Computer Automated Laboratory System (CALS™)

LABORATORY INFORMATION MANAGEMENT SYSTEM

CUSTOM SOFTWARE SPECIFICATION

CUSTOM PROGRAMMING IDENTIFICATION NUMBER 535

MS-Excel Interface for
Aggregate Code Sheets

Prepared for
Florida DOT

Project 1373

Thermo
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1. DOCUMENT DEFINITION

This document is the Custom Software Specification, identification number CPIN 535 which will be used by Thermo Electron Corporation, Informatics, for the development of the MS-Excel Interface for Aggregate Code Sheets custom software program. This software is part of the Florida DOT Laboratory Information Management System (LIMS) project, number 1373.

Mutual agreement to these specifications must be reached between Thermo Informatics and Florida DOT before custom software development is undertaken.

Once accepted, any changes to this document may result in a delay in timelines or additional charges. Any such changes must be executed using procedures defined in the Thermo Informatics Project Management Change Control document.

This document has been reviewed and accepted by Florida DOT:

Project Leader By:______________________ Print Name: John Shoucair
Date: ______________________

and by Thermo Informatics:

Project Management By:______________________ Print Name: Kathy Golden
Date: ______________________
### 2. DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Draft (Revision 0.1)</td>
<td>16 April 2003</td>
</tr>
<tr>
<td>Second Draft (Revision 0.2)</td>
<td></td>
</tr>
<tr>
<td>Third Draft (Revision 0.3)</td>
<td></td>
</tr>
<tr>
<td>Fourth Draft (Revision 0.4)</td>
<td></td>
</tr>
<tr>
<td>Revision 1</td>
<td>28 April 2003</td>
</tr>
<tr>
<td>Revision 1.1</td>
<td>18 June 2003</td>
</tr>
<tr>
<td>Revision 1.2</td>
<td>23 July 2003</td>
</tr>
<tr>
<td>Revision 1.3</td>
<td>4 August 2003</td>
</tr>
<tr>
<td>Revision 1.4</td>
<td>6 August 2003</td>
</tr>
<tr>
<td>Revision 1.5</td>
<td>18 November 2004</td>
</tr>
<tr>
<td>Revision 2</td>
<td></td>
</tr>
<tr>
<td>Revision 3</td>
<td></td>
</tr>
</tbody>
</table>
3. **OVERVIEW**

This section gives an overview of the main functions of the MS-Excel interface program. A description of the major objectives is provided as well as implementation assumptions.

### 3.1 Key Objectives

The key objectives for the software are:

- To automate the entry of aggregate test data from the field into LabManager iLIMS.
- To provide a common code sheet format for use by all mines, plants, and terminals that are required to furnish aggregate test data to the Florida DOT.
- To minimize data entry errors.

### 3.2 Assumptions

This program has been designed to execute on LabManager iLIMS version 9.1b and higher. A copy of this program shall be installed on all Windows PCs of users responsible for executing this interface program.
4. FUNCTIONAL SPECIFICATION

4.1 General Information

Plants, terminals, and mines supplying aggregate materials to the Florida DOT are required to submit material test data to the State Materials Office (SMO) for approval. This data currently arrives at the SMO in the form of a paper Aggregate Code Sheet that has been hand-written or generated as a report by the software program chosen by the supplier. SMO users must re-key the data into LabManager iLIMS, logging in samples, entering results, validating and approving each sample. This represents hundreds of man-hours per week dedicated to re-entering data and increasing the probability of transcription errors.

A program to read this data from an MS-Excel spreadsheet, log the samples, post the results and validate the test results will reduce the number of man-hours spent in manual data entry and greatly reduce transcription errors. Deployment of a commonly-used spreadsheet program, Microsoft Excel, shall make this interface applicable to data from a majority of the Florida DOT’s aggregate suppliers.

4.2 Program Setup

4.2.1 Installation

The AGGCS program must be installed on the user’s PC and the command line configured as illustrated in Figure 4-1 below. This allows the program to be executed from a menu option in LabManager.

Figure 4-1. Command Line Setup
4.2.2 Initialization Table Entry

An Initialization Table entry must be configured as shown below in Figure 4-2. The table below lists the directives that must be entered in the free-form field labeled “Configuration” in the Initialization Table Maintenance screen (DMCF).

**Figure 4-2. Initialization Table Entry for AGGCS Program**

<table>
<thead>
<tr>
<th>Directive</th>
<th>Required?</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP_SERVER=</td>
<td>Y</td>
<td>The IP address or server name of the FTP site from which source files will be moved and processed.</td>
</tr>
<tr>
<td>FTP_LOGIN=</td>
<td>Y</td>
<td>Username and password to be used by the program to gain access to the FTP site. Format will be “username/password”. If left blank the FTP site will be accessed anonymously by the program.</td>
</tr>
<tr>
<td>FTP_DIR=</td>
<td>Y</td>
<td>Pathname on the FTP server to the folder containing source files for this program. Example: /limsftp/lumpsum.</td>
</tr>
<tr>
<td>SOURCE_FILES=</td>
<td>Y</td>
<td>Location on the local server or PC where files to be processed will be temporarily stored. This location will be constant for all instances of the program, such as C:\temp\AggCodeSheet.</td>
</tr>
<tr>
<td>PROJECT=</td>
<td>N</td>
<td>Optional directive indicating the FIN value to be associated with the samples to be logged.</td>
</tr>
<tr>
<td>PAY_ITEM=</td>
<td>N</td>
<td>Optional directive indicating the Pay Item number to be associated with the samples to be logged.</td>
</tr>
<tr>
<td>AUTOVALIDATE=</td>
<td>Y</td>
<td>Directive indicating whether or not the program should validate as Valid all passing tests during processing.</td>
</tr>
</tbody>
</table>

### 4.3 User Interaction

#### 4.3.1 MS-Excel Code Sheet Format

Aggregate suppliers shall submit, either on disk or through electronic mail, code sheets in the form of a Microsoft Excel spreadsheet. One spreadsheet may represent one code sheet, or the data for several samples (code sheets) may be combined within a single spreadsheet file. An example of a spreadsheet containing data for two code sheets is shown on the next page. A full-size example shall be attached to this document as Appendix A.
Figure 4-3. Example of Aggregate MS-Excel Code Sheet

The fields in the Code Sheet shall be defined as listed in the table below.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample No.</td>
<td>FDOT or manufacturer’s sample number; not to be confused with the Sample Id generated by LabManager iLIMS.</td>
</tr>
<tr>
<td>Lab No.</td>
<td>The Lab Id assigned to the plant or terminal. This value shall be furnished to the supplier by the Florida DOT and used in all subsequent data submissions.</td>
</tr>
<tr>
<td>Sampled By</td>
<td>Person who collected the sample. This should be a valid Technician Id, which consists of the first nine letters of the Florida Driver’s License Number,</td>
</tr>
<tr>
<td></td>
<td>followed by “-000”. If “Check_CTQP_Sampler” is enabled for the sample specification, a valid Technician Id must be submitted otherwise the sample will not be logged.</td>
</tr>
<tr>
<td>Date Sampled</td>
<td>Date sample was collected. Format must be DD/MM/YYYY.</td>
</tr>
<tr>
<td>Terminal Number</td>
<td>Authorized Mine Code of terminal if source is a terminal</td>
</tr>
<tr>
<td>Mine No.</td>
<td>Authorized Mine Code</td>
</tr>
<tr>
<td>Tested by</td>
<td>This should be a valid Technician Id; initials may be used but tests with Test Methods will fail Technician Qualification check if valid Technician Id is not supplied. The same Technician Id shall be applied to all tests on the sample.</td>
</tr>
</tbody>
</table>
**Date Tested**  The date the test was actually performed, in the format DD/MM/YYYY.

**Material Code**  Code Number used to determine LIMS Material Code. Suppliers shall receive a list of valid aggregate Material Codes from the Florida DOT.

**Sample Type**  The aggregate sample type: B for Base, C for Coarse, F for Fine.

**Sampled From**  A code used to designate the type of location from which the sample was taken.

**Process**  A numerical code used to record process.

**Test Code**  Following the process field, each test will be listed on a separate line in the upload file. The Florida DOT shall have supplied a list of valid Test Codes to all suppliers.

**Results**  Test results shall be entered, one result to a cell, in columns to the right of the Test Code. Results shall be listed in this order: Component 1 unit 1 replicates 1 through n, unit 2 replicates 2 through n, unit n replicates 1 through n, Component 2 unit 1 replicate 1 through n,…Component n unit 1 replicates 1 through n.

### 4.3.2 AGGCS Execution

Users at the SMO shall copy the MS-Excel spreadsheets received from suppliers into the Source location defined in the Initialization Table. If they have the appropriate security level, the user shall log into LabManager iLIMS and execute the menu option “Upload Code Sheets” from the “Modules” main menu.

Source files may also be copied into a directory on a server executing the File Transfer Protocol service (FTP). All MS-Excel source files must be copied to the FTP site using binary format; otherwise they cannot be processed as MS-Excel files.

The program shall search the Source directory for any files and process each file in turn. Files shall be deleted following processing, so that it is recommended that the user keep copies of the spreadsheets off-line or in a separate backup directory for safekeeping. Errors that are generated shall be written to the Program_Errors Table, along with the program name (“AGGGCS”), the Plant (%$S::PL) associated with the sample being processed, and the date of the error. The Program_Errors Table shall be continuously appended with each program execution, unless its records are deleted.

The AGGCS program will display a dialog box to the user indicating that the program has completed its upload.

### 4.4 Batch Execution

The AGGCS program shall be capable of execution as a scheduled batch job. This job may be scheduled from any client PC on which the custom program and the LabManager client software have been installed. If a continuously-scheduled process is required, it is recommended that the program be executed from an application server on which the appropriate software has been installed.

When executed as a background operation, the program will process all files in the folder specified on the FTP site. The program may be scheduled from the directory in which the AggCS program has been installed, in a command (batch) file containing a statement of this format:
AggCS.exe /logon=\username/\password@\LIMSserver group number

An example would be:

\AggCS.exe /logon=\cals2/\cals2@smlims 2

The example command means that the samples will be logged into Group 2 of the Unit Test server by a user named cals2, having a password of cals2.
5. PROGRAM DESIGN

5.1 Implementation

5.1.1 Client-based Application

Client implementation of this functionality will be in the form of a VisualBasic 6.0 program called AGGCS. The executable file AGGCS.exe must be installed on all PCs using the iLIMS client. This program will be associated with the menu option labeled “Upload Code Sheets” from the “Modules” main menu.

5.1.2 Web-based Application

This program will not be available from the web application.

5.2 Execution

5.2.1 User Logon

When the AggCS program is executed from a desktop icon rather than as a LabManager menu option, the user shall be prompted to log into the LIMS to begin a LabManager session, as shown below in Figure 5-1.

![Logon Dialog Box](image)

**Figure 5-1. Logon Dialog Box**

5.2.2 Source File Location

Once logged in, the Aggregate Code Sheet Dialog box shall be displayed. The user shall select whether the source files are to be processed from the local default drive (“Local/Network Disk”) or from the pre-configured FTP site (“FTP server”). The user may also check the checkbox indicating that he/she wishes to see errors displayed to the screen as well as being written to the Program Errors Table.

Figure 5-2 below illustrates the Aggregate Code Sheet dialog box.
5.2.3 Initial Housekeeping

When "Post Data" is pressed, the program shall check the current entry for "AGGCODESHEET" in the Initialization Table for the source file location. If no entry exists, an error message shall be displayed in a dialog box, "Source File Location not Defined", the error will be recorded in the Program Errors table, and the program shall abort.

If the entry exists, the program shall locate the Source directory, depending on which source was selected by the user. If the pathname specified cannot be found, an appropriate error message will be generated (such as "Source directory not found") and the program shall abort.

The program will verify that files exist in the Source directory. An error message, “No source files available” shall be recorded and displayed if no files exist in the specified Source directory, or if none of the files in the directory end with the Microsoft Excel extension, ".xls".

Figure 5-2. Aggregate Code Sheet Program Dialog Box

The user shall press the key labeled “Find Spreadsheets” to display a list of the files to be processed. To begin processing, the user must press the “Post Data” key. The “Exit” key aborts processing and causes the program to terminate.
Once these housekeeping issues have been addressed, the program shall open the first file and proceed to process each record as described in the sections below.

5.2.4 Sample Login

5.2.4.1 Specification Determination

To log a sample into LabManager iLIMS, the program must determine the Material Id (%SS::MN), Sample Level (%SS::SL), Spec Year (%SS::SY), and Specification Authority (%SS::SA), the user key fields to the Specification Table. The Material Id shall be the value supplied in the spreadsheet's column labeled “Material Code”. The Specification Level used for uploads shall be the value “Q”. The Spec Year and Specification Authority values shall be determined according to the algorithm summarized as follows:

- The most common Specification Authority value for aggregate material consists of the concatenation of the Terminal Number and Mine Number, separated by a forward slash. For example, a valid Specification Authority value for the first example shown in Figure 4-3 would be “TM416/MX411”.

- If one or more specifications having the same Material Id, Sample Level, and concatenated Specification Authority cannot be retrieved, the program will search for one or more specifications having a Specification Authority value equal to the Mine Number, such as “MX411”.

- If the record to be processed does not have a Terminal Number, the program shall search only for the Mine Number equivalent in the Specification Authority field.

- If neither combination can be found in the Specification Authority field, the program will retrieve the latest specification record having a Specification Authority value beginning with the string “Std Spec”. The latest spec is a Specification record having a Spec Year value nearest the current month and year. Spec Year values are expressed as a string in the format "YYYYMM", so that July 2002 is expressed as 200207. For example, if a sample is to be logged in April of 2003, a Spec Year value of “200301” would be preferred to one with a Spec Year of “200212”, etc., given that all other user key field values were the same.

- If more than one Specification Table record can be found with the appropriate Material Id, Sample Level, and Specification Authority, the program will reference the latest Spec Year to log the new sample into LabManager iLIMS.

- If no matching Specification can be found, the error message “Specification not found for Material <Material Code>” shall be written to the Program Errors Table, and the program shall proceed to the next record.

5.2.4.2 Other Sample Header Fields

If present in the MS-Excel spreadsheet, the values appearing in the following columns shall be entered into the new Sample header at log-in:

- “Sample No.” value shall be posted to the Sample Number (%$S::SN) field;

- “Lab No.” value shall be posted to the Lab Id (%$S::LB) field;

- The Project Id (%$S::P1) shall be the FIN value listed next to “PROJECT=” in the Initialization table entry.
- The Pay Item Number (%$S::P2) shall be the value listed next to “PAY ITEM=” in the Initialization table entry.

- The Technician Id listed in the “Sampled By” column shall be verified against the Technician Id field of the Technician View (%NV), and its value (%NV::CI) posted to the Sampled By field (%$S::SB);

- “Date Sampled” shall be posted to the Date Sample Taken (%$S::DT) field;

- “Terminal No.” shall be posted to Terminal Id (%$S::TM);

- “Mine No.” shall be posted to Plant or Pit Number (%$S::PL);

- “Sample Type” shall be posted to Sample Type (%$S::AG);

- “Sampled From” shall be posted to Sampling Point (%$S::S2);

- “Process” shall be posted to Process (%$S::PR).

In addition, the phrase “Auto upload” shall be posted to the Remarks field (%$S::RM) at log-in, indicating the data source.

Any transaction errors that may occur during sample log-in shall be captured and posted to the Program Errors Table and processing will proceed with the next record.

5.2.5 Sample Status at Log-in

All samples logged via the AGGCS program shall have a status of “Sampled” at log-in.

5.2.6 Test Entry

5.2.6.1 Result Entry

Once the uploaded sample has been logged, the program shall proceed to enter its test results. The program shall enter the results as recorded horizontally to the right of the column labeled “Test Code”. If the test code on the spreadsheet does not match any of the tests on the sample, an error message shall be written to the Program Errors Table (i.e., “<Test Code> not found for Material <Material Code>”) and the next test record shall be processed.

Results shall be recorded in LabManager whether they are manual entry or calculated fields, in the order of Component, Unit, and Replicate values. Thus multiple-component/unit/replicate results would be entered horizontally as Component 1/Unit 1/Replicate 1, Component 1/Unit 1/Replicate 2, Component 1/Unit 1/Replicate 3, Component 1/Unit 2/Replicate 1, Component 1/Unit 2/Replicate 2, Component 1/Unit 2/Replicate 3, Component 2/Unit 1/Replicate 1, Component 2/Unit 1/Replicate 2, Component 2/Unit 1/Replicate 3, Component 2/Unit 2/Replicate 1, Component 2/Unit 2/Replicate 2, Component 2/Unit 2/Replicate 3, etc.

Test transaction errors shall be captured and written to the Program Errors Table so that data may be corrected or added manually at a later time by the user.

5.2.6.2 Other Test Data

Additional test header data shall be entered from the spreadsheet on each test, as follows:
• The Technician Id listed in the “Tested By” column shall be verified against the Technician Id field of 
  the Technician View (%NV) and its value (%NV::CI) posted to the Performed By field (%$T::PB) in 
  each test;

• The date entered under “Date Tested” shall be posted to the Performed On (%$T::PD) field in each 
  test.

5.2.6.3 Technician and Lab Qualification Check
If the test to which results are to be posted is associated with a Test Method (%TE::AN), the program shall 
determine the qualification status of the Lab Id and the Technician who performed the test, and post the 
appropriate value to the Qualification Status (%$T::QS) field as part of the transaction upload.

5.2.6.3.1 Technician Qualification
For each test to be populated, the program will determine whether or not the test has been assigned a Test 
Method Number (%TE::AN) by retrieving the referenced record in the Test Definition table. If a Test Method 
Number value exists, the program will examine the Technician Id to be posted to the “Performed By” field 
(%$T::AB) for the test. The program will search the Analyst Training View to determine if a qualification 
record exists for that technician and test method, and if the technician is qualified in that method. Since 
technicians are certified in Qualification Areas that consist of one or more Test Method Numbers, a 
database view is required to join the Analyst Training record to one or more Method Number records; the 
Current Status associated with the Qualification Area will apply to all its Test Methods.

If the Current Status for that Technician and Test Method equals “VALID”, the program will post the word 
“TRAINED” in the Qualification Status (%$T::QS) field for that test and proceed to check the laboratory 
qualification. If no training record exists for the Technician/Test Method, or the Current Status value is 
“INPROGRESS”, “SUSPENDED”, “REVOKED”, blank, or null, the program will post the value “NOT 
TRAINED” in the Qualification Status field.

5.2.6.3.2 Training Record Update
To track the last time a technician has performed a test method within a specified qualification area, the 
Analyst Training Table will contain a field called the Last Test Date (%AN::LT). This field will be updated 
with the “Date Performed” each time a qualification check is performed for a test. The technician’s 
qualification status will not affect the update of this field. Before a qualification check is completed for an 
operator on a test, the program will compare the “Date Performed” on the test to the Last Test Date 
recorded for the technician in the specific qualification area. If the Last Test Date is a date prior to the date 
the test was performed, the program will update the Last Test Date to equal the date the test was performed 
by that technician. The modification reason will be “Updated Last Test Date”. If the Last Test Date is the 
same date as the date the test was performed, or is a date later than the date of the current test, then no 
update will occur.

5.2.6.3.3 Lab Qualification
The program will perform laboratory verification by examining the Lab Id (%$S::LB) value of the sample. 
The program will search the Lab Authorization table for a record for the Lab and Test Method of the test 
being checked. If no authorization record exists, or if the LQS field equals any value except “Valid”, blank, 
or null, the program will post “NO LAB CERT” in the Qualification Status field. If the Technician Id has also 
failed the qualification check, the message posted will be “NO CERT”, to indicate that both the technician 
and laboratory were not authorized to perform the test.
5.2.6.4 Comment Lines

Data rows in which the value for Sample Number (left-most column) consists of two asterisks ("**") shall be ignored by the program. These lines contain spreadsheet comments that have been entered for human readability only.

5.2.7 Test Validation

If the Autovalidation Flag has been set to "Y" in the Initialization Table entry, the program shall validate all test with a $TESTDISP$ of “Pass” as Valid.

5.2.8 Test Deletion

When all test results have been uploaded to a specific sample, the program will kill all tests on the sample that do not contain any test results. Tests with partial results shall be retained.

5.2.9 Program Termination

The AGGCS program shall process all records in each spreadsheet until no further records are detected in each file. When no other files are found, the program will delete all processed files, and display a dialog box indicating “Upload Complete” (if executed interactively).

A flowchart of the program logic is shown below.
BEGIN

VERIFIED DIRECTIVES IN 'AGGCODESHEET' ENTRY, INIT. TABLE

ENTRY EXISTS?

PATHS EXIST?

Files present?

Get Specification key field values

Spec exists?

LOG-IN SAMPLE & POPULATE SAMPLE HEADER

TEST ON SAMPLE?

Source/Error File Locations not defined

Source/Error directory not found

No source files available

TEST HAVE RESULTS?

If test passes, validate as Valid

Autovalidate?

LAST TEST?

LAST RECORD?

END

<Test Code> not found for <Material Code>

Y

N

Y

N

N

Y

N

Y

N

Killed Test

LAST TEST?
6. SYSTEM CONFIGURATION REQUIREMENTS

6.1 Tables

The tables listed below shall be configured with the fields as shown in order for this program to work properly.

6.1.1 Sample Table ($S)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Column Name</th>
<th>Code</th>
<th>Domain</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Number</td>
<td>SAMPLE_NUMBER</td>
<td>SN</td>
<td>A10</td>
<td></td>
</tr>
<tr>
<td>Lab Id</td>
<td>LAB_ID</td>
<td>LB</td>
<td>A6</td>
<td></td>
</tr>
<tr>
<td>Date Sample Taken</td>
<td>DATE_SAMPLE_TAKEN</td>
<td>DT</td>
<td>DATETIME</td>
<td></td>
</tr>
<tr>
<td>Plant or Pit Number</td>
<td>PLANT</td>
<td>PL</td>
<td>A10</td>
<td></td>
</tr>
<tr>
<td>Sampled By</td>
<td>SAMPLED_BY</td>
<td>SB</td>
<td>A13</td>
<td></td>
</tr>
<tr>
<td>Remarks</td>
<td>REMARKS</td>
<td>RM</td>
<td>A79</td>
<td></td>
</tr>
<tr>
<td>Sampling Point</td>
<td>SAMPLING_POINT</td>
<td>S2</td>
<td>A30</td>
<td></td>
</tr>
<tr>
<td>Aggregate Sample Type</td>
<td>AGG_SAMPLE_TYPE</td>
<td>AG</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>PROCESS</td>
<td>PR</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>Terminal Number</td>
<td>TERMINAL_NUMBER</td>
<td>TM</td>
<td>A10</td>
<td></td>
</tr>
<tr>
<td>Project Id</td>
<td>REF_PROJECT_ID</td>
<td>P1</td>
<td>A10</td>
<td>1</td>
</tr>
<tr>
<td>Pay Item Number</td>
<td>REF_PAY_ITEM</td>
<td>P2</td>
<td>A15</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes:
1. Referenced from Pay Item Table

6.1.2 Specification Table (SS)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Column Name</th>
<th>Code</th>
<th>Domain</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Id</td>
<td>MATERIAL_ID</td>
<td>MN</td>
<td>A6</td>
<td>0</td>
</tr>
<tr>
<td>Sample Level</td>
<td>SAMPLE_LEVEL</td>
<td>SL</td>
<td>A3</td>
<td>0</td>
</tr>
<tr>
<td>Spec Year</td>
<td>SPEC_YEAR</td>
<td>SY</td>
<td>A6</td>
<td>0</td>
</tr>
<tr>
<td>Spec Authority</td>
<td>SPEC_AUTHORITY</td>
<td>SA</td>
<td>A20</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:
### 6.1.3 Pay Item Table (PI)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Column Name</th>
<th>Code</th>
<th>Domain</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique Identifier</td>
<td>PIKEY</td>
<td>SYS_GEN_ID</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Version Number</td>
<td>PIKEYV</td>
<td>VERSION</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Project Id</td>
<td>PROJECT_ID</td>
<td>PJ</td>
<td>A15</td>
<td>2,3</td>
</tr>
<tr>
<td>Pay Item Number</td>
<td>PAY_ITEM_NUMBER</td>
<td>PN</td>
<td>A12</td>
<td>2</td>
</tr>
</tbody>
</table>

Notes:
1. Part of system key to Pay Item Table.
2. Part of Pay Item Table User key.
3. Real, copied field from Project Table.

### 6.1.4 Result Test Table ($T)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Column Name</th>
<th>Code</th>
<th>Domain</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Code</td>
<td>TEST_CODE</td>
<td>TC</td>
<td>A12</td>
<td>1</td>
</tr>
<tr>
<td>Performed By</td>
<td>PERFORMED_BY</td>
<td>PB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performed On</td>
<td>PERFORMED_ON</td>
<td>PD</td>
<td>DATE</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Real, copied from Test Definition Table

### 6.1.5 Initialization Table (CF)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Column Name</th>
<th>Code</th>
<th>Domain</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique Identifier</td>
<td>CFKEY</td>
<td>SYSGENID</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Version</td>
<td>CFKEYV</td>
<td>VERSION</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Initialization Id</td>
<td>CONFIG_ID</td>
<td>ID</td>
<td>A14</td>
<td>2</td>
</tr>
<tr>
<td>Init. Group</td>
<td>METHOD_GROUP</td>
<td>GR</td>
<td>A6</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>ACCESS_SECURITY</td>
<td>SE</td>
<td>A16</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>CONFIG_DESC</td>
<td>DE</td>
<td>A60</td>
<td></td>
</tr>
</tbody>
</table>
Field Name | Column Name | Code | Domain | Note |
--- | --- | --- | --- | --- |
Configuration | CONFIGURATION | CG | A* | |

Notes:

1. System keys to Initialization Table
2. User key to Initialization Table

6.1.6 Program Errors Table (PE)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Column Name</th>
<th>Code</th>
<th>Domain</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique Identifier</td>
<td>PEKEY</td>
<td>SYSGENID</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Version</td>
<td>PEKEYV</td>
<td>VERSION</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Error Number</td>
<td>ERROR_NUMBER</td>
<td>EN</td>
<td>A10</td>
<td>2</td>
</tr>
<tr>
<td>Program Name</td>
<td>PROGRAM_NAME</td>
<td>PG</td>
<td>A10</td>
<td></td>
</tr>
<tr>
<td>Plant or Pit</td>
<td>PLANT</td>
<td>PL</td>
<td>A10</td>
<td></td>
</tr>
<tr>
<td>Error Message</td>
<td>ERROR_MESSAGE</td>
<td>EM</td>
<td>A120</td>
<td></td>
</tr>
<tr>
<td>Entry Date</td>
<td>ENTRY_DATE</td>
<td>ED</td>
<td>DATE</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1. System keys to Program Errors Table
2. User key to Program Errors Table

6.1.7 Additional Table Definitions

Tables containing data to be used for technician and laboratory qualification checks are defined in the Custom Program Specification for Analyst Training and Lab Qualification, CPIN 340, Section 7.0.

6.2 Screens

A dictionary maintenance screen, DMCF, is required to maintain the “AGGCODESHEET” entry in the Initialization Table.

6.3 Reports

An RGEN procedure (PGMER2) will be written that prompts the user for a date range and Plant, and it will display all error messages generated within those parameters. This report shall be added as a LabManager menu option.
7. PROGRAM INSTALLATION

An InstallShield setup file shall be available so that AGGCS may be installed on individual PCs. This program should be installed on each PC that will use it.
8. **ERROR AND INFORMATIONAL MESSAGES**

The table below lists the error messages generated either by AGGCS and their explanations. When executing the program interactively, pressing <Okay> or <Cancel> on the Message Box will return the user to the “Modules” menu so that the appropriate data changes can be made and the program re-executed. Messages containing system information may indicate system-wide issues that should be resolved by the iLIMS System Administrator. All messages will also be posted to the Program Errors Table.

<table>
<thead>
<tr>
<th>Error Message</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source or Error File Locations not Defined</td>
<td>“AGGCODESHEET” entry is missing from the Initialization Table, or the pathnames are not defined in the Configuration field.</td>
</tr>
<tr>
<td>Source directory not found</td>
<td>The program cannot locate the path to source files.</td>
</tr>
<tr>
<td>No source files available</td>
<td>There are no spreadsheets (*.xls) in the source directory to be processed.</td>
</tr>
<tr>
<td>Specification not found for Material &lt;Material Code&gt;</td>
<td>The program cannot find a Specification for the Material Code in the spreadsheet. Processing will continue with the next code sheet record.</td>
</tr>
<tr>
<td>Project Missing</td>
<td>The Project or FIN number associated with all samples in the upload is missing or undefined in the Configuration field of the Initialization Table.</td>
</tr>
<tr>
<td>Pay Item Missing</td>
<td>The Pay Item Number value to be associated with all samples in the upload is missing or undefined in the Configuration field of the Initialization Table.</td>
</tr>
<tr>
<td>&lt;Test Code&gt; not found for Material &lt;Material Code&gt;</td>
<td>The Test Code entered on the spreadsheet is not a valid LabManager test code or the Test has not been scheduled on the sample logged for this material.</td>
</tr>
<tr>
<td>Validation Flag missing</td>
<td>The Autovalidation Flag is undefined or missing from the Configuration field of the Initialization Table.</td>
</tr>
</tbody>
</table>
APPENDIX A. AGGREGATE MS-EXCEL CODE SHEET