DATA MANAGEMENT PROCESS

FOR THE

ST. LOUIS FUSRAP SITES

ST. LOUIS MISSOURI

JULY 1999

Revision 0

Prepared for
U.S. Army Corps of Engineers (USACE)
St. Louis District

Prepared by
Science Applications International Corporation

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1.0 INTRODUCTION

The FUSRAP Data Management Process (FDMP) for the St. Louis Sites has been developed to facilitate the proper and efficient flow of FUSRAP analytical laboratory data, and to ensure the validity and accessibility of data, from field collection and processing by the analytical laboratories, to those involved in the evaluation and decision making phase of the project.

The primary data management resource will be a relational database accessible to all data users identified as the St. Louis District Site Characterization Database (SCD) and the St. Louis District (SLD) FUSRAP web site (URL: fusrap.saic.com). The SLD FUSRAP web site contains an access pathway to the SCD, related program information, and other basic features. The types of data to be stored in the SCD include:

sample planning information to be used for pre-populating the SCD, generating sample labels, and chain-of-custody documentation in the field;
sampling station information;
sample descriptions;
field screening results associated with samples;
analytical results associated with samples.

The flowchart on Fig. 1-1 outlines the process and deliverables involved with the FUSRAP Data Management Process.

2.0 ORGANIZATION

The subsections below summarize the responsibilities of functional positions associated with management and operation of the FUSRAP Data Management Process (See Fig.2-1 for the Organizational Chart).

2.1 USACE Laboratory Manager

The Laboratory Manager is responsible for the oversight and implementation of the FUSRAP Data Management Process. This position is responsible for ensuring that the staff and resources are available to carry out the necessary functions.

2.2 USACE St. Louis District Health Physicist

The St. Louis District Health Physicist is responsible for oversight and operation of the St. Louis FUSRAP Radioanalytical Laboratory. Additional responsibilities include:

Overseeing the MARSSIM sampling program;
Approving submission of samples by contractors to the radioanalytical laboratory for analysis;
Assigning priority to samples received in the radiological laboratory;
Approving the purchase of major analytical equipment/facilities; and
Reviewing and approving laboratory standard operating procedures.

2.3 USACE St. Louis District Chemist

The St. Louis District Chemist is responsible for the technical project planning (TPP) needed for the assessment of chemical data quality, including determination of data usability and DQO attainment. Additional responsibilities include:

Ensuring that adequate data quality is maintained, including, SOW'S, SAP'S, contract specifications and final chemical data reports;

Determining the appropriate level of compliance monitoring, in conjunction with the other members of the TPP team, as discussed in ER 1110-1-263;

Approving submission of samples, by contractors, to the contracted laboratories for analysis;

Validating 10% of the radiological data generated from the FUSRAP Radioanalytical Laboratory;

Evaluating new analytical methods and ensuring that chemical data meet the DQO's for each project;

Analyzing water treatment approaches;

2.4 USACE Contract Specialist

The St. Louis District Contract Specialist is responsible for the management of analytical contracts and the associated administrative duties. Additional responsibilities include:

Tracking and maintaining invoices associated with the analyses;

Developing, negotiating and administering subcontract agreements (e.g., Delivery Orders) with the analytical laboratories;

Analyzing cost estimates, conducting negotiations and ensuring subcontractor compliance.

2.5 FUSRAP Laboratory Coordinator/Validation Manager

The FUSRAP Laboratory Coordinator/Validation Manager is a contractor position responsible for coordinating with the other contractors and project chemist and Health Physicist to determine number of samples, determine required analyses, supervising and performing the verification and validation of data, and providing contractors with anticipated turn-around times. Additional responsibilities include:

Communicating contractor requests and verifying that requests are authorized by the USACE;

Interfacing with the USACE to ensure that remedial action contractors are adhering to the sample guidelines established;

Conducting audits and monitoring the quality of the validation review process as needed;

Assist in pursuing outside laboratory contracts and serving as a point of contact for these laboratories.

2.6 FUSRAP Data Coordinator

The FUSRAP Data Coordinator reports to the Laboratory Coordinator/Validation Manager and is responsible for processing and reviewing data, and the associated documentation specific to organic, inorganic, and radiological analyses. Additional responsibilities include:

Receiving data from laboratories, performing data entry tasks, and generating tracking reports;

Tracking and resolving reporting problems encountered with deficiencies in the data and distributing data to the end users;

Providing back up laboratory coordination efforts (e.g., coordinate with contractors to determine number of samples, and provide contractors and Project Chemist and Health Physicist with anticipated turn-around time), and evaluate analytical data against precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters.

2.7 FUSRAP Database Manager

The FUSRAP Database Manager is a contract position responsible for administering and maintaining the SCD and SLD FUSRAP web server. Additional responsibilities include:

- Posting the SCD on the SLD FUSRAP web server weekly;
- Posting the cost schedule/control data on the SLD FUSRAP web server monthly;
- Performing daily backups of the SLD FUSRAP web server with one week retention;
- Developing web-based data access tools;
- Performing standard database maintenance functions (e.g., updates, changes, troubleshooting, etc.);
- Performing standard network maintenance/connectivity support for the SLD FUSRAP web server (e.g., security, user support, etc.).

3.0 SAMPLE PLANNING

3.1 GENERAL

Identification and documentation of historic sample possession from collection, through analysis, and ultimate disposition (i.e., chain of custody) will be maintained to ensure that the validity of the sample has not been compromised. The overall objective of sample custody is to ensure the traceability of a given sample from the time it is collected until final disposition (i.e., reporting or disposal). Chain of custody will be maintained in accordance with the protocols specified in the FUSRAP Sampling and Analysis Guide (SAG).

3.2 SAMPLE PROJECTION TABLES

In order to prioritize and schedule the analyses and staff within the St. Louis FUSRAP Radioanalytical Laboratory and contracted vendor laboratories, a complete and detailed sample projection of chemical and radiological analyses will be maintained.

Contractors submitting samples for analysis are required to complete sample projections detailing the numbers and types of samples projected for the activities under their responsibility. Contractors are to use the format presented in Attachment 1 for their sample projections and are required to fax or e-mail the information to the FUSRAP Laboratory Coordinator. Refer to Figure 3-1 for contact information.

Contractors are required to submit sample projections for an entire fiscal year (FY). Additionally, Contractors will be required to provide a ninety (90) day sample projections on a monthly basis throughout the FY. The monthly sample projections are due to the FUSRAP Laboratory Coordinator three (3) business days prior to beginning of each month. In the event current laboratory capacity is exceeded, the USACE will ensure that additional staff, facilities, and/or off-site analytical contracts will prioritize sample analyses and assure that adequate capacity exists for mission critical samples.

4.0 SAMPLE COLLECTION AND DELIVERY

4.1 SAMPLE NUMBERING SYSTEM

A unique sample-numbering scheme will be used to identify each sample collected following the general outline established on Attachment 2. The purpose of this numbering scheme is to provide a tracking system for the retrieval of analytical and field data on each sample in the SCD. Sample identification (ID) numbers will be used on all sample labels or tags, field data sheets or logbooks, chain-of-custody (COC) forms, and all other applicable documentation used during each project.

The project database will be pre-populated with sample ID numbers. With the exception of general area air, breathing zone air samples, and soil screening samples, sample IDs (e.g., groundwater, surface water, soils, non-occupational air samples, etc.) shall be obtained from and maintained by the FUSRAP Laboratory Coordinator. When requesting sample numbers, twenty-four (24) hour advance notice is required, in addition to the following information:

- Requestor's name and company;
- Site (e.g., SLDS, SLAPS, HISS, etc.);
- Number of samples to be taken;
- Analyses to be performed;
- Number of QA/QC samples to be taken;
- Sampling event;

Media

The field sampling team(s) will be responsible for using these numbers for the proper identification of samples. **Samples improperly identified will not be accepted.**

4.2 CHAIN OF CUSTODY NUMBERING SCHEME

A unique chain of custody numbering scheme will be used to identify each chain of custody generated for FUSRAP sampling activities. The general outline is described below.

Format: **AA***mmddyyyy*-##**L**

AA - Company designator
- IT - IT
- SW - Stone & Webster
- SA - SAIC

mm - Month
dd - Date
yyyy - Year
- Sequential number
L - Laboratory designator
- A - ARDL
- H - HISS
- Q - Quanterra
- X - Omaha CX

The field sampling team(s) will be responsible for using this numbering scheme on the chains of custody generated. **COC's without a number will not be accepted.**

4.3 SAMPLE CONTAINERS

Specific to chemical analyses, the contracted vendor laboratories will provide the appropriate sample containers and preservatives for the sample types and analyses requested. The request for sample containers should be submitted to the FUSRAP Laboratory Coordinator five (5) business days, prior to beginning the sample event.

The RA Contractor will be responsible for providing their own sample bottles/containers for radiological analyses. Additional sample volumes may be requested for the express purpose of performing associated laboratory QC (laboratory duplicates, matrix spikes, and matrix spike duplicates). Additional sample containers will be required for these samples.

4.4 LABORATORY ANALYSIS and DELIVERY ORDER (DO) NUMBERS

Based upon the specific analyses and the turn-around-times required, the FUSRAP Laboratory Coordinator will designate which analytical laboratory will receive and analyze the samples consistent with the USACE Delivery Order(s). Furthermore, as a USACE requirement, the field sampling team(s) will be responsible for writing the appropriate DO number and sampling event description on the chain of custody for tracking and invoicing purposes.

No samples are to be sent for analyses without prior approval (e.g., verbal or written) of the FUSRAP Laboratory Coordinator or designee. This includes on-site and off-site laboratories. The matrix on Attachment 3 is an example of the analyses and proposed contracted laboratories that will perform the analyses specific to a sampling event.

5.0 STORAGE/ARCHIVAL OF SAMPLES

The primary laboratories shall have procedures describing long-term storage/archival of samples and documentation on the storage conditions of all samples, sample extracts, and digestates. These entities shall not be placed in long-term storage/archival until acceptance of the final data package by the USACE, and shall remain in storage in predetermined physical and environmental conditions commensurate with their intended purpose and per contractual requirements.

Long-term storage/archival areas shall be controlled for access to prevent damage and loss, maintain sample container and identification integrity, and comply with appropriate environmental, safety, and health requirements and policies. Removal and/or disposition of samples from long-term storage/archive shall not take place prior to the primary laboratories receiving written approval from the USACE.

6.0 QA/QC SAMPLE COLLECTION AND FREQUENCY

QA/QC sample collection and analysis is the primary tool in determining if the data generated by primary laboratories are technically valid and of adequate quality for the intended use. Based on the data quality objectives (DQOs) of the project, a percentage of samples are homogenized, split, given a unique sample ID and sent to a primary contract laboratory and to a QA laboratory for analysis. FUSRAP sampling events, with the exception of screening samples, require that a **split** and **field duplicate** sample shall be taken approximately once every twenty samples (5%). The split sample is submitted to the primary laboratory analyzing and the field duplicate sample will be sent to a separate laboratory authorized to perform QA analysis.

Unless otherwise directed by the District Chemist, one rinsate blank shall be taken for an entire sampling event (e.g., one taken for the first quarter 1999 groundwater sampling, regardless of the total number of samples taken).

Contractors should consolidate coolers as much as practical to limit the required number of trip blanks sent to the laboratories. In all cases, trip blanks should never exceed more than one per day.

7.0 LETTER OF RECEIPT (LOR) PROCESS

Sample containers will be tracked from field collection activities to the analytical laboratory following proper chain-of-custody protocols and using standardized chain-of-custody forms as documented in the SAG. When the samples are received at the laboratory, the laboratory receiving staff will check and document the condition of the

samples upon arrival, check that the sample identification numbers on containers and chain-of-custody forms match, and assign laboratory sample identification numbers traceable back to the field identification numbers.

The laboratories will confirm sample receipt and log-in information through transmission of a letter of receipt (LOR) to the FUSRAP Laboratory Coordinator and USACE Contract Specialist. The laboratory will FAX a copy of the completed COC form and the U.S. Army Corps of Engineers Cooler Receipt Checklist (Attachment 4) within twenty-four (24) hours of sample receipt. Samples that are provided to the laboratory without utilizing the appropriate quality assurance measures noted above might result in unreliable/unusable data.

8.0 SAMPLE TRACKING DATABASE

A sample tracking database will allow for tracking the status of samples from the time of collection through analysis and validation. The Data Coordinator can generate tracking reports that will inform the project team of sample status (e.g., date collected, date analyzed, date reviewed/evaluated, date validated, etc.), including potential delays or problems related to sample analysis and validation.

9.0 DATA SUBMISSION AND ELECTRONIC DATA DELIVERABLE (EDD)

Any analysis performed for FUSRAP activities, with the exception of screening samples, will be submitted to the FUSRAP Laboratory Coordinator, or designee, regardless of contract mechanism, on standardized forms and electronically in data packages in accordance with the scope of work for analytical services. These forms will contain results and required QA/QC information applicable to the analytical laboratory method used for analysis and will be consistent with those listed in Attachment 5.

If rapid turnaround data (i.e., 48 hour) is required, sample "results only" will be delivered by FAX or electronically, within the specified turnaround time to the FUSRAP Laboratory Coordinator, and shall be marked "Preliminary Data".

The delivery of completed data packages (e.g. hardcopies and EDDs) is subject to contractual requirements. Ideally for a rapid turnaround request, the data should be received within five business (5) days of receiving the preliminary analytical results. For routine turnaround times (e.g., groundwater analysis), complete data packages should follow within fifteen (15) business days of receiving the samples at the laboratory.

The Data Coordinator or other data management personnel receiving laboratory deliverables will transfer, either electronically by diskette, or manually from the hardcopy, the data into appropriate data tables within the database. The EDD shall be provided either as an Excel format, or comma or tab delimited files, readable by Excel. The required structure is outlined in Attachment 6.

Prior to the data being uploaded into the SCD, the data will be verified, reviewed, evaluated and/or validated. Once the data has been uploaded, it can be accessed and used as intended. **No data will be uploaded until these steps have occurred.** If preliminary data is required (e.g., backfill authorization), data can be released and used; however, it is with the data user's understanding that the results may change or be qualified based upon review, evaluation, and/or validation.

10.0 DATA REVIEW, EVALUATION, AND VALIDATION

The FUSRAP Laboratory Coordinator and other data management personnel will perform the review and evaluation of chemical and radiological data, and the validation of chemical and any radiological data not generated from the St. Louis FUSRAP Radiological Laboratory. The validation of radiological data generated from the St. Louis FUSRAP Radiological Laboratory will be performed by the St. Louis District Chemist.

The table on Attachment 7 provides a comparison of the steps relating to review, evaluation and/or validation. Steps for each process are further defined and discussed below.

10.1 Data Review

One hundred percent (100%) of the data generated from all analytical laboratories shall undergo independent data review. Data review documents possible effects on the data that result from various QC failures, it does not determine data usability, nor does it include assignment of data qualifier flags. Data review is conducted to ensure that:

QC data provided in the laboratory deliverables are scientifically sound, appropriate to the method, and completely documented;
QC samples are within established guidelines;
data were appropriately flagged by the laboratory;
documentation of all anomalies in sample preparation and analysis are complete and correct;
corrective action forms, if required, are complete;
holding times and preservation are documented;
data are ready for incorporation in the final report;
data package is complete and ready for archival.

A Chemical Quality Assurance Report (CQAR) and a Radiological Quality Assurance Report (RQAR) are generated from the review of the QA laboratory and primary laboratory data. Data for project samples, QC samples and QA samples are compared, and the impact on the primary laboratory's data is documented. The format to be used for CQAR/RQAR will be consistent with Chapter 4 of USACE EM 200-1-6, *Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects.*

10.2 Data Evaluation

One hundred percent (100%) of the data generated from all analytical laboratories shall undergo independent data evaluation. Data evaluation uses the results of the data review as summarized in the CQAR/RQAR to determine the usability of the data. Data evaluation summarizes the potential effects of QA/QC failures on the data, and the District Chemist or District Health Physicist assesses their impact on the attainment of the project-specific Data Quality Objectives (DQOs) and contract compliance.

Data qualifiers, called flags (Table 1), will be applied as appropriate to alert the data user of deficiencies in the data. Data qualifiers are applied by the District Chemist or validator, taking into account the project specific DQOs. The qualifiers may be different depending on the type of data evaluation performed. The flags are used to delimit the usability of the data, generally because of QC failures.

A Chemical Data Quality Assessment Report (CDQAR) and a Radiological Data Quality Assessment Report (RDQAR) are generated, which documents data usability, DQO attainment, and contract compliance. The format to be used for CDQAR/RDQAR will be consistent with Chapter 5 of USACE EM 200-1-6, *Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects.*

Table 1. Evaluation/Validation Flags

U	Indicates that the analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ	Indicates that the analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
J	Indicates that the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."
NJ	Indicates that the analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
R	Indicates that the sample results for the analyte are rejected or unusable due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
=	Indicates that the value has been validated and that the analyte has been positively identified and the associated concentration value is accurate.

10.3 Data Validation

Consistent with the data quality requirements, as defined in the DQOs, approximately ten (10%) percent of all project data, with the exception of screening samples, will be validated based on these criteria and qualified per the outcome of the review. Although screening samples do not require formal validation, action will be taken to assure that data are accurate and defensible.

Data validation is the systematic process of ensuring that the precision and accuracy of the analytical data are adequate for their intended use. Validation shall be performed in accordance with EPA regional or National Functional Guidelines, or project-specific guidelines. Information gathered during this validation process will be consistent with the information demonstrated by the USACE Data Validation Form (Attachment 8). Either these forms or contractor validation forms containing equivalent documentation will be completed and presented with the Quality Control Summary Report (QCSR).

Validation will be reviewed for compliance with established QC criteria based on the following categories:

Holding Times - Evaluation of holding times ascertains the validity of results based on the length of time from sample collection to sample preparation or sample analysis. Verification of sample preservation must be confirmed and accounted for in the evaluation of sample holding times. The evaluation of holding times is essential to establishing sample integrity and representativeness. Concerns regarding physical, chemical, or biochemical alteration of analyte concentrations can be eliminated or qualified through this evaluation.

Blanks - The assessment of blank analyses is performed to determine the existence and magnitude of contamination problems. The criteria for evaluating of blanks, applies to any blank associated with the samples, including field, trip, equipment, and method blanks. Contamination during sampling or analysis, if not discovered, results in false-positive data.

Laboratory Control Samples (LCS) - The LCS serves as a monitor of the overall performance of the analytical process, including sample preparation, for a given set of samples. Evaluation of this standard provides confidence in or allows qualification of results based on a measurement of process control during each sample analysis.

Surrogate Recovery - System monitoring compounds are added to every organic sample, blank, matrix spike, MS, MSD, and standard. They are used to evaluate extraction, cleanup, and analytical efficiency by measuring recovery on a sample-specific basis. Poor system performance as indicated by low surrogate recoveries is one of the most common reasons for data qualification. Evaluation of surrogate recovery is critical to the provision of reliable sample-specific analytical results.

Internal Standards - Internal standards are utilized to evaluate and compensate for sample-specific influences on the analyte quantification. They are evaluated to determine if data require qualification due to excessive variation in acceptable internal standard quantitative or qualitative performance measures. For example, a decrease or increase in internal standard area counts for organics may reflect a change in sensitivity that can be attributed to the sample matrix. Because quantitative determination of analytes is based on the use of internal standards, evaluation is critical to the provision of reliable analytical results.

Isotopic Tracers - Isotopic tracers are utilized to evaluate and compensate for sample-specific influences and preparation aberrations on the radionuclide quantification. They are evaluated to determine if data require qualification due to excessive variation in acceptable tracer quantitative or qualitative performance measures. For example, a decrease or increase in tracer recovery for a given isotope may reflect a change in sensitivity that can be attributed to the sample matrix or preparation process. Because quantitative determination of many radionuclides is based on the use of tracers, evaluation is critical to the provision of reliable analytical results.

Furnace Atomic Absorption (FAA) QC - Duplicate injections and furnace post-digestion spikes are evaluated to establish precision and accuracy of individual analytical determinations. Because of the nature of the furnace atomic absorption technique and because of the detailed decision tree and analysis scheme required for quantitation of the elements, evaluation of the GFAA QC is critical to ensuring reliable analytical results.

Calibration - The purpose of initial and continuing calibration verification analyses is to verify the linear dynamic range and stability of instrument response. Relative instrument response is used to quantitate the analyte results. If the relative response factor is outside acceptable limits, the data quantification is uncertain and requires appropriate qualification.

Sample Reanalysis - When instrument performance or monitoring standards indicate that an analysis is out of control, the laboratory is required to reanalyze the sample. If the reanalysis does not solve the problem (i.e., surrogate compound recoveries are outside the limits for both analyses), the laboratory is required to submit data from both analyses. An independent review is required to determine which is the appropriate sample result.

Secondary Dilutions - When the concentration of any analyte in any sample exceeds the initial calibration range, a new aliquot of that sample must be diluted and reanalyzed. The laboratory is required to report data from both analyses. When this occurs, an independent review of the data is required to determine the appropriate results to be used for that sample. An evaluation of each analyte exceeding the calibration range must be made, including a review of the dilution analysis performed. Results chosen in this situation may be a combination of both the original

results (i.e., analytes within initial calibration range) and the secondary dilution results.

Laboratory Case Narratives - Analytical laboratory case narratives are reviewed for specific information concerning the analytical process.

11.0 DATA STORAGE AND RECORDS MANAGEMENT

Once the data for a given sample or group of samples are complete and entered into the SCD, the Data Coordinator and other data management personnel will check that all analytical data are complete and properly stored, including both the electronic form and associated data packages. Hard copies of all original site and field logbooks, chain-of-custody forms, data packages with analytical results and associated QA/QC information, data verification and validation forms, and other project-related information will be submitted to a designated records storage facility (Note: The specific facility has yet to be determined).

Sufficient documentation will accompany the archived data to fully describe the source, contents, and structure of the data to ensure future usability. Computer programs used to manipulate or report the archived data will also be included in thc data archive information package to further enhance the data's future usability.

The Database Manager and other data management personnel will perform the daily back-ups of the web server with a one week retention, perform weekly updates of the web site with the most recent version of the SLD SCD, and perform network and database maintenance.

12.0 DATA SUMMARIZATION AND REPORTING

When field sampling has been completed and the analytical data have been received, reviewed, evaluated and/or validated, and transferred into the project database, a Quality Control Summary Report (QCSR) will be prepared on a quarterly basis, which will be included as an appendix to the final report. This report will be submitted to the USACE Task/Technical Lead as determined by the project schedule. The contents of the QCSR will include data validation documentation and discussion of all data that may have been compromised or influenced by aberrations in the sampling and analytical processes. Both field and laboratory QC activities will be summarized. Problems encountered, corrective actions taken, and their impact on project DQOs will be determined.

13.0 REFERENCES

FUSRAP Sampling and Analysis Guide.

USACE EM 200-1-6; *Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects*

EPA; 1987; *Data Quality Objectives for Remedial Response Activities*, Remedial Response and Office of Waste Programs Enforcement; Washington, D.C.; EPA/540/G-87/003.

EPA, 1993a; *Data Quality Objectives Process*, EPA-540-R-93-071, September.

EPA; 1994; *Guidance for the Data Quality Objectives Process*; EPA QA/G-4; September

EPA, 1994; *National Functional Guidelines for Organic Data Review, Multi-media, Multi-concentration (ILMO 1.0) and Low Concentration Water (OLCO 1.0)*; EPA-540-R-94-090.

EPA, 1994; *National Functional Guidelines for Inorganic Data Review*; EPA-540-R-94-013.

ATTACH MENT 1 – Sample Projection Tables

Contractor/Site/Area/Category	Jun-99		Jul-99		Aug-99		Sep-99	
	Chem	Rad	Chem	Rad	Chem	Rad	Chem	Rad
8A CONTRACTOR								
HISS/VP								
East Piles								
Risk/Nature/Extent								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
Remedial Design								
HP SUPPORT								
Air Filters								
BZ/GA								
Perimeter								
SAIC								
SUPPORT								
Remedial Design								
SLAPS Remedial Design								
SLAPS VP Remedial Design								
HISS Remedial Design								
SLDS Remedial Design								
Backfill Evaluation								
HP Support								
HP Support								
BZ/GA Air Filters								
Perimeter Air Filters								
Utility Support								
Environmental Monitoring								
HISS Stormwater								
SLDS Groundwater								
SLAPS & VPs Groundwater								
HISS Groundwater								
Creek Sediment								
NC PAM/FS/ROD								
Soil								
Sediment								
Water								
MADISON								
Risk/Nature/Extent								
Remedial Design								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
QC								
COLDWATER CREEK								
Risk/Nature/Extent								
QC								

ATTACH MENT 1 – Sample Projection Tables (Continued)

Contractor/Site/Area/Category	Jun-99		Jul-99		Aug-99		Sep-99	
	Chem	Rad	Chem	Rad	Chem	Rad	Chem	Rad
STONE AND WEBSTER								
SLAPS								
Construction Support								
NPDES								
Groundwater Wells								
Groundwater								
Surface Water								
Risk/Nature/Extent								
QC								
East End Excavation								
Confirmation Screening								
Preliminary Verification								
Waste Characterization								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
QC								
Radium Pits								
Confirmation Screening								
Preliminary Verification								
Waste Characterization								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
QC								
HP SUPPORT								
Air Filters								
Industrial Hygiene								
BZ/GA								
Perimeter								
QC								
IT Corporation								
SLDS								
City Properties								
Risk/Nature/Extent								
Remedial Design								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
Backfill								
QC								
Plant 2								
Risk/Nature/Extent								
Remedial Design								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
Water Treatment								
Backfill								
QC								

ATTACH MENT 1 – Sample Projection Tables (Continued)

Contractor/Site/Area/Category	Jun-99		Jul-99		Aug-99		Sep-99	
	Chem	Rad	Chem	Rad	Chem	Rad	Chem	Rad
Plant 1								
Risk/Nature/Extent								
Remedial Design								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
Water Treatment								
Backfill								
QC								
Plant 6								
Risk/Nature/Extent								
Remedial Design								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
Water Treatment								
Backfill								
QC								
Plant 7								
Risk/Nature/Extent								
Remedial Design								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
Water Treatment								
Backfill								
QC								
VPs								
Risk/Nature/Extent								
Remedial Design								
Confirmation Screening								
Final Status Survey - Class 1								
Final Status Survey - Class 2								
Waste Characterization								
Water Treatment								
Backfill								
QC								
HP SUPPORT								
Air Filters								
BZ/GA								
Perimeter								

A - Air
W - Water (e.g., groundwater, stormwater, surface water, etc.)
S - Soil (e.g., surface, subsurface, etc.)
O - Other

ATTACHMENT 2 - Sample Identification System for St. Louis FUSRAP Sites

XXX#####-n - Format to be used for sample collection and delivery to laboratory

XXX-AAAmmNNNNn-##### - Format to be used for database and reporting

XXX = Site Designator
Coldwater Creek Watershed = CWC
Hazelwood Interim Storage Site = HIS
Hot Zones = HTZ
Madison = MAD
St. Louis Airport Site = SLA
St. Louis Downtown Site = SLD
SLAPS Vicinity Properties = SVP
Utility Work = UTW
etc. (can include other designators as they are identified)

= Sequential Sample Number
Unique to each site

n = Sample Type

Duplicate = 1	Trip Blank = 3	
Split =2	Equipment Rinsate = 4	Site Source Water Blank = 5

AAA = Area Designator
Investigation Area 1 = IA1 (example IA1 – IA9; then A10 – A99; or others as identified)
Background = BKG
Final Status Survey Soil Sample = ITD
etc. (can include designators for vicinity or contiguous properties)

mm = Media
Surface Soil = SS
Subsurface Soil = SB
Sediment = SD
Ground Water = GW
Surface Water = SW
Storm Water = ST
Wastewater = WW
Aquatic Biota = AB
Terrestrial Biota = TB
Air Filter (Area) = AA
Air Filter (Environmental) = AE
Air Filter (Personal) = AP
Radon Detector = RD
Radon Flux = RF
TLDs = TD
Quality Control = QC

etc. (as new media types are identified)

NNNN = Station Number
Unique Station Identifier

ATTACHMENT 3 – Analysis vs. Laboratory Matrix

	St. Louis FUSRAP Radioanalytical Laboratory	ARDL (USACE)	QUANTERRA (USACE)
Full-suite analysis Ft. Belle & CWC	A	QA	A
Radiological analyses	A		
Groundwater (Full-suite analysis)	A	A	QA
TCLP analyses		QA	A
Organics (PCBs)		QA	A
Organics (BNAs): Ra Pits		QA	A
TAL Metals: Verification, Plant 1, Plant 6, Plant 7		QA	A
Wet Chemistry: NPDES, North County, SLDS, SLDS MSD		A	QA

A – Performing analysis QA – Performing QA analysis

ATTACHMENT 4 – Cooler Receipt Checklist

COOLER RECEIPT CHECKLIST

LIMS number _____ Chain-of-Custody No. _____

Project:_____ Date received:_____

A. Preliminary Examination Phase Date cooler(s) opened:_____

by (print)_____ (signature)_____

Circle response below as appropriate

1. Did cooler(s) come with a shipping slip (airbill, etc.)?	Yes	No	NA
If YES, enter courier name & airbill number here: _____			
2. Were custody seals on outside of cooler(s)?	Yes	No	NA
How many & where:_____ Seal date:_____ Seal name:_____			
3. Were custody seals unbroken and intact at the date and time of arrival?	Yes	No	NA
4. Did you screen samples for radioactivity using a Geiger Counter?	Yes	No	NA
5. Were custody papers sealed in a plastic bag & taped inside the cooler lid?	Yes	No	NA
6. Were custody papers filled out properly (ink, signed, etc.)?	Yes	No	NA
7. Did you sign custody papers in the appropriate place for acceptance of custody?	Yes	No	NA
8. Was project identifiable from custody papers?	Yes	No	NA
9. If required, was enough ice present in the cooler(s)?	Yes	No	NA

Identify type of ice used in cooler and temperature reading upon receipt: _____

Source of temperature reading (check one): Temperature Vial ( ) Sample Material ( )

10. Initial and date this form to acknowledge receipt of cooler(s): (initial)____ (date)_____

B. Log-In-Phase Date samples were logged in: _____

By (print)_____ (signature)_____

11. Describe type of packing in cooler(s): _____

12. Were all bottles sealed in separate plastic bags?	Yes	No	NA
13. Did all bottles arrive unbroken & were labels in good condition?	Yes	No	NA
14. Was all required bottle label information complete?	Yes	No	NA
15. Did all bottle labels agree with custody papers?	Yes	No	NA
16. Were correct containers used for the analyses indicated:	Yes	No	NA
17. Were correct preservatives placed into the sample containers?	Yes	No	NA
18. Was a sufficient amount of sample sent for the analyses required?	Yes	No	NA
19. Were bubbles absent in VOA vials?	Yes	No	NA
If no, list by sample number: _____			
20. Has a copy of this Cooler Receipt Checklist been faxed to the FUSRAP Laboratory Coordinator?	Yes	No	NA

ATTACHMENT 5 - Electronic Deliverable Format

FIELD NAME	MAX LENGTH	DESCRIPTION
SMP_ID	15	The original client sample identification number. *For Lab QC samples this field may be left empty or filled with a placeholder like 'QC' or 'NA' for LCS and blanks. The original client sample ID should be used for MS, MSD, and SUR samples.*
LAB_ID	15	The laboratory's sample identification number.
DATE_REC	10	The date the sample was received by the laboratory (MM/DD/YYYY).
DATE_EXT	10	The date the sample was extracted (MM/DD/YYYY). The extraction refers to any preparatory techniques such as extraction, digestion, and separation.
DATE_ANA	10	The date the sample was analyzed (MM/DD/YYYY).
TIME_ANA	5	The time the sample was analyzed (HH:MM).
MATRIX	10	The sample matrix. Valid values are Water, Solid, or Air. Sediment samples should be referred to as Solid. Biological tissues should be called Water if reported on a volume basis or Solid if reported on a weight basis.
METHOD	21	The method requested by the client (e.g., SW846 8080). This should not be the lab method number.
RES_TYPE	3	Currently the loading routine only handles the following values:
	REG-results of a primary analysis of a client sample	
	REA- results of a reanalysis of a client sample	
	DIL- results of an analysis of a diluted client sample	
	LCS-results of a laboratory control sample as %recovery	
	LCT-expected result of a laboratory control sample as a concentration	
	LCF-actual result of a laboratory control sample as a concentration	
	SUR-surrogate recovery as % recovery	
	MS-matrix spike recovery as a % recovery	
	MST- expected result of a matrix spike sample as a concentration	
	MSF- actual result of a matrix spike sample as a concentration	
	MSD-matrix spike duplicate recovery as relative percent difference	
	MDT- expected result of a matrix spike duplicate sample as a concentration	
	MDF- actual result of a matrix spike duplicate sample as a concentration	
	BLK-result of a laboratory blank sample.	
CAS_NUM	15	The CAS number or blank if no CAS number is available.
PARAMTR	50	Chemical name for the analytic parameter.
RESULTS	N	The analytic result
UNITS	15	The units for the result.
LABQUAL	6	The qualifiers assigned by the laboratory.
DET_LIMIT	N	The Contract-Required Detection Limit for the analyte being measured. It should be reported in the same units as the result. For radionuclides, report the minimum detectable activity (MDA).
UNC	N	The 2-sigma error in the net count rate for radiological analyses. Should be expressed in the same units as the analytic result.
DILUTION	N	The overall dilution of the sample aliquot. A value of one should correspond to nominal conditions for the method. Values less than one corresponds to concentrations.
SMP_WT	N	The weight or volume of the sample used for the analysis.
WT_UNITS	2	The units for the sample weight or volume.
FILTERED	1	Must have 'F' if the sample was filtered either by the lab or in the field.
PCT_SOL	N	Percent solids
TIC (8)	8	Enter 'T' or retention time for tentatively identified compound. Blank if not.

N-Indicates that the field requires a numeric entry.

ATTACHMENT 6 – Analytical Hard-copy Standard Data Deliverables

Method requirements	Deliverables
Requirements for all methods:	
- Holding time information and methods requested	Signed chain-of-custody forms
- Discussion of laboratory analysis, including any laboratory problems	Case narratives
Organics: GC/MS analysis	
- Sample results, including TICs	CLP Form 1 or equivalent
- Surrogate recoveries	CLP Form 2 or equivalent
- Matrix spike/spike duplicate data	CLP Form 3 or equivalent
- Method blank data	CLP Form 4 or equivalent
- GC/MS tune	CLP Form 5 or equivalent
- GC/MS initial calibration data	CLP Form 6 or equivalent
- GC/MS continuing calibration data	CLP Form 7 or equivalent
- GC/MS internal standard area data	CLP Form 8 or equivalent
Organics: GC analysis	
- Sample results	CLP Form 1 or equivalent
- Surrogate recoveries	CLP Form 2 or equivalent
- Matrix spike/spike duplicate data	CLP Form 3 or equivalent
- Method blank data	CLP Form 4 or equivalent
- Initial calibration data	CLP Form 6 or equivalent
- If calibration factors are used	A form listing each analyte, the concentration of each standard, the relative calibration factor, the mean calibration factor, and %RSD
- Calibration curve if used	Calibration curve and correlation coefficient
- Continuing calibration data	CLP Form 9 or equivalent
- Positive identification (second column confirmation)	CLP Form 10 or equivalent
Metals	
- Sample results	CLP Form 1 or equivalent
- Initial and continuing calibration	CLP Form 2 or equivalent, dates of analyses and calibration curve, and the correlation coefficient factor
- Method blank	CLP Form 3 or equivalent and dates of analyses
- ICP interference check sample	CLP Form 4 or equivalent and dates of analyses
- Spike sample recovery	CLP Form 5A or equivalent
- Postdigestion spike sample recovery for ICP metals	CLP Form 5B or equivalent
- Postdigestion spike for GFAA	CLP Form 5B or equivalent
- Duplicates	CLP Form 6 or equivalent
- LCS	CLP Form 7 or equivalent that includes acceptable range or window
- Standard additions (when implemented)	CLP Form 8 or equivalent
- Holding times	CLP Form 13 or equivalent
- Run log	CLP Form 14 or equivalent
Wet Chemistry	Report result
- Sample results	%Recovery
- Matrix spike recovery	%Recovery and %RPD
- Matrix spike duplicate or duplicate	Report results
- Method blank	Calibration curve and correlation coefficient
- Initial calibration	Recovery and % difference
- Continuing calibration check	LCS result and control criteria
- LCS	Copy of run log
- Run log	

ATTACHMENT 6 – Analytical Hard-copy Standard Data Deliverables (Continued)

Radiochemical Analysis

- Sample results	Report results
- Initial calibration	Efficiency determination
- Efficiency check	%Difference from calibration
- Background determinations	Report results
- Spike recover results	Report results
- Internal standard results (tracers or carriers)	Report results
- Duplicate results	Spike added and %Recovery
- Self-absorption factor (α,β)	Standard added and %Recovery
- Cross-talk factor (α,β)	Report results and %RPD
- LCS	Report factors
- Run log	Report factors and control criteria
	LCS results and control criteria
	Copy of run log

CLP – contract laboratory program
LCS – laboratory control sample
GC – gas chromatography
MS – mass spectrometry
GFAA – graphite furnace atomic absorption
RPD – relative percent difference
ICP – inductively coupled plasma
TIC – tentatively identified compound
RSD – relative standard deviation

ATTACHMENT 7 - Review, Evaluation and Validation Comparison Table

	Review	Evaluation	Validation
SAMPLE INTEGRITY			
Sampling Date(s)	X		X
Sample(s) Preserved	X		X
Cooler Temperature (if applicable)	X		X
Chain-of-Custody Form Present and Complete	X		X
ANALYTICAL RESULTS			
Requested Samples Analyzed	X		X
Requested Parameters Analyzed	X		X
Correct Analytical Method(s)	X		X
Detection Limits Met	X		X
Proper Documentation Provided (e.g., Forms, Case Narrative, etc.)	X		X
Laboratory Flags	X		X
QA/QC			
Holding Times	X	X	X
Calibrations			X
Initial			X
Continuing			X
Blanks	X	X	X
Method and/or Preparation	X	X	X
Rinsate/Field/Trip	X	X	X
Calibration			X
LCS/LCSD	X	X	X
MS/MSD	X	X	X
Lab Duplicates	X	X	X
Field Duplicate Sample(s) Taken	X	X	X
Split Sample(s) Taken	X	X	X
Tracer/Carrier Results	X		X
Surrogate Results			X
Internal Standard Results			X
Analyte Identification (e.g., peak recognition, ROIs, etc.)			X
Analyte Quantitation (e.g., recalculate results from raw data, etc.)			X
Qualify Data		X	X

ATTACHMENT 8 – USACE Data Validation Form

DATE: _____

REVIEWER NAME: _____

SIGNATURE: _____

TITLE: _____

DATA VALIDATION CHECKLIST

PROJECT NAME:	
PROJECT NUMBER:	
SAMPLE ID (NUMBERS):	
SAMPLING TEAM:	
SAMPLE MATRIX:	
ANALYSES PERFORMED:	
CESAS DATA REPORTING LEVEL	

FIELD DATA DOCUMENTATION:

FIELD SAMPLING LOGS:	REPORTED		ACCEPTABLE		NOT REQUIRED
	NO	YES	NO	YES	
1. SAMPLING DATES NOTED					
2. SAMPLING TEAM INDICATED					
3. SAMPLE ID TRACEABLE TO LOCATION					
4. SAMPLE LOCATION					
5. SAMPLE DEPTHS FOR SOILS					
6. COLLECTION TECHNIQUE (BAILER, PUMP, ETC.)					
7. SAMPLE TYPE (GRAB, COMPOSITE)					
8. SAMPLE CONTAINER					
9. SAMPLE PRESERVATION					
10. CHAIN OF CUSTODY FORM COMPLETED					
11. REQUIRED ANALYTICAL METHODS					
12. FIELD WATER AND SOIL SAMPLE LOGS					
13. NUMBER OF QA & QC SAMPLES COLLECTED					
14. FIELD EQUIPMENT CALIBRATION					
15. FIELD EQUIPMENT DECONTAMINATION					
16. SAMPLE SHIPPING					

COMMENTS:

_____

_____

_____

_____

ATTACHMENT 8 – USACE Data Validation Form (Continued)

LABORATORY DATA VALIDATION:	REPORTED		ACCEPTABLE		NOT REQUIRED
	NO	YES	NO	YES	
1. SAMPLING RESULTS					
2. PARAMETERS ANALYZED					
3. ANALYTICAL METHOD					
4. SAMPLE RECEIPT DATE					
5. SAMPLE PREPARATION DATE					
6. HOLDING TIMES					
7. CALIBRATION					
8. MS/MSD RPD OR SAMPLE LD RPD					
9. SURROGATE SPIKE RESULTS					
10. BLANKS					
A. RINSATES					
B. FIELD BLANKS					
C. TRIP BLANKS					
11. SAMPLE pH					
12. SAMPLE TEMPERATURE					
13. DETECTION LIMITS					
14. QC DATA					
A. INORGANIC					
B. ORGANIC					

ANALYTE: _____

FLAG: _____

REMARKS: _____

_____

_____

_____

OVERALL COMMENTS: _____

_____

_____

DEFINITIONS:

U	Analyte not detected
J	Analyte identified, concentration is estimated value
UJ	Analyte not detected above estimated detection limits
B	Blank contaminated
R	Rejected value, presence or absence of analyte cannot be verified
UR	Rejected detection limits
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
LD	Laboratory Duplicate

Figure 1-1. Data Management Process Flowchart

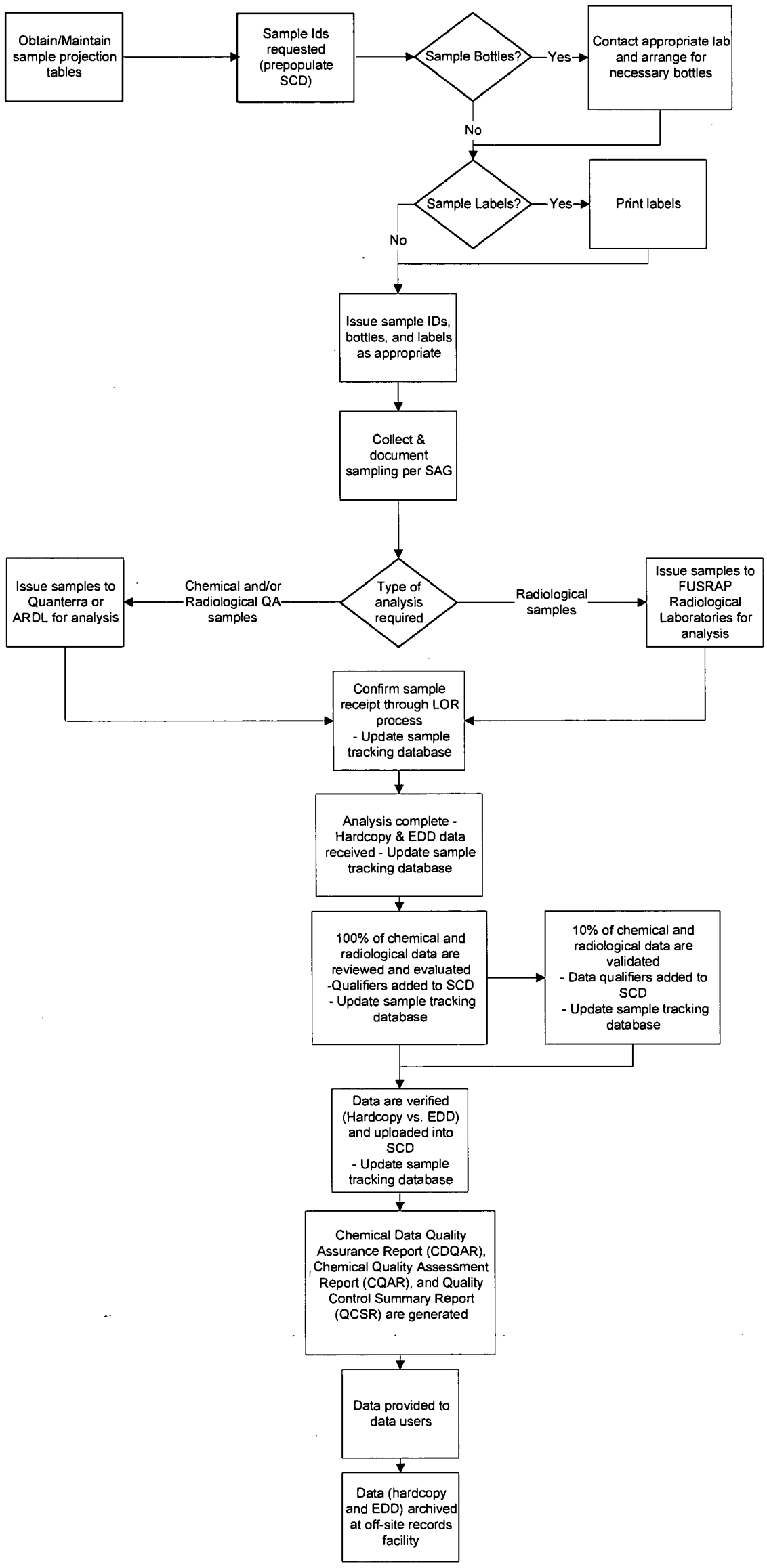

Figure 2-1. Data Management Process Organizational Structure

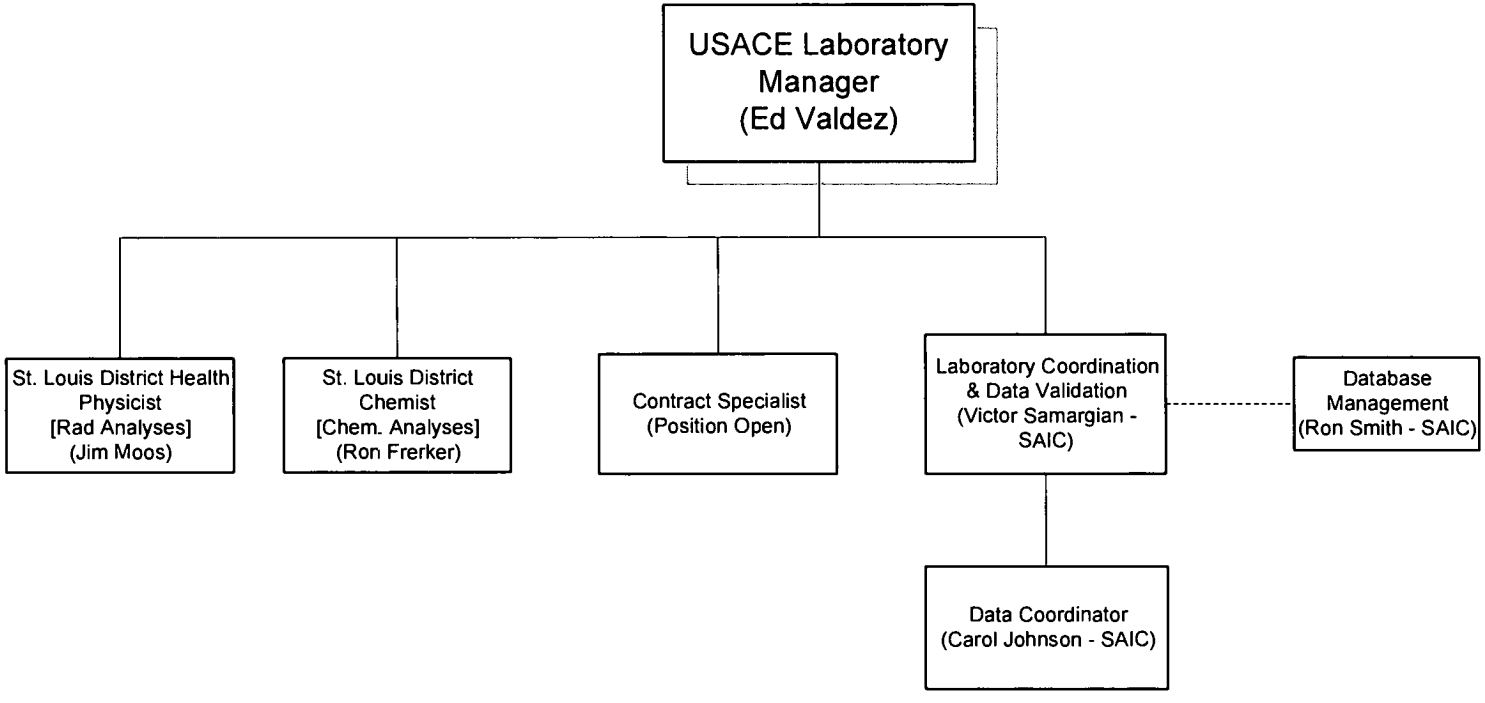

Figure 3-1. Contact Information

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