

## ATTACHMENT C

### REPORT M-00282-97, "SYSTEM MATERIALS ANALYSIS DEPARTMENT REPORT ON THE EVALUATION OF LEVEL I COATINGS IN ZION STATION UNIT 2 CONTAINMENT," DATED JANUARY 22, 1997

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\* Westinghouse has authorized release of this specification.

SYSTEM MATERIALS ANALYSIS DEPARTMENT REPORT  
ON THE EVALUATION OF LEVEL 1 COATINGS  
IN ZION STATION UNIT 2 CONTAINMENT

INTRODUCTION

On January 4, 1997, the System Materials Analysis Department performed an examination and analysis to determine the condition of coated surfaces inside Zion Unit 2 containment. The work was performed by Mr. J. Caturano, SMAD Level 3 Coating Inspector and Mr. F. Guerrieri, SMAD Level 1 Coating Inspector. The scope of the examination included the following:

1. Visual examination of the areas previously examined by SMAD in November, 1996
2. Visual examination of recently repaired areas
3. Adhesion tests on carbon steel and concrete surfaces
4. Development of an inventory of undocumented coatings

VISUAL EXAMINATION OF AREAS EXAMINED IN NOVEMBER, 1996

Areas outside the missile barrier, that were examined in November, 1996, were re-examined visually in January, 1997. The results of the November, 1996 examination were documented in SMAD Report M-07571-96 as follows:

Steel Liner Plate

*ELEVATION 568'*

*Failure of the 305 topcoat was observed on the carbon steel liner near columns Z-24, Z-26, Z-29, Z-33 and Z-34. In each case the topcoat has disbonded from the CZ-11SG primer. The exposed primer is also showing some failure, characterized by rust bleed-through on the primer surface.*

*ELEVATION 592'*

*Failure of the 305/CZ-11SG coating system was observed on the liner plate near columns Z-19, Z-20, Z-22, Z-31 and Z-33. In all cases, the 305 has flaked off, leaving a layer of exposed CZ-11SG primer on the steel substrate. In most areas, some rust through is evident on the primer surface.*

*ELEVATION 617'*

*The liner plate exhibited an area between columns Z-19 and Z-20 at approximately elevation 635', where large areas of coating failure have occurred. Several large areas exhibiting a loss of the 305 topcoat are present in this location. The failures appear to follow vertically along ribs that are welded to the back side of the liner plate. Other smaller areas with similar failures were observed on this elevation.*

As indicated in Report M-07571-96, the coating failures observed in the November, 1996 examination on major structural elements consisted of loss of one or more layers of qualified coating in discrete, scattered spots of the liner plate, polar crane, concrete floors and walls.

On the liner plate, the finish layer of Phenoline 305 had separated from the primer in several locations, as noted, leaving spots of the liner covered with the gray colored inorganic zinc primer. A few spots of rust bleed-through were observed on the exposed primer. During the January, 1997 examination, no debris from the failed topcoat was observed. The remainder of the finish coat and the inorganic zinc primer are solidly adhered as confirmed by adhesion tests performed in November and again in the present January examination.

Polar Crane

The November, 1996 observations of the polar crane coating condition were reported as:

*ELEVATION 617'*

*Several failures, up to 1 ft<sup>2</sup> in area, were observed on the polar crane in which the 305 topcoat is disbonding from the primer.*

Coating failures observed on the polar crane were similar to those on the liner plate. The present condition of the remaining coating on the polar crane is the same as on the liner plate. That is, the topcoat and primer are tightly adhered and there is no debris from the coating that has failed.

Concrete Floors and Walls

Concrete coating conditions observed in the November, 1996 examination were documented as shown in the following:

*ELEVATION 568'*

*All concrete floors on elevation 568' showed extensive failure due to mechanical damage and wear. It is estimated that 40% of all floor coatings had failed, exposing the bare concrete substrate.*

Concrete walls also showed signs of coating failure near Columns Z-24 (wall) and Z-25 (ceiling near the liner plate). In each area, the 305 topcoat and 195 surfacer disbonded from the concrete substrate with some associated concrete damage. The estimated area of failure for carbon steel and concrete wall surfaces is approximately 5%. Other miscellaneous mechanical damage was observed on liner plate and concrete walls at this elevation.

*ELEVATION 592'*

Concrete floors on this elevation exhibited approximately 50% failure, exposing the bare concrete substrate.

Concrete walls exhibited failures of the 195 surfacer/305 topcoat coating system, exposing bare concrete at columns Z-18, Z-20, Z-23 and Z-31. Some of the concrete coating failure is due to cracking of the concrete. Approximately 5% of the carbon steel and concrete wall surfaces showed some degree of coating failure.

*ELEVATION 617'*

Extensive damage to concrete floor coatings was observed on this elevation, mainly in high traffic areas. Approximately 40% of the concrete substrate is exposed. Concrete walls at this elevation were in good condition, except for minor mechanical damage.

The qualified concrete coating failures observed in the November examination were manifested by loss of all layers in the system on areas of the floors and walls. On both floors and walls, the remaining coating appears to be tightly adhered. Adhesion tests made on coatings on the concrete elements yielded strengths of at least 250 psi.

General

Observations of possibly unqualified coatings on a number of items were reported in SMAD Report M-07571-96. The action taken or disposition relative to these items is indicated below:

*Coatings on hand rails and stair treads on all elevations have failed, exposing large areas of bare carbon steel and concrete.*

Action Taken: Remaining coatings on these items within the zone of influence have been removed.



*In addition to the examination of coated surfaces, several areas were identified where undocumented or unqualified coatings were applied to various surfaces. These items include:*

*1. Instrument racks on elevation 568'*

Disposition: Review of the specifications and coating manufacturer test data has shown that the coating system on these racks is qualified for use in containments.

*2. Struts on elevation 568'*

Action Taken: These items are covered in a report on unqualified coatings under development. Unqualified coatings in the zone of influence are being removed.

*3. Charcoal filter housings on elevation 617'*

Action Taken: It was verified during the January, 1997 visual examination that the Phenoline 305 coating has been removed from the galvanized enclosures.

*4. Several valve bodies and piping are coated with unidentified shop primers throughout containment.*

Action Taken: These items are covered in a report on unqualified coatings under development. Unqualified coatings in the zone of influence are being removed.

*5. Many liner plate and concrete wall surfaces have been overcoated with a second coat of 305 using both brush and roller.*

Disposition: The coating system for use on steel has been qualified for thicknesses up to a total of 15 mils. The total thickness measured on the liner plate is within the range that has been successfully tested.

A listing of the potentially undocumented or unqualified coatings is being generated. In addition, a zone of influence analysis is being performed. Coatings located inside this zone of influence are being removed (or a justification provided for not removing) if they are undocumented or not qualified.

#### VISUAL EXAMINATION OF RECENTLY REPAIRED AREAS

Prior to the January, 1997 examination, loose coating was observed by Zion station personnel on concrete walls inside the missile barrier. The loose coating was removed by hand scrapers. The scraped areas were approximately 5 inches wide and from 12 to 48 inches long. It appeared that scraping had removed the loose material back to an adherent edge. Typical failures in this area were not due to delamination of the coating system but to an anomaly of the substrate. A thin layer (approx. 1/16 inch) of cementitious material adhered to the back of

the paint chips that were removed from the wall. Loose coating was not observed outside the missile barrier in either the November, 1996 or the January, 1997 examinations.

#### ADHESION TESTING

Adhesion tests were performed on qualified coatings at various elevations using an Elcometer adhesion tester with a 0 to 1000 pounds per square inch (psi) range. The adhesion tests were performed to verify that the coating systems meet the requirements of ANSI N5.12, 'Protective Coatings for the Nuclear Industry', Paragraph 6.4. Tests were performed on various surfaces in the containment, including concrete surfaces, carbon steel liner plate and structural steel and component carbon steel surfaces. Test areas were chosen based on visual observations and included areas of distressed or visibly degraded coatings as well as areas where coatings appeared to be in good condition. In the areas near prior coating failure, (where loose coatings had been previously removed) tests were performed within 3 inches, 16 inches and 36 to 48 inches of the failed edge to determine if the adhesion had been degraded in the vicinity of the failure. A minimum clearance of 3 inches from the failed edge was necessary in order to properly mount the Elcometer tester. The minimum adhesion strength requirement is 200 psi, per ANSI N5.12. The results of the testing showed a minimum adhesion strength of 225 psi. The adhesion test results and locations are presented in Table 2.

A significant observation made during the adhesion tests concerned the primer found on structural steel elements. In those tests where the prime coat was exposed by the test, it appeared that the primer was inorganic zinc.

#### COATING INVENTORY

An inventory was made of surfaces in the containment that were assumed to be coated with undocumented coating material. For this evaluation, undocumented coatings are defined as those coating systems that could not be determined by visual examination to be Carboline Co. products specified in Specification X-2340. A list of coated items, whose coatings were judged by the examiners to be undocumented was compiled and is presented in Table 1. The determination was performed by visual examination on the basis of color, gloss and a prior knowledge of the appearance of the qualified systems used in containment at Zion. The total area (on each item) of these coatings

was also estimated and is included in Table 1. Subsequent to the examination, it was established that many of the items listed in Table 1 were coated with qualified nuclear coatings. A summary of these findings is shown in Appendix 1.

### CONCLUSION

The results of this examination and analysis indicate that the damaged wall surfaces inside the missile barrier have been scraped back to sound material. These areas should be evaluated during future outages to verify that no further deterioration has occurred. In addition, the results of the adhesion tests conducted in November, 1996 and in January, 1997 indicate that the qualified coating systems observed in containment on the containment liner, structural steel and concrete surfaces meet the minimum adhesion requirement of 200 psi.

### RECOMMENDATIONS TO PREVENT RECURRENCE

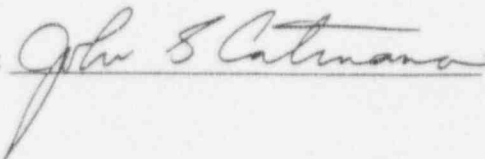
It is recommended that Zion Station:

1. Conduct walkdown inspections during subsequent outages to document coating system conditions.
2. Provide a process to perform coating repairs, as needed, using qualified maintenance coating systems.
3. Provide a process to assure that steel installed in containment from this point on is coated with a qualified coating system.
4. Provide a process to monitor and evaluate undocumented or unqualified coatings added to the containment and revise the list of undocumented coatings.
5. Develop a comprehensive coating plan to restore and maintain the coating systems inside the containment.

Approved by:



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TABLE 1  
ZION UNIT 2 CONTAINMENT COATINGS

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CONTAINMENT PAINT PUNCHLIST						RESOLUTION						
WALKDOWN INFORMATION												
ITEM NO	EQUIPMENT NAME/EPN	DESCRIPTION	LOCATION EL/COL/AZ	SQ-FT	SCAF/LAD	ACCEPT W/O REM	ACTION REQUIRED		AR#	PRI	REMARKS	OWNER
							REM PNT	REM ITM				
162	PZR HTR CNTRL BANKS A,B,C	GRAY	617/Z30	120	L	Y-W						
191	2D RCP HOUSING		PUMP DECK	300	L	Y-W						
193	2C RCP HOUSING		PUMP DECK	300	L	Y-W						
197	2A RCP HOUSING		PUMP DECK	300	L	Y-W						
208	2B RCP HOUSING		PUMP DECK	300	L	Y-W						
3	2A RCDT PUMP DISCHARGE VALVE	2DT9168A	568/Z18/	4	N	Y-W						
4	2B RCDT PUMP DISCHARGE VALVE	2DT9168B	568/Z18/	4	N	Y-W						
6	RC 8031 PRT DRAIN STOP VLV	BLUE	568/Z18/	4	N						TRANSPORT*	DED
7	LIMITORQUE MOV SI 8800C	GREEN VALVE	568/Z18/	7	N	Y-L						
9	ACCUM TK 2D MAKE-UP STOP VALVE	COPE-S-VULCAN - BLUE	568/Z20/	5	N	Y-CVI						
11	ELEVATED VLV - 2RC 8032	S# H41302-1	568/Z21/	3	L						TRANSPORT*	DED
12	AOV ACCUM VLVE	COPE-S-VULCAN - BLUE	568/Z21/	5	N	Y-CVI						
14	AOV ACCUM VLVE	COPE-S-VULCAN - BLUE	568/Z21/	5	N	Y-CVI						
15	AOV ACCUM VLVE	COPE-S-VULCAN - BLUE	568/Z21/	5	N	Y-CVI						
19	ACCUM MAKE-UP STOP VALVE	COPE-S-VULCAN - BLUE	568/Z21/	5	L	Y-CVI						
13	LIMITORQUE VLV	GREEN VALVE	568/Z21/	7	N	Y-L						
24	SS9352C VALVE	S# H41319-1-20	568/Z22/	3	L						TRANSPORT*	DED
21	AOV ACCUM VLVE 8808C	COPE-S-VULCAN - BLUE	568/Z22/	5	L	Y-CVI						
23	ACCUM TK 2C MAKE-UP STOP VALVE	COPE-S-VULCAN - BLUE	568/Z22/	5	N	Y-CVI						
25	ACCUM TK 2C TEST ISO VALVE	COPE-S-VULCAN - BLUE	568/Z22/	5	L	Y-CVI						
22	LIMITORQUE 2C DISCHARGE VLV 8808C	GREEN VALVE	568/Z22/	7	L	Y-L						
32	LIMITORQUE ACTUATOR	GREEN	568/Z26/	3	L	Y-L						
43	AOV ACCUM VLVE 2SI 8877A	COPE-S-VULCAN - BLUE	568/Z29/	5	N	Y-CVI						
44	AOV ACCUM VLVE 2SI 8879A	COPE-S-VULCAN - BLUE	568/Z29/	5	N	Y-CVI						
45	AOV ACCUM VLVE 2SI 8876A	COPE-S-VULCAN - BLUE	568/Z29/	5	N	Y-CVI						
48	AOV ACCUM VLVE 2SI 8878B	COPE-S-VULCAN - BLUE	568/Z29/	5	N	Y-CVI						

TABLE 1  
ZION UNIT 2 CONTAINMENT COATINGS

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42	LIMITORQUE VLV 2SI 8808A	GREEN	568/Z29/	7	N	Y-L						
53	AOV ACCUM VLVE 8884D	COPEES-VULCAN - BLUE	568/Z30/	5	N	Y-CVI						
54	AOV ACCUM VLVE 8884C	COPEES-VULCAN - BLUE	568/Z30/	5	N	Y-CVI						
55	AOV ACCUM VLVE 9009C	COPEES-VULCAN - BLUE	568/Z30/	5	N	Y-CVI						
56	LIMITORQUE VLV 2MCVSI 8800A	GREEN VALVE	568/Z30/	7	N	Y-L						
61	AOV ACCUM VLVE 8884A	COPEES-VULCAN - BLUE	568/Z31/	5	N	Y-CVI						
62	AOV ACCUM VLVE 9008B	COPEES-VULCAN - BLUE	568/Z31/	5	N	Y-CVI						
63	AOV ACCUM VLVE 9080C	COPEES-VULCAN - BLUE	568/Z31/	5	N	Y-CVI						
71	AOV ACCUM VLVE 8879D	COPEES-VULCAN - BLUE	568/Z32/	5	N	Y-CVI						
72	AOV ACCUM VLVE 8878D	COPEES-VULCAN - BLUE	568/Z32/	5	N	Y-CVI						
70	LIMITORQUE VLV	GREEN VLV	568/Z32/	7	N	Y-L						
85	ACCUM TK 2D VENT STOP VLV	COPEES-VULCAN - BLUE	592/Z20	5	N	Y-CVI						
89	ACCUM TK 2C VENT STOP VLV	COPEES-VULCAN - BLUE	592/Z22	5	N	Y-CVI						
107	2R10007 SEAL TABLE AREA MONITOR		592/Z27	1	N						TRANSPORT	DED
116	AOV ACCUM VLVE 8881	COPEES-VULCAN - BLUE	592/Z29	5	N	Y-CVI						
119	AOV ACCUM VLVE 8875	COPEES-VULCAN - BLUE	592/Z29	5	N	Y-CVI						
120	AOV ACCUM VLVE 8885A	COPEES-VULCAN - BLUE	592/Z29	5	N	Y-CVI						
121	AOV ACCUM VLVE 8149C	COPEES-VULCAN - BLUE	592/Z29	5	N	Y-CVI						
122	AOV ACCUM VLVE 8149D	COPEES-VULCAN - BLUE	592/Z29	5	N	Y-CVI						
123	AOV ACCUM VLVE 8885B	COPEES-VULCAN - BLUE	592/Z29	5	N	Y-CVI						
124	AOV ACCUM VLVE 8149A	COPEES-VULCAN - BLUE	592/Z29	5	N	Y-CVI						
128	ELEC BOX ON RCFC UNITS	2 BOXES PER RCFC UNIT	592/Z31	10	L						TRANSPORT	DED
129	AOV ACCUM VLVE 8875	COPEES-VULCAN - BLUE	592/Z32	5	N	Y-CVI						
132	2VC-AOV-8147 LOOP C NORM CHRNQ VLV	MASONIELAN/ BLUE STOP VALVE	608/Z27/	3	S	Y-W						
133	SAME TYPE VLV AS ABOVE (NO ACCESS)	MASONIELAN/ BLUE STOP VALVE	608/Z27/	3	S	Y-W						
134	SAME TYPE VLV AS ABOVE (NO ACCESS)	COPEES-VULCAN - BLUE	608/Z27/	3	S	Y-CVI						
163	U2 CNTRL ELEC BOX	NEAR HATCH	617/	15	L						TRANSPORT	DED
151	TRIANGLE LIFTING RIGGING	BLUE	617/Z26	15	N		Y		970001025		COMPLETE	MAINT
178	RC LOOP 2C CL CNTRL VLV	2SS9358C / H41319-1-11	LOWER LEVE	2	L						TRANSPORT	DED
180	RC LOOP 2A CL CNTRL VLV	2SS9358A / H41319-1-7	LOWER LEVE	2	L						TRANSPORT	DED
185	RC LOOP 2B CL CNTRL VLV	2SS9358B / H66039-1-1	LOWER LEVE	2	L						TRANSPORT	DED
188	RC LOOP 2D CL CNTRL VLV	2SS9358D / H75243-1-2	LOWER LEVE	2	L						TRANSPORT	DED
177	2RC 8035B WORTHINGTON ACTUATOR	BLUE	LOWER LEVE	7	N	Y-W						
179	2RC 8035A WORTHINGTON ACTUATOR	BLUE	LOWER LEVE	7	N	Y-W						



TABLE 1  
ZION UNIT 2 CONTAINMENT COATINGS

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182	2MOV-RH8702 LIMITORQUE VLV	GREEN	LOWER LEVE	7	N	Y-L							
184	2RC 8035D WORTHINGTON ACTUATOR	BLUE	LOWER LEVE	7	N	Y-W							
187	2RC 8035C WORTHINGTON ACTUATOR	BLUE	LOWER LEVE	7	N	Y-W							
195	RCP 2C STANDPIPE OVERFLOW VLV		PUMP DECK	1	N							TRANSPORT*	DED
190	COPE VULCAN VLV 8141C	BLUE	PUMP DECK	6	N	Y-CVI							
204	COPE VULCAN 8141A	BLUE	PUMP DECK	6	N	Y-CVI							
205	COPE VULCAN 8381A	BLUE	PUMP DECK	6	N	Y-CVI							
207	COPE VULCAN (UNMARKED)	GREEN	PUMP DECK	6	N	Y-CVI							
206	COPE VULCAN 2 LVC 459		PUMP DECK	8	N	Y-CVI							
196	LIMITORQUE VLV 2MOV-RC8001B		PUMP DECK	20	N	Y-L							
198	LIMITORQUE VLV 2MOV-RC8001A		PUMP DECK	20	N	Y-L							
199	LIMITORQUE VLV 2MOV-RC8002B		PUMP DECK	20	N	Y-L							
200	LIMITORQUE VLV 2MOV-RC8001C		PUMP DECK	20	N	Y-L							
201	LIMITORQUE VLV 2MOV-RC8001D		PUMP DECK	20	N	Y-L							
202	LIMITORQUE VLV 2MOV-RC8002D		PUMP DECK	20	N	Y-L							
189	LIMITORQUE VLV 2MOV-RC8002C		PUMP DECK	20	N	Y-L							
194	LIMITORQUE VLV 2MOV-RC8002B		PUMP DECK	20	N	Y-L							
10	2RM30 INSTR. RACK	GRAY RACK	568/Z21	70	N	Y - S&L						S&L SPEC X-2313	
16	2RM31 INSTR. RACK	GRAY RACK	568/Z21	70	N	Y - S&L						S&L SPEC X-2313	
17	2RM32 INSTR. RACK	GRAY RACK	568/Z21	70	N	Y - S&L						S&L SPEC X-2313	
18	2RM33 INSTR. RACK	GRAY RACK	568/Z21	70	N	Y - S&L						S&L SPEC X-2313	
26	2RM34 INSTR. RACK	GRAY RACK	568/Z23/	70	N	Y - S&L						S&L SPEC X-2313	
27	2RM35 INSTR. RACK	GRAY RACK	568/Z23/	70	N	Y - S&L						S&L SPEC X-2313	
28	2RM36 INSTR. RACK	GRAY RACK	568/Z23/	70	N	Y - S&L						S&L SPEC X-2313	
37	2RM24 INSTR. RACK	GRAY RACK	568/Z28/	70	N	Y - S&L						S&L SPEC X-2313	
38	2RM25 INSTR. RACK	GRAY RACK	568/Z28/	70	N	Y - S&L						S&L SPEC X-2313	
39	2RM26 INSTR. RACK	GRAY RACK	568/Z28/	70	N	Y - S&L						S&L SPEC X-2313	
65	2RM23 INSTR. RACK	GRAY RACK	568/Z32/	70	N	Y - S&L						S&L SPEC X-2313	
66	2RM24 INSTR. RACK	GRAY RACK	568/Z32/	70	N	Y - S&L						S&L SPEC X-2313	
73	2RM19 INSTR. RACK	GRAY RACK	568/Z32/	70	N	Y - S&L						S&L SPEC X-2313	
74	2RM21 INSTR. RACK	GRAY RACK	568/Z33/	70	N	Y - S&L						S&L SPEC X-2313	
75	2RM22 INSTR. RACK	GRAY RACK	568/Z33/	70	N	Y - S&L						S&L SPEC X-2313	
87	FIRE EXTING. PATCH	RED 1.5' X 3'	592/Z21/	4.5	N		Y			970001548	1	COMPLETE	MAINT
90	EM. LITE PACK & ELEC BOXES	GRAY	592/Z22/	10	L			Y		970001544		COMPLETE	MAINT
100	EM LITE PACK	GRAY	592/Z25/	7	L			Y		970001544		COMPLETE	MAINT
105	STEAM DRAIN TANK	GRAY	592/Z26	500	N	Y-S&L							

TABLE 1  
ZION UNIT 2 CONTAINMENT COATINGS

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101	EM LITE PACK	GRAY	592/Z26/	7	L			Y	970001544		COMPLETE	MAINT
108	FIRE EXTING. PATCH	RED 1 5' X 3'	592/Z27/	4.5	N		Y		970001548	1	COMPLETE	MAINT
109	2AP129 WELD. RECEPTACLE	SILVER BOX	592/Z28/	3	N						TRANSPORT*	DED
130	EM LITE PACK	GRAY	592/Z34	7	L			Y	970001544		COMPLETE	MAINT
165	EM LITE PACK	GRAY	617/	7	L			Y	970001544		COMPLETE	MAINT
168	CHARCOAL FILTERS	TWO FILTERS	617/	1000	L		Y		MULTI AR'S		COMPLETE	MAINT
139	EM LITE PACK 165	GRAY	617/Z18/	7	L			Y	970001544		COMPLETE	MAINT
142	2AP126 WELD RECEPTACLE	SILVER BOX	617/Z19	3	N				970001552		TRANSPORT*	DED
141	1 TON STUD HOIST TROLLEY	ORANGE	617/Z19	200	L						TRANSPORT	DED
143	2AP 152 WELD RECEPTACLE	SILVER BOX	617/Z20/	3	N				970001552		TRANSPORT*	DED
144	2AP 153 WELD RECEPTACLE	SILVER BOX	617/Z20/	3	N				970001552		TRANSPORT*	DED
145	2AP 154 WELD RECEPTACLE	SILVER BOX	617/Z20/	3	N				970001552		TRANSPORT*	DED
146	2AP 155 WELD RECEPTACLE	SILVER BOX	617/Z20/	3	N				970001552		TRANSPORT*	DED
149	FIRE EX. PATCH C2R8	RED 1 5' X 3'	617/Z24	4.5	N		Y		970001548	1	COMPLETE	MAINT
150	EM LITE PACK 166	GRAY	617/Z24	7	L			Y	970001544		COMPLETE	MAINT
154	EM LITE PACK	GRAY	617/Z28	7	L			Y	970001544		COMPLETE	MAINT
160	FIRE EX PATCH	1 5' X 3'	617/Z30	4.5	N		Y		970001548	1	COMPLETE	MAINT
161	2AP128 WELD RECEPTACLE	SILVER BOX	617/Z30/	3	N				970001552		TRANSPORT*	DED
173	FIRE EX PATCH	1 5' X 3'	LOWER LEVE	4.5	N		Y		970001548	1	COMPLETE	MAINT
181	FIRE EX PATCH C21M11	1 5' X 3'	LOWER LEVE	4.5	N		Y		970001548	1	COMPLETE	MAINT
186	BLACK SUPPORT BRACKET - 8 TOTAL - NIS	5' LONG X 4" X 4" (AT 180° POSITION)	LOWER LEVE	56	L	Y-W			970001546			
172	EM LITE PACK 173	GRAY	LOWER LEVE	7	L			Y	970001544		COMPLETE	MAINT
192	EM LITE PACK	GRAY	PUMP DECK	7	L			Y	970001544		COMPLETE	MAINT
210	GANG BOX - OPS			130				Y			COMPLETE	
211	GANG BOX - MM			130				Y			COMPLETE	
212	GANG BOX - IM			130				Y			COMPLETE	
213	GANG BOX - LEAD			260				Y			COMPLETE	
171	ALL YELLOW HAND RAILS	ALL ELEVATIONS		1067				Y			COMPLETE	
209	21A AIR TANK	TWO BLACK TANKS	PUMP DECK	400	L						TRANSPORT	DED
5	ELEC. TRANSMITTER BOX & SUPPORT PLATE	GRAY BOX & GREEN PLATE	568/Z18	2	N						TRANSPORT	DED
1	PIPE STRUT	2" LONG X 3" OD GREEN STRUT	568/Z18/	1.5	L						ALUMINUM	
29	SNUBBER VC-278-S2	BLUE SNUBBER ROD, 3' LONG	568/Z24/	1	N						TRANSPORT	DED
31	SPRING CAN	GRAY	568/Z26/	1	N						TRANSPORT*	DED
36	LOOP A RC FLOW TRANSMITTER CAP	GRAY	568/Z27/	1	N						TRANSPORT*	DED



TABLE 1  
ZION UNIT 2 CONTAINMENT COATINGS

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34	2A RX CAVITY VENT FAN SOLENOID COVER	LIGHT BROWN	568/Z27/	2	N						TRANSPORT	DED
51	PIPE STRUT	3' LONG X 3" OD, GREEN	568/Z30/	2	L						TRANSPORT	DED
57	PIPE STRUT	3' LONG X 3" OD, BROWN	568/Z30/	2	L						TRANSPORT	DED
59	PIPE STRUT	1' LONG X 3" OD	568/Z31/	1	N						TRANSPORT	DED
60	CC RETRN FR RCP 2B BEARING COOLER	PURPLE VALVE	568/Z31/	1	L						TRANSPORT*	DED
81	CC RETRN FR RCP 2D SEAL COOLER VLV	BLUE VALVE	592/Z18/	1	L						TRANSPORT*	DED
82	RED FIRE HORN		592/Z18/	1	L						TRANSPORT	DED
83	PIPING INLET/OUTLET HANDWHEELS	2 GREEN OVERHEAD WHEELS (16" OD)	592/Z19	2	L						TRANSPORT	DED
92	2B RCFC SW OUTLET ISO VLV HANDWHEEL	GREEN OVERHEAD HANDWHEEL	592/Z23/	1	L						TRANSPORT	DED
93	2B RCFC SW INLET ISO VLV HANDWHEEL	GREEN OVERHEAD HANDWHEEL	592/Z23/	1	L						TRANSPORT	DED
94	PIPING SUPPORT BRACKET	REDDISH OVERHEAD BRACKET	592/Z23/	2	L						TRANSPORT*	DED
96	2C RCP SEAL COOLER ISO VLV	RED VLV	592/Z24/	1	N						TRANSPORT*	DED
98	PIPE STRUT	2' LONG X 3" OD, GREEN	592/Z24/	1.5	N						TRANSPORT	DED
97	2C RCP SEAL COOLER ISO VLV FLANGE	FLANGE AND PIPING	592/Z24/	2	N						TRANSPORT*	DED
102	2LCV-MS78 AFP STM DRAIN TK VLV	RED VLV	592/Z26	2	L						TRANSPORT*	DED
104	DRAIN TK PIPE COLLARS	GREEN	592/Z26/	0.5	N						TRANSPORT	DED
103	DRAIN TK GAGE BOX		592/Z26/	1	N						ALUMINUM	
112	SPRING CAN CCH 2403B	GRINELL GREEN	592/Z28	2	N						TRANSPORT	DED
125	CC RETRN FR RCP 2C BEARING COOLER VLV		592/Z29	1	N						TRANSPORT*	DED
126	CC RETRN FR RCP 2A BEARING COOLER VLV		592/Z29/	1	N						TRANSPORT*	DED
127	PIPE STRUT	3' LONG X 2" OD	592/Z31	1.5	N						TRANSPORT	DED
131	CC SUPPLY TO RCP 2D VLV		592/Z34	1	N						TRANSPORT*	DED
140	LOUDSPKR ELEC BOX		617/Z18	2	L						TRANSPORT	DED
153	SNUBBER MSRS-201	GREEN	617/Z27	2	N						TRANSPORT	DED
166	CSRS SNUBBERS	TWO BLUE SNUBBERS	617/Z31	2	N						TRANSPORT*	DED
115	TRANSFORMER CAB	BLUE- ADJACENT TO LITE CABS	592/Z29	4	L						TRANSPORT	DED
114	DC EM LITE CAB 84	GRAY	592/Z29/	4	L						TRANSPORT	DED
155	2RB551 ELEC BOX	GRAY	617/Z28	5	L						TRANSPORT	DED

TABLE 1  
ZION UNIT 2 CONTAINMENT COATINGS

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147	ELEC BOXES	GRAY (NEXT TO WELD RECEPTACLES)	617/Z20/	6	N						TRANSPORT	DED
79	ELECTRICAL BOXES	GRAY	592/Z18/	7	L						TRANSPORT	DED
84	ELEC. BOXES	GRAY	592/Z20	7	L						TRANSPORT	DED
86	MICRO COMPUTER HOUSING	BROWN VENTED HOUSING	592/Z21/	4	N						TRANSPORT*	DED
95	ELEC. BOXES	GRAY	592/Z24	7	L						TRANSPORT	DED
117	REG LTG CAB 73	GRAY	592/Z29	7	N						TRANSPORT	DED
113	AC EM LITE CAB 83	GRAY	592/Z29/	7	L						TRANSPORT	DED
156	REG LTG CAB 72	GRAY	617/Z28	7	L						TRANSPORT	DED
159	REG LTG CAB 63	GRAY	617/Z29	7	L						TRANSPORT	DED
174	REG LTG CAB 88	GRAY	LOWER LEVE	7	L						TRANSPORT	DED
183	REG LTG CAB 87	GRAY	LOWER LEVE	7	L						TRANSPORT	DED
110	2AP151 480 VAC DIST PANEL		592/Z28/	10	N						TRANSPORT	DED
138	ELEC BOX	BLUE	608/Z27/	10	N						TRANSPORT	DED
111	REG LTG CAB 93	GRAY	592/Z28	12	N						TRANSPORT	DED
88	REG LTG CAB 86	GRAY	592/Z21/	14	N						TRANSPORT	DED
136	A,B,C,D ELEC BOXES	GREEN, 8 SQ-FT EACH	608/Z27	24	N		Y		970001543	1		MAINT
137	E,F,G ELEC BOXES	GREEN, 8 SQ-FT EACH	608/Z27	24	N		Y		970001543	1		MAINT
148	DRY TYPE TRANSFORMER BOX	BLUE BOX ON FLOOR	617/Z24/	28	N						TRANSPORT	DED
157	DRY TYPE TRANSFORMER BOX	BLUE BOX ON FLOOR	617/Z29/	28	N						TRANSPORT	DED
164	STEARNS ELEC MOTOR	NEAR CRANE	617/	3	N						TRANSPORT	DED
30		RED 3" FLANGE CONNECTION	568/Z26/	1	N						TRANSPORT*	DED
80	RED FIRE PIPING	3' LONG X 4" OD	592/Z18/	3	N						TRANSPORT	DED
20	RED FIRE PIPING	5' LONG X 3" OD	568/Z22/	4	N						TRANSPORT	DED
47	RED FIRE PIPING	5' LONG X 3" OD	568/Z29/	4	N						TRANSPORT	DED
91	RED FIRE PIPING	4' LONG X 4" OD	592/Z22	4	N						TRANSPORT	DED
99	FOUR 'L-SHAPED' SUPPORT BRACKETS	REDDISH PRIMER	592/Z25/	4	L						TRANSPORT*	DED
105	DRAIN TK SPRING VALVE ACT	GRINELL GREEN	592/Z26/	4	L						TRANSPORT	DED
158	RED FIRE PIPING	6' LONG X 3" OD	617/29	5	N						TRANSPORT	DED
167	ELEC MOTOR HOIST		617/Z31	20	L						TRANSPORT	DED
152	MS LINE SUPPORTS	BLUE	617/Z26	25	N						TRANSPORT	DED
203	COPEES VULCAN VC 208	COPEES-VULCAN BLUE	PUMP DECK	6	N	Y-CVI					M22-0-87-27 (BA RECON)	
135	PIPE STRUT	4' LONG X 3" OD	608/Z27/	3	L						TRANSPORT	DED
52	PIPE STRUT	5' LONG X 3" OD, GREEN	568/Z30/	4	L						TRANSPORT	DED
58	PIPE STRUT	5' LONG X 3" OD, GREEN	568/Z30/	4	L						TRANSPORT	DED
49	SPRING CAN/ SIH 2322	GRAY CAN 18" LONG X 12" OD-GRINELL GREEN	568/Z30/	5	N						TRANSPORT	DED

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TABLE 2

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ZION UNIT 2 CONTAINMENT COATING ADHESION TESTING

TEST #	SUBSTRATE TYPE	ELEVATION / LOCATION	SOUND OR DAMAGED COATING	ADHESION STRENGTH (PSI)	FAILURE TYPE
1	LINER PLATE	568 / Z24	D	>900	GLUE
2	LINER PLATE	568 / Z28	S	300	GLUE
3	LINER PLATE	568 / BETWEEN Z28 & Z29	D	225	PRIMER
4	LINER PLATE	568 / BETWEEN Z28 & Z29	D	400	PRIMER
5	LINER PLATE	568 / Z34	D	450	PRIMER
6	LINER PLATE	592 / Z20	D	550	PRIMER
7	LINER PLATE	617 / Z21	D	250	PRIMER
8	LINER PLATE	617 / Z21	D	400	PRIMER
9	STRUC. STEEL	568 / Z22 SUPPORT COLUMN	D	>900	GLUE
10	STRUC. STEEL	568 / Z26 RCFC HOUSING	S	>900	GLUE
11	STRUC. STEEL	568 / Z31 SUPPORT COLUMN	D	500	INTERCOAT
12	STRUC. STEEL*	568 / Z30 SUPPORT COLUMN NEAR RECIRC SUMP	D	>900	GLUE
13	STRUC. STEEL*	568 / Z30 SUPPORT COLUMN NEAR RECIRC SUMP	D	900	TOPCOAT
14	STRUC. STEEL*	568 / Z30 SUPPORT COLUMN NEAR RECIRC SUMP	D	900	TOPCOAT
15	STRUC. STEEL*	PUMP DECK / COLUMN NEAR 2D RCP HOUSING 3" FROM DAMAGED AREA	D	900	PRIMER
16	STRUC. STEEL*	PUMP DECK / COLUMN NEAR 2D RCP HOUSING 16" FROM DAMAGED AREA	D	800	PRIMER
17	STRUC. STEEL*	PUMP DECK / COLUMN NEAR 2D RCP HOUSING 30" FROM DAMAGED AREA	D	900	TOPCOAT
18	STRUC. STEEL	592 / Z31 2E RCFC HOUSING	D	450	PRIMER
19	CONCRETE*	568 / Z30 WALL ADJ. TO BIOSHIELD 3" FR. DAMAGED AREA	D	525	GLUE
20	CONCRETE*	568 / Z30 WALL ADJ. TO BIOSHIELD 16" FR. DAMAGED AREA	D	600	GLUE
21	CONCRETE*	568 / Z30 WALL ADJ. TO BIOSHIELD 48" FR. DAMAGED AREA	D	800	CONCRETE
22	CONCRETE*	568 / Z30 WALL ADJ. TO RECIRC SUMP 3" FR. DAMAGED AREA	D	800	CONCRETE
23	CONCRETE*	568 / Z30 WALL ADJ. TO RECIRC SUMP 16" FR. DAMAGED AREA	D	650	CONCRETE
24	CONCRETE*	568 / Z30 WALL ADJ. TO RECIRC SUMP 48" FR. DAMAGED AREA	D	500	CONCRETE
25	CONCRETE*	PUMP DECK / Z21 OUTER WALL	S	>900	GLUE

\* - INDICATES TEST LOCATION WITHIN THE MISSILE BARRIER

## APPENDIX 1 QUALIFICATION DOCUMENTATION for CONTAINMENT PROTECTIVE COATINGS

On January 4, 1997, System Materials Analysis Department personnel performed an examination to determine the condition of coated surfaces inside Zion Unit 2 containment. The results of the examination are presented in SMAD Report M-00282-97

One part of the examination resulted in an inventory of surfaces in the containment that were assumed to be coated with undocumented coating material. For this evaluation, undocumented coatings are defined as those coating systems that could not be determined by visual examination to be Carboline Co. products specified in Specification X-2340 or to be qualified coatings called out in procurement specifications. A representative list of coated items, whose coatings were judged by the examiners to be in that category, was compiled and is presented in Table 1 of SMAD Report M-00282-97. Subsequent to the examination, a search of existing documentation and discussions with vendors of equipment yielded sufficient information to provide reasonable assurance that many of the items listed in Table 1 were, in fact, coated with qualified nuclear coatings. The table was then revised to reflect this information.

The purpose of this document is to summarize the information that supports the conclusion that the coatings involved are qualified for use in the Zion containment. Reference documents, along with an explanation where necessary, are described in the following:

### 1. WESTINGHOUSE SUPPLIED EQUIPMENT

The protective coatings specified for equipment items supplied by Westinghouse Electric Corporation are covered in Process Specification 597755, Revision B, issued March 18, 1968, revised May 17, 1968. Under this specification, two coating systems are permitted for uninsulated steel surfaces, for normal operation at 200° F. or less, with inorganic zinc primer and epoxy topcoat (597755-1). The systems are described as follows:

MANUFACTURER	PRIME COAT	FINISH COAT
Ameron	Dimetcote Steel Primer	Amercote 66
Carboline	Carbozinc-11	Phenoline 305

The specification also prescribes coating of uninsulated steel surfaces, for normal operation between 200°F. and 685°F, with inorganic zinc only (597755-2). In particular the following products are specified:

MANUFACTURER	PRIME COAT
Ameron	Dimetcote 5 or 6
Carboline	Carbozinc-11

Included in items covered by Specification 597755 are valves and valve operators supplied by other vendors as subcontractors to Westinghouse. For Zion, these vendors included Copes-Vulcan, Inc. (CVI) and Limitorque. Coating procedures by both vendors are discussed in #2 and #3 below. Specification 597755 is included in Attachment 1.



2. VALVES FURNISHED BY COPES-VULCAN, INC.

Valves and valve actuators supplied by Copes-Vulcan, Inc. (CVI) were coated to the requirements of CVI procedures 8.1.106 (valve bodies and bonnets) and 8.1.107(actuators). The coating systems used for the valves furnished to Zion, according to CVI, were Carboline products. The valve bodies and bonnets were coated with Carbozinc-11. The valve actuators were coated with a Carbozinc-11 primer and Phenoline 305 surface coat. The Carboline products have been tested under DBA conditions and meet the requirements of ANSI N5.9/N5.12. Therefore the coating systems are acceptable for containment use. The CVI procedures and Carboline verification of the coating test results are included in Attachment 2.

3. VALVE OPERATORS FURNISHED BY LIMITORQUE CORPORATION

Coating work for equipment furnished by the Limitorque Corporation are covered by Limitorque procedures LPS-102A and LPS-102B. Information supplied by Limitorque indicates that the coating system used for items furnished to Zion is Carboline Carbozinc-11 primer and Phenoline 305 finish coat. As indicated in #2 above, this system is acceptable for use in nuclear containment applications. Limitorque coating procedures are included in Attachment 3.

4. INSTRUMENT RACKS

Sargent & Lundy Specification X-2313 covers the supply and installation of instrument racks. Section 17 of that specification states that the racks shall be coated with Keeler & Long 7107 primer and 7500 finish coat. This coating system has been successfully tested under Design Basis Accident (DBA) conditions and meets the requirements of ANSI N5.9/N5.12. Therefore, the coating system is acceptable for containment use. Applicable portions of S&L Specification X-2313 and Keeler & Long records of the various test results are included in Attachment 4.

5. MAIN STEAM CONDENSATE COLLECTION TANK

Hudson Fabricating & Eng. Co. Drawing No. 3877 indicates that this tank was coated with Carboline Phenoline 305 primer and Phenoline 305 finish. This Carboline system is qualified for containment use on the basis of DBA test and tests prescribed in ANSI N5.9/N5.12. The Hudson drawing and the Carboline records of the tests performed on the coating system are included in Attachment 5.

6. STRUCTURAL STEEL

The coatings on structural steel were examined visually and small areas of coating were removed from eight locations on structural columns on January 16, 1997. On two NSSS support columns examined inside the missile barrier, a few small patches of topcoat, of approximately 2 or 3 square inches in area, had fallen off exposing the primer. The primer was gray in color and when scratched with a chisel, a metallic sheen resulted. A similar effect was observed when the primer on the liner plate was scratched. Sargent & Lundy Specification X-2340 indicates that the liner plate primer is inorganic zinc and that the appearance of the primer on the columns is very similar to that on the liner. It appears that the primer on the columns is inorganic zinc. Carboline products were specified for use in the containment in Specification X-2340. Therefore the primer is probably Carbozinc-11. The top coat appeared to be Phenoline 305. That system, as stated in #2 above, is qualified for containment use.

Columns and beams that were examined outside the missile barrier showed only minor breaks in the coating. In none of the cases examined was there any evidence of delamination between the

finish and primer coats. The visible substrate at coating breaks was either bare metal or light rust. Attempts were made to remove small areas of the intact coating in order to examine the system layers. However, with the hand tools available, removal of pieces larger than a fraction of an inch in largest dimension was not possible and identification of individual components of the system could not be readily accomplished. At a few locations, there was indication of a two coat system with the primer coat being yellow in color and the topcoat being white. This combination of colors was also observed in floor coatings during an examination of coatings that was performed by IMAD in November, 1996. The floor coating in the containment consists of two coats of Phenoline 305. Based on these observations, it is logical to assume that the columns outside the missile barrier and, by extension, the remaining structural steel is coated with the two coat Phenoline 305 system. This system is DBA qualified for use on both concrete and steel substrates. Test results for the system are provided in Attachment 5.



QUALIFICATION DOCUMENTATION  
for  
CONTAINMENT PROTECTIVE COATINGS

ATTACHMENT 1

WESTINGHOUSE PROPRIETARY CLASS 2



Westinghouse Electric Corporation

Process Specification PWR 597755 Rev. B  
(Stating Dash Number)

Issued: March 16, 1968  
Revised: May 17, 1968

APPLICATION OF PROTECTIVE COATINGS TO REACTOR CONTAINMENT AND SYSTEM COMPONENTS IN  
THE REACTOR CONTAINMENT

SCOPE

This specification covers the application of paint systems to equipment and structures in the reactor containment for which the use of spray systems for fission product removal and/or containment cooling are contemplated.

- 597755 - 1. Application to metal surfaces for normal operation to 200°F, with top (finish) coat.
- 11 Application to metal surfaces for normal operation to 200°F, without top (finish) coat.
- 2 Application to metal surfaces for normal operation between 200°F and 685°F which are not thermally insulated.
- 3 Condition A: Application to concrete surfaces requiring wear resistance.  
Condition B: Application to concrete surfaces not requiring wear resistance.
- 4 Application to metal surfaces for normal operation between 200°F and 685°F which are covered with thermal insulation (such as: pressure vessel, reactor vessel, steam generator tanks).

SAFETY PRECAUTION: USE OF SOME OF THE COMPOUNDS AND MATERIALS MAY REQUIRE SPECIAL PRECAUTIONS. FOLLOW MANUFACTURERS' INSTRUCTIONS WHEN USING.

Note: Any deviations to this specification necessitated by special or unusual circumstances shall be submitted in writing to WAPD for written disposition.

1. OPERATIONS

CAUTION: COMPONENTS, PIPING AND EQUIPMENT IN THE VICINITY OF ITEMS RECEIVING SURFACE PREPARATION SHALL BE PROTECTED FROM ENTRANCE OF BLAST MEDIA. SCHEDULE SHALL BE SUCH THAT BLAST CLEANING SHALL BE PERFORMED PRIOR TO INSTALLATION OF ANY CLEAN ROTATING EQUIPMENT, VALVES, ETC. ARE INSTALLED.

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## WESTINGHOUSE PROPRIETARY CLASS 2

## 1.1 Metal Surface Preparation

## 1.1.1 (For -1, -11 &amp; -2)

- a. Blast clean all surfaces in accordance with SSPC-SP10-63T to remove all rust, mill scale, rust scale, paint and other foreign matter.
- b. Remove all blasting dust by brushing or vacuum cleaning.

## 1.1.2 (For -4)

- a. Surfaces which are subsequently covered with permanent drip proof metallic insulation are to be cleaned to the best of manufacturers' ability. Method to be used shall be consistent with recommendations by paint manufacturer and submitted to WAPD for written approval.

## 1.2 Concrete Surface Preparation

## 1.2.1 (For -3)

- a. All concrete surfaces shall be clean, dry and free of previously applied coatings and disintegrated or chalky material. This may be performed by one of the following methods.
  1. (Preferred Method) Sand blast surfaces using a 16-30 mesh (recommended) silica or equal. Surface shall have a profile that feels like medium sandpaper to the touch. Dust shall be removed from the blasted surface by vacuuming or by blowing with dry, oil-free air.
  2. Prior to installation of any stainless steel components and with written approval of WAPD an alternate method may be used.

(Alternate Method) Acid etch surfaces, original or cement washed to remove glaze and concrete laitence. The etching material shall be a 15% hydrochloric (muriatic) acid solution. First dampen surface with clean water, being sure to avoid excess water which will form puddles. Apply acid solution with a brush and allow to remain on surface at least 3 minutes and until bubbling stops. Flush off with water immediately. Use a stiff brush to remove concrete salts during washing. Neutralize surfaces with an alkaline detergent cleaner such as a 5% solution of trisodium phosphate or sodium carbonate (soda ash). Allow to stand 10 minutes and flush.

## WESTINGHOUSE PROPRIETARY CLASS 2

off with clean water. Surface must be neutral or slightly alkaline and have a finish similar to fine or medium sandpaper. Smooth areas must be retched. All concrete surfaces must be completely dry before coating.

## 2. APPLICATION AND MIXING

General: Application (spray, brush or otherwise) and mixing of paints shall be in accordance with manufacturers' instructions. When brushing is permitted, cover the surface uniformly, brushing the paint on with overlapped strokes, avoiding brush marks as much as possible.

Regardless of type equipment used, uniform films should be applied which are continuous and unbroken at any point and which have a glossy-wet appearance. Spray material wet enough to flow out smoothly. Use a cone-shaped spray for painting small parts, pipes, angle irons, and small or narrow surfaces, and a fan-shaped spray for painting larger areas. Move the spray gun with a steady motion and at such speed over the entire surface as will produce a wet, glossy film and avoid a variation in film thickness. Each stroke of the gun as in brushing shall overlap the previous stroke approximately 50%, so as to produce a uniformly and completely covered surface. Best results are obtained with the gun held so that the material strikes the work at an angle of approximately 90°.

## 3. PRIME AND FINISH COATING

Apply thicknesses and number of coatings in accordance with Table I.

NOTE: Extreme care must be exercised to prevent spilling, splashing or seepage of these materials onto stainless steel surfaces of components.

### 3.1 Prime Coating

#### 3.1.1 Dimetecote Steel Primer (Amercoat Corporation, Brea, Calif.)

- a. Drying - Material will dry within 30 minutes at 50-95°F.
- b. Recoating - Additional coats or thicknesses may be applied over the first coat as soon as the first coat is dry to the touch.
- c. Pot Life - 8 hours maximum at 70°F (mixed material).

#### 3.1.2 Dimetecote No. 5 (Amercoat Corporation, Brea, Calif.)

- a. Drying - Material dries hard within 5-10 minutes and becomes resistant to intermittent contact with water, rain or condensation within 1 hour after application above 70°F and at relative humidities between 50-95%.

## WESTINGHOUSE PROPRIETARY CLASS I

- b. Recoating - Same as 3.1.1(b)
- c. Pot Life - 6 hours maximum at 70°F (mixed material)

## 3.1.3 Dimetecote No. 6 (Amercoat Corporation, Brea, Calif.)

- a. Drying - Will dry to water insoluble condition in 15 minutes above 32°F and abrasion resistance in 2 hours at 70°F.
- b. Recoating - Same as 3.1.1(b)
- c. Pot Life - 24 hours at 70°F

## 3.1.4 Carbozinc 11 (Carboline Co., St. Louis, Mo.)

- a. Drying - Material will dry in approximately 30 minutes after which additional coats or thicknesses may be applied.
- b. Topcoating - Apply top coating after time periods per following time schedule:
  - at 50% Rel. Humidity 6-8 hrs. @ 85°F or higher; 12-16 hrs. @ 40-60°F
  - at 50% Rel. Humidity 8-12 hrs. @ 60-85°F 16-24 hrs. @ 0-40°F
- c. Pot Life - 12 hours maximum at 75°F

NOTE: Supplier recommends green color material for use due to ease of application over blasted steel surface.

3.2 Finish Coating

## 3.2.1 Amercoat No. 66 (Amercoat Corporation, Brea, Calif.)

- a. Drying - To recoat allow 6 hours at 60°
- b. Repairing System - Spot rebast or power sand damaged area, then recoat with same number of coats as originally to obtain required coating thickness.
- c. Curing Time
  - 1. For maintenance, allow to dry for 7 days at 70°F
  - 2. For immersion (nonaqueous) allow to dry for 7 days at 70°F with continuous air circulation.
  - 3. For immersion (aqueous) bake for 24-28 hours at 140°F.

## WESTINGHOUSE PROPRIETARY CLASS 2

d. Pot Life - 8 hours maximum at 70°F.

3.2.2 Phoroline 305 Finish (Carboline Company, St. Louis, Mo.)

a. Drying

1. Final drying time is 3 to 4 days at 75°F
2. Allow 18 hours at 75°F or 12 hours at 90°F drying time between coats.

b. Repairing System - Spot reblast or power sand damaged area, then recoat with same number of coats as originally to achieve required film thickness.

c. Pot Life - 1-1/2 hours maximum at 75°F.

3.2.3 MIL-P-14276

W M-32206A3

a. Drying - Air dry for 24 hours

b. Repairing System - Hand or power tool clean damaged area, then recoat with same number of coat(s) as originally to obtain required coating thickness.

c. Pot Life - Use manufacturers' instructions for 1 part ready-mixed paint.

TABLE I

<u>597755</u>	<u>Primer</u>	<u>No. Coats</u>	<u>Dry Film Thickness Per Coat</u>	<u>Finish</u>	<u>No. Coats</u>	<u>Dry Film Thickness Per Coat</u>
- 1	Dinacote Steel Primer or Carbozinc 11	1	1.5 - 2 mils 3 mils	Amercoat 66 or Phenoline 305	1	4 - 5 mils
-11	Dinacote 5, 6 or Carbozinc 11	2	2 - 3 mils	None		
- 2	Dinacote 5, 6 or Carbozinc 11	2	2 - 3 mils	None		
- 3*	None			Amercoat 66 or Phenoline 305	1,3	4 - 5 mils
- 4	None			MIL-P-14276 W M-32206AB	1	1 - 2 mils

Note: Second coats should be applied only following curing time recommended by supplier.

\* Condition A - For wear resistant applications (floors, stairs) apply 12-15 mils dry film thickness total (apply in three coats).

Condition B - For non-wear resistance (walls, ceilings) apply total of 4-5 mils dry film (can be 1 coat).



QUALIFICATION DOCUMENTATION  
for  
CONTAINMENT PROTECTIVE COATINGS

ATTACHMENT 2

COPE-S-VULCAN, INC.

P. O. BOX 577 ♦ LAKE CITY, PENNSYLVANIA 16423-0577

TELECOPY

To:	Commonwealth Edison	Date:	Jan 8, 1997
Fax:	(847) 731-4279	Page	1 of 7
Attention:	Mike Gard	From:	C.A. Dundon
Subject:	CVI Valves Supplied To <u>W</u> Blue Paint	Ph.	(814) 774-1560
		Fax	(814) 774-1684

Further to our telecon this AM -

Valves originally supplied to you through Westinghouse were painted blue in accordance with the W process specification. Valve bodies and bonnets were painted per CVI Proc. 8.1.106 and the actuators were painted per 8.1.107. Based upon the dates, Revisions 0, 1 or 2 of 8.1.106 could have all been used on your equipment. Likewise Revisions 0 and 1 of 8.1.107 could have been used. If you review the descriptions of the revisions you will see that the same paint and primer would have been used regardless of the revision level.

Since these paints are no longer available CVI would paint new equipment with Carboline 890 over Carbozinc 11 primer.

Best regards,

**COPES-VULCAN, INC.**

LAKE CITY (ERIE CO.), PA U.S.A.

ISSUED February 19, 1970

THESE ARE THE ACTUAL  
MARKING FOR REV. 1 → 2REV. NO. 2 DATE 10-22-78  
2 4.26.78COPES-VULCAN  
PROCEDURE NO. 8.1.107PROCEDURE TITLE PAINTING OF COMMERCIAL VALVE  
OPERATORS (WATER BASE PRIMER)FOR REVISION SEE  
SHEET NO. 4CONTENTSPARAGRAPHPurpose  
Scope  
Materials  
Preparation of Equipment to be painted  
Painting  
Inspection1  
2  
3  
4  
5  
6

## 1. PURPOSE:

The purpose of this procedure is to establish uniform guidelines for painting valves.

## 2. SCOPE:

This procedure recommends the materials to be used, preparation of equipment to be painted, method of painting, and the minimum inspection requirements unless otherwise specified by the customer.

## 3. MATERIALS:

3.1 ~~Paint - SSPC Paint~~ Amercoat No. 86 by Amercoat Corporation  
~~or Phenoline #305 by Carboline Co.~~ Westinghouse Blue ~~Paint~~ <sup>Color</sup> ~~Monell~~  
No. 7.3 PB 48/9.8 or equivalent3.2 Paint thinner - Amercoat #7 by Amercoat Corporation or  
Phenoline by Carboline Co.3.3 ~~Primer - Dimetcoat 2~~ by Amercoat Corporation or  
Carbozinc (II) by Carboline Co.3.4 ~~3.4~~  
3.4 Spray Gun3.5 ~~3.5~~  
3.5 Brush

REVISIONS3-VULCAN  
PROCEDURE NO.

8.1.107

SHT. NO. 4

		SIGNATURE & DATE		
REV. NO.	DESCRIPTION OF CHANGE	REVISED BY	CV-D APPROVAL IF REQUIRED	
			QC	ENGR
0	FIRST SUBMITTAL 2-19-70			
1	Deleted para. 4.2.3, replaced by para. 4.4 & 4.4.1 Revised para. 4.3 to cover inaccessible parts 10-22-75	WMS		
2	<del>Procedure</del> A Complete ly revised.			

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LAKE CITY (ERIE CO.), PA. U.S.A.

ISSUED 10-24-69

REV. NO. 2 DATE 10-2

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PROCEDURE NO. 8.1.106

PROCEDURE TITLE PAINTING OF COMMERCIAL NUCLEAR VALVES

FOR REVISION SEE  
SHEET NO. 4

CONTENTS

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Purpose	1
Scope	2
Materials	3
Preparation of Equipment to be Painted	4
Painting	5
Inspection	6

1. PURPOSE

The purpose of this procedure is to establish uniform guidelines for painting valves.

2. SCOPE

This procedure recommends the materials to be used, preparation of equipment to be painted, method of painting, and the minimum inspection requirements unless otherwise specified by the customer.

3. MATERIALS

- 3.1 Paint - Westinghouse Blue Paint No. 7.3 PB48/9.8 or equivalent or CVI Standard Primer as called for in Shop Order.
- 3.2 Paint Thinner - Xylol by Beaver Paint or equivalent
- 3.3 Spray Gun
- 3.4 Brush

4. PREPARATION OF SURFACES FOR PAINTING

- 4.1 All surfaces to be painted shall be clean and free from dirt, grease, oils, casting sands, and loosely adhering scale and oxides.

#### 4.2 Non-Painted Surfaces

- 4.2.1 The following shall not be painted:
- Stainless Steel Bodies and Bonnets
  - Stems
  - Weld Preparations
  - Gasket Surfaces of Flanges
  - Nameplates and Similar Tags
  - Accessories Mounted on the Valve that were previously painted
  - Internal parts that will contact fluid during service.

- 4.3 Parts that are inaccessible after assembly shall be painted prior to assembly to insure complete coverage.

### 5.

#### PAINTING

- 5.1 Paint shall be mixed 1 part paint to 4 parts thinner. This ratio may be varied slightly to facilitate use of spray gun. Do not exceed a ratio of 4.5 parts thinner to 1 part paint.

Paint and thinner shall be thoroughly mixed before applying. Some means of continual agitating of the mixture shall be used while painting.

#### 5.2 Spray Painting Application:

Spray painting shall be done in a manner to produce a complete and uniform coverage of the surface to be painted.

#### 5.3 Brushing Application:

Painting with a brush shall be done only when spray painting is not practical.

- 5.4 Care shall be taken to eliminate runs or excessive paint.

### 6.

#### INSPECTION

- 6.1 The painter shall visually inspect the final painted assembly.

- 6.1.1 Incomplete coverage, running of paint, or other signs of excess paint shall be corrected.

- 6.1.2 Materials used to mask unpainted surfaces shall be removed by the painter.
- 6.2 The Quality Control section shall periodically audit the final painted assembly for compliance with this procedure.



REVISIONS

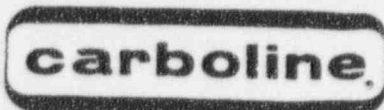
CHT. NO. 4

CPES-VULCAN  
PROCEDURE NO.

8.1.106

SIGNATURE & DATE

REV. NO.	DESCRIPTION OF CHANGE	REVISED BY	CVI APPROVAL IF REQUIRED	
			QC	ENGR
0	First submittal 10-24-69			
1	PROCEDURE NUMBER WAS 8.1.104 1-29-70	WMS	11/1/70	10/29/70
2	Add. CVI Std. to Para. 3.1 10-28-71	FEC	11/5/71	



350 Hanley Industrial Ct. • St. Louis, MO 63144-1599  
an rpm company • 314-644-1000

FACSIMILE TRANSMISSION  
FROM CARBOLINE COMPANY  
314-644-4617

To: Phil Gardy / John Caturano

From: Mark Lebeck

Document Number: \_\_\_\_\_

Date/Time Written: \_\_\_\_\_

Number of pages including  
this cover sheet: 46

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| <input type="checkbox"/> Corr. Service | <input type="checkbox"/> McD. & White |
| <input type="checkbox"/> Other         | <input type="checkbox"/> Kop-Coat LA  |

Phone: 847-731-4265

2152

Hi John:

Hope this data helps.

- Jerry asked me to search for applicable  
02-11 / 305 data.

- Please let me know what else I can do  
to help you.

- Scott Miller (Sargent-Lundy) has historical  
data what was submitted yesterday...

708-206-5549

Best Regards -

John Caturano / Frank Guerrier

COPIED

MARK

555 Juliet Rd

Boling Brook, IL 60446

CC: \_\_\_\_\_

Testing Project: 01445  
 FINAL REPORT -- 28 Hours

August 24, 1976

SUBJECT: LOCA Testing of Carbo Zinc 11/Phenoline 305 Finish at various film thicknesses.

REFERENCE: Toledo Edison, Davis-Besse; Mr. John F. Montle.

PURPOSE: To determine the performance of 1c Carbo Zinc 11/1c Phenoline 305 Finish and 1c Carbo Zinc 11/2c Phenoline 305 Finish at various film thicknesses when exposed to the Davis-Besse Nuclear Power Station Long-Term Containment Temperature Response for the 3.0 square feet DBA Break, and evaluated according to ANSI N101.2-1975, Section 4.5 as interpreted by Carboline.

CONCLUSIONS: After the 28 hours of the test curve, all the systems and thicknesses tested exhibited acceptable performances. (Please refer to "Results.")

PROCEDURE: A) Test Coupons

2" x 5" x 1/4" Sandblasted Steel coupons with rounded edges and corners.

B) Systems Tested

Dry Film Thickness\*

1) 1c Carbo Zinc 11	4 to 5 mils
1c Phenoline 305 Finish	6 mils
2) 1c Carbo Zinc 11	4 to 5 mils
1c Phenoline 305 Finish	8 mils
3) 1c Carbo Zinc 11	4 to 5 mils
1c Phenoline 305 Finish	10 mils
4) 1c Carbo Zinc 11	4 to 5 mils
2c Phenoline 305 Finish	6 mils/coat
5) 1c Carbo Zinc 11	4 to 5 mils
2c Phenoline 305 Finish	7 mils/coat

\*For measured dry film thickness, please refer to "Results".

C) Cure Schedule

Carbo Zinc 11: Overnight at high humidity and 100°F (38°C).

Phenoline 305 Finish: 4 days at ambient temperature (75°F, 24°C), plus 4 hours at 160°F (71°C), final cure.

From the Carboline Research & Development Laboratory

Testing Project: 01445  
 FINAL REPORT -- 28 Hours

August 24, 1976  
 Page Two

PROCEDURE: (Continued)

D) Exposure

Davis-Besse Nuclear Power Station Long-Term Containment  
 Temperature Response for the 3.0 ft<sup>2</sup> DBA Break Curve.

1) Time-Temperature Curve\*

<u>Time:</u>	<u>Temperature:</u>
Initial	Ambient (75°F, 24°C)
Initial to 10 Seconds	225°F (107°C)
10 Seconds to 5 Minutes	260°F (127°C)
5 Minutes to 1 Hour/20 Minutes	215°F (101°C)
1 Hour/20 Minutes to 28 Hours	180°F (82°C)

\*System was held at saturation pressure throughout test.

2) Water Chemistry

0.28 Molar  $H_3BO_3$  (3000 p.p.m. Boron) ;

0.064 Molar  $Na_2S_2O_3$  (1.01%  $Na_2S_2O_3$ )

NaOH to adjust pH to 9.5 at 75°F in de-ionized water.

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 N101.2-1975 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

Testing Project: 01445  
 FINAL REPORT -- 28 Hours

August 24, 1976  
 Page Three

GRADING PROCEDURE: (Continued)

4.5 Methods of Examining and Evaluating the Exposed Test Specimens (Continued)

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 N101.2-1975 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
*Note: A blister is <u>not</u> intact when it has resulted in coating being separated from the test coupon.		
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.

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.

**carboline**

130 HANLEY INDUSTRIAL CT. ST. LOUIS, MO 63104

RESULTS:

Coating System and I.D.	Dry Film Thickness	Flaking	Delamination or Peeling	Blistering	Chalking	Other Performance Characteristics	Performance Evaluation
1A* 1c Carbo Zinc 11 1c Phenoline 305 Finish	4.5 mils 6.5 mils 11.0 mils	10	None	10	10	Less than 1/16" UCA at the scribe	Acceptable
1B 1c Carbo Zinc 11 1c Phenoline 305 Finish	4.5 mils 6.5 mils 11.0 mils	10	None	10	10	1/16" UCA at the scribe	Acceptable
2A* 1c Carbo Zinc 11 1c Phenoline 305 Finish	4.7 mils 8.3 mils 13.0 mils	10	None	10	10	Less than 1/16" UCA at scribe	Acceptable
2B 1c Carbo Zinc 11 1c Phenoline 305 Finish	4.9 mils 8.1 mils 13.0 mils	10	None	10	10	--	Acceptable
3A* 1c Carbo Zinc 11 1c Phenoline 305 Finish	4.3 mils 10.7 mils 15.0 mils	10	None	10	10	Less than 1/16" UCA at the scribe	Acceptable
3B 1c Carbo Zinc 11 1c Phenoline 305 Finish	4.7 mils 10.3 mils 15.0 mils	10	None	10	10	Less than 1/16" UCA at the scribe	Acceptable
Perfect Performance ANSI N101.2-1972		10	None	#4F to #8MD	#8 (Light)	*Panels suspended in chamber.	

UCA = Undercutting due to loss of adhesion.



RESULTS: (Continued)

Coating System and I.D.	Dry Film Thickness	Flaking	Delamination or Peeling	Blistering	Chalking	Other Performance Characteristics	Performance Evaluation
4A*							
1c Carbo Zinc 11	4.7 mils	10	None	10	10	--	Acceptable
1c Phenoline 305 Finish	7.3 mils						
1c Phenoline 305 Finish	3.5 mils 15.5 mils						
4B							
1c Carbo Zinc 11	4.7 mils	10	None	10	10	Less than 1/16" UCA at scribe	Acceptable
1c Phenoline 305 Finish	8.3 mils						
1c Phenoline 305 Finish	3.0 mils 16.0 mils						
5A*							
1c Carbo Zinc 11	5.0 mils	10	None	10	10	Less than 1/16" UCA at scribe	Acceptable
1c Phenoline 305 Finish	8.0 mils						
1c Phenoline 305 Finish	3.8 mils 16.8 mils						
5B							
1c Carbo Zinc 11	4.7 mils	10	None	10	10	Less than 1/16" UCA at scribe	Acceptable
1c Phenoline 305 Finish	8.3 mils						
1c Phenoline 305 Finish	4.5 mils 17.5 mils						
Perfect Performance ANSI N101.2-1972		10	None	#4F to #8MD	#8(Light)	*Panels suspended in chamber	

UCA = Undercutting due to loss of adhesion.

*Patrick D. Fisher*  
 Patrick D. Fisher  
 Developmental Engineer  
 Testing Department

*John F. Montle*  
 John F. Montle  
 Vice President  
 Research & Development

PDF:pm  
 cc: Mr. Ken Tator  
 xc: SLL/HDT/JFM/EWS/MJD/SLS/DRL/JDP/CJW/RJT/Lab Group Leaders

QUALIFICATION DOCUMENTATION  
for  
CONTAINMENT PROTECTIVE COATINGS

ATTACHMENT 3

QCP- 8	PAINT SYSTEM	DATE ISSUED 1-30-76
Page 1 of 5	LPS 102 A&B REV	DATE REVISED

COATING: Primer - Carbozinc #11 - Inorganic zinc  
Topcoat - Phenoline #305 - Epoxy - West. Blue - Carboline #1154  
Alt (Lt. Gray - Carboline #720)

LPS-102 A

SURFACE PREPARATION: Prepare surface in accordance with QCP-8.1  
(Cleaning and blasting).

- MIXING:
- 1) For full use of two component kit mix as supplied.
  - 2) Less than full use of two component kit mix 10 parts and 22 parts zinc filler by weight.
  - 3) Before mixing components stir base resin fully.
  - 4) Sift zinc filler slowly into base resin with continuous agitation.
  - 5) Continue stirring until small lumps are dispersed.
  - 6) Pour thru 30 mesh screen into pot.

- THINNING:
- 1) Below 50°F. ambient temp. use carboline thinner #21. Do not exceed one pint per gallon.
  - 2) For hot weather use carboline thinner #33 or #33A. Do not exceed one pint per gallon.

POT LIFE:	TEMP.	TIME
	45°F. ambient	12 hours
	75°F. ambient	8 hours
	95°F. ambient	4 hours

Moisture in mixed material will decrease pot life.

- SPRAYING:
- 1) Use spray equipment #3 alternate #5. DFT - 2½ - 6 MILS.

NOTE: If necessary to recoat, second coat should be thinned 30-50% to obtain maximum bond.

PAINTERS: Painters coating units in accordance with this spec. must be trained by a Carboline Company field representative or have a minimum of 1 year experience.

QCP- <u>8</u>	PAINT SYSTEM	DATE ISSUED <u>1-30-76</u>
Page <u>2</u> of <u>5</u>	LPS <u>102</u> REV <u>    </u>	DATE REVISED <u>    </u>

		SURFACE TEMP.	AMBIENT TEMP.	HUMIDITY
APPLICATION CONDITIONS:	NORMAL	40-110°F	40-95°F	NA
	Minimum	0°F	0°F	0%
	Maximum	200°F	130°F	95%

## COVERAGE INFORMATION:

- 1) 333 Sq. feet/gal. at 3 mils D.F.T. using a standardized Mikrotest or Elcometer.

## NOTE:

Maximum film thickness per coat is not to exceed 6 mils. Failure to adhere to this limitation will cause cracking or loss of adhesion.

## CURING:

- 1) This material requires moisture to cure.

Cure times are listed at ambient temperature for low and high humidity conditions. (Prior to placing in immersion service or before topcoating.

<u>25 to 50% R.H.</u>	<u>TEMP.</u>	<u>ABOVE 50% R.H.</u>
24 to 48	0 to 40°F	16 to 24
24 to 48	40 to 60°F	12 to 16
24 to 48	60 to 85°F	8 to 12
12 to 24	85 to 100°F	6 to 8

## CLEAN UP:

- 1) Clean equipment using carboline thinner #2 or Kentone solvent.
- 2) Remove hardened material with solution of 10% caustic soda.

NOTE: CAUSTIC SOLUTION ATTACKS ALUMINUM.

QCP- 8	PAINT SYSTEM	DATE ISSUED 1-30-76
Page 3 of 5	LPS 102 REV	DATE REVISED

## FLASH POINTS:

## Pensky Martens Closed Cup

- 1) Carbozinc 11 base. . . . . 56° F.
- 2) Carboline Thinner #21. . . . . 53° F.
- 3) Carboline Thinner #33A . . . . . 77° F.
- 4) Carboline Thinner #33. . . . . 104° F.
- 5) Carbozinc 11 mixed & thinned ready to spray. 58° F.

## STORAGE CONDITIONS:

Temperature 0° Minimum  
Humidity 0 to 100%  
Shelf Life 9 Months Minimum

## CAUTION INFORMATION:

This product contains flammable solvents. Keep away from sparks and open flame. In confined areas workmen should wear fresh airline respirators. Hypersensitive persons should wear gloves or use protective cream on face and hands. All workmen in area should wear conductives and non-sparking shoes and use non-ferrous tools. All electrical equipment and installations should be made and grounded in accordance with the National Electrical Code for Class I Group D, Division I locations.

LPS-102 B

TOPCOAT: Phenoline 305

Color - West. Blue- Carboline #1154

Alternate - Lt. Gray - Carboline #720

SURFACE PREPARATION: Carbozinc 11 (SEE LPS-102A)

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QCP- 8	PAINT SYSTEM	DATE ISSUED 1-30-76
Page 4 of 5	LPS 102 REV	DATE REVISED

- MIXING:
- 1) For full use of two component kit mix as supplied.
  - 2) Less than full use of two component kit mix 4 parts base and 1 part catalyst, by volume.
  - 3) Before mixing components stir base resin fully.
  - 4) Continue stirring and add catalyst slowly.

THINNING: Depending on weather conditions use thinner not exceeding 1½ pints per gallon.

POT LIFE: At 75°F. ambient temperature approximately 1½ hours.

APPLICATION: Use spray equipment #3-alternate #5.

D.F.T.: 3½ Mils minimum

		SURFACE TEMP.	AMBIENT TEMP.	HUMIDITY
APPLICATION CONDITIONS:	Normal	60-85°F	65-85°F	30-75%
	Minimum	50°F	50°F	0%
	Maximum	120°F	120°F	85%

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

#### COVERAGE INFORMATION:

- 1) 320 Sq. feet/gal. at 4 mils D.F.T. using a standardized Mikrotest or Elcometer.

#### NOTE:

- a) Material Losses - During mixing and application will vary. Consider this when estimating job requirements.
- b) Application over inorganic zinc primer may require a mist coat followed by a full coat, to eliminate bubbles.
- c) Wet film thickness required for 4 mils D.F.T. is approximate 6 mils.



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PAGE 5 of 5		LPS 102		REV	DATE REVISED

#### CURING:

Before any subsequent applications of top coat allow surface to dry 18 hours at 75°F. or 12 hours at 90°F.

Final cure for single coat at 4 mils D.F.T. requires 3 to 4 days at 75°F.

#### CLEAN UP:

Clean equipment with carboline thinner #2 or Keytone solvents.

#### FLASH POINTS:

Pensky Martens closed cup

- 1) Phenoline 305 Resin . . . 40°F
- 2) Phenoline 305 Catalyst. . 53°F
- 3) Phenoline Thinner . . . . 77°F

#### STORAGE CONDITIONS - RECOMMENDED

Temperature	40° Minimum
Humidity	6 to 100%
Shelf Life	2 Years Minimum

#### CAUTION INFORMATION:

This product contains flammable solvents. Keep away from sparks and flame. In confined areas workmen should wear fresh airline respirators. Hypersensitive persons should wear gloves or use protective cream on face and hands. All workmen in area should wear conductives and non-sparking shoes and use non-ferrous tools. All electrical equipment and installation should be made and grounded in accordance with the National Electrical Code for Class I Group D, Division I location.

#### INSPECTION AND DOCUMENTATION:

- a) Inspection shall be in conformance with QCP-8.J-1.
- b) Documentation shall be in conformance with QCP-8.J-2.

QUALIFICATION DOCUMENTATION  
for  
CONTAINMENT PROTECTIVE COATINGS

ATTACHMENT 4

SARGENT & LUNDY  
ENGINEERS  
CHICAGO

April 23, 1970

Zion Station - Units 1 and 2  
Local Instrument Racks  
Specification X-2313

Mr. N. A. Kershaw  
System Mechanical & Structural Engineer  
Commonwealth Edison Company  
First National Building - Room 34FN East  
One First National Plaza  
Chicago, Illinois 60670

Dear Mr. Kershaw:

Enclosed for your files are two copies of the above Specification.  
Drawings are included with the Specification.

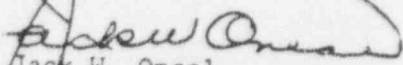
We are holding the bidders copies of the Specification and drawings  
in our offices for release to the bidders when instructed to do so  
by your Purchasing Department.

The estimated cost of the work covered by this Specification is  
\$105,000.

The following Instrument Data Sheets referred to in Paragraph 6H of  
the Specification are not included and will be forwarded shortly:

1PT04	1PT07	1PT21	1FT05	1FT06	1MD16
1.54	1.55	1.58	4.52	4.55	4.62
5.67	9.55	W.05	OPT01		

Yours very truly,

  
Jack W. Oneal  
Senior Contract Specialist

JWO/eg  
In duplicate  
Enclosures

cc: D. L. Levine (1 w/1 enc)  
A. W. Kleinrath (1 w/2 enc)  
R. Cosaro (1 w/2 enc)  
R. E. Meagher (1 w/4 enc)  
Sta. Supt. c/o Meagher (1 w/1 enc)  
N. E. Wandke (1 w/1 enc)  
H. L. Holmberg (1 w/1 enc)  
J. D. Jacobson  
R. W. Patterson

COPY

the instrument rack will not require additional air supply pressure regulating components. Only a single incoming air supply line to each rack will be provided by the Purchaser and, therefore, the Contractor on the rack side of the piping terminals shall make provision to furnish an air supply line to each air user. Shut-off or isolating valves shall be provided in each air supply line to each rack mounted user. Racks having three (3) or more air users shall be provided with a 1/2" brass air header.

- b. Tubing, valves and fittings shall be in accordance with Piping Design Table "U," included herewith.
- c. One spare plugged air supply shut-off valve for instrument testing shall be provided on each rack, including those with only electronic devices.
- d. Connections from control devices shall be terminated in bulkhead fittings on horizontal strap type brackets located at the top of the rack.
- e. Tubing runs shall be continuous from equipment to terminal area except where these are required, or where tubing cannot properly be formed, attached or removed in one piece without deformation.
- f. Arrangement shall be logical, orderly, accessible and neat, with straight, parallel runs, and a minimum of crossing. Vertical runs shall be plumb. Horizontal runs shall pitch slightly away from the instrument. Pneumatic tubing shall be kept segregated from process piping.
- g. Supports shall provide complete freedom from strain on equipment, and runs shall be so arranged that connections can be broken without distortion of the tubing.
- h. Each air supply stop valve and tube terminal connection shall be identified by a stainless steel tag stamped with Purchaser's tag number of connected instrument on the instrument rack.
- i. All signal output connections are to be furnished with a plugged test tee for local test reading of instrument signal.

17. RACK PAINTING

All welding on the rack structure shall have been completed prior to applying the finish. The finish shall be applied as follows:

- A Racks inside containment building:
  - a. The metal surface shall be cleaned and sand blasted to remove all adherent scale and rust.
  - b. Clean all surfaces and apply paint in accordance with manufacturer's instructions.
  - c. Apply two coats of Keeler and Long, Inc., No. 7107 primer.
  - d. Apply one coat of finish paint Keeler and Long, Inc., No. 7500 epoxy stainless steel gray enamel.

*17.01 12/11/11*