IMPERIAL REFINING COMPANY
DATA MANAGEMENT PLAN

Prepared for

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
Oklahoma City, Oklahoma

Prepared by

WESTON SOLUTIONS, INC.
620 N Robinson, Suite 203
Oklahoma City, OK 73102

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LIST OF ACRONYMS AND ABBREVIATIONS

COC	Chains-of-Custody
DM	Data Manager
DMP	Data Management Plan
DV	Data Validator
EDD	Electronic Data Deliverable
FDM	Field Data Manager
FTL	Field Team Leader
GIS	Geographic Information System
GPS	Global Positioning System
ODEQ	Oklahoma Department of Environmental Quality
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RI/FS	Remedial Investigation/Feasibility Study
WESTON	Weston Solutions, Inc

1. INTRODUCTION

Weston Solutions, Inc. (WESTON) has been contracted by the Oklahoma Department of Environmental Quality (ODEQ) under Purchase Order 2929002215 to perform a Remedial Investigation/Feasibility Study (RI/FS) at the Imperial Refining Company (IRC) in Ardmore, Oklahoma. Part of the scope of services is the development of a Data Management Plan (DMP). The purpose of the DMP is to outline for the project team how information will be managed in the field and office. The project team includes: field team leaders, field data managers, data managers, GIS operators, data validators, third party analytical laboratories, and ODEQ. Each team member will be the owner of data during the project and, as such, has responsibilities as outlined in this plan.

The DMP provides procedures for the collection, handling, documentation, quality control, and delivery for each type of data. The DMP is organized in the following manner:

- Section 1 is the Introduction that provides background and purpose of the DMP.
- Section 2 is the Data Flow and Responsibilities that provides a step by step outline of information flow from the point of generation to its ultimate destination.
- Section 3 is the Data Management Procedures that provide procedures for analytical data collection and GIS and GPS Standards.
- Section 4 is a brief description of the Quality Control/Assurance required for this project.
- Appendix A and B are the electronic data deliverable standards that WESTON requires. Appendix A is the more desirable standard and required by commercial laboratories subcontracted by WESTON.
- Appendix C is the standard sample nomenclature required for this project.

The DMP is not a stand-alone document. Other plans or documents that are related to the DMP include the RI/FS Work Plan, the GIS Database, the Sampling and Analysis Plan, the Quality Management Plan, and the Quality Assurance Project Plan (QAPP). These documents together comprise the framework for conducting the RI/FS in a manner that produces logical and traceable conclusions for the collected data.

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2. DATA FLOW AND RESPONSIBILITIES

This section outlines the anticipated and desired flow of information from the point of generation in the field to its ultimate destination, the project database. The activity of each step and the owner of the data during the step are described below.

2.1 ANALYTICAL DATA

2.1.1 SAMPLE COLLECTION

The primary data-generating activity that will be conducted during this project is the collection of field samples. Sample collection requires that several steps be followed to generate high quality data. These steps are:

1. *Sample location is named*
   Upon arrival at a sampling location (station), the Field Team Leader (FTL) is responsible for determining if the sample location has an existing name or whether it is a new location. If the location has a name, that name will be used, if the location is new, the location will be named according to the Station nomenclature guidance found in the Data Management Procedures section below (3.1.1). The FTL is responsible for ensuring that the sample location is accurately named and documented.
2. *Sample is named*
   Once the sample location name has been determined, the next piece of information that is generated is the sample name. The FTL is responsible for ensuring that the sample is named accurately according to the Sample nomenclature guidance found in the Data Management Procedures section below (3.1.2).
3. *Sample is collected*
   Once the sample name has been determined, the sample is collected. Upon collection of the sample, the FTL is responsible for ensuring that the name, date and time of the sample are accurately documented in the field logbook or on other sample documentation.
4. *Jar is labeled with sample name, date and time*
   Once the sample has been collected, it is the FTL's responsibility to ensure that the sample name, date and time are accurately transferred to the sample jar.
5. *Jar is delivered to the field data manager*
   Once the sample has been collected and labeled, the FTL passes responsibility for the sample and its data to the Field Data Manager (FDM) by physically delivering the sample containers. The FDM is now the owner of the data.
6. *Chain of custody is completed by field data manager*
   The FDM is responsible for accurately completing the sample chains-of-custody (COC) required by the analytical laboratory. At a minimum, the

sample name, date, time, and requested analytical methods to be performed on each sample will be documented on the COC.

7. *Sample is packed and shipped to a third party lab*
   Once the COC has been completed, it is the FDM's responsibility to accurately pack samples for shipment to the analytical laboratory. A COC listing the samples will be included in each sample shipment.
8. *A copy of the chain of custody is retained*
   It is the FDM's responsibility to retain and file a signed copy of each COC that is sent to a laboratory.

2.1.2 SAMPLE ANALYSIS

Laboratory analysis of field samples will generate more data points than any other activity during this project. This Data Management Plan will not define processes that will be conducted within the analytical laboratory, but will prescribe some fundamental data handling processes which will ensure that high quality, accurate data is received from the lab. These processes are:

1. *Sample is received by the lab*
   When the lab receives samples, receipt of each sample will be logged using the lab's sample tracking procedure.
2. *Chain of custody is completed*
   The lab should receive a chain of custody with each sample shipment. It is the lab's responsibility to complete the COC by assigning each sample listed on the COC a lab sample identifier and recording that identifier on the COC. Also, it is the lab's responsibility to document the condition of the shipment on the COC by recording the date and time of receipt, the name of the person receiving the samples, the temperature of the samples upon receipt and documenting any broken containers.
3. *Sample is extracted and analyzed*
   It is the lab's responsibility to extract and analyze each sample according to the analytical method requested and to accurately document the results of analysis.
4. *Sample results are put into Electronic Data Deliverable (EDD) format*
   It is the lab's responsibility to create an electronic version of the data generated by analysis. The format of this data is documented in Appendix A. In the event that the lab is unable to generate the format in Appendix A, the format in Appendix B will also be accepted. In the event that neither of these formats can be met, the lab should contact the WESTON data manager to negotiate an alternate delivery format.
5. *EDD and hardcopy of results are returned to WESTON*
   It is the lab's responsibility to return both hardcopy and EDD versions of the analytical results to WESTON. It is the lab's responsibility to ensure that these two versions of the data match exactly so that there is no doubt of the accuracy of the electronic data.

2.1.3 DATA LOADING

When data are received from the lab, they will be loaded into the project database. The project database will be the system of record for the analytical data. The following steps are:

1. *Hardcopy and EDD are received by Data Manager*
   When hardcopy and EDD versions of data are received from the lab, the data are now the responsibility of the Data Manager (DM). It is the DM's responsibility to file the hardcopy results in the project file and save the EDDs in the project directory on the WESTON network.
2. *EDD is reviewed for completeness*
   It is the DM's responsibility to examine each EDD, checking the format of the EDD and the completeness of the EDD data fields.
3. *Sample names are checked vs. COC*
   It is then the DM's responsibility to check the names of the samples returned in each EDD against the COCs for any typographical errors. If any errors are found, it is the DM's responsibility to save a copy of the EDD and make corrections to the sample names in the saved copy, retaining the original EDD for recordkeeping.
4. *EDD is loaded into project database*
   Once sample names have been checked and corrected, it is the DM's responsibility to prepare a copy of the EDD to be loaded. This includes associating the samples with their appropriate sample locations and associating each sample with the project name used in the project database. Once these associations have been made, it is the DM's responsibility to load the data into the database. Once the data have been loaded, it is then the DM's responsibility to ensure that the samples and analytical results contained in the EDD were successfully loaded into the database. This check will be completed by counting the number of records in the EDD for each sample and comparing those counts to a sample status report that is run from the project database. If discrepancies are found, it is the DM's responsibility to reconcile the differences and ensure that the data is loaded accurately.
5. *Data summary report is generated and submitted to Data Validator*
   Once the data have been loaded, it is the DM's responsibility to produce a data summary report, by sample, and to submit that summary report, along with the hardcopy results to the Data Validator for validation.

2.1.4 DATA VALIDATION

Ensuring the quality of analytical data is the responsibility of the Data Validator (DV). The DV's responsibilities include reviewing the data for completeness, accuracy and quality and documenting any problems found in the data by assigning validation flags. The Data Validation steps are:

1. *Analytical data is checked by DV*
   It is the DV's responsibility to check the analytical data for usability. Any deficiencies discovered in the data will be documented through the use of a validation flag. It is the DV's responsibility to assign validation flags by

noting the flag on the data summary report or laboratory hardcopy. Guidance on verification of analytical data can be found in the QAPP.

2. *Validator's flags are returned to DM*
   Once the DV has assigned the validation flags, it is the DV's responsibility to return the hardcopies containing the flags to the DM.
3. *Validator's flags are entered into project database*
   Once the hardcopies containing the validation flags have been received, it is the DM's responsibility to ensure that the flags are accurately entered into the project database. The flags will be entered and that entry will be checked for completeness and accuracy by the DM.

2.1.5 DATA REPORTING

Once the samples have been collected and analyzed and the data have been loaded into the project database and validation flags have been entered, the data are ready to be reported. Accurate reporting of the data is the responsibility of the Data Manager.

1. *Data is reported in standard raw data and comparison tables*
   It is the DM's responsibility to accurately generate analytical summary and comparison tables in response to the project team's requests. These tables will be generated directly from the project database.
2. *Data is made available to GIS through project database*
   It is the DM's responsibility to generate GIS-compatible data for inclusion in the project GIS.

2.2 GIS/GPS

2.2.1 GPS SETUP

Geographic data that is collected in the field will be collected using a high-precision GPS device. Recommended GPS models include the Trimble Pro-XRS and the Trimble GeoXT. In order for these devices to be used properly the user must be specifically trained on their use. To ensure that quality data are collected, the following steps will be followed.

1. *Choose the GPS unit*
   It is the FTL's responsibility to choose the GPS unit to be used during field activities.
2. *Train the FTL*
   Once the GPS unit has been chosen and prior to mobilizing to the field, it is the responsibility of the FTL to ensure that he or a designated member of the field team has been trained on the particular GPS unit to be used. WESTON maintains a Certified Trimble Trainer on staff who can provide this training upon request.
3. *Setup the GPS unit*
   To ensure that the GPS unit is setup to capture locations in the desired coordinate system and to capture the desired metadata, the GPS unit will be setup prior to mobilizing to the field. It is the FTL's responsibility to ensure that this setup is completed by the GIS operator.

2.2.2 SAMPLE COLLECTION

During field activities, many geographically important points and features will be identified. The quality of data collected about these points is vital to the overall quality of the project database. To ensure the quality of this data, the following steps will be followed:

1. *Sample location is mapped*
   Upon arrival at a sampling location, the FTL is responsible for determining the name of the sample location (the "station"). If the location already has a name, that name will be used, if the location is new, the location will be named according to the Station nomenclature guidance found in the Data Management Procedures section below (3.1.1). The FTL is responsible for ensuring that the sample location is accurately named and documented. The FTL is also responsible for ensuring that each location is mapped using a GPS unit. Each GPS location will be collected according to the GPS guidance found in the Data Management Procedures section below (3.2.3). At a minimum, the metadata items specified in the Metadata Standards below will be collected for each location.
2. *GPS data is downloaded from unit*
   Once the location has been captured by the GPS unit, it can be downloaded from the unit. It is the FTL's responsibility to deliver the GPS unit to the FDM. It is then the FDM's responsibility to download the data from the GPS unit.

2.2.3 DATA VERIFICATION

Ensuring that geographic data collected in the field are accurate is extremely important to the quality of the project database. The step described below will help protect the quality of the database.

1. *Verify GPS Data*
   Once the data have been downloaded from the GPS unit, it is the FDM's responsibility to immediately forward the data to the project GIS operator. It is the GIS operator's responsibility to overlay the GPS locations onto a project base map and verify that the points fall within the study area. It is also the GIS operator's responsibility to check the metadata associated with the file to ensure that it is complete.
2. *Archive GPS Data*
   Once the quality control steps have been completed, it is the GIS operator's responsibility to archive the data for safekeeping. Ideally, this process will be completed while the field team is still on site so that any discrepancies can be corrected immediately.

2.2.4 DATA LOADING

Once data have been verified, they will be loaded into the project database. It is the GIS operators responsibility to load the data into the project database. The system of record for this data will be the project database, not the GPS files generated in the field.

3. DATA MANAGEMENT PROCEDURES

3.1 ANALYTICAL DATA

All analytical data will be managed using a commercial-off-the-shelf software from Geotech Computer Systems, Inc. named Enviro Data. Enviro Data runs entirely within Microsoft Access and WESTON's desktop computing standard is Microsoft Access 2002 or newer. Enviro Data will be used to manage all sample location, sample collection, laboratory analysis and validation data.

3.1.1 STATION NOMENCLATURE

Sampling locations (stations) shall be named using the guidance described in the section. A station is defined by a unique set of geographic coordinates on the earth. From any station, multiple samples can be collected, even using different sample matrices. For instance, if a soil boring is made and a groundwater well installed in the boring and both soil and groundwater samples are collected, the station for the samples would be the same. Each station shall have a unique name across the site. A station name shall never be reused even if the location no longer physically exists. This applies particularly to post-removal sampling at the same latitude and longitude. Since material has been removed from the location it is technically a new sampling station.

The station nomenclature shall follow the standard below.

Station ID = Area of Interest + Sample Source + Sequential Number

Where Area of Interest is a 5-digit alpha-numeric string, Sample Source is a 2-digit identifier from the table below and Sequential Number is a number between 01 and 99.

DP	Direct Push
MW	Monitoring Well
SB	Soil Boring
SD	Sediment
SS	Surface Soil
SW	Surface Water

Example:
The first monitoring well located in area of interest WPT03 would be named WPT03MW01.

3.1.2 SAMPLE NOMENCLATURE

Like stations, samples shall always have unique names across the history of the site. Duplication of sample names is a significant threat to the quality of data in the project database and shall be actively prevented. Samples will be named using the following standard. More details on sample nomenclature can be found in Appendix C.

Sample ID = Station ID –Collection Type + QC Type – Depth of Sample Bottom – Date (mmddyy)

3.1.3 ELECTRONIC DATA DELIVERABLES

Data will be transmitted and received electronically when possible to minimize manual entry errors. Electronic delivery is particularly important to the quality of analytical data received from laboratories due to the large volume of data involved. To facilitate electronic delivery, the laboratory should strive to meet the electronic data deliverable standard published in Appendix A. This is the EDD standard for a commercial product called EnviroData (v1.6). EnviroData is the analytical data management product that will be used on this project.

If a laboratory is unable to meet the EDD standard specified in Appendix A, an alternate EDD will also be acceptable, but less desirable. The alternate EDD specification is detailed in Appendix B. In the event that a laboratory is unable to produce a deliverable using either of these EDD specifications, the laboratory should contact the DM as soon as possible to make data transmission arrangements that will minimize manual entry errors.

3.1.4 REPORTING

Data from the project database will be reported in a number of methods. The most important procedure that will be followed when reporting data is that reports will be run directly from the project database with minimal intermediate steps. Each additional step in the reporting process introduces the possibility for error and additional steps should be avoided when possible.

3.1.5 INTEGRATION WITH GIS

Data from the project database will be supplied to the GIS electronically. Since sample location coordinates will be stored in the project database, these coordinates will be included in the data that are supplied to the GIS, ensuring accurate geographic placement of sample results.

3.2 GIS

The GIS created for this project will be built using ESRI's ArcGIS 9.0 or newer. The ArcGIS geodatabase that will be created for this project will be created in Microsoft Access 2002. The GIS geodatabase will be a separate database from the analytical database. The geodatabase will be the system of record for all feature data (data layers) except for sample locations. Sample locations will be owned by the Enviro Data database. For delivery to ODEQ, ESRI shapefiles will be created from the geodatabase. Analytical data from the Enviro Data database will be merged into the geodatabase prior to delivery to ODEQ as shapefiles.

3.2.1 METADATA STANDARDS

The GIS deliverable for this project shall be submitted electronically. Each GIS layer will be submitted with a metadata statement or data description that will include the following information:

Horizontal datum – horizontal datum coordinates based on (NAD83).

Spatial Format –

Horizontal Coordinate System – NAD83 (CONUS)

Map Projection - Albers Conical Equal Area
Standard Parallel: 29.5
Standard Parallel: 45.5
Longitude of Central Meridian: -96
Latitude of Projection Origin: 23
False Easting: 0
False Northing: 0
Planar Distance Units: Meters
Horizontal Datum NAD83
Ellipsoid: GRS1980

Method - Method utilized to create coverage (i.e. digitized, DGPS data)

Statement of Accuracy - Statement of how accurate the data are (i.e. 1-5 meter Circular Error Probability)

Data Description – Specific information describing the coverage. What project or activity the data was compiled for. If available, this description should also include SIC codes for specific type of feature or activity data was collected for.

Data Owner – Name of individual(s) and organization that created the coverage. This should include contact information allowing data users to contact the appropriate person(s) with specific questions concerning the data.

Date – When were the data collected or determined (mm/dd/yy).

Base Map Description – If applicable, scale of base map data utilized for each coverage (24000, 62500, 100000, 250000, or other).

Comment - If relevant, any unique information concerning the collection of the data or the data itself.

3.2.2 GIS MAPS

Digital data sets are preferred for maps, diagrams, and plans; however, if hard copy is all that is available after exhausting options to generate digital data, then it must be submitted with a metadata statement or data description which, at a minimum, provides the following information (where applicable):

Horizontal datum – horizontal datum coordinates based on (NAD83).

Spatial Format –

Horizontal Coordinate System – NAD83 (CONUS)

Map Projection - Albers Conical Equal Area
Standard Parallel: 29.5
Standard Parallel: 45.5
Longitude of Central Meridian: -96
Latitude of Projection Origin: 23
False Easting: 0
False Northing: 0
Planar Distance Units: Meters
Horizontal Datum NAD83
Ellipsoid: GRS1980

Units – Units of measurement utilized.

Method - Method utilized to create data (i.e. digitized, DGPS data, freehand)

Statement of Accuracy - Statement of map accuracy or scale accuracy.

Data Description – Specific information describing the data. What project or activity was the data compiled for. If available, this description should also include SIC codes for specific type of feature or activity data were collected for.

Data Owner – Name of individual(s) and organization who created the data. This should include contact information allowing data users to contact the appropriate person(s) with specific questions concerning the data.

Date – When were the data compiled or determined (mm/dd/yy).

Base Map Description – If applicable, scale of base map data utilized.

Comment - If relevant, any unique information concerning the collection of the data or the data themselves.

3.2.3 GPS DATA COLLECTION

The requirements for horizontal and vertical GPS measurements are detailed below.

Horizontal Measurements
All horizontal geographic coordinate data will be provided in the following format:

> Individual coordinates will be provided as latitude and longitude in decimal degree format utilizing the NAD83 (CONUS) horizontal datum. Decimal accuracy is to be reported to a minimum of 6 decimals.

All horizontal geographic coordinate data shall be submitted with a metadata statement or data description that, at a minimum, provides the following information:

> Horizontal datum – horizontal datum coordinates based on (NAD83).
>
> Coordinate Format – decimal degree latitude and longitude.
>
> Method of Determining Coordinate - Method used to determine horizontal coordinates (i.e. differential GPS, raw uncorrected GPS, reported, extracted from map, unknown).
>
> Statement of Accuracy - Statement of how accurate the data are (i.e. 1-5 meter Circular Error Probability)
>
> Data Description – Specific information describing the feature location data was compiled for. What project or activity data was collected for? If available, this description should also include SIC codes for specific type of feature or activity data were collected for.
>
> Collector of Data – Name of individual(s) and organization who collected data. This should include contact information allowing data users to contact the appropriate person(s) with specific questions concerning the data.
>
> Date – When were the data collected or determined (mm/dd/yy).
>
> Source Map Description – If applicable, map type (i.e. usgs topo), map datum (horizontal and vertical), map date and map scale (24000, 62500, 100000, 250000, or other).
>
> Comment - If relevant, any unique information concerning the collection of the data or the data themselves.

Vertical Measurements

All vertical (elevation) geographic data will be provided in the following format:

Individual points of elevation will be reported in meters above mean sea level utilizing the NAV88 vertical datum. Decimal accuracy of reported data is dependant upon the method used to determine elevation. At a minimum, elevations will be reported to the nearest meter. If the data collection method provides additional accuracy (i.e. sub-meter or centimeter) data will be reported to the appropriate decimal accuracy to reflect the actual accuracy of data.

All vertical geographic data shall be submitted with a metadata statement or data description that, at a minimum, provides the following information:

Vertical Datum – horizontal datum coordinates based on (NAV88)

Elevation Units – meters

Elevation Format – height above mean sea level

Method of Determining Elevation - Method used to determine elevation (i.e. differential GPS, raw uncorrected GPS, reported, extracted from map, unknown).

Statement of Accuracy - Statement of how accurate the data is (i.e. sub-meter, centimeter)

Data Description – Specific information describing the feature elevation data was collected for. What project or activity the data was collected for. If available, this description should also include SIC codes for specific type of feature or activity data were collected for.

Collector of Data – Name of individual(s) and organization who collected data. This should include contact information allowing data users to contact the appropriate person(s) with specific questions concerning the data.

Date – When was the data collected or determined (mm/dd/yy).

Source Map Description – If applicable, map type (i.e. usgs topo), map datum (horizontal and vertical), map date, and map scale (24000, 62500, 100000, 250000, or other)

Comment – If relevant, any unique information concerning the collection of the data or the data itself.

3.3 Data Maintenance and Security

3.3.1 Data Maintenance

The analytical and GIS electronic data for this project will be stored on servers within the Local Area Network of the WESTON offices in Houston, TX. All hardcopies generated

during this project will be maintained ~~by WESTON~~by ~~in~~WESTON in Oklahoma City, Oklahoma. This information will be maintained for a period of 10 years from the date of acceptance of the final report by ODEQ. Electronic information will be maintained on the Houston servers for a period of one year after the conclusion of the project, after which time it will be transferred to optical media (CD-ROM or DVD). Copies of this media will be stored in the Oklahoma City office, the Houston office, in an off-site storage vault in Houston and will also be provided to ODEQ.

3.3.2 Data Security

The electronic data for this project will be protected from unauthorized use, loss and corruption by WESTON's corporate network security and backup procedures. The data will reside within the WESTON corporate network, which is protected by an industry-standard firewall. This firewall will prevent anyone who is not a WESTON employee from accessing the files. In the event that project information is published to a WESTON TeamLink(sm) site, it will be protected on that site by the TeamLink(sm) security. TeamLink security includes the use of Lotus Domino databases, the Secure Sockets Layer (SSL) security protocol and 128-bit encryption.

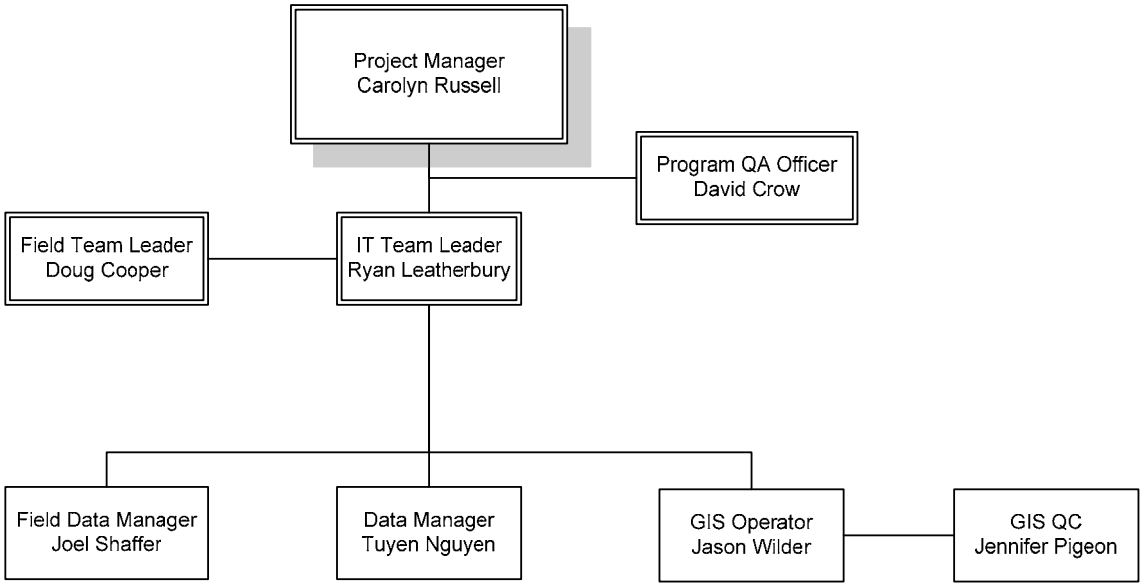
Information will be protected from loss and corruption by the WESTON Houston office's data backup procedures. These procedures include a weekly full backup of all data and daily incremental backups. Should any project information become corrupted, it will be retrievable from the previous evening's backup.

4. QUALITY CONTROL/ASSURANCE

To ensure the quality of data in both the project and GIS databases, quality control (QC) checkpoints have been defined throughout this data management plan.

WESTON's QC policy requires the Project Manager to assign a Quality Assurance (QA) Officer to the project. No project can be opened financially in the WESTON system until a QA Officer is assigned. Prior to delivery to ODEQ, both the project and GIS database will undergo a QA review to ensure that data is accurate and fully documented. Periodic internal QA audits are performed on project files to ensure QA reviews and documentation of QA reviews are in-place. It is the responsibility of Project Manager and Information Technology Lead to confirm that these checkpoints are being met.

Figure 4-1
Data Management Organization Chart



Contact	Information
Project Manager: Carolyn Russell Carolyn.Russell@westonsolutions.com	620 N. Robinson Suite 203 Oklahoma City, OK 73102 (405) 234-3818 (office)
IT Team Leader: Ryan Leatherbury Ryan.Leatherbury@westonsolutions.com	5599 San Felipe Suite 700 Houston, TX 77056 (713) 985-6736 (office)

APPENDIX A

ENVIRODATA V1.6 ELECTRONIC DATA DELIVERABLE FORMAT

Geotech
Computer Systems, Inc.

Data Management • GIS • Graphics • Internet

6535 S. Dayton St., Suite 2100
Englewood, CO 80111 USA
Phone: (303)740-1999
FAX: (303)740-1990

www.geotech.com

Laboratory Data Transfer Standard

Enviro Data® Version 1.6

Purpose

The purpose of this document is to provide a description of three related standard formats for laboratories and other data providers to use when creating electronic data deliverables (EDDs) for submitting data to be included in **Enviro Data**. These formats are intended to be flexible enough to accommodate the majority of the analytical and other technical evaluation and monitoring data for projects. At times there may be data that will not fit into this standard. In that case, the organization supplying that data should contact their project manager to discuss how data transfer can be accommodated. The outline for this dialogue is contained in a section below entitled Non-Conforming Data.

A primary design goal of these standard formats is that files in one of these formats can be created relatively easily using software tools available to those creating the files. If a data provider anticipates additional costs for providing data in one of the formats presented here, they must provide estimates of these additional costs to their project manager prior to finalization of contract terms, so that this information can be used in the vendor selection process.

Database Background Information

Data of concern for this standard includes **Sites** (facilities or projects), **Stations** (observation points), **Samples** (individual observation events), and **Analyses** (specific individual values from an event). The data being transmitted in one of the formats of this standard will be placed in two tables in **Enviro Data**. These tables are **Samples** and **Analyses**. Some of the entries in these tables must have values that match those in other tables, called lookup tables, coded values, or valid value lists. Information on how to match these values is included below, and typical coded entries are listed in Appendix A. Note that for the lookup data, in some cases it is the value that is reported and in others the code, based on common industry practice.

This document contains the description of the latest and most comprehensive DTS version, Version 1.6. Data for this version can be delivered in one of three file formats, tab-delimited ASCII, Excel spreadsheet, and Access relational, as described below. Older DTS versions 1.4 and 1.2a, and the very basic Simplified Import, are still supported, and contain progressively smaller subsets of the data in 1.6. Clients and data providers should agree on the version and format that best fits data availability and project needs. Geotech can provide descriptions of the less-comprehensive formats, however, it is usually best to use the most comprehensive format when possible to be prepared for unanticipated future needs.

Laboratories wanting to ensure that the values delivered in the EDD match those in their client's database should obtain the Laboratory Data Checker software from Geotech Computer Systems and compare EDDs against client data prior to issuing the data. For laboratories familiar with previous versions of the DTS, the changes made between Versions 1.4 and 1.6 are summarized in Appendix B.

Data Content

This section covers the content of the data being transmitted. The following section covers the format of that data. In this document the content is organized by the target table in the database and by the order of the fields in the file. In the text file and spreadsheet formats all of the content is in one structure. In the database format the content is separated into three tables. In the following descriptions, fields are described as "Optional" or "Required". These denote program requirements, usually resulting from relations with lookup tables. Clients should instruct the laboratories if any of the program "Optional" fields are required for a given project. For fields that are required, but the data is not known to the laboratory, a default value such as "Unknown" or "z" (a code often used for "Unknown") should be used. Which one to use depends on whether the field contains a value or code, as described for each field.

General comments on data content

This standard supports import of duplicate sample and reanalyzed analytical data into the database. Indicate the preferred sample and analysis by entering a 0 in the corresponding *DuplicateSample* and *Superseded* fields respectively. If more than one duplicate sample is being reported, increment the *DuplicateSample* field, i.e. 0, 1, 2, etc. and enter the appropriate *QCSampleCode* (See Appendix A). If more than one analysis is being reported, increment the *Superseded* field, i.e. 0, 1, 2, etc. and enter the appropriate code in the *ValueCode* field to designate reanalyzed, dilution, reextracted, etc. Important: These are two different things. The *DuplicateSample* field is used when more than one physical sample is taken in the field from the same station on the same date. The *Superseded* field is used when more than one result is reported for the same parameter for the same physical sample.

For laboratory control spike and matrix spike samples, include two records. In one record, include the measured spike concentration in the *Value* field, the measured units in the *ReportingUnits* field, and the spike concentration in the *SpikeAmount* field. In a second

record, report the recovery percent in the *Value* field and "%" in the *ReportingUnits* field. Moisture content should be reported as a separate analytical record, with the units in %. They should be entered on a "by weight" basis, based on total weight.

All dates should include four-character years.

Sites and Stations

SiteName - The name of the site (project, facility, etc.) from which the samples were taken. This field is required, and must match a site in the **Enviro Data** database. Required.

StationName - The name of the well, boring, etc. from which the sample was taken. The entry must match a station name in the client's **Enviro Data** database for the site name provided. Required.

Samples

A Sample is a unique sampling event for a station. Each station can be sampled at various depths (such as with a soil boring), at various dates (such as with a monitoring well), or, less commonly, both.

SampleDate_D - The date on which the sample was taken. Required.

SampleTypeCode - This is a code for the type of sample. Entries are compared to the **SampleTypes** look-up table in the database. If this information is unavailable to the lab, "z" should be reported. Required.

SampleMatrix - The material that the sample is primarily composed of. Provide the full sample matrix name, such as "Water". Required.

SampleTop and *SampleBottom* - Soil sample depths or elevations, as instructed by the client. The fields should contain only numeric values. If these fields are not applicable (i.e. water samples) or are unknown to the laboratory, then they should be populated with zeros, for compatibility with ODBC databases. Required.

DepthUnits - Units for sample top and sample bottom. This is a coded field that is linked to the **ReportingUnits** lookup table. If this information is unavailable to the lab, "Unknown" should be reported. These units can be entered into the import file by a Data Administrator. Required.

DuplicateSample - This field was discussed above. It should be a zero unless this is a duplicate sample. All analyses must have an entry for this field, with multiple QC samples entered as values incremented from one. Required.

Extracted - Is this an extracted sample? Optional.

FieldSampleID - The client-assigned field ID number for each sample. Required. If this information is not available, enter "Unknown" or "None".

LabSampleID - The sample identification number used internally by the laboratory. Required. If this information is not available, enter "Unknown" or "None".

AltSampleID - Another sample identification number if needed. Optional.

CoolerID - Number to identify cooler in which primary samples and QC samples were shipped. Optional.

Sampler - Person taking the sample. Optional.

Description - Description of the sample, such as its condition. Optional.

WeightVolume - The weight or volume of the sample submitted to the laboratory in agreed-upon units, such as liters or kilograms. Optional.

SampleMethodCode - Coded value for the method used to collect the sample. Entries are compared to the **SamplingMethod** look-up table in the database. Required

LogCode - Coded value identifying the company collecting samples or performing field tests. Optional.

COCNumber - Chain-of-Custody tracking number. Optional.

DeliveryGroup - Sample delivery group. This field is provided for use as a lab tracking field. It is used to define a group of reported together. Optional.

AmbientBlankLot - Ambient blank field lot identifier. Optional.

EquipmentBlankLot - Equipment blank field lot identifier. Optional.

TripBlankLot - Trip blank field lot identifier. Optional.

FilteredSample - Filter information at the sample level. Was the sample filtered, and if so, what size filter was used? It could also be used to identify whether the filtering occurred in the field or the lab. Entries are compared to the **Filtered** look-up table in the database. The lab can supply either the code or the Filter description, whichever is most consistent with their system (i.e. TOT vs. total), but must coordinate this with the client. Required.

QCSequenceID - QC sequence identifier. This field is another lab tracking field, used to relate field samples to lab samples. Optional.

QCSampleCode - Code to identify QC samples. It ties to the **QCCodes** table, which contains codes for both the sample and analysis levels. The lab should supply the code if available, e.g. DUP for duplicate sample, or O for original sample. If this information is not available to the lab, enter "z" for Unknown. Required.

TaskNumber - The administrative task number under which sampling is done. Optional.

PrimarySample - Stores the Field Sample ID of the primary sample to which the QC sample is tied. This field is blank for original samples, may be blank for field QC samples that have been submitted blind to the lab. This number can be entered into the temporary import table by a Data Administrator. The import routine converts this to the sample number of the primary sample before storing it in the database. Optional.

SampleResult - The result of the sampling process, such as "Successful", "Dry", or "No access". It's primary use is to indicate that obtaining a sample was attempted unsuccessfully. If not available from the lab, this field can be entered into the temporary import table by a Data Administrator. Optional.

If a sample was attempted unsuccessfully, the sample fields should be filled in, however all fields associated with analyses, including parameter name, CASNumber and AltParamNumber, should be left blank. The system will then import the sample information, but not create any analyses records.

LabRecvDate_D - Date (and optionally time) on which the lab received the sample. Optional.

Analyses

An Analysis, as used in this document and in the **Enviro Data** data management system, is the observed value of a parameter related to a sample. This term is intended to be interpreted broadly, and not to be limited to chemical analyses. For example, field parameters such as "pH", "temperature", and "turbidity" also are considered analyses.

ParameterName, CASNumber, AltParamNumber - Various combinations of these fields are used to identify the name of the parameter (constituent) analyzed for. *ParameterName* should be always be provided. The system compares *ParameterName* to the entries in the **Parameters** and **ParameterAlias** lookup tables. *CASNumber* and *AltParamNumber* are not required, but should be provided if possible to help ensure the correct parameter name assignment. If *ParameterName* does not match a lookup entry, the system compares either the *CASNumber*, or the *AltParamNumber* (frequently used for STORET codes), to **Parameter** table entries. Care should be taken that consistent numbers be provided. If *ParameterName* is left blank, but a *CASNumber* or *AltParamNumber* is provided, the system assigns a parameter name from the lookup tables based on a number match. Using only numbers to designate the parameter is not recommended.

Superseded - This field is discussed above. It should be a zero unless the analysis is superseded by a later value in the same file, in which case the entry should be 1. This field is used in conjunction with the *ValueCode* field, discussed later in this section. All analyses should have an entry. Required.

AnalyticMethod - Method used to perform the analysis. Optional.

Value - Measured result of the analysis. Optional, but should almost always be provided unless the constituent was not detected.

ReportingUnits - Units of the analysis. The entry provided should be the full abbreviation, such as "mg/l". Entries must match an entry in the **ReportingUnits** lookup table in the database. Detection limits and radiologic error must be reported in the same units as the value. Required.

FlagCode - One to four coded entries for the analytical flag describing the analysis. Each character in the field must match an entry in the **AnalyticFlags** lookup table in the database. More than one flag can be entered. For example, if "b" (detected in blank) and "j" (estimated value) are both entered in the lookup table, then "bj" can be entered as an analytic flag (estimated value, detected in blank). If the analysis is considered a usable value, and would not otherwise have a flag, this field should contain the code for Detected Value (usually a "v"). If the flag is unknown, the field should contain a "z". Required.

ProblemCode - Analytic problems are usually described in the narrative, and not included in the electronic format. If this field data is not provided, the field should contain a "z" for unknown. If the laboratory chooses to supply problems in the electronic file, then the codes must match entries in the **AnalyticProblems** table. As with the *FlagCode* field, the entry can consist of from one to four approved codes. Required.

ValidationCode - One to four flags associated with validation of analyses. The data validation organization usually provides this field, which can contain from one to four of these codes. Others should place a "z" for Unknown in this field. If the laboratory chooses to supply validation flats in the electronic file, then the codes must match entries in the **ValidationFlags** table. Required.

DetectedResult - Supplied by the lab, this field should contain either "y" for yes, the analyte was detected, or "n" for no, the analyte was not detected. This field overlaps slightly with FlagCode. The purpose of this field is to separate the non-detect flag from other lab qualifiers, such as "j" or "b", for statistical, evaluation and validation purposes. Optional.

Detect - First (primary) detection limit for the analysis. Detection limits must be reported in the same units as the value. Optional.

LimitType - Type of limit contained in the Detect field, such as "MDL", "PQL", "RL", etc. Optional.

Detect2 - A second detection limit. Standards should be set for which type of limit should be entered in each field for a given site, for example: IDL or MDL in the first column, CRDL or PQL in the second. Optional.

LimitType2 - Limit type for second detection limit. Optional.

Detect3 - A third detection limit. Optional.

LimitType3 - Limit type for third detection limit. Optional.

SpikeAmount - Spike amount added to the sample. Should be reported in the same units as the Value. Used only for spiked analyses. Optional.

RetentionTime - Retention time for this analysis. Optional.

Error - Standard error for radioactivity measurements. Optional.

DilutionFactor - Amount that the sample was diluted prior to analysis. Optional.

Basis - Analyzed wet or dry. Should be "w" for wet or "d" for dry. Can also report "n" for not applicable, or "z" for unknown. Required.

FilteredAnalysis - Filter or measure basis information at the analysis level. Entries are compared to the **Filtered** look-up table in the database. As with the *FilteredSample* field, the lab can supply either the code or the description for this field. Required.

LeachMethod - Method used to leach sample. Entries are compared to the **LeachMethod** lookup table to maintain consistency. Lab should supply the full name of the method, e.g.: TCLP. If the analysis was not leached, "None" should be reported. Required.

PrepMethod - Method used to prepare sample separate from leaching. Optional.

PreparationLot - The batch designator of an autonomous group of environmental samples and associated QC samples prepared together. Optional.

ReportableResult - Flag for whether the result is to be used in reports. Report "Y" for yes, or "N" for no. Reported by labs or selected by Project Managers for multiple analyses from a selected sample, such as analyses at multiple dilutions. Optional.

AnalDate_D - Date (and optionally time) on which the analysis was performed. Optional.

ExtractDate_D - Date (and optionally time) on which the material was extracted for analysis. Optional.

LabReportDate_D - Date (and optionally time) on which the lab reported the analysis. Optional.

Lab - Name of the laboratory performing the analysis. Optional.

LabComments - Lab comments about this analysis. Optional.

AnalysisLabID - Lab identification number at the analysis level. LabSampleID tracks lab analyses at the sample level. This field is for identification numbers at the analysis level. Optional.

AnalyticalBatch - Lab batch identification number. Optional.

ValueCode - Parameter value classification. This field identifies the analytical trial, and supplies the reason for a superseded analysis. It is a coded entry enforced by the **ValueCode** lookup table. The lab should report the code, such as "RE" for re-extracted, "DL" for dilution, etc., or "O" for original analysis. Required.

RunCode - Confirmation run identification. This is a coded entry enforced by the **RunCode** lookup table. The lab should supply the code, such as "PR" for primary run, "n" for not applicable, or "z" for Unknown. Required.

QCAnalysisCode - QC code at the analysis level. It ties to the **QCCodes** table, which contains codes for both the sample and analysis levels. The lab should supply the code for this field, such as "TIC" for tentatively identified compound, or "O" for original analysis. Required.

AnalysisGroup - Group of methods for this analysis. Optional.

Acceptable File Formats

Enviro Data will accept three file formats when receiving laboratory data for inclusion in the database.

Flat ASCII File Format

The simplest format for data delivery under this standard is in a flat ASCII file with tab delimiters. The file must contain specific data elements as described above in the particular order described below. All modern word processors, spreadsheets, and database manager programs can save data in this format without special programming. There are three components to a text file: encoding, structure and content. Each of these components is described in the following sections.

Encoding

ASCII (American Standard Code for Information Interchange, pronounced "ask-ee") is a character-encoding scheme that allows letters, numbers, punctuation, and other characters to be stored in computer files. All modern computer systems can accommodate this format. The first seven bits (128 characters) of this eight-bit code are well defined and are platform-independent. **Enviro Data** will accept ASCII files using this "low bit" character set if it contains the data elements as described in the following paragraphs. In most cases, if the "Save as ASCII" or "Save as Text" option is used in saving the file, it will be saved with the proper encoding.

Structure

The file should have each observation on a line in the file followed by a line delimiter (sometimes called a paragraph mark, ASCII 13 followed by ASCII 10). Within each line, the file should have each data element (which corresponds to a field in a database manager or a cell in a spreadsheet) in the order specified below. Each data element should be separated by an ASCII Tab character (09). A text data element can be shorter than the specified length but not longer.

Content

The ASCII text file must have the following columns present in the order shown, and the fields marked as required (bold text) must be populated. The file should have the first line in the file be the first line of data. The file should not have the field names in the first record.

Field Name	Data Type	Field Size [6]	Description	Table [9]
SiteName[1]	Text	50	Site Name	Sites
StationName	Text	50	Station identifier or name	Stations
SampleDate_D	Date/Time		Date sample was taken	Samples
SampleTypeCode	Text	5	Type of sample	Samples
SampleMatrix	Text	15	Sample matrix	Samples
SampleTop[2]	Number(Sg) [3]		Sample top	Samples
SampleBottom	Number(Sg)		Sample Bottom	Samples
DepthUnits	Text	15	Units for sample top and sample bottom	Samples
DuplicateSample	Number(Int) [4]		Duplicate samples[7]	Samples
Extracted	Text	1	Is this an extracted sample?	Samples
FieldSampleID	Text	40	Client assigned field sample ID	Samples
LabSampleID	Text	40	Lab sample ID	Samples

AltSampleID	Text	40	Alternate sample identification	Samples
CoolerID	Text	40	Cooler ID number - for QA/QC	Samples
Sampler	Text	50	Name of person taking sample	Samples
Description	Text	50	Sample description	Samples
WeightVolume	Number(Sg)		Weight or volume of the sample	Samples
SampleMethodCode	Text	4	Code for method used to collect the sample	Samples
LogCode	Text	4	Company obtaining samples or field results	Samples
COCNumber	Text	40	Chain-of-custody number	Samples
DeliveryGroup	Text	25	Sample delivery group	Samples
AmbientBlankLot	Text	8	Ambient blank field lot identifier	Samples
EquipmentBlankLot	Text	8	Equipment blank field lot identifier	Samples
TripBlankLot	Text	8	Trip blank field lot identifier	Samples
FilteredSample	Text	20	Filter size	Samples
QCSequenceID	Text	40	QC sequence identifier	Samples
QCSampleCode	Text	3	QC code for this sample	Samples
TaskNumber	Text	40	Task number under which sampling is done	Samples
PrimarySample	Text	40	Primary sample to which QC sample is tied	Samples
SampleResult	Text	255	Result of attempted sampling	Samples
ParameterName	Text	60	Name of material analyzed for	Analyses
CASNumber	Text	20	CAS number of material analyzed for	Analyses
AltParamNumber	Text	20	Alternative number for parameter	Analyses
Superseded	Number(Int)		Analysis superseded by re-analysis? [8]	Analyses
AnalyticMethod	Text	40	Method for performing analysis	Analyses
Value	Number(Sg)		Value measured during analysis	Analyses
ReportingUnits	Text	15	Units of the analysis	Analyses
FlagCode	Text	4	Data qualifier	Analyses
ProblemCode	Text	4	Problems encountered during analysis	Analyses
ValidationCode	Text	4	Code from data validation	Analyses
DetectedResult	Text	1	Was analyte detected	Analyses
Detect	Number(Sg)		Detection limit	Analyses
LimitType	Text	4	Detection limit type	Analyses
Detect2	Number(Sg)		2nd detection limit	Analyses
LimitType2	Text	4	2nd detection limit type	Analyses
Detect3	Number(Sg)		3rd detection limit	Analyses
LimitType3	Text	4	3rd detection limit type	Analyses
SpikeAmount	Number(Sg)		Spike amount added to the sample	Analyses
RetentionTime	Number(Sg)		Retention time for this analysis	Analyses
Error	Number(Sg)		Error range for this analysis	Analyses
DilutionFactor	Number(Sg)		Dilution factor	Analyses
Basis	Text	1	Analyzed wet or dry	Analyses
FilteredAnalysis	Text	20	Filter/measure basis at analytical level	Analyses
LeachMethod	Text	20	Leaching method	Analyses
PrepMethod	Text	40	Lab preparation method	Analyses
PreparationLot	Text	10	Batch designator for samples and assoc. QC	Analyses
ReportableResult	Text	1	Designates analysis as reportable result	Analyses
AnalDate_D	Date/Time		Date the analysis was performed	Analyses
ExtractDate_D	Date/Time		Date the extraction was performed	Analyses
LabReportDate_D	Date/Time		Lab analysis reporting date	Analyses
LabRecvDate_D	Date/Time		Date the lab received the sample	Samples
Lab	Text	20	Name of lab conducting analysis	Analyses
LabComments	Text	50	Lab comments about this analysis	Analyses
AnalysisLabID	Text	40	Lab identification number for analysis	Analyses
AnalyticalBatch	Text	40	Lab batch ID number	Analyses
ValueCode	Text	6	Differentiates between different results	Analyses
RunCode	Text	5	Run code for GC analyses	Analyses
QCAnalysisCode	Text	3	QC code for this analysis	Analyses
AnalysisGroup	Text	20	Group of methods for this analysis	Analyses

[1] Field names in **bold** are required fields. The others may be blank.
[2] SampleTop and SampleBottom are required. Numbers for depth or elevation should be entered for soil analyses, they should be zero if not applicable.
[3] (Sg) Single-precision floating point numbers. A Single variable is stored as a 32-bit (4-byte) number that can be reported with up to 7 significant figures.
[4] (Int) A number ranging from -32,768 to 32,767.
[5] (Lg) Stores numbers from -2,147,483,648 to 2,147,483,647 (no fractions).
[6] Character width for text fields. Does not apply directly to numbers.
[7] Numbered values for duplicate samples, with 0 for preferred sample, increasing by one for each additional value. Must fill in all duplicates or none.
[8] Numbered values for superseded analyses, with 0 for current analysis, increasing by one for each older value.

[9] Database table to receive data, either directly or after converting using a lookup table.

Spreadsheet Format

The **Enviro Data** spreadsheet format contains the same data as the ASCII format, but the data is contained in the format of a spreadsheet program. The spreadsheet selected for this standard is Microsoft Excel for Office 2000. Other brands of spreadsheet programs can save their files in Excel format. The spreadsheet file should contain all of the data on the first sheet. Each row should represent one observation (such as the value of a chemical analysis) and each column a data item for that observation. The first row of the file must contain the field names as listed in the above table. The spreadsheet file must contain the above columns in the order shown, and the fields marked as required (bold text) must be populated. Geotech provides a spreadsheet with the software that can be used as a template.

Database Format

The **Enviro Data** database format contains the same data as the previous two formats, but the data is contained in a database file, with the data elements split into several different tables. The client anticipates that more sophisticated data providers will use this format, especially for large data sets. It is a more efficient way of storing and transferring data because it minimizes data redundancy. This also helps reduce errors caused by minor variations in data content such as spelling and punctuation of the data elements.

The database selected for this format is Microsoft Access 2000. The file submitted should have the following tables and fields. Some of the fields are Key Fields, which means that they are used to relate data in one table to data in another. For example, the *StationNumber* field is contained in both the **Stations** and **Samples** tables. Samples can be related to their respective stations with this number. The actual value of the numbers are not significant to **Enviro Data**, since the values themselves will not be imported, but the numbers must be consistent between the tables within each database file submitted. The data file must have the fields present in the order shown, and the fields marked as required must be populated.

Stations

Field Name	Data Type	Record Size[8]	Description	Relationships
StationNumber[1]	Number(Au)[2]		Unique station number generated by system	Samples
StationName	Text	50	Station identifier or name	
SiteName	Text	50	Site Name	Sites

Samples

Field Name	Data Type	Record Size[8]	Description	Relationships
SampleNumber[1]	Number(Au)[2]		Unique sample number generated by system	Analyses
StationNumber	Number(Lg)[3]		Foreign key linking to Stations table	Stations
SampleDate_D	Date/Time		Date sample was taken	
SampleTypeCode	Text	5	Type of sample	SampleTypes
SampleMatrix	Text	15	Sample matrix	SampleMatrix
SampleTop	Number(Sg)[4]		Sample top	
SampleBottom	Number(Sg)		Sample Bottom	
DepthUnits	Text	15	Units for sample top and sample bottom	ReportingUnits

DuplicateSample	Number(Int) [5]		Duplicate samples[7]	
Extracted	Text	1	Is this an extracted sample?	
FieldSampleID	Text	40	Clieant assigned field sample ID	
LabSampleID	Text	40	Lab sample ID	
AltSampleID	Text	40	Alternate lab sample ID	
CoolerID	Text	40	Cooler ID number - for QA/QC	
Sampler	Text	50	Name of person taking sample	
Description	Text	50	Sample description	
WeightVolume	Number(Sg)		Weight or volume of the sample	
SampleMethodCode	Text	4	Code for method used to collect the sample	SampleMethod
LogCode	Text	4	Company obtaining samples or field results	
COCNumber	Text	40	Chain-of-custody number	
DeliveryGroup	Text	25	Sample delivery group	
AmbientBlankLot	Text	8	Ambient blank field lot identifier	
EquipmentBlankLot	Text	8	Equipment blank field lot identifier	
TripBlankLot	Text	8	Trip blank field lot identifier	
FilteredSample	Text	20	Filter size	Filtered
QCSequenceID	Text	40	QC sequence identifier	
QCSampleCode	Text	3	QC code for this sample	QCCode
TaskNumber	Text	40	Task number under which sampling is done	
PrimarySample	Text	40	Primary sample to which QC sample is tied	
SampleResult	Text	255	Result of attempted sampling	

Analyses

Field Name	Data Type	Record Size[8]	Description	Relationships
SampleNumber[1]	Number(Lg) [3]		Foreign key linking to Samples table	Samples
ParameterName	Text	60	Name of material analyzed for	
CASNumber	Text	20	CAS number of material analyzed for	
AltParamNumber	Text	20	Alternative number for parameter	
Superseded	Number(Int) [5]		Analysis superseded by re-analysis? [6]	
AnalyticMethod	Text	40	Method for performing analysis	
Value	Number(Sg) [4]		Value measured during analysis	
ReportingUnits	Text	15	Units of the analysis	ReportingUnits
FlagCode	Text	4	Data qualifier	AnalyticFlags
ProblemCode	Text	4	Problems encountered during analysis	AnalyticProblems
ValidationCode	Text	4	Data validation code	ValidationFlags
DetectedResult	Text	1	Was analyte detected	
Detect	Number(Sg)		Detection limit	
LimitType	Text	4	Detection limit type	
Detect2	Number(Sg)		2nd detection limit	
LimitType2	Text	4	2nd detection limit type	
Detect3	Number(Sg)		3rd detection limit	
LimitType3	Text	4	3rd detection limit type	
SpikeAmount	Number(Sg)		Spike amount added to the sample	
RetentionTime	Number(Sg)		Retention time for this analysis	
Error	Number(Sg)		Error range for this analysis	
DilutionFactor	Number(Sg)		Dilution factor	
Basis	Text	1	Analyzed wet or dry	
FilteredAnalysis	Text	20	Filter/measure basis at analyitcal level	Filtered
LeachMethod	Text	20	Leaching method	LeachMethod
PrepMethod	Text	40	Lab preparation method	
PreparationLot	Text	10	Batch designator for samples and assoc. QC	
ReportableResult	Text	1	Designates analysis as reportable result	
AnalDate_D	Date/Time		Date the analysis was performed	
ExtractDate_D	Date/Time		Date the extraction was performed	
LabReportDate_D	Date/Time		Date lab reported the analysis	
LabRecvDate_D	Date/Time		Date the lab received the sample	
Lab	Text	20	Name of lab conducting analysis	
LabComments	Text	50	Lab comments about this analysis	
AnalysisLabID	Text	40	Lab identification number for analysis	
AnalyticalBatch	Text	40	Lab batch ID number	
ValueCode	Text	6	Differentiates between different results	ValueCode

RunCode	Text	5	Run code for GC analyses	RunCode
QCAnalysisCode	Text	3	QC code for this analysis	QCCode
AnalysisGroup	Text	20	Group of methods for this analysis	

[1] Field names in **bold** are required fields. The others may be blank.
[2] (Au) Number automatically assigned by the system.
[3] (Lg) A four-byte integer (a whole number between -2,147,483,648 and 2,147,483,647, inclusive)
[4] (Sg) Single-precision floating point numbers. A Single variable is stored as a 32-bit (4-byte) number that can be reported with up to 7 significant figures.
[5] (Int) A number ranging from -32,768 to 32,767.
[6] Numbered values for superseded analyses, with 0 for current analysis, increasing by one for each older value
[7] Numbered values for duplicate samples, with 0 for preferred sample, increasing by one for each additional value.
[8] Character width for text fields. Does not apply directly to numbers.

Submittal Requirements

File Names

Files submitted for import into **Enviro Data** should be given names that describe the contents and format of the file, such as "Rad Industries Sampling March 1997.MDB". The name should include a site name, supplied by the project manager or their consultant, and the date the file is issued. In keeping with the DOS/Windows tradition of using a three-character file extension to describe the file type, the following extensions should be used for the three supported file formats:

File Type	Extension
Flat ASCII Files	.TXT
Spreadsheet Files	.XLS
Database Files	.MDB

When the data is submitted, documentation about the data content and format of each file should accompany the submitted disk, such as on the disk label or in the accompanying email.

Delivery Media and Formats

The client is prepared to receive data in a variety of media and standard formats, and these formats can be expected to change and evolve over time. Submitters should communicate with their project manager prior to delivering data about the best format for the type and volume of data to be delivered. At a minimum, we will accept data in these media and formats:

- 1.44 megabyte floppy disks in DOS/Windows format. Data that will not fit on one diskette can be compressed and, if necessary, split onto more than one diskette using WinZip or compatible software as a file with an extension of .ZIP containing a file with one of the above formats and extensions.
- CD-ROM in ISO 9660 or compatible format.

Delivery via electronic mail, compressed or uncompressed, is acceptable, subject to approval by the project manager.

Consistency of Content

It is very important for data submitters to submit consistent data. Data elements must be entered exactly the same way from submittal to submittal. For example, if a well was

called "MW-1" in a previous submittal, then it must be called "MW-1" in all subsequent submittals, not "MW 1" or "Mw-01". Data items such as station names are used to associate the data from the current submittal with data previously submitted. If the spelling is changed, the association will not be successful. In this example, if the laboratory or consultant suspects that the sampler may have inadvertently misnamed a well (e.g. Mw-01 or MW 1 instead of MW-1), the laboratory or contractor should contact the sampler or project manager and correct the data before submitting the data set.

Another example of consistency of content is the spelling of chemical analytical compounds (parameter names). Data elements must be entered exactly the same way from submittal to submittal. If the spelling is changed without instructions from or notification to the client, the association on import will not be successful. A standardized list of parameter names should be provided to laboratories that supply data to the client, and these are the names that should be used. This can be easily done with **Enviro Data** using the reference file system, and the laboratory can use the **Enviro Data** data checker version to check for consistency prior to issuing the EDD.

This system is also designed to promote consistency between the different labs and projects, however, if for project reasons the names cannot be kept consistent, the client has the ability to alias parameter names. This list can also be supplied to the laboratories.

Coded Entries

In order to foster consistency in the database, a number of data elements in the database tables are Coded. This means that each of these data items must contain one of a list of values. Examples of coded entries that are supplied by the laboratory include *Analyses.ProblemCode*, *Analyses.FlagCode*, and *Analyses.ValidationCode*. These codes describe problems encountered during the analysis, the data qualifier, and the validation data qualifier, respectively. There are a limited number of analytical problems and flags describing an analysis, so codes are used to represent each choice. Example lists of the codes to be used are attached in Appendix A, but this information can be expected to change over time and from project to project.

Non-Conforming Data

The purpose of this DTS is to facilitate the accurate transfer of data by providing a standard format for data delivery. It is our intention that this format be flexible enough to accommodate the majority of the analytical data for most projects. There may at times be data that will not fit into this standard. In that case, the organization with the data should contact their project manager to begin a dialogue about how that data can be accommodated. The outline for this dialogue is contained in this section.

When data is identified which does not appear to easily conform to one of the formats of this DTS, there is a four-step process that should be followed to determine how to handle this data:

1. **Determine whether the data is really non-conforming.** This DTS was designed to accommodate a wide variety of different types of site analytical and other data.

Someone knowledgeable about the data to be transferred and someone knowledgeable about the **Enviro Data** database management system should jointly try to fit the data to the transfer standard. The effort expended in this dialogue should be commensurate with the value of the data to the project. Any decisions made about necessary compromises, or other changes to make the data fit the standard, should be made with great concern for preserving the quality and integrity of the data.

2. **If the data is found to be non-conforming, determine how important it is to have it in the database.** If the data is significant to the management of the project, and must be viewed in relationship to other project data or to data in other projects, then it should be placed in the data management system. If the data is of a supporting nature, but will not be used in combination with other data, then it should be archived in the format provided and effort should not be expended in fitting it into the database system. Often the answer to these questions will not be a simple "yes" or "no". In that case, the decision on whether to integrate the data into the database will need to take into consideration the cost of integrating the data.
3. **Determine the cost to integrate the data.** Adding data to the data management system that does not fit into the structure of the existing tables can be costly. Tasks which must be performed in order for this integration to be successful include analysis of the data, modification of the data model, creation of editing screens, queries and reports, and, sometimes, modification of the menu system and other user interface components. These modifications can, in some cases, adversely affect other users.
4. **Modify the data management system as necessary.** If the value of the data to be integrated (or, more precisely, the value of the use of the data in the data management system) exceeds the cost to integrate it, then resources should be allocated to performing the integration, and the integration performed.

Appendix A - Coded Entries

This section contains example lists of data values for use in transferring data into the **Enviro Data** database. In the EDD, some values should match a code, others should match the data value. Each of the following lists contains either the data values, or the data values and the codes that represent them, depending on which is to be delivered in the EDD. The coded fields are indicated by "code" at the end of the field name. The example entries for each field are given below. The values for each data field are based on industry practice. There will be times when values required by the system will not be known to the data provider. We have attempted to standardize, where possible, the 'z' code to Unknown, and the 'n' code to "None" or "Not Applicable", to use in these situations.

Your clients should make an effort to have these tables contain an extensive list of the codes that will be used in connection with the data. Labs should request approved codes from their clients, or a lab reference file, which can be created using the **Enviro Data** software. Data submitters and database users should use these codes whenever possible. Where it is not possible to use an existing code because a different value is needed, this information should be provided to the client representative or data administrator before the data is submitted or entered. The decision to add a new code should not be taken lightly. This must be balanced with the need to accurately represent in the database what actually happened in the field or laboratory.

SiteName - This is not a coded value, but still must match the list provided by the client.

StationName - This is not a coded value, but still must match the list provided by the client.

SampleTypeCode - Type of sample:

Sample Type Code	Sample Type
c	Composite
d	Disturbed
g	Grab
s	Discrete
u	Undisturbed
z	Unknown

SampleMatrix - Matrix of sample:

Sample Matrix
Air
DNAPL
Gas
Leachate
Sediment
Sludge
Other
Petroleum
LNAPL

Reagent
Soil
Water
Waste
Unknown

SampleMethodCode -

Sample Method Code	Sample Method
as	Automatic sampler
ba	Bailer
bp	Bladder Pump
Gb	Grab
Pe	Peristaltic Pump
sp	Spigot
Ss	Stainless steel bucket
Su	Submersible Pump
z	Unknown

LogCode - The contents of this field will vary from project to project.

FilteredSample and ***FilteredAnalysis*** link to the *Filtered* lookup table.

FilteredCode	FilteredDescrip
DIS	Dissolved
CLF	Clay fraction
F1	Field - unknown
F45u	Field 0.45u
FIL	Filtered
L1	Lab - unknown
L5u	Lab 5u
N	Not applicable
TOT	Total
TRC	Total Recoverable
z	Unknown

QCSampleCode and ***QCAnalysisCode*** link to the **QCCodes** lookup table, which contains codes for both the sample and analysis levels.

QC Code	QC Type	QCScope
AB	Ambient blank	Samples
DUP	Field duplicate	Samples
EB	Equipment blank	Samples
FB	Field blank	Samples
FR	Field replicate	Samples
FS	Field sample spike	Samples
MS	Matrix spike	Samples
MSD	Matrix spike duplicate	Samples

NQ	Not a QC item	Samples
O	Original data	Not applicable
PE	Performance evaluation	Samples
RB	Rinsate blank	Samples
RD	Referee duplicate	Samples
RM	Reference material	Samples
RMD	Reference material dup	Samples
SP	Split samples	Samples
SPD	Split-duplicate samples	Samples
TB	Trip blank	Samples
SUR	Surrogate spikes	Analyses
TAR	Target compound	Analyses
TIC	Tentatively identified	Analyses
Z	Unknown	Not applicable

ParameterName, CASNumber, AltParamNumber - AltParamNumbers may be Storet codes, or other codes decided on between the laboratory and the client. Contact your project manager for a current project parameters list. Do not make up CAS numbers for parameters for which CAS does not provide them. Due to the number of possible parameters and the great variability from project to project, the following list contains examples only.

Parameter Name	CAS Number
1,1,1,2-Tetrachloroethane	630-20-6
1,1-Biphenyl, Dimethyl-	
1,2,4-Trichlorobenzene	120-82-1
1,2-Dibromo-3-chloropropane	96-12-8
2,3,4,6-Tetrachlorophenol	58-90-2
2,3,7,8-TCDD C13 (surrogate)	
2,4,5-T	93-76-5
2,4-D	94-75-7
2,4-DB	
2-Hexanone	591-78-6
4,4'-DDD	72-54-8
4,6-Dinitro-2-methylphenol	534-52-1
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Acetone	67-64-1
Acidity	
Aldrin	309-00-2
Alkalinity (as CaCO3)	
Aluminum	7429-90-5
Ammonia	
Aramite	140-57-8
Aroclor-1016	12674-11-2
Aroclor-1221	11104-28-2
Arsenic	7440-38-2
Barium	7440-39-3
Benz(a)anthracene	56-55-3
Benzene	71-43-2
Benzene, Trimethyl-	25551-13-7
Benzoic acid	
Bicarbonate	
Biochemical oxygen demand	
Chemical oxygen demand	
Chloride	
Chlorinated Hydrocarbons	
Chromium	7440-47-3
Corrosivity PH	l50-50-5
Cyanide	
Endosulfan I	959-98-8
Endosulfan II	33213-65-9
Endosulfan Sulfate	1031-07-8
Field Conductivity	
Field pH	
Field turbidity	
Floaters	
Gross Alpha	
Gross Beta	
Groundwater Elevation	
Hardness (as CaCO3)	
Ignitability	
Indene	95-13-6
Iron	7439-89-6
Laboratory conductivity	
Laboratory pH	
Laboratory Temperature	
Lead	7439-92-1
Methyl yellow	60-11-7
Nitrate	
Nitrate/Nitrite	7727-37-9
Nitrite	
No. 6 Fuel Oil C12-C24	
o,o,o-Triethylphosphorothioate	126-68-1
Oil and grease	
Ortho-Phosphate	
Other Gamma	
Pb-210 - insoluble	
Pb-210 - soluble	
Percent moisture	
Pet. Hydrocarb.	
Phenol	108-95-2
Phenol-D5 (surrogate)	4165-62-2
Pyridine	110-86-1
Quinoline	91-22-5
Ra-224 - insoluble	
Ra-224 - soluble	

Ra-224 - Total	
Reactive Cyanide	
Reactive Sulfide	
Sinkers	
Temperature	
Tin	7440-31-5

Total Dissolved Solids	
Total Organic Carbon	
Total phenols	
Zinc	7440-66-6

ReportingUnits and ***DepthUnits*** - link to the ReportingUnits lookup table. Units of measure for depths or analyses.

Reporting Units
s.u.
umhos/cm
Deg C
days
Deg F
ft
fmsl
hours
in
ppb
ppm
mg/kg
mg/l
ms/cm
meters
NTUs
Other
%
pCi/g
pg/l
pCi/l
mmhos/m
um/cm
ug/g
ug/kg
ug/l
uS/cm
weeks
ug/filter
Unknown

FlagCode - This field can contain up to four coded entries for the flag describing the analysis.

Flag Code	Flag
*	Surrogate outside QC limits
a	Not available
b	Analyte detected in blank and sample
c	Coelute
d	Diluted
e	Exceeds calibration range
f	Calculated from higher dilution
i	Insufficient sample
j	Est value: concentration <quan. limit
m	Matrix interference
q	Uncertain value
s	Surrogate
u	Not detected
v	Detected value
z	Unknown

AnalyticProblems lookup table.

Problem Code	Analytic Problem
a	Exceeds holding time
b	< cont lim, > inst lim
d	Percent RPD criteria not met
e	Exceeds extr holding time
g	Cooler above 10°C
h	Cooler above 4°C
I	Interference
k	Bottle broke; resample value
m	Matrix effect
n	No problems
o	Spike not in control limit
p	Zero headspace not achieved
r	Re-extracted
s	Meth of std additions
t	Diluted
v	Est because of interference
z	Unknown

ValidationFlags - Coded flags associated with validation of analyses.

Validation Code	Flag
a	Anomolous data
j	Estimated data, useable value
r	Rejected data
u	Not detected due to contamination
z	None

LeachMethod - Method used to leach the sample.

LeachMethod
None (default)
TCLP
SPLP
Unknown

ValueCode - lookup table.

ValueCode	Explanation
RA	Re-analyzed
RE	Re-extracted and re-analyzed
RE2	Second re-extraction and re-analysis

DL	Dilution run
DL2	Second dilution run
REDL	Re-extraction of a diluted sample
N	None
O	Original analysis
Z	Unknown

RunCode lookup table.

RunCode	**Explanation**
OR	Original run
PR	Primary run result. For GC tests where the first and second columns are combined to produce this primary set or results
1C	First column result
2C	Second column result
N	None
Z	Unknown

Appendix B - Changes from previous versions of the Data Transfer Standard

The following changes were made from version 1.4 to 1.6. These changes were of two types, increase in field width and new fields.

Analyses table - Revised

Revised	ReportUnitsCode	Text – 4	Change from Text – 2
Revised	AnalyticMethod	Text – 40	Change from Text – 25
Revised	Lab	Text – 20	Change from Text – 10
Revised	AnalysisLabID	Text – 40	Change from Text – 20
Revised	PrepMethod	Text – 40	Change from Text – 20
New Field	Detect3	Num, Single	3rd detection limit for this analysis
New Field	LimitType3	Text – 4	Type of 3rd detection limit
New Field	RetentionTime	Num, Single	Retention time for this Analysis
New Field	PreparationLot	Text – 10	Batch designator of an autonomous group of environmental samples and associated QC samples prepared together
New Field	AnalysisGroup	Text – 20	Group of methods for this Analysis
New Field	SpikeAmount	Num, Single	Spike amount added to the sample

Samples table - Revised

Revised	SampleMatrixCode	Text – 4	Change from Text – 1
Revised	SampleTypeCode	Text – 5	Change from Text – 4
Revised	LabSampleID	Text – 40	Change from Text – 20
Revised	AltSampleID	Text – 40	Change from Text – 20
Revised	FieldSampleID	Text – 40	Change from Text – 20
Revised	DepthUnitsCode	Text – 4	Change from Text – 2
Revised	Description	Text – 50	Change from Text - 25
Revised	CoolerID	Text – 40	Change from Text – 20
Revised	DeliveryGroup	Text – 25	Change from Text - 10
Revised	QCSequenceID	Text – 40	Change from Text – 15
Revised	COCNumber	Text – 40	Change from Text – 20
Revised	TaskNumber	Text – 40	Change from Text – 20
Revised	PrimarySample	Text – 40	Change from Text – 20
New Field	LabRecvDate_D	Date/Time	Date lab received sample
New Field	WeightVolume	Num, Double	Weight or volume of sample
New Field	Extracted	Text – 1	Is this an extracted sample?
New Field	SampleMethodCode	Text - 4	Link to the SampleMethod table
New Field	LogCode	Text – 4	Coded value identifying the company collecting samples or performing field tests
New Field	AmbientBlankLot	Text – 8	Ambient Blank Field Lot Identifier
New Field	EquipmentBlankLot	Text – 8	Equipment Blank Field Lot Identifier
New Field	TripBlankLot	Text – 8	Trip Blank Field Lot Identifier

APPENDIX B

ALTERNATE ELECTRONIC DATA DELIVERABLE FORMAT

SOP	**0210.05**				
GROUP	Computer Specifications				
SUB-GROUP	Data Deliverables				
TITLE	Analytical Data EDD – WESTON Generic				
DATE	02/23/2005	**FILE**	0210-05.doc	**PAGE**	1 of 3

INTRODUCTION

The following Standard Operating Procedure (SOP) presents the specification for providing the electronic data deliverable (EDD) for environmental chemistry analysis. The EDD format and content is based upon specific data requirements for compatibility with WESTON data management systems.

TERMS

CAS Number - A unique number assigned to a chemical compound by the Chemical Abstract Service of the American Chemical Society.

Lab Batch ID - Code assigned by the lab to each batch of samples received.

Lab ID - Code assigned by the lab to identify each sample within a *lab batch*. Preferably the *lab batch* plus a sequential number.

Method Code - Code for the analytical method used.

EDD SUBMITTAL

Ideally, one EDD should be submitted per analytical batch or lab batch. The EDD should be formatted as either a Microsoft Excel v7.0 or older file or as a tab-delimited text file. The EDD should contain column headers as defined in the table below.

The EDD format defined below allows for the inclusion of up to 3 detection limits. The detection limits are intended to be the Sample Quantitation Limit (SQL), the Method Quantitation Limit (MQL) and the Method Detection Limit (MDL). Please include specific designations for each detection limit in the *DL# Desc* column corresponding to each Detection Limit. For example, if the *Detection Limit 1* field contains the SQL, then the *DL1 Desc* column should contain the text "SQL".

All soil results should be reported on a dry-weight basis.

EDD FORMAT

Field	Description
Field Sample ID	Obtained from the Chain-of-Custody (COC) that accompanies the sample. The Field Sample ID shall not be altered or truncated without prior permission from WESTON. In the event of missing or illegible Field Sample IDs, contact WESTON.
Date Collected	The date a sample was collected, obtained from the COC.
Laboratory Name.	Laboratory Name
Matrix Code	The predominant material comprising the sample (or as specified on the COC). See Lookup Table 1.
Laboratory Sample ID	The unique identifier used by the lab for a particular sample. Preferably the *lab batch* plus a sequential number.
Extraction/Preparation Date	The date that the sample was extracted or prepared for analysis.
Analysis Date	The date that the sample was analyzed.
Preparation Batch	The laboratory sample number of the laboratory Method Quality Control Samples associated with a sample. If no Method QC is associated with the sample, "NONE" should be entered.
Method Code	Short description of the analytical method used. (SW846 8270C or 8270C, etc.)
QC Code	Codes that differentiate between actual analytical results and laboratory quality assurance samples such as lab duplicates, matrix spikes, lab blanks, etc. See Lookup Table 2.
CAS Number	The unique number assigned to an analyte by the Chemical Abstract Service.
Result	The numerical result value. If the result is undetected at the Sample Quantitation Limit (SQL), the SQL should be reported in this field and a result qualifier indicating the result was not detected should be placed in the Result Qualifier field. The analytical result for a chemical compound should use minus signs in front of negative results. There should be no commas or other symbols in the result.
Result Qualifier	The result qualifier designated by the laboratory.
Unit of Measure	The unit of measure for the result. This shall match the unit of measure used for the detection limit or MDL. The unit of measure for blanks and lab control samples shall match the unit of measure used for the sample. See Lookup Table 3.
Parameter Name	The name of the compound identified.
Detection Limit 1	The detection limit specified for the analysis type. For diluted samples, a detection limit corrected for the dilution factor should be used. For soils, a detection limit corrected for percent moisture should be used. For diluted soils, both the dilution factor and percent moisture should be corrected for.
DL1 Desc	The description of the detection limit provided in the Detection Limit 1 field.
Detection Limit 2	The detection limit specified for the analysis type. For diluted samples, a detection limit corrected for the dilution factor should be used. For soils, a detection limit corrected for percent moisture should be used. For diluted soils, both the dilution factor and percent moisture should be corrected for.
DL2 Desc	The description of the detection limit provided in the Detection Limit 2 field.
Detection Limit 3	The detection limit specified for the analysis type. For diluted samples, a detection limit corrected for the dilution factor should be used. For soils, a detection limit corrected for percent moisture should be used. For diluted soils, both the dilution factor and percent moisture should be corrected for.
DL3 Desc	The description of the detection limit provided in the Detection Limit 3 field.
Dilution Factor	A numerical value indicating by what factor the sample was diluted. If the sample was not diluted, leave this field blank.

Lookup Table 1 – Matrix Codes

Matrix Code	Matrix Desc
a	Air
d	DNAPL
g	Gas
l	Leachate
m	Sediment
n	Sludge
o	Other
p	Petroleum
q	LNAPL
r	Reagent
s	Soil
u	Ground Water
w	Water
x	Waste
z	Unknown

Lookup Table 2 – QC Codes

QC Code	QC Type Description
B	Blank
BDS	Blind sample
BS	Blank spike
CB	Calibration blank
CCV	Calibration Control Verification
CS	Check sample
DB	Dynamic blank
DUP	Field duplicates
FB	Field blank
FS	Field sample spikes
IS	Internal standard
LCS	Laboratory Control Sample
LCSD	Lab Control Sample Duplicate
LD	Laboratory duplicates
MB	Method blank
MS	Matrix spike
MSD	Matrix spike duplicate
O	Normal
RB	Rinsate blank
SB	Storage blank
SP	Split samples
SPD	Split-Duplicates
SS	Synthetic sample
SUR	Surrogate spikes
TB	Trip blank
Z	Unknown

Lookup Table 3 - Units of Measure

UOM	Unit of Measure
%	Percent
Deg C	Degrees Centigrade
Deg F	Degrees Fahrenheit
mg/filter	Milligrams per filter
mg/kg	Milligram per Kilogram
mg/l	Milligram per Liter
mg/m3	Milligram per cubic meter
mmhos/m	Millimhos per meter
pg/l	Picogram per Liter
PH UNITS	pH Units
s.u.	Scientific Units
ug/filter	Micrograms per filter
ug/g	Micrograms per gram
ug/kg	Micrograms per Kilogram
ug/l	Micrograms per Liter
ug/m3	Micrograms per cubic meter
umhos/cm	Micromhos per centimeter

APPENDIX C

SAMPLE NOMENCLATURE STANDARD

SOP	**0110.01**				
GROUP	Database Management System				
SUB-GROUP	Data Collection and Acquisition				
TITLE	Sample Nomenclature				
DATE	3/28/2005	**FILE**	0110-01.DOC	**PAGE**	1 of 1

INTRODUCTION

The following Standard Operating Procedure (SOP) presents the sample nomenclature for analytical samples in the On-Line Data Management system. The sample nomenclature is based upon specific code requirements for compatibility with the ARCS On-line system. A site specific data management plan should be prepared prior to sample collection.

PROCEDURE

SAMPLE NOMENCLATURE

Station ID - Collection Type + QC Type - Sequential Sample

Where:

Station ID: A three-digit identifier used to designate the particular physical location where the sample was collected.

Collection Type: A one-digit code used to designate what type of sample was collected:

1	Surface Water
2	Ground Water
3	Leachate
4	Field QC/Rinsate
5	Soil/Sediment
6	Oil
7	Waste
8	Other
9	Drinking Water

QC Type: A one-digit code used to designate the QC type of the sample:

1	Normal
2	Duplicate
3	Rinsate Blank
4	Trip Blank
5	Field Blank
6	Confirmation

Sequential Sample: A one-digit code that represents the n^{th} sample of common Collection Types.

Example: ***054-51-3*** Represents the third normal soil sample collected at Station 054.
054-52-3 Represents the duplicate of the third soil sample at Station 054.