



LABORATORY TEST REPORT

August 11, 1978

Testing Project: 01684
FINAL REPORT

SUBJECT: LOCA; Amercoat D-6/Phenoline 305 Finish and the Comanche Peak FSAR LOCA Curve

REFERENCE: Comanche Peak Nuclear Station; Mr. Don Sutton; Mr. Keith Falk; Mr. Dan W. McBride; Testing Project 01651

PURPOSE: To determine the performance of 1c Amercoat D-6/1c Phenoline 305 Finish when exposed to the Comanche Peak Steam Electric Station, FSAR LOCA curve and evaluated according to ANSI N101.2-1972, Section 4.5 as interpreted by Carboline.

CONCLUSION: After the seven days of the Comanche Peak FSAR LOCA curve, the following exhibit an acceptable performance:

	<u>System</u>	<u>Primer Cure</u>
1,2	1c Amercoat D-6 1c Phenoline 305 Finish	17 days at 67-79°F (19-26°C) and 53-88% R.H.
3,4	1c Amercoat D-6 1c Phenoline 305 Finish	17 days at 95-100°F 35-38°C and 100% R.H.

PROCEDURE:A) Test Coupons

Size: 2" x 4" x 1/4" Certified ASTM A36 Steel
Surface Prep: Gritblasted to SSPC-SP5-63
Abrasive Media: GFH #50 grit (Cleveland Metal Abrasives, Inc.)

B)	<u>Systems Tested</u>	<u>Batch Numbers</u>	<u>Dry Film Thickness</u>
1,2	1c Amercoat D-6 (cured in Cure Cabinet*)	1503310 1503210	2.5 - 3.5 mils
	1c Phenoline 305 Finish	7B0427M 6M3959M	6.2 - 8.6 mils
			9.2 - 11.1 mils
3,4	1c Amercoat D-6 (cured in High Humidity Drum**)	1503310 1503210	2.4 - 3.3 mils
	1c Phenoline 305 Finish	7B0427M 6M3959M	4.7 - 5.4 mils
			7.3 - 8.0 mils

*Cure Cabinet is at ambient temperature but, has humidity controlled from 50% to 90% R.H.

**High Humidity Drum is at 100°F (38°C) and 100% R.H.
From the Carboline Research & Development Laboratory

The technical data furnished is true and accurate to the best of our knowledge. However, no guarantee of accuracy is given or implied.

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PDR FOIA
GARDE85-59 PDR



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FINAL REPORT

PROCEDURE: (Continued)C. Cure Schedule

- 1,2 Amercoat D-6: 17 days at 67-79°F (19-26°C) and 53-88% Relative Humidity.
Phenoline 305 Finish: 18 days at 71-80°F (22-27°C) and 55-70% Relative Humidity.
- 3,4 Amercoat D-6: 17 days at 95-100°F (35-38°C) and 100% Relative Humidity.
Phenoline 305 Finish: 18 days at 71-80°F (22-27°C) and 55-70% Relative Humidity.

D. Exposure

Texas Utilities Generating Company, Comanche Peak Steam Electric Station, FSAR Figures 6.2.1-1 and 6.2.1-2.

1. Time/Temperature/Pressure Profile

<u>Time</u>	<u>Temperature</u>	<u>Pressure</u>	<u>Spray Condition</u>
Initial to 10 seconds	240°F (115°C)	44 psia	Static
10 seconds to 15 mins.	270°F (132°C)	58 psia	Dynamic
15 mins. to 1 hour			
15 mins.	215°F (102°C)	34 psia	Dynamic
1 hour 15 mins. to 7 days	215°F-130°F (102°C-51°C)	34-10 psia	Dynamic

(Note: This is the theoretical curve supplied by Comanche Peak. It was followed as closely as possible with the LOCA apparatus available at Carboline Company. Please refer to the recorder chart (L115-129) for exact conditions of LOCA profile.)

2. Spray Solution

H₂BO₃ (2000 ppm as Boron) in deionized water.
pH = 8.5 - 10.0 (NaOH added to adjust pH).

GRADING PROCEDURE:

The test coupons were evaluated for performance in the following areas:

- 1) Material flaking off
- 2) Delamination between coats and/or peeling

From the Carboline Research & Development Laboratory

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300 HANLEY ROAD / NEW CT. ST. LOUIS MO 63104



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GRADING PROCEDURE: (Continued)

- 3) Blistering of the topcoat
- 4) Chalking of the coating
- 5) Excessive cracking

Grading procedures specified in Report N101.2 - 1972 of the American National Standards Institute-Protective coatings for Light Water Nuclear Reactor Containment Facilities:

4.5 Methods of Examining and Evaluating the Exposed Test Specimens

The dynamic and/or static elevated temperature-pressure and irradiation test panels shall be evaluated within 2 hours and again after 2 weeks after removal from the test chamber for the following surface defects: flaking, delamination and/or peeling, blistering, and chalking. Defects listed in Subsections 4.5.1 through 4.5.4 shall be dealt with as follows:

4.5.1 Flaking. ASTM D772, Evaluating Degree of Resistance to Flaking (Scaling) of Exterior Paints, Part 21, American Society for Testing and Materials, Philadelphia, Pa. 19103. Flaking shall not be permitted.

4.5.2 Delamination and/or Peeling. Delamination and/or peeling shall not be permitted.

4.5.3 Blistering. Blistering shall be limited to a few, intact blisters, Size No. 4, ASTM D714, Standard Method of Evaluating Degree of Blistering of Paints, Part 21, American Society for Testing and Materials, Philadelphia, Pa. 19103. The number and the size of blisters shall be recorded.

4.5.4 Chalking. ASTM D659, Standard Method of Evaluating Degree of Resistance to Chalking of Exterior Paints, Part 21, American Society for Testing and Materials, Philadelphia, Pa. 19103. Heavy chalking shall not be permitted.

Any other changes in coating properties which are not also associated with the separation, or the release, of coating from the substrate shall not be a cause for rejection.

From the Carboline Research & Development Laboratory

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LABORATORY TEST REPORT

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Testing Project: 01684
FINAL REPORTANSI N101.2-1972 Criteria
(As interpreted by Carboline)Maximum Degree of Failure Allowable

Flaking ASTM D772

10 (None)

Delamination or Peeling

None

*Blistering ASTM D714-56

Blister SizeBlister Density

*NOTE: A blister is not
intact when it has resulted
in coating being separated
from the test coupon.

#2
#4
#6
#8None
Few
Medium
Medium-Dense

Chalking ASTM D659

8 (Light)

NOTE: Flaking, blistering and chalking are all evaluated according to ASTM Standards, with a rating of 10 indicating that no failure was observed in the specific grading area.

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300 HANLEY INDUSTRIAL CT., ST. LOUIS, MO 63144

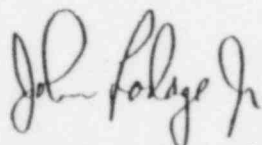
Panel Identification and Coating System	Dry Film Thickness	Flaking	Delamina- tion or Peeling	Blistering	Chalking	Other Performance Characteristics	Performance Evaluation
1A* 1c Amercoat D-6 (Primer Cure 53-88% R.H.) 1c Phenoline 305 Finish	3.5 mils 6.5 mils 10.0 mils	10	None	None	10	----	Acceptable
1B 1c Amercoat D-6 (Primer cure 53-88% R.H.) 1c Phenoline 305 Finish	3.0 mils 6.2 mils 9.2 mils	10	None	#4 Few Intact	10	----	Acceptable
2A* 1c Amercoat D-6 (Primer cure 53-88% R.H.) 1c Phenoline 305 Finish	2.8 mils 7.7 mils 10.5 mils	10	None	None	10	----	Acceptable
2B 1c Amercoat D-6 (Primer cure 53-88% R.H.) 1c Phenoline 305 Finish	2.5 mils 8.6 mils 11.1 mils	10	None	#4 Few Intact	10	----	Acceptable
3A* 1c Amercoat D-6 (Primer cure 100% R.H.) 1c Phenoline 305 Finish	2.4 mils 5.4 mils 7.8 mils	10	None	None	10	----	Acceptable
3B 1c Amercoat D-6 (Primer cure 100% R.H.) 1c Phenoline 305 Finish	3.3 mils 4.7 mils 8.0 mils	10	None	None	10	----	Acceptable
4A* 1c Amercoat D-6 (Primer cure 100% R.H.) 1c Phenoline 305 Finish	2.6 mils 4.7 mils 7.3 mils	10	None	None	10	----	Acceptable
4B 1c Amercoat D-6 (Primer cure 100% R.H.) 1c Phenoline 305 Finish	2.5 mils 4.9 mils 7.4 mils	10	None	None	10	----	Acceptable

Testing Subject: 01684
FINAL REPORT

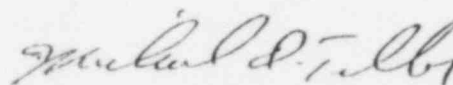
RESULTS

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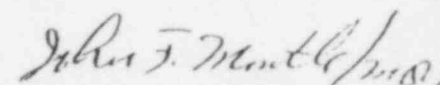
Panel Identification and Coating System	Dry Film Thickness	Flaking	Delamina- tion or Peeling	Blistering	Chalking	Other Performance Characteristics	Performanc Evaluation
Acceptable Performance ANSI N101.2-1972, Section 4.5, As Interpreted by Carboline		10	None	#4F to #8HD	#8 (Light)	*Panel suspended in the vapor phase	



John J. Ladage, Jr.
Developmental Chemist
Testing Department



Michael D. Tellor
Supervisor
Research & Development



John F. Montle
Vice President
Research & Development

/bj

XC: JFM/CJW/DWH/PDL/HDT

MAY 1 - 1978



LABORATORY TEST REPORT

May 9, 1978

Testing Project: #01651
FINAL REPORT

CONFIDENTIAL

SUBJECT: LOCA test of systems topcoated with Phenoline 305 Finish.

REFERENCE: Commanche Peak Nuclear Power Station; Mr. Don Sutton, Mr. Keith Falk;
Mr. Dan McBride; L-115-105

PURPOSE: To test the performance of Phenoline 305 Finish over each of the following primers:

- 1) 1c Amercoat D-6 @ 2.0 - 3.0 mils
- 2) 1c Mobil Zinc 7 @ 2.0 - 3.0 mils
- 3) 1c Carbo Zinc 11 @ 11.0 - 12.0 mils

when exposed to the Commanche Peak Steam Electric Station, FSAR LOCA Curve and evaluated according to the criteria of ANSI N101.2 - 1972, Section 4.5 as interpreted by Carboline.

CONCLUSIONS: After completion of the 7 day Commanche Peak FSAR LOCA test, the systems tested exhibited the following performances when evaluated according to ANSI N101.2 - 1972, Section 4.5 as interpreted by Carboline:

<u>Coating System</u>		<u>Performance</u>
1) Amercoat D-6 @ 2-3 mils Phenoline 305 Finish	Vapor Phase	Acceptable
2) Amercoat D-6 @ 2-3 mils Phenoline 305 Finish	Liquid Phase	Unacceptable
3) Mobil Zinc 7 @ 2-3 mils Phenoline 305 Finish	Vapor Phase	Acceptable
4) Mobil Zinc 7 @ 2-3 mils Phenoline 305 Finish	Liquid Phase	Acceptable
5) Carbo Zinc 11 @ 11-12 mils Phenoline 305 Finish	Vapor Phase	Unacceptable
6) Carbo Zinc 11 @ 11-12 mils Phenoline 305 Finish	Liquid Phase	Unacceptable

From the Carboline Research & Development Laboratory

The technical data furnished is true and accurate to the best of our knowledge. However, no guarantee of accuracy is given or implied.

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LABORATORY TEST REPORT

May 9, 1978/Page 2

CONFIDENTIALPROCEDURE:A) Test Coupons

Size: 2" x 4" x 1/4" Certified ASTM A36 Steel.

Surface Prep: Gritblasted to SSPC-SP5-63

Abrasive Media: 6FH #50 grit (Cleveland Metal Abrasives, Inc)

B)

Systems TestedBatch NumbersDry Film
Thickness

1) 1c Amercoat D-6

6-705416

2.5 - 3.0 mils

6-705420

1c Phenoline 305 Finish

7K2528M

4.8 - 6.2 mils

7K2500M

7.3 - 8.5 mils

2) 1c Mobil Zinc 7

FT7K24

2.1 - 2.7 mils

1c Phenoline 305 Finish

7K2528M

5.3 - 6.9 mils

7K2500M

8.0 - 9.0 mils

3) 1c Carbo Zinc 11

7K3106M

11.0 -13.0 mils

7K0966Z

1c Phenoline 305 Finish

7K2528M

4.0 - 5.5 mils

7K2500M

16.0 -17.0 mils

C) Cure SchedulePrimers (all systems): 17 days at 65-76°F (18-24°C) and
27-90% R.H.Topcoat (all systems): 10 days at 72-79°F (22-26°C) and
31-45% R.H.D) ExposureTexas Utilities Generating Company, Comanche Peak Steam
Electric Station, FSAR Figures 6.2.1-1 and 6.2.1-2

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LABORATORY TEST REPORT

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CONFIDENTIAL

1. Time/Temperature/Pressure Profile

<u>Time</u>	<u>Temperature</u>	<u>Pressure</u>	<u>Spray Condition</u>
Initial to 10 seconds	240°F (115°C)	44 psig	Static
10 seconds to 15 mins.	270°F (132°C)	58 psig	Dynamic
15 mins. to 1 hour			
15 mins.	215°F (102°C)	34 psig	Dynamic
1 hour 15 mins. to			
7 days	215-130°F (102-51°C)	34-10 psig	Dynamic

Please refer to the recorder chart (L115-105) for exact conditions of LOCA profile.

2. Spray Solution

H₂BO₃ (2000 ppm as Boron) in deionized water.
pH = 8.5 - 10.0 (NaOH added to adjust pH)

GRADING PROCEDURE:

The test coupons were evaluated for performance in the following areas:

- 1) Material flaking off
- 2) Delamination between coats and/or peeling
- 3) Blistering of the topcoat
- 4) Chalking of the coating
- 5) Excessive cracking

Grading procedures specified in Report N101.2 - 1972 of the American National Standards Institute-Protective Coatings for Light Water Nuclear Reactor Containment Facilities:

4.5 Methods of Examining and Evaluating the Exposed Test Specimens

The dynamic and/or static elevated temperature-pressure and irradiation test panels shall be evaluated within 2 hours and again after 2 weeks after removal from the test chamber for the following surface defects: flaking, delamination and/or peeling, blistering, and chalking. Defects listed in Subsections 4.5.1 through 4.5.4 shall be dealt with as follows:

From the Carboline Research & Development Laboratory

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LABORATORY TEST REPORT

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4.5.1 Flaking. ASTM D772, Evaluating Degree of Resistance to Flaking (Scaling) of Exterior Paints, Part 21, American Society for Testing and Materials, Philadelphia, Pa. 19103. Flaking shall not be permitted.

4.5.2 Delamination and/or Peeling. Delamination and/or peeling shall not be permitted.

4.5.3 Blistering. Blistering shall be limited to a few, intact blisters, Size No. 4, ASTM D714, Standard Method of Evaluating Degree of Blistering of Paints, Part 21, American Society for Testing and Materials, Philadelphia, Pa. 19103. The number and the size of blisters shall be recorded.

4.5.4 Chalking. ASTM D659, Standard Method of Evaluating Degree of Resistance to Chalking of Exterior Paints, Part 21, American Society for Testing and Materials, Philadelphia, Pa. 19103. Heavy chalking shall not be permitted.

Any other changes in coating properties which are not also associated with the separation, or the release, of coating from the substrate shall not be a cause for rejection.

ANSI N101.2 - 1972 Criteria
(As interpreted by Carboline)

Maximum Degree of Failure Allowable

Flaking ASTM D772		10 (None)
Delamination or Peeling		None
*Blistering ASTM D714-56	<u>Blister Size</u>	<u>Blister Density</u>
	#2	None
	#4	Few
	#6	Medium
	#8	Medium-Dense
Chalking ASTM D659		8 (Light)

*NOTE: A blister is not
intact when it has resulted
in coating being separated
from the test coupon.

NOTE: Flaking, blistering and chalking are all evaluated according to ASTM Standards, with a rating of 10 indicating that no failure was observed in the specific grading area.

From the Carboline Research & Development Laboratory

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May 9, 1978/Pag

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Panel Identification and Coating System	Dry Film Thickness (Mils)	Flaking	Delamina- tion or Peeling	Blister- ing	Chalking	Other Performance Characteristics	Performance Evaluation
1A)* 1c Ameron D-6 1c Phenoline 305 Finish	2.5/3.0 4.8/5.0 7.3/8.0	10	None	None	10	Blistering at bottom edge, both sides, larger than #2F-BT-intact	Acceptable
1B 1c Ameron D-6 1c Phenoline 305 Finish	2.3/2.4 6.2/5.4 8.5/7.8	10	None	#2F-BT on side 1 - intact	10	Blistering at bottom edge, both sides, larger than #2F-BT-cracked	Unacceptable
2A)* 1c Mobil Zinc 7 1c Phenoline 305 Finish	2.7/2.6 5.3/5.4 8.0/8.0	10	None	None	10	Blistering at bottom edge, both sides, larger than #2F-BT-intact	Acceptable
2B) 1c Mobil Zinc 7 1c Phenoline 305 Finish	2.4/2.1 6.6/6.9 9.0/9.0	10	None	None	10	Blistering at bottom edge, both sides; #2M-BT, One #2 at top edge, Side 1.	Acceptable
Acceptable Performance ANSI N101.2-1972, Section 4.5, As Interpreted by Carboline		10	None	#4F to #8MD	#8 Light	*Panel suspended in the vapor phase	LAB/T-1277

May 9, 1978/Paf

CONFIDENTIAL

Panel Identification and Coating System	Dry Film Thickness (Mils)	Flaking	Delamina- tion or Peeling	Blister- ing	Chalking	Other Performance Characteristics	Performance Evaluation
3A)* 1c Carbo Zinc 11 1c Phenoline 305 Finish	11.0/11.5 5.0/ 5.5 16.0/17.0	10	None	Larger than #2F-BT, Side 1; #6F, 4F- BT, Side 2	10	Blistering at bottom edge; One larger than #2-Bf- intact. One larger than #2-B at top edge, Side 2, intact.	Unacceptable
3B) 1c Carbo Zinc 11 1c Phenoline 305 Finish	13.0/12.2 4.0/ 4.8 17.0/17.0	10	See Blistering	Larger than #2F-BT, near edges, Side 2 (peeled)	10	Three hairline cracks 1/4-1/2" on upper edges- coating intact.	Unacceptable

(1) Because blistering is limited to few-moderate, intact blisters occurring at the edges only, panels 1A, 2A and 2B are rated "Acceptable".

Acceptable Performance
ANSI N101.2-1972, Section 4.5,
As Interpreted by Carboline

10

None

#4F to #8MD #8 Light

*Panel suspended in the
vapor phase

LAB, 1277



LABORATORY TEST REPORT

May 9, 1978/Page 7

CONFIDENTIALDISCUSSION
OF RESULTS:

Although panels 1A, 2A and 2B do not meet the strict standards of ANSI N101.2, Section 4.5, Carboline interprets the standard as pertaining primarily to the plane areas of a test coupon, and places limited significance on the discontinuous surfaces such as edges, channels, weld spatter, etc. Therefore, the performance of these panels (1A, 2A, 2B) having intact edge blisters, with no other effects to the coating system or substrate, is rated "Acceptable".

Alicia M. Boldt
Acting Group Leader
Testing Department

Michael D. Teller
Supervisor
Research & Development

John F. Montle
Vice President
Research & Development

/bj

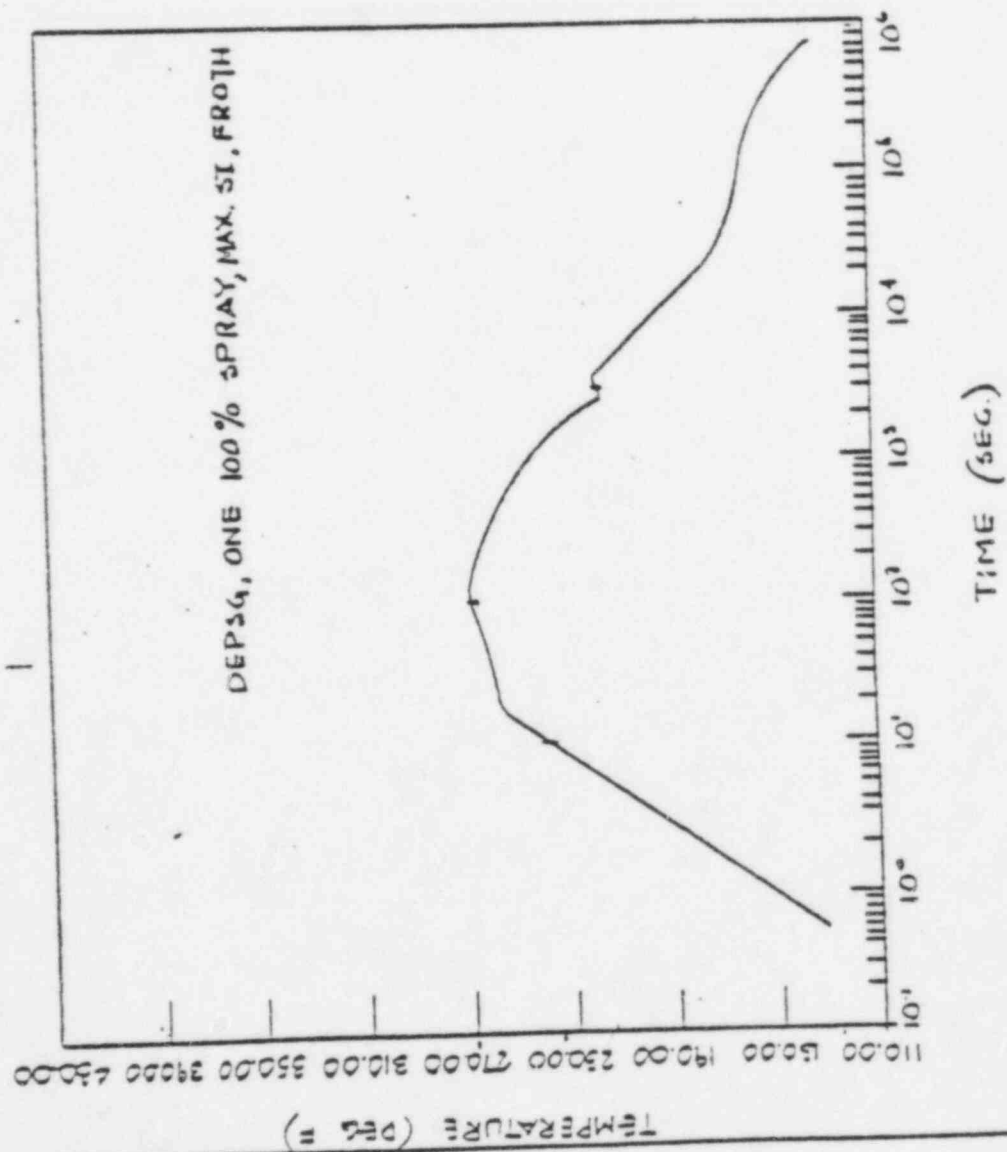
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From the Carboline Research & Development Laboratory

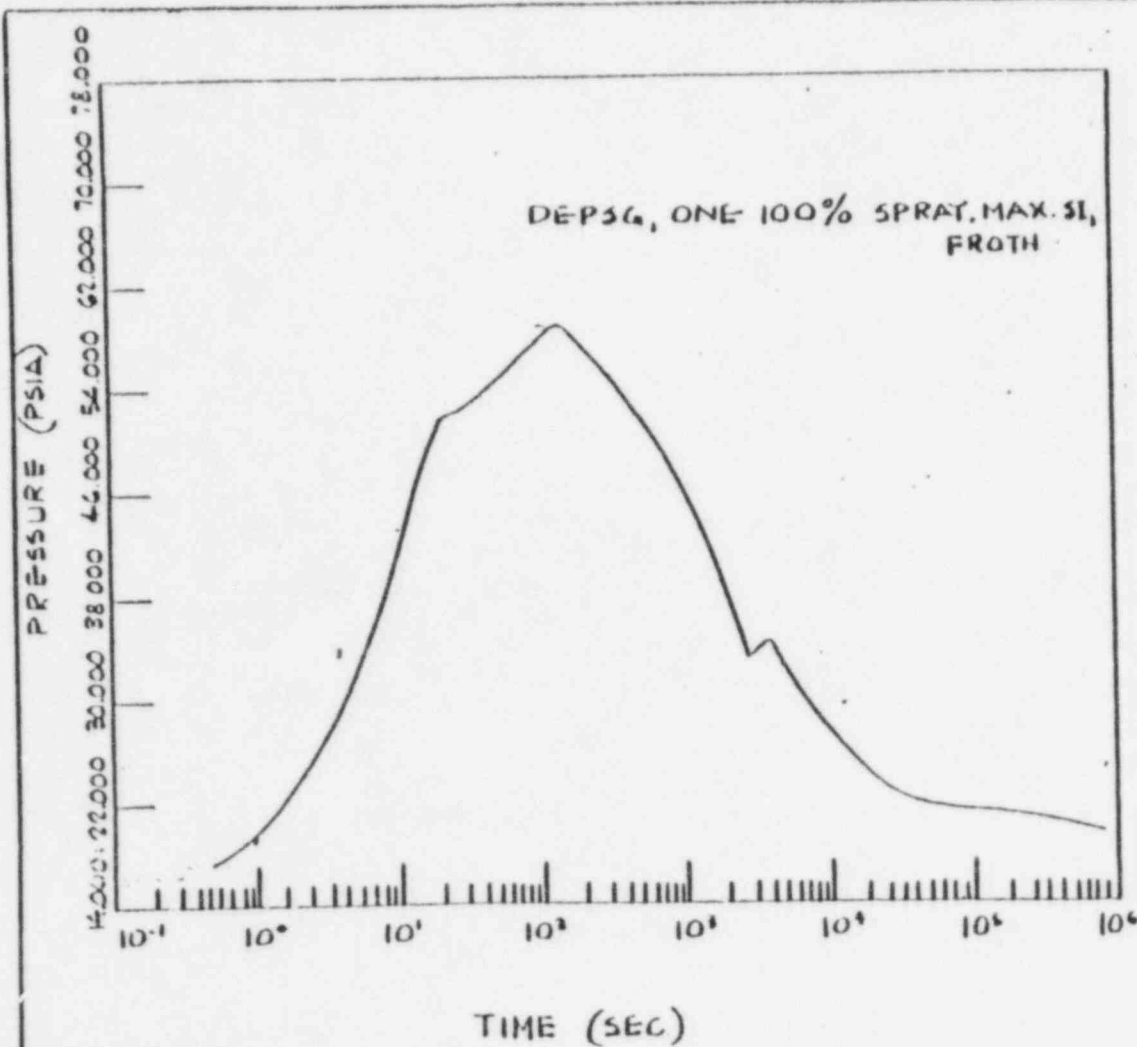
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200 MARKET HOLLISTON CT. ST LOUIS MO 63104



COMANCHE PEAK S.E.S.
 FINAL SAFETY ANALYSIS REPORT
 UNITS 1 and 2
 CONTAINMENT VAPOR
 TEMPERATURE TRANSCIENT -
 DEP36
 PAGE 6.2.1-2



COMANCHE PEAK S.E.S.
FINAL SAFETY ANALYSIS REPORT
UNITS 1 and 2

CONTAINMENT PRESSURE
TRANSIENT - DEPSG

FIGURE 6.2.1-1

OCT 2 1978

OAK RIDGE NATIONAL LABORATORY

OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION



POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

September 28, 1978

Mr. Charles Wiegars
Power Industry Manager
Carboline
350 Hanley Industrial Court
St. Louis, MO 63144

Dear Mr. Wiegars:

As you requested, enclosed is the revised format copy of
Carboline report dated August 15, 1978.

Please call on us if we can be of additional help.

Sincerely yours,

L. T. Corbin, Section Head
Analytical Chemistry Division

LTC:dmw

Enclosures

1629

OAK RIDGE NATIONAL LABORATORY

OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION



POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

AUG 21 1978

August 17, 1978

Mr. Dan W. McBride
Nuclear Market Specialist
Carboline
350 Hanley Industrial Court
St. Louis, MO 63144

Dear Mr. McBride:

Enclosed are the results of the irradiation, decontamination,
and DBA tests you requested. The conditions of the two DBA
tests were identical and are listed in Table 2.

If we can be of further assistance, please feel free to call on
us.

Sincerely yours,

L. T. Corbin, Section Head
Analytical Chemistry Division

LTC:dmw

Enclosures

Manufacturer: Carboline
St. Louis, MO

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

Report of Irradiation, Decontamination, and DBA Testing

The irradiation, decontamination, and design basis accident (DBA) tests are conducted, respectively, in accordance with Bechtel Corp. Standard Specification Coatings for Nuclear Power Plants, spec. Nos. CP-951, CP-952, and CP-956 (or with modifications as noted in Table 2, DBA test conditions). The tests are designed also to meet the specifications set in both A.N.S.I. report N 101.2-1972, Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities, and N 5.12-1974, Protective Coatings (Paints) for the Nuclear Industry. The DBA test spray solution and the test conditions are listed in Tables 1 and 2. After both the DBA and the irradiation tests, the coatings are examined for signs of chalking, blistering, cracking, peeling, delamination, and flaking, according to ASTM standards where applicable. All except the decontamination test panels are returned to the coating manufacturer.

The irradiation tests are run using a spent fuel assembly, removed from the High Flux Isotope Reactor (HFIR) at ORNL, as the source of radiation. These fuel assemblies are stored under 20 feet of demineralized water. The fuel is 93% enriched U^{235} as U_3O_8 combined with aluminum. The spent fuel assemblies are removed after each 23-megawatt day period. Irradiation is done using the gamma energy from the accumulated mixed fission products. This more readily simulates conditions around a reactor than does a cobalt source. Also, the higher gamma activity affords shorter irradiation time to achieve accumulated doses. The dose rate four days after removal of a fuel assembly from the reactor is 1×10^8 rads/hour.

The fuel assembly is 20 inches high. A 20-foot long, 3-1/2-inch diameter pipe, with one end capped, is used for the air irradiation tests. The capped end is lowered into the four-inch opening of the center of the fuel assembly. The open end, above the water level, is covered with an "O" ring sealed flange to which is attached a steel cable and an air outlet hose. The air inlet is located at the bottom of the pipe. The test specimens are connected to the bottom of the cable and lowered into the

Evaluated

Approved

J. C. C. C.
L. T. C. C.

Manufacturer: Carboline
St. Louis, MO

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

radiation field. Also at the center of the fuel assembly is a stainless steel clad cadmium tube used as a neutron absorber. This prevents contamination of the test specimens by induced radiation.

The decontamination procedure is as follows: a mixture of fission product nuclides (aged greater than 90 days and less than three years) is neutralized to pH 4 and immediately applied to the test specimens. The specimens are previously degreased in alcohol. After the contaminated spot is air dried, the activities of four of the nuclides are measured by counting with a $^{76}\text{Ge}(\text{Li})$ detector and a multichannel pulse height analyzer. The specimens are then suspended in a beaker of water at 25°C and washed by stirring for 10 minutes. The specimens are removed, the backs rinsed in water, air dried, and counted as above. The ratios of the activities before, to those after the decontamination are reported as decontamination factors for water. The decontamination and counting steps in 25°C and 80°C acids are repeated, and the respective decontamination factors calculated. The "total overall D.F." is calculated as the ratio of the total activity at the beginning of the test to the total activity at the completion of the three washing steps. All activities are corrected for decay between counts. A computer has been programmed to do all the calculations.

Evaluated

Approved

J. R. R. R.
L. T. R. R.

Manufacturer: Carboline
St. Louis, MO

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

Decontamination Test Results:

These tests performed according to ORNL Master Analytical Manual
Method No. 2 0920 and Bechtel Corp. Spec. CP-952.

ORNL Log Book No. A 7562; A7-17-8-I

Sample Number	Contaminant	Decontamination Factor (DF)				Percent of Total Activity Removed ¹
		Water @25°C	Acid @25°C	Acid @80°C	Overall	
S3-200 (193LF/191HB)	Ce-144	50	2.1	6.9	710	99.4
	Ru-106	16	1.7	1.5	40	
	Cs-137	>2300	>1.5	>1.2	>4100	
	Zr-95	17	1.8	1.1	34	
	TOTAL	40	1.9	2.4	180	
S5-203 (CZ11/288HB)	Ce-144	82	3.8	4.2	1300	99.7
	Ru-106	31	1.9	1.8	110	
	Cs-137	4200	>1.0	>1.5	>6400	
	Zr-95	14	2.7	1.4	51	
	TOTAL	57	2.7	2.0	300	
S7-204 (CZ11/305HB)	Ce-144	660	1.9	1.0	1300	99.6
	Ru-106	18	3.3	3.6	210	
	Cs-137	>3000	>1.6	>1.0	>4800	
	Zr-95	7.1	2.3	1.4	23	
	TOTAL	61	2.7	1.7	280	
	Ce-144					
	Ru-106					
	Cs-137					
	Zr-95					
	TOTAL					
	Ce-144					
	Ru-106					
	Cs-137					
	Zr-95					
	TOTAL					

¹Percent of total activity removed = $(1 - \frac{1}{DF}) \times 100$.

Approved

[Signature]
[Signature]

Manufacturer: Carboline
St. Louis, MO

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

Table 1. DBA solution composition, distilled water

0.28 M boric acid (3,000 ppm boron)
0.064 M sodium thiosulfate
Adjusted to pH 9.5 with sodium hydroxide

Table 2. DBA test conditions*

Time	Temperature (°F)	Pressure (psig)	Comments
Start			
10 seconds	307	60	Steam injection.
2 hrs 47 min	307	60	
5 minutes	307-280	60-30	Injected cold spray.
20 minutes	280-250	30	Adjusted pressure.
4 days	250	30	
3 minutes	250-230	10	Drained; injected cold spray.
15 minutes	230-200	10	Adjusted pressure.
3 days	200	10	
End of test			

*These data are taken from recorder charts on permanent file at ORNL.

ORNL Log Book No. A7562; A7-17-8

Evaluated

G. G. Gellberg

Approved

L. T. Gellberg

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

CZ11/191HB

ORNL Master Analytical Manual Method No. 2 0921;
Bechtel Corp. Spec. No. CP-951;
ORNL Log Book No. A 7562; A7-17-8

Test Conducted In: x air water

Sample No.	1×10^8 rads	1×10^9 rads
S1-1		Coatings intact, no defects.
		sides A, B.
S1-2		Coatings intact, no defects.
		sides A, B.

Additional Comments:

Evaluated J. J. Hall
Approved L. T. B. B.

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 15, 1978

Radiation Tolerance Test Results:

Initial Dose Rate: 1.5×10^7 rads/hr
Test Conducted In: x air water

Sample No.

 1×10^9 rads

S2-23

Coatings intact, no defects,
sides A, B.

S2-24

Coatings intact, no defects,
sides A, B.

Additional Comments:

Evaluated

Approved

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

Radiation Tolerance Test Results:

ORNL Master Analytical Manual Method No. 2 0921;
Bechtel Corp. Spec. No. CP-951;
ORNL Log Book No. A 7562; A7-17-8

Initial Dose Rate: 1.5 x 10⁷ rads/hr
Test Conducted In: x air water

Cumulative Dose Rate:	Comments

Sample No.

 1×10^8 rads 1×10^9 rads

S3-43

Coatings intact, no defects,
sides A, B.

S3-44

Coatings intact, no defects,
sides A, B.

Additional Comments:

Evaluated

Approved

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

CZ11/305Fin

ORNL Master Analytical Manual Method No. 2 C921;
Bechtel Corp. Spec. No. CP-951;
ORNL Log Book No. A 7562; A7-17-8

Test Conducted In: x air water

Sample No.	1×10^8 rads	1×10^9 rads
S6-101		Coatings intact, no defects; sides A, B.
S6-102		Coatings intact, no defects; sides A, B.

Additional Comments:

Evaluated [Signature]
Approved [Signature]

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

Radiation Tolerance Test Results:

ORNL Master Analytical Manual Method No. 2 0921;
Bechtel Corp. Spec. No. CP-951;
ORNL Log Book No. A 7562; A7-17-3

Initial Dose Rate: 1.5×10^7 rads/hr
Test Conducted In: x air water

Cumulative Dose Rate:	Comments

Sample No.	1×10^8 rads	1×10^9 rads
S7-122		Coatings intact, no defects; sides A, B.
S7-123		Coatings intact, no defects; sides A, B.

Additional Comments:

Evaluated [Signature]
Approved [Signature]

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

CZ11/191HB

ORNL Master Analytical Manual Method No. 2 0922;

ORNL Log Book No. A 7562; A7-17-8

*irradiated.

** (SA) = sand blast; (SH) = shot blast; (GR) = grit blast.

Evaluated

Approved

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

CZ11/191HB

DBA Test Results:

ORNL Master Analytical Manual Method No. 2 0922;

ORNL Log Book No. A 7562; A7-17-8

*Irradiated.

** (SA) = sand blast; (SH) = shot blast; (GR) = grit blast.

Evaluated

Approved

carboline

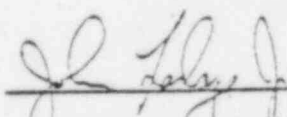
DBA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED Carbo Zinc 11/Carbo Zinc 11 (repair)/ Carboline 191 HB
2. TYPE SUBSTRATE Steel SIZE 2" x 5" x 1/8"
3. SURFACE PREPARATION (describe) Gritblasted to SSPC-SP10-63 with a 1-3 mil blast profile
Damaged area: 3M "Strip & Clean" followed by light needle gun impactment
4. PRODUCT DATA: SAMPLE NO.(s) S10-180A, S10-184A
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED - - -

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)R.H.	THICKNESS (ins.)	TIME & DATE APPLIED
1c	Carbo Zinc	11	7M5123M 7L0980Z	Spray	75°/45%	180A) .0021/.0023 184A) .0024/.0022	4-15-78
1c	Carbo Zinc	11	7M5123M 7L0980Z	Brush	72°/45%	180A) .0017 184A) .0013	4-21-78
1c	Carboline	191 HB	7E1181M 7J2147M	Spray	78°/36%	180A) .0041/.0044 184A) .0039/.0040	5-1-78
5. CURING CONDITIONS:				Primer	66-78°F	Primer	40-87%
				AMBIENT TEMP	73-78°F	*F REL. HUMIDITY	33-56%
				Primer	16		
				MINIMUM CURE	7	DAYS	

6. TEST PROCEDURE ORNL Master Analytical Manual Method No. 2 0922
7. TESTING PERFORMED BY Analytical Chemistry Division DATE SUBMITTED 5-8-78
Oak Ridge National Laboratory


TEST REPORT NO. 01629

boline

DEA AND RADIATION TOLERANCE

TEST PANEL PREPARATION DATA

1. PRODUCT TO BE TESTED Carboline 193 LF Primer/Carboline 191 HB
2. TYPE SUBSTRATE Certified ASTM A36 Steel SIZE 2" x 4" x 1/4"
3. SURFACE PREPARATION (describe) SSPC-SP3-63 Power Tool Clean with 3M
"Strip n Clean"
4. PRODUCT DATA: SAMPLE NO.(s) S3-160, S3-163
5. DATE AND TIME CURING COMPOUND OR PRIMER APPLIED ---

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(*F)R.H.	THICKNESS (ins.)	TIME & DATE APPLIED
	Carboline	193 LF Primer	7H1949M 7L2868M	Spray	74°F/42% S3-160)	.0026/.0026 S3-163) .0026/.002	3-10-78
	Carboline	191 HB	7E1181M 7J2147M	Spray	80°F/28% S3-160)	.0043/.0035 S3-163) .0038/.0035	3-16-78

5. CURING CONDITIONS: Primer 68-80°F
AMBIENT TEMP 73-78 *F REL. HUMIDITY 24-42%
Primer 6
MINIMUM CURE 53 DAYS 28-36%

6. TEST PROCEDURE ORNL Master Analytical Manual Method No. 2 0922
7. TESTING PERFORMED BY Analytical Chemistry DATE SUBMITTED 3-8-78
Division
Oak Ridge National Laboratory

[Signature]
TEST REPORT NO. SRL19

DBA TEST RESULTS

Test Report No.

Manufacturer: Carbr 'ne
St. Louis, MO

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

Table 1. DBA solution composition, distilled water

0.28 M boric acid (3,000 ppm boron)
0.064 M sodium thiosulfate
Adjusted to pH 9.5 with sodium hydroxide

Table 2. DBA test conditions*

Time	Temperature (°F)	Pressure (psig)	Comments
Start			
10 seconds	307	60	Steam injection.
2 hrs 47 min	307	60	
5 minutes	307-280	60-30	Injected cold spray.
20 minutes	280-250	30	Adjusted pressure.
4 days	250	30	
3 minutes	250-230	10	Drained; injected cold spray.
15 minutes	230-200	10	Adjusted pressure.
3 days	200	10	
End of test			

*These data are taken from recorder charts on permanent file at ORNL.

ORNL Log Book No. A7562; A7-17-8

Evaluated

J. Gellert

Approved

L. T. Collins

Analytical Chemistry Division
Oak Ridge National Laboratory
Date: Aug. 16, 1978

193LF/191HB - Power tool clean

ORNL Master Analytical Manual Method No. 2 0922;

ORNL Log Book No. A 7562; A7-17-8

*Irradiated.

** (SA) = sand blast; (SH) = shot blast; (GR) = grit blast.

Evaluated

Approved

DECONTAMINATION TEST
TEST PANEL PREPARATION DATA

Test Report No.

carboline

TEST NO. 01049

DECONTAMINATION TEST

BECHTEL CP-952 AND A.N.S.I. N-5.12

TEST PANEL PREPARATION DATA

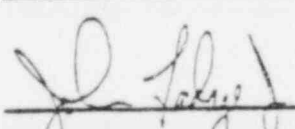
1. PRODUCT TO BE TESTED Carboline 193 LF Primer/Carboline 191 HB
2. TYPE SUBSTRATE Certified ASTM A36 Steel SIZE 2" x 4" x 1/4"
3. SURFACE PREPARATION (describe) Sandblasted to SSPC-SP10-63 with a 1-3 mil blast profile
4. PRODUCT DATA: SAMPLE NO. (s) S3-200

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(*F)R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline	193 LF Primer	7H1949M 7L2868M	Spray	74°/42%	S3-200) .0032/.0033	3-10-78
1c	Carboline	191 HB	7E1181M 7J2147M	Spray	80°/28%	S3-200) .0045/.0046	3-16-78

5. CURING CONDITIONS: Primer 74-80 Primer 28-42
AMBIENT TEMP. 73-78 *F REL. HUMIDITY 33-56
Primer 6
MINIMUM CURE 53 days DAYS

6. TEST PROCEDURE ORNL Master Analytical Manual Method No. 2 0920

7. TESTING PERFORM BY Analytical Chemistry Div. DATE SUBMITTED 5-8-78
Oak Ridge National Laboratory


TEST REPORT NO. SR-119

TS- 06376-1

DECONTAMINATION TEST RESULTS

Test Report No.

Manufacturer: Carboline
St. L. S. MO

Analytical Chemistry Division
Oak Ridge National Laboratory
Date Aug. 16, 1978

Decontamination Test Results:

These tests performed according to ORNL Master Analytical Manual
Method No. 2 0920 and Bechtel Corp. Spec. CP-952.

ORNL Log Book No. A 7562; A7-17-8-I

Sample Number	Contaminant	Decontamination Factor (DF)				Percent of Total Activity Removed ¹
		Water @25°C	Acid @25°C	Acid @80°C	Overall	
S3-200 (193LF/191HB)	Ce-144	50	2.1	6.9	710	99.4
	Ru-106	16	1.7	1.5	40	
	Cs-137	>2300	>1.5	>1.2	>4100	
	Zr-95	17	1.8	1.1	34	
	TOTAL	40	1.9	2.4	180	

¹Percent of total activity removed = $(1 - \frac{1}{DF}) \times 100$.

Approved

L. T. L. L.
G. R. L. L.

193 LF/191 NB

PHYSICAL PROPERTIES

Test Report No. 01720 B

Carboline

PHYSICAL PROPERTIES

BECHTEL CP-954 AND A.N.S.I. N-5.12

1. PRODUCT TESTED Carboline 193 LF/Carboline 191 HB
2. TYPE SUBSTRATE 4"x4"x1/32" steel Taber Abraser Panel
3. SURFACE PREPARATION (describe): Surface roughened with sandpaper.
4. PRODUCT DATA: SAMPLE NOS. 15A, 16A, 17A

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	15A) .0038/.0035 16A) .0034/.0035 17A) .0036/.0035	12/16/7 12/16/7 12/16/7
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	15A) .0040/.0041 16A) .0041/.0041 17A) .0041/.0040	12/26/7 12/26/7 12/26/7

5. CURING DATA:

AMBIENT TEMP. 61-70°F °F REL. HUM. 27-60% CURE TIME 45 days

6. TEST PROCEDURE: Bechtel Standard CP-954 and A.N.S.I. N-5.12

7. TEST RESULTS:

7.1 ABRASION: Federal Test Method Standard 141 Test Method 6192,
1000 cycles with a CS-17 wheel and a 1000 gram load.

LOW - 36.6 mg. HIGH - 38.5 mg. AVERAGE - 37.4 mg.

7.2 ADHESION: Determined by use of the ELCOMETER ADHESION TESTER

AVERAGE OF 5 TESTS _____ psi

DESCRIBE FAILURE _____

7.3 DIRECT-IMPACT RESISTANCE:

*Curing Data - First Coat:
72-81°F 24-60% R.H. 10 days

TS- 06376-4

Approved: 

Carboline

PHYSICAL PROPERTIES

BECHTEL CP-954 AND A.N.S.I. N-5.12

1. PRODUCT TESTED Carboline 193 LF/Carboline 191 HB
2. TYPE SUBSTRATE Certified ASTM A36 - 2"x4"x1/4" steel panel
3. SURFACE PREPARATION (describe) Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
4. PRODUCT DATA: SAMPLE NOS. 15B, 16B, 17B, 18B, 19B

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) %R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	15B) .0039/.0038 16B) .0038/.0039 17B) .0038/.0039 18B) .0038/.0038 19B) .0038/.0039	12/16 12/16 12/16 12/16 12/16
1c	Carboline 191 HB		8K2236M 8J1828M	Spray	73°F/27%	15B) .0048/.0047 16B) .0040/.0040 17B) .0051/.0043 18B) .0048/.0049 19B) .0055/.0048	12/26 12/26 12/26 12/26 12/26

5. CURING DATA:

AMBIENT TEMP. 61-79°F °F REL. HUM. 22-60% % CURE TIME 52 days

6. TEST PROCEDURE: Bechtel Standard CP-954 and A.N.S.I. N-5.12

7. TEST RESULTS:

7.1 ABRASION: Federal Test Method Standard 141 Test Method 6192, 1000 cycles with a CS-17 wheel and a 1000 gram load.

LOW - HIGH - AVERAGE -

*7.2 ADHESION: Determined by use of the ELCOMETER ADHESION TESTER

AVERAGE OF 5 TESTS 630 psi

DESCRIBE FAILURE Cohesion of Carboline 193 LF

7.3 DIRECT-IMPACT RESISTANCE:
 * Curing Data - First Coat:
64-81°F 56-77% 10 days

TS- 06376-4

Approved: 

Carboline

PHYSICAL PROPERTIES

BECHTEL CP-954 AND A.N.S.I. N-5.12

1. PRODUCT TESTED Carboline 193 LF/Carboline 191 HB
2. TYPE SUBSTRATE Certified ASTM A36 - 2"x4"x1/4" steel panel
3. SURFACE PREPARATION (describe) Sandblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
4. PRODUCT DATA: SAMPLE NOS. 15P, 16P, 17P, 18P, 19P

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	15P) .0038/.0037	12/16/7
						16P) .0039/.0036	12/16/7
						17P) .0039/.0038	12/16/7
						18P) .0037/.0038	12/16/7
						19P) .0037/.0038	12/16/7
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	15P) .0040/.0042	12/26/7
						16P) .0043/.0043	12/26/7
						17P) .0044/.0041	12/26/7
						18P) .0041/.0042	12/26/7
						19P) .0041/.0042	12/26/7

5. CURING DATA:

AMBIENT TEMP. 61-79°F *F REL. HUM. 22-60% CURE TIME 52 days

6. TEST PROCEDURE: Bechtel Standard CP-954 and A.N.S.I. N-5.12

7. TEST RESULTS:

- 7.1 ABRASION: Federal Test Method Standard 141 Test Method 6192, 1000 cycles with a CS-17 wheel and a 1000 gram load.

LOW -

HIGH -

AVERAGE -

- *7.2 ADHESION: Determined by use of the ELCOMETER ADHESION TESTER

AVERAGE OF 3 TESTS 665 psi

DESCRIBE FAILURE Cohesion of Carboline 193 LF

- 7.3 DIRECT-IMPACT RESISTANCE:

*Curing Data - First Coat:
64-81°F 56-77% R.H. 10 days

TS- 06376-4

Approved: John F. Long

carboline

PHYSICAL PROPERTIES

BECHTEL CP-954 AND A.N.S.I. N-5.12

1. PRODUCT TESTED Carboline 193 LF/Carboline 191 HB
2. TYPE SUBSTRATE Certified ASTM A36 - 2"x4"x1/4" steel panel
3. SURFACE PREPARATION (describe) Shotblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
4. PRODUCT DATA: SAMPLE NOS. 15Q, 16Q, 17Q, 18Q, 19Q

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8K1682M 8K2406M	Spray	73°F/26%	15Q) .0037/.0034 16Q) .0039/.0034 17Q) .0035/.0036 18Q) .0036/.0035 19Q) .0038/.0038	12/16/7 12/16/7 12/16/7 12/16/7 12/16/7
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	15Q) .0046/.0041 16Q) .0041/.0042 17Q) .0042/.0040 18Q) .0044/.0041 19Q) .0047/.0044	12/26/7 12/26/7 12/26/7 12/26/7 12/26/7

5. CURING DATA: *
 AMBIENT TEMP. 61-79°F °F REL. HUM. 22-60% % CURE TIME 32 days

6. TEST PROCEDURE: Bechtel Standard CP-954 and A.N.S.I. N-5.12

7. TEST RESULTS:

7.1 ABRASION: Federal Test Method Standard 141 Test Method 6192, 1000 cycles with a CS-17 wheel and a 1000 gram load.

LOW - HIGH - AVERAGE -

*7.2 ADHESION: Determined by use of the ELCOMETER ADHESION TESTER

AVERAGE OF 5 TESTS 670 psi

DESCRIBE FAILURE Cohesion of Carboline 193 LF

- 7.3 DIRECT-IMPACT RESISTANCE:

*Curing Data - First Coat:
64-81°F 36-77% R.H. 10 days

TS- 06376-4

Approved: 

carboline

PHYSICAL PROPERTIES

BECHTEL CP-954 AND A.N.S.I. N-5.12

1. PRODUCT TESTED Carboline 193 LF/Carboline 191 HB
2. TYPE SUBSTRATE Schedule 40 pipe, 16" long, 2.375" O.D.
3. SURFACE PREPARATION (describe) Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
4. PRODUCT DATA: SAMPLE NOS. 15C, 16C, 17C, 18C, 19C, 20C, 21C

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	15C) .0040/.0035 16C) .0040/.0038 17C) .0039/.0036 18C) .0040/.0035 19C) .0036/.0032 20C) .0040/.0034 21C) .0039/.0036	12/16/7 12/16/7 12/16/7 12/16/7 12/16/7 12/16/7 12/16/7
1c	Carboline 191 HB		8K2286M 8J1825M	Spray	73°F/27%	15C) .0055/.0050 16C) .0050/.0045 17C) .0046/.0056 18C) .0042/.0045 19C) .0052/.0058 20C) .0051/.0051 21C) .0051/.0051	12/26/7 12/26/7 12/26/7 12/26/7 12/26/7 12/26/7 12/26/7

5. CURING DATA:

AMBIENT TEMP. 61-79°F *F REL. HUM. 24-60% % CURE TIME 10 days

6. *Curing Data - First Coat - 72-81°F 28-49% 36 days
TEST PROCEDURE: Bechtel Standard CP-954 and A.N.S.I. N-5.12

7. TEST RESULTS:

- 7.1 ABRASION: Federal Test Method Standard 141 Test Method 6192, 1000 cycles with a CS-17 wheel and a 1000 gram load.

LOW - HIGH - AVERAGE -

- 7.2 ADHESION: Determined by use of the ELCOMETER ADHESION TESTER

AVERAGE OF 5 TESTS _____ psi

DESCRIBE FAILURE _____

*7.3 DIRECT-IMPACT RESISTANCE: 1/31/79

Pipe Number	Effect of 100 psi impact
15C	No Effect
16C	3/8" delamination paint separated from pipe
17C	No Effect
18C	No Effect
19C	1/4" delamination paint separated from pipe
20C	No Effect
21C	1/4" delamination paint separated from pipe

RESULTS REVIEWED BY

[Signature]

CHEMICAL EXPOSURE TEST
PANEL PREPARATION AND INDIVIDUAL
CHEMICAL RESISTANCE TEST RESULTS

Test Report No.

TEST NO. 01720CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1" CONCRETE STEELASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SF10-63 with a 1.0-2.0
mil blast profile

3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 15E
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) & R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline	193 LF	8H1682M 8K2406M	Spray	73°F/26%	.0038/.0037	12-16-
1c	Carboline	191 HB	8K2286M 8J1828M	Spray	73°F/27%	.0043/.0041	12-26-

4. CURING CONDITIONS:

	AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1ST coat	72°F-81°F	28-49%	10 days
2ND coat	61°F-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Nitric Acid (ph = 0.25)
8. TEST OBSERVATIONS: DATE STARTED 2-5-79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	1/68 in LP	NC	4/788 in LP 8/888 on E	NC
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE= No Effect NC= No Change
LP= Liquid phase B= Blisters
E= Edge F= Few
 S= Substrate

RESULTS REVIEWED BY [Signature]TEST REPORT NO.

CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/2" CONCRETE STEEL ASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblast to SSPC-SP10-63 with a 1.0-2.0
mil blast profile
3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 15F
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)&R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline	193 LF	8H1682M 8K2406M	Spray	73°F/26%	.0038/.0038	12-16-
1c	Carboline	191 HB	8K2286M 8J1328M	Spray	73°F/27%	.0050/.0048	12-26-

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1ST coat 72°-81°F	28-49%	10 days
2ND coat 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Sulfuric Acid (ph= 0.8)
8. TEST OBSERVATIONS: DATE STARTED 2-5-79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE on E in LP	NE on face in LP	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE= No Effect
F= Few
LP= Liquid Phase
M= Medium

NC= No Change
E= Edge
B= Blister

RESULTS REVIEWED BY J. J. [Signature]TEST REPORT NO.

TEST NO. 01720CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/4" CONCRETE STEEL ASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.

3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 15G
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)&R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF	8H1682M 8K2406M		Spray	73°F/26%	.0038/.0039	12/16/
1c	Carboline 191 HB	8K2286M 8J1828M		Spray	73°F/27%	.0043/.0041	12/26/7

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1st coat: 72°F-81°F	28%-48%	10 days
2nd coat: 61°F-79°F	24%-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° + 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Hydrazine (pH = 10.75)
8. TEST OBSERVATIONS: DATE STARTED 2/5/79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE = No Effect

RESULTS REVIEWED BY [Signature]

• TEST REPORT NO.

TEST NO. 01740CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x4" CONCRETE STEELASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblast to SSPC-SP10-63 with a 1.0-2.0
mil blast profile
3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 15H
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)&R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline	193 LF	8H1682M 8K2406M	Spray	73°F/26%	.0037/.0033	12-16-
1c	Carboline	191 HB	8K2286M 8J1828M	Spray	73°F/27%	.0045/.0040	12-26-

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1ST coat 72°-81°F	28-49%	10 days
2ND coat 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Sodium Hydroxide (pH=11.75)
8. TEST OBSERVATIONS: DATE STARTED 2-5-79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE= No Effect
NC= No Change
E= Edge

B= Blister
EA= Back
F= Few

RESULTS REVIEWED BY [Signature]TEST REPORT NO. [Signature]

TEST NO. 01720CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/4" CONCRETE STEEL ASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 15-I
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)&R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	.0033/.0035	12/16/7
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	.0042/.0041	12/26/7

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1st coat: 72°-81°F	28-49%	10 days
2nd coat: 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° + 5° °F SOLUTION 75° + 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Ammonium Hydroxide (pH = 11.6)
8. TEST OBSERVATIONS: DATE STARTED 2/5/79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE = No Effect

RESULTS REVIEWED BY [Signature]• TEST REPORT NO.

TEST NO. 01/20CHEMICAL RESISTANCE TEST RESU. 5BECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x4" CONCRETE STEELASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblast to SSPC-SP10-63 with a 1.0-2.0
mil blast profile

3. PRODUCT TESTED: Carboline 193LF/ SAMPLE NO.: 15J
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) & R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline	193 LF	8H1682M 8K2406M	Spray	73°F/26%	.0037/.0038	12-16-
1c	Carboline	191 HB	8K2286M 8J1828M	Spray	73°F/27%	.0043/.0043	12-16-

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1ST coat 72°-81°F	28-49%	10 days
2ND coat 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Sodium Borate (ph= 9.7)
8. TEST OBSERVATIONS: DATE STARTED 2-5-79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE= No Effect

RESULTS REVIEWED BY [Signature]TEST REPORT NO. [Signature]

TEST NO. 01720CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/4" CONCRETE STEEL ASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mill blast profile.

3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: LSK
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)&R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	.0038/.0036	12/16
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	.0042/.0043	12/26

4. CURING CONDITIONS:

	AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1st coat:	72°-81°F	28-49%	10 days
2nd coat:	61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° + 5° °F SOLUTION 75° + 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 0.5M Sodium Fluoride (pH = 6.6)
8. TEST OBSERVATIONS: DATE STARTED 2/5/79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE = No Effect

RESULTS REVIEWED BY [Signature]TEST REPORT NO.

TEST NO. 01720CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/4" CONCRETE STEEL ASTM A308 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SP10-63.
3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 15L
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) & R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF	8H1682M 8K2406M		Spray	73°F/26%	.0037/.0036	12/16/
1c	Carboline 191 HB	8K2286M 8J1828M		Spray	73°F/27%	.0041/.0041	12/26/

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1st coat: 72°-81°F	28-49%	10 days
2nd coat: 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Citric Acid (pH = 1.65)
8. TEST OBSERVATIONS: DATE STARTED 2/5/79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE = No Effect

RESULTS REVIEWED BY J. L. Leger

TEST REPORT NO. _____

TEST NO. 01720CHEMICAL RESISTANCE TEST RESULTSBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/4" CONCRETE STEEL ^{ASTM} A36 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
3. PRODUCT TESTED: Carboline 193 LF/ Carboline 191 HB SAMPLE NO.: LSM

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F) & R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	.0037/.0038	12/16/
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	.0042/.0042	12/26/

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1st coat: 72°-81°F	28-49%	10 days
2nd coat: 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 0.3M Hydrogen Peroxide (pH = 5.5)
8. TEST OBSERVATIONS: DATE STARTED 2/5/79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE = No Effect

RESULTS REVIEWED BY [Signature]TEST REPORT NO. [Signature]

CHEMICAL RESISTANCE TEST RESULT

BECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/2" CONCRETE STEELASTN A36 OTHER
2. SURFACE PREPARATION (describe): Gritblast to SSPC-SP10-63 1.0-2.0
mil blast profile
3. PRODUCT TESTED: Carboline 193 LF/
Carboline 191 HB SAMPLE NO.: 15 N

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)&R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline	193 LF	SH1682M 3K2406M	Spray	73°F/26%	.0038/.0037	12-16-
1c	Carboline	191 HB	8K2286M 8J1828M	Spray	73°F/27%	.0041/.0041	12-26-

4. CURING CONDITIONS:

	AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1ST coat	72°F-81°F	28-49%	10 days
2ND coat	61°F-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 0.3M Potassium Permanganate (ph= 5.0)
8. TEST OBSERVATIONS: DATE STARTED 2-5-79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	SEV CD in LP	NC	NC	NC	NC

NE= No Effect
NC= No Change
LP= Liquid phase

SEV= Severe
CD= Coating discoloration

RESULTS REVIEWED BY J. L. [Signature]

TEST REPORT NO.

TEST NO. 01720CHEM. AL. RESISTANCE TEST RESULTBECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 1"x4"x1/4" CONCRETE STEEL ASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 15-0
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(*F) & R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	.0039/.0037	12/16/7
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	.0048/.0042	12/26/7

4. CURING CONDITIONS:

AMBIENT TEMP. (*F)	% REL. HUMIDITY	LENGTH OF CURE
1st coat: 72°-81°F	28-49%	10 days
2nd coat: 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° + 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 1.0 lb/l gal. Trisodium Phosphate
 (pH = 11.0)
8. TEST OBSERVATIONS: DATE STARTED 2/5/79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BLISTERING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE = No Effect

RESULTS REVIEWED BY J. H. Tedy

TEST REPORT NO. _____

TEST NO. 01720

CHEMICAL RESISTANCE TEST RESULT

BECHTEL CP-953 and A.N.S.I. N-5.12

1. TYPE SUBSTRATE: SIZE 2"x4"x1/4" CONCRETE STEEL ASTM A36 OTHER
2. SURFACE PREPARATION (describe): Gritblasted to SSPC-SP10-63 with a 1.0-2.0 mil blast profile.
3. PRODUCT TESTED: Carboline 193 LF/ SAMPLE NO.: 13 R
Carboline 191 HB

COAT	PRODUCT	PRODUCT CODES	BATCH #	APPLICATION METHOD	CONDITIONS R/M(°F)&R.H.	THICKNESS (ins.)	DATE APPLIED
1c	Carboline 193 LF		8H1682M 8K2406M	Spray	73°F/26%	.0039/.0038	12/16.
1c	Carboline 191 HB		8K2286M 8J1828M	Spray	73°F/27%	.0044/.0042	12/26.

4. CURING CONDITIONS:

AMBIENT TEMP. (°F)	% REL. HUMIDITY	LENGTH OF CURE
1st coat: 72°-81°F	28-49%	10 days
2nd coat: 61°-79°F	24-60%	6 weeks

5. TYPE OF TEST:

CHEMICAL EXPOSURE TEST PER BECHTEL CP-953 and A.N.S.I. N-5-12

6. TEST TEMPERATURE: AMBIENT 75° ± 5° °F SOLUTION 75° ± 5° °F
7. CHEMICAL SOLUTION (pH and Concentration): 5% Disodium Phosphate (pH = 8.5)
8. TEST OBSERVATIONS: DATE STARTED 2/5/79

ACCEPTANCE CRITERIA	CHEMICAL EXPOSURE RESULTS				
	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS
8.1 FLAKING/PEELING	NE	NE	NE	NE	NE
8.2 DELAMINATION	NE	NE	NE	NE	NE
8.3 BUBBLING	NE	NE	NE	NE	NE
8.4 OTHER EFFECTS	NE	NE	NE	NE	NE

NE = No Effect

RESULTS REVIEWED BY John F. Lyle

TEST REPORT NO. _____

SUMMARY OF CHEMICAL EXPOSURE RESULTS

Test Report No.

carboline

BECHTEL CP-951 AND A.N.S.I. N-5-12

CHEMICAL RESISTANCE TEST RESULTS

COATING SYSTEMS: Carboline 193LF/ Carboline 191 HB

PRODUCT TESTED	5% CITRIC ACID	5% NITRIC ACID	5% HYDRAZINE	5% SULFURIC ACID	0.30 M HYDROGEN PEROXIDE	5% SODIUM HYDROXIDE
	pass	fail	pass	fail	pass	pass

PRODUCT TESTED	0.5M SODIUM FLUORIDE	5% SODIUM BORATE	5% AMMONIUM HYDROXIDE	0.30M POTASSIUM PERMAN- GANATE	1.04/gal. TRISODIUM PHOSPHATE	5% DISODIUM PHOSPHATE
	pass	pass	pass	pass	pass	pass

RESULTS APPROVED

TEST REPORT NO.

[Signature]
01720

IS-06376-6