

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	1 of 35

INSPECTION OF STEEL
SUBSTRATE SURFACE
PREPARATION, PRIMER
APPLICATION, PRIMER
REPAIR, SEAL AND
FINISH COAT APPLICATION
AND REPAIR

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5-4-84
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1.0 GENERAL

1.1 PURPOSE AND SCOPE

The purpose of this instruction is to outline methods utilized by Quality Control personnel in inspection of steel substrate surface preparation, primer application, primer repair, seal and finish coat application and repair for Unit 1 Reactor Building.

2.0 INSTRUCTION

Visual inspection of surfaces as addressed by this instruction shall be made at approximately 30" in distance or an arms length from the surface being inspected. The area of inspection shall be adequately lighted during the inspection activity. Adequate lighting is defined as the minimum light produced by a two (2) D-cell battery flashlight.

Visual aids fabricated on site and approved by Quality Assurance and Engineering may be used by Inspectors as an aid in the performance of their inspections.

For definitions, refer to Attachment 7.

If a conflict arises between the requirements of this procedure and the requirements of the site specification, the requirements of the site specification shall prevail.

2.1 PRE-BLAST CLEANING OPERATIONS

2.1.1 Abrasive Acceptability

The Inspector shall obtain a sample of the abrasive to be used from each work area. The abrasive shall be verified to be dry by feel with no grease, oil and deleterious material. Verify that proper blast abrasive is used

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TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	2 of 35

2.1.2 Blast Equipment Acceptability

The inspector shall perform the following inspections/tests to determine acceptability of blast cleaning equipment prior to use:

- a. Air supply (refer to Attachment 18).
- b. Ambient conditions (reference Attachment 1A and 6).

2.1.3 Solvent Cleaning (If Contamination Is Present)

If oil, grease, or other contamination is present, verify that solvent cleaning is performed and that contamination is removed prior to blast/power tool cleaning steel surfaces.

2.2 POST SURFACE PREPARATION OPERATION

2.2.1 Blast Cleanup

The inspector shall visually check the blasted substrate surface.

The surface shall be air blasted or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.

2.2.2 Blasted or Power Tooled Surface Acceptability

The inspector shall perform the following inspections to determine acceptability of the blast cleaned or power tooled surface:

- a. Absence of Foreign Matter -- A visual inspection shall be performed to determine that all oil and grease, dirt, millscale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for light shadows, very slight streaks or slight discolorations caused by rust stains, mill scale, oxides, or slight, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all residues, and the remainder shall be limited to light discolorations as mentioned above.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	3 of 35

NOTE: For power tooled surfaces, in addition to the 5 percent of tight residue of paint or coating which is permissible, shadows or tightly adhering residues of primer may remain (without limit) in the profile of the previously prepared substrate. 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.

- b. Sharp Projections -- An inspection for sharp projections that were not rounded during blast cleaning or power tooling shall be performed. Sharp projections are unacceptable and shall be ground to a rounded contour.

Weld spatter on structural steel which remains after power tooling and/or sand blasting will be acceptable.

- c. Anchor Pattern Depth -- The anchor pattern depth of surfaces shall be inspected at random locations as necessary using a Keane-Tator Surface Profile Comparator (model 373) or approved equal.

The anchor pattern depth for all surfaces shall be a minimum of 1.0 mils.

Surfaces that have been power tooled with "3M Clean-N-Strip", 60 grit and coarser "flapper wheels", provide acceptable surface profile, when properly used over a previously blasted and coated surfaces.

For power tooled steel surfaces, the 1 mil minimum profile shall be verified by visual comparison to a standard of known profile or other approved methods.

2.3 PRIMER PRE-APPLICATION INSPECTIONS

2.3.1 Ambient Conditions

The inspector at the "paint distribution point" in Reactor 1 shall verify ambient conditions in accordance with Attachment 1-A.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	4 of 35

2.3.1.1 Documentation of Environmental Conditions

- a. The inspector assigned to the "paint distribution point" in the Reactor building shall, as a minimum, take a complete set of readings (air temperature, relative humidity, dew point and surface temperature) on each floor elevation at least three (3) times each shift (preferably, the beginning, mid point and just prior to the end of each shift). More readings may be taken when necessary (i.e., noticeable change in air temperature, request by field inspector to take readings in a specific area, etc.).
- b. The inspector at the "paint distribution point" shall document these readings on Attachment 6 as follows:
 1. The inspector shall fill in the applicable information as delineated on the form, except for the "Report No. _____". (The Report No. will be filled in by the Paper Flow Group when they assign numbers, prior to transmitting to the QA Vault.
 2. Upon completion of the shift, the inspector shall turn all of the environmental log sheets for that shift into the lead inspectors.
- c. The lead inspector(s) shall review the log sheets for completeness and correctness, sign and date the "QC Review" block, obtain copies for QC reference and transmit the originals to the Paper Flow Group.
- d. If at any time the inspector determines readings which do not comply with the parameters set forth in this procedure, he shall proceed in the following manner:
 1. Immediately take an additional set of readings in the immediate area of the first set of unacceptable readings and record them on the environmental log.
 2. If the additional set of readings are acceptable, take a third set of readings for referee purposes and record them. If the referee set of readings are acceptable, then the area in question is acceptable but should be closely monitored with readings as necessary.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	5 of 35

3. If the additional set of readings is unacceptable and/or the referee set of readings is unacceptable, the inspector is to notify the coatings inspectors and/or craft personnel in the areas affected so that coating work may be stopped at that time. Coating work shall not continue until the ambient conditions resume an acceptable status.
4. When unacceptable ambient conditions occur and are verified by step 3 above, the inspector shall document it on a Nonconformance Report (NCR) in accordance with CP-QP-16.0 and adequately identify the affected areas, elevations and items.

2.3.2 Substrate Surface Acceptability

The Inspector shall visually reinspect the sandblasted or powertooled surface of the substrate just prior to primer application for evidence of contamination (oil, grease, markings, rust, etc.) Contamination must be removed prior to priming.

If rust forms after Blasting or Power Tooling, the surface shall be recleaned before priming.

2.3.3 Air Supply Acceptability

The Inspector shall inspect the air per Attachment 18.

2.3.4 Qualification of Applicator(s)

The Inspector shall verify (by Qualification Record or list of qualified applicators from QA file) that the coating applicators are qualified for safety-related coating work. The applicator(s) badge number shall be listed on the back of the traveler.

2.3.5 Mixing Operations

2.3.5.1 Coating Materials Identification

An inspector shall inspect the coating material containers prior to mixing contents for product identification and verify that all materials are correct for coating application.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	6 of 35

Approved materials are:

CZ-11

Carbo Zinc 11 base
Carbo Zinc filler
Carboline #21 or 33 Thinner

DIMETCOTE-6

Dimetcote 6 base
Dimetcote filler
Amercoat #65 or 101 Thinner

CARBOLINE 191

Carboline 191 Primer
Carboline 191 Catalyst
Carboline #15 Thinner

PHENOLINE 305

Phenoline 305 base
Phenoline 305 catalyst
Phenoline thinner

An inspector shall also verify that each component container is identified by batch number and that the shelf life has not expired. Carbo Zinc 11 base and Carboline 191 has a shelf life of 12 months. Carbo Zinc filler, Dimetcote 6 base and filler, and Phenoline 305 all have a shelf life of 24 months. Pot life shall be monitored in accordance with Attachment 8.

2.3.5.2 Mixing Operations

An inspector shall witness each mixing/thinning operation. The inspector shall verify that mixing operations are performed in accordance with Attachment 2.

Prior to distribution of CZ-11 or D-6 inside the building it shall be power mixed or boxed.

2.3.5.3 Thinning Operation

Coating materials (if thinned) viscosity control shall be accomplished by adding thinner as required, but shall not exceed two quarts of thinner per gallon of material.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	7 of 35

2.3.5.4 When coating materials are mixed/thinned, the inspector verifying the mixing operation shall fill out the Paint Mix Slip, Attachment 3. The inspector performing the pre-application inspection shall record the mix sheet number on the travelers. The Mix Slip shall be returned to the Paper Flow Group at the end of each shift to be sent to the vault.

2.4 PRIMER APPLICATION INSPECTION

2.4.1 Monitoring of Primer Application

During application operations of D-6 and CZ-11, the QC Inspector shall monitor that the pressure pot is continuously agitated. The QC Inspector shall also verify that the hose length does not exceed 75 feet. CZ-11 and D-6 shall not be brush applied to areas larger than 1 sq. ft.

2.4.2 During application of Carboline 191, the inspector will monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.4.3 The inspector shall monitor the pot life in accordance with Attachment 8.

2.5 INSPECTION OF PRIMER

2.5.1 Primer Inspection Prior to Application of Seal or Finish Coat

- a. Verify the primer has cured sufficiently for the top coating (as determined by the use of a nickel test on D6 and CZ-11). Cure to top coat of Carboline 191 shall be the same as time to recoat for Phenoline 305, stated in Sec. 2.9.1.
- b. Perform a visual inspection of the primed surface in accordance with the following:
 1. Runs/sags which do not exceed the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs for runs/sags other than the aforementioned shall be per Sec. 2.6.2 or 2.6.3, as applicable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	8 of 35

2. Dry Spray - Must be removed before overcoating per Sec. 2.6.3.

3. Contamination - unacceptable; remove and repair per Sec. 2.6.2 or 2.6.3, as applicable.

Oil and grease - unacceptable; remove and repair per Sec. 2.6.2 or 2.6.3, as applicable.

4. Skips/damaged areas/holidays or voids - unacceptable; repair per Sec. 2.6.2 or 2.6.3, as applicable.

5. Orange peel - Moderate amounts are acceptable. Other than moderate amounts; repair as Sec. 2.6.3.

6. Bubbling - unacceptable; repair per Sec. 2.6.2 or 2.6.3, as applicable (does not apply to CZ11 or D-6).

- c. The inspector shall perform a DFT inspection of the cured primer film. A calibrated 0-25 Elcometer Inspector DFT gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from the edge or a hole should be avoided (See Note 3).

Dry Film Thickness shall be as follows:

	Min. (mils)	Max. (mils)
Carboline 191 spot test	1.6	7.0
CZ-II spot test	1.5	7.0
D6 spot test	1.5	5.5
D6 average DFT	2.0	5.0
CZ-II average DFT	2.0	6.0
Carboline 191 average DFT	2.0	6.0

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	9 of 35

In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Unacceptable areas shall be repaired per Sec. 2.6.3 or 2.6.4.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities, such as handrails, gratings, stairs, sway struts, checker plate, etc., shall be exempt from dry film thickness measurement. For piping, struts, spring canisters, etc, appreciable curvature will be considered as less than 4" in diameter.

2.6 PRIMER REPAIRS

2.6.1 Sags and Runs

Runs/sags which do not exceed the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs for runs/sags other than the aforementioned shall be removed. Repair per Sec. 2.6.2 or 2.6.3, as applicable.

2.6.2 Primer Touch-up Repair (Primer Damaged to Steel Surface)

The coating inspector shall conduct the following inspections to document primer touch-up repair operations when the damage is to the steel surface and spot sandblasting or power tool abrading is performed for surface preparation.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	10 of 35

- a. Surface preparation Ref. Sec. 2.2.2.
- b. Verify that the blasted or power tooled surface has been high pressure air blowdown, and/or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.
- c. Ambient Conditions: Ref. Attachment 1A and 6.

The surface temperature shall be a minimum of 5° above the dew point.
- d. Verify applicator qualifications per 2.3.4.
- e. Verify air supply acceptability per Attachment 1B.
- f. Mixing operation, Reference Sec. 2.3.5.
- g. Verify that primer is applied in accordance with Sec. 2.4.

NOTE 1: (If applicable) 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 inspecting coating interface the interface of the coating or systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE 2: When inorganic zinc is applied at an interface, the cured inorganic zinc shall be screened or abraded prior to application of next coat.

2.6.3 Primer Touch-up Repair (Primer Damage Does Not Extend to Steel Surface)

The coating inspector shall conduct the following inspections for primer touch-up repair operations when the damage is within the primer coat and sandblasting to the steel substrate is not required.

- a. Verify surface is abraded lightly then wiped clean.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	11 of 35

- b. Perform inspections in Sec.(s) 2.3 (except 2.3.2) and 2.4.
- c. Visually verify acceptability of repaired area per Sec. 2.5.

2.6.4 Repair of Primer by Recoating

The coating inspector shall conduct the following inspections for primer recoating repair. Only two (2) overcoats may be applied of inorganic zinc primer.

- a. Verify that the surface has been solvent cleaned or blown down with high air pressure. Contamination is unacceptable and requires further cleaning.
- b. Perform inspections in Sec.(s) 2.3 (except 2.3.2) and 2.4.
- c. Minor defects (mechanical damage such as construction damage or exposing substrate during surface preparation operations, etc.) perform inspection in Sec. 2.10.2. Reference Attachment 7.
- d. Major defects (mechanical damage such as construction damage or exposing substrate during surface preparation operations, etc.) perform inspections in Sec. 2.10.3. Reference Attachment 7.

2.6.5 Complete Primer Repair (Primer Damage to Steel Surface Extends Over Entire Item)

The coating inspector shall conduct the following inspections to document primer repair when the damage is to the steel surface and requires surface preparation to steel substrate over entire item:

- a. Verify ambient conditions per Attachment 1A prior to surface preparation. See Attachment 6.
- b. Perform inspections (a) through (g) in Sec. 2.6.2.

2.6.6 In-process repairs shall be documented on the Traveler (Attachment 4) showing their status and/or completion.

2.7 FINISH COAT PRE-APPLICATION INSPECTIONS

The QC inspector shall verify the following items prior to applying coatings:

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	12 of 35

2.7.1 Coating Applicator Qualifications

The Inspector shall verify (by Qualification Record or list of qualification records in QA File) that the coating applicators on each shift are qualified for safety-related coating work.

2.7.2 Ambient Conditions (Refer Attachment 1A and 6)

The permissible range of surface and ambient temperature for application of finish coat shall be 50-120°F.

The maximum humidity shall be 85% for Phenoline 305.

The surface temperature shall be a minimum of 5°F above the dew point.

2.7.3 Coated Surface Acceptability

The Inspector shall visually reinspect the previously coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter). The defective areas shall be removed and repaired per Sec. 2.6 as applicable

2.7.4 Air Supply Acceptability (Per Attachment 1B)

2.7.5 Finish Coat Mixing Operations

2.7.5.1 Prior to mixing, the mixing inspector shall verify that each component is identified by batch numbers and that the 24 month shelf life has not been exceeded.

2.7.5.2 The mixing inspector shall verify that mixing/thinning operations are performed in accordance with Sec. 2.3.5. Thinning may be done up to two quarts of Phenoline Thinner per gallon of Phenoline 305.

2.7.5.3 Mixing operation shall be documented on the traveler per Sec. 2.3.5.4.

2.8 MONITORING OF SEAL OR FINISH COAT APPLICATION

2.8.1 The Inspector shall verify that hose length does not exceed 75 feet.

2.8.2 The inspector shall also verify that the seal coat (if present) is solvent with xylol or 305 thinner wiped prior to finish coat application.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	13 of 35

2.8.3 The inspector shall monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.8.4 The inspector shall monitor the pot life in accordance with Attachment 8.

2.9 FINISH COAT FINAL ACCEPTANCE INSPECTION

The inspector shall perform a final acceptance inspection of each finish coated item(s) in accordance with Paragraphs 2.9.1 through 2.9.4.

NOTE 1: (If applicable) 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 inspecting coating interface the interface of the systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE 2: If present, the tie in interface between concrete coatings and steel coatings shall be visually inspected during the finish coat final acceptance of both systems.

NOTE 3: When inorganic zinc is applied at an interface, the cured inorganic zinc shall be screened or abraded prior to application of next coat.

2.9.1 Finish Coat Cure

Final QC inspection may be performed after a minimum topcoat cure of 24 hours and cure to recoat time has been met.

Curing and time to recoat for Carboline 191 and Phenoline 305 shall be as shown below:

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

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	14 of 35

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

2.9.2 Visual Defects Inspection

The Inspector shall perform a visual inspection of the cured finish coated substrate surface in accordance with the following:

- a) Runs/sags - Runs or sags in which the DFT of the total coating system is 15.0 mils or less thick, which show no evidence of mudcracking, are acceptable. Those greater than 15.0 mils shall be repaired per Sec. 2.10.1.
- b) Skips, damaged areas, holidays, voids, bubbles, and blisters are not acceptable and shall be repaired per Sec. 2.10, as applicable.
- c) Pinholes - acceptable to the extent allowed by Attachment 5; areas not acceptable shall be repaired per Sec. 2.10.5.
- d) Contamination - unacceptable; areas shall be repaired per Sec. 2.10.4. Ref. Attachment 7.
- e) Dry spray - unacceptable; shall be repaired per Sec. 2.10.6. A minor amount of adherent dry spray is acceptable on the final finish coat. Ref. Attachment 7.
- f) Color and gloss non-uniformity - unacceptable; shall be repaired per Sec. 2.10.8. Ref Attachment 7.
- g) Orange Peel: Moderate amount is acceptable, other than moderate amounts to be repaired per Sec. 2.10.7.

NOTE 1: Top coated areas which have been abraded for various reasons (runs, sags, high millage, and contamination) and are within acceptable procedural thickness following repairs, do not require recoating for gloss enhancing.

NOTE 2: For small repair areas such as pinholes, color and gloss uniformity is not required, provided the coating is smooth and continuous.

2.9.3 Dry Film Thickness (DFT)

The Inspector shall perform a DFT of the cured coating system. A calibrated 0-25 Elcometer Inspector DFT Gage

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	15 of 35

Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from an edge or a hole should be avoided. (See Note 3).

The average DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 13.0 mils. The spot test DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 15.0 mils.

The finish coated system shall exhibit full "hiding" properties of the primecoat.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the unacceptable spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Dimensions and locations of unacceptable areas and results of additional testing shall be documented on the traveler/sketch. Unacceptable areas shall be repaired per Sec. 2.7, 2.8, and 2.9.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	16 of 35

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities such as handrails, checker plate, gratings, stairs, sway struts, etc. shall be exempt from DFT measurement. For piping, struts, spring canisters, etc., appreciable surface curvature will be considered as less than 4" diameter.

2.9.4 Continuity Inspection

The Inspector shall test the continuity of the cured finish coat on liner plate using a Tinker and Razor Model M1 (67.5 volt) holiday detector. 100% of the finish coated surface area shall be tested.

The applied film should contain only a minor number of points of discontinuity. No more than two points of discontinuity should occur within an area having a radius of 6 inches as measured from a point of discontinuity (pinholes). No more than 40% of the total number of allowable points of discontinuity should occur within any one area equal to 25% of the total area being coated. The total number of pinhole discontinuities allowed is defined in Attachment 5. No gross discontinuities are allowed.

2.10 REPAIRS OF FINISH COAT

2.10.1 Repairs of Runs and Sags.

The QC inspector shall verify that the area is abraded until the DFT of the total coating system is within 6.0 and 15.0 mils, and examined for mudcracking. Mudcracking, if present shall be removed and repaired in accordance with Sec. 2.10.2 or 2.10.3.

2.10.2 Repair of Minor Defects

The QC inspector shall perform the following inspection when repairing minor defects:

- a) Verify ambient conditions per Attachment 1A prior to surface preparation.
- b) Verify that the damaged area is blasted or abraded by hand or power tool until all loosely adherent particles are removed.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	17 of 35

- c) Verify damaged area is solvent wiped.
- d) Perform inspections described in Sec. 2.7, 2.8 and 2.9. as applicable.
- e) Minor defects may be repaired at the time of final inspection without later reinspection of the repair.

2.10.3 Repair of Major Defects

The QC inspector shall perform the following inspection when repairing major defects; if damage goes to substrate power tools shall be used in lieu of handsanding.

- a) Verify ambient conditions per Attachment 1A and 6.
- b) Verify area is power tooled or spot blasted until all loosely adherent particles are removed.
- c) Verify area is solvent wiped.
- d) Perform inspections in Sec. 2.2.2, 2.7, 2.8 and 2.9.

2.10.4 Repair of Contamination

The QC inspector shall verify that contamination is removed. If contamination can be removed by abrasion without affecting the continuity of the system, recoating of the area after removal is not required if the coating system thickness is within procedural limits. (Reference Sec. 2.9.2 Note 1).

2.10.5 Repair of Pinholes and Small Discontinuities

- a) Verify all loose particles are removed and area is solvent wiped.
- b) Pinholes and small discontinuities may be repaired at the time of final inspection without a later reinspection of the repair. The inspections in Sec. 2.7 and 2.8 still apply.

2.10.6 Repair of Dry Spray

Repair of dry spray identifiable by visual inspection defined within this procedure shall be removed.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	18 of 35

- a) Verify all loose particles are removed.
- b) Verify coating film thickness is still within allowable range.
- c) If film thickness is not within allowable range perform inspections in Sec. 2.7, 2.8 and 2.9.

NOTE: A minor amount of adherent dry spray is acceptable on the final finish coat.

2.10.7 Repair of Other Than Moderate Amounts Of Orange Peel

- a) Verify the affected area is abraded and solvent wiped.
- b) Verify the affected area is refinished and perform the inspections delineated in Sec. 2.7, 2.8 and 2.9.

2.10.8 Repair of Gloss and Color Nonuniformity

- a) Verify the affected area is abraded and solvent wiped.
- b) Verify the affected area is recoated without exceeding the maximum film thickness and perform inspections in Sec. 2.7, 2.8 and 2.9.
- c) Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, and contamination) and are within acceptable procedural thickness, following repairs, do not require recoating for gloss enhancing.
- d) For small repair areas such as pinholes, color and gloss uniformity is not required, provided the coating is smooth and continuous.

2.10.9 Documentation of In-Process Repairs

In-process repairs shall be documented on the traveler (Attachment 4) showing their completion and/or status.

2.11 NONCONFORMANCES

- 2.11.1 Nonconforming conditions such as coating failure due to loss of adhesion or indeterminate/unacceptable conditions which cannot be repaired or corrected as per existing procedures shall be documented on a Nonconformance Report (NCR) in

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	19 of 35

accordance with CP-QP-16.0. The NCR number shall be referenced on the inspection traveler, if applicable.

2.12 DOCUMENTATION (REFER TO ATTACHMENT 4)

2.12.1 All inspections required by this procedure shall be recorded in the inspection attributes on the back of the travelers (Attachment 4). Preparation and processing of the traveler shall be per QI-QP-11.4-28.

2.12.2 When the inspections required by Sections 2.1 through 2.2 have been satisfactorily completed, Step 1 shall be signed and dated by the inspector.

2.12.3 When the inspections required by Sections 2.3 through 2.7 have been satisfactorily completed, Step 2 shall be signed and dated by the inspector.

2.12.4 When the inspections required by Sections 2.8 through 2.8.4 have been satisfactorily completed, Step 3 shall be signed and dated by the inspector.

2.12.5 When the inspections required by Sections 2.9 through 2.10.9 have been satisfactorily completed, Step 4 shall be signed and dated by the inspector.

2.13 SPECIAL COATINGS PROCEDURES

Special coatings procedures and instructions set forth in CCP-30-M procedures as applicable under the scope of this procedure, shall be inspected as per the guidelines of this procedure using the criteria established in the special coatings procedures.

3.0 CLARIFICATION

3.1 SHOP COATED ITEMS

3.1.1 Items removed from the building for coating at the paint shop shall be the responsibility of the craft department.

3.1.1.1 The craft shall be responsible for identifying each piece by work package number.

3.1.1.2 The craft shall be responsible for returning and installing the shop coated item in the same area it was removed from.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	20 of 35

3.1.2 The shop QC Inspector shall inspect the item(s) in accordance with QI-QP-11.4-1 and QI-QP-11.4-5, as applicable, and document his inspections on an Inspection Report (IR) in accordance with those procedures.

3.1.2.1 In addition to the information required by 11.4-1 or 11.4-5, the shop inspection shall reference the work package number identified on the item(s) on the Inspection Report (IR).

3.1.2.2 The IR, upon completion, shall be transmitted to the Paper Flow Group (PFG) for inclusion in the work package.

3.1.3 The QC Inspector (in the field) shall verify that items prepared/coated in the shop, which are included in the scope of the traveler, have the applicable inspection reports (IR) from the shop included in the work package and correspond with the identification on the item(s).

3.1.4 Items which have been finalized in the shop but incur mechanical damage during reinstallation shall be repaired in accordance with QI-QP-11.4-26 and documented on the traveler accordingly.

3.2 REPAIR OF MECHANICAL DAMAGE TO COMPLETED ITEMS

3.2.1 Areas that have been completed, inspected, accepted and traveler package closed which incur major damage at a later date may be repaired, inspected and documented on the supplemental traveler Attachment 9, "Steel Protective Coating Inspection Repair Traveler". Otherwise, the minor areas of mechanical damage, which occur after completion of an area, will be repaired during the final protective coatings walkdown.

3.3 INACCESSIBLE/LIMITED ACCESS AREAS

If questions arise concerning inaccessible or limited access areas per specifications 2323-AS-31 and/or nondeleterious embedded foreign material in the final finish coat, the above condition(s) will be evaluated by the Project Civil Engineer or designee. Clarification and acceptance of the above stated condition(s) shall be so denoted by signature of the engineer with date and comments as required, in the comments section of the applicable step.

4.0 ATTACHMENTS

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	21 of 35

- 4.1 Attachment 1, "Ambient Conditions"
- 4.2 Attachment 1B, "Air Supply Acceptability"
- 4.3 Attachment 2, "Preparation of Coating Materials"
- 4.4 Attachment 3, "Paint Mix Slip"
- 4.5 Attachment 4, "Steel Protective Coating Inspection Traveler"
- 4.6 Attachment 5, "Total Number of Allowable Points of Discontinuity"
- 4.7 Attachment 6, "Environmental Log Sheet"
- 4.8 Attachment 7, "Definitions"
- 4.9 Attachment 8, "Pot Life Reference Sheet"
- 4.10 Attachment 9, "Steel Protective Coating Inspection Repair Traveler"

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	22 of 35

ATTACHMENT 1A

Ambient Conditions

The inspector shall determine against the Environmental Sheet (Attachment 6) air temperature, surface temperature, relative humidity and dew point of substrate structures. A calibrated non-mercury filled dry bulb thermometer or calibrated temperature recorder (Bristol 4069TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury wet bulb thermometer or a calibrated humidity recorder (Bristol 4069TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperatures using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, WB No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F dry bulb reading. If the dry bulb thermometer exceeds 100°F, the instrument shall be returned to the calibration lab for recalibration. The surface temperature shall be determined by placing a calibrated surface temperature thermometer (Omega-Amprobe fast temp. range of 10°-250°F) in contact with the substrate surface until the temperature reading stabilizes.

Final surface preparation shall not begin unless the temperature of the surface is a minimum of 5°F above the dew point.

Normal conditions of ambient and surface temperature for application of primer shall be as follows:

	<u>Ambient Temp. (°F)</u>	<u>Surface Temp. (°F)</u>
Dimetecote 6	40-120	40-130
Carbo Zinc 11	40-95	40-110
Carboline 191	50-120	50-120
Phenoline 305	50-120	50-120

Inorganic zinc primer may be applied within an ambient range of 0°F to 130°F and surface temperature range of 0°F to 200°F.

Humidity values may vary from 0% to 95% for inorganic primers; however, primers shall not be applied to a wet or damp surface.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	23 of 35

ATTACHMENT 1A (Cont.)

Minimum and maximum values of relative humidity for
Phenoline 305 and Carboline 191 shall be 0% to 85%.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 1 1984	24 of 35

ATTACHMENT 18

Air Supply Acceptability

An inspector shall inspect the air supply system of blast and spray equipment for suitable filters/traps/separators and that they are left cracked open. The effectiveness of these items shall be verified by exposing a piece of white cloth to the air outlet for approximately 30 seconds. The white cloth shall be examined for evidence of contamination (oil, water, foreign matter, etc.). No evidence of contamination is acceptable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 01 1984	25 of 35

ATTACHMENT 2

PREPARATION OF COATING MATERIALS

Primer - The primer, Carbo Zinc 11, is packaged in a two component kit consisting of a base and a 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.

Primer - The primer, Dimetecote 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 of 2 quarts of thinner per gallon of Dimetecote 6. Primer coat shall be reddish gray.

Primer - The primer, Carboline 191, is packaged in a two component kit consisting of Carboline 191 base, Part A, and a catalyst, Part B. Mixes are made by combining and thoroughly mixing the base and catalyst. Partial mixes may be made by combining, in a ration by volume, two 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 Carboline 191.

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 ration 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.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	26 of 35

ATTACHMENT 3

PAINT MIX SLIP

* Report No. _____

Bldg. _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
MIX NUMBER _____ ELEVATION _____
MATERIAL _____ GAL. MIXED _____
SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
DATE & TIME MIXED _____ BASE _____
CURING AGENT _____ FILLER _____ THINNER _____
ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
MIX NUMBER _____ ELEVATION _____
MATERIAL _____ GAL. MIXED _____
SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
DATE & TIME MIXED _____ BASE _____
CURING AGENT _____ FILLER _____ THINNER _____
ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
MIX NUMBER _____ ELEVATION _____
MATERIAL _____ GAL. MIXED _____
SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
DATE & TIME MIXED _____ BASE _____
CURING AGENT _____ FILLER _____ THINNER _____
ACCEPTED BY _____

QC REVIEW & ACCEPTANCE _____
signature _____ date _____

TEXAS UTILITIES GENERATING CO.
CPSES

INSTRUCTION
NUMBER

REVISION

ISSUE
DATE

PAGE

QI-QP-11.4-26

5

MAY 04 1984

27 of 35

ATTACHMENT 4

STEEL PROTECTIVE COATING INSPECTION TRAVELER

WORK PKG. # _____ PCI TRAVELER # _____
ELEVATION: _____ ITEM # / DESCRIPTION _____
REF. DWGS. _____

PREPARED BY: _____ DATE _____

STEP 1	SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
---------------	---

STEP 2	PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
---------------	---

STEP 3	FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
---------------	--

STEP 4	FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
---------------	---

STEP 5	COMPLETION OF INSPECTION TRAVELER VERIFIED. QC REVIEW _____ DATE _____ COMMENTS _____
---------------	---

NOTES	1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.
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28 of 35

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	29 of 35

ATTACHMENT 5

TOTAL NUMBER OF ALLOWABLE POINTS OF DISCONTINUITY

SURFACE AREA BEING COATED (SQ. FT.)	COND. "C" COMMERCIALY CONTINUOUS
10	5
10-50	10
50-100	20
100-500	30
500-1000	50
1000-5000	75

Gross Discontinuities - None Allowed.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	31 of 35

ATTACHMENT 7

DEFINITIONS

Color and Gloss Nonuniformity: A milky haze or mist in the finish of a recently applied coating.

Contaminant: A foreign substance, inadvertently added to a coating or found on the substrate that adversely affects the application, adhesion, curing and/or subsequent performance of the applied coating.

Dry Spray: A dry powdery primer or finish coat readily removed by light sanding with either sandpaper or a wire screen. A minor amount of adherent dry spray is acceptable on the final finish coat.

Feathering: An area that is roughened and tapered to obtain a smooth and continuous surface with an existing coating.

Fisheyes: Small openings ("fisheyes") in wet film exposing old surface or previous coat.

Full Hiding: The coating provides sufficient coverage so that the preceding coat is not readily visible with an unaided eye.

Holiday: A pinhole, skip, discontinuity or void in coating film.

Major Defect: Defined as an area, either circular or linear, in which a 1/2" diameter circle could be inscribed at any point or along the entire length.

Minor Defect: 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.

Monitor: Conformance verification by physically observing a task being performed on a periodic or random basis.

Mudcracking: Irregular cracking as in a dried mud puddle (applicable to inorganic zinc primers).

Orange Peel: Dents in the surface resembling orange skin. A moderate amount is acceptable.

Verify: Confirm or make certain.

Pinholes: Minor discontinuities in coating which exposes primer or substrate.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 0 4 1984	32 of 35

ATTACHMENT 7 (Cont.)

DEFINITIONS

Seal Coat: Finish coat applied at approximately 1 mil DFT over primer to protect the prime coat.

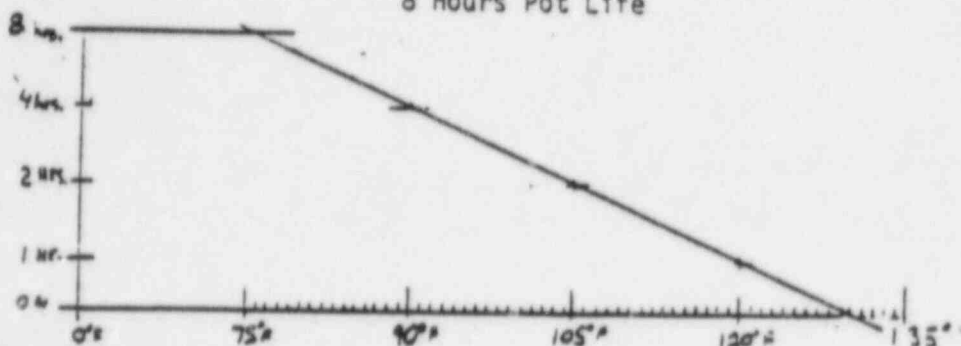
Visual: To examine with an unaided eye (correctional eye glasses or contact lens are acceptable).

ATTACHMENT 8

POT LIFE REFERENCE SHEET

Normal Pot Life - CZ 11

8 Hours Pot Life



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

POT LIFE - DIMETCOTE 6

Pot life for Dimetecote 6, thinned or unthinned, shall be 24 hours regardless of temperatures.

POT LIFE PHENOLINE 305 & CARBOLINE 191

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 hrs.	24 hrs.

Pot life stated above for unthinned coatings are the recommended times and should be utilized as a guideline for coating usage 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.

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	5	MAY 04 1984	34 of 35

ATTACHMENT 9

STEEL PROTECTIVE COATING INSPECTION REPAIR TRAVELER	
WORK PKG. # _____	SUPPLEMENTAL TO PCI TRAVELER # _____
ELEVATION: _____	ITEM # / DESCRIPTION _____
REF DWG. # _____	
PREPARED BY: _____	DATE _____ SHT. _____ OF _____
STEP 1	SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 2	PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 3	FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 4	FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 5	COMPLETION OF INSPECTION TRAVELER VERIFIED. QC REVIEW _____ DATE _____ COMMENTS _____
NOTES	1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 8 1984	1 of 34
INSPECTION OF STEEL SUBSTRATE SURFACE PREPARATION, PRIMER APPLICATION, PRIMER REPAIR, SEAL AND FINISH COAT APPLICATION AND REPAIR	PREPARED BY: <u>Ed Dunbar</u>		<u>3/8/84</u> DATE	
	APPROVED BY: <u>JD Mason</u>		<u>3-8-84</u> DATE	
	APPROVED BY: <u>W. J. [unclear]</u>		<u>3/8/84</u> DATE	

1.0 GENERAL

1.1 PURPOSE AND SCOPE

HISTORICAL FILE

The purpose of this instruction is to outline methods utilized by Quality Control personnel in inspection of steel substrate surface preparation, primer application, primer repair, seal and finish coat application and repair for Unit 1 Reactor Building.

2.0 INSTRUCTION

FOR INFORMATION ONLY

Visual inspection of surfaces as addressed by this instruction shall be made at approximately 30" in distance or an arms length from the surface being inspected. The area of inspection shall be adequately lighted during the inspection activity. Adequate lighting is defined as the minimum light produced by a two (2) D-cell battery flashlight. Flashlight shall be held perpendicular to the surface during visual inspection.

Visual aids fabricated on site and approved by Quality Assurance and Engineering may be used by Inspectors as an aid in the performance of their inspections.

For definitions, refer to Attachment 7.

If a conflict arises between the requirements of this procedure and the requirements of the site specification, the requirements of the site specification shall prevail.

2.1 PRE-BLAST CLEANING OPERATIONS

2.1.1 Abrasive Acceptability

The Inspector shall obtain a sample of the abrasive to be used from each work area. The abrasive shall be verified to be dry by feel with no grease, oil and deleterious material. Verify that proper blast abrasive is used.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 08 1984	2 of 34

2.1.2 Blast Equipment Acceptability

The inspector shall perform the following inspections/tests to determine acceptability of blast cleaning equipment prior to use:

- a. Air supply (refer to Attachment 1B).
- b. Ambient conditions (reference Attachment 1A and 6).

2.1.3 Solvent Cleaning (If Contamination Is Present)

If oil, grease, or other contamination is present, verify that solvent cleaning is performed and that contamination is removed prior to blast/power tool cleaning steel surfaces.

2.2 POST SURFACE PREPARATION OPERATION

2.2.1 Blast Cleanup

The inspector shall visually check the blasted substrate surface.

The surface shall be air blasted or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.

2.2.2 Blasted or Power Tooled Surface Acceptability

The inspector shall perform the following inspections to determine acceptability of the blast cleaned or power tooled surface:

- a. Absence of Foreign Matter -- A visual inspection shall be performed to determine that all oil and grease, dirt, millscale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for light shadows, very slight streaks or slight discolorations caused by rust stains, mill scale, oxides, or slight, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all residues, and the remainder shall be limited to light discolorations as mentioned above.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 5 1984	3 of 34

NOTE: In addition to the 5 percent of tight residue of paint or coating which is permissible, shadows or tightly adhering residues of primer may remain (without limit) in the profile of the previously prepared substrate. 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.

- b. Sharp Projections -- An inspection for sharp projections that were not rounded during blast cleaning or power tooling shall be performed. Sharp projections are unacceptable and shall be ground to a rounded contour.

Weld spatter on structural steel which remains after sand blasting will be acceptable.

- c. Anchor Pattern Depth -- The anchor pattern depth of surfaces shall be inspected at random locations as necessary using a Keane-Tator Surface Profile Comparator (model 373) or approved equal.

The anchor pattern depth for all surfaces shall be a minimum of 1.0 mils.

Surfaces that have been power tooled with "3M Clean-N-Strip", 60 grit and coarser "flapper wheels", provide acceptable surface profile, when properly used over a previously blasted and coated surfaces.

For power tooled steel surfaces, the 1 mil minimum profile shall be verified by visual compasion to a standard of known profile or other approved method.

2.3 PRIMER PRE-APPLICATION INSPECTIONS

2.3.1 Ambient Conditions

The inspector at the "paint distribution point" in Reactor 1 shall verify ambient conditions in accordance with Attachment 1-A.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 0 1984	4 of 34

2.3.1.1 Documentation of Environmental Conditions

- a. The inspector assigned to the "paint distribution point" in the Reactor building shall, as a minimum, take a complete set of readings (air temperature, relative humidity, dew point and surface temperature) on each floor elevation at least three (3) times each shift (preferably, the beginning, mid point and just prior to the end of each shift). More readings may be taken when necessary (i.e., noticeable change in air temperature, request by field inspector to take readings in a specific area, etc.).
- b. The inspector at the "paint distribution point" shall document these readings on Attachment 6 as follows:
 1. The inspector shall fill in the applicable information as delineated on the form, except for the "Report No. _____". (The Report No. will be filled in by the Paper Flow Group when they assign numbers, prior to transmitting to the QA Vault.
 2. Upon completion of the shift, the inspector shall turn all of the environmental log sheets for that shift into the lead inspectors.
- c. The lead inspector(s) shall review the log sheets for completeness and correctness, sign and date the "QC Review" block, obtain copies for QC reference and transmit the originals to the Paper Flow Group.
- d. If at any time the inspector determines readings which do not comply with the parameters set forth in this procedure, he shall proceed in the following manner:
 1. Immediately take an additional set of readings in the immediate area of the first set of unacceptable readings and record them on the environmental log.
 2. If the additional set of readings are acceptable, take a third set of readings for referee purposes and record them. If the referee set of readings are acceptable, then the area in question is acceptable but should be closely monitored with readings as necessary.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 1984	5 of 34

3. If the additional set of readings is unacceptable and/or the referee set of readings is unacceptable, the inspector is to notify the coatings inspectors and/or craft personnel in the areas affected so that coating work may be stopped at that time. Coating work shall not continue until the ambient conditions resume an acceptable status.

4. When unacceptable ambient conditions occur and are verified by step 3 above, the inspector shall document it on a Nonconformance Report (NCR) in accordance with CP-QP-16.0 and adequately identify the affected areas, elevations and items.

2.3.2 Substrate Surface Acceptability

The Inspector shall visually reinspect the sandblasted or powertooled surface of the substrate just prior to primer application for evidence of contamination (oil, grease, markings, rust, etc.) Contamination must be removed prior to priming.

If rust forms after Blasting or Power Tooling, the surface shall be recleaned before priming.

2.3.3 Air Supply Acceptability

The Inspector shall inspect the air per Attachment 1B.

2.3.4 Qualification of Applicator(s)

The Inspector shall verify (by Qualification Record or list of qualified applicators from QA file) that the coating applicators are qualified for safety-related coating work. The applicator(s) badge number shall be listed on the back of the traveler.

2.3.5 Mixing Operations

2.3.5.1 Coating Materials Identification

An inspector shall inspect the coating material containers prior to mixing contents for product identification and verify that all materials are correct for coating application.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 08 1984	6 of 34

Approved materials are:

CZ-11

Carbo Zinc 11 base
Carbo Zinc filler
Carboline #21 or 33 Thinner

DIMETCOTE

Dimetcote 6 base
Dimetcote filler
Amercoat #65 or 101 Thinner

CARBOLINE 191

Carboline 191 Primer
Carboline 191 Catalyst
Carboline #15 Thinner

PHENOLINE 305

Phenoline 305 base
Phenoline 305 catalyst
Phenoline thinner

An inspector shall also verify that each component container is identified by batch number and that the shelf life has not expired. Carbo Zinc 11 base and Carboline 191 has a shelf life of 12 months. Carbo Zinc filler, Dimetcote 6 base and filler, and Phenoline 305 all have a shelf life of 24 months. Pot life shall be monitored in accordance with Attachment 8.

2.3.5.2 Mixing Operations

An inspector shall witness each mixing/thinning operation. The inspector shall verify that mixing operations are performed in accordance with Attachment 2.

Prior to distribution of CZ-11 inside the building it shall be power mixed or boxed.

2.3.5.3 Thinning Operation

Coating materials (if thinned) viscosity control shall be accomplished by adding thinner as required, but shall not exceed two quarts of thinner per gallon of material.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 3 1984	7 of 34

2.3.5.4 When coating materials are mixed/thinned, the inspector verifying the mixing operation shall fill out the Paint Mix Slip, Attachment 3. The inspector performing the pre-application inspection shall record the mix sheet number on the travelers. The Mix Slip shall be returned to the Paper Flow Group at the end of each shift to be sent to the vault.

2.4 PRIMER APPLICATION INSPECTION

2.4.1 Monitoring of Primer Application

During application operations of D-6 and CZ-11, the QC Inspector shall monitor that the pressure pot is continuously agitated. The QC Inspector shall also verify that the hose length does not exceed 75 feet. CZ-11 and D-6 shall not be brush applied to areas larger than 1 sq. ft.

2.4.2 During application of Carboline 191, the inspector will monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.4.3 The inspector shall monitor the pot life in accordance with Attachment 8.

2.5 INSPECTION OF PRIMER

2.5.1 Primer Inspection Prior to Application of Seal or Finish Coat

- a. Verify the primer has cured sufficiently for the top coating (as determined by the use of a nickel test on D6 and CZ-11). Cure to top coat of Carboline 191 shall be the same as time to recoat for Phenoline 305, stated in Sec. 2.9.1.
- b. Perform a visual inspection of the primed surface in accordance with the following:
 1. Runs/sags which do not exceed the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs for runs/sags other than the aforementioned shall be per Sec. 2.6.2 or 2.6.3, as applicable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 08 1984	8 of 34

2. Dry Spray - Must be removed before overcoating per Sec. 2.6.3.

3. Contamination - unacceptable; remove and repair per Sec. 2.6.2 or 2.6.3, as applicable.

Oil and grease - unacceptable; remove and repair per Sec. 2.6.2 or 2.6.3, as applicable.

4. Skips/damaged areas/holidays or voids - unacceptable; repair per Sec. 2.6.2 or 2.6.3, as applicable.

5. Orange peel - Moderate amounts are acceptable. Other than moderate amounts; repair as Sec. 2.6.3.

6. Bubbling - unacceptable; repair per Sec. 2.6.2 or 2.6.3, as applicable (does not apply to CZ11).

c. The inspector shall perform a DFT inspection of the cured primer film. A calibrated 0-25 Elcometer Inspector DFT gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from the edge or a hole should be avoided (See Note 3).

Dry Film Thickness shall be as follows (See Note 4):

	Min. (mils)	Max. (mils)
Carboline 191 spot test	1.6	7.0
CZ-II spot test	1.5	7.0
D6 spot test	1.5	5.5
D6 average DFT	2.0	5.0
CZ-II average DFT	2.0	6.0
Carboline 191 average DFT	2.0	6.0

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 3 1984	9 of 34

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities, such as handrails, gratings, stairs, sway struts, checker plate, etc., shall be exempt from dry film thickness measurement. For piping, struts, spring canisters, etc, Appreciable curvature will be considered as less than 4" in diameter

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Unacceptable areas shall be repaired per Sec. 2.6.3 or 2.6.4.

2.6 PRIMER REPAIRS

2.6.1 Sags and Runs

Runs/sags which do not exceed the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs for runs/sags other than the aforementioned shall be removed. Repair per Sec. 2.6.2 or 2.6.3, as applicable.

2.6.2 Primer Touch-up Repair (Primer Damaged to Steel Surface)

The coating inspector shall conduct the following inspections to document primer touch-up repair operations when the damage is to the steel surface and spot sandblasting or power tool abrading is performed for surface preparation.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 1984	10 of 34

- a. Surface preparation Ref. Sec. 2.2.2.
- b. Verify that the blasted or power tooled surface has been high pressure air blowdown, and/or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.
- c. Ambient Conditions: Ref. Attachment 1A and 6.
The surface temperature shall be a minimum of 5° above the dew point.
- d. Verify applicator qualifications per 2.3.4.
- e. Verify air supply acceptability per Attachment 1B.
- f. Mixing operation, Reference Sec. 2.3.5.
- g. Verify that primer is applied in accordance with Sec. 2.4.

NOTE 1: (If applicable) 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 inspecting coating interface the interface of the coating or systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE 2: When inorganic zinc is applied at an interface, the cured inorganic zinc shall be screened or abraded prior to application of next coat.

2.6.3 Primer Touch-up Repair (Primer Damage Does Not Extend to Steel Surface)

The coating inspector shall conduct the following inspections for primer touch-up repair operations when the damage is within the primer coat and sandblasting to the steel substrate is not required.

- a. Verify surface is abraded lightly then wiped clean.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 1984	11 of 34

- b. Perform inspections in Sec.(s) 2.3 (except 2.3.2) and 2.4.
- c. Visually verify acceptability of repaired area per Sec. 2.5.

2.6.4 Repair of Primer by Recoating

The coating inspector shall conduct the following inspections for primer recoating repair. Only two (2) overcoats may be applied of inorganic zinc primer.

- a. Verify that the surface has been solvent cleaned or blown down with high air pressure. Contamination is unacceptable and requires further cleaning.
- b. Perform inspections in Sec.(s) 2.3 (except 2.3.2) and 2.4.

NOTE: After application of primer to the spot primed area, the only additional feathering required is at the outer edge of the primed area. Sanding of the primed area is not required.

2.6.5 Complete Primer Repair (Primer Damage to Steel Surface Extends Over Entire Item)

The coating inspector shall conduct the following inspections to document primer repair when the damage is to the steel surface and requires surface preparation to steel substrate over entire item:

- a. Verify ambient conditions per Attachment 1A prior to surface preparation. See Attachment 6.
- b. Perform inspections (a) through (g) in Sec. 2.6.2.

2.6.6 In-process repairs shall be documented on the Traveler (Attachment 4) showing their status and/or completion.

2.7 FINISH COAT PRE-APPLICATION INSPECTIONS

The QC inspector shall verify the following items prior to applying coatings:

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 2004	12 of 34

2.7.1 Coating Applicator Qualifications

The Inspector shall verify (by Qualification Record or list of qualification records in QA File) that the coating applicators on each shift are qualified for safety-related coating work.

2.7.2 Ambient Conditions (Refer Attachment 1A and 6)

The permissible range of surface and ambient temperature for application of finish coat shall be 50-120°F.

The maximum humidity shall be 85% for Phenoline 305, and Carboline 191. The maximum humidity shall be 95% for inorganic zincs.

The surface temperature shall be a minimum of 5°F above the dew point.

2.7.3 Coated Surface Acceptability

The Inspector shall visually reinspect the previously coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter). The defective areas shall be removed and repaired per Sec. 2.6 as applicable.

2.7.4 Air Supply Acceptability (Per Attachment 1B)

2.7.5 Finish Coat Mixing Operations

2.7.5.1 Prior to mixing, the mixing inspector shall verify that each component is identified by batch numbers and that the 24 month shelf life has not been exceeded. Pot life shall be monitored in accordance with Attachment 8.

2.7.5.2 The mixing inspector shall verify that mixing/thinning operations are performed in accordance with Sec. 2.3.5. Thinning may be done up to two quarts of Phenoline Thinner per gallon of Phenoline 305.

2.7.5.3 Mixing operation shall be documented on the traveler per Sec. 2.3.5.4.

2.8 MONITORING OF SEAL OR FINISH COAT APPLICATION

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 1987	13 of 34

2.8.1 The Inspector shall verify that hose length does not exceed 75 feet.

2.8.2 The inspector shall also verify that the seal coat (if present) is solvent with xylol or 305 thinner wiped prior to finish coat application.

2.8.3 The inspector shall monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.8.4 The inspector shall monitor the pot life in accordance with Attachment 8.

2.9 FINISH COAT FINAL ACCEPTANCE INSPECTION

The inspector shall perform a final acceptance inspection of each finish coated item(s) in accordance with Paragraphs 2.9.1 through 2.9.4.

NOTE 1: (If applicable) 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 inspecting coating interface the interface of the systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE 2: The tie in interface between concrete coatings and steel coatings shall be visually inspected during the finish coat final acceptance of both systems.

NOTE 3: When inorganic zinc is applied at an interface, the cured inorganic zinc shall be screened or abraded prior to application of next coat.

2.9.1 Finish Coat Cure

Final QC inspection may be performed after a minimum topcoat cure of 24 hours and cure to recoat time has been met.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 8 1984	14 of 34

Curing and time to recoat for Carboline 191 and Phenoline 305 shall be as shown below:

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

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

2.9.2 Visual Defects Inspection

The Inspector shall perform a visual inspection of the cured finish coated substrate surface in accordance with the following:

- a) Runs/sags - Runs or sags in which the DFT of the total coating system is 15.0 mils or less thick, which show no evidence of mudcracking, are acceptable. Those greater than 15.0 mils shall be repaired per Sec. 2.10.1.
- b) Skips, damaged areas, holidays, voids, bubbles, and blisters are not acceptable and shall be repaired per Sec. 2.10, as applicable.
- c) Pinholes - acceptable to the extent allowed by Attachment 5; areas not acceptable shall be repaired per Sec. 2.10.5.
- d) Contamination - unacceptable; areas shall be repaired per Sec. 2.10.4. Ref. Attachment 7.
- e) Dry spray - unacceptable; shall be repaired per Sec. 2.10.6. A minor amount of adherent dry spray is acceptable on the final finish coat. Ref. Attachment 7.
- f) Color and gloss non-uniformity - unacceptable; shall be repaired per Sec. 2.10.8. Ref Attachment 7.
- g) Orange Peel: Moderate amount is acceptable, other than moderate amounts to be repaired per Sec. 2.10.7.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 6 1984	15 of 34

NOTE 1: Top coated areas which have been abraded for various reasons (runs, sags, high millage, and contamination) and are within acceptable procedural thickness following repairs, do not require recoating for gloss enhancing.

NOTE 2: For small repair areas such as pinholes, color and gloss uniformity is not required, provided the coating is smooth and continuous.

2.9.3 Dry Film Thickness (DFT)

The Inspector shall perform a DFT of the cured coating system. A calibrated 0-25 Elcometer Inspector DFT Gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from an edge or a hole should be avoided. (See Note 3).

The average DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 13.0 mils. The spot test DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 15.0 mils (See Note 4).

The finish coated system shall exhibit full "hiding" properties of the primecoat.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 5 1984	16 of 34

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities such as handrails, checker plate, gratings, stairs, sway struts, etc. shall be exempt from DFT measurement. For piping, struts, spring canisters, etc., appreciable surface curvature will be considered as less than 4" diameter.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the unacceptable spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Dimensions and locations of unacceptable areas and results of additional testing shall be documented on the traveler/sketch. Unacceptable areas shall be repaired per Sec. 2.7, 2.8, and 2.9.

2.9.4 Continuity Inspection

The Inspector shall test the continuity of the cured finish coat on liner plate using a Tinker and Razor Model M1 (67.5 volt) holiday detector. 100% of the finish coated surface area shall be tested.

The applied film should contain only a minor number of points of discontinuity. No more than two points of discontinuity should occur within an area having a radius of 6 inches as measured from a point of discontinuity (pinholes). No more than 40% of the total number of allowable points of discontinuity should occur within any one area equal to 25% of the total area being coated. The total number of pinhole discontinuities allowed is defined in Attachment 5. No gross discontinuities are allowed.

2.10 REPAIRS OF FINISH COAT

2.10.1 Repairs of Runs and Sags

The QC inspector shall verify that the area is abraded until the DFT of the total coating system is within 6.0 and 15.0 mils, and examined for mudcracking. Mudcracking, if present, shall be removed and repaired in accordance with Sec. 2.10.2 or 2.10.3.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 06 1984	17 of 34

2.10.2 Repair of Minor Defects

The QC inspector shall perform the following inspection when repairing minor defects:

- a) Verify ambient conditions per Attachment 1A prior to surface preparation.
- b) Verify that the damaged area is blasted or abraded by hand or power tool until all loosely adherent particles are removed.
- c) Verify damaged area is solvent wiped.
- d) Perform inspections described in Sec. 2.7, 2.8 and 2.9. as applicable.
- e) Minor defects may be repaired at the time of final inspection without later reinspection of the repair.

2.10.3 Repair of Major Defects

The QC inspector shall perform the following inspection when repairing major defects; if damage goes to substrate power tools shall be used in lieu of handsanding.

- a) Verify ambient conditions per Attachment 1A and 6.
- b) Verify area is power tooled or spot blasted until all loosely adherent particles are removed.
- c) Verify area is solvent wiped.
- d) Perform inspections in Sec. 2.2.2, 2.7, 2.8 and 2.9.

2.10.4 Repair of Contamination

The QC inspector shall verify that contamination is removed. If contamination can be removed by abrasion without affecting the continuity of the system, recoating of the area after removal is not required if the coating system thickness is within procedural limits. (Reference Sec. 2.9.2 Note 1).

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 06 1984	18 of 34

2.10.5 Repair of Pinholes and Small Discontinuities

- a) Verify all loose particles are removed and area is solvent wiped.
- b) Pinholes and small discontinuities may be repaired at the time of final inspection without a later reinspection of the repair. The inspections in Sec. 2.7 and 2.8 still apply.

2.10.6 Repair of Dry Spray

Repair of dry spray identifiable by visual inspection defined within this procedure shall be removed.

- a) Verify all loose particles are removed.
- b) Verify coating film thickness is still within allowable range.
- c) If film thickness is not within allowable range perform inspections in Sec. 2.7, 2.8 and 2.9.

NOTE: A minor amount of adherent dry spray is acceptable on the final finish coat.

2.10.7 Repair of Other Than Moderate Amounts Of Orange Peel

- a) Verify the affected area is abraded and solvent wiped.
- b) Verify the affected area is refinished and perform the inspections delineated in Sec. 2.7, 2.8 and 2.9.

2.10.8 Repair of Gloss and Color Nonuniformity

- a) Verify the affected area is abraded and solvent wiped.
- b) Verify the affected area is recoated without exceeding the maximum film thickness and perform inspections in Sec. 2.7, 2.8 and 2.9.
- c) Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, and contamination) and are within acceptable procedural thickness, following repairs, do not require recoating for gloss enhancing.
- d) For small repair areas such as pinholes, gloss and gloss uniformity is not required, provided the coating is smooth and continuous.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 08 1984	19 of 34

2.10.9 Documentation of In-Process Repairs

In-process repairs shall be documented on the traveler (Attachment 4) showing their completion and/or status.

2.11 NONCONFORMANCES

2.11.1 Nonconforming conditions such as coating failure due to loss of adhesion or indeterminate/unacceptable conditions which cannot be repaired or corrected as per existing procedures shall be documented on a Nonconformance Report (NCR) in accordance with CP-QP-16.0. The NCR number shall be referenced on the inspection traveler, if applicable.

2.12 DOCUMENTATION (REFER TO ATTACHMENT 4)

2.12.1 All inspections required by this procedure shall be recorded in the inspection attributes on the back of the travelers (Attachment 4). Preparation and processing of the traveler shall be per QI-QP-11.4-28.

2.12.2 When the inspections required by Sections 2.1 through 2.2.2 have been satisfactorily completed, Step 1 shall be signed and dated by the inspector.

2.12.3 When the inspections required by Sections 2.3 through 2.6.5 have been satisfactorily completed, Step 2 shall be signed and dated by the inspector.

2.12.4 When the inspections required by Sections 2.7 through 2.8.4 have been satisfactorily completed, Step 3 shall be signed and dated by the inspector.

2.12.5 When the inspections required by Sections 2.9 through 2.10.8 have been satisfactorily completed, Step 4 shall be signed and dated by the inspector.

2.13 SPECIAL COATINGS PROCEDURES

Special coatings procedures and instructions set forth in CCP-30-M1 through CCP-30-M9, as applicable under the scope of this procedure, shall be inspected as per the guidelines of this procedure using the criteria established in the special coatings procedures.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	R EVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 08 1984	20 of 34

3.0 CLARIFICATION

3.1 SHOP COATED ITEMS

3.1.1 Items removed from the building for coating at the paint shop shall be the responsibility of the craft department.

3.1.1.1 The craft shall be responsible for identifying each piece by work package number.

3.1.1.2 The craft shall be responsible for returning and installing the shop coated item in the same area it was removed from.

3.1.2 The shop QC Inspector shall inspect the item(s) in accordance with QI-QP-11.4-1 and QI-QP-11.4-5, as applicable, and document his inspections on an Inspection Report (IR) in accordance with those procedures.

3.1.2.1 In addition to the information required by 11.4-1 or 11.4-5, the shop inspection shall reference the work package number identified on the item(s) on the Inspection Report (IR).

3.1.2.2 The IR, upon completion, shall be transmitted to the Paper Flow Group (PFG) for inclusion in the work package.

3.1.3 The QC Inspector (in the field) shall verify that items prepared/coated in the shop, which are included in the scope of the traveler, have the applicable inspection reports (IR) from the shop included in the work package and correspond with the identification on the item(s).

3.1.4 Items which have been finalized in the shop but incur mechanical damage during reinstallation shall be repaired in accordance with QI-QP-11.4-26 and documented on the traveler accordingly.

3.2 REPAIR OF MECHANICAL DAMAGE TO COMPLETED ITEMS

3.2.1 Areas that have been completed, inspected, accepted and traveler package closed which incur major damage at a later date may be repaired, inspected and documented on the supplemental traveler Attachment 9, "Steel Protective Coating Inspection Repair Traveler". Otherwise, the minor areas of mechanical damage, which occur after completion of an area, will be repaired during the final protective coatings walkdown.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 1984	21 of 34

3.3 EXCLUSION AREAS

3.3.1 Clarification/Definition

3.3.1.1 Areas which are scheduled to be painted but due to limited or no access are not possible to be painted at the present time and are beyond the control of protective coatings craft or quality control.

3.3.1.2 Building Management and/or the Paper Flow Group (PFG) shall determine the legitimacy of excluding an area.

3.3.2 Areas which are determined as exclusions shall be so noted on the original traveler and a new traveler will be generated by PFG to encompass the exclusion(s).

3.4 INACCESSIBLE/LIMITED ACCESS AREAS

3.4.1 Clarification/Definition

3.4.1.1 Areas where, due to permanent installation configuration, a dry film thickness (DFT) gauge cannot be properly engaged.

3.4.2 These areas shall be visually inspected to verify that the primer is applied and the finish coat is applied over the primer. No other inspection is required.

4.0 ATTACHMENTS

4.1 Attachment 1, "Ambient Conditions"

4.2 Attachment 1B, "Air Supply Acceptability"

4.3 Attachment 2, "Preparation of Coating Materials"

4.4 Attachment 3, "Paint Mix Slip"

4.5 Attachment 4, "Steel Protective Coating Inspection Traveler"

4.6 Attachment 5, "Total Number of Allowable Points of Discontinuity"

4.7 Attachment 6, "Environmental Log Sheet"

4.8 Attachment 7, "Definitions"

4.9 Attachment 8, "Pot Life Reference Sheet"

4.10 Attachment 9, "Steel Protective Coating Inspection Repair Traveler"

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 06 1984	22 of 34

ATTACHMENT 1A

Ambient Conditions

The inspector shall determine against the Environmental Sheet (Attachment 6) air temperature, surface temperature, relative humidity and dew point of substrate structures. A calibrated non-mercury filled dry bulb thermometer or calibrated temperature recorder (Bristol 4069TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury wet bulb thermometer or a calibrated humidity recorder (Bristol 4069TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperatures using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, WB No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F dry bulb reading. If the dry bulb thermometer exceeds 100°F, the instrument shall be returned to the calibration lab for recalibration. The surface temperature shall be determined by placing a calibrated surface temperature thermometer (Omega-Amprobe fast temp. range of 10°-250°F) in contact with the substrate surface until the temperature reading stabilizes.

Final surface preparation shall not begin unless the temperature of the surface is a minimum of 5°F above the dew point.

Normal conditions of ambient and surface temperature for application of primer shall be as follows:

	<u>Ambient Temp. (°F)</u>	<u>Surface Temp. (°F)</u>
Dimetcote 6	40-120	40-130
Carbo Zinc 11	40-95	40-110
Carboline 191	50-120	50-120
Phenoline 305	50-120	50-120

Inorganic zinc primer may be applied within an ambient range of 0°F to 130°F and surface temperature range of 0°F to 200°F.

Humidity values may vary from 0% to 95% for inorganic primers; however, primers shall not be applied to a wet or damp surface.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 1994	23 of 34

ATTACHMENT 1A (Cont.)

Minimum and maximum values of relative humidity for
Phenoline 305 and Carboline 191 shall be 0% to 85%.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 8 1984	24 of 34

ATTACHMENT 1B

Air Supply Acceptability

An inspector shall inspect the air supply system of blast and spray equipment for suitable filters/traps/separators and that they are left cracked open. The effectiveness of these items shall be verified by exposing a piece of white cloth to the air outlet for approximately 30 seconds. The white cloth shall be examined for evidence of contamination (oil, water, foreign matter, etc.). No evidence of contamination is acceptable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 06 1984	25 of 34

ATTACHMENT 2

PREPARATION OF COATING MATERIALS

Primer - The primer, Carbo Zinc 11, is packaged in a two component kit consisting of a base and a 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.

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.

Primer Coat - The primer coat, Carboline 191, is packaged in a two component kit consisting of Carboline 191 base, Part A, and a catalyst, Part B. Mixes are made by combining and thoroughly mixing the base and catalyst. Partial mixes may be made by combining, in a ration by volume, two 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 Carboline 191.

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 ration 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.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 0 1964	26 of 34

ATTACHMENT 3

PAINT MIX SLIP

* Report No. _____

Bldg. _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
 MIX NUMBER _____ ELEVATION _____
 MATERIAL _____ GAL. MIXED _____
 SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
 DATE & TIME MIXED _____ BASE _____
 CURING AGENT _____ FILLER _____ THINNER _____
 ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
 MIX NUMBER _____ ELEVATION _____
 MATERIAL _____ GAL. MIXED _____
 SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
 DATE & TIME MIXED _____ BASE _____
 CURING AGENT _____ FILLER _____ THINNER _____
 ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
 MIX NUMBER _____ ELEVATION _____
 MATERIAL _____ GAL. MIXED _____
 SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
 DATE & TIME MIXED _____ BASE _____
 CURING AGENT _____ FILLER _____ THINNER _____
 ACCEPTED BY _____

QC REVIEW & ACCEPTANCE _____
 signature _____ date _____

QI-QP-11.4-26

4

MAR 03 1984

28 of 34

ATTACHMENT 4
(Cont.)

PROTECTIVE COATING INSPECTION TRAVELER SUPPORTING DOCUMENTATION

PGI TRAVELER NO.	COMMENTS
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TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 03 1984	29 of 34

ATTACHMENT 5

TOTAL NUMBER OF ALLOWABLE POINTS OF DISCONTINUITY

SURFACE AREA BEING COATED (SQ. FT.)	COND. "C" COMMERCIALY CONTINUOUS
10	5
10-50	10
50-100	20
100-500	30
500-1000	50
1000-5000	75

Gross Discontinuities - None Allowed.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	RE	ON	ISSUE DATE	PAGE
	QI-QP-11.4-26	4		MAR 6 1984	31 of 34

ATTACHMENT 7

DEFINITIONS

Color and Gloss Nonuniformity: A milky haze or mist in the finish of a recently applied coating.

Contaminant: A foreign substance, inadvertently added to a coating or found on the substrate that adversely affects the application, adhesion, curing and/or subsequent performance of the applied coating.

Dry Spray: A dry powdery primer or finish coat readily removed by light sanding with either sandpaper or a wire screen. A minor amount of adherent dry spray is acceptable on the final finish coat.

Feathering: An area that is roughened and tapered to obtain a smooth and continuous surface with an existing coating.

Fisheyes: Small openings ("fisheyes") in wet film exposing old surface or previous coat.

Full Hiding: The coating provides sufficient coverage so that the preceding coat is not readily visible with an unaided eye.

Holiday: A pinhole, skip, discontinuity or void in coating film.

Major Defect: Defined as an area, either circular or linear, in which a 1/2" diameter circle could be inscribed at any point or along the entire length.

Minor Defect: 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.

Monitor: Conformance verification by physically observing a task being performed on a periodic or random basis.

Mudcracking: Irregular cracking as in a dried mud puddle (applicable to inorganic zinc primers).

Orange Peel: Dents in the surface resembling orange skin. A moderate amount is acceptable.

Verify: Confirm or make certain.

Pinholes: Minor discontinuities in coating which exposes primer or substrate.

Visual: To examine with an unaided eye (correctional eye glasses or contact lens are acceptable).

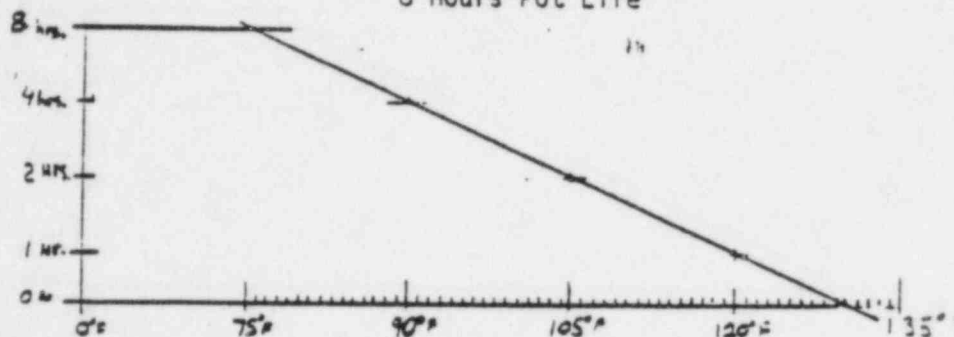
TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 08 1984	32 of 34

ATTACHMENT 8

POT LIFE REFERENCE SHEET

Normal Pot Life - CZ 11

8 Hours Pot Life



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

POT LIFE PHENOLINE 305 & CARBOLINE 191

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 hrs.	24 hrs.

Pot life stated above for unthinned coatings are the recommended times and should be utilized as a guideline for coating usage 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.

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	4	MAR 08 1994	33 of 34

ATTACHMENT 9

STEEL PROTECTIVE COATING INSPECTION REPAIR TRAVELER	
WORK Pkg. # _____	SUPPLEMENTAL TO PCI TRAVELER # _____
ELEVATION: _____	ITEM # / DESCRIPTION _____
NOTES: _____	
PREPARED BY: _____	DATE _____ SHT. _____ OF _____
STEP 1	SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 2	PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 3	FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 4	FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 5	COMPLETION OF INSPECTION TRAVELER VERIFIED. QC REVIEW _____ DATE _____ COMMENTS _____
NOTES	1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.

34 of 34

ATTACHMENT 9
(Continued)

SHEET _____ OF _____
COMMENTS

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	1 of 34

INSPECTION OF STEEL SUBSTRATE SURFACE PREPARATION, PRIMER APPLICATION, PRIMER REPAIR, SEAL AND FINISH COAT APPLICATION AND REPAIR	PREPARED BY: <u>Fred R. Graham</u> APPROVED BY: <u>E. J. Mason</u> APPROVED BY: <u>W. K. Kasher</u>	<u>3-4-84</u> DATE <u>3-4-84</u> DATE <u>3/4/84</u> DATE
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1.0 GENERAL

1.1 PURPOSE AND SCOPE

The purpose of this instruction is to outline methods utilized by Quality Control personnel in inspection of steel substrate surface preparation, primer application, primer repair, seal and finish coat application and repair for Unit 1 Reactor Building.

2.0 INSTRUCTION

Visual inspection of surfaces as addressed by this instruction shall be made at approximately an arms length from the surface being inspected. The area of inspection shall be adequately lighted during the inspection activity. Adequate lighting is defined as the minimum light produced by a two (2) D-cell battery flashlight. Flashlight shall be held perpendicular to the surface during visual inspection.

Visual aids fabricated on site and approved by Quality Assurance and Engineering may be used by Inspectors as an aid in the performance of their inspections.

For definitions, refer to Attachment 7.

If a conflict arises between the requirements of this procedure and the requirements of the site specification, the requirements of the site specification shall prevail.

2.1 PRE-BLAST CLEANING OPERATIONS

2.1.1 Abrasive Acceptability

The Inspector shall obtain a sample of the abrasive to be used from each work area. The abrasive shall be verified to be dry by feel. All grease, oil and deleterious material is unacceptable.

HISTORICAL FILE

FOR INFORMATION ONLY

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	2 of 34

Particle size must be sufficient to achieve 1 mil surface profile minimum.

2.1.2 Blast Equipment Acceptability

The inspector shall perform the following inspections/tests to determine acceptability of blast cleaning equipment prior to use:

- a. Air supply (refer to Attachment 1B).
- b. Ambient conditions (reference Attachment 1A and 6).

2.1.3 Solvent Cleaning (If Contamination Is Present)

If oil, grease, or other contamination is present, verify that solvent cleaning is performed and that contamination is removed prior to blast/power tool cleaning steel surfaces.

2.2 POST SURFACE PREPARATION OPERATION

2.2.1 Blast Cleanup

The inspector shall visually check the blasted substrate surface.

The surface shall be air blasted or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.

2.2.2 Blasted or Power Tooled Surface Acceptability

The inspector shall perform the following inspections to determine acceptability of the blast cleaned or power tooled surface:

- a. Absence of Foreign Matter -- A visual inspection shall be performed to determine that all oil and grease, dirt, millscale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for light shadows, very slight streaks or slight discolorations caused by rust stains, mill scale, oxides, or slight, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all residues, and the remainder shall be limited to light discolorations as mentioned above.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	3 of 34

NOTE: In addition to the 5 percent of tight residue of paint or coating which is permissible, shadows or tightly adhering residues of primer may remain (without limit) in the profile of the previously prepared substrate. 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.

- b. Sharp Projections -- An inspection for sharp projections that were not rounded during blast cleaning or power tooling shall be performed.

Weld spatter on structural steel which remains after sand blasting will be acceptable.

- c. Anchor Pattern Depth -- The anchor pattern depth of surfaces shall be inspected at random locations as necessary using a Keane-Tator Surface Profile Comparator (model 373) or approved equal.

The anchor pattern depth for all surfaces shall be a minimum of 1.0 mils.

Surfaces that have been power tooled with "3M Clean-N-Strip", 60 grit and coarser "flapper wheels", provide acceptable surface profile, when properly used over a previously blasted and coated surfaces.

2.3 PRIMER PRE-APPLICATION INSPECTIONS

2.3.1 Ambient Conditions

The inspector at the "paint distribution point" in Reactor 1 shall verify ambient conditions in accordance with Attachment 1-A.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	4 of 34

2.3.1.1 Documentation of Environmental Conditions

- a. The inspector assigned to the "paint distribution point" in the Reactor building shall, as a minimum, take a complete set of readings (air temperature, relative humidity, dew point and surface temperature) on each floor elevation at least three (3) times each shift (preferably, the beginning, mid point and just prior to the end of each shift). More readings may be taken when necessary (i.e., noticeable change in air temperature, request by field inspector to take readings in a specific area, etc.).
- b. The inspector at the "paint distribution point" shall document these readings on Attachment 6 as follows:
 1. The inspector shall fill in the applicable information as delineated on the form, except for the "Report No. _____". (The Report No. will be filled in by the Paper Flow Group when they assign numbers, prior to transmitting to the QA Vault.
 2. Upon completion of the shift, the inspector shall turn all of the environmental log sheets for that shift into the lead inspectors.
- c. The lead inspector(s) shall review the log sheets for completeness and correctness, sign and date the "QC Review" block, obtain copies for QC reference and transmit the originals to the Paper Flow Group.
- d. If at any time the inspector determines readings which do not comply with the parameters set forth in this procedure, he shall proceed in the following manner:
 1. Immediately take an additional set of readings in the immediate area of the first set of unacceptable readings and record them on the environmental log.
 2. If the additional set of readings are acceptable, take a third set of readings for referee purposes and record them. If the referee set of readings are acceptable, then the area in question is acceptable but should be closely monitored with readings as necessary.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 9 1984	5 of 34

3. If the additional set of readings is unacceptable and/or the referee set of readings is unacceptable, the inspector is to notify the coatings inspectors and/or craft personnel in the areas affected so that coating work may be stopped at that time. Coating work shall not continue until the ambient conditions resume an acceptable status.

4. When unacceptable ambient conditions occur and are verified by step 3 above, the inspector shall document it on a Nonconformance Report (NCR) in accordance with CP-QP-16.0 and adequately identify the affected areas, elevations and items.

2.3.2 Substrate Surface Acceptability

The Inspector shall visually reinspect the sandblasted or powertooled surface of the substrate just prior to primer application for evidence of contamination (oil, grease, markings, rust, etc.) Contamination must be removed prior to priming.

If rust forms after Blasting or Power Tooling, the surface shall be recleaned before priming.

2.3.3 Air Supply Acceptability

The Inspector shall inspect the air per Attachment 18.

2.3.4 Qualification of Applicator(s)

The Inspector shall verify (by Qualification Record or list of qualified applicators from QA file) that the coating applicators are qualified for safety-related coating work. The applicator(s) badge number shall be listed on the back of the traveler.

2.3.5 Mixing Operations

2.3.5.1 Coating Materials Identification

An inspector shall inspect the coating material containers prior to mixing contents for product identification and verify that all materials are correct for coating application.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	6 of 34

Approved materials are:

CZ-11

Carbo Zinc 11 base
Carbo Zinc filler
Carboline #21 or 33 Thinner

DIMETCOTE

Dimetcote 6 base
Dimetcote filler
Amercoat #65 or 101 Thinner

CARBOLINE 191

Carboline 191 Primer
Carboline 191 Catalyst
Carboline #15 Thinner

PHENOLINE 305

Phenoline 305 base
Phenoline 305 catalyst
Phenoline thinner

An inspector shall also verify that each component container is identified by batch number and that the shelf life has not expired. Carbo Zinc 11 base and Carboline 191 has a shelf life of 12 months. Carbo Zinc filler, Dimetcote 6 base and filler, and Phenoline 305 all have a shelf life of 24 months. Pot life shall be monitored in accordance with Attachment 8.

2.3.5.2 Mixing Operations

An inspector shall witness each mixing/thinning operation. The inspector shall verify that mixing operations are performed in accordance with Attachment 2.

Prior to distribution of CZ-11 in to the building it shall be power mixed or boxed.

2.3.5.3 Thinning Operation

Coating materials (if thinned) viscosity control shall be accomplished by adding thinner as required, but shall not exceed two quarts of thinner per gallon of material.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	7 of 34

2.3.5.4 When coating materials are mixed/thinned, the inspector verifying the mixing operation shall fill out the Paint Mix Slip, Attachment 3. The inspector performing the pre-application inspection shall record the mix sheet number on the travelers. The Mix Slip shall be returned to the Paper Flow Group at the end of each shift to be sent to the vault.

2.4 PRIMER APPLICATION INSPECTION

2.4.1 Monitoring of Primer Application

During application operations of CZ-11, the QC Inspector shall monitor that the pressure pot is continuously agitated. The QC Inspector shall also monitor that the hose length does not exceed 75 feet. CZ-11 shall not be brush applied to areas larger than 1 sq. ft.

2.4.2 During application of Carboline 191, the inspector will monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.4.3 The inspector shall monitor the pot life in accordance with Attachment 8.

2.5 INSPECTION OF PRIMER

2.5.1 Primer Inspection Prior to Application of Seal or Finish Coat

- a. Verify the primer has cured sufficiently for the top coating (as determined by the use of a nickel test on D6 and CZ-11). Cure to top coat of Carboline 191 shall be the same as Phenoline 305, stated in Sec. 2.9.1.
- b. Perform a visual inspection of the primed surface in accordance with the following:
 1. Runs/sags which do not exceed the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs for runs/sags other than the aforementioned shall be per Sec. 2.6.2 or 2.6.3, as applicable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 9 1984	8 of 34

2. Dry Spray - Must be removed before overcoating per Sec. 2.6.3.

3. Contamination - unacceptable; repair per Sec. 2.6.2 or 2.6.3, as applicable.

Oil and grease - unacceptable; repair per Sec. 2.6.3.

4. Skips/damaged areas/holidays or voids - unacceptable; repair per Sec. 2.6.2 or 2.6.3, as applicable.

5. Orange peel - Moderate amounts are acceptable. Other than moderate amounts; repair as Sec. 2.6.3.

6. Bubbling - unacceptable; repair per Sec. 2.6.2 or 2.6.3, as applicable (does not apply to CZ11).

c. The inspector shall perform a DFT inspection of the cured primer film. A calibrated 0-25 Elcometer Inspector DFT gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from the edge or a hole shall be avoided (See Note 3).

Dry Film Thickness shall be as follows (See Note 4):

	Min. (mils)	Max. (mils)
Carboline 191 spot test	1.6	7.0
CZ-II spot test	1.5	7.0
D6 spot test	1.5	5.5
D6 average DFT	2.0	5.0
CZ-II average DFT	2.0	6.0
Carboline 191 average DFT	2.0	6.0

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	9 of 34

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities, such as handrails, gratings, stairs, sway struts, checker plate, etc., shall be exempt from dry film thickness measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated.

NOTE 5: Unacceptable areas shall be repaired per Sec. 2.6.3.]

2.6 PRIMER REPAIRS

2.6.1 Sags and Runs

Runs/sags: Ref. Sec. 2.5.1.b if surface is unacceptable. Repair per Sec. 2.6.2 or 2.6.3.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	10 of 34

2.6.2 Primer Touch-up Repair (Primer Damaged to Steel Surface)

The coating inspector shall conduct the following inspections to document primer touch-up repair operations when the damage is to the steel surface and spot sandblasting, hand sanding or power tool abrading is performed for surface preparation.

- a. Surface preparation Ref. Sec. 2.2.2.
- b. Verify that the blasted or power tooled surface has been high pressure air blowdown, and/or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.
- c. Ambient Conditions: Ref. Attachment 1A and 6.
The surface temperature shall be a minimum of 5° above the dew point.
- d. Verify applicator qualifications per 2.3.4.
- e. Verify air supply acceptability per Attachment 1B.
- f. Mixing operation, Reference Sec. 2.3.5.
- g. Verify that primer is applied in accordance with Sec. 2.4.1.

NOTE: (If applicable) 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 inspecting coating interface the interface of the coating or systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE: When inorganic zinc is applied at an interface, the cured inorganic zinc shall be screened or abraded prior to application of next coat.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	11 of 34

2.6.3 Primer Touch-up Repair (Primer Damage Does Not Extend to Steel Surface)

The coating inspector shall conduct the following inspections for primer touch-up repair operations when the damage is within the primer coat and sandblasting to the steel substrate is not required.

- a. Verify surface is abraded lightly then wiped clean.
- b. Verify primer is applied in accordance with Sec. 2.4.1.
- c. Visually verify acceptability of repaired area per Sec. 2.5.1.b.

2.6.4 Repair of Primer by Recoating

The coating inspector shall conduct the following inspections for primer recoating repair. Only two (2) overcoats may be applied of inorganic zinc primer.

- a. Verify that the surface has been solvent cleaned or blown down with high air pressure. Contamination is unacceptable and requires further cleaning.
- b. Perform inspections in Sec. 2.6.2.

NOTE: After application of primer to the spot primed area, the only additional feathering required is at the outer edge of the primed area. Sanding of the primed area is not required.

2.6.5 Complete Primer Repair (Primer Damage to Steel Surface Extends Over Entire Item)

The coating inspector shall conduct the following inspections to document primer repair when the damage is to the steel surface and requires surface preparation to steel substrate over entire item:

- a. Verify ambient conditions per Attachment 1A to surface preparation. See Attachment 6.
- b. Perform inspections (a) through (g) in Sec. 2.6.2.

2.6.6 In-process repairs shall be documented on the Traveler (Attachment 4) showing their status and/or completion.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	12 of 34

2.7 FINISH COAT PRE-APPLICATION INSPECTIONS

The QC inspector shall verify the following items prior to applying coatings:

2.7.1 Coating Applicator Qualifications

The Inspector shall verify (by Qualification Record or list of qualification records in QA File) that the coating applicators on each shift are qualified for safety-related coating work.

2.7.2 Ambient Conditions (Refer Attachment 1A and 6)

The permissible range of surface and ambient temperature for application of finish coat shall be 50-120°F.

The maximum humidity shall be 85% for Phenoline 305, and 95% for inorganic zinc and Carboline 191.

The surface temperature shall be a minimum of 5°F above the dew point.

2.7.3 Coated Surface Acceptability

The Inspector shall visually reinspect the previously coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter). The defective areas shall be repaired per Sec.(s) 2.6.2, 2.6.3, 2.6.4 and 2.6.5, as applicable.

2.7.4 Air Supply Acceptability (Per Attachment 1B)

2.7.5 Finish Coat Mixing Operations

2.7.5.1 Prior to mixing, the mixing inspector shall verify that each component is identified by batch numbers and that the 24 month shelf life has not been exceeded. Pot life shall be monitored in accordance with Attachment 8.

2.7.5.2 The mixing inspector shall verify that mixing/thinner operations are performed in accordance with Sec. 2.3.5.2. Thinning may be done up to two quarts of Phenoline Thinner per gallon of Phenoline 305.

2.7.5.3 Mixing operation shall be documented on the traveler per Sec. 2.3.5.4.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 = 1984	13 of 34

2.8 MONITORING OF SEAL OR FINISH COAT APPLICATION

2.8.1 The Inspector shall monitor that hose length does not exceed 75 feet.

2.8.2 The inspector shall also verify that the seal coat (if present) is solvent wiped prior to finish coat application.

2.8.3 The inspector shall monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.8.4 The inspector shall monitor the pot life in accordance with Attachment 8.

2.9 FINISH COAT FINAL ACCEPTANCE INSPECTION

The inspector shall perform a final acceptance inspection of each finish coated item(s) in accordance with Paragraphs 2.9.1 through 2.9.5.

NOTE: (If applicable) 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 inspecting coating interface the interface of the systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE: The tie in interface between concrete coatings and steel coatings shall be visually inspected during the finish coat final acceptance of both systems.

NOTE: When inorganic zinc is applied at an interface, the cured inorganic zinc shall be screened or abraded prior to application of next coat.

2.9.1 Finish Coat Cure

Final QC inspection may be performed after a minimum topcoat cure of 24 hours and cure to recoat time has been met.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	14 of 34

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

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

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

2.9.2 Visual Defects Inspection

The Inspector shall perform a visual inspection of the cured finish coated substrate surface in accordance with the following:

- a) Runs/sags - Runs or sags in which the DFT of the total coating system is 15.0 mils or less, which show no evidence of mudcracking, are acceptable. Those greater than 15.0 mils shall be repaired per Sec. 2.10.1.
- b) Skips, damaged areas, holidays, voids, bubbles, blisters and excessive orange peel are not acceptable and shall be repaired per Sec. 2.10, as applicable.
- c) Pinholes - acceptable to the extent allowed by Attachment 5; areas not acceptable shall be repaired per Sec. 2.10.5.
- d) Contamination - unacceptable; areas shall be repaired per Sec. 2.10.4.
- e) Dry spray - unacceptable; shall be repaired per Sec. 2.10.6. A minor amount of adherent dry spray is acceptable on the final finish coat.
- f) Color and gloss non-uniformity - unacceptable; shall be repaired per Sec. 2.10.8.
- g) Orange Peel: Moderate amount is acceptable, other than moderate amounts to be repaired per Sec. 2.10.7.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	15 of 34

Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, etc.) and are within acceptable procedural thickness following repairs, do not require recoating for gloss enhancing.

For small repair areas such as pinholes, gloss and gloss uniformity is not required, provided the coating is smooth and continuous.

2.9.3 Dry Film Thickness (DFT)

The Inspector shall perform a DFT of the cured coating system. A calibrated 0-25 Elcometer Inspector DFT Gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from an edge or a hole shall be avoided. (See Note 3).

The average DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 15.0 mils. The spot test DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 15.0 mils for CZ-11/305 and 191/305. For D6/305, average DFT of total system, shall be a minimum 7.0 mils and a maximum of 11.0 mils. The spot test DFT of the total coating system shall be a minimum of 7 mils and a maximum of 11.5 mils (See Note 4).

The finish coated system shall exhibit full "hiding" properties of the primecoat.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	16 of 34

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities such as handrails, gratings, stairs, sway struts, etc. shall be exempt from DFT measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Dimensions and locations of unacceptable areas and results of additional testing shall be documented on the traveler/sketch.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated. If the recalculated average is acceptable, the traveler shall be so marked with an explanation in "Remarks" stating that "average recalculated - now acceptable", or wording to that effect. If the recalculated average is unacceptable, the unacceptable spots shall be isolated and repaired per Sec. 2.10.

2.9.4 Continuity Inspection

The Inspector shall test the continuity of the cured finish coat on liner plate using a Tinker and Rasor Model M1 (67.5 volt) holiday detector. 100% of the finish coated surface area shall be tested.

The applied film should contain only a minor number of points of discontinuity. No more than two points of discontinuity should occur within an area having a radius of 6 inches as measured from a point of discontinuity (pinholes). No more than 40% of the total number of allowable points of discontinuity should occur within any one area equal to 25% of the total area being coated. The total number of pinhole discontinuities allowed is defined in Attachment 5. No gross discontinuities are allowed.

2.10 REPAIRS OF FINISH COAT

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	17 of 34

2.10.1 Repairs of Runs and Sags

The QC inspector shall verify that the area is abraded until the DFT of the total coating system is within 6.0 to 13.0 mils, for CZ-11/305 and with a minimum 7.0 to 11.5 for D-6/305, and examined for mudcracking. Mudcracking shall be repaired in accordance with Sec. 2.10.2 or 2.10.3.

2.10.2 Repair of Minor Defects

The QC inspector shall perform the following inspection when repairing minor defects; if damage goes to substrate power tools shall be used in lieu of hand sanding:

- a) Verify ambient conditions per Attachment 1A prior to surface preparation.
- b) Verify that the damaged area is blasted or abraded until all loosely adherent particles are removed.
- c) Verify damaged area is solvent wiped.
- d) Perform inspections described in Sec. 2.7, 2.8 and 2.9.
- e) Minor defects may be repaired at the time of final inspection without later reinspection of the repair.

2.10.3 Repair of Major Defects

The QC inspector shall perform the following inspection when repairing major defects; if damage goes to substrate power tools shall be used in lieu of handsanding.

- a) Verify ambient conditions per Attachment 1A and 6.
- b) Verify area is abraded or spot blasted until all loosely adherent particles are removed.
- c) Verify area is solvent wiped.
- d) Perform inspections in Sec. 2.2.2, 2.7, 2.8 and 2.9.

2.10.4 Repair of Contamination

The QC inspector shall verify that contamination is removed by abrading and the surface recoated. The inspector shall perform inspections delineated in Sec. 2.7, 2.8 and 2.9.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	18 of 34

2.10.5 Repair of Pinholes and Small Discontinuities

- a) Verify all loose particles are removed and area is solvent wiped.
- b) Pinholes and small discontinuities may be repaired at the time of final inspection without a later reinspection of the repair. The inspections in Sec. 2.7 and 2.8 still apply.

2.10.6 Repair of Dry Spray

Repair of dry spray identifiable by visual inspection defined within this procedure shall be removed.

- a) Verify all loose particles are removed.
- b) Verify coating film thickness is still within allowable range.
- c) If film thickness is not within allowable range perform inspections in Sec. 2.7, 2.8 and 2.9.

NOTE: A minor amount of adherent dry spray is acceptable on the final finish coat.

2.10.7 Repair of Other Than Moderate Amounts Of Orange Peel

- a) Verify the affected area is abraded and solvent wiped.
- b) Verify the affected area is refinished and perform the inspections delineated in Sec. 2.7, 2.8 and 2.9 if repair exceeds minimum DFT.

2.10.8 Repair of Gloss and Color Nonuniformity

- a) Verify the affected area is solvent wiped.
- b) Verify the affected area is recoated without exceeding the maximum film thickness and perform inspections in Sec. 2.7, 2.8 and 2.9.
- c) Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, etc.) and are within acceptable procedural thickness, following repairs, do not require recoating for gloss enhancing.
- d) For small repair areas such as pinholes, gloss and gloss uniformity is not required, provided the coating is smooth and continuous.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	19 of 34

2.10.9 Documentation of In-Process Repairs

In-process repairs shall be documented on the traveler (Attachment 4) showing their completion and/or status.

2.11 NONCONFORMANCES

2.11.1 Unacceptable conditions which are not readily repaired or corrected per the approved procedures shall be documented as unsatisfactory on the inspection traveler.

2.11.2 Nonconforming conditions such as coating failure due to loss of adhesion or indeterminate/unacceptable conditions which cannot be repaired or corrected as per existing procedures shall be documented on a Nonconformance Report (NCR) in accordance with CP-QP-16.0. The NCR number shall be referenced on the inspection traveler, if applicable.

2.12 DOCUMENTATION (REFER TO ATTACHMENT 4)

2.12.1 All inspections required by this procedure shall be recorded in the inspection attributes on the back of the travelers (Attachment 4). Preparation and processing of the traveler shall be per QI-QP-11.4-28.

2.12.2 When the inspections required by Sections 2.1 through 2.2.3 have been satisfactorily completed, Step 1 shall be signed and dated by the inspector.

2.12.3 When the inspections required by Sections 2.3 through 2.6.5 have been satisfactorily completed, Step 2 shall be signed and dated by the inspector.

2.12.4 When the inspections required by Sections 2.7 through 2.8.4 have been satisfactorily completed, Step 3 shall be signed and dated by the inspector.

2.12.5 When the inspections required by Sections 2.9 through 2.10.7 have been satisfactorily completed, Step 4 shall be signed and dated by the inspector.

2.13 SPECIAL COATINGS PROCEDURES

Special coatings procedures and instructions set forth in CCP-30-M1 through CCP-30-M9, as applicable under the scope of this procedure, shall be inspected as per the guidelines of this procedure using the criteria established in the special coatings procedures.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	20 of 34

3.0 CLARIFICATION

3.1 SHOP COATED ITEMS

3.1.1 Items removed from the building for coating at the paint shop shall be the responsibility of the craft department.

3.1.1.1 The craft shall be responsible for identifying each piece by work package number.

3.1.1.2 The craft shall be responsible for returning and installing the shop coated item in the same area it was removed from.

3.1.2 The shop QC Inspector shall inspect the item(s) in accordance with QI-QP-11.4-1 and QI-QP-11.4-5, as applicable, and document his inspections on an Inspection Report (IR) in accordance with those procedures.

3.1.2.1 In addition to the information required by 11.4-1 or 11.4-5, the shop inspection shall reference the work package number identified on the item(s) on the Inspection Report (IR).

3.1.2.2 The IR, upon completion, shall be transmitted to the Paper Flow Group (PFG) for inclusion in the work package.

3.1.3 The QC Inspector (in the field) shall verify that items prepared/coated in the shop, which are included in the scope of the traveler, have the applicable inspection reports (IR) from the shop included in the work package and correspond with the identification on the item(s).

3.1.4 Items which have been finished in the shop but incur mechanical damage during reinstallation shall be repaired in accordance with QI-QP-11.4-26 and documented on the traveler accordingly.

3.2 REPAIR OF MECHANICAL DAMAGE TO COMPLETED ITEMS

3.2.1 Areas that have been completed, inspected, accepted and traveler package closed which incur major damage at a later date may be repaired, inspected and documented on Attachment 9, "Steel Protective Coating Inspection Repair Traveler". Otherwise, the minor areas of mechanical damage, which occur after completion of an area, will be repaired during the final protective coatings walkdown.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	21 of 34

3.3 EXCLUSION AREAS

3.3.1 Clarification/Definition

3.3.1.1 Areas which are scheduled to be painted but due to limited or no access are not possible to be painted at the present time and are beyond the control of protective coatings craft or quality control.

3.3.1.2 Building Management and/or the Paper Flow Group (PFG) shall determine the legitimacy of excluding an area.

3.3.2 Areas which are determined as exclusions shall be so noted on the original traveler and a new traveler will be generated by PFG to encompass the exclusion(s).

3.4 INACCESSIBLE/LIMITED ACCESS AREAS

3.4.1 Clarification/Definition

3.4.1.1 Areas where, due to permanent installation configuration, a dry film thickness (DFT) gauge cannot be properly engaged.

3.4.2 These areas shall be visually inspected to verify that the primer is applied and the finish coat is applied over the primer. No other inspection is required.

4.0 ATTACHMENTS

4.1 Attachment 1, "Ambient Conditions"

4.2 Attachment 18, "Air Supply Acceptability"

4.3 Attachment 2, "Preparation of Coating Materials"

4.4 Attachment 3, "Paint Mix Slip"

4.5 Attachment 4, "Steel Protective Coating Inspection Traveler"

4.6 Attachment 5, "Total Number of Allowable Points of Discontinuity"

4.7 Attachment 6, "Environmental Log Sheet"

4.8 Attachment 7, "Definitions"

4.9 Attachment 8, "Pot Life Reference Sheet"

4.10 Attachment 9, "Steel Protective Coating Inspection Repair Traveler"

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	22 of 34

ATTACHMENT 1A

Ambient Conditions

The inspector shall determine against the Environmental Sheet (Attachment 6) air temperature, surface temperature, relative humidity and dew point of substrate structures. A calibrated non-mercury filled dry bulb thermometer or calibrated temperature recorder (Bristol 4069TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury wet bulb thermometer or a calibrated humidity recorder (Bristol 4069TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperatures using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, WB No. 235. When dry bulb readings are greater than 100°F, the dew point should be determined using the 100°F dry bulb reading, and relative humidity shall be determined by subtracting wet bulb from the surface temperature or ambient temperature, whichever is greater. If the dry bulb thermometer exceeds 100°F, the instrument shall be returned to the calibration lab for recalibration. The surface temperature shall be determined by placing a calibrated surface temperature thermometer (Omega-Amprobe fast temp. range of 10°-250°F) in contact with the substrate surface until the temperature reading stabilizes.

Final surface preparation shall not begin unless the temperature of the surface is a minimum of 5°F above the dew point.

Normal conditions of ambient and surface temperature for application of primer shall be as follows:

	<u>Ambient Temp. (°F)</u>	<u>Surface Temp. (°F)</u>
Dimetecote 6	40-120	40-130
Carbo Zinc 11	40-95	40-110
Carboline 191	50-120	50-120
Phenoline 305	50-120	50-120

Inorganic zinc primer may be applied within an ambient range of 0°F to 130°F and surface temperature range of 0°F to 200°F.

Humidity values may vary from 0% to 95% for inorganic primer; however, primer shall not be applied to a wet or damp surface.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	23 of 34

ATTACHMENT 1A (Cont.)

Minimum and maximum values of relative humidity for Phenoline 305 and Carboline 191 shall be 0% and 85% respectively.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	24 of 34

ATTACHMENT 1B

Air Supply Acceptability

An inspector shall inspect the air supply system of blast and spray equipment for suitable filters/traps/separators and that they are left cracked open. The effectiveness of these items shall be verified by exposing a piece of white cloth to the air outlet for approximately 30 seconds. The white cloth shall be examined for evidence of contamination (oil, water, foreign matter, etc.). No evidence of contamination is acceptable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	25 of 34

ATTACHMENT 2

PREPARATION OF COATING MATERIALS

Primer - The primer, Carbo Zinc 11, is packaged in a two component kit consisting of a base and a 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.

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.

Primer Coat - The primer coat, Carboline 191, is packaged in a two component kit consisting of Carboline 191 base, Part A, and a catalyst, Part B. Mixes are made by combining and thoroughly mixing the base and catalyst. Partial mixes may be made by combining, in a ration by volume, two 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 Carboline 191.

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 ration 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.

TEXAS UTILITIES GENERATING CO.
CPSES

PROCEDURE
NUMBER

REVISION

ISSUE
DATE

PAGE

QI-QP-11.4-26

3

MAR 05 1994

26 of 34

ATTACHMENT 3

PAINT MIX SLIP

* Report No. _____

Bldg. _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____

MIX NUMBER _____ ELEVATION _____

MATERIAL _____ GAL. MIXED _____

SHELF LIFE ACCEPTABLE: YES _____ NO _____ MATE #'S _____

DATE & TIME MIXED _____ BASE _____

CURING AGENT _____ FILLER _____ THINNER _____

ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____

MIX NUMBER _____ ELEVATION _____

MATERIAL _____ GAL. MIXED _____

SHELF LIFE ACCEPTABLE: YES _____ NO _____ MATE #'S _____

DATE & TIME MIXED _____ BASE _____

CURING AGENT _____ FILLER _____ THINNER _____

ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____

MIX NUMBER _____ ELEVATION _____

MATERIAL _____ GAL. MIXED _____

SHELF LIFE ACCEPTABLE: YES _____ NO _____ MATE #'S _____

DATE & TIME MIXED _____ BASE _____

CURING AGENT _____ FILLER _____ THINNER _____

ACCEPTED BY _____

QC REVIEW & ACCEPTANCE _____

signature

date

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	27 of 34

ATTACHMENT 4

STEEL PROTECTIVE COATING INSPECTION TRAVELER	
WORK PKG. # _____	PCI TRAVELER # _____
ELEVATION: _____	ITEM # / DESCRIPTION _____
REF. DWGS.: _____	
PREPARED BY: _____	DATE _____
STEP 1	SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 2	PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 3	FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 4	FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 5	COMPLETION OF INSPECTION TRAVELER VERIFIED. QC REVIEW _____ DATE _____ COMMENTS _____
NOTES	1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	29 of 34

ATTACHMENT 5

TOTAL NUMBER OF ALLOWABLE POINTS OF DISCONTINUITY

SURFACE AREA BEING COATED (SQ. FT.)	COND. "C" COMMERCIALY CONTINUOUS
10	5
10-50	10
50-100	20
100-500	30
500-1000	50
1000-5000	75

Gross Discontinuities - None Allowed.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 0 5 1984	31 of 34

ATTACHMENT 7

DEFINITIONS

Color and Gloss Nonuniformity: A milky haze or mist in the finish of a recently applied coating.

Contaminant: A foreign substance, inadvertently added to a coating or found on the substrate that adversely affects the application, adhesion, curing and/or subsequent performance of the applied coating.

Dry Spray: A dry powdery primer or finish coat readily removed by light sanding with either sandpaper or a wire screen. A minor amount of adherent dry spray is acceptable on the final finish coat.

Feathering: An area that is roughened and tapered to obtain a smooth and continuous surface with an existing coating.

Fisheyes: Small openings ("fisheyes") in wet film exposing old surface or previous coat.

Full Hiding: The coating provides sufficient coverage so that the preceding coat is not readily visible with an unaided eye.

Holiday: A pinhole, skip, discontinuity or void in coating film.

Major Defect: Defined as an area, either circular or linear, in which a 1/2" diameter circle could be inscribed at any point or along the entire length.

Minor Defect: 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.

Monitor: Conformance verification by physically observing a task being performed on a periodic or random basis.

Mudcracking: Irregular cracking as in a dried mud puddle (applicable to inorganic zinc primers).

Orange Peel: Dents in the surface resembling orange skin. A moderate amount is acceptable.

Verify: Confirm or make certain.

Visual: To examine with an unaided eye (correctional eye glasses or contact lens are acceptable).

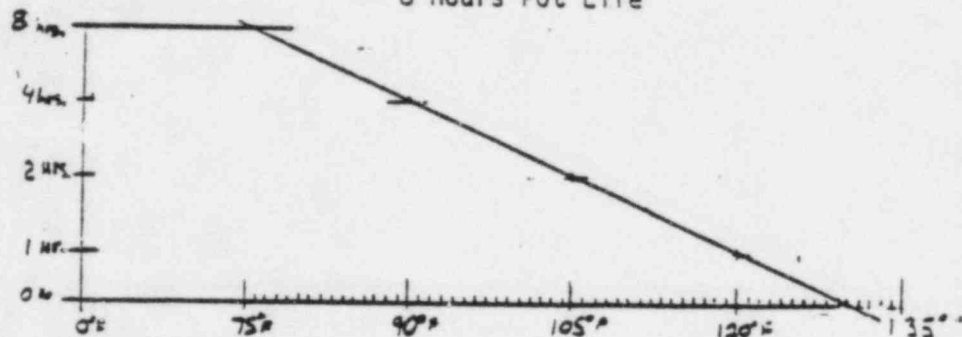
TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	32 of 34

ATTACHMENT 8

POT LIFE REFERENCE SHEET

Normal Pot Life - CZ 11

8 Hours Pot Life



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

POT LIFE PHENOLINE 305 & CARBOLINE 191

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 hrs.	24 hrs.

Pot life stated above for unthinned coatings are the recommended times and should be utilized as a guideline for coating usage 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.

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	3	MAR 05 1984	33 of 34

ATTACHMENT 9

STEEL PROTECTIVE COATING INSPECTION REPAIR TRAVELER	
WORK PKG. NO. _____	SUPPLEMENTAL TO PCI TRAVELER # _____
ELEVATION: _____	ITEM # / DESCRIPTION _____
REF DWG. # _____	
PREPARED BY: _____	DATE _____ SHT. _____ OF _____
STEP 1	SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 2	PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION. INSPECTOR _____ DATE _____ COMMENTS _____
STEP 3	FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 4	FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26 INSPECTOR _____ DATE _____ COMMENTS _____
STEP 5	COMPLETION OF INSPECTION TRAVELER VERIFIED. QC REVIEW _____ DATE _____ COMMENTS _____
NOTES	1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S) 3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	1 of 34

INSPECTION OF STEEL SUBSTRATE SURFACE PREPARATION, PRIMER APPLICATION, PRIMER REPAIR, SEAL AND FINISH COAT APPLICATION AND REPAIR	PREPARED BY: <u>[Signature]</u>	<u>2/20/84</u>
	APPROVED BY: <u>[Signature]</u>	<u>2-22-84</u>
	APPROVED BY: <u>[Signature]</u>	<u>2/22/84</u>

1.0 GENERAL

1.1 PURPOSE AND SCOPE

The purpose of this instruction is to outline methods utilized by Quality Control personnel in inspection of steel substrate surface preparation, primer application, primer repair, seal and finish coat application and repair for Unit 1 Reactor Building.

2.0 INSTRUCTION

Visual inspection of surfaces as addressed by this instruction shall be made at approximately an arms length from the surface being inspected. The area of inspection shall be adequately lighted during the inspection activity. Adequate lighting is defined as the minimum light produced by a two (2) D-cell battery flashlight. Flashlight shall be held perpendicular to the surface during visual inspection.

Visual aids fabricated on site and approved by Quality Assurance and Engineering may be used by Inspectors as an aid in the performance of their inspections.

For definitions, refer to Attachment 7.

2.1 PRE-BLAST HAND AND/OR POWER TOOL CLEANING OPERATIONS

2.1.1 Abrasive Acceptability

The Inspector shall obtain a sample of the abrasive to be used from each work area. The abrasive shall be verified to be dry by feel. All grease, oil and deleterious material is unacceptable.

HISTORICAL FILE

FOR INFORMATION ONLY

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	2 of 34

Particle size must be sufficient to achieve 1 mil surface profile minimum.

2.1.2 Blast Equipment Acceptability

The inspector shall perform the following inspections/tests to determine acceptability of blast cleaning equipment prior to use:

- a. Air supply (refer to Attachment 1B).
- b. Ambient conditions (reference Attachment 1A and 6).

2.1.3 Solvent Cleaning (If Chemical Contamination Present)

If oil, grease, or other chemical contamination is present, verify that solvent cleaning is performed and that chemical contamination is removed prior to blast/power tool cleaning steel surfaces.

2.2 POST BLAST CLEANING OPERATIONS

2.2.1 Blast Cleanup

The inspector shall visually check the blasted substrate surface.

The surface shall be air blasted or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.

2.2.2 Blasted or Power Tooled Surface Acceptability

The inspector shall perform the following inspections to determine acceptability of the blast cleaned or power tooled surface:

- a. Absence of Foreign Matter -- A visual inspection shall be performed to determine that all oil and grease, dirt, millscale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for light shadows, very slight streaks or slight discolorations caused by rust stains, mill scale, oxides, or slight, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all residues, and the remainder shall be limited to light discolorations as mentioned above.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	3 of 34

NOTE: In addition to the 5 percent of tight residue of paint or coating which is permissible, shadows or tightly adhering residues of primer may remain (without limit) in the profile of the previously prepared substrate. 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.

- b. Removal of Sharp Projections -- An inspection for sharp projections that were not blended (rounded) during blast cleaning or power tooling shall be performed.

Weld spatter on structural steel which remains after grinding or sand blasting will be acceptable.

Sharp projections are not acceptable.

Protrusions and peaks shall be ground to a rounded contour.

NOTE: Any mechanical surface preparation other than sandblasting or hand or power tooling of sharp edges or weld spatter will require a visual welding inspector's acceptance of the work performed.

- c. Anchor Pattern Depth -- The anchor pattern depth of the blasted surface shall be inspected at random locations using a Keane-Tator Surface Profile Comparator (model 373) or equivalent.

The anchor pattern depth for a blasted surface shall be a minimum of 1.0 mils.

Surfaces that have been power tooled with "3M Clean-N-Strip", 80 grit and coarser "flapper wheels", sanding discs, "Roto-Peen" or equivalent, provide acceptable surface profile.

No maximum profile will be specified, providing that correct millage and surface uniformity requirements can be obtained after primer application.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	4 of 34

2.2.3 Unique Number Identification

After blasting, power tool and prior to prime coat application (if applicable), QC shall verify that construction has identified each piece with a unique number.

2.3. PRIMER PRE-APPLICATION INSPECTIONS

2.3.1 Ambient Conditions

The inspector at the "paint distribution point" in Reactor 1 shall verify ambient conditions in accordance with Attachment 1-A.

2.3.1.1 The inspector shall monitor the ambient conditions being recorded on the Environmental Log (Attachment 6) at the "paint distribution point" in the building.

2.3.1.2 Documentation of Environmental Conditions

- a. The inspector assigned to the "paint distribution point" in the Reactor building shall, as a minimum, take a complete set of readings (air temperature, relative humidity, dew point and surface temperature) on each floor elevation at least three (3) times each shift (preferably, the beginning, mid point and just prior to the end of each shift). More readings may be taken when necessary (i.e., noticeable change in air temperature, request by field inspector to take readings in a specific area, etc.).
- b. The inspector at the "paint distribution point" shall document these readings on Attachment 6 as follows:
 1. One (1) Environmental Log Sheet (Attachment 6) shall be completed for all readings taken on one (1) floor elevation or specific area in a given shift.
 2. The inspector shall fill in the applicable information as delineated on the form, except for the "Report No. _____". (The Report No. will be filled in by the Paper Flow Group when they assign numbers, prior to transmitting to the QA Vault.
 3. Upon completion of the shift, the inspector shall turn all of the environmental log sheets for that shift into the lead inspectors.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	5 of 34

- c. The lead inspector(s) shall review the log sheets for completeness and correctness, sign and date the "QC Review" block, obtain copies for QC reference and transmit the originals to the Paper Flow Group.
- d. If at any time the inspector determines readings which do not comply with the parameters set forth in this procedure, he shall proceed in the following manner:
 1. Immediately take an additional set of readings in the immediate area of the first set of unacceptable readings and record them on the environmental log.
 2. If the additional set of readings are acceptable, take a third set of readings for referee purposes and record them. If the referee set of readings are acceptable, then the area in question is acceptable but should be closely monitored with readings as necessary.
 3. If the additional set of readings is unacceptable and/or the referee set of readings is unacceptable, the inspector is to notify the coatings inspectors in the areas affected so that coating work may be stopped at that time. Coating work shall not continue until the ambient conditions resume an acceptable status.
 4. When unacceptable ambient conditions occur and are verified by step 3 above, the inspector shall document it on a Nonconformance Report (NCR) in accordance with CP-QP-16.0 and adequately identify the affected areas/elevations.

2.3.2 Substrate Surface Acceptability

The Inspector shall visually reinspect the sandblasted or powertooled surface of the substrate just prior to primer application for evidence of contamination (oil, grease, markings, rust, etc.) Contamination must be removed prior to priming.

If rust forms after Blasting or Power Tooling, the surface shall be recleaned before priming. Under no case will a prepared surface be exposed for more than 24 hours before priming.

2.3.3 Air Supply Acceptability

The Inspector shall inspect the air per Attachment 1B.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	6 of 34

2.3.4 Qualification of Applicator(s)

The Inspector shall verify (by Qualification Record or list of qualified applicators from QA file) that the coating applicators are qualified for safety-related coating work. The applicator(s) badge number shall be listed on the back of the traveler.

2.3.5 Mixing Operations

2.3.5.1 Coating Materials Identification

An inspector shall inspect the coating material containers prior to mixing contents for product identification and verify that all materials are correct for coating application.

Approved materials are:

CZ-11

Carbo Zinc 11 base (gray or green)
Carbo Zinc filler
Carboline #21 or 33 Thinner

DIMETCOTE

Dimetcote 6 base
Dimetcote filler
Amercoat #65 or 101 Thinner

CARBOLINE 191

Carboline 191 Primer (Red Brick)
Carboline 191 Catalyst
Carboline #15 Thinner

PHENOLINE 305

Phenoline 305 base
Phenoline 305 catalyst
Phenoline thinner

An inspector shall also verify that each component container is identified by batch number and that the shelf life has not expired. Carbo Zinc 11 base and Carboline 191 has a shelf life of 12 months. Carbo Zinc filler, Dimetcote 6 base and filler, and Phenoline 305 all have a shelf life of 24 months. Pot life shall be monitored in accordance with Attachment 8.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	7 of 34

2.3.5.2 Mixing Operations

An inspector shall witness each mixing/thinning operation. The inspector shall verify that mixing operations are performed in accordance with Attachment 2.

2.3.5.3 Thinning Operation

Coating materials (if thinned) viscosity control shall be accomplished by adding thinner as required, but shall not exceed two quarts of thinner per gallon of material.

2.3.5.4 When coating materials are mixed/thinned, the inspector verifying the mixing operation shall fill out the Paint Mix Slip, Attachment 3. The inspector performing the pre-application inspection shall record the mix sheet number on the travelers. The Mix Slip shall be returned to the Paper Flow Group at the end of each shift to be sent to the vault.

2.4 PRIMER APPLICATION INSPECTION

2.4.1 Monitoring of Primer Application

During application operations of CZ-11, the QC Inspector shall monitor that the pressure pot is continuously agitated. The QC Inspector shall also monitor that the hose length does not exceed 75 feet. CZ-11 shall not be brush applied to areas larger than 1 sq. ft.

2.4.2 During application of Carboline 191, the inspector will monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.4.3 The inspector shall monitor the pot life in accordance with Attachment 8.

2.5 INSPECTION OF PRIMER

2.5.1 Primer Inspection Prior to Application of Seal or Finish Coat

- a. Verify the primer has cured sufficiently for the top coating (as determined by the use of a nickel test on CZ-11). Cure to top coat of Carboline 191 shall be the same as Phenoline 305, stated in Section 2.9.1.
- b. Perform a visual inspection of the primed surface in accordance with the following:

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	8 of 34

1. Runs/sags which do not exceed the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs for runs/sags other than the aforementioned shall be as per Sections 2.6.2 or 2.6.3, as applicable.
2. Dry Spray - Must be removed before overcoating as per Section 2.6.3.
3. Contamination - unacceptable; repair as per Section 2.6.2 or 2.6.3, as applicable.
Oil and grease - unacceptable; repair as per Section 2.6.3.
4. Skips/damaged areas/holidays or voids - unacceptable; repair as per 2.6.2 or 2.6.3, as applicable.
5. Orange peel - Moderate amounts are acceptable. Excessive amounts unacceptable; repair as per Section 2.6.3.
6. Bubbling - unacceptable; repair as per Section 2.6.2 or 2.6.3, as applicable (does not apply to CZ11).

- c. The inspector shall perform a DFT inspection of the cured primer film. A calibrated 0-25 Elcometer Inspector DFT gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from the edge or a hole shall be avoided (See Note 3).

Dry Film Thickness shall be as follows (See Note 4):

	Min. (mils)	Max. (mils)
Carboline 191 spot test	1.6	8.5
CZ-II spot test	1.5	7.0
D6 spot test	1.5	5.5
D6 average DFT	2.0	5.0
CZ-II average DFT	2.0	6.0
Carboline 191 average DFT	2.0	7.0

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	9 of 34

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities, such as handrails, gratings, stairs, sway struts, checker plate, etc., shall be exempt from dry film thickness measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated.

NOTE 5: Unacceptable areas shall be repaired as per Section 2.6.3.

TEXAS UTILITIES GENERATING CPSSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	10 of 34

2.6 PRIMER REPAIRS

2.6.1 Sags and Runs

Runs/sags: Ref. Sec. 2.5.1.b if surface is unacceptable.
Repair per Sec. 2.6.2 or 2.6.3.

2.6.2 Primer Touch-up Repair (Primer Damaged to Steel Surface)

The coating inspector shall conduct the following inspections to document primer touch-up repair operations when the damage is to the steel surface and spot sandblasting, hand sanding or power tool abrading is performed for surface preparation.

- a. Surface preparation Ref. Sec. 2.2.2.
- b. Verify that the blasted or power tooled surface has been high pressure air blowdown, and/or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.
- c. Ambient Conditions: Ref. Attachment 1A and 6.
Air Supply Acceptability: Ref. Attachment 1B.
The surface temperature shall be a minimum of 5° above the dew point.
- d. Verify applicator qualifications per Section 2.3.4.
- e. Verify air supply acceptability per Attachment 1B.
- f. Verify ambient condition per Attachment 1A.

1. Coating Materials Identification

Verify per Sec. 2.3.5.1.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	11 of 34

2. Mixing Operations

Verify per Sec. 2.3.5.2.

3. Thinning Operation

Verify per Sec. 2.3.5.3.

- g. Verify that primer is applied in accordance with Sec. 2.4.1.

NOTE: (If applicable) 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 inspecting coating interface the interface of the coating or systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

2.6.3 Primer Touch-up Repair (Primer Damage Does Not Extend to Steel Surface)

The coating inspector shall conduct the following inspections for primer touch-up repair operations when the damage is within the primer coat and sandblasting to the steel substrate is not required.

- Verify surface is abraded lightly then wiped clean.
- Verify primer is applied in accordance with Section 2.4.1.
- Visually verify acceptability of repaired area per Section 2.5.1.b.

2.6.4 Repair of Primer by Recoating

The coating inspector shall conduct the following inspections for primer recoating repair. Only two (2) overcoats may be applied of inorganic zinc primer.

- Verify that the surface has been solvent cleaned or blown down with high air pressure. Contamination is unacceptable and requires further cleaning.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	12 of 34

b. Perform inspections in Section 2.6.2.

NOTE: After application of primer to the spot primed area, the only additional feathering required is at the outer edge of the primed area. Sanding of the primed area is not required.

2.6.5 Complete Primer Repair (Primer Damage to Steel Surface
Extends Over Entire Item)

The coating inspector shall conduct the following inspections to document primer repair when the damage is to the steel surface and requires surface preparation to steel substrate over entire item:

- a. Verify ambient conditions per Attachment 1A to surface preparation. See Attachment 6.
- b. Perform inspections (a) through (g) in Section 2.6.2.

2.6.6 In-process repairs shall be documented on the Traveler (Attachment 4) showing their status and/or completion.

2.7 FINISH COAT PRE-APPLICATION INSPECTIONS

The QC inspector shall verify the following items prior to applying coatings:

2.7.1 Coating Applicator Qualifications

The Inspector shall verify (by Qualification Record or list of qualification records in QA File) that the coating applicators on each shift are qualified for safety-related coating work.

2.7.2 Ambient Conditions (Refer Attachment 1A and 6)

The permissible range of surface and ambient temperature for application of finish coat shall be 50-120°F.

The maximum humidity shall be 85% for Phenoline 305, and 95% for inorganic zinc and Carboline 191.

The surface temperature shall be a minimum of 5°F above the dew point.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	13 of 34

2.7.3 Coated Surface Acceptability

The Inspector shall visually reinspect the previously coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter). The defective areas shall be repaired per Sec.(s) 2.6.2, 2.6.3, 2.6.4 and 2.6.5, as applicable.

2.7.4 Air Supply Acceptability (Per Attachment 1B)

2.7.5 Finish Coat Mixing Operations

2.7.5.1 Prior to mixing, the mixing inspector shall verify that each component is identified by batch numbers and that the 24 month shelf life has not been exceeded. Pot life shall be monitored in accordance with Attachment 8.

2.7.5.2 The mixing inspector shall verify that mixing/thinner operations are performed in accordance with Sec. 2.3.5.2. Thinning may be done up to two quarts of Phenoline Thinner per gallon of Phenoline 305.

2.7.5.3 Mixing operation shall be documented on the traveler per Sec. 2.3.5.4.

2.8 MONITORING OF SEAL OR FINISH COAT APPLICATION

2.8.1 The Inspector shall monitor that hose length does not exceed 75 feet.

2.8.2 The inspector shall also verify that the seal coat (if present) is solvent wiped prior to finish coat application.

2.8.3 The inspector shall monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.8.4 The inspector shall monitor the pot life in accordance with Attachment 8.

2.9 FINISH COAT FINAL ACCEPTANCE INSPECTION

The inspector shall perform a final acceptance inspection of each finish coated item(s) in accordance with Paragraphs 2.9.1 through 2.9.5.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	14 of 34

NOTE: (If applicable) 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 inspecting coating interface the interface of the systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE: The tie in interface between concrete coatings and steel coatings shall be visually inspected during the finish coat final acceptance of both systems.

2.9.1 Finish Coat Cure

Final QC inspection may be performed after a minimum topcoat cure of 24 hours and cure to recoat time has been met.

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

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

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

2.9.2 Visual Defects Inspection

The Inspector shall perform a visual inspection of the cured finish coated substrate surface in accordance with the following:

- a) Runs/sags - Runs or sags in which the DFT of the total coating system is 15.0 mils or less, which show no evidence of mudcracking, are acceptable. Those greater than 15.0 mils shall be repaired as per Section 2.10.1.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	15 of 34

- b) Skips, damaged areas, holidays, voids, bubbles, blisters and excessive orange peel are not acceptable and shall be repaired as per Section 2.10, as applicable.
- c) Pinholes - acceptable to the extent allowed by Attachment 5; areas not acceptable shall be repaired as per Section 2.10.5.
- d) Contamination - unacceptable; areas shall be repaired as per Section 2.10.4.
- e) Dry spray - unacceptable; shall be repaired as per Section 2.10.6. A minor amount of adherent dry spray is acceptable on the final finish coat.
- f) Color and gloss non-uniformity - unacceptable; shall be repaired as per Section 2.10.8.

Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, etc.) and are within acceptable procedural thickness following repairs, do not require recoating for gloss enhancing.

For small repair areas such as pinholes, gloss and gloss uniformity is not required, provided the coating is smooth and continuous.

2.9.3 Dry Film Thickness (DFT)

The Inspector shall perform a DFT of the cured coating system. A calibrated 0-25 Elcometer Inspector DFT Gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from an edge or a hole shall be avoided. (See Note 3).

The average DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 13.0 mils. The spot test DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 15.0 mils (See Note 4).

The finish coated system shall exhibit full "hiding" properties of the primecoat.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	16 of 34

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities such as handrails, gratings, stairs, sway struts, etc. shall be exempt from DFT measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Dimensions and locations of unacceptable areas and results of additional testing shall be documented on the IR.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated. If the recalculated average is acceptable, the traveler shall be so marked with an explanation in "Remarks" stating that "average recalculated - now acceptable", or wording to that effect. If the recalculated average is unacceptable, the unacceptable spots shall be isolated and repaired per Sec. 2.10.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	17 of 34

2.9.4 Continuity Inspection

The Inspector shall test the continuity of the cured finish coat on liner plate using a Tinker and Razor Model M1 (67.5 volt) holiday detector. 100% of the finish coated surface area shall be tested.

The applied film should contain only a minor number of points of discontinuity. No more than two points of discontinuity should occur within an area having a radius of 6 inches as measured from a point of discontinuity (pinholes). No more than 40% of the total number of allowable points of discontinuity should occur within any one area equal to 25% of the total area being coated. The total number of pinhole discontinuities allowed is defined in Attachment 5. No gross discontinuities are allowed.

2.10 REPAIRS OF FINISH COAT

2.10.1 Repairs of Runs and Sags

The QC inspector shall verify that the area is abraded until the DFT of the total coating system is within 6.0 to 15.0 mils, and examined for mudcracking. Mudcracking shall be repaired in accordance with Sec. 2.10.2 or 2.10.3.

2.10.2 Repair of Minor Defects

The QC inspector shall perform the following inspection when repairing minor defects:

- a) Verify ambient conditions per Attachment 1A prior to surface preparation.
- b) Verify that the damaged area is blasted or abraded until all loosely adherent particles are removed.
- c) Verify damaged area is solvent wiped.
- d) Perform inspections described in Sec. 2.7, 2.8 and 2.9.
- e) Minor defects may be repaired at the time of final inspection without later reinspection of the repair.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	18 of 34

2.10.3 Repair of Major Defects

The QC inspector shall perform the following inspection when repairing major defects:

- a) Verify ambient conditions per Attachment 1A and 6.
- b) Verify area is abraded or spot blasted until all loosely adherent particles are removed.
- c) Verify area is solvent wiped.
- d) Perform inspections in Section 2.7, 2.8 and 2.9.

2.10.4 Repair of Contamination

The QC inspector shall verify that contamination is removed by abrading and the surface recoated. The inspector shall perform inspections delineated in Sections 2.7, 2.8 and 2.9.

2.10.5 Repair of Pinholes and Small Discontinuities

- a) Verify all loose particles are removed and area is solvent wiped.
- b) Pinholes and small discontinuities may be repaired at the time of final inspection without a later reinspection of the repair. The inspections in Section 2.7, 2.8 and 2.9 still apply.

2.10.6 Repair of Dry Spray

Repair of dry spray identifiable by visual inspection defined within this procedure shall be removed.

- a) Verify all loose particles are removed.
- b) Verify coating film thickness is still within allowable range.
- c) If film thickness is not within allowable range perform inspections in Sec. 2.7, 2.8 and 2.9.

NOTE: A minor amount of adherent dry spray is acceptable on the final finish coat.

2.10.7 Repair of Excessive Orange Peel

- a) Verify the affected area is abraded and solvent wiped.
- b) Verify the affected area is refinished and perform the inspections delineated in Section 2.7, 2.8 and 2.9.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	19 of 34

2.10.8 Repair of Gloss and Color Nonuniformity

- a) Verify the affected area is solvent wiped.
- b) Verify the affected area is recoated without exceeding the maximum film thickness and perform inspections in Sections 2.7, 2.8 and 2.9.
- c) Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, etc.) and are within acceptable procedural thickness, following repairs, do not require recoating for gloss enhancing.
- d) For small repair areas such as pinholes, gloss and gloss uniformity is not required, provided the coating is smooth and continuous.

2.10.9 Documentation of In-Process Repairs

In-process repairs shall be documented on the traveler (Attachment 4) showing their completion and/or status.

2.11 NONCONFORMANCES

2.11.1 Unacceptable conditions which are not readily repaired or corrected per the approved procedures shall be documented as unsatisfactory on the inspection traveler.

2.11.2 Nonconforming conditions such as coating failure due to loss of adhesion or indeterminate/unacceptable conditions which cannot be repaired or corrected as per existing procedures shall be documented on a Nonconformance Report (NCR) in accordance with CP-QP-16.0. The NCR number shall be referenced on the inspection traveler, if applicable.

2.12 DOCUMENTATION (REFER TO ATTACHMENT 4)

2.12.1 All inspections required by this procedure shall be recorded in the inspection attributes on the back of the travelers (Attachment 4). Preparation and processing of the traveler shall be per QI-QP-11.4-28.

2.12.2 When the inspections required by Sections 2.1 through 2.2.3 have been satisfactorily completed, Step 1 shall be signed and dated by the inspector.

2.12.3 When the inspections required by Sections 2.3 through 2.6.5 have been satisfactorily completed, Step 2 shall be signed and dated by the inspector.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	20 of 34

2.12.4 When the inspections required by Sections 2.7 through 2.8.4 have been satisfactorily completed, Step 3 shall be signed and dated by the inspector.

2.12.5 When the inspections required by Sections 2.9 through 2.10.7 have been satisfactorily completed, Step 4 shall be signed and dated by the inspector.

2.13 SPECIAL COATINGS PROCEDURES

Special coatings procedures and instructions set forth in CCP-30-M1 through CCP-30-M9, as applicable under the scope of this procedure, shall be inspected as per the guidelines of this procedure using the criteria established in the special coatings procedures.

3.0 CLARIFICATION

3.1 SHOP COATED ITEMS

3.1.1 Items removed from the building for coating at the paint shop shall be the responsibility of the craft department.

3.1.1.1 The craft shall be responsible for identifying each piece by work package number.

3.1.1.2 The craft shall be responsible for returning and installing the shop coated item in the same area it was removed from.

3.1.2 The shop QC Inspector shall inspect the item(s) in accordance with QI-QP-11.4-1 and QI-QP-11.4-5, as applicable, and document his inspections on an Inspection Report (IR) in accordance with those procedures.

3.1.2.1 In addition to the information required by 11.4-1 or 11.4-5, the shop inspection shall reference the work package number identified on the item(s) on the Inspection Report (IR).

3.1.2.2 The IR, upon completion, shall be transmitted to the Paper Flow Group (PFG) for inclusion in the work package.

3.1.3 The QC Inspector (in the field) shall verify that items prepared/coated in the shop, which are included in the scope of the traveler, have the applicable inspection reports (IR) from the shop included in the work package and correspond with the identification on the item(s).

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	21 of 34

3.1.4 Items which have been finalized in the shop but incur mechanical damage during reinstallation shall be repaired in accordance with QI-QP-11.4-26 and documented on the traveler accordingly.

3.2 REPAIR OF MECHANICAL DAMAGE TO COMPLETED ITEMS

3.2.1 Areas that have been completed, inspected, accepted and traveler package closed which incur major damage at a later date may be repaired, inspected and documented on Attachment 9, "Steel Protective Coating Inspection Repair Traveler". Otherwise, the minor areas of mechanical damage, which occur after completion of an area, will be repaired during the final protective coatings walkdown.

3.3 EXCLUSION AREAS

3.3.1 Clarification/Definition

3.3.1.1 Areas which are scheduled to be painted but due to limited or no access are not possible to be painted at the present time and are beyond the control of protective coatings craft or quality control.

3.3.1.2 Building Management and/or the Paper Flow Group (PFG) shall determine the legitimacy of excluding an area.

3.3.2 Areas which are determined as exclusions shall be so noted on the original traveler and a new traveler will be generated by PFG to encompass the exclusion(s).

3.4 INACCESSIBLE/LIMITED ACCESS AREAS

3.4.1 Clarification/Definition

3.4.1.1 Areas where, due to permanent installation configuration, a dry film thickness (DFT) gauge cannot be properly engaged.

3.4.2 These areas shall be visually inspected to verify that the primer is applied and the finish coat is applied over the primer. No other inspection is required.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	22 of 34

4.0 ATTACHMENTS

- 4.1 Attachment 1, "Ambient Conditions"
- 4.2 Attachment 1B, "Air Supply Acceptability"
- 4.3 Attachment 2, "Preparation of Coating Materials"
- 4.4 Attachment 3, "Paint Mix Slip"
- 4.5 Attachment 4, "Steel Protective Coating Inspection Traveler"
- 4.6 Attachment 5, "Total Number of Allowable Points of Discontinuity"
- 4.7 Attachment 6, "Environmental Log Sheet"
- 4.8 Attachment 7, "Definitions"
- 4.9 Attachment 8, "Pot Life Reference Sheet"
- 4.10 Attachment 9, "Steel Protective Coating Inspection Repair Traveler"

ATTACHMENT 1A

Ambient Conditions

The inspector shall determine against the Environmental Sheet (Attachment 6) air temperature, surface temperature, relative humidity and dew point of substrate structures. A calibrated non-mercury filled dry bulb thermometer or calibrated temperature recorder (Bristol 4069TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury wet bulb thermometer or a calibrated humidity recorder (Bristol 4069TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperatures using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, WB No. 235. When dry bulb readings are greater than 100°F, the dew point should be determined using the 100°F dry bulb reading, and relative humidity shall be determined by subtracting wet bulb from the surface temperature or ambient temperature, whichever is greater. If the dry bulb thermometer exceeds 100°F, the instrument shall be returned to the calibration lab for recalibration. The surface temperature shall be determined by placing a calibrated surface temperature thermometer (Omega-Amprobe fast temp. range of 10°-250°F) in contact with the substrate surface until the temperature reading stabilizes.

Final surface preparation shall not begin unless the temperature of the surface is a minimum of 5°F above the dew point.

Normal conditions of ambient and surface temperature for application of primer shall be as follows:

	<u>Ambient Temp. (°F)</u>	<u>Surface Temp. (°F)</u>
Dimetecote 6	40-120	40-130
Carbo Zinc 11	40-95	40-110
Carboline 191	50-120	50-120
Phenoline 305	50-120	50-120

Humidity values may vary from 0% to 95% for inorganic primer; however, primer shall not be applied to a wet or damp surface.

Minimum and maximum values of relative humidity for Phenoline 305 and Carboline 191 shall be 0% and 85% respectively.

TEXAS UTILITIES GENERATING COMPANIES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	FEB 24 1984	24 of 34

ATTACHMENT 1B

Air Supply Acceptability

An inspector shall inspect the air supply system of blast and spray equipment for suitable filters/traps/separators and that they are left cracked open. The effectiveness of these items shall be verified by exposing a piece of white cloth to the air outlet for approximately 30 seconds. The white cloth shall be examined for evidence of contamination (oil, water, foreign matter, etc.). No evidence of contamination is acceptable.

TEXAS UTILITIES GENERATING CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	25 of 34

ATTACHMENT 2

PREPARATION OF COATING MATERIALS

Primer - The primer, Carbo Zinc 11, is packaged in a two component kit consisting of a base and a 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.

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.

Primer Coat - The primer coat, Carboline 191, is packaged in a two component kit consisting of Carboline 191 base, Part A, and a catalyst, Part B. Mixes are made by combining and thoroughly mixing the base and catalyst. Partial mixes may be made by combining, in a ration by volume, two 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 Carboline 191.

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 ration 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.

TEXAS UTILITIES GENERATING CO.
CPSES

PROCEDURE
NUMBER

REVISION

ISSUE
DATE

PAGE

QI-QP-11.4-26

2

FEB 24 1984

26 of 34

ATTACHMENT 3

PAINT MIX SLIP

* Report No. _____

Bldg. _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____

MIX NUMBER _____ ELEVATION _____

MATERIAL _____ GAL. MIXED _____

SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____

DATE & TIME MIXED _____ BASE _____

CURING AGENT _____ FILLER _____ THINNER _____

ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____

MIX NUMBER _____ ELEVATION _____

MATERIAL _____ GAL. MIXED _____

SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____

DATE & TIME MIXED _____ BASE _____

CURING AGENT _____ FILLER _____ THINNER _____

ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____

MIX NUMBER _____ ELEVATION _____

MATERIAL _____ GAL. MIXED _____

SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____

DATE & TIME MIXED _____ BASE _____

CURING AGENT _____ FILLER _____ THINNER _____

ACCEPTED BY _____

QC REVIEW & ACCEPTANCE _____

signature

date

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	27 of 34

ATTACHMENT 4

STEEL PROTECTIVE COATING INSPECTION TRAVELER	
WORK PKG. # _____	PCI TRAVELER # _____
ELEVATION: _____	ITEM # / DESCRIPTION _____
REF. DWGS. _____	
PREPARED BY: _____	DATE _____
STEP 1	<p>SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 2	<p>PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 3	<p>FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 4	<p>FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 5	<p>COMPLETION OF INSPECTION TRAVELER VERIFIED.</p> <p>QC REVIEW _____ DATE _____</p> <p>COMMENTS _____</p>
NOTES	<p>1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.</p>

2

FEB 24 1984 28 of 34

NEW 200. ALSO
PROTECTIVE COATING INSPECTION TRAVELER SUPPORTING DOCUMENTATION

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	29 of 34

ATTACHMENT 5

TOTAL NUMBER OF ALLOWABLE POINTS OF DISCONTINUITY

SURFACE AREA BEING COATED (SQ. FT.)	COND. "C" COMMERCIALY CONTINUOUS
10	5
10-50	10
50-100	20
100-500	30
500-1000	50
1000-5000	75

Gross Discontinuities - None Allowed.

TEXAS UTILITIES GENERATING COMPANIES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	31 of 34

ATTACHMENT 7

DEFINITIONS

Color and Gloss Nonuniformity: A milky haze or mist in the finish of a recently applied coating.

Contaminant: A foreign substance, inadvertently added to a coating or found on the substrate that adversely affects the application, adhesion, curing and/or subsequent performance of the applied coating.

Dry Spray: A dry powdery primer or finish coat readily removed by light sanding with either sandpaper or a wire screen. A minor amount of adherent dry spray is acceptable on the final finish coat.

Feathering: An area that is roughened and tapered to obtain a smooth and continuous surface with an existing coating.

Fisheyes: Small openings ("fisheyes") in wet film exposing old surface or previous coat.

Full Hiding: The coating provides sufficient coverage so that the preceding coat is not readily visible with an unaided eye.

Holiday: A pinhole, skip, discontinuity or void in coating film.

Major Defect: Defined as an area, either circular or linear, in which a 1/2" diameter circle could be inscribed at any point or along the entire length.

Minor Defect: 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.

Monitor: Conformance verification by physically observing a task being performed on a periodic or random basis.

Mudcracking: Irregular cracking as in a dried mud puddle (applicable to inorganic zinc primers).

Orange Peel: Dents in the surface resembling orange skin. A moderate amount is acceptable.

Verify: Confirm or make certain.

Visual: To examine with an unaided eye (corrective eye glasses or contact lens are acceptable).

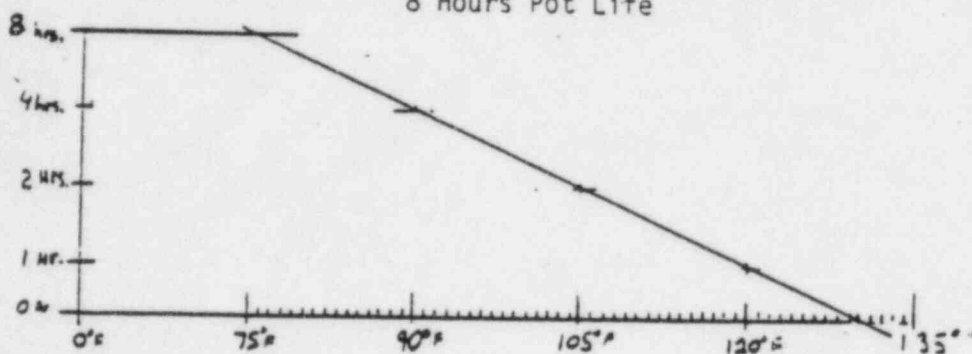
TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	2	FEB 24 1984	32 of 34

ATTACHMENT 8

POT LIFE REFERENCE SHEET

Normal Pot Life - CZ 11

8 Hours Pot Life



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

POT LIFE PHENOLINE 305 & CARBOLINE 191

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 hrs.	24 hrs.

Pot life stated above for unthinned coatings are the recommended times and should be utilized as a guideline for coating usage 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.

ATTACHMENT 9

STEEL PROTECTIVE COATING INSPECTION REPAIR TRAVELER	
WORK PKG. #	SUPPLEMENTAL TO PCI TRAVELER #
ELEVATION	ITEM # / DESCRIPTION
REF. DWGS.	
PREPARED BY:	DATE _____ SHT. _____ OF _____
STEP 1	<p>SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 2	<p>PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 3	<p>FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 4	<p>FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 5	<p>COMPLETION OF INSPECTION TRAVELER VERIFIED.</p> <p>QC REVIEW _____ DATE _____</p> <p>COMMENTS _____</p>
NOTES	<p>1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.</p>

34 of 34

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER QI-QP-11.4-26	REVISION 1	ISSUE DATE JAN 28 1984	PAGE 1 of 29
INSPECTION OF STEEL SUBSTRATE SURFACE PREPARATION, PRIMER APPLICATION, PRIMER REPAIR, SEAL AND FINISH COAT APPLICATION AND REPAIR	PREPARED BY: <u>Ken Walcott</u> BY <u>W.D. Walcott</u> APPROVED BY: <u>W.D. Walcott</u> APPROVED BY: <u>L. J. Nelson</u>		<u>1-28-84</u> DATE <u>1-28-84</u> DATE <u>1-28-84</u> DATE	

1.0 GENERAL

FOR INFORMATION ONLY

1.1 PURPOSE AND SCOPE

The purpose of this instruction is to outline methods utilized by Quality Control personnel in inspection of steel substrate surface preparation, primer application, primer repair, seal and finish coat application and repair for Unit 1 Reactor Building.

2.0 INSTRUCTION

Visual inspection of surfaces as addressed by this instruction shall be made at approximately an arms length from the surface being inspected. The area of inspection shall be adequately lighted during the inspection activity. Adequate lighting is defined as the minimum light produced by a two (2) cell battery flashlight. Flashlight shall be held perpendicular to the surface during visual inspection.

Visual surface preparation standards fabricated on site and approved by Quality Assurance and Engineering may be used by Inspectors as an aid in the performance of their inspections.

For definitions, refer to Attachment 7.

2.1 PRE-BLAST HAND AND/OR POWER TOOL CLEANING OPERATIONS

2.1.1 Abrasive Acceptability

The Inspector shall obtain a sample of the abrasive to be used from each work area. The abrasive shall be verified to be dry by feel. All grease, oil and deleterious material is unacceptable.

HISTORICAL FILE

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	2 of 29

Particle size must be sufficient to achieve 1 mil surface profile minimum.

2.1.2 Blast Equipment Acceptability

The inspector shall perform the following inspections/tests to determine acceptability of blast cleaning equipment prior to use:

- a. Air supply (refer to Attachment 1B).
- b. Ambient conditions (reference Attachment 1A and 6).

2.1.3 Solvent Cleaning (If Chemical Contamination Present)

If oil, grease, or other chemical contamination is present, verify that solvent cleaning is performed and that chemical contamination is removed prior to blast/power tool cleaning steel surfaces.

2.2 POST BLAST CLEANING OPERATIONS

2.2.1 Blast Cleanup

The inspector shall visually check the blasted substrate surface.

The surface shall be air blasted or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.

2.2.2 Blasted or Power Tooled Surface Acceptability

The inspector shall perform the following inspections to determine acceptability of the blast cleaned or power tooled surface:

- a. Absence of Foreign Matter -- A visual inspection shall be performed to determine that all oil and grease, dirt, millscale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for light shadows, very slight streaks or slight discolorations caused by rust stains, mill scale, oxides, or slight, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all residues, and the remainder shall be limited to light discolorations as mentioned above.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	3 of 29

NOTE: In addition to the 5 percent of tight residue of paint or coating which is permissible, shadows or tightly adhering residues of primer may remain (without limit) in the profile of the previously prepared substrate. 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.

- b. Removal of Sharp Projections -- An inspection for sharp projections that were not blended (rounded) during blast cleaning or power tooling shall be performed.

Weld spatter on structural steel which remains after grinding or sand blasting will be acceptable.

Sharp projections are not acceptable.

Protrusions and peaks shall be ground to a rounded contour.

NOTE: Any mechanical surface preparation other than sandblasting or hand or power tooling of sharp edges or weld spatter will require a visual welding inspector's acceptance of the work performed.

- c. Anchor Pattern Depth -- The anchor pattern depth of the blasted surface shall be inspected at random locations using a Keane-Tator Surface Profile Comparator (model 373) or equivalent.

The anchor pattern depth for a blasted surface shall be a minimum of 1.0 mils.

Surfaces that have been power tooled with "3M Clean-N-Strip", 80 grit and coarser "flapper wheels", sanding discs, "Roto-Peen" or equivalent, provide acceptable surface profile.

No maximum profile will be specified, providing that correct millage and surface uniformity requirements can be obtained after primer application.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	4 of 29

2.2.3 Unique Number Identification

After blasting, power tool and prior to prime coat application (if applicable), QC shall verify that construction has identified each piece with a unique number.

2.3 PRIMER PRE-APPLICATION INSPECTIONS

2.3.1 Ambient Conditions

The inspector at the "paint distribution point" in Reactor 1 shall verify ambient conditions in accordance with Attachment 1-A.

2.3.1.1 The inspector shall monitor the ambient conditions being recorded on the Environmental Log (Attachment 6) at the "paint distribution point" in the building.

2.3.1.2 Documentation of Environmental Conditions

- a. The inspector assigned to the "paint distribution point" in the Reactor building shall, as a minimum, take a complete set of readings (air temperature, relative humidity, dew point and surface temperature) on each floor elevation at least three (3) times each shift (preferably, the beginning, mid point and just prior to the end of each shift). More readings may be taken when necessary (i.e., noticeable change in air temperature, request by field inspector to take readings in a specific area, etc.).
- b. The inspector at the "paint distribution point" shall document these readings on Attachment 6 as follows:
 1. One (1) Environmental Log Sheet (Attachment 6) shall be completed for all readings taken on one (1) floor elevation or specific area in a given shift.
 2. The inspector shall fill in the applicable information as delineated on the form, except for the "Report No. _____". (The Report No. will be filled in by the Paper Flow Group when they assign numbers, prior to transmitting to the QA Vault.
 3. Upon completion of the shift, the inspector shall turn all of the environmental log sheets for that shift into the lead inspectors.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 26 1984	5 of 29

- c. The lead inspector(s) shall review the log sheets for completeness and correctness, sign and date the "QC Review" block, obtain copies for QC reference and transmit the originals to the Paper Flow Group.
- d. If at any time the inspector determines readings which do not comply with the parameters set forth in this procedure, he shall proceed in the following manner:
 1. Immediately take an additional set of readings in the immediate area of the first set of unacceptable readings and record them on the environmental log.
 2. If the additional set of readings are acceptable, take a third set of readings for referee purposes and record them. If the referee set of readings are acceptable, then the area in question is acceptable but should be closely monitored with readings as necessary.
 3. If the additional set of readings is acceptable and/or the referee set of readings is unacceptable, the inspector is to notify the coatings inspectors in the areas affected so that coating work may be stopped at that time. Coating work shall not continue until the ambient conditions resume an acceptable status.
 4. When unacceptable ambient conditions occur and are verified by step 3 above, the inspector shall document it on a Nonconformance Report (NCR) in accordance with CP-QP-16.0 and adequately identify the affected areas/elevations.

2.3.2 Substrate Surface Acceptability

The Inspector shall visually reinspect the sandblasted or powertooled surface of the substrate just prior to primer application for evidence of contamination (oil, grease, markings, rust, etc.) Contamination must be removed prior to priming.

If rust forms after Blasting or Power Tooling, the surface shall be recleaned before priming. Under no case will a prepared surface be exposed for more than 24 hours before priming.

2.3.3 Air Supply Acceptability

The Inspector shall inspect the air per Attachment 1B.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	6 of 29

2.3.4 Qualification of Applicator(s)

The Inspector shall verify (by Qualification Record or list of qualified applicators from QA file) that the coating applicators are qualified for safety-related coating work. The applicator(s) badge number shall be listed on the back of the traveler.

2.3.5 Mixing Operations

2.3.5.1 Coating Materials Identification

An inspector shall inspect the coating material containers prior to mixing contents for product identification and verify that all materials are correct for coating application.

Approved materials are:

CZ-11

Carbo Zinc 11 base (gray or green)
Carbo Zinc filler
Carboline #21 or 33 Thinner

DIMETCOTE

Dimetcote 6 base
Dimetcote filler
Amercoat #65 or 101 Thinner

CARBOLINE 191

Carboline 191 Primer (Red Brick)
Carboline 191 Catalyst
Carboline #15 Thinner

PHENOLINE 305

Phenoline 305 base
Phenoline 305 catalyst
Phenoline thinner

An inspector shall also verify that each component container is identified by batch number and that the shelf life has not expired. Carbo Zinc 11 base and Carboline 191 has a shelf life of 12 months. Carbo Zinc filler, Dimetcote 6 base and filler, and Phenoline 305 all have a shelf life of 24 months.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 26 1984	7 of 29

2.3.5.2 Mixing Operations

An inspector shall witness each mixing/thinning operation. The inspector shall verify that mixing operations are performed in accordance with Attachment 2.

2.3.5.3 Thinning Operation

Coating materials (if thinned) viscosity control shall be accomplished by adding thinner as required, but shall not exceed two quarts of thinner per gallon of material.

2.3.5.4 When coating materials are mixed/thinned, the inspector verifying the mixing operation shall fill out the Paint Mix Slip, Attachment 3. The inspector performing the pre-application inspection shall record the mix sheet number on the travelers. The Mix Slip shall be returned to the Paper Flow Group at the end of each shift to be sent to the vault.

2.4 PRIMER APPLICATION INSPECTION

2.4.1 Surveillance of Primer Application

During application operations of CZ-11, the QC Inspector shall monitor that the pressure pot is continuously agitated. The QC Inspector shall also verify that the hose length does not exceed 75 feet. CZ-11 shall not be brush applied to areas larger than 1 sq. ft.

2.4.2 During application of Carboline 191, the inspector will monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.5 INSPECTION OF PRIMER

2.5.1 Primer Inspection Prior to Application of Seal or Finish Coat

- a. Verify the primer has cured sufficiently for the top coating (as determined by the use of a nickel test on CZ-11). Cure to top coat of Carboline 191 shall be the same as Phenoline 305.
- b. Perform a visual inspection of the primed surface in accordance with the following:

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	8 of 29

1. Runs/sags which do not exceed the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs for runs/sags other than the aforementioned shall be as per Sections 2.6.2 or 2.6.3, as applicable.
2. Dry Spray - Must be removed before overcoating as per Section 2.6.3.
3. Contamination - unacceptable; repair as per Section 2.6.2 or 2.6.3, as applicable.
Oil and grease - unacceptable; repair as per Section 2.6.3.
4. Skips/damaged areas/holidays or voids - unacceptable; repair as per 2.6.2 or 2.6.3, as applicable.
5. Orange peel - Moderate amounts are acceptable. Excessive amounts unacceptable; repair as per Section 2.6.3.
6. Bubbling - unacceptable; repair as per Section 2.6.2 or 2.6.3, as applicable (does not apply to CZ11).

- c. The inspector shall perform a DFT inspection of the cured primer film. A calibrated 0-25 Elcometer Inspector DFT gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from the edge or a hole shall be avoided (See Note 3).

Dry Film Thickness shall be as follows (See Note 4):

	Min. (mils)	Max. (mils)
Carboline 191 spot test	1.6	8.5
CZ-II spot test	1.5	7.0
D6 spot test	1.5	5.5
D6 average DFT	2.0	5.0
CZ-II average DFT	2.0	6.0
Carboline 191 average DFT	2.0	7.0

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QF-11.4-26	1	JAN 29 1984	9 of 29

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities, such as handrails, gratings, stairs, sway struts, checker plate, etc., shall be exempt from dry film thickness measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated.

NOTE 5: Unacceptable areas shall be repaired as per Section 2.6.3.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	10 of 29

- d. Inaccessible and/or limited access areas where DFT gauge cannot be properly engaged shall be visually inspected to verify that primer is applied to the substrate. No other inspection is required.

2.6 PRIMER REPAIRS

2.6.1 Sags and Runs

Runs/sags: Ref. Sec. 2.5.1.b if surface is unacceptable. Repair per Sec. 2.6.2 or 2.6.3.

2.6.2 Primer Touch-up Repair (Primer Damaged to Steel Surface)

The coating inspector shall conduct the following inspections to document primer touch-up repair operations when the damage is to the steel surface and spot sandblasting, hand sanding or power tool abrading is performed for surface preparation.

- a. Surface preparation Ref. Sec. 2.2.2.
- b. Verify that the blasted or power tooled surface has been high pressure air blowdown, and/or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.
- c. Ambient Conditions: Ref. Attachment 1A and 6.
Air Supply Acceptability: Ref. Attachment 1B.
The surface temperature shall be a minimum of 5° above the dew point.
- d. Verify applicator qualifications per Section 2.3.4.
- e. Verify air supply acceptability per Attachment 1B.
- f. Verify ambient condition per Attachment 1A.

1. Coating Materials Identification

Verify per Sec. 2.3.5.1.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	11 of 29

2. Mixing Operations

Verify per Sec. 2.3.5.2.

3. Thinning Operation

Verify per Sec. 2.3.5.3.

- g. Verify that primer is applied in accordance with Sec. 2.4.1.

NOTE: (If applicable) 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 inspecting coating interface the interface of the coating or systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

2.6.3 Primer Touch-up Repair (Primer Damage Does Not Extend to Steel Surface)

The coating inspector shall conduct the following inspections for primer touch-up repair operations when the damage is within the primer coat and sandblasting to the steel substrate is not required.

- a. Verify surface is abraded lightly then wiped clean.
- b. Verify primer is applied in accordance with Section 2.4.1.
- c. Visually verify acceptability of repaired area per Section 2.5.1.b.

2.6.4 Repair of Primer by Recoating

The coating inspector shall conduct the following inspections for primer recoating repair. Only two (2) overcoats may be applied of inorganic zinc primer.

- a. Verify that the surface has been solvent cleaned or blown down with high air pressure. Contamination is unacceptable and requires further cleaning.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	12 of 29

b. Perform inspections in Section 2.6.2.

NOTE: After application of primer to the spot primed area, the only additional feathering required is at the outer edge of the primed area. Sanding of the primed area is not required.

2.6.5 Complete Primer Repair (Primer Damage to Steel Surface Extends Over Entire Item)

The coating inspector shall conduct the following inspections to document primer repair when the damage is to the steel surface and requires surface preparation to steel substrate over entire item:

- a. Verify ambient conditions per Attachment 1A to surface preparation. See Attachment 6.
- b. Perform inspections (a) through (g) in Section 2.6.2.

2.7 FINISH COAT PRE-APPLICATION INSPECTIONS

The QC inspector shall verify the following items prior to applying coatings:

2.7.1 Coating Applicator Qualifications

The Inspector shall verify (by Qualification Record or list of qualification records in QA File) that the coating applicators on each shift are qualified for safety-related coating work.

2.7.2 Ambient Conditions (Refer Attachment 1A and 6)

The permissible range of surface and ambient temperature for application of finish coat shall be 50-120°F.

The maximum humidity shall be 85% for Phenoline 305, and 95% for inorganic zinc and Carboline 191.

The surface temperature shall be a minimum of 5°F above the dew point.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	13 of 29

2.7.3 Coated Surface Acceptability

The Inspector shall visually reinspect the previously coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter). The defective areas shall be repaired per Sec.(s) 2.6.2, 2.6.3, 2.6.4 and 2.6.5, as applicable.

2.7.4 Air Supply Acceptability (Per Attachment 1B)

2.7.5 Finish Coat Mixing Operations

2.7.5.1 Prior to mixing, the mixing inspector shall verify that each component is identified by batch numbers and that the 24 month shelf life has not been exceeded.

2.7.5.2 The mixing inspector shall verify that mixing/thinner operations are performed in accordance with Sec. 2.3.5.2. Thinning may be done up to two quarts of Phenoline Thinner per gallon of Phenoline 305.

2.7.5.3 Mixing operation shall be documented on the traveler per Sec. 2.3.5.4.

2.8 SURVEILLANCE OF SEAL OR FINISH COAT APPLICATION

2.8.1 The Inspector shall monitor that hose length does not exceed 75 feet.

2.8.2 The inspector shall also verify that the seal coat (if present) is solvent wiped prior to finish coat application.

2.8.3 The inspector shall monitor to assure that no fisheyes appear in the applied coating. If detected, the inspector shall inform the paint foreman of their presence and that they should be removed while coating is still wet, surface cleaned with solvent and coating reapplied.

2.9 FINISH COAT FINAL ACCEPTANCE INSPECTION

The inspector shall perform a final acceptance inspection of each finish coated item(s) in accordance with Paragraphs 2.9.1 through 2.9.5.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	14 of 29

NOTE: (If applicable) 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 inspecting coating interface the interface of the systems shall be a maximum of 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE: The tie in interface between concrete coatings and steel coatings shall be visually inspected during the finish coat final acceptance of both systems.

2.9.1 Finish Coat Cure

Final QC inspection may be performed after a minimum topcoat cure of 24 hours and cure to recoat time has been met.

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

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

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

2.9.2 Visual Defects Inspection

The Inspector shall perform a visual inspection of the cured finish coated substrate surface in accordance with the following:

- a) Runs/sags - Runs or sags in which the DFT of the total coating system is 15.0 mils or less, which show no evidence of mudcracking, are acceptable. Those greater than 15.0 mils shall be repaired as per Section 2.10.1.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	15 of 29

- b) Skips, damaged areas, holidays, voids, bubbles, blisters and excessive orange peel are not acceptable and shall be repaired as per Section 2.10, as applicable.
- c) Pinholes - acceptable to the extent allowed by Attachment 5; areas not acceptable shall be repaired as per Section 2.10.5.
- d) Contamination - unacceptable; areas shall be repaired as per Section 2.10.4.
- e) Dry spray - unacceptable; shall be repaired as per Section 2.10.6. A minor amount of adherent dry spray is acceptable on the final finish coat.
- f) Color and gloss non-uniformity - unacceptable; shall be repaired as per Section 2.10.8.

Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, etc.) and are within acceptable procedural thickness following repairs, do not require recoating for gloss enhancing.

For small repair areas such as pinholes, gloss and gloss uniformity is not required, provided the coating is smooth and continuous.

2.9.3 Dry Film Thickness (DFT)

The Inspector shall perform a DFT of the cured coating system. A calibrated 0-25 Elcometer Inspector DFT Gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from an edge or a hole shall be avoided. (See Note 3).

The average DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 13.0 mils. The spot test DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 15.0 mils (See Note 4).

The finish coated system shall exhibit full "hiding" properties of the primecoat.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	16 of 29

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities such as handrails, gratings, stairs, sway struts, etc. shall be exempt from DFT measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Dimensions and locations of unacceptable areas and results of additional testing shall be documented on the IR.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated. If the recalculated average is acceptable, the traveler shall be so marked with an explanation in "Remarks" stating that "average recalculated - now acceptable", or wording to that effect. If the recalculated average is unacceptable, the unacceptable spots shall be isolated and repaired per Sec. 3.10.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	.1	JAN 23 1984	17 of 29

2.9.4 Continuity Inspection

The Inspector shall test the continuity of the cured finish coat on liner plate using a Tinker and Razor Model M1 (67.5 volt) holiday detector. 100% of the finish coated surface area shall be tested.

The applied film should contain only a minor number of points of discontinuity. No more than two points of discontinuity should occur within an area having a radius of 6 inches as measured from a point of discontinuity (pinholes). No more than 40% of the total number of allowable points of discontinuity should occur within any one area equal to 25% of the total area being coated. The total number of pinhole discontinuities allowed is defined in Attachment 5. No gross discontinuities are allowed.

- 2.9.5 Inaccessible and/or limited access areas, where a DFT gauge cannot be properly engaged, shall be visually inspected to verify that topcoat is applied. No other inspection is required.

2.10 REPAIRS OF FINISH COAT

2.10.1 Repairs of Runs and Sags

The QC inspector shall verify that the area is abraded until the DFT of the total coating system is within 6.0 to 15.0 mils, and examined for mudcracking. Mudcracking shall be repaired in accordance with Sec. 2.10.2 or 2.10.3.

2.10.2 Repair of Minor Defects

The QC inspector shall perform the following inspection when repairing minor defects:

- Verify ambient conditions per Attachment 1A prior to surface preparation.
- Verify that the damaged area is blasted or abraded until all loosely adherent particles are removed.
- Verify damaged area is solvent wiped.
- Perform inspections described in Sec. 2.7, 2.8 and 2.9.
- Minor defects may be repaired at the time of final inspection without later reinspection of the repair.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	18 of 29

2.10.3 Repair of Major Defects

The QC inspector shall perform the following inspection when repairing major defects:

- a) Verify ambient conditions per Attachment 1A and 6.
- b) Verify area is abraded or spot blasted until all loosely adherent particles are removed.
- c) Verify area is solvent wiped.
- d) Perform inspections in Section 2.7, 2.8 and 2.9.

2.10.4 Repair of Contamination

The QC inspector shall verify that contamination is removed by abrading and the surface recoated. The inspector shall perform inspections delineated in Sections 2.7, 2.8 and 2.9.

2.10.5 Repair of Pinholes and Small Discontinuities

- a) Verify all loose particles are removed and area is solvent wiped.
- b) Pinholes and small discontinuities may be repaired at the time of final inspection without a later reinspection of the repair. The inspections in Section 2.7, 2.8 and 2.9 still apply.

2.10.6 Repair of Dry Spray

Repair of dry spray identifiable by visual inspection defined within this procedure shall be removed.

- a) Verify all loose particles are removed.
- b) Verify coating film thickness is still within allowable range.
- c) If film thickness is not within allowable range perform inspections in Sec. 2.7, 2.8 and 2.9.

NOTE: A minor amount of adherent dry spray is acceptable on the final finish coat.

2.10.7 Repair of Excessive Orange Peel

- a) Verify the affected area is abraded and solvent wiped.
- b) Verify the affected area is refinished and perform the inspections delineated in Section 2.7, 2.8 and 2.9.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 22 1984	19 of 29

2.10.8 Repair of Gloss and Color Nonuniformity

- a) Verify the affected area is solvent wiped.
- b) Verify the affected area is recoated without exceeding the maximum film thickness and perform inspections in Sections 2.7, 2.8 and 2.9.
- c) Top coated areas which have been abraded for various reasons (i.e., runs, sags, high millage, etc.) and are within acceptable procedural thickness, following repairs, do not require recoating for gloss enhancing.
- d) For small repair areas such as pinholes, gloss and gloss uniformity is not required, provided the coating is smooth and continuous.

2.10.9 Documentation of Repairs

Repairs shall be documented on the traveler (Attachment 4) showing their completion and/or status.

2.11 NONCONFORMANCES

2.11.1 Unacceptable conditions which are not readily repaired or corrected per the approved procedures shall be documented as unsatisfactory on the inspection traveler.

2.11.2 Nonconforming conditions such as coating failure due to loss of adhesion or indeterminate/unacceptable conditions which cannot be repaired or corrected as per existing procedures shall be documented on a Nonconformance Report (NCR) in accordance with CP-QP-16.0. The NCR number shall be referenced on the inspection traveler, if applicable.

2.12 DOCUMENTATION (REFER TO ATTACHMENT 4)

2.12.1 All inspections required by this procedure shall be recorded in the inspection attributes on the back of the travelers (Attachment 4). Preparation and processing of the traveler shall be per QI-QP-11.4-28.

2.12.2 When the inspections required by Sections 2.1 through 2.2.3 have been satisfactorily completed, Step 1 shall be signed and dated by the inspector.

2.12.3 When the inspections required by Sections 2.3 through 2.6.5 have been satisfactorily completed, Step 2 shall be signed and dated by the inspector.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	20 of 29

2.12.4 When the inspections required by Sections 2.7 through 2.8.4 have been satisfactorily completed, Step 3 shall be signed and dated by the inspector.

2.12.5 When the inspections required by Sections 2.9 through 2.10.7 have been satisfactorily completed, Step 4 shall be signed and dated by the inspector.

2.13 SPECIAL COATINGS PROCEDURES

Special coatings procedures and instructions set forth in CCP-30-M1 through CCP-30-M9, as applicable under the scope of this procedure, shall be inspected as per the guidelines of this procedure using the criteria established in the special coatings procedures.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 9 5 1984	21 of 29

ATTACHMENT 1A

Ambient Conditions

The inspector shall determine against the Environmental Sheet (Attachment 6) air temperature, surface temperature, relative humidity and dew point of substrate structures. A calibrated non-mercury filled dry bulb thermometer or calibrated temperature recorder (Bristol 4069TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury wet bulb thermometer or a calibrated humidity recorder (Bristol 4069TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperatures using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, WB No. 235. When dry bulb readings are greater than 100°F, the dew point should be determined using the 100°F dry bulb reading, and relative humidity shall be determined by subtracting wet bulb from the surface temperature or ambient temperature, whichever is greater. If the dry bulb thermometer exceeds 100°F, the instrument shall be returned to the calibration lab for recalibration. The surface temperature shall be determined by placing a calibrated surface temperature thermometer (Omega-Amprobe fast temp. range of 10°-250°F) in contact with the substrate surface until the temperature reading stabilizes.

Final surface preparation shall not begin unless the temperature of the surface is a minimum of 5°F above the dew point.

Normal conditions of ambient and surface temperature for application of primer shall be as follows:

	<u>Ambient Temp. (°F)</u>	<u>Surface Temp. (°F)</u>
Dimetcote 6	40-120	40-130
Carbo Zinc 11	40-95	40-110
Carboline 191	50-120	50-120
Phenoline 305	50-120	50-120

Humidity values may vary from 0% to 95% for inorganic primer; however, primer shall not be applied to a wet or damp surface.

Minimum and maximum values of relative humidity for Phenoline 305 and Carboline 191 shall be 0% and 85% respectively.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	22 of 29

ATTACHMENT 1B

Air Supply Acceptability

An inspector shall inspect the air supply system of blast and spray equipment for suitable filters/traps/separators and that they are left cracked open. The effectiveness of these items shall be verified by exposing a piece of white cloth to the air outlet for approximately 30 seconds. The white cloth shall be examined for evidence of contamination (oil, water, foreign matter, etc.). No evidence of contamination is acceptable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	23 of 29

ATTACHMENT 2

PREPARATION OF COATING MATERIALS

Primer - The primer, Carbo Zinc 11, is packaged in a two component kit consisting of a base and a 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.

Primer - The primer, Dimetecote 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 Dimetecote 6 application instructions. Primer coat shall be reddish gray.

Primer Coat - The primer coat, Carboline 191, is packaged in a two component kit consisting of Carboline 191 base, Part A, and a catalyst, Part B. Mixes are made by combining and thoroughly mixing the base and catalyst. Partial mixes may be made by combining, in a ration by volume, two 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 Carboline 191.

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 ration 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.

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	24 of 29

ATTACHMENT 3

PAINT MIX SLIP

* Report No. _____

Bldg. _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
 MIX NUMBER _____ ELEVATION _____
 MATERIAL _____ GAL. MIXED _____
 SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
 DATE & TIME MIXED _____ BASE _____
 CURING AGENT _____ FILLER _____ THINNER _____
 ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
 MIX NUMBER _____ ELEVATION _____
 MATERIAL _____ GAL. MIXED _____
 SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
 DATE & TIME MIXED _____ BASE _____
 CURING AGENT _____ FILLER _____ THINNER _____
 ACCEPTED BY _____

DATE _____ POT LIFE _____ SHIFT _____ TIME _____
 MIX NUMBER _____ ELEVATION _____
 MATERIAL _____ GAL. MIXED _____
 SHELF LIFE ACCEPTABLE: YES _____ NO _____ M&TE #'S _____
 DATE & TIME MIXED _____ BASE _____
 CURING AGENT _____ FILLER _____ THINNER _____
 ACCEPTED BY _____

QC REVIEW & ACCEPTANCE _____
 signature _____ date _____

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	25 of 29

ATTACHMENT 4

STEEL PROTECTIVE COATING INSPECTION TRAVELER	
WORK PKG. # _____	PCI TRAVELER # _____
ELEVATION: _____	ITEM # (DESCRIPTION) _____
REF. DWGS.: _____	
PREPARED BY: _____	DATE: _____
STEP 1	<p>SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 2	<p>PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 3	<p>FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 4	<p>FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 5	<p>COMPLETION OF INSPECTION TRAVELER VERIFIED.</p> <p>QC REVIEW _____ DATE _____</p> <p>COMMENTS _____</p>
NOTES	<p>1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.</p>

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 28 1984	27 of 29

ATTACHMENT 5

TOTAL NUMBER OF ALLOWABLE POINTS OF DISCONTINUITY

<u>SURFACE AREA BEING COATED (SQ. FT.)</u>	<u>COND. "C" COMMERCIALY CONTINUOUS</u>
10	5
10-50	10
50-100	20
100-500	30
500-1000	50
1000-5000	75

Gross Discontinuities - None Allowed.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	1	JAN 23 1984	29 of 29

ATTACHMENT 7

DEFINITIONS

Color and Gloss Nonuniformity: A milky haze or mist in the finish of a recently applied coating.

Contaminant: A foreign substance, inadvertently added to a coating or found on the substrate that adversely affects the application, adhesion, curing and/or subsequent performance of the applied coating.

Dry Spray: A dry powdery primer or finish coat readily removed by light sanding with either sandpaper or a wire screen. A minor amount of adherent dry spray is acceptable on the final finish coat.

Feathering: An area that is roughened and tapered to obtain a smooth and continuous surface with an existing coating.

Fisheyes: Small openings ("fisheyes") in wet film exposing old surface or previous coat.

Full Hiding: The coating provides sufficient coverage so that the preceding coat is not readily visible with an unaided eye.

Holiday: A pinhole, skip, discontinuity or void in coating film.

Major Defect: Defined as an area, either circular or linear, in which a 1/2" diameter circle could be inscribed at any point or along the entire length.

Minor Defect: 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.

Monitor: To observe or check, especially for a special purpose.

Mudcracking: Irregular cracking as in a dried mud puddle (applicable to inorganic zinc primers).

Orange Peel: Dents in the surface resembling orange skin. A moderate amount is acceptable.

Surveillance: Close watch kept over someone or something.

Verify: Confirm or make certain.

Visual: To examine with an unaided eye (correctional eye glasses or contact lens are acceptable).

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	1 of 24
INSPECTION OF STEEL SUBSTRATE SURFACE PREPARATION, PRIMER APPLICATION, PRIMER REPAIR, SEAL AND FINISH COAT APPLICATION AND REPAIR	PREPARED BY: <u>[Signature]</u> APPROVED BY: <u>[Signature]</u> APPROVED BY: <u>[Signature]</u>	<u>12-29-83</u> DATE <u>12-29-83</u> DATE <u>12-29-83</u> DATE		

1.0 GENERAL

FOR INFORMATION ONLY

1.1 PURPOSE AND SCOPE

The purpose of this instruction is to outline methods utilized by Quality Control personnel in inspection of steel substrate surface preparation, primer application, primer repair, seal and finish coat application and repair for Unit 1 Reactor Building.

- 1.2 (If applicable) Backfit shall be performed per QI-QP-11.4-23. Document in the comments section of the traveler Attachment 4.

2.0 INSTRUCTION

Visual inspection of surfaces as addressed by this instruction shall be made at approximately an arms length from the surface being inspected. The area of inspection shall be adequately lighted during the inspection activity. Adequate lighting is defined as the minimum light produced by a two (2) cell battery flashlight. Flashlight shall be held perpendicular to the surface during visual inspection.

HISTORICAL FILE

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	2 of 24

2.1 PRE-BLAST HAND AND/OR POWER TOOL CLEANING OPERATIONS

2.1.1 Abrasive Acceptability

The Inspector shall obtain a sample of the abrasive to be used from each work area. The abrasive shall be verified to be dry by feel. All grease, oil and deleterious material is unacceptable.

Particle size must be sufficient to achieve 1 mil surface profile minimum.

2.1.2 Blast Equipment Acceptability

The inspector shall perform the following inspections/tests to determine acceptability of blast cleaning equipment prior to use:

- a. Air supply (refer to Attachment 1B).
- b. Ambient conditions (reference Attachment 1A and 6).

2.1.3 Solvent Cleaning (If Chemical Contamination Present)

If oil, grease, or other chemical contamination is present, verify that solvent cleaning is performed and that chemical contamination is removed prior to blast cleaning steel surfaces.

2.2 POST BLAST CLEANING OPERATIONS

2.2.1 Blast Cleanup

The inspector shall visually check the blasted substrate surface.

The surface shall be air blasted or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.

2.2.2 Blasted or Power Tooled Surface Acceptability

The inspector shall perform the following inspections to determine acceptability of the blast cleaned or power tooled surface:

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	3 of 24

- a. Absence of Foreign Matter -- A visual inspection shall be performed to determine that all oil and grease, dirt, millscale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for light shadows, very slight streaks or slight discolorations caused by rust stains, mill scale, oxides, or slight, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all residues, and the remainder shall be limited to light discolorations as mentioned above.

NOTE: In addition to the 5 percent of tight residue of paint or coating which is permissible (above), shadows or tightly adhering residues of primer may remain (without limit) in the profile of the previously prepared substrate.

- b. Removal of Sharp Projections -- A reinspection for sharp projections that were not blended (rounded) during blast cleaning or power tooling shall be performed.

Weld splatter on structural steel which remains after grinding or sand blasting will be acceptable.

Sharp projections are not acceptable.

Protrusions and peaks shall be ground to a rounded contour.

NOTE: Any mechanical surface preparation other than sandblasting or hand or power tooling of sharp edges or weld spatter will require a visual welding inspector's acceptance of the work performed.

- c. Anchor Pattern Depth -- The anchor pattern depth of the blasted surface shall be inspected at random locations using a Keane-Tator Surface Profile Comparator (model 373) or equivalent.

The anchor pattern depth for a blasted surface shall be a minimum of 1.0 mils. >

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	4 of 24

Surfaces that have been power tooled with "3M Clean-N-Strip", 80 grit and coarser "flapper wheels", sanding discs, "roto beans" or equivalent, provide acceptable surface profile.

No maximum profile will be specified, providing that correct millage and surface uniformity requirements can be obtained after primer application.

2.2.3 Unique Number Identification

After blasting, power tool and prior to prime coat application (if applicable), QC shall verify that construction has identified each peice with a unique number.

2.3 PRIMER PRE-APPLICATION INSPECTIONS

2.3.1 Ambient Conditions

The inspector shall verify ambient conditions in accordance with Attachment 1-A.

2.3.2 Substrate Surface Acceptability

The Inspector shall visually reinspect the sandblasted or powertooled surface of the substrate just prior to primer application for evidence of contamination (oil, grease, markings, rust, etc.) Contamination must be removed prior to priming.

If rust forms after Blasting or Power Tooling, the surface shall be recleaned before priming. Under no case will a prepared surface be exposed for more than 24 hours before priming. (This shall be verified on Step 1 of Traveler Attachment 4.)

2.3.3 Air Supply Acceptability

The Inspector shall inspect the air per Attachment 1B.

2.3.4 Qualification of Applicator(s)

The Inspector shall verify (by Qualification Record or list of qualified applicators from QA file) that the coating applicators are qualified for safety-related coating work. The applicator(s) badge number shall be listed on the back of the traveler.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	5 of 24

2.3.5 Mixing Operations

2.3.5.1 Coating Materials Identification

An inspector shall inspect the coating material containers prior to mixing contents for product identification and verify that all materials are correct for coating application.

Approved materials are:

CZ-11

Carbo Zinc 11 base (gray or green)
Carbo Zinc filler
Carboline #21 or 33 Thinner

DIMETCOTE

Dimetcote 6 base
Dimetcote filler
Amercoat #65 or 101 Thinner

CARBOLINE 191

Carboline 191 Primer (Red Brick)
Carboline 191 Catalyst
Carboline #15 Thinner

An inspector shall also verify that each component container is identified by batch number and that the shelf life has not expired. Carbo Zinc 11 base and Carboline 191 has a shelf life of 12 months. Carbo Zinc filler and Dimetcote 6 base and filler have a shelf life of 24 months.

2.3.5.2 Mixing Operations

An inspector shall witness each mixing/thinning operation. The inspector shall verify that mixing operations are performed in accordance with Attachment 2.

2.3.5.3 Thinning Operation

Coating materials (if thinned) viscosity control shall be accomplished by adding thinner as required, but shall not exceed two quarts of thinner per gallon of material.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 09 1983	6 of 24

2.3.5.4 When coating materials are mixed/thinned, the inspector verifying the mixing operation shall fill out the Paint Mix Slip, Attachment 3. The inspector performing the pre-application inspection shall record the mix sheet number on the travelers. The Mix Slip shall be returned to the Paper Flow Group at the end of each shift to be sent to the vault.

2.4 PRIMER APPLICATION INSPECTION

2.4.1 Surveillance of Primer Application

During application operations of CZ-11, the QC Inspector shall monitor that the pressure pot is continuously agitated. The QC Inspector shall also verify that the hose length does not exceed 75 feet.

2.5 INSPECTION OF PRIMER

2.5.1 Primer Inspection Prior to Application of Seal or Finish Coat

- a. Verify the primer has cured sufficiently for the top coating (as determined by the use of a nickel test). Cure of Carboline 191 shall be the same as Phenoline 305.
- b. Perform a visual inspection of the primed surface in accordance with the following:
 1. Runs/sags which are less than or equal to the maximum dry film thickness for each coating applied and show no evidence of mud cracking or loss of adhesion are acceptable. Repairs (if applicable) per Sec. 2.6.2 or 2.6.3.

NOTE: Mudcracking is defined as irregular cracking as in a dried mud puddle.

2. Dry Spray - Must be removed before overcoating.
3. Over Spray - Must be removed before overcoating.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	7 of 24

4. Contamination - unacceptable

Oil and grease - unacceptable

NOTE: Contaminant - a foreign substance, inadvertently added to a coating or found on the substrate, that adversely affects the application, adhesion, curing, and/or subsequent performance of the applied coating.

5. Skips/damaged areas/gross discontinuities such as holidays or voids - unacceptable.

- c. The inspector shall perform a DFT inspection of the cured primer film. A calibrated 0-25 Elcometer Inspector DFT gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from the edge or a hole shall be avoided (See Note 3).

Dry Film Thickness shall be as follows (See Note 4):

	Min. (mils)	Max. (mils)
Carboline 191 spot test	1.6	8.5
CZ-II spot test	1.5	7.0
D6 spot test	1.5	5.5
D6 average DFT	2.0	5.0
CZ-II average DFT	2.0	6.0
Carboline 191 average DFT	2.0	7.0

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISIO..	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 09 1983	8 of 24

Area Sq. Ft.	No. Spots
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100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities, such as handrails, gratings, stairs, sway struts, checker plate, etc., shall be exempt from dry film thickness measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated.

2.6 PRIMER REPAIRS

2.6.1 Sags and Runs

Runs/sags: Ref. Sec. 2.8.b.1 if surface is unacceptable. Repair per Sec. 2.9.2 or 2.9.3.

2.6.2 Primer Touch-up Repair (Primer Damaged to Steel Surface)

The coating inspector shall conduct the following inspections to document primer touch-up repair operations when the damage is to the steel surface and spot sandblasting, hand sanding or power tool abrading is required for surface preparation.

a. Surface preparation Ref. Sec. 2.2.2.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	9 of 24

b. Verify that the blasted or power tooled surface has been high pressure air blowdown, and/or solvent wiped to the extent required for final surface inspection. The adjacent areas shall be cleaned to the extent necessary to avoid contamination during subsequent coating applications.

c. Ambient Conditions: Ref. Attachment 1A and 6.

Air Supply Acceptability: Ref. Attachment 1B.

The surface temperature shall be a minimum of 5° above the dew point.

d. Verify applicator qualifications per Section 2.3.4.

e. Verify air supply acceptability per Attachment 1B.

f. Verify ambient condition per Attachment 1A.

1. Coating Materials Identification

Verify per Sec. 2.3.5.1.

2. Mixing Operations

Verify per Sec. 2.3.5.2.

3. Thinning Operation

Verify per Sec. 2.3.5.3.

g. Verify that primer is applied in accordance with Sec. 2.4.1.

NOTE: (If applicable) 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 interface the interface of the coating or systems shall be approximately 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	10 of 24

2.6.3 Primer Touch-up Repair (Primer Damage Does Not Extend to Steel Surface)

The coating inspector shall conduct the following inspections for primer touch-up repair operations when the damage is within the primer coat and sandblasting to the steel substrate is not required.

- a. Verify surface is abraded lightly then wiped clean.
- b. Visually verify acceptability of repaired area per Section 2.5.1.b.

2.6.4 Repair of Primer by Recoating

The coating inspector shall conduct the following inspections for primer recoating repair. Only two (2) overcoats shall be applied of CZ11.

- a. Verify that the surface has been solvent cleaned or cleansed with high air pressure blow down. Contamination is unacceptable and requires further cleaning.
- b. Perform inspections in Section 2.6.2.

NOTE: After application of primer to the spot primed area, the only additional feathering required is at the outer edge of the primed area. Sanding of the primed area is not required.

2.6.5 Complete Primer Repair (Primer Damage to Steel Surface Extends Over Entire Item)

The coating inspector shall conduct the following inspections to document primer repair when the damage is to the steel surface and requires surface preparation to steel substrate over entire item:

- a. Verify ambient conditions per Attachment 1A to surface preparation. See Attachment 6.
- b. Perform inspections (a) through (g) in Section 2.9.2.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	11 of 24

2.7 FINISH COAT PRE-APPLICATION INSPECTIONS

The QC inspector shall verify the following items prior to applying coatings:

2.7.1 Coating Applicator Qualifications

The Inspector shall verify (by Qualification Record or list of qualification records in QA File) that the coating applicators on each shift are qualified for safety-related coating work.

2.7.2 Ambient Conditions (Refer Attachment 1A and 6)

The permissible range of surface and ambient temperature for application of finish coat shall be 50-120°F.

The maximum humidity shall be 85% for Carboline 305, and 95% for inorganic zinc and Carboline 191.

The surface temperature shall be a minimum of 5°F above the dew point.

2.7.3 Coated Surface Acceptability

The Inspector shall visually reinspect the previously coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter). The defective areas shall be repaired per Sec.(s) 2.9.6A and B and/or Sec. 2.6.4.A and B.

2.7.4 Air Supply Acceptability (Per Attachment 1B)

2.7.5 Finish Coat Mixing Operations

2.7.5.1 Prior to mixing, the mixing inspector shall verify that each component is identified by batch numbers and that the 24 month shelf life has not been exceeded.

2.7.5.2 The mixing inspector shall verify that mixing/thinner operations are performed in accordance with Sec. 2.3.5.2. Thinning may be done up to two quarts of Phenoline Thinner per gallon of Phenoline 305.

2.7.5.3 Mixing operation shall be documented on the traveler per Sec. 2.3.5.4.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISIO..	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	12 of 24

2.8 SURVEILLANCE OF SEAL OR FINISH COAT APPLICATION

The Inspector shall verify that hose length is less than 75 feet.

The inspector shall also verify that the seal coat (if present) is solvent wiped with Phenoline 305 thinner or Xylol prior to finish coat application.

This shall be verified in Step 3 of Attachment 4.

2.9 FINISH COAT FINAL ACCEPTANCE INSPECTION

The inspector shall perform a final acceptance inspection of each finish coated item(s) in accordance with Paragraphs 2.9.1 through 2.9.5.

NOTE: (If applicable) 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 interface the interface of the systems shall be approximately 1½ inch in width. Within the interface area, overlapping of any materials or systems is acceptable.

NOTE: The tie in interface between concrete coatings and steel coatings shall be visually inspected during the finish coat final acceptance of both systems.

2.9.1 Finish Coat Cure

Final QC inspection may be performed after a minimum topcoat cure of 24 hours.

2.9.2 Visual Defects Inspection

The Inspector shall perform a visual inspection of the cured finish coated substrate surface in accordance with the following:

- a) Runs/sags - Runs or sags in which the DFT of the total coating system is 15.0 mils or less thick, which show no evidence of mudcracking, are acceptable. Those greater than 15.0 mils shall be repaired.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	13 of 24

- b) Skips/ damaged areas/ gross discontinuities such as holidays, voids, and bubbles are not acceptable.
- c) Pinholes - acceptable to the extent allowed by Attachment 5.
- d) Contamination - unacceptable.

2.9.3 Dry Film Thickness (DFT)

The Inspector shall perform a DFT of the cured coating system. A calibrated 0-25 Elcometer Inspector DFT Gage Model III/1E, or equivalent, shall be used. Separate spot measurements (See Note 1) spaced evenly over the structure (See Note 2) shall be taken. Since the magnetic gage is sensitive to geometric discontinuities in the steel, measurements less than 1 inch from an edge or a hole shall be avoided. (See Note 3).

The average DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 13.0 mils. The spot test DFT of the total coating system shall be a minimum of 6.0 mils and a maximum of 15.0 mils (See Note 4).

The finish coated system shall exhibit full "hiding" properties of the primecoat.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The probe should be moved a short distance for each gage reading. Discard any unusually high or low gage reading that cannot be repeated consistently. Take an average of these three gage readings as one spot measurement.

NOTE 2: Five spot tests shall be taken for every 100 square feet of coated surface. For areas less than 100 square feet, the following shall apply:

Area Sq. Ft.	No. Spots
100-80	5
80-50	4
50-10	3
10-3	2
3-0	1

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 23 1993	14 of 24

NOTE 3: Items with appreciable surface curvature and other geometrical discontinuities such as handrails, gratings, stairs, sway struts, etc. shall be exempt from DFT measurement.

NOTE 4: In the event that any spot is found to be outside of the acceptable thickness range, three additional spots shall be taken at approximately 6 inches from the failing spot and spaced radially at approximately 120 degree intervals to determine the extent of the unacceptable area. Dimensions and locations of unacceptable areas and results of additional testing shall be documented on the IR.

In the event that the average of the area is unacceptable due to unacceptable spot readings, the unacceptable spots shall be isolated as described above. Additional spot readings shall be taken equal to the number of unacceptable spot readings and the average recalculated. If the recalculated average is acceptable, the traveler shall be so marked with an explanation in "Remarks" stating that "average recalculated - now acceptable", or wording to that effect. If the recalculated average is unacceptable, the unacceptable spots shall be isolated and repaired per Sec. 3.10.

2.9.4 Continuity Inspection

The Inspector shall test the continuity of the cured finish coat on liner plate using a Tinker and Razor Model M1 (67.5 volt) holiday detector. 100% of the finish coated surface area shall be tested.

The applied film should contain only a minor number of points of discontinuity. No more than two points of discontinuity should occur within an area having a radius of 6 inches as measured from a point of discontinuity (pinholes). No more than 40% of the total number of allowable points of discontinuity should occur within any one area equal to 25% of the total area being coated. The total number of pinhole discontinuities allowed is defined in Attachment 5. No gross discontinuities are allowed.

2.9.5 Documentation of Finish Coat/Seal Coat Acceptance Inspections

Results of inspections described in Sections 2. shall be documented on the traveler, Attachment 4.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 20 1983	15 of 24

2.10 REPAIRS OF FINISH COAT

2.10.1 Repairs of Runs and Sags

The QC inspector shall verify that the area is abraded until the DFT of the total coating system is within 6.0 to 15.0 mils, and examined for mudcracking. Mudcracking shall be repaired in accordance with Sec. 2.10.2 or 2.10.3.

2.10.2 Repair of Minor Defects

The QC inspector shall perform the following inspection when repairing minor defects:

- a) Verify ambient conditions per Attachment 1A prior to surface preparation.
- b) Verify that the damaged area is blasted or abraded.
- c) Verify damaged area is solvent wiped.
- d) Perform inspections described in Sec. 2.7

NOTE: Minor defects are defined as an area, either circular or linear, in which a $\frac{1}{2}$ " diameter circle could not be completely inscribed at any point along the entire length.

2.10.3 Repair of Major Defects

The QC inspector shall perform the following inspection when repairing major defects:

- a) Verify ambient conditions per Attachment 1A and 6.
- b) Verify area is abraded or spot blasted.
- c) Perform inspections in Section 2.10.2(d).

NOTE: Major defects are defined as an area, either circular or linear, in which a $\frac{1}{2}$ " diameter circle could be inscribed at any point or along the entire length.

2.10.4 Repair of Contamination

The QC inspector shall verify that contamination is removed and the surface recoated per Section 2.9.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 9 1983	16 of 24

2.10.5 Repair of Pinholes and Discontinuities

- a) Verify all loose particles are removed and area is solvent wiped.
- b) Pinholes and minor discontinuities may be repaired at the time of final inspection without a later reinspection of the repair.

2.10.6 Repair of Excessive Over Spray, and/or Overcoating

- a) Verify all loose particles are removed.
- b) Verify coating film thickness is still within allowable range.
- c) If film thickness is not within allowable range perform inspections in Sec. 2.7.

2.10.7 Documentation of Repairs

All repairs shall be documented on the traveler, Attachment 4.

2.11 NONCONFORMANCES

Unacceptable conditions shall be reported on the traveler except for coating failure due to loss of adhesion, which shall be reported on an NCR in accordance with CP-QP-16.0.

2.12 TRAVELER COMPLETION

All inspections required by this procedure shall be recorded on the Coating Traveler, Attachment 4. The traveler shall be completed in accordance with QI-QP-11.4-28.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 20 1983	17 of 24

ATTACHMENT 1A

Ambient Conditions

The inspector shall determine against the Environmental Sheet (Attachment 6) air temperature, surface temperature, relative humidity and dew point of substrate structures. A calibrated non-mercury filled dry bulb thermometer or calibrated temperature recorder (Bristol 4069TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury wet bulb thermometer or a calibrated humidity recorder (Bristol 4069TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperatures using the U.S. Department of Commerce Weather Bureau Psychometric Tables, WB No. 235. When dry bulb readings are greater than 100°F, the dew point should be determined using the 100°F dry bulb reading, and relative humidity shall be determined by subtracting wet bulb from the surface temperature or ambient temperature, whichever is greater. If the dry bulb thermometer exceeds 100°F, the instrument shall be returned to the calibration lab for recalibration. The surface temperature shall be determined by placing a calibrated surface temperature thermometer (Omega-Amprobe fast temp. range of 10°-250°F) in contact with the substrate surface until the temperature reading stabilizes.

Final surface preparation shall not begin unless the temperature of the surface is a minimum of 5° above the dew point.

Normal conditions of ambient and surface temperature for application of primer shall be as follows:

	<u>Ambient Temp. (°F)</u>	<u>Surface Temp. (°F)</u>
Dimetcote 6	40-120	40-130
Carbozinc 11	40-95	40-110
Carboline 191	50-120	50-120

Humidity values may vary from 0% to 95%; however, primer shall not be applied to a wet or damp surface.

Minimum and maximum values of relative humidity for Pheno-line 305 shall be 0% and 85% respectively.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1993	18 of 24

ATTACHMENT 18

Air Supply Acceptability

An inspector shall inspect the air supply system of blast and spray equipment for suitable filters/traps/separators and that they are left cracked open. The effectiveness of these items shall be verified by exposing a piece of white cloth to the air outlet for approximately 30 seconds. The white cloth shall be examined for evidence of contamination (oil, water, foreign matter, etc.). No evidence of contamination is acceptable.

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 21 1983	19 of 24

ATTACHMENT 2

PREPARATION OF COATING MATERIALS

Primer - The primer, Carbo Zinc 11, is packaged in a two component kit consisting of a base and a 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.

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.

Primer Coat - The primer coat, Carboline 191, is packaged in a two component kit consisting of Carboline 191 base, Part A, and a catalyst, Part B. Mixes are made by combining and thoroughly mixing the base and catalyst. Partial mixes may be made by combining, in a ration by volume, two 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.

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 ration 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.

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 9 1983	20 of 24

ATTACHMENT 3

PAINT MIX SLIP

Date _____ Shift _____
 Mix Number _____ Elevation _____
 Material _____ Gal. Mixed _____
 Shelf Life Acceptable: Yes ___ No ___ Base _____
 Comments _____ M&TE #'s _____
 Curing Agent _____ Filler _____ Thinner _____
 Accepted By: _____

Date _____ Shift _____
 Mix Number _____ Elevation _____
 Material _____ Gal. Mixed _____
 Shelf Life Acceptable: Yes ___ No ___ Base _____
 Comments _____ M&TE #'s _____
 Curing Agent _____ Filler _____ Thinner _____
 Accepted By: _____

Date _____ Shift _____
 Mix Number _____ Elevation _____
 Material _____ Gal. Mixed _____
 Shelf Life Acceptable: Yes ___ No ___ Base _____
 Comments _____ M&TE #'s _____
 Curing Agent _____ Filler _____ Thinner _____
 Accepted By: _____

Date _____ Shift _____
 Mix Number _____ Elevation _____
 Material _____ Gal. Mixed _____
 Shelf Life Acceptable: Yes ___ No ___ Base _____
 Comments _____ M&TE #'s _____
 Curing Agent _____ Filler _____ Thinner _____
 Accepted By: _____

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1993	21 of 24

ATTACHMENT 4

STEEL PROTECTIVE COATING INSPECTION TRAVELER	
WORK PKG. #	PCI TRAVELER #
ELEVATION	ITEM # / DESCRIPTION
REF DWGS.	
PREPARED BY:	DATE
STEP 1	<p>SURFACE PREPARATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR PRIMER APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 2	<p>PRIMER APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26 AND RELEASED FOR FINISH COAT APPLICATION.</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 3	<p>FINISH COAT APPLICATION INSPECTED AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 4	<p>FINISH COAT INSPECTED FOR FINAL ACCEPTANCE AND FOUND ACCEPTABLE PER QI-QP11.4-26</p> <p>INSPECTOR _____ DATE _____</p> <p>COMMENTS _____</p>
STEP 5	<p>COMPLETION OF INSPECTION TRAVELER VERIFIED.</p> <p>QC REVIEW _____ DATE _____</p> <p>COMMENTS _____</p>
NOTES	<p>1) DOCUMENT INSPECTION ATTRIBUTES ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>2) DOCUMENT REPAIRS AND ATTRIBUTES, IF REQUIRED, ON ATTACHED SUPPORTING DOCUMENTATION SHEET(S)</p> <p>3) FOR ENVIRONMENTAL CONDITIONS REFERENCE THE ENVIRONMENTAL LOG.</p>

TEXAS UTILITIES GENERATING CO. CPSES	INSTRUCTION NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 29 1983	23 of 24

ATTACHMENT 5

TOTAL NUMBER OF ALLOWABLE POINTS OF DISCONTINUITY

<u>SURFACE AREA BEING COATED (SQ. FT.)</u>	<u>COND. "C" COMMERCIALY CONTINUOUS</u>
10	5
10-50	10
50-100	20
100-500	30
500-1000	50
1000-5000	75

Gross Discontinuities - None Allowed.

TEXAS UTILITIES GENERATING CO. CPSES	PROCEDURE NUMBER	REVISION	ISSUE DATE	PAGE
	QI-QP-11.4-26	0	DEC 9 1983	24 of 24

ATTACHMENT 6

Sheet _____ of sheet _____

Sheet Number _____

ENVIRONMENTAL

M&TE #'s _____

Elevation _____

Date _____

Shift _____

[illegible]

CPSES MRC TRT
SSER - COATINGS 4
WORK PACKAGE

VOL V of XIII

QI-QP-11.4-26
HISTORICAL

(STEEL COATINGS INSPECTION)

FOIA-85-59

A/69