LEAD INDUSTRIES ASSOCIATION

420 LEXINGTON AVENUE
NEW YORK 17, N. Y.

RED LEAD DIVISION

November 22, 1949

SUBJECT: REPORT ON FIRST ANNUAL INSPECTION OF PROJECT NO. 14

To The Members Of The Red Lead Technical Committee

A report on the first year's performance of the primed paints in Lead Industries Association Project No. 14 is attached. This report was prepared following the completion of a personal inspection tour of all five exposure sites.

The report shows considerable variation in performance of identical paint compositions at the different exposure locations. A few of these inconsistencies are undoubtedly due to differences in climate and environment. San Francisco in particular seems to offer an unusually rigorous exposure.

However film thickness measurements made at San Francisco and in a few cases at Joplin indicate that many of the failures occurred on paints applied at thicknesses considerably under or over the prescribed 1.5 mils ± 10%. Several of the seriously corroded single primer coat areas at San Francisco contained less than 1 mil of paint. This applies to red lead base paints as well as paints based on zinc chromate and other pigments. Also, three paints showing checking on the exposed primer areas at Joplin were applied at dry film thicknesses considerably in excess of 1.5 mils.

In view of these unanticipated adverse results, we think it advisable that the members of the Red Lead Technical Committee reconsider previously adopted plans for publicizing this project. This has been placed on the agenda for the next Committee meeting on December 8.

Very truly yours,

C. J. Vanderbilt

N2811

CONFIDENTIAL REPORT
TO NEW DELHI TECHNICAL COMMITTEE

L. I. A. PROJECT NO. 14

First General Inspection

Inspection Dates: August 26, 1949 - Cleveland (with O. F. Shobe and L. Atwood)
September 7, 1949 - Sayville (with R.L.P.C.)
October 10, 1949 - New Orleans (with J. Pedarre)
October 12, 1949 - Joplin (with L. L. Carrick)
November 8, 1949 - San Francisco (with W. Helfrich)

Reported by: C. J. Vander Valk
Date: Nov. 15, 1949

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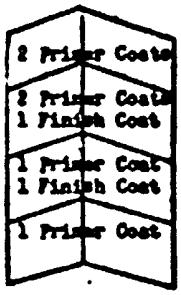
INTRODUCTION

Project No. 14 is comprised of ninety-four primer paints atmospherically exposed at five sites. Flat panels are exposed at all sites. Angle iron specimens were placed on exposure at two locations, Joplin and Sayville.

The specimens were layed out in the following manner in order to obtain exposure of the primer in one and two coat thicknesses and under aluminum and white finish coats.

1 Primer Coat 1 Finish Coat	2 Primer Coats 1 Finish Coat
1 Primer Coat	2 Primer Coats



The specified film thickness was 1.5 mils ± 10% per coat for both the primer paints and finish paints. Each primer appears at each location on two flat panels, one with the aluminum finish coat and one with the white finish coat. Each primer appears at Joplin and Sayville on four angle specimens; two with the aluminum finish coat and two with the white finish coat.

All specimens were exposed at 45 degrees facing south between September 1 and October 1, 1948.

TABULATION OF DATA

With few exceptions, significant deterioration or failure was found only on the single coat primer areas and was confined to general corrosion. Therefore tabulation in this report is limited to corrosion ratings on exposed single coat areas. Paints showing significant deterioration in multiple coat systems are listed on page 4 following the summary table for the single coat areas.

Where impairment in performance indicated excessive or deficient film thicknesses, measurements were made with a Magne Gauge at the time of inspection. These measurements are tabulated in the "Summary Table of Inspection Data" for the Joplin and San Francisco sites.

The photographic reference standards for "Evaluating Degree of Resistance To Rusting Obtained With Paint On Iron Or Steel Surfaces" (A.S.T.M. Designation: D610-41T) were used as the basis for rating the specimens at all exposure sites.

The seventy paints under study based on five vehicles are listed on the first three pages of the table. The twenty-four comparison paints, including several conforming to government specifications, are listed on the last page of the table.

Summary of Results

San Francisco

The following paints received corrosion ratings of 8 or less on the single coat primer area of at least one specimen at San Francisco:

Those marked with an asterisk are sufficiently rusted to rate five or less on at least one specimen. The numbers preceded by (-) indicate that at least one of the panels contains less than the prescribed film thickness of 1.5 mils - 10% or 1.35 mils.

Paints Under Study

(-) 203 - 100% red lead in oil.
(-) 205 - 100% red lead in a mixed alkyd-phenolic vehicle.
(-) 206 - 100% red lead in an alkyd vehicle.
(-) 207 - 100% red lead in a modified phenolic vehicle extended with linseed oil.
(-) 210 - 75% red lead in a mixed pigmentation containing a mixed alkyd-phenolic vehicle.
(-) 211 - 75% red lead in a mixed pigmentation containing an alkyd vehicle.
(-)*215 - 25% zinc chromate in a mixed pigmentation containing a mixed alkyd - phenolic vehicle.
(-)*217 - 25% zinc chromate in a mixed pigmentation in a modified phenolic vehicle extended with linseed oil.
(-)*227 - 49.5% zinc chromate in a mixed pigmentation in a modified phenolic vehicle extended with linseed oil.
*228 - 24.5% zinc chromate in a mixed pigmentation containing an oil vehicle.
229 - 24.5% zinc chromate containing an oil extended alkyd vehicle.
(-) 232 - 24.5% zinc chromate in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
(-) 235 - 24.5% red lead in a mixed pigmentation contained in a mixed alkyd - phenolic vehicle.
238 - 54.5% red lead in a mixed pigmentation contained in an oil vehicle.
(-) 252 - 39.5% red lead in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
254 - 14.5% zinc chromate in a mixed pigmentation contained in a mixed alkyd-phenolic vehicle.
(-) 257 - 14.5% zinc chromate in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
286 - 51.5% red lead in a mixed pigmentation contained in an oil vehicle.
(-) 290 - 51.5% red lead in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
(-) 29) - 37.5% red lead in a mixed pigmentation contained in a mixed alkyd-phenolic vehicle.
(-) 314 - 34.5% lead chromate in a mixed pigmentation contained in an alkyd vehicle.
(-)*315 - 34.5% lead chromate in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.

Comparison Paints

258 - United States Maritime Commission Specification 52-MC-29.
(-)e259 - 55.0% zinc chromate in a mixed pigmentation with an alkyd vehicle.
(-)e260 - 65.0% zinc chromate in a mixed pigmentation with a phenolic vehicle.
261 - 25% zinc chromate in a mixed pigmentation with a phenolic vehicle.
e262 - Federal Specification TT-P-641 (80% Zn dust, 20% ZnO-Oil)
(-)e264 - 25% lead chromate in a mixed pigmentation with an alkyd vehicle.
(-) 266 - 60% blue lead in a mixed pigmentation with linseed oil.
(-) 267 - 57.4% blue lead in a mixed pigmentation with an alkyd vehicle.
(-) 268 - Federal Specification TT-P-86.
297 - 72% leaded zinc in a mixed pigmentation with an alkyd vehicle.
299 - 72% B.C.W.L. in a mixed pigmentation with an alkyd vehicle.
301 - 72% B.S.W.L. in a mixed pigmentation with an alkyd vehicle.
(-)e302 - Navy Dept. Specification 52-P-18.
e307 - 100% red lead in vinyl. (wash primer was not applied)
(-)e310 - Federal Specification TT-P-20 (100% blue lead in linseed oil)
(-) 311 - Federal Specification TT-P-86a, Type IV.
(-) 342 - 30% Ba-K chromate in an alkyd extended with oil.

Joplin

All of the paints under study received corrosion ratings of ten on the single primer coat areas on the flat panels at Joplin. However paint 203 showed considerable checking over the two coat primer area and was rated seven in this category. The single coat areas on both the aluminum and white finished panels contained less than the prescribed amount of paint, 1 and 0.9 mil respectively, while the two coat areas contained paint thicknesses in excess of the prescribed amount (3.6 and 3.4 mils respectively).

Among the comparison paints exposed at Joplin only two showed significant rusting on the single coat areas on the flat panels. These were 297 consisting of a leaded zinc pigmentation and 299 consisting of a basic carbonate white lead pigmentation, both in the same alkyd vehicle. Paints 268 (TT-P-86) and 310 (TT-P-20) were severely checked over the exposed primer areas. Both of these paints were applied at twice the originally specified thickness of 1.5 mils per coat.

Although corrosion on the flat specimens was virtually non-existent at Joplin, several of the angle iron specimens were rated eight or worse for general corrosion. Much of this corrosion apparently resulted from the presence of loosely adherent mill scale on the base specimens. This was indicated by the concentration of rust in small areas and by the wide difference in performance in many cases between two specimens carrying the same primer.

Paint 203 showed no checking on the angle specimens at Joplin. However paints 268 and 310 were seriously checked on both the flat specimens and angle specimens.

Paints at Joplin rated eight or worse for corrosion on single coated angle specimen areas were:

Paints Under Study

205 - 100% red lead in a mixed alkyd-phenolic vehicle.
207 - 100% red lead in an oil extended modified phenolic vehicle.
210 - 75% red lead in a mixed pigmentation contained in a mixed alkyd-phenolic vehicle.
218 - 34.5% zinc chromate in a mixed pigmentation with an oil vehicle.
221 - 34.5% zinc chromate in a mixed pigmentation contained in an alkyd vehicle.
225 - 49.5% zinc chromate in a mixed pigmentation with a mixed alkyd-phenolic vehicle.
234 - 24.5% red lead in a mixed pigmentation with an oil extended alkyd vehicle.
240 - 54.5% red lead in mixed pigmentation with a mixed alkyd-phenolic vehicle.
242 - 54.5% red lead in mixed pigmentation with an oil extended modified phenolic vehicle.
293 - 37.5% red lead in mixed pigmentation with a mixed alkyd-phenolic vehicle.
313 - 34.5% lead chromate in mixed pigmentation with a mixed alkyd-phenolic vehicle.

Comparison Paints

258 - United States Maritime Commission Spec. 52-MC-29.
267 - 57.6% blue lead in mixed pigmentation with an alkyd vehicle.
297 - 72.0% leaded zinc in mixed pigmentation with an alkyd vehicle.
299 - 72.0% B.C.W.L. in mixed pigmentation with an alkyd vehicle.
307 - 100% red lead in vinyl vehicle.
331 - Federal Specification TT-P-86a, Type IV.
340 - Joint Army-Navy Specification Jan-P-735 (Navy 84/47).
351 - Federal Specification TT-P-86a, Type I.
353 - Federal Specification TT-P-86a, Type III.

New Orleans

No corrosion was observed on the single primer coat areas of the paints under study at New Orleans. Checking was also absent.

Checking was observed on the exposed primer areas with two comparison paints at the New Orleans site. These were 268 (F.S.TT-P-86) and 310 (F.S.TT-P-20).

Comparison paints showing serious corrosion at New Orleans on single primer coat areas were:

261 - 25% zinc chromate in mixed pigmentation with a phenolic vehicle.
263 - 80% zinc dust, 20% ZnO in an alkyd vehicle.
297 - 72% leaded zinc in mixed pigmentation with an alkyd vehicle.
299 - 72% B.C.W.L. in mixed pigmentation with an alkyd vehicle.

301 - 72% B.S.W.L. in mixed pigmentation with an alkyd vehicle.
307 - 100% red lead in vinyl vehicle.
310 - Federal Specification TT-P-20.

Cleveland

None of the panels exposed at Cleveland showed any general corrosion after one year exposure. However these panels contained a heavy collection of dirt.

The panels containing paints 297, 299 and 301, by far the poorest performing paints at the other locations, showed some edge corrosion at Cleveland but no general corrosion.

Sayville

All of the flat panels containing the primers under study at Sayville rated ten in general corrosion. No checking was observed on these panels.

Only a few of the comparison paints contained on the flat panels were seriously corroded. Those receiving ratings of eight or less were:

266 - 60% blue lead in mixed pigmentation with an oil vehicle.
297 - 72% leaded zinc in mixed pigmentation with an alkyd vehicle.
299 - 72% B.C.W.L. in mixed pigmentation with an alkyd vehicle.
301 - 72% B.S.W.L. in mixed pigmentation with an alkyd vehicle.
310 - Federal Specification TT-P-20.

As at Joplin, several of the angle specimens showed serious corrosion even though the identical system was unaffected on the cold rolled flat panels. This was probably due in large part to imperfections in the steel surfaces. Among the paints under study receiving general corrosion ratings of eight or less were:

205 - 100% red lead in a mixed alkyd-phenolic vehicle.
215 - 24.5% zinc chromate in a mixed pigmentation with a mixed alkyd-phenolic vehicle.
216 - 24.5% zinc chromate in a mixed pigmentation with an alkyd vehicle.
217 - 24.5% zinc chromate in a mixed pigmentation with an oil extended modified phenolic vehicle.
266 - 65% red lead in a mixed pigmentation with an alkyd vehicle.
254 - 50% iron oxide in a mixed pigmentation in an oil extended alkyd vehicle.

Among the comparison paints rated eight or less on angles at Sayville were:

263 - 80% zinc dust, 20% ZnO in an alkyd vehicle.
266 - 60% blue lead in mixed pigmentation with an oil vehicle.
297 - 72% leaded zinc in mixed pigmentation with an alkyd vehicle.
299 - 72% B.C.W.L. in mixed pigmentation with an alkyd vehicle.
301 - 72% B.S.W.L. in mixed pigmentation with an alkyd vehicle.
302 - Navy Dept. Spec. 52-P-18.
310 - Federal Specification TT-P-20.

SUMMARY TABLE OF INSPECTION DATA
EXPOSURE NO. 14
SINGLE PRIMER COAT AREAS

PANEL NO.	BATESVILLE FLAT	BATESVILLE ANGLE No. 1	BATESVILLE ANGLE No. 2	CLEVELAND FLAT	NEW ORLEANS FLAT	JOPLIN FLAT COND.	JOPLIN FLAT FILM MILS	JOPLIN ANGLE No. 1	JOPLIN ANGLE No. 2	SAN FRANCISCO FLAT COND.	SAN FRANCISCO FLAT FILM MILS	TYPE PIGMENTATION	TYPE VEHICLE	NOTES
203A 203B	10 10	10 10	10 10	10 10	10 10	10 10	1.0 0.9	10 10	10 10	8 10	1.4 0.9		OIL	Two coat primer areas showing on Joplin - Rating & Film thick. A-1.8 B-[illegible]
204A 204B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.9 2.0	[illegible]	OIL AND ALKYD	
205A 205B	10 10	10 6	10 9	10 10	10 10	10 10	- -	10 9	8 8	9 8	1.1 0.7	RED	ALKYD AND PHENOLIC	
206A 206B	10 10	10 10	10 10	10 10	10 10	10 10	- -	8 8	10 9	9 9	0.7 0.9	LEAD	ALKYD	
207A 207B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 [illegible]	10 [illegible]	8 8	0.8 0.7		OIL AND MOD. PHENOLIC	
208A 208B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	8 10	[illegible] [illegible]	1.6 1.6		OIL	
209A 209B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 8	10 10	10 10	0.8 1.5	[illegible]	OIL AND ALKYD	
210A 210B	10 10	10 10	10 9	10 10	10 10	10 10	- -	8 8	10 8	9 9	1.1 0.8	RED	ALKYD AND PHENOLIC	B angle at Joplin - considerable semi-adherent mill scale.
211A 211B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 8	10 8	8 8	0.8 0.7	LEAD	ALKYD	
212A 212B	10 10	10 10	10 10	10 10	10 10	10 10	- -	9 9	8 10	10 10	1.0 1.5		OIL AND MOD. PHENOLIC	
213A 213B	10 10	10 10.	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.9 2.0	50.50 Zn CHROM.	OIL	
214A 214B	10 10	10 10	9 8	10 10	10 10	10 10	- -	8 8	10 10	10 10	1.9 1.7		OIL AND ALKYD	
215A 215B	10 10	10 8	10 10	10 10	10 10	10 10	- -	10 10	8 10	9 8	1.3 0.8	AND	ALKYD AND PHENOLIC	
216A 216B	10 10	10 10	10 9	10 10	10 10	10 10	- -	9 10	10 10	10 10	0.8 0.9	IRON OXIDE	ALKYD	
217A 217B	10 10	10 10	8 10	10 10	10 10	10 10	- -	10 10	10 10	8 8	1.3 0.9		OIL AND MOD. PHENOLIC	
218A 218B	10 10	10 10	10 10	10 10	10 10	10 10.	- -	9 10	10 [illegible]	10 10	1.9 2.0	50.50	OIL	
219A 219B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.8 1.8	Pb	OIL AND ALKYD	
220A 220B	10 10	10 8	10 9	10 10	10 10	10 10	- -	10 10	10 10	10 9	1.8 1.9	CHROM.	ALKYD AND PHENOLIC	
221A 221B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 8	10 9	10 10	1.7 2.0	AND	ALKYD	
222A 222B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.8 1.8	IRON OXIDE	OIL AND MOD. PHENOLIC	
223A 223B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	9 9	1.9 2.0	40.60	OIL	
224A 224B	10 10	10 10	10 10	10 10	10 10	10 10	- -	8 8	10 10	10 10	2.0 2.0	Zn.	OIL AND ALKYD	
225A 225B	10 10	10 8	10 10	10 10	10 10	10 10	- -	10 8	8 8	10 10	1.9 2.0	CHROM.	ALKYD AND PHENOLIC	
226A 226B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 8	10 10	10 10	1.9 0.9	AND IRON	ALKYD	
227A 227B	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	8 8	1.0 1.0	OXIDE	OIL AND MOD. PHENOLIC	

LIA07929

PANEL No.	[illegible] FLAT	[illegible] ANGLE No. 1	[illegible] ANGLE No. 2	CLEVE-LAND FLAT	NEW ORLEANS FLAT	JOPLIN FLAT CODE	JOPLIN FLAT THICK MILS	JOPLIN ANGLE No. 1	JOPLIN ANGLE No. 2	SAN FRANCISCO CODE	SAN FRANCISCO THICK MILS	TYPE PIGMENT RATIO	TYPE VEHICLE	NOTES
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	OIL	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	OIL AND ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	CHROM [illegible]	ALKYD AND PHENOLIC	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	IRON	ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	OXIDE	OIL AND MOD. PHENOLIC	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]		OIL	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] RED	OIL AND ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	LEAD [illegible]	ALKYD AND PHENOLIC	—
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	ALKYD	
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	OXIDE	OIL AND MOD. PHENOLIC	
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	RED	OIL AND ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	LEAD	ALKYD AND PHENOLIC	
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- / -	[illegible]	[illegible]	[illegible]	[illegible]	OXIDE	OIL AND MOD. PHENOLIC	

PANEL NO.	BATESVILLE FLAT	BATESVILLE ANGLE No. 1	BATESVILLE ANGLE No. 2	CLEVELAND FLAT	NEW ORLEANS FLAT	JOPLIN FLAT COND.	JOPLIN FLAT THICK MILS	JOPLIN ANGLE No. 1	JOPLIN ANGLE No. 2	SAN FRANCISCO FLAT COND.	SAN FRANCISCO FLAT THICK MILS	TYPE PIGMENTATION	TYPE VEHICLE	NOTES
281A	10	10	10	10	10	10	-	10	10	9	1.7		OIL	
281B	10	10	10	10	10	10	-	10	10	10	1.8	20.0%		
284A	10	10	10	10	10	10	-	10	10	8	1.8	IRON	OIL AND ALKYD	
284B	10	10	7	10	10	10	-	10	10	10	1.0+			
285A	10	10	10	10	10	10	-	10	10	10	1.0+	OXIDE	ALKYD AND PHENOLIC	
285B	10	10	10	10	10	10	-	10	10	10	1.0+			
286A	10	10	10	10	10	10	-	10	10	10	1.0+	14.0%	ALKYD	
286B	10	10	10	10	10	10	-	10	10	10	1.0+	ZN.		
287A	10	8	10	10	10	10	-	10	10	7	0.8		OIL AND MOD. PHENOLIC	
287B	10	10	10	10	10	10	-	10	10	8	1.2	CHROM.		
288A	10	10	10	10	10	10	-	10	10	8	1.5		OIL	
288B	10	10	10	10	10	10	-	10	10	8	1.0+	51.0%		
289A	10	10	10	10	10	10	-	10	10	10	1.0	RED	OIL AND ALKYD	
289B	10	9	10	10	10	10	-	10	10	9	1.4			
290A	10	10	10	10	10	10	-	10	10	10	1.0+	LEAD	ALKYD AND PHENOLIC	
290B	10	10	10	10	10	10	-	10	10	10	1.0			
293A	10	10	10	10	10	10	-	10	10	10	1.0+	34.0%	ALKYD	
293B	10	10	10	10	10	10	-	10	10	10	1.8	IRON		
294A	10	10	10	10	10	10	-	10	10	8	1.1		OIL AND MOD. PHENOLIC	
294B	10	9	10	10	10	10	-	10	10	10	1.4	OXIDE		
301A	10	10	10	10	10	10	-	10	10	10	1.0+		OIL	
301B	10	10	10	10	10	10	-	10	10	10	1.0+	37.0%		
302A	10	10	10	10	10	10	-	10	10	10	1.8	RED	OIL AND ALKYD	
302B	10	10	10	10	10	10	-	10	10	10	1.8			
303A	10	10	10	10	10	10	-	10	10	7	1.2	LEAD	ALKYD AND PHENOLIC	
303B	10	10	10	10	10	10	-	8	8	7	1.0+			
304A	10	10	10	10	10	10	-	10	10	8	0.5	34.0%	ALKYD	
304B	10	10	10	10	10	10	-	10	10	10	0.8	IRON		
306A	10	10	10	10	10	10	-	10	10	10	1.8	OXIDE	OIL AND MOD. PHENOLIC	
306B	10	9	10	10	10	10	-	10	10	10	1.8			
311A	10	10	10	10	10	10	-	10	10	9	1.9	34.0%	OIL	
311B	10	10	10	10	10	10	-	10	10	10	1.0+	LEAD		
312A	10	10	10	10	10	10	-	10	10	10	1.0	CHROM.	OIL AND ALKYD	
312B	10	9	9	10	10	10	-	10	10	10	1.0+			
313A	10	10	10	10	10	10	-	10	10	10	1.0+	40.0%	ALKYD AND PHENOLIC	
313B	10	10	9	10	10	10	-	9	8	10	1.0+			
314A	10	10	10	10	10	10	-	10	10	10	1.0+	IRON	ALKYD	
314B	10	10	10	10	10	10	-	10	10	8	1.0	OXIDE		
315A	10	10	10	10	10	10	-	10	10	8	0.9		OIL AND MOD. PHENOLIC	
315B	10	10	10	10	10	10	-	10	10	8+	0.8			

(COMPARISON PAINTS)

PANEL NO.	SAYVILLE [illegible]	SAYVILLE [illegible] No. 1	SAYVILLE [illegible] No. 2	CLEVELAND FLAT	NEW ORLEANS FLAT	JOPLIN [illegible] COND.	JOPLIN [illegible] MILS	JOPLIN [illegible] No. 1	JOPLIN [illegible] No. 2	SAN FRANCISCO [illegible] COND.	SAN FRANCISCO [illegible] MILS	TYPE PIGMENTATION	TYPE VEHICLE	REMARKS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	47.9% ZN CHROM.	ALKYD	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN CHROM.	ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN CHROM.	PHENOLIC	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN CHROM.	PHENOLIC	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN DUST	OIL	TT-P-[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN DUST	ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] PB CHROM.	ALKYD	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] RED LEAD	ALKYD	TT-P-[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] BLUE LEAD	OIL	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] BLUE LEAD	ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] RED LEAD	OIL	TT-P-86. Checking on Joplin [illegible] on exposed primer areas.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] LEADED ZINC	ALKYD	Slight edge corr. at Cleveland.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] [illegible]	ALKYD	Slight edge corr. at Cleveland.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] [illegible]	ALKYD	Slight edge corr. at Cleveland.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN CHROM.	ALKYD AND PHENOLIC	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] RED LEAD	VINYL	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] BLUE LEAD	OIL	TT-P-86. Heavy checking at all sites except Cleveland on exposed primer area.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] RED LEAD	PHENOLIC	TT-P-86a, Type [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN CHROM.	ALKYD	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ZN CHROM.	OIL AND ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	- -	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] CHROM.	OIL AND ALKYD	
[illegible]	[illegible]	[illegible]	[illegible]	(1)	(1)	[illegible] (1)	- -	[illegible] (1)	[illegible] (1)	(1)	-	[illegible] RED LEAD	OIL	TT-P-86a, Type [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	(1)	(1)	[illegible] (1)	- -	[illegible] (1)	[illegible] (1)	(1)	-	[illegible] RED LEAD	OIL AND ALKYD	TT-P-86a, Type [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	(1)	(1)	[illegible] (1)	- -	[illegible] (1)	[illegible] (1)	(1)	-	[illegible] RED LEAD	ALKYD	TT-P-86a, Type III

(1) [illegible]
(2) Vertical exposure.

CONDITION OF MULTIPLE COAT AREAS

San Francisco

Except for the few paints listed below, breakdown was limited to the single coat primer areas.

235 - 24.5% red lead mixed pigmentation in a mixed alkyd-phenolic vehicle. Slight corrosion was in evidence on the exposed two primer coat area (rated 9) on the panel containing the aluminum finish coat. The corresponding area on the panel containing the white finish coat was O.K.

238 - 54.5% red lead mixed pigmentation in oil vehicle. Slight corrosion was in evidence on the exposed two primer coat area (rated 9) on the panel containing the white finish coat.

247 - 65% red lead mixed pigmentation in oil extended modified phenolic vehicle. A panel (aluminum finish coat) showed corrosion on exposed two primer coat area (rated 9). - B panel O.K.

315 - 34:5% lead chromate mixed pigmentation in an oil extended modified phenolic vehicle. Considerable corrosion present on two coat primer area (rated 8) on A panel. - Same area on B panel O.K.

258 - 52-MC-29. A panel shows considerable rusting on two coat primer area (rated 8). Same area on B panel O.K.

301 - 72% B.S.W.L. mixed pigmentation in alkyd vehicle. Areas containing two primer coats rusted on both A and B panels (rated 8 on A panel, 9 on B panel).

302 - Navy 52-P-18. Two coat primer area slightly rusted on B panel (rated 9). Same area on A panel O.K.

307 - 100% red lead in vinyl vehicle. Severely rusted on both primer areas and on finish coated single primer coat area. The wash primer treatment was omitted from the system.

310 - Federal Specification TT-P-20. Both A and B panels severely corroded on areas containing two primer coats (rated 2 and 4). These areas also showed severe checking (both rated 5).

312 - Ba-K chromate mixed pigmentation in alkyd vehicle. Double coated primer areas show rust on A and B panels. (A panel rated 9, B panel rated 8).

Joplin

Only two paints showed any rust on the multiple coat areas of the flat panels. These were 297, rated 9+ on the two primer coat area of panel B and 310, rated 9+ on the two primer coat area of panel B.

Three paints exposed at Joplin on flat panels showed serious checking on the two primer coat areas. These were 20) (rated 7 on both panels), 260 (rated 6 on both panels) and 310 (rated 3 on both panels). The first two are composed of red lead in oil while the third is composed of blue lead in oil (F.S. TT-P-20). In all three cases it was found that these paints were applied to dry film thicknesses in excess of the prescribed 1.5 mils ± 10%.

Several of the paints showed some corrosion on the angle specimens at Joplin on the areas containing two coats of primer exposed to the atmosphere. However this corrosion was generally evident on only one of the duplicate sets of angles. In most cases the corrosion on multiple coat areas was apparently associated with the surface condition of the base specimen. Most of the rusting was localized and in many cases the lifting of semi-adherent mill scale was clearly evident.

New Orleans

The multiple coat areas at New Orleans were entirely free of rust. Two paints showed serious checking at New Orleans on the two primer coat areas. These were 268 (F.S.TT-P-86) and 110 (F.S.TT-P-20).

Cleveland

None of the multiple paint coat areas were rusted, checked or otherwise deteriorated at the Cleveland site.

Sayville

None of the flat specimen areas containing multiple paint coats showed any corrosion at Sayville.

Only a few isolated cases of rusting were observed on the multiple coat areas at Sayville. These were limited to only one specimen of the duplicate sets. As at Joplin, most of this corrosion was localized and can probably be accounted for by the presence of loose and semi-adherent mill scale.