

CATEGORY Quality Assurance	PROJECT Rocky Mountain Arsenal	Project: Plan Q-001-RMA (Rev. 4)	
TITLE Quality Management Plan		LEGEND R-INDICATES REVISION	DATE 04/01/2004 Revised
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Purpose

This Quality Management Plan (QMP) identifies and describes the elements of a Quality Assurance/Quality Control (QA/QC) program integral to environmental cleanup activities. Individual Quality Assurance Project Plans (QAPPs) or Construction Quality Assurance Plans (CQAPs) are prepared to cover the specifics of a given project. Each QAPP or CQAP references the applicable sections of the QMP, and includes field-specific quality requirements for the individual tasks. This QMP is written as a management plan, and discusses quality requirements for environmental programs in a general perspective as specifically related to the scope of environmental remediation work.

This QMP provides the framework and basic criteria for developing detailed QAPPs, CQAPs, and other implementing procedures required to meet specific task order requirements. All other quality-affecting plans and implementing documents will contain applicable QA/QC requirements from this QMP as referenced within those documents.

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ACRONYMS

ANSI	American National Standards Institute
ASQC	American Society for Quality Control
CQAP	Construction Quality Assurance Plan
CSQ®	Client Service Quality®
DQO	Data Quality Objective
IT	Information Technology
M&TE	Measuring and Testing Equipment
OJT	On-the-job training
PMC	Program Management Contractor
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QC	Quality Control
QMP	Quality Management Plan
RMA	Rocky Mountain Arsenal
ROD	Record of Decision
RVO	Remediation Venture Office
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SOW	Scope of Work
TtFW	Tetra Tech FW, Inc.

TERMS AND DEFINITIONS

Activity

An all-inclusive term describing a specific set of operations or work to be performed in accordance with established policies, plans, procedures or requirements (e.g., management systems; collection and evaluation of data; and design, construction, and operation).

Assessment

An all-inclusive term used to denote any of the following: audit, performance evaluation, management systems review, peer review, inspection, or surveillance.

Audit

A documented, systematic, and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives [1] “Arrangements” may include, but are not limited to, established procedures, instructions, drawings, Construction Quality Assurance Plans, Quality Assurance Project Plans and other applicable documents or requirements.

Client Service Quality® (CSQ®)

Clients provide the base of our operation; Service is the work we perform; and Quality becomes the measure of our success. CSQ® is our company’s operating philosophy.

Condition Adverse to Quality

An all-inclusive term used in reference to any of the following: failures, malfunctions, deficiencies, defective items, and nonconformances. A significant condition adverse to quality is one that, if uncorrected, could have a serious affect on safety or operability [2].

Conditional Release

A Conditional Release is a documented and approved release to permit implementation of a minor Design Change with only the formal approvals/signatures of the Project Manager and the responsible Remediation Venture Office (RVO) Engineer. Signatures of the Regulators are not required for a Conditional Release. The “Conditional Release” is approved on the Design Change Notice form.

Construction Quality Assurance Plan (CQAP)

Prepared by the Quality Department to cover the specifics of a given construction project. Each CQAP references the applicable sections of the Quality Management Plan (QMP), and includes field-specific quality requirements for the individual tasks.

Controlled Document

Written information that is prepared, reviewed, and approved in accordance with established procedures, has controlled distribution, and is subject to revision control [2].

Corrective Action

Action taken to eliminate the causes of an existing nonconformance, deficiency, or other undesirable situation in order to prevent recurrence [1].

Customer

Any individual or organization for which items or services are furnished or work is performed in response to defined requirements and expectations [3].

Data Quality Objectives (DQOs)

Qualitative and quantitative statements derived from the outputs of each step of the DQO Process which specify the study objectives, domain and limitations, the most appropriate type of data and efficient method of collection, and the decision rules and levels of decision error that will be acceptable for the decision.

Deficiency

An unauthorized deviation from acceptable procedures or practices, an unacceptable procedure or practice, or a defect in an item or product that renders its use unacceptable [4].

Department Heads

Members of Senior Management technically and administratively responsible for activities within their area of expertise. These areas include Health and Safety, Quality Assurance, Project Controls, Information Technology (IT), Environmental Compliance and Engineering.

Deviation

A departure from specified requirements [2].

Document

Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results [5].

Documentation Plan

The plan that establishes distribution lists and location of files, identifies how files will be administered and establishes a file numbering system.

Entity

That which can be individually described and considered, such as a process, product, item, or organization, or a combination thereof [1].

Environmental Data

Any measurements or information that describe environmental processes or conditions, or the performance of engineered environmental systems [6].

Environmental Processes

Man-made or natural processes that produce discharges to or impact the ambient environment [6].

Environmental Technologies

An all-inclusive term used to describe pollution control devices and systems, waste treatment processes, and site remediation technologies and their components that may be used to remove pollutants or contaminants from the environment. Examples include wet scrubbers (air), soil washing (soil), granulated activated carbon unit (water), and filtration (air, water). Usually, this term will apply to hardware-based systems; however, it will also apply to methods or techniques used for pollutant reduction or containment of contamination to prevent further movement of the contaminants, such as capping, solidification or vitrification, and biological treatment [3].

Finding

A statement of fact relating to compliance or noncompliance with previously agreed-upon codes, standards, specifications or other forms of contractual or legal obligations [2].

Graded Approach

The process of basing the level of application of managerial controls applied to an item or activity according to the intended use of the results and the degree of confidence needed in the quality of the results [7].

Hold Point

A mandatory inspection point identified by the Contractor in the subcontract document, beyond which work specific to a certain activity shall not proceed until such time that the contractor has conducted an inspection and documented that the inspection results are acceptable.

Independent Assessment

An assessment performed by a qualified individual, group, or organization that is not a part of the organization directly performing the work being assessed [4].

Implementation Projects

Remedy execution activities, including management and execution of remedial design and action, based on Record of Decision (ROD) requirements and as established by the Remediation Design and Implementation Schedule [2].

Inspection

An activity such as measuring, examining, testing, or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformance is achieved for each characteristic [3].

Lessons Learned

An experience, example, or observation of a result or an event that provides an example for future reference. Results or consequences may be due to a good or bad action or event and may be captured formally (Lessons Learned Report) or informally (discussions during meetings).

Management

Those individuals directly responsible and accountable for planning, implementing, and assessing work. Management in a broader sense may also include managers of support activities [4].

Management Assessment

An assessment used to evaluate the performance of the work process and the application of and compliance with programmatic requirements.

Nonconformance

A deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate; nonfulfillment of a specified requirement [1,8].

Objective Evidence

Any documented statement of fact, other information, or record, either quantitative or qualitative, pertaining to the quality of an item or activity, based on observations, measurements, or tests which can be verified [1,8].

Observation

A determination based on an evaluation of existing processes or systems that needs to be brought to the attention of management. The determination may express a positive situation that is noteworthy or an area of concern that may lead to a condition that is adverse to quality. The information may enhance considerations of safety, reliability, productivity, or customer satisfaction. Each observation will identify the need for a written response [3].

Positive Practice

An audit observation that identifies a condition of exceptional merit.

Procedure

A set of steps or actions that systematically specifies or describes activity performance [2].

Process

A set of interrelated resources and activities that transforms inputs into outputs [1].

Program

Management policies, objectives, principles and general procedures by which an organization produces or provides products and services.

Project

An organized set of activities within a program [3,4].

Project Controls

Functions performed to provide cash flow forecast, variance analysis, performance measurement reports, cost to complete estimates, schedule impact assessments, and change order control.

Quality

The degree or sum of features, properties, and characteristics of a process, item, or service that conforms to, meets, or exceeds the stated or implied needs and expectations of the user [2].

Quality Assurance (QA)

An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item or service is the type and quality needed and expected by the customer [3].

Quality Assurance Program

A structured and documented management system describing the policies, objectives, principles, organizational structure, functional responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The QA program provides the framework for planning, implementing, and assessing work performed by the organization, and for carrying out required QA and Quality Control (QC) activities.

Quality Assurance Project Plan (QAPP)

A formal document describing in comprehensive detail the necessary QA, QC, and other technical activities that must be implemented to ensure that the results of the work performed will satisfy the stated performance criteria as defined by the Project Engineer to cover the specifics of a given project. Each QAPP references the applicable sections of the QMP, and includes project-specific quality requirements for the individual tasks [4].

Quality Control

The overall system of technical activities that measures the attributes and performance of a process, item, or service to verify they meet the stated requirements of the customer [1,4].

Quality Improvement

A program for improving the quality of operations. Such management programs generally entail a formal mechanism for encouraging worker recommendations with timely management evaluation and feedback or implementation. At Rocky Mountain Arsenal (RMA), the Cost/Productivity Improvement Program and Lessons Learned program have been implemented to foster continuous improvement [4].

Quality Management Plan

A formal document that describes the Quality System in terms of the organizational structure, functional responsibilities of management and staff, lines of authority, and required interfaces for those planning, implementing, and assessing all activities conducted under the QA program [3].

Readiness Review

A systematic, documented review of the readiness for the startup or continued use of a facility, process, or activity. Readiness reviews are typically conducted before proceeding beyond project milestones and prior to initiation of a major phase of work [4].

Record (Quality)

A document that furnishes objective evidence of the quality of items or activities and that has been verified and authenticated as technically complete and correct. Records may include, but are not limited to, photographs, drawings, magnetic tape, and other data recording media [1,4].

Remedial Action

Actions to prevent or reduce the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare of the environment [2].

Remedial Design

A phase of site cleanup in which engineers design the technical specifications for cleanup remedies and technologies, as specified in the ROD.

Remediation Venture Office

An organization of representatives from the U.S. Army Program Manager Rocky Mountain Arsenal Remediation, Shell Oil Company and the U.S. Fish and Wildlife Service. The RVO is responsible for remediation oversight at RMA.

Repair

Action taken on a nonconforming product so that it will fulfill the intended usage requirements although it may not conform to the originally specified requirements.

Rework

Action taken on a nonconforming product so that it will fulfill the specified requirements [2].

Risk Management

A management process to identify risks associated with a project to determine the scope of work and associated budget required to deal with risks effectively.

Root Cause

The major contributor to the existence of defects or deviations and one which must be remedied before there can be an adequate solution [2].

Self-Assessment

Assessments of work conducted by individuals, groups, or organizations immediately responsible for performing the work [4].

Standard Operating Procedure (SOP)

A written document that details the method of an operation, analysis, or action with thoroughly prescribed techniques and procedures and officially approved as the method for performing certain routine or repetitive tasks [4].

Subcontractor

Any organization or individual that contracts to furnish services or items or performs work at a certain site; a supplier in a contractual situation.

Supplier

Any individual or organization furnishing items or services according to a procurement document or financial assistance agreement. This is an all-inclusive term used in place of any of the following: vendor, seller, contractor, subcontractor, fabricator, or consultant [4].

Surveillance

Continual or frequent monitoring and verification of the status of an entity and the analysis of records to ensure that specified requirements are being fulfilled [1].

Traceability

The ability to trace the history, application, or location of an entity by means of recorded identifications [1].

Use-as-is

A disposition permitted for a nonconforming item when it can be established that the item is satisfactory

for its intended use [2].

Validation

An activity that demonstrates that a process, item, data set, or service satisfies the requirements defined by the user.

Verification

The act of confirmation by evaluation and provision of objective evidence that specified requirements have been fulfilled [1].

Work Plan

A plan developed to identify specific activities for each task order, including objectives and specific methods for accomplishing work.

Sources for Terms and Definitions

1. ISO 8402: 1994, Quality Management and Quality Assurance Vocabulary.
2. Rocky Mountain Arsenal Remediation Venture Office: 1997, Quality Assurance Program.
3. American National Standards Institute/American Society for Quality Control (ANSI/ASQC): 1994, E-4 Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs.
4. TRADE Quality Assurance Resources Guide, "Glossary of Terms, Abbreviations and Acronyms," Training Resources and Data Exchange (TRADE), Oak Ridge Institute for Science and Education (July 1991).
5. AMSE, NQA-1, Quality Assurance Program Requirements for Nuclear Facilities. 1989 Edition.
6. U.S. Environmental Protection Agency interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, (QAMS-005/80), December 29, 1980.
7. U.S. Department of Energy Order 5700.6C Quality Assurance.
8. ANSI/ASQC A3-1987, Quality Systems Terminology.

FOREWORD

This QMP defines the quality program to be implemented during the performance of environmental investigation, remedial action activities and program support activities (e.g., Program Support Contract, Laboratory Support Services, and Waste Management). This QMP represents the Program Management Contractor (PMC) QA program policy and requirements for ensuring the quality of services covering all aspects of environmental activities. It includes program support activities, studies, investigation, design, construction, and remediation of hazardous waste sites under the Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation, and Liability Act, and state and local regulations as well as operational programs.

This QMP addresses quality requirements from a program/project management perspective, providing managers with QA/QC requirements needed to plan, implement, and assess environmental programs. It forms a set of fundamental requirements commensurate with the scope, nature, and complexity of environmental activities. Environmental activities covered by this QMP include environmental studies, feasibility studies, remedial investigations, records of decision, project planning, remedial design, remediation testing, remedial/removal actions, and site cleanup verification activities. Specific task order quality requirements not completely covered by this QMP will be addressed in a QAPP or a CQAP developed for specific projects.

Consensus standard American National Standards Institute /American Society for Quality Control (ANSI/ASQC) E4 - 1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (ANSI/ASQC 1995) provides the basis for this QMP. This ANSI/ASQC E4 standard combines various federal agency QA/QC requirements to make a uniform and consistent set of QA/QC requirements to manage the quality of environmental programs and has been used to develop the RVO Quality Assurance Program (RVO 1997). The effective implementation of the QA/QC requirements of this QMP, coupled with project-specific QAPPs or CQAPs, will ensure the quality of environmental programs.

1.0 PURPOSE AND SCOPE

This QMP identifies and describes the elements of a QA/QC program integral to environmental cleanup activities. Individual QAPPs or CQAPs are prepared to cover the specifics of a given project. Each QAPP or CQAP includes field-specific quality requirements for the individual tasks. This QMP is written as a management plan, and discusses quality requirements for environmental programs in a general perspective as specifically related to the scope of environmental remediation work at the RMA.

This QMP provides the framework and basic criteria for developing detailed QAPPs, CQAPs, and other implementation procedures required to meet specific task order requirements. All other quality affecting plans and implementing documents will contain applicable QA/QC requirements from this QMP.

1.1 Applicability

This QMP is specifically designed for environmental programs. Programs to which this QMP apply may include collection and evaluation of environmental data and design, construction, and operation of environmental technologies (i.e., remedial design, remedial/removal actions, and waste and disposal systems). Additional applicable programs may include development of responses to regulatory requirements and enforcement actions, environmental research activities, program support activities, and data gathering for decision making. The following sections of this QMP apply as indicated:

2.0: Management Systems applies to all work performed by the PMC in relation to remedy execution activities. Section 2.0 of this QMP addresses the requirements of ANSI/ASQC E4-1994.

3.0: Collection and Evaluation of Environmental Data applies to all activities involving the generation, collection, analysis, evaluation, and reporting of environmental data. Section 3.0 of this QMP addressed the requirements of ANSI/ASQC E4-1994.

4.0: Design, Construction, and Operation of Environmental Technology applies to all design, construction, and operation of systems or facilities in relation to the remedy execution activities. Section 4.0 of this QMP addresses the requirements of ANSI/ASQC E4-1994.

1.2 Program Description

To support this QMP, individual QAPPs or CQAPs are developed containing distinctive information and requirements necessary for specific projects. The development of QAPPs or CQAPs occurs after individual task orders are received. Information or requirements not fully addressed in the QMP are covered in the QAPP or CQAP, thus providing full guidance for managing the quality of all environmental cleanup programs at RMA and the specific projects.

This QMP is divided into three major sections as noted in the table of contents. After the introduction to the QMP, the three major sections are as follows:

2.0 - Management Systems

3.0 - Collection and Evaluation of Environmental Data

4.0 - Design, Construction, and Operation of Environmental Technology

A list of the subheadings for each major section is provided in the introduction statements preceding each major section.

2.0 MANAGEMENT SYSTEMS

The Management Systems section contains the common quality management functions (i.e., leading, planning, organizing, and controlling QA/QC activities), plus specific activities that enable project-specific operations to be planned, implemented, and assessed. The elements contained in Section 2.0 are used in conjunction with the other sections of this QMP to formulate a complete quality management program. Program elements discussed in Section 2.0 include the following:

- 2.1 Management and Organization
- 2.2 Quality System and Description
- 2.3 Personnel Qualification and Training
- 2.4 Procurement of Items and Services
- 2.5 Documents and Records
- 2.6 Computer Hardware and Software
- 2.7 Planning
- 2.8 Implementation of Work Processes
- 2.9 Assessment and Response
- 2.10 Quality Improvement

The PMC management determines the requirements to meet RVO needs, based on PMC's understanding of the scope of work, and is responsible for meeting those needs as a measure of quality and success. All individuals performing work will comply with the requirements of this QMP and the applicable PMC and Tetra Tech FW, Inc. (TtFW) procedures and documents to ensure a desired level of quality.

2.1 Management and Organization

2.1.1 Purpose and Scope

This section describes the matrix organization and authority for the development, implementation, and assessment of the QMP. This section also documents the organizational structure, functional responsibilities, levels of authority, and lines of communication established within the PMC to achieve quality work and data. Specific individuals with responsibilities and authorities related to individual task orders are discussed in the QAPP or CQAP developed for specific scopes of work.

2.1.2 Responsibilities and Authorities

2.1.2.1 Program Manager

The Program Manager is responsible for all operations under this contract. The Program Manager reports directly to TtFW senior management. In addition, the Program Manager reports

to the RVO Contracting Officer Representative(s) who is responsible for oversight of PMC's activities.

2.1.2.2 Quality-Related Responsibilities for Department Heads/Project Managers

All Project Managers and Department Heads or their designee(s) shall be responsible for implementing applicable elements of the QMP as outlined below.

Training

Personnel performing work shall be trained and qualified based on job classification and project-specific requirements prior to the start of work as described in PMC Administrative Procedure A-019-RMA, PMC Training Procedure (TtFW 2004a). The need to require formal qualification or certification of personnel performing certain specialized activities shall be evaluated and implemented where necessary. Appropriate technical and management training, which may include, but is not limited to classroom and on-the-job, shall be performed and documented. When job requirements change, the need for retraining to ensure continued satisfactory job proficiency shall be evaluated. Objective evidence of personnel job qualification shall be documented and maintained for the duration of the project or activity affected, or longer if required by statute or organization policy. Documentation of training activities shall be coordinated with and maintained by the PMC Training Administrator.

Documents and Records

Procedures shall be established, controlled, and maintained for preparing, reviewing, approving, revising, indexing, filing, storing, maintaining, retrieving, and final transmittal to the RVO of pertinent quality documentation and records.

Documents requiring control shall be identified. Documents, including revisions, shall be reviewed by qualified personnel for conformance with technical requirements and quality system requirements and approved for release by authorized personnel. Documents used to perform work shall be kept current. Obsolete or superseded documents shall be discarded or identified as obsolete or superseded and measures shall be taken to prevent their use.

Sufficient records shall be specified, prepared, reviewed, authenticated and maintained to reflect the achievement of the required quality. The maintenance of records shall include provisions for retention, protection, preservation, traceability, and retrievability.

Retention times for records shall be determined based on contractual and statutory requirements or as specified by management. Records shall be protected from damage, loss, and deterioration.

Computer software and computer hardware/software configurations used in environmental programs defined by ANSI/ASQC E4 shall be installed, tested, used, maintained, controlled, and documented to meet the requirements of the user as specified in PMC PC-017- RMA Microcomputers (FWENC 2002a) and PC-020-RMA PMC Software Development (FWENC 2002b)

Planning

A systematic planning process shall be established, implemented, controlled, and documented as necessary to accomplish the following:

- Identify the customer and their needs and expectations for the results of the work to be performed.

- Identify the technical and quality goals that meet the needs and expectations of the customer.
- Translate the technical and quality goals into requirement documents (e.g., specifications, work plans) that will produce the desired result.

All planning documentation shall be reviewed and approved for implementation by authorized personnel before the specific work begins.

Implementation of work processes

Work shall be performed according to approved requirement documents. Implementation of work shall be accomplished with a level of management oversight and inspection commensurate with the importance and complexity of the particular project.

Procedures shall be developed, documented, and implemented for appropriate routine, standardized, special, or critical operations. Procedures that specify technical requirements shall be reviewed for adequacy and approved by qualified personnel before use.

Implementation of work processes shall include the routine measurement of performance against established technical and quality specifications. The work process shall be monitored to ensure continued satisfactory performance.

2.1.2.3 QA Manager (QAM) Responsibilities

Establishes, documents, implements, and assesses the PMC QA system in accordance with industry standards, TtFW, and RVO requirements.

Assessment and Response

Assessments shall be planned, scheduled and periodically conducted, and their results evaluated to measure the effectiveness of the implemented quality system. Assessments shall include an evaluation to determine and verify whether technical requirements, not just procedural compliance, are being implemented effectively. Assessment results shall be documented, reported to, and reviewed by management.

Quality Improvement

A quality improvement process shall be established and implemented to continuously develop and improve the Quality System. Procedures shall be established and implemented to prevent recurrence as well as to detect and correct problems that adversely affect quality during all phases of technical and management activities. The relationship between cause and effect and the root causes of significant problems shall be determined. Appropriate corrective actions shall be planned, documented, and implemented in response to findings in a timely manner.

2.1.2.4 Procurement-Specific Responsibilities

The procurement of purchased items and services that directly affect the quality of environmental projects shall be planned and controlled to ensure that the quality of the items and services is known and documented, and meets the technical requirements and acceptance criteria of the customer.

Procurement documents shall contain information clearly describing the item or service needed and the associated technical and quality requirements. The procurement documents shall specify the quality requirements and how those elements will be verified. Procurement documents including Scopes of Work (SOWs) and subcontractor bid documents shall be reviewed for

accuracy and completeness by qualified personnel prior to release or award as appropriate. Changes to procurement documents shall receive the level of review and approval as appropriate to the change.

Appropriate measures shall be established to ensure that the procured items and services satisfy all stated requirements and specifications.

2.1.3 Requirements and Instructions

Requirements and Instructions are identified within the text of each section of the QMP. Additional position-specific responsibilities are defined in PMC Administrative Procedure A-002 – RMA, Key Roles and Job Responsibilities (FWENC 1998) and in project-specific plans and documents such as the CQAP and QAPP.

2.1.4 Records

Storage, maintenance, retention, and final transmittal requirements to the RVO shall be implemented in accordance with Section 2.5 – Documents and Records, PMC Administrative Procedure A-012-RMA, Document Control, (FWENC 2001) and PMC Administrative Procedure A-015-RMA, Record Transmittal (FWENC 2003a).

No QA records are generated by the use of this section of the QMP.

2.2 Quality System and Description

2.2.1 Purpose and Scope

This QMP describes the overall quality program that will be implemented to ensure the production of quality results to achieve the goals for each activity undertaken. The QMP establishes the structure, defines the authority, identifies the responsibilities, and provides the instructions used to manage, implement, and assess quality-affecting activities and to create lower tier quality documents.

2.2.2 Responsibilities and Authorities

Responsibilities and authorities for the work to be performed pursuant to this QMP are delineated in Section 2.1.2 of this QMP.

2.2.3 Requirements and Instructions

This QMP applies to all quality-affecting work performed by PMC personnel and Subcontractors at RMA. The extent to which this QMP is applied, either wholly or in part, will depend upon the nature and scope of the individual task order activities to be performed. The level of application of the QMP will be delineated and documented in the project-specific QAPP or CQAP. Specific task order quality requirements are addressed in specific QAPPs or CQAPs commensurate with the task order activities. This implementation approach provides a mechanism to address basic quality program requirements, while providing the flexibility to implement additional quality requirements to meet specific internal and external customer expectations.

This QMP is a part of a systematic management approach for planning, implementing, and assessing work to ensure that the results satisfy stated technical, administrative, and quality objectives. This QMP encompasses all of the policies, authorities, requirements, and guidance documents necessary for implementation. Procedures that implement activities shall be established, reviewed, and approved to satisfy the criteria of this QMP. This QMP also includes provisions to ensure, when implemented effectively, that engineered environmental systems are designed, constructed, and operated to fulfill their intended purposes and that environmental data

of the quality needed are produced and documented.

This QMP includes two levels of management controls for environmental data operations and engineered environmental systems, the organizational level and the technical project level. The organizational level consists of all activities supporting common or standardized functions (e.g., management assessment, personnel qualifications and training, procurement policies, and document control), and establishes the basic structure for performing work. The technical project level consists of specific task order quality activities necessary to produce the desired quality of products, results, and type of data within the framework defined by and used in conjunction with functions at the organizational level.

2.2.4 Records

No QA records are generated by the use of this section of the QMP.

2.3 Personnel Qualification and Training

2.3.1 Purpose and Scope

The PMC management is responsible to ensure PMC and Subcontractor personnel are trained and qualified to perform work within their specific scope of work. The PMC and Subcontractor personnel performing work in accordance with this QMP shall be qualified to perform their assigned work according to the requirements of this QMP and to specific task order requirements. Education and training of all PMC employees is emphasized to achieve and maintain proficiency and to create an environment of individual responsibility and accountability for quality. This requirement applies to all personnel performing or managing activities directly affecting quality.

2.3.2 Responsibilities and Authorities

The PMC management is responsible for the following:

- Determining the level of education, experience, and training required to ensure that PMC personnel are qualified to perform work within their respective organizations and specific task orders. Specialized training requirements needed to accomplish highly technical work activities are identified in work plans, QAPPs, CQAPs and SOPs.
-
- Establishing specific requirements for indoctrination, subject matter training, qualification, certification, personnel training records (and their maintenance), and implementing in accordance with project procedures
- Providing training resources for required education, training, and retraining, including activities such as continuing education, on-the-job training (OJT), and training seminars to ensure that personnel demonstrate and maintain proficiency in performing assigned work
- Ensuring that when job requirements change, the need for retraining is evaluated by PMC management and provided when necessary
- Ensuring that records of training, qualification, and certifications are maintained

The PMC Training Administrator is responsible for the overall administration and maintenance of the PMC Administrative Procedure A-019-RMA, PMC Training Procedure (TtFW 2004a).

2.3.3 Requirements and Instructions

The PMC management must perform all required actions to accomplish the specific responsibilities identified in Section 2.3.2.

The PMC personnel selected to perform work shall demonstrate that they possess the education, experience, and training commensurate with the specified activity.

Where required by statute or other applicable requirement, personnel may be required to be qualified and/or certified to conduct specific work. Management and workers must achieve specific requirements for qualification and/or certification to meet specific needs.

2.3.4 Records

Records generated through implementation of the requirements of this section of the QMP include all documentation needed to support successful accomplishment of training, qualification, and certification. All records shall include one or more of the following documents applicable to the type of experience, education, and/or training provided:

- Course or training outline or similar documentation of the subject matter of the course or training offered, when course training is used
- Attendance sheets
- Test or examination results, or other documentation indicating proficiency as applicable
- OJT documentation
- Records directly related to historical work experience or training
- Copies of qualification or certification documents issued
- Job Classification Training Requirements Matrices for all PMC employees

All education, training, and results shall be documented and managed to provide evidence of successful completion. Records shall be maintained by the PMC Training Administrator in accordance with the PMC Administrative Procedure A-019-RMA, PMCTraining Procedure (TtFW 2004a).

2.4 Procurement of Items and Services

2.4.1 Purpose and Scope

This section of the QMP defines a management system to ensure that procurement processes are properly documented and controlled, and that procured items and services conform to established requirements.

2.4.2 Responsibilities and Authorities

The Procurement Group is responsible for the following:

- Controlling procurement documents (e.g., master ordering agreements, purchase requisitions, purchase orders, basic ordering agreements, service contracts)

- Adhering to the procurement requirements contained in the TtFW and PMC procurement procedures
- Securing replacement of or remedy for suppliers of deficient items and services

Department Heads and Project Managers are responsible for the following:

- Providing the Procurement Group with appropriate specifications, drawings, SOWs, and other documentation necessary to obtain suitable and acceptable items and services
- Assuring that the appropriate technical reviews of procurement documents are conducted prior to the distribution for bid
- Identifying quality-affecting items and services to the Procurement Group and the QAM
- Monitoring the quality of items and services provided by suppliers in support of work activities
- Ensuring all documents used for procurement of items and services include appropriate quality requirements (e.g., applicable specifications, standards, regulations, drawings, and a scope of work including quality requirements)

The QAM is responsible for the following:

- Performing procurement subcontractor evaluations when requested by the Project or Program Manager
- Providing methods for determining the level of supplier quality through assessments, inspections, surveillances, tests and certifications to verify compliance of items and services to procurement document requirements, upon PMC management request

2.4.3 Requirements and Instructions

All PMC organizations and groups supporting the work pursuant to the basic contract must implement systems to perform and ensure compliance with their responsibilities.

Suppliers providing items and services according to the requirements of this section are required to have a system capable of ensuring items and services meet requirements of the procurement document. Assessment of the supplier's QA approach relative to the SOW will be completed as part of the review of the bid package or proposal. Suppliers must incorporate appropriate quality requirements in their subtier procurement documents.

2.4.4 Records

The QA records generated through implementation of the requirements of this QMP include the following:

- Copies of pertinent portions of procurement documents
- Reports on supplier evaluations from the procurement group and technical personnel
- Reports on monitoring supplier quality

2.5 Documents and Records

2.5.1 Purpose and Scope

Documents can be described as supporting program and project plans and procedures that are developed for the purpose of managing work processes during project activities. Documents developed for use in activities affecting quality will be prepared, reviewed, approved, distributed, revised, indexed, filed, stored, maintained, retrieved and transmitted to the RVO according to requirements specified in PMC procedures. Included are PMC Administrative Procedure A-012-RMA, Document Control (FWENC 2001); PMC Administrative Procedure A-015-RMA, Records Transmittal (FWENC 2003a); PMC Engineering Procedure ENG-002-RMA, Developing, Changing, and Issuing Engineering Documents (TtFW 2004b); PMC Engineering Procedure ENG-003-RMA, Review and Processing of Vendor/Subcontractor Documents (FWENC 2003b); and PMC Construction Procedure CP-003-RMA, Construction Document and Record Drawing Control (TtFW 2004c). Documents may include, but are not limited to, the following:

- Design packages (30, 60, 95 and 100% designs)
- PMC Health and Safety Plan
- Procedures and SOPs
- Specifications
- QAPPs
- CQAPs
- Sampling and Analysis Plans (SAPs)
- SOWs

Records are generated and used to document the quality of items, services, environmental processes, and engineered systems and require the same controls as documents discussed above. Specific records generated by performance of activities associated with this QMP are identified within each specific section, within each task-order-specific QAPP or CQAP, and/or within plans or specifications used to perform specific tasks. The QA Records may be in the form of handwritten, printed, or electronic media. Quality records to be controlled by this QMP include only those that furnish documentary evidence of the quality of items, services, environmental processes, and engineered systems. The term record(s) used throughout this QMP denotes quality Records. Records generated during project activities may include, but are not limited to, the following:

- QA Reviews
- Response to Comments
- Calculations
- Record Documents
- Technical Memoranda
- Draft and Final Reports

- Sampling and analytical data
- Field logs and measurements
- Instrument test data
- Calibration data
- QC data/records
- Inspection results
- Materials testing results
- Technical and readiness reviews results
- Assessment results including audits and surveillances
- Data usability review results
- Correspondence
- Engineering Records
- Unexploded Ordnance Records
- Health and Safety Records
- Environmental Compliance Records
- Air Quality Data and Records

2.5.2 Responsibilities and Authorities

The PMC Program Manager is responsible for implementing a document control and records management system to ensure clarity, completeness, retrievability, and conformance to all contract and procedural requirements.

Originators and, to a lesser extent, custodians of documents and records are responsible for the following:

- Legibility, accuracy, and completeness of documents and records
- Preparation, review, issuance, and revision(s) of documents and/or records that specify quality requirements

The Program Manager is responsible for ensuring that all reports, technical plans, design documents, and other technical deliverables are subjected to an internal review and approval process. The QAM is responsible for assessing the effectiveness of the implementation of document and record requirements. Project Managers are responsible for maintenance, issuance, retrieval, filing, and final transmittal to the RVO of project records.

2.5.3 Requirements and Instructions

Document control and records management include (a) identification of documents and records to be managed and their specified distribution; (b) identification of assignment of responsibility for preparing, reviewing, approving, and issuing documents; and (c) review of documents for adequacy, completeness, and correctness prior to approval and issuance. Document revisions shall follow the review and approval process outlined in procedures identified in Section 2.5.1 of this QMP prior to issuance.

Special requirements for records include validation, indexing, record accuracy, maintenance, and final transmittal. Maintenance of records shall include provision for retention, protection, preservation, traceability, retrievability, and final transmittal.

2.6 Computer Hardware and Software

2.6.1 Purpose and Scope

This section of the QMP addresses computer hardware and software used in the PMC activities. Hardware includes network servers and disk drives, electrical components, personal computers, and printers. Computer programs are synonymous with software. Computer programs addressed by this QMP include, but are not limited to, design, design analysis, models of environmental processes and conditions, operations or process control, and databases. Computer programs not addressed by this QMP include, but are not limited to, nontechnical software such as word processing applications.

2.6.2 Responsibilities and Authorities

The IT Department is responsible for software installation and support, maintenance and support of computer-related equipment, maintenance of the computer network, computer-related equipment troubleshooting, ensuring network security, maintaining Lotus Notes Electronic mail, and maintaining an inventory of all computer-related hardware and equipment.

All PMC personnel are responsible for meeting the computer user requirements delineated in PMC Project Control Procedure PC-017-RMA, Microcomputers (FWENC 2002a).

2.6.3 Requirements and Instructions

Computer program development is accomplished using an approved software development methodology. Internally developed programs shall be validated, verified, and documented according to the intended use of the software as described in PMC Project Control Procedure PC-020-RMA, PMC Software Development (FWENC 2002b). Test requirements for internally developed software include verification tests, in-use tests, testing procedures, documentation of results, and control and maintenance of all test records. Documentation of software test results shall be maintained within the IT Department or within the Department responsible for the software development.

Revisions to verified computer programs shall be controlled and assessed to determine the potential impact of the change on the performance of the software. Verifications of revised computer programs are made and documented according to the same procedures required for the original program.

Computer programs that are commercially available have been widely used and can be reasonably assumed to be correct will not be verified.

2.6.4 Records

The QA records generated through implementation of the requirements of this section of the QMP include records documenting acceptance of computer hardware and software, inventories of computer-related hardware and equipment and verifications of internally developed computer programs.

2.7 Planning

2.7.1 Purpose and Scope

This section describes the planning process to be implemented by the PMC for all projects conducted at RMA. Planning is conducted in accordance with the TtFW Project Operations Procedure, PO-1 – Project Management Planning (TtFW 2004d) to accomplish several objectives.

First, planning provides a basis through which the following project objectives can be defined:

- To implement and complete the defined scope of work
- To complete an assigned task within the approved and agreed-upon schedule
- To perform the task work within budget
- To meet the technical and quality goals of the RVO and the identified acceptance criteria

Second, planning establishes and confirms agreement on the details of the four project objectives.

Third, planning provides guidance on the conduct of the task to project personnel.

Fourth, planning provides a base for forecasting and monitoring progress and managing the assigned tasks.

2.7.2 Responsibilities and Authorities

The Program Manager, acting in accordance with corporate procedures and policies, has the responsibility for ensuring all PMC projects are planned in accordance with TtFW Project Operations Procedure PO-1, Project Management Planning (TtFW 2004d). The PO-1 Checklist shall be used to document the results of the planning process. The Program Manager may have specific activities planned, scheduled, and budgeted in more detail by project discipline leads.

Projects and supporting activities must be planned, and all planning documentation must be reviewed, approved and documented. The amount of detail in the planning documents will depend on the scope, complexity, and significance of the project being planned. Organizational responsibilities, interfaces, and implementing instructions must be identified during planning and must be maintained throughout the work. All organizations assigned responsibilities must be included in the review process, and their comments must be resolved prior to the start of that specific work.

2.7.3 Planning Elements

The project planning process consists of 11 primary elements that shall be considered by the Project Manager, as follow:

1. Work Plan - to include the schedule, tasks, objectives, anticipated activities, and normal operating procedures of site operations and the specific methods and resources to meet

them

2. Environmental, Health and Safety - to ensure a safe and environmentally sound work environment and incident-free performance on each project, and to ensure that the services provided to the RVO comply with applicable or relevant and appropriate federal, state, and local environmental laws and regulations
3. Risk Awareness and Management - to identify risks associated with the project, based upon the scope of work and associated budget required to deal with the risks effectively
4. Status and Monitoring - to provide the current status of cost, schedule, and accomplishment (including quality) anticipated by the RVO, and to focus on areas of potential problems
5. Project Controls – to develop periodic forecasts of cost and schedules at project milestones to minimize cost or time impacts - provides a systematic and efficient methodology of measuring, collecting, verifying, reporting and quantifying data reflecting the progress and status of operations on the project as compared to the work plan
6. Procurement - to determine what work will be performed by Subcontractors and to identify subcontracting requirements
7. Quality Assurance/Quality Control - to identify and implement the quality activities to obtain feedback, identify problems, address issues, and maintain continuous improvement practices (QA) - to ensure an overall system of checks to measure the attributes and performance of the process, item, or service against defined standards (QC)
8. Staffing/Resource Management - to assess project needs to ensure that qualified resources are available and are managed properly
9. Cash Management - to ensure effective financial management
10. Communication - to identify internal or external communication channels and reporting requirements
11. Document Control - to define the document control process and identify personnel responsible to ensure effective document management

2.7.4 Records

The QA records generated through implementation of the requirements of this section include completed copies of the PO-1 checklist with the signature of the Program Manager.

2.8 Implementation of Work Processes

2.8.1 Purpose and Scope

Work conducted by the PMC is planned, implemented, and assessed according to all applicable sections of this QMP. The work processes and operations discussed in this section of the QMP only relate to quality-affecting processes and operations. Task-Order-specific requirements for work processes and operations are discussed in the individual task order QAPPs or CQAPs.

2.8.2 Responsibilities and Authorities

Department Heads and Project Managers are responsible to plan, document, and assess work processes.

Managers must identify applicable basic contract and task order quality requirements, program and task expectations, and the project scope of work during the work planning process. This planning process occurs before and during the initiation of individual task orders.

Responsible managers must establish policies and procedures to address identification of routine operations requiring plans; preparation of plans including form, content, and applicability; and documented approval of plans.

The PMC managers are responsible for performing self-assessments of compliance and effectiveness of work processes under their control. The QA staff is responsible for performing independent assessments of all work processes impacting quality as directed by the QAM. The PMC and Subcontractor personnel are required to perform work according to approved documents.

2.8.3 Requirements and Instructions

The basic requirements for controlling work processes and operations are discussed below:

- Planning for quality is conducted according to a graded approach by addressing the nature, complexity, and scope of work to be performed. The graded approach defines the extent and degree of the level of quality applied to work activities.
- For characterization of environmental processes and conditions, planning includes a determination of the level, type, quantity and quality of data required.
- For engineered environmental systems, planning includes a determination of the appropriate design criteria and design bases. Planning considers any specially controlled conditions required to ensure that objectives are satisfactorily achieved.
- Work is performed according to approved Work Plans, Drawings and Specifications, SAPs, QMP, CQAPs, QAPPs, and other applicable documents or procedures.
- Work is implemented in a sequence consistent with the need for completion of prerequisite as well as final operations.
- Plans are developed and implemented for appropriate routine and standard work operations. Specialized and/or critical operations may use project-specific documents to perform work operations.
- Management assessments of work processes and operations are accomplished through self-assessments and independent assessments. Assessments are conducted according to the requirements of Section 2.9 – Assessment and Response and PMC Quality Assurance Procedures Q-003-RMA, Audits (FWENC 2002c); Q-007-RMA, Quality Control Inspections (FWENC 2003c); and Q-008-RMA, Surveillances (FWENC 2003d).

2.8.4 Records

Records generated through implementation of the requirements of this section include assessment records as identified in Section 2.9 – Assessment and Response, Statements of

Work, work plans, and procedures.

2.9 Assessment and Response

2.9.1 Purpose and Scope

The PMC management will regularly assess the adequacy of the Quality System and ensure its effective implementation. While specific quality assessment activities may be delegated to others, PMC management may not delegate overall responsibility for assuring that an effective Quality System has been established, implemented, and followed. Assessments are planned and documented based on program or project requirements. Approaches used for assessments will vary with the objectives of the assessment and the status of the project. All assessment activities will be performed in accordance with the requirements of this QMP. Additional project-specific requirements for assessments are discussed in the individual CQAPs or QAPPs.

2.9.2 Responsibilities and Authorities

The QA staff has prime responsibility to ensure independent assessment of implementation of corporate and project requirements. Independent assessments evaluate the performance of work processes with regard to requirements, compliance and expectations for safely performing the work and achieving the goals of the project and organization. The focus of independent assessments is the items and services produced and provided and their associated processes. The QAM ensures that assessments of all quality system elements are performed to verify adherence to procedures and evaluate the adequacy of the quality system.

Management assessments require direct participation of all affected levels of management. Both organizational level and technical level managers should perform self-assessments of their respective organizations to determine the quality of products and technical work, and adequate implementation of the corporate procedures. The PMC management is responsible for implementing effective corrective actions to remedy problems discovered by management assessments. Independent management assessments may be performed as needed, as determined by the Program Manager or the Deputy Program Manager. Independent management assessments will be used to evaluate the performance of the work process and the application of and compliance with programmatic requirements. This type of assessment is generally not scheduled for every project.

2.9.3 Requirements and Instructions

Assessments include a means for determining the following:

- Effectiveness of the management control system used to achieve and ensure quality
- Adequacy of resources and personnel provided to implement and ensure quality in all activities
- Adequacy, implementation, and compliance with the corporate and project plans and procedures

The QA and QC personnel routinely assess designated operations or individual technical programs/projects. Management and technical independent assessments will be conducted by management, QA and QC personnel to provide an objective and unbiased assessment of the Quality System and project-specific requirements. Independent assessments must be conducted by those who are not performing or responsible for work or specific projects and who possess the necessary technical or management skills to perform the assessment.

Management and technical self-assessments should be conducted by those responsible for specific work.

The PMC management shall determine the response actions necessary as a result of independent assessments and self-assessments, and shall implement appropriate corrective actions. Following the completion of corrective action measures, PMC management shall perform follow-up assessments to determine the effectiveness of implemented corrective measures and to confirm that corrective actions prevent a recurrence of the problem. The QA personnel shall provide reports to PMC management on the status of all corrective action(s) and follow-up results.

Assessment tools consist of audits, surveillances, peer reviews, readiness reviews, and technical reviews.

- Audits shall be conducted in accordance with PMC Quality Assurance Procedure, Q-003-RMA, Audits (FWENC 2002c).
- Surveillances shall be conducted in accordance with PMC Quality Assurance Procedure Q-008-RMA, Surveillances (FWENC 2003d).
- Inspections shall be conducted in accordance with PMC Quality Assurance Procedure Q-007, Quality Control Inspections (FWENC 2003c).
- Project reviews shall be conducted as specified in the PMC Project Operations Procedures PM-002-RMA, Subcontract Implementation and Management (FWENC 2003e).
- A Readiness Review shall be performed and documented as specified in PMC Project Management Procedure PM-002-RMA Subcontract Implementation and Management (FWENC 2003e), and TtFW Procedure PO-12, Project Review Procedure (TtFW 2003).
- Management self-assessments may be conducted via Project Status Meetings in accordance with PMC Project Management Procedure PM-002-RMA, Subcontract Implementation and Management (FWENC 2003e).
- Technical independent assessments are conducted through Health and Safety walkthroughs, environmental compliance inspections, and quality control inspections, surveillances and audits.
- Independent management assessments are conducted as needed, consistent with TtFW Procedures.
- Peer/technical reviews shall be conducted in accordance with PMC Engineering Procedure ENG-002-RMA, Developing, Changing, and Issuing Engineering Documents (TtFW 2004b).

2.9.4 Records

Quality Assurance Records generated by implementation of this section of the QMP include the following:

- Assessment (Audit, Surveillance, and Inspection) Plans
- Assessment (Audit, Surveillance) Reports
- Inspection Reports

- Daily Quality Control Reports
- Nonconformance Reports
- Project Readiness Review Minutes
- Independent Management Assessment Reports
- Document Review/Routing Sheets

2.10 Quality Improvement

2.10.1 Purpose and Scope

The quality improvement process employed by the PMC is an internal activity not applied to any specific project. The intent is to improve operations and work processes, thus providing better value. The continuous quality improvement process embraces the basic concepts and principles of the CSQ® Program.

These principles include understanding the client's requirements and expectations, implementing quality improvement "tools," involving all personnel in the improvement process, and measuring the impact of improvements on applicable operations, services, and products.

2.10.2 Responsibilities and Authorities

The PMC management shall conduct quality improvement activities to enhance work processes and detect/correct problems that adversely affect quality during planning, implementation, and assessment of technical and management activities. The improvement system employed by management uses various components of CSQ® including, but not limited to, the Quality Committee, assessments, lessons learned, and corrective and preventive action. The improvement system is aimed at improving all operations. The improvement system focuses primarily on exceeding internal and external client requirements and expectations, thus indirectly and/or directly providing more value to clients.

The PMC management is required to develop and implement solutions to correct quality-affecting problems, thus supporting and augmenting the overall improvement process. Project Managers and Department Heads should identify applicable performance data to analyze and detect trends that adversely impact quality. The QAM is responsible for providing Quality Assurance Reports to Management. Specific requirements for the reports are discussed in Section 2.10.3.

The QAM will establish a Performance Indicator Program to provide a system for reporting operational data and identifying trends reflected in these data.

2.10.3 Requirements and Instructions

Quality Assurance Reports to Management shall be provided as follows:

- The QAM shall provide a weekly report to the Program Manager and other responsible managers on the status of the "quality" of activities and the overall program.
- The information for this report shall be obtained through the surveillance and audit process addressed in this QMP.

- These reports to management shall identify quality-related problems and, when possible, include recommended solutions to those problems. The corrective action process is identified in Section 2.9, Assessment and Response.

2.10.4 Records

The QA records generated through implementing this section of the QMP include the QA Reports to Management as described in Section 2.10.3 of this QMP.

3.0 COLLECTION AND EVALUATION OF ENVIRONMENTAL DATA

Section 3.0 of the QMP contains additional QA elements needed to plan, implement, and assess environmental data operations, including the collection, handling, analysis, and evaluation of environmental data. Section 3.0 elements must be used in conjunction with Section 2.0 in order to provide an adequate quality system for collecting and evaluating environmental data. Such data include chemical, biological, toxicological, ecological, geotechnical, and physical data. Data may be obtained directly from the environment or from systems representing environmental conditions, such as laboratories or test chambers. The activities described in Section 3.0 have traditionally been associated with environmental monitoring. Section 3.0 elements also apply to the collection of environmental data that are used directly to design, construct, or operate environmental technology. The following program elements are contained in Section 3.0:

3.1 Planning and Scoping

3.2 Design of Data Collection Operations

3.3 Implementation of Planned Operations

3.4 Assessment and Verification of Data Usability

Environmental data include data and samples from the environment, the results of other analytical testing of environmental conditions, and process or physical parameters from the construction or operation of environmental technologies. All individuals performing work that affects quality will comply with the requirements of this QMP and subordinate procedures and documents.

3.1 Planning and Scoping

3.1.1 Purpose and Scope

This section of the QMP defines the management system to ensure that all projects involving the generation, acquisition, and use of environmental data are planned and documented. Project-specific requirements for planning and scoping are discussed in the individual QAPPs.

3.1.2 Responsibilities and Authorities

All designated PMC personnel are responsible for reviewing documents developed as a result of the planning process. All documents shall be reviewed according to project-specific requirements, and approved by the Project Manager or designee involved in the project.

The PMC managers of activities involving the collection and evaluation of environmental data are responsible for the following planning and scoping activities:

- Determining assessment tools (i.e., program technical reviews, peer reviews, inspections, surveillances, and audits) as needed and/or specified in the QMP
- Providing personnel and equipment and other resources required to perform associated work activities
- Providing training activities to meet specific requirements contained within individual task orders per the requirements of Section 2.3 – Personnel Qualification and Training
- Providing training considerations specific to work on individual task orders discussed in the individual SAPs and QAPPs.
- Performing specific project reviews of the documents developed as a result of the planning process
- Approving documents according to project-specific requirements
- Identifying conditions requiring stoppage or suspension of work
- Approving/Implementing corrective actions
- Managing the collection and processing of data
- Ensuring the data are properly identified, recorded, authenticated, and filed

The QAM is responsible for ensuring that the requirements of this section of the QMP are implemented, and approving the QAPPs.

3.1.3 Requirements and Instructions

Project planning shall be coordinated among participating departments and the client, and shall include, but not be limited to, the following elements:

- Definition of project/task scope, objectives, and desired results including definition of the precise problem and the associated action(s) to be taken when appropriate
- Identification and inclusion of the organizations that shall participate in the project and their role in planning, implementation, and assessment activities
- Identification and documentation of the specific type and quality of environmental data to be collected and analyzed through use of a systematic planning process
- Identification of the environmental data required to achieve the desired action or result
- Identification of QA and QC requirements to establish the quality of the data collected or produced, including data quality indicator goals (precision, accuracy, representativeness, comparability, completeness, and bias); acceptable level of confidence (statistical uncertainty); and level of data validation and verification needed
- Identification of the documentation needed to adequately describe the quality of the results
- Identification of necessary personnel skills and required equipment

- Identification of applicable special regulatory requirements and other constraints (e.g., time and budget)
- Identification of conditions under which suspension of work will be necessary
- Determination of assessment tools needed (e.g., program technical reviews, peer reviews, surveillances, readiness reviews and technical audits)
- Identification of methods/procedures for storing retrieving, analyzing, and reporting the data produced (based on the intended use of the data)
- Identification of possible methods/procedures for characterization and disposal of contaminated sample material that may be accumulated during project activities, including waste minimization practices

For field data collection activities not covered as part of existing plans, use the following process:

- Notify the RVO in advance of any sampling and testing not specifically addressed in specifications, plans, or procedures.
- Use a graded approach for the planning document depending on the circumstances as defined by the RVO's Technical Representative. As a minimum, address objectives, data use, and data quality.
- Forward the planning document via e-mail to the RVO's Technical Representative to coordinate client review. Submit the final plan to the client by the PMC Program Manager.

3.1.4 Records

The QA records generated through the implementation of the requirements of this section of the QMP include the following:

- Copy of approved project-specific documents and revisions
- Records of training activities

3.2 Design of Data Collection Operations

3.2.1 Purpose and Scope

This section of the QMP identifies QA requirements to ensure that the design of data collection operations is defined, verified, documented, and controlled. The design process shall identify all relevant activities pertaining to environmental data operations, establish performance specifications, and identify appropriate controls. The data collection design process applies to field sampling, sample handling and custody procedures, field and laboratory analytical procedures, data validation and verification methods, techniques for assessing limitations on data use, control and calibration of measuring and testing equipment (M&TE), preventive maintenance procedures, and data reporting requirements. The design process also applies to data compilation for modeling or additional environmental studies. Project-specific requirements not addressed in this section are discussed in the individual QAPPs.

3.2.2 Responsibilities and Authorities

The PMC managers directing or supporting project-specific tasks are responsible for the following requirements as appropriate:

- Approving procedures, instructions, specification drawings, specific personnel, applicable documents, authorities, and subsequent revisions or cancellations
- Providing reports regarding the status of quality-affecting work, interim results, and results of assessment activities to program/project management as well as supporting organizational management
- Supervising personnel and ensuring implementation of requirements
- Ensuring that persons knowledgeable in the technical discipline and appropriate administrative details perform reviews

The QAM is responsible for the following:

- Providing an independent review process on project-specific plans and procedures
- Assuring incorporation of appropriate quality requirements in all procedures
- Assuring that the minimum requirements for sample documentation and custody procedures are implemented
- Developing an assessment schedule of audits, surveillances, and reviews as appropriate to the scope of work
- Participating in on-site audits of the laboratory facilities to ensure compliance with the requirements of the Chemical Quality Assurance Plan laboratory SOPs, QAPPs, and other requirement documents
- Providing the Program Manager with assistance to evaluate and control all activities related to the identification and control of samples and items

3.2.3 Requirements and Instructions

3.2.3.1 Design Process

The design process shall include (but not be limited to) consideration and development of detailed plans for the following:

- Assessments needed during the project (e.g., surveillance, audits, and performance evaluations)
- Data reporting requirements
- Data validation and verification methods
- Integrating cost or schedule constraints into the design
- Protection of health and safety of workers and the public

- Readiness reviews prior to data collection
- Requirements for calibration and QC samples for analytical method used
- Requirements for field and laboratory QA/QC activities
- Requirements and qualifications for sampling and analysis personnel
- Sample handling, packaging, shipping, and custody requirements
- Sample types, numbers, quantities, and sampling location requirements
- Selection of analytical methods and their quality performance expectations
- Selection of analytical or laboratory facility
- Selection of field sampling or testing methodology, including specific sampling or field analytical instrumentation requirements and other analytical testing requirements
- Techniques for assessing limitations on data use
- Disposal or minimization procedures for wastes produced during sampling and analysis operations

Key variables that determine or directly affect the quality of results shall be identified during the DQO process and appropriately controlled.

Data transfer, reduction, verification, and validation requirements must be determined and documented during the data collection design process. Data interpretation and analysis needs, such as specific statistical methods, shall be determined and specified in the design. Any needed reports to management regarding the status of work, interim results, and assessment activities shall be identified and documented. Any restriction on the use of interim results shall be identified and stated with the data.

The results of the environmental data collection design process shall be documented in a SAP and/or QAPP. The QAPP shall be reviewed and approved by technically capable designated persons.

3.2.3.2 Planning Documents

The results of the environmental data collection design process shall be documented in a QAPP and/or other planning documents such as the SAP.

The approved QAPP shall be developed containing and/or referencing approved work plans, laboratory plans, and other related information. The SAP will be developed as described in PMC Environmental Data Operations Procedure EDO-002-RMA, Guidance for Preparing Sampling and Analysis Plans (FWENC 2002d).

Planning documents for data collection activities not covered by existing plans will be developed using a graded approach and coordinated with the client prior to sampling. Oversight, verification methods, independent assessments, and quality control requirements shall be included in the QAPPs.

Guidance for development of QAPPs is defined in PMC Environmental Data Operations Procedure EDO-002-RMA, Guidance for Preparing Sampling and Analysis Plans (FWENC

2002d).

3.2.4 Records

The QA records generated by implementing this section of the QMP include the following:

- Document Review/Routing Sheet
- Any additional quality records generated by specific procedures, work instructions, or SOPs referenced in this section of the QMP, which may be listed within those respective procedures

3.3 Implementation of Planned Operations

3.3.1 Purpose and Scope

This section of the QMP defines the implementing requirements to ensure the quality of environmental data collection operations.

3.3.2 Responsibilities and Authorities

The PMC managers who perform quality-related activities are responsible for implementing the quality requirements stated in the QMP and other planning documents. All PMC personnel performing quality-related work activities shall comply with approved SOPs, planning documents, and applicable sections of this QMP.

The QAM shall be responsible for assessing implementation of the requirements of this section.

3.3.3 Requirements and Instructions

Environmental data operations shall be implemented according to the approved applicable planning and design documents and by qualified personnel. Planning and design documents include the QMP, project QAPPs, work plans, task-specific health and safety plans, SAPs, SOPs, and other planning documentation. These planning documents are the primary source for information and requirements used to execute the actions, decisions, and results of the planning and design functions. Approved changes to planning documents shall be made and distributed to project personnel to replace previous versions of the documents.

Only qualified and accepted items or services shall be used for environmental data operations. Acceptance shall be identified on the items themselves and/or in documents traceable to the items.

Acceptance inspection and testing (including the use of QC samples) shall be required for all components of environmental sampling and measurement systems, in accordance with the intended use of the measurement systems. This requirement includes inspections and acceptance testing of sampling, measurement, and analytical instrumentation and their components to confirm the intended use of the items as specified by the design.

When acceptance criteria are not met, deficiencies must be identified, documented, and resolved, then reinspected to original acceptance criteria. Identification of accepted items or services shall be maintained on the item itself and/or in documentation traceable to the items or services. Specific requirements for the identification of samples shall be discussed within project-specific work plans and QAPPs.

The M&TE used for activities affecting quality shall be controlled as required in TtFW Procedure QP-10, Control of Measuring and Test Equipment, (TtFW 2002) and shall be calibrated as

applicable at specified intervals and documented to maintain accuracy and precision within specified limits. The acceptance limits for M&TE calibrations and operations shall be specified in the project-specific QAPP. Equipment found to be unsuitable for its prescribed use shall be identified, labeled, and segregated to prevent its use. The validity of any measurements and tests performed with out-of-calibration equipment shall be evaluated and such measurements and tests repeated as required and as practicable. The basis for calibration shall be documented. Limitations on the handling, use, and storage of items shall be defined in the applicable calibration test and SOP. Control requirements for commercial devices such as tape measures, levels and other devices used in project-related tasks may not be necessary if normal commercial equipment is determined to provide adequate accuracy. Traceability to nationally recognized performance standards shall be maintained as applicable or appropriate when they are used for critical or sensitive items and activities. Documentation of calibration shall be maintained and traceable to the equipment.

Periodic preventive and corrective maintenance of measurement and testing equipment shall be performed to assure availability and satisfactory performance of the systems. All equipment subject to maintenance or repair shall be recalibrated as necessary before the equipment is used.

Handling, storage, cleaning, packaging, and preservation of field samples shall be performed according to required specifications and PMC Environmental Data Operations Procedure EDO-004-RMA, Sample Documentation Preservation, Labeling and, Packaging and Shipping (TtFW 2004e). These activities prevent damage, loss, and deterioration of the samples. Sample custody shall be documented and tracked to ensure integrity and validity of the samples.

Data or information management, including assessment, validation, and retrieval shall be performed in accordance with approved planning documents and individual QAPPs.

3.3.4 Records

All QA records generated by implementing the requirements of this section shall be identified within each of the planning documents developed to implement planning and design of environmental operations and conditions.

3.4 Assessment and Verification of Data Usability

3.4.1 Purpose and Scope

This section of the QMP defines the requirements to assess environmental data operations. Data obtained from environmental operations shall be assessed, verified, and qualified according to the intended use of the data. Project-specific requirements not addressed in this section shall be discussed in the individual QAPPs.

3.4.2 Responsibilities and Authorities

The PMC and Subcontractor personnel performing quality-related work activities are required to comply with approved procedures to assure the quality of data. The PMC personnel are responsible for evaluating and validating field data collected during field operation activities and may be responsible for validation of analytical data from RMA subcontract laboratories as specified. The QAM is responsible for assessing implementation of all appropriate requirements of this section.

3.4.3 Requirements and Instructions

The data quality objectives and criteria for measurement data are defined in individual SAPs. This seven-step process clarifies the objectives, inputs, and decisions for the current project and helps define the data quality requirements. Data quality indicators are parameters such as precision,

accuracy, comparability, representativeness, and completeness used to assess the quality of data obtained during most sampling programs. Requirements for the acceptability of data quality indicators are identified in the PMC Environmental Data Operations Procedure EDO-001-RMA, Chemical Quality Assurance Plan (FWENC 2003f) and are also discussed in project-specific SAPs. Because RMA uses performance-based methods, requirements may be different from those associated with other programs. Assessment of the data quality indicators will be completed during the data validation process described below.

Data obtained from environmental data operations shall be assessed, verified, and qualified according to their planned and intended use. Any limitations on data use shall be expressed (quantitatively to the extent practicable) and shall be documented in print or electronic reporting of the data. All data review and validation activities will be conducted in accordance with the PMC Procedure Environmental Data Operations Plan, EDO-007-RMA Environmental Data Validation Plan (TtFW 2004f). The data usability process is the final assessment that will be performed to ensure that the implementation of the sampling and analysis program provides results that can be used to meet the stated project objectives. Deficiencies identified during this assessment will be documented in project data summary reports, and will be an indication of how the assessment will impact the use of the data. Any data obtained from sources that did not use a quality system equivalent to the QMP shall be assessed according to approved and documented procedures.

Project data summary reports, or reports containing the results of environmental data operations, shall be reviewed by individuals other than those who produced the data or reports. The independent review is to confirm that the data and/or results are presented correctly. These reports shall be approved by management prior to release, publication, or distribution.

Additional data assessment and verification requirements may be found in the project-specific plans.

3.4.4 Records

All QA records generated by implementing this section of the QMP shall be identified within each of the procedures developed to evaluate the quality of data.

4.0 DESIGN, CONSTRUCTION, AND OPERATION OF ENVIRONMENTAL TECHNOLOGY

This introduction to Section 4.0 contains the elements that apply to design, construction, and operation of environmental technologies installed or constructed as part of the remedial activities at RMA. Environmental technologies include pollution prevention and removal, waste treatment processes, waste storage and disposal, and remediation of environmental contamination.

This section of the QMP is applicable to environmental technologies used for remediation and to protect the environment from pollution or contamination. These program elements include the specific activities needed to plan, implement, and assess engineered environmental systems to ensure the systems perform as designed and for their intended function. The basic program elements of this section include the following:

4.1 Planning

4.2 Design of Engineered Systems

4.3 Construction/Fabrication of Systems and Components

4.4 Operation of Systems

4.5 Verification and Acceptance of Systems

Section 4.0 requirements are used in conjunction with Section 2.0 for the design, construction, and operation of environmental technologies. Environmental evaluations and data collection and management in support of the design, construction, and operation of environmental technologies are conducted under the requirements of Section 3.0 of the QMP. All individuals performing work affecting quality shall comply with the requirements of this QMP and subordinate procedures and documents.

4.1 Planning

4.1.1 Purpose and Scope

This section of the QMP defines the management systems to ensure that all work activities involving the design, construction, and operation of environmental technologies are planned and documented. Project-specific requirements for planning of engineered environmental technologies are discussed in the individual CQAPs.

4.1.2 Responsibilities and Authorities

The PMC management personnel are responsible for developing, documenting, and implementing the requirements for planning activities related to design, construction, and operation of engineered environmental systems.

All designated PMC personnel are responsible for reviewing documents developed as a result of the planning process. All documents shall be reviewed in accordance with PMC procedures, and approved by the Project Manager involved in the project.

The QAM is responsible for assuring that the requirements of this section of the QMP are implemented.

4.1.3 Requirements and Instructions

Project planning shall be coordinated among all participating departments and interfacing projects and shall include the following requirements as applicable to the specific task(s) performed:

- Acceptance criteria for the completed system
- Delivery, handling, storage, identification, inspection, testing, and installation requirements
- Coordination with organizations that have been identified as participants in the project and their role in planning, design, construction/fabrication, operation, and assessment activities
- Special personnel training requirements, equipment, and other required resources
- A definition of the program/task scope and objectives, and listings of the primary requirements and activities involved in the work; when appropriate, this includes the definition of the precise problem and the associated action to be taken
- Assessment tools needed (i.e., program technical reviews, peer reviews, surveillances, technical and quality audits and readiness reviews) as needed and/or specified by management and/or individual task-order-specific quality plans
- Project and QA records required

- Identification of specific environmental technology or components to be designed, fabricated, constructed, and operated
- Technical, performance, regulatory and quality standards, criteria, and objectives

Documentation of project and activity planning shall include the appropriate use of work plans, CQAPs, design criteria, schedules, organization charts, and conceptual design drawings.

Planning documents shall be distributed to remedial implementation project participants to ensure that participants are informed of and understand the requirements of the project in a timely manner.

4.1.4 Records

The QA records generated by implementing the requirements of this section of the QMP include the following:

- QA records identified in the procedures and/or documents developed as a result of the planning process
- Work Plans, Quality Plans, Design Criteria, and Conceptual Design Drawings

4.2 Design of Engineered Systems

4.2.1 Purpose and Scope

This section of the QMP establishes the quality requirements to ensure that environmental technologies are designed using sound engineering/scientific principles and appropriate standards. Engineering and design activities include the technical and management processes leading to and including issuing and revising design documents which define technical requirements for engineered systems and associated activities. Project-specific requirements for designing environmental technologies are discussed in the individual task order plans.

4.2.2 Responsibilities and Authorities

The PMC Managers are responsible for ensuring that environmental technologies and their components are properly designed.

All PMC personnel performing design activities are responsible for following the requirements of this QMP and PMC internal design procedures.

All necessary design documents, including reports, drawings, instructions, and specifications for an engineered system shall be documented and reviewed by designated personnel, and approved by the Project Manager or designee.

The Project Manager is responsible to ensure that technical reviews or other assessments, as needed, shall be performed prior to the implementation of the final design.

The PMC QAM shall assure that the requirements of this section of the QMP are properly implemented.

4.2.3 Requirements and Instructions

All design personnel shall use the applicable PMC Engineering Procedures ENG-002-RMA, ENG-003-RMA and ENG-004-RMA for preparation, review, and approval of drawings, specifications, and other design-related documents. These engineering and design procedures cover preparation of calculations; review and approval of reports, drawings and specifications;

review and approval of Design Change Notices; preparation of record drawings; and review and processing of vendor design-related documents.

Design activities shall be coordinated among all participating organizations and shall include, but not be limited to, the following requirements as applicable to the specific task(s) performed:

- All design documents shall be reviewed and approved by a registered professional engineer designated by the Engineering Manager. All 100 percent design documents are sealed by the registered professional engineer who is responsible for the project.
- Components and systems will have the ability to perform under expected conditions of use.
- Components and systems will have the ability to respond to unexpected conditions (such as accidents and equipment failures), including consideration of redundant systems or other safeguards. Design should consider unintended uses and misuses.
- Design documents shall specify technical and quality acceptance criteria and shall detail the inspection and test requirements to verify acceptable construction and operation.
- Design documents shall be developed to be consistent with established design criteria and contract requirements as well as appropriate regulatory requirements and national standards.
- Cost or schedule constraints shall be adhered to.

Design adequacy shall be verified by persons other than those who designed the process or item. Complex designs shall be verified at critical stages of the development process to ensure timely correction of deficient conditions.

Computer software used for design and associated design calculations shall be verified, validated, and documented as appropriate according to PMC Procedure- PC-020-RMA PMC Software Development (FWENC 2002b)

Design changes, including field changes, shall be reviewed and approved by design engineers. Design changes shall be controlled in accordance with PMC Engineering Procedure ENG-002-RMA, Developing, Changing, and Issuing Engineering Documents (TtFW 2004b).

When an engineered system is completed, record drawings will be developed to depict the actual configuration.

Technical reviews or other assessments shall be performed in accordance with PMC Project Management Procedure PM-002-RMA, Subcontract Implementation and Management (FWENC 2003e).

4.2.4 Records

The QA records generated by implementing this section of the QMP shall include the following:

- Checked calculations with applicable signatures
- Approved reports, drawings, specifications and related design documents with applicable review signatures, including sealing of 100 percent design documents generated in support of design-engineered systems

4.3 Construction/Fabrication of Systems and Components

4.3.1 Purpose and Scope

This section of the QMP establishes the quality requirements to ensure that construction, fabrication, manufacture, and erection of engineered systems are performed under suitably controlled conditions according to the drawings, specifications, and requirements of the approved design.

4.3.2 Responsibilities and Authorities

The PMC Program Manager is responsible to ensure that construction, fabrication, manufacture, and erection of engineered systems are performed under suitably controlled conditions according to the requirements of the approved design.

The PMC managers of organizations or personnel performing activities supporting the construction, fabrication, manufacture and erection of engineered systems are responsible to control the quality of their activities per the requirements of this QMP and of the approved design.

The PMC QAM is responsible to assure the requirements of this section of the QMP are properly implemented.

4.3.3 Requirements and Instructions

The construction of engineered technologies is coordinated among all applicable organizations, and includes the following requirements as applicable to the specific task order(s) performed:

- Only qualified and accepted items and services are used in the implementation (construction) of the design. Acceptance of items and services shall be accomplished per the requirements of the project-specific plans and procedures.
- The identification and acceptability of items, equipment, or systems shall be maintained on items or in documents traceable to the items, or in a manner assuring that identification is established and maintained.
- Inspections or tests shall be performed at various points during the construction/fabrication process as identified in the approved design to verify conformity to design specifications.
- Handling, storage, cleaning, packaging, shipping, and preserving equipment, components, and parts are controlled during construction/fabrication to prevent damage, loss, and deterioration.
- The status of construction completion and readiness of equipment and/or systems for turnover and/or operation is verified and documented prior to use in accordance with the approved design.
- Periodic, preventive, and corrective maintenance of systems and equipment shall be performed and documented.
- Measuring and test equipment affecting quality shall be of the proper type, range and accuracy, and shall be calibrated, maintained and used according to Procedure QP-10, Control of Measuring and Test Equipment (TtFW 2002) and approved design specifications.

- Equipment found unsatisfactory for its prescribed use shall be recalibrated and certified within tolerances or replaced. The validity of any measurements and tests performed with out-of-calibration equipment shall be evaluated, and such measurements and tests shall be repeated as required.
- Test and inspection procedures that include test objectives, personnel requirements, equipment requirements, acceptance criteria, and disposition of unacceptable items shall be maintained.

4.3.4 Records

The QA records generated by implementing this section of the QMP include the following:

- Records of acceptance of items and equipment used for the construction of engineered systems
- Traceability documents, when records of acceptance are maintained on documents traceable to an accepted item
- Maintenance and calibration records

4.4 Operation of Systems

4.4.1 Purpose and Scope

This section of the QMP establishes the quality requirements to assure environmental technologies are operated according to management-approved design, operating instructions and guides. Project-specific requirements are discussed in the individual CQAPs.

4.4.2 Responsibilities and Authorities

The PMC Project Managers are responsible for ensuring that all engineered environmental systems are operated according to management-approved design, operating instructions and guides.

The PMC personnel operating engineered technologies or performing support activities are responsible for controlling the quality of their activities and supervising system operators.

All operators of engineered systems shall perform work processes and operations per the applicable requirements of the project-specific plans and procedures.

The QAM is responsible for assuring that the requirements of this section of the QMP are properly implemented.

4.4.3 Requirements and Instructions

The operation of engineered systems requires the development of procedures, work instructions, and/or SOPs for individuals to perform required operations. These procedures, work instructions, and SOPs shall be developed and controlled per the applicable requirements of Section 2.5, Documents and Records.

The operation of engineered environmental systems shall be coordinated among all participating organizations, and shall include the following requirements as applicable to the specific task(s) performed:

- Only qualified and accepted services or items and consumables shall be used during the operation of systems.
- Status indicators with tolerance limitations must be provided to indicate the operating status of systems and components as indicated in the approved design and operating instructions.
- Identification of components and complete engineered systems shall be maintained, or recorded in a manner assuring that identification is accurately established and maintained.
- Inspections or tests shall be performed and documented at various points during operation to verify conformity to operating specification or parameters. Such inspections or tests shall clearly indicate the acceptance criteria applied and reflect the importance of the item or service to quality.
- The handling, storing, cleaning, and preservation of equipment, components, and complete engineered systems shall be controlled during setup and operation to prevent damage, loss, and deterioration.
- Periodic preventive and corrective maintenance of engineered systems shall be performed and documented according to operating guidance and/or design specifications to ensure satisfactory performance of the system within established operating parameters.
- Critical spare parts shall be provided and maintained according to operating guidance and/or design specifications.
- Measuring and test equipment affecting quality shall be of the proper type, range and accuracy, and shall be calibrated, maintained and used according to approved design specifications.
- Equipment found unsatisfactory for acceptance testing must be recalibrated and certified within tolerances or replaced. The validity of any measurements and tests performed with out-of-calibration equipment shall be evaluated and such measurements and tests shall be repeated as required.

4.4.4 Records

The QA records generated by implementing this section of the QMP shall include the following:

- Acceptance records for components, equipment, and complete engineered systems
- Traceability documents, when records of acceptance are maintained on documents traceable to an accepted component, equipment, or complete system
- Calibration records

4.5 Verification and Acceptance of Systems

4.5.1 Purpose and Scope

This section of the QMP establishes the quality requirements to ensure the construction inspection and operational acceptance testing of engineered systems and their components. This task is performed according to specified approved design specifications and operating

documents. Project-specific requirements are discussed in the individual task order CQAPs.

4.5.2 Responsibilities and Authorities

The PMC Project Managers are responsible for ensuring that all engineered environmental systems are properly inspected and tested. Inspection and testing of temporary facilities will be as determined by the Design Engineer.

The PMC Project Managers, personnel inspecting or testing engineered systems, or personnel performing support activities are responsible for documenting the quality of all related activities.

All operators of engineered systems are to perform work processes and operations per the applicable requirements of the project-specific plans and procedures.

The QAM is responsible for ensuring that the requirements of this section of the QMP are properly implemented.

4.5.3 Requirements and Instructions

The inspection and testing of construction and operation of engineered systems requires the development of procedures, inspection plans, test plans, and/or SOPs for individuals to perform required tasks. Development of procedures shall be coordinated among all participating organizations, and shall include the following requirements as necessary for the specific task(s) to be performed:

- Identification of appropriate level of independence of inspection and test personnel
- A reinspection or retest to original or revised acceptance criteria, after the Project Manager resolves deficiencies and conducts repairs, when required
- M&TE of the appropriate type, range, and accuracy
- M&TE used in quality-affecting work calibrated against certified equipment. If no such standards exist, the basis for the calibration is documented
- M&TE maintained and used according to design specifications and/or manufacturer's requirements

4.5.4 Records

The QA records generated by implementing the requirements of this section of the QMP include the following:

- Copy of approved procedures and test plans
- Documents indicating acceptance or rejection of either inspection and testing or reinspection and retesting
- M&TE calibration records

5.0 REFERENCES

References to site-wide plans and documents refer to the current revision as of the preparation of this document. Contact the Rocky Mountain Arsenal Technical Information Center (303-289-0342) for the most current version.

Reference dates are current at the revision date. The PMC Reference Library should be checked for any updates to reference documents.

ANSI/ASQC (American National Standards Institute/American Society for Quality Control)

1995 (Jan 3) *E4-1994 Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs.*

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980)
42 U.S.C. §§ 9601 et seq.

EPA (United States Environmental Protection Agency)

1994 (Feb) *National Functional Guidelines for Inorganic Data Review.*

1994 (Feb) *National Functional Guidelines for Organic Data Review.*

FWENC (Foster Wheeler Environmental Corporation)

2003a (June 13) *Administrative Procedure, A-015-RMA, Records Transmittal. Revision 1.*

2003b (Jan 20) *Engineering Procedure, ENG-003-RMA, Review and Processing of Vendor/Subcontractor Documents. Revision 2.*

2003c (July 31) *Quality Assurance Procedure, Q-007-RMA, Quality Control Inspections. Revision 6.*

2003d (Dec 12) *Quality Assurance Procedure, Q-008-RMA, Surveillances. Revision 7.*

2003e (Nov 17) *Program Management Procedure PM-002-RMA, Subcontract Implementation and Management. Revision 1.*

2003f (Nov 14) *Environmental Data Operations Plan EDO-001-RMA, Chemical Quality Assurance Plan. Revision 2.*

2002a (Oct 16) *Project Controls Procedure, PC-017-RMA, Microcomputers, Revision 1.*

2002b (Nov 5) *Project Control Procedure, PC-020-RMA, PMC Software Development, Revision 0.*

2002c (Dec 17) *Quality Assurance Procedure, Q-003-RMA Audits Revision 6.*

2002d (Mar. 27) *Environmental Data Operations Plan EDO-002-RMA, Guidance for Preparing Sampling and Analysis Plans. Revision 2.*

2001 (May 18) Administrative Procedure, A-012-RMA, *Document Control*, Revision 3.

1998 (Nov 1) Administrative Procedure, A-002-RMA, *Key Roles and Job Responsibilities*, Revision 0.

RCRA (Resource Conservation and Recovery Act) 42 U.S.C. §§ 6901 et seq.

RVO (Rocky Mountain Arsenal Remediation Venture Office)

1997 (June) *Quality Assurance Program Manual*, Revision 0.

TtFW (Tetra Tech FW, Inc.)

2004a (Feb 23) Administrative Procedure A-019-RMA, *PMC Training Procedure*. Revision 5.

2004b (Feb 12) Engineering Procedure, ENG-002-RMA, *Developing, Changing, and Issuing Engineering Documents*. Revision 6.

2004c (Feb 17) Construction Procedure, CP-003-RMA, *Construction Document and Record Drawing Control*. Revision 5.

2004d (Apr.29) Project Operations Procedure, PO-1 – *Project Management Planning*. (TtFW Corporate Reference Library Procedure).

2004e (Feb 18) Environmental Data Operations Procedure, EDO-004-RMA, *Sample Documentation, Preservation, Labeling and Packaging and Shipping*. Revision 3.

2004f (Jan 8) Environmental Data Operations Plan EDO-007-RMA, *Environmental Data Validation Plan*. Revision 1.

2003 (Sept 8) Project Operations Procedure, PO-12, *Project Review Procedure* (TtFW Corporate Reference Library Procedure)

2002 (Apr 2) Quality Programs Procedure, QP-10, *Control of Measuring and Test Equipment* (TtFW Corporate Reference Library Procedure).