

BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30	10	1/26/82	1 of 13
TITLE: COATING STEEL SUB-STRATES INSIDE REACTOR BUILDING AND RADIATION AREAS	ORIGINATOR:	<u>Mark L. Bellis</u>		<u>1-23-82</u> DATE
	REVIEWED BY:	<u>[Signature]</u> B&R QA		<u>1-23-82</u> DATE
		<u>[Signature]</u> TUGCO QA		<u>1-23-82</u> DATE
	APPROVED BY	<u>Charles Weiss</u> CONSTRUCTION PROJECT MANAGER		<u>1-24-82</u> DATE

0.1	<u>TABLE OF CONTENTS</u>	DCN #1
1.0	<u>INTRODUCTION</u>	DCN #2
1.1	PURPOSE	DCN #3
1.2	SCOPE	DCN #4
1.3	GENERAL DISCUSSION	DCN #5
2.0	<u>DEFINITIONS OF TERMS</u>	DCN #6
3.0	<u>SPECIAL ITEMS AND OPERATIONS</u>	#7
3.1	<u>QUALIFICATION OF PERSONNEL</u>	
3.2	SAFETY REQUIREMENTS	
3.3	INSTRUMENTS AND THEIR USE	
3.4	DOCUMENTATION	
3.5	RECEIVING, STORING AND DISPENSING OF COATING MATERIALS	
3.6	SPECIAL COATING PROCEDURE	
3.7	TOUCH-UP & FINISH COATING OF VENDOR APPLIED COATINGS	
4.0	<u>PROCEDURE FOR COATING</u>	
4.1	PREPARATION OF SUBSTRATES AND COATING MATERIALS	
4.2	SURFACE PREPARATION FOR FINISH COAT	
4.3	PREPARATION OF COATING MATERIALS	
4.4	APPLICATION OF PRIME AND FINISH COATING	
4.5	FINAL ACCEPTANCE TESTING	
4.6	HOLD POINTS	
5.0	<u>SUPPORTING INFORMATION</u>	
	ATTACHMENTS	
	REFERENCES	

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JOB 35-1195
Comanche Peak Steam Electric Station

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 7

This notice applies to Construction Procedure No. 35-1195- CCP-30 Revision 10.

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

Change the procedure as follows:

Please replace the following pages with the attached:

Page 10 of 13
Page 12 of 13

Reviewed by: Mark Wells 6/10/83 NA
Originator Date Brown & Root Quality Assurance Date

Approved by: W. H. [Signature] 6/10/83
TCGCO Quality Assurance Date

P. C. [Signature] 6-11-83 6-11-83
Construction Project Manager Date Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 6

This notice applies to Construction Procedure No. 35-1195-CCP-30 Revision 10.

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 8 of 13
Attachment 3 Page 1 of 2
Attachment 3 Page 2 of 2

Reviewed by:

Mark Wells 4/29/83 N/A 4-29-83
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

Approved by:

[Signature] 4/29/83
TUGCO Quality Assurance Date

[Signature] 4-29-83 April 29, 1983
Construction Project Manager Date Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 2

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 5

This notice applies to Construction Procedure No. 35-1195- CCP-30 Revision 10.
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 11 of 13

Reason for change: Additional requirement.

Reviewed by:

M. W. Wells 1-11-83 W. Robert M. Frazier 1-12-83
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

Approved by:

C. T. Gales 1-14-83
TUGCO Quality Assurance Date

D. E. Frank 1-17-82 1/17/83
Construction Project Manager Date Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 2

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 4

This notice applies to Construction Procedure No. 35-1195- CCP-30 Revision 10.
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 11 of 13

Reason for change: Change in requirement.

<u>Mark Wells</u> Originator	<u>12-17-82</u> Date	Reviewed by: <u>NA</u>	<u>12/17/82</u> Brown & Root Quality Assurance Date
Approved by:		Reviewed by: <u>[Signature]</u>	<u>12/21/82</u> TUGCO Quality Assurance Date
<u>[Signature]</u>	<u>12/22/82</u> Construction Project Manager Date		<u>12/21/82</u> Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 4

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 3

This notice applies to Construction Procedure No. 35-1195- CCP-30 Revision 10.
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 11 of 13
Page 12 of 13
Page 1 of 1 Attachment 4

Reason for change: Additional requirements

Reviewed by:

M. L. [Signature] 9/12/82 1000 [Signature]
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

Approved by:

[Signature] 9/20/82
TUGCO Quality Assurance Date

[Signature] 9-20-82 9/21/82
Construction Project Manager Date Effective Date



ARMS
INDEXED

JOB 35-1195
Comanche Peak Steam Electric Station

DATE
Sheet 1 of 2

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 2

This notice applies to Construction Procedure No. 35-1195- CCP-30 Revision 10.

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 6 of 13

Reason for change: Additional requirement

Reviewed by:

Mark Wells 5/10/82 11/2 JES
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

Approved by:

[Signature] 5/11/82
TUGCO Quality Assurance Date

D. Frank 5-10-82
Construction Project Manager Date

5/11/82
Effective Date



ARMS
INDEXED

JOB 35-1195
Comanche Peak Steam Electric Station

DATE:

Sheet 1 of 2

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 1

This notice applies to Construction Procedure No. 35-1195- CCP-30 Revision 10.

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 5 of 13

Reason for change: Additional requirements

Reviewed by:

Robert H. FARRIN 2-16-82
Originator Date

N/A 2/16/82
Brown & Root Quality Assurance Date

Approved by:

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

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

2/17/82
Effective Date



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	2 of 13
1.0	<u>INTRODUCTION</u>			
1.1	PURPOSE			
1.1.1	The purpose of this procedure is to establish the methods by which the prime and finish coats are to be applied to the containment liners and radiation areas in accordance with specification, drawing, and manufacturer's requirements. This procedure may also be used for coating any steel substrate inside the reactor buildings scheduled to receive Carbo Zinc 11 primer and Phenoline 305 finish coat.			
1.2	SCOPE			
1.2.1	The scope of this procedure covers the surface preparation and coating of Unit 1 and 2 steel substrates inside the reactor buildings and radiation areas scheduled to receive protective coatings.			
1.3	GENERAL DISCUSSION			
1.3.1	All coating materials covered by this procedure shall be as manufactured by Carboline Corporation of St. Louis, Missouri. The coating shall consist of a prime coat of Carbo Zinc 11 with a finish coat of Phenoline 305. To protect the prime coat from prolonged exposure, a "seal coat" consisting of approximately one mil. of Phenoline 305, thinned in accordance with Section 4.4.2.4, may be applied over the prime coat. Prior to finish coating, the seal coat shall be solvent wiped with Phenoline thinner or Xylol. Finish coating shall be applied when convenient prior to completion of the building or prior to placement of concrete, equipment, or obstructions which would make finish coating impossible.			
	In order to maintain traceability on protective coatings applied to shop coated steel cited for installation in the Reactor Building, these items shall be steel stamped with a unique coating code number. The code numbers shall be assigned by QC Paint and applied by craft personnel. Upon division of materials, this unique number will be transferred along with all other unique identifying numbers.			
2.0	<u>DEFINITIONS OF TERMS</u>			
2.1	TERMS			
2.1.1	Substrate - The uncoated surface to which a coating is applied.			



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	3 of 13

3.0 SPECIAL ITEMS AND OPERATIONS

3.1 QUALIFICATION OF PERSONNEL

3.1.1 Coating application personnel shall be qualified per previous experience and practical application. In addition, each painter shall have been instructed by the Paint Superintendent or his representative in the use of the products as consistent with Carboline's training procedures, which includes both classroom instruction and a field application demonstration. This shall be verified by completing a form similar to Attachment 1. This form shall be executed by the Brown & Root Paint Superintendent or his representative. A coating manufacturer's representative will be available for technical supervision upon initial painting effort. Applicators performing work to Attachment 2 shall be qualified for "Q" coatings when applicable.

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 Site Safety Department to establish the frequency of monitoring the coating work.

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 insure efficiency of coating applications. This shall include surface profile comparators, holiday detectors, thermometers, and wet and dry film gauges. Viscosity measuring devices will not be used. Wet film gauges will be randomly used during coating application as an aid to field personnel on Phenoline 305 only. Readings will be limited to the minimum necessary to control coating thickness.

3.4 DOCUMENTATION

3.4.1 Records shall be maintained on Attachments 1 and 2 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 sheet.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	4 of 13

3.5 RECEIVING, STORAGE AND DISPENSING OF COATING MATERIALS

3.5.1 Receiving and Storage - 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 45° - 110°F. Infrequent dips in air temperature in storage areas as low as 32°F for up to 24 hours are acceptable. Temporary storage may be required at the receiving warehouse due to receiving or other problems.

3.5.2 Dispensing - 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. With the exception of 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 document, the appropriate Project Engineer (Mechanical, Civil, Electrical) shall complete Attachment 2 and transmit it to the Paint Superintendent. A log of all procedures from Attachment 2 shall be maintained by the Site Coating Engineer. The following information shall be completed on each procedure.

3.6.2 Each procedure shall be given a unique number. The scope will describe the working limits of the procedure with detailed work requirements being listed under the requirements section. The approvals section shall have signatures of the following: Project Discipline Engineer (Mechanical, Civil, etc.), QA Manager if coating of item is safety related, TUSI representative when required, Engineer who prepared document, and a revision number and date. Upon completion of the document, distribution shall be made to all holders of this procedure.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	5 of 13

3.7 TOUCH-UP AND FINISH COATING OF VENDOR APPLIED COATINGS

3.7.1 Prior to touch-up of primer or application of topcoat on vendor coated items other than pipe hanger support components, an adhesion test shall be performed by the Brown & Root QC Department. If results are acceptable, work may proceed in accordance with sections 4.4.2.2 through 4.4.2.9.

3.7.2 The QC Inspector or his representative shall notify the responsible area engineer and/or the Paint Superintendent as soon as possible after receipt of a nonconforming item in need of paint repair to allow time for Attachment 2 preparation and a planned schedule for repair.

4.0 PROCEDURE FOR COATING

4.1 PREPARATION OF SUBSTRATES AND COATING MATERIALS

4.1.1 Surface Preparation for Primer - Final surface preparation shall not begin unless the temperature of the surface to be blasted and/or power tooled is 5°F above the dew point. If needed, the surface to be primed shall then be cleaned of any heavy oil or grease deposits in accordance with SSPC-SP-1-63 "Solvent Cleaning".

Small amounts of grease or oil deposits may be removed by blast operations. The surface shall then be cleaned by blast, hand or power tool operations to achieve an equivalent of SSPC-SP10-63, "near white" blast cleaning. Although 1-3 mil. surface profile is preferred, a minimum of 1 mil. profile is required. After the above surface preparation, the surface to be primed shall be air blasted and/or solvent wiped to remove dust, sand or foreign contaminants from the surface. Air blasting shall not be performed where air-borne contaminants could adhere to tacky paint. Sufficient time shall be provided to allow suspended particles to settle before beginning primer application. If rust forms after surface preparation, the rusted area shall be re-cleaned before primer application. Under no case shall a blast, hand, or power tool cleaned surface be exposed for more than 24 hours prior to priming without additional cleaning of the surface. When applying coatings that will be joined together by a later coating operation, the interface shall be constructed as follows:

- a. Blasting using no border tape - ~~Overblast~~ the steel to near white metal approximately 12" - 18" beyond the point which will receive primer. Hold back approximately 12" - 18" from edge of blasted area when applying primer.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	6 of 13
<p>b. Blast, hand or power tool cleaning using border tape - Clean the steel to near white metal approximately 3" - 6" beyond the point which will receive primer. Place border tape approximately 1" in from edge of cleaned area and prime. When applying seal or finish coat on either of above methods hold back approximately 12" - 18" from edge of primer.</p>				
4.1.2	<p>Removal of weld spatter and other minor surface imperfections (not to exceed .031" for containment liners) - If needed, weld spatter omitted by others will be removed by Painting Personnel in accordance with SSPC-SP-2 and SSPC-SP-3. If it is determined that surface defects are severe enough to require later repair, the area to be repaired will be blocked out and spot painted at a later date. All protrusions and peaks shall be ground to a rounded contour.</p>			
4.1.3	<p>If coating removal is required from an area or item which has previously been coated in accordance with this procedure, shadows or tight residue of primer which may remain in the profile of the previously prepared substrate is acceptable.</p>			
4.2	<p>SURFACE PREPARATION FOR FINISH COAT</p>			
4.2.1	<p>Surface preparation for the finish coat shall consist of the removal, if needed, of any oil or grease. This shall be accomplished by the use of a manufacturer recommended cleanser or cleansing method on areas that have been seal-coated. On areas where the Carbo Zinc 11 primer is exposed, oil and grease will be removed by sand blasting, hand, or power tool grinding, and needle scaling and then by solvent wiping the area prior to replacing the primer. Power tool grinding and needle scaling should be equivalent to a near white blast SP-10 specification with no size limitation as long as the millage requirements are obtained.</p>			
4.2.2	<p>The ambient temperature and relative humidity shall be measured to determine the dew point temperature. Phenoline 305 finish coat shall be applied unless the substrate temperature is more than 5°F above the dew point.</p>			
4.3	<p>PREPARATION OF COATING MATERIALS</p>			
4.3.1	<p>Primer - The primer, Carbo Zinc 11, is packaged in a two component kit consisting of a base and zinc filler. First the base shall be thoroughly mixed. Zinc filler shall then be added under constant agitation and mixed until free of lumps. Partial mixes shall be mixed by weight in a proportion of 10 parts base to 22 parts zinc filler using a suitable scale to achieve a plus or minus 2 percent accuracy. The mixture shall then be strained through a 30-mesh screen. Viscosity shall be controlled by adding thinner, as required, but shall not exceed two quarts of thinner per gallon of Carbo Zinc 11. Pot life of CZ 11 shall be as shown in Attachment 4.</p>			



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	7 of 13

4.3.2 Finish Coat - The finish coat, Phenoline 305, is packaged in a two component kit consisting of Phenoline 305 base, Part A, and a Phenoline catalyst, Part B. Mixes are made by combining and thoroughly mixing the base and catalyst. Partial mixes may be made by combining, in a ratio by volume, four parts base to one part catalyst. Viscosity shall be controlled by adding thinner, as required, but shall not exceed two quarts of thinner per gallon of Phenoline 305. Pot life of Phenoline 305 shall be shown on Attachment 4.

4.4 APPLICATION OF PRIME AND FINISH COATING

4.4.1 Prime Coat

4.4.1.1 Coating material shall be applied using conventional spray equipment with agitated pressure pots having a maximum hose length of 75 feet. Care must be taken to assure that air and material pressures are adjusted to compensate the additional length of hose from 50' to 75' in length. The primer shall be allowed to become tack free before start of other construction operations which could create contamination problems. Any runs or sags having a detrimental effect on the coating system shall be removed and repaired. The following application parameters shall also be followed:

1. Normal conditions of ambient and surface temperature shall be 40° - 95°F and 40° - 110°F respectively; however, primer may be applied within an ambient range of 0° - 130°F and a surface temperature range of 0° - 200°F. Carbo-Zinc 11 may be thinned up to 2 quarts per gallon for application; however, when using higher thinning levels at or below normal temperature range, care must be taken to obtain proper film build. Above 85°F it is advisable to use up to 2 quarts per gallon to minimize dry spray. In no case shall carboline limits be exceeded.
2. Humidity values vary from 10 to 95% however, coating shall not be applied to a wet or damp surface.
3. Thickness of prime coat shall have a minimum dry film thickness of 2 mils and a maximum of 4.5 mils. Minimum and maximum spot test values shall be 1.5 and 5.5 mils respectively.
4. A double regulated pot having an adequate air volume supply shall be used.
5. As a guide, coating material may be applied using a 50% overlap with each pass while holding a gun 8-10 inches from the surface. Cross hatch application is permissible.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	8 of 13

6. Carbo Zinc 11 is sufficiently cured for topcoat when the coating may be burnished rather than removed when rubbed with the flat portion of a smooth edged coin such as a nickle. (Minor amounts of zinc dust may be removed during cure verification, however, a burnished surface must be achieved). Attachment 3 may be utilized as general guidelines for cure to topcoat time of CZ-11 above 25% relative humidity. If required, the cure of carbo zinc II may be accelerated by the use of water spray, however, a minimum of one hour must elapse between application of coating and water spray. Below 25% relative humidity, water curing is recommended to obtain the desired cure. Water utilized in conjunction with water curing shall have a PH factor from 5 to 9. Application of water spray for curing purposes may be as often as necessary to obtain the proper cure.

- 4.4.1.2 Recoating of Carbo Zinc 11 Primer - Prior to recoating, if no major defects per section 4.4.2.9 are present, the entire primed surface to be recoated shall be wiped with clean rags moistened with Carboline Thinner #33. Wiping shall continue until no appreciable discoloration is noticed on the rags. Carbo Zinc 11 shall then be thinned by using two quarts Carboline NO. 33 per gallon mix. This will be applied to achieve a 2.0 - 4.5 mils total DFT. Only two recoats may be applied. Special attention should be given to spray application and dry film thickness when using a 50% mix. The primed surface shall not be recoated until cured per section 4.4.1.1.6.
- 4.4.1.3 Repair of Sags and Runs - Sags or runs in excess of 5.5 mils will be adraded with an aluminum screen or sandpaper to 2.0 to 5.5 mils. Sags or runs 5.5 mils or less which show no evidence of mud-cracking will not be repaired. If coating surface is satisfactory after abrading, then finish coat may be applied; however, if coating surface is unsatisfactory, blast, hand abraade or power tool grind to near white metal is required and primer coat re-applied. A satisfactory coating is considered one having no mud-cracking to the metal surface as visible to the unaided eye.
- 4.4.1.4 Brush touch-up painting shall be done on the prime coat in accordance with the following:
- Prime Coat:
1. Carboline Application Instruction (Carbo Zinc 11) Bulletin - October 76-N.
 2. Carboline Product Data Sheet (Carbo Zinc 11) Bulletin - October 76-N. Brush touch-up allowed on areas one square foot or less.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	9 of 13
4.4.1.5	Embedded foreign particles shall be removed by abrading, if low millage or major defects result, recoat or repair per section 4.4.1.2 or section 4.4.2.9.			
4.4.1.6	Treatment of Rust Stains - Remove residue, though not necessarily the stain, with bristle brush and water or Carboline Thinner #33. Allow to dry thoroughly.			
4.4.1.7	Coating Interface - Refer to Section 4.4.3.0 for coating interfacing.			
4.4.2	Finish Coat			
4.4.2.1	<p>Finish coating shall be applied using conventional, airless, brush or roller. Weld seams, edges and other sharp geometrical discontinuities may receive an initial coat of 1-2 mils finish coating thinned by using two quarts Phenoline Thinner per each gallon kit of Phenoline 305. To aid in continuity at edges, edges may be "striped" with Phenoline unthinned instead of the 50% mixture as stated above. In either "striping" or initial coating of edges, welds, etc., time should be allotted for the coating to harden sufficiently to maintain a "sealing" effect prior to continuing coating operations. The initial coating of edges, striping, etc., as stated above, shall be considered part of the total initial finish coating operation. The material shall be allowed to become tack free before any other construction operations proceed which could create contamination problems by dust or other foreign matter. A continuity check shall be performed in accordance with NACE T-6F-3 Condition "C". No gross discontinuities are acceptable such as holidays, voids, skips, bubbles, and misses. Any runs or sags having a detrimental effect on the coating system shall be removed and repaired. The following application parameters shall govern:</p> <ol style="list-style-type: none"> <li data-bbox="516 1449 1520 1651">1. The permissible range of surface and ambient temperature for application shall be 50° - 120°F. Temperature may rise above 120°F after material has become "tack free". Phenoline 305 may be thinned up to 2 quarts of Phenoline Thinner per gallon mix. The ratio of thinner to Phenoline will be that which gives the best workable mix, i.e., usually advantageous to use more thinner at lower temperatures. <li data-bbox="516 1683 1503 1742">2. Minimum and maximum values of relative humidity shall be 0% and 85% respectively. <li data-bbox="516 1774 1503 1859">3. As a guide, coating material shall be applied using a 50% overlap with each pass while holding the gun 8-10 inches from the surface. 			



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	10 of 13

4. Curing and time to recoat Phenoline 305 shall be as shown below:

<u>Between Coats</u>	<u>Temperature °F</u>	<u>Final Cure</u>
72 hours	50 - 59	12 days
36 hours	60 - 74	8 days
18 hours	75 - 89	4 days
12 hours	90 and above	2 days

5. Phenoline thinned at 50% and applied as a seal coat may be recoated after 4 hours of cure at or above 75°F.

6. Tack free shall be defined as the extent of cure at which foreign contaminants will not adhere to the coating.

7. The total coating system shall have a dry film thickness range of 7 to 11 mils, with a minimum spot check of 7 mils and a maximum spot check of 11.5 mils.

4.4.2.2 Repair of Runs and Sags - Runs and sags will be abraded until the DFT of the Phenoline 305 is within 1.9 - 4.5 mils. If cracks are visible, then runs and sags will be removed to primer by power tool grinding followed by solvent wiping. If no cracking occurs, top coat will be considered acceptable. Area will be recoated as outlined in the Repair of Pinholes and Discontinuities (Section 4.4.2.4).

4.4.2.3 Repair of Embedded Foreign Particles - Foreign particles shall be removed by abrading and then recoated as outlined in the repair of pinholes and discontinuities. Recoating shall not be performed until cure times stated in Section 4.4.2.1(4) have been satisfied.

4.4.2.4 Repair of Pinholes and Discontinuities - Loose particles shall be removed by brushing or vacuum or compressed air. The affected area shall be solvent wiped with Phenoline 305 Thinner or xylol. Pinholes and small discontinuities may be repaired at the time of final inspection without a later reinspection of the repair. If the repair area requires recoating, recoat the area with Phenoline 305 thinned 50%. Recoated areas require cure to final inspection time per section 4.5.1.

4.4.2.5 Repair of Scratches and Damaged Areas - Any scratches or damaged areas will be abraded until loosely adherent particles are removed. The area shall then be solvent wiped (Carboline thinner #33 for primer, Carboline Phenoline thinner or xylol for topcoat) and repaired with appropriate coating, i.e., Phenoline 305 if damage is considered a minor defect per section 4.4.2.8 and Carbo Zinc 11 and Phenoline 305 if damaged area is considered a major defect per section 4.4.2.9. All edges of existing coating around the perimeter of the cleaned area shall be "feathered" back a sufficient distance to ensure a smooth blend with existing coating. Thickness shall be as required for the pertinent coating.

BROWN & ROOT, INC. CFSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	11 of 13
4.4.2.6	Brush touch-up painting shall be done on the finish coat in accordance with the following:			
	<ol style="list-style-type: none"> 1. Carboline Application Instruction (Phenoline 305) Bulletin 775. 2. Carboline Product Data Sheet (Phenoline 305 Primer and Finish) Bulletin 473. Brush touch-up and complete application is allowed with no area restrictions. 			
4.4.2.7	Treatment of Rust Stains - If surface is contaminated with rust stains or minute metallic particles, then surface shall be prepared by solvent wiping with Phenoline 305 Thinner or xylol and overcoating with a coat of Phenoline 305 prepared in accordance with Section 4.4.2.4.			
4.4.2.8	Repair of Topcoat and/or CZ 11 Minor Defects - (Minor defects are defined as an area, either circular or linear, in which a ½" diameter circle could not be completely inscribed at any point along the entire length.) Blast or abrade, by machine or hand, the Phenoline 305 finish surrounding the damaged area and clean any exposed steel to ensure contaminant free surface. Solvent wipe the surrounding 305 finish with Carboline's Phenoline Thinner or xylol. Spray or brush Phenoline 305 finish at approximately 4 mil DFT over the damaged area. Overlap onto the surrounding coating a sufficient amount to insure a smooth and continuous topcoat system.			
4.4.2.9	Repair of Topcoat and/or CZ 11 Major Defects - (Major defects are defined as an area, either circular or linear, in which a ½" diameter circle could be completely inscribed at any point or along the entire length.) Spot blast or abrade, machine or hand, the damaged area. Power tool or hand abrading must be very thorough in order to prepare the surface for Carbo Zinc 11 touch-up. The resulting surface preparation shall be equivalent to a near white SP-10 Specification. A surface roughness equivalent to a minimum of one mil blast profile shall be obtained.			
4.4.3.0	Coating Interface - At coating interface for finish and/or primer coat, the existing coating shall be "feathered back" a sufficient distance to ensure a smooth final coating system. When interfacing the 305/CZ11 system and the 305/D6 system, the interface of the two primers shall be no greater than 1½" in width.			
4.4.3.1	Cure of Minor Topcoat Repair - Minor defects, as defined in Section 4.4.2.8, which are noted in the topcoat and repaired, may be inspected for final acceptance after cure to recoat time as stated in Section 4.4.2.1(4) has been satisfied. Full cure to topcoat repairs shall be satisfied prior to placement into service.			



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	12 of 13

4.5 FINAL ACCEPTANCE TESTING

4.5.1 Final acceptance inspection may be performed after a minimum topcoat cure of 24 hours and cure for recoat time as state in section 4.4.2.1 paragraph 4 is satisfied.

After 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. A copy will then be transmitted to the B&R Paint Superintendent as soon as possible after final acceptance is made.

4.6 HOLD POINTS

4.6.1 Onsite receipt of coating materials.

4.6.2 Substrates before and following surface preparation.

4.6.3 Mixing and preparation of coating material for application.

4.6.4 Film characteristics after drying and curing.

4.6.5 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. Special Coating Procedure
3. CZ 11 Cure to Topcoat Time
4. Pot Life CZ 11 and Phenoline 305

5.2 REFERENCES

1. Gibbs & Hill Specification 2323-SS-14, "Containment Steel Liner", Latest Revision
2. Steel Structures Paint Council, Volume 2, Second Edition
3. Carboline Corporation "Application Instruction", October 76-N Revision and Bulletin Number 775 - data sheets October 76-N Revision and 473, Latest Revision
4. ANSI N 101.2, "Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities"
5. Gibbs & Hill Specification 2323-AS-31, "Protective Coatings", Latest Revision



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	13 of 13

6. Gibbs & Hill Specification 2323-MS-101,
"Equipment Erection", Latest Revision
7. Gibbs & Hill Specification 2323-MS-43B,
"Nuclear Piping", Latest Revision
8. Gibbs & Hill Specification 2323-MS-44B,
"Non-Nuclear Piping"
9. Gibbs & Hill Specification 2323-MS-100,
"Piping Erection"
10. Gibbs & Hill Specification 2323-SS-17,
"Miscellaneous Steel", Latest Revision



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30	10	1/26/82	1 of 1

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
Tugco QA Vault (Original)



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	1 of 2

"Q" Coating _____

ATTACHMENT 2

Sheet _____ of _____

"Non-Q" Coating _____

Procedure # _____

Rev. _____ Date _____

SPECIAL COATING PROCEDURE NO. _____

SCOPE _____

REQUIREMENTS:

REFERENCE DOCUMENTS

APPROVALS

PDE _____

QA/QC _____

TUSI _____

ENGINEER _____

REV. _____ DATE _____



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30	10	1/26/82	2 of 2

Sheet ____ of ____

ATTACHMENT 2 (Continued) Procedure # _____

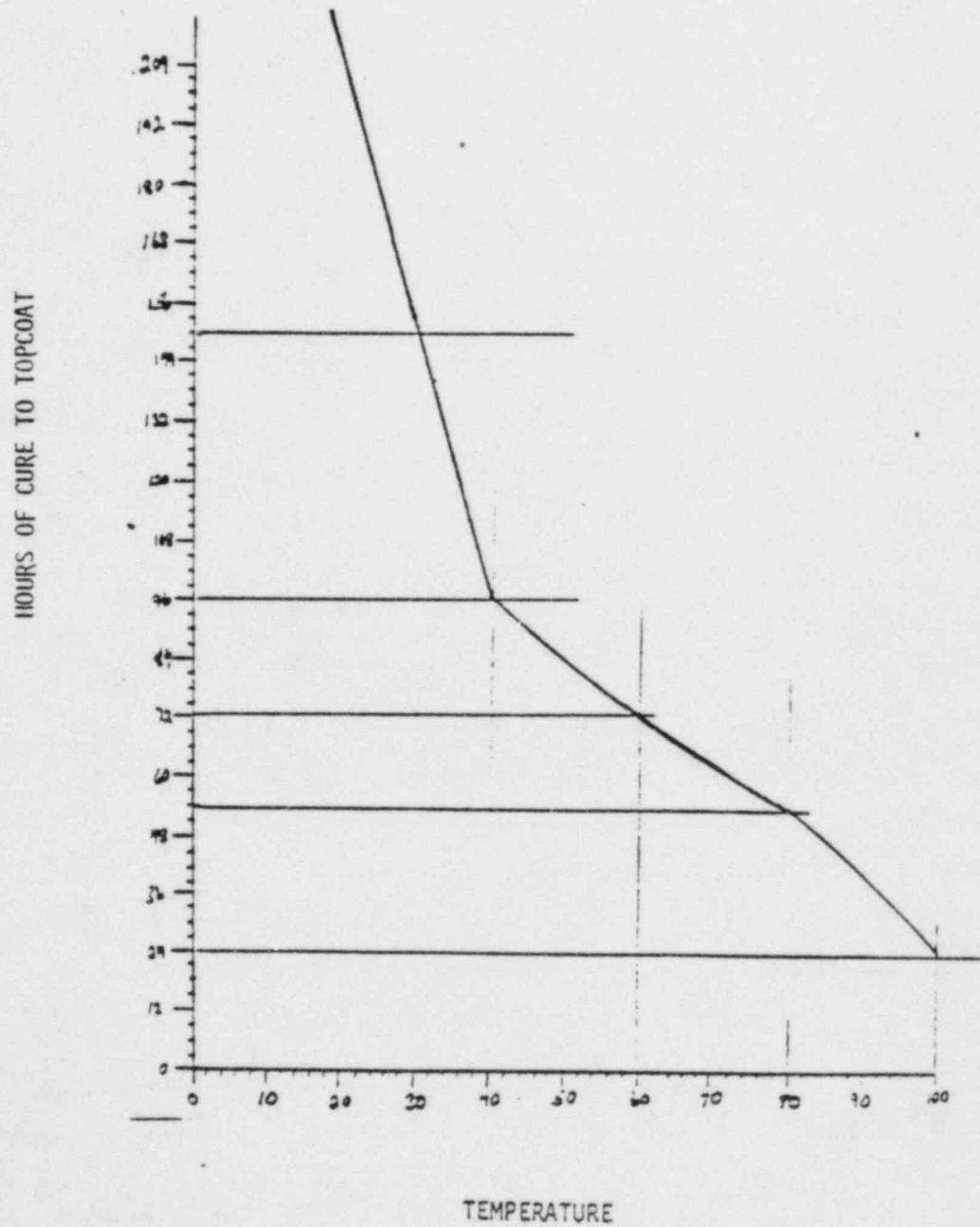
Rev. _____ Date _____

REQUIREMENTS (Continued)



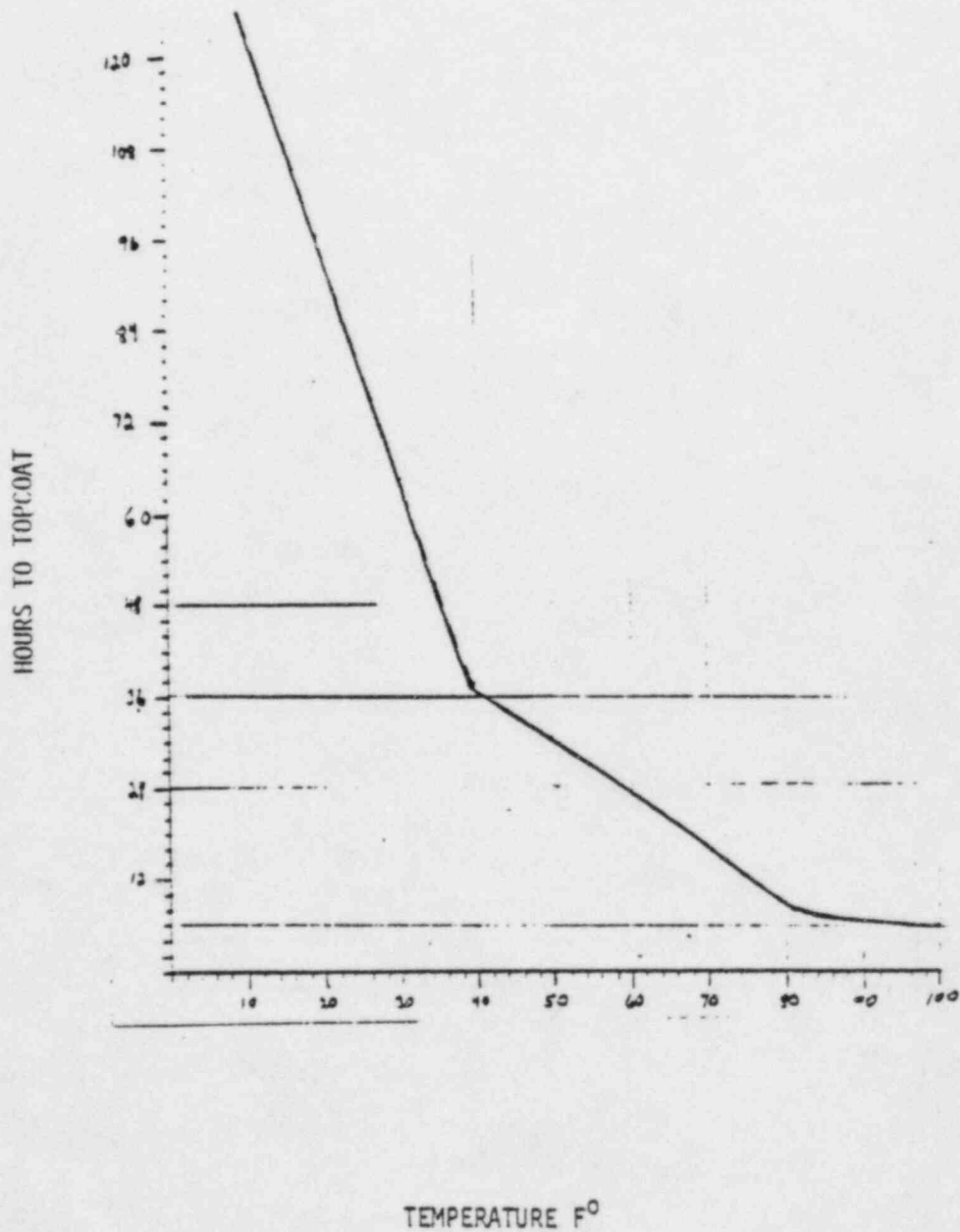
BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30	10	1/26/82	1 of 2

Attachment 3
CZ-11 CURE TO TOPCOAT TIME
25-50% R. H.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30	10	1/26/83	2 of 2

ATTACHMENT 3
CZ-11 CURE TO TOPCOAT TIME
50-100% R.H.

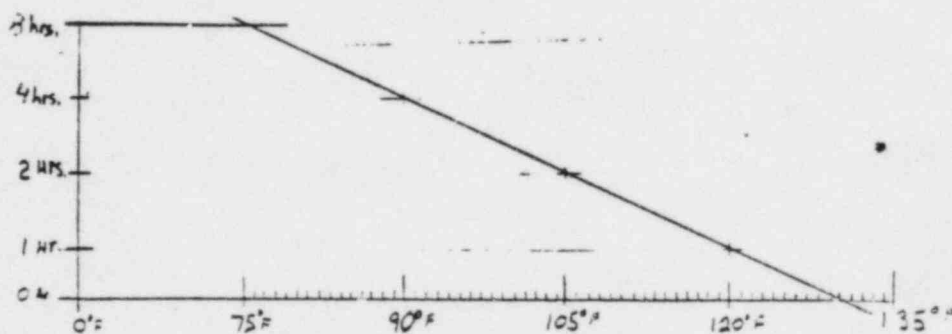


BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30	10	1/26/82	1 of 1

ATTACHMENT 4

POT LIFE - CZ 11

8 Hours Max. Pot Life



POT LIFE PHENOLINE 305

TEMPERATURE (°F)	UNTHINNED	THINNED-50%
50 - 54	10 hrs	24 hrs
55 - 59	7 hrs	24 hrs
60 - 64	4½ hrs	24 hrs
65 - 69	3½ hrs	24 hrs
70 - 74	2 hrs	24 hrs
75 - 79	1½ hrs	24 hrs
80 - 84	1½ hrs	24 hrs
85 - 89	1½ hrs	24 hrs
90 - 95	1 hr	24 hrs

Pot life for coatings thinned up to but not including max. amount of thinner allowed, use pot life for unthinned material.

For spray application, pot life as stated above is recommended maximum times and should be utilized for a basis for coating usage time; however, actual pot life may be longer. If coating when temperature is above 95°F, or if pot life as stated above has been exceeded, the actual pot life ends when proper atomization and spraying becomes difficult and the coating loses body and begins to sag. When utilizing other than spray application methods, pot life shall be as stated in the above table.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30A	2	9/20/82	1 of 13
TITLE: COATING STEEL SUBSTRATES INSIDE REACTOR BUILDING & RADIATION AREAS	ORIGINATOR:	<i>Mark Miller</i>	<i>9/17/82</i>	DATE
	REVIEWED BY:	<i>[Signature]</i> B&R QA <i>[Signature]</i> AUGCO QA	<i>9/16/82</i>	DATE
	APPROVED BY	<i>[Signature]</i> CONSTRUCTION PROJECT MANAGER	<i>9-17-82</i>	DATE

VOID

0.1	<u>TABLE OF CONTENTS</u>	DCN 1 #6
1.0	<u>INTRODUCTION</u>	DCN 3
1.1	PURPOSE	#3
1.2	SCOPE	#4
1.3	GENERAL DISCUSSION	#5
2.0	<u>DEFINITIONS OF TERMS, ABBREVIATIONS AND SYMBOLS</u>	
2.1	TERMS	
2.2	ABBREVIATIONS	
2.3	SYMBOLS	
3.0	<u>SPECIAL ITEMS AND OPERATIONS</u>	
3.1	QUALIFICATION OF PERSONNEL	
3.2	SAFETY REQUIREMENTS	
3.3	INSTRUMENTS AND THEIR USE	
3.4	DOCUMENTATION	
3.5	RECEIVING, STORING AND DISPENSING OF VENDOR APPLIED COATINGS	
3.6	SPECIAL COATING PROCEDURE	
3.7	TOUCH-UP & COATING OF VENDOR APPLIED COATINGS	
4.0	<u>PROCEDURE FOR COATING</u>	
4.1	PREPARATION OF SUBSTRATES AND COATING MATERIALS	
4.2	SURFACE PREPARATION FOR FINISH COAT	
4.3	PREPARATION OF COATING MATERIALS	
4.4	APPLICATION OF PRIME AND FINISH COATING	
4.5	FINAL ACCEPTANCE TESTING	
4.6	HOLD POINTS	
5.0	<u>SUPPORTING INFORMATION</u>	
5.1	ATTACHMENTS	
5.2	REFERENCES	

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JOB 35-1195

COMANCHE PEAK STEAM ELECTRIC STATION

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 6

Notice applicable to Construction Procedure No. 35-1195- CCP-30A Rev. 2

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

Change the procedure as follows:

Please replace the following pages with the attached:

Page 6 of 13

Page 9 of 13

Page 12 of 13

Reviewed by:

Shane C. Kelly 11/7/83
Originator Date

N/A General Thomas 11/9/83
Brown & Root Quality Assurance Date

Approved by:

C.T. Reilly 11/15
TUGCO Quality Assurance Date

D.P. Frank 11-16-83
Construction Project Manager Date

November 16, 1983
Effective Date



JOB 35-1195

COMANCHE PEAK STEAM ELECTRIC STATION

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 5

Notice applicable to Construction Procedure No. 35-1195- CCP-30A Rev. 2

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

Change the procedure as follows:

Please replace the following page with the attached:

Page 1 of 1; Attachment 3

Reviewed by:

Mark Wells 11/2/93
Originator Date

N/A L. ... 11/2/93
Brown & Root Quality Assurance Date

Approved by:

W. ... 11/3/93
TUGCO Quality Assurance Date

F. C. ... 11-3-93
Construction Project Manager Date

November 2, 1993
Effective Date



JOB 35-1195

COMANCHL PEAK STEAM ELECTRIC STATION

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 4

Notice applicable to Construction Procedure No. 35-1195- CCP-30A Rev. 2

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

Change the procedure as follows:

Please replace the following page(s) with the attached:

Page 12 of 13

Reviewed by:

Mark Wells 10/13/83 N/A Louise Hamata 10/12/83
Originator Date Brown & Root Quality Assurance Date

Approved by:

R. W. Kuehler 10/17/83
TUGCO Quality Assurance Date

D. C. Frankum 10/17/83
Construction Project Manager Date

October 17, 1983
Effective Date



JOB 35-1195

COMANCHE PEAK STEAM ELECTRIC STATION

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 3

Notice applicable to Construction Procedure No. 35-1195- CCP-30A Rev. 2

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

Change the procedure as follows:

Please replace the following pages with the attached:

Page 12 of 13

Page 13 of 13

Attachment 3: Page 1 of 1

** Page 13 accompanies this DCN to show paragraphal movement only.

Reviewed by:

Mark Wells 9/21/83
Originator Date

N. J. ... 9/21/83
Brown & Root Quality Assurance Date

Approved by:

M. ... 9/22/83
TUGCO Quality Assurance Date

... 9/22/83
Construction Project Manager Date

September 22, 1983
Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 2

Construction Procedure
DOCUMENT CHANGE .. ICE NUMBER 2

This notice applies to Construction Procedure No. 35-1195-CCP-30A Revision 2.

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 11 of 13

Reason for change: Additional requirement.

Reviewed by:

M. H. C. Williams 1-11-83 N. K. Root 1-12-83
Originator Date / Brown & Root Quality Assurance Date

Reviewed by:

C. T. [Signature] 1/14/83
TUGCO Quality Assurance Date

Approved by:

DC. [Signature] 1-17-82 1/17/83
Construction Project Manager Date Effective Date



JOB 35-1195
Comanche Peak Steam Electric Station

Sheet 1 of 2

Construction Procedure
DOCUMENT CHANGE NOTICE NUMBER 1

This notice applies to Construction Procedure No. 35-1195-CCP-30A Revision 2.

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 11 of 13

Reason for change: Change in requirement.

Reviewed by:

Mark Wells 12-17-82 NT CPE
Originator Date Brown & Root Quality Assurance Date

Reviewed by:

Approved by:

[Signature]
TUGCO Quality Assurance Date

[Signature] 12-22-82 12/21/82
Construction Project Manager Date Effective Date



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	2 of 13

1.0 INTRODUCTION

1.1 PURPOSE

1.1.1 The purpose of this procedure is to establish an alternate prime coat system utilizing existing topcoat system. Coatings shall be applied to the containment liners and radiation areas in accordance with specification, drawing, and manufacturer's requirements. This procedure may also be used for coating any steel substrate inside the reactor buildings scheduled to receive primer or Dimetcote 6 and Phenoline 305 finish coat manufactured by Ameron and Carboline respectively.

1.2 SCOPE

1.2.1 The scope of this procedure covers the surface preparation and coating of Unit 1 and 2 steel substrates inside the reactor buildings and radiation areas scheduled to receive protective coatings.

1.3 GENERAL DISCUSSION

1.3.1 All coating materials covered by this procedure shall be as manufactured by Carboline Corporation of St. Louis, Missouri or Ameron Protective Coatings Division, Brea, California. The coating system will consist of a prime coat of Dimetcote 6 by Ameron with a finish coat of Phenoline 305 by Carboline. In order to protect the prime coat from prolonged exposure, a seal coat consisting of approximately one mil of Phenoline 305, thinned in accordance with Section 4.4.2.4, may be applied over the prime coat. Surface preparation of the seal coat prior to finish coating, shall consist of solvent wiping if exposed longer than 30 days. Finish coating shall be applied when convenient prior to completion of the building --- or, prior to placement of concrete, equipment, or obstructions which would make finish coating impossible.

In order to maintain traceability on protective coatings applied to shop coated steel cited for installation in the Reactor Building, these items shall be steel stamped with a unique coating code number. The code number shall be assigned by QC Paint and applied by craft personnel. Upon division of materials, this unique number will be transferred along with all other unique identifying numbers.

2.0 DEFINITIONS OF TERMS, ABBREVIATIONS AND SYMBOLS

2.1 TERMS

2.1.1 Substrate - The uncoated surface to which a coating is applied.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	3 of 13

2.2 ABBREVIATIONS

2.2.1 (NONE)

2.3 SYMBOLS

2.3.1 (NONE)

3.0 SPECIAL ITEMS AND OPERATIONS

3.1 QUALIFICATION OF PERSONNEL

3.1.1 Coating application personnel shall be qualified per previous experience and practical application. In addition, each painter shall have been instructed by the Paint Superintendent or his representative in the use of the product as consistent with carboline's and Ameron training procedures, which includes both classroom instruction and a field application demonstration. This shall be verified by completing a form similar to Attachment 1. This form shall 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. Applicators performing work to Attachment 2 shall be qualified for "Q" coatings, when applicable.

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 establish the frequency of monitoring of the coating work.

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 insure efficiency of coating applications. This shall include surface profile comparators, holiday detectors, thermometers, and wet and dry film gauges. Viscosity measuring devices will not be used.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30A	2	9/20/82	4 of 13

Wet film gauges will be randomly used during coating application as an aid to field personnel on Phenoline 305 only. Readings will be limited to the minimum necessary to control coating thickness.

3.4 DOCUMENTATION

3.4.1 Records shall be maintained on Attachments 1 and 2 listed in Section 5.1. After completions, 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 sheet.

3.5 RECEIVING, STORAGE AND DISPENSING OF COATING MATERIALS

3.5.1 Receiving and Storage - 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 done 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 45°F - 110°F. Infrequent dips in air temperature in storage areas as low as 32°F for up to 24 hours is acceptable. Temporary storage may be required at the receiving warehouse due to receiving or other problems.

3.5.2 Dispensing - 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. After materials have been partially used from an individual container, the same container cannot be resealed and returned to "Q" storage area. Containers opened and partially used in the "Q" paint storage area may be resealed and the contents used for later "Q" painting. With the exception of thinners, the contents from partially used containers will not be reused after a period of one week 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 document, the appropriate Project Engineer (Mechanical, Civil, Electrical) shall complete Attachment 2 and transmit it to the Paint Superintendent. A log of all procedures from Attachment 2 shall be maintained by the Project Mechanical Engineer. The following information shall be filled out on each procedure.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	5 of 13
3.6.2	<p>Each procedure shall be given a unique number. The scope will describe the working limits of the procedure with detailed work requirements being listed under the requirements section. The approvals section shall have signatures of the following: Project Discipline Engineer (Mechanical, Civil, etc.), TUGCO Quality Engineering if coating of item is safety related, TUSI representative when required, Engineer who prepared document, and a revision number and date. Upon completion of the document, distribution shall be made to all holders of this procedure.</p>			
3.7	TOUCH-UP AND FINISH COATING OF VENDOR APPLIED COATINGS			
3.7.1	<p>Prior to touch-up of primer or application of topcoat, an adhesion test shall be performed by the Brown & Root QC Department. If results are acceptable, work may proceed in accordance with sections 4.4.2.2 through 4.4.2.9.</p>			
3.7.2	<p>The QC Inspector or his representative shall notify the responsible area engineer and/or the Paint Superintendent as soon as possible after receipt of a non-conforming item in need of paint repair to allow time for Attachment 2 preparation and a planned schedule for repair.</p>			
4.0	<u>PROCEDURE FOR COATING</u>			
4.1	PREPARATION OF SUBSTRATES AND COATING MATERIALS			
	<p>Surface Preparation for Primer - Final surface preparation shall not begin unless the temperature of the surface to be blasted and/or power tooled is 5°F above the dew point. If needed, the surface to be primed shall then be cleaned of any heavy oil or grease deposits in accordance with SSPC-SP-1-63 "Solvent Cleaning".</p>			
	<p>Small amounts of grease or oil deposits may be removed by blast operations. The surface shall then be cleaned by blast, hand or power tool operations to achieve an equivalent of SSPC-SP10-63, "near white" blast cleaning. Although 1-3 mil. surface profile is preferred, a minimum of 1 mil. profile is required. After the above surface preparation, the surface to be primed shall be air blasted and/or solvent wiped to remove dust, sand or foreign contaminants from the surface. Air blasting shall not be performed where air-borne contaminants could adhere to tacky paint. Sufficient time shall be provided to allow suspended particles to settle before beginning primer application. If rust forms after surface preparation, the rusted area shall be re-cleaned before primer application. Under no case shall a blast, hand, or power tool cleaned surface be exposed for more than 24 hours prior to priming without additional cleaning of the surface. When applying coatings that will be joined together by a later coating operation, the interface shall be constructed as follows:</p>			



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	JOB 35-1195 CCP-30A	2	9/20/82	6 of 13

- a. Blasting using no border tape - Overblast the steel to near white metal approximately 12" - 18" beyond the point which will receive primer. Hold back approximately 12" - 18" from edge of blasted area when applying primer.
 - b. Blast, hand or power tool cleaning using border tape - Clean the steel to near white metal approximately 3" - 6" beyond the point which will receive primer. Place border tape approximately 1" in from edge of cleaned area and prime. When applying seal or finish coat on either of above methods hold back approximately 12" - 18" from edge of primer.
- 4.1.2 Removal of weld spatter and other minor surface imperfections (not to exceed .031" for containment liners) - If needed, weld spatter omitted by others will be removed by Painting Personnel in accordance with SSPC-SP-2 and SSPC-SP-3. If it is determined that surface defects are severe enough to require later repair, the area to be repaired will be blocked out and spot painted at a later date. All protrusions and peaks shall be ground to a rounded contour.
- 4.1.3 If coating removal is required from an area or item which has previously been coated in accordance with this procedure, shadows or tight residue of primer which may remain in the profile of the previously prepared substrate is acceptable. However, areas with residues of Carboline 191 Primer shall be recoated with Carboline 191 Primer. Areas with residues of inorganic zinc may be coated with either inorganic zinc or Carboline 191 Primer. It is not required that such areas meet the criteria of SSPC-SP10 or SSPC-SP6.
- 4.2 SURFACE PREPARATION FOR FINISH COAT
- 4.2.1 Surface preparation for the finish coat shall consist of the removal, if needed, of any oil or grease. This shall be accomplished by the use of a manufacturer recommended cleanser or cleansing method on areas that have been seal-coated. On areas where the Carbo Zinc 11 primer is exposed, oil and grease will be removed by sand blasting, hand, or power tool grinding, and needle scaling and then by solvent wiping the area prior to replacing the primer. Power tool grinding and needle scaling should yield surface cleanliness equal to that of SSPC-SP-10 "near white" blast cleaning. Power tool areas should be kept to a minimum however no size limitation is imposed providing acceptable surface cleanliness is achieved.
- 4.2.2 The ambient temperature and relative humidity shall be measured to determine the dew point temperature. Phenolite 305 finish shall not be applied unless the substrate temperature is 5°F or more above the dew point.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30A	2	9/20/82	7 of 13

4.3 PREPARATION OF COATING MATERIALS

4.3.1 Primer - The primer, Dimetcote 6, is packaged in a two component kit consisting of a base and zinc filler. The base shall be thoroughly mixed first. Zinc filler shall then be added under constant agitation and mixed until free of lumps. Partial mixes shall be mixed by weight in a proportion of 6.4 parts base to 15 parts zinc filler using a suitable scale to achieve a plus or minus 2 percent accuracy. The mixture shall then be strained through a 30-mesh screen. Viscosity shall be controlled by adding thinner as required up to the maximum allowed by the latest revision of Dimetcote 6 application instructions. Primer coat shall be reddish gray. Pot life of Dimetcote 6 shall be 24 hours.

4.3.2 Finish Coat - The finish coat consists of carbolines Phenoline 305, to which is added a catalyst. This shall be thoroughly mixed while combining in a ratio by volume, of four parts Phenoline 305 to one part catalyst; the finish color shall be as required by the governing specification. Viscosity control shall be accomplished by adding thinner as required, but shall not exceed two quarts of thinner per gallon of 305. Pot life for finish coating shall be in accordance with Attachment 3.

4.4 APPLICATION OF PRIME AND FINISH COATING

4.4.1 Prime Coat: (Ameron Dimetcote 6)

4.4.1.1 Coating materials shall be applied using conventional spray equipment with agitated pressure pots having a maximum hose length of 75 feet. The primer shall be allowed to become tack free before start of other construction operations which could create contamination problems. Any runs or sags having a detrimental effect on the coating system shall be removed and repaired. The following application parameters shall also be followed:

1. Normal conditions of ambient and surface temperature shall be 40° - 120°F and 40° - 130°F, respectively; however, primer may be applied within an ambient range of 0° - 130°F and a surface temperature range of 0° - 200°F. Under other than normal conditions, it may be advisable to use more thinner to reduce dry spray. If surface temperature is above 85°F, it is advisable to use between 1 pint and 2 quarts of Amercoat thinner #101 per gallon of Dimetcote 6 to get wet application.



BROWN & ROOT, INC. CPSES JOB 35-1195	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
	CCP-30A	2	9/20/82	8 of 13

2. Humidity values may vary from 10 to 95% however, coating shall not be applied to a wet or damp surface.
3. Thickness of prime coat shall be a minimum dry film of 2 mils and a maximum of 5 mils. Minimum spot test values shall be 1.5 mils and 5.5 mils respectively.
4. A double regulated pot having an adequate air volume supply shall be used.
5. As a guide, coating materials shall be applied using a 50% overlap with each pass while holding the gun 8-10 inches from the surface. Cross hatch application is permissible.
6. Curing time shall be as follows, depending upon approximate surface temperature and relative humidity conditions:

<u>TEMPERATURE WITH OVER 50% R.H.</u>	<u>Curing Time Before Topcoating</u>
40 - 99°	24 hours
100° and above	12 hours

NOTE: When water curing, below 40°F, and/or below 50% R.H., rely on "coin test" method for determining cure. "Coin Test" is defined as: the coating is sufficiently cured for topcoat when the coating may be burnished rather than removed when rubbed with the flat portion of a coin such as a nickle.

If required, the cure of Dimetcote 6 may be accelerated by use of water spray after allowing at least one hour cure after application. This shall be done as often as required using clean water having a ph range of 6 to 8. If used, a filter system will be installed in order to assure proper cleanliness of the curing water.

- 4.4.1.2 Recoating of Dimetcote 6 Primer - Surface shall be free of all oil, grease and other contaminants. (Remove oil or grease per Section 4.2.1) A wash down with Trisodium Phosphate (T.S.P.) or detergent, using a stiff bristle brush, followed by flushing with fresh water is required. Do not solvent wipe the surface as a final cleaning method. If no major defects as defined in Section 4.4.2.9 are present and the primed surface to be recoated is cured and prepared in accordance with this procedure, recoating may be performed.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	9 of 13

4.4.1.3 Repair of Sags and Runs - Sags or runs in excess of 5.5 mils will be abraded with an aluminum screen or sandpaper to 2.0 to 5.5. mils. Sags or runs 5.5. mils or less which show no evidence of mud-cracking will not be repaired. If coating surface is satisfactory after abrading, then Carbolines finish coat may be applied; however, if coating surface is unsatisfactory, blast, hand abrade or power tool grind to near white metal is required and primer coat re-applied. A satisfactory coating is considered one having no mud-cracking to the metal surface as visible to the unaided eye.

4.4.1.4 Brush touch-up painting shall be done on the prime coat in accordance with the following:

Prime Coat:

1. Dimetcote 6 application instruction R 11-78. Max. allowable touchup - 144 square inches.
2. Dimetcote 6 Product bulletin R 6-79.

4.4.1.5 Repair of Embedded Foreign Particles - Embedded foreign particles shall be removed by abrading. If low millage or major defects result, recoat or repair per section 4.4.1.2 or section 4.4.2.9 respectively.

4.4.1.6 Treatment of Stains - Remove residue, though not necessarily the stain with bristle brush and water or Carboline Thinner #33 or Amercoat #12 cleaner. Allow to dry thoroughly.

4.4.1.7 Coating Interface - Refer to Section 4.4.3.0 for coating interfacing.

4.4.2 Finish Coat; Carboline, Phenoline 305

4.4.2.1 Finish coating shall be applied using conventional, airless, brush or roller. Weld seams, edges and other sharp geometrical discontinuities may receive an initial coat of 1-2 mils finish coating thinned by using two quarts Phenoline Thinner per each gallon kit of Phenoline 305. To aid in continuity at edges, edges may be "striped" with Phenoline unthinned instead of the 50% mixture as stated above. In either "striping" or initial coating of edges, welds, etc., time should be allotted for the coating to harden sufficiently to maintain a "sealing" effect prior to continuing coating operations. The initial coating of edges, striping, etc., as stated above, shall be considered part of the total initial finish coating operation. The material shall be allowed to become tack free before any other construction operations proceed which could create contamination problems by dust or other foreign matter. A continuity check shall be performed in accordance with NACE T-6F-3 Condition "C". No gross discontinuities are acceptable such as holidays, voids, skips, bubbles, and misses. Any runs or sags having a detrimental effect on the coating system shall be removed

BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	10 of 13

and repaired. The following application parameters shall govern:

1. The permissible range of surface and ambient temperature for application shall be 50° - 120°F. After the material has become "tack free", temperature may rise above 120°F. Phenoline 305 may be thinned up to 2 quarts of Phenoline Thinner per gallon mix. The ratio of thinner to Phenoline will be that which gives the best workable mix; i.e., usually advantageous to use more thinner at lower temperatures.
2. Minimum and maximum values of relative humidity shall be 0% and 85% respectively.
3. As a guide, coating material shall be applied using a 50% overlap with each pass while holding the gun 8-10 inches from the surface.
4. Curing and time to recoat Phenoline 305 shall be as shown below:

<u>Between Coats</u>	<u>Temperature °F</u>	<u>Final Cure</u>
72 hours	50 - 59	12 days
36 hours	60 - 74	8 days
18 hours	75 - 89	4 days
12 hours	90 and above	2 days

Phenoline thinned at 50% and applied as a seal coat may be recoated after 4 hours cure at or above 75°F.

5. Tack free shall be defined as the extent of cure which foreign contaminants will not adhere to the coating.
 6. The total coating system shall have a dry film thickness range of 7-11 mils with a minimum spot check of 7 mils and a maximum spot check of 11.5 mils.
- 4.4.2.2 Repair of Runs and Sags - Runs or sags will be abraded until the DFT of the Phenoline 305 is within 1.9 - 4.5 mils. If cracks are visible, then runs and sags will be removed to primer by power tool grinding followed by solvent wiping. If no cracking occurs, top coat will be considered acceptable. Refer to Section 4.4.2.1(4) for cure to recoat time.
- 4.4.2.3 Repair of Embedded Foreign Particles - Foreign particles shall be removed by abrading and then recoated as outlined in the repair of pinholes and discontinuities. Refer to Section 4.4.2.1(4) for recoating times.



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	11 of 13
4.4.2.4	Repair of Pinholes and Discontinuities - Loose particles shall be removed by brushing or vacuum. The entire area shall then be solvent wiped using Phenoline 305 Thinner and recoated using thinned down Phenoline 305 consisting of two quarts Phenoline Thinner per each gallon kit of Phenoline 305 applied at approximately 1-2 mils DFT. (See Section 4.4.2.1(4) for recoating time.)			
4.4.2.5	Repair of Scratches and Damaged Areas - Any scratches or damaged areas will be abraded until loosely adherent particles are removed. The area will then be solvent wiped (Amercoat 12 cleaner for primer, Phenoline Thinner#305 or xylol for topcoat), and repaired with appropriate coating, i.e., Phenoline 305 if damage does not extend to primer; Dimetcote 6 and Phenoline 305 if primer is damaged (if area is considered a major defect). Thickness shall be as required for the pertinent coating. If damage extends to metal and is considered a major defect (Refer to Section 4.4.2.9), damaged area will be blasted, hand or machine ground until bare metal is exposed. All edges of existing coating around perimeter of cleaned area shall be feathered back a sufficient amount to ensure a smooth blend with existing coating.			
4.4.2.6	Brush touch-up painting shall be done on the finish coat in accordance with the following: 1. Carboline Application Instruction (Phenoline 305) Bulletin 775. 2. Carboline Product Data Sheet (Phenoline 305 Primer and Finish) Bulletin 473. Brush touch-up and complete application is allowed with no area restrictions.			
4.4.2.7	Treatment of Rust Stains - If surface is contaminated with rust stains or minute metallic particles, then surface shall be prepared by solvent wiping with Phenoline 305 Thinner or xylol and overcoating with a coat of Phenoline 305 prepared in accordance with Section 4.4.2.4.			
4.4.2.8	Repair of Topcoat and/or D-6 Minor Defect - (Minor defects are defined as an area, either circular or linear, in which a 1/2" diameter circle could not be completely inscribed at any point along the entire length.) Blast or abrade, by machine or hand, the Phenoline 305 finish surrounding the damaged areas and clean any exposed steel to ensure contaminant free surface. Solvent wipe the surrounding 305 finish with Carboline 305 thinner or xylol. Spray or brush Phenoline 305 finish at approximately 4 mil DFT over the damaged area. Overlap onto the surrounding coating a sufficient amount to insure a smooth and continuous topcoat system.			



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	12 of 13

4.4.2.9 Repair of Phenoline 305 Topcoat and/or Dimetcote 6 Primer Major Defects - (Major defects are defined as an area, either circular or linear, in which a ½" diameter circle could be completely inscribed at any point or along the entire length.) Spot blast or abrade, machine or hand, the damaged area. Power tool or hand abrading must be very thorough in order to prepare the surface for Dimetcote 6 touch-up. The surface shall not be polished by wire brushing or other means.

4.4.3.0 Coating Interface - At coating interface for finish and/or primer coat, the existing coating shall be "feathered back" a sufficient distance to ensure a smooth final coating system. When performing coating interfacing the interface of the coatings or systems shall be a maximum of approximately 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

4.4.3.1 Cure of Minor Topcoat Repair - Minor defects, as defined in Section 4.4.2.8, which are noted in the topcoat and repaired, may be inspected for final acceptance after cure to recoat time as stated in Section 4.4.2.1(4) has been satisfied. Full cure to topcoat repairs shall be satisfied prior to placement into service.

4.5 FINAL ACCEPTANCE TESTING

4.5.1 Final acceptance inspection may be performed after a minimum topcoat cure of 24 hours and cure for recoat time as stated in section 4.4.2.1 paragraph 4 is satisfied.

Touch up of minor defects, as described in section 4.4.2.8 of this procedure may be done at time of final inspection without later reinspection of the repair.

After 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. A copy will then be transmitted to the B&R Paint Superintendent as soon as possible after final acceptance is made.

4.6 HOLD POINTS

4.6.1 Onsite receipt of coating materials.

4.6.2 Substrates before and following surface preparation

4.6.3 Mixing and preparation of coating material for application.

4.6.4 Film characteristics after drying and curing.

4.6.5 Control of ambient conditions and surface temperatures during all phases of the coating work.

BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	13 of 13

5.0 SUPPORTING INFORMATION

5.1 ATTACHMENTS

1. Painter Qualification Record
2. Special Coating Procedure
3. Pot Life Phenoline 305

5.2 REFERENCES

1. Gibbs & Hill Specification 2323-SS-14,
"Containment Steel Liner", Latest Revision
2. Steel Structures Paint Council, Volume 2, Second Edition
3. Carboline Corporation "Application Instructions",
October 76-N Revision, and 473, Latest Revision
4. Ameron Protective Coating Division Dimetcote 6
"Application Instructions". R 11-78, Dimetcote 6
Production Bulletin R 6-79
6. Gibbs & Hill Specification 2323-AS-31,
"Protective Coatings", Latest Revision
7. Gibbs & Hill Specification 2323-MS-101,
"Equipment Erection", Latest Revision
8. Gibbs & Hill Specification 2323-MS-43B,
"Nuclear Piping", Latest Revision
9. Gibbs & Hill Specification 2323-MS-44B,
"Non-Nuclear Piping"
10. Gibbs & Hill Specification 2323-MS-100,
"Piping Erection"
11. Gibbs & Hill Specification 2323-SS-17,
"Miscellaneous Steel", Latest Revision



BROWN & ROOT, INC. CPSES	PROCEDURE NUMBER	REVISION	EFFECTIVE DATE	PAGE
JOB 35-1195	CCP-30A	2	9/20/82	1 of 2

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
Tugco QA Vault (Original)



BROWN & ROOT, INC.
CPSES

JOB 35-1195

PROCEDURE
NUMBER

REVISION

EFFECTIVE
DATE

PAGE

CCP-30A

2

9/20/82

2 of 2

ATTACHMENT 2

"Q" Coating _____

Sheet _____ of _____
Procedure # _____

"Non-Q" Coating _____

Rev. _____ Date _____

SPECIAL COATING PROCEDURE NO. _____

SCOPE _____

REQUIREMENTS:

REFERENCE DOCUMENTS _____

APPROVALS

PDE _____

QA/QC _____

TUSI _____

ENGINEER _____

REV. _____ DATE: _____



BROWN & ROOT, INC.
CPSES

JOB 35-1195

PROCEDURE
NUMBER

CCP-30A

REVISION

2

EFFECTIVE
DATE

9/20/82

PAGE

1 of 1

ATTACHMENT 3

POT LIFE PHENOLINE 305

<u>TEMPERATURE (°F)</u>	<u>UNTHINNED</u>	<u>THINNED-50%</u>
50-54	10 hrs	24 hrs
55-59	7 hrs	24 hrs
60-64	4½ hrs	24 hrs
65-69	3½ hrs	24 hrs
70-74	2 hrs	24 hrs
75-79	1½ hrs	24 hrs
80-84	1½ hrs	24 hrs
85-89	1½ hrs	24 hrs
90-95	1 hrs	24 hrs

Pot life stated above for unthinned coatings are the recommended times and should be utilized as a guideline for coating dry time, however, actual pot life may be longer. For unthinned coatings or coatings thinned 50% or less, actual pot life is determined by the applicability of the coating.

