LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE

For The Technical Direction Of The LTPP Program

Program Area: IMS **Directive Number: IMS-45**

Date: July 23, 1997

Subject: Automated Entry of Materials Testing Data from the FHWA LTPP Laboratory Testing Contractors

This Information Management System Directive No. IMS-45 transmits information and instructions to the RCOCs regarding automated entry of materials testing data from the FHWA LTPP laboratory contractors (Braun Intertec, Minneapolis, MN and Law Engineering and Environmental Services, Inc., Atlanta, GA). This directive should be implemented in the RCOCs as soon as possible to facilitate the entry of all materials testing data produced to-date from these laboratories (except Resilient Modulus testing) by the upload deadline.

Any questions regarding this directive should be submitted to the FHWA Pavement Performance Division with a copy to the LTPP Technical Assistance Contractor (TAC).

Approved by:

Aramis Lopez for
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LTPP Team Leader

Automated Entry of Materials Testing Data from the FHWA LTPP Laboratory Testing Contractors

Introduction

The FHWA LTPP Laboratory Testing Contractors are performing testing for the GPS and SPS programs. The data that is generated from this effort is stored in a standard format in electronic form. A filter program (MATLOAD) has been designed to allow the data to be automatically transferred to the RIMS. MATLOAD will be transmitted to the RCOCs in IMS Version 1.3.

A pilot test of the system has been undertaken by the TAC with data that has been uploaded to-date. The results of this test yielded several systematic problems with the data that must be resolved by the RCOCs. This is explained in more detail later in this directive.

Instructions

Each RCO has received the paper data sheets from the laboratories and a diskette containing the data files from the TAC. The electronic data file received from the laboratories should not be used.

The RCOC should perform their standard procedure for verifying the sample layer numbers, sample numbers, etc. It is assumed that each RCOC has a system in-place to log the receipt of the materials testing data and a method with which to check the validity of a given test sample (SHRP_ID, STATE_CODE, LAYER_NO, TEST_NO, FIELD_SET, LOC_NO, etc.). This should include checking between the L04 form (GPS and SPS) and the laboratory tracking tables (SPS) to ensure that the proper samples were tested and the proper identifiers have been attached to the sample test results. Other items that should be checked (as a minimum) are as follows:

1. Paper data sheet exists for each record that exists in electronic format (conversely every record that exists in electronic format should have a matching paper data sheet).

2. The layer number assigned to the specimen matches the L05B form for the test section. *Note: this is one of the most important checks that will be performed on this data. It is imperative that the layer numbers match between **TST_L05B** data and the testing data*.

3. The data on the paper data sheet matches the data in the electronic file.

4. The data on the paper data sheets is complete and the results appear reasonable.

Any and all discrepancies should be resolved between the RCOC and the appropriate laboratory. The resultant revisions to the data should of course be made on the paper data sheet and in the electronic file. The data in the electronic file must be edited manually by the RCOC as per the format contained in a later section of this document. When all discrepancies have been resolved, Barbara Ostrom and the TAC (Charlie Copeland) should be notified in writing (memo or e-mail).

Materials Testing Data Filter Process

This section contains the specifications for the materials testing filter program (MATLOAD). MATLOAD will be used to automatically populate IMS tables for data generated by Braun Intertec's Mechanical Testing Laboratory and Law Engineering's Atlanta Branch Testing Laboratory. As you will notice, these specifications do not include data for resilient modulus testing (**TST_AC07_*, TST_UG07_SS07_***). Resilient modulus data will be filtered into the IMS at a later date. Also, these specifications do not include data for other selected IMS_TST_* tables. The FHWA contract laboratories generally do not conduct these other tests.

File Naming Convention

Data for each test procedure listed in Attachment A is stored in its own uniquely named ASCII data file in a comma-delimited format. Multiple records will exist within each file. The file name for each set of data will consist of the region and the test name. The file **extension** may be anything that the laboratory chooses - we have recommended that they use a "TXT" file extension. Therefore, for example, the test results from the Southern Region for AC01 testing have a file name of STHAC01.TXT (please note that the "0" portion of the file name is the number "**zero**" and not the letter "O" for all files). Attachment A also contains a list of all current file names that are valid for the LTPP testing being conducted by Braun and Law. Please note that additional file structures may be added to the filter program in the future but this version should accommodate all current tests.

File Format/Order

Attachment B contains the sequential order required for LTPP materials characterization data in each file. This table contains the sequence, units, LTPP IMS field name, Oracle format, required field designation, and recommended QA range. This ordering is used as the basis for the filter program and will be used by the RCOCs to edit the data file.

There is one major discrepancy between the data items and the matching LTPP IMS field name that should be noted.

Two data items, the **second** (SPS Project Code), and the **eighth** (Section Number) combine to form the four-digit field SHRP_ID in the LTPP IMS schema. The two digits of the SPS Project Code make up the first two digits of the SHRP_ID field and the two digits of the Section Number make up the last two digits of the SHRP_ID field. There are four exceptions. In the files STHACLAY.TXT, NARACLAY.TXT, NCRACLAY.TXT, and WRACLAY.TXT the **second** and the **sixth** data items combine to form the field SHRP_ID in the LTPP IMS schema as outlined above.

Also, in each data file, the **fourth data** item (corresponding to the LTPP IMS field name LAB_CODE) should always have a value of 1311 or 2711. However, in the files STHACLAY.TXT, NARACLAY.TXT, NCRACLAY.TXT, WRACLAY.TXT no appropriate field exists for LAB_CODE therefore, this data item is not entered in the IMS for these files. These two codes, 1311 (Law) and 2711 (Braun), represent the two laboratories that are currently performing these tests.

The data files generated by the laboratories may not follow the exact specifications regarding "Oracle Format" for a given entry. For example, "Total Core Thickness" for file STHAC01.TXT is a NUMBER(4,2) field in the IMS. In the data file received from the laboratory, the entry for this item may be 12.3245. In these cases, the data will be truncated to the appropriate IMS field size and then input into the appropriate field in the IMS.

Additionally, the TEST_DATE is converted from the format MM-DD-YY to the IMS format of DD-MM-YY. No other conversion is used for this data.

Data Handling Procedures

The following step-by step procedures are performed to filter the materials data:

0. The RCOC shall create the following directories on the drive of their choice on the RIMS computer:

   <Drive>:\TESTDATA
   <Drive>:\TESTDATA\INPUT (input files)
   <Drive>:\TESTDATA\INPUT\GOOD
   <Drive>:\TESTDATA\INPUT\BAD (rejected records)
   <Drive>:\TESTDATA\INPUT\GOOD\LOG (log of filtered data)
   < Drive>:\TESTDATA\INPUT\BAD\LOG (log of rejected data)

A. The TAC submits the electronic data set to the appropriate RCOC. The data set may contain one file or it may contain up to 21 different files based on the type of testing the laboratory has performed to-date. It is recommended that the RCOC backup the original data set before proceeding with the remainder of the instructions.

B. The files should be copied to <Drive>:\TESTDATA\INPUT.

C. From the < Drive >:\ TESTDATA\INPUT directory, the filter program will be initiated as per the instructions contained with IMS NT vl.2.

D. The filter program will perform logical error checking procedures (explained in a later section) and based on these checks either filter the data or fail the data for subsequent evaluation.

E. If a given record in a file is filtered successfully, the program will load the data into the IMS and delete the record from the current file in <Drive>:\TESTDATA\INPUT. At the completion of this process, the files in <Drive>:\TESTDATA\INPUT will have a zero byte file size. The successful filtering of a record will be output to a filter log located in <Drive:\TESTDATA\INPUT\GOOD\LOG. Only the key fields are output to this log file.

F. If a particular record is not filtered successfully, the program will delete the record from the current file in <Drive>:\TESTDATA\INPUT and append the data to the appropriate file located in <Drive>:\TESTDATA\INPUT\BAD. This directory will serve as the storage area for all data in need of subsequent evaluation and possible revision. The unsuccessful attempt to filter the record will be output to an error log containing an appropriate error message (described later in this memorandum) located in <Drive>:\TESTDATA\INPUT\BAD\LOG. For all data not successfully loaded, the RCOC will have to resolve the discrepancy in-house or by communicating with the laboratory that submitted the data.

G. Once the problem has been resolved, the RCOC must edit the record in the appropriate file and append the revised data to the same file in <Drive>:\TESTDATA\INPUT for subsequent filtering.

Error Checking

The error checking for the filter generally follow the checks that are in the IMS data entry forms as follows:

Note: In all cases, line # refers to the line in the same file located in the testdata\input\bad\directory.

1. The following directories must exist:

   \testdata\input\
   \testdata\input\bad\
   \testdata\input\bad\log\
   \testdata\input\good\log

   If the directory does not exist, the user will be notified with:
   "Unable to open file DIRECTORY_NAME for loading."
   "Please check that the directory and file exist."

2. Check for a valid section.

   For each record in a given file, the filter will check for the existence of a valid section number in EXPERIMENT_SECTION. If a matching record is not found, a notation is made in the testdata\input\bad\log directory similar to the following:

   "Invalid section, not found in EXPERIMENT_SECTION, review line #."

   This error should be relatively rare and generally occurs when (Case 1) the section does not exist in EXPERIMENT_SECTION or (Case 2) the laboratory has entered an incorrect section number.

   For Case 1 failures, the EXPERIMENT_SECTION table should be checked to determine if the section is indeed missing. If missing, the RCO should determine if the section should be added to the EXPERIMENT_SECTION table. For Case 2 failures, the RCO should resolve the problem with the laboratory.

3. Check for key fields.

   For each record in a given file, the filter will check for the existence of key fields. The key fields for each data file are bold and italicized in Attachment B. If a key field is missing, a notation is made in the testdata\input\bad\log directory similar to the following:

   "Missing required key fields, indicated by a "R", review line #.

This error should also be relatively rare. Usually the RCO must resolve this problem with the laboratory.

4. Check for TEST_DATE.

   For each record in a given file, the filter will check for the existence of a TEST_DATE. If the TEST_DATE is null, a notation is made in the testdata\input\bad\log directory similar to the following:

   "Missing TEST_DATE field, review line #."

   This error generally occurs when a sample is designated for testing but the sample is mis-handled in some manner (shipping, handling, etc.) so as to render it untestable. The sample is still shown on the test data sheet with a note indicating that the sample was not testable. Usually the RCO must resolve this with the laboratory. If the laboratory cannot resolve the error, the RCO may elect to insert an arbitrary date such as 01/01/97.

5. Check for pre-existing record.

   For each record, the filter will check for the existence of a matching record (same key fields) existing in the RIMS. If a record already exist, a notation is made in the testdata\input\bad\log directory similar to the following:

   "ORA-00001: unique constraint violated, review line #."

   This is a relatively rare problem for most testing tables.

   This error is generated if a record is present in a given IMS table with identical key fields as the record that MATLOAD is trying to filter. In this case, the RCO should check to make sure that the data in the IMS is identical to the record which is to be filtered. If it is, then the data can be deleted from the filter data. If the data is not identical, then the RCO should check all of the key fields in the data to ensure they are correct. If the problem cannot be resolved in-house, then the RCO should resolve this discrepancy with the laboratory.

6. Check for valid SAMPLE_NO.

   For each record in a given file, the filter will check for the existence of a matching SAMPLE_NO in one of the field sampling tables as appropriate for the type of sample. This consists of the following tables:

   TST_SAMPLE_LOG
   TST_UNCOMP_BITUMINOUS
   TST_ASPHALT_CEMENT
   TST_SAMPLE_LOG_SPS_3_4.

   If the SAMPLE_NO is not found, a notation is made in the testdata\input\bad\log directory similar to the following :

"Invalid SAMPLE_NO, review line #."

This is one of the more common errors likely to be found in the data. Some of the most likely reasons for this error are as follows:

- Field data has not been entered in RIMS for this sample.
- Sample number in field data present in RIMS is incorrect.
- Sample number in lab data incorrect.
- LOC_NO does not match between lab and RIMS field data.
- FIELD_SET does not match between lab and RIMS field data.

This problem occurs frequently for SPS-3 data (TST_AC0l, TST_AC0l_LAYER, TST_AE0lS, TST_AE02S, TST_AE06S) as it appears that field data have not been entered for a given field set. In addition, it appears that the laboratories numbered the cores differently in the lab than the numbering scheme used in the field.

7. Assignment of CONSTRUCTION_NO.

   For each record in a given file, the filter will attempt to determine the CONSTRUCTION_NO to input into the table. To perform this action, the filter looks in one of the field sampling tables as appropriate for the type of sample. This consists of the following tables:

   TST_HOLE_LOG
   TST_UNCOMP_BITUMINOUS
   TST_ASPHALT_CEMENT
   TST_SAMPLE_LOG_SPS_3_4

   If a matching LOC_NO is not found, a notation is made in the testdata\input\bad\log directory similar to the following:

   "CONSTRUCTION_NO not found for this record, review line #."

   This is a relatively rare problem. Similar reasons as shown for the check for a valid SAMPLE_NO appear to be the cause of this error.

8. Check for valid LAYER_TYPE in TST_L05B.

   For each record in a given file, the filter will check for the existence of a valid LAYER_TYPE in TST_L05B. If a matching record does not exist in TST_L05B or the LAYER_TYPE is not appropriate for a given test, a notation is made in the testdata\input\bad\log directory similar to the following:

   "Invalid LAYER_TYPE, review line #."

The following contains a list of valid LAYER_TYPE for a given test:

TEST SERIES	VALID LAYER TYPE
TST_AC**	AC, TB, TS
TST_AG**	AC, TB, TS
TST_AE**	AC, TB, TS
TST_UG**	GB, GS
TST_SS**	SS, GS

This is a common error for the TST_AC01_LAYER table and the SS** type tables.

For the TST_AC01_LAYER table this is caused by a fundamental difference in the layering of the asphalt cores and the layering contained in TST_L05B. Usually the TST_AC01_LAYER contains more layers than the TST_L05B table. Thus the filter program does not find a match for the largest layer number. This error is predominant for SPS project data in which a final L05B has not been generated for a given test section. An example follows:

TST_AC01_LAYER Layering	TST_L05B Layering
Layer 7 AC	Layer 6 AC
Layer 6 AC	Layer 5 AC
Layer 5 AC	Layer 4 AC
Layer 4 AC	Layer 3 GB
	Layer 2 GS
	Layer 1 SS

In this example, the layer 4 in AC01_LAYER would match with layer 4 in TST_L05B, layer 5 would match with layer 5 and layer 6 would match with layer 6. However layer 7 in AC01_LAYER would not find a match in L05B, thus causing an error to be generated. This illustrates the importance of revising the layer structures to reflect the results of the laboratory testing prior to attempting to filter the data into the RIMS. Not only should the layers be in synch between these two tables, but among all tables, including other AC**, AE** and AG**-type tables.

This error also occurs frequently for GPS-6* and GPS-7* (overlay) projects. This is commonly caused by the lack of (or missing) an updated L05B for CONSTRUCTION_NO = 2 or higher.

For UG** and SS**-type data tables, this error is usually caused by the entry of an inappropriate LAYER_TYPE (SS, GB, GS) in TST_L05B. For these tables, the problem is usually not CONSTRUCTION_NO related since subgrade, subbase and base samples are usually only sampled during CONSTRUCTION_NO = 1.

9. Check for valid LAB_CODE.

For each record in a given file, the filter will check for the existence of a valid LAB_CODE. If the LAB_CODE is null or does not equal 1311or 2711, a notation is made in the testdata\input\bad\log directory similar to the following:

"Invalid LAB_CODE, must be either '1311' or '2711', review line #."

A very rare occurrence. If Braun data insert a "2711", if Law data, insert a "1311."

10. Check for valid entries in CODE fields.

For each record in a given file, the filter will check for the existence of a valid entry in a CODE field. This includes comment fields, visual classification code fields, etc.

The following is a list of comment fields that MATLOAD checks:

FIELD	CODES TABLE VERIFICATION
COMMENT_*	COMMENT
VISUAL_EXAM_CODE_*	VISUAL_AC
SOIL_GEOL	SOIL_GEOL
GEOL_CODE_A	GEOL_CLASS
GEOL_CODE_B	GEOL_CLASS
DESC_CODE_*	SOIL_CRITERIA
AASHTO_SOIL_CLASS	AASHTO_SOIL_CLASS

If a valid code does not exist in the CODES table a notation is made in the testdata\input\bad\log directory similar to the following:

"Invalid COMMENT_1 field, review line #."
(same check is done for COMMENT_2 ...COMMENT_6)
"Invalid VISUAL_EXAM_* code, review line #."
"Invalid SOIL_GEO code, review line #."
"Invalid GEOL_CODE_A code, review line #."
"Invalid GEOL_CODE_B code, review line #."
"Invalid DESC_CODE_1, review line #."
(same check is done for DESCRIPTION_CODE_l ...10.)
"Invalid AASHTO_SOIL_CLASS code, review line #."

This is a very rare occurrence. If this error does occur, the appropriate code should be verified in the data file and the problem resolved with the laboratory.

Summary

Input regarding possible improvement to this procedure are welcomed from the RCOCs. All questions and comments concerning this should be directed to FHWA with a copy to the TAC.

ATTACHMENT A

VALID FILE NAMES FOR LTPP MATERIALS TESTING DATA

LTPP TEST DESIGNATION	TEST NAME	FORM NAME	FILE NAMES
Asphalt Concrete			
AC01	Core Exam. and Thickness	T01A	STHAC01.TXT, NARAC01.TXT, NCRAC01.TXT, WRAC01.TXT
AC01 LAYER	Core Exam. - Layer Thickness	T01B	STHACLAY.TXT, NARACLAY.TXT, NCRACLAY.TXT, WRACLAY.TXT
AC02	Bulk Specific Gravity	T02	STHAC02.TXT, NARAC02.TXT, NCRAC02.TXT, WRAC02.TXT
AC03	Maximum Specific Gravity	T03	STHAC03.TXT, NARAC03.TXT, NCRAC03.TXT, WRAC03.TXT
AC04	Asphalt Content	T04	STHAC04.TXT, NARAC04.TXT, NCRAC04.TXT, WRAC04.TXT
Asphalt Cement			
AE01S	Recovery	H01	STHAE01S.TXT, NARAE01S.TXT, NCRAE01S.TXT, WRAE01S.TXT
AE02S	Penetration	H03	STHAE02S.TXT, NARAE02S.TXT, NCRAE02S.TXT, WRAE02S.TXT
AE06S	Viscosity	H03	STHAE06S.TXT, NARA E06S.TXT, NCRAE06S.TXT, WRAE06S.TXT
Extracted Aggregates			
AG04	Gradation	T14	STHAG04.TXT, NARAG04.TXT, NCRAG04.TXT, WRAG04.TXT
AG05	Fine Aggregate Particle Shape	T14A	STHAG05.TXT, NARAG05.TXT, NCRAG05.TXT, WRAG05.TXT
Unbound Granular Base/Subbase			
UG01	Particle Size Analysis	T41	STHUG01.TXT, NARUG01.TXT, NCRUG01.TXT, WRUG01.TXT
UG04	Atterberg Limits	T43	STHUG04.TXT, NARUG04.TXT, NCRUG04.TXT, WRUG04.TXT
UG05	Moisture-Density Relations	T44	STHUG05.TXT, NARUG05.TXT, NCRUG05.TXT, WRUG05.TXT
UG08	Classification	T47	STHUG08.TXT, NARUG08.TXT, NCRUG08.TXT, WRUG08.TXT
UG010	Natural Moisture Content	T49	STHUG10.TXT, NARUG10.TXT, NCRUG10.TXT, WRUG10.TXT

LTPP TEST DESIGNATION	TEST NAME	FORM NAME	FILE NAMES
Subgrade			
SS01	Sieve Analysis	T51	STHSS01.TXT, NARSS01.TXT, NCRSS01.TXT, WRSS01.TXT
SS02	Hydrometer	T42	STHSS02.TXT, NARSS02.TXT, NCRSS02,TXT, WRSS02.TXT
SS03	Atterberg Limits	T43	STHSS03.TXT, NARSS03.TXT, NCRSS03.TXT, WRSS03.TXT
SS04	Classification	T52	STHSS04.TXT, NARSS04.TXT, NCRSS04.TXT, WRSS04.TXT
SS05	Moisture-Density Relations	T55	STHSS05.TXT, NARSS05.TXT, NCRSS05.TXT, WRSS05.TXT
SS09	Natural Moisture Content	T49	STHSS09.TXT, NARSS09.TXT, NCRSS09.TXT, WRSS09.TXT

ATTACHMENT B

REQUIRED DATA FORMAT AND SEQUENCE

File Name: STHACLAY.TXT, NARACLAY.TXT, NCRACLAY.TXT, WRACLY.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	VARCHAR2 (2)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	***FIELD_LAYER_NO***	N/A	NUMBER (2,0)	Y	(0-99)
5.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
6.	***SHRP_ID (Section Number)***	N/A	VARCHAR2 (5)	Y	
7.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
8.	LAYER_DESCRIPTION	N/A	NUMBER (2,0)	Y	1,2,3,4,9,10
9.	LAYER_THICKNESS	inch	NUMBER (3,1)	Y	0.0 - 18.0
10.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	0 - 99

[1]Required unless sample is damaged.

File Name: STHAC01.TXT, NARAC01.TXT, NCRAC01.TXT, WRAC01.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	VARCHAR2 (2)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***FIELD_LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	TEST_DATE	N/A	DATE	Y	>1/1/92
12.	CORE_AVG_THICKNESS	inch	NUMBER (4,2)	Y[1]	0.0 - 50.0
13.	VISUAL_EXAM_1	N/A	NUMBER (2,0)		1 - 22, 99
14.	VISUAL_EXAM_2	N/A	NUMBER (2,0)		1 - 22, 99
15.	VISUAL_EXAM_3	N/A	NUMBER (2,0)		1 - 22, 99
16.	VISUAL_EXAM_4	N/A	NUMBER (2,0)		1 - 22, 99
17.	VISUAL_EXAM_5	N/A	NUMBER (2,0)		1 - 22, 99
18.	VISUAL_EXAM_6	N/A	NUMBER (2,0)		1 - 22, 99
19.	VISUAL_EXAM_OTHER	N/A	VARCHAR2 (40)		
20.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 99

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
21.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 99
22.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 99
23.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 99
24.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 99
25.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 99
26	COMMENTS_OTHER	N/A	VARCHAR2 (40)		

1. If T01A Exam Code (1,2,3,4,5 or 6) = 7, then Total Core Thickness must be null.

File Name: STHAC02.TXT, NARAC02.TXT, NCRAC02.TXT, WRAC02.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	BSG	N/A	NUMBER (4,3)	Y	1.000 - 4.000
12.	WATER_ABS	%	NUMBER (2,0)	Y	0 - 6
13.	PARAFFIN_COATED	N/A	VARCHAR2 (1)		Y,N
14.	Paraffin Spec Gravity	N/A	N/A		
15.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 99
16.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 99
17.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 99
18.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 99
19.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 99
20.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 99

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
21.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
22.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHAC03.TXT, NARAC03.TXT, NCRAC03.TXT, WRAC03.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	MAX_SPECIFIC_GRAVITY	N/A	NUMBER (4,3)	Y	1.000 - 4.000
12.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 99
13.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 99
14.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 99
15.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 99
16.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 99
17.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 99
18.	COMMENT_OTHER	N/A	VARCHAR2 (40)		
19.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHAC04.TXT, NARAC04.TXT, NCRAC04.TXT, WRAC04.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	ASPHALT_CONTENT_MEAN	%	NUMBER (3,1)	Y	0.0 - 30.0
12.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 99
13.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 99
14.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 99
15.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 99
16.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 99
17.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 99
18.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
19.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHAE01S.TXT, NARAE01S.TXT, NCRAE01S.TXT, WRAE01S.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	MOISTURE_IN_MIXTURE	%	NUMBER (3,1)		0 - 3
11.	ASPHALT_CONTENT	%	NUMBER (3,1)	Y	3 - 12
12.	ASH_CONTENT_OF_BITUMEN	%	NUMBER (2,1)		0 - 2
13.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 19, 99
14.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 19, 99
15.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 19, 99
16.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 19, 99
17.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 19, 99
18.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 19, 99
19.	GENERAL_REMARK	N/A	VARCHAR2 (40)		
20.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHAE02S.TXT, NARAE02S.TXT, NCRAE02S.TXT, WRAE02S.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	AVERAGE_PENETRATION	0.1 mm	NUMBER (3,0)	Y	10 - 250
11.	TEST_TEMPERATUR	◦ C	NUMBER (3,0)	Y	20 - 30
12.	COMMENT_1	N/A	NUMBER (2,0)		1 - 18, 99
13.	COMMENT_2	N/A	NUMBER (2,0)		1 - 18, 99
14.	COMMENT_3	N/A	NUMBER (2,0)		1 - 18, 99
15.	COMMENT_4	N/A	NUMBER (2,0)		1 - 18, 99
16.	COMMENT_5	N/A	NUMBER (2,0)		1 - 18, 99
17.	COMMENT_6	N/A	NUMBER (2,0)		1 - 18, 99
18.	GENERAL_REMARK	N/A	VARCHAR2 (40)		
19.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHAE06S.TXT, NARAE06S.TXT, NCRAE06S.TXT, WRAE06S.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	VACUUM_CAPILLARY_VISC	poise	NUMBER (7,0)	Y	500 - 999999
11.	TEST_TEMPERATURE	◦ C	NUMBER (3,0)		59 - 61
12.	VACUUM	mm Hg	NUMBER (3,0)		290 - 310
13.	COMMENT_1	N/A	NUMBER (2,0)		1 - 20, 99
14.	COMMENT_2	N/A	NUMBER (2,0)		1 - 20, 99
15.	COMMENT_3	N/A	NUMBER (2,0)		1 - 20, 99
16.	COMMENT_4	N/A	NUMBER (2,0)		1 - 20, 99
17.	COMMENT_5	N/A	NUMBER (2,0)		1 - 20, 99
18.	COMMENT_6	N/A	NUMBER (2,0)		1 - 20, 99
19.	GENERAL_REMARK	N/A	VARCHAR2 (40)		
20.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHAG04.TXT, NARAG04.TXT, NCRAG04.TXT, WRAG04.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	ONE_AND_HALF_PASSING	%	NUMBER (3,0)		
12.	ONE_PASSING	%	NUMBER (3,0)	Y	75 - 100
13.	THREE_FOURTHS_PASSING	%	NUMBER (3,0)		55 - 100
14.	ONE_HALF_PASSING	%	NUMBER (3,0)		45 - 100
15.	THREE_EIGHTHS_PASSING	%	NUMBER (3,0)		40 - 100
16.	NO_4_PASSING	%	NUMBER (3,0)	Y	10 - 100
17.	NO_10_PASSING	%	NUMBER (3,0)		5 - 90
18.	NO_40_PASSING	%	NUMBER (3,0)	Y	4 - 65
19.	NO_80_PASSING	%	NUMBER (3,0)		2 - 30
20.	NO_200_PASSING	%	NUMBER (3,1)	Y	0.0 - 15.0
21.	SOIL_GEOL	N/A	NUMBER (2,0)		1 - 60

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	GEOL_CODE_A	N/A	NUMBER (2,0)		1 - 60
23.	GEOL_CODE B	N/A	NUMBER (2,0)		1 - 60
24.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 99
25.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 99
26.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 99
27.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 99
28.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 99
29.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 99
30.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
31.	TEST_DATE	N/A	NUMBER (2,0)	Y	>1/1/92

File Name: STHAG05.TXT, NARAG05.TXT, NCRAG05.TXT, WRAG05.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	BSG	N/A	NUMBER (4,3)	Y[1]	1.500 - 3.500
12.	ABSORPTION	%	NUMBER (3,2)	Y[1]	0.0 - 8.0
13.	Void Trial 1	N/A			Not entered in IMS.
14.	Void Trial 2	N/A			Not entered in IMS.
15.	UNCOMP_VOID_AVG	%	NUMBER (4,2)	Y[1]	30 - 60
16.	Difference in Void Content	N/A			Not entered in IMS.
17.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 61, 99
18.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 61, 99
19.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 61, 99
20.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 61, 99
21.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 61, 99

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 61, 99
23.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
24.	TEST_DATE	N/A	DATE	Y	>1/1/92

1. At least one must be non-null.

File Name: STHSS01.TXT, NARSS01.TXT, NCRSS01.TXT, WRSS01.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	***SHRP_TEST***	N/A	VARCHAR2 (5)	Y	SS01
12.	WASHING_PASSING	N/A	NUMBER (4,1)	Y	0.0 - 99.9
13.	THREE_PASSING	%	NUMBER (4,1)		90.0 - 100.0
14.	TWO_PASSING	%	NUMBER (4,1)		0 - 100
15.	ONE_AND_HALF_PASSING	%	NUMBER (4,1)		40 - 100
16.	ONE_PASSING	%	NUMBER (4,1)	Y	35 - 100
17.	THREE_FOURTHS_PASSING	%	NUMBER (4,1)		35 - 100
18.	ONE_HALF_PASSING	%	NUMBER (4,1)		20 - 100
19.	THREE_EIGHTHS_PASSING	%	NUMBER (4,1)		10 - 100
20.	NO_4_PASSING	%	NUMBER (4,1)	Y	10 - 100
21.	NON_10_PASSING	%	NUMBER (4,1)		5 - 100

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	NO_40_PASSING	%	NUMBER (4,1)	Y	0 - 99
23.	NO_80_PASSING	%	NUMBER (4,1)		0 - 99
24.	NO_200_PASSING	%	NUMBER (4,1)	Y	0.0 - 99.9
25.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
26.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
27.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
28.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
29.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
30.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
31.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
32.	SAMPLE_WT	lb	NUMBER (4,1)		10 - 150
33.	MOISTURE_CONTENT	%	NUMBER (2,0)	Y	0.1 - 50.0
34.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHSS02.TXT, NARSS02.TXT, NCRSS02.TXT, WRSS02.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	THREE_PASSING	%	NUMBER (4,1)		90.0 - 100.0
12.	TWO_PASSING	%	NUMBER (4,1)		0 - 100
13.	ONE_AND_HALF_PASSING	%	NUMBER (4,1)		40 - 100
14.	ONE_PASSING	%	NUMBER (4,1)	Y	35 - 100
15.	THREE_FOURTHS_PASSING	%	NUMBER (4,1)		35 - 100
16.	ONE_HALF_PASSING	%	NUMBER (4,1)		20 - 100
17.	THREE_EIGHTHS_PASSING	%	NUMBER (4,1)		10 - 100
18.	NO_4_PASSING	%	NUMBER (4,1)	Y	10 - 100
19.	NO_10_PASSING	%	NUMBER (4,1)		5 - 100
20.	NO_40_PASSING	%	NUMBER (4,1)	Y	0 - 99
21.	NO_80_PASSING	%	NUMBER (4,1)		0 - 99

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	NO_200_PASSING	%	NUMBER (4,1)	Y	0.0 - 99.9
23.	GT_2MM	N/A	NUMBER (4,1)		0.0 - 99.9
24.	COARSE_SAND	N/A	NUMBER (4,1)		0.0 - 99.9
25.	FIND_SAND	N/A	NUMBER (4,1)	Y	0.0 - 99.9
26.	SILT	N/A	NUMBER (4,1)		0.0 - 99.9
27.	CLAY	N/A	NUMBER (4,1)		0.0 - 99.9
28.	COLLOIDS	%	NUMBER (4,1)	Y[1]	0.0 - 35.0
29.	HYDRO_02	N/A	NUMBER (4,1)	Y	0.0 - 99.9
30.	HYDRO_002	N/A	NUMBER (4,1)	Y	0.0 - 99.9
31.	HYDRO_001	N/A	NUMBER (4,1)	Y	0.0 - 99.9
32.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 48, 99
33.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 48, 99
34.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 48, 99
35.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 48, 99
36.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 48, 99
37.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 48, 99
38.	COMMENTS_OTHER	N/A	VARCHAR(40)		
39.	HYGRO_MOIST	%	NUMBER (2,0)	Y	0 - 10
40.	TEST_DATE	N/A	DATE	Y	>1/1/92

1. Required unless Comment Code (1, 2, 3, 4, 5, or 6) = 48.

File Name: STHSS03.TXT, NARSS03.TXT, NCRSS03.TXT, WRSS03.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	LIQUID_LIMIT	%	NUMBER (3,0)	Y	0, 10 - 150
12.	PLASTIC_LIMIT	%	NUMBER (3,0)	Y	0, 9 - 100
13.	PLASTICITY_INDEX	N/A	VARCHAR2 (2)	Y	NP, 0 - 50
14.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
15.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
16.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
17.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
18.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
19.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
20.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
21.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHSS04.TXT, NARSS04.TXT, NCRSS04.TXT, WRSS04.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	PART_SIZE_RANGE	N/A	VARCHAR2 (40)	Y	
12.	MAX_PART_SIZE	N/A	VARCHAR2 (40)	Y	
13.	SOIL_COLOR	N/A	VARCHAR2 (40)		
14.	DESC_CODE_1	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
15.	DESC_CODE_2	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
16.	DESC_CODE_3	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
17.	DESC_CODE_4	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
18.	DESC_CODE_5	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
19.	DESC_CODE_6	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
20.	DESC_CODE_7	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
21.	DESC_CODE_8	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	DESC_CODE_9	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
23.	DESC_CODE_10	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
24.	VISUAL_CLASS	N/A	NUMBER (3,0)		See Table D.1 of Lab Guide
25.	AASHTO_SOIL_CLASS	N/A	NUMBER (3,0)	Y[1]	501 - 515
26.	MR_MATL_TYPE	N/A	NUMBER (1,0)	Y	1,2
27.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
28.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
29.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
30.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
31.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
32.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
33.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
34.	TEST_DATE	N/A	DATE	Y	>1/1/92

1. Required if Layer Number = 1 (subgrade)

File Name: STHSS05.TXT, NARSS05.TXT, NCRSS05.TXT, WRSS05.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	MAX_LAB_DRY_DENSITY_TEST	N/A	VARCHAR2 (1)	Y	B,D
12.	OPTIMUM_LAB_MOISTURE	%	VARCHAR2 (1)	Y	4 - 30
13.	MAX_LAB_DRY_DENSITY	pcf	NUMBER (2,0)	Y	70 - 160
14.	COMMENTS_1	N/A	NUMBER (4,1)		1 - 17, 61-65, 70-78, 83, 84, 99
15.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 61-65, 70-78, 83, 84, 99
16.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 61-65, 70-78, 83, 84, 99
17.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 61-65, 70-78, 83, 84, 99
18.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 61-65, 70-78, 83, 84, 99
19.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 61-65, 70-78, 83, 84, 99
20.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
21.	RAMMER_FACE	N/A	VARCHAR2 (40)		
22.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHSS09.TXT, NARSS09.TXT, NCRSS09.TXT, WRSS09.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	***SAMPLE_NO***	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 99
12.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 99
13.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 99
14.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 99
15.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 99
16.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 99
17.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
18.	TEST_DATE	N/A	DATE	Y	>1/1/92
19.	MOIST_CONTENT	%	NUMBER (3,1)	Y	0.0 - 50.0

File Name: STHUG01.TXT, NARUG01.TXT, NCRUG01.TXT, WRUG01.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	***SHRP_TEST***	N/A	VARCHAR2 (5)	Y	UG01
12.	WASHING_PASSING	N/A	NUMBER (4,1)	Y	0.0 - 99.9
13.	THREE_PASSING	%	NUMBER (4,1)		90.0 - 100.0
14.	TWO_PASSING	%	NUMBER (4,1)		0 - 100
15.	ONE_AND_HALF_PASSING	%	NUMBER (4,1)		40 - 100
16.	ONE_PASSING	%	NUMBER (4,1)	Y	35 - 100
17.	THREE_FOURTHS_PASSING	%	NUMBER (4,1)		35 - 100
18.	ONE_HALF_PASSING	%	NUMBER (4,1)		20 - 100
19.	THREE_EIGHTHS_PASSING	%	NUMBER (4,1)		10 - 100
20.	NO_4_PASSING	%	NUMBER (4,1)	Y	10 - 100
21.	NO_10_PASSING	%	NUMBER (4,1)		5 - 100

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	NO_40_PASSING	%	NUMBER (4,1)	Y	0 - 99
23.	NO_80_PASSING	%	NUMBER (4,1)		0 - 99
24.	NO_200_PASSING	%	NUMBER (4,1)	Y	0.0 - 99.9
25.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
26.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
27.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
28.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
29.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
30.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
31.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
32.	SAMPLE_WT	lb	NUMBER (4,1)		10 - 150
33.	MOISTURE_CONTENT	%	NUMBER (2,0)	Y	0.1 - 50.0
34.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHUG04.TXT, NARUG04.TXT, NCRUG04.TXT, WRUG04.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	LIQUID_LIMIT	%	NUMBER (3,0)	Y	0, 10 - 150
12.	PLASTIC_LIMIT	%	NUMBER (3,0)	Y	0, 9 - 100
13.	PLASTICITY_INDEX	N/A	VARCHAR2 (2)	Y	NP, 0 - 50
14.	COMMENT_1	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
15.	COMMENT_2	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
16.	COMMENT_3	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
17.	COMMENT_4	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
18.	COMMENT_5	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
19.	COMMENT_6	N/A	NUMBER (2,0)		1 - 17, 67 - 69, 99
20.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
21.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHUG05.TXT, NARUG05.TXT, NCRUG05.TXT, WRUG05.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	SAMPLE_NO	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	MAX_LAB_DRY_DENSITY_TEST	N/A	VARCHAR2 (1)	Y	B, D
12.	OPTIMUM_LAB_MOISTURE	%	NUMBER (2,0)	Y	4 - 30
13.	MAX_LAB_DRY_DENSITY	pcf	NUMBER (4,1)	Y	70 - 160
14.	COMMENTS_1	N/A	NUMBER (2,0)		1-17, 61-65, 70-78, 83, 84, 99
15.	COMMENTS_2	N/A	NUMBER (2,0)		1-17, 61-65, 70-78, 83, 84, 99
16.	COMMENTS_3	N/A	NUMBER (2,0)		1-17, 61-65, 70-78, 83, 84, 99
17.	COMMENTS_4	N/A	NUMBER (2,0)		1-17, 61-65, 70-78, 83, 84, 99
18.	COMMENTS_5	N/A	NUMBER (2,0)		1-17, 61-65, 70-78, 83, 84, 99
19.	COMMENTS_6	N/A	NUMBER (2,0)		1-17, 61-65, 70-78, 83, 84, 99
20.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
21.	RAMMER_FACE	N/A	VARCHAR2 (40)		

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	TEST_DATE	N/A	DATE	Y	
21.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHUG08.TXT, NARUG08.TXT, NCRUG08.TXT, WRUG08.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	***SAMPLE_NO***	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	PART_SIZE_RANGE	N/A	VARCHAR2 (40)	Y	
12.	MAX_PART_SIZE	N/A	VARCHAR2 (40)	Y	
13.	SOIL_Color	N/A	VARCHAR2 (40)		
14.	DESC_CODE_1	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
15.	DESC_CODE_2	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
16.	DESC_CODE_3	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
17.	DESC_CODE_4	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
18.	DESC_CODE_5	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
19.	DESC_CODE_6	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
20.	DESC_CODE_7	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
21.	DESC_CODE_8	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
22.	DESC_CODE_9	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
23.	DESC_CODE_10	N/A	NUMBER (4,0)		See Table D.2 of Lab Guide
24.	VISUAL_CLASS	N/A	NUMBER (3,0)		See Table D.2 of Lab Guide
25.	MR_MATL_TYPE	N/A	NUMBER (1,0)	Y	1, 2
26.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
27.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
28.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
29.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
30.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
31.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 61 - 65, 99
32.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
33.	TEST_DATE	N/A	DATE	Y	>1/1/92

File Name: STHUG10.TXT, NARUG10.TXT, NCRUG10.TXT, WRUG10.TXT

Sequence No.	Field Name	Units	Oracle Format	Required Field?	Recommended QA Range
1.	***STATE_CODE***	N/A	NUMBER (2,0)	Y	
2.	***SHRP_ID (SPS Project Code)***	N/A	NUMBER (2,0)	Y	
3.	***FIELD_SET***	N/A	NUMBER (2,0)	Y	
4.	LAB_CODE	N/A	VARCHAR2 (4)	Y	1311,2711
5.	***LAYER_NO***	N/A	NUMBER (2,0)	Y	
6.	***LOC_NO***	N/A	VARCHAR2 (5)	Y	
7.	***SAMPLE_NO***	N/A	VARCHAR2 (6)	Y	
8.	***SHRP_ID (Section Number)***	N/A	NUMBER (2,0)	Y	
9.	***TEST_NO***	N/A	NUMBER (2,0)	Y	1,2,3
10.	SAMPLE_AREA_NO	N/A	VARCHAR2 (5)		
11.	COMMENTS_1	N/A	NUMBER (2,0)		1 - 17, 99
12.	COMMENTS_2	N/A	NUMBER (2,0)		1 - 17, 99
13.	COMMENTS_3	N/A	NUMBER (2,0)		1 - 17, 99
14.	COMMENTS_4	N/A	NUMBER (2,0)		1 - 17, 99
15.	COMMENTS_5	N/A	NUMBER (2,0)		1 - 17, 99
16.	COMMENTS_6	N/A	NUMBER (2,0)		1 - 17, 99
17.	COMMENTS_OTHER	N/A	VARCHAR2 (40)		
18.	TEST_DATE	N/A	DATE	Y	>1/1/92
19.	MOIST_CONTENT	%	NUMBER (3,1)	Y	0.0 - 50.0