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USACE / NAVFAC / AFCEC / NASA **UFGS-01 35 45.00 10 (April 2006)**

Preparing Activity: USACE **Superseding UFGS-01450A (July 2004)**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2014
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CHEMICAL DATA QUALITY CONTROL

04/06

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SECTION 01 35 45.00 10

CHEMICAL DATA QUALITY CONTROL
04/06

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NOTE: This guide specification covers requirements for Chemical Data Quality Control (CDQC) for remedial and removal actions at Hazardous, Toxic, and Radioactive Waste (HTRW) contaminated sites.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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PART 1 GENERAL

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NOTE: This specification is applicable to remedial and removal actions involving HTRW that are conducted by the U.S. Army Corps of Engineers (USACE). It includes the collection and analysis of environmental samples and process parameter measurements required for the pre-remedial activities, remediation, and post remediation phases. This includes chemical measurements of soil, water, air, and other chemical parameters required for Defense Environmental Restoration Program (DERP), Base Realignment and Closure (BRAC), installation environmental compliance, military construction, superfund, civil works, and other construction projects involving HTRW.

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1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

Publications included in this guide specification are applicable to chemical data quality control for HTRW remedial actions. Include all references necessary to attain project Data Quality Objectives (DQO). References for sampling and/or analytical procedures must be for the most recent update of the method. Include in the specification additional references that are unique to the project such as the Record of Decision (ROD), Federal, state and local Applicable or Relevant and Appropriate Requirements (ARAR), remedial and innovative technology requirements, unique contaminants, etc. Use references in the CDQC section which are compatible with references in other sections of the specification. The designer should state in the specification whether a reference is mandatory or provided as guidance.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE (USACHPPM)

USACHPPM Protocol	(1993) Sampling Protocol Building Demolition Debris and Buildings Painted with Lead-Based Paint

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 200-1-1	(1994) Environmental Quality -- Validation of Analytical Chemistry Laboratories

EM 200-1-3	(2001) Engineering and Design -- Requirements for the Preparation of Sampling and Analysis Plans
EM 200-1-6	(1997) Environmental Quality -- Chemical Quality Assurance for HTRW Projects
ER 1110-1-263	(1998) Engineering and Design -- Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 540/R 99-008	(1999) USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review
EPA SW-846.3-3	(1999, Third Edition, Update III-A) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 268	Land Disposal Restrictions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 178	Specifications for Packagings

1.2 ACRONYMS

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NOTE: Acronyms included in this UFGS are defined in the specification language, but are not required for all projects. Define all acronyms used in this section. Acronyms included in the CDQC section must not conflict and must be compatible with definitions and acronyms in other sections of the specification.

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The definition of acronyms used by the Contractor that pertain to chemical data quality control shall be clearly defined for all contract related products and communications.

1.3 MEASUREMENT AND PAYMENT

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NOTE: For some remedial action contracts, chemical parameter measurement may be acquired by both lump

sum pricing and additional unit pricing. Unless adequately addressed in the Special Contract Requirements section of the contract, make clear what chemical measurement pricing procedures are to be used for the contract and that payment will be withheld pending Government Approval (GA) of the chemical data final report. The designer should coordinate this paragraph with the bidding schedule.

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Separate payment will not be made for providing and maintaining the chemical data quality requirements including the chemical data quality management, chemical data validation, minimum chemical data reporting requirements, and chemical data quality submittal requirements; these costs shall be included in the applicable unit prices or lump sum prices contained in the bidding schedule.

1.4 CHEMISTRY REQUIREMENTS

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NOTE: The designer may include chemistry elements in other sections of the specification; however, all elements of chemical data quality control required by this guide specification must be included in that section or the chemistry must also be included in this section of the specification. In addition, the designer should review or have the Contractor review other sections of the specification to extract the list of sampling and analysis requirements.

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Chemical Data Quality Control (CDQC) shall be as defined in ER 1110-1-263; this ER, which integrates USACE guidance on the subject, shall be supplemented by EM 200-1-6 for detail technical guidance on CDQC. Tables and charts defining Design Analysis (DA), ROD, and remedial technology specific chemistry shall be according to or consistent with EM 200-1-3.

1.4.1 Site History

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NOTE: The designer should provide a sufficient site history for the Contractor to meet the information requirements of the Sampling and Analysis Plan (SAP). The information in the Contractor's SAP must provide field and laboratory personnel all necessary site specific chemical data. Include references containing this information.

****

[_____]

1.4.2 Data Quality Objectives (DQO)

****

NOTE: It is the responsibility of the designer to identify and define chemical DQO in the construction specification either as previously determined in the DA, ROD, other decision documents or developed in accordance with EM 200-1-2. As prescribed within EM

200-1-2, the designer's technical planning team is responsible for developing project-specific data collection programs that define the quality and quantity of data needed to perform all the engineering and scientific evaluations required for the project. Data users will determine initial data needs in order to perform specific evaluations and make the engineering and scientific judgments required to complete the necessary activities leading to site closeout. Implementors provide input to planning specific data collection tasks and are responsible for task execution.

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Sample acquisition, chemical analysis and chemical parameter measurements shall be performed so that the resulting data meet and support data use requirements. The chemical data shall be acquired, documented, verified and reported to ensure that the specified precision, accuracy, representativeness, comparability, completeness and sensitivity requirements are achieved.

1.4.3 Sampling, Analysis and Measurement

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NOTE: The process to determine number of samples and sample locations should be fully described here. The specification should describe sampling frequency (e.g. per excavated area, per a certain number of cubic meters (yards) of soil, per a certain number of drums) and general procedures for sample locations (e.g. stained areas, grid pattern over the excavated area, center of stockpile). This provides adequate information for the Contractor bid preparation, as well as for field oversight of Contractor sampling, while allowing the Contractor the flexibility to do the best possible job given each site's unique characteristics.

Analytical method requirements for all project chemical measurements must be specified, including number and type of samples to be collected and instrumental measurements. For National Priority List (NPL) sites, chemical data requirements for delisting the site from the NPL must be defined and included.

For each type of sample, provide a table that identifies the number of samples, including Quality Control (QC) and Quality Assurance (QA) samples, extraction and analytical methods, precision, accuracy, representativeness, comparability, completeness and sensitivity for analytical determinations.

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[_____]

1.4.3.1 Soil/Sediment and Ground/Surface Water Samples

Soil/sediment and ground/surface water samples shall be collected and analyzed and/or shipped to a primary laboratory according to the following table: [_____].

1.4.3.2 Process Solid and Liquid Samples

Process solid and liquid samples shall be collected and analyzed and/or shipped to a primary laboratory according to the following table: [_____].

1.4.3.3 Borrow or Fill Material Samples

Borrow or fill material samples shall be collected and analyzed according to the following table: [_____].

1.4.3.4 Investigation Derived Waste Samples

Investigation derived waste (IDW) samples shall be collected and analyzed according to the following table: [_____].

1.4.3.5 Manifesting Samples

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NOTE: Typical testing requirements for manifesting include, as a minimum, the following: 1) DQO of Transporter and Treatment, Storage and Disposal Facility (TSDF); including sampling for suspected contaminants on TSDF's permit restrictions; 2) DQO of installation's hazardous waste management plan (when applicable); 3) DQO of any state/province through which the waste will pass (Contractor responsibility); and 4) Testing for characteristic wastes {ignitability (D001), corrosivity (D002), and reactivity (D003); Toxicity Characteristic Leaching Procedure (TCLP) metals (D004 to D011); TCLP pesticides/herbicides (D012 to D017); TCLP volatile and semi-volatile organic compounds (D018 to D043)}.

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Material shipping manifesting shall be in accordance with 40 CFR 261, 40 CFR 262, 40 CFR 268, 49 CFR 172, and 49 CFR 178. Manifesting samples shall be collected and analyzed according to the following table: [_____].

1.4.3.6 Process Gas and Particulate Emission Samples

Process and emission gas and particulate matter samples shall be collected and analyzed and/or shipped to a primary laboratory according to the following table: [_____].

1.4.3.7 Real-Time Instrumental Measurement Samples

Real-time instrumental measurements shall be analyzed onsite for chemical parameters according to the following table: [_____].

1.4.3.8 Perimeter Air Monitoring Samples

Perimeter air monitoring samples shall be analyzed according to the following table: [_____].

1.4.3.9 Compatibility Field Testing for Bulking Operations

Samples for compatibility field testing for bulking operations shall be in accordance with the following table: [_____]. Use appropriate compatibility field tests before any bulking operations. The compatibility testing system shall include procedures for: 1) tests conducted prior to drum opening; 2) tests conducted at the drum head; 3) sample acquisition; 4) compatibility tests on collected samples; 5) sample compositing; 6) bulking; and 7) limitations.

1.4.3.10 Demolition Samples

Sampling and analysis for demolition shall be according to USACHPPM Protocol and the following table: [_____].

1.4.3.11 Field Screening

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NOTE: The designer should determine the appropriate field screening techniques to check for presence of contamination. The designer should consider the use of a photoionization detector, flame ionization detector, colorimetric test kits, field gas chromatography, and immunoassay field kits, etc.
****

Field screening shall include [photoionization detector] [flame ionization detector] [colorimetric] [field gas chromatography] [immunoassay field kits] or similar methods according to the following table: [_____].

1.5 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy,

Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sampling and Analysis Plan; G, [_____]

Submit no later than [_____] days after receipt of notice to proceed.

SD-06 Test Reports

QA Sample Collection and Analysis
Chemistry Data Package

Chemical Data Final Report; G, [_____]

Each report shall be labeled with the contract number, project name and location.

1.6 QUALITY ASSURANCE ELEMENTS

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NOTE: All HTRW projects require a comprehensive and multifaceted approach to quality control and quality assurance in order to achieve and document attainment of appropriate quality for the intended data usage. The designer, in consultation with the technical team, can choose from several techniques to monitor and ensure the quality of the chemical data. The designer must define the appropriate QA elements to be applied to the project, as well as the frequency of application, and any contingency or corrective action protocols necessary in the event of deficiency or failure. EM 200-1-6 provides a description of each Chemical Data Quality Management (CDQM) activity.

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Follow the QA elements necessary to monitor and ensure the quality of chemical data produced.

1.6.1 Laboratory Validation Requirements

Propose the minimum number of laboratories that can attain or have attained U.S. Army Corps of Engineers (USACE) validation in accordance with EM 200-1-1 and consistent with contract required chemical data quality. The Contractor may propose laboratories that shall subsequently be

validated by the USACE, or select currently validated USACE laboratories. Identify all proposed project laboratories [no later than the coordination meeting] [in the sampling and analysis plan (SAP)]. If a proposed analytical laboratory cannot meet specified analytical requirements or achieve the required validation, select another laboratory. If not currently validated, the USACE laboratory validation process requires a nominal 120 day process.

1.6.2 QA Sample Collection and Analysis

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NOTE: The designer should ensure that the number or frequency of QA samples is clearly specified. In addition, the designer should identify the address and point of contact for the QA laboratory.

It is the responsibility of the Contracting Officer (CO) to report any significant discrepancies between the primary and QA laboratory results to the Contractor. In the event of such an occurrence, the Contractor must initiate an investigation into possible reasons for the discrepancies and submit a plan to resolve any problems that are identified.

****

Collect and transport QA samples to the QA laboratory. Samples for all analyses (except volatiles) shall be taken as splits of homogenized samples. Samples for volatiles shall be collected as discrete duplicates/triplicates. Samples shall be collected at a rate of [_____] percent per matrix per analysis per sampling event.

a. Submit the QA Laboratory Advance Notification (QALAN) to the QA laboratory at least [10 business] [_____] days before the initial shipment of samples. The QALAN shall include a list of laboratory-related DQO. The DQO shall include, but shall not be limited to, identification of extraction and analysis method numbers, a list of analytes with required limits, estimated number of tests, approximate sampling dates, and requested completion date for QA testing. Notify the Contracting Officer (CO) and the QA laboratory immediately of any changes.

b. Provide all labor and field supplies, including sample containers and shipping coolers, for collecting and shipping samples for QA testing. In the presence of the Contracting Officer, properly collect, label, and package the QA samples, fill out all chain-of-custody forms, and ship the samples by one-day delivery service to the designated QA laboratory for analysis. Notify the laboratory when all sampling is completed and shall clearly mark the chain-of-custody form accompanying the final shipment "FINAL" in 25 mm 1 inch high lettering.

c. Allow [60 calendar] [_____] days for laboratory analysis of QA samples, data review, and submission of the Government chemical quality assurance report. The elapsed time shall begin when the Contractor's last sample arrives at the QA laboratory, provided that the Contractor's completed chemistry data package is received within 30 calendar days thereafter. Otherwise, allow 30 calendar days from the date the completed chemistry data package is received at the laboratory. [The Contractor may, as an option, continue activities based on initial sampling and QC results, before receipt of QA test

results.] Where QA results are unacceptable due to Contractor negligence (e.g. improper sample collection and/or handling by the Contractor), or where QA sample results conflict with the Contractor's primary sample results, further sampling and testing shall be performed as directed by the CO. All costs for such additional sampling and testing due to Contractor negligence, including both QC and QA testing and analysis, and for any required remedial actions in the work, shall be borne by the Contractor. USACE acceptance of final disposition of any excavated soil shall not occur until the Contractor's sampling and QC results have been confirmed by QA results. This includes all final stockpiling, wasting, backfilling, and related construction. No payment will be made for laboratory sampling and testing before receipt and acceptance by the Government of the QA samples and the completed Chemical Data Final Report (CDFR), properly formulated according to these specifications.

1.6.3 Single or Double Blind Performance Evaluation Samples

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NOTE: The designer should evaluate the need and frequency of Performance Evaluation (PE) samples. In some cases, PE samples may be a regulatory requirement (e.g. trial burns). PE samples are used to assess routine performance levels of a laboratory. There are several options available for PE samples including single blind, double blind, and duplicate splits or collocated samples (similar to QA splits samples described above).
****

Submit certified [soil] [water] [air] Performance Evaluation (PE) samples. The PE samples shall contain the site specific contaminants of concern. The analytes shall be contained in the PE samples at the site specific action levels for each target analyte. Throughout the duration of the project [_____] samples per analysis type shall be submitted for analysis. At least [_____] samples shall be submitted during the first week of analysis so that the Contractor can assess the quality of the laboratory data. If the laboratory does not meet the certified PE sample acceptance limits, project sample analysis shall be terminated until corrective actions have been implemented. Supply the PE sample results and the vendor's acceptance limit documentation to the CO within [_____] hours following reporting of the results by the laboratory.

1.6.4 Review of Primary Laboratory Data

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NOTE: There are several different levels of data assessment (e.g. verification, review, evaluation and validation) described in EM 200-1-6.
****

Secure independent data review of the entire primary data set.

1.6.5 Validation of Data

Validate [_____] percent of the data in accordance with EPA 540/R 99-008. The data validation strategy shall be established at the beginning of the project to be consistent with project DQO.

1.6.6 Electronic Tape Audits

Perform an electronic tape audit on [_____] percent of project sample results. The raw data from a given batch shall be re-calculated and compared to the results reported by the laboratory. The data quality shall be measured by laboratory compliance with the required methods and acceptable practices for analysis and data reduction.

1.7 QUALIFICATIONS

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NOTE: Insert the required personnel and their desired minimum educational and/or related experience, as required for the authoritative and decision-making responsibilities that comprise the chemical quality control organization. Experience and/or education requirements must correspond to chemical data responsibilities assigned in the Contractor Quality Control (CQC) plan. Assign personnel requirements appropriate to the magnitude of the remedial action. As a minimum, HTRW remedial action projects requiring chemical measurements must have a designated Chemical Quality Control Officer within the CQC system.

For smaller projects, both the environmental sampler and project chemist may not be required. The duties/responsibilities should be consolidated into one individual. The designer should edit the number and qualifications of personnel as appropriate.

****

[_____]

1.7.1 Chemical Quality Control Officer

As a minimum, the Contractor's Chemical Quality Control Officer shall have: a [_____] degree in Chemistry; [_____] years of experience related to investigations, studies, design and remedial actions at HTRW sites; and [_____] field seasons (or one continuous calendar year experience) in calibration and operation of various field monitoring devices as well as standard analytical chemistry methods common for analyzing soil, water, air and other materials for chemical contamination assessment, including hazardous waste manifesting. The Chemical Quality Control Officer shall ensure that all chemistry related objectives including responsibilities for DQO definitions, sampling and analysis, project requirements for data documentation and validation, and final project reports are attained. The Chemical Quality Control officer need not be present onsite during routine sampling, but shall be available for consultation with Government and Contractor personnel.

1.7.2 Project Chemist

As a minimum, the Contractor's Senior Chemist shall have: a [_____] degree in Chemistry; [_____] years of experience related to investigations, studies, design and remedial actions at HTRW sites; [_____] field seasons experience in calibrating and operating various field monitoring devices; and [_____] years of experience in the operation of an HTRW commercial laboratory with standard analytical chemistry methods common for analyzing

soil, water, air and other materials for chemical contamination assessment, including data for hazardous waste manifesting. The project chemist shall ensure that all chemistry related goals of the program are attained. The project chemist shall be onsite during all sampling events and shall also be available for consultation with Government personnel.

1.7.3 Environmental Sampler

As a minimum, the Contractor's Environmental Sampler shall have: [a [_____] degree in Chemistry, Environmental Science, Engineering, Geology, Hydrology, or a related field;] [_____] years of experience in the development and preparation of SAP and work plans; [_____] years of experience in and knowledge of EPA methods for collecting environmental and hazardous waste samples; [_____] years of experience in operation of field screening equipment (e.g. PID, FID, infrared spectrometer, immunoassay, etc.); and [_____] field seasons of experience with the particular field screening techniques for use on this project. The Environmental Sampler shall collect all onsite samples and perform all field screening tests. The Environmental Sampler shall review the sampling results, and provide recommendations for the Contractor's sampling program. The Environmental Sampler shall be onsite during excavation and stockpiling operations involving contaminated soil or soil to be checked for contamination.

1.8 COORDINATION MEETING

****

NOTE: QA of Contractor work for this contract is a function of the Government. For CDQM, USACE has established QA policy that is defined in ER 1110-1-263. The designer must require in the specification that the Contractor comply with USACE CDQM as described in ER 1110-1-263.

****

After the preconstruction conference, before any sampling or testing, the Contractor and the Contracting Officer will meet at [the construction site][_____] to discuss the CQC Plan and the SAP. The coordination meeting will be simultaneous to any CQC coordination meeting required in Section 01 45 00.00 10 QUALITY CONTROL unless otherwise indicated or directed. A list of definable features that involve chemical measurements shall be agreed upon. At a minimum, each matrix (soil, water, air, containerized wastes, radioactive wastes, instrumental chemical parameter measurement, etc.) shall be a definable work feature. Management of the chemical data quality system including project DQO, project submittals, chemical data documentation, chemical data assessment, required sampling and analysis protocols, and minimum data reporting requirements shall be agreed upon. The meeting will serve to establish an interrelationship between the Contractor's chemical data quality management and Government chemical quality assurance requirements. Minutes of the meeting will be documented by the Government and shall be signed by both the Contractor and the Contracting Officer. The minutes will include any or all unresolved chemical issues along with the conditions for resolution and will become a part of the contract file.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Provide chemical sample acquisition, sample analysis, instrumental measurements of chemical parameters for chemical data quality control. An effective chemical data quality control system shall be established that meets the requirements for the chemical measurement DQO applicable to the project. The system shall cover chemical measurements pertaining to and required for Contractor and subcontractor produced chemical data. Control field screening, sampling, and testing in conjunction with remedial activities to meet all DQO; minimize the amount of excavated material requiring temporary storage; prevent dilution of contaminated soils with clean soils; and ensure completion of work within the required time.

3.2 QUALITY CONTROL PLAN

****
NOTE: The designer should incorporate the desired chemical quality control requirements into the CQC Plan specified in Section 01 45 00 QUALITY CONTROL.
****

[_____]

3.2.1 Additional Requirements

In addition to the quality control requirements specified in Section 01 45 00.00 10 QUALITY CONTROL, the CQC Plan shall incorporate the qualifications, authority and responsibilities of all chemical quality management and support personnel. Chemical measurements including sampling and/or chemical parameter measurement will not be permitted to begin until after production and acceptance of the CQC Plan, and Government approval of the SAP.

3.2.2 Chemistry Elements of the CQC Plan

****
NOTE: Define the chemical data quality control management and staff requirements that assure compliance with project chemical data requirements. The level of chemical measurement expertise and project commitment must be relevant to the magnitude of the project chemistry requirements.
****

To cover contract related chemical measurements by the Contractor and all subContractors, the CQC Plan shall include the following as a minimum.

3.2.2.1 Qualifications

Names, education, experience qualifications, authorities, and decision-making responsibilities of all chemical quality management and support personnel. The CQC Plan shall contain a copy of a letter from the project QC manager designating and authorizing a Chemical Quality Control Officer and chemical quality control organization staff.

3.2.2.2 Authority and Responsibility

A diagram, flow chart, or figure clearly depicting the chemical data quality management and support staff and the authority and responsibility of each for chemical sampling and analysis, procedures for corrective actions, deliverables and submittals, deviations and changes, chemical quality documentation, data validation, minimum data reporting requirements, and DQO for chemical parameter measurement by the Contractor and subContractors. The contents of this section of the CQC Plan shall be included in the applicable "Project Organization" elements of the FSP and the QAPP.

3.3 SAMPLING AND ANALYSIS PLAN (SAP)

****

NOTE: The SAP may be required to be a single stand alone document or a two-part document to be used by the sampling and measurement personnel as well as Contractor analytical laboratory personnel. Sufficient project chemical data requirements, to the extent the design allows, must be included in paragraph CHEMISTRY REQUIREMENTS for the Contractor to prepare each of the elements of the SAP. The SAP must be provided to all Contractor and subcontractor personnel responsible for chemical parameter measurements. The Quality Assurance Project Plan (QAPP) portion of the SAP must be provided to Contractor's analytical laboratories.

The Contractor should be directed to prepare the SAP in accordance with project specific chemical data quality requirements and EM 200-1-3. For larger projects requiring an extensive SAP, it may be more user friendly to make the Field Sampling Plan (FSP) independent of the QAPP. In such case the two must not cross reference but must be stand alone parts of the SAP. The designer must designate which is required by the contract.

Depending on the size or complexity of the project, all the elements listed below may not be appropriate; in these instances, the format may be abbreviated or modified to accommodate the project activities.

Chemical measurements for the initial phases of the contract may be allowed by the USACE CO through an interim or abbreviated plan applicable to the particular feature of work, following acceptance of the CQC Plan. The measurement of chemical parameter, that is not included in a Government approved interim plan and is not included in the contract specification, will not be permitted.

****

Prepare the SAP in accordance with CDQC requirements and EM 200-1-3. The SAP is a [single] [two-part] document that contains two distinct elements: FSP and QAPP. [Do not cross] [Cross] reference sections of the FSP and QAPP. The SAP confirms the Contractor's understanding of the contract

requirements for chemical data quality control, and describes procedures for field sampling and sample submittal for analysis, field chemical parameter measurement, data documentation, data assessment and data reporting requirements. In the SAP, delineate the methods to be used to accomplish the chemical quality control items to assure accurate, precise, representative, complete, legally defensible and comparable data. Describe all chemical parameter measurements for all matrices for all phases of the remediation contract. As a single interrelated document, provide the SAP to field and laboratory personnel. Original/innovative approaches to chemical parameter measurements may be proposed for cost reduction and remediation efficiency by abbreviated sampling, contingency sampling and/or contingency analysis, indicator or tracer analysis, onsite analytical services, equivalency or screening methods. Clearly identify the Contractor obtained laboratories. Address all levels of the investigation with enough detail to become a document which may be used as an audit guide for field and laboratory work. Furnish copies of the Government approved SAP to all laboratories and the Contractor's field sampling crew.

3.3.1 Field Sampling Plan (FSP)

The FSP contains necessary technical detail and direction for the field personnel to understand sampling and field measurement requirements. In the FSP provide a comprehensive description and full detail for personnel to perform all onsite activities required to attain project DQO, including: locations of samples, sampling procedures for onsite and offsite chemical analysis, summaries of analyses to be performed on samples, shipment of samples for offsite analyses, performance of onsite and offsite instrumental parameter measurements, data documentation and reporting requirements.

3.3.2 Quality Assurance Project Plan (QAPP)

The QAPP contains necessary technical detail and direction for field and laboratory personnel to understand project sample analysis, quality control and data reporting requirements, analytical methods, required detection limits, QC requirements, and data validation and reporting requirements.

3.4 CHEMISTRY DATA PACKAGE

****

NOTE: A schedule for data delivery should be established so that data packages are provided as needed for chemical quality assurance assessment. More frequent delivery of data packages allows USACE to evaluate the project lab's performance on a continuing basis by comparing primary and QA laboratory results. The designer should identify the anticipated number and/or frequency in light of project objectives (e.g. amount of data produced, project duration, etc.). Most projects are short-term (within 1 year) and will require one data package at the end of the project.

Recommended content of a data package is defined in EM 200-1-6.

****

Provide the chemistry data package through USACE CO [to the USACE QA lab] [to the process treatment personnel] [as an attachment to the CDFR] [every

[_____] [days] [weeks] of the project] [at the end of the project].

The chemistry data package contains information to demonstrate that the project's DQO have been fulfilled. The QA function will compare QA sample results to corresponding primary sample results, will assess the Contractor's compliance with the SAP, and will recommend corrective action as necessary.

3.5 CONTROL OF CHEMICAL DATA QUALITY

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NOTE: EM 200-1-3 provides a detailed checklist that enables field personnel to implement the three-phase control procedures required for chemical measurement, sample acquisition and shipment.
****

Contractor chemical data quality control ensures that a quality control program is in place that assures sampling and analytical activities and the resulting chemical parameter measurement data comply with the DQO and the requirements of the SAP. Utilize the three-phase control system that includes a preparatory, initial and follow-up phase for each definable feature of work. The three-phase chemical data control process must ensure that data reporting requirements are achieved and shall be implemented according to Section 01 45 00.00 10 QUALITY CONTROL. Combine the three-phase chemical data control process with that under Section 01 45 00.00 10 QUALITY CONTROL.

3.6 ANALYTICAL TESTING LABORATORIES

****
NOTE: Designate whether an onsite laboratory is a requirement or whether the Contractor is allowed the option of performing chemical analyses either onsite or offsite by the Contractor's lab in order to comply with analytical requirements of the contract. Specify any special laboratory requirements such as radiation capabilities, special EPA, or state requirements, etc.

The designer should specify the type of validation necessary for the contract. For underground storage tank projects, at a minimum, the laboratory must be State certified.
****

Propose the analytical laboratories to be used for the primary samples analyses. Laboratory validation requirements shall be in accordance with paragraph Laboratory Validation Requirements. The Contractor may utilize its own laboratory or utilize subcontract laboratories to achieve the primary required sample analyses.

3.6.1 Laboratory Analytical Requirements

Provide the specified chemical analyses by the Contractor's laboratory. Provide chemical analyses to achieve the project DQO for all parameters specified by the methods. To give the USACE programs the greatest flexibility in the execution of its projects, the EPA SW-846.3-3 methods are generally the methods employed for the analytical testing of

environmental samples. These methods are flexible and shall be adapted to individual project-specific requirements.

3.6.2 Laboratory Performance

Provide continued acceptable analytical performance and shall establish a procedure to address data deficiencies noted by review and/or quality assurance sample results. Provide and implement a mechanism for providing analytical labs with the SAP or QAPP portion of the SAP, for monitoring the lab's performance and for performing corrective action procedures. Acquire analytical services with additional [USACE] [State of [_____]] validated laboratories in the event a project lab loses its validation status during the project.

3.7 CHEMICAL DATA FINAL REPORT

The CDFR shall be produced including a summary of quality control practices employed and all chemical parameter measurement activities after project completion. As a minimum, the CDFR shall contain the following:

a. Summary of project scope and description.

b. Summary of any deviations from the design chemical parameter measurement specifications.

c. Summary of chemical parameter measurements performed as contingent measurements.

d. Summary discussion of resulting data including achieving data reporting requirements.

e. Summary of achieving project specific DQO.

f. Presentation and evaluation of the data to include an overall assessment on the quality of the data for each method and matrix.

g. Internal QC data generated during the project, including tabular summaries correlating sample identifiers with all blank, matrix spikes, surrogates, duplicates, laboratory control samples, and batch identifiers.

h. A list of the affected sample results for each analyte (indexed by method and matrix) including the appropriate data qualifier flag (J, B, R, etc.), where sample results are negatively impacted by adverse quality control criteria.

i. Summary of field and laboratory oversight activities, providing a discussion of the reliability of the data, QC problems encountered, and a summary of the evaluation of data quality for each analysis and matrix as indicated by the laboratory QC data and any other relevant findings.

j. Conclusions and recommendations.

k. Appendices containing: (1) Chemistry data package, and (2) Results of the Chemical Quality Assurance Report (CQAR). The CQAR is a Government produced document achieved through the inspection and analysis of QA samples and corresponding project sample data. The CQAR will include review of all QC parameters such as holding times, detection limits,

method blanks, surrogate recoveries, matrix spikes and duplicates, and inter-laboratory and intra-laboratory data comparisons.

3.8 DOCUMENTATION

Documentation records shall be provided as factual evidence that required chemical data has been produced and chemical data quality has been achieved. The documentation shall comply with the requirements specified in paragraphs SAMPLING AND ANALYSIS PLAN, CHEMISTRY DATA PACKAGE, and CHEMICAL DATA FINAL REPORT. Documentation requirements shall be in accordance with Section 01 20 01.00 10 COST AND PERFORMANCE REPORT.

3.9 NOTIFICATION OF NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice.

-- End of Section --