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TITLE: PROTECTIVE COATING OF CONCRETE SURFACES		ORIGINATOR: <u>Mark Wells</u> <u>5/10/82</u> DATE REVIEWED BY: <u>N/A CPES</u> <u>B&amp;R QA</u> <u>5/10/82</u> <u>TUGZO QA</u> DATE APPROVED BY: <u>Dr. Frankum</u> <u>5-10-82</u> CONSTRUCTION PROJECT MANAGER DATE			

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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)				



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3.0	<u>SPECIAL ITEMS AND OPERATIONS</u>				
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.				



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### 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.





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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 mill scale and solvent wiped to remove any grease or oil.



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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

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

#### INDUCTION TIMES

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



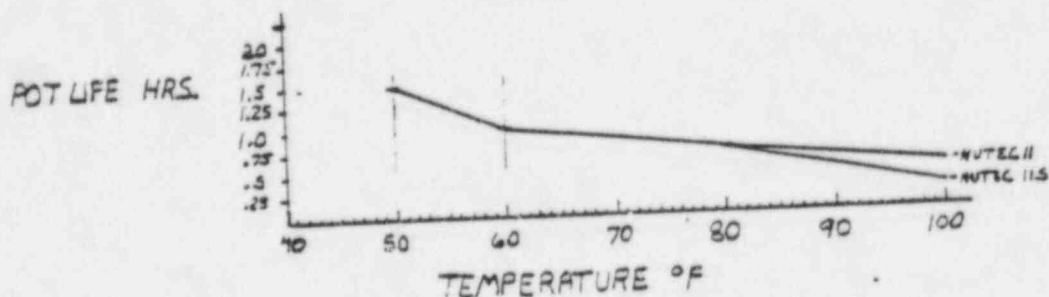
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#### 4.3 APPLICATION OF SURFACER & FINISH COATING

##### 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 hours 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 between 50°F and 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:



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- 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.



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#### TEMPERATURE °F

50-59  
60-69  
70-79  
80-89  
90-100

#### FULL CURE 11, 11S

10 days  
8 days  
7 days  
6 days  
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	3-16 Mils

#### Areas other than Service Level 1

NUTEC 11S	10-60 Mils
NUTEC 11	3-20 Mils
Reactic 1201	3-16 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 blow off with compressed air, washed with water or DL-54 thinner (No. Q) and coated with NUTEC 11S or NUTEC 11 until the desired film thickness is achieved.





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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.			
4.3.1.12	Repair of Scratches and Similar Damage - Any scratches or damaged areas shall be abraded by hand or mechanical methods until loosely adherent particles are removed. If the damaged area extends to concrete and is $\frac{1}{4}$ " or less in diameter additional surfacer need not be applied. If the damage extending to concrete substrate is greater than $\frac{1}{4}$ " in diameter but 2 sq. inches or less in area, the area may be repaired with 11 or 11S for surfacer prior to topcoating. Damages involving areas larger than that stated above shall be repaired with normal coating system.			

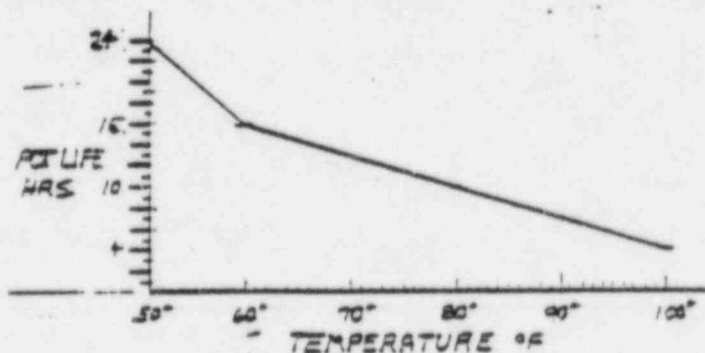


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#### 4.3.2 Finish

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 between 50°F and 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 Imperial DL-6A thinner. It is normally advisable to use more thinner at lower temperatures and when using conventional spray equipment.



2. Thickness of 1201 topcoat for Service Level 1 and Service Level II areas 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%.



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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 - Runs or sags showing evidence of cracking must be removed. Runs or sags inside Service Level 1 areas which exhibit no other coating defects, shall be abraded to the thickness of adjoining coating. Runs or sags outside Service Level 1 areas which exhibit no other coating defect need not be removed.
- 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  $\frac{1}{4}$ " or less in diameter, the damaged area may be coated with Reactic #1201. If the damaged area extending to concrete substrate is greater than  $\frac{1}{4}$ " in diameter by 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.



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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 preparation if blasting or bush hammering is to be utilized and following all methods of 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.				
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	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 Coating" 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				



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ATTACHMENT 1  
Painter Qualification Record

GENERAL DATA

Date \_\_\_\_\_ Report Number \_\_\_\_\_

TECHNICAL DATA

Name of Painter \_\_\_\_\_

Summary of Field Experience \_\_\_\_\_

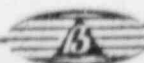
Experience with Following Product Types \_\_\_\_\_

Application Test for Specified Substrate \_\_\_\_\_

Additional Qualifications (School) \_\_\_\_\_

Signature \_\_\_\_\_  
Applicator's Field Supervisor

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





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## ATTACHMENT 2

NOTES 11s

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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	96	0	6.4	0	9.6
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	8	2	22.4
2	2	26	3.2	3	14.4	3	0
2	3	23	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



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	REVIEWED BY:	<i>H. J. ...</i> 11/3/81 B&R QA <i>C. J. ...</i> 11/2/81 UGCC QA DATE		
	APPROVED BY	<i>D. J. ...</i> 11/4/81 CONSTRUCTION PROJECT MANAGER DATE		

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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	

**VOID**



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Construction Procedure  
DOCUMENT CHANGE NOTICE NUMBER 6

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 9 of 13  
Page 11 of 13  
Page 12 of 13

Reason for change: Change in requirements

Reviewed by:

Mark Wells 5482 NA CDB  
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

[Signature] 5/6/82  
TUGCO Quality Assurance Date

Approved by:

[Signature] 5-1-82  
Construction Project Manager Date

5/10/82  
Effective Date



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INDEXED

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Comanche Peak Steam Electric Station

DATE

Sheet 1 of 2

Construction Procedure  
DOCUMENT CHANGE NOTICE NUMBER 5

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 page with the attached:

Page 13 of 13

Reason for change: Additional requirements

Reviewed by:

R. H. Davis 2-16-82  
Originator Date

M. A. Root 3/16/82  
Brown & Root Quality Assurance Date

Reviewed by:

Approved by:

R. A. Cumming 2/17/82  
TUGCO Quality Assurance Date

D. C. Zuercher 2-17-82  
Construction Project Manager Date

2/17/82  
Effective Date





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DATE:

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Construction Procedure  
DOCUMENT CHANGE NOTICE NUMBER 4

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 11 of 13

Reason for change: Change in requirement

This change approved by:

Reviewed by:

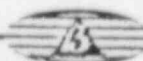
Mark Weller 1-18-82 N/A Anderson for JPC 1-18-82  
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

Reviewed by:

R.C. Cunningham 1-18-82  
TUGCO Quality Assurance Date

O. Frank 1-19-82 1/19/82  
Construction Project Manager Date Effective Date



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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:

Marks Wilson 11-13-81  
Originator Date

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

Reviewed by:

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

O. D. Hankins 11/17/81  
Construction Project Manager Date

11/18/81  
Effective Date



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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  
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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. E. Frankum 11/13/81  
Construction Project Manager Date

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

11/16/81  
Effective Date



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DOCUMENT CHANGE NOTICE NUMBER 1

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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 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



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1.0 INTRODUCTION

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 DEFINITIONS OF TERMS, ABBREVIATIONS AND SYMBOLS

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)





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### 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.



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### 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

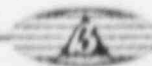
3.5.2.1 When coating materials are needed in the field, they shall be transferred from the controlled storage area to temporary storage in the field. If damage occurs in transit from storage area, material will be consigned to "Non-Q" storage; damage shall mean a broken seal.

### 4.0 PROCEDURE FOR COATING

#### 4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

##### 4.1.1 Preparation for Surfacer

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.



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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 Xylol. 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 mill scale and solvent wiped to remove any grease or oil.



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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

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

#### INDUCTION TIMES

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



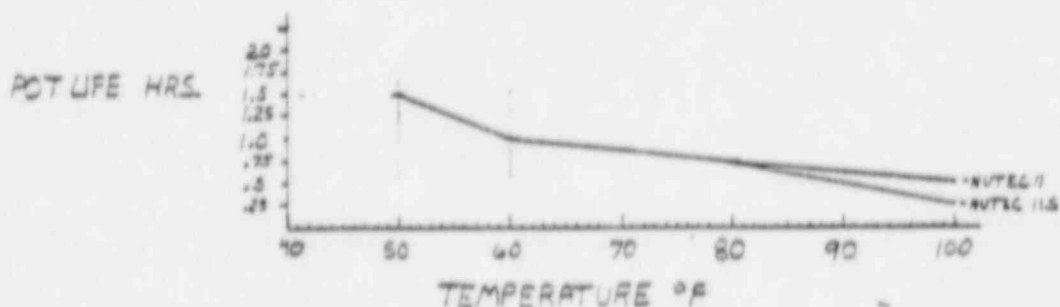
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#### 4.3 APPLICATION OF SURFACER & FINISH COATING

##### 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 hours 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 between 50°F and 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:

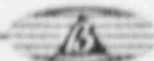
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- a. Reduced viscosity of 11S during application, and excessive sagging from bug holes.
  - b. Wet rings around bug holes.
  - c. Failure of 11S to adhere to the substrate during the squeegeeing or trowelling process.
  - d. Visible signs of surface 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.





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TEMPERATURE °F	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.

- 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.
- 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.
- 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.

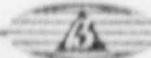
4.3.1.2 Imperial coatings may be applied in the following sequential order: #11S/1201/11S/1201 or 11S/1201/11/1201. Millage requirements per coat are as follows:

Service Level 1	
NUTEC 11S	10-35 Mils
NUTEC 11	3-20 Mils
Reactic 1201	3-16 Mils

Areas other than Service Level 1	
NUTEC 11S	10-60 Mils
NUTEC 11	3-20 Mils
Reactic 1201	3-16 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.



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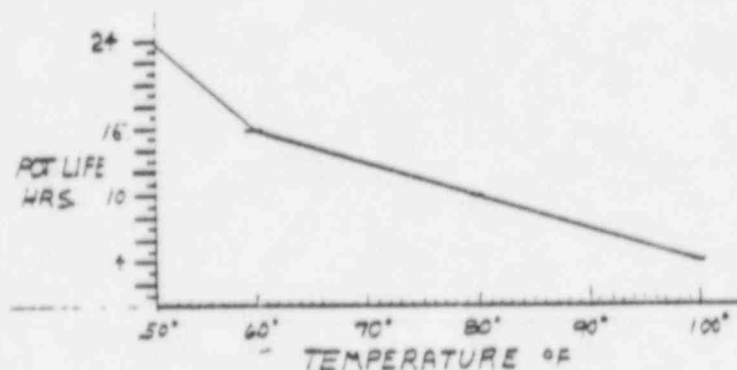
- 4.3.1.4 Repair of Pinholes, blowholes, or overworked areas - Remove any contaminants by compressed air or clean water. Apply NUTEC 11 to the defective area and work back and forth to fill in area. NUTEC #11S surfacer may be smoothed by spraying a mist of Imperial DL-54 thinner on the #11S film 15-30 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.

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#### 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 between 50°F and 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 Imperial DL-6A thinner. It is normally advisable to use more thinner at lower temperatures and when using conventional spray equipment.



2. Thickness of 1201 topcoat for Service Level 1 and Service Level II areas 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%.



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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 - Runs or sags showing evidence of cracking must be removed. Runs or sags inside Service Level 1 areas which exhibit no other coating defects, shall be abraded to the thickness of adjoining coating. Runs or sags outside Service Level 1 areas which exhibit no other coating defect need not be removed.

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 ¼" or less in diameter, the damaged area may be coated with Reactic #1201. If the damaged area extending to concrete substrate is greater than ¼" in diameter by 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.



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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 preparation if blasting or bush hammering is to be utilized and following all methods of 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 SUPPORTING INFORMATION

##### 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 Coating" 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

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# 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)







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ATTACHMENT 3  
TABLE FOR PARTIAL MIXES OF REACTIC #1201

Gal.	Qts.	Base		Cure		Maximum Permissible Thickness	
		lbs.	oz.	lbs.	oz.	qts.	oz.
0	1	2	9.6	0	6.4	0	9.6
0	2	5	3.2	0	12.8	0	19.2
0	3	8	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	16.4	3	1.6	2	12.8
2	1	23	8	3	0	2	22.4
2	2	25	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



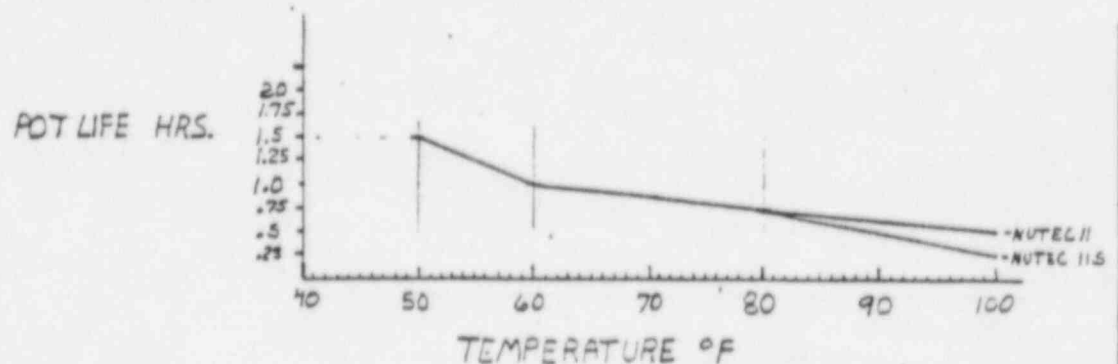
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#### 4.3 APPLICATION OF SURFACER & FINISH COATINGS

##### 4.3.1 Surfacers Coat

4.3.1.1 Coating material shall be applied using a bottom feed conventional pressure pot-mastic gun set-up, quick spray hopper, or a conventional pump mastic gun arrangement. 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 GEI-20 and patched per CCP-12 may be coated after 48 hours 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:

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4.3.1.4	<p>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.</p>			
4.3.1.5	<p>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.</p>			
4.3.1.6	<p>Repair of Sags and Runs - Inside containment, if in excess of 35 mils, runs or sags will be abraded down to adjoining thickness. Outside containment, if coating is sound, sags and runs will not be repaired.</p>			
4.3.1.7	<p>Repair of Embedded Foreign Particles - Embedded foreign particles shall be removed by abrading. If pinholes or discontinuities exist, then area shall be repaired in accordance with Section 4.3.1.4.</p>			
4.3.1.8	<p>Treatment of Rust Stains - Remove residue, though not necessarily the stain, with bristle brush and water or Imperial Thinner #DL-54.</p>			
4.3.1.9	<p>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.</p>			
4.3.1.10	<p>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.</p>			
4.3.1.11	<p>Coating of Expansion Joints - Expansion joints will not be coated. Coatings will be feathered back at the edges.</p>			

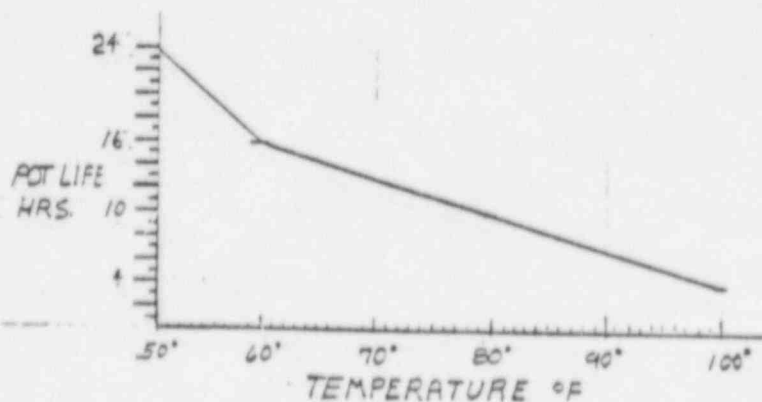


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#### 4.3.2 Finish

4.3.2.1 Finish coating shall be applied using the same or similar type of equipment as used for the surfacer. If needed, a brush may also be used. 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 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 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 10% by volume with Imperial DL-6A thinner. It is normally advisable to use more thinner at lower temperatures. If required, Reactic #1201 may be thinned as much as 30% by volume.



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%.



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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.

##### 4.2.2 Finish Coat

4.2.2.1 The finish coat, REACTIC #1201, is a two component epoxy topcoat consisting of a base and cure. These shall be thoroughly mixed under constant agitation until a homogenous blend is achieved. Minimum induction times shall be as follows:

#### TEMPERATURE °F

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

#### INDUCTION TIME

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

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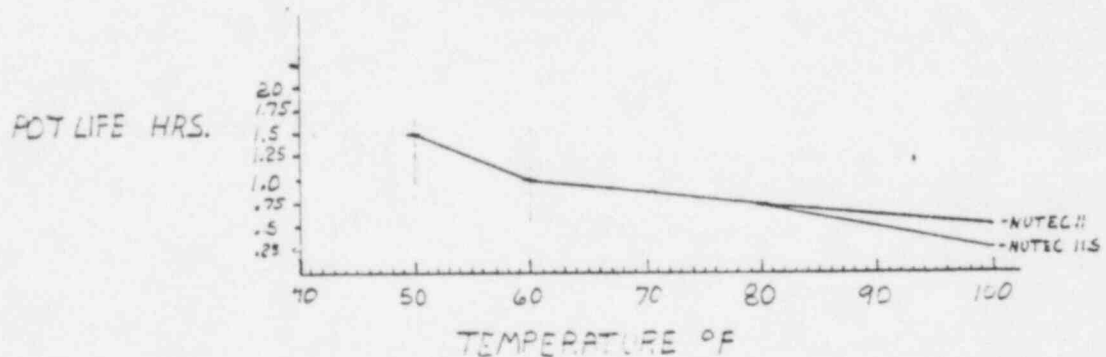
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#### 4.3 APPLICATION OF SURFACER & FINISH COATING

##### 4.3.1 Surfacers Coat

4.3.1.1 Coating material shall be applied using a bottom feed conventional pressure pot-mastic gun set-up, quick spray hopper, or a conventional pump mastic gun arrangement. 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 hours 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 between 50° and 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 IIS be applied to a surface containing free standing water. Free standing water may be identified by:

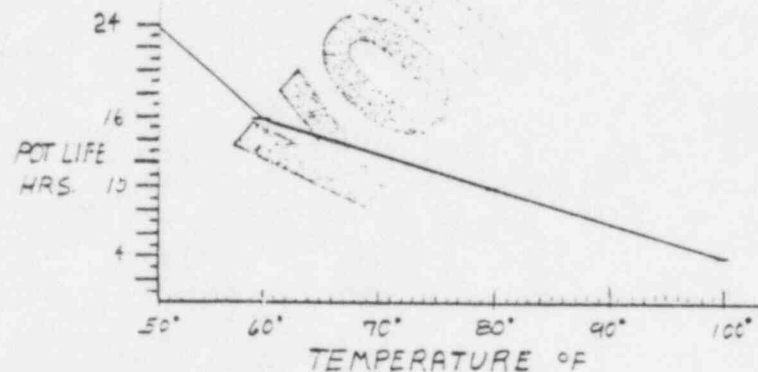


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#### 4.3.2 Finish

4.3.2.1 Finish coating shall be applied using the same or similar type of equipment as used for the surfacer. If needed, a brush may also be used. 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 temperatures shall be between 50° and 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 10% by volume with Imperial DL-6A thinner. It is normally advisable to use more thinner at lower temperatures. If required, Reactic #1201 may be thinned as much as 30% by volume.



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%.



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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				
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				



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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, voids or depressions in the concrete surface that exceed 2" in diameter and 1/2" depth shall be repaired with dry pack or an epoxy grout. Voids which are greater than 2" in diameter but less than 1/2" in depth need not be repaired; however, holes which are greater than 1/2" in depth should also be repaired. Detrimental surface irregularities such as projections, fins, or ridges shall be reduced by bush-hammering, power grinding, or stoning. Wood particles or "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 Xylol. Marking paint (surveyor marks) shall be completely removed by solvent wiping, water blasting, sandblasting, or power tool cleaning.

4.4.1.3 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 mill scale and solvent wiped to remove any grease or oil.

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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 will be abraded by hand cleaning, power tool cleaning, or spot blasting until loosely adherent particles are removed. The area will then be repaired with NUTEC #11/REACTIC #1201 if damage extends to concrete substrate or REACTIC #1201 if the surfacer is still intact.



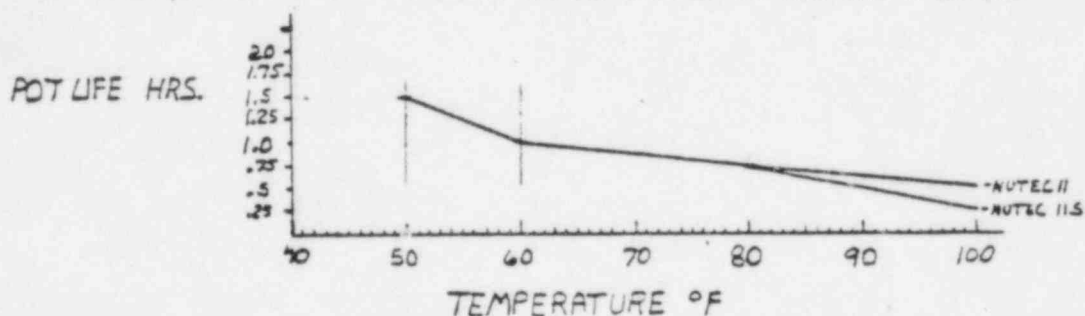
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#### 4.3 APPLICATION OF SURFACER & FINISH COATING

##### 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 II.S be applied to a surface containing free standing water. Free standing water may be identified by:



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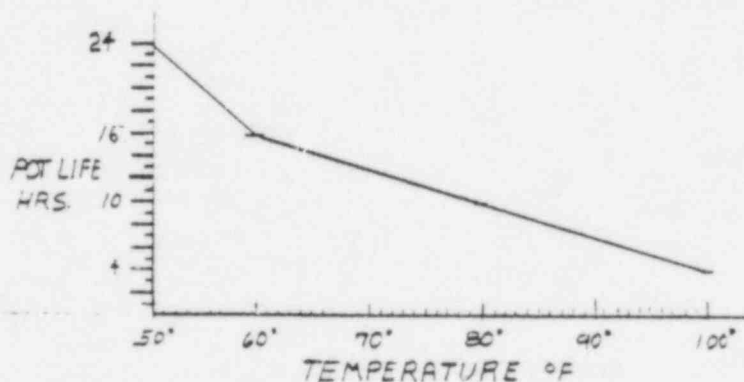
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#### 4.3.2 Finish

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:

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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.



- 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.
- Coating materials shall be applied as a heavy, wet coat in even, parallel passes, overlapping each pass approximately 50%.



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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 SUPPORTING INFORMATION

##### 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

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#### 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.



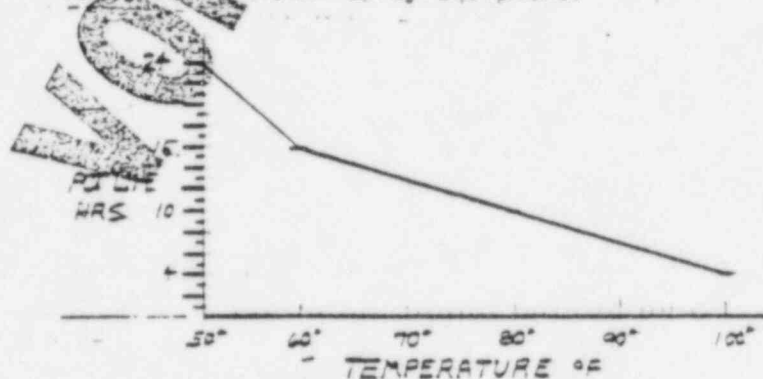
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#### 4.3.2 Finish

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 between 50°F and 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 10% by volume with Imperial 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%.



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

5. Tack free time is as follows:

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

6. Full cure time is as follows:

TEMPERATURE °F	FULL CURE TIME
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 ¼" or less in diameter, the damaged area may be coated with Reactic #1201. If the damaged area extending to concrete substrate is greater than ¼" 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.



VOID

35-1195-CCP-40, Nov. 29, 1977

REVISION 2, January 8, 1979

JOB 35-1195

ARMS  
INDEXED

COMANCHE PEAK STEAM ELECTRIC STATION

DATE:

CONSTRUCTION PROCEDURE

DCN #1  
DCN #2  
DCN #3

35-1195-CCP-40

PROTECTIVE COATING OF CONCRETE SURFACES

APPROVED BY:

APPROVED BY:

J. H. H. Magnus 1-15-79  
Date

J. H. Magnus

Project Engineer

U. D. Douglas 1-16-79  
Date

U. D. Douglas

Project Manager

PREPARED BY:

REVIEWED BY:

Gordon McPhail 1-15-79  
Date

Area Civil Engineer

ED [Signature] 1/23/79  
Date

Quality Assurance

BROWN & ROOT, INC.

HOUSTON, TEXAS





JOB 35-1195  
Comanche Peak Steam Electric Station

ARMS  
INDEXED

Construction Procedure  
DOCUMENT CHANGE NOTICE NUMBER 3

Sheet 1 of 6

This notice applies to Construction Procedure No. 35-1195- CCP-40 Revision 2.

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

Change the procedure as follows:

REPLACE THE FOLLOWING PAGES WITH THE ATTACHED:

4 of 16  
5 of 16  
7 of 16  
14 of 16  
15 of 16

ADD THE FOLLOWING PAGES:

16a of 16

Reason for change: To broaden the scope of the procedure.

This change approved by:

Reviewed by:

- Mark Wells 4/15/81 James C. Galt 4/27/81  
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

Charles Vasquez 4-28-81  
Construction Project Manager Date

April 30, 1981  
Effective Date



JOB 35-1195  
Comanche Peak Steam Electric Station

ARMS  
INDEXED

Construction Procedure  
DOCUMENT CHANGE NOTICE NUMBER 2

Sheet 1 of 3

This notice applies to Construction Procedure No. 35-1195- CCP-40 Revision 2.

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

Change the procedure as follows:

Replace Pages 5 of 16 and 6 of 16 with the attached.

Reason for change: Clarification

This change approved by:

Reviewed by:

Mark L. Latta 2/18/81  
Originator Date

J. L. Cunniff 2/16/81  
Brown & Root Quality Assurance Date

R. M. Shattuck 2/13/81  
TUGCO Quality Assurance Date

Reviewed by:

D. J. [Signature] 2-18-81  
Construction Project Manager Date

February 18, 1981  
Effective Date



JOB 35-1195  
Comanche Peak Steam Electric Station

ARMS  
INDEXED

DATE

Construction Procedure  
DOCUMENT CHANGE NOTICE NUMBER 1

Sheet 1 of 2

This notice applies to Construction Procedure No. 35-1195-CCP-40 Revision 2.

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

Change the procedure as follows:

Replace Page 14 of 16 with the attached.

Reason for change: Revised technical requirements.

This change approved by:

Reviewed by:

John D. Land 30-July-80  
Originator Date

W/A JBA  
Brown & Root Quality Assurance Date

JR Amundson 8/6/80  
TUGCO Quality Assurance Date

Reviewed by:

J. P. Smith 8-13-80  
Construction Project Manager Date

August 13, 1980  
Effective Date



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NOTE

This document has been completely retyped  
for convenience in issuing Revision 2.  
Vertical lines (change bars) appearing in  
the margin indicate what information was  
actually changed, added or deleted.



## 1. INTRODUCTION

### 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 concrete surfaces inside the reactor buildings and radiation areas 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. DEFINITION OF TERMS, ABBREVIATIONS AND SYMBOLS

### 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)



### 3. 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 shall be forwarded to Tugco Vault for filing and distribution to the various parties listed on the distribution list.





3.5 RECEIVING, STORING AND DISPENSING OF COATING MATERIALS

3.5.1 Receiving and Storage

3.5.1 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 ACP-3. 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. Containers opened and partially mixed in the "Q" paint storage area may be resealed and the contents used for later "Q" painting. The contents from partially used containers will not be reused after a period of one week has elapsed from date of initial opening.

4. PROCEDURE FOR COATING

4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

4.1.1 Preparation for Surfacers

4.1.1.1 Surface preparation may consist of:

1. Water blasting with 4000 - 10,000 psi of water.
2. Sand injection blasting with 2500 psi of water.
3. Acid etching with a solution that is recommended by Imperial Coatings.
4. Sand blasting.
5. Power tooling with power tools capable of achieving the recommended surface preparation before coating.

Any one or combination of the above methods of surface preparation may be used. Any heavy oil or grease deposits shall be removed by steam cleaning; trisodium phosphate wash with a 3 - 6 pound T.S.P. per gallon of water mixture; or use of an Imperial Coatings recommended detergent.



Following surface preparation, the surface shall be free from appreciable amounts of construction dust, laitance and loose deposits. If cleaning does not remove oil and grease, the contaminated concrete surface shall be chipped away and patched before coating. All T.S.P cleaned areas shall be flushed thoroughly with clean water. Holes, voids or depressions in the concrete surface that exceed 2" in diameter and  $\frac{1}{2}$ " in depth shall be repaired in accordance with CCP-12. Voids which are greater than 2" in diameter but  $\frac{1}{2}$ " or less in depth need not be repaired. Holes which are greater than  $\frac{1}{2}$ " in depth but 2" or less in diameter shall be repaired in accordance with CCP-12. Detrimental surface irregularities, such as projections, fins, or ridges shall be reduced by bush-hammering, power grinding, or stoning. Wood particles or "fuzz" remaining after water blasting, is acceptable.

- 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 Xylol. 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 rust and mil scale and solvent wiped to remove any grease or oil.



4. Objects larger than one square inch shall be prepared in the same manner, however, they shall be coated with inorganic zinc primer which has been approved for nuclear use.
5. Objects which are recessed to a depth greater than 1/2" shall be repaired using a "dry patch" 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.

4.1.2 Preparation for finish coat

4.1.2.1 Prior to beginning surface preparation for the finish coat, the surface temperature shall be at least 50° F above the dew point. Surface preparation shall then consist of the removal of any oil or grease by use of trisodium phosphate washing, 3-6 pounds T.S.P. per gallon, or any other manufacturer recommended cleanser or cleansing method. Construction dust shall be removed by the use of compressed air.

4.2 PREPARATION OF COATING MATERIALS

4.2.1 Surfacer 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 may be made by utilizing attachment 2.



4.2.2 Finish Coat

- 4.2.2.1 The finish coat, REACTIC #1201, is a two component epoxy topcoat consisting of a base and cure. These shall be thoroughly mixed under constant agitation until a homogeneous blend is achieved. Minimum induction times shall be as follows:

<u>TEMPERATURE° F</u>	<u>INDUCTION TIME</u>
40	45 min.
50	45 min.
60	35 min.
80	15 min.
90	05 min.
100	NONE

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 set-up, a quick spray hopper, or a conventional pump-mastic gun arrangement. The concrete surface shall be allowed to cure a minimum of 28 days prior to application of material. 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 by use of an upward motion. 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 40° and on the rise, up to 100°F; however, if the temperature is above 80°F, pot life will be greatly shortened. Application shall not begin unless the surface temperature is at least 5°F above the dew point.

<u>TEMPERATURE° F</u>	<u>POT LIFE 11,11S</u>
50	1 hr. 30 min.
60	1 hr. 00 min.
80	0 hr. 45 min.
100	0 hr. 30 min. (11)
	0 hr. 15 min. (11S)



2. Humidity may vary as high as 100%; however, free standing water will 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:
  - 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	6 hrs.	8 hrs.
60	4 hrs.	6 hrs.
80	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</u>
50	72 hours
60	48 hours
80	24 hours
100	12 hours





TEMPERATURE OF

FULL CURE 11, 11S

50  
60  
80  
100

10 days  
8 days  
7 days  
5 days

Temperature durations below 50° will add to the 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 maximum 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 or 2 to 4 hours. #11S and #11 may be subjected to personnel foot traffic only 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.





- 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, if in excess of 35 mils, runs or sags will 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. If pinholes or 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 that 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.

4.3.2 Finish

4.3.2.1 Finish coating shall be applied using the same or similar type of equipment as used for the surfacer. If needed, a brush may also be used. The material shall be allowed to dry as much as possible 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 temperatures shall be 40°F and on the rise, up to 100°F. 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 10% by volume with Imperial DL-6A thinner. It is normally advisable to use more thinner at lower temperatures. If required, Reactic #1201 may be thinned as much as 30% by volume.

<u>TEMPERATURE° F</u>	<u>POT LIFE</u>
50	24 hrs.
60	16 hrs.
80	10 hrs.
100	04 hrs.

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 material shall be applied as a heavy, wet coat in even, parallel passes, overlapping each pass approximately 50%.



4. Recoating time of REACTIC #1201 is 24 hours at 75° F.

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	11 days
60	8 days
80	7 days
100	5 days

#1201 may be subjected to personnel foot traffic after 24 hours at 80° F. Temperature durations below 50° F will add to the cure time.

- 4.3.2.2 Repair of Runs and Sags - Any run or sag showing evidence of cracking must be removed. All other runs or sags will 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 will be abraded by hand cleaning, power tool cleaning, or spot blasting until loosely adherent particles are removed. The area will then be repaired with NUTEC #11/REACTIC #1201 if damage extends to concrete substrate or REACTIC #1201 if the surfacer is still intact.
- 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.

VOID

per DCN#1



- 4.3.2.5 Repair of Scratches and Damaged Areas - Any scratches or damaged areas shall be abraded by hand or power tool or spot blasted to remove all loosely adherent particles. The area can then be repaired with Nutec #11/Reactic #1201.

NOTE: On spot areas no larger than one inch in diameter, Reactic #1201 can be applied directly over the substrate providing the finished surface is smooth and pinhole free.

- 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. SUPPORTING INFORMATION

### 5.1 ATTACHMENTS

1. Painter Qualification Record

### 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





## 5. SUPPORTING INFORMATION

### 5.1 ATTACHMENTS

1. Painter Qualification Record
2. Table for Partial Mixes of Nutec #11S

### 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

ATTACHMENT 1

BROWN & ROOT, INC.  
COMANCHE PEAK STEAM ELECTRIC STATION

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



ATTACHMENT 2

NOTE: 11s									
	BASE		CURE		FILLER		PERMISSIBLE THINNER		
	lbs.	oz.	lbs.	oz.	lbs.	oz.	pts.	oz.	
0 Gal. - 1 Qt.		10.6	0	6.3	3	0	0	1.6	
0 Gal. - 2 Qt.	1	5.1	0	12.6	6	0	0	3.2	
0 Gal. - 3 Qt.	1	15.7	1	3	9	0	0	4.8	
1 Gal. - 0 Qt.	2	10.2	1	9.3	12	0	0	6.4	
1 Gal. - 1 Qt.	3	4.8	1	15.6	15	0	0	8	
1 Gal. - 2 Qt.	3	15.4	2	5.9	18	0	0	9.6	
1 Gal. - 3 Qt.	4	9.9	2	12.2	21	0	0	11.2	
2 Gal. - 0 Qt.	5	4.5	3	2.6	24	0	0	12.8	
2 Gal. - 1 Qt.	5	15.0	3	8.9	27	0	0	14.4	
2 Gal. - 2 Qt.	6	9.6	3	15.2	30	0	0	16	
2 Gal. - 3 Qt.	7	4.2	4	5.5	33	0	1	1.6	
3 Gal. - 0 Qt.	7	14.7	4	11.8	36	0	1	3.2	
3 Gal. - 1 Qt.	8	9.3	5	2.2	39	0	1	4.8	
3 Gal. - 2 Qt.	9	3.8	5	8.5	42	0	1	6.4	
3 Gal. - 3 Qt.	9	14	5	14.8	45	0	1	8	
4 Gal. - 0 Qt.	10	9	6	5.1	48	0	1	9.6	
4 Gal. - 1 Qt.	11	3.5	6	11.4	51	0	1	11.2	
4 Gal. - 2 Qt.	11	14.1	7	1.8	54	0	1	12.8	
4 Gal. - 3 Qt.	12	8.6	7	8.1	57	0	1	14.4	
5 Gal. - 0 Qt.	13	3.2	7	14.4	60	0	2	0	



**VOID**

## 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 Record shall be maintained on the attachment 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.

*Void Per DCN #3*



3.5 RECEIVING, STORING AND DISPENSING OF COATING MATERIALS

3.5.1 Receiving and Storage

3.5.1 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 ACP-3. 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 30°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. PROCEDURE FOR COATING

4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

4.1.1 Preparation for Surfacers

4.1.1.1 Surface preparation may consist of:

1. Water blasting with 4000 - 10,000 psi of water.
2. Sand injection blasting with 2500 psi of water.
3. Acid etching with a solution that is recommended by Imperial Coatings.
4. Sand blasting.
5. Power tooling with power tools capable of achieving the recommended surface preparation before coating.

Any one or combination of the above methods of surface preparation may be used. Any heavy oil or grease deposits shall be removed by steam cleaning; trisodium phosphate wash with a 3 - 6 pound T.S.P. per gallon of water mixture; or use of an Imperial Coatings recommended detergent.

4. Objects larger than one square inch shall be prepared in the same manner, however, they shall be coated with inorganic zinc primer which has been approved for nuclear use.
5. Objects which are recessed to a depth greater than 1/2" shall be repaired using a "dry patch" 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.

4.1.2 Preparation for finish coat

4.1.2.1 Prior to beginning surface preparation for the finish coat, the surface temperature shall be at least 50° F above the dew point. Surface preparation shall then consist of the removal of any oil or grease by use of trisodium phosphate washing, 3-6 pounds T.S.P. per gallon, or any other manufacturer recommended cleanser or cleansing method. Construction dust shall be removed by the use of compressed air.

4.2 PREPARATION OF COATING MATERIALS

4.2.1 Surfacer 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.





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REVISION 2, January 8, 1979  
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### 3.5 RECEIVING, STORING AND DISPENSING OF COATING MATERIALS

#### 3.5.1 Receiving and Storage

3.5.1 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 ACP-3. 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. 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. water. 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.



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, voids or depressions in the concrete surface that exceed 2" in diameter and 1/2" depth shall be repaired with dry patch or an epoxy grout (voids which are greater than 2" in diameter but less than 1/2" in depth need not be repaired; however, holes which are greater than 1/2" in depth should also be repaired. Detrimental surface irregularities such as projections, fins, or ridges shall be reduced by bush-hammering, power grinding, or stoning. Wood particles or "fuzz" remaining after water blasting is acceptable. Recommended surface preparation shall include power tools which are capable of removing laitance and curing membranes on the floor.

- 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 Xylol. 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 rust and mil scale and solvent wiped to remove any grease or oil.

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REVISION 1, January 25, 1978

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35-1195

MANCHE PEAK STEAM ELECTRIC STATION

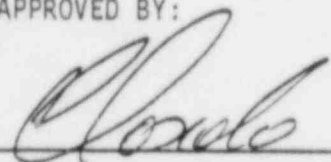
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CONSTRUCTION PROCEDURE

35-1195-CCP-40

PROTECTIVE COATING OF CONCRETE SURFACES

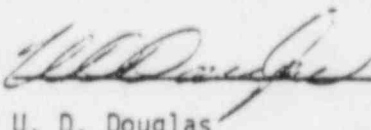
APPROVED BY:



P. F. Foscolo

Project Engineer

APPROVED BY:



U. D. Douglas

Project Manager

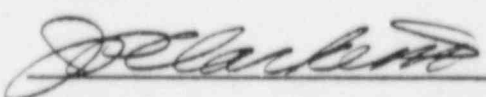
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Quality Assurance

BROWN & ROOT, INC.

HOUSTON, TEXAS



LIST OF EFFECTIVE PAGES

The total number of pages in this document is 15. The page numbering sequence and revision status of each page is as follows:

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NOTE

This document has been completely retyped for convenience in issuing Revision 1. Vertical lines (change bars) appearing in the margin indicate what information was actually changed, added or deleted.



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## 1. INTRODUCTION

### 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 concrete surfaces inside the reactor buildings and radiation areas as delineated by Reference 1.

### 1.3 GENERAL DISCUSSION

- 1.3.1 All coating materials addressed by this procedure shall be as manufactured by Southern Imperial Coatings 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. DEFINITION OF TERMS, ABBREVIATIONS AND SYMBOLS

### 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 expose the primer or substrate.

### 2.2 ABBREVIATIONS

- 2.2.1 (NONE)

### 2.3 SYMBOLS

- 2.3.1 (NONE)





### 3. 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 instructed by Southern Imperial in the use of their products as consistent with Southern Imperial's Training Procedures. 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 the attachment 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.



3.5 RECEIVING, STORING AND DISPENSING OF COATING MATERIALS

3.5.1 Receiving and Storage

3.5.1 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 ACP-3. 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. Infrequent dips (up to 24 hrs.) 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° F 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; due to limited shelf life, this shall be done on a "first-in", "first-out" basis. If damage occurs in transit from storage area, material will be consigned to "Non-Q" storage; damage shall mean a broken seal.

4. PROCEDURE FOR COATING

4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

4.1.1 Preparation for Surfacers

4.1.1.1 Under normal conditions, surface preparation shall not begin unless the temperature of the surface to be prepared is 5F° above the dew point. Normal surface preparation shall consist of water blasting with approximately 4000 P.S.I. water held at 2-3 feet from the surface. Additionally, surface preparation may be accomplished by use of approximately 2500 P.S.I. water blasting with sand injection (held 2-3 feet), 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. 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. Detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush-hammering, power grinding, or stoning. All tie holes and other holes greater than 2 inches in diameter will be filled with a sand cement "Dry-Pack". Holes 2 inches or less in diameter may be filled with #11S surfacer.

4.1.2 PREPARATION FOR FINISH COAT

- 4.1.2.1 Prior to beginning surface preparation for the finish coat, the surface temperature shall be at least 5° F above the dew point. It shall then consist of the removal of any oil or grease by use of trisodium phosphate washing, 3-6 pounds T.S.P. per gallon, or any other manufacturer recommended cleanser or cleansing method. Construction dust shall be removed by use of compressed air.

4.2 PREPARATION OF COATING MATERIALS

4.2.1 Surfacer 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.



4.2.2 Finish Coat

- 4.2.2.1 The finish coat, REACTIC #1201, is a two component epoxy topcoat consisting of a base and cure. These shall be thoroughly mixed under constant agitation until a homogeneous blend is achieved. Minimum induction times shall be as follows:

<u>TEMPERATURE° F</u>	<u>INDUCTION TIME</u>
50	45 min.
60	35 min.
80	15 min.
90	05 min.
100	NONE

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 set-up, a quick spray hopper, or a conventional pump-mastic gun arrangement. The concrete surface shall be allowed to cure a minimum of 28 days prior to application of material. 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 by use of an upward motion. 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 40° to 100° F.; however, if temperature is above 80° F, pot life will be greatly shortened. Application shall not begin unless the surface temperature is at least 5F° above the dew point.

<u>TEMPERATURE° F</u>	<u>POT LIFE 11,11S</u>
50	1 hr. 30 min.
60	1 hr. 00 min.
80	0 hr. 45 min.
100	0 hr. 30 min. (11)
	0 hr. 15 min. (11S)



2. Humidity may vary as high as 100%; however, free standing water will be removed. Coating application over a damp surface is permissible.
3. Thickness of surfacer may vary between 10 and 35 mils, depending on surface roughness.
4. Tack free times shall be as follows:

<u>TEMPERATURE° F</u>	<u>#11</u>	<u>#11S</u>
50	6 hrs.	8 hrs.
60	4 hrs.	6 hrs.
80	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</u>
50	72 hours
60	48 hours
80	24 hours
100	12 hours

<u>TEMPERATURE° F</u>	<u>FULL CURE 11, 11S</u>
50	10 days
60	8 days
80	7 days
100	5 days

Temperature durations below 50° F will be added to the cure time.

NUTEC # 11S may be touched up with #11S or #11 as soon as it has set to touch (2 to 4 hours). #11S and #11 may be subjected to personnel foot traffic only after 24 hours cure and lay down of material after full cure.



6. 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 Repair and Recoating of NUTEC #11S - Remove all loose coating and concrete by sanding or wire brushing and feather edge adjacent coating. The area shall then be blown off with compressed air, wiped with water or thinner DL-54 and coated with NUTEC #11S or NUTEC # 11 until the desired film thickness is achieved.
- 4.3.1.3 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.
- 4.3.1.4 Repair of Sags and Runs - Inside containment, if in excess of 35 mils, runs or sags will be abraded down to adjoining thickness. Outside containment, if coating is sound then runs or sags will not be repaired.
- 4.3.1.5 Repair of Embedded Foreign Particles - Embedded foreign particles shall be removed by abrading. If pinholes or discontinuities exist, then area shall be repaired in accordance with Section 4.3.1.3.
- 4.3.1.6 Treatment of Rust Stains - Remove residue, though not necessarily the stain, with bristle brush and water or Imperial Thinner #DL-54.
- 4.3.1.7 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.





4.3.1.8 Coating of Expansion Joints - Expansion joints will not be coated. Coatings will be feathered back at the edges.

4.3.2 Finish

4.3.2.1 Finish coating shall be applied using the same or similar type of equipment as used for the surfacer. If needed, a brush may also be used. The material shall be allowed to dry until it is 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 temperatures shall be 40° F to 100° F. Application shall not begin unless the surface temperature is at least 5F° above the dew point. If increased workability is desired REACTIC #1201 may be thinned up to 10% by volume with Imperial Thinner #DL-(A). It is normally advisable to use more thinner at lower temperatures. If required, REACTIC #1201 may be thinned as much as 30% by volume.

<u>TEMPERATURE° F</u>	<u>POT LIFE</u>
50	24 hrs.
60	16 hrs.
80	10 hrs.
100	04 hrs.



2. Thickness of coating shall be a minimum of 3 mils and a maximum of 12 mils.
3. Coating material shall be applied as a heavy, wet coat in even, parallel passes, overlapping each pass approximately 50%.
4. Recoating time of REACTIC #1201 is 24 hours at 75° F.
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	11 days
60	8 days
80	7 days
100	5 days

#1201 may be subjected to personnel foot traffic after 24 hours at 80° F. Temperature durations below 50° F will be added to the cure time.

- 4.3.2.2 Repair of Runs and Sags - Any run or sag showing evidence of cracking must be removed. All other runs or sags will 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 will be abraded by hand cleaning, power tool cleaning, or spot blasting until loosely adherent particles are removed. The area will then be repaired with NUTEC #11/REACTIC #1201 if damage extends to concrete substrate or REACTIC #1201 if the surfacer is still intact.
- 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.

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## 5. SUPPORTING INFORMATION

### 5.1 ATTACHMENTS

1. Painter Qualification Record

### 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 #115 and REACTIC #1201,  
Dated 7/77
4. NACE Publication T-6F-3



ATTACHMENT 1

BROWN & ROOT, INC.  
COMANCHE PEAK STEAM ELECTRIC STATION

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.  
Q.C. Department



VOID

35-1195-CCP-40, Nov. 29, 1977  
REVISION 0

JOB 35-1195

COMANCHE PEAK STEAM ELECTRIC STATION

CONSTRUCTION PROCEDURE

35-1195-CCP-40

VOID

PROTECTIVE COATING OF CONCRETE SURFACES

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H. M. E. Hogg  
Project Engineer

APPROVED BY:

*H. C. Dodd, Jr.*  
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*D. G. Sutton*  
D. G. Sutton  
Area Civil Engineer

REVIEWED BY:

*P. L. Bussolini*  
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BROWN & ROOT, INC.

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## 1. INTRODUCTION

### 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 concrete surfaces inside the reactor buildings and radiation areas as delineated by Reference 1.

### 1.3 GENERAL DISCUSSION

- 1.3.1 All coating materials addressed by this procedure shall be as manufactured by Southern Imperial Coatings 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. DEFINITION OF TERMS, ABBREVIATIONS AND SYMBOLS

### 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 expose the primer or substrate.

### 2.2 ABBREVIATIONS

- 2.2.1 (NONE)

### 2.3 SYMBOLS

- 2.3.1 (NONE)



### 3. 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 instructed by Southern Imperial in the use of their products as consistent with Southern Imperial's Training Procedures. This shall be verified by completing a form similar to Attachment 2 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 Paint Superintendent to carry out actions as required by the Safety Department representative who will be present to monitor and enforce 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 all instruments necessary to assure that proper application procedures are being followed. This shall include thermometers, wet film gauges, and a psychrometer 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 all attachments listed in Section 5.1. The Superintendent in charge of painting, or his representative, shall assure that all necessary forms are completed by the appropriate personnel. After completion, distribution copies shall be made and distributed to the parties as shown on the distribution section. The original will be forwarded to the Brown & Root Quality Control Department for filing. All distribution shall be the responsibility of the Painting Department personnel.



3.5 RECEIVING, STORING AND DISPENSING OF COATING MATERIALS

3.5.1 Receiving and Storage

3.5.1 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 ACP-3. 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. Infrequent dips (up to 24 hrs.) 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° F 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; due to limited shelf life, this shall be done on a "first-in", "first-out" basis. If damage occurs in transit from storage area, material will be consigned to "Non-Q" storage; damage shall mean a broken seal. At the time of issuance, Attachment 1 shall be used to verify the issuance of coating from an individual batch.

4. PROCEDURE FOR COATING

4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

4.1.1 Preparation for Surfacers

4.1.1.1 Under normal conditions, surface preparation shall not begin unless the temperature of the surface to be prepared is 5F° above the dew point. Normal surface preparation shall consist of water blasting with approximately 4000 P.S.I. water held at 2-3 feet from the surface. Additionally, surface preparation may be accomplished by use of approximately 2500 P.S.I. water blasting with sand injection (held 2-3 feet), 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. 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. Detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush-hammering, power grinding, or stoning. All tie holes and other holes greater than 2 inches in diameter will be filled with a sand cement "Dry-Pack". Holes 2 inches or less in diameter may be filled with #11S surfacer.

#### 4.1.2 PREPARATION FOR FINISH COAT

- 4.1.2.1 Prior to beginning surface preparation for the finish coat, the surface temperature shall be at least 50° F above the dew point. It shall then consist of the removal of any oil or grease by use of trisodium phosphate washing, 3-6 pounds T.S.P. per gallon, or any other manufacturer recommended cleanser or cleansing method. Construction dust shall be removed by use of compressed air.

#### 4.2 PREPARATION OF COATING MATERIALS

##### 4.2.1 Surfacer 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.





4.2.2 Finish Coat

- 4.2.2.1 The finish coat, REACTIC #1201, is a two component epoxy topcoat consisting of a base and cure. These shall be thoroughly mixed under constant agitation until a homogeneous blend is achieved. Minimum induction times shall be as follows:

<u>TEMPERATURE° F</u>	<u>INDUCTION TIME</u>
50	45 min.
60	35 min.
80	15 min.
90	05 min.
100	NONE

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 set-up, a quick spray hopper, or a conventional pump-mastic gun arrangement. The concrete surface shall be allowed to cure a minimum of 28 days prior to application of material. 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 by use of an upward motion. 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 40° to 100° F.; however, if temperature is above 80° F, pot life will be greatly shortened. Application shall not begin unless the surface temperature is at least 5F° above the dew point.

<u>TEMPERATURE° F</u>	<u>POT LIFE 11,11S</u>
50	1 hr. 30 min.
60	1 hr. 00 min.
80	0 hr. 45 min.
100	0 hr. 30 min. (11)
	0 hr. 15 min. (11S)



2. Humidity may vary as high as 100%; however, free standing water will be removed. Coating application over a damp surface is permissible.
3. Thickness of surfacer may vary between 10 and 35 mils, depending on surface roughness.
4. Tack free times shall be as follows:

<u>TEMPERATURE° F</u>	<u>#11</u>	<u>#11S</u>
50	6 hrs.	8 hrs.
60	4 hrs.	6 hrs.
80	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</u>
50	72 hours
60	48 hours
80	24 hours
100	12 hours

<u>TEMPERATURE° F</u>	<u>FULL CURE 11, 11S</u>
50	10 days
60	8 days
80	7 days
100	5 days

Temperature durations below 50° F will be added to the cure time.

NUTEC # 11S may be touched up with #11S or #11 as soon as it has set to touch (2 to 4 hours). #11S and #11 may be subjected to personnel foot traffic only after 24 hours cure and lay down of material after full cure.



6. 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 Repair and Recoating of NUTEC #11S - Remove all loose coating and concrete by sanding or wire brushing and feather edge adjacent coating. The area shall then be blown off with compressed air, wiped with water or thinner DL-54 and coated with NUTEC #11S or NUTEC # 11 until the desired film thickness is achieved.
- 4.3.1.3 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.
- 4.3.1.4 Repair of Sags and Runs - Inside containment, if in excess of 35 mils, runs or sags will be abraded down to adjoining thickness. Outside containment, if coating is sound then runs or sags will not be repaired.
- 4.3.1.5 Repair of Embedded Foreign Particles - Embedded foreign particles shall be removed by abrading. If pinholes or discontinuities exist, then area shall be repaired in accordance with Section 4.3.1.3.
- 4.3.1.6 Treatment of Rust Stains - Remove residue, though not necessarily the stain, with bristle brush and water or Imperial Thinner #DL-54.
- 4.3.1.7 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.



4.3.1.8 Coating of Expansion Joints - Expansion joints will not be coated. Coatings will be feathered back at the edges.

4.3.2 Finish

4.3.2.1 Finish coating shall be applied using the same or similar type of equipment as used for the surfacer. If needed, a brush may also be used. The material shall be allowed to dry until it is 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 temperatures shall be 40° F to 100° F. Application shall not begin unless the surface temperature is at least 5F° above the dew point. If increased workability is desired REACTIC #1201 may be thinned up to 10% by volume with Imperial Thinner #DL-6A. It is normally advisable to use more thinner at lower temperatures. If required, REACTIC #1201 may be thinned as much as 30% by volume.

<u>TEMPERATURE° F</u>	<u>POT LIFE</u>
50	24 hrs.
60	16 hrs.
80	10 hrs.
100	04 hrs.



2. Thickness of coating shall be a minimum of 3 mils and a maximum of 12 mils.
3. Coating material shall be applied as a heavy, wet coat in even, parallel passes, overlapping each pass approximately 50%.
4. Recoating time of REACTIC #1201 is 24 hours at 75° F.
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	11 days
60	8 days
80	7 days
100	5 days

#1201 may be subjected to personnel foot traffic after 24 hours at 80° F. Temperature durations below 50° F will be added to the cure time.

- 4.3.2.2 Repair of Runs and Sags - Any run or sag showing evidence of cracking must be removed. All other runs or sags will 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 will be abraded by hand cleaning, power tool cleaning, or spot blasting until loosely adherent particles are removed. The area will then be repaired with NUTEC #11/REACTIC #1201 if damage extends to concrete substrate or REACTIC #1201 if the surfacer is still intact.
- 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 TESTING
  - 4.4.1 All testing as performed by the B&R Foreman, General Foreman, or their representative shall be performed in order to insure proper application procedures are followed. All other testing shall be the responsibility of the B&R Quality Control Department. After coating system cure, final inspection, and resolution of all discrepancies is completed, the QC inspector shall document the final acceptance by completing and signing the Final Acceptance Record.

(THIS SPACE LEFT INTENTIONALLY)





## 5. SUPPORTING INFORMATION

### 5.1 ATTACHMENTS

1. Coating Materials - Warehousing Record
2. Painter Qualification Record
3. Coating Applicator's Coating Record

### 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



ATTACHMENT 1

BROWN & ROOT, INC.  
COMANCHE PEAK STEAM ELECTRIC STATION

Coating Materials - Warehousing Record

(To be used by Painting Dept. when issuing paint)

GENERAL DATA

Date \_\_\_\_\_ Report No. \_\_\_\_\_ Purchase Order No. \_\_\_\_\_

TECHNICAL DATA

Coating Manufacturer \_\_\_\_\_

Product Name & Number \_\_\_\_\_

Batch Number \_\_\_\_\_ Expiration Date \_\_\_\_\_

Gallons Received \_\_\_\_\_ Date Received \_\_\_\_\_

Date	Storage Temperature ° F (Ret. Daily-if uncontrolled)	Number Gallons Withdrawn	Number Gallons Remaining	Remarks

Signature/Title \_\_\_\_\_

Distribution: Painting Supt.  
Q.C. Department



ATTACHMENT 2

BROWN & ROOT, INC.  
COMANCHE PEAK STEAM ELECTRIC STATION

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.  
Q.C. Department



ATTACHMENT 3

BROWN & ROOT, INC.  
COMANCHE PEAK STEAM ELECTRIC STATION

Coating Applicator's Coating Record

GENERAL DATA

Date \_\_\_\_\_ Report No. \_\_\_\_\_ Unit No. \_\_\_\_\_ Shift No. \_\_\_\_\_

TECHNICAL DATA

Applicator \_\_\_\_\_ Inspector \_\_\_\_\_

Location of Work \_\_\_\_\_

Drawing Number(s) (If available) \_\_\_\_\_

Type of Coating PRIME \_\_\_\_\_ INT.COAT \_\_\_\_\_ FIN. COAT \_\_\_\_\_ Surface Prep. \_\_\_\_\_

Coating Batch Numbers \_\_\_\_\_ Description \_\_\_\_\_

Comp. A \_\_\_\_\_

Comp. B \_\_\_\_\_

Thinner \_\_\_\_\_

Coating Equipment \_\_\_\_\_ Spray gun type \_\_\_\_\_

Fluid tip type \_\_\_\_\_

Air cap type \_\_\_\_\_

Spray pot type \_\_\_\_\_

Moisture Separator Used & Type \_\_\_\_\_

Applicator's Signature/Title \_\_\_\_\_

Foreman's Signature \_\_\_\_\_

Distribution: Paint Supt.  
Q. C. Department  
Civil Eng.



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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 Department 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 and 4 listed in Section 5.1. After completion, each form shall be forwarded to The Brown & Root Document Control Center for filing and distribution to the various parties as listed on the distribution list.



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### 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, it shall be transferred from the controlled area to a designated temporary storage area or area of intended use in the field. Due to limited shelf-life of coating materials, this shall be done on a "first-in" "first out" basis. After materials have been partially used from an individual container, the said container cannot be resealed and returned to "Q" storage area for later use. Containers opened and partially distributed from the "Q" paint storage area may be resealed and the remaining contents used for "Q" painting. Except for thinners, the contents from partially used containers shall not be reused after a period of 7 days has elapsed from date of initial opening.

### 3.6 Special Coating Procedure

3.6.1 When items require special coating not covered under the content of this procedure, Attachment 4 shall be completed by the Protective Coatings engineer and transmitted to painting superintendent for construction. Special coatings procedures issued via Attachment 4 shall be attached to this procedure after completion.

3.6.2 Special Coating Procedures added by Attachment 4 shall receive a unique identification number issued in sequence beginning with C-1. The scope of the procedure shall describe the working limits of the special procedure with pertinent storage and coating requirements listed under the requirements section. The approvals section shall have the signatures of the Project Civil Engineer, TUGCo QA Manager if safety related, Originator, and the Construction Project Manager. Each procedure shall exhibit the revision number and issue date.

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4.0 PROCEDURE

4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

4.1.1 Preparation of 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.

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 drypack or epoxy grout. Detrimental surface irregularities such as projections, fins, or ridges shall be reduced by bushhammering, 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 SSPCSP1 using DL6A or commercially available MEK or Xylol. Marking paint (surveyor marks) shall be removed by solvent wiping, water blasting, sandblasting, or power tool cleaning. Discolored coatings due to aging or stains shall be abraded and solvent wiped to remove the discoloration. Residual marking or discoloration remaining in pores below the plane of the surface is acceptable.

- 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.



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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 IIS.
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. Metal objects larger than four square inches shall be coated with an inorganic zinc primer in accordance with CCP-30.
4. 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 will not be detrimental to the performance of NUTEC IIS providing the surface is free of water, oil, grease, laitance, efflorescence, deleterious curing membranes, or other contaminants as outlined in this procedure. If NUTEC 10 curing membrane is present with thickness sufficient to give a glossy appearance, the surface shall be abraded to "roughen" the NUTEC 10 prior to application of IIS surfacer.

## 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 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 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, NUTEC #1201, is a two component epoxy topcoat consisting of a base and cure. These shall be thoroughly mixed under constant agitation until a homogenous blend is achieved. Partial mixes of NUTEC #1201 shall be in accordance with Attachment 3. Minimum induction times shall be as follows:



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TEMPERATURE °F

50-59  
60-69  
70-79  
80-90  
91-100

INDUCTION TIMES

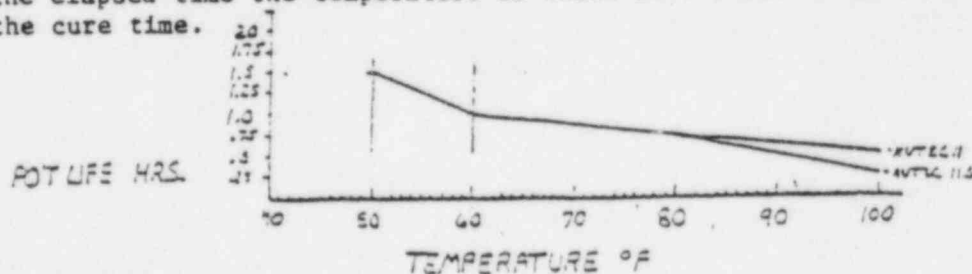
45 min.  
30 min.  
20 min.  
10 min.  
NONE

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. Under normal conditions, the concrete surface shall be allowed to cure a minimum of 28 days prior to application of protective coatings. However, if the coatings are to be applied to pour backs, grouting, or patching to which NUTEC 10 has been applied as a curing compound, coating may be performed after a minimum of 6 days has elapsed from NUTEC 10 application time. Abandoned hilti bolt holes, tie holes, and spalled concrete as defined in CEI-20 and patched per CCP-12 and grout under base plates which have 3 square feet or less of exposed grouted surface to be coated, may be coated after 48 hours 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 between 50°F and 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.



Pot lives shown above are the recommended times and should be utilized as a guideline for coating usage time, actual pot life is determined by the applicability of the coating. This applies to thinned and unthinned coatings.

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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:

- 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.
60-69	48 hrs.
70-79	24 hrs.
80-89	18 hrs.
90-100	12 hrs.





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TEMPERATURE °F

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 50oF, therefore, maintain area coated above 50oF. Infrequent dips in temperature to 40oF is permissible; however, duration below 50oF shall be added to cure time.

6. NUTEC 11S may be 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 90o 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 touched up 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 For repair and/or touch-up purposes, 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
NUTEC 1201	3-16 Mils

Areas other than Service Level 1

NUTEC 11S	10-60 Mils
NUTEC 11	3-20 Mils
NUTEC 1201	3-16 Mils





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- 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.
- 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 Contamination - Contamination shall be removed by abrading. If pinholes and discontinuities exist, then area shall be repaired in accordance with Section 4.3.1.4.
- 4.3.1.8 Treatment of 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.



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4.3.1.12 Repair of scratches and/or damages - Any scratches or damaged areas shall be abraded until loosely adherent particles are removed. The following minimum coating requirements shall be maintained for damages extending to concrete:

Damage  $\frac{1}{2}$ " or less regardless of length - no additional surfacer required prior to topcoat.

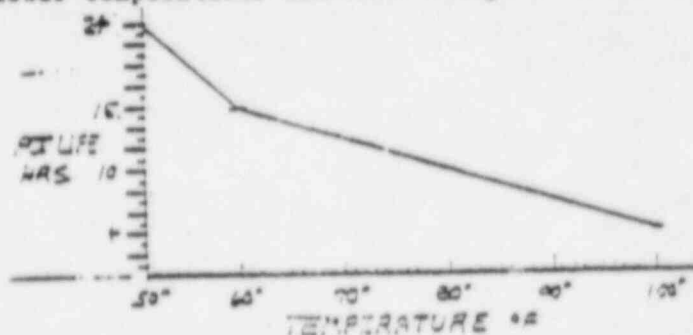
Damage greater than  $\frac{1}{2}$ " to 2" in width, regardless of length - Nutec 11 surfacer prior to topcoat application.

Damage greater than 2" in width - normal coating system required.

#### 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 between 50°F and 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 Imperial DL-6A thinner. It is normally advisable to use more thinner at lower temperatures and when using conventional spray equipment.



Pot life shown above is the recommended time and should be utilized as a guideline for coating time, actual pot life is determined by the applicability of the coating. This applies to thinned and unthinned coatings.

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2. Thickness of 1201 topcoat for Service Level I and Service Level II areas 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%.
4. Recoating time of NUTEC #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 temperature above 50°F.

- 4.3.2.2 Repair of Runs and Sags - Runs or sags showing evidence of cracking must be removed. Runs or sags inside Service Level I areas which exhibit no other coating defects, shall be abraded to the thickness of adjoining coating. Runs or sags outside Service Level I areas which exhibit no other coating defect need not be removed.
- 4.3.2.3 Repair of Contamination - Contamination shall be removed by abrading. Repair as necessary to meet film thickness requirements.
- 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. Pinholes and small discontinuities may be repaired at time of final inspection without a later reinspection of the repair. If the repaired coating will be subjected to a high moisture environment after placement into service, the placement into service shall not be made until full cure of the repair.

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4.3.2.5 Repair of Scratches and Damaged Areas - Any scratches or damaged areas shall be abraided to remove loosely adherent particles. Coating repair criteria shall be, as a minimum, as stated in Section 4.3.1.12.

4.3.2.6 Treatment of Rust Stains - If the topcoat surface is contaminated with rust stains, the 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 NUTEC #1201.

#### 4.4 FINAL ACCEPTANCE TESTING

4.4.1 Full cure of the coating system shall be maintained prior to testing and/or inspection for other than visual inspection. Final acceptance inspection may be performed, when visual inspection only is required, after topcoat has cured per paragraph 4.3.2.1(4).

After final inspection, and resolution of all discrepancies are completed, the 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 preparation if blasting or bush hammering is to be utilized and following all methods of 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 SUPPORTING INFORMATION

##### 5.1 ATTACHMENTS

1. Painter Qualification Record
2. Table for Partial Mixes of NUTEC 11S
3. Table for Partial Mixes of NUTEC #1201
4. Special Coating Procedure
5. Special Coating Procedure C-1



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## 5.2

### REFERENCES

1. Gibbs & Hill Specification 2323-AS-31, "Protective Coating"  
Latest Revision
2. Steel Structures Paint Council, Vol.2, Second Edition
3. Imperial Data Sheet NUTEC #11S and NUTEC #1201, Dated 7/77
4. NACE Publication T-6F-3



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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)







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ATTACHMENT 3

TABLE FOR PARTIAL MIXES OF NUTEC #1201

		Base		Cure		Maximum Permissible Thinner	
Gal.	Qts.	lbs.	oz.	lbs.	oz.	qts.	oz.
0	1	2	96	0	6.4	0	9.6
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	3	3	0	2	22.4
2	2	26	3.2	3	14.4	3	0
2	3	23	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



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"Q" Coating \_\_\_\_\_

ATTACHMENT 4

Sheet \_\_\_\_\_ of \_\_\_\_\_

"Non-Q" Coating \_\_\_\_\_

Procedure # \_\_\_\_\_

Rev. \_\_\_\_\_ Date \_\_\_\_\_

SPECIAL COATING PROCEDURE NO. \_\_\_\_\_

SCOPE \_\_\_\_\_

REQUIREMENTS:

REFERENCE DOCUMENTS

APPROVALS

ORIGINATOR \_\_\_\_\_

PROJECT C.E. \_\_\_\_\_

TUGCO QA \_\_\_\_\_

CONST. P.M. \_\_\_\_\_

REV. \_\_\_\_\_ DATE \_\_\_\_\_



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ATTACHMENT 4 (Continued)

Procedure # \_\_\_\_\_

Rev. \_\_\_\_\_ Date \_\_\_\_\_

REQUIREMENTS (Continued)



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"Q" Coating   X  

ATTACHMENT 5

Sheet   1   of       

Procedure #   C-1  

Rev.   1   Date       

"Non-Q" Coating

SPECIAL COATING PROCEDURE NO.   C-1  

SCOPE   Application of NUTEC #10 concrete curing and sealing compound.  

REQUIREMENTS:

Refer to attached guidelines for application of NUTEC #10 and product data sheet.

REFERENCE DOCUMENTS

APPROVALS

ORIGINATOR   [Signature]  

PROJECT C.E.   [Signature]  

TUGCO QA   [Signature]  10/14/83

CONST. P.M.   D.C. [Signature]  10/14/83

REV.   1   DATE   10-14-83  



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# ATTACHMENT 5

## GUIDELINES FOR THE APPLICATION OF NUTEC #10 TO CONCRETE SUBSTRATES

### 1.0 SCOPE

1.1 Application on NUTEC 10 concrete curing and sealing compound.

### 2.0 SURFACE PREPARATION

#### 2.1 "Green" Concrete

2.1.1 "Green" concrete walls shall be cleaned by using compressed air to remove loose concrete and laitance.

2.1.2 "Green" Concrete floors shall be lightly wirebrushed, followed by compressed air, to remove loose concrete and laitance.

2.1.3 Any forming material transferred to the concrete shall be removed by wirebrushing.

### 3.0 APPLICATION PROCEDURE

#### 3.1 GENERAL CONDITIONS

3.1.1 NUTEC #10 containers shall be stored at temperatures between 40°F and 110°F and shall not be exposed to direct sunlight for a prolonged period of time. Temperatures may fall below or rise above normal storage temperatures to 0°F or 120°F. Respectively for an accumulative period of 14 days during shelf life of the product.

3.1.2 The amount of time required for curing increases with decreasing temperature. An accelerator may be added at temperatures below 60°F to facilitate the drying and curing processes. The accelerator is available in premeasured portions and shall be added as a third component to the base-cure mixture. Accelerator shall be utilized in accordance with manufacturing instructions.

Cure times for NUTEC #10 is as follows:

ST - 50°F-69°F - 72 hours

70°F-89°F - 24 hours

90°F and above - 18 hours



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- 3.1.3 All equipment used shall be kept in good condition and shall be comparable to the equipment listed in Section 3.2.
- 3.1.4 All equipment shall be cleaned properly before and after each use with the recommended solvent (Imperial's DL-6A universal Solvent).
- 3.1.5 NUTEC #10 Primer/Sealer shall not be applied under inclement weather conditions and not at surface temperatures below 50°F.
- 3.1.6 Concrete to be coated shall be shaded. Epoxy coatings have a tendency to blister when exposed to direct sunlight.
- 3.2 APPLICATION EQUIPMENT
  - 3.2.1 Airless
    - 3.2.1.1 Use standard industrial spray equipment such as Graco, Binks, or DeVilbiss using 30:1 pump ratio with 65-85 psi inbound pressure and a .016 to .019 fluid tip.
  - 3.2.2 Conventional
    - 3.2.2.1 Pressure pot equipment with a water trap.
    - 3.2.2.2 Separate atomizing air and fluid pressure regulator.
    - 3.2.2.3 Air supply: Compressor capable of supplying a continuous volume of air at 60 to 80 psi to the nozzle of each gun.



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#### ATTACHMENT 5

3.2.2.4 Recommended air hose - 5/16" or 3/8" I.D.

3.2.2.5 Recommended material hose - 3/8" or 1/2" I.D.

3.2.2.6 Industrial spray gun such as Binks #18 with 66 PB air cap, 66 fluid tip and 66 needle size or DeVilbiss MRC 60D.

3.2.3 Brush

3.2.3.1 A clean, high quality brush may be used to coat small areas or concrete inaccessible for spraying.

3.2.4 Roller

3.2.4.1 A short to medium knap roller shall be used.

### 3.3 APPLICATION

3.3.1 Flush equipment with Imperial's #DL-6A Universal Solvent or imperials #DL-56 (Cellosolve) Solvent prior to use.

3.3.2 Mixing instructions - slowly mix by power agitation or by hand the entire volume of the cure component with the entire volume of the base. If an accelerator is used, add thepremeasured portion to the base-cure mix and mix slowly. Avoid rapid agitation which may result in air entrapment. Do not vary proportions.

3.3.3 Thin the NUTEC #10 mix with 10-40% #DL-56 solvent (Cellosolve). Thinning minimizes air entrapment, eliminates film irregularities, enhances penetration, and prolongs the pot life of the material.

3.3.4 As a guide, if using conventional spray, regulate the air pressure: 60-80 psi to gun; 10-20 psi to pot.

NOTE: Required pressures may vary with temperature of hose length.



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#### ATTACHMENT 5

- 3.3.5 As a guide, during spray application, apply material as a heavy, wet coat, in even, parallel passes overlapping each pass by 50%
- 3.3.6 Apply NUTEC #10 at a spreading rate of approximately 350-400 sq. ft./gal. Avoid excessive build up which will cause a "glazing" affect after drying.
- 3.3.7 NUTEC #10 has a pot life of approximately 1 hour (at 75°F). No material shall be applied which has exceeded its pot life. If this has occurred, there is an increase in the viscosity of the material, a noticeable heat of exotherm and applied material will "crawl" and refuse to penetrate the concrete. All material thus applied shall be removed from the concrete with solvent and a clean cloth. All equipment shall be cleaned immediately and any remaining NUTEC #10 (expired) shall be discarded. Caution: Storage of NUTEC #10 containers at high temperatures or in direct sunlight will greatly reduce its pot life.

NOTE: Pot life stated above for unthinned coating is the recommended time and should be used as a guideline for coating usage time, however, actual pot life may be longer. For unthinned coating or coating thinned less than 50%, the actual pot life is determined by applicability of the coating.

- 3.3.8 During application all areas found to contain sags, surface irregularities, or excessive buildup of NUTEC #10 shall be removed with solvent and a clean cloth and fresh NUTEC #10 applied.
- 3.3.9 Flush Spray equipment periodically with Imperial's DL6A Solvent or DL-56 to avoid build up of material in the hoses.
- 3.3.10 Clean up all equipment immediately following application with Imperial's #DL-56 cellosolve solvent or Imperial's #DL-6A Universal Solvent.

NOTE:

1. Do not apply NUTEC #10 curing compound to surfaces which visible surface moisture or standing water is present.
2. Refer to manufactures product data sheet for general information.
3. Material may be applied at temperatures above 80°F. When applications are made at temperatures above 80°F care must be taken to assure pot life not exceeded.



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#### TEMPERATURE °F

50-59  
60-69  
70-79  
80-90  
91-100

#### INDUCTION TIMES

45 min.  
30 min.  
20 min.  
10 min.  
NONE

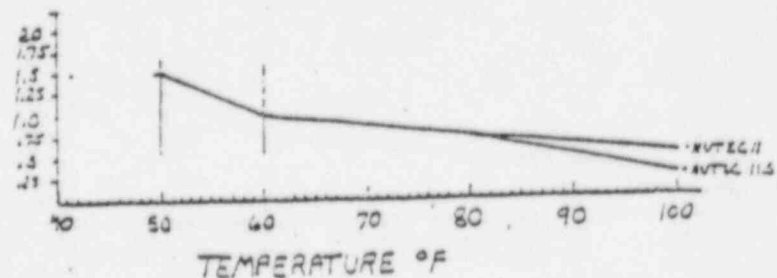
### 4.3 APPLICATION OF SURFACER & FINISH COATING

#### 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. Under normal conditions, the concrete surface shall be allowed to cure a minimum of 28 days prior to application of protective coatings. However, if the coatings are to be applied to pour backs, grouting, or patching to which NUTEC 10 has been applied as a curing compound, coating may be performed after a minimum of 6 days has elapsed from NUTEC 10 application time. Abandoned hilti bolt holes, tie holes, and spalled concrete as defined in CEI-20 and patched per CCP-12 and grout under base plates which have 3 square feet or less of exposed grouted surface to be coated, may be coated after 48 hours 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 between 50°F and 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.

POT LIFE HRS.



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VOID

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- 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.
- 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 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.



VOID

P.O. D.C.N.#1



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4.3.1.12 Repair of scratches and/or damages - Any scratches or damaged areas shall be abraided until loosely adherent particles are removed. The following minimum coating requirements shall be maintained for damages extending to concrete:

Damage  $\frac{1}{2}$ " or less regardless of length - no additional surfacer required prior to topcoat.

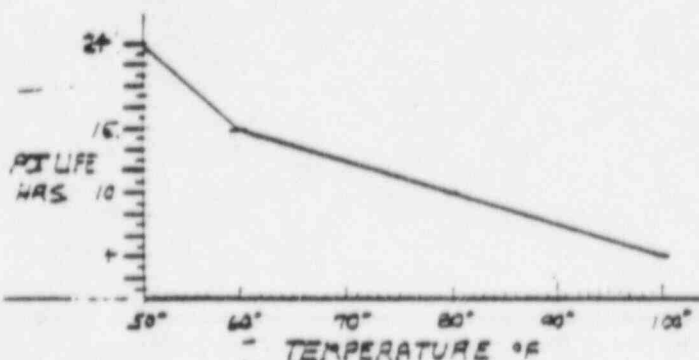
Damage greater than  $\frac{1}{2}$ " to 2" in width, regardless of length - No additional surfacer prior to topcoat application.

Damage greater than 2" in width - normal coating system required.

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 between 50°F and 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 Imperial DL-6A thinner. It is normally advisable to use more thinner at lower temperatures and when using conventional spray equipment.





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2. Thickness of 1201 topcoat for Service Level I and Service Level II areas 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%.
4. Recoating time of NUTEC #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 hr.
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 temperature above 50°F.

- 4.3.2.2 Repair of Runs and Sags - Runs or sags showing evidence of cracking must be removed. Runs or sags inside Service Level I areas which exhibit no other coating defects, shall be abraded to the thickness of adjoining coating. Runs or sags outside Service Level I areas which exhibit no other coating defect need not be removed.
- 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. Pinholes and small discontinuities may be repaired at time of final inspection without a later reinspection of the repair. If the repaired coating will be subjected to a high moisture environment after placement into service, the placement into service shall not be made until full cure of the repair.



VOID per DCN#1