UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	
TEXAS UTILITIES ELECTRIC COMPANY, et al.	)	Dockets Nos. 50-445 and 50-446
	)	
	)	
(Comanche Peak Steam Electric Station, Units 1 and 2)	)	(Application for Operating License)

AFFIDAVIT OF C. THOMAS BRANDT
REGARDING MAXIMUM ROUGHNESS SURFACE
PREPARATION ISSUE

My name is C. Thomas Brandt. I reside in Ft. Worth, Texas. I am employed by Ebasco Services, Inc. at Comanche Peak Steam Electric Station. A statement of my educational and professional qualifications has been received in evidence as an attachment to Applicants' Exhibit 141.

This affidavit addresses the question of the maximum roughness of steel substrate when it is prepared for coating with primer. Robert Hamilton testified that Steel Structure Painting Council specifications for near-white blast call for a surface profile from 1 to 3 mils, and that Comanche Peak procedures do not specify a maximum profile (CASE Ex. 653 at 16). Mr. Hamilton perceived this to be a problem because, in his view, "[t]he rougher the surface is, the earlier the paint will break down."

The Procedures

Section 4.1.1 of Comanche Peak construction procedure CCP-30, "Coating Steel Substrates Inside Reactor Building and Radiation Areas," provides that "[a]lthough 1-3 mil. surface profile is preferred, a minimum of 1 mil. profile is required." As Mr. Hamilton states, no maximum profile is specified.

Methods of Surface Preparation

Applicants' personnel prepare steel substrates in three alternative ways: sandblasting; power tooling; and hand sanding. Power tooling includes the use of flapper wheels, 3-M Clean 'n' Strip disks (used with a rotary power tool), and belt sanders.

Sandblasting

All steel substrate inside containment, including the liner plate and all structural steel, was originally prepared for primer coat by sandblasting. Applicants utilize power tooling only for repair or rework. The major part of the total area of all safety-related coating surfaces, therefore, were prepared by sandblasting.

For sandblasting, Applicants use No. 3 blasting sand, which is a coarse sand. Attached to this affidavit (Attachment A) is a copy of Steel Structures Painting Council (SSPC) Surface Preparation Specification No. 10, Near-White Blast Cleaning (commonly referred to as SP-10). The Appendix (A.4) to SP-10 provides a table that details the maximum achievable surface profiles normally achievable using each of several blasting media. According to SP-10--the specification on which Mr. Hamilton relies--the maximum height of the profile normally achieved by blasting with large sand will be 2.8 mils. The use of finer sands for blasting will produce smaller maximum profiles. According to the specification, therefore, Applicants will normally achieve a maximum profile height of 2.8 mils for steel substrate surfaces prepared by sandblasting.

Even if sandblasting were to produce a surface profile in excess of 2.8 mils, there would be no loss in the integrity of the primer coating. Mr. Hamilton's allegation that "the rougher the surface is, the earlier the paint will break down" is incorrect. To the contrary, the rougher the surface--the greater the profile depth--the <u>greater</u> the adhesion of the coating to the substrate. This is so because a higher profile produces more total surface area to which the coating material may adhere. The very purpose of

sandblasting (and other forms of surface preparation) is, after all, to create microscopic peaks and valleys in the steel surface to enhance the adhesion of the primer coat.

The foregoing has been confirmed independently by the coatings manufacturer. Applicants consulted with the manufacturer of the primer coatings (Carbo Zinc 11, or CZ-11) used at Comanche Peak regarding the procedures for steel substrate surface preparation. Regarding maximum surface profile, the manufacturer, Carboline Company, has advised Applicants that no maximum surface profile need be specified on certain conditions (Attachment B to this affidavit):

> On the specification as you explained it to me there is no maximum limit on the profile. This is acceptable to Carboline provided a specific blast media is called for thus limiting the actual blast profile achieved and that the primer used completely covers the profile achieved in the field.

Applicants meet each of the two Carboline conditions. The blasting medium used at Comanche Peak is coarse sand, which as discussed above, limits the maximum height of profile according to SP-10. Applicants' procedures also assure that the steel substrate is covered completely. Assuming, for example, a steel surface profile in excess of 3 mils, and further assuming a primer coating insufficient to completely cover the microscopic peaks in the steel surface, the exposed steel peaks would oxidize, causing a phenomenon known as "pinpoint rusting." Pinpoint rusting is easily identified in a coated surface. Under section 3.3.3

of Applicants' quality instructions QI-QP-11.4-5, "Inspection of Steel Substrate Primer Repair and Seal and Finish Coat Application and Repair" (Attachment C to this affidavit), this surface condition would be identified as "contamination" during inspection prior to the application of the top coat, which would then be rejected and repaired or reworked. The surface must then be reinspected prior to application of top coat.

Power Tooling

Applicants use several different power tools to prepare steel substrate. Power tools are generally used in connection with repair work. Applicants use four power tools (or accessories) to prepare steel substrate surfaces: a flapper wheel, which is a rotary device used with 60 Grit sandpaper; a 3-M Clean 'n' Strip, an abrasive nylon pad, also used with a rotary power tool; a belt sander, which Applicants use with a 36 Grit sandpaper; and a needle gun, a pneumatic tool that scores the surface being prepared.

Applicants have prepared test panels using each of these power tools. Attachment D to this affidavit is a memorandum detailing the heights of profile achieved by each method. The tests showed the following maximum profiles for the corresponding power tools:

60 Grit Flapper Wheel	1.5 mils
3-M Clean 'n' Strip	1.8 mils
Belt Sand 36 Grit	2.0 mils
Needle Gun	2.7 mils

The majority of the individual readings showed lower surface profiles.

It is my opinion that these tests are sufficient to demonstrate that, with the power tools in use at Comanche Peak, Applicants cannot produce a surface profile in excess of 3 mils. The physical properties of the abrasive materials, for example, can abrade the steel surface just so much, and no further; using an endless supply of sandpaper on the belt sander, for example, one would theoretically sand a steel surface down to nothing. At all times, however, the maximum height of the surface profile would not exceed 3 mils.

Hand Sanding

For certain small or hard-to-reach areas, Applicants hand sand steel substrate prior to primer application. Applicants have also performed tests to determine the maximum profile achieved by the hand sanding. The maximum profile achieved with hand sanding was 1.75 mils (see

Attachment D). Again, my judgment is that these tests demonstrate that maximum profile achievable by hand sanding will not exceed 3 mils.

Consistency of the Procedures with the Specification

Mr. Hamilton alleged, with respect to surface profile, that "[t]he specification calls for a near-white blast, which is defined in the Steel Structure Painting Council specifications as being from a 1 to 3 mill [sic] profile." Mr. Hamilton incorrectly describes the specification.

Section 3.8 of SSPC-SP-10 (Attachment A, p. 2), by which Applicants are bound, does not specify a maximum profile height by millage. Rather, it provides: "The height of profile of the anchor pattern produced on the surface shall be limited to a maximum height that will not be detrimental to the life of the paint film." Applicants' specification AS-31 (protective coatings) further provides that: "The proper abrasive for sandblasting required to obtain the specified profile (anchor pattern) as designated in the coating manufacturer's latest application instruction shall be used." Applicants' original procedural requirement that surface preparation produce a 1-3 mil profile was excerpted from a product data sheet provided by Carboline, the manufacturer (see Attachment E), not SSPC-SP-10 as Mr. Hamilton had stated. As discussed above, Carboline has

accepted Applicants' procedures governing steel substrate surface preparation. Applicants' procedures are consistent with SP-10 and Applicants' specifications.

In sum, Applicants' use of sandblasting, power tooling, and hand sanding should not achieve a surface profile in excess of 3.0 mils. Assuming that surface preparation produces a profile in excess of 3 mils, and that the applied primer does not cover the peaks in the profile, pinpoint rusting would occur and be identified and corrected during normal QC inspection. The defective surface would be reworked to acceptable standards. Applicants' procedures regarding surface profile are fully consistent with SSPC specifications, Applicants' AS-31 coatings specifications, and manufacturer's recommendation.

C. Thomas Brandt

Subscribed and sworn to before me this 8th day of June, 1984.

My Commission Expires January 31, 1985

Notary Public

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
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(Comanche Peak Steam Electric Station, Units 1 and 2)	)	(Application for Operating Licenses)

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "Applicants' Motion For Summary Disposition of Maximum Roughness Surface Preparation Issue," in the above-captioned matter were served upon the following persons by overnight delivery (*), or deposit in the United States mail, first class, postage prepaid, or by hand delivery (**), this 25th day of June 1984:

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U.S. Nuclear Regulatory Commission
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Nicholas S. Reynolds

cc: Homer C. Schmidt
Robert A. Wooldridge, Esq.
David R. Pigott, Esq.

Attachment A

SSPC - SP 10-63T
October 1, 1963
Minor changes made and
Approved on October 1, 1967
Editorial changes January 1, 1971

Steel Structures Painting Council Surface Preparation Specifications

No. 10 Near-White Blast Cleaning

1. Scope

1.1 This specification covers the procedure required for the Near-White Blast Cleaning of structural steel surfaces prior to painting or coating.

2. Definition

2.1 Near-White Blast Cleaning is a method of preparing metal surfaces for painting or coating by removing nearly all mill scale, rust, rust-scale, paint, or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree hereafter specified.

2.2 A Near-White Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for very light shadows, very slight streaks, or slight discolorations caused by rust stain, 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 visible residues, and the remainder shall be limited to the light discoloration mentioned above. Photographic or other visual standards of surface preparation may be used as provided in the Appendix to modify or further define the surface if specified in the contract.

2.3 The over-all blast cleaning effort expended (nozzle time) shall be not less than two-thirds (⅔) of that which would be required to produce a White Metal Surface Finish on the same surface; nor should more than ninety-five percent (95%) of such effort be required. This limitation shall not be construed as a waiver of any of the above requirements.

3. Procedures

3.1 Near-White Blast Cleaning shall consist of the following sequence of operations:

3.1.1 Heavy deposits of oil or grease shall be removed by the methods outlined in Spec. SSPC-SP1-63, "Solvent Cleaning." Small quantities of oil or grease may be removed by the blast cleaning operation. If oil and grease are removed by blast cleaning, the abrasive shall not be reused if such reuse is detrimental to the surface.

3.1.2 Excessive rust-scale may be removed by impact tools, as outlined in Spec. SSPC-SP 2-63, "Hand Tool Cleaning," or SSPC-SP 3-63, "Power Tool Cleaning" or by special blast cleaning equipment.

3.1.3 The surface shall be blast cleaned to a Near-White Finish by any one of the following methods:

3.1.3.1 Dry sandblasting using compressed air blast nozzles and dry sand of a maximum particle size no larger than that passing through a 16 mesh screen, U. S. sieve series.

3.1.3.2 Wet or water-vapor sandblasting using compressed air blast nozzles, water and sand of a maximum particle size no larger than that passing through a 16 mesh screen, U. S. sieve series.

3.1.3.3 Grit blasting using compressed air blast nozzles and crushed grit made of cast iron, malleable iron, steel, or synthetic grits other than sand, of a maximum particle size no larger than that passing through a 16 mesh screen, U. S. sieve series. The largest commercial grade of metal grit permitted by this specification is SAE No. G-25 abrasive material.

3.1.3.4 Shot blasting using compressed air nozzles and cast iron, malleable iron, steel, or synthetic shot of a maximum size no larger than that passing

through a 16 mesh screen, U. S. sieve series. The largest commercial grade permitted by this specification is SAE No. S-330.

3.1.3.5 Closed, recirculating nozzle blasting using compressed air, vacuum, and any of the preceding abrasives.

3.1.3.6 Grit blasting using centrifugal wheels and crushed grit made of cast iron, malleable iron, steel, or synthetic grits of a maximum particle size no larger than that passing through a 16 mesh screen, U. S. sieve series. The largest commercial grade of metal grit permitted by this specification is SAE No. G-25.

3.1.3.7 Shot blasting using centrifugal wheels and cast iron, malleable iron, steel, or synthetic shot of a maximum particle size no larger than that passing through a 16 mesh screen, U. S. sieve series. The largest commercial grade permitted by this specification is SAE No. S-330.

3.2 The surface, if dry blasted, shall be brushed with clean brushes made of hair, bristle or fiber, or blown off with compressed air (from which detrimental oil and water have been removed), or cleaned by vacuum, for the purpose of removing any traces of blast products from the surface, and also for the removal of abrasive from pockets and corners.

3.3 The surface, if wet sandblasted, shall be cleaned by rinsing with fresh water to which sufficient corrosion inhibitor has been added to prevent rusting, or with fresh water followed immediately by an inhibitive treatment. This cleaning shall be supplemented by brushing, if necessary, to remove any residue.

3.4 The compressed air used for nozzle blasting shall be free of detrimental amounts of condensed water or oil. Adequate separators and traps shall be provided.

3.5 Blast cleaning operations shall be done in such a manner that no damage is done to partially or entirely completed portions of the work.

3.6 Dry blast cleaning operations shall not be conducted on surfaces that will be wet after blast cleaning and before painting, or when ambient conditions are such that any visible rusting occurs before painting or coating.

If any rust forms after blast cleaning, the surface shall be reblast cleaned before painting.

3.7 The blast cleaned surface shall be examined for any traces of oil, grease, or smudges. If present, they shall be removed as outlined in Spec. SSPC-SP 1-63, "Solvent Cleaning."

3.8 The height of profile of the anchor pattern produced on the surface shall be limited to a maximum height that will not be detrimental to the life of the paint film. The maximum particle sizes specified in paragraphs 3.1.3.1 to 3.1.3.7 may produce an anchor pattern that is too high or too rough for the paint system to be used. In such cases the abrasive sizes should be reduced. If the application of the second coat of paint is deferred, an adequate reduction in anchor pattern height shall be made.

3.9 The height of the anchor pattern can be determined by grinding a flat spot on the blasted surface until the bottoms of the pits are almost reached. The height may then be measured with a micrometer depth gauge graduated to read 0.001" and with a base having a bearing length of two inches and a measuring rod of 3/32" diameter.

3.10 The blast cleaned surface should be further treated or primed, as specified in the agreement covering the work, preferably within 24 hours after blast cleaning when practicable, but in any event before any visible or detrimental rusting occurs. (See Section 3.6 and Appendix A.7)

Where chemical contamination of the surface may occur, the steel should be painted as soon as possible after blast cleaning.

4. Safety Precautions

4.1. If fire or explosion hazards are present, proper precautions shall be taken before any work is done. If the structure previously contained flammable materials, it shall be purged of dangerous concentrations.

4.2 Nozzle blast operators exposed to blast dust shall wear a U. S. Bureau of Mines approved helmet connected to a source of clean, compressed air.

4.3 Filter type air respirators should be worn by all others who are exposed to blast dust environment. Adequate protection for personnel from flying particles shall also be provided in any blasting operation.

4.4 Safety goggles shall be worn by all persons near any blasting operation.

4.5 Blast hose shall be grounded to dissipate static charges.

5. Inspection

5.1 All work under this specification shall be subject to inspection by the owner or his representative. All parts of the work shall be accessible to the inspector. The contractor shall correct such work as is found defective under the specifications. If the contractor does not agree with the inspector, the arbitration or settlement procedure established in the contract, if any, shall be followed. If no arbitration or settlement procedure is established, the procedure specified by the American Arbitration Association shall be used.

Appendix

A.1 SCOPE. The recommendations contained in this appendix are believed to represent current good practice, but are not to be considered as requirements of the specification.

A.2 Near-White Blast Cleaning should be employed for all general purposes where a high degree of blast cleaning is required. It will remove practically all rust, mill scale, and other detrimental matter from the surface. The surface will not necessarily be completely uniform in color, nor will all surfaces be uniformly clean. If the cleaning when done according to this specification is likely to result in a surface unsatisfactory to the owner or unsuitable for very severe service, then White Metal Blast Cleaning should be specified by the owner in the contract. The advantage of Near-White Blast Cleaning lies in the lower cost for surface preparation that is satisfactory for all but the most severe service conditions.

A.3 When this specification is used in maintenance painting, specific instructions should be given on the extent of surface to be blast cleaned in accordance with this specification and the amount of spot cleaning required. In maintenance painting it is not ordinarily intended that sound, adherent old paint be removed unless it is excessively thick or inflexible.

In preparing a previously painted surface, it is necessary to remove all corrosion and all paint which shows evidence of corrosion, peeling, excessive thickness, brittleness, blistering, checking, scaling or general disintegration. It is essential that the removal of the old paint be carried back around the edges of the spot or area until an area of completely intact and adhering paint film, with no rust or blisters underneath, is attained. Edges of tightly adherent paint remaining around the area to be recoated must be feathered, so that the repainted surface can have a smooth appearance. The remaining old paint should have sufficient adhesion so that it cannot be lifted as a layer by inserting a blade of a dull putty knife under it. The rate of blast cleaning may vary from one area to the next, in order to achieve the desired end condition.

A.4 The maximum permissible size of the abrasive particles will depend upon the allowable surface roughness or "maximum height of profile" of the surface; the allowable maximum height of profile is, in turn, dependent upon the thickness of paint to be applied.

The maximum height of profile is the height of the anchor pattern produced on the surface, measuring from the bottoms of the lowest pits to the tops of the highest peaks.

A typical maximum height of profile produced by a number of different abrasives in actual blast cleaning operations has been measured as follows:

Abrasive	Maximum Particle Size	Maximum Height of Profile
Sand, very fine	through 80 mesh*	1.5 mils
Sand, fine	through 40 mesh	1.9
Sand, medium	through 18 mesh	2.5
Sand, large	through 12 mesh	2.8
**Steel grit #G-80	through 40 mesh	1.3–3.0
***Iron grit #G-50	through 25 mesh	3.3
Iron grit #G-40	through 18 mesh	3 6
Iron grit #G-25	through 16 mesh	4.0
Iron grit #G-16	through 12 mesh	8.0
**Steel shot #S-170	through 20 mesh	1.8–2.8
Iron shot #S-230	through 18 mesh	3.0
Iron shot #S-330	through 16 mesh	3.3
Iron shot #S-390	through 14 mesh	3.6

*U.S. Sieve Series. **Operating mixtures.
***Crushed iron grit. A comparator available from SSPC is useful in estimating sand blast profile depth.

Maximum profile will vary somewhat with the angle and velocity of particle, with the hardness of surface, with the amount of recycling of working mixtures (of shot and grit) and with the thoroughness of blast cleaning.

A.5 The dry paint film thickness above the peaks of the profile should equal the thickness known to be needed over a smooth surface for the desired protection. If it is not possible to use an abrasive sized small enough to produce a desirable height of profile, the dry paint film thickness should be increased to provide adequate thickness above the peaks.

A.6 A suitable inhibitive treatment for blast cleaned surfaces is water containing 0.32 per cent of sodium nitrite and 1.28 per cent by weight of ammonium phosphate, secondary (dibasic), or as an alternate water containing about 0.2 per cent by weight of (a) chromic acid or (b) sodium chromate or (c) sodium dichromate or (d) potassium dichromate. Note: If solutions containing either chromates or dichromates are used, precautions should be taken to protect personnel from hazards resulting from breathing spray or contacting the solution.

A.7 The blast cleaned surface must be treated or primed before any rusting occurs. Otherwise the benefit of the Near-White Blast Cleaning is lost. The freshly exposed bare metal will rust quickly under conditions of high humidity, when wet, or when in a corrosive atmosphere. Under normal mild atmospheric conditions it is best practice to prime or chemically treat within 24 hours after blast cleaning. Under no circumstance should the steel be permitted to rust before painting, regardless of the time elapsed.

Moisture condenses on any surface that is colder than the dew point of the surrounding air. It is therefore recommended that dry blast cleaning should not be conducted when the steel surface is less than 5°F above the dew point.

The permissible time interval between blast cleaning and priming will vary greatly (from minutes to weeks) from one environment to another, in order that the surface remain free of corrosion, oil, etc. as required by Sections 3.6, 3.7, and 3.10. If a maximum interval is desired it shall be so specified in the contract covering the work.

A.8 Photographic standards of comparison may be used to define the final surface condition to be supplied under this specification. For partially rusted mill scale, for completely rusted mill scale, or for completely rusted and pitted surfaces, the appearance of the surface after Near-White Blast Cleaning should correspond with pictorial standards B Sa 2½, C Sa 2½ and D Sa 2½ of SSPC Vis 1-67T. As additional standards become available, these may be included by reference in the contract.

The color of the cleaned surface may be affected by the nature of the abrasive used.

A.9 Other visual standards of surface preparation may be used as required by the owner when they are specified in the contract to illustrate the degree of metal cleanliness required. The owner will provide the specified samples or standards of such size and condition that they may be compared during the entire contract. If blast cleaned steel samples are used, they should be completely protected from corrosion during the period of the contract.

A.10 If specified in the contract, a percentage other than 95% of the surface area may be designated in Section 2.2.

Attachment B

P
TUSCO GRSE

XSO 84
TX 3067
ATTN TOM KELLEY
SURFACE PROFILE OF 191 PRIMER AND C211

PLEASE BE ADVISED THAT CARROLINE RECOMMENDS A MINIMUM OF A 1 MIL PROFILE FOR THE ABOVE TWO PRIMERS. ON THE SPECIFICATION AS YOU EXPLAINED TO ME THERE IS NO MAXIMUM LIMIT ON THE PROFILE. THIS IS ACCEPTABLE TO CARROLINE PROVIDED A SPECIFIED BLAST MEDIA IS CALLED FOR THUS LIMITING THE ACTUAL PROFILE ACHIEVED AND THAT THE PRIMER USED COMPLETELY COVERS THE PROFILE ACHIEVED IN THE FIELD. WE DO FEEL THAT A MAXIMUM OF A 3 MIL PROFILE IS ACCEPTABLE.

STEVE HARRISON
CC CHARLES RUSHING, ROGER TECTMEYER

/841010 CARD UA

TUSCO GRSE
.....
REPLY VIA MCI/LUI - 101

amp Dec
file
M R McBay
HL - Civil Eng.
MEQ -

2:44 PM
5-4-84
ERJ

3.3.1 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.

3.3.2 Ambient Conditions

The inspector shall determine 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.

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

Maximum values of relative humidity shall be 85%.

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

3.3.3 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) and stains.

Contamination is unacceptable. All contamination must be removed per Reference 1-B or 1-C prior to finish coating.

Rust (red) and zinc oxide (white) stains are acceptable provided all loose particles have been removed (as evidenced by existence of no stain on cloth) from the coated surface by approved cleaning operations. Phenoline Thinner or Xylol are approved cleaners for seal coat. Thinner wiping is not recommended for Dimetcoat primer. Use Carboline #33 cleaner for CZ11 Primer and #15 thinner for Carboline 191 primer.

3.3.4 Air Supply Acceptability

The Inspector shall inspect the air supply system (pressure pots and spray guns) for the existence of suitable filters/traps/separators.

The effectiveness of these items shall be verified by placing a clean piece of cheesecloth (or white fabric) over the exit of the air lines and allowing air to flow for 30 seconds minimum. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.5 Finish Coat Mixing Operations

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

3.3.5.2 The inspector shall verify that mixing/thinner operations are performed in accordance with References 1-B and 1-C. Thinning may be done up to two quarts of Phenoline Thinner per gallon of Phenoline 305.

3.3.5.3 The inspector shall verify that the pot life has not expired per References 1-B and 1-C.

3.3.5.4. When coating materials are mixed/thinned in locations other than the field, the inspector verifying the mixing operation shall fill out the Paint Mixing Slip, Attachment 5. The inspector performing the pre-application inspection shall record the information from the Paint Mixing Slip on the Inspection Report, Attachment 1. The Paint Mixing Slip need not be retained.

Attachment D

CPP-15,956

TEXAS UTILITIES GENERATING COMPANY

OFFICE MEMORANDUM

To Tom Brandt Glen Rose, Texas May 8, 1984

Subject COMANCHE PEAK STEAM ELECTRIC STATION
PROFILE TEST RESULTS

On March 9, 1984, a series of profile tests were performed. The tests were conducted to verify the consistency of the Test Tex Profile Gauge and to determine the profile of power and hand tools used on site.

The results were:

60 grit flapper wheel	1.5, 1.1, 1.0, 1.5, 1.4, 1.4, 1.5
3-M clean & strip	1.8, 1.4, 1.3, 1.2, 1.75, 1.4, 1.6
Hand sand (60 grit)	1.7, 1.7, 1.5, 1.75, 1.4, 1.6, 1.6, 1.3
Belt sand (36 grit)	1.1, 1.1, 1.0, 0.8, 2.0, 0.9, 0.8, 1.3
Needle gun	2.5, 2.7, 2.7, 2.25, 2.3, 2.5, 1.8

Tom Kelly

TK/bb

ATTACHMENT E

product data sheet

carboline

CARBO ZINC® 11

350 HANLEY INDUSTRIAL COURT • ST. LOUIS, MO. 63144 • 314-644-1000

SELECTION DATA

GENERIC TYPE: Self curing, inorganic zinc primer. The coating consists of a basic zinc silicate complex. Base and zinc filler mixed prior to application.

GENERAL PROPERTIES: An inorganic zinc base coat that protects steel galvanically, eliminating sub-film corrosion. Has outstanding application properties. Can be applied at the recommended thickness in one coat.

RECOMMENDED USES: Carbo Zinc 11 (the first self-curing inorganic zinc primer) is used as a single coat protection of steel structures in weathering exposure and as a base coat for organic and inorganic topcoats in more severe services. Excellent for the interiors and exteriors of storage tanks containing fuels and organic solvents. Has many uses as a maintenance primer, with or without topcoats, depending on exposure. Used widely in chemical plants, paper mills, refineries and coastal or salt atmospheres including offshore structures. Carbo Zinc 11 meets the stringent performance requirements of the American National Standards Institute, ANSI N101.2-1972 and ANSI N5.12-1974.

NOT RECOMMENDED FOR: Immersion or indirect exposure to acids or alkalies without suitable topcoat.

CHEMICAL RESISTANCE GUIDE: (with proper topcoat)

Exposure	Immersion	Heavy Fumes or Light Splash and Spillage	Outside Weathering or Mild Fumes
Acids	NR	Very Good	Excellent
Alkalies	NR	Very Good	Excellent
Solvents	Excellent	Excellent	Excellent
Salt	Excellent	Excellent	Excellent
Water	Excellent	Excellent	Excellent

TEMPERATURE RESISTANCE: (non-immersion)

Continuous:	750°F (399°C)
Non-continuous:	800°F (427°C)

FLEXIBILITY: Fair-Good **WEATHERING:** Excellent

ABRASION RESISTANCE: Excellent. Abrasion resistance increases with age.

SUBSTRATES: Apply over properly prepared steel, cast iron, or other surfaces as recommended.

TOPCOAT REQUIRED: May be topcoated with epoxies, phenolics, vinyls, acrylics, silicones, chlorinated rubbers or others as recommended.

NOTE: Under certain conditions a mist coat or tie coat may be desirable to prevent topcoat bubbling.

COMPATIBILITY WITH OTHER COATINGS: Apply directly over substrate, Carbo Weld® 11 or other inorganic zincs as recommended.

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SPECIFICATION DATA

THEORETICAL SOLIDS CONTENT OF MIXED MATERIAL:

	By Weight
Carbo Zinc 11	79% ± 2%
Percent zinc in dry film	86%

RECOMMENDED DRY FILM THICKNESS PER COAT: 2-3 mils (50 to 75 microns)

THEORETICAL COVERAGE PER MIXED GALLON:* 1000 mil sq. ft. (24.5 sq.m/1 @ 25 microns) 333 sq. ft. at 3 mils (8.2 sq.m/1 @ 75 microns)

***NOTE:** Material losses during mixing and application will vary and must be taken into consideration when estimating job requirements.

SHELF LIFE: Base: 12 months minimum
Zinc Filler: 24 months minimum

COLORS: Gray or Green only.

GLOSS: Matte finish.

ORDERING INFORMATION

Prices may be obtained from Carboline Sales Representative or Main Office. Terms – Net 30 days.

SHIPPING WEIGHT:

	1's	5's
Carbo Zinc 11	23 lbs. (10.4 kg)	113 lbs. (51.3 kg)
Carboline Thinner #33	9 lbs. (4.1 kg)	41 lbs. (18.6 kg)
Carboline Thinner #21	8 lbs. (3.6 kg)	36 lbs. (16.3 kg)

FLASH POINT: (Pensky-Martens Closed Cup)

Carbo Zinc 11 Base	56°F (13°C)
Carboline Thinner #33	101°F (38°C)
Carboline Thinner #21	53°F (12°C)

Feb. 81 Replaces Jan. 80

APPLICATION INSTRUCTIONS

These instructions are not intended to show product recommendations for specific service. They are issued as an aid in determining correct surface preparation, mixing instructions, and application procedure. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

SURFACE PREPARATION: Remove any oil or grease from surface to be coated with clean rags soaked in Carboline Thinner #2 or toluol.

Steel: For immersion service, dry abrasive blast to a White Metal finish in accordance with SSPC-SP 5-63 to a degree of cleanliness in accordance with NACE #1 to obtain a 1 to 3 mil (25-75 microns) blast profile. For non-immersion service, dry abrasive blast to a Commercial finish in accordance with SSPC SP 6-63 to a degree of cleanliness in accordance with NACE #3 to obtain a 1 to 3 mil blast profile. The Horton pickling process is also acceptable – for other acceptable surface preparations consult the Technical Service Department.

MIXING: Mix separately, then combine and mix in the following proportions:

	1 Gal. Kit	5 Gal. Kit
Carbo Zinc 11 Base	1 Gal. (partially filled)	5 Gal. (partially filled)
Zinc Filler	14.6 lb. unit	73 lb. unit

Mix as supplied. Sift zinc filler slowly into base with continuous agitation. Mix until free of lumps. Pour mixture through a 30 mesh screen. When less than full kit is used, mix by weight 10 parts Base: 22 parts Zinc Filler. Thin up to 12% by volume with Carboline Thinner #21 in cool weather (below 55°F [13°C]). For warmer or windy conditions, use Carboline Thinner #33.

POT LIFE: Eight hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use.

APPLICATION TEMPERATURES:

	Material	Surfaces
Normal	40-95°F (4-35°C)	40-110°F (4-43°C)
Minimum	0°F (–18°C)	0°F (–18°C)
Maximum	130°F (54°C)	200°F (93°C)

	Ambient	Humidity
Normal	40-95°F (4-35°C)	40-90%
Minimum	0°F (–18°C)	10%
Maximum	130°F (54°C)	95%

Do not apply when the surface temperature is less than 5°F (2°C) above the dew point.

Special thinning and application techniques may be required above or below normal conditions.

SPRAY: Use adequate air volume for correct operation.

Use a 50% overlap with each pass of the gun. On irregular surfaces, coat the edges first, making an extra pass later.

NOTE: The following equipment has been found suitable, however, equivalent equipment may be substituted.

Conventional: Use a 3/8" minimum I.D. material hose. Hold gun 8-10 inches from the surface and at a right angle to the surface.

Use agitated pot. Maximum 50 foot hose. Keep pot at same elevation as gun. If spraying stops for more than 15 minutes, blow the material from hose back into pot.

Mfr. & Gun	Fluid Tip	Air Cap
Binks #18 or #62	66	66PE
DeVilbiss P-MBC or JGA	E	704
	approx. .070" I.D.	

Airless: Use a 3/8" minimum I.D. material hose. Hold gun 12-14 inches from the surface and at a right angle to the surface. Keep material under mild agitation during application.

Mfr. & Gun	Pump*
DeVilbiss JGB-507	QHA-508
Graco 205-591	President 30:1 or Bulldog 30:1
Binks Model 500	Mercury 5C

*Teflon packings are recommended and available from pump manufacturer.

Use a .019-.025" tip with 1500-2000 psi.

BRUSH: For areas less than one square foot. For touch-up only, using medium bristle brush. Avoid rebrushing.

DRYING TIMES:

Temperature with over 50% RH	Before topcoating or placing into service untopcoated*
0°F (–18°C)	7 days
40°F (4°C)	24 hours
60°F (16°C)	16 hours
80°F (27°C)	8 hours
100°F (38°C)	6 hours

*Represents minimum times. If allowed to weather, excessive salting should be removed.

CLEAN UP: Use Carboline Thinner #2 or xylol. Remove hardened material with 10% caustic soda solution. Caution: Caustic attacks aluminum.

STORAGE CONDITIONS:
Temperature: 40-110°F (4-43°C) Humidity: 0-100%

NOTE:

a) To recoat Carbo Zinc 11 – thin 50%. Apply over clean, dry Carbo Zinc 11.

b) When Carbo Zinc is used for immersion service untopcoated where zinc pickup could be detrimental or when dry spray is evident and Carbo Zinc is to be topcoated, remove loose zinc after curing by rubbing with aluminum screen wire.

c) For interior applications, or tank linings if the relative humidity is low, the curing rate can be increased by raising the relative humidity by steam or a water spray on the coated surface after allowing to dry for one hour at 75°F (24°C).

d) Carbo Zinc 11 will skin if left in opened container. Skin has no effect on performance, but should be removed before reusing.

CAUTION: CONTAINS FLAMMABLE SOLVENTS. KEEP AWAY FROM SPARKS AND OPEN FLAMES. IN CONFINED AREAS WORKMEN MUST WEAR FRESH AIRLINE RESPIRATORS. HYPERSENSITIVE PERSONS SHOULD WEAR GLOVES OR USE PROTECTIVE CREAM. ALL ELECTRIC EQUIPMENT AND INSTALLATIONS SHOULD BE MADE AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. IN AREAS WHERE EXPLOSION HAZARDS EXIST, WORKMEN SHOULD BE REQUIRED TO USE NONFERROUS TOOLS AND TO WEAR CONDUCTIVE AND NONSPARKING SHOES.

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