Title and Approval Page

(UFP-QAPP Manual Section 2.1 – Worksheet #1)

[Document Version (Internal Draft, Draft, Draft Final, Final)]

TIER II SAMPLING AND ANALYSIS PLAN

[Preparation Date-Day Month Year]

[Document Title – should reflect nature of project]
[Site Involved]
[Facility]

Prepared for:
Department of the Navy
[Name of Navy Organization]
[Address]

Prepared by:
[Preparer's Name]
[Preparer's Address]
[Preparer's Telephone #]

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Review Signature:	[Contractor QAM Signature]_____	
	[Printed Name/Title]	Date
Approval Signature:	[Navy QAO/Chemist Signature]_____	
	[Printed Name/Title]	Date
Other Approval Signature:	[Signature]_____	
(as required)	[Printed Name/Title]	Date

EXECUTIVE SUMMARY

Include a very brief description of the site under investigation (e.g. facility/project site background, any aspect of site physical setting- topography and climate, geology, hydrogeology that may have significant impacts on the project), summarize project objective(s), and include administrative or other general information (e.g. contract information) that may be needed to provide a comprehensive overview.

CONTENTS

ACRONYMS AND ABBREVIATIONS

Include project-specific acronyms only.

AA	Atomic Absorption
ANSI/ASQ	American National Standards Institute/American Society for Quality
ASTM	American Society for Standards and Materials
BOD	Biological Oxygen Demand
CA	Corrective Action
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CLP	Contract Laboratory Program
COC	Contaminant of Concern
CRDL	Contract-Required Detection Limit
CSM	Conceptual Site Model
CTO	Contract Task Order
CWA	Clean Water Act
DL	Detection Limit
DoD	Department of Defense
DCN	Document Control Number
DQI	Data Quality Indicator
DQO	Data Quality Objective
EPA	Environmental Protection Agency, United States
FCR	Field Change Request
FS	Feasibility Study
FSP	Field Sampling Plan
GC	Gas Chromatograph
GC/MS	Gas Chromatograph/Mass Spectrometer
GIS	Geographic Information System
GPC	Gel Permeation Chromatography
GPS	Global Positioning System
GW	groundwater
ICP	Inductively Coupled Plasma
IDQTF	Intergovernmental Data Quality Task Force
LCS	Laboratory Control Sample
LFB	Laboratory Fortified Blank
LIMS	Laboratory Information Management Systems
LOD	Limit of Detection
LOQ	Limit of Quantification
MARLAP	Multi-Agency Radiological Laboratory Analytical Protocols (Manual)
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCL	Maximum Contaminant Level
MOU	Memorandum of Understanding
MPC	Measurement Performance Criteria
MQO	Measurement Quality Objectives
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSR	Management Systems Review
NEIC	National Enforcement Investigations Center
NIST	National Institute of Standards and Technology

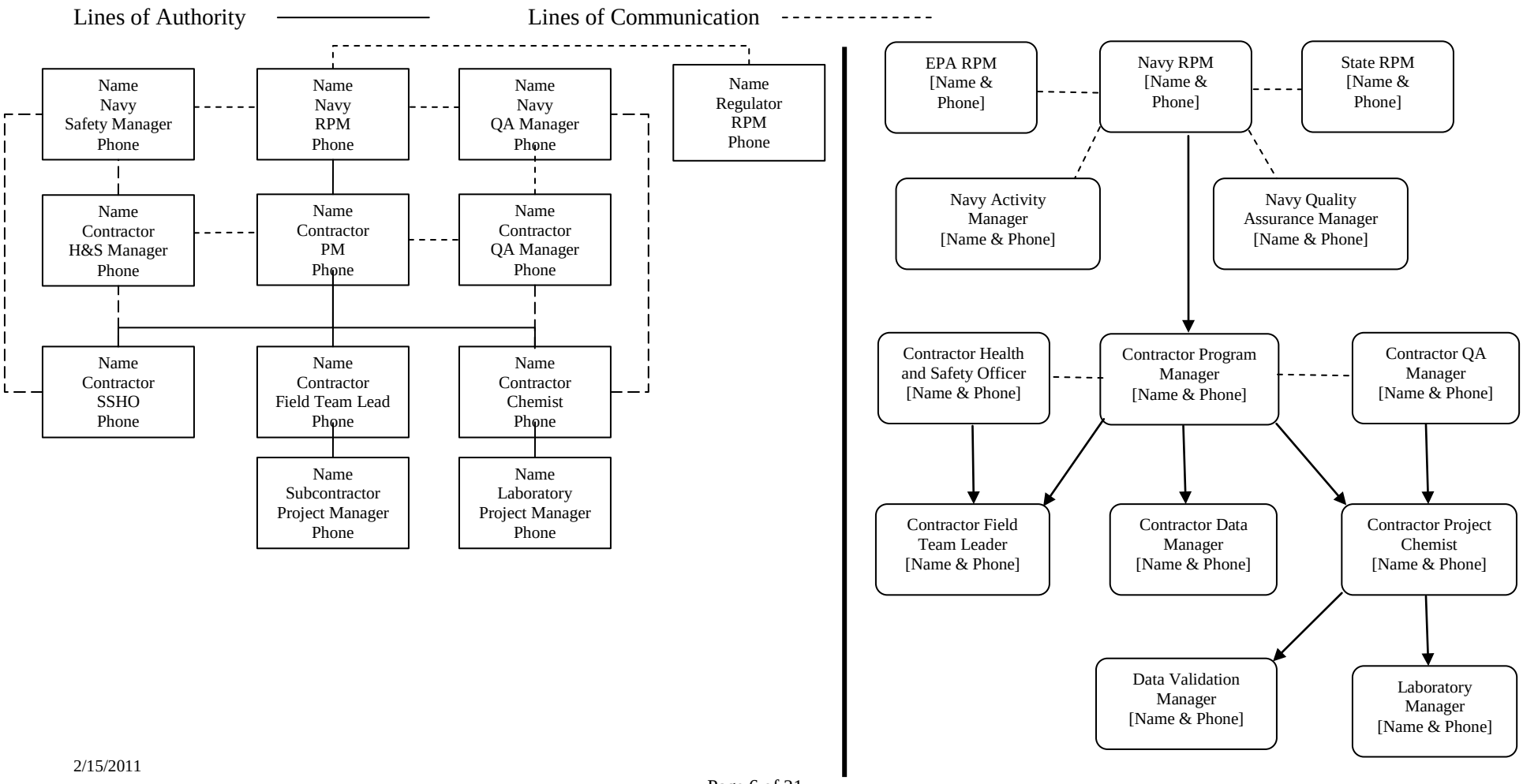
NPL	National Priorities List
PA/SI	Preliminary Assessment/Site Investigation
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCBs	Polychlorinated Biphenyls
PDF	Portable Document Format
PG	Professional Geologist
PM	Project Manager
PQOs	Project Quality Objectives
PRP	Potentially Responsible Party
PRQL	Project-Required Quantitation Limit
PT	Proficiency Testing (previously known as performance evaluation (PE) sample)
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QL	Quantitation Limit
QMP	Quality Management Plan
QS	Quality System
QSM	Quality Systems Manual
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RIC	Reconstructed Ion Chromatogram
RPD	Relative Percent Difference
RPM	Remedial Project Manager
RTM	Remedial Technical Manager
RSD	Relative Standard Deviation
RT	Retention Time
SAP	Sampling and Analysis Plan
SD	Standard Deviation
SDG	Sample Delivery Group
SDWA	Safe Drinking Water Act
SOP	Standard Operating Procedure
SQLs	Sample Quantitation Limits
SRM	Standard Reference Material
SVOA	Semivolatile Organic Analytes
SVOC	Semivolatile Organic Compounds
SW	Surface Water
TCLP	Toxicity Characteristic Leaching Procedure
TBD	To Be Determined
TSA	Technical Systems Audit
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
VOA	Volatile Organic Analytes
VOC	Volatile Organic Compounds
VSP	Visual Sample Plan

Project Organizational Chart

(UFP-QAPP Manual Section 2.4.1 – Worksheet #5)

Provide a concise organizational chart for the project, including reporting relationships between all organizations involved in the project. Charts must include lines of responsibility and should include lines of communication, and phone numbers of key personnel as well. It is permissible to use "TBD" for subcontractors not chosen prior to preparing the Draft SAP, but relationships between organizations and organizational roles should be noted. Update as necessary in the Final SAP.

The following charts are only examples:



Communication Pathways

(UFP-QAPP Manual Section 2.4.2 – Worksheet #6)

Describe the communication pathways and modes of communication that will be used during the project. The information needs to promote an understanding of which project team members are exchanging key information. Twelve standard communication drivers are listed which should be addressed; additional drivers may be added as needed. Describe the procedures for soliciting and/or obtaining approval between project personnel, between different contractors, and between samplers and laboratory staff. Timing is the maximum amount of time allowed for the communication event to take place. Pathways describe the type of communication such as e-mail, phone, etc. A text format is acceptable in lieu of the table as long as the eleven key communication drivers and all criteria in the column headings are included.

The communication pathways for the SAP are shown below.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
Regulatory Agency Interface				
Field Progress Reports				
Stop Work due to Safety Issues				
SAP/WP Changes prior to Field/ Laboratory work				
SAP/WP Changes in the Field				
Field Corrective Actions				
Sample Receipt Variances				
Reporting Lab Quality Variances				
Reporting Concerns Involving Lab				
Notification of Non-Usable Data				
Analytical Corrective Actions				
Reporting Data Validation Issues				
Data Validation Corrective Actions				

Notes:

Project Planning Session Participants Sheet

(UFP-QAPP Manual Section 2.5.1 – Worksheet #9)

This information documents to the extent practicable, the dates and participants in project planning meetings. A copy of this worksheet should be completed for meetings where project planning is conducted, whether sessions are internal (Navy) or external (includes regulators and/or stakeholders). Identify project team members who are responsible for planning the project. The following is the generic form used for scoping meetings. NAVFAC RPMs should include meeting minutes and participant rosters in the project file and administrative record. Correspondence (fax, e-mails etc.) to document consensus decisions and significant discussions, as well as records of communication (including meetings) shall be submitted to the admin record file. There may be multiple entries (tables) for this element. Text format is acceptable for this element in lieu of the table (e.g. meeting minutes) as long as the key information is included. Scoping sessions are not limited to partnering meetings, and may include phone conferences and email correspondence. All consensus decisions made should be documented here.

Project Name:
Projected Date(s) of Sampling:
Project Manager:
Date of Session:
Scoping Session Purpose:

Site Name:
Site Location:

Name	Title	Affiliation	Phone #	E-mail Address	Project Role

Comments/Decisions:

Action Items:

Consensus Decisions:

Conceptual Site Model

(UFP-QAPP Manual Section 2.5.2 – Worksheet #10)

It is important to concisely describe all information related to the project and to provide a conceptual model that summarizes information that is currently known and how this relates to the project's goal (EPA QA/G4, February 2006). This worksheet provides known site information, and serves as the conceptual site model (CSM). This section is intended to present the conceptual site model (CSM) of the project. The level of detail in the CSM should be based on a graded approach based on the nature of work being performed and the intended use of the data. A CSM to support environmental sampling usually includes a narrative description of site history, primary release mechanism, secondary contaminant migration, fate and transport considerations, and land use considerations, and then includes either graphic or narrative components to describe key aspects of the site (site geology, hydrology, topography, weather, exposure pathways, etc.) and current interpretation of nature and extent of contamination that will influence the project quality objectives and the sampling design. Uncertainties associated with the CSM need to be clearly identified. The CSM will continuously evolve as new data are collected. The applicable regulatory program(s) should be identified as part of this section

The information presented on this section should be site-specific and should support actions proposed in this SAP. It is unnecessary to describe overall regional information unless it is needed to understand the CSM. There are various formats that can be used to display elements of a CSM (e.g. narrative, figures, photos or combination thereof). The appropriate format for a CSM will vary with respect to complexity and may change over time depending on site issues, constraints, and requirements associated with management decisions. Formats are specific to the decision-making needs of the site and stakeholder team. For instance, 3-D figures may provide an overall summary, but also may be hard to interpret. On the other hand, cross sections are easier to comprehend, but may not accurately represent site conditions with respect to contaminant plume size and extent.

Data Quality Objectives/Systematic Planning Process Statements

(UFP-QAPP Manual Section 2.6.1 – Worksheet #11)

Use this section to develop and document data quality objectives (DQOs). DQO's are developed using a systematic planning process (SPP). EPA's TRIAD Approach and DQO Process are examples of systemic planning. Regardless of the SPP applied, the SAP must document the environmental decisions that need to be made and the level of data quality needed to ensure that those decisions are based on sound scientific data. The SAP requires the following critical questions to be answered:

- List the DQOs in the form of if/then qualitative and quantitative statements.
- What is the environmental question that is being answered?
- What are the Project Action Limits (PALs)? (A specific detailed list should be provided in the Reference Limits and Evaluation Tables)
- What will the data be used for?
- What types of data are needed (matrix, target analytes, analytical groups, field screening, onsite analytical or offsite laboratory techniques, sampling techniques)?
- Are there any special data quality needs, field or laboratory, in order to support environmental decisions?
- Where, when, and how should the data be collected/generated?
- How will the data usability be documented?

Information regarding EPA's DQO process can be found at *Guidance on Systematic Planning Using the Data Quality Objectives Process*, TRIAD information can be found at: http://www.triadcentral.org/over/index.cfm

Field Quality Control Samples

(UFP-QAPP Manual Section 2.6.2 – Worksheet #12)

Complete this section for each matrix, analytical group, and concentration level. This section is intended to describe how the project will use specific QC samples to assess the principal data quality indicators (DQIs) of precision, bias, representativeness, completeness, comparability, and sensitivity. Identify the QC sample and/or activity and the associated measurement performance criteria (MPC) that will used to assess the DQIs for both the sampling and analytical measurement systems. Use additional sheets if necessary. If MPC for a specific DQI vary within an analytical parameter, i.e., if MPC are analyte-specific, then provide analyte-specific MPC on additional sheets. Separate sheets should be provided for each matrix. If information varies within an analytical group, separate by individual analyte.

Measurement Performance Criteria Table – Field QC Samples

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria

Notes:

Sampling Design and Rationale

(UFP-QAPP Manual Section 3.1.1 - Worksheet #17)

Describe and provide a rationale for choosing the sampling approach and method (e.g., grid system, multi-incremental, judgmental). Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be sampled and at what concentration levels, the sampling methods and locations (including QC, critical, and background samples), the number of samples to be collected, and the sampling frequency (including seasonal considerations). If software products (e.g. Visual Sampling Plan, ProUCL, etc.) are used, the SAP must document the name and version number of the software and describe how it was used to support or develop the sampling design**. Include a site map showing the sampling locations; if locations are not known at the time the SAP is finalized, then the boundaries of the sampling area shall be shown.** Include charts, plans, and SOPs (CD format is suitable) and other documents to reference how the sampling points or locations were or shall be precisely determined. **If the TRIAD approach is utilized, then a detailed field decision-making flowchart shall be provided.**

Field Project Implementation (Field Project Instructions)

Add any project-specific content warranted such that the information provided can be used by the field team as Field Project Instructions. The Worksheets #14, 18, 19, 20, 21, 30 from the 37 Worksheet Tier I SAP meet the criteria in the Field Project Implementation (Field Project Instructions) section and can be used in place of this section.

Field Project Tasks

(UFP-QAPP Manual Section 2.8.1 – Worksheet #14)

Include step-by-step instructions (i.e., a recipe) that provide the details necessary for the field staff to appropriately implement each particular field project task. Examples of project tasks include (but are not limited to):

- Utility clearance
- Drilling and well installation
- Well development
- Environmental sample collection and quality control
- Specific sampling methods
- Equipment decontamination
- Investigation-derived waste management
- Land surveying

Field Project Implementation (Field Project Instructions), continued

Field SOPs Reference Table

(UFP-QAPP Manual Section 3.1.2 – Worksheet #21)

In each field project task or in the Field SOPs Reference Table, cite any applicable Standard Operating Procedures (SOPs) that will be followed. With each SOP citation, include the location of the SOP and the current version (i.e., to reflect any revisions, updates, or new SOPs). Also include in this SAP, if known, any project-specific deviations from the SOPs that will be employed and the rationale for the deviations. The comment field should be used to ensure the sampling method can be duplicated to obtain consistent results. Examples of SOPs are:

- Sample collection
- Sample preservation
- Equipment decontamination
- Well installation

SOP Reference Number	Title/Author	Revision Date or Version Number	Location of SOP (if not included in the SAP)	Any planned deviation for Project Work	Comments

Notes:

Field Project Implementation (Field Project Instructions), continued

Sample Details Table

(UFP-QAPP Manual Sections 3.1.1 and 3.5.2.3 – Worksheets #18, 19, 20 and 30)

This discussion relates to the Sample Detail table located on the two sheets immediately following. Using the table, list all site locations that will be sampled and include sample/ID number, if available. (Provide a range of sampling locations or ID numbers if a site has a large number.) Specify matrix and, if applicable, depth at which samples will be taken. Complete all required information, using additional sheets if necessary. The SAP must describe how samples will be collected. The selected sample collection procedures must be appropriate to ensure that project personnel collect representative samples in a consistent manner for all required sample matrices and locations, that contamination is not introduced during collection, and that sample volumes are properly preserved in order to meet project objectives.

For each matrix and analytical group, list the analytical and preparation method/SOP and associated container specifications, preservation requirements, and maximum holding time. Summarize by matrix and analytical group the number of field QC samples that will be collected and sent to the laboratory. Refer to minimum requirements in the UFP-QAPP compendium or justify in text format if/when those requirements are not needed.

Identify all laboratories or organizations that will provide analytical services for the project, including on-site screening, on-site definitive, and off-site laboratory analytical work. Group by matrix, analytical group, sample location or ID number. If applicable, identify the subcontractor laboratories and backup laboratory or organization that will be used if the primary laboratory or organization cannot be used. Using following table.

Field Project Implementation (Field Project Instructions), continued

Sample Details

(CTO and Project Reference) (Tentative Sampling Dates) (Laboratory Name and Address) (Point of Contact Name) (Phone Number)						**Analysis Group**				
						Preparation and Analytical Method	SW846 8260B			
						Analytical Laboratory/ Analytical SOP Reference[3]	Gold Star Lab/ SOP #1			
						Data Package Turnaround Time	28 Calendar day			
						Container Type/ Volume required (if different than container volume)	3 – 40ml VOA Vials			
						Preservative	HCl to pH <2; Cool to ≤ 6 °C; no headspace			
						Holding Time (Preparation/ Analysis)[4]	14 days to analysis			
Site	**Matrix**	**Station ID[2,5]**	**Sample ID[5]**	**Coordinates[5]** (optional)		**Depth/ Sampling Interval**				
				X	**Y**					
1	Groundwater	GW01	GW01-MMDDYY			15ft below ground surface	**X**			
Field QC Samples[1]										
	Field Duplicate	GW01	GW01D-MMDDYY			15ft below ground surface	**X**			
	Matrix Spike									
	Matrix Spike Duplicate									
	Equipment Blank					NA				
	Trip Blank					NA				
	Field Blank					NA				
						Total Number of Samples to the Laboratory				

[1] Include field QC samples (per site and media) including field duplicates, MS/MSDs, trip blanks, equipment blanks, and field blanks. Field QC counts may change depending upon duration of field event.

Frequency of QA/QC sample collection:

Field Duplicate- One per 10 field samples

MS/MSD- One pair per 20 field samples (including field QC samples)

Trip Blank- One per cooler to the laboratory containing volatiles

Equipment Blank- One per week of sampling

Field Blank- One per week of sampling

[2] If samples will be collected at different depths at the same location, count each discrete sampling depth as a separate sampling location or station.
[3] List laboratory addresses and contacts in the upper left hand corner of table. If samples will be shipped to multiple laboratories then specify as well. If backup laboratory has been identified specify in upper left hand corner.
[4] Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.
[5] Sample locations may be unknown at start of project. Designate if this information will be determined in the field.

Additional columns may be added if additional classification of samples is needed.

Reference Limits and Evaluation Tables

(UFP-QAPP Manual Section 2.8.1 – Worksheet # 15)

Complete this worksheet for each matrix sampled (e.g. Worksheet #15.1 Soil, Worksheet #15.2 Groundwater). Identify the target analytes/contaminants of concern and project-required action limits and quantitation goals. Next, list the laboratory-defined detection limits (DLs), limits of detection (LODs), and the limits of quantitation (LOQs) that must be met to achieve the project quality objectives. Strive to achieve project quantitation limits that are at least 3 to 5 times lower than the project action limits. The Project Action Limit Reference refers to the regulatory or site specific decision criterion (e.g. MCLs, PRGs, EALs, etc.) that was used to establish the Project Action Limit for a specific analyte. Additional columns can be added to present multiple decision criteria. If individual action limits are not appropriate, explanation should be provided. The Project Quantification Limit Goal (PQ) should be greater than the LOQ, but if not attainable the team should discuss the approach for using the data in the earlier DQO worksheet.

Matrix:

Analytical Group:

Analyte	CAS No.	Project AL (applicable limits)	Project AL Reference[1]	Project QL Goal (applicable units)	Laboratory Specific Limits [2, 3, 4]		
					LOQs	LODs	DLs

Notes:
1 List the type and source of the PAL used for each matrix specific analyte (e.g. Background, HH-MCL, HH-region III RBC, eco-WQC, eco-Region III BTAG, etc.)
2 Laboratory-specific DLs, LODs, and LOQs are limits that an individual laboratory can achieve when performing a specific analytical method.
3 If Laboratory-specific limits are not-known at time of Draft SAP, place to-be-determined, "TBD", as a placeholder in the columns. However, these fields MUST be populated and approved in the Final SAP prior to the sampling event.
4 Laboratory specific limits may be presented in a different manner if necessary to comply with project or regulatory requirements.

Analytical SOP References Table

(UFP-QAPP Manual Section 3.2.1 – Worksheet #23)

An individual sheet should be prepared for each primary and backup laboratory proposed for use. The Accreditation and Certifications (e.g. DoD ELAP, State Approval, etc.) required for a laboratory completing the work of the SAP, documentation of the laboratory having each requirement met and expiration date should be documented. All analytical and preparation procedures that will be used in the project must be documented in the SAP or attached document(s) to allow for review and approval. Attachments must be provided or appropriately referenced and available for access. If information is not available at the time of SAP submittal, a placeholder stating the required information is to-be-determined, "TBD", is permissible but is required prior to finalizing the SAP and field implementation. List all SOPs that will be used to perform onsite or offsite analysis. Indicate whether the procedure produces screening or definitive data. Include copies of the SOPs as attachments or reference in the SAP. The reference number can be used throughout the SAP to refer to a specific SOP. If the SOP has been modified for project work, note the modification in the final column. Process management SOPs are not required to be included (i.e sample disposal, sample receipt, sample custody)

(Laboratory Name and Address)
(Point of Contact Name)
(Phone Number)

Lab SOP Number	Title, Revision Date, and Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Variance to QSM	Modified for Project Work? (Y/N)

Notes:

Include the specific Lab Accreditation or Certification requirements for the work of this project, verification that these have been met and the expiration dates as appropriate.

Laboratory QC Samples Table

(UFP-QAPP Manual Section 3.4 – Worksheet #28)

Complete a separate sheet for each sampling technique, analytical method/SOP, matrix, and analytical group. If method/SOP QC acceptance limits exceed the measurement performance criteria, the data obtained may be unusable for making project decisions. See Section 2.2 of Part 2B of the UFP-QAPP QA/QC Compendium, and the QA Matrix in Section 3.4 and Tables 4 & 5 for rationale for QC sample collection. Those QC samples listed are only examples and other QC samples should be included as appropriate. Screening analyses should include a decision tree or logical diagram to describe how samples will be selected for subsequent definitive data analysis.

Matrix

Analytical Group

Analytical Method/ SOP Reference

QC Sample:	Frequency & Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank						
LCS						
PT						
MS/MSD						

Note: LCS laboratory control spike
PT Proficiency test

Data Verification and Validation (Steps I and IIa/IIb) Process Table

(UFP-QAPP Manual Section 5.2.1, UFP-QAPP Manual Section 5.2.2, Figure 37 UFP-QAPP Manual, Table 9 UFP-QAPP Manual – Worksheets #34, 35, 36)

Data review procedures and criteria are documented in the SAP to ensure that data are evaluated properly, completely, and consistently for use in meeting project quality objectives (PQOs). Describe the processes that will be followed for data review. Verification (Step I) is a completeness check that is performed before the data review process continues in order to determine whether the required information (complete data package) is available for further review. The description should detail how each item will be reviewed, when the activity will occur, and what documentation is necessary. *Internal* or *external* is in relation to the data generator. For analytical data validation, the data review input is the matrix and analytical group of the data. The description is then the validation criteria for comparison. Verification and validation inputs for this section include items such as those listed in Table 9 on page 112-113 of the UFP-QAPP Manual, V.1, March 2005. Validation guidance and documents should address items such as those specified on page 115 of the UFP-QAPP Manual (i.e. the process that will be used to validate sample collection handling, field analysis and analytical lab project data). If streamlining of data review is being performed, clearly identify the amounts and type of data to be streamlined, as well as the nature of the streamlining activity in the text.

Data Review Input	Description	Responsible for Verification (name, organization)	Internal/ External