CONCERNING THREE COAT SYSTEM OF ZINC DBA Q1-QP-11.4.5 REV. 27 PARA 3.2.4 PERMITS ONLY 2 COATS, BUT 3 COATS HAVE BEEN APPLIED WITH NO DBA

--- ACTION ITEMS ---

- 1.
- 2.
- 3.

BNL/CPSES TRT ALLEGATION DATA FILE (L2) - ALLEGATION NUMBER 10 - CONCERNING POWER TOOL SURF. PREP. DBA Q1-QP-11.4.5, REV. 27 PARA 3.2.2.3 ALLOWS MANY POWER TOOLS - NOT DBA TESTED & DOESN'T GIVE PROFILE

--- ACTION ITEMS ---

1. VERIFY NEW PROCEDURE REV. TO SPECIFY PROPER TOOLS
2. INVESTIGATE SIZE OF TOTAL AREA INVOLVED.
3. CHK SAMPLE PANELS-HOW CERTIFIED-RECORDS SHOW TOOLS

BNL/CPSES TRT ALLEGATION DATA FILE (L2) - ALLEGATION NUMBER 11 - CONCERNING PRIMER THICKNESS OF .5 MILS DBA PERMITTED BY DCA 18,489, REV. 1, BUT NOT DBA TESTED

--- ACTION ITEMS ---

1. VERIFY ACCURACY OF AREA FIGURE FROM LICENSEE.
- 2.
- 3.

NOTE TO FILE

30 AUG 84

W. C. NEWS

THE IMPERIAL DBA REPORT
PROVIDED TO DEMONSTRATE ACCEPTABILITY
OF IMPERIAL OVER EMBEDDED STEEL
IS NOT ACCEPTABLE BECAUSE A
NUMBER OF THE TEST COUPONS
FAILED (LOSS OF ADHESION, BLISTERS
> #4 ROW, ETC.)

W. C. News

30 AUG 84