MINIMUM RETROREFLECTIVITY OF TRAFFIC SIGNS AND PAVEMEMT MARKINGS

Final Report for
Iowa DOT Project HR-562

Federal Highway Administration
Project IA-94-05

November 1995

Project Development Division

Iowa Department of Transportation

Final Report
for
Iowa Department of Transportation
Project HR-562

MINIMUM RETROREFLECTIVITY

OF

TRAFFIC SIGNS AND PAVEMENT MARKINGS

by

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November 1995

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DISCLAIMER

The contents of this report reflect the views of the author and do not necessarily reflect the official views of the Iowa Department of Transportation. This report does not constitute any standard, specifictaion or regulation.

RESEARCH DATA AND FINAL REPORT

This final report contains two separate reports which describe the retroreflectivity levels of various traffic signs and pavement markings on the Iowa primary road system. The data was collected in the fall/winter of 1994 and given to the Federal Highway Administration in March of 1995. This information is currently being combined with similar information from other jurisdictions across the country for the purpose of determining the impact of mandated minimum retroreflectivity levels. The FHWA will be releasing their report sometime in 1996.

In October 1992, Congress mandated (Public Law 102-388) the Secretary of Transportation to revise the Manual of Uniform Traffic Control Devices to include a minimum level of retroreflectivity for pavement markings and traffic signs which shall apply to all roads open to public travel. In 1994, the FHWA initiated research studies to determine the retroreflectivity levels which currently exist for signs and markings in an attempt to develop standards which are reasonable to implement. The Iowa Department of Transportation participated in both of the studies and the final reports are included.

After compilation and analysis of the collected retroreflectivity data, the FHWA will propose the new MUTCD standards through the federal rule making process. It is estimated that the actual MUTCD change will occur sometime in late 1997 or early 1998.

STUDY OF SIGN RETROREFLECTIVITY

Iowa Department of Transportation
800 Lincoln Way, Ames, IA 50010 (515) 239-1129
FAX: (515) 239-1891

March 8, 1995

Mr. Ernest Huckaby
Federal Highway Administration (HHS-21)
400 Seventh Street, SW
Washington, D.C. 20590

Dear Mr. Huckaby:

The Iowa Department of Transportation's study of sign retroreflectivity has determined the following results for each type of sign category. Refer to the enclosed tables for specific information regarding each reference.

Warning signs: Of the 164 warning signs measured, only three signs did not exceed the proposed minimum retroreflectivity. The three failing signs were all object markers. This may be caused by the close placement of the object markers to the roadway where they receive much more abrasive and chemical abuse from the traffic flow. Also, they are not a "typical" sign and may not be given as high of priority during inspection.

White on red regulatory: Only one white on red regulatory signs (of the 266 surveyed) failed to pass minimum retroreflectivity. The failing stop sign looked to be in excellent condition, but the sheeting appeared to be defective.

Black on white regulatory: Of the 222 black on white regulatory signs sampled, none failed the proposed minimum retroreflectivity.

Guide signs: One-hundred white on green guide signs were sampled. None of the sampled signs failed the minimum retroreflectivity.

From the 752 signs surveyed in the minimum retroreflectivity study, our results show a very small percentage of signs which will need to be replaced if the proposed minimum retroreflectivity levels are implemented. The summary of our collected data is compiled in the following categories:

- Number of signs needed to be replaced:
  From the gathered data, a maximum of 2,500 signs would need to be replaced as a result of implementing the proposed minimum retroreflectivity values.
- Percentage of signs needed to be replaced:
  The overall percentage of signs to be replaced is less than 1%.
- Cost of sign replacement:
  The cost will be approximately $50,000.
- Impact on budget and staffing:
  Due to the small number of signs effected, no budget or staffing levels will be changed by implementing the proposed minimum retroreflectivity levels.

With such a small number of effected signs, the existing method of determining sign replacement (visually conducting daytime and nighttime reviews) probably will not change. A statewide retroreflectivity monitoring of random signs will probably be implemented to insure compliance, to determine trends, and to check for uniformity throughout the state.

Sincerely,

John Sebastian

John Sebastian
Traffic Engineering

Enclosures

CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	Black	Yellow	>=48	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	W14-3	Type III	04-88		B YE 203.5
2	W14-3	Type III	05-88		B YE 144.6
3	W14-3	Type III	01-86		B YE 207.3
4	W14-3	Type III	04-88		B YE 203.5
5	W14-3	Type III	Unknown		B YE 206.1
6	W14-3	Type III	04-88		B YE 187.9
7	W14-3	Type III	04-90		B YE 229.8
8	W14-3	Type III	04-88		B YE 186.0
9	W14-3	Type III	04-88		B YE 187.7
10	W14-3	Type III	12-87		B YE 190.5
11	W14-3	Type III	05-88		B YE 210.2
12	W14-3	Type III	Unknown		B YE 170.7
13	W14-3	Type III	Unknown		B YE 190.8
14	W14-3	Type III	01-86		B YE 207.3
15	W14-3	Type III	04-90		B YE 229.8
16	W14-3	Type III	Unknown		B YE 185.9
17	W14-3	Type III	05-94		B YE 178.2
18	W14-3	Type III	05-88		B YE 187.4
19	W14-3	Type III	08-86		B YE 180.5
20	W14-3	Type III	10-87		B YE 176.8
21	W14-3	Type III	10-89		B YE 231.0
22	W14-3	Type III	10-89		B YE 239.2
23	W14-3	Type III	Unknown		B YE 140.0
24	W14-3	Type III	05-94		B YE 178.2
25	W14-3	Type III	Unknown		B YE 212.2
26	W14-3	Type III	Unknown		B YE 159.9
27	W14-3	Type III	Unknown		B YE 178.4
28	W14-3	Type III	Unknown		B YE 187.5
29	W14-3	Type III	06-88		B YE 214.7
30	W1-6	Type III	02-87		B YE 184.3
31	W1-7	Type III	Unknown		B YE 208.4
32	W1-7	Type III	Unknown		B YE 208.4
33	W1-7	Type III	Unknown		B YE 198.7
34	W1-7	Type III	Unknown		B YE 191.0
35	W1-7	Type III	05-88		B YE 204.9
36	W1-7	Type III	08-87		B YE 217.6
37	W1-7	Type III	Unknown		B YE 172.4
38	W1-7	Type III	Unknown		B YE 165.7
39	W3-1a	Type III	Unknown		B YE 182.4
40	W3-1a	Type III	Unknown		B YE 213.6
41	W3-1a	Type III	Unknown		B YE 222.9
42	W3-1a	Type III	Unknown		B YE 222.5
43	W3-1a	Type III	Unknown		B YE 213.6
44	W3-1a	Type III	Unknown		B YE 222.5
45	W3-1a	Type III	Unknown		B YE 222.9
46	W3-1a	Type III	06-90		B YE 197.0
47	W3-3	Type III	11-90		B YE 219.6
48	W3-3	Type III	11-90		B YE 215.6
49	W4-1	Type III	Unknown		B YE 190.8
50	W4-1	Type III	Unknown		B YE 190.8
51	W4-2	Type III	Unknown		B YE 199.5
52	W4-2	Type III	Unknown		B YE 203.1
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	Black	Yellow	30-36	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	OM-3L	Type III	03-88		B YE 133.0
2	OM-3L	Type III	10-89		B YE 180.9
3	OM-3L	Type III	10-89		B YE 210.4
4	OM-3L	Type III	Unknown		B YE 137.1
5	OM-3L	Type III	Unknown		B YE 215.6
6	OM-3L	Type III	Unknown		B YE 166.3
7	OM-3L	Type III	Unknown		B YE 174.9
8	OM-3L	Type III	Unknown		B YE 179.4
9	OM-3L	Type III	Unknown		B YE 160.6
10	OM-3L	Type III	Unknown		B YE 192.1
11	OM-3L	Type III	Unknown		B YE 130.3
12	OM-3L	Type III	Unknown		B YE 157.8
13	OM-3L	Type III	Unknown		B YE 168.8
14	OM-3L	Type III	Unknown		B YE 216.4
15	OM-3L	Type III	Unknown		B YE 113.5
16	OM-3R	Type III	02-90		B YE 179.6
17	OM-3R	Type III	02-90		B YE 182.2
18	OM-3R	Type III	08-93		B YE 156.0
19	OM-3R	Type III	10-89		B YE 172.9
20	OM-3R	Type III	11-90		B YE 220.7
21	OM-3R	Type III	Unknown		B YE 172.8
22	OM-3R	Type III	Unknown		B YE 152.4
23	OM-3R	Type III	Unknown		B YE 157.6
24	OM-3R	Type III	Unknown		B YE 77.2
25	OM-3R	Type III	Unknown		B YE 192.5
26	OM-3R	Type III	Unknown		B YE 147.1
27	OM-3R	Type III	Unknown		B YE 184.3
28	OM-3R	Type III	Unknown		B YE 156.5
29	OM-3R	Type III	Unknown		B YE 119.1
30	S1-1	Type III	Unknown		B YE 156.6
31	S1-1	Type III	Unknown		B YE 142.5
32	S2-1	Type III	Unknown		B YE 141.6
33	S2-1	Type III	Unknown		B YE 134.6
34	W10-1	Type III	Unknown		B YE 197.9
35	W10-1	Type III	Unknown		B YE 191.8
36	W10-1	Type III	Unknown		B YE 166.3
37	W1-2R	Type III	Unknown		B YE 155.2
38	W14-3	Type III	02-91		B YE 196.1
39	W14-3	Type III	06-88		B YE 177.1
40	W14-3	Type III	07-87		B YE 181.9
41	W14-3	Type III	11-92		B YE 201.8
42	W14-3	Type III	Unknown		B YE 108.7
43	W3-1a	Type III	02-90		B YE 211.7
44	W3-1a	Type III	08-94		B YE 151.0
45	W3-1a	Type III	Unknown		B YE 228.4
46	W4-2	Type III	11-84		B YE 115.1
47	W4-2	Type III	11-84		B YE 105.9
48	W6-1	Type III	04-92		B YE 207.1
49	W6-1	Type III	11-84		B YE 147.9
50	W6-1	Type III	11-84		B YE 136.0
51	W6-1	Type III	Unknown		B YE 177.1
52	W6-1	Type III	Unknown		B YE 177.1
53	W6-1	Type III	Unknown		B YE 206.9
54	W6-1	Type III	Unknown		B YE 142.3
55	W6-1	Type III	Unknown		B YE 167.4
56	W6-3	Type III	Unknown		B YE 166.6
57	W9-1	Type III	11-90		B YE 240.8
58	W9-1	Type III	Unknown		B YE 173.4
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	Black	Yellow	30-36	<=40	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	OM-3L	Type III	Unknown		B YE 44.8
2	OM-3L	Type III	Unknown		B YE 95.5
3	OM-3L	Type III	Unknown		B YE 111.6
4	OM-3L	Type III	Unknown		B YE 24.7
5	OM-3R	Type III	Unknown		B YE 70.3
6	OM-3R	Type III	Unknown		B YE 29.6
7	OM-3R	Type III	Unknown		B YE 129.3
8	OM-3R	Type III	03-88		B YE 161.0
9	S1-1	Type III	Unknown		B YE 202.1
10	S1-1	Type III	Unknown		B YE 117.3
11	S1-1	Type III	Unknown		B YE 226.1
12	S1-1	Type III	06-86		B YE 201.2
13	S1-1	Type III	05-90		B YE 219.7
14	S1-1	Type III	05-90		B YE 163.3
15	S1-1	Type III	Unknown		B YE 161.0
16	S2-1	Type III	Unknown		B YE 157.9
17	S2-1	Type III	07-87		B YE 179.1
18	S2-1	Type III	Unknown		B YE 182.4
19	S2-1	Type III	Unknown		B YE 215.1
20	S2-1	Type III	Unknown		B YE 163.2
21	S2-1	Type III	Unknown		B YE 190.1
22	S2-1	Type III	Unknown		B YE 176.8
23	S2-1	Type III	Unknown		B YE 101.8
24	S2-1	Type III	10-90		B YE 201.4
25	W10-1	Type III	Unknown		B YE 172.8
26	W10-1	Type III	12-88		B YE 117.4
27	W10-1	Type III	Unknown		B YE 177.3
28	W10-1	Type III	Unknown		B YE 180.1
29	W10-1	Type III	Unknown		B YE 189.2
30	W11-1	Type III	12-92		B YE 198.6
31	W11-1	Type III	12-92		B YE 238.1
32	W11-1	Type III	11-90		B YE 184.6
33	W11-1	Type III	05-88		B YE 190.5
34	W11A-2	Type III	04-88		B YE 209.6
35	W11A-2	Type III	11-89		B YE 188.1
36	W11A-2	Type III	11-89		B YE 204.8
37	W12-2	Type III	Unknown		B YE 173.1
38	W12-2	Type III	Unknown		B YE 173.2
39	W12-2	Type III	12-93		B YE 174.2
40	W12-2	Type III	Unknown		B YE 170.1
41	W12-2	Type III	Unknown		B YE 181.9
42	W1-2L	Type III	Unknown		B YE 236.7
43	W1-2R	Type III	Unknown		B YE 192.0
44	W14-3	Type III	Unknown		B YE 171.2
45	W14-3	Type III	Unknown		B YE 237.8
46	W14-3	Type III	10-87		B YE 199.5
47	W14-3	Type III	Unknown		B YE 158.3
48	W14-3	Type III	06-89		B YE 209.1
49	W3-1	Type III	Unknown		B YE 161.6
50	W3-1a	Type III	Unknown		B YE 141.0
51	W3-1a	Type III	Unknown		B YE 175.4
52	W3-3	Type III	04-87		B YE 147.4
53	W3-3	Type III	03-89		B YE 232.1
54	W3-3	Type III	Unknown		B YE 241.1
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	White	Red	>=48	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R1-1	Type III	Unknown	L WH 214.1	B RE 47.5
2	R1-1	Type III	Unknown	L WH 229.0	B RE 36.7
3	R1-1	Type III	Unknown	L WH 213.7	B RE 55.4
4	R1-1	Type III	Unknown	L WH 230.0	B RE 56.7
5	R1-1	Type III	Unknown	L WH 179.4	B RE 4.3
6	R1-1	Type III	Unknown	L WH 214.6	B RE 42.9
7	R1-1	Type III	Unknown	L WH 219.0	B RE 46.8
8	R1-1	Type III	Unknown	L WH 288.9	B RE 64.4
9	R1-1	Type III	Unknown	L WH 228.0	B RE 55.4
10	R1-1	Type III	Unknown	L WH 234.7	B RE 57.5
11	R1-1	Type III	Unknown	L WH 214.4	B RE 69.4
12	R1-1	Type III	Unknown	L WH 229.0	B RE 36.7
13	R1-1	Type III	03-88	L WH 201.8	B RE 44.4
14	R1-1	Type III	Unknown	L WH 232.9	B RE 37.4
15	R1-1	Type III	Unknown	L WH 220.3	B RE 43.4
16	R1-1	Type III	Unknown	L WH 214.6	B RE 54.0
17	R1-1	Type III	Unknown	L WH 208.6	B RE 41.3
18	R1-1	Type III	Unknown	L WH 214.7	B RE 44.9
19	R1-1	Type III	Unknown	L WH 203.2	B RE 46.0
20	R1-1	Type III	Unknown	L WH 201.7	B RE 45.7
21	R1-1	Type III	Unknown	L WH 209.0	B RE 45.9
22	R1-1	Type III	Unknown	L WH 212.7	B RE 55.0
23	R1-1	Type III	Unknown	L WH 239.4	B RE 35.8
24	R1-1	Type III	Unknown	L WH 225.9	B RE 45.8
25	R1-1	Type III	Unknown	L WH 230.4	B RE 58.6
26	R1-1	Type III	Unknown	L WH 212.7	B RE 44.4
27	R1-1	Type III	Unknown	L WH 272.4	B RE 51.7
28	R1-1	Type III	11-93	L WH 233.5	B RE 37.7
29	R1-1	Type III	Unknown	L WH 194.4	B RE 15.6
30	R1-1	Type III	09-86	L WH 221.6	B RE 43.3
31	R1-1	Type III	06-91	L WH 247.5	B RE 29.5
32	R1-1	Type III	04-94	L WH 236.6	B RE 34.8
33	R1-1	Type III	07-87	L WH 223.8	B RE 40.5
34	R1-1	Type III	05-90	L WH 255.4	B RE 54.8
35	R1-1	Type III	06-91	L WH 247.5	B RE 29.5
36	R1-1	Type III	07-87	L WH 215.0	B RE 47.9
37	R1-1	Type III	03-86	L WH 222.3	B RE 33.6
38	R1-1	Type III	07-87	L WH 241.0	B RE 49.8
39	R1-1	Type III	06-89	L WH 272.8	B RE 51.9
40	R1-1	Type III	Unknown	L WH 293.3	B RE 44.8
41	R1-1	Type III	09-87	L WH 228.2	B RE 42.1
42	R1-1	Type III	03-90	L WH 209.6	B RE 41.5
43	R1-1	Type III	06-91	L WH 246.9	B RE 48.7
44	R1-1	Type III	01-90	L WH 252.8	B RE 37.4
45	R1-1	Type III	07-87	L WH 238.0	B RE 52.9
46	R1-1	Type III	11-89	L WH 175.1	B RE 36.3
47	R1-1	Type III	08-93	L WH 252.4	B RE 51.4
48	R1-1	Type III	10-86	L WH 224.6	B RE 45.5
49	R1-1	Type III	08-93	L WH 258.7	B RE 46.5
50	R1-1	Type III	10-88	L WH 244.7	B RE 43.5
51	R1-1	Type III	10-86	L WH 224.6	B RE 45.5
52	R1-1	Type III	Unknown	L WH 219.0	B RE 46.8
53	R1-1	Type III	Unknown	L WH 213.6	B RE 42.6
54	R1-1	Type III	12-86	L WH 212.3	B RE 40.5
55	R1-1	Type III	12-86	L WH 227.3	B RE 43.1
56	R1-1	Type III	10-88	L WH 259.6	B RE 45.1
57	R1-2	Type III	05-89	L RE 46.7	B WH 255.4
58	R1-2	Type III	05-89	L RE 48.7	B WH 251.9
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	White	Red	36	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R1-1	Type III	03-94	L WH 295.7	B RE 50.9
2	R1-1	Type III	Unknown	L WH 259.1	B RE 47.9
3	R1-1	Type III	Unknown	L WH 267.5	B RE 51.1
4	R1-1	Type III	Unknown	L WH 256.8	B RE 36.8
5	R1-1	Type III	Unknown	L WH 248.3	B RE 40.9
6	R1-1	Type III	Unknown	L WH 258.6	B RE 53.3
7	R1-1	Type III	Unknown	L WH 292.5	B RE 57.3
8	R1-1	Type III	Unknown	L WH 289.8	B RE 50.3
9	R1-1	Type III	Unknown	L WH 237.2	B RE 28.7
10	R1-1	Type III	Unknown	L WH 275.9	B RE 50.6
11	R1-1	Type III	02-92	L WH 286.5	B RE 58.1
12	R1-1	Type III	Unknown	L WH 297.9	B RE 48.7
13	R1-1	Type III	Unknown	L WH 255.9	B RE 25.0
14	R1-1	Type III	Unknown	L WH 240.3	B RE 38.1
15	R1-1	Type III	04-85	L WH 252.6	B RE 36.1
16	R1-1	Type III	03-94	L WH 295.7	B RE 50.9
17	R1-1	Type III	02-90	L WH 257.4	B RE 49.2
18	R1-1	Type III	02-94	L WH 268.1	B RE 44.8
19	R1-1	Type III	Unknown	L WH 268.6	B RE 54.6
20	R1-1	Type III	03-92	L WH 294.1	B RE 51.7
21	R1-1	Type III	03-92	L WH 294.1	B RE 51.7
22	R1-1	Type III	02-93	L WH 278.0	B RE 50.1
23	R1-1	Type III	Unknown	L WH 267.3	B RE 52.0
24	R1-1	Type III	08-92	L WH 243.3	B RE 37.9
25	R1-1	Type III	Unknown	L WH 268.1	B RE 37.4
26	R1-1	Type III	06-91	L WH 219.9	B RE 26.0
27	R1-1	Type III	07-90	L WH 293.0	B RE 54.8
28	R1-1	Type III	06-89	L WH 285.2	B RE 50.7
29	R1-1	Type III	06-91	L WH 233.0	B RE 32.3
30	R1-1	Type III	06-91	L WH 247.5	B RE 23.6
31	R1-1	Type III	05-88	L WH 256.1	B RE 22.3
32	R1-1	Type III	08-90	L WH 290.4	B RE 44.2
33	R1-1	Type III	06-91	L WH 219.9	B RE 26.0
34	R1-1	Type III	06-91	L WH 233.0	B RE 32.3
35	R1-1	Type III	06-91	L WH 247.5	B RE 23.6
36	R1-1	Type III	08-93	L WH 261.3	B RE 50.9
37	R1-1	Type III	06-94	L WH 285.1	B RE 48.6
38	R1-1	Type III	11-89	L WH 281.3	B RE 55.3
39	R1-1	Type III	09-88	L WH 262.7	B RE 31.0
40	R1-1	Type III	09-94	L WH 222.2	B RE 38.2
41	R1-1	Type III	10-89	L WH 278.6	B RE 46.8
42	R1-1	Type III	10-89	L WH 282.6	B RE 50.0
43	R1-1	Type III	10-92	L WH 291.5	B RE 49.3
44	R1-1	Type III	05-88	L WH 245.4	B RE 25.6
45	R1-1	Type III	10-92	L WH 291.5	B RE 49.3
46	R1-1	Type I	11-89	L WH 98.2	B RE 14.8
47	R1-1	Type III	11-90	L WH 283.7	B RE 56.1
48	R1-2	Type III	09-86	L RE 21.9	B WH 246.7
49	R1-2	Type III	09-86	L RE 29.9	B WH 255.2
50	R5-1	Type III	Unknown	L WH 215.9	B RE 30.3
51	R5-1	Type III	Unknown	L WH 261.0	B RE 33.3
52	R5-1	Type III	Unknown	L WH 231.7	B RE 33.6
53	R5-1	Type III	08-93	L WH 236.8	B RE 28.7
54	R5-1	Type III	04-92	L WH 247.4	B RE 34.4
55	R5-9	Type III	Unknown	L WH 243.2	B RE 32.2
56	R5-9	Type III	Unknown	L WH 215.6	B RE 28.7
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	White	Red	<=30	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R1-1	Type III	Unknown	L WH 237.0	B RE 25.9
2	R1-1	Type III	Unknown	L WH 284.5	B RE 32.9
3	R1-1	Type III	Unknown	L WH 240.4	B RE 58.6
4	R1-1	Type III	Unknown	L WH 286.6	B RE 49.6
5	R1-1	Type III	Unknown	L WH 251.9	B RE 30.6
6	R1-1	Type III	Unknown	L WH 286.6	B RE 49.6
7	R1-1	Type III	Unknown	L WH 285.2	B RE 49.5
8	R1-1	Type III	01-89	L WH 234.0	B RE 44.1
9	R1-1	Type III	Unknown	L WH 247.0	B RE 37.6
10	R1-1	Type III	02-90	L WH 273.5	B RE 49.9
11	R1-1	Type III	Unknown	L WH 228.1	B RE 31.2
12	R1-1	Type III	Unknown	L WH 288.3	B RE 33.9
13	R1-1	Type III	Unknown	L WH 284.5	B RE 32.9
14	R1-1	Type III	Unknown	L WH 249.8	B RE 34.3
15	R1-1	Type III	Unknown	L WH 239.2	B RE 41.0
16	R1-1	Type III	Unknown	L WH 218.2	B RE 51.5
17	R1-1	Type III	Unknown	L WH 251.9	B RE 30.6
18	R1-1	Type III	Unknown	L WH 248.9	B RE 35.5
19	R1-1	Type III	Unknown	L WH 227.9	B RE 69.9
20	R1-1	Type III	Unknown	L WH 232.7	B RE 24.2
21	R1-1	Type III	10-94	L WH 294.5	B RE 47.2
22	R1-1	Type III	05-88	L WH 241.4	B RE 36.6
23	R1-1	Type III	10-89	L WH 262.1	B RE 45.4
24	R1-1	Type III	06-94	L WH 279.3	B RE 56.1
25	R1-1	Type III	07-87	L WH 268.2	B RE 80.6
26	R1-1	Type III	10-87	L WH 208.9	B RE 39.5
27	R1-1	Type III	10-87	L WH 254.3	B RE 52.9
28	R1-1	Type III	02-92	L WH 309.7	B RE 53.0
29	R1-1	Type III	11-88	L WH 259.9	B RE 37.6
30	R1-1	Type III	11-88	L WH 264.0	B RE 41.1
31	R1-1	Type III	03-94	L WH 302.1	B RE 51.0
32	R1-1	Type III	03-94	L WH 273.0	B RE 54.2
33	R1-1	Type III	11-90	L WH 290.0	B RE 55.8
34	R1-1	Type III	05-88	L WH 241.4	B RE 36.6
35	R1-1	Type III	11-90	L WH 303.1	B RE 48.1
36	R1-1	Type III	11-90	L WH 298.8	B RE 49.4
37	R1-1	Type III	11-90	L WH 269.3	B RE 48.9
38	R3-5	Type III	Unknown	L WH 220.1	B RE 22.3
39	R3-5	Type III	Unknown	L WH 220.1	B RE 22.3
40	R5-1	Type III	08-90	L WH 241.6	B RE 16.0
41	R5-1	Type III	07-86	L WH 231.8	B RE 26.9
42	R5-1	Type III	Unknown	L WH 193.7	B RE 22.6
43	R5-1	Type III	Unknown	L WH 242.4	B RE 22.8
44	R5-1	Type III	Unknown	L WH 247.1	B RE 20.8
45	R5-1	Type III	Unknown	L WH 254.1	B RE 34.4
46	R5-1	Type III	10-86	L WH 242.6	B RE 26.9
47	R5-1	Type III	Unknown	L WH 190.6	B RE 17.9
48	R5-1	Type III	Unknown	L WH 228.2	B RE 36.3
49	R5-1	Type III	Unknown	L WH 242.4	B RE 39.6
50	R5-1	Type III	Unknown	L WH 198.2	B RE 19.7
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	White	Red	36	<=40	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R1-1	Type III	02-89	L WH 236.8	B RE 34.6
2	R1-1	Type III	Unknown	L WH 267.9	B RE 52.5
3	R1-1	Type III	Unknown	L WH 267.8	B RE 46.5
4	R1-1	Type III	09-88	L WH 265.0	B RE 45.8
5	R1-1	Type III	01-89	L WH 281.2	B RE 44.0
6	R1-1	Type III	09-88	L WH 255.9	B RE 38.6
7	R1-1	Type III	Unknown	L WH 231.6	B RE 57.1
8	R1-1	Type III	08-90	L WH 261.1	B RE 50.6
9	R1-1	Type III	11-84	L WH 250.1	B RE 49.6
10	R1-1	Type III	Unknown	L WH 233.9	B RE 33.5
11	R1-1	Type III	Unknown	L WH 242.4	B RE 48.9
12	R1-1	Type III	12-88	L WH 236.9	B RE 42.6
13	R1-1	Type III	Unknown	L WH 196.0	B RE 40.2
14	R1-1	Type III	Unknown	L WH 240.7	B RE 66.5
15	R1-1	Type III	Unknown	L WH 237.9	B RE 33.5
16	R1-1	Type III	Unknown	L WH 193.4	B RE 44.6
17	R1-1	Type III	Unknown	L WH 209.7	B RE 12.6
18	R1-1	Type III	Unknown	L WH 253.3	B RE 50.0
19	R1-1	Type III	Unknown	L WH 276.8	B RE 51.5
20	R1-1	Type III	Unknown	L WH 153.8	B RE 21.2
21	R1-1	Type III	Unknown	L WH 247.5	B RE 70.2
22	R1-1	Type III	09-88	L WH 253.2	B RE 45.8
23	R1-1	Type III	Unknown	L WH 214.4	B RE 47.1
24	R1-1	Type III	12-93	L WH 279.1	B RE 52.6
25	R1-1	Type III	Unknown	L WH 189.7	B RE 33.0
26	R1-1	Type III	Unknown	L WH 250.2	B RE 42.5
27	R1-1	Type III	Unknown	L WH 247.3	B RE 49.7
28	R1-1	Type III	Unknown	L WH 220.9	B RE 30.4
29	R1-1	Type III	Unknown	L WH 164.5	B RE 34.0
30	R1-1	Type III	07-94	L WH 243.7	B RE 50.4
31	R1-1	Type III	Unknown	L WH 265.1	B RE 44.3
32	R1-1	Type III	Unknown	L WH 245.1	B RE 15.6
33	R1-1	Type III	Unknown	L WH 211.6	B RE 30.6
34	R1-1	Type III	Unknown	L WH 135.2	B RE 50.1
35	R1-1	Type III	11-90	L WH 257.9	B RE 47.1
36	R1-1	Type III	06-93	L WH 273.1	B RE 49.0
37	R1-1	Type III	06-93	L WH 270.0	B RE 53.1
38	R1-1	Type III	02-86	L WH 184.8	B RE 20.1
39	R1-1	Type III	Unknown	L WH 234.6	B RE 45.9
40	R1-1	Type III	07-94	L WH 274.0	B RE 47.2
41	R1-1	Type III	07-88	L WH 266.2	B RE 44.6
42	R1-1	Type III	06-93	L WH 244.3	B RE 47.6
43	R1-1	Type III	02-88	L WH 232.2	B RE 36.8
44	R1-1	Type III	06-93	L WH 236.6	B RE 49.2
45	R1-1	Type III	07-89	L WH 278.8	B RE 50.2
46	R1-1	Type III	06-93	L WH 278.2	B RE 50.5
47	R5-9	Type III	Unknown	L WH 216.9	B RE 36.4
48	R5-9	Type III	Unknown	L WH 244.0	B RE 16.1
49	R5-9	Type III	Unknown	L WH 220.5	B RE 36.1
50	R5-9	Type III	Unknown	L WH 207.2	B RE 16.9
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	White	Red	<=30	<=40	27-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R1-1	Type III	Unknown	L WH 241.4	B RE 40.4
2	R1-1	Type III	Unknown	L WH 228.5	B RE 41.2
3	R1-1	Type III	11-88	L WH 241.4	B RE 37.0
4	R1-1	Type III	07-86	L WH 238.0	B RE 38.4
5	R1-1	Type III	04-87	L WH 236.8	B RE 69.5
6	R1-1	Type III	06-89	L WH 244.6	B RE 45.0
7	R1-1	Type III	07-86	L WH 243.6	B RE 36.1
8	R1-1	Type III	Unknown	L WH 213.9	B RE 27.6
9	R1-1	Type III	Unknown	L WH 182.3	B RE 24.7
10	R1-1	Type III	Unknown	L WH 229.8	B RE 33.2
11	R1-1	Type III	Unknown	L WH 204.0	B RE 35.0
12	R1-1	Type III	Unknown	L WH 266.9	B RE 43.5
13	R1-1	Type III	Unknown	L WH 212.9	B RE 35.7
14	R1-1	Type III	Unknown	L WH 228.2	B RE 26.1
15	R1-1	Type III	Unknown	L WH 241.3	B RE 38.0
16	R1-1	Type III	11-88	L WH 250.8	B RE 44.7
17	R1-1	Type III	Unknown	L WH 270.3	B RE 47.9
18	R1-1	Type III	Unknown	L WH 213.7	B RE 27.2
19	R1-1	Type III	Unknown	L WH 274.0	B RE 45.0
20	R1-1	Type III	07-86	L WH 223.1	B RE 35.8
21	R1-1	Type III	Unknown	L WH 224.9	B RE 21.1
22	R1-1	Type III	Unknown	L WH 241.1	B RE 39.3
23	R1-1	Type III	06-90	L WH 250.3	B RE 47.1
24	R1-1	Type III	08-92	L WH 260.5	B RE 45.8
25	R1-1	Type III	12-94	L WH 307.6	B RE 48.1
26	R1-1	Type III	02-94	L WH 276.6	B RE 43.4
27	R1-1	Type III	Unknown	L WH 257.6	B RE 49.3
28	R1-1	Type III	02-88	L WH 206.3	B RE 31.1
29	R1-1	Type III	02-94	L WH 282.1	B RE 34.0
30	R1-1	Type III	02-88	L WH 269.7	B RE 62.5
31	R1-1	Type III	01-90	L WH 246.4	B RE 43.7
32	R1-1	Type III	02-88	L WH 227.7	B RE 33.1
33	R1-1	Type III	12-88	L WH 262.5	B RE 43.1
34	R1-1	Type III	02-94	L WH 284.3	B RE 45.4
35	R1-1	Type III	01-90	L WH 264.9	B RE 41.8
36	R1-1	Type III	02-88	L WH 99.3	B RE 18.8
37	R1-1	Type III	02-94	L WH 281.9	B RE 44.5
38	R1-1	Type III	02-88	L WH 237.3	B RE 31.3
39	R1-1	Type III	08-89	L WH 291.0	B RE 46.9
40	R1-1	Type III	Unknown	L WH 250.5	B RE 35.7
41	R1-1	Type III	12-88	L WH 216.3	B RE 40.1
42	R1-1	Type III	12-88	L WH 271.9	B RE 41.9
43	R1-1	Type III	04-85	L WH 253.5	B RE 41.9
44	R1-1	Type III	03-87	L WH 258.1	B RE 39.2
45	R1-1	Type III	03-86	L WH 213.4	B RE 52.5
46	R1-1	Type III	01-91	L WH 213.5	B RE 37.2
47	R1-1	Type III	Unknown	L WH 246.3	B RE 52.4
48	R1-1	Type III	Unknown	L WH 246.3	B RE 46.9
49	R5-1	Type III	Unknown	L WH 243.3	B RE 20.1
50	R5-1	Type III	Unknown	L WH 237.6	B RE 25.6
51	R5-1	Type III	Unknown	L WH 233.9	B RE 20.7
52	R5-1	Type III	Unknown	L WH 228.7	B RE 29.2
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	Black	White	>=48	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R2-1	Type III	02-90		B WH 257.0
2	R2-1	Type III	03-92		B WH 249.1
3	R2-1	Type III	04-88		B WH 267.2
4	R2-1	Type III	04-92		B WH 233.1
5	R2-1	Type III	04-92		B WH 274.4
6	R2-1	Type III	06-87		B WH 216.9
7	R2-1	Type III	06-87		B WH 215.5
8	R2-1	Type III	06-87		B WH 266.8
9	R2-1	Type III	06-87		B WH 276.4
10	R2-1	Type III	06-87		B WH 216.9
11	R2-1	Type III	06-87		B WH 266.8
12	R2-1	Type III	06-88		B WH 240.0
13	R2-1	Type III	06-88		B WH 267.7
14	R2-1	Type III	06-89		B WH 290.3
15	R2-1	Type III	07-87		B WH 214.6
16	R2-1	Type III	07-92		B WH 276.8
17	R2-1	Type III	08-89		B WH 242.4
18	R2-1	Type III	08-93		B WH 277.0
19	R2-1	Type III	09-89		B WH 270.9
20	R2-1	Type III	09-89		B WH 266.7
21	R2-1	Type III	09-89		B WH 224.0
22	R2-1	Type III	11-84		B WH 208.3
23	R2-1	Type III	11-85		B WH 32.3
24	R2-1	Type III	11-89		B WH 281.1
25	R2-1	Type III	11-91		B WH 204.1
26	R2-1	Type III	12-86		B WH 216.2
27	R2-1	Type III	Unknown		B WH 222.1
28	R2-1	Type III	Unknown		B WH 228.2
29	R2-1	Type III	Unknown		B WH 198.7
30	R2-1	Type III	Unknown		B WH 217.1
31	R2-1	Type III	Unknown		B WH 275.8
32	R2-1	Type III	Unknown		B WH 274.3
33	R2-1	Type III	Unknown		B WH 256.2
34	R2-1	Type III	Unknown		B WH 221.0
35	R2-1	Type III	Unknown		B WH 201.1
36	R2-1	Type III	Unknown		B WH 234.4
37	R2-1	Type III	Unknown		B WH 218.2
38	R2-1	Type III	Unknown		B WH 203.5
39	R2-1	Type III	Unknown		B WH 256.1
40	R2-1	Type III	Unknown		B WH 190.4
41	R2-4	Type III	Unknown		B WH 258.4
42	R2-5c	Type III	02-88		B WH 282.2
43	R2-5c	Type III	05-92		B WH 211.2
44	R2-5c	Type III	08-92		B WH 196.6
45	R2-5c	Type III	Unknown		B WH 169.8
46	R2-5c	Type III	Unknown		B WH 259.6
47	R2-5c	Type III	Unknown		B WH 246.4
48	R6-1	Type III	03-94		B WH 293.2
49	R6-1	Type III	03-94		B WH 293.2
50	R6-1	Type III	04-92		B WH 282.1
51	R6-1	Type III	09-89		B WH 237.7
52	R6-1	Type III	11-85		B WH 196.8
53	R6-1	Type III	Unknown		B WH 246.5
54	R6-1	Type III	Unknown		B WH 247.0
55	R6-1	Type III	Unknown		B WH 255.1
56	R6-1	Type III	Unknown		B WH 203.0
57	R6-1	Type III	Unknown		B WH 241.1
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	Black	White	30-36	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R2-1	Type III	Unknown		B WH 266.6
2	R2-1	Type III	02-85		B WH 110.3
3	R2-1	Type III	03-92		B WH 191.2
4	R2-1	Type III	03-92		B WH 255.2
5	R2-1	Type III	10-85		B WH 206.5
6	R2-1	Type III	02-85		B WH 210.3
7	R2-1	Type III	Unknown		B WH 255.6
8	R2-1	Type III	10-85		B WH 252.2
9	R2-1	Type III	06-91		B WH 284.8
10	R2-1	Type III	Unknown		B WH 268.2
11	R2-1	Type III	06-91		B WH 277.0
12	R2-1	Type III	11-92		B WH 254.9
13	R2-1	Type III	Unknown		B WH 267.6
14	R2-1	Type III	10-93		B WH 198.2
15	R2-1	Type III	03-91		B WH 279.2
16	R2-1	Type III	Unknown		B WH 260.1
17	R2-1	Type III	Unknown		B WH 183.3
18	R2-1	Type III	02-86		B WH 258.7
19	R2-1	Type III	Unknown		B WH 221.0
20	R2-1	Type III	Unknown		B WH 303.2
21	R3-3	Type III	03-94		B WH 280.1
22	R3-3	Type III	Unknown		B WH 164.3
23	R3-3	Type III	Unknown		B WH 162.0
24	R3-3	Type III	03-94		B WH 283.0
25	R3-3	Type III	03-94		B WH 280.1
26	R3-3	Type III	03-94		B WH 283.0
27	R4-7	Type III	04-94		B WH 135.0
28	R4-7	Type III	Unknown		B WH 174.7
29	R4-7	Type III	Unknown		B WH 289.6
30	R4-7	Type III	Unknown		B WH 180.4
31	R4-7	Type III	Unknown		B WH 155.0
32	R4-7	Type III	05-92		B WH 240.1
33	R4-7	Type III	Unknown		B WH 242.4
34	R4-7	Type III	Unknown		B WH 136.0
35	R4-7	Type III	04-91		B WH 269.3
36	R4-7	Type III	01-86		B WH 144.3
37	R4-7	Type III	04-90		B WH 250.4
38	R4-7	Type III	Unknown		B WH 135.4
39	R4-7	Type III	07-91		B WH 192.7
40	R4-7	Type III	12-89		B WH 234.7
41	R4-7	Type III	10-86		B WH 208.7
42	R4-7	Type III	06-87		B WH 210.2
43	R4-7	Type III	Unknown		B WH 174.9
44	R4-7	Type III	Unknown		B WH 269.2
45	R4-7	Type III	Unknown		B WH 257.2
46	R4-7	Type III	Unknown		B WH 168.4
47	R4-7	Type III	Unknown		B WH 106.5
48	R4-7	Type III	Unknown		B WH 134.8
49	R4-7	Type III	Unknown		B WH 177.5
50	R4-7	Type III	Unknown		B WH 160.7
51	R6-1	Type III	03-94		B WH 268.9
52	R6-1	Type III	Unknown		B WH 235.3
53	R6-1	Type III	Unknown		B WH 253.6
54	R6-1	Type III	03-92		B WH 243.5
55	R6-1	Type III	03-94		B WH 268.9
56	R6-1	Type III	Unknown		B WH 198.7
57	R6-1	Type III	03-92		B WH 185.8
58	R6-1	Type III	04-94		B WH 156.4
59	R6-1	Type III	05-92		B WH 230.3
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	Black	White	30-36	<=40	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	R2-1	Type III	11-85		B WH 217.1
2	R2-1	Type III	04-92		B WH 307.1
3	R2-1	Type III	12-88		B WH 132.9
4	R2-1	Type III	03-89		B WH 276.7
5	R2-1	Type III	04-88		B WH 251.4
6	R2-1	Type III	04-92		B WH 271.7
7	R2-1	Type III	04-92		B WH 208.6
8	R2-1	Type III	05-93		B WH 266.9
9	R2-1	Type III	05-88		B WH 238.4
10	R2-1	Type III	Unknown		B WH 212.3
11	R2-1	Type III	06-89		B WH 232.5
12	R2-1	Type III	07-87		B WH 280.5
13	R2-1	Type III	08-91		B WH 256.8
14	R2-1	Type III	08-93		B WH 255.6
15	R2-1	Type III	08-93		B WH 264.1
16	R2-1	Type III	10-90		B WH 269.3
17	R2-1	Type III	Unknown		B WH 207.8
18	R2-1	Type III	11-85		B WH 219.4
19	R2-1	Type III	Unknown		B WH 153.9
20	R2-1	Type III	Unknown		B WH 278.2
21	R2-1	Type III	Unknown		B WH 302.6
22	R2-1	Type III	Unknown		B WH 205.8
23	R2-1	Type III	Unknown		B WH 139.4
24	R2-1	Type III	Unknown		B WH 215.8
25	R2-1	Type III	Unknown		B WH 231.6
26	R2-1	Type III	Unknown		B WH 132.1
27	R2-1	Type III	Unknown		B WH 158.6
28	R2-1	Type III	02-92		B WH 288.0
29	R2-1	Type III	03-89		B WH 234.5
30	R2-1	Type III	Unknown		B WH 229.0
31	R2-1	Type III	Unknown		B WH 213.7
32	R2-1	Type III	Unknown		B WH 229.3
33	R2-1	Type III	Unknown		B WH 157.4
34	R2-1	Type III	Unknown		B WH 131.1
35	R2-1	Type III	Unknown		B WH 177.8
36	R2-1	Type III	Unknown		B WH 237.4
37	R2-1	Type III	Unknown		B WH 278.5
38	R2-1	Type III	Unknown		B WH 241.1
39	R2-1	Type III	Unknown		B WH 284.2
40	R2-1	Type III	Unknown		B WH 290.7
41	R2-1	Type III	Unknown		B WH 166.4
42	R2-1	Type III	Unknown		B WH 262.7
43	R2-1	Type III	Unknown		B WH 226.4
44	R3-9b	Type III	05-89		B WH 185.1
45	R3-9b	Type III	05-89		B WH 248.6
46	R3-9b	Type III	Unknown		B WH 191.2
47	R6-1	Type III	Unknown		B WH 246.5
48	R6-1	Type III	Unknown		B WH 245.8
49	R6-1	Type III	Unknown		B WH 243.0
50	R6-1	Type III	Unknown		B WH 226.9
51	R6-1	Type III	Unknown		B WH 271.5
52	R6-1	Type III	Unknown		B WH 206.1
53	R6-1	Type III	Unknown		B WH 242.6
54	R6-1	Type III	Unknown		B WH 209.8
55	R6-1	Type III	Unknown		B WH 251.9
56	R6-1	Type III	Unknown		B WH 233.9
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	Black	White	<=24	<=40	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	M1-4	Type III	Unknown		B WH 236.5
2	M1-4	Type III	Unknown		B WH 251.9
3	M1-4	Type III	Unknown		B WH 234.6
4	M1-4	Type III	Unknown		B WH 171.2
5	M1-4	Type III	Unknown		B WH 182.2
6	M1-4	Type III	Unknown		B WH 254.0
7	M1-4	Type III	03-90		B WH 212.9
8	M1-4	Type III	Unknown		B WH 201.3
9	M1-4	Type III	12-90		B WH 270.4
10	M1-4	Type III	Unknown		B WH 256.7
11	M1-4	Type III	03-90		B WH 207.4
12	M1-4	Type III	04-94		B WH 262.4
13	M1-5	Type III	Unknown		B WH 285.9
14	M1-5	Type III	Unknown		B WH 271.6
15	M1-5	Type III	11-92		B WH 288.7
16	M1-5	Type III	Unknown		B WH 281.1
17	M1-5	Type III	06-91		B WH 258.4
18	M1-5	Type III	Unknown		B WH 294.1
19	M1-5	Type III	Unknown		B WH 283.8
20	M1-5	Type III	Unknown		B WH 291.3
21	M1-5	Type III	01-90		B WH 289.4
22	M1-5	Type III	Unknown		B WH 250.9
23	M1-5	Type III	Unknown		B WH 279.9
24	M1-5	Type III	Unknown		B WH 286.7
25	M1-5	Type III	05-91		B WH 285.0
26	M2-1	Type III	Unknown		B WH 222.3
27	M3-1	Type III	Unknown		B WH 237.2
28	M3-1	Type III	Unknown		B WH 251.2
29	M3-2	Type III	03-90		B WH 195.5
30	M3-3	Type III	Unknown		B WH 264.6
31	M3-3	Type III	Unknown		B WH 197.7
32	M3-4	Type III	03-90		B WH 219.3
33	M4-5	Type III	Unknown		B WH 218.6
34	M4-6	Type III	Unknown		B WH 253.8
35	M5-1	Type III	Unknown		B WH 264.0
36	M5-1	Type III	08-94		B WH 278.2
37	M5-1	Type III	Unknown		B WH 249.3
38	M6-1	Type III	Unknown		B WH 167.9
39	M6-1	Type III	03-90		B WH 191.0
40	M6-1	Type III	Unknown		B WH 244.1
41	M6-1	Type III	Unknown		B WH 250.0
42	M6-1	Type III	Unknown		B WH 240.3
43	M6-1	Type III	Unknown		B WH 224.1
44	M6-1	Type III	Unknown		B WH 299.1
45	M6-1	Type III	Unknown		B WH 259.7
46	M6-2	Type III	Unknown		B WH 146.0
47	M6-4	Type III	Unknown		B WH 240.4
48	M6-4	Type III	Unknown		B WH 257.2
49	M6-4	Type III	Unknown		B WH 199.0
50	R2-1	Type III	Unknown		B WH 276.7
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	[redacted]
	White	Green	n/a	>=45	08-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	D1-1	Type III	07-89	L WH 256.8	B GR 47.3
2	D1-1	Type III	05-86	L WH 218.9	B GR 50.4
3	D1-1	Type III	04-92	L WH 285.0	B GR 51.5
4	D1-1	Type III	Unknown	L WH 248.4	B GR 45.1
5	D1-1	Type III	Unknown	L WH 244.1	B GR 42.0
6	D1-1	Type III	06-86	L WH 273.2	B GR 54.0
7	D1-1	Type III	03-91	L WH 310.2	B GR 59.3
8	D1-1	Type III	04-92	L WH 287.5	B GR 52.0
9	D1-1	Type III	06-86	L WH 273.2	B GR 54.0
10	D1-1	Type III	Unknown	L WH 260.0	B GR 44.6
11	D1-2	Type III	09-87	L WH 269.8	B GR 49.1
12	D1-2	Type III	02-94	L WH 317.7	B GR 50.1
13	D1-2	Type III	03-91	L WH 305.6	B GR 58.8
14	D1-2	Type III	Unknown	L WH 250.0	B GR 32.1
15	D1-2	Type III	Unknown	L WH 252.5	B GR 49.1
16	D1-2	Type III	Unknown	L WH 277.5	B GR 45.0
17	D1-2	Type III	Unknown	L WH 301.9	B GR 49.6
18	D1-2	Type III	03-91	L WH 278.4	B GR 60.1
19	D1-3	Type III	10-85	L WH 233.0	B GR 40.2
20	D1-3	Type III	04-91	L WH 202.3	B GR 41.5
21	D1-3	Type III	Unknown	L WH 230.8	B GR 46.5
22	D1-3	Type III	Unknown	L WH 267.9	B GR 50.8
23	D1-3	Type III	07-88	L WH 242.5	B GR 47.7
24	D1-3	Type III	08-86	L WH 281.5	B GR 46.4
25	D1-3	Type III	08-86	L WH 287.1	B GR 52.7
26	D1-3	Type III	Unknown	L WH 204.8	B GR 36.1
27	D1-3	Type III	Unknown	L WH 294.0	B GR 53.4
28	D1-3	Type III	Unknown	L WH 399.2	B GR 32.0
29	D1-3	Type III	Unknown	L WH 266.1	B GR 56.5
30	D1-3	Type III	Unknown	L WH 266.1	B GR 56.5
31	D2-2	Type III	Unknown	L WH 266.1	B GR 47.8
32	E1-1	Type III	Unknown	L WH 309.7	B GR 64.2
33	E1-1	Type III	03-91	L WH 306.2	B GR 59.5
34	E1-1	Type III	Unknown	L WH 309.7	B GR 64.2
35	E1-1	Type III	Unknown	L WH 245.2	B GR 61.5
36	E1-1	Type III	Unknown	L WH 295.0	B GR 60.7
37	E1-1	Type III	Unknown	L WH 295.0	B GR 60.7
38	E1-1	Type III	Unknown	L WH 245.2	B GR 61.5
39	E5-1	Type III	09-91	L WH 276.2	B GR 54.9
40	E5-1	Type III	Unknown	L WH 274.9	B GR 51.0
41	E5-1	Type III	09-91	L WH 276.2	B GR 54.9
42	E5-1	Type III	Unknown	L WH 275.2	B GR 52.3
43	E5-1	Type III	Unknown	L WH 274.9	B GR 51.0
44	E5-1	Type III	Unknown	L WH 273.3	B GR 50.6
45	E5-1	Type III	Unknown	L WH 273.3	B GR 50.6
46	E5-1	Type III	Unknown	L WH 275.2	B GR 52.3
47	E5-1	Type III	03-91	L WH 295.2	B GR 56.0
48	I-3	Type III	08-93	L WH 271.1	B GR 50.0
49	I-3	Type III	08-87	L WH 180.0	B GR 28.3
50	I-3	Type III	Unknown	L WH 267.4	B GR 47.8
51					
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CELL DESCRIPTION	Legend Color	Background Color	Sign Size	Speed Limit	
	White	Green	n/a	<=40	27-Mar-95
Sign Number	**MUTCD Code**	**Material Type**	**Install Date**	**Legend Ra Value**	**Background Ra Value**
1	D1-1	Type III	Unknown	L WH 245.6	B GR 47.1
2	D1-1	Type III	08-88	L WH 244.2	B GR 43.2
3	D1-1	Type III	Unknown	L WH 208.9	B GR 34.9
4	D1-1	Type III	Unknown	L WH 233.7	B GR 43.2
5	D1-1	Type III	Unknown	L WH 58.1	B GR 22.7
6	D1-1	Type III	03-91	L WH 275.8	B GR 51.6
7	D1-1	Type III	Unknown	L WH 239.8	B GR 43.6
8	D1-1	Type III	Unknown	L WH 227.1	B GR 49.2
9	D1-1	Type III	Unknown	L WH 304.7	B GR 47.6
10	D1-1	Type III	Unknown	L WH 267.7	B GR 47.0
11	D1-1	Type III	Unknown	L WH 285.1	B GR 47.3
12	D1-1	Type III	06-87	L WH 253.9	B GR 46.2
13	D1-1	Type III	Unknown	L WH 234.6	B GR 46.5
14	D1-1	Type III	03-92	L WH 264.7	B GR 47.0
15	D1-2	Type III	Unknown	L WH 244.8	B GR 40.2
16	D1-2	Type III	Unknown	L WH 222.6	B GR 39.6
17	D1-2	Type III	03-91	L WH 280.6	B GR 53.1
18	D1-2	Type III	03-91	L WH 297.7	B GR 56.7
19	D1-2	Type III	Unknown	L WH 299.6	B GR 45.0
20	D1-2	Type III	Unknown	L WH 247.5	B GR 42.5
21	D1-2	Type III	04-89	L WH 206.1	B GR 36.6
22	D1-2	Type III	06-89	L WH 206.4	B GR 117.3
23	D1-2	Type III	08-90	L WH 272.8	B GR 47.2
24	D1-2	Type III	08-90	L WH 263.5	B GR 50.6
25	D1-2	Type III	05-90	L WH 195.2	B GR 44.0
26	D1-3	Type III	Unknown	L WH 270.3	B GR 47.2
27	D1-3	Type III	Unknown	L WH 243.8	B GR 36.4
28	D1-3	Type III	02-87	L WH 285.8	B GR 56.9
29	D1-3	Type III	01-90	L WH 255.7	B GR 42.2
30	D1-3	Type III	Unknown	L WH 279.9	B GR 45.5
31	D1-3	Type III	Unknown	L WH 251.8	B GR 44.1
32	D1-3	Type I	Unknown	L WH 90.6	B GR 30.7
33	D1-3	Type III	Unknown	L WH 230.3	B GR 41.6
34	D1-3	Type III	07-87	L WH 255.6	B GR 49.4
35	D1-3	Type III	Unknown	L WH 196.9	B GR 29.7
36	D1-3	Type III	Unknown	L WH 231.1	B GR 31.4
37	D1-3	Type III	03-91	L WH 294.0	B GR 55.7
38	D1-3	Type III	09-91	L WH 271.6	B GR 55.9
39	D1-3	Type III	08-74	L WH 259.0	B GR 48.2
40	D1-3	Type III	08-86	L WH 253.6	B GR 46.5
41	D1-3	Type III	Unknown	L WH 261.6	B GR 49.4
42	D1-3	Type III	Unknown	L WH 261.6	B GR 49.4
43	D1-3	Type III	Unknown	L WH 244.1	B GR 42.4
44	D1-3	Type III	12-89	L WH 254.0	B GR 49.4
45	D1-3	Type III	12-89	L WH 250.9	B GR 44.4
46	D2-1	Type III	Unknown	L WH 167.8	B GR 35.4
47	D2-1	Type III	10-88	L WH 289.4	B GR 50.6
48	D2-2	Type III	Unknown	L WH 201.9	B GR 33.5
49	D2-2	Type III	07-94	L WH 294.8	B GR 54.2
50	D2-3	Type III	05-90	L WH 164.5	B GR 42.6
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STUDY OF PAVEMENT MARKING RETROREFLECTIVITY

Iowa Department of Transportation
800 Lincoln Way, Ames, IA 50010 515 239-1129
515-239-1891 FAX

March 23, 1995

Mr. Ernest Huckaby
Federal Highway Administration
400 Seventh Street, SW
Washington, D.C. 20590

Dear Mr. Huckaby:

We have analyzed the pavement marking retroreflectivity readings taken on Iowa Department of Transportation roadways and offer the following comments. The attached data and charts are helpful when interpreting this information.

WATERBORNE PAINT - RURAL FREEWAY

Average Reading	163
Standard Deviation	94
Total Readings	300
Readings below 80	25%
Readings below 100	32%
Readings below 120	39%

As can be seen from the attached chart, the readings are evenly distributed throughout the 40 to 290 mcd/lux/m^2 range with no sign of a bell curve.

WATERBORNE PAINT - OTHER RURAL

Average Reading	128
Standard Deviation	65
Total Readings	385
Readings under 80	23%
Readings under 100	35%
Readings under 120	48%

The data looks similar to a bell curve with the peak being located near the average of 130 mcd/lux/m^2.

WATERBORNE PAINT - URBAN FREEWAY

Average Reading	144
Standard Deviation	90
Total Readings	275
Readings under 80	36%
Readings under 100	44%
Readings under 120	50%

Forty-four percent of the readings are between 40 and 120 mcd/lux/m^2 and most of the other readings were evenly distributed between 120 and 290 mcd/lux/m^2.

WATERBORNE PAINT - OTHER URBAN

Average Reading	184
Standard Deviation	98
Total Readings	149
Readings under 80	21%
Readings under 100	22%
Readings under 120	23%

In general, the readings are evenly distributed between a wide range of values; however 16% of the readings are greater than 300 mcd/lux/m^2.

EPOXY MARKINGS - URBAN FREEWAY

Average Reading	164
Standard Deviation	74
Total Readings	180
Readings under 80	12%
Readings under 100	21%
Readings under 120	32%

Forty-six percent of the readings fall between 100 and 170 mcd/lux/m^2 with most of the remaining readings being higher than 170 mcd/lux/m^2.

EPOXY MARKINGS - RURAL FREEWAY

Average Reading	166
Standard Deviation	80
Total Readings	130
Readings under 80	9%
Readings under 100	15%
Readings under 120	22%

The attached chart for these markings shows some resemblances to a bell curve with the peak being located near the average of 160 mcd/lux/m^2.

As part of this retroreflectivity study, each participating jurisdiction was asked to answer the following three questions regarding the proposed minimum retroreflectivity levels of 80, 100 and 120 mcd/lux/m^2.

1. How often would the markings have to be replaced?

   Currently, 95+% of our roadways are marked using traffic paints. As a minimum, all center lines and lane lines are repainted each year and the edgelines are repainted every other year. Most edge lines and some center/lane lines are repainted more often. Considering the substantial percentage of readings below the proposed levels, and the high standard deviations found in the study, it is safe to say that the Department will always have a percentage of readings below any minimum level. A program would have to be implemented to increase the frequency of painting and increase the glass bead application rate. Also, a statewide program to place more durable markings would have to be initiated.

2. Cost of replacement for each of the three above levels?

   Following is a proposed marking improvement program with estimated costs.

   80 mcd/lux/m^2 :

Increase painting frequency 20%	= $ 800,000
Increase glass bead rate 30%	= $ 150,000
Statewide durable marking projects	= $1,000,000
Total Estimated Annual Cost	= $1,950,000

   100 mcd/lux/m^2 :

Total Estimated Annual Cost	= $4,000,000

   120 mcd/lux/m^2 :

Total Estimated Annual Cost	= $6,000,000

3. Impact on existing and proposed budget and staffing for each of the above levels?

   The annual budgets would be impacted as noted above. The staffing levels of the State would not change, however, more private industry personnel would be contracted.

The Department hopes that the FHWA carefully considers all of the issues facing minimum retroreflectivity standards. We believe it is important to stress the importance of good retroreflective markings but we don't know if setting minimum standards is the most appropriate method. Our concern lies in the fact that pavement markings cannot be effectively measured and the measurements are not repeatable because of the large variability associated with pavement markings. The high standard deviations are proof of this statement. In addition, pavement marking retroreflectivity changes constantly due to wear on the markings, moisture on the roadway surface, soil particles/dirt, dried salt brine, etc. The fact is that any individual with a hand-held retroreflectometer can go to a short section of roadway anywhere in the United States and "hand-pick" hundreds of very poor readings.

On the other hand, setting minimum retroreflectivity values for traffic signs does make sense. We can measure signs effectively and those measurements are repeatable. Sign retroreflectivity does not change dramatically over time and the readings are fairly consistent throughout a given sign.

We were very disappointed to hear that Tonya, Inc. will not be coming back to Iowa to recheck the same locations this spring. This information would have enabled the Iowa DOT and the FHWA to determine how snow removal practices affect pavement marking retroreflectivity. This is an area where northern states have a lot of concerns regarding minimum levels because of the inability to effectively place markings from December through April of each year.

Thank you for allowing us to participate in this very important study.

Sincerely,

Steve J. Gent

Steve J. Gent
Traffic Operations Engineer

SJG:jsb
Enclosures

MASTER FILE

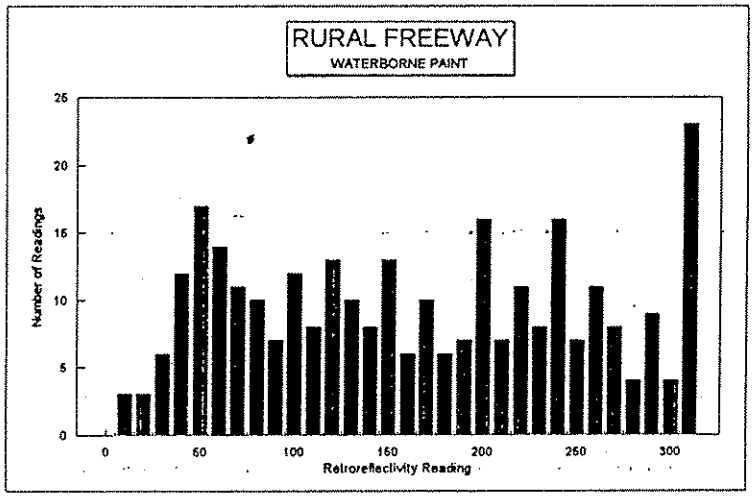
Crew	Date	State	County	Call	Route	Dirn	Section	Mile 0 MP	RL	Type	Mile 2 MP	RL	Type	Mile 4 MP	RL	Type	Marking Data Line	Color	Type	Marking
AK	09/04/94	IA	?	RFPW	61	NS	1	126	17	PCC	129	17	PCC	130	26	PCC	LEFT	Y	L	WRAINT
AK	09/04/94	IA	?	RFPW	61	NB	1	126	17	PCC	128	17	PCC	130	26	PCC	RIGHT	W	E	WRAINT
AK	09/04/94	IA	?	RFPW	61	NB	2	132	27	PCC	134	18	PCC	136	18	PCC	LEFT	Y	L	WRAINT
AK	09/04/94	IA	?	RFPW	61	NB	2	132	27	PCC	134	18	PCC	136	18	PCC	RIGHT	W	E	WRAINT
AK	09/04/94	IA	?	ORPW	30	EB	1	316	24	PCC	318	29	PCC	320	12	PCC	LEFT	Y	L	WRAINT
AK	09/04/94	IA	?	ORPW	30	EB	1	316	24	PCC	318	29	PCC	320	12	PCC	RIGHT	W	E	WRAINT
AK	09/04/94	IA	?	RFPW	218	SB	1	96	26	PCC	94	13	PCC	92	41	PCC	LEFT	Y	L	WRAINT
AK	09/04/94	IA	?	RFPW	218	SB	1	96	26	PCC	94	13	PCC	92	41	PCC	RIGHT	W	E	WRAINT
AK	09/29/94	IA	?	RFPW	218	NB	2	91.7	21	PCC	94	15	PCC	96	29	PCC	LEFT	Y	L	WRAINT
AK	09/29/94	IA	?	RFPW	218	NB	2	91.7	21	PCC	94	15	PCC	96	29	PCC	RIGHT	W	E	WRAINT
AK	09/29/94	IA	?	RFEP	380	?	2	7	22	PCC	9	26	PCC	11	1	PCC	LEFT	Y	L	EPOXY
AK	09/29/94	IA	?	RFEP	380	?	2	7	22	PCC	9	26	PCC	11	1	PCC	RIGHT	W	E	EPOXY
AK	09/29/94	IA	?	RFEP	380	NB	1	1	15	N/A	3	37	N/A	5.7	13	N/A	LEFT	Y	L	EPOXY
AK	09/29/2000	IA	?	RFEP	380	NB	1	1	15	N/A	3	37	N/A	5.7	13	N/A	RIGHT	W	E	EPOXY
AK	09/29/94	IA	?	RFEP	380	SB	3	15	22	AC	15	26	AC	16	3	AC	LEFT	Y	L	EPOXY
AK	09/29/94	IA	?	RFEP	380	SB	3	15	22	AC	13	20	AC	18	3	AC	RIGHT	W	E	EPOXY
AK	09/29/94	IA	?	RFEP	380	SB	4	9	12	AC	7	17	AC	5	13	AC	LEFT	Y	L	EPOXY
AK	09/29/94	IA	?	RFEP	380	SB	4	9	12	AC	7	17	AC	5	13	AC	RIGHT	W	E	EPOXY
AK	09/29/94	IA	?	RFEP	380	?	5	-1	25	AC	-1	-1	N/A	-1	-1	N/A	LEFT	Y	L	EPOXY
AK	09/29/94	IA	?	RFEP	380	?	5	-1	25	AC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	EPOXY
AK	09/29/94	IA	?	RFPW	80	EB	1	240.5	8	PCC	243	21	N/A	245	10	N/A	LEFT	Y	L	WRAINT
AV	09/29/94	IA	?	ORPW	20	WB	?	165	29	PCC	163	33	PCC	161	26	PCC	CL DOWN	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	20	WB	?	165	29	PCC	163	33	PCC	161	26	PCC	CL UP	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	20	WB	?	165	29	PCC	163	33	PCC	161	26	PCC	RIGHT	W	E	WRAINT
AV	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	LEFT	Y	L	WRAINT
AV	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	CL DOWN	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	CL UP	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	RIGHT	W	E	WRAINT
AV	09/29/94	IA	?	ORPW	63	NB	?	120	23	PCC	122	7	PCC	124	28	N/A	CL DOWN	W	C	WRAINT
AV	09/29/94	IA	?	ORPW	63	NB	?	120	23	PCC	122	7	PCC	124	28	N/A	CL UP	W	C	WRAINT
AV	09/29/94	IA	?	ORPW	63	NB	?	120	23	PCC	122	7	PCC	124	28	N/A	RIGHT	W	E	WRAINT
AV	09/29/94	IA	?	ORPW	96	EB	?	15	26	AC	13	10	AC	11	17	AC	CL DOWN	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	96	EB	?	15	26	AC	13	10	AC	11	17	AC	CL UP	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	96	EB	?	15	26	AC	13	10	AC	11	17	AC	RIGHT	W	E	WRAINT
AV	09/29/94	IA	?	?	14	NB	?	-1	-1	PCC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	WRAINT
AV	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	LEFT	Y	L	WRAINT
AV	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	CL DOWN	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	CL UP	Y	C	WRAINT
AV	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	RIGHT	W	E	WRAINT
AK	09/30/94	IA	?	RFPW	80	EB	2	257.7	14	PCC	260	18	AC	262	10	AC	LEFT	Y	L	N/A
AK	09/30/94	IA	?	RFPW	80	EB	2	257.7	14	PCC	260	18	AC	262	10	AC	RIGHT	W	E	WRAINT
AK	09/30/94	IA	?	RFPW	80	WB	3	245.5	21	PCC	243	11	PCC	241	20	PCC	LEFT	Y	L	N/A
AK	09/30/94	IA	?	RFPW	80	WB	3	245.5	21	PCC	243	11	PCC	241	20	PCC	RIGHT	W	E	WRAINT
AK	09/30/94	IA	?	RFPR	6	EB	?	248.5	6	PCC	250.5	16	N/A	-1	-1	N/A	LEFT	Y	L	RIPRINT
AK	09/30/94	IA	?	RFPR	6	WB	2	-1	4	N/A	-1	1	N/A	-1	-1	N/A	LEFT	Y	L	RIPRINT
AK	09/30/94	IA	?	RFPR	1	?	1	84.5	3	PCC	-1	-1	N/A	-1	-1	N/A	LEFT	Y	L	RIPRINT
AK	09/30/94	IA	?	RFPR	1	?	1	84.5	3	PCC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	RIPRINT
AK	09/30/94	IA	?	RFOM	1	NB	?	84	68	PCC	-1	-1	N/A	-1	-1	N/A	LEFT	Y	L	N/A
AK	09/30/94	IA	?	RFOM	1	NB	?	84	68	PCC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	N/A
AV	09/30/94	IA	?	?	35	SB	?	105	23	PCC	103	19	PCC	101	2	PCC	CL UP	W	C	RIPRINT
AV	09/30/94	IA	?	?	35	SB	?	105	23	PCC	103	19	PCC	101	2	PCC	RIGHT	W	E	RIPRINT
AV	09/30/94	IA	?	?	80	EB	?	144	32	PCC	146	20	PCC	148	24	N/A	CL UP	W	C	RIPRINT
AV	09/30/94	IA	?	?	80	EB	?	144	32	PCC	146	20	PCC	148	24	N/A	RIGHT	W	E	RIPRINT
AV	09/30/94	IA	?	?	80	WB	?	178	35	PCC	176	17	PCC	174	22	PCC	CL UP	W	C	RIPRINT
AV	09/30/94	IA	?	?	80	WB	?	178	35	PCC	176	17	PCC	174	22	PCC	RIGHT	W	E	RIPRINT
AV	09/30/94	IA	?	?	35	NB	?	135	47	PCC	137	20	PCC	139	15	PCC	CL UP	W	C	RIPRINT
AV	09/30/94	IA	?	?	35	NB	?	135	47	PCC	137	20	PCC	139	15	PCC	RIGHT	W	E	RIPRINT
AV	10/03/94	IA	?	?	46	SB	?	5	21	AC	-1	-1	N/A	-1	-1	N/A	CL DOWN	Y	C	RIPRINT
AV	10/03/94	IA	?	?	46	SB	?	5	21	AC	-1	-1	N/A	-1	-1	N/A	CL UP	Y	C	RIPRINT
AV	10/03/94	IA	?	?	46	SB	?	5	21	AC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	RIPRINT
AV	10/03/94	IA	?	?	163	EB	?	1	30	N/A	3	25	AC	5	17	N/A	CL UP	W	C	TAPE
AV	10/03/94	IA	?	?	163	EB	?	1	30	N/A	3	25	AC	5	17	N/A	RIGHT	W	E	TAPE
?	10/03/94	IA	?	?	415	SB	?	2	49	AC	-1	-1	N/A	-1	-1	N/A	CL UP	W	C	RIPRINT
?	10/03/94	IA	?	?	415	SB	?	2	49	AC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	RIPRINT
AV	10/03/94	IA	?	?	415	NB	?	1	11	AC	3	28	PCC	-1	-1	N/A	CL UP	W	C	RIPRINT
AV	10/03/94	IA	?	?	415	NB	?	1	11	AC	3	28	PCC	-1	-1	N/A	RIGHT	W	E	RIPRINT
AV	10/03/94	IA	?	?	6	WB	?	134.8	17	PCC	132.6	1	AC	129	1	PCC	CL UP	W	C	RIPRINT
AV	10/03/94	IA	?	?	6	WB	?	141	18	PCC	139	11	AC	137	11	AC	CL UP	W	C	RIPRINT
AV	10/03/94	IA	?	?	74	SB	1	1	12	AC	3	17	AC	-1	32	AC	LEFT	Y	L	EPOXY
AV	10/03/94	IA	?	?	74	SB	1	1	12	AC	3	17	AC	-1	32	AC	RIGHT	W	E	EPOXY
AV	10/03/94	IA	?	?	74	WB	2	4	19	AC	3	29	AC	28	15	N/A	LEFT	Y	L	EPOXY
AV	10/03/94	IA	?	?	74	WB	2	4	19	AC	3	29	AC	28	15	N/A	RIGHT	W	E	EPOXY
AK	10/03/94	IA	?	RFPW	80	EB	1	301	29	AC	302.5	24	AC	304	99	AC	LEFT	Y	L	WRAINT
AK	10/03/94	IA	?	RFPW	80	EB	1	301	29	AC	302.5	24	AC	304	99	AC	RIGHT	W	E	WRAINT
AK	10/03/94	IA	?	RFPW	80	WB	2	304	21	AC	302	44	PCC	301	12	PCC	LEFT	Y	L	WRAINT
AK	10/03/94	IA	?	RFPW	80	WB	2	304	21	AC	302	44	PCC	301	12	PCC	RIGHT	W	E	WRAINT
AK	10/03/94	IA	?	RFPW	280	SB	1	2	11	PCC	4	19	PCC	6	20	PCC	LEFT	Y	L	WRAINT
AK	10/03/94	IA	?	RFPW	280	SB	1	2	11	PCC	4	19	PCC	6	20	PCC	RIGHT	W	E	WRAINT
AK	10/03/94	IA	?	UFPW	280	WB	2	6	17	PCC	3	15	N/A	-1	-1	N/A	LEFT	Y	L	WRAINT
AK	10/03/94	IA	?	UFPW	280	WB	2	6	17	PCC	3	15	N/A	-1	-1	N/A	RIGHT	W	E	WRAINT
AK	10/03/94	IA	?	RFPW	6	EB	1	3	27	AC	3.03	16	PCC	3.04	20	N/A	LEFT	Y	L	WRAINT
AK	10/03/94	IA	?	RFPW	6	EB	1	3	27	AC	3.03	16	PCC	3.04	20	N/A	CL UP	Y	C	WRAINT
AK	10/03/94	IA	?	RFPW	6	EB	1	3	27	AC	3.03	16	PCC	3.04	20	N/A	RIGHT	W	E	WRAINT
AK	10/03/94	IA	?	RFPW	6	WB	2	3.04	21	PCC	3.03	16	PCC	3.02	16	AC	LEFT	Y	L	WRAINT
AV	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	LEFT	Y	L	RIPRINT
AV	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	CL DOWN	Y	C	RIPRINT
AV	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	CL UP	Y	C	RIPRINT
AV	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	RIGHT	W	E	RIPRINT
AV	10/04/94	IA	?	?	175	EB	?	146	30	AC	148	33	AC	150	23	AC	CL DOWN	Y	C	RIPRINT
AV	10/04/94	IA	?	?	175	EB	?	146	30	AC	148	33	AC	150	23	AC	CL UP	Y	C	RIPRINT
AV	10/04/94	IA	?	?	175	EB	?	146	30	AC	148	33	AC	150	23	AC	RIGHT	W	E	RIPRINT
AV	10/04/94	IA	?	?	17	SB	?	46	9	PCC	44	33	PCC	42	30	PCC	CL DOWN	Y	C	RIPRINT
AV	10/04/94	IA	?	?	17	SB	?	46	9	PCC	44	33	PCC	42	30	PCC	CL UP	Y	C	RIPRINT
AV	10/04/94	IA	?	?	17	SB	?	46	9	PCC	44	33	PCC	42	30	PCC	RIGHT	W	E	RIPRINT
AV	10/04/94	IA	?	?	20	WB	?	146	33	PCC	144	9	PCC	142	32	PCC	CL UP	W	C	RIPRINT
AV	10/04/94	IA	?	?	20	WB	?	146	33	PCC	144	9	PCC	142	32	PCC	RIGHT	W	E	RIPRINT
AV	10/05/94	IA	?	?	?	?	?	-1	7	AC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	RIPRINT
AV	10/05/94	IA	?	?	80	WB	?	37	11	AC	135	24	AC	133	15	PCC	CL UP	W	C	RIPRINT
AV	10/05/94	IA	?	?	80	WB	?	37	11	AC	135	24	AC	133	15	PCC	RIGHT	W	E	RIPRINT
AV	10/05/94	IA	?	?	80	EB	?	132	20	PCC	134	6	PCC	136	21	PCC	CL UP	W	C	RIPRINT
AV	10/05/94	IA	?	?	80	EB	?	132	20	PCC	134	8	PCC	136	21	PCC	RIGHT	W	E	RIPRINT
AV	10/05/94	IA	?	?	35	SB	?	125	15	PCC	72	25	AC	70	31	AC	CL UP	W	C	RIPRINT
AV	10/05/94	IA	?	?	35	SB	?	125	15	PCC	72	25	AC	70	31	AC	RIGHT	W	E	RIPRINT
AV	10/05/94	IA	?	?	35	NB	?	70	18	AC	72	18	AC	126	11	PCC	CL UP	W	C	RIPRINT
AV	10/05/94	IA	?	?	35	NB	?	70	18	AC	72	18	AC	126	11	PCC	RIGHT	W	E	RIPRINT
AV	10/05/94	IA	?	?	235	WB	?	6	6	N/A	4	8	N/A	2	12	N/A	CL UP	W	C	EPOXY
AV	10/05/94	IA	?	?	235	WB	?	6	6	N/A	4	8	N/A	2	12	N/A	RIGHT	W	E	EPOXY
AV	10/05/94	IA	?	?	235	WB	?	14	27	N/A	12	10	N/A	10	12	N/A	CL UP	N/A	C	EPOXY
AV	10/05/94	IA	?	?	235	WB	?	14	27	N/A	12	10	N/A	10	12	N/A	RIGHT	N/A	E	EPOXY
AV	10/05/94	IA	?	?	235	EB	?	9	10	N/A	11	10	N/A	13	20	N/A	CL UP	W	C	EPOXY
AV	10/05/94	IA	?	?	235	EB	?	9	10	N/A	11	10	N/A	13	20	N/A	RIGHT	W	E	EPOXY
AV	10/05/94	IA	?	?	235	EB	?	1	17	N/A	3	14	N/A	5	12	N/A	CL UP	W	C	EPOXY
AV	10/05/94	IA	?	?	235	EB	?	1	17	N/A	3	14	N/A	5	12	N/A	RIGHT	W	E	EPOXY

Mile 0 #1	#2	#3	#4	#5	Mile 2 #1	#2	#3	#4	#5	Mile 4 #1	#2	#3	#4	#5
217	299	297	305	240	360	380	390	407	344	75	313	307	311	231
53	48	54	44	44	13	26	51	50	49	47	43	56	42	32
192	267	268	279	290	339	291	286	291	268	177	318	319	326	307
37	31	27	37	47	33	34	37	31	34	36	51	43	42	37
252	221	314	325		247	316	343	85	293	270	297	285	309	279
82	53	95	87	61	114	91	69	138	100	43	9	45	45	68
145	170	215	200	198	192	319	244	253	196	375	231	27	245	124
267	319	258	257	259	128	146	150	148	171	234	285	161	409	355
114	258	288	264	198	116	233	240	253	205	58	218	217	248	238
323	163	372	127	223	233	197	273	186	222	226	281	124	214	190
164	111	144	150	141	143	152	159	156	161	165	104	179	175	179
89	92	89	87	95	131	80	110	125	122	114	73	201	124	157
145	147	139	156	152	103	112	107	123	97	86	54	48	58	35
127	114	121	130	139	152	138	137	142	90	39	66	34	35	29
165	171	163	162	152	216	203	207	212	255	327	234	211	206	215
132	152	126	153	187	151	155	149	153	153	171	220	183	217	203
52	564	232	228	229	216	240	210	229	232	214	229	208	241	210
167	157	185	210	187	137	126	337	133	156	158	144	149	186	163
217	195	215	206	383										
485	456	198	207	327										
184	254	288	273	242	182	209	210	184	170	154	186	234	242	218
133	119	112	129	107						80	117	100	124	92
132	153	148	147	110						110	162	142	165	133
137	74	103	63	94	170	183	198	172	176	230	213	185	204	163
					172	199	169	172	161					
					21	65	52	34	38	121	105	255	134	148
					38	85	41	41	34	58	78	118	89	72
135	174	159	187	197	212	204	177	106	176	209	186	197	279	164
77	173	182	179	169	70	102	101	68	89	109	91	86	130	132
					115	126	138	112	90	134	87	97	76	180
					133	128	119	47	43	83	123	25	57	55
64	105	153	134	61	55	118	85	148	110	49	74	88	89	92
80	105	181	145	143	83	156	153	167	92	8	144	131	146	83
132	144	182	149	192	159	145	173	147	115	156	175	158	141	142
232	84	56	28	45										
58	98	131	126	135	132	19	156	175	162					
156	166	166	133	18	170	148	170	190	186	208	133	106	67	56
133	182	134	158	118	142	155	159	172	143	71	125	116	107	68
116	180	364	109	301	82	73	74	64	68	93	73	63	97	114
140	272	254	231	244	81	105	111	100	92	56	90	71	48	72
260	112	184	178	186	146	171	187	149	120	220	161	180	152	191
68	227	251	231	49	72	280	298	93	250	73	252	263	338	222
61	61	67	70	67	77	87	47	56	75	55	67	72	58	58
41	142	143	166	22	225	267	333	251	275					
216	264	234	95	239	248	257	250	278	250					
17	110	42	73	15										
16	58	44	44	26										
87	231	244	231	240										
17	29	32	37	35										
204	266	66	365	50	115	247	250	22	217	2	283	286	260	245
64	122	6	70	131	145	179	118	222	145	48	70	43	102	97
99	113	116	159	52	53	191	201	210	170	153	109	233	188	53
85	119	123	105	133	163	96	145	132	147	76	91	264	115	106
186	212	170	99	207	106	153	28	169	156	200	150	188	204	131
64	67	65	81	66	55	79	107	31	75	62	55	8	11	82
239	262	280	222	234	146	214	90	234	275	229	169	229	233	144
137	134	132	98	109	85	64	96	28	42	122	133	107	126	127
63	218													
21	42													
57	71	69	70	55										
175	99	133	140	191	77	70	78	86	55	77	96	90	139	129
										87	74	130	91	80
136	173	170	211	199										
189	194	181	155	177										
217	211	166	215	49	211	259	156	203	177					
178	159	136	139	129	194	153	189	196	181					
192	191	243	66	56	133	137	206	213	85	186	233	266	38	15
184	166	170	130	164	185	148	186	183	195	179	188	156	187	69
240	264	296	267	249	221	224	234	217	218	172	150	185	170	194
215	208	214	217	227	166	178	131	150	116	264	293	277	291	250
221	237	224	225	232	293	307	218	282	281	298	313	292	285	305
166	176	165	170	164	313	312	273	289	269	264	263	264	277	266
73	103	98	105	48	36	298	302	367	197	162	199	194	179	162
110	96	106	74	88	271	258	246	256	275	273	286	273	261	304
235	246	265	270	262	136	114	90	70	75	40	114	61	69	73
203	235	214	221	206	58	49	56	58	51	76	89	72	81	99
194	265	296	267	273	242	238	64	231	212	220	241	106	259	208
60	77	61	62	71	102	92	91	67	101	354	377	363	360	305
263	220	271	261	301	245	272	266	307	269					
156	174	175	187	186	83	80	73	77	77					
154	150	144	147	139	285	311	304	321	332	327	341	341	343	346
179	177	168	145	120										
186	175	232	206	212										
265	336	321	349	376	372	363	371	373	364	337	327	318	341	325
					85	83	77	85	78					
131	136	142	156	86	50	129	127	133	131	2	102	122	129	79
140	116	74	94	82	100	143	97	119	104	53	29	37	70	18
116	120	150	133	139	197	180	169	180	145	179	177	190	183	186
134	115	121	109	54	110	143	136	126	71	68	557	132	127	106
92	70	106	75	16	107	105	21	71	96	83	95	70	100	104
212	225	225	191	201	196	127	144	197	158	160	148	152	145	143
117	54	107	126	5	159	111	55	72	137	104	131	101	120	20
56	168	107	59	140	131	68	18	22	200	35	42	154	83	35
201	146	111	182	157	225	192	213	170	206	204	217	192	203	226
256	152	210	332	220	195	213	197	227	200	345	266	269	314	191
96	54	121	142	50	58	76	63	39	119	80	100	75	78	92
586	220	123	12	45										
123	94	159	151	120	76	61	142	152	121	38	120	165	143	186
34	70	57	48	13	39	64	43	36	13	57	24	64	70	35
132	201	165	221	164	115	221	286	160	200	74	232	194	176	168
93	29	4	61	8	23	46	40	34	55	9	75	37	31	25
69	143	185	109	159	142	223	279	221	201	45	142	126	133	147
50	29	57	86	52	94	103	87	94	105	88	56	55	90	65
206	226	160	190	211	123	155	192	137	108	188	184	197	194	193
60	55	62	75	60	54	80	37	42	29	370	37	29	54	24
102	165	18	108	76	99	135	124	130	83	167	149	143	155	158
169	204	219	184	164	166	163	100	133	204	142	108	66	76	93
93	121	112	62	121	156	135	154	136	135	336	251	57	119	112
2	179	169	181	164	57	64	62	69	32	231	127	290	275	233
107	130	136	98	93	93	80	119	97	66	137	193	155	150	133
46	36	119	159	148	160	130

RURAL FREEWAY
WATERBORNE PAINT

								Mile 0			Mile 2			Mile 4			Marking Data				Mile 0					Mile 2					Mile 4				
Crew	Date	State	County	Cell	Route	Dirn	Sect#	MP	RL	Type	MP	RL	Type	MP	RL	Type	Line	Color	Type	Material	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5
A/K	09/04/94	IA	?	RFPW	61	NB	1	126	17	PCC	128	17	PCC	130	26	PCC	LEFT	Y	L	W/PAINT	217	299	297	305	240	360	380	390	407	344	75	313	307	311	231
A/K	09/04/94	IA	?	RFPW	61	NB	1	126	17	PCC	128	17	PCC	130	26	PCC	RIGHT	W	E	W/PAINT	53	48	54	44	44	13	26	51	50	49	47	43	56	42	32
A/K	09/04/94	IA	?	RFPW	61	NB	2	132	27	PCC	134	18	PCC	136	18	PCC	LEFT	Y	L	W/PAINT	192	287	288	278	290	239	291	286	291	268	177	318	319	326	307
A/K	09/04/94	IA	?	RFPW	61	NB	2	132	27	PCC	134	18	PCC	136	18	PCC	RIGHT	W	E	W/PAINT	37	31	27	17	47	33	34	37	31	34	36	51	43	42	37
A/K	09/04/94	IA	?	RFPW	218	SB	1	96	26	PCC	94	13	PCC	92	41	PCC	LEFT	Y	L	W/PAINT	145	170	215	200	198	192	319	244	253	196	375	231	27	245	124
A/K	09/04/94	IA	?	RFPW	218	SB	1	96	26	PCC	94	13	PCC	92	41	PCC	RIGHT	W	E	W/PAINT	267	319	238	257	259	128	146	150	148	171	234	285	161	409	355
A/K	09/29/94	IA	?	RFPW	218	NB	2	91.7	21	PCC	94	15	PCC	96	29	PCC	LEFT	Y	L	W/PAINT	114	258	288	264	198	118	233	240	253	205	58	218	217	248	238
A/K	09/29/94	IA	?	RFPW	218	NB	2	91.7	21	PCC	94	15	PCC	96	29	PCC	RIGHT	W	E	W/PAINT	323	163	372	127	223	233	197	273	186	222	226	281	124	214	190
A/K	09/30/94	IA	?	RFPW	80	EB	2	257.7	14	PCC	260	18	AC	262	10	AC	LEFT	Y	L	N/A	140	272	254	231	244	87	105	111	100	92	56	90	71	48	72
A/K	09/30/94	IA	?	RFPW	80	EB	2	257.7	14	PCC	260	18	AC	262	10	AC	RIGHT	W	E	W/PAINT	260	112	184	178	186	146	171	187	149	120	220	161	180	152	191
A/V	09/30/94	IA	?	?	35	SB	?	105	23	PCC	103	19	PCC	101	2	PCC	CL UP	W	C	R/PAINT	204	266	66	365	50	115	247	259	22	217	2	283	286	260	245
A/V	09/30/94	IA	?	?	35	SB	?	105	23	PCC	103	19	PCC	101	2	PCC	RIGHT	W	E	R/PAINT	64	122	9	70	131	145	179	116	222	145	48	70	43	102	97
A/V	09/30/94	IA	?	?	80	EB	?	144	32	PCC	146	20	PCC	148	24	N/A	CL UP	W	C	R/PAINT	99	113	116	159	52	53	191	201	210	170	153	199	233	168	53
A/V	09/30/94	IA	?	?	80	EB	?	144	32	PCC	146	20	PCC	148	24	N/A	RIGHT	W	E	R/PAINT	85	119	123	105	133	163	96	145	132	147	76	91	264	115	106
A/V	09/30/94	IA	?	?	80	WB	?	178	35	PCC	176	17	PCC	174	22	PCC	CL UP	W	C	R/PAINT	186	212	170	99	207	106	153	28	169	156	200	159	188	204	131
A/V	09/30/94	IA	?	?	80	WB	?	178	35	PCC	176	17	PCC	174	22	PCC	RIGHT	W	E	R/PAINT	64	67	65	81	66	55	79	102	31	75	62	55	8	11	82
A/V	09/30/94	IA	?	?	35	NB	?	135	47	PCC	137	20	PCC	139	15	PCC	CL UP	W	C	R/PAINT	239	262	260	222	234	146	214	90	234	275	229	169	229	233	144
A/V	09/30/94	IA	?	?	35	NB	?	135	47	PCC	137	20	PCC	139	15	PCC	RIGHT	W	E	R/PAINT	117	134	132	98	109	85	64	96	28	42	122	133	107	126	127
A/V	10/04/94	IA	?	?	20	WB	?	146	33	PCC	144	9	PCC	142	32	PCC	CL UP	W	C	R/PAINT	256	192	210	332	220	195	213	197	227	200	245	266	269	314	191
A/V	10/04/94	IA	?	?	20	WB	?	146	33	PCC	144	9	PCC	142	32	PCC	RIGHT	W	E	R/PAINT	96	54	121	142	50	58	76	63	39	119	80	100	75	78	92

DATA SUMMARY	
AVERAGE READING	162.73
STANDARD DEVIATION	93.76



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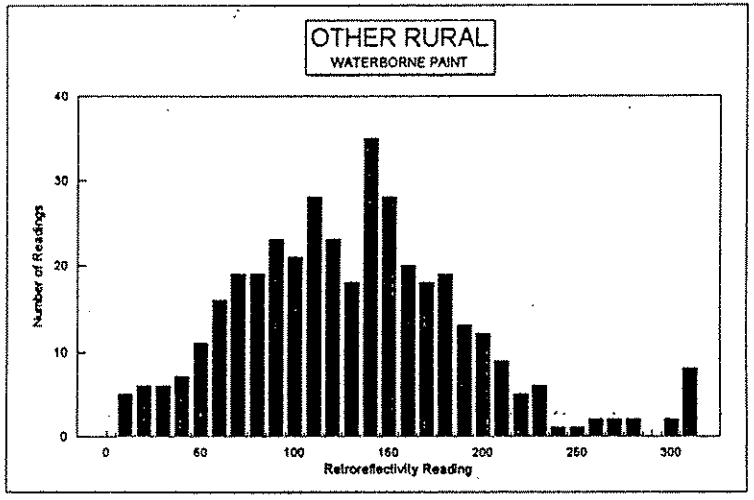
270	8
280	4
290	9
300	4
300+	23
Total	300

OTHER RURAL
WATERBORNE PAINT

Crew	Date	State	County	Cell	Route	Dirn	Sect#	Mile 0 MP	RL	Type	Mile 2 MP	RL	Type	Mile 4 MP	RL	Type	Marking Data Line	Color	Type	Material	Mile 0 #1	#2	#3	#4	#5	Mile 2 #1	#2	#3	#4	#5	Mile 4 #1	#2	#3	#4	#5
A/K	09/04/94	IA	?	ORPW	30	EB	1	316	24	PCC	318	29	PCC	320	12	PCC	LEFT	Y	L	R/PAINT	252	221	314	325	0	247	316	343	85	293	270	297	265	309	279
A/K	09/04/94	IA	?	ORPW	30	EB	1	316	24	PCC	318	29	PCC	320	12	PCC	RIGHT	W	E	R/PAINT	82	53	95	87	61	114	91	69	138	100	43	9	45	45	68
A/V	09/29/94	IA	?	ORPW	20	WB	?	165	29	PCC	163	33	PCC	161	26	PCC	CL DOWN	Y	C	W/PAINT	133	119	112	129	107						60	117	100	124	92
A/V	09/29/94	IA	?	ORPW	20	WB	?	165	29	PCC	163	33	PCC	161	26	PCC	CL UP	Y	C	W/PAINT	132	153	148	147	110						110	162	142	165	133
A/V	09/29/94	IA	?	ORPW	20	WB	?	165	29	PCC	163	33	PCC	161	26	PCC	RIGHT	W	E	W/PAINT	137	74	103	63	94	170	183	196	172	176	230	213	185	204	163
A/V	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	LEFT	Y	L	W/PAINT						172	199	169	172	161					
A/V	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	CL DOWN	Y	C	W/PAINT						21	65	52	34	38	121	105	255	134	148
A/V	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	CL UP	Y	C	W/PAINT						38	85	41	41	34	58	76	118	89	72
A/V	09/29/94	IA	?	ORPW	30	EB	?	-1	3	PCC	-1	1	PCC	-1	12	N/A	RIGHT	W	E	W/PAINT	135	174	159	187	197	218	204	177	106	176	209	186	197	279	164
A/V	09/29/94	IA	?	ORPW	63	NB	?	120	23	PCC	122	7	PCC	124	28	N/A	CL DOWN	W	C	W/PAINT	77	173	168	179	169	70	102	101	68	89	109	91	86	130	132
A/V	09/29/94	IA	?	ORPW	63	NB	?	120	23	PCC	122	7	PCC	124	28	N/A	CL UP	W	C	W/PAINT						113	128	138	112	90	134	97	97	76	180
A/V	09/29/94	IA	?	ORPW	63	NB	?	120	23	PCC	122	7	PCC	124	28	N/A	RIGHT	W	E	W/PAINT						133	128	119	47	43	83	123	25	57	55
A/V	09/29/94	IA	?	ORPW	96	EB	?	15	28	AC	13	10	AC	11	17	AC	CL DOWN	Y	C	W/PAINT	64	106	153	134	61	55	118	85	148	110	49	74	88	89	92
A/V	09/29/94	IA	?	ORPW	96	EB	?	15	28	AC	13	10	AC	11	17	AC	CL UP	Y	C	W/PAINT	80	105	181	145	143	83	156	153	167	92	8	144	131	146	83
A/V	09/29/94	IA	?	ORPW	96	EB	?	15	28	AC	13	10	AC	11	17	AC	RIGHT	W	E	W/PAINT	132	144	182	149	192	159	145	173	147	115	156	175	158	141	142
A/V	09/29/94	IA	?	?	14	NB	?	-1	-1	PCC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	W/PAINT	232	84	56	28	45										
A/V	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	LEFT	Y	L	W/PAINT	58	98	131	126	135	132	19	156	175	162					
A/V	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	CL DOWN	Y	C	W/PAINT	156	168	166	133	18	170	148	170	190	186	208	133	106	62	56
A/V	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	CL UP	Y	C	W/PAINT	133	162	134	158	118	142	155	159	172	143	71	125	116	107	68
A/V	09/29/94	IA	?	ORPW	14	NB	?	115	24	PCC	117	37	AC	119	18	AC	RIGHT	W	E	W/PAINT	116	180	364	109	301	86	73	74	64	68	93	73	63	97	114
A/V	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	LEFT	Y	L	R/PAINT						85	83	77	85	78					
A/V	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	CL DOWN	Y	C	R/PAINT	131	136	142	156	89	50	129	127	133	131	2	102	122	129	79
A/V	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	CL UP	Y	C	R/PAINT	140	116	74	94	82	100	143	97	119	104	53	29	37	70	18
A/V	10/04/94	IA	?	?	69	SB	?	133	13	AC	131	3	AC	124	33	AC	RIGHT	W	E	R/PAINT	119	120	150	133	139	197	180	189	180	145	179	177	190	183	186
A/V	10/04/94	IA	?	?	175	EB	?	146	30	AC	148	33	AC	150	23	AC	CL DOWN	Y	C	R/PAINT	134	115	121	109	54	110	143	136	128	71	68	557	132	127	106
A/V	10/04/94	IA	?	?	175	EB	?	146	30	AC	148	33	AC	150	23	AC	CL UP	Y	C	R/PAINT	92	70	106	75	16	107	105	21	71	96	83	95	70	100	104
A/V	10/04/94	IA	?	?	175	EB	?	146	30	AC	148	33	AC	150	23	AC	RIGHT	W	E	R/PAINT	212	225	225	191	201	196	127	144	197	158	160	148	152	145	143
A/V	10/04/94	IA	?	?	17	SB	?	46	9	PCC	44	33	PCC	42	30	PCC	CL DOWN	Y	C	R/PAINT	117	54	107	126	5	159	111	55	72	137	104	131	101	120	20
A/V	10/04/94	IA	?	?	17	SB	?	46	9	PCC	44	33	PCC	42	30	PCC	CL UP	Y	C	R/PAINT	56	168	107	59	140	131	68	18	22	200	35	42	154	83	35
A/V	10/04/94	IA	?	?	17	SB	?	46	9	PCC	44	33	PCC	42	30	PCC	RIGHT	W	E	R/PAINT	201	149	111	182	157	225	192	213	170	208	204	217	192	201	226

DATA SUMMARY	
AVERAGE READING	127.79
STANDARD DEVIATION	65.20



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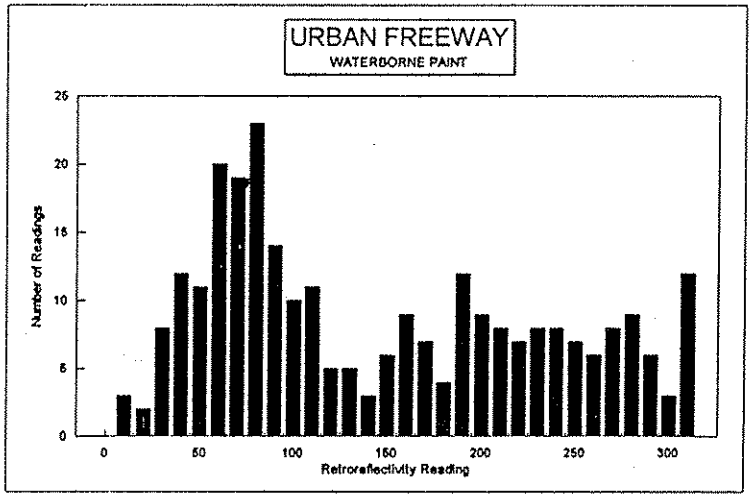
220	5
230	6
240	1
250	1
260	2
270	2
280	2
290	0
300	2
300+	8
Total	385

URBAN FREEWAY
WATERBORNE PAINT

Crew	Date	State	County	Cell	Route	Dirn	Sect#	Mile 0 MP	RL	Type	Mile 2 MP	RL	Type	Mile 4 MP	RL	Type	Marking Data Line	Color	Type	Material	Mile 0 #1	#2	#3	#4	#5	Mile 2 #1	#2	#3	#4	#5	Mile 4 #1	#2	#3	#4	#5
A/K	09/29/94	IA	?	RFPW	80	EB	1	240.5	8	PCC	243	21	N/A	245	10	N/A	LEFT	Y	L	W/PAINT	184	254	286	273	242	182	209	210	184	170	154	186	234	242	218
A/K	09/30/94	IA	?	RFPW	80	WB	3	245.5	21	PCC	243	11	PCC	241	20	PCC	LEFT	Y	L	N/A	68	227	251	231	49	72	280	296	93	250	73	252	263	338	222
A/K	09/30/94	IA	?	RFPW	80	WB	3	245.5	21	PCC	243	11	PCC	241	20	PCC	RIGHT	W	E	W/PAINT	61	81	67	70	67	77	87	47	56	75	55	67	72	58	58
A/K	10/03/94	IA	?	RFPW	80	EB	1	301	29	AC	302.5	24	AC	304	99	AC	LEFT	Y	L	W/PAINT	73	103	98	105	48	36	298	302	367	197	162	190	194	179	162
A/K	10/03/94	IA	?	RFPW	80	EB	1	301	29	AC	302.5	24	AC	304	99	AC	RIGHT	W	E	W/PAINT	110	96	106	74	88	271	258	246	256	275	273	286	273	261	304
A/K	10/03/94	IA	?	RFPW	80	WB	2	304	21	AC	302	44	PCC	301	12	PCC	LEFT	Y	L	W/PAINT	235	240	285	270	262	130	114	90	70	75	49	114	81	69	73
A/K	10/03/94	IA	?	RFPW	80	WB	2	304	21	AC	302	44	PCC	301	12	PCC	RIGHT	W	E	W/PAINT	203	235	214	221	206	58	49	56	58	51	76	89	72	81	99
A/K	10/03/94	IA	?	RFPW	280	SB	1	2	11	PCC	4	19	PCC	6	20	PCC	LEFT	Y	L	W/PAINT	194	283	296	287	273	242	238	68	231	212	220	247	106	259	208
A/K	10/03/94	IA	?	RFPW	280	SB	1	2	11	PCC	4	19	PCC	6	20	PCC	RIGHT	W	E	W/PAINT	60	77	81	62	71	102	92	91	67	101	354	377	363	360	305
A/K	10/03/94	IA	?	UFPW	280	WB	2	6	17	PCC	3	15	N/A	-1	-1	N/A	LEFT	Y	L	W/PAINT	263	220	271	261	301	245	272	269	307	269					
A/K	10/03/94	IA	?	UFPW	280	WB	2	6	17	PCC	3	15	N/A	-1	-1	N/A	RIGHT	W	E	W/PAINT	158	174	175	182	186	83	80	73	77	77					
A/V	10/05/94	IA	?	?	80	WB	?	37	11	AC	135	24	AC	133	15	PCC	CL UP	W	C	R/PAINT	123	94	159	151	120	76	61	142	152	121	38	120	185	143	186
A/V	10/05/94	IA	?	?	80	WB	?	37	11	AC	135	24	AC	133	15	PCC	RIGHT	W	E	R/PAINT	34	70	57	48	13	39	64	43	36	13	57	24	84	70	35
A/V	10/05/94	IA	?	?	80	EB	?	132	70	PCC	134	8	PCC	136	21	PCC	CL UP	W	C	R/PAINT	132	201	168	221	164	115	221	286	160	200	74	232	194	178	168
A/V	10/05/94	IA	?	?	80	EB	?	132	70	PCC	134	8	PCC	136	21	PCC	RIGHT	W	E	R/PAINT	91	29	4	61	8	23	46	40	34	55	9	75	37	31	25
A/V	10/05/94	IA	?	?	35	SB	?	125	15	PCC	72	25	AC	70	31	AC	CL UP	W	C	R/PAINT	69	149	189	109	159	142	223	219	221	201	45	142	125	133	147
A/V	10/05/94	IA	?	?	35	SB	?	125	15	PCC	72	25	AC	70	31	AC	RIGHT	W	E	R/PAINT	50	25	57	85	52	94	103	87	94	105	88	56	55	90	65
A/V	10/05/94	IA	?	?	35	NB	?	70	18	AC	72	18	AC	125	11	PCC	CL UP	W	C	R/PAINT	206	226	160	190	211	123	155	192	137	108	188	164	197	194	193
A/V	10/05/94	IA	?	?	35	NB	?	70	18	AC	72	18	AC	125	11	PCC	RIGHT	W	E	R/PAINT	60	55	62	75	80	54	80	37	42	29	370	37	29	54	24

DATA SUMMARY	
AVERAGE READING	144.10
STANDARD DEVIATION	89.82



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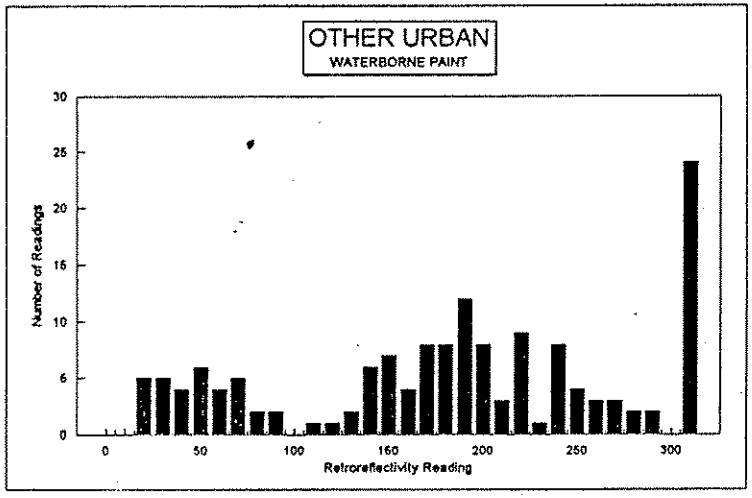
220	7
230	8
240	8
250	7
260	6
270	8
280	9
290	6
300	3
300+	12
Total	275

OTHER URBAN
WATERBORNE PAINT

Crew	Date	State	County	Cell	Route	Dirn	Sect#	Mile 0 MP	RL	Type	Mile 2 MP	RL	Type	Mile 4 MP	RL	Type	Marking Data Line	Color	Type	Material	Mile 0 #1	#2	#3	#4	#5	Mile 2 #1	#2	#3	#4	#5	Mile 4 #1	#2	#3	#4	#5
A/K	09/30/94	IA	?	RFPR	6	EB	?	248.5	6	PCC	250.5	16	N/A	-1	-1	N/A	LEFT	Y	L	R/PAINT	41	142	143	166	22	225	267	333	251	275					
A/K	09/30/94	IA	?	RFPR	6	WB	2	-1	4	N/A	-1	1	N/A	-1	-1	N/A	LEFT	Y	L	R/PAINT	219	264	234	25	239	248	257	250	278	250					
A/K	09/30/94	IA	?	RFPR	1	?	1	84.5	3	PCC	-1	-1	N/A	-1	-1	N/A	LEFT	Y	L	R/PAINT	17	110	42	73	15										
A/K	09/30/94	IA	?	RFPR	1	?	1	84.5	3	PCC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	R/PAINT	16	58	44	44	28										
A/K	09/30/94	IA	?	RFOM	1	NB	?	84	68	PCC	-1	-1	N/A	-1	-1	N/A	LEFT	Y	L	N/A	87	231	244	231	240										
A/K	09/30/94	IA	?	RFOM	1	NB	?	84	68	PCC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	N/A	17	29	32	37	38										
A/V	10/03/94	IA	?	?	46	SB	?	5	21	AC	-1	-1	N/A	-1	-1	N/A	CL DOWN	Y	C	R/PAINT	63	218													
A/V	10/03/94	IA	?	?	46	SB	?	5	21	AC	-1	-1	N/A	-1	-1	N/A	CL UP	Y	C	R/PAINT	21	42													
A/V	10/03/94	IA	?	?	46	SB	?	5	21	AC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	R/PAINT	57	71	69	70	55										
?	10/03/94	IA	?	?	415	SB	?	2	49	AC	-1	-1	N/A	-1	-1	N/A	CL UP	W	C	R/PAINT	138	173	170	211	199										
?	10/03/94	IA	?	?	415	SB	?	2	49	AC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	R/PAINT	189	194	181	155	177										
A/V	10/03/94	IA	?	?	415	NB	?	1	11	AC	3	28	PCC	-1	-1	N/A	CL UP	W	C	R/PAINT	217	211	166	215	49	211	259	166	203	177					
A/V	10/03/94	IA	?	?	415	NB	?	1	11	AC	3	28	PCC	-1	-1	N/A	RIGHT	W	E	R/PAINT	178	159	136	139	129	194	163	189	196	181					
A/V	10/03/94	IA	?	?	6	WB	?	134.8	17	PCC	132.8	1	AC	129	1	PCC	CL UP	W	C	R/PAINT	192	191	240	66	56	133	137	206	213	85	166	233	268	38	15
A/V	10/03/94	IA	?	?	6	WB	?	141	18	PCC	139	11	AC	137	11	AC	CL UP	W	C	R/PAINT	184	186	170	130	194	185	148	186	183	195	179	188	156	187	69
A/K	10/03/94	IA	?	RFPW	6	EB	1	3	27	AC	3.03	16	PCC	3.04	20	N/A	LEFT	Y	L	W/PAINT	156	150	144	147	139	285	311	304	321	332	327	341	341	343	346
A/K	10/03/94	IA	?	RFPW	6	EB	1	3	27	AC	3.03	16	PCC	3.04	20	N/A	CL UP	Y	C	W/PAINT	179	177	168	145	120										
A/K	10/03/94	IA	?	RFPW	6	EB	1	3	27	AC	3.03	16	PCC	3.04	20	N/A	RIGHT	W	E	W/PAINT	186	175	232	206	212										
A/K	10/03/94	IA	?	RFPW	6	WB	2	3.04	21	PCC	3.03	16	PCC	3.02	16	AC	LEFT	Y	L	W/PAINT	285	339	321	349	376	372	363	371	373	364	337	327	318	341	325

DATA SUMMARY	
AVERAGE READING	184.43
STANDARD DEVIATION	97.51



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230	1
240	8
250	4
260	3
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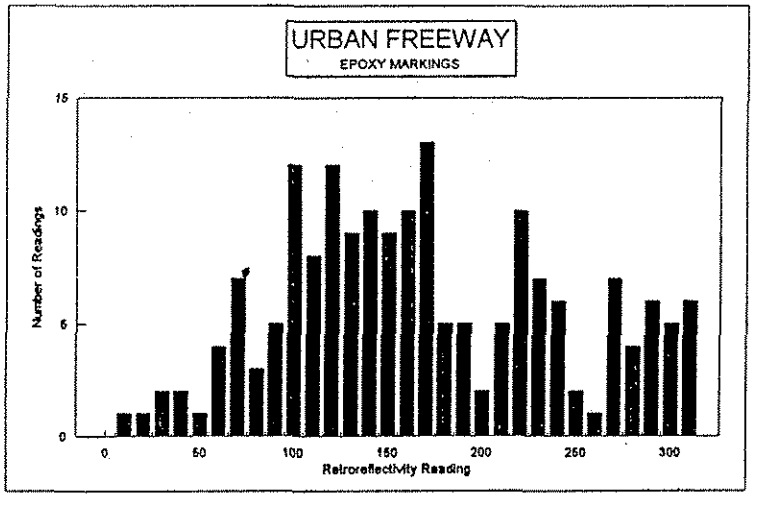
280	2
290	2
300	0
300+	24
Total	149

URBAN FREEWAY
EPOXY MARKINGS

								Mile 0			Mile 2			Mile 4			Marking Data				Mile 0					Mile 2					Mile 4				
Crew	Date	State	County	Cell	Route	Dirn	Sect#	MP	RL	Type	MP	RL	Type	MP	RL	Type	Line	Color	Type	Material	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5
A/V	10/03/94	IA	?	?	74	SB	1	1	12	AC	3	17	AC	-1	32	AC	LEFT	Y	L	EPOXY	240	264	256	267	249	221	224	234	217	216	172	150	185	170	194
A/V	10/03/94	IA	?	?	74	SB	1	1	12	AC	3	17	AC	-1	32	AC	RIGHT	W	E	EPOXY	215	208	214	217	227	166	178	131	150	116	264	293	277	291	250
A/K	10/03/94	IA	?	?	74	WB	2	4	19	AC	3	29	AC	2.8	15	N/A	LEFT	Y	L	EPOXY	227	237	224	225	232	293	302	216	282	281	298	313	292	285	305
A/K	10/03/94	IA	?	?	74	WB	2	4	19	AC	3	29	AC	2.8	15	N/A	RIGHT	W	E	EPOXY	166	176	165	170	164	313	312	273	289	269	284	263	264	277	266
A/V	10/05/94	IA	?	?	235	WB	?	6	8	N/A	4	8	N/A	2	12	N/A	CL UP	W	C	EPOXY	102	189	18	108	76	99	135	124	130	83	167	149	143	155	158
A/V	10/05/94	IA	?	?	235	WB	?	6	8	N/A	4	8	N/A	2	12	N/A	RIGHT	W	E	EPOXY	169	204	219	184	184	166	163	100	133	204	142	108	66	76	93
A/V	10/05/94	IA	?	?	235	WB	?	14	27	N/A	12	10	N/A	10	12	N/A	CL UP	N/A	C	EPOXY	93	121	117	62	121	156	139	154	139	135	338	221	57	119	112
A/V	10/05/94	IA	?	?	235	WB	?	14	27	N/A	12	10	N/A	10	12	N/A	RIGHT	N/A	E	EPOXY	2	179	169	181	164	57	64	62	69	32	231	127	290	275	233
A/V	10/05/94	IA	?	?	235	EB	?	9	10	N/A	11	10	N/A	13	20	N/A	CL UP	W	C	EPOXY	107	100	108	98	93	93	80	119	97	66	137	193	155	150	133
A/V	10/05/94	IA	?	?	235	EB	?	9	10	N/A	11	10	N/A	13	20	N/A	RIGHT	W	E	EPOXY	48	39	110	159	148	160	130	154	21	25	116	136	145	115	135
A/V	10/05/94	IA	?	?	235	EB	?	1	17	N/A	3	14	N/A	5	12	N/A	CL UP	W	C	EPOXY	158	170	150	177	157	85	117	87	91	102	106	114	121	122	130
A/V	10/05/94	IA	?	?	235	EB	?	1	17	N/A	3	14	N/A	5	12	N/A	RIGHT	W	E	EPOXY	211	203	211	204	217	113	112	97	54	117	84	96	67	81	52

DATA SUMMARY	
AVERAGE READING	164.23
STANDARD DEVIATION	74.05



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140	10
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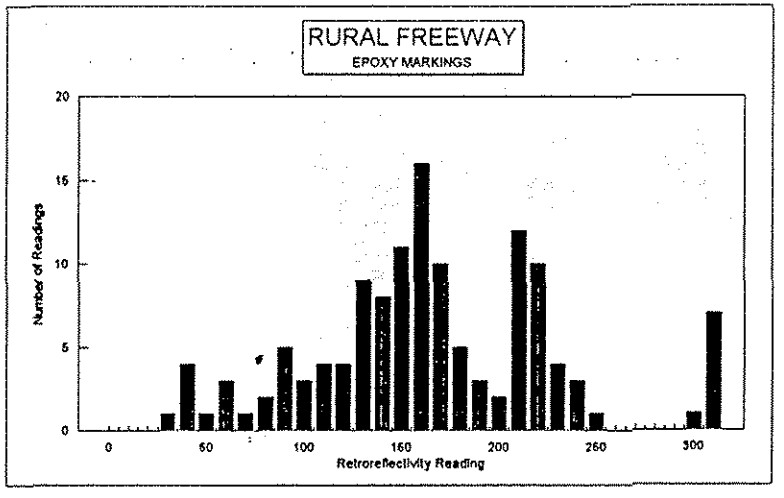
160	10
170	13
180	5
190	5
200	2
210	5
220	10
230	7
240	6
250	2
260	1
270	7
280	4
290	6
300	5
300+	6
Total	180

RURAL FREEWAY
EPOXY MARKINGS

Crew	Date	State	County	Cell	Route	Dirn	Sect#	Mile 0 MP	RL	Type	Mile 2 MP	RL	Type	Mile 4 MP	RL	Type	Marking Data Line	Color	Type	Material	Mile 0 #1	#2	#3	#4	#5	Mile 2 #1	#2	#3	#4	#5	Mile 4 #1	#2	#3	#4	#5
A/K	09/29/94	IA	?	RFEP	380	?	2	7	22	PCC	9	26	PCC	11	1	PCC	LEFT	Y	L	EPOXY	164	111	144	150	141	143	152	159	150	161	165	104	179	175	179
A/K	09/29/94	IA	?	RFEP	380	?	2	7	22	PCC	9	26	PCC	11	1	PCC	RIGHT	W	E	EPOXY	89	92	89	87	95	131	80	110	125	122	114	71	201	124	154
A/K	09/29/94	IA	?	RFEP	380	NB	1	1	15	N/A	3	37	N/A	5.7	13	N/A	LEFT	Y	L	EPOXY	145	147	139	156	152	103	112	107	123	97	86	54	48	58	33
A/K	09/29/2009	IA	?	RFEP	380	NB	1	1	15	N/A	3	37	N/A	5.7	13	N/A	RIGHT	W	E	EPOXY	127	114	121	130	139	152	138	137	142	90	39	66	34	35	29
A/K	09/29/94	IA	?	RFEP	380	SB	3	15	22	AC	13	20	AC	18	3	AC	LEFT	Y	L	EPOXY	165	171	163	162	152	210	203	207	212	295	327	214	211	206	215
A/K	09/29/94	IA	?	RFEP	380	SB	3	15	22	AC	13	20	AC	18	3	AC	RIGHT	W	E	EPOXY	132	152	128	153	187	151	155	149	153	153	171	220	183	217	203
A/K	09/29/94	IA	?	RFEP	380	SB	4	9	12	AC	7	17	AC	5	13	AC	LEFT	Y	L	EPOXY	52	564	232	228	229	216	240	210	229	232	214	229	208	241	210
A/K	09/29/94	IA	?	RFEP	380	SB	4	9	12	AC	7	17	AC	5	13	AC	RIGHT	W	E	EPOXY	167	157	165	210	187	137	126	337	133	156	158	144	149	166	163
A/K	09/29/94	IA	?	RFEP	380	?	5	-1	25	AC	-1	-1	N/A	-1	-1	N/A	LEFT	Y	L	EPOXY	217	195	215	205	383										
A/K	09/29/94	IA	?	RFEP	380	?	5	-1	25	AC	-1	-1	N/A	-1	-1	N/A	RIGHT	W	E	EPOXY	485	456	198	207	327										

DATA SUMMARY	
AVERAGE READING	166.22
STANDARD DEVIATION	80.29



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120	4
130	9
140	8
150	11
160	16
170	10
180	5
190	3
200	2
210	12
220	10
230	4
240	3
250	1
260	0
270	0
280	0
290	0
300	1
300+	7
Total	130