CPSES NRC TRT
SSER - COATINGS 4
WORK PACKAGE
VOL VIII OF XIII

QI-QP. 11.4-10
HISTORICAL [PARTIAL]
(CONCRETE COATINGS
INSPECTION) FOIA-85-59
A/61

Visual inspection of surfaces as addressed by this instruction shall be made at approximately an arm's 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 at perpendicular to the surface during visual inspection.

3.1 SURFACE PREPARATION

The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

Tie holes, abandoned Hilti bolt holes and spalled concrete as defined in Reference 1-H, and patched per Reference 1-I and grout under base plates which has 3 square feet or less of exposed surface to be coated, may be coated after a 48 hour cure.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:

a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 3 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.I.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and contamination are all unacceptable.

Contamination is not allowed.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder.

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-69 | 48 hrs. |
| 70-79 | 24 hrs. |
| 80-89 | 18 hrs. |
| 90-100 | 12 hrs. |

Temperature durations below 50°F will be added to the cure time on an hour by hour basis.

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

a) The inspector shall determine the DFT of the existing coated surface (prior to recoating) by either, or one of the two following methods.

1) Using the DFT readings acquired during the backfit documentation (Reference 1-E).

2) The scratch test of the REACTIC 120I finish coat shall be performed using a Mark II Tooke Inspection Gage equipped with a 2x tip. Five separate readings spaced randomly over each finish coated area of 100 square feet or less shall be taken.

NOTE: Tooke tests are not required to be performed on areas on concrete which have not been finish coated with REACTIC 120I.

b) Verify that the surface is prepared as required by Reference 1-A.

c) Verify that runs and sags which show evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

d) Verify that all contamination is removed from surface in accordance with Reference 1-A.

e) Verify that the surface is solvent wiped in accordance with Reference 1-A.

f) Verify that NUTEC 1201 is mixed/thinned per Section 3.2.

g) Verify air supply acceptability per Section 3.4.2.3.

h) Verify that pot life is not exceeded per Section 3.4.3.1.

i) Verify applicator(s) qualification per Section 3.4.2.4.

j) Verify cure time for recoat. Recoating time for NUTEC 1201 is 24 hours.

k) Verify dry film thickness of the recoat per Section 3.4.3.2.

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

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the inspector shall verify that the finish coat has cured for the minimum of 24 hours.

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the finish coat after a minimum cure of 24 hours. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area. The pinholes that are beyond the acceptance of Attachment 3 shall be repaired in accordance with Section 3.5 and 3.6.3.6.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) At the time of the final inspection, pinholes and small discontinuities may be repaired with no reinspection required of these areas.

Visual inspection of painted surfaces as addressed by this instruction shall be made at approximately an arm's 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 at 90° to the surface during visual inspection.

3.1 SURFACE PREPARATION



The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

Tie holes, abandoned Hilti bolt holes and spalled concrete as defined in Reference 1-H, and patched per Reference 1-I and grout under base plates which has 3 square feet or less of exposed surface to be coated, may be coated after a 48 hour cure.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:

a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the

c) Skips, holidays, damaged areas, blisters, bubbles, and fish eyes will be repaired in accordance with Section 3.5.

d) Contamination detrimental to the coating film is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

f) Any approved primer and/or finish coat spatter adjacent to embeds or base plates is acceptable.

3.7 APPLICATION OF NUTEC 10 CURING COMPOUND

3.7.1 The QC Inspector shall verify that the green concrete has been cleaned per Reference 1-F, Paragraph 2.0.

3.7.2 The QC Inspector shall verify that NUTEC 10 is not applied under inclement conditions and that the surface temperatures are above 50°F. Areas of visible moisture or standing water are unacceptable.

3.7.3 The QC Inspector shall verify that the NUTEC 10 air supply and equipment shall be in accordance with Reference 1-F. NUTEC 10 may also be applied by brush or roller.

3.7.4 NUTEC 10 shall be mixed per Paragraph 3.2. The NUTEC 10 has a pot life of (1) one hour at 75°F. If the NUTEC 10 gives the appearance of a crawl and does not penetrate the concrete, the material shall be removed from the concrete by solvent and a clean cloth. All the expired material shall be discarded and the equipment shall be cleaned per Reference 1-F.

3.7.5 NUTEC 10 shall be applied in accordance with Reference 1-F. Apply NUTEC 10 at a spreading rate of approximately 350-400 sq. ft./gal.

3.7.6 The QC Inspector shall verify that during application of NUTEC 10, areas with sags, surface irregularities or excessive buildup shall be removed with solvent and a clean cloth. Reapply NUTEC 10 in accordance with Reference 1-F.

FOR INFORMATION ONLY

Visual inspection of painted surfaces as addressed by this instruction shall be made at approximately an arm's 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.

3.1 SURFACE PREPARATION

The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

Tie holes, abandoned Hilti bolt holes and spalled concrete as defined in Reference 1-H, and patched per Reference 1-I and grout under base plates which has 3 square feet or less of exposed surface to be coated, may be coated after a 48 hour cure.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:

a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the surface shall be abraded without completely removing the NUTEC 10 prior to application of the surfacer.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

3.10 NONCONFORMANCES

Nonconforming conditions shall be reported on an IR in accordance with CP-QP-18.0, except for coating failure due to loss of adhesion, which shall be reported on an NCR in accordance with CP-QP-16.0.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 APPLICATION OF NUTEC 10 CURING COMPOUND

3.7.1 The QC Inspector shall verify that the green concrete has been cleaned per Reference 1-F, Paragraph 2.0.

3.7.2 The QC Inspector shall verify that NUTEC 10 is not applied under inclement conditions and that the surface temperatures are above 50°F. Areas of visible moisture or standing water are unacceptable.

3.7.3 The QC Inspector shall verify that the NUTEC 10 air supply and equipment shall be in accordance with Reference 1-F. NUTEC 10 may also be applied by brush or roller.

3.7.4 NUTEC 10 shall be mixed per Paragraph 3.2. The NUTEC 10 has a pot life of (1) one hour at 75°F. If the NUTEC 10 gives the appearance of a crawl and does not penetrate the concrete, the material shall be removed from the concrete by solvent and a clean cloth. All the expired material shall be discarded and the equipment shall be cleaned per Reference 1-F.

3.7.5 NUTEC 10 shall be applied in accordance with Reference 1-F. Apply NUTEC 10 at a spreading rate of approximately 350-400 sq. ft./gal.

3.7.6 The QC Inspector shall verify that during application of NUTEC 10, areas with sags, surface irregularities or excessive buildup shall be removed with solvent and a clean cloth. Reapply NUTEC 10 in accordance with Reference 1-F.

FOR INFORMATION ONLY

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

3.10 NONCONFORMANCES

Nonconforming conditions shall be reported on an IR in accordance with CP-QP-18.0.

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INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: [signature] DATE 8/19/83

APPROVED BY: [signature] DATE 8/19/83

APPROVED BY: [signature] CTR-GAQT DATE 8/19/83

1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

1-E QI-QP-11.4-24, "Reinspection of Protective Coatings on Concrete Substrates for Which Documentation is Missing or Discrepant"

1-F CCP-13, "Application of NUTEC 10 Curing Compound"

1-G CP-QP-15.0, "Tagging Systems"

1-H CEI-20, "Field Installation of Hilti Bolts"

1-I CCP-12, "Concrete Patching, Finishing, and Preparation of Construction Joints"

2.0 GENERAL

2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS

Application of 11, 11S and 1201 shall be per Sections 3.1 through 3.6, 3.8 and 3.9 and application of NUTEC 10 shall be per Section 3.7.

Visual inspection of painted surfaces as addressed by this instruction shall be made at approximately an arm's 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.

3.1 SURFACE PREPARATION

The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

Tie holes, abandoned Hilti bolt holes and spalled concrete as defined in Reference 1-H, and patched per Reference 1-I and grout under base plates which has 3 square feet or less of exposed surface to be coated, may be coated after a 48 hour cure.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:

a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the surface shall be abraded without completely removing the NUTEC 10 prior to application of the surfacer.

The QC inspector shall note the method(s) used on the Inspection Report (IR), Attachment 1. The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface are ground or cut smooth until object is flush.

g) All loosely adhering objects embedded are removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects are power tool cleaned and solvent wiped.

i) Metal objects larger than 4 square inches are primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and 1-F and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired. NUTEC 10 has an expiration date marked on the container and it shall not be used after that date.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A and 1-F. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F reading (note in Remarks Section). The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, loose deposits and markings).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/ separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If unsatisfactory coating still exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S, NUTEC 11 or NUTEC 1201 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials as per Section 4.3.1 and/or Paragraph 4.3.2.5.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S, NUTEC 11 or NUTEC 1201 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coat.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-69 | 48 hrs. |
| 70-79 | 24 hrs. |
| 80-89 | 18 hrs. |
| 90-100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2.4 Qualification of Applicator(s)

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

3.4.3 Finish Coat Application

3.4.3.1 Pot Life

The QC inspector shall verify that the pot life of NUTEC 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.3.2 Dry Film Thickness

The inspector shall determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

The total DFT of NUTEC 1201, recoat and existing coat shall not exceed 16 mils.

3.5 FINISH COAT REPAIRS

For repairs in the NUTEC 1201 Finish Coat, the QC Inspector shall verify the following:

a) The inspector shall determine the DFT of the existing coated surface (prior to recoating) by either, or one of the two following methods.

1) Using the DFT readings acquired during the backfit documentation (Reference 1-E).

2) The scratch test of the REACTIC 1201 finish coat shall be performed using a Mark II Tooke Inspection Gage equipped with a 2x tip. Five separate readings spaced randomly over each finish coated area of 100 square feet or less shall be taken.

NOTE: Tooke tests are not required to be performed on areas on concrete which have not been finish coated with REACTIC 1201.

b) Verify that the surface is prepared as required by Reference 1-A.

c) Verify that runs and sags which show evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

d) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

e) Verify that the surface is solvent wiped in accordance with Reference 1-A.

f) Verify that NUTEC 1201 is mixed/thinned per Section 3.2.

g) Verify air supply acceptability per Section 3.4.2.3.

h) Verify that pot life is not exceeded per Section 3.4.3.1.

i) Verify applicator(s) qualification per Section 3.4.2.4.

j) Verify cure time for recoat. Recoating time for NUTEC 1201 is 24 hours.

k) Verify dry film thickness of the recoat per Section 3.4.3.2.

NOTE: The tie in interface between concrete coatings and steel coatings shall be inspected during the finish coat final acceptance for steel coated items per QI-QP-11.4-5.

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the inspector shall verify that the finish coat has cured for the minimum of 24 hours.

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the finish coat after a minimum cure of 24 hours. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area. The pinholes that are beyond the acceptance of Attachment 3 shall be repaired in accordance with Section 3.5 and 3.6.3.6.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) At the time of the final inspection, pinholes and small discontinuities may be repaired with no reinspection required of these areas.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 APPLICATION OF NUTEC 10 CURING COMPOUND

3.7.1 The QC Inspector shall verify that the green concrete has been cleaned per Reference 1-F, Paragraph 2.0.

3.7.2 The QC Inspector shall verify that NUTEC 10 is not applied under inclement conditions and that the surface temperatures are above 50°F. Areas of visible moisture or standing water are unacceptable.

3.7.3 The QC Inspector shall verify that the NUTEC 10 air supply and equipment shall be in accordance with Reference 1-F. NUTEC 10 may also be applied by brush or roller.

3.7.4 NUTEC 10 shall be mixed per Paragraph 3.2. The NUTEC 10 has a pot life of (1) one hour at 75°F. If the NUTEC 10 gives the appearance of a crawl and does not penetrate the concrete, the material shall be removed from the concrete by solvent and a clean cloth. All the expired material shall be discarded and the equipment shall be cleaned per Reference 1-F.

3.7.5 NUTEC 10 shall be applied in accordance with Reference 1-F. Apply NUTEC 10 at a spreading rate of approximately 350-400 sq. ft./gal.

3.7.6 The QC Inspector shall verify that during application of NUTEC 10, areas with sags, surface irregularities or excessive buildup shall be removed with solvent and a clean cloth. Reapply NUTEC 10 in accordance with Reference 1-F.

3.8 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.5 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-O. Results of the inspections discussed in Section 3.6 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-O. Results of all inspections discussed in Section 3.7 shall be documented on an Inspection Report (Attachment 6) in accordance with Reference 1-O.

NOTE: A reject tag will be applied to any unsat area, with the inspection report, inspector's name, and phone extension listed per Reference 1-G.

3.9 MAPPING

For each IR generated in accordance with Section 3.3 and 3.6, a sketch shall be attached to indicate the location and size of the applicable coating application (See Note 3). The individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

PROTECTIVE COATINGS

AS-31 QI-QP-11.4-10 Rev.

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION INSPECTION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ SPECIAL INSPECTION

INSP RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR DATE

| ITEM NO | INSPECTION ATTRIBUTES | N/A | ACCEPT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | VERIFY SURFACE FREE OF GREASE AND OIL PER PARA. 3.1.1 (REQUIRED ONLY IF SURFACE PREPARATION IS BY ONE OF THE FOLLOWING:) | | | | |
| | a. WATER BLASTING | | | | |
| | b. WATER BLASTING WITH SAND INJECTION | | | | |
| | c. DRY SAND BLASTING | | | | |
| | d. BUSH HAMMERING | | | | |
| 2. | SURFACE PREPARATION IN ACCORDANCE WITH CCP-40. LIST METHODS OF SURFACE PREPARATION: | | | | |
| 3. | VERIFY SURFACE PREPARATION ACCEPTABLE AND ALL LOOSE AND FOREIGN MATERIAL REMOVED PER PARA. 3.1.2.2. | | | | |
| 4. | VERIFY CONCRETE CURING/REPAIRS COMPLETE (SURFACER ONLY) PER PARA. 3.1. and 3.1.2.2) | | | | |
| 5. | VERIFY CURE TIME OF PREVIOUS COAT BEFORE FINISH COATING PER PARA. 3.4.2.2 (FINISH COAT ONLY) | | | | |
| 6. | RECORD TOOK GARGE READINGS PER PARA. 3 FINISH COAT REPAIRS ONLY) MIN. DFT: MAX. DFT: AVG. DFT: | | | | |
| 7. | VERIFY COATED SURFACER FREE OF UNACCEPTABLE DEFECTS PRIOR TO FINISH COAT ONLY PER PARA 3.4.2.1 | | | | |
| 8. | VERIFY MIXING OPERATIONS PER PARA. 3.2 a. LIST MATERIAL NAME b. BATCH NUMBER(S) OF MATERIAL: THINNER CURING AGENT BASE FILLER | | | | |
| 9. | VERIFY THAT SHELF LIFE OF COATING MATERIALS HAS NOT EXPIRED. | | | | |

(CONTINUED ON NEXT PAGE)

ATTACHMENT 1 (Continued)

COMANCHE PEAK STEAM ELECTRIC STATION
INSPECTION REPORT
(SUPPLEMENTAL)

QI-QP-11.4-10, R. ___
Sheet 2 of 2

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. | INSPECTION ATTRIBUTES | DATE | C.C. SIGNATURE |
|---|---|---|---|
| 10. | VERIFY QUALIFICATION OF APPLICATORS (LIST APPLICATORS) | | |
| | | | |
| | | | |
| 11. | VERIFY AMBIENT CONDITIONS PER PARA. 7.7.1 | | |
| | DRY BULB: WET BULB: | | |
| | SURFACE TEMP.: DEW POINT: | | |
| | RELATIVE HUMIDITY: | | |
| 12. | VERIFY AIR SUPPLY FREE OF CONTAMINATION AND THAT TRAP | | |
| | FILTERS, AND SEPARATORS ARE INSTALLED | | |
| 13. | RECORD WET FILM THICKNESS: | | |
| | | | |
| 14. | %VOLUME SOLIDS: | | |
| | DFT = WFT x % VOL SOL | | |
| | MIN. WFT: MIN. DFT: | | |
| | MAX. WFT: MAX. DFT: | | |
| | AVG. WFT: AVG. DFT: | | |
| | (RECORD ADDITIONAL SETS OF READINGS IN REMARKS) | | |
| | | | |
| | | | |

REMARKS: (Shims, SPECS, ETC.)

RELATED NCR NO. | I.R. CLOSED ☐ DATE SIGNATURE QC INSPECTOR

TUGCO QA

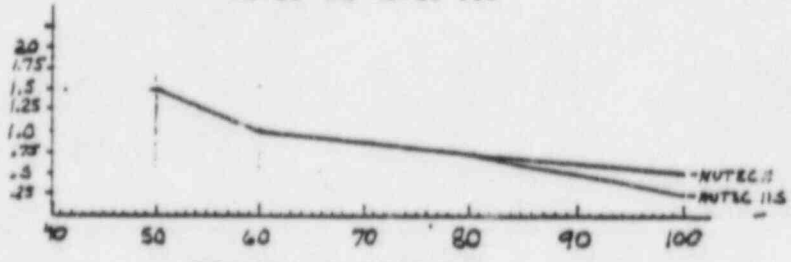
Form 10Q. 1

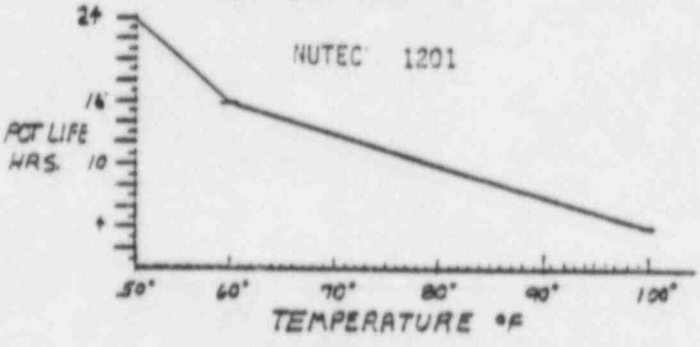
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Nutec 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




INDUCTION TIMES FOR NUTEC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-69 | 30 min. |
| 70-79 | 20 min. |
| 90-90 | 10 min. |
| 91-100 | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
NUTEC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

ATTACHMENT 5

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET ___ OF ___

ITEM DESCRIPTION: PROTECTIVE COATINGS | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION

SPEC. NO. | REV | REF QC DOC & REV & CHANGE NO: QI-QP-11.4-10, Rev. | MEASURE OR TEST EQUIP. IDENT NO.

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.6.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.6.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.6.3. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. | I.R CLOSED ☐ | DATE | SIGNATURE _____ QC INSPECTOR

ATTACHMENT 6

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 1 NO.

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| NUTEC 10 | | |

| SPEC NO. | REV | REF QC DOC. & REV & CHANGE NO | MEASURE OR TEST EQUIP IDENT NO. |
|---|---|---|---|
| AS-31 | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| 1. | Verify concrete has been cleaned per Para. 3.7.1 | | | | |
| 2. | Verify that NUTEC 10 is not applied under inclement conditions per Para. 3.7.2 | | | | |
| 3. | Verify that the NUTEC 10 air supply and equipment is in accordance with Ref. 1-F, per Para. 3.7.3. | | | | |
| 4. | Verify mixing operations per Para. 3.7.4. | | | | |
| 5. | Verify qualification of applicators (List applicators) per Para. 3.3.5. | | | | |
| 6. | Verify the application rate of NUTEC 10 per Para. 3.7.5. | | | | |
| 7. | Verify coated surface free of unacceptable defects, sags, surface irregularities or excessive build up per Para. 3.7.6. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. _____ NCR CLOSED = _____ DATE _____ SIGNATURE _____ QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 13 | AUG 9 1983 | 1 of 20 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: Harry A Williams DATE 8/9/83

APPROVED BY: C. T. Bowers DATE 8/9/83

APPROVED BY: C. T. Bowers DATE 8/9/83



1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

1-E QI-QP-11.4-24, "Reinspection of Protective Coatings on Concrete Substrates for Which Documentation is Missing or Discrepant"

1-F CCP-13, "Application of NUTEC 10 Curing Compound"

1-G CP-QP-15.0, "Tagging Systems"



2.0 GENERAL

2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS

Application of 11, 11S and 1201 shall be per Sections 3.1 through 3.6, 3.8 and 3.9 and application of NUTEC 10 shall be per Section 3.7.

Visual inspection of painted surfaces as addressed by this instruction shall be made at approximately an arm's 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.

3.1 SURFACE PREPARATION

The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:
a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the surface shall be abraded without completely removing the NUTEC 10 prior to application of the surfacer.

The QC inspector shall note the method(s) used on the Inspection Report (IR), Attachment 1. The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface are ground or cut smooth until object is flush.

g) All loosely adhering objects embedded are removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects are power tool cleaned and solvent wiped.

i) Metal objects larger than 4 square inches are primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and 1-F and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired. NUTEC 10 has an expiration date marked on the container and it shall not be used after that date.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A and 1-F. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F reading (note in Remarks Section). The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, loose deposits and markings).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taker.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If unsatisfactory coating still exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S, NUTEC 11 or NUTEC 1201 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials as per Section 4.3.1 and/or Paragraph 4.3.2.5.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S, NUTEC 11 or NUTEC 1201 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coat.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-69 | 48 hrs. |
| 70-79 | 24 hrs. |
| 80-89 | 18 hrs. |
| 90-100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2.4 Qualification of Applicator(s)

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

3.4.3 Finish Coat Application

3.4.3.1 Pot Life

The QC inspector shall verify that the pot life of NUTEC 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.3.2 Dry Film Thickness

The inspector s ,11 determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

The total DFT of NUTEC 1201, recoat and existing coat shall not exceed 16 mils.

3.5 FINISH COAT REPAIRS

For repairs in the NUTEC 1201 Finish Coat, the QC Inspector shall verify the following:

a) The inspector shall determine the DFT of the existing coated surface (prior to recoating) by either, or one of the two following methods.

1) Using the DFT readings acquired during the backfit documentation (Reference 1-E).

2) The scratch test of the REACTIC 1201 finish coat shall be performed using a Mark II Tooke Inspection Gage equipped with a 2x tip. Five separate readings spaced randomly over each finish coated area of 100 square feet or less shall be taken.

NOTE: Tooke tests are not required to be performed on areas on concrete which have not been finish coated with REACTIC 1201.

b) Verify that the surface is prepared as required by Reference 1-A.

c) Verify that runs and sags which show evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

d) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

e) Verify that the surface is solvent wiped in accordance with Reference 1-A.

f) Verify that NUTEC 1201 is mixed/thinned per Section 3.2.

g) Verify air supply acceptability per Section 3.4.2.3.

h) Verify that pot life is not exceeded per Section 3.4.3.1.

i) Verify applicator(s) qualification per Section 3.4.2.4.

j) Verify cure time for recoat. Recoating time for NUTEC 1201 is 24 hours.

k) Verify dry film thickness of the recoat per Section 3.4.3.2.

NOTE: The tie in interface between concrete coatings and steel coatings shall be inspected during the finish coat final acceptance for steel coated items per QI-QP-11.4-5.

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the inspector shall verify that the finish coat has cured for the minimum of 24 hours.

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the finish coat after a minimum cure of 24 hours. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area. The pinholes that are beyond the acceptance of Attachment 3 shall be repaired in accordance with Section 3.5 and 3.6.3.6.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) At the time of the final inspection, pinholes and small discontinuities may be repaired with no reinspection required of these areas.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 APPLICATION OF NUTEC 10 CURING COMPOUND

3.7.1 The QC Inspector shall verify that the green concrete has been cleaned per Reference 1-F, Paragraph 2.0.

3.7.2 The QC Inspector shall verify that NUTEC 10 is not applied under inclement conditions and that the surface temperatures are above 50°F. Areas of visible moisture or standing water are unacceptable.

3.7.3 The QC Inspector shall verify that the NUTEC 10 air supply and equipment shall be in accordance with Reference 1-F. NUTEC 10 may also be applied by brush or roller.

3.7.4 NUTEC 10 shall be mixed per Paragraph 3.2. The NUTEC 10 has a pot life of (1) one hour at 75°F. If the NUTEC 10 gives the appearance of a crawl and does not penetrate the concrete, the material shall be removed from the concrete by solvent and a clean cloth. All the expired material shall be discarded and the equipment shall be cleaned per Reference 1-F.

3.7.5 NUTEC 10 shall be applied in accordance with Reference 1-F. Apply NUTEC 10 at a spreading rate of approximately 350-400 sq. ft./gal.

3.7.6 The QC Inspector shall verify that during application of NUTEC 10, areas with sags, surface irregularities or excessive buildup shall be removed with solvent and a clean cloth. Reapply NUTEC 10 in accordance with Reference 1-F.

3.8 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.5 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-D. Results of the inspections discussed in Section 3.6 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-D. Results of all inspections discussed in Section 3.7 shall be documented on an Inspection Report (Attachment 6) in accordance with Reference 1-D.

NOTE: A reject tag will be applied to any unsat area, with the inspection report, inspector's name, and phone extension listed per Reference 1-G.

3.9 MAPPING

For each IR generated in accordance with Section 3.3 and 3.6, a sketch shall be attached to indicate the location and size of the applicable coating application (See Note 3). The individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 2

ITEM DESCRIPTION: PROTECTIVE COATINGS | DESCRIPTION NO: | INSTALL. STRUCTURE DESIGNATION:

DRAWING: AS-31 | REV: | REF. QI DOC. & REV. & CHANGE NO: QI-QP-11.4-10 Rev. | RELATED QA LIST EQUIP. ITEM NO:

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION

NSR RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | VERIFY SURFACE FREE OF GREASE AND OIL PER PARA. 3.1.1 (REQUIRED ONLY IF SURFACE PREPARATION IS BY ONE OF THE FOLLOWING:) | | | | |
| | a. WATER BLASTING | | | | |
| | b. WATER BLASTING WITH SAND INJECTION | | | | |
| | c. DRY SAND BLASTING | | | | |
| | d. BUSH HAMMERING | | | | |
| 2. | SURFACE PREPARATION IN ACCORDANCE WITH CCP-40. LIST METHODS OF SURFACE PREPARATION: | | | | |
| 3. | VERIFY SURFACE PREPARATION ACCEPTABLE AND ALL LOOSE AND FOREIGN MATERIAL REMOVED PER PARA. 3.1.2.2. | | | | |
| 4. | VERIFY CONCRETE CURING/REPAIRS COMPLETE (SURFACER ONLY) PER PARA. 3.1. and 3.1.2.2) | | | | |
| 5. | VERIFY CURE TIME OF PREVIOUS COAT BEFORE FINISH COATING PER PARA. 3.4.2.2 (FINISH COAT ONLY) | | | | |
| 6. | RECORD TOOK GARGE READINGS PER PARA. 3.5 (FINISH COAT REPAIRS ONLY) MIN. DFT: MAX. DFT: AVG. DFT: | | | | |
| 7. | VERIFY COATED SURFACER FREE OF UNACCEPTABLE DEFECTS PRIOR TO FINISH COAT ONLY PER PARA. 3.4.2.1 | | | | |
| 8. | VERIFY MIXING OPERATIONS PER PARA. 3.2 | | | | |
| | a. LIST MATERIAL NAME: | | | | |
| | b. BATCH NUMBER(S) OF MATERIAL: | | | | |
| | THINNER CURING AGENT | | | | |
| | BASE FILLER | | | | |
| 9. | VERIFY THAT SHELF LIFE OF COATING MATERIALS HAS NOT EXPIRED. | | | | |

(CONTINUED ON NEXT PAGE)

ATTACHMENT 1 (Continued)

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

(SUPPLEMENTAL)

QI-QP-11.4-10, R. ___

Sheet 2 of 2

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | Q.C. SIGNATURE |
|---|---|---|---|---|---|
| 10. | VERIFY QUALIFICATION OF APPLICATORS (LIST APPLICATORS) | | | | |
| | | | | | |
| | | | | | |
| 11. | VERIFY AMBIENT CONDITIONS PER PARA. 3.3.1 | | | | |
| | DRY BULB: WET BULB: | | | | |
| | SURFACE TEMP.: DEW POINT: | | | | |
| | RELATIVE HUMIDITY: | | | | |
| 12. | VERIFY AIR SUPPLY FREE OF CONTAMINATION AND THAT TRAP | | | | |
| | FILTERS, AND SEPARATORS ARE INSTALLED | | | | |
| 13. | RECORD WET FILM THICKNESS: | | | | |
| | | | | | |
| 14. | %VOLUME SOLIDS: | | | | |
| | DFT = WET x % VOL SOL | | | | |
| | MIN. WET: MIN. DFT: | | | | |
| | MAX. WET: MAX. DFT: | | | | |
| | AVG. WET: AVG. DFT: | | | | |
| | (RECORD ADDITIONAL SETS OF READINGS IN REMARKS) | | | | |
| | | | | | |
| | | | | | |

REMARKS: (DWGS, SPECS, ETC.)

RELATED NCR NO. | I.R. CLOSED ☐ DATE | SIGNATURE QC INSPECTOR

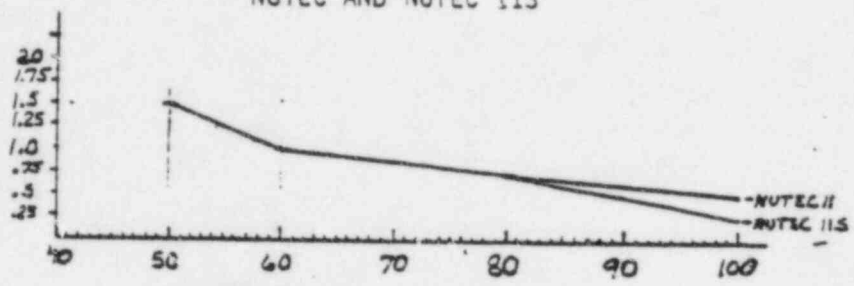
Form No. 1

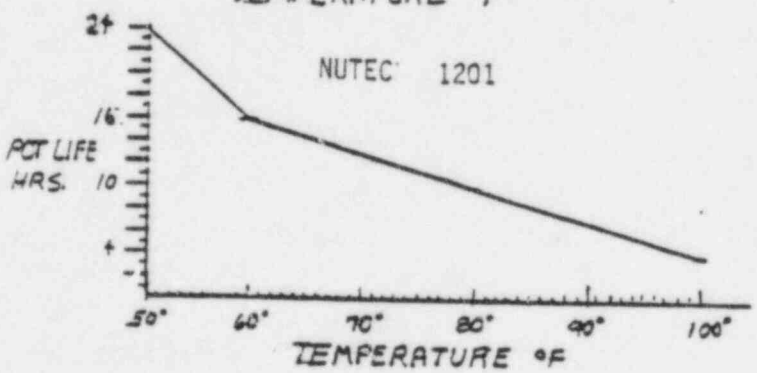
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Nutec 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




NUTEC 1201

INDUCTION TIMES FOR NUTEC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-69 | 30 min. |
| 70-79 | 20 min. |
| 80-90 | 10 min. |
| 91-100 | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
NUTEC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

ATTACHMENT 5

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET ___ OF ___ NO.

| ITEM DESCRIPTION (2) | IDENTIFICATION NO. (3) | SYSTEM / STRUCTURE DESIGNATION (4) |
|---|---|---|
| PROTECTIVE COATINGS | | |

| SPEC. NO. (5) | REV. (6) | REF Q.C. DOC. & REV. & CHANGE NO. (7) | MEASURE OR TEST EQUIP. IDENT. NO. (8) |
|---|---|---|---|
| | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION (9)

NSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____ (10)

| ITEM NO. (11) | INSPECTION ATTRIBUTES (12) | SAT | UNSAT | DATE | QC SIGNATURE (13) |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.6.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.6.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.6.3. | | | | |

REMARKS (DWGS, SPECS, ETC.) (14)

RELATED NCR NO. (15) I.R CLOSED ☐ DATE _____ SIGNATURE _____ QC INSPECTOR (16)

ATTACHMENT 6

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 1

NO.

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| NUTEC 10 | | |

| SPEC. NO. | REV. | REF. Q.C. DOC. & REV. & CHANGE NO. | MEASURE OR TEST EQUIP. IDENT. NO. |
|---|---|---|---|
| AS-31 | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR DATE

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| 1. | Verify concrete has been cleaned per Para. 3.7.1 | | | | |
| 2. | Verify that NUTEC 10 is not applied under inclement conditions per Para. 3.7.2 | | | | |
| 3. | Verify that the NUTEC 10 air supply and equipment is in accordance with Ref. 1-F, per Para. 3.7.3. | | | | |
| 4. | Verify mixing operations per Para. 3.7.4. | | | | |
| 5. | Verify qualification of applicators (List applicators) per Para. 3.3.5. | | | | |
| 6. | Verify the application rate of NUTEC 10 per Para. 3.7.5. | | | | |
| 7. | Verify coated surface free of unacceptable defects, sags, surface irregularities or excessive build up per Para. 3.7.6. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. I.R CLOSED ☐ DATE SIGNATURE QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 12 | JUL 06 1983 | 1 of 20 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: Gary D. Williams — DATE 7/5/83

APPROVED BY: C.T. Bynum — DATE 7/5/83

APPROVED BY: C.T. Bynum — DATE 7/5/83

1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

1-E QI-QP-11.4-24, "Reinspection of Protective Coatings on Concrete Substrates for Which Documentation is Missing or Discrepant"

1-F CCP-13, "Application of NUTEC 10 Curing Compound"

1-G CP-QP-15.0, "Tagging Systems"



2.0 GENERAL

2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS

Application of 11, 11S and 1201 shall be per Sections 3.1 through 3.6, 3.8 and 3.9 and application of NUTEC 10 shall be per Section 3.7.

3.1 SURFACE PREPARATION

The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:
a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the surface shall be abraded without completely removing the NUTEC 10 prior to application of the surfacer.

The QC inspector shall note the method(s) used on the Inspection Report (IR), Attachment 1. The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface are ground or cut smooth until object is flush.

g) All loosely adhering objects embedded are removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects are power tool cleaned and solvent wiped.

i) Metal objects larger than 4 square inches are primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and 1-F and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired. NUTEC 10 has an expiration date marked on the container and it shall not be used after that date.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A and 1-F. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F reading (note in Remarks Section). The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, loose deposits and markings).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If unsatisfactory coating still exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S, NUTEC 11 or NUTEC 1201 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials as per Section 4.3.1 and/or Paragraph 4.3.2.5.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S, NUTEC 11 or NUTEC 1201 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coat.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-69 | 48 hrs. |
| 70-79 | 24 hrs. |
| 80-89 | 18 hrs. |
| 90-100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2.4 Qualification of Applicator(s)

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

3.4.3 Finish Coat Application

3.4.3.1 Pot Life

The QC inspector shall verify that the pot life of NUTEC 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.3.2 Dry Film Thickness

The inspector shall determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

The total DFT of NUTEC 1201, recoat and existing coat shall not exceed 16 mils.

3.5 FINISH COAT REPAIRS

For repairs in the NUTEC 1201 Finish Coat, the QC Inspector shall verify the following:

a) The inspector shall determine the DFT of the existing coated surface (prior to recoating) by either, or one of the two following methods.

1) Using the DFT readings acquired during the backfit documentation (Reference 1-E).

2) The scratch test of the REACTIC 1201 finish coat shall be performed using a Mark II Tooke Inspection Gage equipped with a 2x tip. Five separate readings spaced randomly over each finish coated area of 100 square feet or less shall be taken.

NOTE: Tooke tests are not required to be performed on areas on concrete which have not been finish coated with REACTIC 1201.

b) Verify that the surface is prepared as required by Reference 1-A.

c) Verify that runs and sags which show evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

d) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

e) Verify that the surface is solvent wiped in accordance with Reference 1-A.

f) Verify that NUTEC 1201 is mixed/thinned per Section 3.2.

g) Verify air supply acceptability per Section 3.4.2.3.

h) Verify that pot life is not exceeded per Section 3.4.3.1.

i) Verify applicator(s) qualification per Section 3.4.2.4.

j) Verify cure time for recoat. Recoating time for NUTEC 1201 is 24 hours.

k) Verify dry film thickness of the recoat per Section 3.4.3.2.

NOTE: The tie in interface between concrete coatings and steel coatings shall be inspected during the finish coat final acceptance for steel coated items per QI-QP-11.4-5.

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the inspector shall verify that the finish coat has cured for the minimum of 24 hours.

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the finish coat after a minimum cure of 24 hours. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area. The pinholes that are beyond the acceptance of Attachment 3 shall be repaired in accordance with Section 3.5 and 3.6 3.6.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) At the time of the final inspection, pinholes and small discontinuities may be repaired with no reinspection required of these areas.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 APPLICATION OF NUTEC 10 CURING COMPOUND

3.7.1 The QC Inspector shall verify that the green concrete has been cleaned per Reference 1-F, Paragraph 2.0.

3.7.2 The QC Inspector shall verify that NUTEC 10 is not applied under inclement conditions and that the surface temperatures are above 50°F. Areas of visible moisture or standing water are unacceptable.

3.7.3 The QC Inspector shall verify that the NUTEC 10 air supply and equipment shall be in accordance with Reference 1-F. NUTEC 10 may also be applied by brush or roller.

3.7.4 NUTEC 10 shall be mixed per Paragraph 3.2. The NUTEC 10 has a pot life of (1) one hour at 75°F. If the NUTEC 10 gives the appearance of a crawl and does not penetrate the concrete, the material shall be removed from the concrete by solvent and a clean cloth. All the expired material shall be discarded and the equipment shall be cleaned per Reference 1-F.

3.7.5 NUTEC 10 shall be applied in accordance with Reference 1-F. Apply NUTEC 10 at a spreading rate of approximately 350-400 sq. ft./gal.

3.7.6 The QC Inspector shall verify that during application of NUTEC 10, areas with sags, surface irregularities or excessive buildup shall be removed with solvent and a clean cloth. Reapply NUTEC 10 in accordance with Reference 1-F.

3.8 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.5 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-D. Results of the inspections discussed in Section 3.6 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-D. Results of all inspections discussed in Section 3.7 shall be documented on an Inspection Report (Attachment 6) in accordance with Reference 1-D.

NOTE: A reject tag will be applied to any unsat area, with the inspection report, inspector's name, and phone extension listed per Reference 1-G.

3.9 MAPPING

For each IR generated in accordance with Section 3.3 and 3.6, a sketch shall be attached to indicate the location and size of the applicable coating application (See Note 3). The individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 2

NO.

ITEM DESCRIPTION: PROTECTIVE COATINGS | IDENTIFICATION NO: | SYSTEM/STRUCTURE DESIGNATION:

SPEC NO.: AS-31 | REV: | REF DWG NO. & REV. & CHANGE NO: QI-QP-11.4-10 Rev. | RELEASE OF WELD FILLER MATL NO:

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION/ERECTION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION

INSPECTION RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | N/A | WITNESS | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | VERIFY SURFACE FREE OF GREASE AND OIL PER PARA. 3.1.1 (REQUIRED ONLY IF SURFACE PREPARATION IS BY ONE OF THE FOLLOWING:) | | | | |
| | a. WATER BLASTING | | | | |
| | b. WATER BLASTING WITH SAND INJECTION | | | | |
| | c. DRY SAND BLASTING | | | | |
| | d. BUSH HAMMERING | | | | |
| 2. | SURFACE PREPARATION IN ACCORDANCE WITH CCP-40. LIST METHODS OF SURFACE PREPARATION: | | | | |
| 3. | VERIFY SURFACE PREPARATION ACCEPTABLE AND ALL LOOSE AND FOREIGN MATERIAL REMOVED PER PARA. 3.1.2.2. | | | | |
| 4. | VERIFY CONCRETE CURING/REPAIRS COMPLETE (SURFACER ONLY) PER PARA. 3.1. and 3.1.2.2) | | | | |
| 5. | VERIFY CURE TIME OF PREVIOUS COAT BEFORE FINISH COATING PER PARA. 3.4.2.2 (FINISH COAT ONLY) | | | | |
| 6. | RECORD TOOK GARGE READINGS PER PARA. 3.5 (FINISH COAT REPAIRS ONLY) MIN. DFT: MAX. DFT: AVG. DFT: | | | | |
| 7. | VERIFY COATED SURFACER FREE OF UNACCEPTABLE DEFECTS PRIOR TO FINISH COAT ONLY PER PARA. 3.4.2.1 | | | | |
| 8. | VERIFY MIXING OPERATIONS PER PARA. 3.2 a. LIST MATERIAL NAME: b. BATCH NUMBER(S) OF MATERIAL: _____ THINNER _____ CURING AGENT _____ BASE _____ FILLER | | | | |
| 9. | VERIFY THAT SHELF LIFE OF COATING MATERIALS HAS NOT EXPIRED. | | | | |

(CONTINUED ON NEXT PAGE)

ATTACHMENT 1 (Continued)

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

(SUPPLEMENTAL)

QI-QP-11.4-10, R. ___

Sheet 2 of 2

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | Q.C. SIGNATURE |
|---|---|---|---|---|---|
| 10. | VERIFY QUALIFICATION OF APPLICATORS (LIST APPLICATORS) | | | | |
| | | | | | |
| | | | | | |
| 11. | VERIFY AMBIENT CONDITIONS PER PARA. 3.3.1 | | | | |
| | DRY BULB: WET BULB: | | | | |
| | SURFACE TEMP.: DEW POINT: | | | | |
| | RELATIVE HUMIDITY: | | | | |
| 12. | VERIFY AIR SUPPLY FREE OF CONTAMINATION AND THAT TRAP | | | | |
| | FILTERS, AND SEPARATORS ARE INSTALLED | | | | |
| 13. | RECORD WET FILM THICKNESS: | | | | |
| | | | | | |
| 14. | %VOLUME SOLIDS: | | | | |
| | DFT = WFT x % VOL SOL | | | | |
| | MIN. WFT: MIN. DFT: | | | | |
| | MAX. WFT: MAX. DFT: | | | | |
| | AVG. WFT: AVG. DFT: | | | | |
| | (RECORD ADDITIONAL SETS OF READINGS IN REMARKS) | | | | |
| | | | | | |
| | | | | | |

REMARKS: (Over, Specs, etc.)

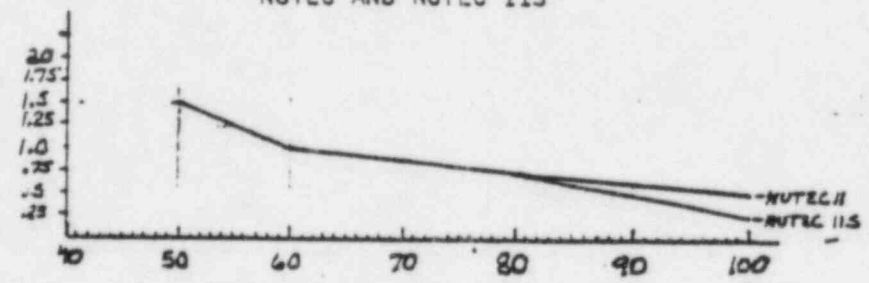
RELATED NCR NO. | I.R CLOSED ☐ DATE SIGNATURE QC INSPECTOR

ATTACHMENT 2

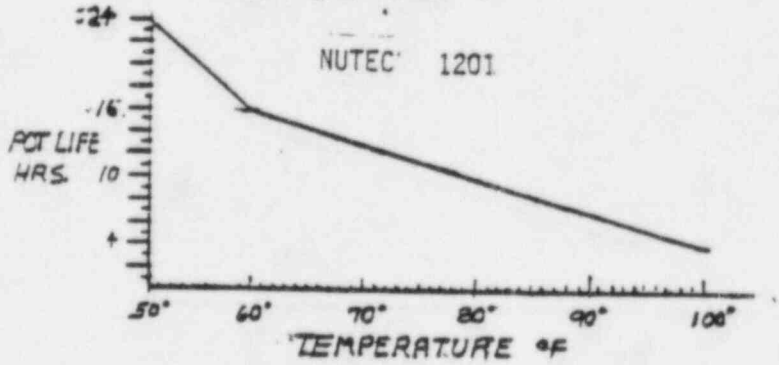
| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Nutec 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




NUTEC 1201




INDUCTION TIMES FOR NUTEC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-69 | 30 min. |
| 70-79 | 20 min. |
| 80-90 | 10 min. |
| 91-100 | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
NUTEC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

ATTACHMENT 5

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET ___ OF ___ NO.

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| PROTECTIVE COATINGS | | |

| SPEC. NO. | REV. | REF. Q.C. DOC. & REV. & CHANGE NO. | MEASURE OR TEST EQUIP. IDENT. NO. |
|---|---|---|---|
| | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.6.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.6.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.6.3. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. _____ I.R. CLOSED ☐ DATE _____ SIGNATURE _____ QC INSPECTOR

ATTACHMENT 6

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 1

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| NUTEC 10 | | |

| SPEC. NO. | REV. | REF. Q.C. DOC. & REV. & CHANGE NO. | MEASURE OR TEST EQUIP. DESIG. NO. |
|---|---|---|---|
| AS-31 | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| 1. | Verify concrete has been cleaned per Para. 3.7.1 | | | | |
| 2. | Verify that NUTEC 10 is not applied under inclement conditions per Para. 3.7.2 | | | | |
| 3. | Verify that the NUTEC 10 air supply and equipment is in accordance with Ref. 1-F, per Para. 3.7.3. | | | | |
| 4. | Verify mixing operations per Para. 3.7.4. | | | | |
| 5. | Verify qualification of applicators (List applicators) per Para. 3.3.5. | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 6. | Verify the application rate of NUTEC 10 per Para. 3.7.5. | | | | |
| | | | | | |
| | | | | | |
| 7. | Verify coated surface free of unacceptable defects, sags, surface irregularities or excessive build up per Para. 3.7.6. | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

REMARKS (Drwgs, Specs, etc.)

RELATED NCR NO. _____ I.R. CLOSED — — DATE _____ SIGNATURE _____ QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 11 | JUN 27 1983 | 1 of 20 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: Harry O Williams 6/27/83 DATE

APPROVED BY: [signature] 6/27/83 DATE

APPROVED BY: [signature] 6/27/83 DATE

1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

1-E QI-QP-11.4-24, "Reinspection of Protective Coatings on Concrete Substrates for Which Documentation is Missing or Discrepant"

1-F CCP-13, "Application of NUTEC 10 Curing Compound"

1-G CP-QP-15.0, "Tagging Systems"



2.0 GENERAL

2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS

Application of 11, 11S and 1201 shall be per Sections 3.1 through 3.6, 3.8 and 3.9 and application of NUTEC 10 shall be per Section 3.7.



3.1 SURFACE PREPARATION

The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:
a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the surface shall be abraded without completely removing the NUTEC 10 prior to application of the surfacer.

The QC inspector shall note the method(s) used on the Inspection Report (IR), Attachment 1. The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface are ground or cut smooth until object is flush.

g) All loosely adhering objects embedded are removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects are power tool cleaned and solvent wiped.

i) Metal objects larger than 4 square inches are primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and 1-F and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired. NUTEC 10 has an expiration date marked on the container and it shall not be used after that date.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A and 1-F. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F reading (note in Remarks Section). The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, loose deposits and markings).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If unsatisfactory coating still exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S, NUTEC 11 or NUTEC 1201 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials as per Section 4.3.1 and/or Paragraph 4.3.2.5.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S, NUTEC 11 or NUTEC 1201 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coat.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature °F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-69 | 48 hrs. |
| 70-79 | 24 hrs. |
| 80-89 | 18 hrs. |
| 90-100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2.4 Qualification of Applicator(s)

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

3.4.3 Finish Coat Application

3.4.3.1 Pot Life

The QC inspector shall verify that the pot life of NUTEC 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.3.2 Dry Film Thickness

The inspector shall determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

The total DFT of NUTEC 1201, recoat and existing coat shall not exceed 16 mils.

3.5 FINISH COAT REPAIRS

For repairs in the NUTEC 1201 Finish Coat, the QC Inspector shall verify the following:

a) The inspector shall determine the DFT of the existing coated surface (prior to recoating) by either, or one of the two following methods.

   1) Using the DFT readings acquired during the backfit documentation (Reference 1-E).

   2) The scratch test of the REACTIC 1201 finish coat shall be performed using a Mark II Tooke Inspection Gage equipped with a 2x tip. Five separate readings spaced randomly over each finish coated area of 100 square feet or less shall be taken.

NOTE: Tooke tests are not required to be performed on areas on concrete which have not been finish coated with REACTIC 1201.

b) Verify that the surface is prepared as required by Reference 1-A.

c) Verify that runs and sags which show evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

d) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

e) Verify that the surface is solvent wiped in accordance with Reference 1-A.

f) Verify that NUTEC 1201 is mixed/thinned per Section 3.2.

g) Verify air supply acceptability per Section 3.4.2.3.

h) Verify that pot life is not exceeded per Section 3.4.3.1.

i) Verify applicator(s) qualification per Section 3.4.2.4.

j) Verify cure time for recoat. Recoating time for NUTEC 1201 is 24 hours.

k) Verify dry film thickness of the recoat per Section 3.4.3.2.

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the inspector shall verify that the finish coat has cured for the minimum of 24 hours.

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the finish coat after a minimum cure of 24 hours. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area. The pinholes that are beyond the acceptance of Attachment 3 shall be repaired in accordance with Section 3.5 and 3.6.3.6.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) At the time of the final inspection, pinholes and small discontinuities may be repaired with no reinspection required of these areas.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 APPLICATION OF NUTEC 10 CURING COMPOUND

3.7.1 The QC Inspector shall verify that the green concrete has been cleaned per Reference 1-F, Paragraph 2.0.

3.7.2 The QC Inspector shall verify that NUTEC 10 is not applied under inclement conditions and that the surface temperatures are above 50°F. Areas of visible moisture or standing water are unacceptable.

3.7.3 The QC Inspector shall verify that the NUTEC 10 air supply and equipment shall be in accordance with Reference 1-F. NUTEC 10 may also be applied by brush or roller.

3.7.4 NUTEC 10 shall be mixed per Paragraph 3.2. The NUTEC 10 has a pot life of (1) one hour at 75°F. If the NUTEC 10 gives the appearance of a crawl and does not penetrate the concrete, the material shall be removed from the concrete by solvent and a clean cloth. All the expired material shall be discarded and the equipment shall be cleaned per Reference 1-F.

3.7.5 NUTEC 10 shall be applied in accordance with Reference 1-F. Apply NUTEC 10 at a spreading rate of approximately 350-400 sq. ft./gal.

3.7.6 The QC Inspector shall verify that during application of NUTEC 10, areas with sags, surface irregularities or excessive buildup shall be removed with solvent and a clean cloth. Reapply NUTEC 10 in accordance with Reference 1-F.

3.8 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.5 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-D. Results of the inspections discussed in Section 3.6 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-D. Results of all inspections discussed in Section 3.7 shall be documented on an Inspection Report (Attachment 6' in accordance with Reference 1-D.

NOTE: A reject tag will be applied to any unsat area, with the inspection report, inspector's name, and phone extension listed per reference 1-G.

3.9 MAPPING

For each IR generated in accordance with Section 3.3 and 3.6, a sketch shall be attached to indicate the location and size of the applicable coating application (See Note 3). The individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 2

ITEM DESCRIPTION: PROTECTIVE COATINGS | IDENTIFICATION NO. | SYSTEM/STRUCTURE DESIGNATION

SPEC NO.: AS-31 | REV.: | REF. DWG. & REV. & CHANGE NO.: QI-QP-11.4-10 Rev. | DRAWING OR TEST EQUIP. IDENT. NO.:

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | VERIFY SURFACE FREE OF GREASE AND OIL PER PARA. 3.1.1 (REQUIRED ONLY IF SURFACE PREPARATION IS BY ONE OF THE FOLLOWING:) | | | | |
| | a. WATER BLASTING | | | | |
| | b. WATER BLASTING WITH SAND INJECTION | | | | |
| | c. DRY SAND BLASTING | | | | |
| | d. BUSH HAMMERING | | | | |
| 2. | SURFACE PREPARATION IN ACCORDANCE WITH CCP-40. LIST METHODS OF SURFACE PREPARATION: | | | | |
| 3. | VERIFY SURFACE PREPARATION ACCEPTABLE AND ALL LOOSE AND FOREIGN MATERIAL REMOVED PER PARA. 3.1.2.2. | | | | |
| 4. | VERIFY CONCRETE CURING/REPAIRS COMPLETE (SURFACER ONLY) PER PARA. 3.1. and 3.1.2.2) | | | | |
| 5. | VERIFY CURE TIME OF PREVIOUS COAT BEFORE FINISH COATING PER PARA. 3.4.2.2 (FINISH COAT ONLY) | | | | |
| 6. | RECORD TOOK GARGE READINGS PER PARA. 3.5.1 (FINISH COAT REPAIRS ONLY) MIN. DFT: MAX. DFT: AVG. DFT: | | | | |
| 7. | VERIFY COATED SURFACER FREE OF UNACCEPTABLE DEFECTS PRIOR TO FINISH COAT ONLY PER PARA. 3.4.2.1 | | | | |
| 8. | VERIFY MIXING OPERATIONS PER PARA. 3.2 a. LIST MATERIAL NAME: b. BATCH NUMBER(S) OF MATERIAL: THINNER CURING AGENT BASE FILLER | | | | |
| 9. | VERIFY THAT SHELF LIFE OF COATING MATERIALS HAS NOT EXPIRED. | | | | |

(CONTINUED ON NEXT PAGE)

ATTACHMENT 1 (Continued)

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

(SUPPLEMENTAL)

QI-QP-11.4-10, R. ___

Sheet 2 of 2

FOR FULL READINGS, SEE SHEET 1 NO.

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | Q.C. SIGNATURE |
|---|---|---|---|---|---|
| 10. | VERIFY QUALIFICATION OF APPLICATORS (LIST APPLICATORS) | | | | |
| | | | | | |
| | | | | | |
| 11. | VERIFY AMBIENT CONDITIONS PER PARA. 3.3.1 | | | | |
| | DRY BULB: WET BULB: | | | | |
| | SURFACE TEMP.: DEW POINT: | | | | |
| | RELATIVE HUMIDITY: | | | | |
| 12. | VERIFY AIR SUPPLY FREE OF CONTAMINATION AND THAT TRAP | | | | |
| | FILTERS, AND SEPARATORS ARE INSTALLED | | | | |
| 13. | RECORD WET FILM THICKNESS: | | | | |
| | | | | | |
| 14. | %VOLUME SOLIDS: | | | | |
| | DFT = WFT x % VOL SOL | | | | |
| | MIN. WFT: MIN. DFT: | | | | |
| | MAX. WFT: MAX. DFT: | | | | |
| | AVG. WFT: AVG. DFT: | | | | |
| | (RECORD ADDITIONAL SETS OF READINGS IN REMARKS) | | | | |
| 15. | RECORD TOOKE GAGE READING PER PARA. 3.6 | | | | |
| | | | | | |

REMARKS: (DWGS, SPECS, ETC.)

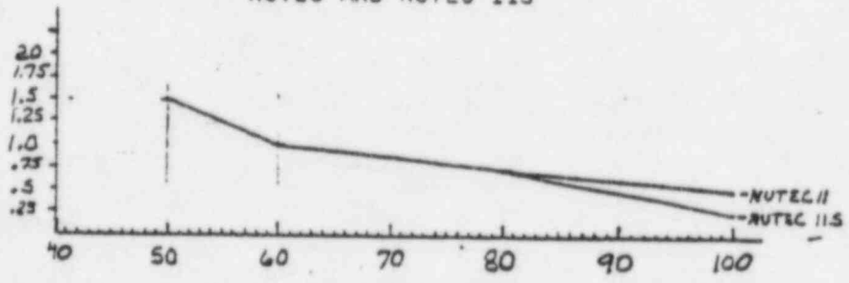
RELATED NCR NO. | I.R. CLOSED ☐ DATE SIGNATURE QC VERIFICATION

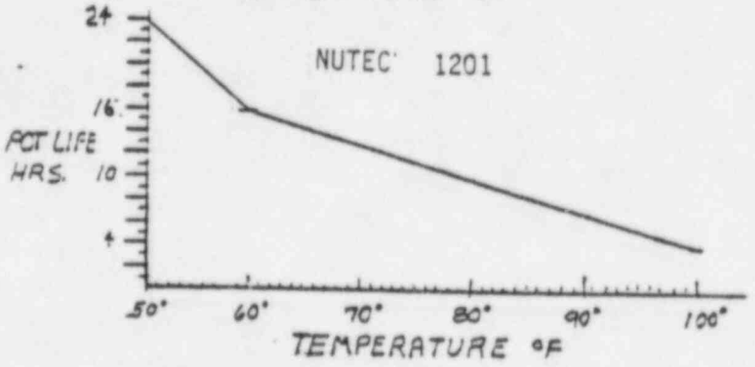
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Nutec 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




INDUCTION TIMES FOR NUTEC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-69 | 30 min. |
| 70-79 | 20 min. |
| 80-90 | 10 min. |
| 91-100 | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
NUTEC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

ATTACHMENT 5

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET ___ OF ___ NO.

| ITEM DESCRIPTION (2) | IDENTIFICATION NO. (3) | SYSTEM / STRUCTURE DESIGNATION (4) |
|---|---|---|
| PROTECTIVE COATINGS | | |

| SPEC NO. (5) | REV. (6) | REF Q.C. DOC. & REV. & CHANGE NO. (7) | MEASURE OR TEST EQUIP. IDENT. NO. (8) |
|---|---|---|---|
| | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE-INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION (9)

NSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____ (10)

| ITEM NO. (11) | INSPECTION ATTRIBUTES (12) | SAT | UNSAT | DATE | QC SIGNATURE (13) |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.6.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.6.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.6.3. | | | | |

REMARKS (DWGS, SPECS, ETC.) (14)

RELATED NCR NO. (15) I.R. CLOSED ☐ DATE _____ SIGNATURE _____ QC INSPECTOR (16)

ATTACHMENT 6

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 1 NO.

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM/STRUCTURE DESIGNATION |
|---|---|---|
| NUTEC 10 | | |

| SPEC. NO. | REV. | REF. QC DOC. & REV. & CHANGE NO. | MEASURE OR TEST EQUIP. IDENT. NO. |
|---|---|---|---|
| AS-31 | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR DATE

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| 1. | Verify concrete has been cleaned per Para. 3.7.1 | | | | |
| 2. | Verify that NUTEC 10 is not applied under inclement conditions per Para. 3.7.2 | | | | |
| 3. | Verify that the NUTEC 10 air supply and equipment is in accordance with Ref. 1-F, per Para. 3.7.3. | | | | |
| 4. | Verify mixing operations per Para. 3.7.4. | | | | |
| 5. | Verify qualification of applicators (List applicators) per Para. 3.3.5. | | | | |
| 6. | Verify the application rate of NUTEC 10 per Para. 3.7.5. | | | | |
| 7. | Verify coated surface free of unacceptable defects, sags, surface irregularities or excessive build up per Para. 3.7.6. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. I R CLOSED — DATE SIGNATURE QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 10 | JUN 17 1983 | 1 of 17 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: [signature] DATE 6/16/83

APPROVED BY: [signature] DATE 6/16/83

APPROVED BY: [signature] DATE 6/17/83

1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

1-E QI-QP-11.4-24, "Reinspection of Protective Coatings on Concrete Substrates for Which Documentation is Missing or Discrepant"

2.0 GENERAL



2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of protective coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS



3.1 SURFACE PREPARATION

The concrete surface shall be cured a minimum of 28 days prior to application of protective coatings. If the concrete surface is cured with NUTEC 10, coating may be performed after a minimum of 6 days after application of NUTEC 10.

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:
a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation. If NUTEC 10 curing membrane has been applied and gives a "glossy" appearance, the surface shall be abraded without completely removing the NUTEC 10 prior to application of the surfacer.

The QC inspector shall note the method(s) used on the Inspection Report (IR), Attachment 1. The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface are ground or cut smooth until object is flush.

g) All loosely adhering objects embedded are removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects are power tool cleaned and solvent wiped.

i) Metal objects larger than 4 square inches are primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the

difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F reading (note in Remarks Section). The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, loose deposits and markings).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/ separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If unsatisfactory coating still exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S, NUTEC 11 or NUTEC 1201 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials as per Section 4.3.1 and/or Paragraph 4.3.2.5.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S, NUTEC 11 or NUTEC 1201 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coat.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature °F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-69 | 48 hrs. |
| 70-79 | 24 hrs. |
| 80-89 | 18 hrs. |
| 90-100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2.4 Qualification of Applicator(s)

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

3.4.3 Finish Coat Application

3.4.3.1 Pot Life

The QC inspector shall verify that the pot life of NUTEC 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.3.2 Dry Film Thickness

The inspector shall determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

The total DFT of NUTEC 1201, recoat and existing coat shall not exceed 16 mils.

3.5 FINISH COAT REPAIRS

For repairs in the NUTEC 1201 Finish Coat, the QC Inspector shall verify the following:

a) The inspector shall determine the DFT of the existing coated surface (prior to recoating) by either, or one of the two following methods.

   1) Using the DFT readings acquired during the backfit documentation (Reference 1-E).

   2) The scratch test of the REACTIC 1201 finish coat shall be performed using a Mark II Tooke Inspection Gage equipped with a 2x tip. Five separate readings spaced randomly over each finish coated area of 100 square feet or less shall be taken.

   NOTE: Tooke tests are not required to be performed on areas on concrete which have not been finish coated with REACTIC 1201.

b) Verify that the surface is prepared as required by Reference 1-A.

c) Verify that runs and sags which show evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

d) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

e) Verify that the surface is solvent wiped in accordance with Reference 1-A.

f) Verify that NUTEC 1201 is mixed/thinned per Section 3.2.

g) Verify air supply acceptability per Section 3.4.2.3.

h) Verify that pot life is not exceeded per Section 3.4.3.1.

i) Verify applicator(s) qualification per Section 3.4.2.4.

j) Verify cure time for recoat. Recoating time for NUTEC 1201 is 24 hours.

k) Verify dry film thickness of the recoat per Section 3.4.3.2.

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the inspector shall verify that the finish coat has cured for the minimum of 24 hours.

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the finish coat after a minimum cure of 24 hours. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using

a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area. The pinholes that are beyond the acceptance of Attachment 3 shall be repaired in accordance with Section 3.5 and 3.6.3.6.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) At the time of the final inspection, pinholes and small discontinuities may be repaired with no reinspection required of these areas.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.5 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-O. Results of the inspections discussed in Section 3.6 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-O.

3.8 MAPPING

For each IR generated in accordance with Section 3.6, a sketch shall be attached to indicate the location and size

of the applicable coating application (See Note 3). The individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET 1 OF 2

ITEM DESCRIPTION: PROTECTIVE COATINGS

DRAWING: AS-31

REV. NO.:

REF. DCI OR SPEC. & REV. & CHANGE NO.: QI-QP-11.4-10 Rev.

STRUCTURE DESIGNATION

DRAWING OR TEST ELEM. REV. NO.

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION

N&P RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR DATE

| ITEM NO. | INSPECTION ATTRIBUTES | N/A | REQ'D | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | VERIFY SURFACE FREE OF GREASE AND OIL PER PARA. 3.1.1 (REQUIRED ONLY IF SURFACE PREPARATION IS BY ONE OF THE FOLLOWING:) | | | | |
| | a. WATER BLASTING | | | | |
| | b. WATER BLASTING WITH SAND INJECTION | | | | |
| | c. DRY SAND BLASTING | | | | |
| | d. BUSH HAMMERING | | | | |
| 2. | SURFACE PREPARATION IN ACCORDANCE WITH CCP-40. LIST METHODS OF SURFACE PREPARATION: | | | | |
| 3. | VERIFY SURFACE PREPARATION ACCEPTABLE AND ALL LOOSE AND FOREIGN MATERIAL REMOVED PER PARA. 3.1.2.2. | | | | |
| 4. | VERIFY CONCRETE CURING/REPAIRS COMPLETE (SURFACER ONLY) PER PARA. 3.1. and 3.1.2.2) | | | | |
| 5. | VERIFY CURE TIME OF PREVIOUS COAT BEFORE FINISH COATING PER PARA. 3.4.2.2 (FINISH COAT ONLY) | | | | |
| 6. | RECORD TOOK GARGE READINGS PER PARA. 3.5.1 (FINISH COAT REPAIRS ONLY) MIN. DFT: MAX. DFT: AVG. DFT: | | | | |
| 7. | VERIFY COATED SURFACER FREE OF UNACCEPTABLE DEFECTS PRIOR TO FINISH COAT ONLY PER PARA. 3.4.2.1 | | | | |
| 8. | VERIFY MIXING OPERATIONS PER PARA. 3.2 a. LIST MATERIAL NAME: b. BATCH NUMBER(S) OF MATERIAL: THINNER CURING AGENT BASE FILLER | | | | |
| 9. | VERIFY THAT SHELF LIFE OF COATING MATERIALS HAS NOT EXPIRED. | | | | |

(CONTINUED ON NEXT PAGE)

ATTACHMENT 1 (Continued)

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

(SUPPLEMENTAL)

QI-QP-11.4-10, R. ___

Sheet 2 of 2

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. | INSPECTION ATTRIBUTES | | | DATE | Q.C. SIGNATURE |
|---|---|---|---|---|---|
| 10. | VERIFY QUALIFICATION OF APPLICATORS (LIST APPLICATORS) | | | | |
| | | | | | |
| | | | | | |
| 11. | VERIFY AMBIENT CONDITIONS PER PARA. 3.3.1 | | | | |
| | DRY BULB: | WET BULB: | | | |
| | SURFACE TEMP.: | DEW POINT: | | | |
| | RELATIVE HUMIDITY: | | | | |
| 12. | VERIFY AIR SUPPLY FREE OF CONTAMINATION AND THAT TRAP | | | | |
| | FILTERS, AND SEPARATORS ARE INSTALLED | | | | |
| 13. | RECORD WET FILM THICKNESS: | | | | |
| | | | | | |
| 14. | %VOLUME SOLIDS: | | | | |
| | DFT = WET x % VOL SOL | | | | |
| | MIN. WET: | MIN. DFT: | | | |
| | MAX. WET: | MAX. DFT: | | | |
| | AVG. WET: | AVG. DFT: | | | |
| | (RECORD ADDITIONAL SETS OF READINGS IN REMARKS) | | | | |
| 15. | RECORD TOOKE GAGE READING PER PARA. 3.5 | | | | |
| | | | | | |

REMARKS: (DWGS, SPECS, ETC.)

RELATED NCR NO. | I.R. CLOSED | DATE | SIGNATURE

QC INSPECTOR

TUGCO QA

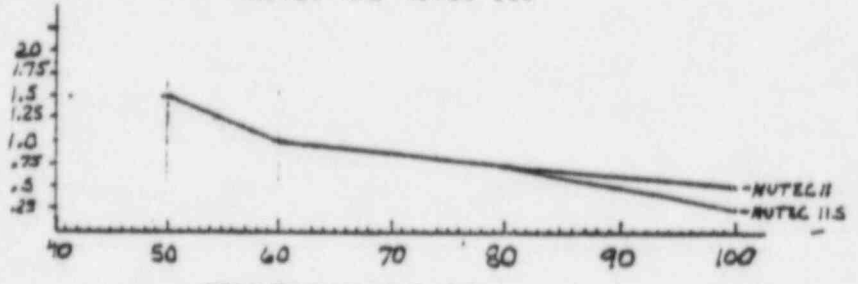
Form No. 1

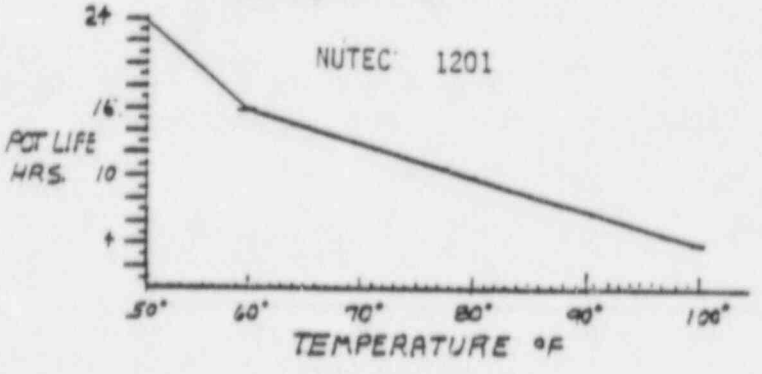
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Nutec 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




NUTEC 1201

INDUCTION TIMES FOR NUTEC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-69 | 30 min. |
| 70-79 | 20 min. |
| 80-90 | 10 min. |
| 91-100 | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
NUTEC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

COMANCHE PEAK STEAM ELECTRIC STATION

## INSPECTION REPORT

SHEET NO. ___ OF ___

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| PROTECTIVE COATINGS | | |

| SPEC NO. | REV. | REF. G.O. DOC. & REV. & CHANGE NO. | MEASURE OR TEST EQUIP. IDENT NO. |
|---|---|---|---|
| | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | ACC | REJECT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.6.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.6.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.6.3. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. _____ I.R. CLOSED ☐ DATE _____ SIGNATURE _____ QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 9 | SEP 10 1982 | 1 of 10 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: Gary R. Williams — DATE: 9/7/82

APPROVED BY: W. E. Ferter — DATE: 9/10/82

APPROVED BY: C. T. Bynum — DATE: 9/10/82

1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

2.0 GENERAL

2.1 PURPOSE AND SCOPE



This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of protective coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS



3.1 SURFACE PREPARATION

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, or grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:
a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation.

The QC inspector shall note the method(s) used on the Inspection Report (IR) (Attachment 1). The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface ground or cut smooth until object is flush.

g) All loosely adhering objects embedded removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects power tool cleaned and solvent wiped.

i) Metal objects larger than 4 square inch primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the

difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. When dry bulb readings are greater than 100°F, the dew point and relative humidity should be determined using the 100°F reading (note in remarks). The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, and loose deposits).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/ separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If unsatisfactory coating still exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S, NUTEC 11 or NUTEC 1201 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials as per Section 4.3.1 and/or Paragraph 4.3.2.5.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S, NUTEC 11 or NUTEC 1201 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| NUTEC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coat.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-69 | 48 hrs. |
| 70-79 | 24 hrs. |
| 80-89 | 18 hrs. |
| 90-100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2.4 Qualification of Applicator(s)

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

3.4.3 Finish Coat Application

3.4.3.1 Pot Life

The QC inspector shall verify that the pot life of NUTEC 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.3.2 Dry Film Thickness

The inspector shall determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

Thickness of coating shall be a minimum of 3 mils and a maximum of 16 mils.

3.5 FINISH COAT REPAIRS

For repairs in the NUTEC 1201 Finish Coat, the QC inspector shall verify the following:

a) Verify that the surface is prepared as required by Reference 1-A.

b) Verify that runs and sags which show evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

c) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

d) Verify that the surface is solvent wiped in accordance with Reference 1-A.

e) Verify that NUTEC 1201 is mixed/thinned per Section 3.2.

f) Verify air supply acceptability per Section 3.4.2.3.

g) Verify that pot life is not exceeded per Section 3.4.3.1.

h) Verify applicator(s) qualification per Section 3.4.2.4.

i) Verify cure time for recoat. Recoating time for NUTEC 1201 is 24 hours.

j) Verify dry film thickness of the coating shall be a minimum of 1 mil and a maximum of 16 mils.

k) Prior to recoating an area due to top coat repair the inspector will take a Tooke Gage reading for the total dry film thickness.

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the Inspector shall verify that the finish coat has cured for the minimum of 24 hours, when visual inspection only is required. A calibrated non-mercury filled dry-bulb thermometer, a calibrated temperature recorder, or local weather station data may be used.

a. Recoating time NUTEC #1201 is 24 hours.

Full Cure time is as follows:

b.

| Temperature °F | Full Cure Time |
|---|---|
| 50-59 | 11 days |
| 60-79 | 8 days |
| 80-99 | 7 days |
| 100 | 5 days |

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the finish coat after a minimum of 24 hours. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) Pinholes - acceptable to extent shown on Attachment 3. Greater than those allowable will be repaired in accordance with Section 3.5.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.5 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-D. Results of the inspections discussed in Section 3.6 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-D.

3.8 MAPPING

For each IR generated in accordance with Section 3.6, a sketch shall be attached to indicate the location and size of the applicable coating application (See Note 3). The individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET NO. ____ OF ____

ITEM DESCRIPTION: PROTECTIVE COATINGS | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION

SPEC NO: AS-31 | REV | REF DWG. & REV. & CHANGE NO: CI-QP-11.4-10, Rev. | MEASURE OR TEST EQUIP. IDENT NO.

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR ____ DATE ____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | Verify surface free of grease and oil per Para. 3.1.1 (Required only if surface preparation is by one of the following: a. Water Blasting b. Water blasing with sand injection c. Dry sand blasting d. Rush hammering | | | | |
| 2. | Surface preparation in accordance with CCP-40. LIST METHODS OF SUPFACE PREPARATION: | | | | |
| 3. | Verify surface preparation accentable and all loose and foreign material removed per Para. 3.1.2.2 | | | | |
| 4 | Verify concrete repairs complete (Surfacer only) | | | | |
| 5. | Verify cure time of previous coat before finish coating per Para. 3.4.2.2 (Finish coat only) | | | | |
| 6. | Verify coated surfacer free of unacceptable defects prior to finish coat only per Para. 3.4.2.1 | | | | |
| 7. | Verify mixing operations per Para. 3.2 a. List material name: b. Batch Number(s) of material: ____ Thinner ____ Curing Agent ____ Base ____ Filler | | | | |
| 8. | Verify that shelf life of coating materials has not expired | | | | |
| 9. | Verify qualification of applicators (List Applicators) | | | | |

ATTACHMENT 1
Sheet 2 of 2

COMANCHE PEAK STEAM ELECTRIC STATION
INSPECTION REPORT

(SUPPLEMENTAL) Sheet ____ of ____

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. (1) | INSPECTION ATTRIBUTES (2) | SAT | UNSAT | DATE | Q.C. SIGNATURE (3) |
|---|---|---|---|---|---|
| 10. | Verify ambient conditons per Para. 3.3.1 | | | | |
| | DRY BULB: WET BULB: | | | | |
| | SURFACE TEMP: DEW POINT: | | | | |
| | RELATIVE HUMIDITY: | | | | |
| 11. | Verify air supply free of contamination and that traps, | | | | |
| | filters, and separators are installed | | | | |
| 12. | Verify pot life not exceeded | | | | |
| 13. | Record wet film thickness: | | | | |
| | %VOLUME SOLIDS: | | | | |
| | DFT = WFT x %Vol. Sol. | | | | |
| | Min. WFT = Min. DFT = | | | | |
| | Max. WFT = Max. DFT = | | | | |
| | Avg. WFT = Avg. DFT = | | | | |
| | (Record additional sets of readings in Remarks) | | | | |

REMARKS: (DWGS, SPECS, ETC.) (4)

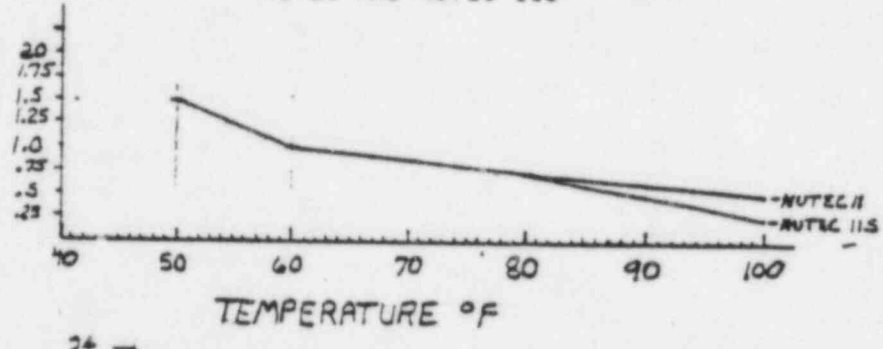
RELATED NCR NO (5) | I.R CLOSED ☐ DATE | SIGNATURE QC INSPECTOR (6)

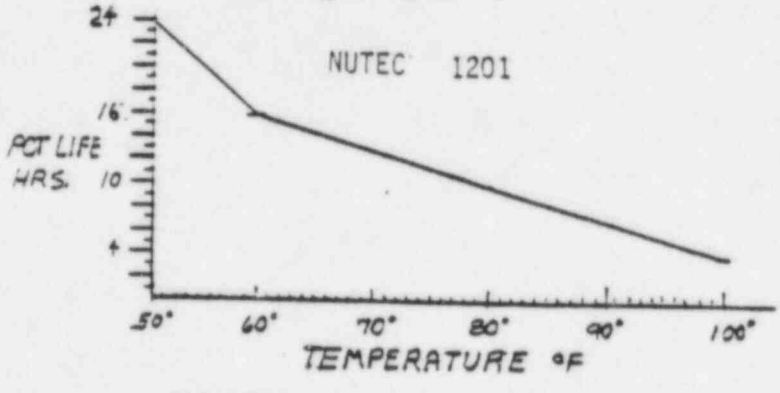
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Nutec 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




INDUCTION TIMES FOR NUTEC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-69 | 30 min. |
| 70-79 | 20 min. |
| 80-90 | 10 min. |
| 91-100 | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
NUTEC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET NO. ___ OF ___

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| PROTECTIVE COATINGS | | |

| SPEC. NO. | REV. | REF. QC DOC. & REV. & CHANGE NO. | MEASURE OR TEST EQUIP. CENT. NO. |
|---|---|---|---|
| | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR ___ DATE ___

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.6.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.6.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.6.3. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. ___ I.R. CLOSED ☐ DATE ___ SIGNATURE ___ QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 8 | AUG 20 1982 | 1 of 18 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: Henry D. Williams 8/19/82 DATE

APPROVED BY: M Elate 8/18/82 DATE

APPROVED BY: [signature] 8/19/82 DATE



1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

2.0 GENERAL



2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of protective coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS

3.1 SURFACE PREPARATION

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, or grinding, or stoning.

NOTE 1: The preblast visual inspection is required only when surface preparation is by one of the following methods:
a. Water blasting
b. Water blasting with sand injection
c. Dry sandblasting
d. Bush hammering

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation.

The QC inspector shall note the method(s) used on the Inspection Report (IR) (Attachment 1). The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface ground or cut smooth until object is flush.

g) All loosely adhering objects embedded removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects power tool cleaned and solvent wiped.

i) Metal objects larger than 1 square inch primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the

difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, and loose deposits).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/ separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If unsatisfactory coating still exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S, NUTEC 11 or Reactic 1201 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials as per Section 4.3.1 and/or Paragraph 4.3.2.5.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S, NUTEC 11 or Reactic 1201 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.4.2.1.

h) Verify that curing is in accordance with Section 3.4.2.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |
| REACTIC 1201 | 1 - 16 mils |

NOTE 1: See Section 3.3.6 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.2 Surfacer Post Application Operation

3.4.2.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat NUTEC 11S and NUTEC 11 prior to the finish coat application for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed from NUTEC 11S or NUTEC 11 surfaces prior to application of finish coat.

c) Dry spray, over spray, damaged areas, skips, holidays, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coat.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.4.2.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-79 | 48 hrs. |
| 80-99 | 24 hrs. |
| 100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.4.2.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2.4 Qualification of Applicator(s)

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

3.4.3 Finish Coat Application

3.4.3.1 Pot Life

The QC inspector shall verify that the pot life of Reactic 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.3.2 Dry Film Thickness

The inspector shall determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

Thickness of coating shall be a minimum of 3 mils and a maximum of 16 mils.

3.5 FINISH COAT REPAIRS

For repairs in the Reactic 1201 Finish Coat, the QC inspector shall verify the following:

a) Verify that the surface is prepared as required by Reference 1-A.

b) Verify that runs and sags which show no evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

c) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

d) Verify that the surface is solvent wiped in accordance with Reference 1-A.

e) Verify that Reactic 1201 is mixed/thinned per Section 3.2.

f) Verify air supply acceptability per Section 3.4.2.3.

g) Verify that pot life is not exceeded per Section 3.4.3.1.

h) Verify applicator(s) qualification per Section 3.4.2.4.

i) Verify cure time for recoat. Recoating time for Reactic 1201 is 24 hours.

j) Verify dry film thickness of the coating shall be a minimum of 1 mil and a maximum of 16 mils.

k) Prior to recoating an area due to top coat repair the inspector will take a Tooke Gage reading for the total dry film thickness.

3.6 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.6.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the Inspector shall verify that the finish coat has fully cured. A calibrated non-mercury filled dry-bulb thermometer, a calibrated temperature recorder, or local weather station data may be used.

Full Cure time is as follows:

| Temperature °F | Full Cure Time |
|---|---|
| 50-59 | 11 days |
| 60-79 | 8 days |
| 80-99 | 7 days |
| 100 | 5 days |

3.6.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the cured finish coat. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of

discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area.

3.6.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.5.

b) Pinholes - acceptable to extent shown on Attachment 3. Greater than those allowable will be repaired in accordance with Section 3.5.

c) Skips, holidays, over spray, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.5.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.5.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.5. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.7 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.5 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-D. Results of the inspections discussed in Section 3.6 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-D.

3.8 MAPPING

For each IR generated in accordance with Section 3.6, a sketch shall be attached to indicate the location and size of the applicable coating application (See Note 3). The

individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET ___ OF ___

ITEM DESCRIPTION: PROTECTIVE COATINGS | IDENTIFICATION NO. | SYSTEM STRUCTURE DESIGNATION

SPEC NO.: AS-31 | REV | REF S.C. DOC. & REV. & CHANGE NO.: QI-QP-11.4-10, Rev. | MEASURE OR TEST EQUIP. SER. NO.

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | Verify surface free of grease and oil per Para. 3.1.1 (Required only if surface preparation is by one of the following: a. Water Blasting b. Water blasing with sand injection c. Dry sand blastinn d. Bush hammering | | | | |
| 2. | Surface preparation in accordance with CCP-40. LIST METHODS OF SUPFACE PREPARATION: | | | | |
| 3. | Verify surface preparation accentable and all loose and foreign material removed per Para. 3.1.2.2 | | | | |
| 4. | Verify concrete repairs complete (Surfacer only) | | | | |
| 5. | Verify cure time of previous coat before finish coating per Para. 3.4.2.2 (Finish coat only) | | | | |
| 6. | Verify coated surfacer free of unacceptable defects prior to finish coat only per Para. 3.4.2.1 | | | | |
| 7. | Verify mixing operations per Para. 3.2 a. List material name: b. Batch Number(s) of material: _____ Thinner _____ Curing Agent _____ Base _____ Filler | | | | |
| 8. | Verify that shelf life of coating materials has not expired | | | | |
| 9. | Verify qualification of applicators (List Applicators) _____ | | | | |

ATTACHMENT 1
Sheet 2 of 2

COMANCHE PEAK STEAM ELECTRIC STATION
**INSPECTION REPORT**

(SUPPLEMENTAL) Sheet_____of_____

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. (1) | INSPECTION ATTRIBUTES (2) | SAT | UNSAT | DATE | Q.C SIGNATURE (3) |
|---|---|---|---|---|---|
| 10. | Verify ambient conditons per Para 3.3.1 | | | | |
| | DRY BULB: WET BULB: | | | | |
| | SURFACE TEMP: DEW POINT: | | | | |
| | RELATIVE HUMIDITY: | | | | |
| 11. | Verify air supply free of contamination and that traps, | | | | |
| | filters, and separators are installed | | | | |
| 12. | Verify pot life not exceeded | | | | |
| 13. | Record wet film thickness: | | | | |
| | %VOLUME SOLIDS: | | | | |
| | DFT = WFT x %Vol. Sol. | | | | |
| | Min. WET = Min. DFT = | | | | |
| | Max. WET = Max. DFT = | | | | |
| | Avg. WFT = Avg. DFT = | | | | |
| | (Record additional sets of readings in Remarks) | | | | |

REMARKS: (DWGS, SPECS, ETC.)

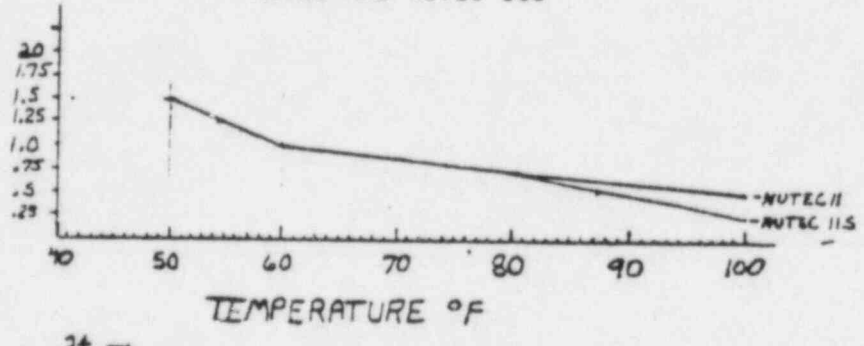
| RELATED NCR NO (5) | I R CLOSED ☐ | DATE | SIGNATURE QC INSPECTOR (6) |
|---|---|---|---|

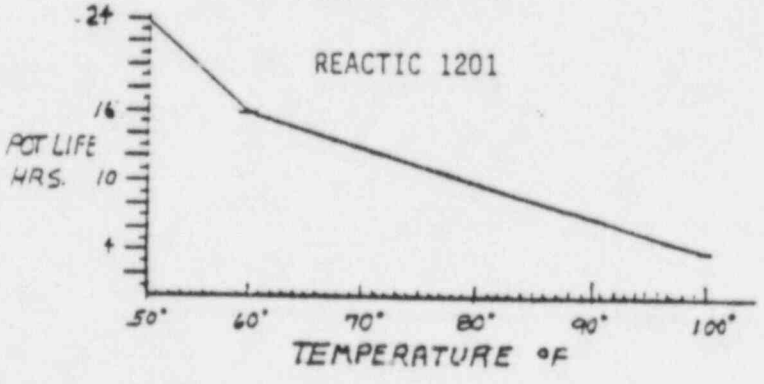
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Reactic 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




INDUCTION TIMES FOR REACTIC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-79 | 35 min. |
| 80-89 | 15 min. |
| 90-99 | 05 min. |
| 100 + | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
REACTIC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

COMANCHE PEAK STEAM ELECTRIC STATION

## INSPECTION REPORT

SHEET NO. ____ OF ____

| ITEM DESCRIPTION | IDENTIFICATION NO. | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| PROTECTIVE COATINGS | | |

| SPEC. NO. | REV. | REF. Q.C. DOC. & REV. & CHANGE NO. | MEASURE OR TEST EQUIP. DEV. NO. |
|---|---|---|---|
| | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR ____ DATE ____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.6.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.6.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.6.3. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO. ____ I.R. CLOSED ☐ DATE ____ SIGNATURE ____ QC INSPECTOR

FOR INFORMATION ONLY

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET NO. ____ OF ____

ITEM DESCRIPTION: PROTECTIVE COATINGS | CENTRACON NO. | SYSTEM/STRUCTURE DESIGNATION

SPEC NO.: AS-31 | REV. | REF. DOC. & REV. & CHANGE NO.: QI-QP-11.4-10 | MEASURE OR TEST EQUIP. IDENT NO.

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION

INSP. RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | | |
| | ORIGINAL REPAIR | | | | |
| 1. | Verify surface free of grease and oil per Para. 3.1.1 (Required only if surface preparation is by one of the following: a. Water blasting b. Water blasting with sand injection c. Dry sand blasting d. Bush hammering | | | | |
| 2. | Surface preparation in accordance with CCP-40 LIST METHODS OF SURFACE PREPARATION: | | | | |
| 3. | Verify surface preparation acceptable and all loose and foreign material removed per Paragraph 3.1.2.2. | | | | |
| 4. | Verify concrete repairs complete (Surfacer Only) | | | | |
| 5. | Verify cure time of previous coat before finish coating per Paragraph 3.3.6.2 (Finish Coat Only) | | | | |
| 6. | Verify previously coated surface acceptability per Paragraph 3.4.1.2 (Finish Coat Only) | | | | |
| 7. | Verify mixing operations per Paragraph 3.2 a. List Material name: b. Batch Number(s) of Material: Thinner Curing Agent Base Filler | | | | |
| 8. | Verify that shelf life of coating materials has not expired. | | | | |
| 9. | Verify qualification of applicators (List Applicators) | | | | |

ATTACHMENT I

Sheet 2 of 2

QI-QP-11.4-10

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

(SUPPLEMENTAL) Sheet_____ of_____

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | Q.C. SIGNATURE |
|---|---|---|---|---|---|
| 10. | Verify ambient conditions per Paragraph 1.1.1: | | | | |
| | DRY BULB: _____ WET BULB: _____ | | | | |
| | SURFACE TEMP: _____ DEW POINT: _____ | | | | |
| | RELATIVE HUMIDITY: _____ | | | | |
| 11. | Verify air supply free of contamination and that trap filters and separators are installed. | | | | |
| 12. | Verify pot life not exceeded. | | | | |
| 13. | Verify coated surface free of unacceptable defects per Paragraph 1.1.6 (Surfacer Only) | | | | |
| 14. | Record Wet Film Thickness: | | | | |
| | * VOLUME SOLIDS: _____ | | | | |
| | DFT = WFT x % Vol. Sol. | | | | |
| | Min. WFT = _____ Min. DFT = _____ | | | | |
| | Max. WFT = _____ Min. DFT = _____ | | | | |
| | Avg. WFT = _____ Avg. DFT = _____ | | | | |
| | (Record additional sets of readings in Remarks) | | | | |

REMARKS: (DWGS, SPECS, ETC.)

RELATED NCR NO. | I.R CLOSED ☐ DATE | SIGNATURE _____ QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 5 | FEB 10 1982 | 1 of 18 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: [signature] DATE 2/10/82

APPROVED BY: [signature] DATE 2-10-82

APPROVED BY: [signature] for B.C. Scott DATE 2/10/82

1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

2.0 GENERAL

2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of protective coatings on a concrete substrate inside the Reactor Containment Buildings.

3.0 INSTRUCTIONS

FOR INFORMATION ONLY

3.1 SURFACE PREPARATION

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, or grinding, or stoning.

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation.

The QC inspector shall note the method(s) used on the Inspection Report (IR) (Attachment 1). The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface ground or cut smooth until object is flush.

g) All loosely adhering objects embedded removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects power tool cleaned and solvent wiped.

i) Metal objects larger than 1 square inch primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACER APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. The surface temperature shall be determined by placing a calibrated Range 0-110°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, and loose deposits).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/ separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Qualification of Applicator(s)

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

3.3.6 Surfacer Post Application Operation

3.3.6.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat for the following defects:

a) Runs or sags which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed prior to application of finish coat.

c) Dry spray, overspray, skips, holidays, pinholes, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.3.6.2 Surfacer Cure

The inspector shall monitor ambient temperature after the surfacer is applied to determine when cure is adequate for topcoating operations to commence. A calibrated non-mercury filled dry bulb thermometer, calibrated temperature recorder or local weather station data may be used.

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-79 | 48 hrs. |
| 80-99 | 24 hrs. |
| 100 | 12 hrs. |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.3.6.3 Dry Film Thickness

The QC inspector shall determine the DFT of the applied surfacer by taking wet film thickness spot measurements and multiplying each reading by the % volume solids (taking in account any thinner used). A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.7 Surfacer Repair Work

3.3.7.1 Repair of Runs and Sags

Runs and sags which show evidence of mudcracking shall be abraded flush with the surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.7.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If pinholes or discontinuities exist, then the area shall be repaired in accordance with Section 3.3.7.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.7.3 Repairs When Touch Up or Recoating is Necessary

For repairs that require either touch up or recoating with NUTEC 11S or NUTEC 11 in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from loose and foreign materials.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify that NUTEC 11S or NUTEC 11 is mixed/thinned in accordance with Section 3.2.

e) Verify pot life is not exceeded per Attachment 2.

f) Verify qualification of applicator(s) per Section 3.3.5.

g) Visually inspect per Section 3.3.6.1.

h) Verify that curing is in accordance with Section 3.3.6.2.

i) Verify dry film thickness in the repair area is in accordance with the following millage requirements:

| | |
|---|---|
| NUTEC 11S | 10 - 35 mils |
| NUTEC 11 | 3 - 20 mils |

NOTE 1: See Section 3.3.6.3 and Attachment 4 for DFT calculation using Wet Film Thickness measurement and percent volume solids.

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.1.2 Coated Surface Acceptability

The inspector shall visually reinspect the NUTEC 11S or NUTEC 11 coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter) and stains.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coating.

Rust (red) and zinc oxide (white) stains are acceptable provided all loose particles have been removed from the NUTEC 11S or NUTEC 11 surface by approved cleaning operations per Reference 1-A.

3.4.1.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.1.4 Qualification of Applicator(s)

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

3.4.2 Finish Coat Application

3.4.2.1 Pot Life

The QC inspector shall verify that the pot life of Reactic 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.2.2 Dry Film Thickness

The inspector shall determine the DFT of the applied finish coat by taking wet film thickness spot measurements and multiplying each reading by the % volume solids. A minimum of five (5) separate spot wet film thickness (WFT) measurements (See Note 1) spaced evenly over the coated area (See Note 2) shall be taken.

NOTE 1: A spot measurement is a series of three measurements in the same general area. The WFT gage 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: For small areas of coating, five (5) spot measurements shall be taken. For larger areas, 5 spot measurements shall be taken for each 100 square feet (or fraction thereof) of coating.

(See Attachment 4 for method of determining percent volume solids.)

Thickness of coating shall be a minimum of 3 mils and a maximum of 12 mils.

3.4.3 Finish Coat Repairs

For repairs in the Reactic 1201 Finish Coat, the QC inspector shall verify the following:

a) Verify that the surface is prepared as required by Reference 1-A.

b) Verify that runs and sags which show no evidence of mudcracking are abraded flush with the surrounding surface. If after abrading the finish coat is still unsatisfactory, verify that unsatisfactory coating is removed to the substrate and repaired per Steps (c) through (j) below.

c) Verify that all loose particles and foreign particles are removed from surface in accordance with Reference 1-A.

d) Verify that the surface is solvent wiped in accordance with Reference 1-A.

e) Verify that Reactic 1201 is mixed/thinned per Section 3.2.

f) Verify air supply acceptability per Section 3.4.1.3.

g) Verify that pot life is not exceeded per Section 3.4.2.1.

h) Verify applicator(s) qualification per Section 3.4.1.4.

i) Verify cure time for recoat. Recoating time for Reactic 1201 is 24 hours.

j) Verify dry film thickness per Section 3.4.2.2.

3.5 FINISH COAT FINAL ACCEPTANCE INSPECTION PRIOR TO AREA TURNOVER

Immediately prior to turnover of each area within the RCB's, a final visual inspection in accordance with the following subsections shall be performed on exposed finish coated concrete substrates.

3.5.1 Finish Coat Cure

Prior to performing finish coat final acceptance inspections, the Inspector shall verify that the finish coat has fully cured. A calibrated non-mercury filled dry-bulb thermometer, a calibrated temperature recorder, or local weather station data may be used.

Full Cure time is as follows:

| Temperature °F | Full Cure Time |
|---|---|
| 50-59 | 11 days |
| 60-79 | 8 days |
| 80-99 | 7 days |
| 100 | 5 days |

3.5.2 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the cured finish coat. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of discontinuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area.

3.5.3 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and sags which show no evidence of mudcracking are acceptable. Unacceptable runs and sags will be repaired in accordance with Section 3.4.3.

b) Pinholes - acceptable to extent shown on Attachment 3. Greater than those allowable will be repaired in accordance with Section 3.4.3.

c) Skips, holidays, damaged areas, blisters, bubbles, dry spray, excessive orange peel, fish eyes, and gross discontinuities will be repaired in accordance with Section 3.4.3.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.4.3.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.4.3. This requirement shall not be applicable to areas exhibiting runs and sags which have been abraded.

3.6 DOCUMENTATION

Results of all inspections discussed in Sections 3.1 through 3.4 shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-D. Results of the inspections discussed in Section 3.5 shall be documented on an Inspection Report, Attachment 5 in accordance with Reference 1-D.

3.7 MAPPING

For each IR generated in accordance with Section 3.6, a sketch shall be attached to indicate the location and size of the applicable coating application (See Note 3). The individual sketches from each IR shall be used to prepare composite maps which shall cover in scope a specific room, compartment, quadrant or cavity within the Reactor Containment Buildings.

For concrete surfaces which have received coatings prior to 11/11/81 (issuance date of Rev. 2 of this procedure) a unique number shall be assigned to the original inspection checklist. This number shall be transferred to the applicable area on the composite map in order to provide traceability to the original checklist. For any coatings applied after 11/11/81, the IR number shall be transferred to the area on the composite map.

The composite maps shall be maintained by the QC Supervisor, or his designee, until the entire surface in a given area has been coated, at which time, the completed map shall be transmitted to the PPRV.

NOTE 1: Separate composite maps shall be maintained for the surfacer and finish coats.

NOTE 2: Coating repairs requiring recoating shall be mapped but repairs requiring only touch up need not be mapped.

NOTE 3: The following parameters (as necessary) should be considered for descriptions of test areas on the sketch.

a. Bottom and Top Elevations (vertical and diagonal surfaces) or Elevation of Surface (horizontal surfaces).

b. Dimensions in relation to Azimuths, column lines, reactor centerline or other components of known location.

c. Whether concrete substrate is wall, ceiling, floor, beam or column.

d. Quadrant, compartment, cavity or room in which inspection area is located.

e. Unit number.

f. Relation of surface to Cardinal Directions (i.e. North, South, etc.).

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

ITEM DESCRIPTION: PROTECTIVE COATINGS

DRAWING NO.: AS-31

REV.:

REF. SPEC. SEC. & REV. & CHANGE NO.: QI-QP-11.4-10

MEASURE & TEST EQUIP. DESIG. NO.:

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE-TEST INSPECTION

N&P RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR: DATE:

| ITEM NO. | INSPECTION ATTRIBUTES | N/A | DATE | QC SIGNATURE |
|---|---|---|---|---|
| | COAT NO.: SURFACER FINISH COAT | | | |
| | ORIGINAL REPAIR | | | |
| 1. | Verify surface free of grease and oil | | | |
| 2. | Surface preparation in accordance with CCP-40 | | | |
| | LIST METHODS OF SURFACE PREPARATION: | | | |
| 3. | Verify surface preparation acceptable and all loose and foreign material removed per Paragraph 3.1.2.2. | | | |
| 4. | Verify concrete repairs complete (Surfacer Only) | | | |
| 5. | Verify cure time of previous coat before finish coating (Finish Coat Only) | | | |
| 6. | Verify previously coated surface acceptability per Paragraph 3.4.1.2 (Finish Coat Only) | | | |
| 7. | Verify mixing operations per Paragraph 3.2 | | | |
| | a. List Material name: | | | |
| | b. Batch Number(s) of Material: | | | |
| | _____ Base | | | |
| | _____ Curing Agent | | | |
| | _____ Thinner | | | |
| 8. | Verify qualification of applicators (List Applicators) _____ | | | |
| | _____ | | | |
| | _____ | | | |
| 9. | Verify ambient conditions: | | | |
| | DRY BULB: WET BULB: | | | |
| | SURFACE TEMP: DEW POINT: | | | |
| | RELATIVE HUMIDITY: | | | |
| 10. | Verify air supply free of contamination and that traps, filters and separators are installed. | | | |
| 11. | Verify pot life not exceeded. | | | |

ATTACHMENT 1 (Continued)

COMANCHE PEAK STEAM ELECTRIC STATION QI-QP-11.4-10
INSPECTION REPORT Sheet 2 of 2
(SUPPLEMENTAL) Sheet ____ of ____

FOR FULL HEADINGS, SEE SHEET 1 NO.

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | Q.C. SIGNATURE |
|---|---|---|---|---|---|
| 12. | Verify coated surface free of unacceptable defects. | | | | |
| | (Surfacer Only) | | | | |
| 13. | Record wet film thickness: | | | | |
| | %VOLUME SOLIDS: ____ | | | | |
| | DFT = WFT x % Vol. Sol. | | | | |
| | Min. WFT = ____ Min. DFT = ____ | | | | |
| | Max. WFT = ____ Max. DFT = ____ | | | | |
| | Avg. WFT = ____ Avg. DFT = ____ | | | | |
| | (Record additional sets of readings in Remarks) | | | | |

REMARKS: (Dwgs, SPECS, ETC.)

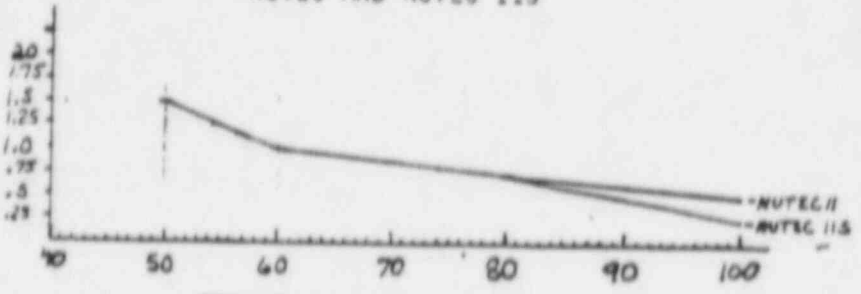
RELATED NCR NO. ____ I.R. CLOSED ____ DATE ____ SIGNATURE ____ QC INSPECTOR

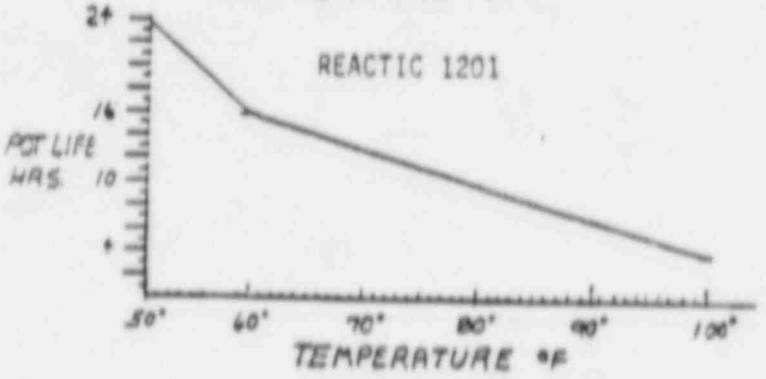
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Reactic 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




INDUCTION TIMES FOR REACTIC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-79 | 35 min. |
| 80-89 | 15 min. |
| 90-99 | 05 min. |
| 100 + | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
REACTIC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.

ATTACHMENT 5

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET ___ OF ___

| ITEM OR SCRIPTION | IDENTIFICATION NO | SYSTEM / STRUCTURE DESIGNATION |
|---|---|---|
| PROTECTIVE COATINGS | | |

| SPEC NO | REV | REF QC DOC & REV & CHANGE NO | MEASURE OR TEST EQUIP IDENT NO |
|---|---|---|---|
| AS-31 | | QI-QP-11.4-10, Rev. | |

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☐ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRE TEST INSPECTION

NSP RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW

QC INSPECTOR _____ DATE _____

| ITEM NO | INSPECTION ATTRIBUTES | N/A | SATISFACTORY | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | FINISH COAT FINAL ACCEPTANCE | | | | |
| 1. | Verify cure of finish coat per Para. 3.5.1. | | | | |
| 2. | Verify finish coat continuity per Para. 3.5.2. | | | | |
| 3. | Visually inspect finish coat per Para. 3.5.3. | | | | |

REMARKS (DWGS, SPECS, ETC.)

RELATED NCR NO _____ I R CLOSED ☐ DATE _____ SIGNATURE _____ QC INSPECTOR

| TEXAS UTILITIES GENERATING CO. CPSES | INSTRUCTION NUMBER | REVISION | ISSUE DATE | PAGE |
|---|---|---|---|---|
| | QI-QP-11.4-10 | 2 | NOV 11 1981 | 1 of 15 |

INSPECTION OF CONCRETE SUBSTRATE SURFACE PREPARATION AND COATINGS APPLICATION AND REPAIR

PREPARED BY: George C. Williams 11/4/81 DATE

APPROVED BY: [signature] 11/11/81 DATE

APPROVED BY: R. F. Tolson 11/11/81 DATE

1.0 REFERENCES

1-A CCP-40, "Protective Coating of Concrete Surfaces"

1-B QI-QP-11.0-5, "Inspection of Concrete Repair"

1-C CCP-30, "Coating Steel Substrate Inside Reactor Buildings and Radiation Areas"

1-D CP-QP-18.0, "Inspection Reports"

2.0 GENERAL

2.1 PURPOSE AND SCOPE

This instruction shall describe the methods used by Quality Control personnel while performing inspections of application of protective coatings on a concrete substrate inside the Reactor Building.

3.0 INSTRUCTIONS

3.1 SURFACE PREPARATION

3.1.1 Preblast Cleaning Operations

Prior to surface preparation, the QC inspector shall visually examine the surface to be water blasted for heavy deposits of oil and grease. Any heavy oil or grease deposits shall be removed by steam cleaning, trisodium phosphate washing with a mixture of 3-6 pounds TSP per gallon of water, or use of an Imperial recommended detergent.

The QC inspector shall also verify that any detrimental surface irregularities such as projections, fins, or ridges shall be removed by bush hammering, hand or power tooling, or grinding, or stoning.

3.1.2 Surface Preparation

3.1.2.1 Methods of Surface Preparation

Water blasting, water blasting with sand injection, acid etching, sand blasting, and power tooling are all acceptable methods of surface preparation.

The QC inspector shall note the method(s) used on the Inspection Report (IR) (Attachment 1). The inspector shall verify that the method(s) used are in compliance with Reference 1-A. In the event TSP is used, the QC inspector shall verify that the area is flushed with clean water. If sand blasting is used, the QC inspector shall verify that a trap, filter, or separator is installed in the air line.

3.1.2.2 Post Blasting Operations

After surface preparation, the QC inspector shall visually examine the surface to verify the following:

a) The surface shall be free of construction dust, laitance, and loose deposits, and all adjacent areas cleaned to avoid contamination.

b) All holes greater than 1/2 inch in depth are repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

c) All sharp projections removed.

d) Markings (ink, pencil, chalk, felt tip marker, etc.) solvent wiped in accordance with Reference 1-A.

e) Marking paint removed in accordance with Reference 1-A.

f) Objects protruding from surface ground or cut smooth until object is flush.

g) All loosely adhering objects embedded removed.

h) Smooth embedded objects such as plastic or steel roughened. Metal objects power tool cleaned and solvent wiped.

i) Metal objects larger than 1 square inch primed in accordance with Reference 1-C.

j) Surface is free of grease, oil, and curing membranes. If grease and oil remain after TSP cleaning, the area shall be chipped out and repaired with dry pack or epoxy grout and inspected by Civil QC in accordance with Reference 1-B.

3.2 MIXING OPERATIONS

3.2.1 Materials

The QC inspector shall verify that the materials to be used are in accordance with Reference 1-A and that each component is identified by a batch number. The QC inspector shall also verify that the shelf life (See Attachment 2) has not expired.

3.2.2 Mixing/Thinning

The QC inspector shall witness all mixing/thinning operations, and verify that mixing/thinning is performed in accordance with Reference 1-A. Induction times for finish mixes are shown in Attachment 2.

3.3 SURFACE APPLICATION

3.3.1 Ambient Conditions

The inspector shall determine air temperature, relative humidity, dew point, and surface temperature of concrete substrate. A calibrated non-mercury filled dry bulb thermometer or a calibrated temperature recorder (Bristol 4069 TH or equivalent) shall be used for air temperature determination. A calibrated non-mercury filled wet bulb thermometer or a calibrated humidity recorder (Bristol 4069 TH or equivalent) shall be used to determine relative humidity. The dew point shall be determined by the difference in dry and wet bulb temperature using the U.S. Department of Commerce Weather Bureau Psychrometric Tables, W.B. No. 235. The surface temperature shall be determined by placing a calibrated Range 0-250°F thermometer or equivalent in contact with the surface to be coated. The thermometer probe shall remain in contact with the surface until the temperature reading stabilizes.

Minimum and maximum values of surface and ambient temperatures shall be 50°F and 100°F respectively. Infrequent dips in temperature to 40°F is permissible during application and/or cure; however, the elapsed time the temperature is below 50°F shall be added to the cure time. Application of the coating shall not begin unless the surface temperature is 5°F above the dew point. Pot life shall be as stated in Attachment 2.

Humidity may vary as high as 100%; however, free standing water shall be removed. Coating application over a damp surface is permissible. Under no conditions shall NUTEC 11S be applied to a surface containing free standing water. Methods of identifying free standing water are shown in Reference 1-A.

3.3.2 Surface Acceptability

The QC inspector shall visually examine the substrate surface immediately prior to surfacer application to verify that it is free of contamination (dust, laitance, and loose deposits).

3.3.3 Air Supply Acceptability

The inspector shall inspect the air supply system for pressure pots and spray guns for suitable filters/traps/ separators. The effectiveness of these items shall be verified by exposing a piece of white paper or cloth to a blast of air for approximately 30 seconds. The cloth shall show no evidence of moisture, oil or foreign matter when examined.

3.3.4 Pot Life

The QC inspector shall verify that the pot life as shown in Attachment 2 is not exceeded.

3.3.5 Surfacer Post Application Operation

3.3.5.1 Visual Defects Inspection

The inspector shall perform a visual inspection of the surfacer coat for the following defects:

a) Runs or sags, 35 mils or less DFT which show no evidence of mudcracking are acceptable.

b) Stains - rust (red) and zinc oxide (white) stains are acceptable provided loose particles are removed prior to application of finish coat.

c) Dry spray, overspray, skips, holidays, pinholes, blisters, bubbling, fisheyes, orange peel, mudcracking, oil and grease, and embedded foreign material are all unacceptable.

Unacceptable conditions will be repaired in accordance with Reference 1-A.

3.3.5.2 Surfacer Cure

The inspector shall monitor ambient conditions (temperature, humidity) after the surfacer is applied to determine when "tack-free" and when cure is adequate to topcoating operations to commence. A calibrated wet bulb/dry bulb thermometer, calibrated temperature/humidity recorder or local weather station data may be used.

TACK FREE TIME

| Temperature °F | #11 | #11S |
|---|---|---|
| 50-59 | 6 hrs. | 8 hrs. |
| 60-79 | 4 hrs. | 6 hrs. |
| 80-99 | 2 hrs. | 4 hrs. |
| 100 | 1 hr. | 2 hrs. |

Curing time shall be as follows:

| Temperature 0°F | Curing Time Before Topcoating with 1201 |
|---|---|
| 50-59 | 72 hrs. |
| 60-79 | 48 hrs. |
| 80-99 | 24 hrs. |
| 100 | 12 hrs. |

| Temperature °F | Full Cure 11, 11S |
|---|---|
| 50-59 | 10 days |
| 60-69 | 8 days |
| 70-79 | 7 days |
| 80-89 | 6 days |
| 90-100 | 5 days |

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

NUTEC 11S may be touched up or recoated with #11 or #11S as soon as the initial coat has dried such that the paint shall not adhere to the thumb when downward pressure is exerted on the paint film while turning a 90° angle. (This does not refer to the two pass application method.)

3.3.5.3 Dry Film Thickness

The QC inspector shall determine the DFT of the cured surface by taking sufficient wet film thickness readings and multiplying each reading by the % volume solids (taking in account any thinner used). Thickness of surfacer may vary between 10 and 35 mils. (See Attachment 4 for method of determining percent volume solids.)

3.3.6 Surfacer Repair Work

3.3.6.1 Repair of Runs and Sags

Runs and sags greater than 35 mils shall be abraded to surrounding surface. If after abrading, surfacer is unsatisfactory, remove unsatisfactory coating to substrate and reapply the surfacer. If after abrading the surfacer is satisfactory, no further repair is necessary.

3.3.6.2 Repair of Embedded Foreign Particles

Embedded foreign particles shall be removed by abrading. If pinholes or discontinuities exist, then the area shall be repaired in accordance with Section 3.3.6.3.

NOTE: Rust stains residue, not necessarily the stain, shall be removed with bristle brush and water or Imperial Thinner #DL-54.

3.3.6.3 Repairs When Touch Up or Recoating is Necessary

The repairs that require either touch up or recoating in accordance with Reference 1-A, the QC inspector shall:

a) Verify ambient conditions are acceptable per Section 3.3.1.

b) Verify surface has been prepared in accordance with Reference 1-A and is free from foreign matter.

c) Verify acceptable materials (per Reference 1-A) are used, and shelf life is not exceeded.

d) Verify pot life is not exceeded per Attachment 2.

e) Verify that curing is is accordance with Section 3.3.5.2.

f) Verify dry film thickness in the repair area is between 10 and 35 mils. (See Section 3.3.5.3.)

3.4 FINISH COAT APPLICATION

3.4.1 Preapplication Inspection

3.4.1.1 Ambient Conditions

Prior to finish coat application, the QC inspector shall determine ambient conditions in accordance with Section 3.3.1.

3.4.1.2 Coated Surface Acceptability

The inspector shall visually reinspect the NUTEC 11S or NUTEC 11 coated surface just prior to finish coat application for evidence of contamination (oil, grease, foreign matter) and stains.

Contamination is not allowed. It must be removed per Reference 1-A prior to finish coating.

Rust (red) and zinc oxide (white) stains are acceptable provided all loose particles have been removed from the NUTEC 11S or NUTEC 11 surface by approved cleaning operations per Reference 1-A.

3.4.1.3 Air Supply Acceptability

The QC inspector shall verify the air supply is acceptable per Section 3.3.3.

3.4.2 Finish Coat Application

3.4.2.1 Pot Life

The QC inspector shall verify that the pot life of Reactic 1201 has not been exceeded. Pot life is shown on Attachment 2.

3.4.2.2 Visual Examination

The QC inspector shall visually examine the finish coated surface for the following defects:

a) Runs and Sags - runs and sags will be removed and repaired in accordance with Section 3.4.3.

b) Pinholes - acceptable to extent shown on Attachment 3. Greater than those allowable will be repaired in accordance with Section 3.4.3.

c) Skips, holidays, damaged areas, blisters, bubbles, and gross discontinuities will be repaired in accordance with Section 3.4.3.

d) All contamination (foreign particles) is unacceptable. Area must be repaired per Section 3.4.3.

e) Color and Gloss Uniformity - the coated surface shall have uniform color and gloss. Those surfaces which are nonuniform shall be repaired in accordance with Section 3.4.3.

3.4.2.3 Finish Coat Cure

The inspector shall monitor the ambient temperature and humidity after the finish coat is applied (including touch up) to determine when cure is adequate for final acceptance. A calibrated non-mercury filled wet/dry bulb thermometer, a calibrated termperature/humidity recorder or local weather station data may be used.

Recoating time for Reactic 1201 is 24 hours.

Full Cure time is as follows:

| Temperature °F | Full Cure Time |
|---|---|
| 50-59 | 11 days |
| 60-79 | 8 days |
| 80-99 | 7 days |
| 100 | 5 days |

3.4.2.4 Dry Film Thickness

The inspector shall determine the DFT of the cured surface by taking sufficient wet film thickness readings and multiplying each reading by the % volume solids. (See Attachment 4 for method of determining percent volume solids.)

Thickness of coating shall be a minimum of 3 mils and a maximum of 12 mils.

3.4.2.5 Finish Coat Continuity Inspection

The QC inspector shall visually inspect the continuity of the cured finish coat. The maximum number of permissible pinholes is shown on Attachment 3. No more than 2 points of discontinuity shall occur within an area having a radius of six inches (using a point of continuity as the center of the circle). No more than 40% of the total number of allowable points of discontinuity shall occur within any one area equal to 25% of the total area.

3.4.3 Finish Coat Repairs

For repairs in the Reactic 1201 Finish Coat, the QC inspector shall verify the following:

a) Verify that the surface is prepared as required by Reference 1-A.

b) Verify that all loose particles are removed from surface.

c) Verify that the surface is solvent wiped in accordance with Reference 1-A.

d) Verify that Reactic 1201 is mixed/thinned per Section 3.2.

e) Verify air supply acceptability per Section 3.4.1.3.

f) Verify that pot life is not exceeded per Section 3.4.2.1.

g) Perform visual examination per Section 3.4.2.2.

h) Verify cure per Section 3.4.2.3.

i) Verify dry film thickness per Section 3.4.2.4.

j) Verify finish coat continuity per Section 3.4.2.5.

3.5 DOCUMENTATION

Results of all inspections shall be documented on an Inspection Report, Attachment 1, in accordance with Reference 1-D.

ATTACHMENT 1

COMANCHE PEAK STEAM ELECTRIC STATION

INSPECTION REPORT

SHEET ___ OF ___

ITEM DESCRIPTION: PROTECTIVE COATINGS | IDENTIFICATION NO | SYSTEM STRUCTURE DESIGNATION

DRAWING: AS-31 REV. | REF. QI QSC & REV. & CHANGE NO: QI-QP-11.4-10 | WELDER OR WELD FILLER ITEM NO

☐ IN PROCESS INSPECTION ☐ PRE INSTALLATION VERIFICATION ☒ INSTALLATION INSPECTION ☐ FINAL INSPECTION ☐ PRETEST INSPECTION

NSP RESULTS

☐ INSPECTION COMPLETED, ALL APPLICABLE ITEMS SATISFACTORY

☐ INSPECTION COMPLETED, UNSATISFACTORY ITEMS LISTED BELOW | QC INSPECTOR | DATE

| ITEM NO | INSPECTION ATTRIBUTES | ACCEPT | REJECT | DATE | QC SIGNATURE |
|---|---|---|---|---|---|
| | COAT NO. 1. ☐ 2. ☐ 3. ☐ 4. ☐ | | | | |
| | ORIGINAL ___ REPAIR ☐ | | | | |
| | METHOD OF COATING APPLICATION: | | | | |
| 1. | Verify surface free of grease and oil. | | | | |
| 2. | Surface preparation in accordance with CQP-40. | | | | |
| | LIST METHODS OF SURFACE PREPARATION: | | | | |
| 3. | Verify surface preparation acceptable. | | | | |
| 4. | Verify concrete repairs complete (if required) | | | | |
| 5. | Verify mixing operations per Paragraph 3.2 | | | | |
| | a. List Material name: | | | | |
| | b. Batch Number(s) of Material: | | | | |
| | ___ Base Filler | | | | |
| | Curing Agent | | | | |
| | Thinner | | | | |
| | c. Time Mixed: | | | | |
| 6. | Verify ambient conditions: | | | | |
| | DRY BULB: WET BULB: | | | | |
| | SURFACE TEMP: DEW POINT: | | | | |
| | RELATIVE HUMIDITY: | | | | |
| 7. | Verify air supply free of contamination and traps/ filters/ and separators. | | | | |
| 8. | Verify pot life not exceeded. | | | | |
| 9. | Verify coated surface free of unacceptable defects | | | | |
| 10. | Record Wet Film Thickness: ___ | | | | |
| | % VOLUME SOLIDS: | | | | |
| | DFT = WFT x % Vol. Sol. * | | | | |

(CONTINUED ON NEXT PAGE)

ATTACHMENT 1 (Continued)

QI-QP-11.4-10, Rev. _____

COMANCHE PEAK STEAM ELECTRIC STATION Sheet 2 of 2

INSPECTION REPORT

(SUPPLEMENTAL)

| ITEM NO. | INSPECTION ATTRIBUTES | SAT | UNSAT | DATE | Q.C. SIGNATURE |
|---|---|---|---|---|---|
| 11. | Verify surface continuity (finish coat only). | | | | |
| 12. | Verify Cure Time. | | | | |

REMARKS (DWGS, SPECS, ETC.)

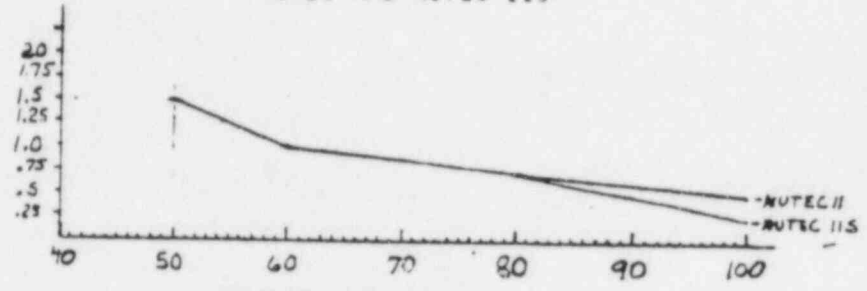
| RELATED NCR NO | I.R. CLOSED | DATE | SIGNATURE _____ QC INSPECTOR |
|---|---|---|---|

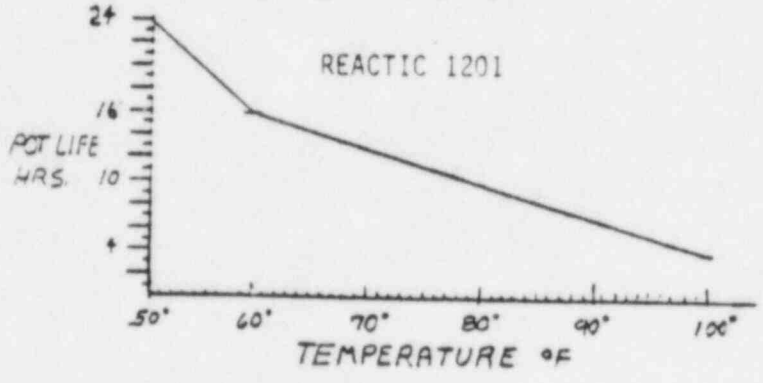
ATTACHMENT 2

| Material | Shelf Life |
|---|---|
| Nutec 11 Base & Curing Agent | 12 months |
| Nutec 11S Base & Curing Agent | 12 months |
| Reactic 1201 Base & Curing Agent | 12 months |
| Thinnners and Sand Filler | Unlimited |

POT LIFE

NUTEC AND NUTEC 11S




REACTIC 1201

INDUCTION TIMES FOR REACTIC 1201

| Temp. (°F) | |
|---|---|
| 50-59 | 45 min. |
| 60-79 | 35 min. |
| 80-89 | 15 min. |
| 90-99 | 05 min. |
| 100 + | None |

ATTACHMENT 3

| Surface Area (sq. ft.) | Total Allowable Number of Points of Discontinuity |
|---|---|
| Up to 10 | 1 |
| 10-50 | 2 |
| 50-100 | 5 |
| 100-500 | 10 |
| 500-1000 | 15 |
| 1000-5000 | 25 |

No gross discontinuities are acceptable.

ATTACHMENT 4

Percent volume solids for unthinned concrete coatings are as follows:

NUTEC 11 - 78%
NUTEC 11S - 88%
REACTIC 1201 - 54%

EXAMPLE: 11 mils WFT X 54% = 5.94 mils DFT

For thinned mixes:

$$\% \text{ Volume Solids} = \frac{\text{Volume of unthinned coating}}{\text{Volume of unthinned coating + Volume thinner}} \times \% \text{ Volume Solids (unthinned)}$$

NOTE: In above equation, volume must be expressed in the same unit of measure.