LTPP Seasonal Monitoring Program

Site Monitoring Suspension Status
Draft Final Report for
GPS Section 183002 (18A)
Lafayette, Indiana

U.S. Department
of Transportation
Federal Highway
Administration

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August 1996

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Lafayette, Indiana

Report No. FHWA-

Prepared by

ERES Consultants, Inc.
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Prepared for

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LTPP Division, HNR-40
Turner-Fairbanks Highway Research Center
6300 Georgetown Pike
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August 1996

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FHWA LTPP Technical Representative - Aramis Lopez, HNR-40

16. Abstract

This report contains information on instrument de-installation and monitoring data collection activities for the Long Term Pavement Performance (LTPP) General Pavement Study (GPS) section 183002 conducted on August 2, 1996. The report presents a description of the following activities: SMP data collection activities, including instrument and equipment problems noted prior to de-installation; instrument de-installation activities and unresolved problems with installed sensors; and instrument reinstallation schedule. Also included in the report are the color copies of site photographs taken during suspension preparation activities. The reinstallation of the instrumentation in this site is scheduled for August 1-7, 1997. All units such as the rain gauge, air temperature sensor, and the associated metal poles will be carefully reinstalled and tested.

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1.0 INTRODUCTION

The seasonal monitoring data collection for the Long Term Pavement Performance (LTPP) General Pavement Study (GPS) section 183002 has been suspended for a period of one year effective August 2, 1996. The test section, which is part of the Seasonal Monitoring Program (SMP) managed by the Federal Highway Administration (FHWA) LTPP Division, is approximately 50 kilometers northwest of Lafayette, Indiana, on the southbound driving lane of U.S. Highway 41. Additional background information on the test section, including the exact location of the test section, types of instruments installed, and the pavement structure in-place, can be found in the *Site Installation Report for GPS Section 183002 (18A), Lafayette, Indiana* dated February 1996 (1).

This report contains information on instrument de-installation and monitoring data collection activities conducted on August 2, 1996. After the installation of instrumentation in the test section on September 7, 1995, the test section was visited a total of eight times for SMP data collection, two in 1995 and six in 1996, including the de-installation visit. The dates and activities

performed during these visits can be found in the SMP data collection summary table in appendix A. The instrumentation for the site is scheduled for reinstallation August 1997 and will be monitored for another year. This section is planned to be monitored every other year for the remainder of the LTPP Study.

The report presents a description of the following activities: SMP data collection activities, including instrument and equipment problems noted prior to de-installation; instrument de-installation activities and unresolved problems with installed sensors; and instrument reinstallation schedule. Also included in the report are the color copies of site photographs taken during suspension preparation activities.

2.0 SMP DATA COLLECTION

2.1 SMP Data Collection

Prior to de-installation of the instrumentation in this test section, the full suite of SMP monitoring measurements in the *LTPP Seasonal Monitoring Program Instrument Installation and Data Collection Guidelines* (2) was performed. These include the following:

- FWD and associated measurements.
- Elevation survey.
- Manual distress survey with transverse profile measurements.
- Manual electrical resistivity measurements (two- and four-point).

- Automated mobile data measurements (Time Domain Reflectometry [TDR] and resistivity).
- Water table measurements.

A summary of all the SMP data collected to date can be found in the SMP data collection summary table in appendix A. The specific type and amount of data collected can be found on the copy of SMP field activity report (data sheet SMP-D10) in appendix B. Ten other SMP data sheets pertaining to the data collection activities are also in appendix B. The locations for FWD, faultmeter, and elevation measurements can be found in the site information sheet (SIS) in appendix C. During the instrument de-installation and data collection activities, the weather was calm and sunny.

As can be seen the SMP data collection summary table in appendix A, no longitudinal profile measurements were recorded. This data will be collected at the first opportunity once the new longitudinal profile equipment is released for use or the old profile equipment is in working condition. Also, the second cycle for the FWD and associated measurements was incomplete. The incomplete second FWD cycle was for the J4 and J5 tests.

2.3 Instrument and Equipment Problems

The performance of all TDR, rain gauge, and Measurement Research Corporation (MRC) sensors in the test section were evaluated by reviewing the data from the onsite and mobile dataloggers using the SMPCheck program (3).

A review of the onsite data collected during this visit indicated that MRC sensors 1, 2, and 3 are not functioning as expected. As can be seen in the plots presented figure D-1 in appendix D, the temperature recorded by MRC sensors 1, 2, and 3 in the summer from June 4, 1996, through August 1, 1996, were all below 0 °C. The problems with the MRC sensors were first reported on November 20, 1995. At this time, no effort is directed at repairing these sensors, which are located in the pavement. The temperature recordings from the remaining MRC sensors and air temperature measuring sensor appear reasonable and typical of temperatures at this time of the year.

The precipitation data recorded by the datalogger in figure D-1 appears reasonable, suggesting the rain gauge is functioning as expected. No obvious problems were noted from the data recorded from June 4, 1996, through August 1, 1996.

A review of the data from the mobile datalogger indicates that the TDR sensors are functioning as expected. All the TDR traces, which can be found in figures D-2 and D-3 in Appendix D, had the maximum and minimum points on the traces that enable analysis. However, in the same figure, plot K indicates potential problems with the mobile unit, possibly the CRREL multiplexer. As can be seen in plot K, a value of -6999 was noted for locations 10 and 11, suggesting potential problems at these locations in the mobile unit. A review of data from previous visits indicates that this problem existed as early as March 11, 1996.

The snapring at station 4+91 ILE is located in a spalled area, as shown in photograph number 1 in appendix E. This snapring was replaced in March 11, 1996, and was in good condition at during the site visit. However, during reinstallation this snapring will be monitored closely.

3.0 INSTRUMENT DE-INSTALLATION ACTIVITIES

3.1 Suspension Preparation and Repairs to Instrumentation Hole

As required by the LTPP Seasonal Directive SM-8 (3), on the last day of monitoring, the following site preparation activities were performed:

- Application of an electronics quality, anti-corrosion compound to the TDR and BNC connectors, electrical resistivity connector, and MRC temperature lead wires, as shown in photograph number 2 in appendix E.
- Disconnection and removal of the panel board containing the Onsite CR10, power supply, terminal strip, and relay. A desiccant pouch with all wires and connectors was sealed in a plastic bag. The wires were secured as high as possible in the cabinet, as shown in photograph number 3 in appendix E.
- Locked cabinet as shown in photograph number 4 in appendix E.
- Painted the units used to protect Indiana DOT benchmark red for easy identification, as shown in photograph number 5 in appendix E.

- Resealed edges of the instrumentation block and a crack in the access trench, as shown in photograph number 6 in appendix E.

All units such as the rain gauge, air temperature sensor, and the associated metal poles were labeled "18SA" and carefully stored in the North Central Regional Coordination Office (NCRCO) for reinstallation. The union was left onsite in the cabinet.

3.2 Unresolved Problems with the Installed Sensors

The unresolved problems at this site are associated with the MRC sensors 1, 2, and 3 and the CRREL multiplexer in the mobile unit. Previous problem reports (PRs) on these cases namely NA-01, NC-08, and NC-15 submitted February 22, 1995, February 27, 1995, and October 13, 1995 (5), respectively were reviewed. These problems were resolved and required no immediate action at the time.

Two new problem reports NC-39 and NC-40 on the problems related to the MRC sensors and the CRREL multiplexer have been despatched to the other three Regional Coordination Offices, PCS/Law and the LTPP Division, HN-40 of the FHWA.

3.3 Unique Site Features

This test section is the 13th SMP installation in the LTPP North Central Region, and happens to be the oldest concrete SMP section in the North Central Region.

The MOBILE program used to collect data from the mobile datalogger has been modified to account for the nonstandard TDR cable lengths in this site. The

program, which is referred to as "18SAMOB," enables the maximum and minimum points on the TDR traces to be captured.

Another unique feature is that the site is located in an area that is on eastern time but does not observe daylight savings time (DST).

4.0 INSTRUMENT REINSTALLATION

Reinstallation of the instrumentation in this site is scheduled for August 1-7, 1997. All units such as the rain gauge, air temperature sensor, and the associated metal poles labeled "18SA" are carefully reinstalled and tested.

At the SMPCheck meeting recently held in Champaign, Illinois it was discussed that solar panels would be installed at the SMP sites on top of the cabinets to prolong the life of the battery onsite. There are ongoing efforts to purchase these units.

5.0 SUMMARY

This report contains information on instrument de-installation and monitoring data collection activities for the Long Term Pavement Performance (LTPP) General Pavement Study (GPS) section 183002, conducted on August 2, 1996. The report presents a description of the SMP data collection activities including instrument and equipment problems noted prior to de-installation, instrument de-installation activities, unresolved problems with the MRC 1, 2, and 3 sensors and the CRREL multiplexer in the mobile unit; and instrument reinstallation

schedule. Also included in the report are the color copies of site photographs taken during suspension preparation activities.

During reinstallation of the instrumentation in this site is scheduled for August 1-7, 1997, all units such as the rain gauge, air temperature sensor, and the associated metal poles will be carefully reinstalled and tested. This includes the installation of solar panels on the cabinets to prolong the life of the battery onsite. There are ongoing efforts to purchase these units.

LIST OF REFERENCES

1. *LTPP Seasonal Monitoring Program Site Installation Report for GPS Section 183002 (18A) Lafayette, Indiana.* Federal Highway Administration, LTPP Division, HNR-40, Turner-Fairbanks Highway Research Center, McLean, Virginia. February 1996.
2. *LTPP Seasonal Monitoring Program: Instrumentation Installation and Data Collection Guideline.* FHWA-RD-94-110, Federal Highway Administration, LTPP Division, HNR-40, Turner-Fairbanks Highway Research Center, McLean, Virginia. April 1994.
3. SMPCheck, computer software version 2.4, prepared for The Federal Highway Administration, Pavement Performance Division, HNR-30, McLean, Virginia. August 1996.
4. Lopez, Aramis Jr. *Long Term Pavement Performance Directive for the Seasonal Monitoring Program: Directive Number SM-8, Suspension of SMP Site Monitoring Activities.* Federal Highway Administration, LTPP Division, Turner-Fairbanks Highway Research Center, McLean, Virginia. March 1995.
5. Padgett, Sherry. *Long Term Pavement Performance (LTPP) Monitoring Problem Report.* A nine page Facsimile Message from Jonathan Groegr, PCS/Law, Beltsville, Maryland to Thomas Wilson, ERES Consultants, Inc., Champaign, Illinois, August 29, 1996.

Appendix A - SMP Data Collection Summary Table

SMP DATA COLLECTION SUMMARY

18SA - 183002, US-41, ABOUT 3O MILES NW OF LAYFAYETTE, IN. (1.7 MILES S OF SR-18)

		ONSITE Data			MOBILE Data		Manual Data								FWD Data				Distress		Profile		Comments
Date dd/mmm/yy	Visit ID	Pvmt. Temp.	Air Temp.	Rain	TDR	Frost Volts	Backup TDR	Backup TDR	Frost 2-Pt.	Frost 4-Pt.	Water Table	Pvmt. Elev.	Joint Open.	Joint Fault	Man. Temp.	OWP	ML	PE	M	P	P	D	
16-Mar-95																					X		
14-Jun-95															X	1	1	1	X				DISTRESS SIRVEY/FWD DATA PRIOR
7-Sep-95	95A														X		1						INSTALLATION
8-Sep-95	95B	X	X	X	X	X			D	D	D			D	X	2	2	2					SNAPRINGS NOT INSTALLED YET
13-Oct-95	95C		X	X	X	X			D	D	D	D	D		X	3	3	3					FAULTMETER IN SHOP, MRC 1,2,3 OUT
24-Oct-05																					X		
20-Nov-95	95D	X	X	X	X	X			D	D	D	D	D	D	X	3	3	3					MRC 1,2,3 OUT , RESET TO STANDARD TIME
8-Dec-95	95E	X	X	X	X	X					D		D	D	X	1	1	1					BAD WEATHER, LIMITED TESTING
26-Jan-96	96A	X	X	X	X	X			D	D	D	B	D	D	X	2	2	2	X	X			REPLACED SNAPRING ML @ STA. 4+59
11-Mar-96	96B	X	X	X	X	X			X	X	X		X	X	X	2	2	2					REPLACED SNAPRING ILE @ STA. 4+91
30-Apr-96	96C	X	X	X	X	X			X	X	X	X	X	X	X	2	2	2					SEALED BLOCK, NO DST
2-Aug-96	96D	D	D	D	D	D			D	D	D	D	D	D	X	1.5	2	2	X	X			DE-INSTALLED SITE

Appendix B - SMP Data Sheets

- SMP-D10: SMP Field Activity Report
- SMP-D03: Contact Resistance Measurements
- SMP-D04: Four-Point Resistivity Measurements
- SMP-D05: Ground Water Table Measurement
- SMP-D06: Joint Opening Measurement
- SMP-D07: Joint Faulting Measurement
- SMP-D09: Elevation Measurements - PCC
- SMP-M1: Distress Survey of Instrument Area
- FHWA/SHRP-LTPP Pavement Temperature Profile Measurements
- FASTBACK PLUS - Backup History Report

1 8 S A 9 6 D

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-D10 SMP Field Activity Report	Agency Code [1 8] LTPP Section ID [3 0 0 2]

Onsite Datalogger and Instrumentation		
File Name - *.ONS	18SA96DH	Comments: MRC 1,2,3 De-installation
Battery Replace	Yes (No)	Voltages 12.1
Repairs/Calib.	Weather Station deinstalled	
Other:	MRC 1,2,3, Failed	

Mobile Datalogger		
File Name - *.MOB	18SA96DH	Comments:
TDR/Resistance Voltages	Sets (0 2)	Positions 10 11 read -6999
Other:	All cables sprayed with desiccant	

Manual Data Collection		
Piezometer	(Yes) - No	Comments: 2.578 m
Resistance 2 pt.	Sets (0 1)	None, Calm and Sunny
Resistivity 4 pt.	Sets (0 1)	None, Calm and Sunny
Elevations	Sets (0 1)	None, Calm and Sunny
Distress Survey	(Yes) - No	Full 500 ft. Survey
Long. Dipstick Profile	Yes - (No)	
Photos or Video	(Yes) - No	
Other:		

FWD and Associated Data		
FWD Testing	Sets (0 2)	Operator: GFE
JCP - Snap Rings	Sets (0 2)	
JCP - Faulting	Sets (0 2)	
Other:	Incomplete testing at J4 and J5 tests in second cycle.	

IF REQUIRED, ATTACH SKETCHES TO THIS DATA SHEET

Comments: De-installed weather station. Photos on Video available. Left Union and conduit to pipe in Cabinet.

Prepared by: RKK (Robert Kumapley) Employer: ERES CONSULTANTS, INC

Date (dd/mmm/yy): 02/AUG/96 Daylight Savings Time (Y or N): N (winter is STD. Time)

18 SA96 D

LTPP Seasonal Monitoring Program Data Sheet SMP-D03 Contact Resistance Measurements	Agency Code [18] LTPP Section ID [3002]

Start Time (military): 1200

Test Position	Switch Settings I1 V1	Switch Settings I2 V2	Voltage (ACV) Range Setting	Voltage (ACV) Reading	Current (ACA) Range Setting	Current (ACA) Reading	Comments
1	1	2	Volts	2.513	Micro A	348.8	
2	2	3		1.189		295.7	
3	3	4		1.330		266.9	
4	4	5		1.456		255.8	
5	5	6		1.933		227.6	
6	6	7		1.697		273.8	
7	7	8		2.059		249.5	
8	8	9		2.489		214.7	
9	9	10		1.762		240.9	
10	10	11		1.832		231.8	
11	11	12		1.850		218.0	
12	12	13		1.566		229.9	
13	13	14		1.725		229.2	
14	14	15		2.053		213.9	
15	15	16		1.925		245.8	
16	16	17		1.779		268.8	
17	17	18		1.862		255.5	
18	18	19		1.810		273.8	
19	19	20		2.052		276.9	
20	20	21		2.500		245.3	
21	21	22		2.767		274.7	
22	22	23		2.808		325.9	
23	23	24		2.894		328.0	
24	24	25		3.269		345.2	
25	25	26		2.884		346.8	
26	26	27		3.235		313.0	
27	27	28		3.060		345.0	
28	28	29		2.401		408.0	
29	29	30		2.420		397.2	
30	30	31		2.450		410.0	
31	31	32		2.397		374.0	
32	32	33		2.187		417.0	
33	33	34		2.179		498.0	
34	34	35		1.988		523.0	
35	35	36		2.510		435.0	
36	36	37	Milli Volts	3.1	Micro A	4028.0	R1 = 0.7696
37	37	38	Milli Volts	365.0		3603.0	R2 = 101.30
38	38	39	Volts	2.096		2090.0	R3 = 1002.87
39	39	00	Volts	6.96		7.8	R4 = 892307.6

Note: R = V/I, in ohms; measured resistances should be compared with known values.

Comments: Calm, Sunny

Prepared by: DSP/RKumagolay Employer: ERES CONSULTANTS, INC

Date (dd/mmm/yy): 02/AUG/96

18 S A 96

LTPP Seasonal Monitoring Program
Data Sheet SMP-D04
Four-Point Resistivity Measurements

Agency Code [18]

LTPP Section ID [3002]

Start Time (military): 1225

Test Position	Switch Settings I1	V1	V2	I2	Voltage (ACV) Range Setting	Reading (Volts)	Current (ACA) Range Setting	Reading (Amps)	Comments
1	1	2	3	4	Milli V	129.0	Micro A	97.8	
2	2	3	4	5		103.7		96.5	
3	3	4	5	6		91.6		86.2	
4	4	5	6	7		98.6		88.1	
5	5	6	7	8		73.7		69.4	
6	6	7	8	9		115.3		67.2	
7	7	8	9	10		127.7		63.1	
8	8	9	10	11		89.6		57.0	
9	9	10	11	12		99.8		68.5	
10	10	11	12	13		95.8		71.8	
11	11	12	13	14		80.9		66.4	
12	12	13	14	15		85.3		75.9	
13	13	14	15	16		89.7		78.0	
14	14	15	16	17		80.4		76.1	
15	15	16	17	18		84.4		89.6	
16	16	17	18	19		97.6		89.2	
17	17	18	19	20		91.5		82.9	
18	18	19	20	21		102.4		77.3	
19	19	20	21	22		125.7		79.2	
20	20	21	22	23		106.8		82.3	
21	21	22	23	24		120.4		82.6	
22	22	23	24	25		146.6		103.4	
23	23	24	25	26		156.3		104.4	
24	24	25	26	27		150.0		103.9	
25	25	26	27	28		164.7		120.1	
26	26	27	28	29		145.0		112.0	
27	27	28	29	30		137.5		111.7	
28	28	29	30	31		173.3		124.6	
29	29	30	31	32		169.7		119.3	
30	30	31	32	33		185.3		126.5	
31	31	32	33	34		149.0		135.5	
32	32	33	34	35		165.3		145.6	
33	33	34	35	36		149.0		156.8	
36	36	36	37	37	Milli V	3.1	Micro A	4034	R1 = 0.768 Ω
37	37	37	38	38	V	366		3623	R2 = 101.02 Ω
38	38	38	39	39	V	2.091		2085	R3 = 1002.88 Ω
39	39	39	00	00	V	6.96		7.8	R4 = 892307.6 Ω

Note: R = V/I, in ohms; measured resistances should be compared with known values.

Comments: Calm and Sunny

Prepared by: RK Kumapley / DSP Employer: ERES CONSULTANTS, INC

Date (dd/mmm/yy): 02/AUG/96

18 S A 9 6 D

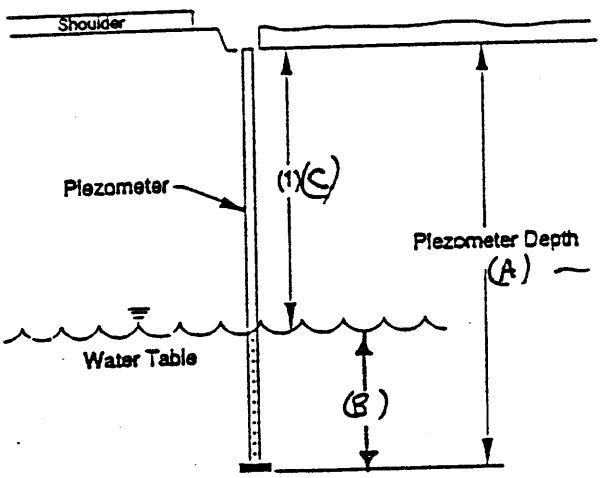
LTPP Seasonal Monitoring Program Data Sheet SMP-D05 Ground Water Table Measurement	Agency Code [18] LTPP Section ID [3002]

MEASURED
Piezometer Depth (m): (A) 4.281

Measurement Number	Time (military)	(C) Depth to Water[1,2] (m) (A−B)	(B) Depth of Water (m) measure	Comments
1	1000	1.70	2.581	
2	1230	1.70	2.578	

[1] Distance from top of piezometer pipe to top of ground water table; to an accuracy of ±10 mm (0.4 in)

[2] If piezometer pipe is dry or frozen, enter "time" when observation was made, leave "depth to water" field blank, and enter "pipe is dry" or "pipe is frozen" under comments column.



MEASURE. DO NOT ASSUME DEPTH O. INFO SHEET IS CORRECT. RV

Comments: Calm and Sunny

Prepared by: R Kumapley /DSP Employer: ERES CONSULTANTS, INC

Date (dd/mmm/yy): 02/AUG/96

18S496D

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-D06 Joint Opening Measurement	Agency Code [18] LTPP Section ID [3002]

Station	Time (military)	Joint Opening (mm)			Joint Width (mm)	Joint Width (in) for FW
		Offset (PE): 0.30 m	Offset (ML): 1.83 m	Offset (ILE): 3.53 m		
4+41	1133	115.70	115.57	115.73	11.	0.43
		115.11	115.69	115.79		
		115.76	115.58	115.82		
	1405	115.76	115.64	115.78	10.5	0.42
4+59	1139	114.78	114.07	116.05	12.	0.47
		114.79	113.79	116.02		(0.46)
		114.79	113.96	116.10		
	1410	114.82	115.53	116.06	12.	
4+78	1157	114.26	115.36	113.66	13.	0.54
		115.76	115.34	113.42		
		115.72	115.31	113.34		
						0.54
	1415	115.73	115.32	113.46	13.	
4+91	1204	114.83	114.92	113.28	14.	0.57
		114.75	114.85	113.23		
		114.79	114.93	113.30		
	1418	114.76	114.97	113.62	12.	.48
5+03	1212	115.97	115.92	115.90	13.	0.54
		116.00	115.95	116.05		
		116.00	115.87	115.78		
						0.45
	1422	116.07	115.83	116.03	12.	
5+21	1230	118.19	115.74	114.74	11.5	0.47
		117.98	115.76	114.80		
		118.36	115.49	114.88		
						0.43
		118.16	115.77	114.60	11.	

Comments: _____

Prepared by: GFE/Kumarley Employer: ERES CONSULTANTS INC

Date (dd/mmm/yy): 02/AUG/96

1 & 5 A 9 6 D

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-D07 Joint Faulting Measurement	Agency Code [15] LTPP Section ID [3022]

Station	Time (military)	Joint Faulting (mm) Offset (OWP): ___.___ m	Offset (ML): ___.___ m	Offset (IWP): ___.___ m	
4+41	1123	0.0	0.0	1.0	
	1410	0.0		0.0	
4+59	1130	0.0	1.0	0.0	
	1410	0.0	0.0	0.0	
4+78	1150	0.0	0.0	0.0	
					No Readings taken
4+91	1217	1.0	1.0	1.0	
					No readings taken
5+03	1219	1.0	1.0	0.0	
					No readings taken
5+21	1224	1.0	0.0	1.0	
					No readings taken

Comments: Faultmeter reads only to 1mm accuracy.
No faultmeter readings taken for 4+91, 5+03, 5+21
for the second cycle FWD

Prepared by: GFF / Kumaplay Employer: FRFS CONSULTANTS INC

Date (dd/mmm/yy): 02/AUG/96

18 SA96

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-D09 Elevation Measurements - PCC	Agency Code [18] LTPP Section ID [3002]

Type of Instrument: NA2000

Start Time (military): 1050

check "close" at midpoint of survey.

BM	Station	BS	HI	~~IFS~~	FS	ELEV	CLOSE
Piez.	4+86	1.5884		1.5883			1.5883
B.O.T. BM Other	4+53	1.8706					1.8703

Station	Offset (PE): ___.___ m	Offset (ML): ___.___ m	Offset (ILE): ___.___ m	Comments
4+41	1.3464	1.3224	1.2965	AJ
4+50	1.3222	1.2971	1.2708	MP
4+59	1.2994	1.2753	1.2484	BJ
4+59	1.2993	1.2739	1.2466	AJ
4+68	1.2742	1.2477	1.2262	MP
4+78	1.2415	1.2201	1.1992	BJ
4+78	1.2407	1.2188	1.2012	AJ
4+84	1.2188	1.1955	1.1744	MP
4+91	1.1964	1.1739	1.1514	BJ
4+91	1.1957	1.1725	1.1506	AJ ILE SONT SMALL
4+97	1.1803	1.1563	1.1345	MP
5+03	1.1654	1.1430	1.1193	BJ
5+03	1.1658	1.1419	1.1183	AJ
5+12	1.1472	1.1181	1.0973	MP BLK AT PE
5+21	1.1151	1.0935	1.0703	BJ

Comments: Calm survey day

Prepared by: Dep / Kumaplay Employer: ERES CONSULTANTS, INC

Date (dd/mmm/yy): 02/AUG/96

18 S A 96 D

LTPP Seasonal Monitoring Program Data Sheet SMP-M1 (Page 1) Distress Survey of Instrumentation Area	Agency Code [18] Test Section Number [3002]

Rate the condition of the instrumentation area (check one):

✓ Good (little or no distress; repairs are not required in the immediate future)

___ Poor (significant distress, repairs required now or in the immediate future)

List any repairs (type and extent) done since instrumentation installation and/or last survey of instrumentation area: Previously resealed joints along edge of instrumentation block. Some areas of the resealed joints failed and were resealed as part of site closing activities. One of the three Low severity cracks in trench to instrument block sealed. Photos taken.

Additional Comments: Settlement of instrument block has not progressed since last measurement.

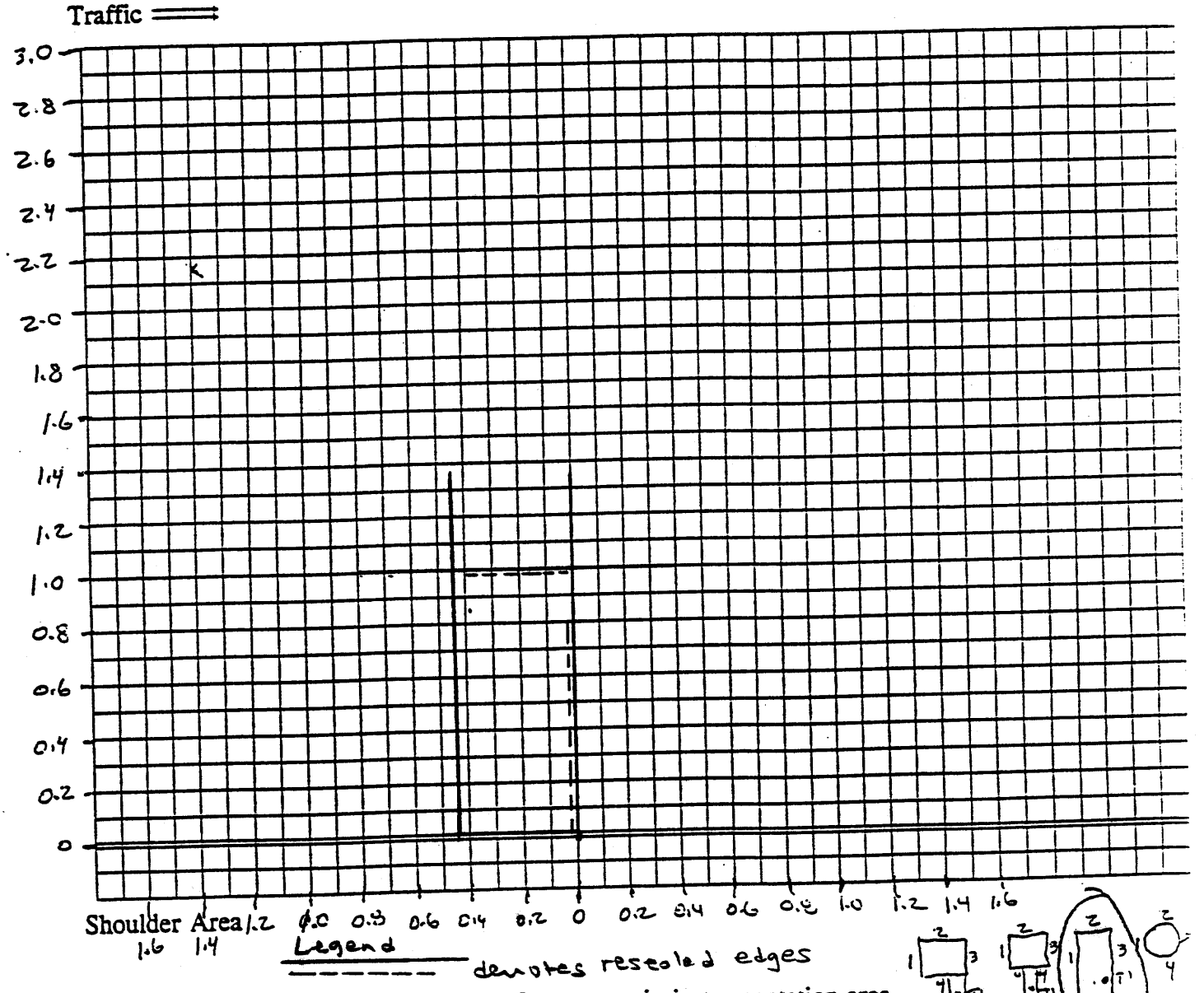
Prepared by: R Kumapley Employer: EREC CONSULTANTS, INC

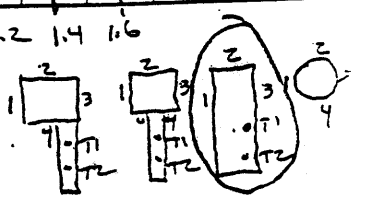
Date: 02-AUG-96
dd-mmm-yy

1 8 S A9 6 D

LTPP Seasonal Monitoring Program Data Sheet SMP-M1 (Page 2) Distress Survey of Instrumentation Area	Agency Code [18] SHRP Section ID [3002] Survey Date [02/AUG/96] dd mmm yy

Use grid below to sketch distresses within 1.5 m (5 ft) of instrumentation block/hole and trench. Use LTPP Distress Identification Manual to extent possible. (Note: each square in grid equals 0.1 m by 0.1 m area)





Use table below to record settlement of pavement in instrumentation area.

Measurement Device: DIPSTICK / STRAIGHT EDGE

Location	Settlement, mm			
	Location 1	Location 2	Location 3	Location 4
Instrumentation block/hole	14.0.	16.0.	13.0.	___.
Trench	11.0.	07.0.	n/a	n/a

SHRP LTPP

SHRP REGION: NCR STATE CODE 18 SHRP ASSIGNED ID 183002

STATE IN TESTING SMP FWD DISTRICT IN DOT

LTPP EXPERIMENT CODE SMP FWD ROUTE/HIGHWAY NO. US 41

FIELD ACTIVITY REPORT

FIELD SET NO. SMP 96D

TESTING DATE 2 / Aug / 96 SHEET NUMBER 1 OF 3 DOG SHEET

FWD AND TOW VEHICLE BEFORE OPERATION CHECKS CE (Initial)

	TIME	ODOMETER
START TRAVEL	600	72200
END TRAVEL	800	72329
READY TO TEST	900	
TRAFFIC CONTROL READY	830	
BEGIN TESTING	900	
END TESTING	1430	
START TRAVEL	1510	72329
END TRAVEL	1700	

DOWN TIME _____ HOURS REASON(S) _____

NUMBER OF TESTS	BASIN	JT/CRACK
TP	—	1 cycle × 12 tests
OWP	—	
PE	2 cycles × 11 tests	
ML	2 cycles × 5 tests (5)	

ADDTIONAL REMARKS REGARDING TESTING Unable to complete 2nd cycle due to early traffic control departure.

TRAFFIC CONTROL CREW
AGENCY IN DOT
NAMES _____

TEST COMPLETED
ERES CONSULTANTS, INC. GEE (FWD OPERATOR) Aug (MONTH) 2nd (DAY) 96 (YEAR)

COPIES: RCO

FHWA/SHRP-LTPP PAVEMENT TEMPERATRURE PROFILE MEASUREMENTS

SHRP NORTH CENTRAL REGION

SHRP SECTION I.D. # 183002

AGENCY IN DOT

TESTING SMP FWD

ROUTE/HIGHWAY # US 41

FIELD SET # SMP 96 D

TESTING DATE 2 Aug 96

SHEET # 2 OF 3

LOCATION STATION 5+06

DEPTH MILTIME	D1 = 1.0" T1 (F)	D2 = 4.5" T2 (F)	D3 = 8.2" T3 (F)	D4 = T4 (F)	D5 = T5 (F)	WEATHER CONDITIONS
930	88.3	84.6	80.7			S
1000	88.9	77.2	76.1			PC
1100	91.1	81.7	78.0			S
1200	94.5	83.6	79.0			S
1319	99.0	87.0	81.0			S
1418	94.0	89.0	83.0			S
1515	97.3	89.3	82.9			S

NOTE: USE ONLY THESE WEATHER TERMS; (S) SUNNY, (PC) PARTLY CLOUDY, (C) CLOUDY, (R) RAIN

COMMENT _____

TESTING COMPLETED BY:

ERES CONSULTANTS, INC.
FHWA FWD S/N 8002-060

GFE
FWD OPERATOR

2 Aug 96
DATE

FASTBACK PLUS BACKUP HISTORY REPORT 08-02-96 14:30:32

```
SU  User name       = HI_DISK
SN  Set name        = C960802A.FUL
SV  Volume          = C:
SY  Volume type     = Fixed Disk
SI  Comment         = ""
SM  Media           = A:MS-DOS 1.44Mb 3 1/2 Floppies
SD  Date gates      = Off :  01-01-80  12-31-99
SR  Size gates      = Off :           0  2146435072
SA  Attributes      = Off :  None
SE  ECC             = On
SC  Compression     = Save Time
    Virus Scanning  = Off
ST  Backup Type     = Full
SP  Protection      = NONE
```

	FILE NAME	SIZE	DATE	TIME	ATTR	SEG	ENGBLK
P	PATH = \						2
P	PATH = \FWD						2
P	PATH = \FWD\DATA						2
F	18SA96D1.FWD	385400	08-02-96	13:14:44	---A	1	2
F	18SA96D2.FWD	653048	08-02-96	13:57:06	---A	1	10
F	18SA96D3.FWD	614836	08-02-96	14:26:02	---A	1	25

Pg 6 has bad file name – no tests

Pg 8 change J4 lane spec to J5

Pg 13 change DM1 442 to 450

change J2 lane spec to J3

Note J2 test @ DM1 442 is missing from this pass.

Pg 15 change J3 lane spec to J2

change DM1 503 to 504

Appendix C- Site Information Sheet (SIS)

Updated August 29, 1996

183002 - 18SA

LOCATION - US-41 SB Lanes, about 30 miles NW of Lafayette, IN (1.7 miles S of SR-18)
CONTACTS - Don Carrol (also Gary or Ross) 317-884-1500, Brian Cory 317-463-1521
TEMP HOLES - Sta 5+05, Depths about 1.0", 4.5", and 8.2" (PCC = 9.5"0.

TEST LOCATIONS:

I1	I2	I3	I4	I5
450	442	450	441	442
468	460	469	459	460
484	479	485	478	479
497	492	496	491	492
512	504	BLK	503	504
--	--	--	521	522

DISTRESS COMMENTS:

Sta I1 - Midpanel tests.

512 LP ADJACENT TO INSTRUMENTATION HOLE

Sta I2 and I3 - Corner and Mid-edge tests.

Sta I4 and I5 - Load transfer tests in the OWP.

PIEZOMETER - Sta 4+86, 2 feet from edge of paved shoulder, Depth = 4.290M.
(Located longitudinally at midpanel of third panel tested.)

ELEVATIONS - DOT BM @ Sta. 4+53, 10 feet off paved shoulder.

Offsets:	PE	ML	ILE	
	(M)	0.30	1.83	3.35
	(ft)	1.0	6.0	11.0
		(hole)	(hole)	(hole)

Sta:	--	BJ/AJ	441	459	478	491	503	521
	--	at MP	450	468	484	497	512	

(only **AJ** at **441** and **BJ** at **521**)

FAULTMETER Offsets:

	OWP	ML	IWP
(M)	0.76	1.83	2.90
(ft)	2.5	6.0	9.5

Sta:	441	459	478	491	503	521

COMMENTS
-- use "18SAMOB" versus "MOBILE"
-- Tri-way Inn (219-474-5141) in Kentland, IN at Highways 41, 24, and 52.
-- Snapring at Sta.4+91 ILE moving from pavement distress
-- MRC 1, 2, and 3 sensors failed.
-- **Eastern Time, but area does not observe DST!**

Appendix D - Instrument and Equipment Evaluation Plots

- MRC Sensor Profiles (figure D-1)
- TDR Traces (figures D-2 and D-3)

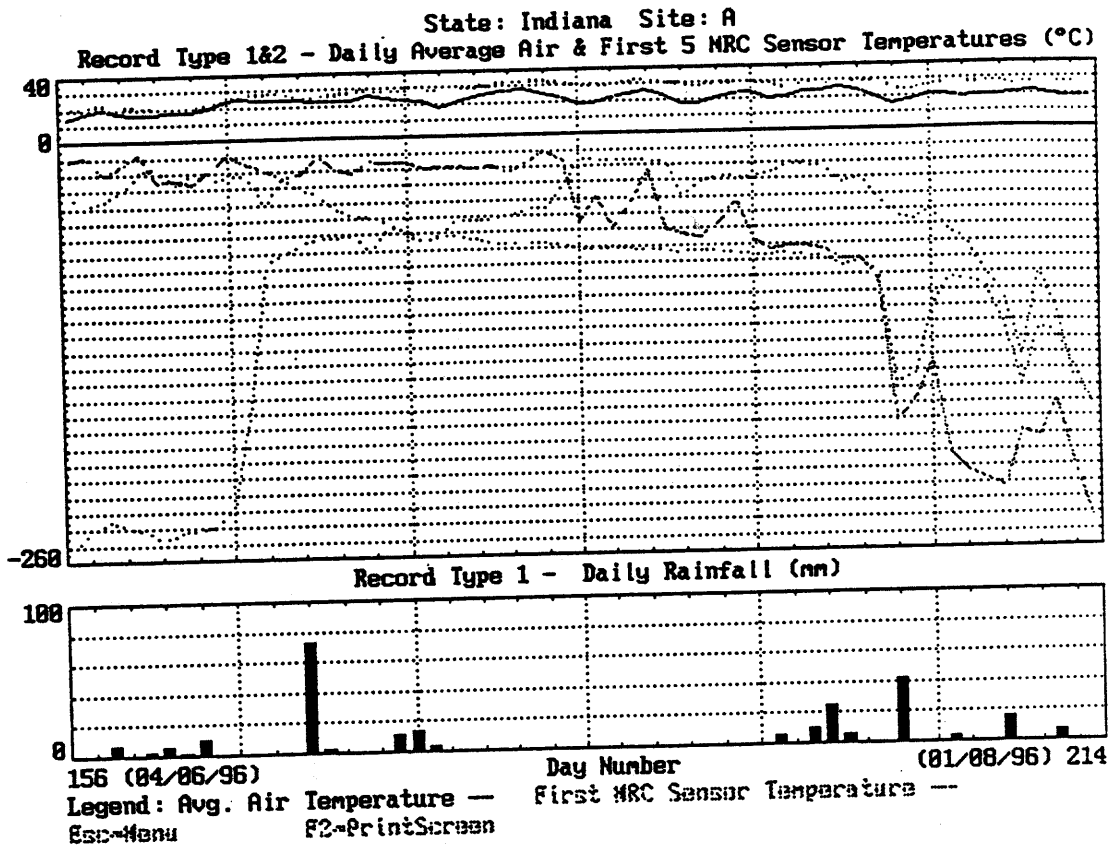


Figure D-1. Profiles for the first 5 MRC sensors for test section 18SA for the period of June 4, 1996 to August 1, 1996.

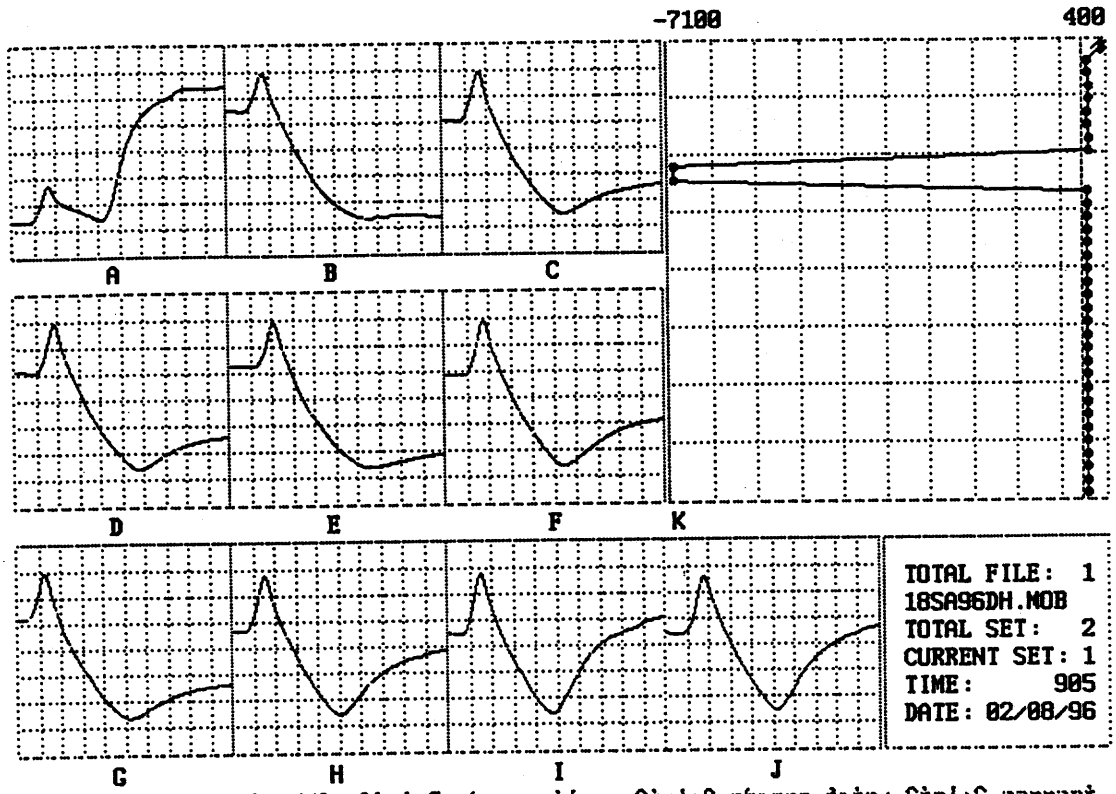


Figure D-2. TDR traces for section 18SA recorded at 9:05a.m. on August 2, 1996.

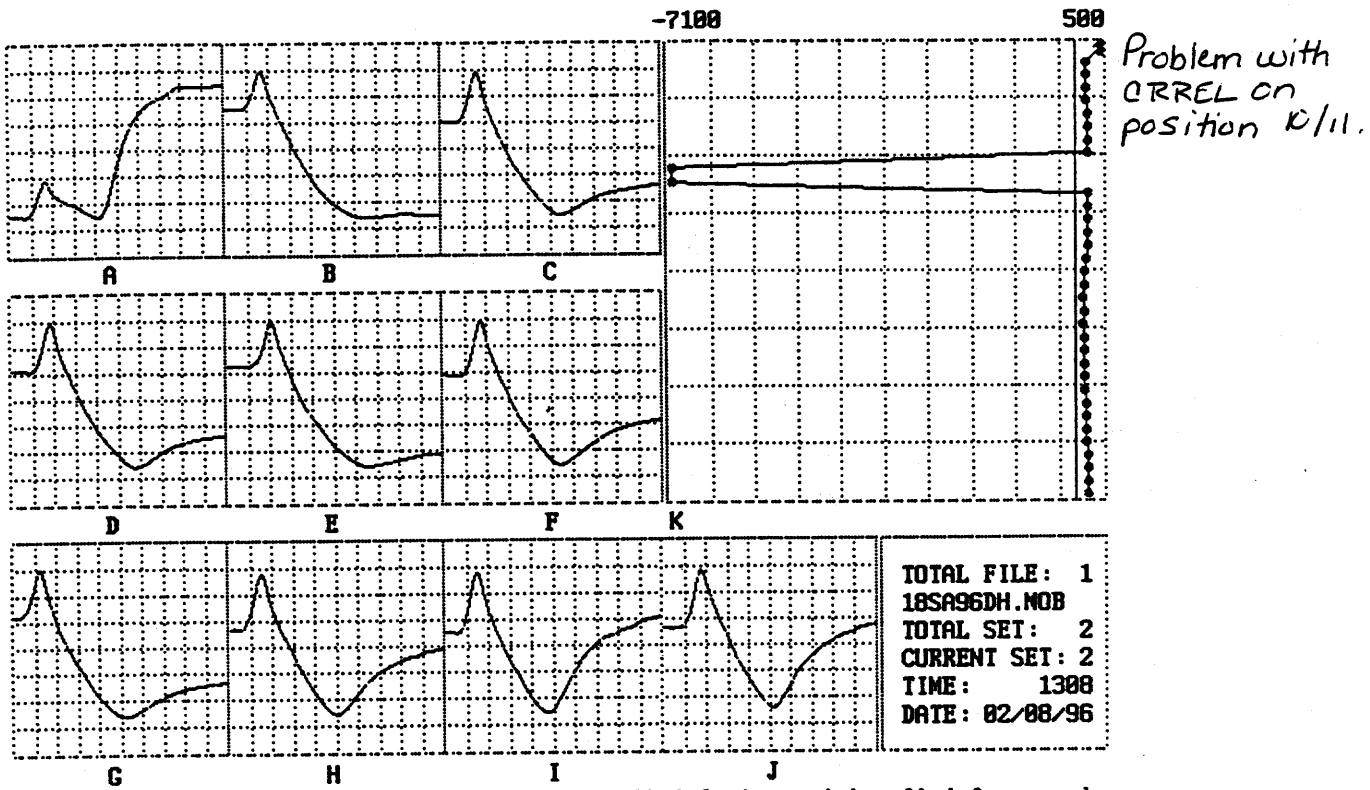
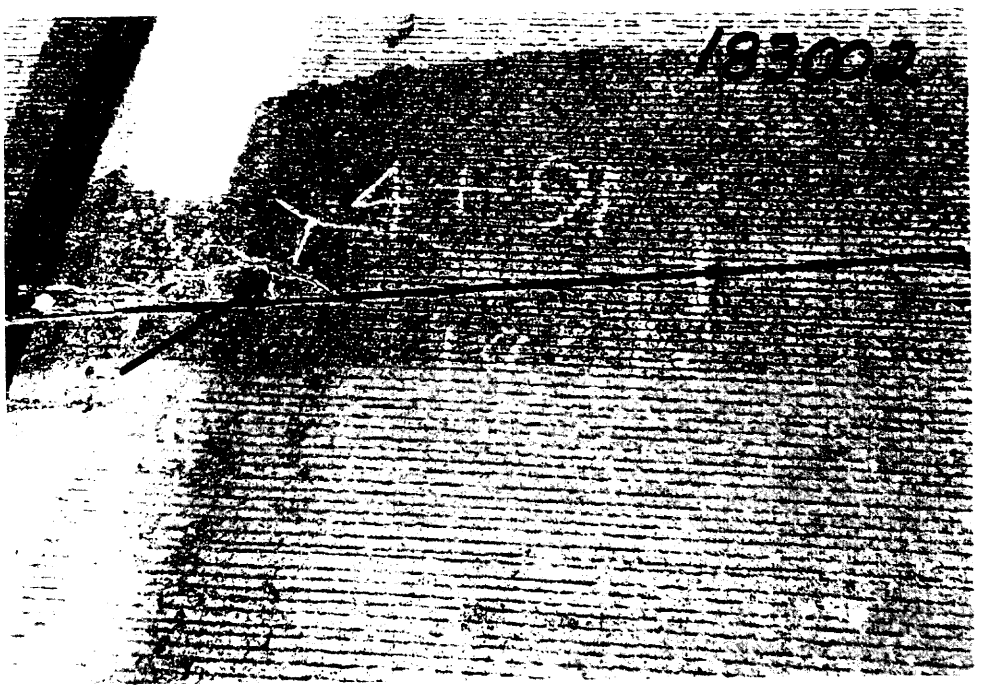


Figure D-3. TDR traces for test section 18SA recorded at 1:08p.m. on August 2, 1996.

Appendix E - Photographs

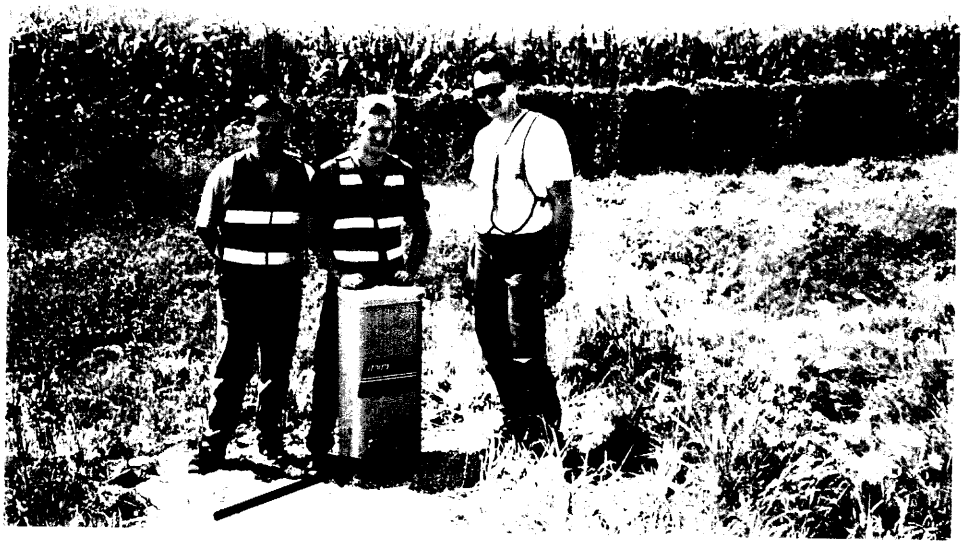


Photograph #1

Photograph # 2

Photograph # 3

183002



Photograph # 4

Photograph #5 ⇒

⇐ Photograph # 6