LTPP Seasonal Monitoring Program

Site Installation Report for GPS Section 310114 (31A) Hebron, Nebraska

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Report No. FHWA- February 1996

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Site Installation Report for SPS Section 310114 (31A) Hebron, Nebraska

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Report No. FHWA-

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Prepared for

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6300 Georgetown Pike
McLean, Virginia 22101-2296

February 1996

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA-		

4. Title and Subtitle	5. Report Date
LTPP Seasonal Monitoring Program Site Installation Report for SPS Section 310114 (31A) Hebron, Nebraska	February 1996
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Robert J. Van Sambeek and Ronald R. Urbach	DBNX92700-B6-31A

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Braun Intertec Corporation 6875 Washington Avenue South, P.O. Box 39108 Minneapolis, Minnesota 55439-0108	11. Contract or Grant No. DTFH61-92-C-00009

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Federal Highway Administration LTPP-Division, HNR-40 Turner-Fairbanks Highway Research Center 6300 Georgetown Pike McLean, Virginia 22101-2296	Final Report August 1995 - January 1996
	14. Sponsoring Agency Code

15. Supplementary Notes
Contracting Officer's Technical Representative - Aramis Lopez, HNR-40

16. Abstract

This report contains instrumentation installation details and data collection summaries for SPS test section 310114, which is a core section in the LTPP Seasonal Monitoring Program. This asphalt concrete pavement section on U.S. Highway 81 south of Hebron, Nebraska was instrumented August 7, 1995. Instrumentation included time domain reflectometry (TDR) probes to estimate moisture content in unbound pavement layers, thermistor probes to measure pavement structure thermal gradients and air temperature, electrical resistivity probe to predict frost/thaw conditions, piezometer to measure water table depth below the pavement surface, and tipping-bucket rain gauge to measure precipitation.

Monitoring data was collected the day after instrument installation and roughly on a monthly basis from August 1995 to January 1996, and data collection is expected to continue through July 1996 to complete the current monitoring cycle. In addition to temperature and precipitation data that are collected continuously by a datalogger at the site, monitoring data each month usually includes Falling Weight Deflectometer data, TDR probe readings, frost/thaw readings, and piezometer readings. On a less regular basis, longitudinal profile data, pavement surface elevation data, and manual distress data are collected as required by FHWA guidelines. A summary of data collected is included in the report.

17. Key Words	18. Distribution Statement
Long Term Pavement Performance, LTPP, Pavement Instrumentation, Seasonal Monitoring Program, SMP, Time Domain Reflectometry, TDR, Resistance, Frost, Thaw, Temperature, Thermistor, Water Table, Piezometer, Falling Weight Deflectometer, FWD	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price

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LTPP Seasonal Monitoring Program
Site Installation Report for SPS Section 310114 (31A)
Hebron, Nebraska

I. Introduction

This report contains information specific to instrument installation and monitoring data collection for the Long Term Pavement Performance (LTPP) Special Pavement Study (SPS) section 310114, which is part of the core Seasonal Monitoring Program (SMP) under the Federal Highway Administration (FHWA) LTPP Division. This pavement section was instrumented on August 7, 1995, and will have regular data collection through July 1996. The section will be monitored every other year under the LTPP Study for a ten-year period or until it is removed from the study.

A. Test Site Location

SPS section 310114 is located 13 kilometers south of Hebron, Nebraska on the southbound driving lane of U.S. Highway 81. This location is just north of the state line in the southeast corner of the state.

B. General Test Section Information

The southbound lanes of this four-lane divided highway were constructed in 1994 and 1995, and include both an SPS-1 and an SPS-9 project. Grading on the fine-grain subgrade was completed in 1994, and the dense-graded base and asphalt concrete surface were completed in 1995. The dense-graded base is 280-mm thick compared to the SPS-1 design target of 305-mm thick, and the asphalt surface is 210-mm thick compared to the SPS-1 design target of 180-mm thick. The highway had only been open to traffic about one week prior to instrumentation installation on August 7, 1995. The SPS-1 sections will carry detour traffic until reconstruction of the northbound lanes is completed in the spring of 1996. Additional background information about the section is located in Appendix A-1. This information includes, but is not limited to, the following items:

- SMP location map;
- Detailed section location map;
- Draft IMS L05B table - SPS Laboratory Testing Data Sheet; and
- SPS-1 Nomination and Information Form.

Relevant pre-installation monitoring data for the section located in Appendix A-2 includes the following:

- Pre-installation pavement distress data;
- Pre-installation FWD data (includes tests outside the section limits); and
- FWDCHECK program uniformity analysis results.

C. SMP Test Section Information

The geographic location and existing pavement structure place this section in Cell 11 of the SMP experiment, which is defined by the following parameters:

- Thick asphaltic concrete pavement (greater than 127-mm thick);
- Fine-grain subgrade;
- Freezing environment; and
- Dry environment.

This was the tenth SMP installation in the LTPP North Central Region, and highlights of the installation are summarized in Section IV of this report. Data forms from the LTPP Seasonal Monitoring Program: Instrumentation and Data Collection Guidelines, April 1994, were used for this installation, and the people involved with the installation are listed on "Data Sheet SMP-I01: List of Installed Instrumentation," which is included in Appendix C-1 along with the other SMP installation forms.

II. Instrumentation Installation

A. Pre-Installation Activities

Mr. George Woolstrum and Mr. Thomas Wais of the Nebraska Department of Roads (Department of Roads or referred to as "the agency" in this report) were initially contacted regarding potential sections identified for the seasonal monitoring pilot activities started in 1991 under the Strategic Highway Research Program (SHRP). General Pavement Study (GPS) section 311030 was included in the pilot study, and falling weight deflectometer (FWD) data was collected on that site from the fall of 1991 through the spring of 1992 on roughly a monthly basis as weather permitted. Data analysis results from the SHRP SMP pilot were published in Transportation Research Record Number 940903.

In 1993, Mr. Woolstrum was contacted to confirm continued agency support for GPS section 311030 as a core section in the SMP study administered by the FHWA LTPP Division. In addition, SPS section 310114, and GPS sections 313018 and 313023 were identified as potential core sections. The agency was willing to support two sections, and SPS section 310114 and GPS section 313018 were selected. The agency agreed to defer any pavement rehabilitation at least the five years required to get three years of monitoring data that is collected every other year. The agency could not guarantee deferred rehabilitation for the asphalt surface placed in 1982 on GPS section 311030, which had been in the SHRP SMP pilot testing. Also, manual distress data for GPS section 313023 includes map cracking on the concrete pavement surface which made GPS section 313018 a better choice.

SPS section 310114 was under construction in 1995, and Regional Coordination Office (RCO) staff worked with the agency to install rigid PVC conduits for SMP use at Station 0-10 and Station 5+15. The conduits were buried about 70 mm below the top of the granular base prior to asphalt surface placement. The conduits were installed to eliminate the conduit trench and associated pavement repairs usually required to bury instrumentation wires from the driving lane to beyond the shoulder. Only one of the two conduits would be used based on the end of the section selected for SMP monitoring.

On July 20, 1995, a pre-installation meeting was held in Lincoln, Nebraska for agency staff involved with instrumentation installation and monitoring activities for both SPS section 310114 and GPS section 313018. A presentation was given on the SMP, arrangements were made for the agency to supply equipment and materials required for the installation, and installation dates were set for agency staff to verify availability of equipment and materials. The agenda, list of participants, and notes from the pre-installation meeting are included in Appendix B-1.

The day after the pre-installation meeting, RCO staff stopped at SPS section 310114 to identify any installation concerns with the site and to select which end of the section to monitor. Field notes from the site visit are included in Appendix B-1. Also, pre-installation monitoring activities for SPS section 310114 included FWD testing on July 21, 1995 and a manual distress survey completed on August 1, 1995.

At the RCO, pre-installation activities included performing instrumentation checks/calibrations, and incorporating improvements to the installation process based on previous installations done in 1993 and 1994. Recommended improvements to the installation process resulting from instrumentation of

SPS section 310114 are listed in Section IV of this report, and results from instrumentation checks/calibration are included in Appendix B-2 using the following forms:

- Data Sheet SMP-C01: TDR Probe Check;
- Data Sheet SMP-C02: Thermistor and Air Temperature Probe Check;
- Data Sheet SMP-C03: Electrical Resistivity Probe Check;
- Data Sheet SMP-C04: Function Generator, Multi-meter, and Switch Box Checks; and
- Data Sheet SMP-C05: Tipping-Bucket Rain Gauge Calibration.

For the air temperature and thermistor probes, checks were done using the datalogger to monitor the 19 temperature readings for the two probes simultaneously for tests run in an environmental chamber for about 12 hours at both 1.7°C and 37.9°C. The probes were left connected to the datalogger for several days after the check to verify their continued operation and consistency among the 19 temperatures recorded. The tipping-bucket rain gauge was also calibrated during this time period with data stored on the datalogger.

For the resistivity probe, loose electrode wraps were tightened by twisting the lead with a needle-nose pliers, and lead wires sticking out of the potting material for the probe were covered with silicon sealant for protection during installation. Excess potting material was scraped off the electrodes for better contact with the soil.

Pre-installation activities also required selection of the instrumentation location for the section. As previously discussed, two conduits had been installed during construction of the section, but only one conduit would be used for SMP instrumentation installation. Pavement distress data from August 6, 1995 and FWDCHECK program analysis for FWD testing done July 21, 1995 were used to select Station 0-20 to Station 2+00 for monitoring with instrumentation to be placed at Station 0-10. No pavement distress was identified on the two-week-old surface. However, the subgrade elastic modulus results from FWDCHECK at Station 0-10 were more representative of the adjacent monitoring section. Also, this end of the section avoided concerns with a culvert under the highway at Station 4+65.

B. Installation Activities

The SMP instrumentation installation itinerary for Nebraska included travel, installation, and data collection time for two sites over a one-week period. On August 6, 1995, RCO staff traveled to Hebron, Nebraska, and instrumentation installation was completed at SPS section 310114 on August 7, 1995. Some final installation activities continued on the following day. The following installation forms are included in Appendix C-1 along with field notes and photographs of the installation:

- Data Sheet SMP-I01: List of Installed Instrumentation;
- Data Sheet SMP-I02: Instrumentation Locations;
- Data Sheet SMP-I03: Log of Piezometer Hole;
- Data Sheet SMP-I04: Log of Instrumentation Hole;
- Data Sheet SMP-I05: Field Gravimetric Moisture Contents;
- Data Sheet SMP-I05(A): Lab Gravimetric Moisture Contents;
- Data Sheet SMP-I05(B): Gravimetric Moisture Comparison;
- Data Sheet SMP-I06: TDR Moisture Content; and

- Data Sheet SMP-I07: Representative Dry Density.

Piezometer installation was done according to protocol. A 0.6-m long access tube was set in concrete just below the estimated finished grade for the shoulder material to protect the top of the piezometer and provide easy access for measurements. A 3.0-m long grease sleeve was used on this piezometer to isolate the piezometer from frost heave. The grease sleeve extends about 0.2 m up into the access tube with the space between the two filled with sand. Additional piezometer installation notes are included in Appendix C-1.

The rigid PVC conduit installed during construction of the section was marked on the shoulder. RCO staff dug out the conduit on the shoulder to verify the location, and a 460-mm square for the instrumentation hole was marked on the pavement surface at Station 0-10 using the pavement edge stripe as a reference. FWD testing was done on the SMP portion of the section from Station 0-20 to Station 2+00 including a test over the instrumentation hole.

The block was sawed after the FWD testing over the instrumentation hole was done, and after several attempts, the block was lifted out using expansion anchors tapped into the pavement and two hooks slipped under the block through the saw cuts. Expansion anchors did not work very well in the soft asphalt. The agency had elected to epoxy the block back into the pavement surface later in the day. Therefore, the block was washed off and laid upside down on the flat shoulder to prevent physical distortion of the block, which was soft from the high air temperatures and the asphalt being less than two weeks old.

The base material, which was very wet from water used to saw the pavement, was manually removed from the instrumentation hole to expose the rigid PVC conduit installed in the base material. About 100 mm of the conduit projecting into the hole was cut off, and the conduit was capped while the drill rig was used to remove subgrade soil from the hole in 0.15-m lifts. All materials removed from the hole were placed in sealed pails. After materials were removed from the instrumentation hole, the signal leads and a 7.6-m long flexible conduit were pulled through the rigid PVC conduit.

Sensors were placed in the instrumentation hole according to protocol, except as follows for TDR probes 1 and 2. TDR probe 1 was placed mid-depth in the base layer, and TDR probe 2 was placed at the bottom of the base layer. A hole was dug into the base material to place the printed circuit board (PCB) for TDR probe 1 about even with the edge of the hole cut in the pavement surface. This was done to allow more aggressive compaction of the base material without excessive risk of damage to TDR probe 1. Also, the PCB for TDR probe 1 was placed with the cable towards the pavement because it would have been difficult to dig the PCB into the base material containing a high percentage of larger aggregate.

For installation reports from the LTPP North Central RCO, "Data Sheet SMP-I05(A): Lab Gravimetric Moisture Contents," is used to report agency laboratory moisture results. Also, "Data Sheet SMP-I05(B): Gravimetric Moisture Comparison" was created to summarize moisture data obtained from field moisture tests, laboratory moisture tests, and interpretation of TDR probe data. These forms, along with a plot of the moisture results, are included in Appendix C-1, and the following assumptions and conclusions were made regarding the moisture data:

- LTPP Directive Number: SM-13 "TDR Trace Interpretation Method for Calibration and Function Checks" dated August 17, 1995 was used to interpret the apparent

length of each TDR trace obtained during installation for estimating moisture results. This method was specified for "calibration and function checks," but no other method had been distributed by FHWA LTPP staff. The interpreted apparent lengths are reported on "Data Sheet SMP-I06: TDR Moisture Content" in Appendix C-1.

- Equations on pages II-2 and II-5 of the LTPP Seasonal Monitoring Program: Instrumentation Installation and Data Collection Guidelines, April 1994 were used to convert apparent lengths to gravimetric moisture estimates for the base and subgrade materials, and the results are included on "Data Sheet SMP-I05(B): Gravimetric Moisture Comparison," located in Appendix C-1. A plot comparing the TDR probe moisture data to the field and laboratory data is also included in Appendix C-1.

- The field moisture results averaged 1.4 percentage points greater than the laboratory moisture results, but the difference was fairly consistent.

- The moisture estimates from TDR probes 1 and 2 in the base averaged 8.0 percent, which is 4.2 percentage points higher than the average obtained between the field and laboratory data.

- The moisture estimates from TDR probes 3 through 8 in the upper part of the subgrade are questionable because of flat traces caused by soil characteristics, typically dissolved salts, that electrically short circuit the probe. The second inflection points on these probe traces were placed where the trace went flat, and moistures were calculated to compare with field and laboratory results. As seen on the plot included in Appendix C-1, these TDR probe data, especially for TDR probes 5, 6, and 8, are not consistent with others in the subgrade when compared to the field and laboratory results.

- The moisture estimates from TDR probes 9 and 10 in the lower part of the subgrade are significantly higher than results from the field and laboratory tests. For these TDR probes, moisture estimates average 12.3 percentage points higher than the average between the field and laboratory moisture results.

- Answers to the following questions could help explain the differences seen in the moisture data, but they are beyond the scope of this report:

    1. Are the same equations appropriate for all materials on this site?

    2. Do estimates of dry density for the subgrade used to convert from volumetric to gravimetric moisture seem reasonable given the consistently higher moisture values from the TDR probes compared to the field and laboratory results, especially for TDR probe 2 at the interface between the base and subgrade?

    3. Does removing the large aggregate from the base material to prevent damage to the TDR probes significantly affect the data from the probes compared to the field and laboratory data?

    4. How much influence does compaction have on the results?

"Data Sheet SMP-I07: Representative Dry Density" was used to record test data obtained during the installation to estimate the dry density of the subgrade, and the form is included in Appendix C-1. The agency performed density tests as part of construction testing for the SPS-1 project, but this data were not available for comparison at the time of this report.

Several items were changed regarding installation of the datalogger cabinet and weather pole as follows:

- RCO staff were not able to get the 9.1-m offset from the lane edge specified on page II-23 and Figure II-12 of the LTPP Seasonal Monitoring Program: Instrumentation Installation and Data Collection Guidelines, April 1994 because the TDR cables provided were too short. The cabinet at this site is offset about 7.5 m and the weather pole is offset about 8.0 m. This places the obstructions inside the normal 9.15-m safety zone for highways. However, FHWA LTPP Division staff approved the two obstructions as break-away objects (page II-32 of manual) for placement inside the safety zone.

- The bottom of the front panel on the datalogger cabinet was notched about 0.1 m so the conduit buried about 0.3 m below the shoulder was easier to get into the cabinet, and it also slightly increased the distance the cabinet could be placed from the roadway.

- The conduit for the air temperature probe and tipping-bucket rain gauge signal wires was cut into the back of the cabinet above ground instead of running the conduit underground as shown in the guidelines. If the cables were run underground, the air temperature probe signal cable would have to be extended using special wire and resistors to compensate for increased lead resistance. Also, a union coupler was used on the weather pole about 0.3 m above ground to make pole installation easier.

For pavement repairs, handling of the block was kept to a minimum because it was very fragile from air temperatures over 30°C. Two supports were used on the bottom of the block with wires extending up the sides of the block to lift the block without it breaking in half. The base material was left slightly higher than the original, and the asphalt block was placed in the hole. The block was too high, and it was removed to allow one adjustment to the base material. The block was put back in the hole, and it was still about 12 mm above the adjacent pavement surface. RCO and agency staff anticipated that the coarse texture on the bottom of the block would allow the block to settle if driven over by a loaded truck, and the block was left in the hole. Also, very warm temperatures were predicted for the next few days, and traffic loadings were expected to cause some compaction of the disturbed asphalt.

About three liters of W.R. Meadows "REZI-WELD 1000" multi-purpose construction epoxy was poured into the saw cuts around the block before a loaded truck was used to seat the block into the base material. The block remained about 5.0 mm higher than the adjacent pavement surface. Additional epoxy was use to fill the saw cuts flush with the pavement surface to bond the pavement thermistor probe and asphalt block in place. This medium-viscosity epoxy had a 45-minute pot life at room temperature, and it had been stored in a cooler to provide sufficient time to continue adding material to the saw cuts as the epoxy settled. The epoxy was allowed to set up while other installation activities were completed.

On the following day, the pavement repairs looked good with the block only slightly higher than the adjacent pavement surface. RCO staff decided not to seal the top of the saw cuts with Dow Corning 890-SL crack sealant until a later date when part of the epoxy could be ground out to create the minimum reservoir depth for the sealant as recommended by the manufacturer.

Additional observations about the pavement repair at the instrumentation hole up to the completion of this installation report include observation of hairline cracks that have formed near the saw cuts. See photograph in Appendix D-2.

III. SMP Data Collection

A. Initial SMP Data Collection

On August 8, 1995, final wiring of the datalogger in the cabinet was completed, test locations were marked on the pavement using the edge stripe as a reference, PK nails were placed at offsets -0.16 m and 3.81 m, and the first set of SMP data was collected.

Three cycles of FWD data were collected, as well as manual data including resistivity probe data, elevation data, and piezometer data. The manual data are included in Appendix D-1 as follows:

- One set of contact resistance data;
- One set of four-point resistivity data;
- One ground water table measurement; and
- One set of elevation data including shots on the DOT benchmark.

Data from the piezometer should not be entered into the IMS database because low permeability for the soils on this site will require several days for piezometer readings to stabilize. Also, on this day, the agency brought out a maintainer to bring the shoulder and ditch elevation up to final grade around the piezometer and datalogger cabinet to limit additional work in these areas by the grading contractor on the project.

Computer data files obtained from automated data collection using the dataloggers included the following:

- Three sets of TDR traces and CRREL voltages; and
- Temperature and precipitation data collected from the datalogger to verify operation overnight.

The first set of TDR traces was collected with default cable lengths in the software program, and this data were used to establish the maximum cable lengths to use in the software that would still capture the first inflection point for the probes. The maximum length was used because TDR probes 3 through 8 have very flat or nearly flat traces out the end of the probe, which produces long apparent lengths for these probes.

Temperature data from the thermistor probe should not be entered into the IMS database because of heat given off by epoxy used to repair the pavement and disturbance of material around the probe. In addition, temperature data up to several days after instrument installation will have to be reviewed to determine when the disturbed materials came back to thermal equilibrium. Data affected by the installation will have to be edited from the computer files.

B. Routine SMP Data Collection

Routine data collection done on the site from August 8, 1995 through January 23, 1996, is summarized on LTPP's standard data tracking log included in Appendix D-2. Data collection is expected to continue through July 1996 to complete the current monitoring loop.

Events that influenced the data collection and that will influence data interpretation for the site include the following:

- A hexagonal-shaped nut, measuring about 12 mm in diameter, was accidentally dropped inside the piezometer pipe. RCO staff will have to verify water depth readings because the tape measure extended to the bottom of the pipe will probably rest on top of the nut at least most of the time.

- Detour traffic for the northbound traffic will continue to use the southbound passing lane of the divided highway until the spring of 1996. This may limit FWD testing as the agency will not be able to provide extended lane closures.

- Unstable manual resistivity probe readings were noted for data collected January 23, 1996. For the range of values observed for each test position, the average value will be entered into the database.

- The following TDR probe data are probably not useable because the traces are flat: TDR probes 3 through 8 collected in August and September 1995, TDR probes 4 through 8 collected in October 1995, and TDR probe 8 collected in November 1995. On August 7, 1995, a manual trace for TDR probe 7 with the horizontal scale set to 0.5 m per division was collected to confirm the flat trace for the soil, and the trace is included in Appendix C-1.

Instrumentation and equipment problems at the site include the following:

- Intermittent failure of the datalogger channel for the air temperature probe is identified on the screen prints of temperature data in Appendix D-2. Datalogger serial number 16528 was replaced with serial number 16548 on October 17, 1995. No additional problems have been observed for air temperature readings.

- Cold temperatures during data collection with the cable reader caused vertical shifts or spikes in some TDR traces. Screen prints in Appendix D-2 of data from January 23, 1996 show spikes in TDR probes 8, 9, and 10 traces.

- TDR probes 3 through 8 generally have flat traces.

Other problems experienced at the site include failures with switch boxes used to collect manual resistance/resistivity data and failures of the CRREL multiplexer for automated resistance data collection. Print screens showing the failure modes for the CRREL multiplexer are included in Appendix D-2.

IV. Summary, Conclusions, and Recommendations

A. Instrumentation Installation Highlights

The following items are identified by the authors as unique or particular items of interest regarding this section in the SMP.

- This was the tenth SMP installation in the LTPP North Central Region, and SPS section 310114 was one of the two Nebraska sites installed in 1995.
- This was the first SMP installation on an SPS-1 project in the North Central RCO, and data collected will help correlate pavement performance to site specific environmental conditions.
- Monthly FWD data will be available to document post construction changes in deflection response starting one week after surface placement up to about one year after surface placement on this new section of highway.
- In 1996, an automated weather station (AWS) will be installed at the SPS-1 project. The AWS will collect additional data not recorded by SMP instrumentation. These data include solar radiation, wind speed, wind direction, and relative humidity. In addition, the AWS uses a heated tipping-bucket rain gauge to monitor precipitation under all conditions, while SMP instrumentation can only accurately record liquid precipitation amounts and intensity.

B. Recommendations for Improving Installations

In addition to previous modifications from other installations, the following procedure and equipment changes from protocol were used during this installation or are recommended for future installations:

- For this installation, a 75-mm diameter conduit was installed in the base layer prior to surface placement which eliminated the trench usually required to get sensor cables to the cabinet in the ditch. This procedure should be considered for any SMP sites identified prior to surface placement to limit pavement repairs required for SMP instrumentation installation.
- For all 1995 installations in the North Central Region, the air temperature and thermistor probe checks were done in an environmental chamber at temperatures of about 1.0°C and 38.0°C. The probes were left connected to the datalogger for about 12 hours at each temperature, and the consistency among the 19 temperature readings was considerably better than results obtained in 1993 and 1994 using an ice bath and hot water bath for the two temperature checks. With data recorded starting from room temperature in the chamber, the lag time for different thermistors to stabilize was observed, especially for thermistor 4 at the top of the probe. Documentation of this lag time may help explain temperature differences observed in the field data between the individual thermistors.

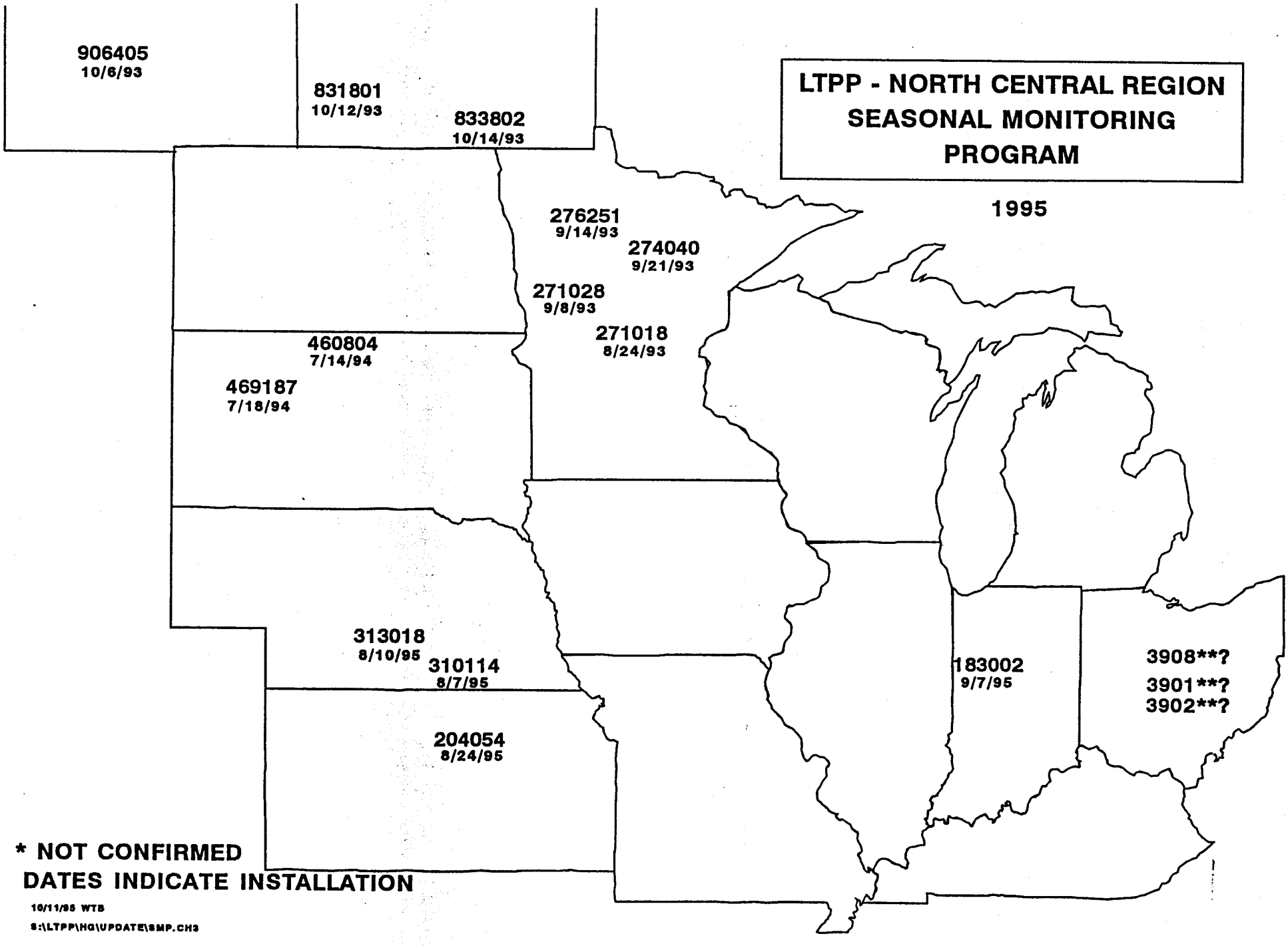
- For this installation, the saw cut for the pavement thermistor probe was not widened. Instead, a 12-mm diameter hole was drilled through the saw cut at the appropriate angle for placing the pavement thermistor probe. The normal saw cut was wide enough for the teflon signal wire for the probe, and the probe was inserted into the 12-mm diameter hole from the pavement surface instead of inserting it from the bottom of the pavement, which would have required the base material be dug out. Because the saw cut width is kept to a minimum, disturbance of thermal characteristics of pavement around the pavement thermistor probe is also kept to a minimum.

- For all installations in 1995 on fine-grain subgrades, the end of the conduit in the instrumentation hole was sealed with plumber's putty to prevent the conduit from acting as a drain tile for any water moved by gravity through the pavement structure.

Appendix A-1: Test Section Background Information

Appendix A-1 contains the following test section background information:

- SMP location map;
- Detailed section location map;
- SPS-1 Nomination and Information Form; and
- Draft IMS L05B tables - SPS Laboratory Testing Data Sheet.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3908**?
3901**?
3902**?
* NOT CONFIRMED
DATES INDICATE INSTALLATION
10/11/95 WTB
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310124
7" AC,
12" ATB/4" PATB
DRAINS
10484+00-10489+00

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DRAINS
104477+50-10482+50

ck. location of end

310114
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12" DGAB
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SMP

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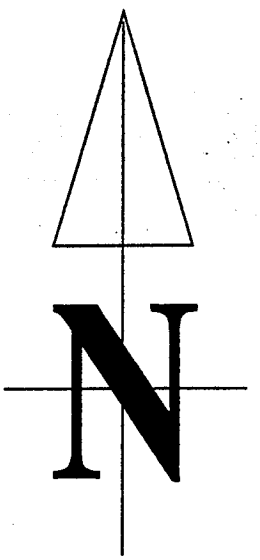

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NOT TO SCALE

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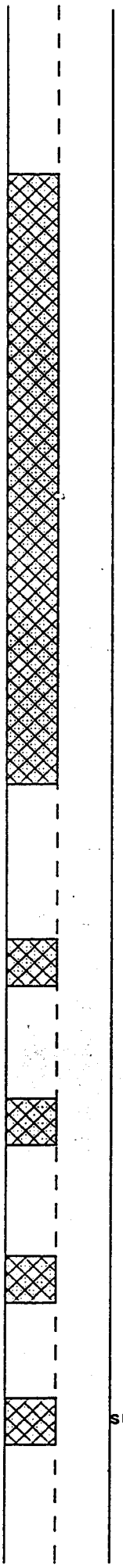
SPS-9
THAYER COUNTY, NE
US-81 SOUTHBOUND

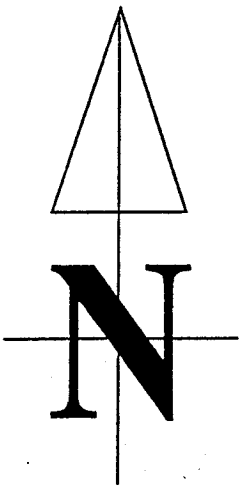
UPDATED 06/7/95

SPS-1 SECTIONS

10489+00-408+50

(EQUATION: 10426+18.11 BK = 430+10.43 AH)





310901
STATE CONTROL
7" AC, 12" GB
402+50-407+50

310904
SMA
7" AC, 12" GB
396+15-401+15

310902
SUPERPAVE
7" AC, 12" GB
388+80-393+80

310903
SUPERPAVE+2 GRADES
7" AC, 12" GB
381+25-386+25

NOT TO SCALE

S:\LTPP\NG\SPS\SPS9_NE

NATIONAL RESEARCH COUNCIL

STRATEGIC HIGHWAY RESEARCH PROGRAM

North Central Region, 1983 Sloan Place, Suite 10, St. Paul, MN 55117, Tel: (612) 776-2210 Fax: (612) 776-7201

RICHARD C. INGBERG
Regional Engineer

Date: March 31, 1993

Memo To: Monte Symons, LTPP

From: Dick Ingberg, Regional Engineer

Re: SPS-1 Nomination
SB US-81 in Thayer County, Nebraska

Attached is the completed nomination for an SPS-1 experiment to be constructed on southbound US-81 in Thayer County, Nebraska. This project includes the removal of an existing two-lane concrete pavement and construction of a new four-lane divided asphalt pavement.

We have reviewed the attached nomination and all requirements appear to be met. We recommend that this project be accepted into the LTPP program.

Encl:

cc: Gene Skok, Braun Intertec
Ann Johnson, Braun Intertec
George Woolstrum, Nebraska Dept. of Roads (w/o enclosure)
John Miller, PCS Law

STATE OF NEBRASKA

DEPARTMENT OF ROADS
Allan L. Abbott, *Director-State Engineer*
500 Nebraska Hwy 2
) Box 94759
.incoln NE 68509-4759
hone (402) 471-4567
AX (402) 479-4325

March 8, 1993

E. Benjamin Nelson
Governor

Gene Skok
Braun Intertec Pavement Inc
1983 Sloan Place
St Paul MN 55117-2004

RE: SPS-1

Dear Gene:

These are the nomination forms for the SPS-1 project which we discussed. This project is still being designed so there will probably be some changes before things are finaled.

George Woolstrum

George Woolstrum
Speical Projects Engineer

GW/bb

cc: T. Wais
R. Ingberg

SHEET A. SPS-1 CANDIDATE PROJECT NOMINATION AND INFORMATION FORM

STATE Nebraska SHRP SECTION NO _____

GENERAL PROJECT INFORMATION

PROJECT LOCATION

ROUTE NUMBER 81

ROUTE SIGNING [ ] Interstate [X] U.S. [ ] State [ ] County ~ 70 miles South of I-80

Other _____

PROJECT LOCATION Start Milepost 2.48 End Milepost 4.07

Start Station 408+00 End Station 490+00

DIRECTION OF TRAVEL [ ] North B. [X] South B. [ ] West B. [ ] East B.

PROJECT LOCATION DESCRIPTION Highway US-81, 1.47 miles north of the jct. with highway Nebr-8 in the south bound lanes.

COUNTY Thayer

HIGHWAY AGENCY DISTRICT NUMBER 4

SHRP ENVIRONMENTAL ZONE

[ ] WET FREEZE [ ] WET NO-FREEZE [X] DRY FREEZE [ ] DRY NO-FREEZE

SIGNIFICANT DATES

fine grain

LATEST DATE OF APPROVAL NOTIFICATION FROM SHRP May 1993

CONTRACT LETTING DATE Febr. 1994

ESTIMATED CONSTRUCTION START DATE June 1994

ESTIMATED DATE TEST SECTIONS OPENED TO TRAFFIC Oct. 1994 ?

ESTIMATED CONSTRUCTION COMPLETION DATE Oct. 1994

PROJECT DESCRIPTION

PROJECT TYPE [ ] New Route [ ] Removal and Reconstruction [X] Parallel Roadway

Other _____

FACILITY [X] Divided [ ] Undivided NUMBER OF LANES (One Way) _____

DESIGN TRAFFIC DATA

ANNUAL AVERAGE DAILY TRAFFIC (TWO DIRECTIONS) 4725 *

% HEAVY TRUCKS AND COMBINATIONS (OF AADT) 26

ESTIMATED 18K ESAL RATE IN STUDY LANE (1,000 ESAL/YR) 119

TOTAL DESIGN 18K ESAL APPLICATIONS IN DESIGN LANE 2.4×10^6

DESIGN PERIOD (Years) 20

SHEET B. SPS-1 CANDIDATE PROJECT NOMINATION AND INFORMATION FORM

STATE Nebraska SHRP SECTION NO _____

AGENCY'S PAVEMENT STRUCTURE DESIGN FOR SITE SILTY CLAY FINE

LAYER[1] NO.	LAYER[2] DESCRIPTION CODE	MATERIAL TYPE[3] CLASS CODE	THICKNESS[4] (INCHES)	STRUCTURAL[5] COEFFICIENT
1	SUBGRADE (7)	53	—	—
2	11	53	40.0±	0.02
3	05	23	4.0	0.14
4	03	04	9.0	0.NA
5				0.
6				0.
7				0.
8				0.
9				0.

STRUCTURAL DESIGN METHOD [ ] 1972 AASHTO [X] 1986 AASHTO [ ] Modified AASHTO

Other _____

AASHTO DESIGN RELIABILITY FACTORS R% 80 S_o 0.35

OUTSIDE SHOULDER TYPE

[ ] Turf [ ] Granular [ ] Asphalt Concrete [ ] Surface Treatment

[X] PCC [ ] Curb and Gutter Other _____

OUTSIDE SHOULDER WIDTH (Feet) 8

SUBSURFACE EDGE DRAINS [ ] Yes [X] No

NOTES

1. Layer 1 is the natural occurring subgrade soil. The pavement surface will have the largest assigned layer number.

2. Layer description codes:

Surface Layer	03	Base Layer	05	Subgrade	07
Subsurface HMAC ..	04	Subbase Layer	06	Embankment (Fill)	11

3. Refer to Tables 1 through 4 for material class codes.

4. If subgrade depth to a rigid layer is known, enter this depth for subgrade thickness, otherwise leave subgrade layer thickness blank.

5. Enter AASHTO structural layer coefficient value, as appropriately modified, used in pavement design or typical coefficient used by agency for this material. For the subgrade, enter either AASHTO soil support value or resilient modulus value (psi) used in design.

SHEET C. SPS-1 CANDIDATE PROJECT NOMINATION AND INFORMATION FORM

STATE Nebraska SHRP SECTION NO _____

TEST SECTION LAYOUT

NUMBER OF TEST SECTIONS ENTIRELY ON: FILL 12 CUT _____

SHORTEST TRANSITION BETWEEN CONSECUTIVE TEST SECTIONS (Feet) 182

VERTICAL GRADE (Avg %) (+ upgrade; - downgrade) _____

HORIZONTAL CURVATURE (Degrees) ☒ Tangent _____#

COMMENTS ON DEVIATIONS FROM DESIRED SITE LOCATION CRITERIA

Slopes vary from +1.16% To -1.16%. Most slopes are less than ± 0.5%.

OTHER SHRP TEST SECTIONS

DOES AGENCY DESIGN CONFORM TO GPS-1 OR GPS-2 PROJECT CRITERIA? [ ] YES ☒ NO

DISTANCE TO NEAREST GPS TEST SECTION ON SAME ROUTE (Miles) 165

TEST SECTION NUMBER OF NEAREST GPS SECTION 313033

SUPPLEMENTAL TEST SECTIONS

IF SUPPLEMENTAL EXPERIMENTAL TEST SECTIONS ARE PROPOSED, COMPLETE THE FOLLOWING

TOTAL NUMBER OF SUPPLEMENTAL TEST SECTIONS _____

FACTORS TO BE INVESTIGATED _____

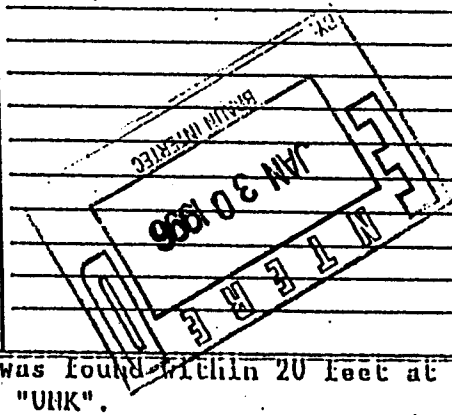
******** ********** SPS LABORA[illegible] TESTING DATA SHEET ********** **********

TPP LABORATORY MATERIAL HANDLING AND TESTING
SUMMARY OF PAVEMENT LAYERS - ANALYSIS
LAB DATA SHEET L05B

SHEET ____ OF ____

TATE CODE 31
ECTION ID 0114
ONSTRUCTION NUMBER 01

1	2	3	4	5	6	7	8
LAYER NUMBER	PROJECT LAYER CODE	LAYER DESCRIPT.	LAYER TYPE	LAYER THICKNESS (INCHES)	MATERIAL CODE	COMMENT CODE	COMMENT NOTE (50 characters or less) (Use an extra sheet IF necessary)
1	A	07	SS	(UNK) ___.Et)*	131		
02	E	05	TB	12.0	322		DESIGN THICKNESS *
03	E	03	AC	7.0	01		DESIGN THICKNESS *
							*WAITING FOR CORE RESULTS / ROD LEVEL



See the shoulder auger probe logs (Form SU5); circle "UNK" IF no refusal was found within 20 feet at the nearest adjacent robe: enter depth to refusal in feet IF found within 20 feet and cross out "UNK".

eneral Remarks _____

HECKED AND APPROVED, DATE _____

HRP REPRESENTATIVE _____
ffiliation _____

Appendix A-2: Pre-Installation Monitoring Data and FWDCHECK Results

Appendix A-2 contains the following pre-installation monitoring data and FWDCHECK analysis results:

- Pre-installation pavement distress data;
- Pre-installation FWD data; and
- FWDCHECK program uniformity analysis results.

Revised December 1, 1992

STATE ASSIGNED ID _ _ _ _

SHEET 1

STATE CODE 31

DISTRESS SURVEY

SHRP SECTION ID 0114

LTPP PROGRAM

DISTRESS SURVEY FOR PAVEMENTS WITH ASPHALT CONCRETE SURFACES

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 08/01/95

SURVEYORS: BJP, _ _ _ _ PHOTOS, VIDEO, OR BOTH WITH SURVEY (P, V, B) _

PAVEMENT SURFACE TEMP - BEFORE _ _ _ _ °C; AFTER _ _ _ _ °C

DISTRESS TYPE	SEVERITY LEVEL: LOW	MODERATE	HIGH
CRACKING			
1. FATIGUE CRACKING (Square Meters)			
2. BLOCK CRACKING (Square Meters)			
3. EDGE CRACKING (Meters)			
4. LONGITUDINAL CRACKING (Meters)			
4a. Wheel Path Length Sealed (Meters)			
4b. Non-Wheel Path Length Sealed (Meters)			
5. REFLECTION CRACKING AT JOINTS Number of Transverse Cracks			
Transverse Cracking (Meters) Length Sealed (Meters)			
Longitudinal Cracking (Meters) Length Sealed (Meters)			
6. TRANSVERSE CRACKING Number of Cracks			
Length (Meters) Length Sealed (Meters)			
PATCHING AND POTHOLES			
7. PATCH/PATCH DETERIORATION (Number)			
(Square Meters)			
8. Potholes (Number)			
(Square Meters)			

Revised December 1, 1992

SHEET 2

DISTRESS SURVEY

LTPP PROGRAM

STATE ASSIGNED ID _ _ _ _

STATE CODE 31

SHRP SECTION ID 0114

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 08/01/95

SURVEYORS: BJP, _ _ _

DISTRESS SURVEY FOR PAVEMENTS WITH ASPHALT CONCRETE SURFACES (CONTINUED)

DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
SURFACE DEFORMATION			
9. RUTTING - REFER TO SHEET 3 FOR SPS-3 OR Form S1 from Dipstick Manual			
10. SHOVING (Number) (Square Meters)			0
SURFACE DEFECTS			
11. BLEEDING (Square Meters)	0	0	
12. POLISHED AGGREGATE (Square Meters)			
13. RAVELING (Square Meters)			
MISCELLANEOUS DISTRESSES			
14. LANE-TO-SHOULDER DROPOFF - REFER TO SHEET 3			
15. WATER BLEEDING AND PUMPING (Number) Length of Affected Pavement (Meters)			
16. OTHER (Describe)			

Revised May 29, 1992

SHEET 3

DISTRESS SURVEY

LTPP PROGRAM

STATE ASSIGNED ID ____

STATE CODE 31

SHRP SECTION ID 0114

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 08/01/95

SURVEYORS: BJP

DISTRESS SURVEY FOR PAVEMENTS WITH ASPHALT CONCRETE SURFACES (CONTINUED)

9. RUTTING - (FOR SPS-3 SITE SURVEYS)

INNER WHEEL PATH			OUTER WHEEL PATH		
Point No.	Point Distance[1] (Meters)	Rut Depth (mm)	Point No.	Point Distance[1] (Meters)	Rut Depth (mm)
1	0.		1	0.	
2	15.25		2	15.25	
3	30.5		3	30.5	
4	45.75		4	45.75	
5	61.		5	61.	
6	76.25		6	76.25	
7	91.5		7	91.5	
8	106.75		8	106.75	
9	122.		9	122.	
10	137.25		10	137.25	
11	152.5		11	152.5	

14. LANE-TO-SHOULDER DROPOFF

Point No.	Point Distance[1] Meters	Lane-to-Shoulder Dropoff (mm)
1	0.	0
2	15.25	
3	30.5	
4	45.75	
5	61.	
6	76.25	
7	91.5	
8	106.75	
9	122.	
10	137.25	
11	152.5	

Note 1: "Point Distance" is the distance in meters from the start of the test section to the point where the measurement was made. The values shown are SI equivalents of the 50 ft spacing used in previous surveys.

DATE	8/1/95
RATER	BJP
TEMP (C)	65 F

1

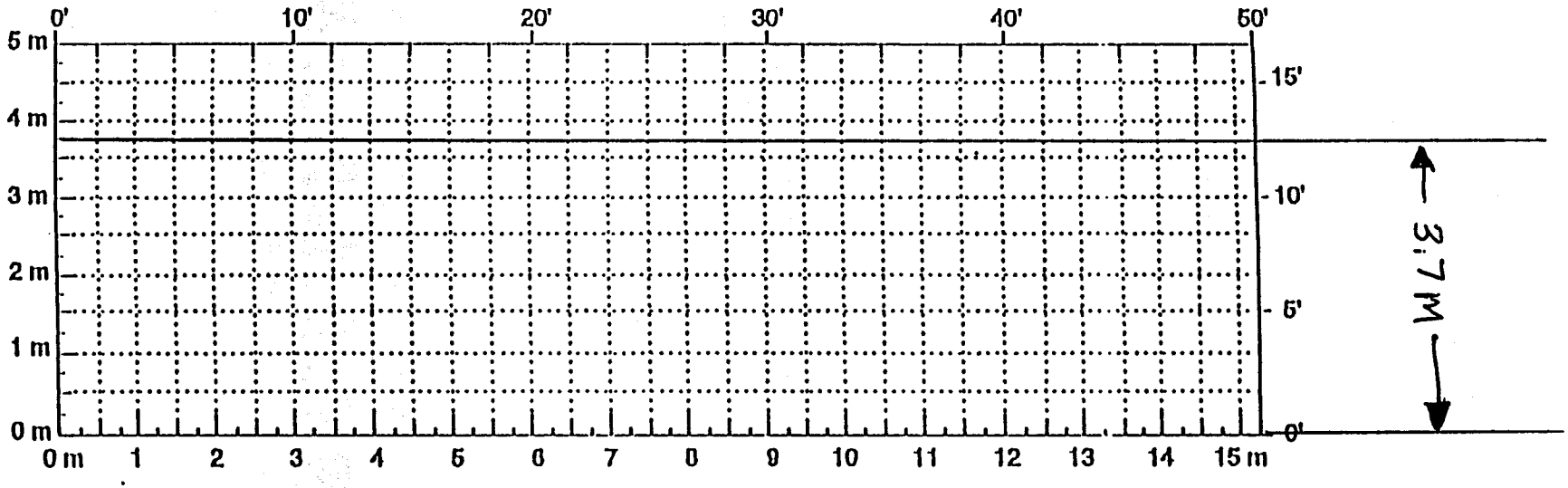
2

3

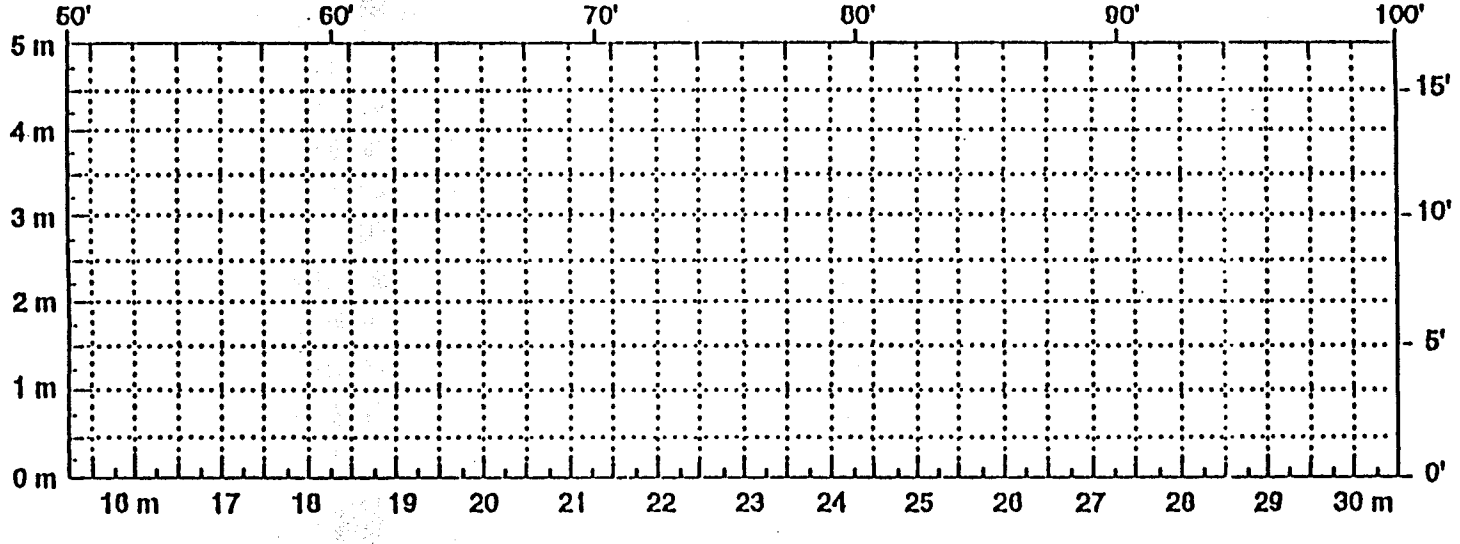
4

5

6



Comments: _____



Comments: _____

SECTION	31014
DATE	8/1/95

1

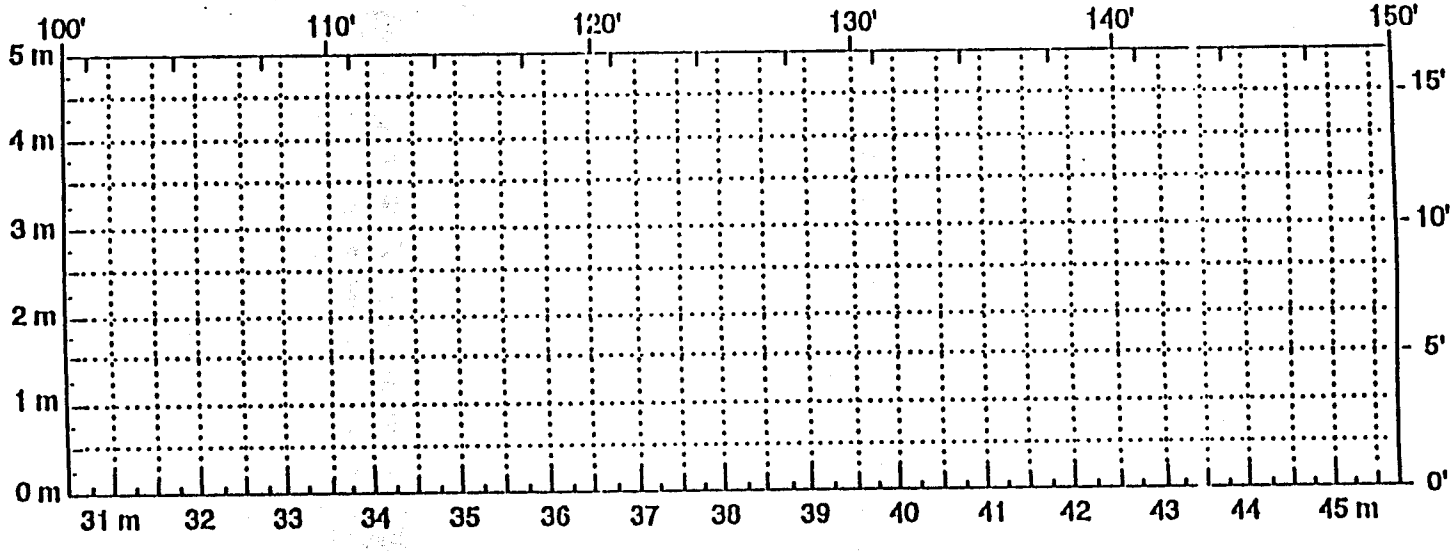
2

3

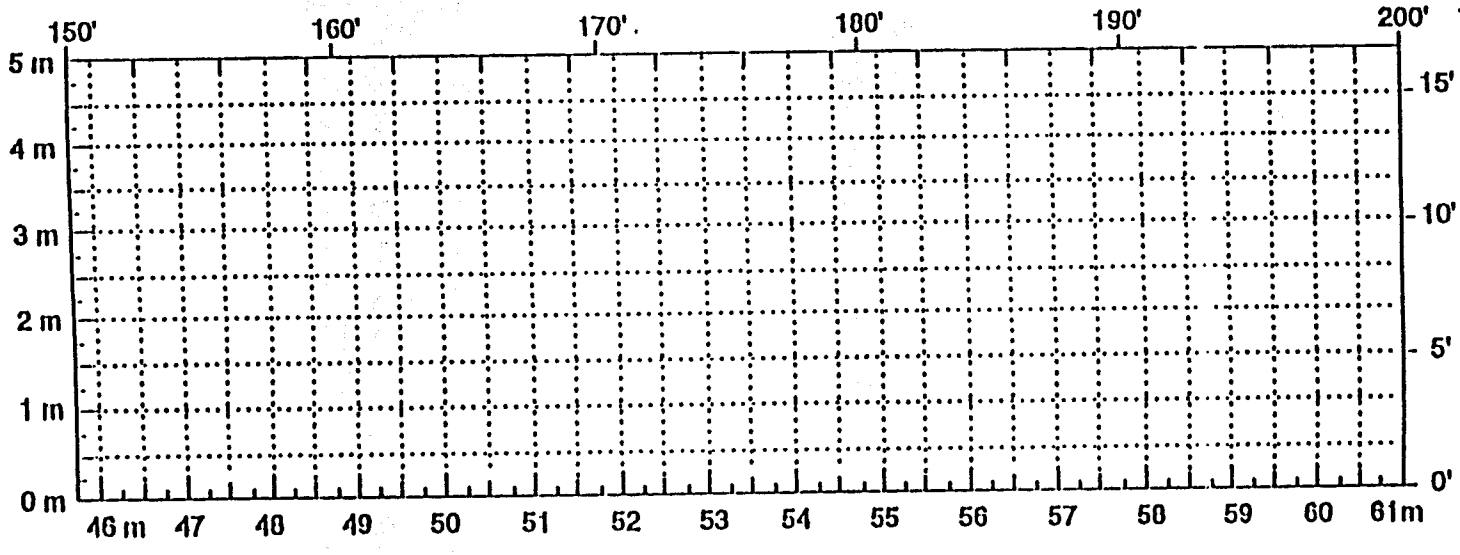
4

5

6



Comments: _____



Comments: _____ _____

SECTION	310114
DATE	8/1/95

1

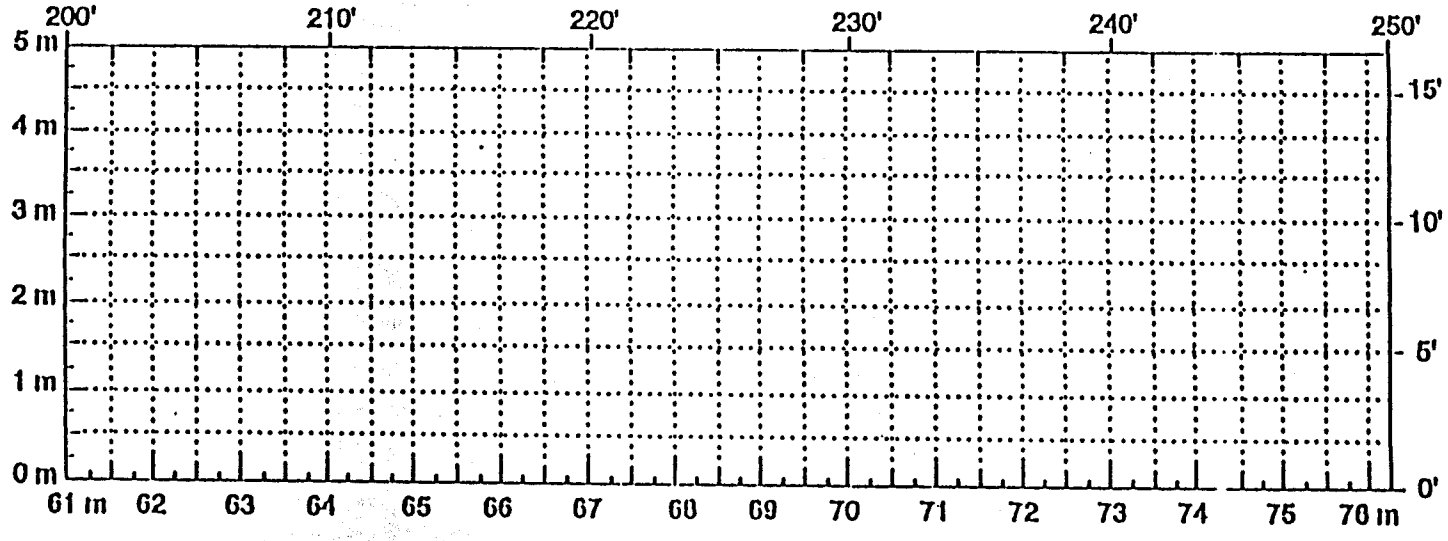
2

3

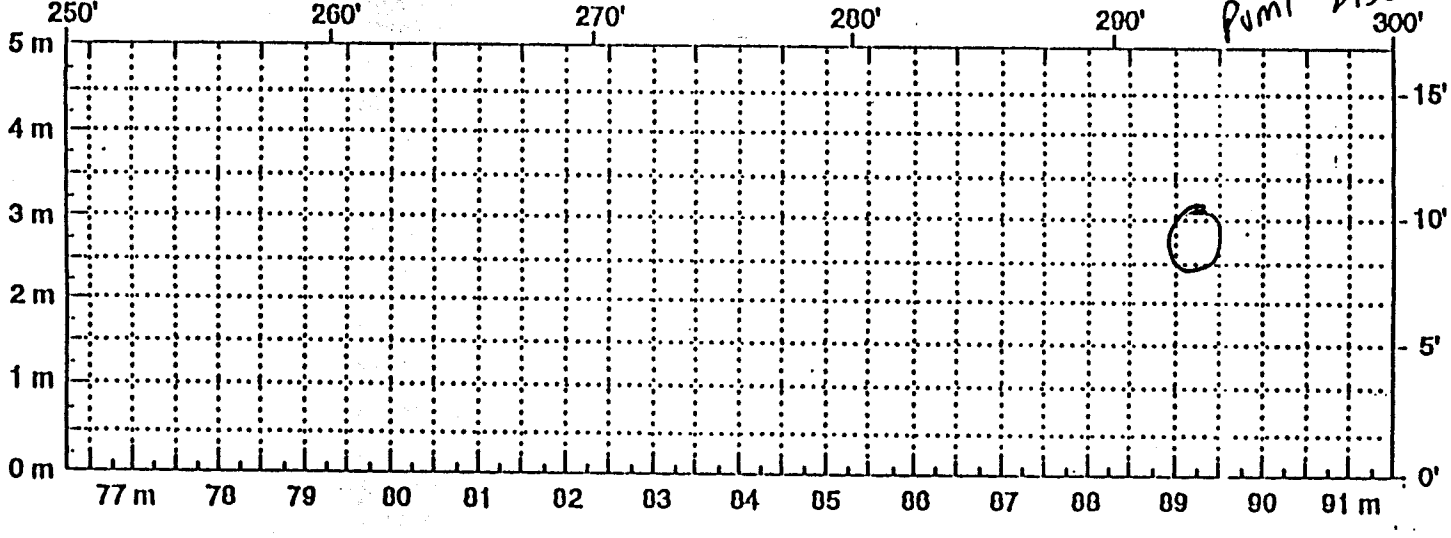
4

5

6

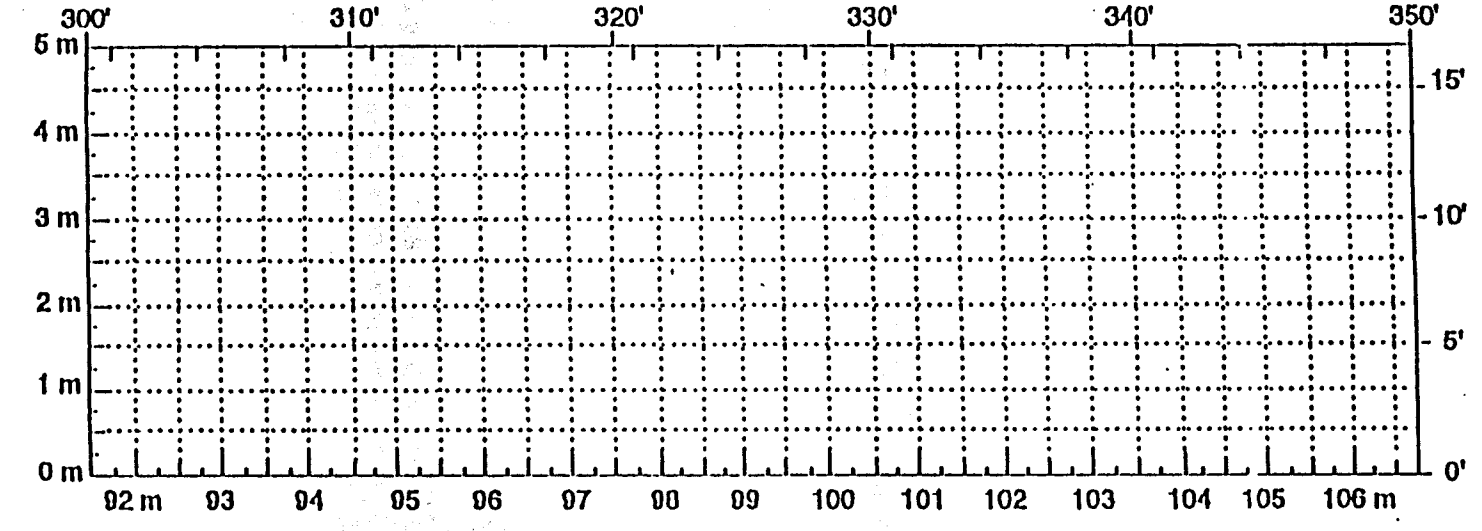


Comments: _____

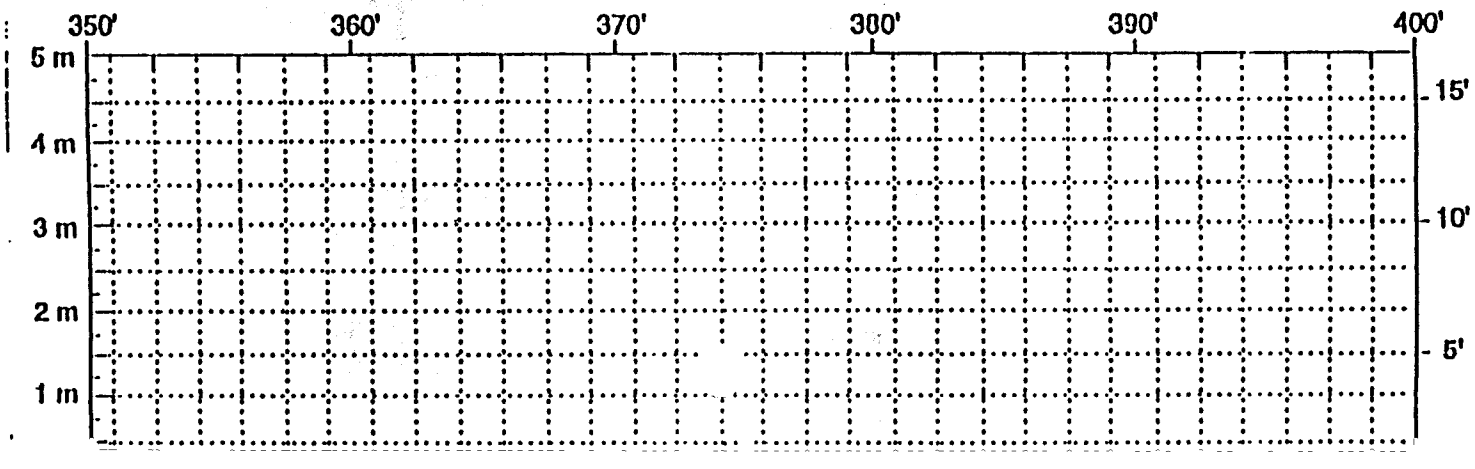


Comments: _____

SECTION	310114
DATE	8/1 95



Comments: _____



Renamed to "B"

08:23 950721

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

FWD S/N : 8002-130
Operator ID : HENRICKSON, JEFFREY A.

Stationing...: Feet

Diameter of Plate: 11.8
Deflector distances : 8 12 18 24 36 60

SHRP TESTING - FLEXIBLE - BASIN TEST (F0,F1,F3)
Sequence: CCC1111222233334444

-10

Stn:		0	Lane:F1	Temp:		J/C:		Air: 87	PvT: 84		08:46
Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
	C	109.4	11989	49.80	35.58	26.36	17.05	10.75	5.08	2.93	
	C	110.0	12057	46.07	33.74	25.61	17.17	11.20	5.46	2.98	
	C	110.0	12057	45.32	33.50	25.60	17.32	11.38	5.57	3.01	
*	1	54.9	6018	21.81V	16.16V	12.29	8.26	5.44	2.71	1.41	
*	1	55.0	6026	21.52	15.94	12.13	8.18	5.41	2.73	1.42	
*	1	55.0	6026	21.32	15.79	12.04	8.12	5.39	2.73	1.42	
*	1	54.9	6010	21.23	15.74	12.00	8.11	5.39	2.74	1.43	
*	2	82.1	8990	32.16	23.89	18.28	12.44	8.27	4.17	2.20	
*	2	82.3	9018	32.27	24.06	18.44	12.58	8.38	4.22	2.22	
*	2	82.6	9053	32.37	24.17	18.55	12.67	8.44	4.26	2.24	
*	2	82.5	9038	32.15	24.02	18.44	12.60	8.41	4.24	2.23	
*	3	109.6	12013	43.24	32.28	24.84	16.98	11.30	5.64	3.00	
*	3	110.1	12061	43.64	32.65	25.19	17.26	11.50	5.72	3.02	
*	3	110.1	12061	43.74	32.79	25.30	17.36	11.56	5.76	3.04	
*	3	110.0	12057	43.67	32.79	25.31	17.38	11.59	5.78	3.04	
*	4	144.1	15787	58.02V	43.57V	33.76V	23.15V	15.39V	7.54	4.00	
*	4	144.7	15850	58.94	44.36	34.43	23.66	15.73	7.68	4.05	
*	4	144.6	15846	59.25	44.69	34.72	23.88	15.89	7.75	4.09	
*	4	144.6	15838	59.43	44.87	34.87	24.01V	15.99	7.80	4.10	

'ACCEPTED TEST WITH VARIANCE

-10

Stn:		0	Lane:F1	Temp:		J/C:		Air: 87	PvT: 84		08:49
Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
	C	109.3	11973	46.08	34.35	26.35	17.97	11.93	5.83	3.06	
	C	109.5	12001	45.13	33.89	26.16	17.96	12.01	5.91	3.07	
	C	109.4	11989	44.86	33.74	26.07	17.93	12.00	5.91	3.08	
*	1	54.2	5935	22.02	16.48	12.55	8.48	5.61	2.79	1.43	
*	1	54.3	5951	21.87	16.37	12.47	8.44	5.60	2.80	1.43	
*	1	54.3	5951	21.76	16.28	12.41	8.41	5.57	2.79	1.42	
*	1	54.7	5999	21.71	16.24	12.39	8.39	5.58	2.80	1.42	
*	2	81.6	8942	32.70	24.55	18.86	12.91	8.63	4.31	2.22	
*	2	82.1	8998	32.94	24.76	19.04	13.06	8.73	4.36	2.25	
*	2	82.1	8990	32.86	24.69	19.00	13.04	8.73	4.35	2.25	
*	2	81.9	8974	32.81	24.69	19.00	13.04	8.74	4.36	2.24	
*	3	109.3	11973	43.46	32.69	25.30	17.46	11.74	5.85	3.04	
*	3	109.6	12009	43.87	33.00	25.57	17.66	11.89	5.91	3.06	
*	3	109.7	12017	43.94	33.06	25.62	17.70	11.91	5.93	3.07	
*	3	109.5	11997	43.83	32.99	25.57	17.66	11.88	5.91	3.06	
*	4	144.0	15779	57.52	43.27	33.70	23.34	15.71	7.77	4.07	
*	4	144.6	15838	58.28	43.85	34.18	23.67	15.92	7.84	4.09	
*	4	144.3	15807	58.46	44.02	34.31	23.77	15.98	7.86	4.09	
*	4	144.5	15835	58.60	44.14	34.42	23.84	16.03	7.87	4.09	

Stn:		0	Lane:F1	Temp:		J/C:		Air: 86	PvT: 84		08:55
Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
	C	108.4	11882	49.10	34.97	26.07	17.18	10.98	5.22	2.99	
	C	109.0	11941	46.15	33.56	25.55	17.37	11.43	5.58	3.07	
	C	108.9	11930	45.47	33.29	25.50	17.46	11.57	5.68	3.10	
*	1	54.1	5931	21.89V	16.11V	12.26V	8.35	5.54	2.76	1.47	
*	1	54.2	5943	21.61	15.86	12.06	8.23	5.49	2.78	1.45	
*	1	54.4	5955	21.42	15.72	11.96	8.19	5.47	2.78	1.46	
*	1	54.6	5979	21.45	15.76	12.00	8.22	5.50	2.80	1.48	
*	2	81.3	8906	32.37	23.76	18.16	12.51	8.41	4.25	2.26	
*	2	81.8	8966	32.60	24.02	18.39	12.70	8.54	4.31	2.28	
*	2	81.7	8954	32.45	23.96	18.36	12.69	8.55	4.32	2.29	
*	2	81.8	8962	32.43	23.95	18.36	12.70	8.56	4.34	2.31	

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	3	108.8	11926	43.57	32.12	24.74	17.11	11.50	5.78	3.10
*	3	109.1	11957	43.89	32.50	25.05	17.35	11.69	5.87	3.13
*	3	109.0	11945	43.98	32.55	25.15	17.43	11.74	5.88	3.15
*	3	109.0	11941	43.96	32.59	25.18	17.47	11.76	5.90	3.14
*	4	143.8	15755	58.25V	43.22V	33.58V	23.32V	15.65V	7.72	4.15
*	4	143.8	15755	59.18	44.03	34.27	23.83	16.00	7.85	4.20
*	4	143.9	15763	59.56	44.37	34.58	24.04	16.15	7.90	4.22
*	4	143.7	15747	59.81	44.61V	34.78V	24.20V	16.26V	7.94	4.24

'ACCEPTED TEST WITH VARIANCE

Stn: 25 Lane:F1 Temp: J/C: Air: 87 PvT: 86 08:59

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	108.0	11830	49.34	35.00	25.97	16.98	10.76	5.19	3.03
	C	108.3	11870	45.40	32.94	25.04	16.96	11.14	5.53	3.09
	C	108.6	11898	44.67	32.69	25.04	17.12	11.33	5.65	3.12
*	1	53.8	5899	21.05V	15.45V	11.80	8.03	5.30	2.69	1.45
*	1	53.5	5863	20.78	15.24	11.64	7.93	5.26	2.70	1.44
*	1	53.7	5887	20.56	15.08	11.53	7.88	5.25	2.71	1.45
*	1	53.6	5871	20.41	14.97	11.46	7.84	5.23	2.72	1.44
*	2	81.2	8895	31.42	23.06	17.68	12.18	8.15	4.20	2.27
*	2	81.1	8891	31.53	23.24	17.86	12.34	8.28	4.26	2.30
*	2	81.0	8879	31.43	23.20	17.84	12.33	8.28	4.25	2.31
*	2	81.3	8906	31.41	23.21	17.85	12.37	8.32	4.28	2.31
*	3	108.4	11882	42.46	31.33	24.16	16.70	11.20	5.70	3.11
*	3	108.8	11918	42.77	31.71	24.52	16.99	11.40	5.79	3.16
*	3	108.8	11922	42.85	31.81	24.62	17.08	11.48	5.81	3.16
*	3	108.9	11930	42.82	31.83	24.66	17.13	11.51	5.84	3.17
*	4	143.4	15711	57.22V	42.59V	33.15V	23.02V	15.44V	7.73	4.20
*	4	143.7	15747	58.09	43.44	33.87	23.57	15.81	7.86	4.24
*	4	143.4	15715	58.38	43.72	34.13	23.76	15.96	7.92	4.27
*	4	143.4	15707	58.52	43.85	34.25V	23.89V	16.03	7.94	4.27

'ACCEPTED TEST WITH VARIANCE

Stn: 50 Lane:F1 Temp: J/C: Air: 88 PvT: 87 09:02

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	107.0	11719	51.20	36.05	26.53	17.03	10.68	5.29	3.19
	C	108.0	11830	46.59	33.47	25.19	16.83	11.06	5.76	3.31
	C	108.0	11838	45.48	32.98	25.02	16.93	11.26	5.94	3.37
*	1	53.3	5844	21.76V	15.81V	11.96V	8.05	5.35	2.90	1.59
*	1	53.3	5840	21.36	15.50	11.75	7.93	5.32	2.92	1.59
*	1	53.2	5828	21.08	15.30	11.59	7.81	5.24	2.88	1.52
*	1	53.0	5812	20.96	15.24	11.56	7.82	5.28	2.92	1.58
*	2	80.1	8775	31.91	23.23	17.66	12.00	8.13	4.44	2.45
*	2	80.5	8823	32.07	23.44	17.86	12.21	8.27	4.51	2.49
*	2	80.5	8823	31.94	23.40	17.85	12.22	8.28	4.52	2.49
*	2	80.7	8843	31.93	23.44	17.89	12.27	8.33	4.56	2.50
*	3	107.6	11794	42.86	31.46	24.04	16.49	11.20	6.07	3.37
*	3	108.2	11858	43.30	31.85	24.40	16.76	11.44	6.20	3.41
*	3	107.8	11814	43.20	31.87	24.44	16.83	11.46	6.20	3.42
*	3	108.2	11850	43.23	31.93	24.50	16.88	11.52	6.23	3.42
*	4	143.0	15672	57.43	42.50V	32.78V	22.62V	15.40V	8.19	4.52
*	4	143.5	15723	58.25	43.28	33.44	23.16	15.76	8.36	4.59
*	4	143.5	15723	58.47	43.51	33.65	23.35	15.90	8.44	4.61
*	4	143.0	15672	58.56	43.61	33.75	23.43V	15.97V	8.48	4.60

'ACCEPTED TEST WITH VARIANCE

Stn: 75 Lane:F1 Temp: J/C: Air: 88 PvT: 88 09:05

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	106.3	11643	55.55	39.97	29.72	19.47	12.30	5.77	3.26
	C	107.0	11727	50.90	37.37	28.42	19.32	12.70	6.28	3.38
	C	107.2	11743	49.88	36.94	28.29	19.43	12.91	6.45	3.41
*	1	52.6	5768	23.58V	17.47V	13.30V	9.10	6.06	3.11	1.60
*	1	52.9	5800	23.32	17.30	13.18	9.04	6.07	3.15	1.62
*	1	52.9	5800	23.09	17.13	13.06	8.98	6.05	3.15	1.62
*	1	53.3	5844	23.02V	17.09V	13.04V	8.98	6.09	3.23	1.70
*	2	79.8	8744	35.16	26.16	20.02	13.85	9.33	4.83	2.51
*	2	80.2	8787	35.31	26.36	20.23	14.04	9.48	4.91	2.54
*	2	80.2	8787	35.20	26.32	20.23	14.06	9.51	4.93	2.55

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	2	80.4	8811	35.11	26.31	20.23	14.08	9.54	4.95	2.56
*	3	106.7	11687	47.05	35.28	27.21	18.95	12.80	6.57	3.43
*	3	107.4	11763	47.58	35.80	27.68	19.30	13.06	6.69	3.48
*	3	107.6	11790	47.62	35.91	27.80	19.41	13.15	6.73	3.48
*	3	107.6	11790	47.61	35.93	27.83	19.46	13.19	6.75	3.50
*	4	141.2	15473	63.14V	47.67V	37.08V	25.92V	17.53V	8.85	4.59
*	4	141.7	15521	63.98	48.50	37.82	26.47	17.92	9.01	4.65
*	4	141.5	15505	64.31	48.82	38.13	26.72	18.09	9.07	4.66
*	4	141.4	15497	64.48	49.02	38.30V	26.87V	18.20V	9.13	4.67

'ACCEPTED TEST WITH VARIANCE

Stn: 100 Lane:F1 Temp: J/C: Air: 88 PvT: 88 09:08

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	106.0	11616	56.22	39.54	29.17	18.68	11.71	5.54	3.25
	C	106.6	11679	51.47	37.09	28.10	18.76	12.28	6.05	3.38
	C	106.6	11683	50.47	36.70	28.01	18.91	12.52	6.22	3.46
*	1	52.5	5756	23.87V	17.39V	13.19	8.88	5.89	3.00	1.59
*	1	52.4	5736	23.54	17.13	13.01	8.80	5.88	3.02	1.59
*	1	52.6	5764	23.38	17.01	12.93	8.76	5.87	3.04	1.61
*	1	52.7	5772	23.18V	16.87V	12.84	8.71	5.85	3.04	1.59
*	2	79.5	8712	35.54	25.93	19.79	13.46	9.03	4.63	2.49
*	2	79.8	8744	35.74	26.18	20.02	13.66	9.18	4.71	2.54
*	2	80.0	8763	35.73	26.23	20.08	13.72	9.24	4.74	2.55
*	2	79.8	8744	35.65	26.20	20.07	13.74	9.25	4.76	2.56
*	3	106.7	11691	48.07	35.32	27.15	18.58V	12.50V	6.36	3.50
*	3	107.0	11727	48.51	35.78	27.59	18.92	12.73	6.46	3.53
*	3	107.0	11727	48.56	35.91	27.70	19.02	12.81	6.50	3.54
*	3	107.2	11747	48.57	35.98	27.78	19.09	12.88	6.53	3.56
*	4	141.5	15505	64.62V	47.87V	37.13V	25.51V	17.15V	8.57	4.65
*	4	141.8	15533	65.47	48.72	37.88	26.08	17.54	8.72	4.70
*	4	142.1	15572	65.85	49.06	38.17	26.32	17.71	8.81	4.74
*	4	141.9	15552	66.04	49.23	38.34	26.47V	17.82	8.85	4.74

'ACCEPTED TEST WITH VARIANCE

Stn: 125 Lane:F1 Temp: J/C: Air: 87 PvT: 88 09:11

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.1	11516	61.72	43.83	32.02	20.12	12.11	5.47	3.46
	C	106.3	11643	56.24	40.64	30.31	19.84	12.52	6.01	3.59
	C	106.6	11683	54.82	39.89	29.96	19.85	12.70	6.17	3.62
*	1	52.3	5728	25.99V	18.94V	14.14V	9.36	6.07	3.06	1.70
*	1	52.4	5744	25.63	18.68	13.95	9.27	6.05	3.08	1.72
*	1	52.5	5756	25.31	18.43	13.78	9.18	6.03	3.09	1.70
*	1	52.1	5713	25.02V	18.24V	13.64	9.11	5.99	3.08	1.69
*	2	79.2	8676	38.30	27.93	20.98	14.07	9.22	4.68	2.62
*	2	79.4	8704	38.44	28.16	21.21	14.28	9.38	4.77	2.67
*	2	79.5	8716	38.30	28.09	21.19	14.27	9.39	4.78	2.67
*	2	79.5	8712	38.31	28.15	21.24	14.34	9.45	4.82	2.70
*	3	106.4	11659	51.50	37.81	28.64	19.33	12.67	6.36	3.63
*	3	106.9	11715	51.92	38.24	29.03	19.64	12.90	6.46	3.67
*	3	107.0	11719	52.02	38.40	29.19	19.78	13.01	6.53	3.69
*	3	107.0	11719	51.96	38.39	29.21	19.81	13.05	6.55	3.70
*	4	141.0	15445	68.78	50.85V	38.90V	26.41V	17.33V	8.48	4.87
*	4	141.4	15497	69.68	51.66	39.61	26.95	17.70	8.63	4.94
*	4	141.4	15493	69.96	51.94	39.87	27.17	17.86	8.70	4.96
*	4	141.4	15497	70.00	52.03	39.97	27.26	17.94	8.75	4.98

Stn: 150 Lane:F1 Temp: J/C: Air: 87 PvT: 87 09:15

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.7	11580	59.53	41.69	30.22	18.98	11.86	5.77	3.42
	C	106.3	11647	53.81	38.42	28.54	18.74	12.26	6.26	3.54
	C	106.6	11675	52.48	37.78	28.30	18.82	12.46	6.43	3.59
*	1	52.5	5752	24.84V	17.87V	13.29V	8.83	5.94	3.16	1.71
*	1	52.6	5768	24.51	17.60	13.10	8.74	5.91	3.16	1.70
*	1	53.2	5824	24.28V	17.41V	12.98	8.67	5.89	3.19	1.71
*	1	53.0	5808	24.19V	17.34V	12.92V	8.65	5.87	3.20	1.70
*	2	79.7	8732	36.88	26.56	19.89	13.37	9.03	4.83	2.63
*	2	79.8	8740	37.02	26.78	20.12	13.59	9.20	4.93	2.69
*	2	79.8	8744	36.86	26.69	20.08	13.59	9.20	4.94	2.68
*	2	80.2	8783	36.89	26.76	20.16	13.66	9.28	4.99	2.69

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	3	106.2	11632	49.32	35.80	27.07	18.34	12.38	6.56	3.59
*	3	106.7	11687	49.63	36.17	27.44	18.63	12.58	6.66	3.63
*	3	106.8	11703	49.75	36.30	27.57	18.73	12.67	6.70	3.64
*	3	106.8	11699	49.74	36.35	27.64	18.81	12.72	6.74	3.66
*	4	140.9	15441	66.04	48.38V	36.96V	25.13V	16.87V	8.78	4.83
*	4	141.4	15497	66.97	49.20	37.70	25.67	17.24	8.93	4.90
*	4	141.5	15505	67.13	49.37	37.88	25.82	17.34	8.98	4.91
*	4	141.7	15521	67.31	49.50	38.03	25.95	17.44	9.04	4.92

'ACCEPTED TEST WITH VARIANCE

Stn: 175 Lane:F1 Temp: J/C: Air: 87 PvT: 88 09:17

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.8	11592	56.35	40.07	29.82	19.23	11.92	5.59	3.28
	C	106.3	11643	51.69	37.55	28.52	19.04	12.30	6.06	3.37
	C	106.7	11691	50.85	37.20	28.43	19.15	12.48	6.22	3.42
*	1	52.3	5728	24.10V	17.63V	13.38V	8.97	5.91	3.01	1.59
*	1	52.4	5744	23.81	17.39	13.19	8.85	5.87	3.03	1.59
*	1	52.4	5736	23.58	17.23	13.08	8.81	5.86	3.04	1.59
*	1	52.8	5788	23.52V	17.17V	13.03	8.77	5.83	3.04	1.60
*	2	79.3	8688	35.80	26.25	20.03	13.58	9.00	4.63	2.48
*	2	80.1	8775	36.14	26.60	20.34	13.83	9.18	4.72	2.53
*	2	79.6	8720	35.93	26.51	20.28	13.81	9.19	4.74	2.54
*	2	79.5	8708	35.92	26.53	20.33	13.86	9.23	4.76	2.54
*	3	106.5	11663	48.33	35.69	27.42	18.70	12.40	6.33	3.44
*	3	106.8	11703	48.77	36.15	27.84	19.01	12.61	6.43	3.46
*	3	106.7	11691	48.82	36.26	27.94	19.10	12.69	6.47	3.49
*	3	106.8	11703	48.78	36.25	27.94	19.11	12.70	6.48	3.48
*	4	141.1	15457	64.97V	48.35V	37.44V	25.60V	16.89V	8.48	4.63
*	4	141.7	15525	66.03	49.28	38.22	26.17	17.26	8.64	4.68
*	4	141.7	15525	66.47	49.66	38.57	26.42	17.45	8.70	4.70
*	4	141.6	15517	66.69	49.86	38.74	26.55	17.55V	8.76	4.72

'ACCEPTED TEST WITH VARIANCE

Stn: 200 Lane:F1 Temp: J/C: Air: 86 PvT: 88 09:20

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.8	11592	55.48	38.89	28.14	17.78	11.01	5.42	3.24
	C	106.2	11640	50.24	36.00	26.69	17.61	11.46	5.90	3.37
	C	106.9	11715	49.21	35.54	26.56	17.76	11.67	6.06	3.41
*	1	51.9	5689	22.99V	16.63V	12.34V	8.20	5.45	2.92	1.57
*	1	52.5	5756	22.72	16.45	12.22	8.13	5.45	2.94	1.57
*	1	52.8	5780	22.57	16.32	12.11	8.07	5.41	2.93	1.59
*	1	52.6	5768	22.41V	16.23V	12.07	8.08	5.45	2.96	1.60
*	2	79.0	8652	34.38	24.92	18.61	12.53	8.40	4.50	2.45
*	2	79.7	8736	34.57	25.18	18.85	12.71	8.55	4.58	2.51
*	2	79.4	8700	34.52	25.20	18.93	12.81	8.61	4.63	2.50
*	2	79.8	8744	34.47	25.18	18.91	12.79	8.62	4.63	2.52
*	3	106.9	11707	46.52	33.94	25.59V	17.33V	11.61V	6.17	3.40
*	3	106.7	11687	46.87	34.37	25.99	17.65	11.84	6.28	3.45
*	3	107.0	11727	46.87	34.44	26.06	17.69	11.88	6.30	3.46
*	3	106.9	11707	46.82	34.46	26.10	17.73	11.93	6.31	3.46
*	4	141.1	15461	62.46V	46.00V	35.01V	23.81V	15.90V	8.27	4.56
*	4	141.6	15509	63.39	46.86	35.76	24.35	16.29	8.42	4.63
*	4	141.7	15521	63.72	47.15	36.04	24.56	16.46	8.48	4.65
*	4	141.3	15485	63.88	47.27	36.15	24.65	16.52	8.53	4.67

'ACCEPTED TEST WITH VARIANCE

Stn: 225 Lane:F1 Temp: J/C: Air: 86 PvT: 90 09:24

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.3	11425	63.35	46.78	36.02	24.70	16.46	7.93	3.70
	C	104.8	11485	58.80	44.46	35.09	25.00	17.29	8.73	3.96
	C	105.0	11508	57.96	44.20	35.12	25.24	17.65	8.99	4.05
*	1	51.3	5617	27.22V	20.82V	16.52V	11.93V	8.40	4.45	1.98
*	1	51.7	5665	26.91	20.55	16.31	11.80	8.34	4.47	2.00
*	1	51.7	5665	26.67	20.37	16.17	11.70	8.31	4.47	2.00
*	1	51.6	5657	26.45V	20.20V	16.06	11.65	8.28	4.46	2.00
*	2	78.1	8561	40.80	31.24	24.80	18.00	12.77	6.78	3.07
*	2	78.6	8608	41.12	31.61	25.15	18.31	12.99	6.90	3.11
*	2	78.6	8608	41.02	31.57	25.15	18.35	13.03	6.94	3.15

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	2	78.4	8589	40.86	31.48	25.08	18.28	13.04	6.93	3.09
*	3	105.0	11504	55.11	42.46V	33.93V	24.67V	17.50V	9.15	4.12
*	3	105.3	11536	55.86	43.22	34.59	25.19	17.88	9.33	4.19
*	3	105.4	11548	56.00	43.39	34.77	25.37	17.98	9.39	4.20
*	3	105.4	11548	56.09	43.51	34.88	25.45	18.06	9.42	4.19
*	4	139.0	15235	73.95V	57.40V	46.15V	33.59V	23.65V	12.11V	5.40
*	4	139.3	15259	75.22	58.59	47.17	34.37	24.17	12.32	5.45
*	4	139.4	15278	75.76	59.15	47.65	34.75	24.44	12.43	5.50
*	4	139.1	15243	76.07V	59.44V	47.91V	34.96V	24.60V	12.50	5.52

'ACCEPTED TEST WITH VARIANCE

Stn: 250 Lane:F1 Temp: J/C: Air: 87 PvT: 89 09:27

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.6	11457	61.29	44.54	33.33	21.85	13.90	6.69	3.53
	C	105.3	11532	56.89	42.28	32.42	22.07	14.64	7.30	3.68
	C	105.1	11520	56.17	42.08	32.48	22.34	14.96	7.50	3.75
*	1	51.8	5677	26.74V	20.09V	15.42V	10.57	7.08	3.60	1.76
*	1	51.3	5621	26.26	19.74	15.17	10.44	7.04	3.61	1.76
*	1	51.4	5633	25.92	19.46	14.97	10.33	6.98	3.61	1.77
*	1	51.7	5669	25.87V	19.43V	14.96	10.33	7.02	3.65	1.78
*	2	78.1	8557	39.70	29.88	23.09	16.03	10.89	5.61	2.76
*	2	78.6	8616	40.04	30.24	23.44	16.31	11.09	5.72	2.81
*	2	78.7	8624	39.92	30.18	23.41	16.31	11.10	5.72	2.80
*	2	78.5	8601	39.67	30.02	23.30	16.25	11.07	5.71	2.80
*	3	105.1	11516	53.50	40.38	31.37V	21.86V	14.87V	7.61	3.76
*	3	105.5	11556	54.05	40.95	31.88	22.24	15.13	7.72	3.81
*	3	105.4	11548	54.23	41.14	32.05	22.39	15.24	7.76	3.81
*	3	105.3	11532	54.30	41.26	32.15	22.48	15.30	7.80	3.83
*	4	139.6	15298	71.81V	54.62V	42.73V	29.85V	20.21V	10.11V	4.99
*	4	139.9	15326	73.10	55.82	43.73	30.60	20.72	10.31	5.07
*	4	139.6	15298	73.62	56.30	44.14	30.93	20.94	10.39	5.07
*	4	139.8	15322	73.94	56.61V	44.41V	31.15V	21.11V	10.47	5.09

'ACCEPTED TEST WITH VARIANCE

Stn: 275 Lane:F1 Temp: J/C: Air: 87 PvT: 90 09:30

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.0	11508	57.29	39.72	28.78	18.00	11.05	5.28	3.10
	C	105.4	11544	52.65	37.56	27.96	18.25	11.64	5.70	3.17
	C	105.5	11560	51.70	37.18	27.90	18.41	11.83	5.81	3.20
*	1	51.5	5637	24.46V	17.56V	13.10V	8.57	5.53	2.78	1.47
*	1	51.6	5657	24.12	17.30	12.91	8.48	5.50	2.79	1.48
*	1	51.6	5657	23.85	17.11	12.77	8.40	5.46	2.79	1.48
*	1	51.5	5645	23.65V	16.98	12.68	8.36	5.45	2.80	1.46
*	2	78.2	8573	36.37	26.22	19.66	13.04	8.51	4.32	2.32
*	2	78.8	8636	36.67	26.54	19.96	13.30	8.69	4.41	2.35
*	2	78.6	8608	36.52	26.45	19.91	13.28	8.69	4.41	2.36
*	2	78.4	8589	36.31	26.33	19.83	13.24	8.67	4.41	2.35
*	3	105.5	11560	49.07	35.55	26.85V	17.95V	11.74V	5.92	3.19
*	3	105.9	11608	49.68	36.11	27.33	18.30	11.97	6.00	3.23
*	3	105.7	11580	49.74	36.21	27.44	18.40	12.04	6.02	3.23
*	3	105.9	11604	49.75	36.23	27.48	18.44	12.07	6.04	3.24
*	4	140.0	15342	66.25V	48.23V	36.72V	24.65V	16.08V	7.93	4.30
*	4	140.8	15429	67.58	49.42	37.69	25.33	16.52	8.07	4.36
*	4	140.5	15390	68.02	49.82	38.04	25.60	16.69	8.12	4.39
*	4	140.9	15441	68.46	50.16V	38.33V	25.81V	16.83V	8.16	4.41

'ACCEPTED TEST WITH VARIANCE

Stn: 300 Lane:F1 Temp: J/C: Air: 87 PvT: 90 09:33

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.6	11572	52.37	37.67	28.14	18.57	12.02	6.05	3.33
	C	106.4	11659	47.92	35.35	27.14	18.73	12.72	6.70	3.46
	C	106.3	11651	47.11	35.09	27.15	18.94	13.02	6.93	3.51
*	1	52.0	5701	22.26V	16.52V	12.71V	8.85	6.14	3.32	1.65
*	1	51.9	5689	21.79	16.18	12.47	8.71	6.07	3.32	1.63
*	1	51.7	5661	21.67	16.09	12.41	8.69	6.07	3.34	1.65
*	1	52.1	5705	21.44V	15.91V	12.29V	8.63	6.06	3.35	1.64
*	2	78.7	8620	33.00	24.64	19.06	13.43	9.40	5.15	2.57
*	2	79.2	8672	33.33	24.94	19.33	13.66	9.58	5.26	2.62

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	2	79.2	8680	33.24	24.96	19.36	13.70	9.62	5.28	2.62
*	2	79.1	8664	33.07	24.83	19.28	13.64	9.59	5.27	2.62
*	3	106.0	11616	44.90	33.74	26.25	18.54V	12.96V	7.03	3.52
*	3	106.1	11624	45.32	34.17	26.63	18.86	13.19	7.15	3.57
*	3	106.4	11655	45.48	34.35	26.80	18.99	13.30	7.20	3.60
*	3	106.3	11651	45.60	34.46	26.91	19.09	13.38	7.25	3.60
*	4	141.3	15477	61.02V	46.16V	36.09V	25.52V	17.71V	9.43	4.74
*	4	141.5	15505	62.04	47.04	36.83	26.08	18.11	9.60	4.80
*	4	141.5	15501	62.48	47.44	37.19	26.35	18.31	9.69	4.83
*	4	141.3	15477	62.72V	47.65V	37.36V	26.49V	18.42V	9.75	4.83

'ACCEPTED TEST WITH VARIANCE

Stn: 325 Lane:F1 Temp: J/C: Air: 86 PvT: 90 09:36

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.9	11608	49.98	34.76	25.45	16.22	10.17	5.14	3.11
	C	106.3	11647	45.13	32.19	24.19	16.10	10.56	5.57	3.20
	C	106.5	11663	44.24	31.84	24.10	16.22	10.74	5.70	3.25
*	1	51.8	5681	20.82V	15.03V	11.32	7.59	5.06	2.72	1.49
*	1	52.0	5697	20.52	14.79	11.16	7.51	5.04	2.76	1.49
*	1	52.2	5724	20.43	14.74	11.13	7.49	5.04	2.77	1.51
*	1	52.2	5716	20.29	14.68	11.09	7.49	5.05	2.77	1.50
*	2	79.0	8660	31.08	22.43	16.96	11.51	7.74	4.25	2.37
*	2	79.5	8712	31.19	22.58	17.12	11.65	7.86	4.31	2.41
*	2	79.2	8680	31.18	22.63	17.17	11.72	7.92	4.36	2.43
*	2	79.4	8704	31.04	22.54	17.12	11.68	7.91	4.35	2.41
*	3	106.7	11687	42.09	30.56	23.29	15.89	10.69	5.80	3.26
*	3	106.9	11707	42.39	30.87	23.57	16.12	10.85	5.89	3.30
*	3	106.7	11691	42.44	30.96	23.66	16.20	10.92	5.93	3.31
*	3	106.6	11683	42.43	30.98	23.69	16.24	10.95	5.94	3.31
*	4	141.8	15533	56.92V	41.61V	31.82V	21.84V	14.63V	7.80	4.39
*	4	141.9	15552	57.74	42.30	32.50	22.28	14.94	7.94	4.45
*	4	141.9	15545	58.01	42.48	32.67	22.43	15.06	7.98	4.48
*	4	141.8	15533	58.08	42.54	32.74	22.49	15.11	8.02	4.49

'ACCEPTED TEST WITH VARIANCE

Stn: 350 Lane:F1 Temp: J/C: Air: 87 PvT: 91 09:40

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.6	11465	61.30	43.92	32.41	20.88	12.94	6.02	3.41
	C	105.4	11544	56.60	41.54	31.47	21.11	13.67	6.59	3.53
	C	105.0	11500	55.67	41.16	31.39	21.27	13.89	6.76	3.57
*	1	51.3	5625	26.01V	19.23V	14.63V	9.91V	6.55	3.28	1.67
*	1	51.9	5689	25.69	18.97	14.42	9.80	6.51	3.30	1.69
*	1	52.0	5693	25.54	18.85	14.33	9.74	6.50	3.33	1.70
*	1	51.7	5669	25.24V	18.65V	14.19	9.68	6.48	3.31	1.69
*	2	78.4	8593	39.20	28.94	22.03	15.06	10.05	5.11	2.67
*	2	78.5	8597	39.35	29.21	22.29	15.27	10.20	5.17	2.70
*	2	78.8	8632	39.37	29.24	22.32	15.31	10.23	5.19	2.68
*	2	78.5	8597	39.25	29.20	22.32	15.34	10.27	5.21	2.69
*	3	105.6	11568	53.12	39.46V	30.27V	20.75V	13.80V	6.91	3.62
*	3	105.6	11572	53.60	39.98	30.73	21.11	14.06	7.00	3.65
*	3	105.7	11576	53.74	40.15	30.88	21.24	14.15	7.03	3.65
*	3	105.0	11504	53.59	40.11	30.87	21.26	14.17	7.05	3.65
*	4	139.3	15259	71.19V	53.20V	41.10V	28.23V	18.70V	9.16	4.76
*	4	139.4	15274	72.54	54.39	42.09	28.94	19.17	9.33	4.81
*	4	139.2	15247	72.97	54.80	42.43	29.22	19.35	9.39	4.83
*	4	139.4	15278	73.26	55.07V	42.67V	29.40V	19.48V	9.44	4.85

Stn: 375 Lane:F1 Temp: J/C: Air: 87 PvT: 91 09:43

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.8	11588	49.96	34.78	25.38	16.15	10.03	4.97	3.09
	C	106.4	11659	45.45	32.39	24.24	16.15	10.51	5.42	3.17
	C	106.6	11683	44.54	32.04	24.15	16.25	10.69	5.56	3.19
*	1	51.8	5673	20.59V	14.83V	11.11	7.51	4.97	2.63	1.44
*	1	51.3	5625	20.20	14.53	10.88	7.37	4.91	2.62	1.43
*	1	51.8	5677	20.17	14.52	10.89	7.38	4.92	2.64	1.44
*	1	51.8	5677	20.03	14.43	10.83	7.36	4.93	2.65	1.44
*	2	79.1	8664	31.23	22.54	16.99	11.56	7.72	4.15	2.31
*	2	79.4	8696	31.26	22.64	17.09	11.67	7.81	4.19	2.35
*	2	79.3	8688	31.32	22.72	17.17	11.74	7.87	4.23	2.36

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	2	79.3	8684	31.17	22.64	17.12	11.71	7.87	4.22	2.35
*	3	106.2	11640	42.45	30.79	23.33	15.91	10.63	5.63	3.19
*	3	106.7	11691	42.86	31.22	23.70	16.19	10.83	5.73	3.23
*	3	106.6	11679	42.94	31.35	23.81	16.28	10.92	5.76	3.24
*	3	106.9	11715	42.97	31.37	23.84	16.31	10.95	5.79	3.25
*	4	142.3	15588	57.82V	42.30V	32.21V	21.91V	14.61V	7.59	4.33
*	4	142.2	15576	58.80	43.05	32.87	22.37	14.92	7.72	4.40
*	4	142.1	15572	59.12	43.32	33.10	22.56	15.06	7.76	4.42
*	4	142.5	15616	59.23	43.45	33.21	22.65	15.13	7.81	4.43

'ACCEPTED TEST WITH VARIANCE

Stn: 400 Lane:F1 Temp: J/C: Air: 87 PvT: 92 09:47

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
	C	103.5	11338	69.66	51.59	39.14	25.85	16.37	7.37	3.58	
	C	103.8	11369	64.98	49.17	38.15	26.14	17.22	8.12	3.72	
	C	104.2	11421	64.18	48.87	38.09	26.31	17.50	8.35	3.80	
*	1	51.1	5601	30.70V	23.41V	18.16V	12.56V	8.40	4.11	1.80	
*	1	50.8	5562	29.84	22.75	17.67	12.26	8.26	4.09	1.79	
*	1	51.0	5589	29.59	22.54	17.52	12.18	8.23	4.12	1.81	
*	1	51.0	5585	29.43V	22.44V	17.44V	12.15	8.24	4.14	1.81	
*	2	77.2	8454	45.22	34.45	26.81	18.67	12.62	6.30	2.82	
*	2	78.0	8541	45.67	34.94	27.23	19.00	12.88	6.43	2.89	
*	2	77.7	8513	45.65	34.95	27.26	19.04	12.93	6.47	2.89	
*	2	77.8	8529	45.65	34.98	27.29	19.08	12.97	6.49	2.91	
*	3	104.2	11417	60.91	46.53V	36.41V	25.42V	17.22V	8.48	3.85	
*	3	104.2	11417	61.59	47.21	36.99	25.84	17.51	8.61	3.89	
*	3	104.1	11405	61.65	47.29	37.08	25.91	17.56	8.63	3.90	
*	3	104.4	11433	61.86	47.48	37.23	26.04	17.66	8.69	3.93	
*	4	138.2	15139	81.10V	62.15V	48.92V	34.15V	23.06V	11.16	5.07	Off Range!
*	4	137.9	15104	82.39	63.32	49.89	34.83	23.50	11.28	5.13	Off Range!
*	4	138.0	15119	82.96	63.87	50.40	35.20	23.72	11.37	5.18	Off Range!
*	4	138.0	15115	83.28	64.14V	50.63V	35.37V	23.83	11.38	5.16	Off Range!

'ACCEPTED TEST WITH VARIANCE

Stn: 425 Lane:F1 Temp: J/C: Air: 87 PvT: 92 09:50

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.5	11449	58.63	40.93	29.67	18.52	11.24	5.41	3.22
	C	105.4	11548	53.52	38.30	28.61	18.74	11.97	5.94	3.33
	C	105.3	11540	52.30	37.75	28.44	18.87	12.19	6.09	3.39
*	1	51.2	5605	24.23V	17.51V	13.15V	8.72	5.71	2.93	1.55
*	1	51.6	5649	24.07	17.37	13.05	8.69	5.71	2.98	1.58
*	1	51.3	5617	23.72	17.12	12.88	8.61	5.68	2.96	1.56
*	1	51.4	5629	23.48V	16.92V	12.72V	8.48	5.62	2.94	1.54
*	2	78.3	8581	36.44	26.37	19.89	13.39	8.87	4.59	2.46
*	2	78.6	8616	36.69	26.67	20.16	13.65	9.06	4.69	2.50
*	2	78.6	8616	36.47	26.56	20.09	13.63	9.06	4.69	2.52
*	2	78.8	8632	36.52	26.65	20.18	13.71	9.14	4.78	2.57
*	3	105.6	11572	49.50	36.08	27.39	18.47V	12.20V	6.27	3.37
*	3	105.8	11592	49.91	36.57	27.81	18.79	12.43	6.36	3.41
*	3	105.6	11572	49.94	36.66	27.90	18.88	12.50	6.40	3.43
*	3	105.8	11592	49.97	36.70	27.96	18.94	12.57	6.43	3.44
*	4	140.6	15405	66.81V	49.22V	37.64V	25.45V	16.76V	8.39V	4.56
*	4	140.7	15417	67.96	50.24	38.48	26.07	17.15	8.54	4.61
*	4	140.6	15409	68.30	50.53	38.76	26.28	17.31	8.63	4.64
*	4	140.5	15394	68.48	50.70	38.91V	26.41V	17.41	8.68	4.63

'ACCEPTED TEST WITH VARIANCE

Stn: 450 Lane:F1 Temp: J/C: Air: 87 PvT: 93 09:54

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.1	11405	61.63	45.22	34.22	22.52	14.17	6.49	3.42
	C	104.6	11461	56.82	42.63	33.05	22.68	14.93	7.20	3.61
	C	104.7	11469	55.89	42.25	32.97	22.83	15.19	7.42	3.68
*	1	51.1	5593	26.45V	19.92V	15.45V	10.69	7.15	3.60	1.66
*	1	51.3	5621	26.15	19.69	15.29	10.60	7.13	3.63	1.69
*	1	51.2	5609	25.94	19.53	15.18	10.56	7.14	3.66	1.69
*	1	51.5	5641	25.66V	19.36V	15.07V	10.52	7.13	3.67	1.71
*	2	78.0	8549	39.61	29.99	23.40	16.35	11.08	5.62	2.73
*	2	78.5	8605	39.95	30.34	23.72	16.62	11.27	5.72	2.76

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	2	78.2	8573	39.76	30.26	23.68	16.60	11.28	5.74	2.78
*	2	78.4	8585	39.68	30.20	23.65	16.60	11.28	5.74	2.77
*	3	104.7	11473	53.26	40.54	31.82	22.30V	15.12	7.59	3.70
*	3	105.2	11528	54.03	41.21	32.40	22.73	15.41	7.72	3.76
*	3	105.1	11516	54.09	41.29	32.47	22.78	15.44	7.70	3.73
*	3	105.1	11520	54.11	41.36	32.55	22.86	15.51	7.77	3.76
*	4	139.9	15330	71.76V	54.83V	43.26V	30.33V	20.50V	10.10	4.95
*	4	139.8	15322	73.01	55.89	44.15	30.96	20.91	10.24	4.99
*	4	140.1	15350	73.71	56.48	44.64	31.32	21.17	10.33	5.04
*	4	140.3	15370	74.09V	56.80V	44.91V	31.52V	21.31V	10.39	5.07

'ACCEPTED TEST WITH VARIANCE

Stn: 463 Lane:F1 Temp: J/C: Air: 88 PvT: 92 09:57

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
	C	103.2	11310	70.74	51.48	38.80	25.39	15.94	7.09	3.52	
	C	103.5	11342	65.57	48.85	37.71	25.69	16.85	7.86	3.71	
	C	103.6	11354	64.72	48.55	37.67	25.89	17.13	8.04	3.71	
*	1	50.8	5566	30.70V	23.05V	17.81V	12.21	8.17	3.96	1.76	
*	1	51.2	5613	30.36	22.79	17.62	12.14	8.17	4.02	1.76	
*	1	51.5	5637	30.16	22.63	17.51	12.07	8.16	4.02	1.76	
*	1	51.1	5593	29.94	22.49	17.44	12.07	8.19	4.06	1.76	
*	2	77.6	8497	45.98	34.55	26.81	18.61	12.56	6.15	2.74	
*	2	77.8	8525	46.03	34.70	26.96	18.77	12.69	6.21	2.78	
*	2	77.7	8509	46.07	34.78	27.06	18.87	12.78	6.28	2.79	
*	2	77.8	8521	45.85	34.62	26.96	18.81	12.75	6.28	2.78	
*	3	103.7	11361	61.65	46.52V	36.32V	25.30V	17.05	8.25	3.71	
*	3	104.0	11389	62.41	47.19	36.89	25.71	17.30	8.33	3.74	
*	3	103.7	11361	62.54	47.38	37.05	25.84	17.40	8.37	3.76	
*	3	104.0	11397	62.64	47.51	37.17	25.93	17.48	8.42	3.78	
*	4	137.9	15108	82.46V	62.58V	49.08V	34.19V	22.86V	10.81	4.91	Off Range!
*	4	138.3	15155	84.06	63.91	50.17	34.94	23.32	10.92	4.96	Off Range!
*	4	138.1	15135	84.75	64.42	50.60	35.26	23.52	10.99	4.98	Off Range!
*	4	137.8	15096	85.00V	64.67V	50.80V	35.41V	23.62V	11.02	4.99	Off Range!

'ACCEPTED TEST WITH VARIANCE

'TEST OVER 7' DEEP PIPE

Stn: 475 Lane:F1 Temp: J/C: Air: 88 PvT: 91 10:01

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
	C	103.3	11322	68.27	49.48	36.65	23.53	14.79	6.83	3.59	
	C	104.0	11397	63.01	46.71	35.53	23.97	15.85	7.69	3.75	
	C	104.0	11397	61.98	46.33	35.50	24.24	16.20	7.93	3.84	
*	1	50.8	5566	29.23V	21.81V	16.56V	11.27	7.66	3.86	1.73	
*	1	51.2	5605	28.86	21.51	16.37	11.20	7.67	3.93	1.75	
*	1	51.0	5585	28.50	21.24	16.17	11.08	7.61	3.91	1.75	
*	1	50.7	5550	28.27	21.08	16.04	11.01	7.59	3.91	1.75	
*	2	77.7	8509	43.65	32.67	25.01	17.27	11.82	6.00	2.78	
*	2	77.7	8517	43.81	32.89	25.24	17.47	11.98	6.09	2.82	
*	2	77.7	8513	43.84	32.95	25.32	17.56	12.05	6.12	2.83	
*	2	77.7	8513	43.77	32.93	25.33	17.59	12.09	6.17	2.83	
*	3	103.9	11381	58.68	44.12	34.06V	23.62V	16.11	8.09	3.81	
*	3	104.4	11433	59.44	44.78	34.63	24.04	16.39	8.22	3.88	
*	3	104.3	11429	59.62	44.98	34.82	24.19	16.50	8.26	3.90	
*	3	104.3	11429	59.68	45.05	34.89	24.24	16.54	8.28	3.91	
*	4	138.5	15179	78.70V	59.50V	46.27V	32.13V	21.78V	10.66	5.18	
*	4	138.6	15183	80.12	60.69	47.23	32.80	22.19	10.77	5.23	Off Range!
*	4	138.0	15115	80.63	61.08	47.57	33.03	22.33	10.81	5.23	Off Range!
*	4	138.0	15123	80.87V	61.34V	47.81V	33.20V	22.45	10.85	5.22	Off Range!

'ACCEPTED TEST WITH VARIANCE

Stn: 500 Lane:F1 Temp: J/C: Air: 88 PvT: 95 10:04

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.6	11461	58.13	39.31	27.93	16.81	9.83	4.59	2.80
	C	105.7	11580	52.04	36.11	26.47	16.85	10.46	5.10	2.89
	C	105.8	11588	50.75	35.57	26.33	17.02	10.72	5.28	2.93
*	1	51.8	5673	23.36V	16.43V	12.06V	7.77	4.98	2.55	1.33
*	1	51.6	5653	22.93	16.12	11.83	7.65	4.93	2.54	1.33
*	1	51.8	5681	22.77	16.01	11.77	7.62	4.92	2.54	1.33

File: C:\FWD\DATA\310114C1.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	1	52.1	5709	22.65V	15.93V	11.71	7.60	4.92	2.55	1.34
*	2	78.5	8601	35.19	24.83	18.37	12.01	7.78	3.97	2.11
*	2	79.0	8652	35.29	25.02	18.57	12.19	7.91	4.04	2.15
*	2	79.0	8652	35.13	24.95	18.55	12.20	7.94	4.07	2.16
*	2	79.0	8652	35.11	25.00	18.60	12.27	7.99	4.11	2.17
*	3	105.6	11572	47.73	33.93	25.34	16.68V	10.76V	5.41	2.91
*	3	106.2	11640	48.29	34.45	25.81	17.05	11.01	5.52	2.96
*	3	106.2	11636	48.21	34.48	25.87	17.11	11.07	5.54	2.96
*	3	105.9	11604	48.09	34.47	25.89	17.15	11.11	5.57	2.97
*	4	141.0	15445	64.70V	46.40V	34.98V	23.13V	14.87V	7.25V	3.95
*	4	141.0	15445	65.83	47.35	35.81	23.74	15.28	7.40	4.02
*	4	140.6	15409	66.09	47.58	36.04	23.94	15.43	7.48	4.03
*	4	140.8	15421	66.17	47.72	36.19	24.07V	15.54V	7.52	4.05

'ACCEPTED TEST WITH VARIANCE

Stn: 515 Lane:F1 Temp: J/C: Air: 88 PvT: 94 10:07

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.5	11564	52.94	34.95	24.20	14.32	8.55	4.23	2.71
	C	106.2	11632	46.55	31.61	22.59	14.15	8.95	4.57	2.76
	C	106.1	11628	45.19	31.07	22.43	14.26	9.13	4.69	2.78
*	1	51.6	5653	20.90V	14.38V	10.27	6.52	4.24	2.20	1.22
*	1	51.8	5681	20.63	14.18	10.13	6.47	4.23	2.23	1.23
*	1	51.5	5637	20.45	14.06	10.06	6.45	4.24	2.24	1.25
*	1	51.6	5657	20.34	13.99	10.02	6.44	4.24	2.25	1.24
*	2	78.7	8620	31.46	21.78	15.73	10.14	6.65	3.50	2.00
*	2	79.0	8656	31.48	21.88	15.85	10.26	6.74	3.56	2.04
*	2	79.0	8656	31.35	21.83	15.85	10.28	6.76	3.58	2.03
*	2	79.3	8692	31.40	21.92	15.92	10.34	6.80	3.59	2.04
*	3	106.3	11643	42.56	29.73	21.72	14.09	9.18	4.79	2.78
*	3	106.7	11687	42.94	30.15	22.09	14.37	9.37	4.87	2.81
*	3	106.8	11699	42.95	30.25	22.20	14.46	9.44	4.91	2.84
*	3	106.5	11671	42.83	30.23	22.21	14.48	9.46	4.91	2.81
*	4	141.7	15521	57.79V	40.93V	30.22V	19.64V	12.68V	6.44	3.78
*	4	142.2	15584	58.77	41.79	30.95	20.18	13.02	6.58	3.84
*	4	141.7	15525	58.98	42.03	31.17	20.35	13.15	6.60	3.84
*	4	142.1	15568	59.14	42.18	31.33	20.45	13.23	6.67	3.87

'ACCEPTED TEST WITH VARIANCE

Mileage: 0 -> .098

Rename to B

10:08 950721 11.

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

FWD S/N : 8002-130
Operator ID : HENRICKSON, JEFFREY A.

Stationing...: Feet

Diameter of Plate: 11.8
Deflector distances : 8 12 18 24 36 60

SHRP TESTING - FLEXIBLE - BASIN TEST (F0,F1,F3)
Sequence: CCC1111222233334444

Stn: -20 Lane:F3 Temp: J/C: Air: 88 PvT: 98 10:15

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	107.3	11751	34.60	21.84	16.39	11.19	7.74	4.61	2.73
	C	108.0	11830	32.46	21.07	16.09	11.25	7.80	4.72	2.74
	C	107.8	11810	31.78	20.92	16.05	11.29	7.96	4.76	2.74
*	1	52.1	5713	14.89V	9.91V	7.58V	5.29	3.76	2.29	1.28
*	1	52.3	5732	14.62	9.71	7.42	5.19	3.69	2.26	1.27
*	1	52.3	5732	14.54	9.67	7.40	5.19	3.70	2.26	1.27
*	1	52.3	5728	14.49	9.64	7.37	5.17	3.69	2.26	1.28
*	2	79.3	8688	22.29	14.87	11.40	8.07	5.77	3.51	1.99
*	2	80.1	8771	22.35	14.98	11.50	8.15	5.83	3.54	2.02
*	2	80.0	8767	22.34	15.01	11.53	8.19	5.85	3.56	2.02
*	2	80.2	8783	22.26	15.00	11.52	8.19	5.86	3.56	2.02
*	3	107.8	11806	30.30	20.41	15.72	11.17	7.96	4.79	2.73
*	3	108.1	11846	30.44	20.61	15.90	11.30	8.04	4.83	2.74
*	3	108.2	11850	30.47	20.69	15.97	11.35	8.08	4.85	2.74
*	3	108.0	11838	30.43	20.70	15.98	11.37	8.09	4.85	2.76
*	4	143.8	15759	41.00	28.03V	21.68V	15.45	10.93	6.43	3.67
*	4	144.5	15831	41.52	28.50	22.09	15.75	11.12	6.51	3.71
*	4	144.5	15831	41.66	28.66	22.24	15.87	11.19	6.53	3.73
*	4	144.3	15815	41.71	28.72	22.31	15.92	11.23	6.54	3.74

'ACCEPTED TEST WITH VARIANCE

Stn: -10 Lane:F3 Temp: J/C: Air: 90 PvT: 95 10:18

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	106.5	11663	43.79	30.28	22.21	14.24	9.13	4.83	2.99
	C	106.9	11707	40.80	28.79	21.57	14.28	9.42	5.08	3.01
	C	107.0	11727	40.19	28.60	21.55	14.36	9.52	5.15	3.02
*	1	52.3	5732	18.94	13.54	10.19	6.76	4.52	2.48	1.41
*	1	52.5	5756	18.79	13.43	10.12	6.71	4.48	2.48	1.41
*	1	52.8	5784	18.72	13.37	10.09	6.71	4.50	2.50	1.41
*	1	52.4	5740	18.53	13.25	10.00	6.67	4.48	2.48	1.41
*	2	79.3	8684	28.44	20.38	15.42	10.33	6.93	3.80	2.18
*	2	79.4	8696	28.58	20.52	15.54	10.43	7.00	3.85	2.22
*	2	79.8	8740	28.57	20.54	15.57	10.46	7.04	3.87	2.22
*	2	79.7	8736	28.52	20.53	15.58	10.48	7.06	3.88	2.22
*	3	106.9	11715	38.79	27.81	21.08	14.20	9.51	5.19	3.03
*	3	107.0	11727	39.12	28.11	21.33	14.37	9.61	5.22	3.03
*	3	107.3	11759	39.30	28.31	21.50	14.48	9.72	5.28	3.08
*	3	107.2	11743	39.24	28.29	21.50	14.50	9.73	5.28	3.07
*	4	142.4	15604	52.94V	38.28V	29.21V	19.70V	13.12V	6.97	4.09
*	4	142.8	15648	53.87	39.01	29.81	20.15	13.40	7.10	4.14
*	4	142.8	15644	54.08	39.21	29.99	20.28	13.49	7.13	4.15
*	4	142.6	15624	54.24	39.35	30.11	20.37V	13.56	7.18	4.16

'ACCEPTED TEST WITH VARIANCE

Stn: -5 Lane:F3 Temp: J/C: Air: 90 PvT: 97 10:21

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	106.4	11655	45.43	31.82	23.23	14.80	9.24	4.90	3.07
	C	106.8	11703	42.12	30.09	22.47	14.84	9.59	5.19	3.09
	C	107.0	11723	41.46	29.89	22.46	14.96	9.74	5.27	3.10
*	1	52.0	5693	19.35V	14.07	10.49	6.95	4.56	2.50	1.42
*	1	52.1	5705	19.17	13.93	10.39	6.88	4.56	2.51	1.42
*	1	52.1	5709	19.04	13.84	10.35	6.90	4.54	2.52	1.42
*	1	52.1	5709	18.90	13.72	10.25	6.82	4.52	2.51	1.42
*	2	78.8	8628	29.04	21.07	15.84	10.63	7.02	3.88	2.23

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	2	79.0	8652	29.20	21.26	16.00	10.74	7.13	3.93	2.27
*	2	79.4	8704	29.13	21.24	15.98	10.73	7.15	3.93	2.27
*	2	79.7	8728	29.17	21.31	16.06	10.80	7.19	3.96	2.28
*	3	106.6	11679	39.66	28.85	21.83	14.70	9.70	5.30	3.09
*	3	107.1	11731	39.92	29.15	22.06	14.83	9.86	5.34	3.10
*	3	106.7	11691	39.86	29.19	22.13	14.89	9.89	5.36	3.11
*	3	106.9	11707	39.94	29.28	22.19	14.93	9.94	5.38	3.11
*	4	141.9	15548	53.81V	39.45V	30.07V	20.25V	13.39V	7.08	4.16
*	4	142.2	15584	54.57	40.20	30.72	20.73	13.70	7.20	4.21
*	4	142.1	15564	54.83	40.46	30.96	20.92	13.83	7.26	4.22
*	4	142.2	15584	54.92	40.50	31.01	20.97	13.89	7.28	4.22

'ACCEPTED TEST WITH VARIANCE

'LP OVER TEMP HOLE

Stn: 0 Lane:F3 Temp: J/C: Air: 90 PvT: 97 10:26

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.9	11600	50.74	34.76	25.35	16.13	10.12	5.11	3.07
	C	106.1	11628	46.82	32.92	24.58	16.20	10.52	5.44	3.13
	C	106.0	11616	45.90	32.69	24.59	16.37	10.70	5.54	3.15
*	1	51.5	5637	21.56V	15.44V	11.54	7.66	5.08	2.68	1.45
*	1	52.1	5713	21.49	15.40	11.51	7.65	5.07	2.69	1.46
*	1	52.0	5701	21.19	15.21	11.37	7.57	5.05	2.69	1.46
*	1	51.6	5657	21.04	15.11	11.32	7.57	5.05	2.72	1.47
*	2	78.5	8601	32.26	23.20	17.47	11.75	7.83	4.15	2.29
*	2	79.0	8656	32.52	23.47	17.70	11.92	7.94	4.21	2.33
*	2	79.2	8672	32.41	23.45	17.72	11.96	7.98	4.23	2.33
*	2	78.7	8624	32.27	23.40	17.69	11.94	7.98	4.22	2.32
*	3	106.2	11640	43.67	31.61	23.99	16.20	10.76	5.63	3.15
*	3	106.4	11659	43.96	31.98	24.32	16.45	10.92	5.69	3.18
*	3	106.3	11643	43.99	32.06	24.41	16.54	10.98	5.72	3.20
*	3	106.3	11643	44.02	32.15	24.49	16.61	11.04	5.75	3.19
*	4	141.3	15481	58.85V	43.07V	33.00V	22.36V	14.75V	7.49	4.25
*	4	141.7	15521	59.84	43.96	33.76	22.91	15.13	7.64	4.31
*	4	141.4	15489	60.01	44.11	33.92	23.04	15.22	7.69	4.32
*	4	141.3	15481	60.13	44.24	34.04	23.14V	15.31	7.74	4.31

'ACCEPTED TEST WITH VARIANCE

Stn: 25 Lane:F3 Temp: J/C: Air: 90 PvT: 98 10:30

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.4	11548	50.22	32.31	22.64	14.06	8.93	4.81	2.96
	C	105.9	11600	45.83	30.43	21.89	14.13	9.30	5.10	3.03
	C	106.3	11643	44.88	30.17	21.90	14.26	9.44	5.18	3.04
*	1	51.5	5637	21.14V	14.35V	10.29	6.67	4.44	2.44	1.39
*	1	51.8	5673	20.91	14.20	10.22	6.66	4.48	2.48	1.39
*	1	51.7	5665	20.73	14.08	10.12	6.59	4.43	2.46	1.38
*	1	51.9	5685	20.66	14.04	10.11	6.60	4.44	2.47	1.39
*	2	78.2	8573	31.67	21.53	15.64	10.28	6.92	3.84	2.19
*	2	79.0	8652	31.83	21.71	15.81	10.42	7.01	3.88	2.22
*	2	79.1	8664	31.69	21.68	15.80	10.43	7.03	3.89	2.23
*	2	79.0	8656	31.63	21.67	15.81	10.45	7.05	3.91	2.22
*	3	106.4	11659	42.82	29.30	21.50	14.21	9.52	5.24	3.04
*	3	106.6	11679	43.01	29.56	21.74	14.39	9.64	5.29	3.07
*	3	106.6	11675	42.98	29.62	21.81	14.46	9.68	5.31	3.07
*	3	106.2	11640	42.85	29.60	21.83	14.48	9.70	5.32	3.07
*	4	141.6	15509	57.51	39.86V	29.58V	19.63V	13.04V	7.00	4.12
*	4	141.6	15509	58.24	40.57	30.20	20.08	13.33	7.11	4.20
*	4	141.9	15545	58.51	40.83	30.46	20.28	13.47	7.17	4.22
*	4	141.7	15529	58.61	40.94	30.57	20.38V	13.56	7.22	4.22

'ACCEPTED TEST WITH VARIANCE

Stn: 50 Lane:F3 Temp: J/C: Air: 90 PvT: 98 10:33

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.8	11596	45.18	29.52	21.11	13.19	8.41	4.56	2.84
	C	106.5	11671	41.19	27.65	20.22	13.11	8.65	4.80	2.87
	C	106.8	11703	40.30	27.39	20.19	13.19	8.77	4.86	2.89
*	1	51.7	5665	18.97V	13.07	9.48	6.14	4.11	2.27	1.31
*	1	51.8	5681	18.79	12.93	9.38	6.09	4.09	2.28	1.31

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	1	51.9	5689	18.68	12.87	9.35	6.08	4.09	2.28	1.32
*	1	52.1	5709	18.56	12.78	9.30	6.05	4.07	2.28	1.31
*	2	78.8	8632	28.43	19.54	14.36	9.44	6.35	3.57	2.07
*	2	79.4	8696	28.57	19.75	14.54	9.59	6.46	3.63	2.11
*	2	79.2	8680	28.43	19.72	14.53	9.59	6.46	3.63	2.11
*	2	79.3	8684	28.38	19.71	14.53	9.60	6.48	3.65	2.12
*	3	106.2	11640	38.41	26.63	19.75	13.05	8.75	4.88	2.85
*	3	106.5	11663	38.60	26.89	19.98	13.24	8.88	4.94	2.90
*	3	106.5	11663	38.57	26.94	20.05	13.28	8.90	4.94	2.89
*	3	106.6	11675	38.57	27.02	20.12	13.35	8.96	4.98	2.92
*	4	142.2	15576	52.20	36.62V	27.44V	18.22V	12.12V	6.61	3.90
*	4	142.5	15616	52.92	37.39	28.12	18.70	12.44	6.76	3.96
*	4	142.4	15604	53.10	37.63	28.33	18.87	12.56	6.81	3.97
*	4	142.5	15612	53.19	37.76	28.44	18.96V	12.64	6.85	3.98

'ACCEPTED TEST WITH VARIANCE

Stn: 75 Lane:F3 Temp: J/C: Air: 90 PvT: 99 10:36

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.0	11508	50.76	34.31	25.21	16.17	10.44	5.50	3.13
	C	105.8	11588	47.20	32.78	24.63	16.35	10.86	5.81	3.18
	C	105.9	11600	46.58	32.73	24.72	16.52	11.04	5.89	3.21
*	1	51.4	5629	21.72V	15.25V	11.35	7.51	5.06	2.72	1.44
*	1	51.5	5637	21.52	15.11	11.29	7.52	5.11	2.76	1.44
*	1	52.0	5697	21.37	15.01	11.22	7.48	5.09	2.76	1.44
*	1	51.8	5673	21.20V	14.86	11.10	7.41	5.06	2.76	1.44
*	2	78.2	8573	32.82	23.14	17.42	11.70	7.95	4.32	2.30
*	2	78.4	8593	32.87	23.26	17.54	11.81	8.02	4.35	2.31
*	2	78.6	8608	32.87	23.30	17.58	11.85	8.06	4.39	2.32
*	2	78.8	8628	32.81	23.31	17.58	11.85	8.05	4.38	2.32
*	3	105.9	11600	44.61	31.69V	24.03V	16.20V	10.96	5.90	3.19
*	3	106.2	11640	45.00	32.13	24.40	16.47	11.13	5.97	3.22
*	3	106.3	11651	45.31	32.43	24.64	16.65	11.26	6.01	3.25
*	3	105.9	11600	45.19	32.41	24.63	16.64	11.25	6.01	3.24
*	4	141.0	15453	60.83V	43.73V	33.41V	22.55V	15.12V	7.91	4.34
*	4	141.3	15477	61.97	44.74	34.21	23.13	15.48	8.07	4.40
*	4	141.3	15477	62.33	45.04	34.46	23.31	15.61	8.11	4.40
*	4	141.1	15461	62.53	45.16	34.57V	23.38	15.66	8.15	4.41

'ACCEPTED TEST WITH VARIANCE

Stn: 100 Lane:F3 Temp: J/C: Air: 90 PvT: 99 10:40

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	105.0	11504	53.00	36.47	26.54	16.74	10.54	5.38	3.22
	C	105.9	11604	49.69	35.07	26.12	16.98	10.98	5.66	3.28
	C	105.8	11592	49.19	35.00	26.20	17.15	11.14	5.74	3.30
*	1	51.2	5605	23.06V	16.52V	12.30V	8.00	5.21	2.71	1.50
*	1	51.6	5649	22.79	16.31	12.14	7.92	5.18	2.72	1.50
*	1	51.4	5633	22.76	16.29	12.15	7.93	5.19	2.73	1.48
*	1	52.1	5705	22.60V	16.16V	12.06V	7.88	5.18	2.74	1.49
*	2	78.1	8553	34.89	24.94	18.70	12.32	8.11	4.26	2.38
*	2	78.5	8597	35.06	25.12	18.86	12.44	8.19	4.30	2.40
*	2	78.6	8608	35.05	25.15	18.89	12.47	8.22	4.31	2.40
*	2	78.6	8616	34.99	25.13	18.89	12.47	8.20	4.30	2.39
*	3	105.7	11580	47.37	33.93	25.54V	16.88	11.07	5.76	3.28
*	3	106.0	11616	47.83	34.41	25.93	17.15	11.24	5.82	3.31
*	3	105.8	11592	47.97	34.54	26.05	17.23	11.28	5.84	3.31
*	3	105.7	11584	48.04	34.63	26.12	17.28	11.32	5.87	3.32
*	4	140.3	15370	64.30V	46.43V	35.21V	23.32V	15.18V	7.67	4.42
*	4	140.8	15425	65.59	47.54	36.10	23.95	15.54	7.80	4.48
*	4	140.7	15413	65.97	47.85	36.36	24.13	15.67	7.84	4.52
*	4	140.5	15394	66.21	48.00V	36.48V	24.22V	15.73	7.86	4.52

'ACCEPTED TEST WITH VARIANCE

Stn: 125 Lane:F3 Temp: J/C: Air: 90 PvT: 99 10:43

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.5	11445	56.16	37.65	27.15	17.02	10.77	5.72	3.39
	C	105.2	11524	51.92	35.82	26.40	17.08	11.08	5.96	3.44
	C	104.9	11497	51.10	35.59	26.36	17.15	11.18	6.01	3.46
*	1	51.5	5641	24.19V	16.87V	12.36	8.02	5.24	2.83	1.58

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	1	51.4	5633	23.76	16.58	12.17	7.93	5.20	2.83	1.57
*	1	51.3	5625	23.46	16.35	12.03	7.85	5.18	2.83	1.56
*	1	51.2	5605	23.40	16.35	12.04	7.87	5.20	2.83	1.56
*	2	77.8	8529	36.07	25.23	18.67	12.27	8.10	4.39	2.46
*	2	78.0	8549	36.30	25.50	18.90	12.45	8.22	4.46	2.51
*	2	78.0	8549	36.16	25.49	18.90	12.47	8.25	4.48	2.50
*	2	78.0	8541	36.17	25.50	18.92	12.49	8.26	4.49	2.50
*	3	105.4	11544	49.04	34.54V	25.71V	16.91V	11.16	6.02	3.45
*	3	105.3	11540	49.42	35.00	26.09	17.15	11.31	6.07	3.51
*	3	105.0	11500	49.48	35.10	26.17	17.20	11.32	6.08	3.51
*	3	105.1	11516	49.59	35.23	26.26	17.26	11.37	6.10	3.51
*	4	140.1	15354	66.60V	47.51V	35.59V	23.43V	15.31V	8.01	4.80
*	4	140.3	15370	67.72	48.45	36.35	23.92	15.59	8.13	4.82
*	4	140.3	15370	68.17	48.82	36.66	24.12	15.71	8.16	4.83
*	4	140.0	15334	68.36	48.99V	36.80V	24.22	15.78	8.19	4.84

'ACCEPTED TEST WITH VARIANCE

Stn: 150 Lane:F3 Temp: J/C: Air: 90 PvT: 100 10:46

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.4	11437	55.15	37.06	26.70	17.02	11.00	6.00	3.39
	C	105.0	11500	51.17	35.39	26.11	17.13	11.29	6.21	3.41
	C	105.1	11520	50.43	35.30	26.21	17.32	11.47	6.29	3.46
*	1	51.3	5617	23.42V	16.46	12.09	7.97	5.33	2.97	1.57
*	1	51.2	5609	23.30	16.38	12.03	7.94	5.33	2.99	1.58
*	1	51.7	5661	23.05	16.20	11.92	7.89	5.32	3.00	1.59
*	1	51.8	5677	22.94V	16.16	11.91	7.90	5.32	2.99	1.59
*	2	77.8	8529	35.43	24.99	18.53	12.36	8.31	4.63	2.48
*	2	78.5	8605	35.63	25.24	18.77	12.53	8.41	4.69	2.52
*	2	78.4	8585	35.52	25.26	18.78	12.54	8.44	4.73	2.55
*	2	78.5	8601	35.42	25.20	18.77	12.54	8.45	4.71	2.54
*	3	105.1	11516	47.93	34.14V	25.54V	17.06V	11.41	6.31	3.46
*	3	105.7	11576	48.48	34.71	26.04	17.41	11.62	6.40	3.49
*	3	105.5	11556	48.55	34.86	26.18	17.50	11.67	6.41	3.50
*	3	105.4	11548	48.55	34.96	26.28	17.57	11.71	6.43	3.50
*	4	139.8	15322	65.00V	46.94V	35.46V	23.67V	15.69V	8.44	4.67
*	4	140.0	15338	66.24	48.04	36.42	24.33	16.08	8.57	4.72
*	4	139.9	15330	66.70	48.46	36.76	24.56	16.23	8.61	4.73
*	4	140.0	15334	67.03V	48.68V	36.97V	24.72V	16.31	8.67	4.74

'ACCEPTED TEST WITH VARIANCE

Stn: 175 Lane:F3 Temp: J/C: Air: 91 PvT: 100 10:48

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.7	11477	49.26	33.41	24.32	15.60	10.22	5.56	3.23
	C	105.6	11568	46.33	32.26	24.00	15.81	10.58	5.79	3.26
	C	105.6	11568	45.84	32.21	24.11	15.96	10.71	5.87	3.27
*	1	50.9	5581	21.37	15.01	11.07	7.24	4.91	2.73	1.47
*	1	50.9	5573	21.30	14.97	11.06	7.28	4.96	2.74	1.48
*	1	50.9	5573	21.11	14.83	10.97	7.22	4.93	2.74	1.48
*	1	50.9	5573	20.88V	14.68	10.87	7.19	4.92	2.72	1.47
*	2	77.8	8521	32.54	22.96	17.12	11.40	7.76	4.30	2.37
*	2	78.1	8561	32.76	23.19	17.33	11.56	7.87	4.35	2.37
*	2	78.3	8581	32.74	23.20	17.34	11.57	7.88	4.36	2.39
*	2	78.5	8597	32.66	23.15	17.33	11.57	7.89	4.37	2.38
*	3	105.3	11540	44.40	31.46	23.69	15.82	10.71	5.89	3.27
*	3	105.9	11600	44.91	31.96	24.10	16.11	10.89	5.95	3.30
*	3	105.7	11584	45.04	32.12	24.22	16.20	10.94	5.97	3.31
*	3	105.6	11572	45.10	32.20	24.30	16.25	10.98	6.00	3.31
*	4	140.7	15417	60.67V	43.45V	33.02V	22.06V	14.78V	7.90	4.44
*	4	140.8	15429	61.86	44.53	33.90	22.65	15.14	8.04	4.49
*	4	140.5	15398	62.31	44.87	34.17	22.82	15.24	8.07	4.50
*	4	140.8	15425	62.77V	45.17V	34.42V	22.99V	15.36	8.13	4.52

'ACCEPTED TEST WITH VARIANCE

Stn: 200 Lane:F3 Temp: J/C: Air: 91 PvT: 101 10:52

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.2	11417	55.31	37.35	27.28	17.35	10.98	5.73	3.36
	C	104.8	11485	51.50	35.81	26.75	17.53	11.35	5.97	3.41
	C	104.6	11457	50.58	35.56	26.71	17.62	11.45	6.01	3.40

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

*	1	50.8	5569	23.56	16.54	12.34	8.14	5.31	2.81	1.52
*	1	50.7	5554	23.61	16.59	12.38	8.19	5.35	2.85	1.54
*	1	51.1	5597	23.28	16.35	12.20	8.10	5.31	2.84	1.53
*	1	51.4	5633	23.44	16.48	12.30	8.17	5.36	2.87	1.55
*	2	77.6	8501	35.84	25.30	18.98	12.65	8.33	4.46	2.46
*	2	77.7	8509	36.06	25.56	19.19	12.81	8.44	4.51	2.48
*	2	77.9	8533	35.99	25.55	19.19	12.83	8.44	4.50	2.48
*	2	77.8	8525	35.93	25.55	19.20	12.84	8.46	4.50	2.48
*	3	105.0	11504	48.65	34.63	26.13	17.42	11.45	6.06	3.41
*	3	105.1	11516	49.07	35.04	26.49	17.67	11.61	6.12	3.44
*	3	105.1	11516	49.23	35.22	26.64	17.77	11.66	6.13	3.45
*	3	105.1	11516	49.30	35.33	26.74	17.84	11.71	6.14	3.44
*	4	139.7	15306	65.89V	47.44V	36.10V	24.07V	15.65V	8.05	4.60
*	4	139.7	15306	67.07	48.44	36.92	24.62	15.98	8.16	4.67
*	4	139.7	15310	67.59	48.83	37.25	24.85	16.12	8.20	4.70
*	4	139.9	15326	67.83	49.00	37.40	24.97	16.20	8.25	4.68

'ACCEPTED TEST WITH VARIANCE

Stn: 225 Lane:F3 Temp: J/C: Air: 91 PvT: 102 10:55

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	103.6	11350	60.69	41.86	30.75	20.04	13.02	6.80	3.57
	C	104.1	11401	56.69	40.55	30.52	20.56	13.61	7.15	3.67
	C	104.1	11409	55.96	40.54	30.67	20.80	13.80	7.25	3.70
*	1	50.7	5558	26.43V	19.03V	14.30	9.66	6.46	3.44	1.69
*	1	50.5	5534	26.10	18.80	14.14	9.58	6.41	3.43	1.69
*	1	50.8	5569	25.83	18.60	14.03	9.56	6.39	3.45	1.69
*	1	50.9	5573	25.64V	18.47V	13.93	9.48	6.38	3.43	1.67
*	2	77.0	8434	39.44	28.63	21.63	14.79	9.95	5.33	2.68
*	2	77.1	8446	39.65	28.91	21.88	15.00	10.09	5.41	2.71
*	2	77.2	8458	39.56	28.89	21.88	15.01	10.12	5.43	2.73
*	2	77.4	8477	39.68	29.01	21.98	15.09	10.16	5.45	2.74
*	3	104.2	11413	53.48	39.25V	29.84V	20.47V	13.69	7.27	3.72
*	3	104.7	11473	54.20	39.92	30.39	20.83	13.94	7.36	3.74
*	3	104.5	11449	54.36	40.12	30.56	20.97	13.99	7.39	3.74
*	3	104.5	11445	54.36	40.19	30.63	21.02	14.02	7.40	3.75
*	4	138.8	15207	72.31V	53.71V	41.09V	28.15V	18.71V	9.63	4.91
*	4	138.7	15191	73.71	54.99	42.11	28.79	19.19	9.74	4.98
*	4	138.7	15199	74.24	55.48	42.52	29.07	19.36	9.80	5.00
*	4	138.7	15191	74.65V	55.81V	42.80V	29.26V	19.48V	9.85	5.02

'ACCEPTED TEST WITH VARIANCE

Stn: 250 Lane:F3 Temp: J/C: Air: 92 PvT: 102 10:58

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	103.3	11318	59.73	40.14	29.06	18.50	11.87	6.34	3.68
	C	103.9	11385	55.98	38.93	28.91	19.02	12.50	6.66	3.69
	C	104.0	11389	55.07	38.80	29.01	19.24	12.68	6.75	3.71
*	1	50.4	5518	25.93V	18.30V	13.60V	8.94	5.91	3.19	1.65
*	1	50.7	5554	25.49	18.02	13.46	8.91	5.92	3.21	1.67
*	1	50.8	5569	25.29	17.85	13.31	8.81	5.87	3.19	1.65
*	1	50.1	5490	24.94	17.63	13.19	8.76	5.85	3.18	1.65
*	2	76.9	8422	38.76	27.45	20.61	13.80	9.23	5.00	2.66
*	2	77.3	8465	39.04	27.76	20.89	14.01	9.37	5.06	2.68
*	2	77.4	8485	38.96	27.78	20.92	14.06	9.41	5.09	2.68
*	2	77.4	8485	38.91	27.78	20.94	14.09	9.44	5.11	2.71
*	3	104.4	11437	52.63	37.56V	28.31V	19.02V	12.68V	6.80	3.66
*	3	104.7	11469	53.19	38.16	28.80	19.37	12.90	6.89	3.70
*	3	104.6	11461	53.41	38.40	29.00	19.52	13.00	6.92	3.70
*	3	104.6	11461	53.44	38.51	29.07	19.58	13.05	6.94	3.71
*	4	138.9	15219	71.22V	51.53V	39.13V	26.35V	17.39V	9.02	4.87
*	4	139.1	15243	72.57	52.70	40.09	27.02	17.80	9.16	4.93
*	4	139.0	15227	72.98	53.06	40.40	27.24	17.93	9.20	4.93
*	4	138.7	15191	73.31V	53.34V	40.62V	27.42V	18.04V	9.24	4.91

'ACCEPTED TEST WITH VARIANCE

Stn: 275 Lane:F3 Temp: J/C: Air: 92 PvT: 103 11:02

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.4	11437	55.35	37.16	26.33	16.43	10.45	5.63	3.20
	C	104.8	11485	51.37	35.71	26.04	16.80	10.94	5.87	3.24

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

	C	105.0	11500	50.71	35.62	26.18	17.00	11.11	5.95	3.26
*	1	50.6	5546	23.59V	16.63V	12.04V	7.76	5.14	2.75	1.42
*	1	50.9	5573	23.29	16.41	11.91	7.69	5.12	2.75	1.44
*	1	50.5	5538	23.12	16.29	11.83	7.67	5.12	2.77	1.44
*	1	50.8	5569	23.02	16.19V	11.76	7.63	5.11	2.78	1.43
*	2	77.2	8458	35.67	25.15	18.47	12.07	8.04	4.35	2.32
*	2	77.9	8537	36.02	25.47	18.74	12.27	8.18	4.43	2.37
*	2	77.8	8529	35.93	25.43	18.73	12.26	8.17	4.43	2.35
*	2	77.6	8501	35.74	25.33	18.69	12.25	8.18	4.43	2.35
*	3	104.8	11481	48.63	34.43	25.54V	16.73V	11.09	5.96	3.24
*	3	105.1	11512	49.10	34.90	25.94	17.00	11.26	6.02	3.27
*	3	104.9	11489	49.24	35.07	26.10	17.11	11.31	6.05	3.28
*	3	105.0	11504	49.33	35.21	26.22	17.19	11.37	6.07	3.29
*	4	139.7	15310	66.25V	47.39V	35.50V	23.24V	15.21V	7.96	4.40
*	4	140.0	15334	67.54	48.50	36.43	23.85	15.58	8.10	4.45
*	4	139.8	15318	68.10	48.98	36.84	24.12	15.74	8.16	4.48
*	4	140.0	15342	68.39	49.24V	37.07V	24.28V	15.84	8.19	4.48

'ACCEPTED TEST WITH VARIANCE

Stn: 300 Lane:F3 Temp: J/C: Air: 93 PvT: 103 11:05

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	103.7	11365	61.10	41.36	29.54	18.20	11.26	5.70	3.43
	C	104.3	11425	57.23	40.00	29.35	18.67	11.85	6.03	3.41
	C	104.4	11433	56.61	39.99	29.54	18.91	12.08	6.13	3.43
*	1	50.6	5546	26.73V	18.84V	13.79	8.76	5.61	2.85	1.50
*	1	50.5	5530	26.33	18.57	13.63	8.70	5.63	2.87	1.51
*	1	50.4	5522	26.14	18.41	13.52	8.65	5.61	2.88	1.54
*	1	50.7	5558	26.00V	18.32V	13.48	8.65	5.61	2.86	1.50
*	2	77.0	8434	39.85	28.25	20.83	13.46	8.74	4.51	2.44
*	2	77.6	8501	40.26	28.64	21.19	13.71	8.92	4.59	2.47
*	2	77.8	8521	40.33	28.75	21.28	13.79	8.97	4.63	2.49
*	2	78.1	8557	40.35	28.79	21.32	13.83	9.00	4.65	2.49
*	3	105.0	11504	54.33	38.83V	28.89V	18.72	12.13	6.19	3.41
*	3	104.8	11481	54.76	39.26	29.24	18.96	12.27	6.24	3.44
*	3	104.8	11481	54.93	39.43	29.39	19.06	12.32	6.27	3.45
*	3	105.0	11504	55.09	39.61	29.54	19.16	12.39	6.28	3.44
*	4	139.3	15262	73.36V	52.99V	39.71V	25.76V	16.48V	8.17	4.60
*	4	139.5	15282	74.73	54.22	40.69	26.42	16.85	8.32	4.65
*	4	139.2	15255	75.34	54.72	41.09	26.69	17.02	8.39	4.66
*	4	139.0	15235	75.53V	54.93V	41.26V	26.80V	17.09V	8.41	4.71

'ACCEPTED TEST WITH VARIANCE

Stn: 325 Lane:F3 Temp: J/C: Air: 93 PvT: 104 11:08

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	104.2	11421	55.68	38.11	27.62	17.34	10.97	5.81	3.34
	C	104.7	11469	52.50	36.99	27.50	17.80	11.49	6.07	3.37
	C	104.6	11465	52.00	36.99	27.66	18.00	11.67	6.15	3.38
*	1	51.1	5597	24.59V	17.45V	13.01V	8.39	5.44	2.89	1.51
*	1	50.7	5550	24.16	17.13	12.76	8.25	5.39	2.86	1.50
*	1	50.7	5558	23.97	16.98	12.68	8.22	5.38	2.87	1.51
*	1	51.0	5589	23.86V	16.90V	12.61V	8.19	5.38	2.88	1.50
*	2	77.4	8485	36.83	26.20	19.57	12.83	8.44	4.52	2.44
*	2	77.6	8505	36.95	26.38	19.75	12.98	8.54	4.56	2.44
*	2	78.2	8565	37.06	26.48	19.83	13.04	8.59	4.61	2.46
*	2	78.0	8541	36.94	26.43	19.79	13.03	8.59	4.60	2.46
*	3	104.7	11469	49.99	35.83V	26.96V	17.74V	11.61	6.15	3.36
*	3	105.1	11512	50.71	36.47	27.46	18.08	11.82	6.23	3.42
*	3	105.0	11504	50.83	36.61	27.59	18.17	11.87	6.24	3.42
*	3	104.7	11477	50.91	36.72	27.67	18.22	11.91	6.26	3.41
*	4	139.8	15314	68.31V	49.42V	37.43V	24.63V	15.96V	8.22	4.57
*	4	139.5	15282	69.54	50.46	38.26	25.18	16.28	8.34	4.63
*	4	140.1	15346	70.22	51.00	38.67	25.45	16.44	8.40	4.64
*	4	140.0	15334	70.59V	51.26V	38.87V	25.59V	16.52	8.44	4.67

'ACCEPTED TEST WITH VARIANCE

Stn: 350 Lane:F3 Temp: J/C: Air: 93 PvT: 104 11:11

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	103.8	11369	59.74	41.31	30.46	19.62	12.54	6.48	3.46

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

	C	104.4	11437	55.44	39.59	29.88	19.82	12.97	6.75	3.49
	C	104.5	11445	54.74	39.50	29.96	19.95	13.11	6.83	3.51
*	1	50.7	5550	25.51V	18.33V	13.80V	9.16	6.08	3.21	1.57
*	1	50.9	5581	25.25	18.15	13.69	9.07	6.03	3.19	1.59
*	1	50.8	5566	25.05	17.99	13.59	9.02	6.02	3.20	1.59
*	1	50.8	5569	24.76V	17.78V	13.45	8.95	5.99	3.20	1.58
*	2	77.2	8461	38.45	27.78	21.02	14.09	9.39	4.99	2.52
*	2	77.9	8537	38.85	28.18	21.37	14.34	9.57	5.09	2.57
*	2	77.6	8501	38.75	28.16	21.35	14.34	9.57	5.07	2.57
*	2	77.7	8517	38.72	28.16	21.36	14.35	9.58	5.09	2.58
*	3	104.6	11457	52.45	38.17V	29.06V	19.52V	12.97	6.81	3.48
*	3	104.7	11473	53.12	38.78	29.58	19.87	13.18	6.91	3.51
*	3	104.6	11461	53.32	38.98	29.74	19.97	13.24	6.93	3.54
*	3	104.7	11477	53.48	39.13	29.85	20.05	13.30	6.95	3.52
*	4	138.8	15207	71.35V	52.33V	40.11V	26.87V	17.70V	9.09	4.69
*	4	139.1	15243	72.95	53.64	41.15	27.56	18.13	9.26	4.78
*	4	138.8	15207	73.41	54.00	41.44	27.76	18.24	9.29	4.78
*	4	138.7	15191	73.82V	54.30V	41.67V	27.92V	18.33V	9.32	4.79

'ACCEPTED TEST WITH VARIANCE

Stn: 375 Lane:F3 Temp: J/C: Air: 93 PvT: 105 11:14

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	103.5	11338	59.56	39.70	28.96	18.45	11.70	5.95	3.31
	C	104.2	11417	55.00	37.90	28.25	18.56	12.09	6.20	3.35
	C	104.4	11437	54.27	37.85	28.31	18.70	12.24	6.27	3.38
*	1	50.7	5550	25.35V	17.60V	12.97V	8.57	5.61	2.87	1.47
*	1	50.7	5558	25.01	17.33	12.80	8.46	5.57	2.87	1.47
*	1	50.4	5526	24.50	16.97	12.55	8.34	5.50	2.85	1.45
*	1	50.6	5546	24.45V	16.95	12.57	8.35	5.52	2.85	1.45
*	2	77.2	8458	38.07	26.58	19.82	13.20	8.75	4.54	2.40
*	2	77.7	8509	38.37	26.93	20.11	13.43	8.91	4.61	2.43
*	2	77.6	8505	38.22	26.82	20.04	13.39	8.88	4.61	2.41
*	2	77.5	8493	38.15	26.83	20.04	13.41	8.92	4.63	2.44
*	3	104.5	11449	51.85	36.57V	27.48V	18.33V	12.13	6.26	3.35
*	3	104.5	11453	52.43	37.12	27.90	18.62	12.30	6.32	3.41
*	3	104.5	11453	52.64	37.37	28.09	18.76	12.39	6.36	3.41
*	3	104.8	11481	52.73	37.48	28.19	18.82	12.43	6.38	3.42
*	4	139.0	15235	70.48V	50.40V	38.13V	25.44V	16.65V	8.40	4.59
*	4	139.1	15239	71.89	51.57	39.04	26.04	17.04	8.54	4.64
*	4	139.6	15290	72.43	52.03	39.38	26.25	17.15	8.58	4.66
*	4	139.2	15251	72.63	52.22V	39.54V	26.36V	17.24	8.60	4.67

'ACCEPTED TEST WITH VARIANCE

Stn: 400 Lane:F3 Temp: J/C: Air: 93 PvT: 105 11:17

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
	C	102.1	11191	70.44	50.61	38.18	25.19	16.31	8.01	3.70	
	C	102.6	11242	66.94	49.64	38.19	25.87	17.05	8.40	3.78	
	C	102.5	11234	66.63	49.89	38.51	26.20	17.28	8.51	3.82	
*	1	50.0	5482	31.83V	23.78V	18.19V	12.32V	8.15	4.08	1.70	
*	1	50.8	5569	31.52	23.50	17.97	12.18	8.09	4.09	1.73	
*	1	50.3	5506	30.95	23.10	17.69	12.04	8.04	4.08	1.72	
*	1	50.1	5486	30.68V	22.89	17.56	11.98	8.03	4.08	1.73	
*	2	76.2	8350	47.46	35.59	27.42	18.80	12.53	6.32	2.77	
*	2	76.9	8422	48.06	36.15	27.87	19.14	12.77	6.43	2.82	
*	2	76.9	8426	48.11	36.20	27.92	19.17	12.79	6.44	2.82	
*	2	76.9	8422	48.05	36.20	27.93	19.19	12.81	6.45	2.83	
*	3	103.3	11314	64.27V	48.43V	37.51V	25.77V	17.17V	8.56	3.83	
*	3	103.2	11302	65.19	49.28	38.21	26.22	17.42	8.63	3.85	
*	3	103.3	11314	65.60	49.65	38.50	26.41	17.50	8.65	3.85	
*	3	103.4	11326	65.84	49.88	38.68	26.52	17.56	8.67	3.86	
*	4	137.0	15012	86.26V	65.54V	51.06V	35.00V	23.09V	11.22	5.10	Off Range!
*	4	136.9	14996	88.12	67.17	52.37	35.83	23.54	11.34	5.15	Off Range!
*	4	136.9	15000	89.13	68.08	53.07	36.27	23.76	11.38	5.16	Off Range!
*	4	136.8	14988	89.61V	68.59V	53.48V	36.53V	23.89V	11.41	5.17	Off Range!

'ACCEPTED TEST WITH VARIANCE

Stn: 425 Lane:F3 Temp: J/C: Air: 93 PvT: 105 11:20

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

	Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
		C	104.2	11421	55.74	36.68	26.67	17.02	10.99	5.86	3.27
		C	104.7	11477	51.07	35.01	26.06	17.17	11.35	6.11	3.29
		C	105.0	11504	50.20	34.87	26.11	17.30	11.48	6.17	3.31
*		1	51.0	5589	23.30V	16.19	11.97	7.89	5.33	2.88	1.44
*		1	51.3	5617	23.17	16.10	11.91	7.87	5.34	2.90	1.46
*		1	51.5	5641	23.09	16.06	11.88	7.87	5.35	2.90	1.46
*		1	51.6	5657	22.82V	15.85V	11.74V	7.78	5.29	2.88	1.44
*		2	77.8	8521	35.22	24.65	18.39	12.31	8.33	4.53	2.35
*		2	78.3	8577	35.46	24.91	18.62	12.49	8.45	4.61	2.39
*		2	78.2	8565	35.35	24.88	18.60	12.49	8.46	4.61	2.37
*		2	78.3	8581	35.28	24.89	18.61	12.52	8.49	4.62	2.41
*		3	105.0	11508	48.01	33.88	25.45V	17.09	11.45	6.20	3.28
*		3	105.3	11540	48.47	34.41	25.88	17.38	11.62	6.28	3.31
*		3	105.5	11556	48.62	34.56	26.00	17.48	11.72	6.30	3.33
*		3	105.4	11552	48.69	34.63	26.07	17.53	11.74	6.32	3.33
*		4	140.4	15386	65.40V	46.73V	35.33V	23.70V	15.69V	8.28	4.51
*		4	140.6	15409	66.67	47.82	36.19	24.26	16.02	8.41	4.55
*		4	140.9	15433	67.19	48.25	36.51	24.47	16.15	8.45	4.56
*		4	140.4	15382	67.44V	48.46V	36.68V	24.58V	16.22	8.46	4.57

Stn: 450 Lane:F3 Temp: J/C: Air: 93 PvT: 106 11:23

	Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
		C	105.2	11524	58.41	39.29	28.73	18.57	12.01	6.16	3.34
		C	104.6	11457	52.90	36.92	27.73	18.59	12.40	6.45	3.36
		C	104.9	11489	52.13	36.81	27.80	18.78	12.57	6.56	3.39
*		1	50.8	5569	24.54V	17.30V	12.96V	8.76	5.91	3.15	1.47
*		1	50.9	5581	24.35	17.17	12.88	8.75	5.93	3.15	1.48
*		1	51.4	5633	24.15	17.03	12.79	8.70	5.91	3.14	1.46
*		1	51.3	5621	23.81V	16.76V	12.60V	8.58	5.84	3.13	1.47
*		2	77.6	8497	36.89	26.10	19.70	13.45	9.12	4.84	2.37
*		2	78.1	8557	37.20	26.39	19.97	13.65	9.27	4.92	2.41
*		2	78.2	8569	37.17	26.39	19.97	13.67	9.28	4.93	2.41
*		2	77.6	8505	36.90	26.23	19.86	13.61	9.24	4.93	2.39
*		3	105.1	11520	50.15	35.61V	27.09V	18.53	12.52	6.57	3.33
*		3	105.2	11528	50.62	36.07	27.46	18.80	12.69	6.64	3.34
*		3	104.7	11477	50.63	36.15	27.55	18.85	12.72	6.65	3.32
*		3	104.8	11485	50.71	36.25	27.64	18.91	12.76	6.66	3.33
*		4	139.6	15298	67.87V	48.70V	37.28V	25.45V	17.06V	8.72	4.43
*		4	139.6	15290	69.09	49.74	38.10	26.02	17.43	8.84	4.45
*		4	139.7	15302	69.62	50.19	38.48	26.31	17.59	8.91	4.48
*		4	139.4	15278	69.79	50.35V	38.62V	26.42V	17.69	8.94	4.49

'ACCEPTED TEST WITH VARIANCE

Stn: 475 Lane:F3 Temp: J/C: Air: 93 PvT: 105 11:26

	Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
		C	104.7	11477	61.94	42.30	30.12	18.77	11.83	6.30	3.31
		C	104.2	11413	56.17	39.72	29.19	18.96	12.31	6.54	3.32
		C	104.0	11397	55.20	39.44	29.19	19.11	12.49	6.61	3.33
*		1	51.0	5589	26.23V	18.68V	13.77V	8.98	5.90	3.14	1.52
*		1	50.8	5566	25.57	18.19	13.44	8.81	5.83	3.15	1.50
*		1	50.9	5577	25.58	18.23	13.49	8.89	5.88	3.17	1.51
*		1	51.0	5585	25.33V	18.04V	13.37	8.83	5.80	3.15	1.51
*		2	77.4	8481	39.12	27.96	20.67	13.71	9.12	4.90	2.41
*		2	77.4	8481	39.18	28.08	20.81	13.83	9.20	4.93	2.43
*		2	78.0	8541	39.29	28.21	20.91	13.91	9.26	4.96	2.45
*		2	77.8	8525	39.21	28.15	20.89	13.91	9.28	4.99	2.46
*		3	104.4	11441	52.96	38.13V	28.38V	18.87	12.49	6.65	3.35
*		3	104.6	11461	53.49	38.64	28.78	19.15	12.66	6.72	3.37
*		3	104.6	11461	53.75	38.92	29.00	19.29	12.76	6.75	3.40
*		3	104.6	11465	53.77	38.99	29.06	19.34	12.79	6.76	3.41
*		4	139.3	15259	71.76V	52.27V	39.12V	25.96V	17.04V	8.85	4.55
*		4	138.9	15219	73.28	53.52	40.05	26.61	17.38	8.96	4.63
*		4	138.9	15215	73.75	54.00	40.39	26.85	17.53	9.03	4.63
*		4	138.8	15203	74.01V	54.26V	40.57V	26.98V	17.61	9.05	4.62

'ACCEPTED TEST WITH VARIANCE

Stn: 500 Lane:F3 Temp: J/C: Air: 93 PvT: 106 11:29

	Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
		C	106.1	11620	51.59	33.11	23.15	14.24	8.97	4.95	2.87

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HERRON, NB
Subsection: 310114

	C	105.3	11540	46.48	31.13	22.40	14.37	9.31	5.07	2.85
	C	105.6	11572	45.58	30.99	22.43	14.49	9.45	5.12	2.86
*	1	51.1	5597	21.57	14.61	10.40	6.72	4.39	2.36	1.27
*	1	51.0	5589	21.36	14.46	10.32	6.69	4.39	2.38	1.26
*	1	51.0	5585	21.14	14.33	10.23	6.67	4.39	2.39	1.26
*	1	51.1	5597	21.07	14.28	10.20	6.63	4.37	2.37	1.28
*	2	77.8	8525	32.30	22.08	15.96	10.43	6.90	3.76	2.03
*	2	78.2	8573	32.38	22.25	16.12	10.57	7.00	3.81	2.05
*	2	78.4	8589	32.31	22.24	16.15	10.60	7.00	3.83	2.08
*	2	78.3	8577	32.20	22.21	16.11	10.57	7.01	3.82	2.07
*	3	105.6	11568	43.59	30.13	22.02	14.44	9.45	5.15	2.83
*	3	105.6	11572	43.75	30.43	22.24	14.54	9.60	5.20	2.88
*	3	105.6	11568	43.82	30.54	22.33	14.62	9.65	5.21	2.87
*	3	105.8	11596	43.92	30.69	22.46	14.72	9.71	5.24	2.90
*	4	140.9	15437	59.04V	41.48V	30.54V	19.93V	13.01V	6.91	3.88
*	4	140.9	15433	59.82	42.22	31.15	20.35	13.28	6.98	3.94
*	4	140.9	15433	60.17	42.52	31.41	20.54	13.38	7.04	3.93
*	4	141.0	15449	60.41	42.71	31.59	20.68V	13.48	7.08	3.95

'ACCEPTED TEST WITH VARIANCE

Stn: 505 Lane:F3 Temp: J/C: Air: 93 PvT: 108 11:32

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	106.1	11624	48.50	29.77	20.57	12.74	8.17	4.83	2.89
	C	105.5	11556	43.09	27.85	19.82	12.73	8.40	4.93	2.87
	C	105.9	11604	42.19	27.76	19.89	12.85	8.51	4.98	2.87
*	1	50.7	5550	19.71V	12.93V	9.13	5.85	3.91	2.24	1.26
*	1	51.1	5593	19.50	12.80	9.06	5.85	3.92	2.26	1.26
*	1	51.1	5601	19.37	12.74	9.02	5.83	3.93	2.26	1.28
*	1	51.2	5609	19.26V	12.65	8.98	5.83	3.92	2.28	1.25
*	2	78.3	8581	29.72	19.69	14.10	9.19	6.19	3.59	2.03
*	2	78.2	8573	29.76	19.84	14.24	9.33	6.28	3.67	2.07
*	2	78.6	8612	29.63	19.78	14.21	9.31	6.26	3.66	2.06
*	2	78.4	8589	29.51	19.73	14.17	9.26	6.26	3.64	2.07
*	3	106.0	11616	40.27	27.00	19.50	12.74	8.52	4.96	2.85
*	3	105.7	11576	40.39	27.24	19.71	12.86	8.60	4.99	2.86
*	3	106.4	11659	40.60	27.43	19.85	12.95	8.67	5.02	2.88
*	3	106.0	11616	40.57	27.52	19.92	13.02	8.70	5.03	2.89
*	4	141.6	15513	54.95V	37.46V	27.27V	17.76V	11.69V	6.72	3.93
*	4	141.7	15525	55.71	38.18	27.81	18.06	11.93	6.78	3.99
*	4	141.9	15545	56.07	38.46	28.06	18.27	12.07	6.83	4.02
*	4	141.6	15513	56.13	38.52	28.13	18.31	12.11	6.83	4.01

'ACCEPTED TEST WITH VARIANCE

Stn: 515 Lane:F3 Temp: J/C: Air: 93 PvT: 103 11:35

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
	C	106.0	11612	52.20	31.97	21.46	12.71	7.94	4.66	2.87
	C	105.4	11544	45.31	29.18	20.30	12.63	8.18	4.74	2.80
	C	105.8	11596	44.22	28.95	20.35	12.78	8.31	4.80	2.82
*	1	51.1	5593	20.58V	13.47V	9.37	5.82	3.78	2.16	1.20
*	1	51.2	5613	20.35	13.28	9.29	5.82	3.80	2.20	1.21
*	1	51.5	5637	20.21	13.23	9.25	5.78	3.77	2.16	1.22
*	1	51.2	5609	20.00	13.07	9.18	5.76	3.78	2.19	1.20
*	2	77.8	8529	30.90	20.34	14.37	9.09	5.98	3.47	2.00
*	2	78.3	8577	30.96	20.50	14.51	9.20	6.06	3.50	2.02
*	2	78.4	8593	30.85	20.43	14.49	9.20	6.05	3.52	2.01
*	2	78.5	8597	30.84	20.48	14.53	9.23	6.07	3.51	2.02
*	3	105.7	11580	42.01	28.01	19.98	12.67	8.29	4.79	2.81
*	3	105.9	11600	42.21	28.29	20.24	12.86	8.41	4.85	2.82
*	3	105.8	11592	42.19	28.35	20.29	12.91	8.44	4.84	2.84
*	3	105.8	11588	42.12	28.35	20.29	12.91	8.43	4.81	2.78
*	4	141.2	15473	57.34V	38.93V	27.87V	17.64V	11.41V	6.50	3.93
*	4	141.4	15497	58.35	39.77	28.54	18.08	11.67	6.60	3.98
*	4	141.9	15552	58.62	40.06	28.79	18.24	11.78	6.67	3.98
*	4	141.4	15497	58.74	40.15	28.89V	18.32V	11.82	6.68	3.96

'ACCEPTED TEST WITH VARIANCE

Stn: 520 Lane:F3 Temp: J/C: Air: 93 PvT: 105 11:38

Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7

File: C:\FWD\DATA\310114C3.FWD
Road: US-81, SB LANES, 10 MILES S. OF HEBRON, NB
Subsection: 310114

	Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7
		C	104.6	11465	56.05	33.35	21.32	12.10	7.44	4.39	2.82
		C	105.3	11540	48.62	30.34	20.26	12.15	7.77	4.54	2.84
		C	105.5	11560	47.18	29.94	20.23	12.28	7.90	4.61	2.81
*		1	51.3	5617	22.27V	14.01	9.37	5.72	3.67	2.11	1.22
*		1	51.1	5601	21.84	13.76	9.22	5.66	3.66	2.11	1.19
*		1	50.9	5577	21.70	13.69	9.19	5.66	3.65	2.11	1.20
*		1	51.2	5609	21.62	13.61	9.15	5.62	3.64	2.11	1.20
*		2	77.6	8505	32.99	21.02	14.24	8.82	5.75	3.31	1.91
*		2	78.0	8545	33.00	21.14	14.37	8.94	5.84	3.38	1.99
*		2	78.0	8549	32.91	21.13	14.39	8.96	5.85	3.40	1.97
*		2	78.1	8561	32.85	21.13	14.39	8.97	5.86	3.41	2.00
*		3	105.5	11556	44.48	28.69	19.65	12.17	7.94	4.61	2.74
*		3	105.5	11564	44.67	28.96	19.89	12.35	8.04	4.67	2.76
*		3	105.2	11524	44.58	29.04	19.95	12.39	8.07	4.67	2.78
*		3	105.4	11548	44.59	29.06	20.00	12.44	8.09	4.67	2.76
*		4	141.0	15449	60.58V	39.82V	27.57V	17.02V	10.92V	6.22	3.90
*		4	141.4	15489	61.44	40.54	28.14	17.38	11.14	6.33	3.96
*		4	141.1	15461	61.73	40.75	28.33	17.51	11.22	6.39	3.96
*		4	141.0	15453	61.86	40.80	28.38	17.56	11.26	6.42	3.95

'ACCEPTED TEST WITH VARIANCE

Stn: 463 Lane:F3 Temp: J/C: Air: 93 PvT: 108 11:42

	Sto	Hgt	psi	lbf	Df1	Df2	Df3	Df4	Df5	Df6	Df7	
		C	101.8	11151	75.22	52.45	38.63	24.88	15.92	7.41	3.30	
		C	102.8	11262	65.65	47.13	35.56	23.85	15.93	7.85	3.42	
		C	103.1	11294	63.56	46.04	35.02	23.69	15.91	7.93	3.46	
*		1	50.4	5518	30.74V	22.10V	16.65V	11.18	7.59	3.79	1.52	
*		1	50.5	5534	30.19	21.70	16.40	11.06	7.56	3.80	1.55	
*		1	50.8	5566	30.01	21.56	16.32	11.04	7.57	3.83	1.54	
*		1	50.5	5538	29.79V	21.44	16.22	11.00	7.56	3.83	1.54	
*		2	76.8	8410	45.09	32.67	24.89	17.02	11.63	5.93	2.52	
*		2	77.1	8440	45.11	32.81	25.04	17.14	11.72	5.96	2.53	
*		2	77.0	8434	44.95	32.75	25.02	17.13	11.74	5.99	2.53	
*		2	76.8	8418	44.78	32.66	24.96	17.09	11.72	5.99	2.54	
*		3	103.8	11373	59.99	43.85	33.68	23.06	15.70	7.98	3.49	
*		3	103.6	11350	60.27	44.23	34.01	23.26	15.82	8.02	3.52	
*		3	103.4	11330	60.21	44.30	34.09	23.33	15.85	8.04	3.50	
*		3	103.5	11342	60.26	44.36	34.17	23.37	15.90	8.06	3.51	
*		4	137.6	15072	79.17V	58.61V	45.33V	31.00V	20.90V	10.46	4.72	Off Range!
*		4	137.6	15072	80.62	59.79	46.30	31.63	21.22	10.50	4.72	Off Range!
*		4	137.3	15044	80.91	60.04	46.50	31.76	21.28	10.53	4.73	Off Range!
*		4	137.1	15024	81.11	60.23	46.66	31.87	21.35	10.56	4.76	Off Range!

'ACCEPTED TEST WITH VARIANCE

'TEST OVER 7' DEEP PIPE

Mileage:-.004 -> .098

Summary of Data for section 3101141
Analyzed by: Bob Van Sambeek on 08-02-1995

OWP (F3) Data

UNCORRECTED Overall Deflection Statistics

Mean Values (mils/kip)

Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
3	1	4.0905	2.8667	2.1178	1.3960	0.9303	0.5020	0.2600
	2	4.0922	2.8927	2.1559	1.4380	0.9622	0.5202	0.2756
	3	4.1346	2.9463	2.2110	1.4762	0.9824	0.5250	0.2829
	4	4.2499	3.0612	2.3146	1.5450	1.0178	0.5288	0.2891

Standard Deviations

Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
3	1	0.6528	0.5211	0.4162	0.2903	0.1943	0.0873	0.0256
	2	0.6518	0.5265	0.4214	0.2967	0.1983	0.0890	0.0276
	3	0.6560	0.5336	0.4287	0.3011	0.1997	0.0877	0.0279
	4	0.6667	0.5456	0.4393	0.3068	0.2008	0.0843	0.0266

Coefficient of Variation

Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
3	1	15.96%	18.18%	19.65%	20.79%	20.89%	17.39%	9.83%
	2	15.93%	18.20%	19.55%	20.63%	20.61%	17.10%	10.01%
	3	15.87%	18.11%	19.39%	20.40%	20.32%	16.70%	9.88%
	4	15.69%	17.82%	18.98%	19.86%	19.73%	15.94%	9.19%

Flexible Pavement Deflection Statistics - 3101141

Mean Values (mils/kip)

Test Loc.	Drop Ht	CORRECTED Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
3	1	3.1755	2.8667	2.1178	1.3960	0.9303	0.5020	0.2600
	2	3.1797	2.8927	2.1559	1.4380	0.9622	0.5202	0.2756
	3	3.2158	2.9463	2.2110	1.4762	0.9824	0.5250	0.2829
	4	3.3109	3.0612	2.3146	1.5450	1.0178	0.5288	0.2891

Standard Deviations

Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
3	1	0.4945	0.5211	0.4162	0.2903	0.1943	0.0873	0.0256
	2	0.4965	0.5265	0.4214	0.2967	0.1983	0.0890	0.0276
	3	0.5014	0.5336	0.4287	0.3011	0.1997	0.0877	0.0279
	4	0.5107	0.5456	0.4393	0.3068	0.2008	0.0843	0.0266

Coefficient of Variation

Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
3	1	15.57%	18.18%	19.65%	20.79%	20.89%	17.39%	9.83%
	2	15.62%	18.20%	19.55%	20.63%	20.61%	17.10%	10.01%
	3	15.59%	18.11%	19.39%	20.40%	20.32%	16.70%	9.88%
	4	15.42%	17.82%	18.98%	19.86%	19.73%	15.94%	9.19%

Outlier Statistics - 3101141

Station	Height	Sensor	Number of Std. Dev.
-20	1	1	-2.26
-20	1	2	-2.24
-20	2	1	-2.27
-20	2	2	-2.25
-20	2	3	-2.00
-20	3	1	-2.28
-20	3	2	-2.26
-20	3	3	-2.03
-20	4	1	-2.34
-20	4	2	-2.31
-20	4	3	-2.09
-20	4	7	-2.04
400	1	1	2.48
400	1	2	2.62
400	1	3	2.70
400	1	4	2.77
400	1	5	2.76
400	1	6	2.74
400	1	7	2.04
400	2	1	2.52
400	2	2	2.65
400	2	3	2.73
400	2	4	2.80
400	2	5	2.78
400	2	6	2.73
400	2	7	2.13
400	3	1	2.53
400	3	2	2.65
400	3	3	2.72
400	3	4	2.80
400	3	5	2.79
400	3	6	2.71
400	3	7	2.05
400	4	1	2.49
400	4	2	2.62
400	4	3	2.70
400	4	4	2.77
400	4	5	2.76
400	4	6	2.69
400	4	7	2.03
463	1	2	2.02
463	1	3	2.02
463	1	4	2.08
463	1	5	2.25
463	1	6	2.13
463	2	5	2.15
463	2	6	2.11
463	3	5	2.06
463	3	6	2.08

Outlier Statistics - 3101141

Station	Height	Sensor	Number of Std. Dev.
463	4	6	2.01

Pavement Construction Information - 3101141

Material Code	Material Name	Layer Thickness
700	Asphaltic Concrete	5.2
304	Crushed Gravel	12.0

Assume

Depth to rigid foundation: 100.0 ft.

FLEXIBLE Pavement Thickness Data - 3101141
(comparison of each calculation to the expected value)

Minimum expected SN value: 2.90
Maximum expected SN value: 4.50

Height	Station	Effective SN
1	100	2.90
3	100	2.90
4	100	2.90
1	125	2.85
2	125	2.90
3	125	2.85
4	125	2.85
1	200	2.90
3	200	2.90
4	200	2.90
1	250	2.90
2	250	2.90
3	250	2.90
4	250	2.90
4	275	2.90
1	300	2.80
2	300	2.85
3	300	2.80
4	300	2.80
1	325	2.90
3	325	2.90
4	325	2.90
1	375	2.90
3	375	2.90
4	375	2.90
3	400	2.90
4	400	2.90
4	475	2.90
1	520	2.85
2	520	2.90
3	520	2.90
4	520	2.90

FLEXIBLE Pavement Thickness Data - 3101141

Height	Station	Effective SN

No predicted SN values fall outside the expected range...

FLEXIBLE Pavement Thickness Statistics - 3101141

Drop height 1

Subsection	Station	Subgrade Modulus	Effective SN
No test pit data found, therefore no results exist...			
1	-20	17838	3.40
	-10	14336	3.10
	-5	13975	3.10
	0	11832	3.00
	25	14194	3.10
	50	15911	3.05
	75	11511	3.00
	100	11478	2.90
	125	11507	2.85
	150	10935	2.95
	175	11977	3.00
	200	10885	2.90
	225	8098	2.95
	250	9274	2.90
	275	11076	2.95
	300	9937	2.80
	325	10481	2.90
	350	8799	2.95
	375	9890	2.90
	400	5470	2.95
	425	10504	3.05
	450	8806	3.10
	475	8942	2.95
	500	13703	3.00
	505	16143	3.05
	515	16804	3.00
	520	17698	2.85
	463	5818	3.00
Subsection 1 Overall Mean:		11708	2.99
Standard Deviation:		3262	0.11
Coeff Of Variation:		27.86%	3.83%

FLEXIBLE Pavement Thickness Statistics - 3101141

Drop height 2

Subsection	Station	Subgrade Modulus	Effective SN
No test pit data found, therefore no results exist...			
1	-20	17313	3.45
	-10	13941	3.10
	-5	13646	3.10
	0	11547	3.00
	25	13771	3.10
	50	15375	3.10
	75	11087	3.05
	100	11125	2.95
	125	11050	2.90
	150	10544	2.95
	175	11568	3.05
	200	10555	2.95
	225	7889	2.95
	250	8959	2.90
	275	10755	2.95
	300	9660	2.85
	325	10199	2.95
	350	8560	3.00
	375	9569	2.95
	400	5383	2.95
	425	10210	3.05
	450	8748	3.05
	475	8785	2.95
	500	13209	3.05
	505	15639	3.10
	515	16278	3.00
	520	16863	2.90
	463	5873	3.05
Subsection 1 Overall Mean:		11361	3.01
Standard Deviation:		3110	0.11
Coeff Of Variation:		27.37%	3.71%

FLEXIBLE Pavement Thickness Statistics - 3101141

Drop height 3

Subsection	Station	Subgrade Modulus	Effective SN
No test pit data found, therefore no results exist...			
1	-20	16932	3.45
	-10	13684	3.10
	-5	13278	3.10
	0	11324	3.00
	25	13571	3.10
	50	14960	3.10
	75	10817	3.00
	100	11011	2.90
	125	10984	2.85
	150	10304	2.95
	175	11289	3.00
	200	10420	2.90
	225	7758	2.95
	250	8820	2.90
	275	10578	2.95
	300	9555	2.80
	325	10011	2.90
	350	8327	2.95
	375	9345	2.90
	400	5334	2.90
	425	10030	3.05
	450	8696	3.05
	475	8667	2.95
	500	13080	3.05
	505	15375	3.10
	515	15796	3.00
	520	16500	2.90
	463	5954	3.05
Subsection 1 Overall Mean:		11157	2.99
Standard Deviation:		3010	0.12
Coeff Of Variation:		26.98%	4.10%

FLEXIBLE Pavement Thickness Statistics - 3101141

Drop height 4

Subsection	Station	Subgrade Modulus	Effective SN
No test pit data found, therefore no results exist...			
1	-20	16309	3.40
	-10	12991	3.10
	-5	12578	3.05
	0	10839	3.00
	25	12977	3.10
	50	14170	3.05
	75	10311	3.00
	100	10551	2.90
	125	10688	2.85
	150	9797	2.95
	175	10737	3.00
	200	10066	2.90
	225	7415	2.95
	250	8418	2.90
	275	10152	2.90
	300	9254	2.80
	325	9650	2.90
	350	8027	2.95
	375	8988	2.90
	400	5262	2.90
	425	9790	3.00
	450	8344	3.05
	475	8428	2.90
	500	12599	3.05
	505	14761	3.05
	515	15142	3.00
	520	15892	2.90
	463	5996	3.00
Subsection 1 Overall Mean:		10719	2.98
Standard Deviation:		2844	0.11
Coeff Of Variation:		26.54%	3.77%

esting done without final AC placed (estimate 5.2" AC)
esting to evaluate end to monitor for SMP.
ssumed material code for base layer.
lvert at Sta. 4+63.
y variations in deflection data. Note - no traffic on sections yet.
WD consolidating the pavement layers?

Summary of Results

Section uniformity:
NO Subsections were identified within the section.

Outliers - Test pits: 28 combinations at each test pit
NO Test pit data was present.

Outliers - Section data: 784 total combinations within the section
50 height/sensor/station combinations are data outliers in subsection 1.

Structural capacity - Test pits: 4 combinations at each test pit
All results for TP 1 are within the range of expected values.
All results for TP 2 are within the range of expected values.

Structural capacity - Section data: 112 total combinations within the section
32 height/station combinations are NOT within the range of expected values.

Subgrade response:
70 height/station combinations exhibit linear response.
42 height/station combinations exhibit slightly non-linear response.

ML (FI) data

Summary of Data for section 3101141
Analyzed by: Bob Van Sambeek on 08-02-1995

UNCORRECTED Overall Deflection Statistics

Mean Values (mils/kip)

Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
1	1	4.1795	3.0705	2.3320	1.5836	1.0617	0.5500	0.2779
	2	4.1800	3.0902	2.3628	1.6223	1.0938	0.5659	0.2907
	3	4.2253	3.1409	2.4182	1.6658	1.1218	0.5728	0.2962
	4	4.3158	3.2282	2.5035	1.7282	1.1587	0.5779	0.2996

Standard Deviations

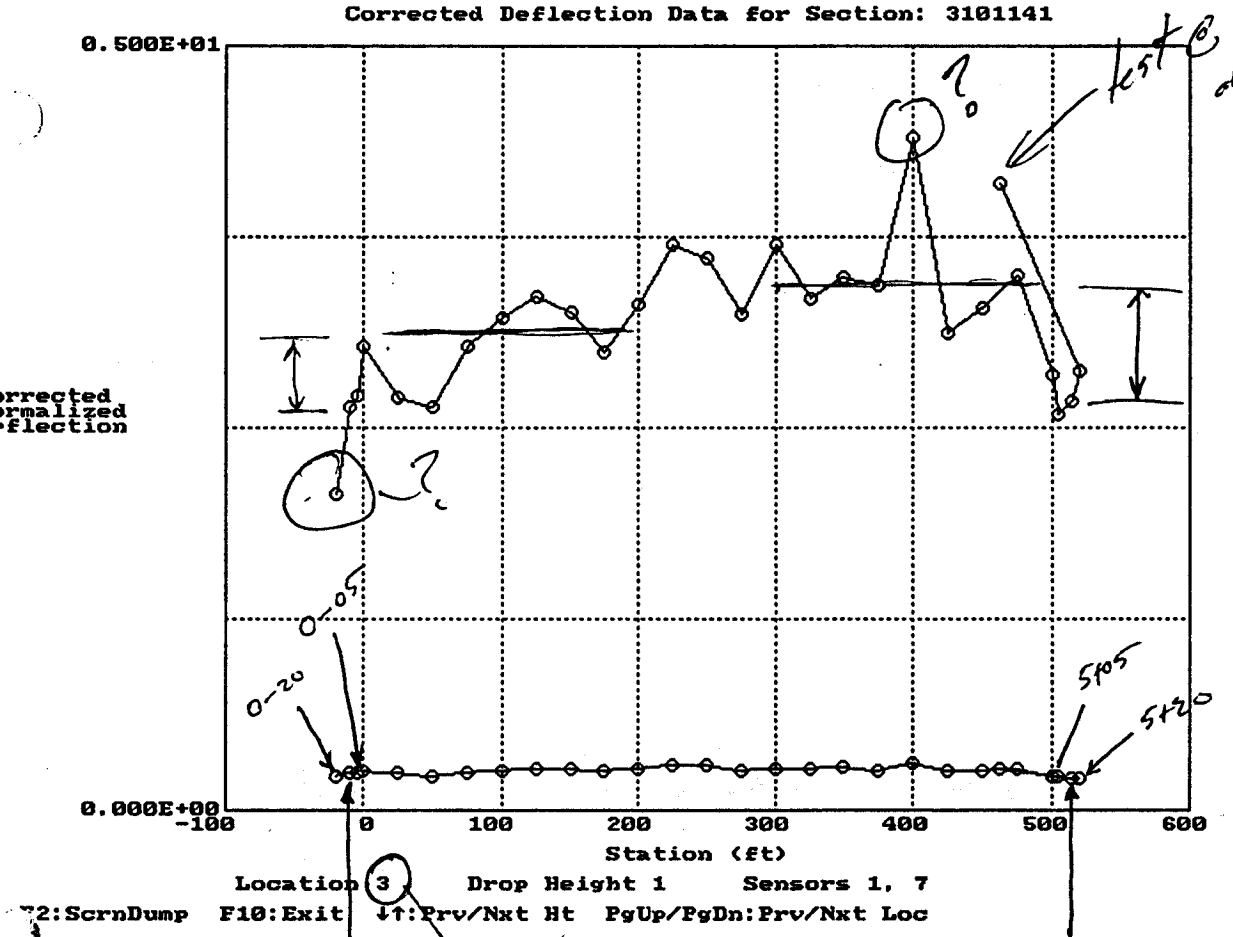
Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
1	1	0.5648	0.4648	0.3843	0.2883	0.2071	0.1019	0.0323
	2	0.5645	0.4656	0.3850	0.2895	0.2083	0.1019	0.0324
	3	0.5710	0.4703	0.3901	0.2924	0.2096	0.1003	0.0316
	4	0.5698	0.4701	0.3907	0.2920	0.2071	0.0961	0.0297

Coefficient of Variation

Test Loc.	Drop Ht	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7
1	1	13.51%	15.14%	16.48%	18.20%	19.50%	18.53%	11.62%
	2	13.50%	15.07%	16.29%	17.84%	19.04%	18.01%	11.15%
	3	13.51%	14.97%	16.13%	17.55%	18.69%	17.52%	10.68%
	4	13.20%	14.56%	15.61%	16.89%	17.87%	16.63%	9.93%

esting done without final AC placed (estimate 5.2" AC)
esting to evaluate end to monitor for SMP.
ssumed material code for base layer.
lvert at Sta. 4+63.
y variations in deflection data. Note - no traffic on sections yet.
WD consolidating the pavement layers?
un ML (F1) data for comparison outside section limits.

WDCHECK allows material entry (layers) but will not analyze ML data?!



OWP Data

Conduit installed @ sta. 0-10

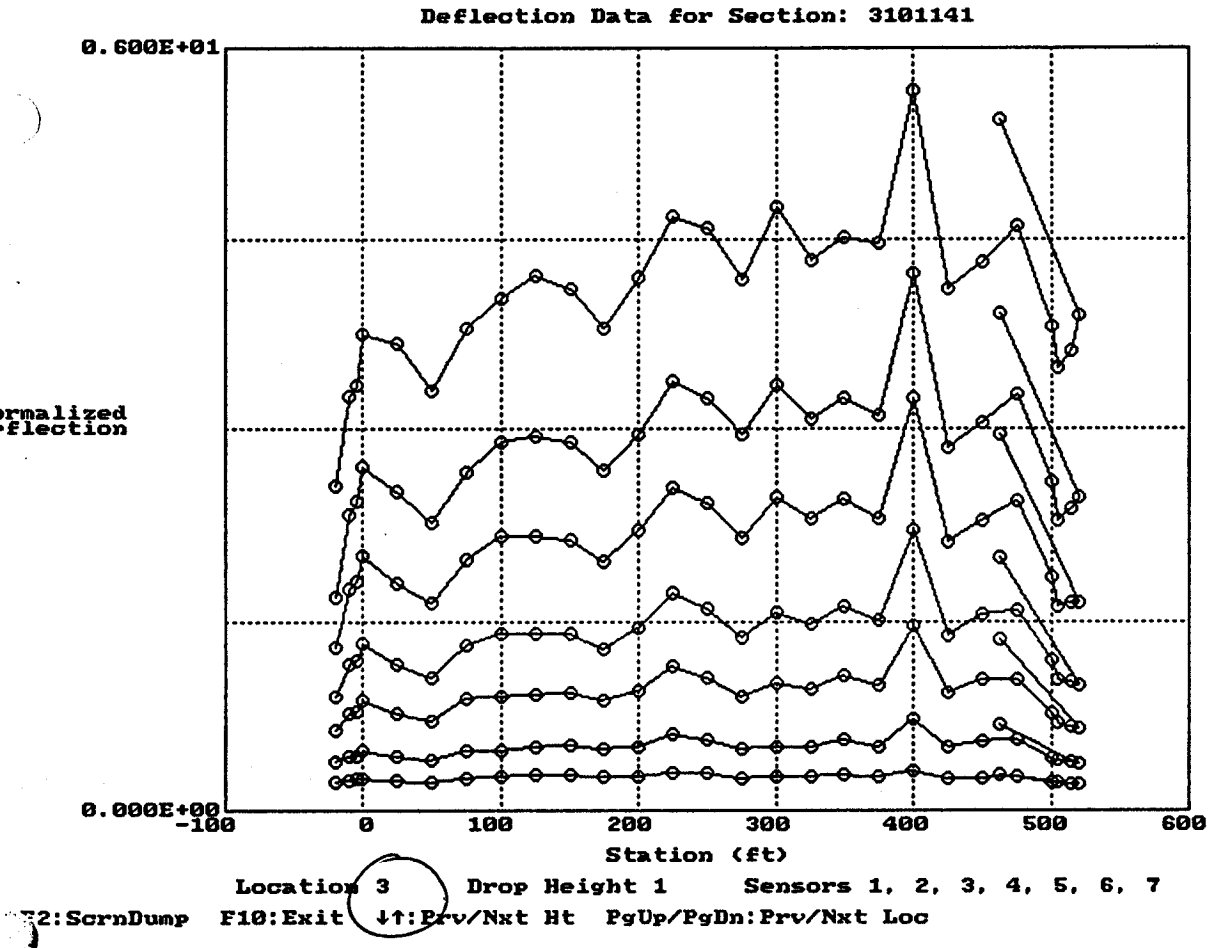
Conduit installed @ sta. 5+15

- edge drain ends @ 0-45

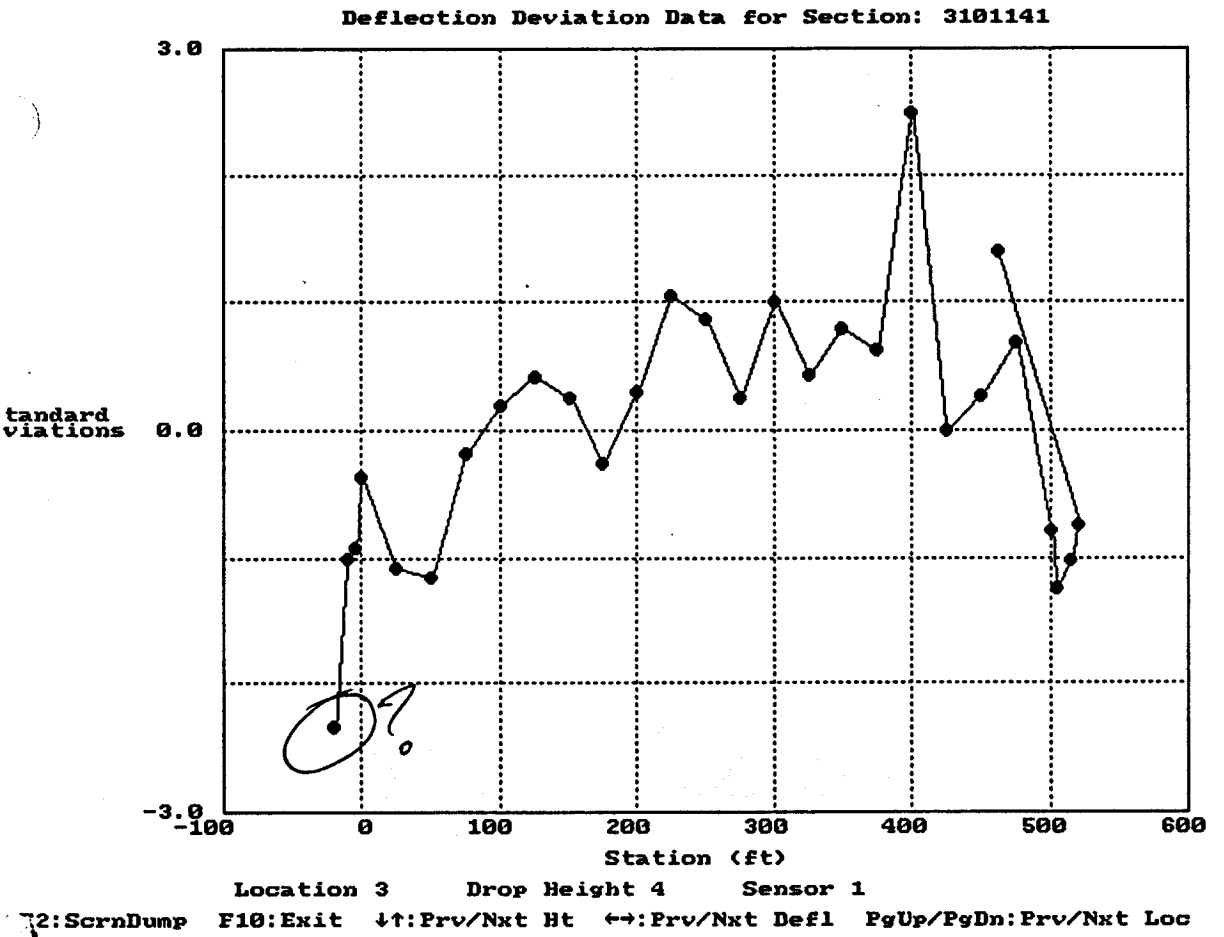
- edge drain starts @ 5+56

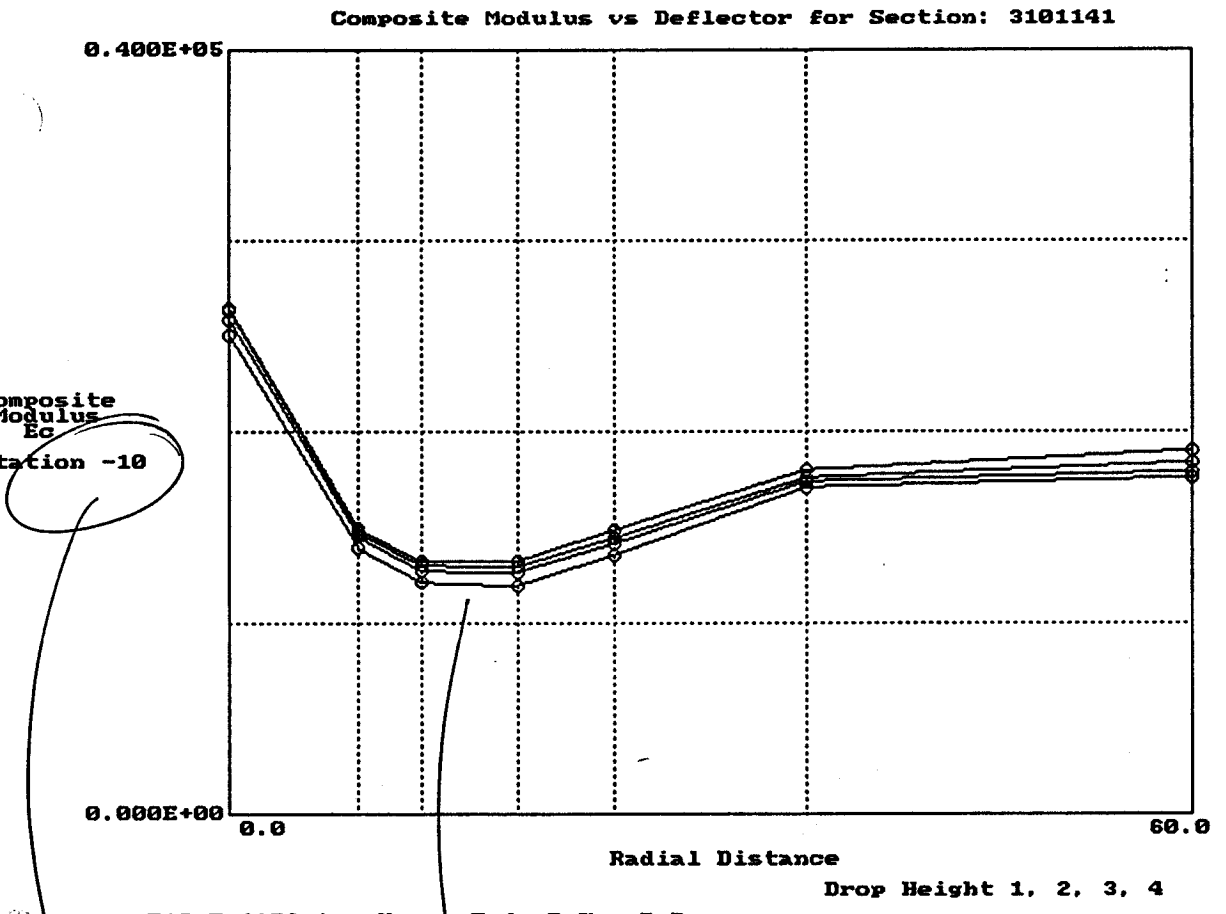
- maybe some concern with irrigation system?

how fitted
- use sta. 0 and


Deflection Data for Section: 3101141
0.600E+01
ormalized
eflection
0.000E+00
-100
0
100
200
300
400
500
600
Station (ft)
Location 3
Drop Height 1
Sensors 1, 2, 3, 4, 5, 6, 7
F2:ScrnDump
F10:Exit
↓↑:Prv/Nxt Ht
PgUp/PgDn:Prv/Nxt Loc

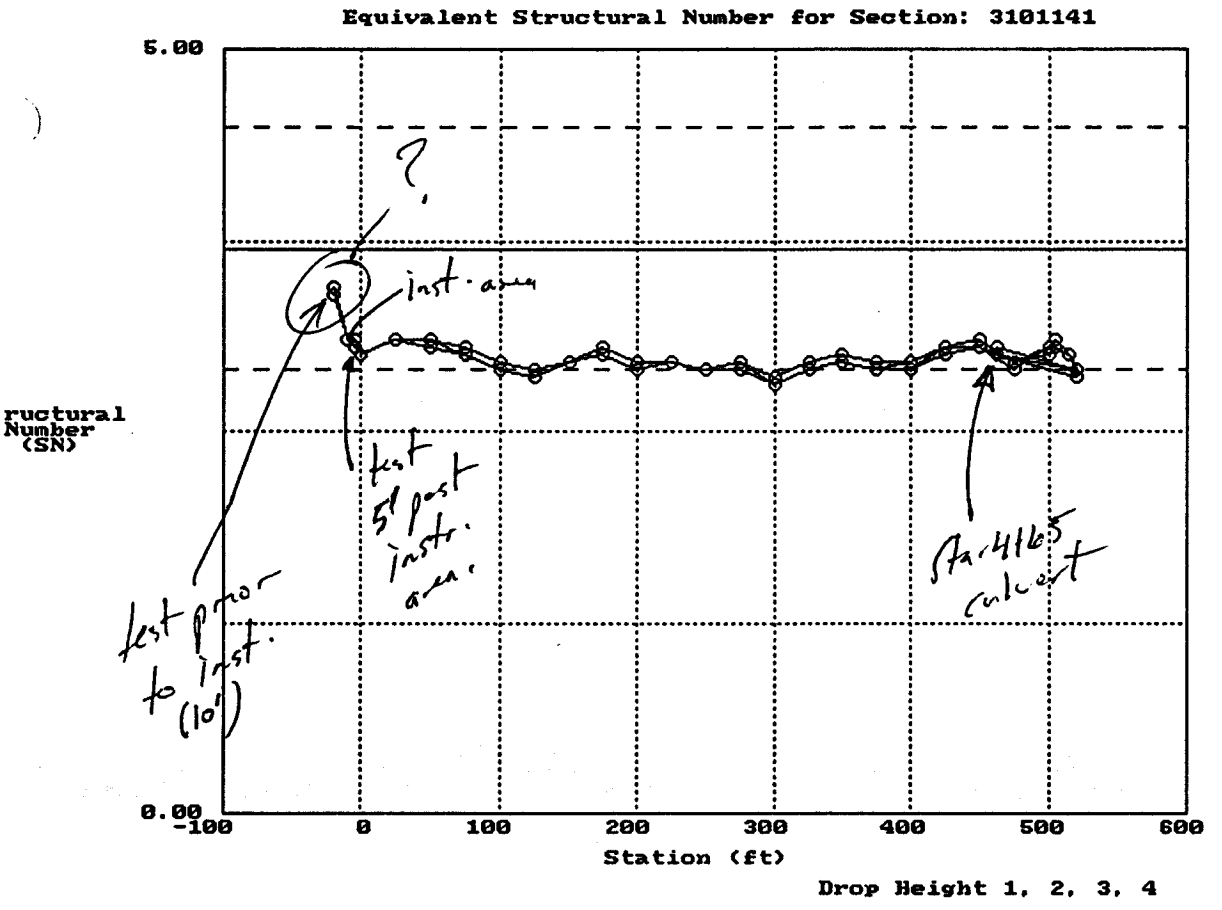
awp


Deflection Deviation Data for Section: 3101141
3.0
tandard
viations
0.0
-3.0
-100
0
100
200
300
400
500
600
Station (ft)
Location 3
Drop Height 4
Sensor 1
2:ScrnDump
F10:Exit
↓↑:Prv/Nxt Ht
↔:Prv/Nxt Defl
PgUp/PgDn:Prv/Nxt Loc

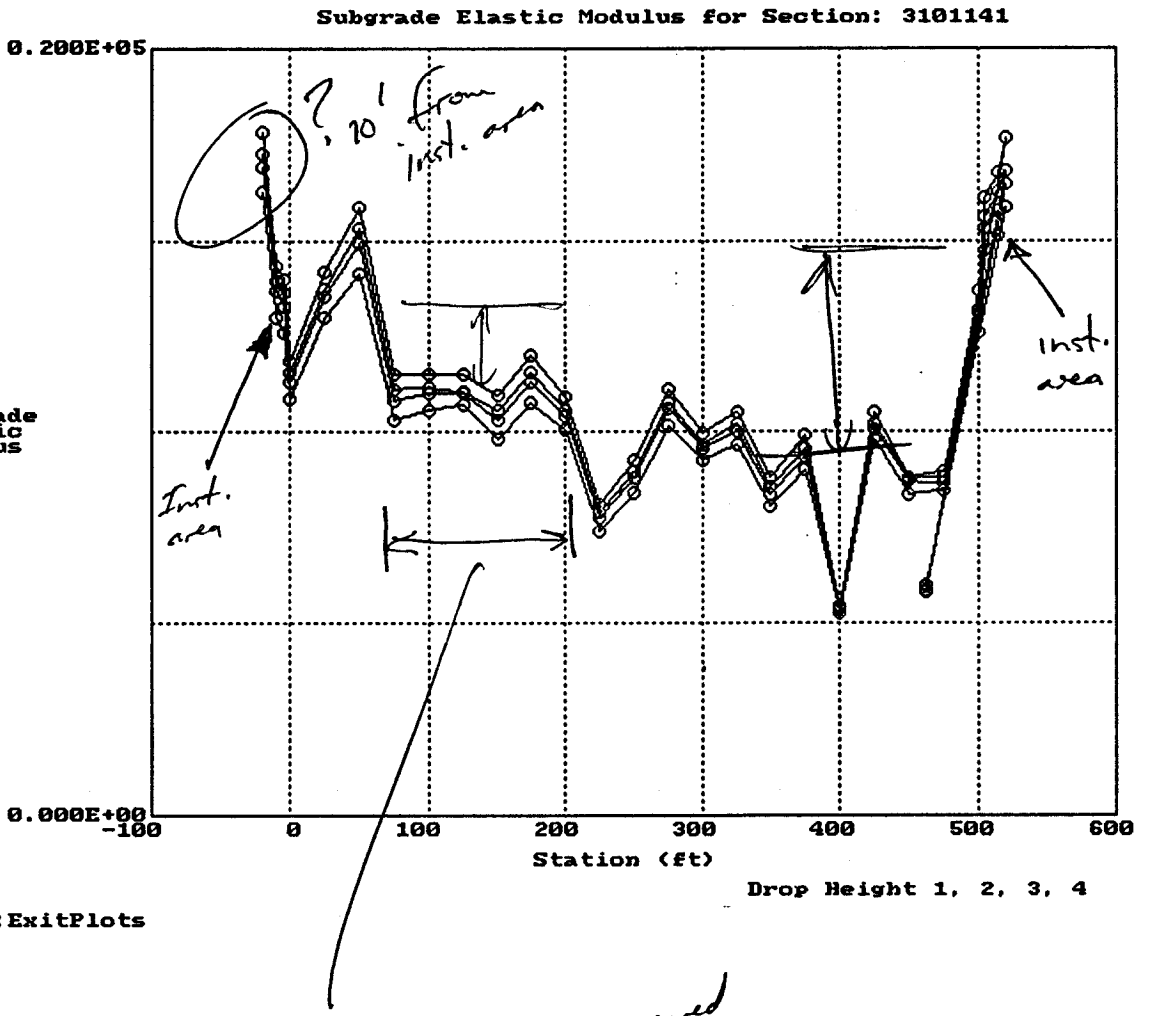


Conduit on Sta. 0 end.

- No traffic on new AC
- Compaction from FWD loadings!



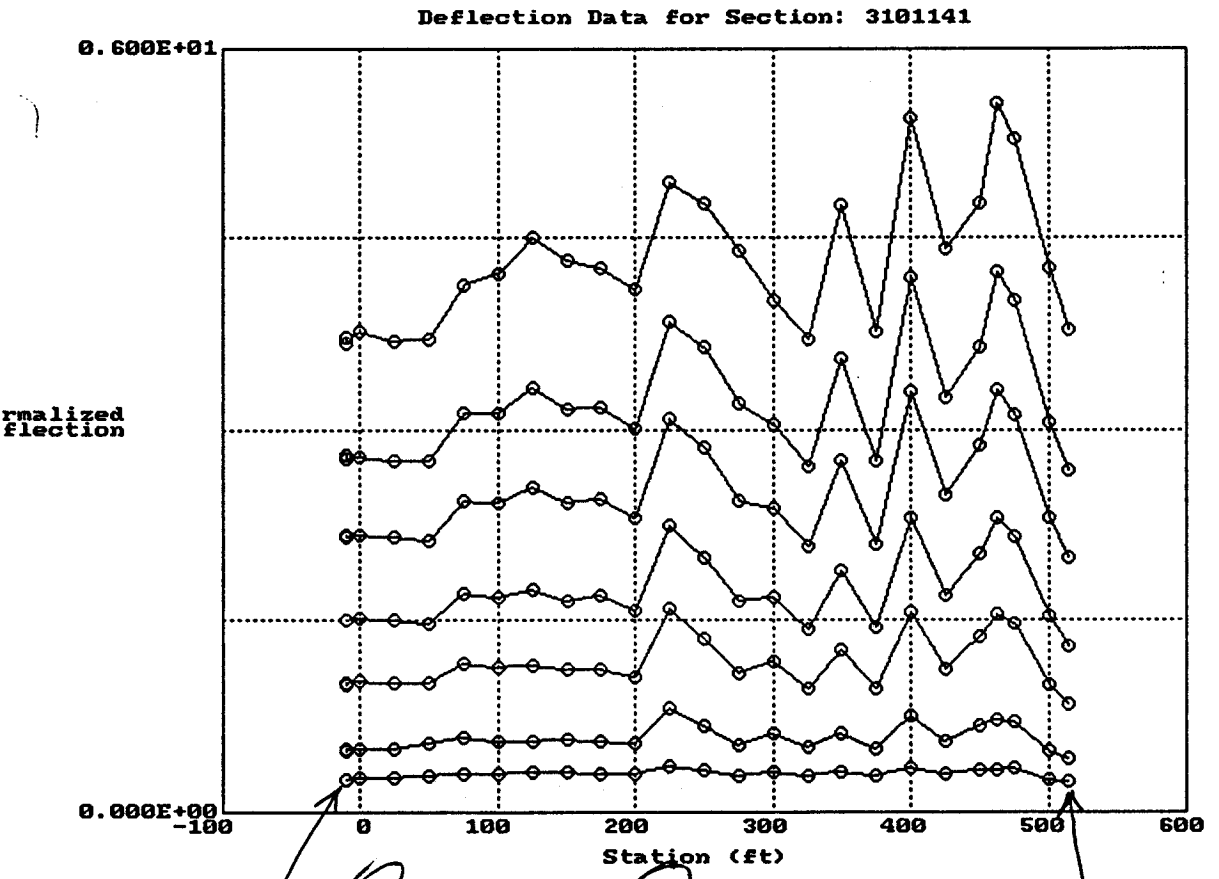
F10:ExitPlots



More uniform compared to instr. area that Section @ sta. 5 end.

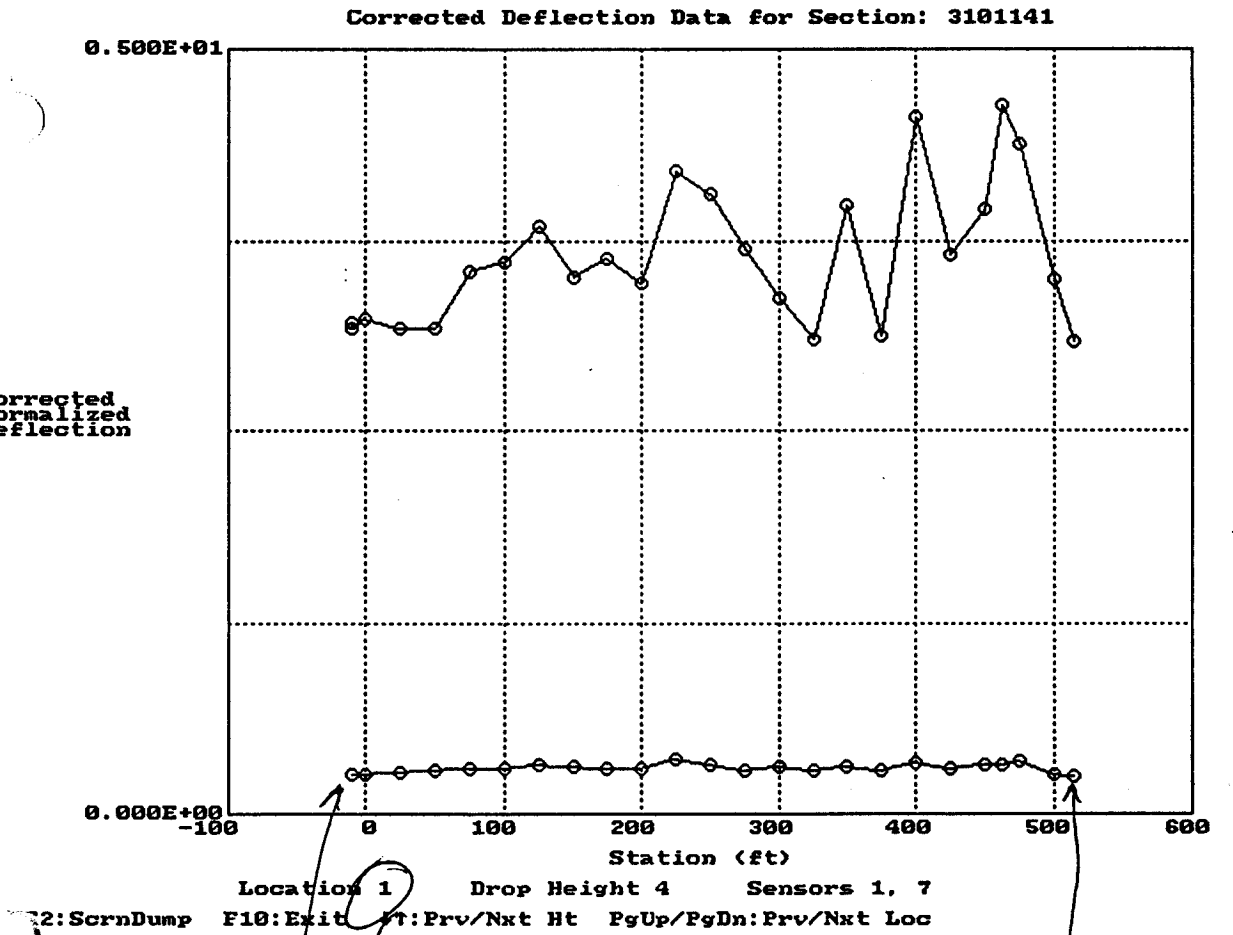
— use sta. 0 end ?

— expect section to "settle down" after traffic loadings applied ?



ML pass (F1)

test ML (will be adjacent to instr. area.



ML pass (F1)

test adjacent to instr. area

Appendix B-1: Pre-Installation Site Recruitment and Coordination Information

Appendix B-1 contains the following pre-installation site recruitment and coordination information:

- SMP site recruitment notes;
- Conduit installation notes;
- Pre-installation meeting agenda, list of participants, and notes; and
- Site visit field notes.

STATE OF NEBRASKA

DEPARTMENT OF ROADS

KAY A. ORR
GOVERNOR

G. C. STROBEL
DIRECTOR-STATE ENGINEER

Erland Lukanen
Braun Pavement Technologies
1404 Concordia Avenue
St Paul MN 55104

November 15, 1990

RE: SHRP GPS DEFLECTION TESTING

Enclosed is the form with the frost depth information which you requested. Also, we would be willing to participate in SHRP's seasonal deflection testing program.

George

George Woolstrum
Special Projects Engineer

GW/bb

cc: T. Wais
R. Ingberg

PO BOX 94759 LINCOLN NE 68509-4759 PHONE (402) 471-4567, FAX (402) 479-4325

WORKSHEET FOR GATHERING FROST DEPTH INFORMATION FOR SEASONAL TESTING

GPS-1 and 2 SECTIONS IN NORTH CENTRAL REGION

AGENCY	SECTION NUMBER	FULL-DEPTH	AC (in.)	SOIL	DEPTH TO WATER	DEPTH TO REFUSAL	FROST DEPTH	
IL.	171002	Y	13.3	F	13	N		
IL.	171003	N	11.0	F	N	N		
IN.	181028	Y	15.0	F	N	N		
IN.	181037	Y	14.0	F	N	N		
IN.	182008	Y	19.0	F	N	N		
IN.	182009	N	15.0	F	N	N		
IA.	191044	Y	16.0	F	N	N		
KS.	201005	Y	13.5	F	N	16		
KS.	201009	Y	10.0	C	N	N		
KS.	201010	Y	8.0	C	N	N		
KY.	211010	N	6.3	C	N	15		
KY.	211014	Y	12.5	C	N	N		
KY.	211034	Y	15.0	F	N	10		
MI.	261001	N	2.3	C	6	N		
MI.	261004	N	4.5	C	N	2.5		
MI.	261010	N	2.3	F	6.5	N		
MI.	261012	N	6.0	F	N	N		
MI.	261013	N	7.5	C	N	N		
MN.	271016	N	3.0	C	N	N		WET SOIL
MN.	271018	N	4.5	C	20	N		
MN.	271019	N	4.8	C	N	N		
MN.	271023	N	10.7	C	N	N		
MN.	271028	Y	9.5	C	N	N		
MN.	271029	Y	8.0	C	N	N		
MN.	271085	Y	12.0	F	N	N		
MN.	271087	Y	14.3	C	N	N		
MN.	276251	N	7.0	C	N	N		WET @ 5'
MO.	291002	N	7.0	F	N	N		
MO.	291005	N	9.0	F	N	N		
MO.	291008	N	10.0	F	N	N		
MO.	291010	N	14.0	F	N	7.5		
NE.	311030	Y	7.0	F	N	N	30 in.	
ND.	382001	N	2.5	F	N	N		6" LEAN PCC BASE
SD.	469187	N	4.5	F	N	N		
MB.	831801	N	4.4	F	N	N		
MB.	836454	Y	11.0	F	N	N		BIT. STAB. BASE
SK.	906405	N	3.0	C	N	N		

STATE OF NEBRASKA

310114

DEPARTMENT OF ROADS
G. C. Strobel, *Director*
Nebraska Hwy 2
Box 94759
Lincoln NE 68509-4759
Phone (402) 471-4567
FAX (402) 479-4325

1-16-91 & Copy Sent By FAX

July 5, 1991

E. Benjamin Nelson
Governor

Mr. Richard Ingberg
Regional Engineer
Strategic Highway Research Program
1404 Concordia Avenue
St. Paul, MN 55104

Re: Seasonal Monitoring of SHRP GPS Sections

Nebraska can participate in the seasonal monitoring project outlined in your letter of June 26, 1991. This will involve GPS section 311030 on US-6 east of Arapahoe.

For traffic control purposes, we will need at least 48 hours prior notice before a monitoring visit. Also, all monitoring activities will have to be completed during daylight hours.

We look forward to working with you on this project.

Sincerely,

Thomas A. Wais

Thomas A. Wais
Deputy Director - Planning

TAW/GW/bt

xc: J. Orrell
G. Woolstrum

Dropped in 1995 - not lost w/o rehabilitation

Memorandum

Date: April 4, 1995

To: Gene Skok, Ron Urbach

From: Robert Van Sambeek RVS

Re: Potential SMP Sites and AWS Installations in Nebraska.
C:\SMP\WP\NB1995.SMP

AWS - easy things first. At the project, please look up, down, and all around at potential AWS installation locations. Usual concerns with obstructions, overhead utilities, etc. as described in LTPP Directive AWS-1 (copy attached).

- Combine WIM and AWS in expanded fence (AWS require 20'X20')? Expand to 20'X30' to keep 4X the height from WIM cabinet as an obstruction? Prevailing wind direction critical if obstructions exist. Both require 120 VAC power?

SMP - the potential SMP sites identified in Nebraska are listed below according to the SMP experimental cell. At this point, the program could use all four sites listed if the DOT is interested. Realistically expect two sites based on the additional discussion below.

SMP Cell 11 - Dry, Freeze, Fine Subgrade, and Thick AC Pavement

311030 on US-6 east of Arapahoe.
- This section was monitored in the pilot testing done for SHRP (Sta 0-34 to 2+00).
- Biggest concern is the age of the surface (constructed in 1982) regarding maintenance in the next six to ten years.
- Another concern is with two-way traffic requiring flagging operation for lane closures. On one previous visit, the traffic control had to come from the next district because of staff limitations.

310114 is the 7.0 inch AC on 12.0 inch DGAB section on the SPS-1 project.
- Scheduled for completion this summer.

My preference is to use the SPS-1 site in order to get additional environmental data for the project that the AWS does not collect (pavement, base, and subgrade temperatures; base and subgrade moisture contents; and frost/thaw depths). However, both sites can be included if the DOT is willing to provide the traffic control 14 times every other year, as well as, the materials and support for installation of the sites.

SMP Cell 23 - Dry, Freeze, Coarse Subgrade, and JPC Pavement

313018 on IH-80.
- Constructed 1985.
- Concern with AADT of about 10,000.
- Any planned maintenance? Previous note on weak joint at Sta 4+66?

313023 on IH-80.

- Constructed 1984.
- Concern with AADT of about 10,000.
- Any planned maintenance?

Other SMP Items

Please give George Woolstrum the two SMP manuals and one video tape from the pilot installation. Note - some items in the video have been changed.

The attached notes from previous meeting agendas with the DOTs may help regarding requirements from the DOT for the program.

NOT INCLUDED w/ INSTALLATION REPORT
- SEE PRE-INSTALLATION MEETING RV
AGENDA IN APPENDIX B-1

George Wolstrum 402-479-4791

BRAUNSM
INTERTEC

Description: NEBRASKA SPS-1 SMP SITE

Project No: DBNX 92700 85

Date: May 31, 1995 By: RJV

01.14

- What is the plan for the existing roadway regarding rehabilitation?

  - if work scheduled, when?

  - will lane closure still be possible on the SPS-1 for SMP testing Sept. 95 to Aug. 96. ~~To~~ (14 x).

    * 5000 ADT 25% HCADT ?

    2500 Now 12% Now

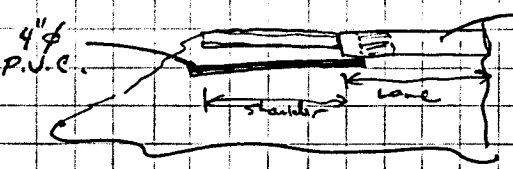
...ll back

* Next year (96) will work on existing lanes. Then traffic (lane closure) will be more difficult, but can still be handled.

  - no problem after 1996.

* what minimum requirements for monitoring the first year? - skip some FWD?

MOD. INSTALLATION TO INCLUDE A RIGID PVC CONDUIT PRIOR TO PAVING THAT WILL RUN FROM INSTR. HOLE TO THE EDGE OF THE SHOULDER.



...I. mtg? July 20, 1:00 to 3:00 Lincoln

...install sch. Aug. 7-11 for two sites

Lincoln or York?

321-95

T Catt-George - July 20 1:00-3:00 ok for mtg in Lincoln. - will fax map

Post-It™ brand fax transmittal memo 7671 | # of pages ▸

To Gonzalo Rada	From Rob V.
Co. PCS Law	Co. Rizzo Assoc.
Dept.	Phone # 617-942-3047
Fax #	Fax #

GONZALO, I TALKED TO GENE. HE IS OKAY WITH "POINTS" BELOW. ARE YOU? ROB V.

Date: June 1, 1995

To: Gene Skok

cc: ?

From: Robert Van Sambeek

Re: Summary of Conversation with Gonzalo Rada and Following Discussion Regarding 271018 Rehabilitation and Concerns with 310114 SMP Monitoring.
C:\SMP\WP\GONZALO.27A

Gene, below are the critical points from our conversation with Gonzalo and the following discussion that will decide matters on 271018 and 300114. If you do not agree with what was discussed, please let me know.

271018

1. Decision is to mill and overlay the section to obtain a surface that will last 15 years regarding monitoring of overlay sections with instrumentation (supplemental section?).

2. In the construction process have someone at the site to instruct crews where the temperature probe is located, so the milling depth can be adjusted to about one inch to miss the probe and still remove the blade patch.

3. Proceed with post construction monitoring including the SMP data collection activities. This monitoring is currently scheduled for July 7, 1995. The actual monitoring requirements for the "supplemental overlay study" have not been identified, but they are not expected to exceed the requirements for the SMP.

I will contact the DOT regarding the construction schedule and arrangements to adjust the milling depth near the temperature probe. I will not be available during the construction, and someone else will need to be at the site. This person will have to be familiar with the SMP monitoring to use the computer to monitor the instrumentation during the milling. ?

310114

1. Discussed concern with construction traffic that may limit lane closures as the old roadway is reconstructed. It is possible that lane closures may limit FWD testing to one or two cycles each visit until the construction is complete.

2. Gonzalo indicated some missed monitoring with the FWD would be acceptable, but instrumentation data should always be collected.

TT - Calvin @ 518-828-2465
- June 19 start job north of Randall. (45 day project)
- Head Insp. - Craig Walls will show up on June 12th to visit the site while monitoring. with the FWD. will instruct

BRAUN SM
INTERTEC

NOTES FROM RON U. MTG. W/ D.O.T. for NB 310114 SMP SITE. 6/23/95

3" PVC PIPE FOR SEASONAL INSTRUMENTATION SITE. IT WILL BE PLACED AT TEST SECTION 310114.

IT WILL BE PUT IN AFTER PLACEMENT OF THE AC PAVEMENT.

THER WILL BE A 18"X18" BLOCK CUTOUT OF THE PAVEMENT IN THE OUTSIDE WHEEL PATH.

AFTER THE 18"X18" BLOCK IS REMOVED SOIL WILL BE REMOVED TO A DEPTH OF ABOUT 6', INSTRUMENTATION WILL BE PLACED DURING THE SOIL REPLACEMENT

THE INSTRUMENTATION CABLES HAVE TO BE RUN TO THE CABINET ON THE SHOULDER.

THE 3" PVC PIPE WILL BE USED TO RUN THE CABLES TO THE SHOULDER.

IF THE PVC PIPE IS NOT PUT IN A TRENCH WILL HAVE TO BE CUT IN THE SHOULDER. THEY WILL THEN HAVE TO PATCH THE TRENCH.

UNTILL THE FWD TESTING HAS BEEN DONE.

SO WE WOULD LIKE TO PUT PVC PIPE AT BOTH ENDS OF THE TEST SECTION.

BRAUN℠
INTERTEC

SPS-1 TEST SECTION STARTS AT STATION 10474+50. AND END AT STATION 10469+50

FOR THE START OF THE SECTION, THE PVC PIPE SHOULD BE PUT 10' BEFORE THE START OF THE SECTION. PROJECT STATION 10474+60.

FOR THE END OF THE TEST SECTION, THE PVC PIPE SHOULD BE PUT IN PROJECT STATION 10469+35

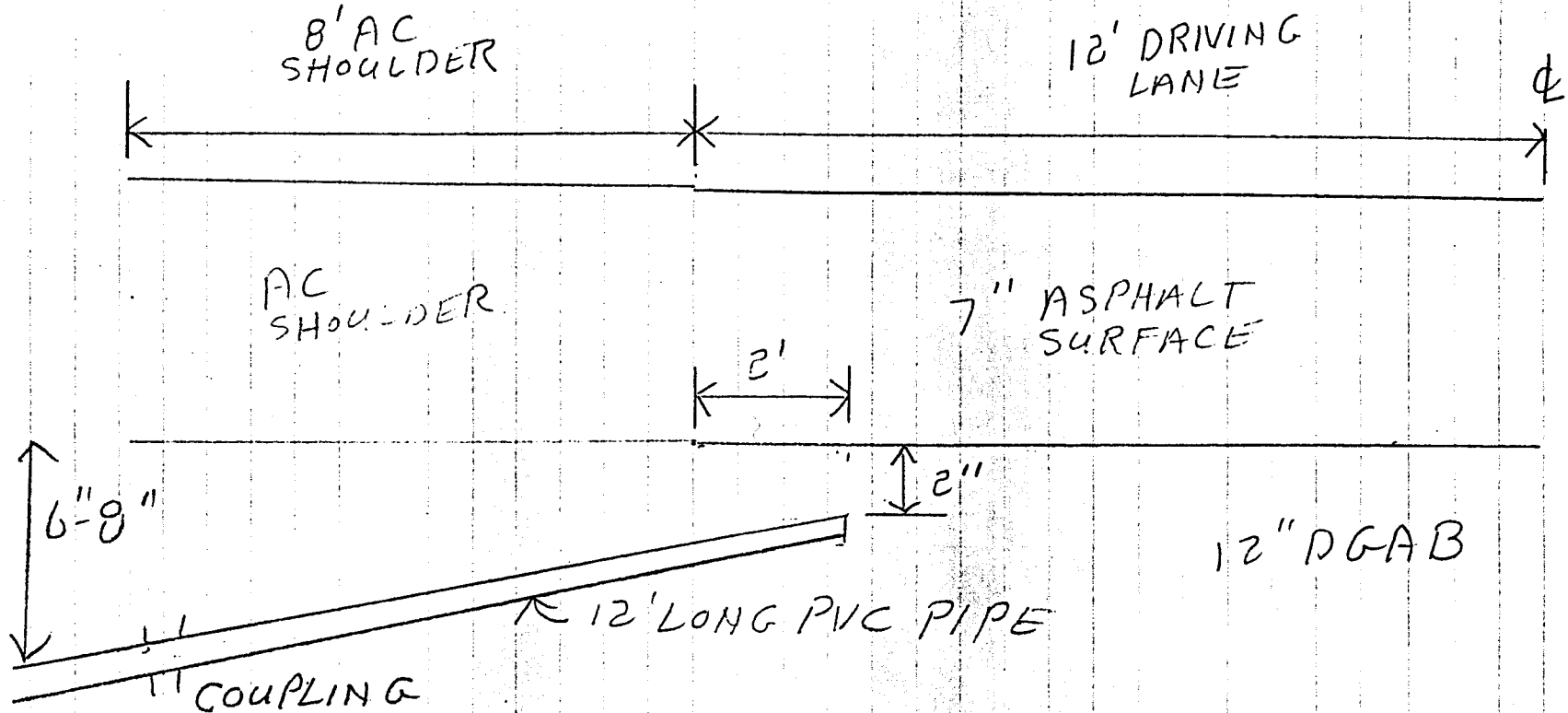
THE 12" OF DGAB SHOULD BE IN PLACE COMPACTED AND TRIMED TO GRADE.

THE PVC PIPE IS 12' LONG WITH A COUPLING 2' FROM ONE END. THE COUPLING SHOULD BE OUT BY THE SHOULDER.

WHEN THE INSTRUMENTATION IS PLACED WE WILL CUT OUT THE 18"X18" BLOCK. PIG DOWN TO THE PVC PIPE. THEN FISH OUR CABLES THROUGH THE PVC PIPE.

SOMEONE FROM OUR OFFICE WILL TRY TO BE ON SITE TO HELP.

PLEASE PUT A STAKE AT THE END BY THE SHOULDER



END OF PVC 2' FROM EDGE OF AC PAVEMENT OR 10' FROM CENTER LINE. THE TOP PIPE DOWN ABOUT 2"

AT THE SHOULDER THE END DOWN ABOUT 6' TO 8". THIS IS FOR DRAINAGE.

BRAUN INTERTEC

rom: JUL 13 '95 11:50AM NEBR ROADS TEST LAB 402 479 3975 and time 07/13/95P.21:02:08
: DOR9007 --NEBR ORTH, ELDON DOR11020--NEBR RONNAU, DALYCE
DOR5025 --NEBR GUY, TERRY DOR34003--NEBR PARRISH, BILL
DOR9040 --NEBR CHENEY, KEN

OM: George Woolstrum
ject: Roadway Instrumentation

e FHWA-SHRP office is proposing to instrument the roadway at the SHRP
st site on I-80 east of Kearney. There will be a meeting:

ursday July 20,1995
00pm -3:00pm
anning Division conference room
terials & Tests building

representative from the SHRP Regional Office will be here to discuss the
oject and various responsibilities.

FILE

Memorandum

Date: July 14, 1995

To: Ron Urbach and Jeff Henrickson

From: Robert J. Van Sambeek

Re: Pre-Installation Testing on SPS Section 310114
C:\SMP\WP\310114.SMP

SPS section 310114 is top priority for FWD testing if it is ready on July 21 or July 22.

Jeff, for pre-SMP FWD testing, test at the following locations (includes extra tests):

ML Test at -10; 25 foot interval from 0 to 5+00; and 515.

OWP Test at -20, -10, -5; 25 foot interval from 0 to 500; 505, 515, and 520.

Note: Tests at -10 and 515 should match the location of the conduit installed prior to paving. These conduits may or may not be marked in the ditch or on the pavement.

Jeff, use normal file names for SPS testing (310114C1.FWD and 310114C3.FWD) and include the extra tests in these files.

Ron, please bring the computer disks and paper copy of the FWD data for this section back with you so I can evaluate which end to monitor prior to the scheduled installation.

I am planning on stopping at the site on July 20, 1995 on my way to Kansas. If I see anything I need to talk to you or Jeff about, I will call one of the vans on Friday, July 21.

7/18/95 - TT - Charles Potter
- only able to have mtg. July 31 or Aug. 7.
↑ too late
Ask Ron to sort schedule?
27/28 to Aug. 3?, July 2?

Bob V. Copy

FHWA-LTPP SEASONAL MONITORING PROGRAM IN NEBRASKA

MEETING AGENDA

July 20, 1995 at 1:00 PM to 3:00 PM

Nebraska Department of Roads - Lincoln, Nebraska

Planning Division Conference Room - Materials and Tests Building

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Introductions – Signup sheet – NAME → DIVISION/DEPT. → PH. #

FHWA-LTPP Seasonal Monitoring Program in Nebraska

- Introduction
- Test Sections
- Sensor Description and Installation Procedures

Break

Planning Session for Agency Staff Involved with Instrumentation and Monitoring

- Installation and Monitoring Schedule
- Special Concerns
- Nebraska Department of Roads Responsibilities
- NCRCO and FHWA Staff Responsibilities
- Closing Comments

FHWA-LTPP Seasonal Monitoring Program in Nebraska

Introduction

Objectives of the Seasonal Monitoring Program

- Collect and analyze data on select SHRP sections to better understand the short and long term impacts of environmental factors including temperature, moisture, and frost/thaw depth on a pavement structure for improving pavement design.

- Factors defined in the core experiment monitored by FHWA-LTPP include
  - wet or dry climate
  - freeze or no freeze climate (NCR)
  - pavement surface type (AC or PCC)
  - pavement surface thickness
  - original construction

- Agencies are encouraged to monitor supplemental sections to study factors not included in the core experiment
  - reduced monitoring requirements
  - use existing GPS or SPS sections

Overview of Sensor Installation and Monitoring Activities for Core experiment

- Two days for initial instrumentation installation and monitoring

- About $10,000 of equipment installed at each site

- Monitor sections every other year (70 days over a 10 year period)

- Relate environmental variations to changes in pavement performance
  - pavement, base and subgrade strength calculated from deflection data
    - collected monthly most of year and bi-weekly in the spring
  - ride quality determined from profile data
    - collected five times per year
  - pavement distress documented using detailed distress surveys
    - collected two times per year in addition to PASCO photo logging
  - frost heave/swelling soil monitored using elevation data
    - collected five times in the first year and two times per year after that

Test Sections

Section Location

- 64 sections in the Core Experiment for the United States and Canada monitored under FHWA-LTPP contract

- 16 sections in the North Central Region with two in Nebraska

  - 310114 (SPS-1), SB US-81, north of Chester (ST-8), Thayer County.
    - SMP Cell 11 - Dry, Freeze, Fine Subgrade, and Thick AC Pavement
    - 7.0 inch AC on 12.0 inch DGAB

  - 313018 (GPS-3), WB IH-80, east of Kearney, MP 274.57 to 274.48, Buffalo County.
    - SMP Cell 23 - Dry, Freeze, Coarse Subgrade, and JPC Pavement
    - 12.0 inch JPCP on 5.0 inch Soil Cement with 10 foot PCC shoulder.

- see map of core sections in the North Central Region on the next page

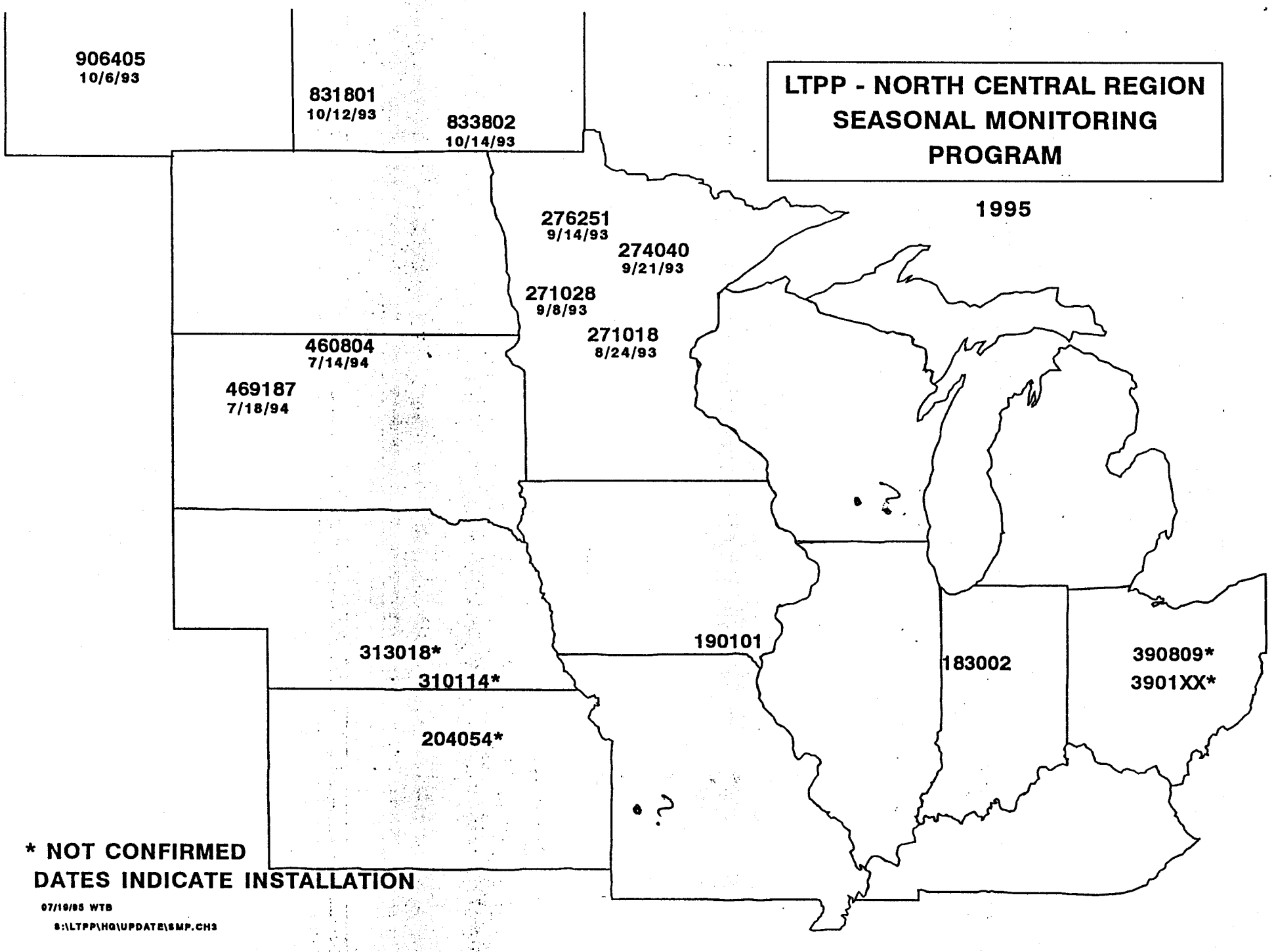
Allowable Maintenance

- any routine maintenance scheduled for either section?
  - shoulder work?

- no structural rehabilitation preferred for ten years → $$ invested - 3 loops to get data to analyze
  - safety is primary concern

- careful around buried cables and equipment
  - temperature probe one inch below pavement surface
  - piezometer cover two inches below the shoulder material
  - conduit one foot below surface from pavement edge to the cabinet

- careful plowing heavy snow and slush into the equipment cabinet


LTPP - NORTH CENTRAL REGION
SEASONAL MONITORING
PROGRAM
1995
906405
10/6/93
831801
10/12/93
833802
10/14/93
276251
9/14/93
274040
9/21/93
271028
9/8/93
271018
8/24/93
460804
7/14/94
469187
7/18/94
313018*
310114*
204054*
190101
183002
390809*
3901XX*
* NOT CONFIRMED
DATES INDICATE INSTALLATION
07/19/95 WTB
S:\LTPP\HQ\UPDATE\SMP.CH3

Sensor Description and Installation Procedure

TDR (Time Domain Reflectometry) Probes

- FHWA design available through Campbell Scientific @ $60.00 each (1993)

- measure dielectric of material between probes and relate to moisture content
  - material dielectrics - air = 1.0, dry soil = 3 to 4, and water = 80

- calibration
  - laboratory in air, water, and shorted
  - field moisture test on material placed around each probe
  - retain soil samples for additional laboratory calibration

- 10 probes per installation
  - one mid-depth in the base, seven at six inch intervals in the top of the subgrade, and two at 12 inch intervals approximately seven feet below the surface

Thermistor (Temperature) Probe

- Measurement Research Corporation (MRC) @ $1000.00 (1993)
  - built in multiplexer for automated readings on 18 channels

- thermistors change resistance with change in temperature

- stainless steel section (13 inches long) monitor pavement temperature gradient
  - one inch deep, mid depth, and one inch above bottom of pavement

- plexiglass section (72 inches long) monitor base and subgrade temperature gradient
  - 15 depths - three-inch intervals to 12 inch depth and six-inch intervals from 18 inch depth to 72 inch depth

- laboratory calibration (check) at 32°F and 100°F

Resistivity Instrumentation

- CRREL design probe @ $800.00 (1993)
  - PVC probe with 36 electrodes at two inch intervals

- large increase in resistance when moisture in the soil freezes
  - used to determine both frost and thaw depth

- require signal generator and multimeters for manual readings and CRREL multiplexer for automated readings

Air Temperature Probe

- Campbell Scientific @ $150.00 (1993)

- air probe and radiation shield mount on instrument pole nine feet above the ground

Rain Gauge/Tipping Bucket

- Texas Electronics @ $255.00 (1993)
- 0.1 mm (0.004 inches) liquid precipitation per tip 1" rain = 250 tips
- mount on instrument pole nine feet above the ground

Equipment Cabinet and Instrument Pole

- telephone pedestal (break away classification)
  - contain power supply, data logger, sensor connections for mobile reader
  - conduit runs into cabinet from instrumentation hole
  - pea rock inside base to prevent condensation
  - located about 26 feet off edge of driving lane (limited by cable length)
- two-inch diameter instrument pole (break away classification)
  - extend below frost line
  - holds rain gauge and air temperature probe
  - located about 27 feet off edge of driving lane behind equipment cabinet

Interface/Communications Equipment

- FHWA "mobile" unit @ $5000.00 (1993)
  - used each site visit to automatically read TDR probes and resistivity probe
- Tektronics model 1502 cable reader @ $8000.00 (1993)
  - generates signal and monitors reflected energy from TDR probes
  - relate time for pulse to travel through probe to dielectric constant
    - relate dielectric constant to moisture content

13k

- computer and software
  - "onsite" used to monitor temperatures and rainfall continuously
  - "mobile" used to monitor resistivity probe and TDR probes during site visits

Observation Piezometer

- monitor depth to ground water table
- designed to act as frost free bench mark with anchor at 14 foot depth
  - sliding section filled with grease extends eight feet below the surface

Measuring Points for Joint Movement on PCC Pavements

- install three sets of snap rings on each joint monitored
  - bonded 0.3 inched deep in the pavement at one, six and eleven feet from edge of slab
- measure distance between rings to the nearest 0.001 inch with digital caliper
  - use "hot" measurement as zero opening on the joint

Planning Session for Staff Involved with Instrumentation and Monitoring

Installation and Monitoring Schedule

Instrumentation Installation and Initial Monitoring

- two days required with third day as contingency
  - first day complete instrument installation
  - second day collect data

- tentative schedule
  - August 7 and 8 for 310114 on US-81
  - August 10 and 11 for 313018 on IH-80

Long Term Monitoring — start Sept —

- one day every month with the exception of two times per month in the spring

- every other year for 10 years to obtain about 70 days of FWD monitoring data
  period | 5 yrs. of data

Special Concerns

Safety Issues

- bring up any safety concerns during installation

- buried utility markers and hazard markers for the cabinet and instrument pole?
  - standard "Buried Utility" marker for conduit?
  - hazard markers for snowmobiles? None Required

- any special agency requirements other than safety vests and work boots?
  orange hats?
  ↑ where appropriate

A = 310114
B = 313018

Nebraska Department of Roads Responsibilities

Project Contacts for Maintenance Activities and Traffic Control
- will set up traffic control directly with district if desired

315A —
315B —

Utility Clearance
- 600 foot section (extend 50 foot outside both ends of 500 foot test section)
- utility clearance on driving lane and 40 feet into the ditch on the right side

KEN

315A — Construction?
315B —

Traffic Control
- two days for initial installation and monitoring in August
- full lane closure for 700 foot section on 313018 (310114 under construction)
- set up as early as possible - 7:30 AM?
- may want to mark locations for placing traffic control signs

315A — Construction?
315B — Aug. 10 + 11

Establish Elevation Reference for Piezometer or Install Local Frost Free Bench Mark (DOT STD)
- actual elevation not required (local reference only)
- check piezometer elevation every other year? — to geodetic mark

— 315A — anything as part of steel

Equipment
- pavement saw and operator
  - only required for first day during instrument installation at each site
  - saw 16 inch square block out of the pavement surface (~~or option to core~~)
    - located in the outer wheel path
    - agency has option to epoxy block back in-place or patch hole
  - equipment capable of cutting one inch deeper than estimated pavement thicknesses
    - 310114 has 7.0 inches AC (cut 8.0 inches deep)
    - 313018 has 12.0 inches PCC (cut 13.0 inches deep)
  - saw four inch wide trench for conduit on 313018
    - extend from outer wheel path to edge of 10 foot paved PCC shoulder
    - Note: 310114 has conduit installed under the pavement/shoulder
  - saw 13 inch slot for temperature probe

Saw

~~315A — Aug. 7~~
~~315B — Aug. 10~~

may modify on PCC to 16x78

↑ see if plant still operational

Rent larger one? — Bill.

— Horiz Boring. — George

3" ± D.

- drill rig and operator
  - only required for first day during instrument installation at each site
  - able to reach location for instrument pole 27 feet off edge of driving lane
  - bore one six-inch diameter hole for piezometer
    - 14 feet deep
    - located just off paved shoulder
  - bore one 12-inch-diameter hole for instrumentation
    - eight feet deep in the outer wheel path
    - solid stem auger preferred
      - continuous flighting not required
      - NCRCO has 12-inch-diameter auger with 1-5/8 inch male hex drive

315A — Aug. 7
315B — Aug. 10

Hollow-stem

Bring → Ken — (fork) crowfoot for 12" ϕ to hold during

- bore one 12-inch-diameter hole for equipment cabinet (or will dig by hand)
  - two feet deep
  - located about 26 feet outside the driving lane in the ditch

- bore one six-inch-diameter hole for the instrumentation pole
  - 10 feet deep
  - located one foot behind the equipment cabinet in the ditch

(Hollow stem) O.D. 7" to 8"

Need - ~~small~~ portable generator if readily available to run small power tools

Skw

Materials for Each Site — Bring.

- cover assembly for piezometer (Braun Intertec can provide)
  - must function for ten years and be able to open in the winter
  - minimum four-inch inside diameter and 18 inches to 24 inches long

- sackcrete for piezometer cover and instrumentation pole — Bill
  - estimate six bags

- bentonite pellets for sealing piezometer — Drill rig.
  - five-gallon pail

- clean filter sand for piezometer — Bill
  - 400 pounds (four bags)
  - particle size not critical (silica sand will work)

- pea gravel or trap rock for equipment cabinet — Bill
  - 500 pounds (four five-gallon pails)
  - 3/8 inch or 1/2 inch size preferred

- agency option to patch hole versus epoxy old block back in the pavement
  - additional materials required if patching
    - 310114 - hot mix patch or replace block?
    - 313018 - quick set patch or replace block?
    - ~~rebar and epoxy if patching?~~

Horiz Boring. → will have quick set available

16x16x16

Horiz Bore

- patch for conduit trench (313018 only)
  - 10 foot long by four inch wide by ___ inch deep

- water for mixing sackcrete and equipment clean-up
  - estimate 30 gallons (available on drill rig?)

- ~~hazard markers for cabinet and instrument pole (if required by the agency)~~

Pavement Repairs

- ~~patch conduit trench (313018 only)~~
- assist with block replacement or patching

Miscellaneous Activities

- mow tall grass in area identified for utility clearance if needed

NCRCO (Braun Intertec) and FHWA Staff Responsibilities

Instrumentation

- provide all instrumentation

- install all instrumentation with assistance from anyone on-site

- collect all required monitoring data

- NCRCO phone 1-800-344-7477 or 612-942-3047
    - main contacts for the Seasonal Monitoring Program
        - Bob Van Sambeek (Coordination and instrumentation)
        - Ron Urbach (Geotechnical and materials)

Closing Comments

Questions or concerns?

NAME	DIVISION / DEPT.	TELEPHONE NO.
Bob VanSambeek	Braun Intertec / LTPP	800-344-7471
* Bill Parrish (Both Sites)	N.D.O.T. Dist. 4	308-385-6265
Terry Guy	NDOR Planning	402-479-4509
Darrell L. Nave	NDOR Mat'ls & Tests	402-479-4709
George Woolstrum	NDOR M&T	402-479-4791
Ken Cheney (Drill Rig?)	NDOR M+T	402-479-4678
Dalyce Ronnau	Maint. Div	402-479-4544

Traffic Control Contacts

Al ~~Hall~~ Horak	Chester (315A)	402-362-5930
William ~~Bobb~~ Bobb	Kearney (315B)	308-865-5430

→ will get # from Bill

- Fri. July 28 - George - possible to H-bore ahead?
  → better if not - allow FWD first, will ask FHWA if necessary
  → still no saw for 12" pcc - still calling around

Joe Voss? - Saw?

Don Missouri? (SP?) - MST @ SPS-1 (310114 only)

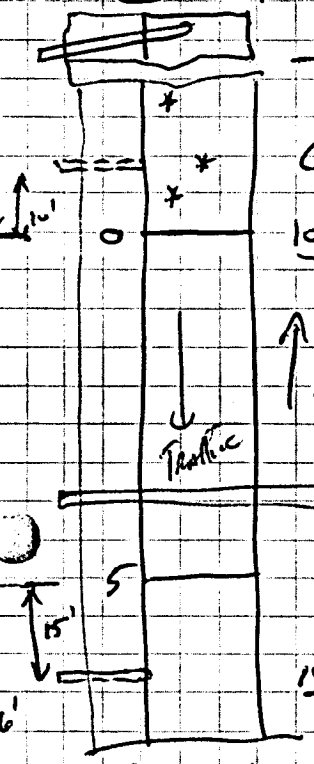
BRAUN INTERTEC

Description: SITE VISIT 310114

Project No: DBUX9279Q 85

Date: July 21, 95 By: RV

SITE VISIT w/ Ron U. - No signs etc, still under constr.
look @ both SWP site and Ams site for SPS-1



- Edge drain 45' from section - base layer change just past edgedrain

Conduit installed @ 0-10' - FWD { -20, -5 OWP, -10 ML }

10474+50 project stationing

Culvert @ Stn. 4+65 about 5' deep

10469+50

- IRRIGATION SYSTEM FARTHER AWAY @ Sta-5

- Ditch not to final grade - Cabinet installation? - erosion?

- Shallow medians

- include putty on installation materials to seal wires into conduit

- is FWD @ 0-20 to close to edgedrains @ 0-45

- Traffic control - flag until work finished on NB.

FACSIMILE MEMORANDUM

Braun Intertec Corporation
6875 Washington Avenue South, P.O. Box 39108, Minneapolis, MN 55439-0108
(612) 941-5600 FAX: (612) 942-3059

TO: Gonzalo Rada - 301-210-5032
Aramis Lopez - 703-285-2767

Pages 9

FROM: Robert J. Van Sambeek (612) 942-3047

DATE: August 2, 1995

SUBJECT: SMP Site 310114 (31SA) Monitoring Location
C:\SMP\WP\31SAEND.SMP

Pre-SMP installation FWD was done at section 310114 with only 5.2" of the 7.0" AC surface. This testing was done one day after the paving, and many variations were obtained in the deflection data (from compaction of the layers?). This section had conduits installed at Sta. 0-10 and Sta. 5+15 prior to paving so the shoulder would not have to be cut to install the SMP sensors, and the FWD test locations were based on the conduit locations.

Please review the FWDCHECK data that is attached regarding which end of the section to monitor for SMP purposes. SEE APPENDIX A-2 OF INSTALLATION RPT.

At this point I favor the Sta. 0 end for the following reasons.

* The instrumentation area at Sta. 0-10 is more representative of the 200 foot section.
* The irrigation system may influence the Sta. 5 end.
* The culvert at Sta. 4+63 will influence the Sta. 5 end.

Note - edge drains for adjacent sections end at Sta. 0-45 and start again at Sta. 5+56.

The installation is scheduled for Monday, August 7. If I do not hear otherwise, I will proceed with installation details at the Sta. 0 end.

TF
Gonzalo @ 4:00 PM
* use sta 0. end.

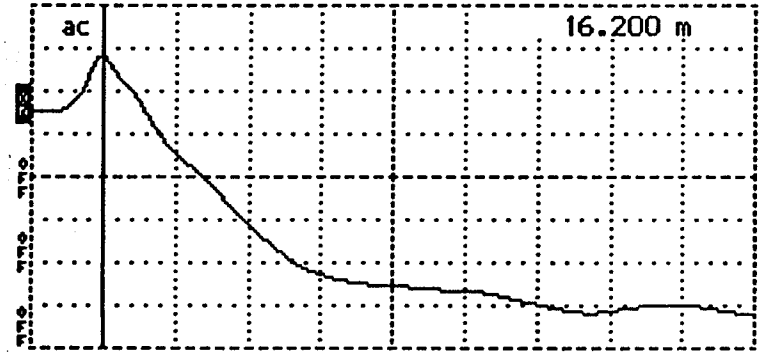
Appendix B-2: Pre-Installation Equipment Checks/Calibration Information

Appendix B-2 contains the following data sheets for the pre-installation equipment checks/calibration:

- Data Sheet SMP-C01: TDR Probe Check;
- Data Sheet SMP-C02: Thermistor and Air Temperature Probe Check;
- Data Sheet SMP-C03: Electrical Resistivity Probe Check;
- Data Sheet SMP-C04: Function Generator, Multi-meter, and Switch Box Checks; and
- Data Sheet SMP-C05: Tipping-Bucket Rain Gauge Calibration.

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

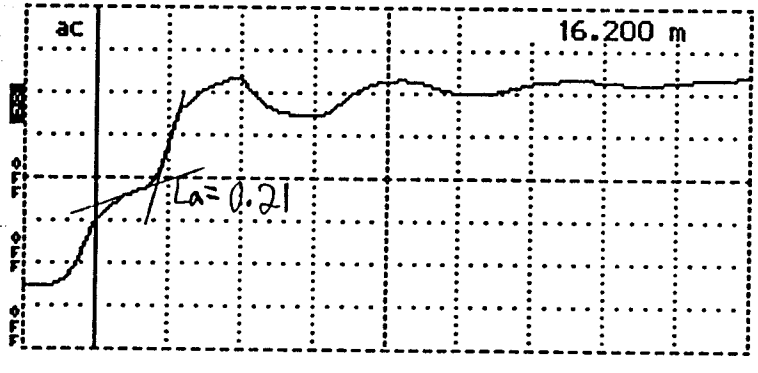
Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 01
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

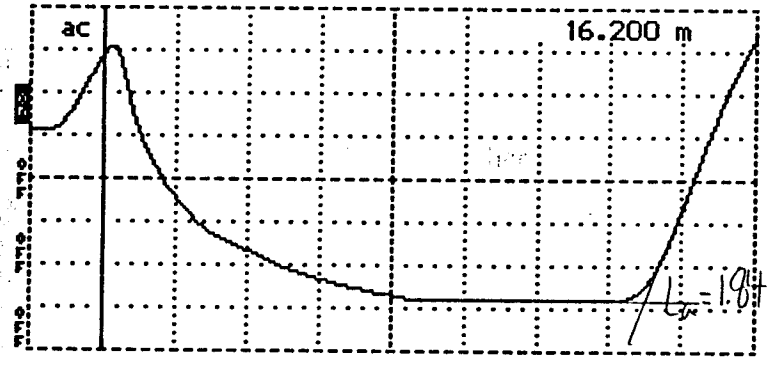


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 01
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[1]
"In Air"	0.21	1.08

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [01 14]

Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 01
Notes water
-room temp

Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.84	83.00

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A01 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

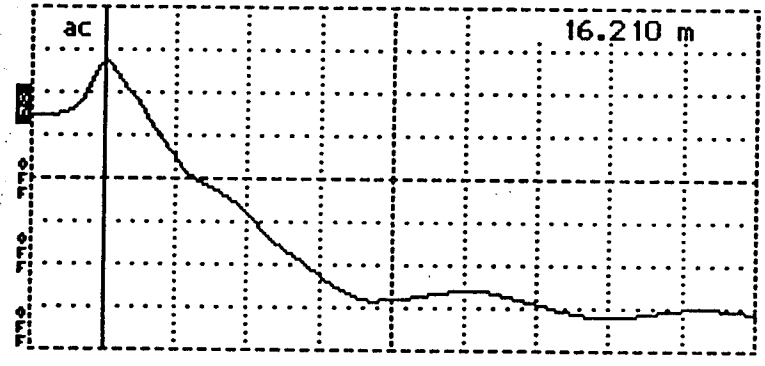
Comments: _____

Prepared by: Jeff Henrickson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [01 14]

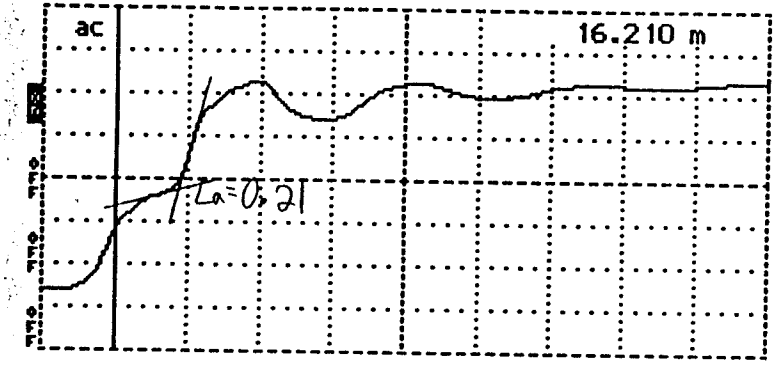
Cursor ..... 16.210 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 02
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.210 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

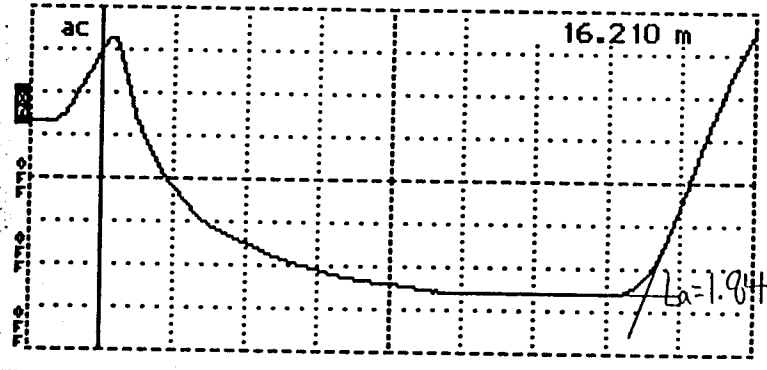


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 02
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)[1]	Dielectric Constant[1]
"In Air"	0.21	1.08

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [01 14]

Cursor ..... 16.210 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUN-95
Cable 31A 02
Notes water
-Room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.84	83.00

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A02 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

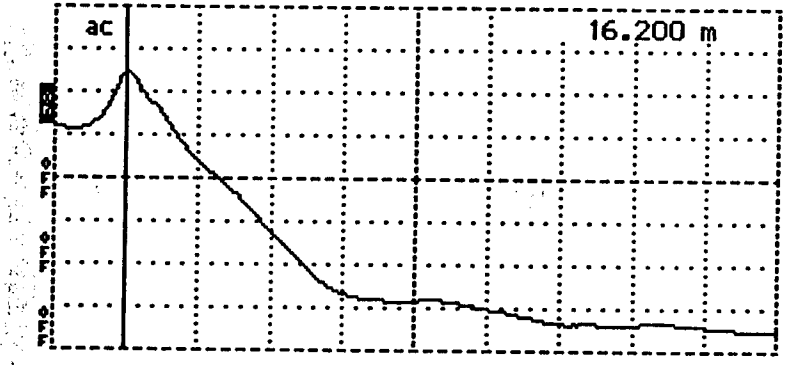
Comments: _____

Prepared by: Jeff Henrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

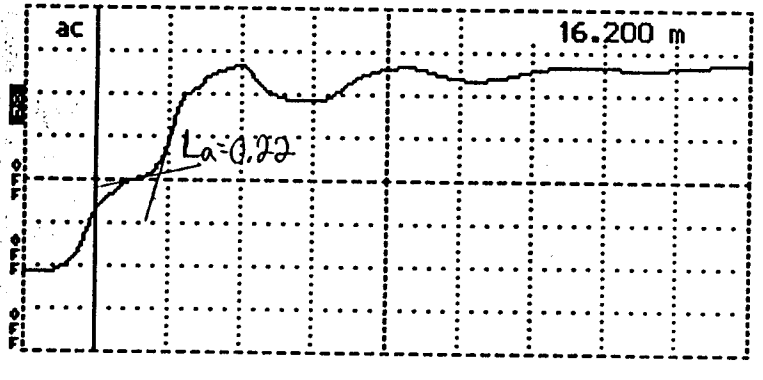
Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 03
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

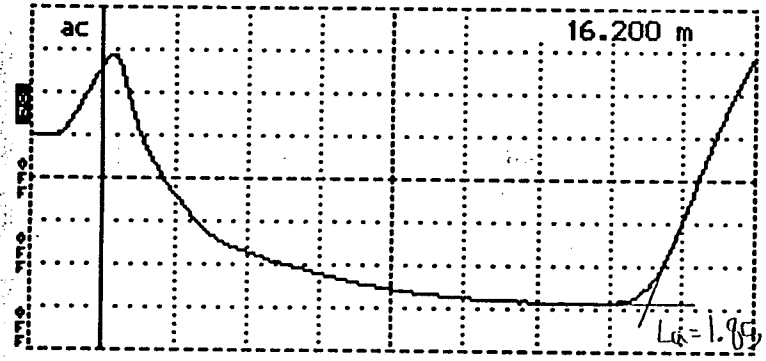


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 03
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[1]
"In Air"	0.22	1.19

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 77.0 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 03
Notes water
– Room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.85	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A03 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

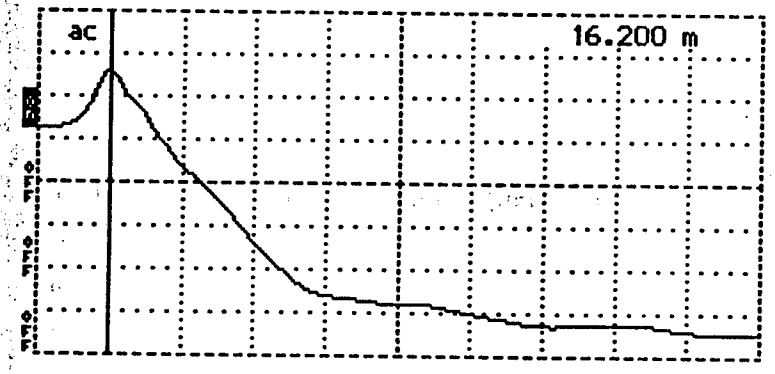
Comments: _____

Prepared by: Jeff Henrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [01 14]

Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
VP 0.99
Noise Filter..... 1 avg
Power..... ac

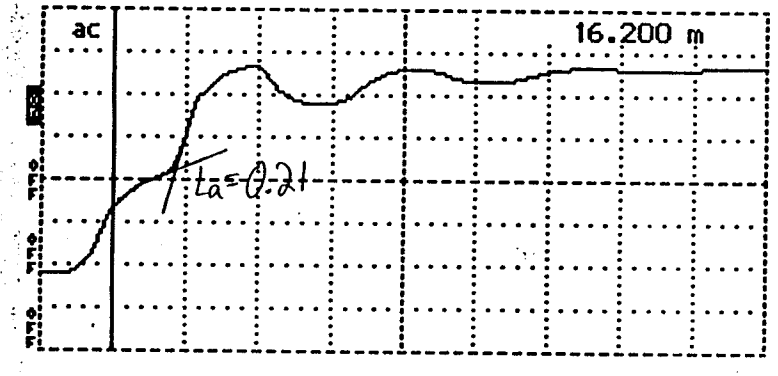


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 04
Notes short

Input Trace _____
Stored Trace _____
Difference Trace _____

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
VP 0.99
Noise Filter..... 1 avg
Power..... ac



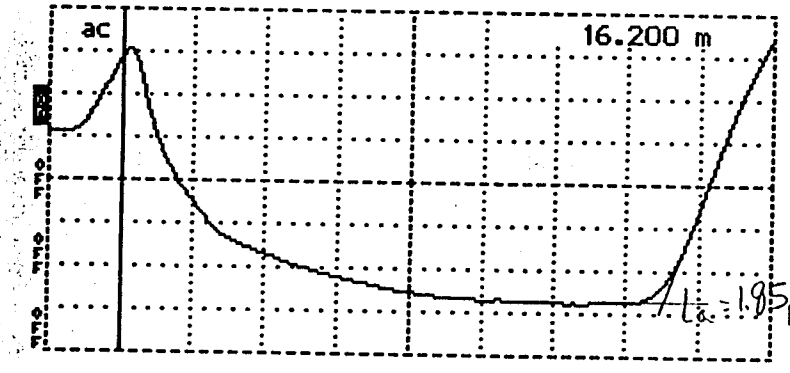
Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 04
Notes air

Input Trace _____
Stored Trace _____
Difference Trace _____

TDR Trace	Apparent Length, (m)	Dielectric Constant
"In Air"	0.21	1.08

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31_] LTPP Section ID [0114]

Cursor ..... 16.200 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 04
Notes water
– Room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace[1]	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.95	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A04 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

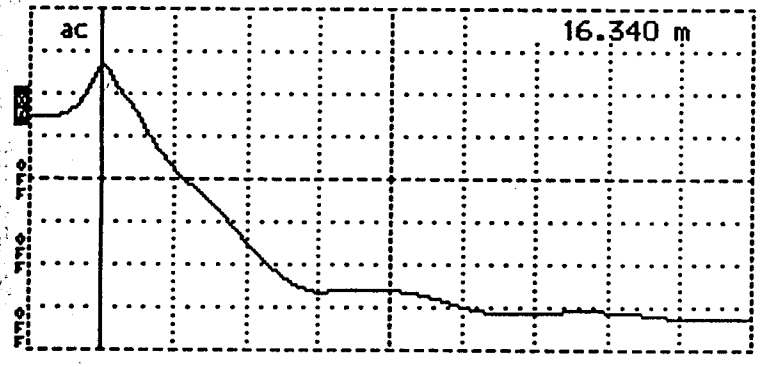
Comments: _____

Prepared by: Jeff Herrickson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

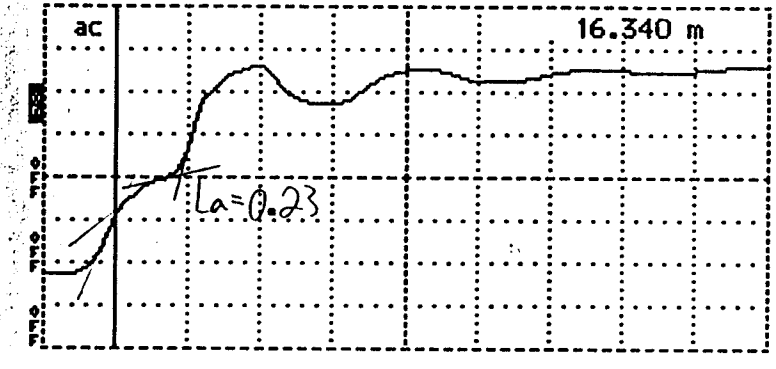
Cursor ..... 16.340 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 05
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.340 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

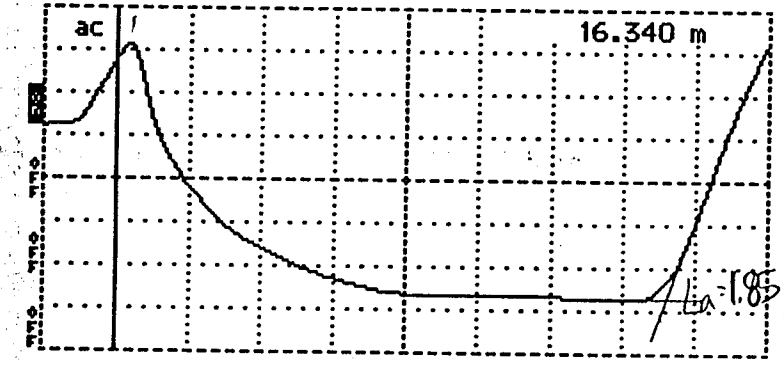


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 05
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[1]
"In Air"	0.23	1.30

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

Cursor ..... 16.340 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 05
Notes water
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.85	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A05 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

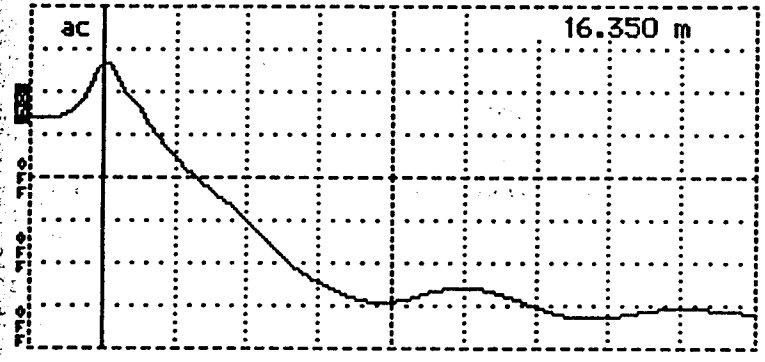
Comments: _____

Prepared by: Jeff Herrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

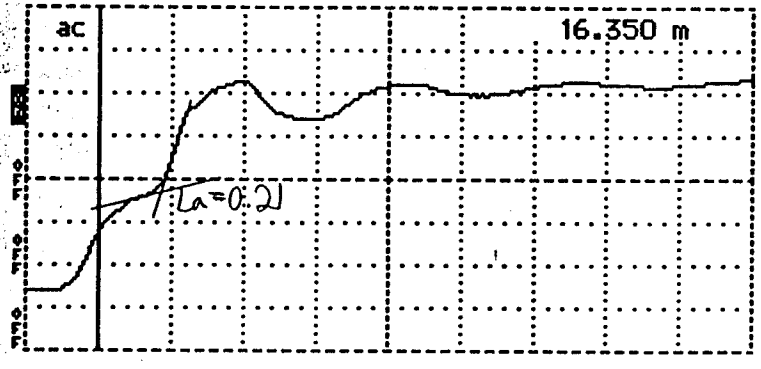
Cursor ..... 16.350 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 06
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.350 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

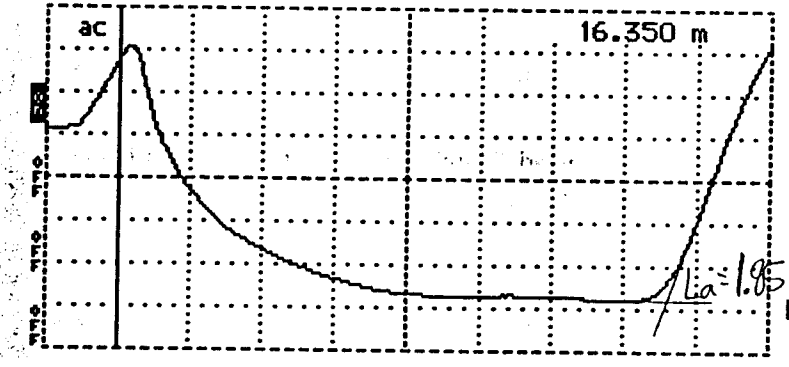


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 06
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"In Air"	0.21	1.08

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

Cursor ..... 16.350 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 06
Notes water
— Room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.95	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A06 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

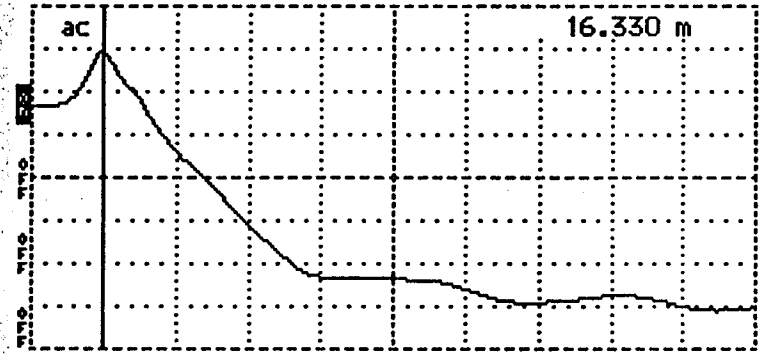
Comments: _____

Prepared by: Jeff Henrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

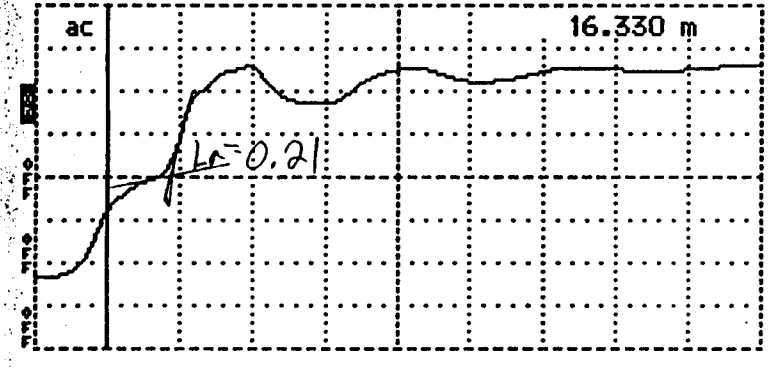
Cursor ..... 16.330 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 07
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.330 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

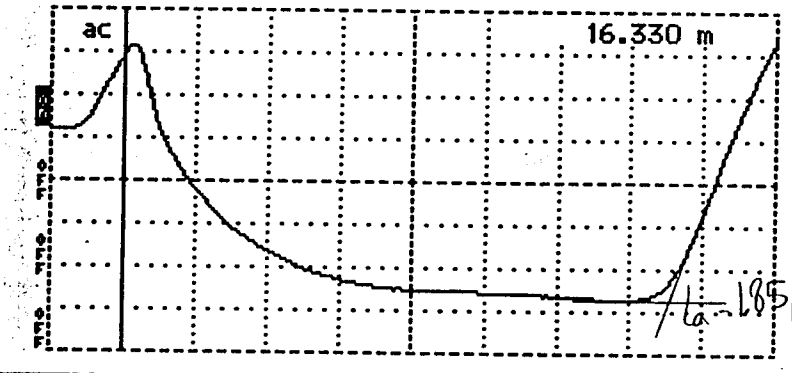


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 07
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"In Air"	0.21	1.08

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

Cursor ..... 16.330 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A07
Notes water
– Room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.85	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A07 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

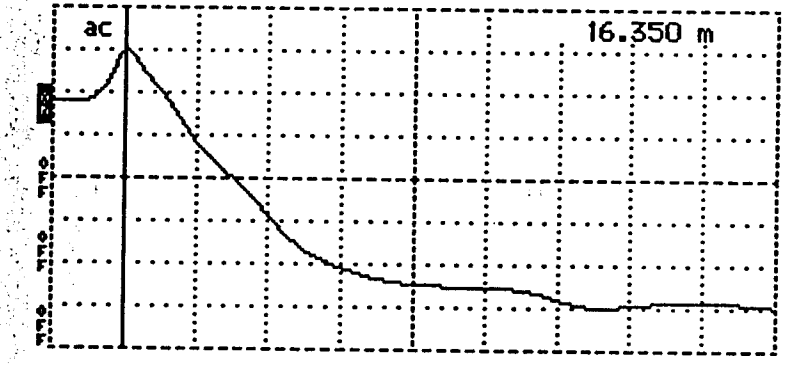
Comments: _____

Prepared by: Jeff Henrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

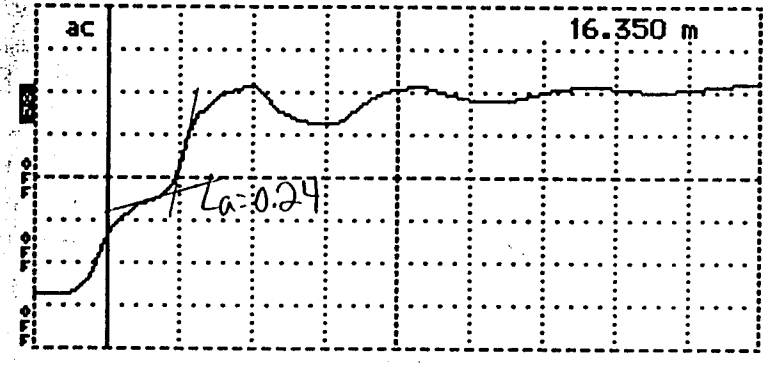
Cursor ..... 16.350 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 08
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.350 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

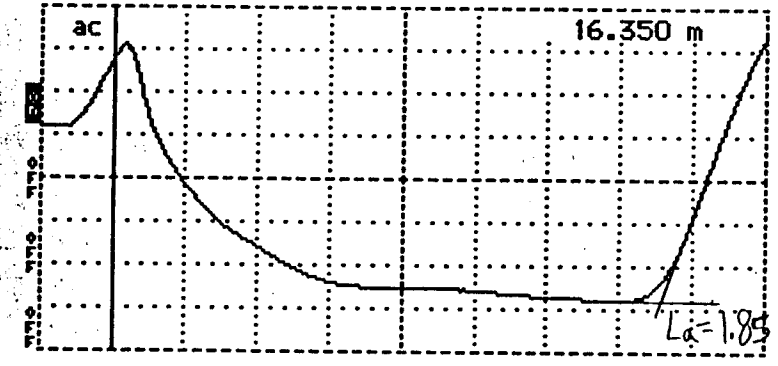


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 08
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"In Air"	0.24	1.41

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

Cursor ..... 16.350 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 08
Notes water
room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.85	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A08 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

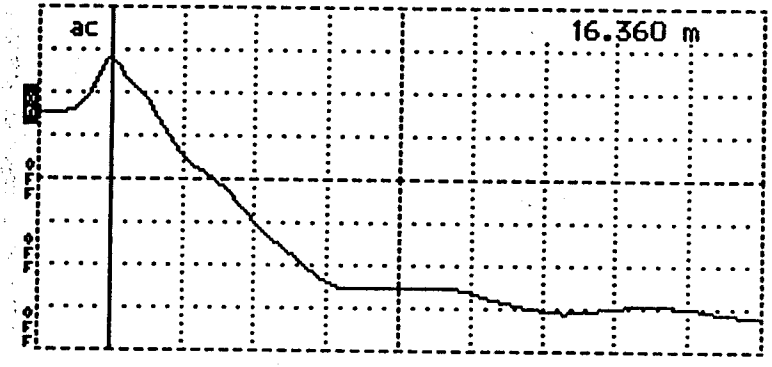
Comments: _____

Prepared by: Jeff Henrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

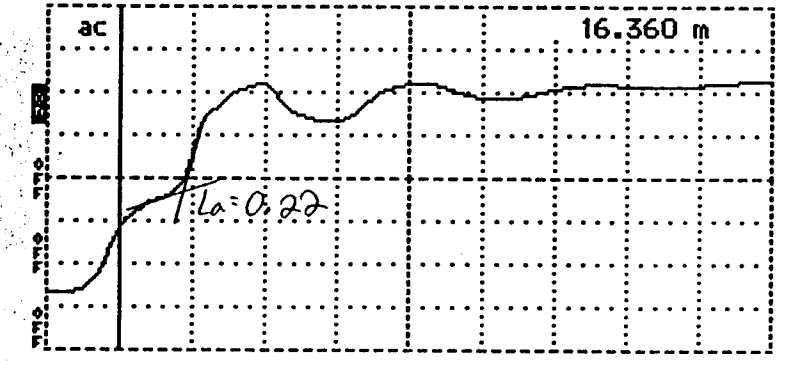
Cursor ..... 16.360 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 09
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.360 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

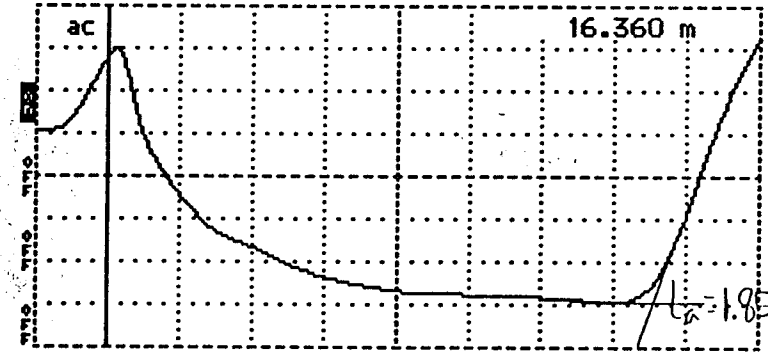


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 09
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[1]
"In Air"	0.22	1.19

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

Cursor ..... 16.360 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 09
Notes water @ room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.85	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A09 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

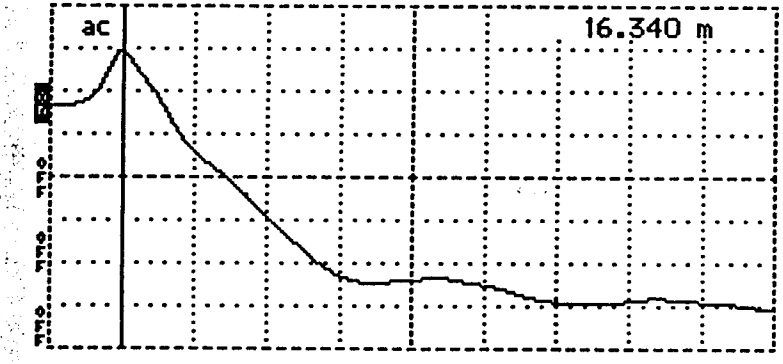
Comments: _____

Prepared by: Jeff Henrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 1) TDR Probe Check	Agency Code [31] LTPP Section ID [01 14]

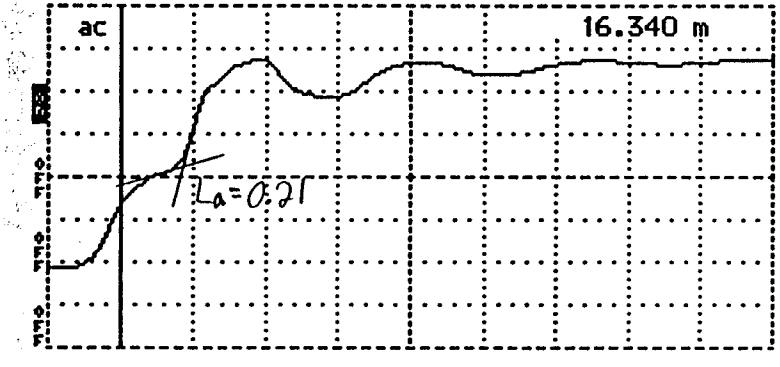
Cursor ..... 16.340 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 10
Notes short
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"Shorted at Start"		

Cursor ..... 16.340 m
Distance/Div..... .25 m/div
Vertical Scale.... 177 mρ/div
Vp 0.99
Noise Filter..... 1 avg
Power..... ac

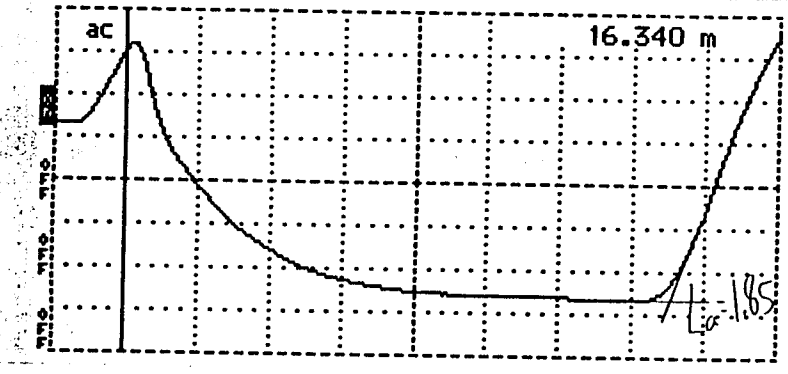


Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 10
Notes air
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant
"In Air"	0.21	1.08

LTPP Seasonal Monitoring Program Data Sheet SMP-C01 (Page 2) TDR Probe Check	Agency Code [31] LTPP Section ID [0114]

Cursor ..... 16.340 m
Distance/Div..... .25 m/div
Vertical Scale.... 74.8 mρ/div
VP 0.99
Noise Filter..... 1 avg
Power..... ac



Tektronix 1502B TDR
Date 13-JUL-95
Cable 31A 10
Notes water @ room temp
Input Trace
Stored Trace
Difference Trace

TDR Trace	Apparent Length, (m)	Dielectric Constant[2]
"In Water"	1.95	83.91

[1] If dielectric constant not between 0.75 and 2.0, contact FHWA LTPP Division
[2] If dielectric constant not between 76 and 84, contact FHWA LTPP Division

Note: Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

TDR Probe Serial Number: 31A10 TDR Probe Length, L: 0.204 m Length of Coax Cable: ___.__ m

Comments: _____

Prepared by: Jeff Henrichson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 13/JUL/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C02 Thermistor Probe Check	Agency Code [31] LTPP Section ID [0114]

Thermistor Probe Assigned Serial Number : [31A T]

Air Temperature Probe Assigned Serial Number: [31A A T]

Thermistor Number	Distance from Top (m)	Temperature (°C) – Calibration in: Ice-Bath; T = 1.7°C	Other HOT; T = 37.9°C	Comments
1	./	1.57	38.0	
2	./	1.57	38.1	
3	./	1.53	38.0	
4	0.017	1.64	38.3	
5	0.094	1.75	38.2	
6	0.170	1.75	38.2	
7	0.245	1.75	38.2	
8	0.322	1.78	38.2	
9	0.474	1.75	38.3	
10	0.626	1.67	38.2	
11	0.780	1.67	38.2	
12	0.930	1.64	37.7	
13	1.083	1.75	37.8	
14	1.237	1.71	37.8	
15	1.388	1.78	37.8	
16	1.541	1.75	38.1	
17	1.695	1.75	38.2	
18	1.844	1.67	38.2	
End	1.854	n/a	n/a	
Air Probe	n/a	1.43	38.7	

Comments: 3Aug95: COLD → TIME = 1256, DISPLAY @ = 1.17 °E, HG @ = 1.67 °E

2Aug95: HOT → TIME = 1358, DISPLAY = 37.9 °E HG = 38.8 °C

– IN ENVIRONMENTAL CHAMBER

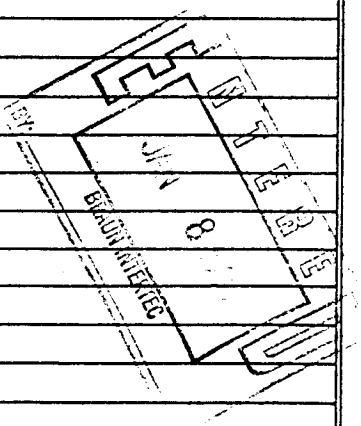
Prepared by: Jeff Henrickson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 12JUL95

LTPP Seasonal Monitoring Program Data Sheet SMP-C03 Resistivity Probe Check	Agency Code [31] LTPP Section ID [0114]

Electrical Resistivity Serial Number: 31AR

DB37 Connector Pin Number	Electrode Number	Distance from Top (m) (round up) Line 1	Line 2	Avg	Continuity ✓	Spacing (m)	Comments
36	1	0.030	.031	.031	✓	———	
35	2	0.080	.081	.081	✓	.050	
34	3	0.130	.130	.130	✓	.049	
33	4	0.181	.181	.181	✓	.051	
32	5	0.232	.234	.233	✓	.052	
31	6	0.283	.283	.283	✓	.050	
30	7	0.333	.334	.334	✓	.052	
29	8	0.383	.383	.383	✓	.049	
28	9	0.434	.434	.434	✓	.051	
27	10	0.485	.485	.485	✓	.051	
26	11	0.535	.536	.536	✓	.051	
25	12	0.586	.587	.587	✓	.051	
24	13	0.637	.638	.638	✓	.051	
23	14	0.689	.689	.689	✓	.052	
22	15	0.739	.739	.739	✓	.050	
21	16	0.789	.789	.789	✓	.050	
20	17	0.840	.840	.840	✓	.051	
19	18	0.891	.891	.891	✓	.051	
18	19	0.942	.943	.943	✓	.052	
17	20	0.992	.993	.993	✓	.050	
16	21	1.043	1.043	1.043	✓	.050	
15	22	1.095	1.095	1.095	✓	.052	
14	23	1.145	1.145	1.145	✓	.050	
13	24	1.195	1.196	1.196	✓	.051	
12	25	1.246	1.246	1.246	✓	.050	
11	26	1.297	1.298	1.298	✓	.052	
10	27	1.347	1.348	1.348	✓	.050	
9	28	1.399	1.399	1.399	✓	.051	
8	29	1.450	1.451	1.451	✓	.052	
7	30	1.500	1.502	1.501	✓	.050	
6	31	1.551	1.551	1.551	✓	.050	
5	32	1.602	1.602	1.602	✓	.051	
4	33	1.652	1.652	1.652	✓	.050	
3	34	1.703	1.704	1.704	✓	.052	
2	35	1.754	1.754	1.754	✓	.050	
1	36	1.806	1.806	1.806	✓	.052	
	Bottom	1.830	1.830	1.830	n/a	n/a	



Comments: many of the coils are wrapped loosely

Prepared by: Jeff Henrickson Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 27/JUN/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C04 Function Generator, Multimeter, and Switch Box Checks	Agency Code [31] LTPP Section ID [0114]

Start Time (military): 1227

Test Position	Switch Settings		Voltage (ACV)		Current (ACA)		Measured Resistance R = V/I (ohms)	Known Resistance (ohms)
	I_1 V_1	I_2 V_2	Range Setting	Reading	Range Setting	Reading		
36	36	37	MILLI m	0.2	MICRO	95.5	R1 =	R1 =
37	37	38		12.2		73.2	R2 =	R2 =
38	38	39		15.2		1.6	R3 =	R3 =
39	39	00		152.2		0.5	R4 =	R4 =
36	36	37		0.2		83.9	R1 =	R1 =
37	37	38		12.2		73.5	R2 =	R2 =
38	38	39		15.4		1.6	R3 =	R3 =
39	39	00		152.3		0.5	R4 =	R4 =
36	36	37		0.5		292.1	R1 =	R1 =
37	37	38		27.2		269.5	R2 =	R1 =
38	38	39		14.0		14.0	R3 = 1000	R1 = 1004
39	39	00		392.2		.4	R4 =	R2 =

Comments: SET # 1 & 2 HAD ~~BAD CONNECTOR~~ meter set on DC vs. AC.!

Prepared by: _____ Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 08/Aug/95

LTPP Seasonal Monitoring Program Data Sheet SMP-C05 Rain Gauge Calibration	Agency Code [31] LTPP Section ID [0114]

General Information:

Manufacturer: TEXAS ELECTRONICS INC.

Model Number: TRP-525M

Serial Number: 12038

Note: The screen should be tacked inside the funnel using silicon at three to four points to prevent loss from wind.

Rain Gauge Calibration Data

Trial	Start Time (Military)	End Time (Military)	Volume (ml)	Number of Tips	Adjustment[1] No. of Turns
1	1200	1300	473.	98.	+0.4
2	1400	1500	473.	101.	0.0
3	0800	0900	473.	101.	_._

02 Aug 95

[1] Adjust gauge to obtain 100 tips ± 3 for 473 ml of water.

+ = CW

Comments: See onsite file 315ACAL.ONS.

Prepared by: Jerome Dicks Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 01/Aug/95

Appendix C-1: Instrumentation Installation Information

Appendix C-1 contains the following installation data sheets and associated field notes, as well as, certificate of registration for instrumentation, and photographs documenting the installation:

- Data Sheet SMP-D10: SMP Field Activity Report;
- Data Sheet SMP-I01: List of Installed Instrumentation;
- Data Sheet SMP-I02: Instrumentation Locations;
- Data Sheet SMP-I03: Log of Piezometer Hole;
- Data Sheet SMP-I04: Log of Instrumentation Hole;
- Data Sheet SMP-I05: Field Gravimetric Moisture Contents;
- Data Sheet SMP-I05(A): Lab Gravimetric Moisture Contents;
- Data Sheet SMP-I05(B): Gravimetric Moisture Comparison;
- Data Sheet SMP-I06: TDR Moisture Content;
- Data Sheet SMP-I07: Representative Dry Density;
- Plot of Gravimetric Moisture Results; and
- Installation Photographs.

31 S A 9 5 A

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-D10 SMP Field Activity Report	Agency Code [31] LTPP Section ID [01 14]

Onsite Datalogger and Instrumentation		
File Name - *.ONS	INSTALL	Comments: —
Battery Replace	Yes - (No)	Voltages 12.5 VDC
Repairs/Calib.	INSTALL SITE	
Other:		

Mobile Datalogger		
File Name - *.MOB	MANUAL	Comments: —
TDR/Resistance Voltages	Sets (0)	INSTALL
Other:		—

Manual Data Collection		
Piezometer	Yes - (No)	Comments: INSTALL m
Resistance 2 pt.	Sets (0)	INSTALL SITE
Resistivity 4 pt.	Sets (0)	" "
Elevations	Sets (0)	" "
Distress Survey	Yes - (No)	
Long. Dipstick Profile	Yes - (No)	
Photos or Video	(Yes) - No	INSTALLATION
Other:		—

FWD and Associated Data		
FWD Testing	Sets (1)	Operator: BRUCE & PELKEY
JCP - Snap Rings	Sets (N/A)	—
JCP - Faulting	Sets (N/A)	—
Other:		

IF REQUIRED, ATTACH SKETCHES TO THIS DATA SHEET

Comments: Very hot and humid.

Prepared by: Robert Van Sambeek Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/Aug/95 Daylight Savings Time (Y or N): Y

31 S A 95 A

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-I01 Instrumentation Installed and Participants	Agency Code [31] LTPP Section ID [0114]

List of Equipment:

Equipment	Quantity	Serial Number(s)
Instrument Hole:		
Thermistor Probe	01	31AT
Resistivity Probe	01	31AR
TDR Sensors	10	31A01 to 31A10
Equipment Cabinet:		
Campbell Scientific CR10 Datalogger	01	16528
Battery Package	01	~~5660~~ 5658 990
Weather Station:		
Rain Gauge	01	12038
Air Temperature Probe	01	31AAT
Radiation Shield	01	31A
Observation Piezometer/Bench Mark:	01	n/a

List of Participants:

Name of Participant	Agency/Employer
Bob Van Sambeek	Braun Intertec Corp.
Ron Urbach	" " "
Bruce Pelkey	" " "
Nebraska DOT	Nebraska DOT

Prepared by: Robert Van Sambeek Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/Aug/95

3 1 S A 9 5 A

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-I02 Installed Instrument Location	Agency Code [3 1] LTPP Section ID [0 1 1 4]

Longitudinal and Transverse Location of Instrumentation:

Instrument	Station (Customary Units)		Offset (m)[1]		
	Planned	Actual	Planned	Actual	
Instrumentation Hole	0-10	0-10	+0.76	+0.76	from stripe
Observation Piezometer	1+00	0+99.5	-2.71	-2.71	off paved edge of shoulder
Equipment Cabinet	0-10	0-10	-7.62	-7.50	
Weather Station	0-10	0-10	-8.23	-8.05	

[1] Transverse distance in meters from pavement edge (see LTTP Manual for FWD Testing) with (+) values toward mid-lane and (-) towards shoulder

Depth Location of Instrumentation:

Instrument		Depth from Pavement Surface to Top of Probe (m)		Comments
		Planned	Actual	
Thermistor Probe	Metal Top	0.025	0.025	*AC = 8.25" vs. 7.0"
	Metal Bottom	0.150	0.185	
	PVC Top	0.230	0.268	~~Placed deeper due to conduit~~
Resistivity Probe		0.230	0.268	

PIEZ. IS 0.1923 meters below PE @ 1100 on 08-AUG-95.

TDR Number	Depth from Pavement Surface to Probe (m)			Comments
	Planned Location [11]		Actual Location	
1	13	0.330	0.340	Placed upright under edge of AC.
2	19	0.480	0.475	
3	25	0.635	0.646	
4	31	0.790	0.793	
5	37	0.940	0.938	
6	43	1.090	1.073	
7	49	1.245	1.256	
8	55	1.400	1.397	
9	67	1.700	1.670	
10	879	2.010	2.000	Drill 80" deep.

ATTACH TOP-VIEW SKETCH OF INSTRUMENTATION HOLE SHOWING DIRECTION OF TRAFFIC AND LOCATION OF THERMISTOR AND RESISTIVITY PROBES. LABEL PROBES "T" AND "R", RESPECTIVELY

Prepared by: Robert Van Sant Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/AUG/95

31 S A 9 5 A

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-I03 Log of Piezometer Hole	Agency Code [31] LTPP Section ID [0114]

Operator: _____ Equipment Used: CME 55

Location: Station: 1+00 Offset: −2.71 m (from WHITE LINE lane edge)

Bore Hole Diameter: 160 . mm² Auger Type: 6¼" HOLLOW STEM AUGER

Scale (m)	Depth from Surface[1] (m)	Material Description	Material Code[2]
0.5		SILTY CLAY BROWN MOIST	131
1.0			
1.5	1.55		
	1.80	SILTY CLAY DK BROWN MOIST	131
2.0			
2.5		SILTY CLAY BROWN MOIST	131
3.0			
3.5			
4.0			
4.5	4.56		
5.0			

[1] Format: __.____ m; [2] Format: ___

Prepared by: RON URBACH Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/AUG/95

Data Sheet SMP-I03: Log of Piezometer Hole

BRAUN[SM]
INTERTEC

310114 315A95B

07 AUG 95 PIEZOMETER.

PIEZOMETER LENGTH 4.30M

DRILL TO 4.56M DEPTH. REFILLED AND COMPACTED SOIL TO 4.45M DEPTH.

FILTER SAND FROM 4.45M UP TO 3.35M USED TAMPER DURING SAND WAS PLACED.

BENTONITE PLACED FROM TOP OF SAND 3.35M TO 3.02M FOR A THICKNESS .33M (13").

USED SOIL REMOVED DURING DRILLING AS BACK FILL FROM TOP OF BENTONITE 3.02M TO ABOUT .7M. TAMPER USED DURING BACKFILLING.

THE PROTECTIVE PIPE WAS PLACED AT ABOUT .7M (27"±) BELOW GROUND SURFACE. CONCRETE MIX WAS PLACED AROUND THE PROTECTIVE PIPE TO ABOUT .13M (5") BELOW TOP OF PIPE.

ONE 5 GAL PAIL OF SOIL WAS TAKEN DURING DRILLING FROM 1.35M TO 2.0M DEPTH. SAMPLE PLACED IN STORAGE FOR POSSIBLE TESTING AT A LATER DATE

RON URBACH

31 S A 9 5 A

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-I04 Log of Instrumentation Hole	Agency Code [31] LTPP Section ID [0114]

Operator: _____ Equipment Used: CME 55

Location: Station: 0-10 Offset: +0.76 m (from lane edge)

Bore Hole Diameter: 300. mm 12"

Scale (m)	Strata Change[1] (m)	Material Description	PAIL #	Material Code[2]
0.10	.21	AC		700
0.20				
0.30	.49	AGGREGATE BASE	1, 2, 3, 4	304
0.40				
0.50	.64	SILTY CLAY BROWN MOIST	5	131
0.60	.72	SILTY CLAY BROWN MOIST	6	131
0.70	.84	SILTY CLAY BROWN MOIST	7	131
0.80	.98	SILTY CLAY BROWN MOIST	8	131
0.90	1.11	SILTY CLAY BROWN MOIST	9	131
1.00	1.25	SILTY CLAY BROWN MOIST	10	131
1.10	1.39	SILTY CLAY BROWN MOIST	11	131
1.20	1.53	SILTY CLAY DK BROWN MOIST (OLD TOPSOIL)	12	131
1.30	1.69	SILTY CLAY BROWN MOIST	13	131
1.40	1.75	SILTY CLAY BROWN MOIST	14	131
1.50	1.79	SILTY CLAY BROWN MOIST	15	131
1.60		SILTY CLAY BROWN MOIST	16	131
1.70				
1.80				
1.90				
2.00				
2.10				
2.20				
2.30				
2.40				
2.50				

[1] Format: __.____ m; [2] Format: ____

Prepared by: RON URBACH Employer: Braun Intertec Corporation

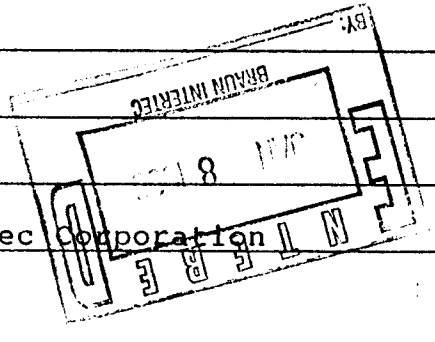
Date (dd/mmm/yy): 07 AUG 95

LTPP Seasonal Monitoring Program Data Sheet SMP-I05 (Field) Gravimetric Moisture Content	Agency Code [31] LTPP Section ID [0114]

TDR Probe	Probe Depth[1] (m)	Moisture Sample No.	Pan No.	Wt. of Pan (gms) = A	~~Wt. of Pan~~ + Wet Soil (gms) = B	~~Wt. of Pan~~ + Dry Soil (gms) = C	Wt. of Dry Soil (gms) = D = C - A	Wt. of Water (gms) = E = B - C	Moisture Content (%) = w = E/D * 100
1	0.330	1	2	0.0	455.8		437.8	18.0	4.1
2	0.480	2	1	0.0	490.6		471.9	18.7	4.0
3	0.635	3	2	0.0	275.6		234.9	40.7	17.3
4	0.790	4	1	0.0	244.4		199.9	44.5	22.3
5	0.940	5	2	0.0	228.6		184.7	43.9	23.8
6	1.090	6	1	0.0	258.8		209.3	49.5	23.7
7	1.245	7	2	0.0	241.7		199.7	42.0	21.0
8	1.400	8	1	0.0	254.4		208.9	45.5	21.8
9	1.700	9	3	0.0	269.8		230.5	39.3	17.0
10	2.010	10	1	0.0	259.0		208.7	50.3	24.1
1 POINT PROBE			2		256.8		211.5	45.3	21.4

[1] Distance in meters from pavement surface to TDR probe

Comments: _____



Prepared by: NEBRASKA DOT Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/AUG/95

LTPP Seasonal Monitoring Program Data Sheet SMP-~~105~~ (LAB) I05(A) LAB [redacted] Gravimetric Moisture Content	Agency Code [31] LTPP Section ID [0114]

TDR Probe	Probe Depth[1] (m)	Moisture Sample No.	Pan No.	Wt. of Pan (gms) = A	Wt. of Pan + Wet Soil (gms) = B	Wt. of Pan + Dry Soil (gms) = C	Wt. of Dry Soil (gms) = D = C - A	Wt. of Water (gms) = E = B - C	Moisture Content (%) = w = E/D * 100
1	0.330	1	1	226.0	1044.6	1017.6	791.6	27.0	3.4
2	0.480	2	2	230.2	1070.6	1041.1	810.9	29.5	3.6
3	0.635	3	3	241.7	587.0	532.3	290.6	54.7	18.8
4	0.790	4	4	231.5	753.4	660.9	429.4	92.5	21.5
5	0.940	5	5	230.0	540.5	484.6	254.6	55.9	22.0
6	1.090	6	6	229.5	622.1	552.6	323.1	69.5	21.5
7	1.245	7	7	230.0	645.1	576.3	346.3	68.8	19.9
8	1.400	8	8	226.7	624.0	558.9	332.2	65.1	19.6
9	1.700	9	9	233.2	714.2	444.5	211.3	29.7	14.1
10	2.010	10	10	231.7	712.3	445.4	213.7	46.9	21.9
L POINT PROCTOR			11	230.1	461.7	423.3	193.2	38.4	19.9

[1] Distance in meters from pavement surface to TDR probe

Comments: _____

Prepared by: NEBRASKA DOT Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/AUG/95

LTPP Seasonal Monitoring Program Data Sheet SMP-I05 (B) Gravimetric Moisture Comparison	Agency Code [31] LTPP Section ID [0114]

TDR	SMP-I02 TDR Depth (m)	SMP-I04 Material Code	Lab Data Dry Density (pcf)	TDR Installation Data		Gravimetric Moistures		Comments
				SMP-I06 La (m)	Calculated Gravimetric (percent)	SMP-I05 Field (percent)	SMP-I05A Lab (percent)	
1	0.340	304	*140.0	0.67	*9.4	4.1	3.4	Very coarse base with water added for compaction
2	0.475	304	*140.0	0.57	*6.7	4.0	3.6	
3	0.646	131	**98.7	1.54	39.9	17.3	18.8	Some base mixed in.
4	0.793	131	**98.7	1.67	47.2	22.3	21.5	
5	0.938	131	**98.7	+2.25	+99.9	23.8	22.0	FLAT TRACES
6	1.073	131	**98.7	2.12	+99.9	23.7	21.5	
7	1.256	131	**98.7	+1.50	+38.4	21.0	19.9	
8	1.397	131	**98.7	1.96	89.3	21.8	19.6	
9	1.670	131	**98.7	1.02	25.9	17.0	14.1	
10	2.000	131	**98.7	1.47	37.3	24.1	21.9	FLAT TRACE

TDR Gravimetric moistures calculated using equations on pages II-2 and II-5 of FHWA-RD-94-110 with La = 0.203 m, and Vp = 0.99.

Comments: * Estimated 140 pcf for calculation. Construction data not available yet.
** SMP-107 has 98.7 pcf @ 1.18 meter depth. Construction data not available - TDR moistures are not valid for flat traces.

Prepared by: RJV Employer: Braun Intertec Corporation Date (dd/mmm/yy): 08/JAN/96

$$w = \left(-330.72 + 4526.78\,La^2 - 2103.88\,La^4 + 402.25\,La^6\right)/\gamma_d$$; La (meters), γ_d (pcf), w (%)

3 1 SA 9 5 A

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-I06 TDR Moisture Content	Agency Code [31] LTPP Section ID [0114]

Required Settings:

Dist./Division: 0.25 m
Phase Velocity: 0.99
Noise Filter: 1 average

Probe Number	Probe Depth[1] (m)	Time (military)	Apparent Length (m)	Dielectric Constant[2]	Comments
1	0.340	(1)	0.67	11.11	Very coarse matl. added water to top for compaction
2	0.475		0.57	8.04	
3	0.646		1.54	58.70	Some base matl. mixed into soil
4	0.793		1.67	69.03	FLAT TRACE
5	0.938		≥2.25	125.31	FLAT TRACE
6	1.073		2.12	111.25	FLAT TRACE
7	1.256		≥1.50	≥56.00	FLAT TRACE
8	1.397		1.96	95.09	FLAT TRACE
9	1.670		1.02	25.75	
10	2.000	√	1.47	53.49	FLAT TRACE

[1] Distance in meters from pavement surface to TDR probe
[2] Dielectric constant is determined as follows:

$$\varepsilon = \left[\frac{(L_a)}{(L)(V_p)}\right]^2 = \left[\frac{(D_2 - D_1)}{(L)(V_p)}\right]^2$$

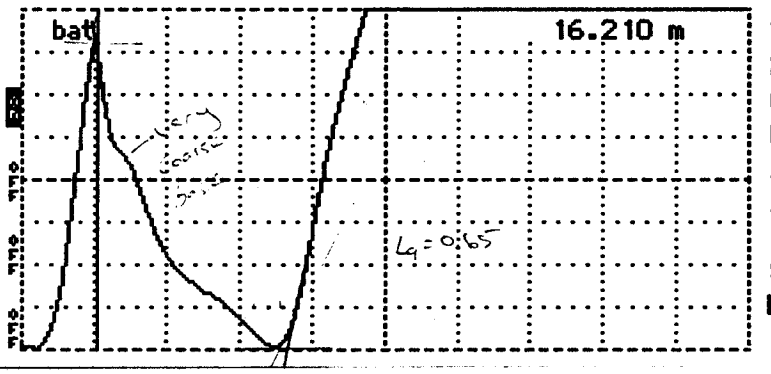
where ε = dielectric constant; L_a = apparent length of probe, m; L = actual length of probe units (= 0.203 m (8 in) for FHWA probes); V_p = phase velocity setting (= 0.99).

ATTACH TDR TRACES TO THIS DATA SHEET.

Comments: (1) NOT RECORDED. ALL PROBES PLACE MID TO LATE AFTER NOON.

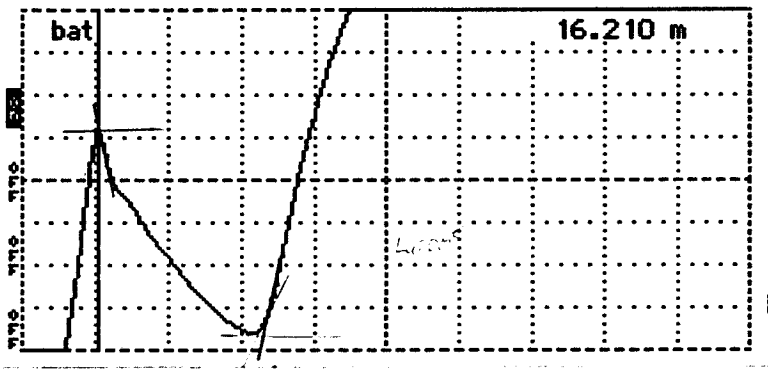
Prepared by: Robert Van Sambeek Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/AUG/95



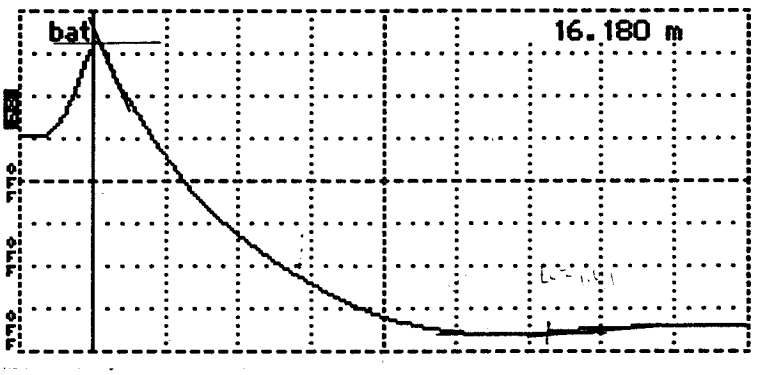
..... 16.210 m
...iv..... .25 m/div
...cale.... 28.1 mρ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07-AUG-95
Cable 31A01
Notes Installation
- added H2O to top
Input Trace 2" of mtl.
Stored Trace
Difference Trace



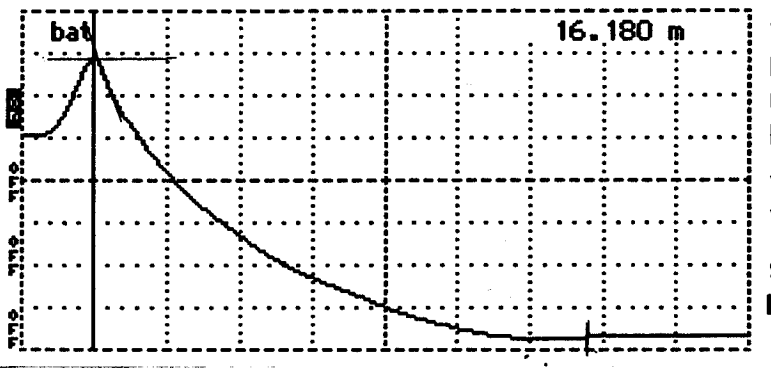
..... 16.210 m
...iv..... .25 m/div
...cale.... 33.4 mρ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG95
Cable 31A02
Notes INSTALL
- BASE LAYER
Input Trace
Stored Trace
Difference Trace



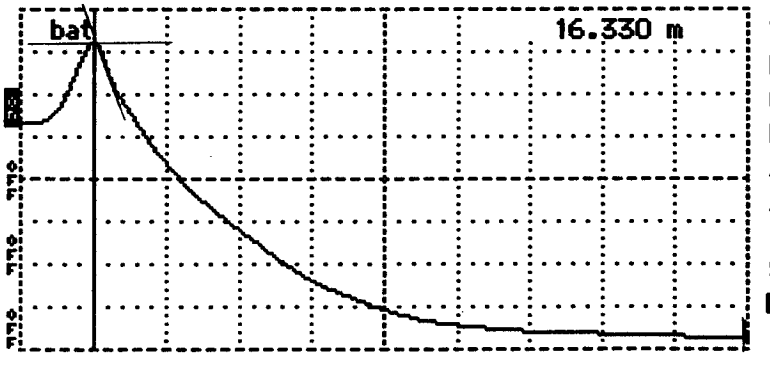
..... 16.180 m
...iv..... .25 m/div
...cale.... 86.4 mρ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG95
Cable 31A03
Notes INSTALL
- Some base matl. mixed in
Input Trace
Stored Trace
Difference Trace



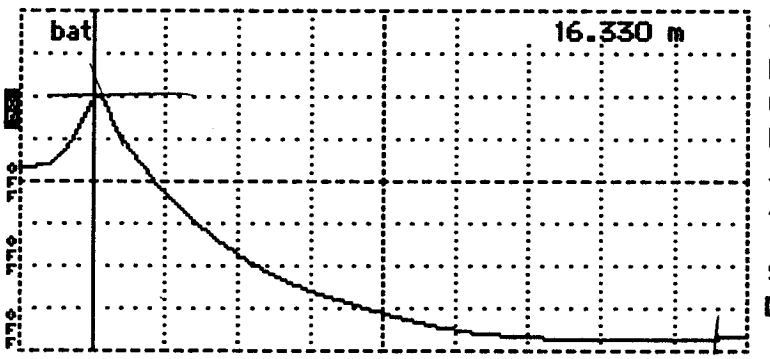
..... 16.180 m
...iv..... .25 m/div
...cale.... 103 mρ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG95
Cable 31A04
Notes INSTALL
Input Trace
Stored Trace
Difference Trace



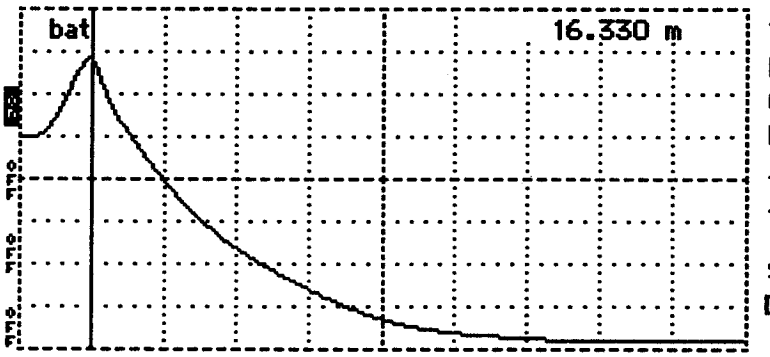
..... 16.330 m
...iv..... .25 m/div
...cale.... 96.9 mρ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG-95
Cable 31A05
Notes INSTALL
- no second inflection pt.
Input Trace
Stored Trace
Difference Trace



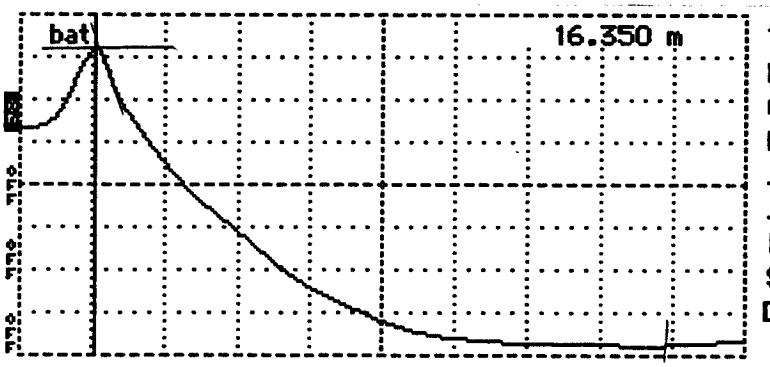
..... 16.330 m
iv..... .25 m/div
cale.... 115 mΩ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG95
Cable 31A06
Notes INSTALL
Input Trace
Stored Trace
Difference Trace



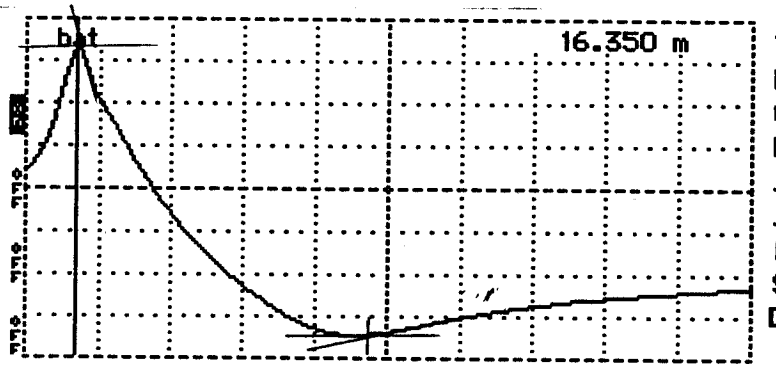
..... 16.330 m
..... .25 m/div
...e.... 96.9 mΩ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG95
Cable 31A087 (Fr
Notes INSTALL
(also see Trace w/
Input Trace .5m/div)
Stored Trace
Difference Trace



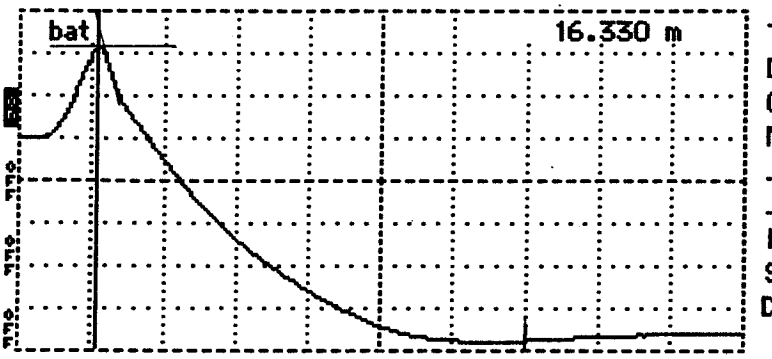
..... 16.350 m
...v..... .25 m/div
cale.... 91.5 mΩ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG95
Cable 31A08
Notes INSTALL
Input Trace
Stored Trace
Difference Trace



..... 16.350 m
...v..... .25 m/div
cale.... 68.6 mΩ/div
..... 0.99
...r..... 1 avg
..... bat

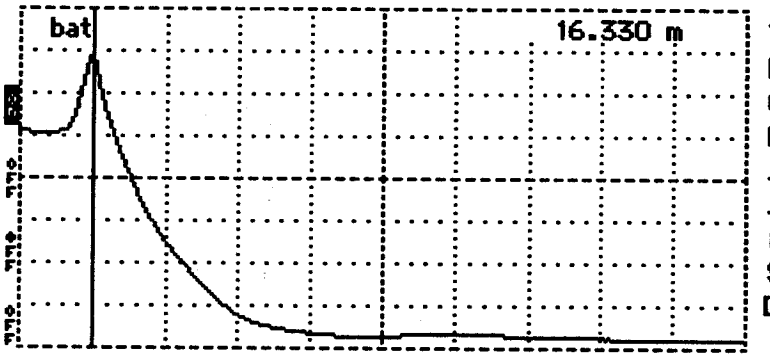
Tektronix 1502B TDR
Date 07/AUG/95
Cable 31A09
Notes INSTALL
Input Trace
Stored Trace
Difference Trace



..... 16.330 m
..... .25 m/div
...e.... 83.9 mΩ/div
..... 0.99
..... 1 avg
..... bat

Tektronix 1502B TDR
Date 07AUG95
Cable TDR #10
Notes INSTAL.
~~31A95~~ (31A10)
Input Trace
Stored Trace
Difference Trace

..... 16.330 m
V..... 0.5 m/div
ale.... 96.9 m℘/div
..... 0.99
..... 1 avg
..... bat



Tektronix 1502B TDR
Date 7AUG95
Cable 31A07 (Second
Notes INSTALL
NOTE HORZ. Scale

Input Trace
Stored Trace
Difference Trace

NOTE: A SECOND TRACE WAS PRINTED FOR TDR #7 WITH THE HORIZONTAL SCALE SET TO 0.5 m/div. TO VERIFY THE "FLAT" TRACE REGARDING NO SECOND INFLECTION POINT.

THIS IS ALSO SEEN ON TDR #8, #6, #5 AND #4.

LTPP Seasonal Monitoring Program Data Sheet SMP-I07 Representative Dry Density	Agency Code 31SA95A [31] LTPP Section ID [01 14]

PAIL #10
1.11M TO 1.25M

Depth of Representative Sample (from pavement surface): 1.18 m

4549gm/#

Dry Density Determination:

a. Tare Weight of Empty Mold: 4272g (9.41 lb)

b. Weight of Mold and Compacted Soil: 6084g (13.40 lb)

c. Weight of Compacted Sample (b - a): WET 1812g (3.99 lb)

d. Unit Weight of Compacted Soil = [(b - a) / 943.0] = V 1.92 g/cm³

([(b - a) * 30] = WET 119.7 lb/ft³)

e. Dry Density of Compacted Soil = [d / (100 - r)] = DRY 1.58 g/cm³

1.58 x 62.4 = 98.7PCF DRY (98.6 lb/ft³)

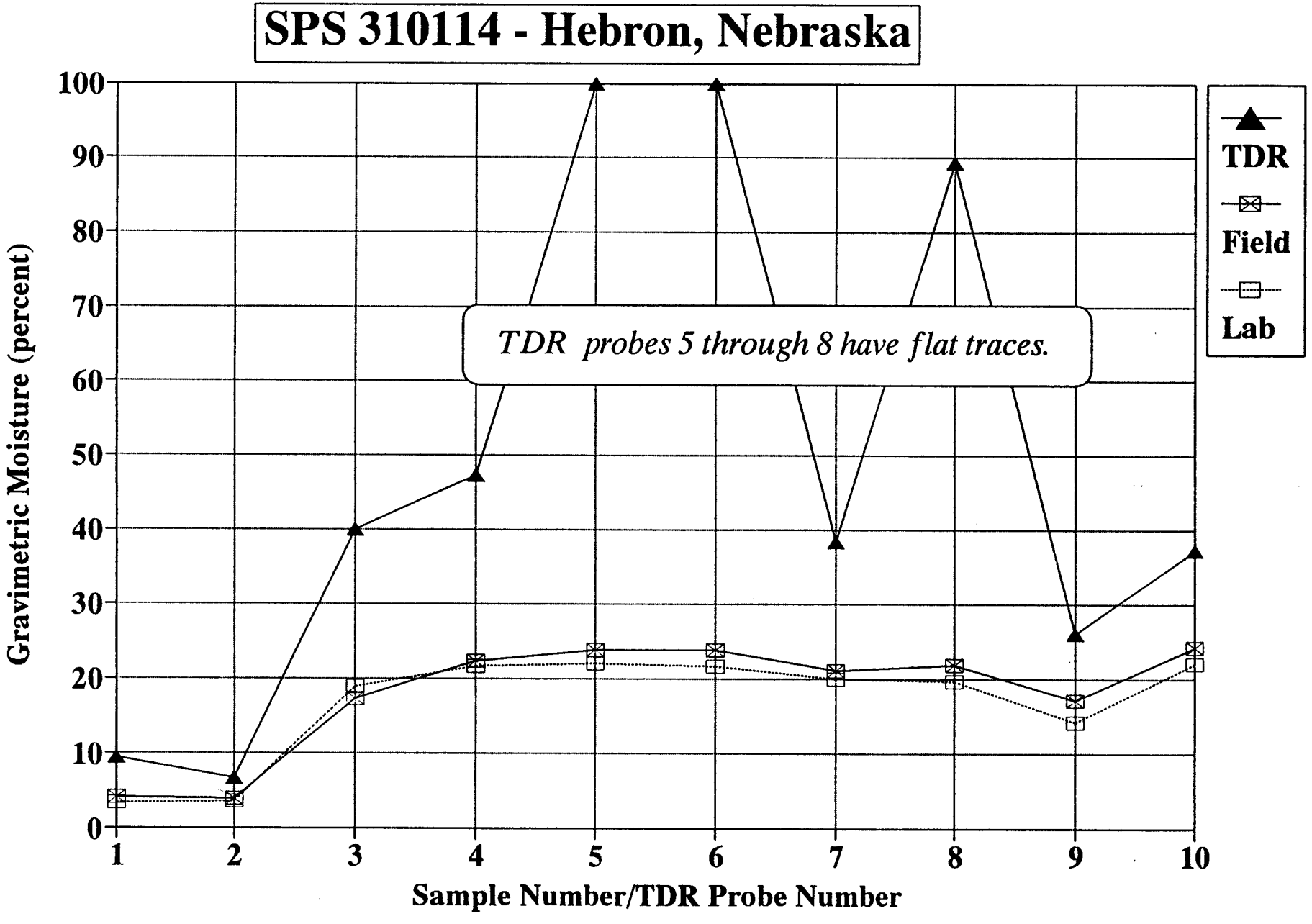
Moisture Content Determination:

		Sampsack	
m.	Tare Weight of Pan:	100.0	____ g
n.	Weight of ~~Pan~~ and Moisture Sample: WET	356.8	256.8 g
o.	Weight of ~~Pan~~ and Dry Sample:	311.5	211.5 g
p.	Weight of Moisture (n - o):		45.3 g
q.	Weight of Dry Sample (o - m):		211.5 g
r.	Moisture Content by Weight = [(p / (p + q) * 100] =		21.4 %

Comments: _____

Prepared by: RON UNBACH Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 07/AUG/95


SPS 310114 - Hebron, Nebraska
Gravimetric Moisture (percent)
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
Sample Number/TDR Probe Number
TDR probes 5 through 8 have flat traces.
TDR
Field
Lab

(1)

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Description: 315A-310114 SMP INSTALL

Project No: DBNX92700 B6

Date: 07-AUG-95 By: RJV

10114 – paved less ~~than~~ two weeks
– open to traffic less than one week
– conduit installed for SMP to prevent sawing shoulder
– two sets of FWD prior to 07-AUG-95

t layout – only measured out test points from Sta. 0+20 to Sta. 0+00 – rest of test points with FWD DM1.
– modify to keep ahead of heat – not got w/ high temp.

WD – tested pts. from Sta. 0+20 to Sta. 0+00 first to allow saw to start. Then, rest of FWD ran. Some points may have been missed because of drill rig @ Sta. 1+60 installing piezometer.

meter – Ron U. install. Concern w/ additional work required on ~~shoulder~~ ditch slope. Will put markers by access on 08-AUG-95
– Ron – other comments?
– used 6" ϕ plate on bottom of piezometer

– marked block outline and traffic direction.
wing – Cut deeper than 7" – paint 8¼" thick.
– hard time getting block out of ~~hole~~ hole because paint. So warm for anchors. Used two hooks in slots to ~~lift~~ assist w/ lifting on anchors.
– left block upside down on flat shoulder anticipating very ~~warm~~ hot day.
– Note: all water in slots from sawing soaked into the base material before block was removed.
– dug ~~the~~ trench from shoulder to cabinet to 14"to16" depth

stl.(hole) – hand dug 12" base material (4 pails) – very wet aggregate
– Cut off conduit for cables (stuck ≈ 4" into hole. Plugged conduit during augering of rest of hole.
– Note: chunk ~~End of Hole~~ 4" ϕ addition base sloughing off got mixed into the top subgrade material.
– Ron U. – any additional notes – bore log?

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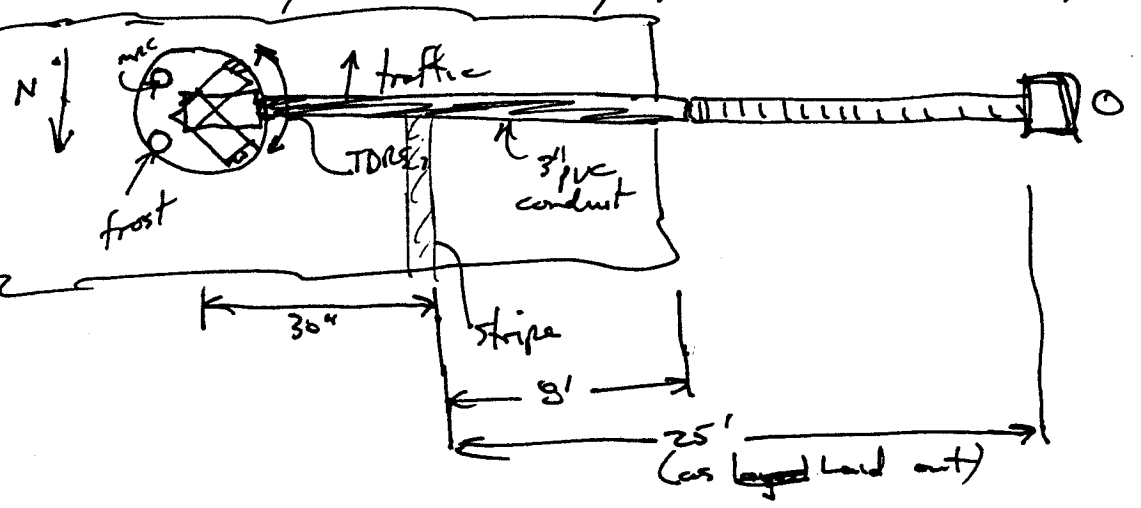
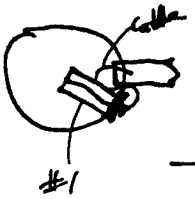
Description: 315A – 310114 SMP INSTALL

Project No: DBNX92700 B6
Date: 07-AUG-95 By: RJV

ors – pushed flex. conduit into 3" pvc conduit installed prior to paving. Pushed through to lay on top of pvmt. surface while fishing cables through the two conduits.
– housing off resistivity probe cable to pass through the conduit



– drilled to 82" depth
– punched holes for additional depth on MRC + RESISTIVITY
– compacted up to TDR#10 depth.
– Placed #10 to #2 as planned - depths not adjusted for 8' vs. 7" pvmt
– subtracted 12mm for plywood around the hole – top of plywood as reference
– #1 TDR placed slightly different because of the conduit



– dug out under edge of pvmt to get PCB under pvmt. slightly to ~~get~~ allow better compaction on rest of base material – ~~note~~
– #1 placed at depth to allow cable to come up vs. placing probe upside down.
– ~~reason~~ very coarse base would be very difficult to get probe upside down and compact.

up probe later)

t – used wire under block to lift. Was ≅ 3/4" high first test.
– pulled out - removed ~~&~~ some coarse material then sifted some coarse material to get less air void space.
– ~~block~~ back in – still about ±" high. Decision to leave at this height in anticipation of hot weather that

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Description: 315A - 310114 SMP INSTALL
Project No: DBNX92700 B6
Date: 07-AUG-95 By: RJV

will allow block to settle from traffic over next two days.
- taped off adjacent to cracks - placed 1 gal. of epoxy
- then rolled w/ truck - block settled to within 3/16" to 1/4" of original height.
- mixed and placed 1 qt. more epoxy one saw cuts and temp. probe

probe - marked board w/ angle required for probe. Then drilled through saw cut w/ hammer drill to get hole for drill into saw cut - used angle on board as guide for drill.

1/2" ø hole.
- ø clean out hole
- then passed probe up into the hole.
- Set top @ 1" depth and checked location on cable matching bottom of block - Then measured on guide to determine depth on lower end - very close to 1" up from bottom.
- epoxy very thin from heat poured into hole for probe very well

lled traffic control

inet - placed pole behind cabinet location down to 10'
- Ran - notes?
- dug in cabinet infront of cabinet
- temporarily hooked up probes to run CR10 over night
- Conduit into back of cabinet.

ø - ø

(41)

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INTERTEC

Description: 315A - 310114 SMP INSTALL

Project No: DBNX92700 BG + BS

Date: 08-AUG-95 By: RJV

---

two @ site

out elevation points -
- outside edge of paint stripe @ 12'8" and fairly straight.
  - used as reference for placing PK nails
  - nail @ -0.5' and 12.5' from reference line @ sta. 0-20, 0-10, 0-5, 0+00 @ 25' intervals to 2+00
  - used drill to place ¼" deep dimples @ five points across at each station
    - experience says FHP operators on SMP testing will end up using permanent markings of some kind. I made the decision to place marks @ correct locations measured out to within 10 mm.

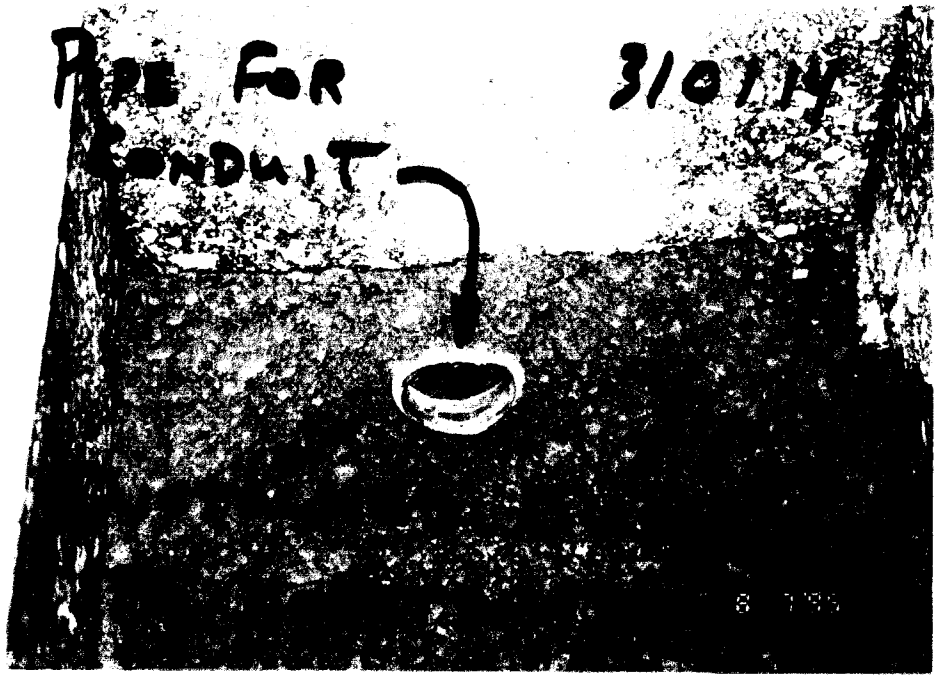
A-site - finished wiring in cabinet -

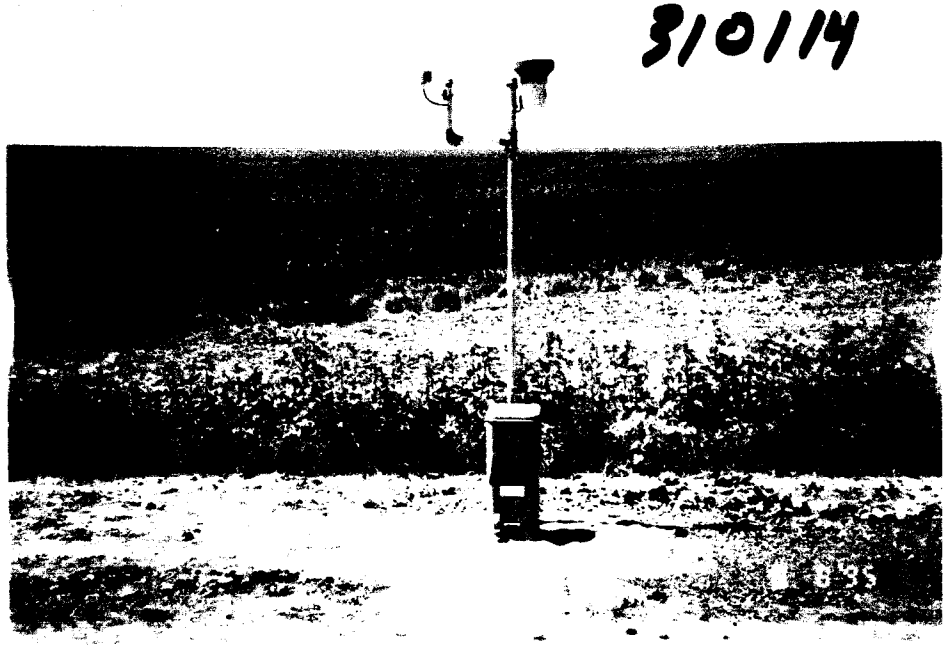
Mobile - ran first set - need to adjust cable lengths in program to get 2nd inflection point
- ran two additional sets

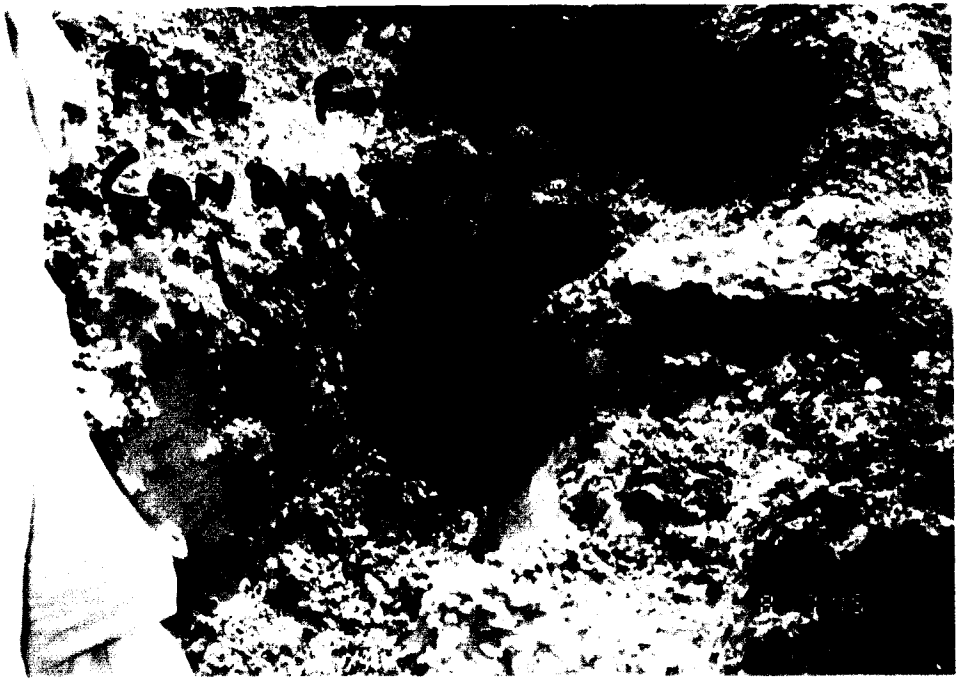
Sthvity - concern w/ switch box. - channel 1 or 2

lock - shoot elevation points on block & pavement
- cracks not sealed.
  - plan to saw cracks out later and seal. (next visit?)

ez. - D.O.T. brought out a maintainer to bring material up at the piezometer to reduce risk of damage as ditch is worked on to establish grass, etc.
- dry well.

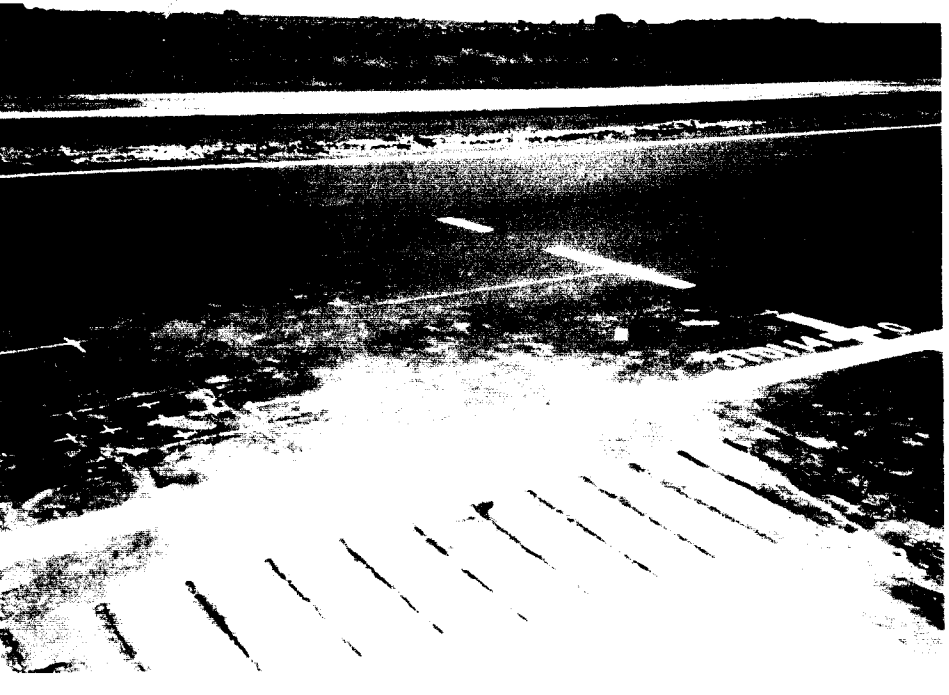

PIPE FOR
CONDUIT
3/01/14

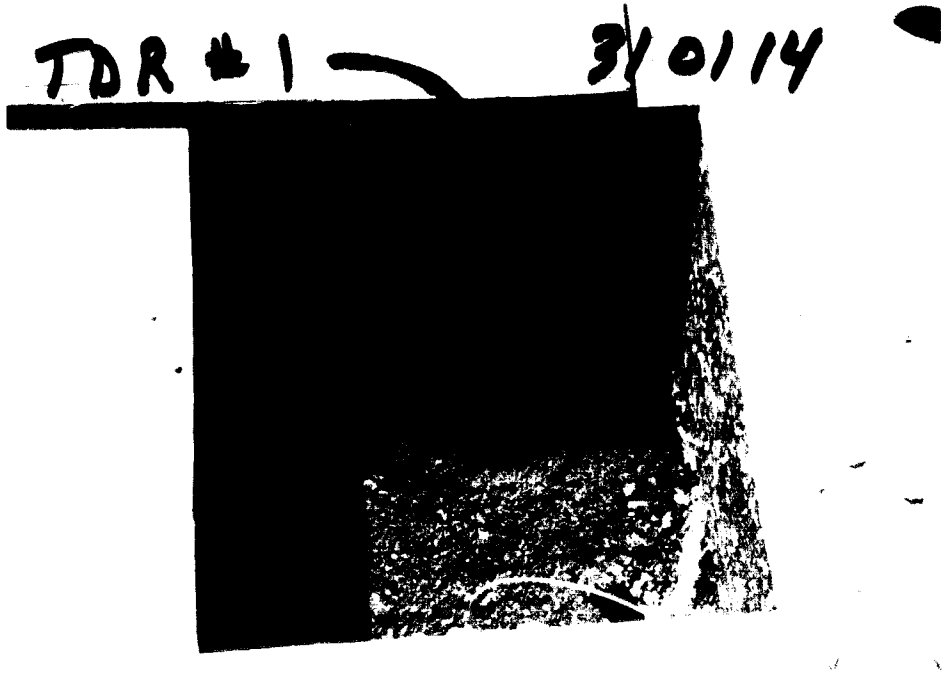

3/01/14

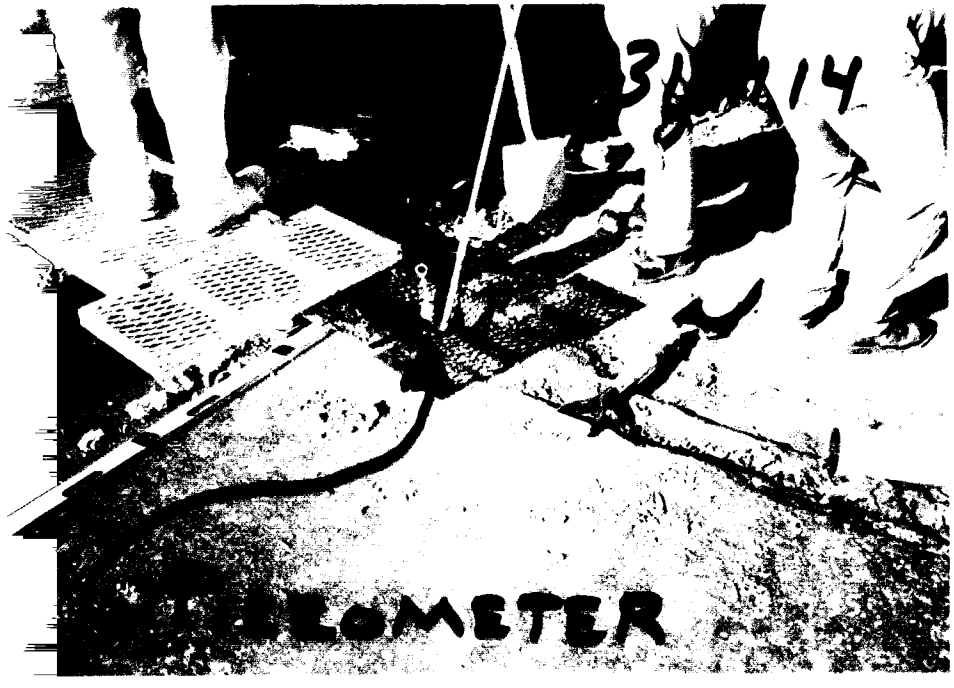



INLET


3/01/14




TDR #1
3/01/14




sharp

Appendix D-1: Initial SMP Monitoring Data Collection

Appendix D-1 contains the following data sheets with information collected the day after instrumentation installation:

- Data Sheet SMP-D10: SMP Field Activity Report;
- Data Sheet SMP-D03: Contact Resistance Measurements;
- Data Sheet SMP-D04: Four-Point Resistivity Measurements;
- Data Sheet SMP-D05: Ground Water Table Measurements; and
- Data Sheet SMP-D08: Surface Elevation Measurements - AC Pavements.

31 S A 95 B

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-D10 SMP Field Activity Report	Agency Code [31] LTPP Section ID [0114]

Onsite Datalogger and Instrumentation		
File Name - *.ONS	315A95BH	Comments: —
Battery Replace	Yes - (No)	Voltages 12.5
Repairs/Calib.	Finish Installation	
Other:	—	

Mobile Datalogger		
File Name - *.MOB	315A95BH	Comments: Two sets (#2+#3) are
TDR/Resistance Voltages	Sets (03)	w/ corrected cable lengths. Set #1
Other:		has std. cable lengths

Manual Data Collection		
Piezometer	(Yes) - No	Comments: Pipe is dry m
Resistance 2 pt.	Sets (01)	—
Resistivity 4 pt.	Sets (01)	—
Elevations	Sets (01)	Extra shots on block area
Distress Survey	Yes - (No)	—
Long. Dipstick Profile	Yes - (No)	—
Photos or Video	(Yes) - No	
Other:	—	

FWD and Associated Data		
FWD Testing	Sets (03)	Operator: Bruce Pelkey
JCP - Snap Rings	Sets (N/A)	—
JCP - Faulting	Sets (N/A)	—
Other:		

IF REQUIRED, ATTACH SKETCHES TO THIS DATA SHEET

Comments: _____

Prepared by: _____ Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 08 / Aug / 95 Daylight Savings Time (Y) or N): X Y

31 SA95B

LTPP Seasonal Monitoring Program Data Sheet SMP-M1 (Page 2) Distress Survey of Instrumentation Area	Agency Code [31] SHRP Section ID [0114] Survey Date [08/AUG/95]

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

X 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: Day after replacement. Removed duct tape used to help place epoxy.

Additional Comments: Plan on sawing grooves ½" deep on a future visit for filling with crack sealant.

PLEASE REMEMBER TO ATTACH COLOR PHOTOGRAPH(S) OF INSTRUMENTATION AREA TO THIS DATA SHEET.

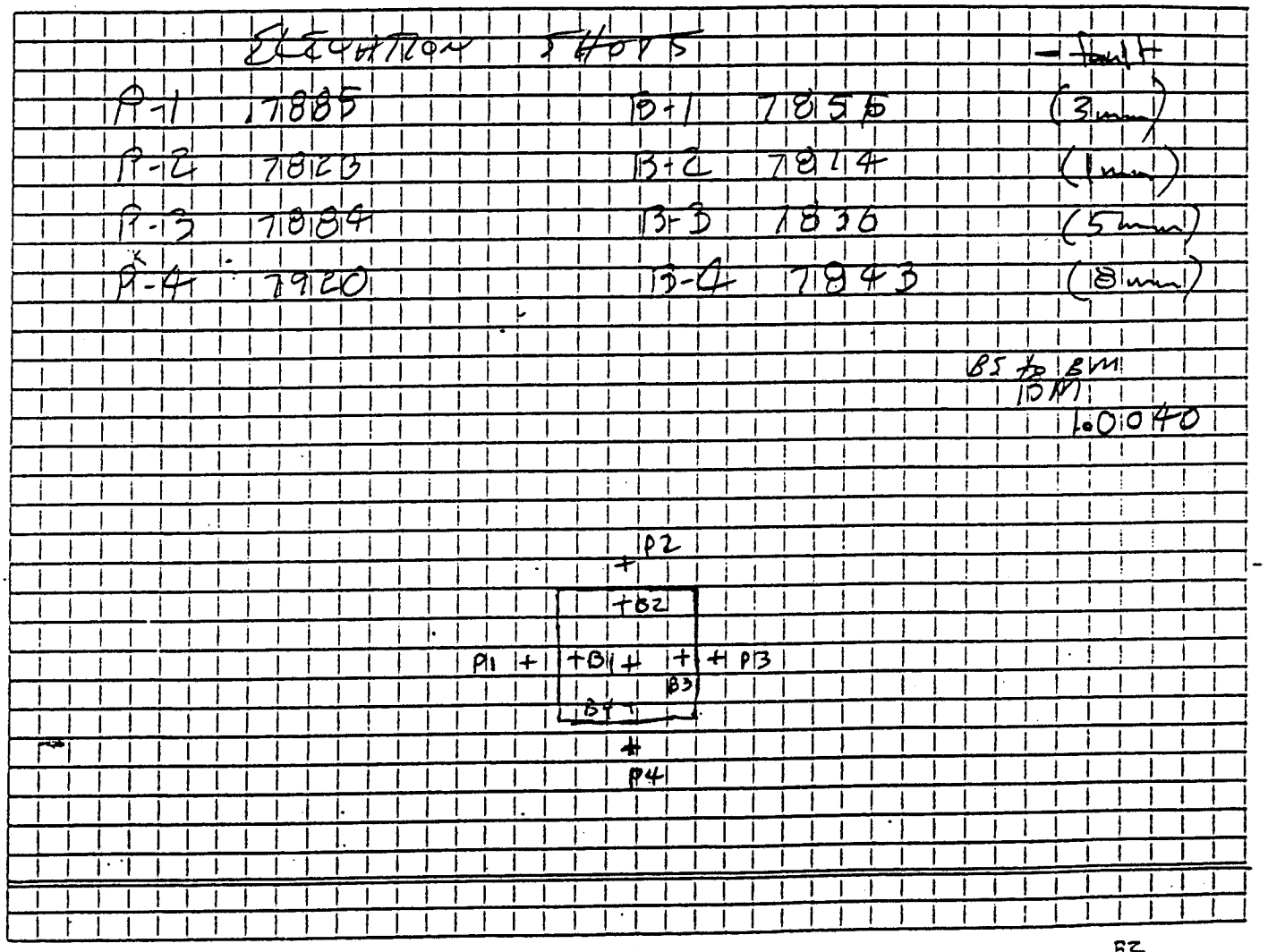
Prepared by: Robert La Sarge Employer: BRAUN INTERTEC COR?.

Date: (ddmmmyy) 08/AUG/95

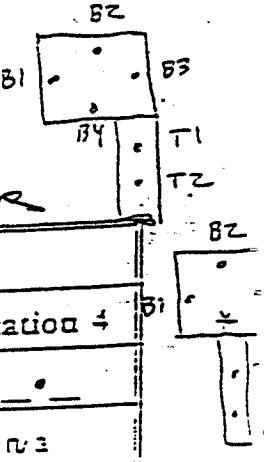
LTPP Seasonal Monitoring Program Data Sheet SMP-M1 (Page 1) Distress Survey of Instrumentation Area	Agency Code [31] SHRP Section ID [0174] Survey Date [08/AUG/94]

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)

Traffic ⟹



Shoulder Area



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

Measurement Device: ~~FAULTMETER~~ See Elevation shots above

Location	Settlement, mm			
	Location 1	Location 2	Location 3	Location 4
Instrumentation block/hole	-.0	-.0	-.0	-.0
Trench	-.0	-.0	n/a	n/a

* with trench centered on block, take reading on each

SHRP S-A-9-5 B

LTPP Seasonal Monitoring Program
Data Sheet SMP-D03
Contact Resistance Measurements

Agency Code [31]

LTPP Section ID [0114]

Start Time (military): 1230

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	MILLI	236.4	MICRO	13.5	
2	2	3		101.9		6.9	
3	3	4		214.4		11.7	
4	4	5		122.0		3.6	
5	5	6		160.6		5.4	
6	6	7		70.6		6.3	
7	7	8		~~* 0.3~~		~~1.3~~	SWITCH BAD?
8	8	9		38.1		5.1	
9	9	10		48.3		5.1	
10	10	11		~~* 1.0~~		~~1.3~~	Switch Bad?
11	11	12		32.6		5.1	
12	12	13		32.3		5.1	
13	13	14		32.8		5.2	
14	14	15		~~* 1.0~~		~~1.3~~	Switch Bad?
15	15	16		32.8		5.3	
16	16	17		26.6		5.5	
17	17	18		35.2		5.2	
18	18	19		37.8		5.5	
19	19	20		38.0		5.6	
20	20	21		36.9		5.2	
21	21	22		37.7		5.6	
22	22	23		34.7		5.4	
23	23	24		~~* 0.3~~		~~1.2~~	Switch Bad?
24	24	25		66.3		5.8	
25	25	26		63.3		6.4	
26	26	27		73.8		5.8	
27	27	28		99.0		6.0	
28	28	29		69.0		7.6	
29	29	30		51.2		5.0	
30	30	31		105.3		5.3	
31	31	32		57.7		6.7	
32	32	33		72.6		6.9	
33	33	34		62.4		6.9	
34	34	35		67.1		5.8	
35	35	36		83.7		5.1	
36	36	37		0.3		84.3	R1 =
37	37	38		8.1		73.8	R2 =
38	38	39		1.7		1.6	R3 =
39	39	00		233.4		1.3	R4 =

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

Comments: * low readings - some for 4pt. data - switch box going bad?

Prepared by: Robert Van Sambeek Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 08/AUG/95

3 1 S A 9 5 B

LTPP Seasonal Monitoring Program — Agency Code [31]
Data Sheet SMP-D04
Four-Point Resistivity Measurements JAN 8 — LTPP Section ID [0114]

Start Time (military): 1240

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	13.8	MICRO	2.7	
2	2	3	4	5		8.1		0.8	
3	3	4	5	6		15.1		1.4	
4	4	5	6	7		4.2		1.3	
5	5	6	7	8		2.5		1.7	
6	6	7	8	9		2.4		2.0	
7	7	8	9	10		* 0.2		1.3	
8	8	9	10	11		1.9		1.7	
9	9	10	11	12		1.8		1.7	
10	10	11	12	13		* 0.2		1.3	
11	11	12	13	14		1.8		1.7	
12	12	13	14	15		1.8		1.7	
13	13	14	15	16		1.9		1.7	
14	14	15	16	17		* 0.2		1.3	
15	15	16	17	18		1.8		1.8	
16	16	17	18	19		2.0		1.8	
17	17	18	19	20		1.8		1.7	
18	18	19	20	21		2.0		1.8	
19	19	20	21	22		2.0		1.9	
20	20	21	22	23		1.9		1.7	
21	21	22	23	24		0.2 1.9		1.1 1.8	
22	22	23	24	25		0.2 1.9		1.1 1.9	
23	23	24	25	26	*	0.2 0.8		1.1 1.1	
24	24	25	26	27	*	0.2 1.9		1.1 1.9	
25	25	26	27	28		0.2 2.6		1.3 1.7	
26	26	27	28	29		0.3 3.1		1.4 1.8	
27	27	28	29	30		0.2 2.5		1.3 1.7	
28	28	29	30	31		0.2 2.7		1.2 2.7	
29	29	30	31	32		0.2 1.8		1.1 2.5	
30	30	31	32	33		1.9		2.0	
31	31	32	33	34		2.7		2.4	
32	32	33	34	35		2.6		2.0	
33	33	34	35	36		2.8		2.5	
36	36	36	37	37		0.3		84.5	R1 =
37	37	37	38	38		8.1		74.0	R2 =
38	38	38	39	39		1.9		1.9	R3 =
39	39	39	00	00		233.7		0.3	R4 =

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

Comments: * low readings both 2pt and 4pt. - problem with switch box.

Prepared by: Robert Von Swearingen — Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 08/Aug/95

31 SA95 B

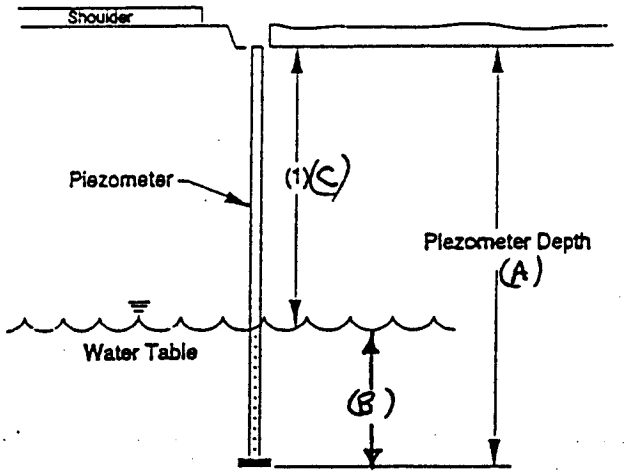
LTPP Seasonal Monitoring Program Data Sheet SMP-D05 Ground Water Table Measurement	Agency Code [31] LTPP Section ID [0114]

Piezometer Depth (m): (A) 4.285

Measurement Number	Time (military)	(C) Calculated (A−B) Depth to Water[1,2] (m)	(B) Measure Depth of Water (m)	Comments
1	1000	DRY	____	Pipe is dry
2	_____	____	____	

[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.



Comments: Day after installation. Note: 5/16" not fell in pipe during installation – watch prez. depth if change slightly.

Prepared by: Robert Lee Sanders Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 08/Aug/95

31 SA95 B

Seasonal Monitoring Program Guidelines: Version 2.1a/March 1995

LTPP Seasonal Monitoring Program Data Sheet SMP-D08 Elevation Measurements	Agency Code [31] LTPP Section ID [0114]

Type of Instrument: NA2000

Start Time (military): 1015

check "close" at midpoint of survey

BM	Station	BS	HI	~~IFS~~ *	FS	ELEV	CLOSE
Piez.	1+00	1.0040		1.0041			1.0039
D.O.T. BM Other							

Station	Offset (PE): 0.16 m	Offset (OWP): 0.76 m	Offset (ML): 1.83 m	Offset (IWP): 2.90 m	Offset (ILE): 3.51 m	Comments
0-20	.7960	.7875	.7683	.7582	.7528	
0-10	.7961	.7831	.7696	.7584	.7521	
0-05	.7957	.7880	.7674	.7572	.7504	
0+00	.7956	.7867	.7684	.7567	.7501	
0+25	.7955	.7888	.7704	.7597	.7540	
0+50	.8028	.7959	.7784	.7684	.7622	
0+75	.8059	.7992	.7803	.7695	.7640	
1+00	.8117	.8041	.7842	.7738	.7665	
1+25	* .8072	.8021	.7826	.7747	.7697	
1+50	.8173	.8099	.7908	.7801	.7719	
1+75	.8149	.8052	.7871	.7765	.7705	
2+00	.8148	.7968	.7884	.7769	.7712	

Comments: SHOTS ON BLOCK @ Sta. 0-10 ON "BLOCK DISTRESS" SECT

Prepared by: Robert Van Sambeek Employer: Braun Intertec Corporation

Date (dd/mmm/yy): 08/Aug/95

Appendix D-2: Routine SMP Monitoring Data Collection Summary

Appendix D-2 contains the following information:

- Standard LTPP SMP data tracking log;
- Field testing information sheet; and
- Screen prints and photographs documenting equipment problems.

31SA - 310114, US-81 SB LANES, 8 MILES SOUTH OF HEBRON, NE.

Date		ONSITE Data			MOBILE Data		Manual Data								FWD Data				Distress		Profile		Comments
dd/mmm/yy (ctrl+shft+d)	Visit ID	Pvmt. Temp.	Air Temp.	Rain	TDR	Frost Volts	Backup Temp	Backup TDR	Frost 2-Pt.	Frost 4-Pt.	Water Table	Pvmt. Elev.	Joint Open.	Joint Fault	Man. Temp.	No. of Cycles/Visit OWP	ML	PE	M	P	P	D	
21-Jul-95															X	1	1						FWD PRIOR TO INSTALLATION.
01-Aug-95																			X		X		
07-Aug-95	95A														X	1	1						INSTALLATION
08-Aug-95	95B	X	X	X	X	X			X	X	X	X			X	3	3						
20-Sep-95	95C	X	X	X	X	X			X	X	X	X			X	2	2						
17-Oct-95	95D	X	X	X	X	X			X	X	X	X			X	3	3						
01-Nov-95																					X		
15-Nov-95	95E	X	X	X	X	X			X	X	X	X			X	3	3						CHANGED TIME TO STANDARD TIME.
12-Dec-95	95F	X	X	X	X	X					X				X	3	3						
23-Jan-96	96A	X	X	X	X	X			X	X	X					0	0						NO TRAFFIC CONTROL, TOO COLD.

S:\LTPP\SMP\QPRO\SMPLOGNW.WB2

310114 - 31SA

Updated 31-Oct-95

LOCATION - US-81 SB Lanes, 8 Miles South of Hebron, NE
CONTACTS - Al Horak (402)-362-5930 (second contact is Bill Parrish (308)-385-6265)
TEMP HOLES - Sta 0-03, Depths about 1.0", 3.9", and 6.8" (AC = 8.25").

DISTRESS COMMENTS:

Sta F1 - Tests at -10, and at 25 foot intervals from Sta 0+00 to Sta 2+00.

-10 LP ADJACENT TO INSTRUMENTATION HOLE

Sta F3 - Tests at -20, -5, and at 25 foot intervals from Sta 0+00 to Sta 2+00.

PIEZOMETER - Sta 0+99.5, 1.0 feet from edge of paved shoulder, Depth = 4.285 M.

ELEVATIONS - No DOT BM.

Offsets:		PE	OWP	ML	IWP	ILE	
(M)	-0.16	0.16	0.76	1.83	2.90	3.51	3.81
(ft)	-0.5	0.5	2.5	6.0	9.5	11.5	12.5
	(nail)	dimp	dimp	dimp	dimp	dimp	(nail)

Note: Offsets are based on 12' 3" lane using the edge of the stripe.

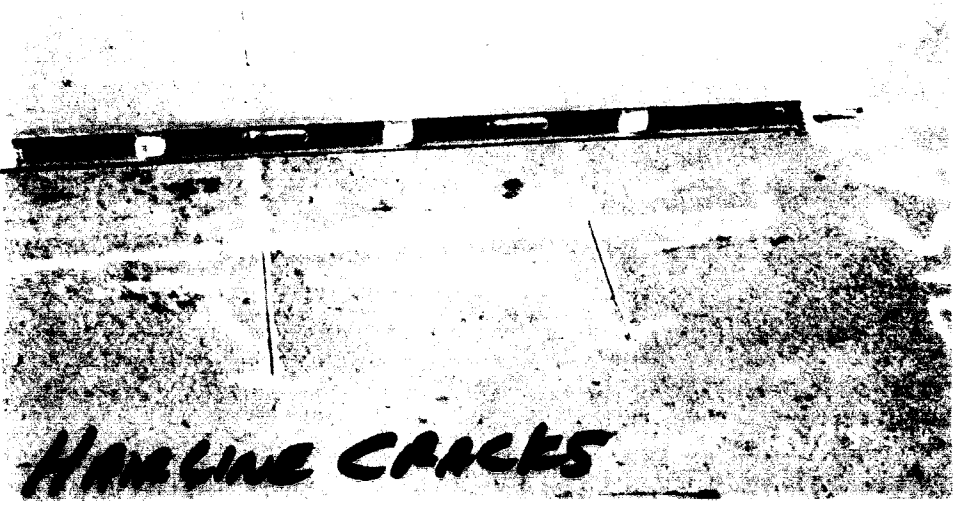
Note: PK nails are 13 feet apart and elevations between nails are at 1.0'(LE), 3.0'(WP), 6.5'(ML), 10.0'(WP), and 12.0'(LE). Latest guidelines require nails be 0.5 feet outside the section.

Sta: Transverse profiles at -20, -10, -5 and every 25 feet from Sta 0+00 to Sta 2+00.

COMMENTS - **use 31SAMOB vs. MOBILE program** - cable lengths 18.90 and 20.85
- Wayfare Motel (402-768-7226) - in Hebron just south of DOT yard
  Rosewood Villa (402-768-6524) - in Hebron 0.5 blocks south of DOT

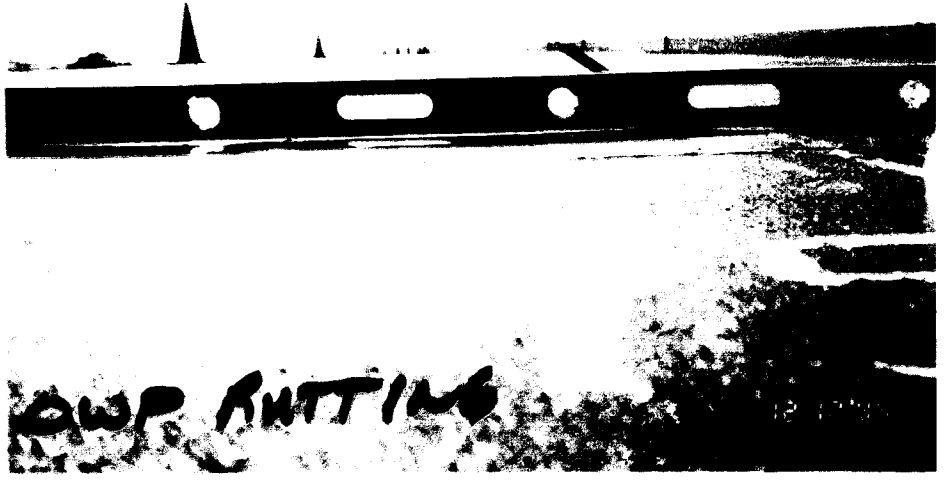
8-AUG-95

310114
SMP95F

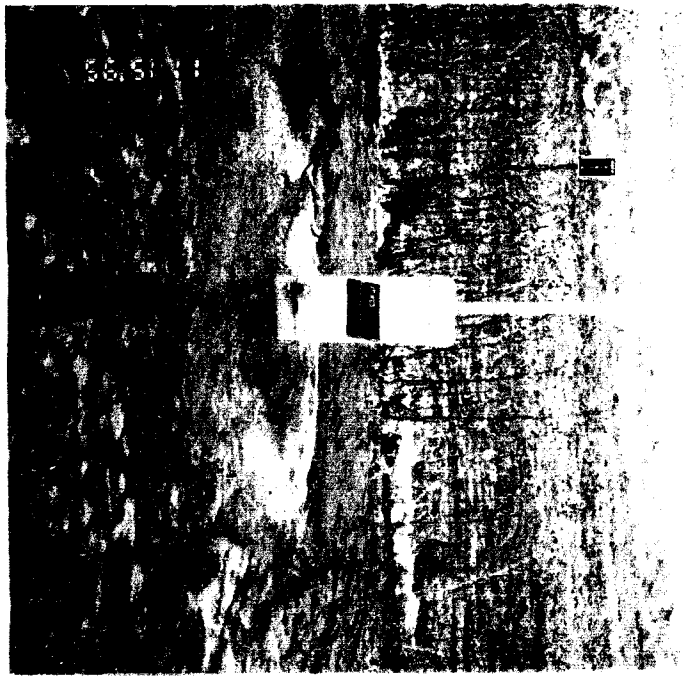


HAIRLINE CRACKS

310114
SMP95F



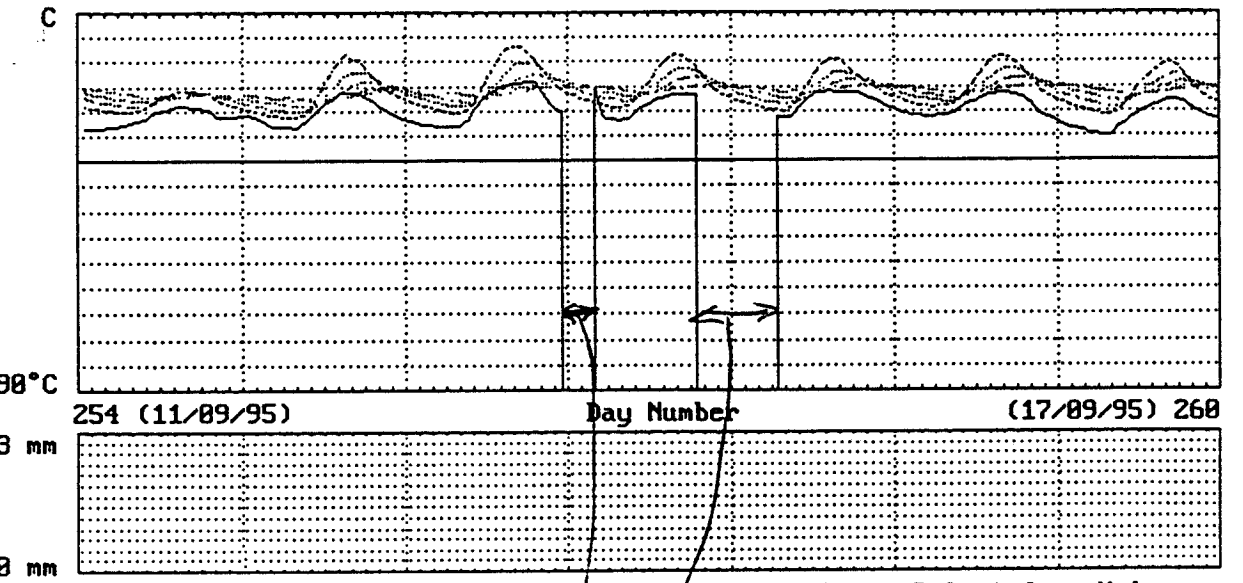
GWP RUTTING



15-NOV-95

310114

Record Type 5 & 6 - Hourly Air & First 5 MRC Sensor Temperatures
State: Nebraska Site: A



Legend	Start	Day	Time	Selected	End	Day	Time	Selected	Value
AirT	0	254	100		0	261	000		
MRC1	1	254	100		1	261	000		
MRC2	2	254	100		2	261	000		
MRC3	3	254	100		3	261	000		
MRC4	4	254	100		4	261	000		
MRC5	5	254	100		5	261	000		
[illegible]	6	254	100		6	261	000		

Menu: PgUp,PgDn=Prior/Next Week; F8,F9=Edit; Ctrl+F10=Remove; F2=PrintScreen

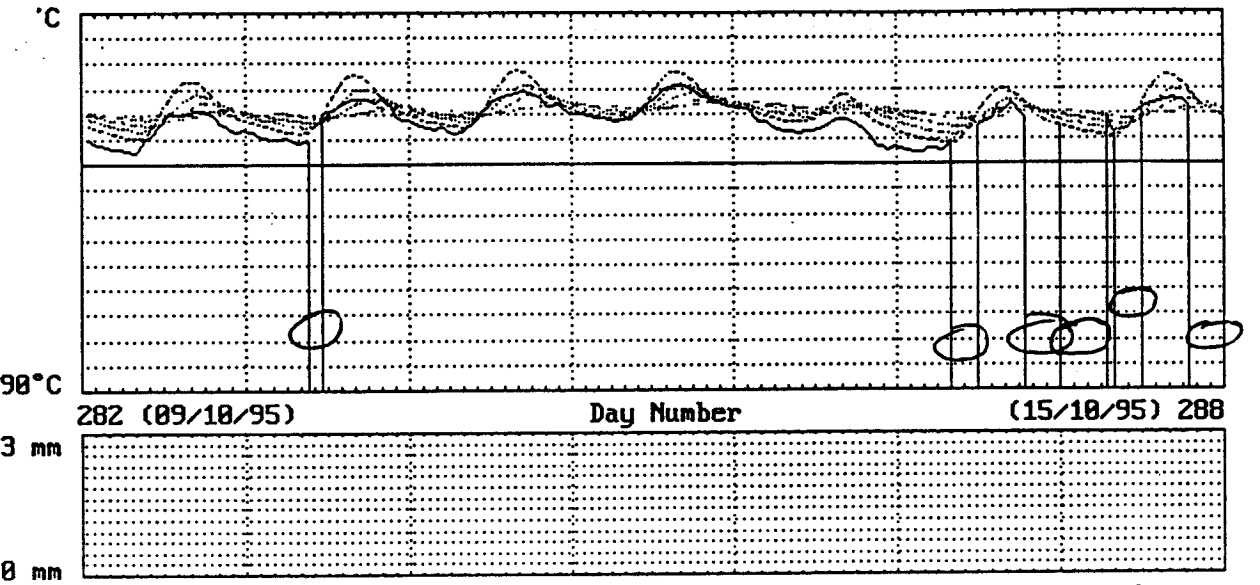
AIR TEMPERATURES BAD

— CR10 DATALOGGER PROBLEM

— DATALOGGER REPLACED

17-OCT-95

Record Type 5 & 6 - Hourly Air & First 5 MRC Sensor Temperatures
State: Nebraska Site: A



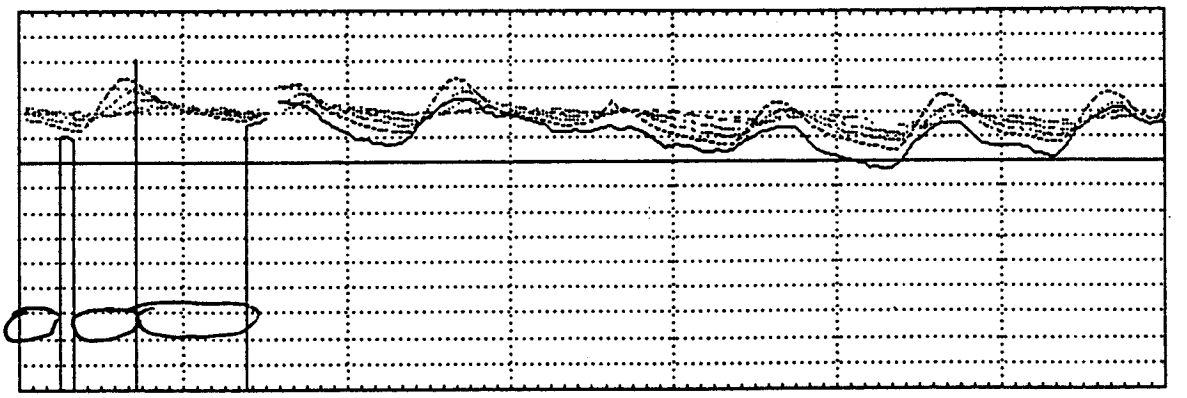
282 (09/10/95) Day Number (15/10/95) 288

Legend	Start	Day	Time	Selected	End	Day	Time	Selected	Value
AirT	0	282	100		0	289	000		
MRC1	1	282	100		1	289	000		
MRC2	2	282	100		2	289	000		
MRC3	3	282	100		3	289	000		
MRC4	4	282	100		4	289	000		
MRC5	5	282	100		5	289	000		
[illegible]	6	282	100		6	289	000		

=Menu: PgUp,PgDn=Prior/Next Week: F8,F9=Edit: Ctrl+F10=Remove: F2=PrintScreen

- SAME COMMENT AS DAY 254 TO 260

Record Type 5 & 6 - Hourly Air & First 5 MRC Sensor Temperatures
State: Nebraska Site: A



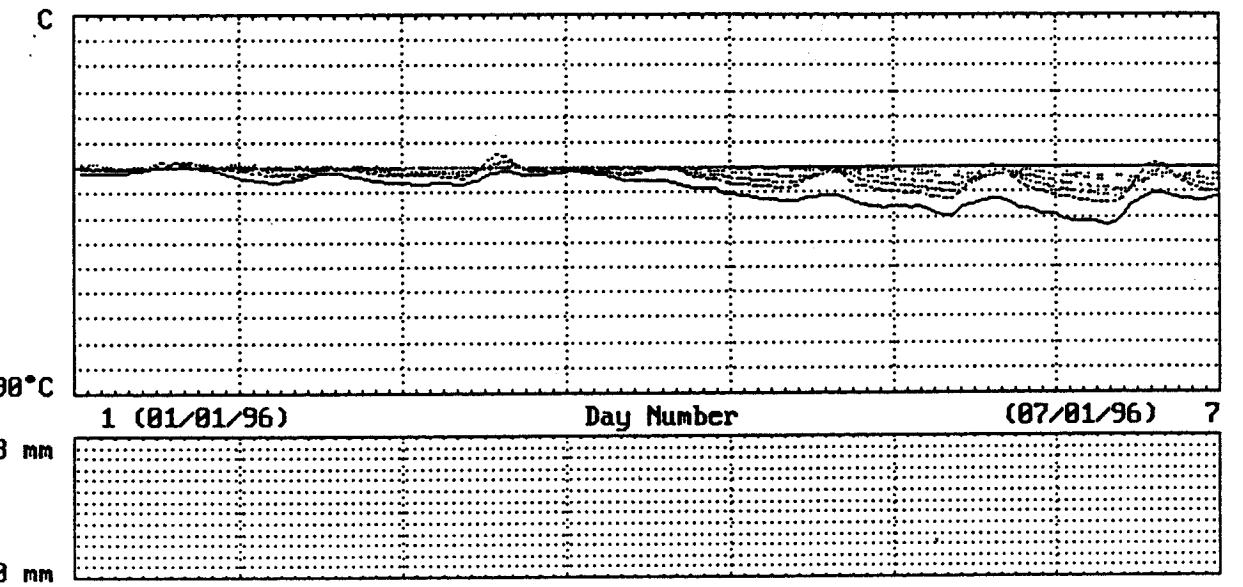
289 (16/10/95) Day Number (22/10/95) 295

Legend	Start Day	Time	Selected	End Day	Time	Selected	Value
AirT	0 289	100		0 296	000		
MRC1	1 289	100		1 296	000		
MRC2	2 289	100		2 296	000		
MRC3	3 289	100		3 296	000		
MRC4	4 289	100		4 296	000		
MRC5	5 289	100		5 296	000		
[illegible]	6 289	100		6 296	000		

Menu: PgUp,PgDn=Prior/Next Week: F8,F9=Edit: Ctrl+F10=Remove: F2=PrintScreen

- Same Comment as Day 254 to 260

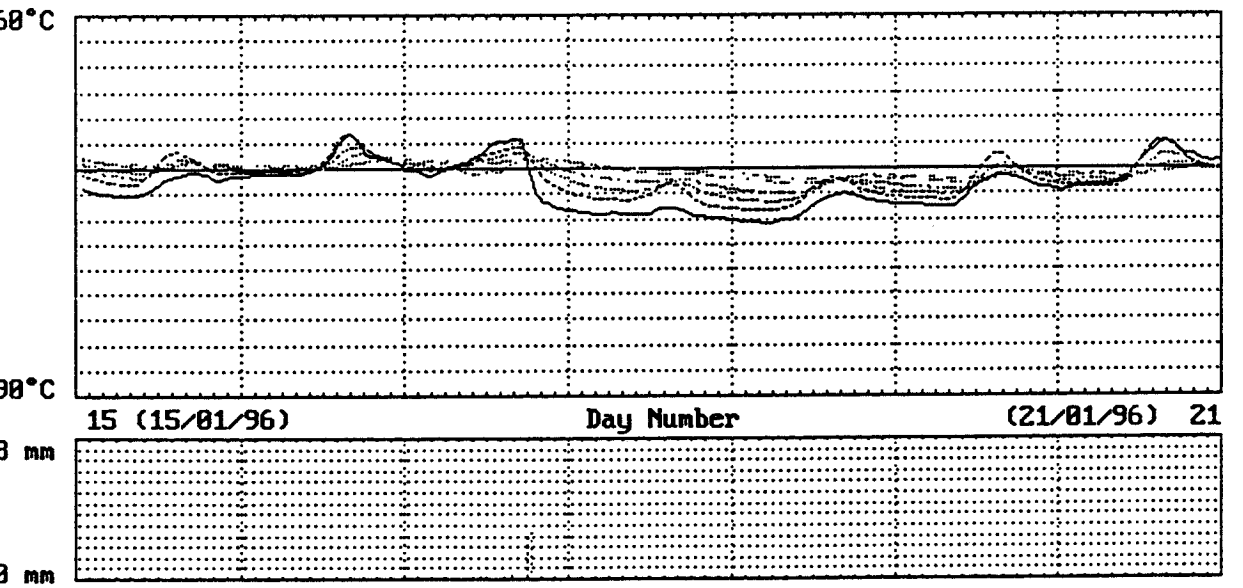
Record Type 5 & 6 - Hourly Air & First 5 MRC Sensor Temperatures
State: Nebraska Site: A



Legend	Start Day	Time	Selected	End Day	Time	Selected	Value
AirT	0 1	100		0 8	000		
MRC1	1 1	100		1 8	000		
MRC2	2 1	100		2 8	000		
MRC3	3 1	100		3 8	000		
MRC4	4 1	100		4 8	000		
MRC5	5 1	100		5 8	000		
[illegible]	6 1	100		6 8	000		

=Menu: PgUp.PgDn=Prior/Next Week: F8.F9=Edit: Ctrl+F10=Remove: F2=PrintScreen

Record Type 5 & 6 - Hourly Air & First 5 MRC Sensor Temperatures
State: Nebraska Site: A

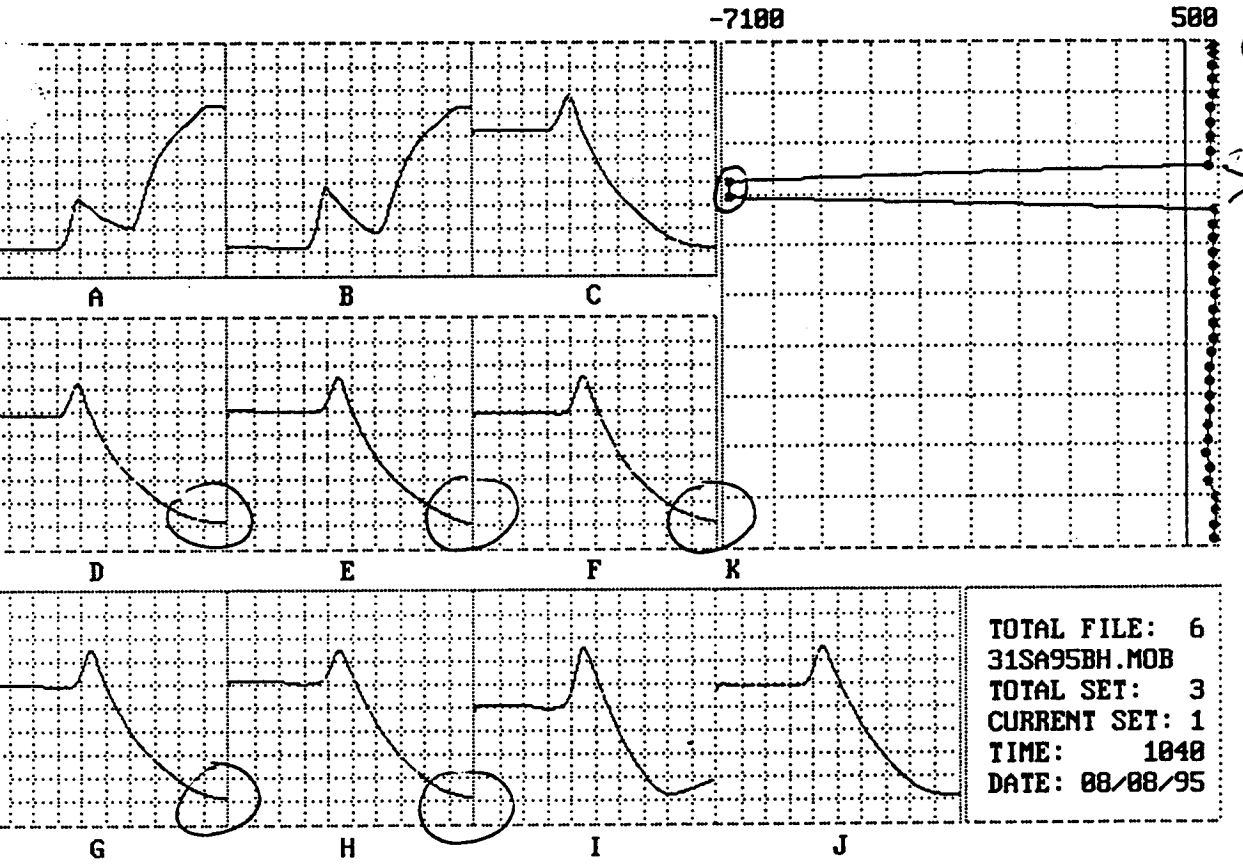


Legend	Start Day	Time	Selected	End Day	Time	Selected	Value
AirT	0 15	100		0 22	000		
MRC1	1 15	100		1 22	000		
MRC2	2 15	100		2 22	000		
MRC3	3 15	100		3 22	000		
MRC4	4 15	100		4 22	000		
MRC5	5 15	100		5 22	000		
[illegible]	6 15	100		6 22	000		

sc=Menu: PgUp.PgDn=Prior/Next Week: F8.F9=Edit: Ctrl+F10=Remove: F2=PrintScreen

LATEST DATA BEFORE REPORT

- NEW CR10 WORKING OKAY.



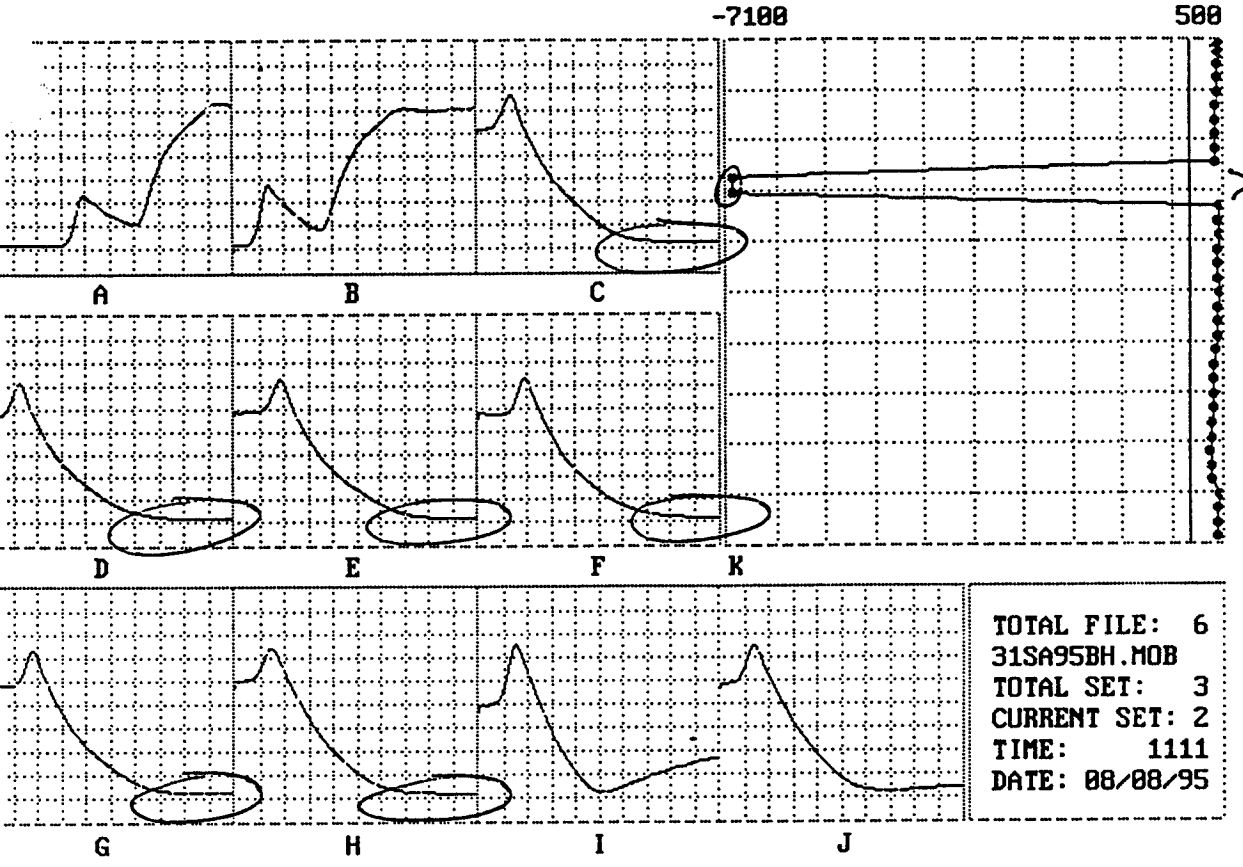
CREEL FAILURE ON POSITION 1=/11.

ASSIGN -6999 to -1

er=Curve to select (*): PgU/PgD=Prior/Next set: Ctrl+PgU/PgD=Prior/Next File

- FIRST SET AFTER INSTALL — ADJUSTED CABLE LENGTHS FOR 3/2 AND 3/3

- FOR THIS SET 4, 5, 6, 7, AND 8 ARE BAD.

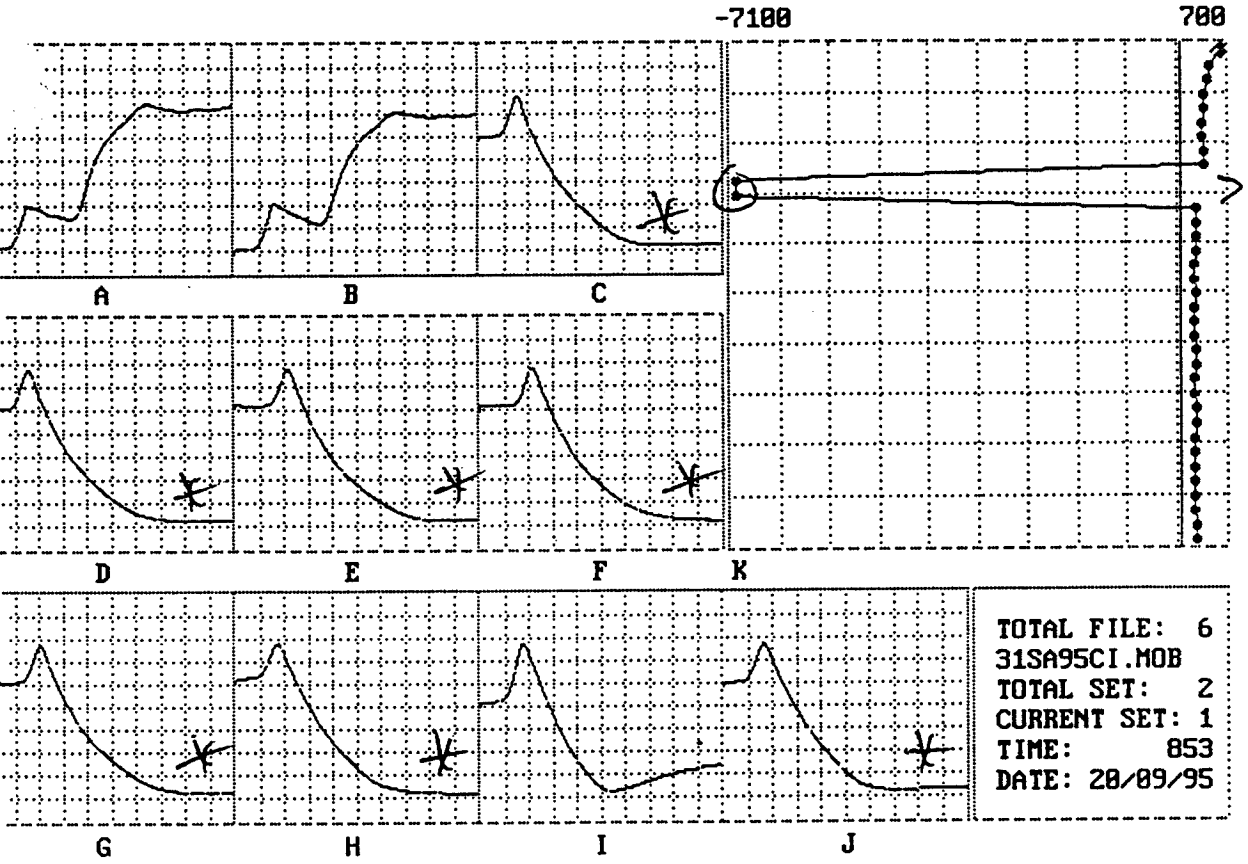


ASSIGN -6999 to -1

'er=Curve to select (*): PgU/PgD=Prior/Next set: Ctrl+PgU/PgD=Prior/Next File

FLAT TRACES - FHWA/TAC ADVISE GOOD/BAD?

- DISSOLVED SALTS IN SOIL?



ASSIGN -6999 to -1

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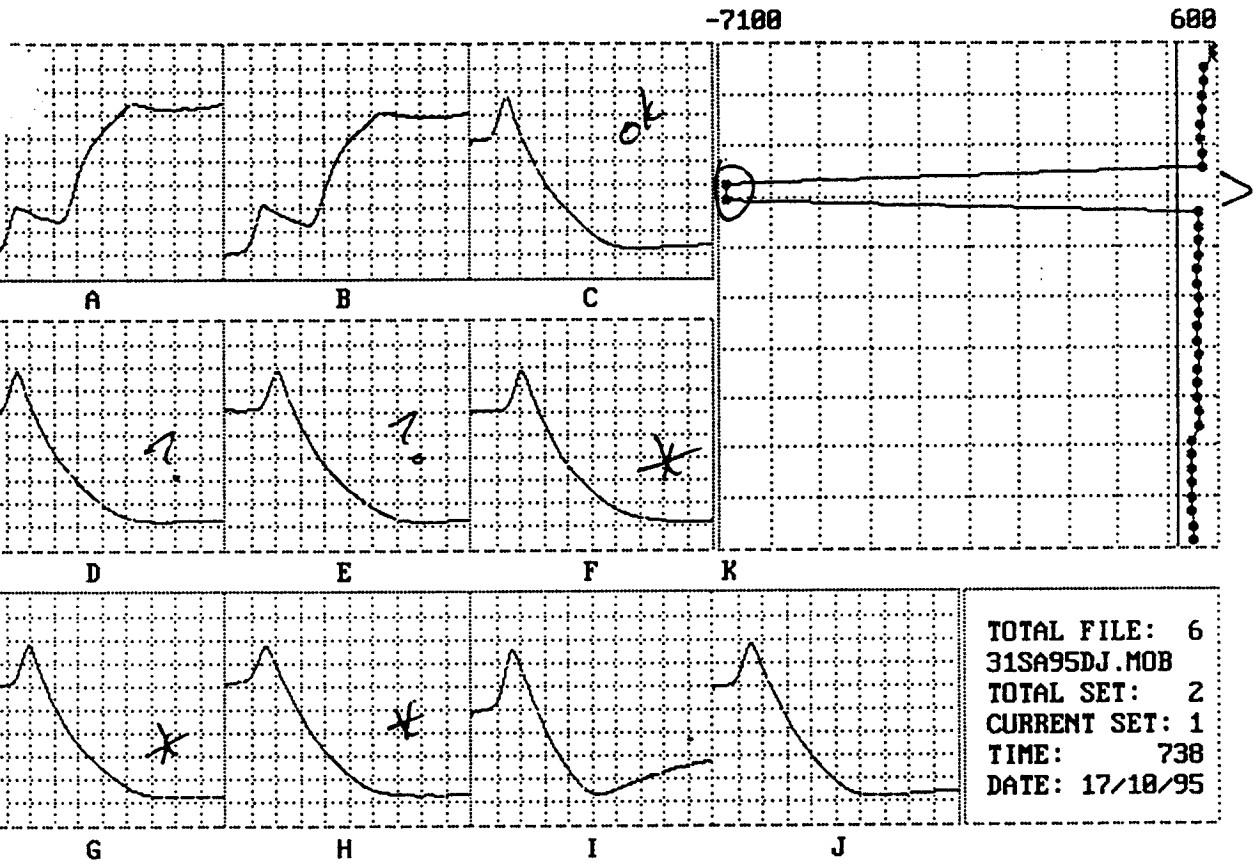
* FHWA/TAC ADVISE GOOD/BAD ON FLAT TRACES !

- INCLUDE #10



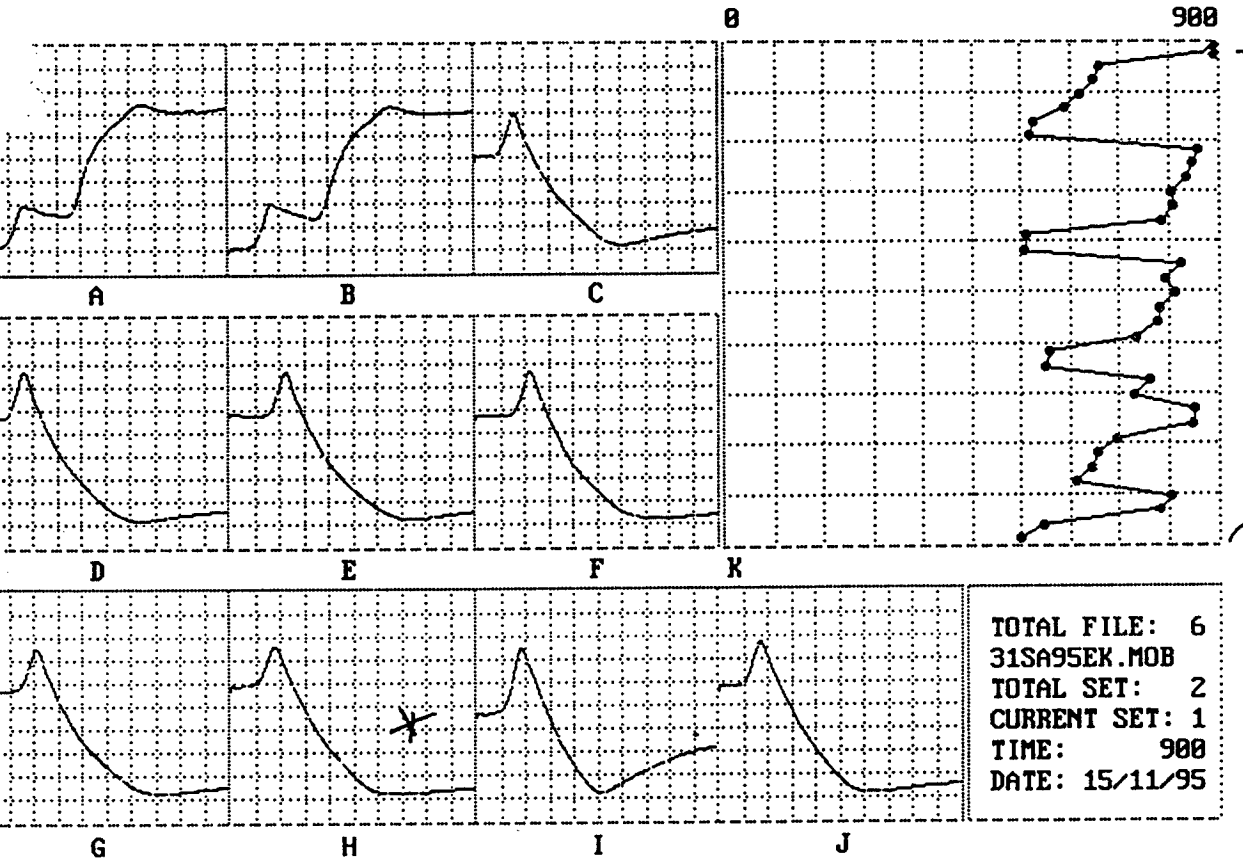
ASSIGN −C999 to −1

er=Curve to select (*): PgU/PgD=Prior/Next set: Ctrl+PgU/PgD=Prior/Next File

* FLAT

? MAY BE OKAY

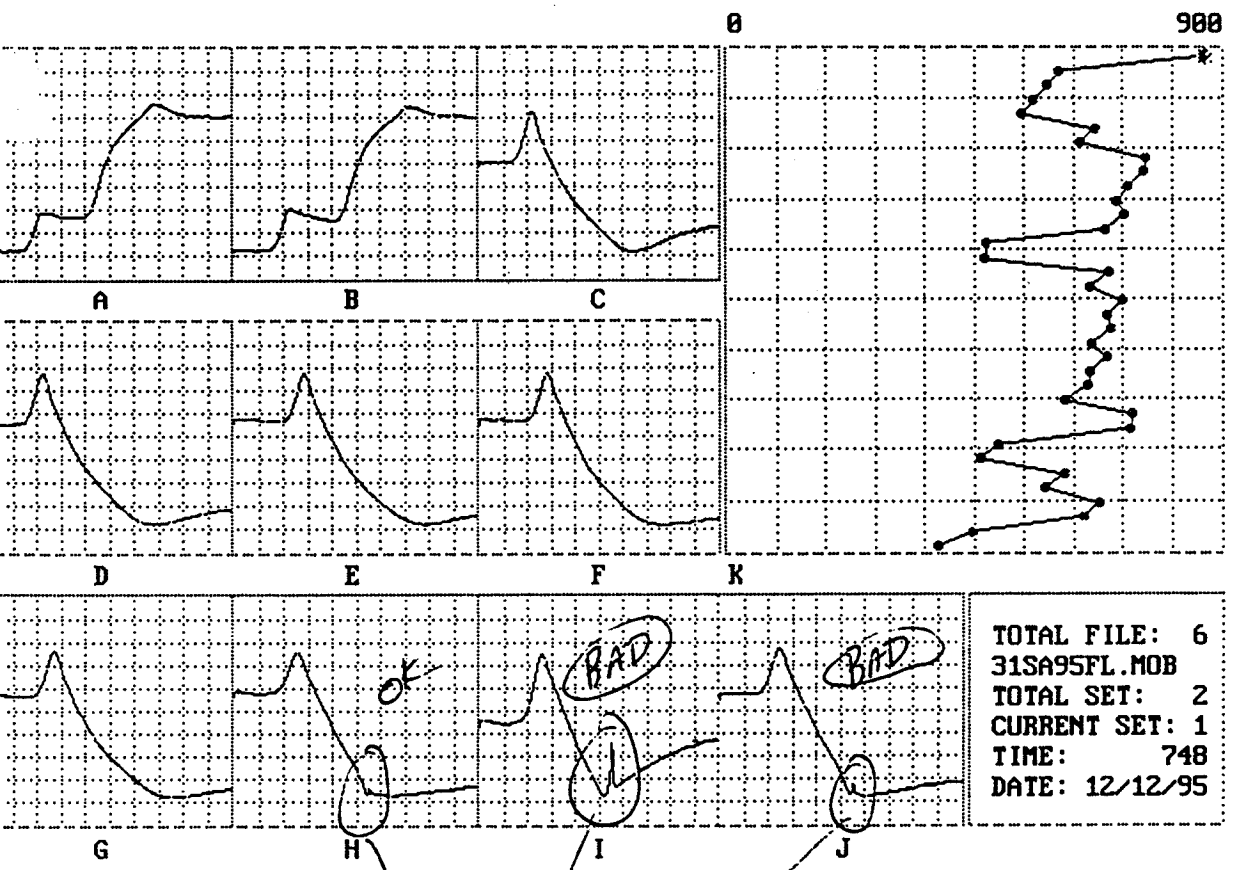
} FHWA/TAC ADVISE



FHWA/TAC ADVISE
- STEPS ?
- COMPARE TO MANUAL DATA ?

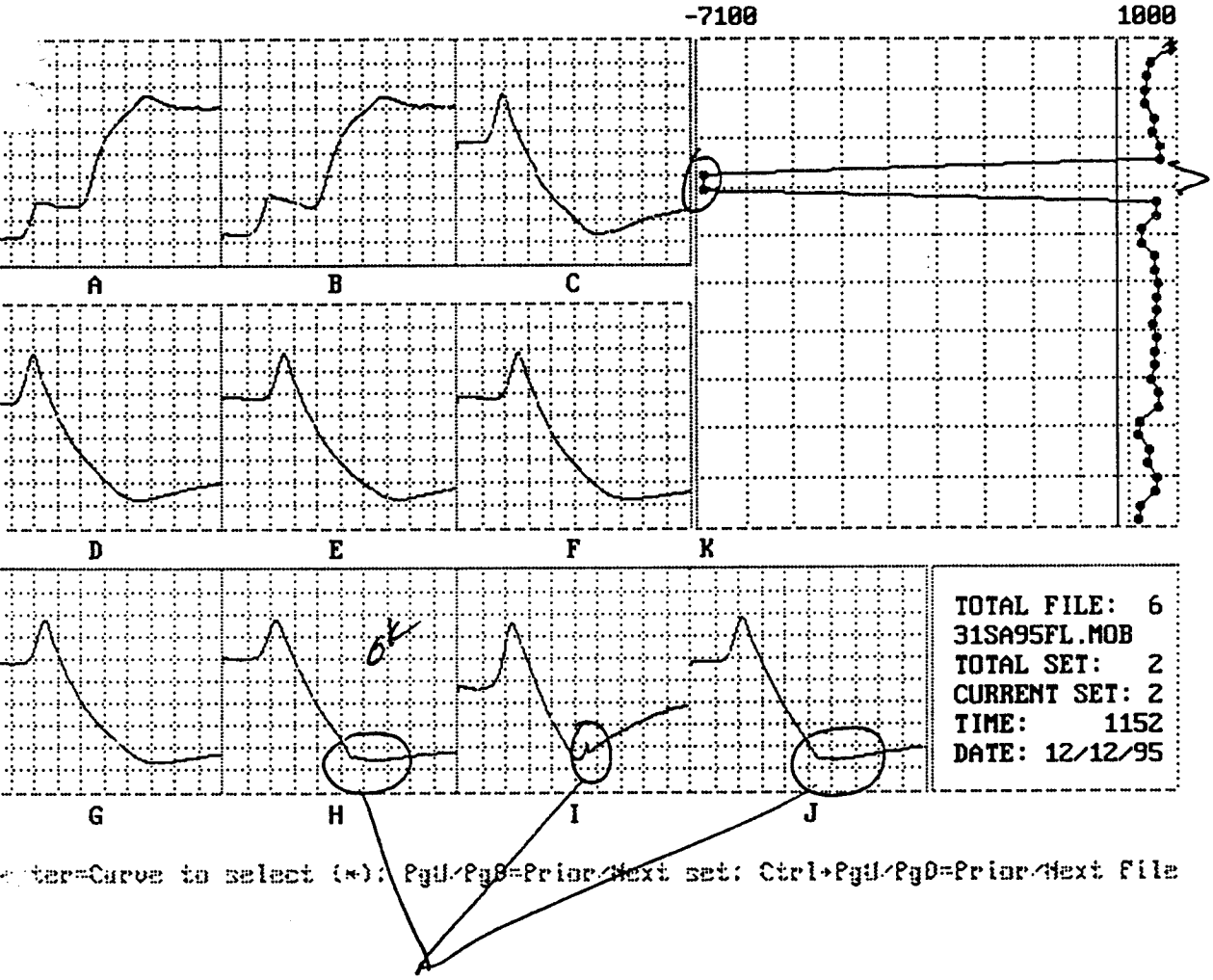
er=Curve to select (*): PgU/PgD=Prior/Next set: Ctrl+PgU/PgD=Prior/Next File

* FLAT TRACE



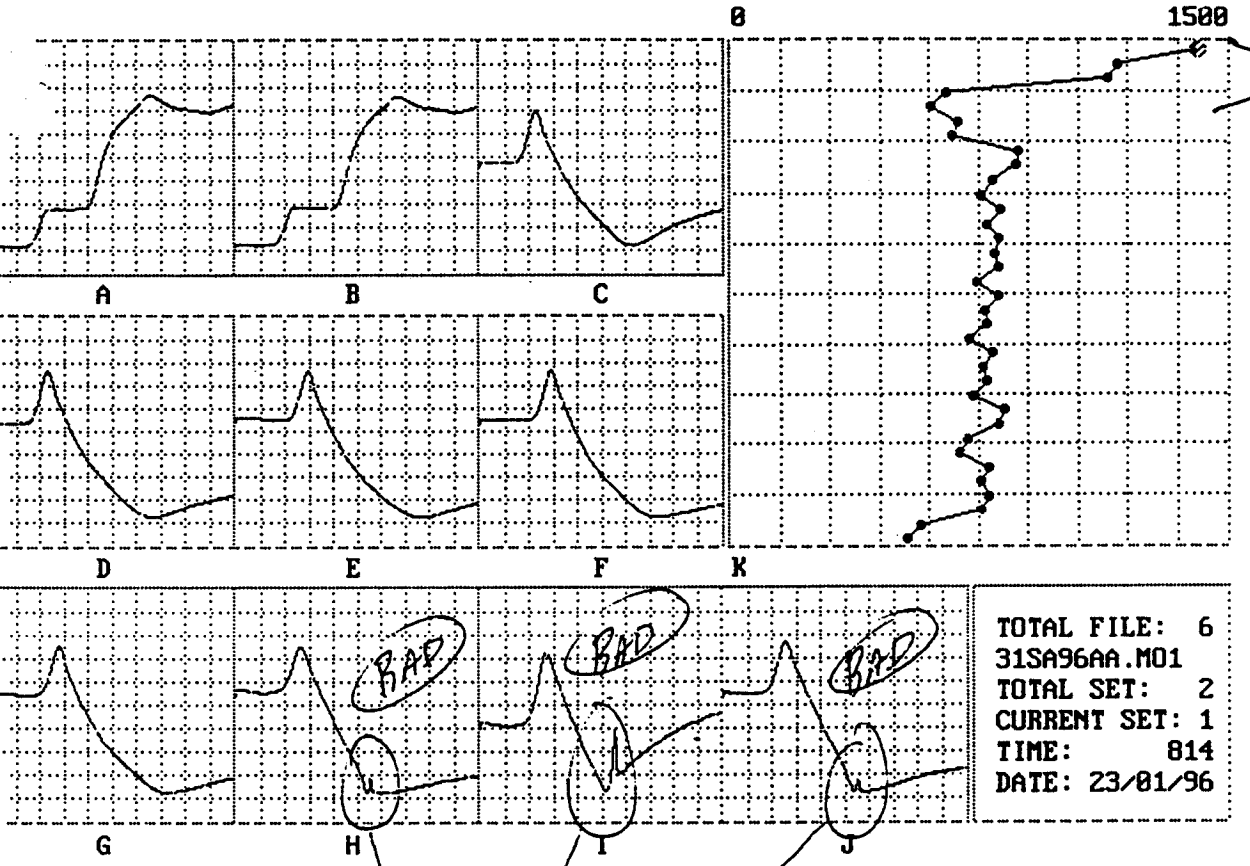
SPIKE FROM COLD CABLE READER

FHWA/TAC ADVISE ON TDR #9 AND #10



ASSIGN -6999 to -1

SAME AS 2/1 — FHWA/TAC ADVISE ON TDR #9 AND #10



- CABLE READER WAS 'FIXED'?

- STILL HAVE SPIKES?

- LEVEL II BOARD BAD?

- FHWA/MC ADVISE ON TDR #8, 9, AND 10