



EPA Region V

RAC

Response Action Contract

*Frontier Hard Chrome
ISRM Wall Installation/Source Area Treatment
Construction Quality Assurance Plan
Work Assignment Number: 153-RARA-1027*

EPA Contract: 68-W7-0026

March 2003

Copy No. _____



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**FRONTIER HARD CHROME
ISRM WALL/SOURCE AREA TREATMENT
CONSTRUCTION QUALITY ASSURANCE PLAN
VANCOUVER, WASHINGTON**

Prepared for

**U.S. Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle, Washington 98101**

Contract No. 68-W7-0026
Work Assignment No. 153-RARA-1027
Work Order No. 20064.153.100.0370
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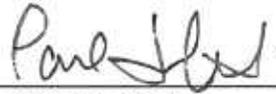
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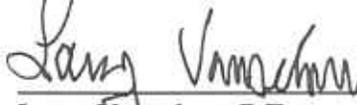
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LIST OF ACRONYMS AND ABBREVIATIONS

<u>Acronym</u>	<u>Definition</u>
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CQA PLAN	Construction Quality Plan
EPA	U.S. Environmental Protection Agency
FHC	Frontier Hard Chrome Superfund Site
FSP	Field Sampling Plan
HASP	Health and Safety Plan
ISRM	In-Situ Redox Manipulation
NELAC	National Environmental Laboratory Accreditation Council
PM	Project Manager
QA	quality assurance
QA/QC	quality assurance and quality control
QAPP	Quality Assurance Project Plan
CQMP	Construction Quality Management Plan
QAU	Quality Assurance Unit (EPA)
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
SAP	Sampling and Analysis Plan
Weston	Weston Solutions, Inc.

SECTION 1

INTRODUCTION

1.1 GENERAL PURPOSE

This Environmental Construction Quality Assurance Plan (CQA Plan) has been developed as implementation of Weston's *Corporate Construction Quality Management Plan* (CQMP; Weston 2002a) and follows guidelines presented in *Construction Quality Assurance for Hazardous Waste Land Disposal Facilities* (EPA 1986) for the In-Situ Redox Manipulation (ISRM) Wall Installation and Source Area Treatment at the Frontier Hard Chrome (FHC) Superfund site in Vancouver, Washington. This CQA Plan introduces personnel, defines responsibilities, and details activities in Weston's quality assurance and quality control (QA/QC) program, such as inspections, testing, monitoring, audits, and corrective action. The details regarding the QA/QC program for chemical analytical work to be completed under this contract are presented in the Quality Assurance Project Plan (QAPP) that has been incorporated into the Sampling and Analysis Plan (SAP; Weston 2003a).

The objective in developing and implementing the CQA Plan is to define the management system that will control and document:

- The quality of the techniques, materials, and equipment used in the project to ensure that they meet contract specifications and applicable EPA standards.
- The timeliness of performance through integration of quality functions within routine project schedules.
- The framework for communicating the quality control procedures and requirements to the individuals who will work on this project.

1.2 DISTRIBUTION

This CQA Plan as well as other documents such as the Health and Safety Plan (HASP; Weston 2002b) and others is required reading for all staff participating in the work effort. A current version of the site-specific CQA Plan will be in the possession of the field teams completing the remedial effort. All subcontractors will be required to comply with the procedures documented in this CQA Plan in order to ensure the quality and effectiveness of the final product.

Controlled distribution of the CQA Plan will be implemented by Weston to ensure that the current approved version is being used. Final versions of the CQA Plan will be provided to applicable EPA and Weston managers, regulatory agencies, remedial project managers, project managers, and quality assurance (QA) personnel. Whenever Weston revisions are made or addenda added to the CQA Plan, a document control system will be put into place to ensure that all parties holding a controlled copy of the CQA Plan will receive the revisions/addenda and the outdated material will be removed from circulation. The document control system does not

preclude making and using copies of the CQA Plan; however, the holders of controlled copies are responsible for distributing additional material to update any copies within their organizations. The distribution list for controlled copies will be maintained by Weston.

1.3 CQA PLAN FORMAT

The remainder of this CQA Plan has been organized to outline the personnel and procedures that will be utilized to maintain work quality during the project. This information has been organized as follows:

- Section 2—Background and Scope
- Section 3—Quality Management Organizational Structure
- Section 4—Construction Quality Control Testing and Reporting
- Section 5—Inspection and Reviews
- Section 6—Non-Compliance and Corrective Action
- Section 7—Maintenance of Documentation
- Section 8—Procedures for Submittals

Additional plans pertinent to project quality control are summarized below:

- *Chemical Stabilization of Chromium in Soil and Groundwater Work Plan* (Work Plan; Weston 2003b)—The Work Plan describes the general nature of the work to be performed at the site with the methods to be employed to safely accomplish the work in accordance with EPA national (EPA 1986) and contract-specific (EPA RAC 5 68-W7-0026) requirements. The Work Plan will be reviewed and approved by EPA.
- The Sampling and Analysis Plan (Weston 2003a) consists of the following two documents:
 - *Quality Assurance Project Plan* (QAPP)—The QAPP for the project defines functional activities and quality assurance and quality control protocols necessary to achieve chemical analytical data quality objectives. Reference will be made to the QAPP when detailing the analytical requirements of the project.
 - *Field Sampling Plan* (FSP)—The FSP provides guidance for all fieldwork by defining in detail the sampling and data-gathering methods to be used to perform the chemical stabilization activities.
- A *Health and Safety Plan* (HASP; Weston 2002b) has been drafted to provide site-specific information on the planned work to be performed, contaminants and their characteristics, evaluation of hazards, levels of protection, surveillance equipment, contingencies, and emergency precautions.

SECTION 2

BACKGROUND AND SCOPE

2.1 PROJECT SITE DESCRIPTION

The primary work areas associated with the project are associated with industrial support areas. The FHC site is located at 113 "Y" Street, Clark County, Vancouver, Washington. It is approximately one-half mile north of the Columbia River and is within the river's historical floodplain. The site's geographical coordinates are 45 deg. 37 min. 16 sec. N. latitude; 122 deg. 38 min. 39 sec. W. longitude. A map of the site vicinity is provided in Figure 1 of the FSP (Weston 2003a). A site diagram illustrating site features is presented in Figure 2 of the FSP (Weston 2003a).

The site was the location of chrome plating operations for approximately 25 years between 1958 and 1983. Prior to 1955, the site was used as an open storage area for neighboring businesses. In 1955, the site was filled with hydraulic dredge material and construction rubble. Since then, the site has been primarily occupied by two businesses, both engaged in chrome plating. Pioneer Plating operated at the site from 1958 to 1970. The site was then occupied by FHC until 1983.

FHC has had two different Records of Decision (RODs). One in 1987 dealt with the cleanup of chrome-contaminated soils at the site. The second ROD, in 1988, dealt with the cleanup of contaminated groundwater. Since the original RODs were issued, EPA has continued to monitor groundwater and soils, and evaluate new, innovative cleanup technologies to address the persistently high concentrations in soils and groundwater at the FHC site. In May 2000, the United States Environmental Protection Agency (EPA) finalized a Focused Feasibility Study (FS) which identified and evaluated several new and innovative technologies for addressing the problems at the site. One of the promising new in-situ treatment technologies identified in the Focused FS, In-Situ Redox Manipulation, or ISRM, was further evaluated in a bench scale test in February 2001. The results of the bench scale test indicated that the technology would be appropriate for use at the FHC site.

In late 2001, EPA issued a Record of Decision for cleanup of both soils and groundwater at the site. The ROD identified in-situ treatment using reducing compounds as EPA's Preferred Alternative.

Recent site activities in support of RA design have included the performance of a Geoprobe groundwater characterization study, installation of eleven monitoring wells and two treatment wells, and an ISRM Treatment Wall pilot scale study. These activities are described in the *Frontier Hard Chrome Remediation Design Final Data Evaluation Report* (Weston, 2003c). Above-ground structures at the Facility (including the Frontier Hard Chrome Building, the adjacent Richardson Metal Works Building, and out buildings) were demolished by Weston in late January/early February 2003.

2.2 PROJECT PURPOSE AND SCOPE

The purpose of this project is to stabilize hexavalent chromium in soil and groundwater and keep existing chromium contamination within the source area from moving offsite. This will be done by constructing an ISRM Treatment Wall downgradient of the source area to treat hexavalent chromium contaminated groundwater moving in a southerly direction from the site. In addition, the source area upgradient of the ISRM Treatment Wall will be treated as a source control measure. A description of the site work is provided below:

- *ISRM Wall Installation Characterization*—Seven Geoprobes will be completed along the locations of the proposed ISRM Wall alignment. The probe locations will be logged. Groundwater samples will be collected for baseline characterization purposes from the probes and thirteen existing monitoring wells (sampling and quality assurance requirements related to chemical parameters are provided in the Sampling and Analysis Plan [Weston 2003a]).
- *ISRM Wall Installation*—Following ISRM Treatment Wall Installation Characterization, the treatment wall will be installed by injecting a reducing agent into the subsurface aquifer at approximately 12 to 14 locations. Once the reagent has had time to react with the native iron, the reagent will be extracted. Groundwater samples will be collected from six treatment wells, 9 operational/functional wells as well as 3 up- and down-gradient monitoring wells to evaluate performance. Wastewater and injection withdrawal water generated during ISRM wall installation will be tested for hexavalent chromium, sulfur and total dissolved solids prior to disposal.
- *Source Area Treatment*—Approximately 22,000 cubic yards of soil above and below the water table will be treated by augering a reducing agent into the subsurface. This process will also treat resident groundwater. Soil and groundwater samples will be collected during full scale testing to verify treatment goals have been attained. Air monitoring will also be performed to assess site worker and community exposure.

SECTION 3

QUALITY MANAGEMENT ORGANIZATIONAL STRUCTURE

An organization chart showing the reporting relationships of the persons involved in QA/QC for this project is provided in Figure 1. The chart shows the lines of authority from EPA's Project Manager through the Weston and EPA project and quality control personnel. Weston's Quality Officer will ensure that the CQA Plan is effectively implemented through independent audits as requested by EPA. As shown, Weston's Project Quality Officer has direct reporting lines to Weston's Project Manager, and will provide direct communication to EPA's QA Officer, as requested. The subsections that follow describe the specific functions and authority of each of these persons.

3.1 QUALIFICATIONS OF QUALITY MANAGEMENT PERSONNEL

Quality management personnel are assigned on a program and/or project-specific basis. The requirements for on-site and off-site personnel will differ for each project and will be specifically identified by the Client and WESTON for individual projects. Assigned personnel will have the required qualifications pertaining to the specific categories anticipated to be encountered at the site (i.e., hazardous, toxic, radiological, engineering, hydrogeological, etc.).

The title and suggested qualifications, responsibilities, and authorities of each person assigned a quality management function are provided in the following subsections for guidance. The qualifications, responsibilities, and authorities will vary by project and should be updated accordingly. Some projects may require that resumes for quality management personnel be provided.

Prior to replacing assigned quality management personnel on a program or a project, Weston should obtain Client approval. Requests should include the names, qualifications, duties, and responsibilities of each proposed replacement.

Program-level personnel are discussed in Weston's Construction Quality Management Plan (Weston 2002a). A copy of the CQMP is on-file in Weston's Seattle office.

3.1.1 Project Manager

For each construction project, a Project Manager (PM) will be designated. The PM will have appropriate experience in construction, remediation, or engineering consulting. The qualifications of the PM will depend on the type of contract for which work is being (e.g., landfills vs. buildings and structures). The PM will either satisfy the following target qualifications or satisfy the Client that his or her education and experience are appropriate to conduct the duties of PM:

- A college degree in engineering, construction, construction management, or related field, and professional registration, as appropriate

- A minimum of 5 years of project management experience, with a minimum of 3 years in functional work area of the specific project
- Working knowledge of applicable federal, state, and local laws, regulations, and guidance

The PM is the single point of contact for the project. The PM is responsible for the management and execution of activities in accordance with the approved statement of work (SOW), approved work plans, and federal, state, and local laws and regulations. This includes coordinating the activities of the groups, subcontractors, or teams working on the project.

The PM's specific responsibilities will include the following:

- Completing the construction activities in accordance with the contract specifications and drawings and approved advance planning documents.
- Ensuring that the work is conducted in a safe and environmentally sound manner (this includes ensuring coordination between the Program Safety and Health Manager and the Site Safety and Health Officer [SSHO]).
- Maintaining close communication and coordination with the Client for the duration of the project.
- Preparing the required reports and submitting them to the Client in a timely manner.
- Immediately notifying the Client of problems with construction or safety and health procedures.
- Ensuring that site personnel follow the approved procedures presented in the site-specific project plans or the Construction QMP.

The PM or the Project Quality Officer has the authority to stop work on any part of the job if it is found to be noncompliant with contract specifications or project plans. Further, the PM is authorized to institute corrective actions, as necessary, and to implement these changes, with Client approval, if necessary, in accordance with the provisions of the contract. The groups, subcontractors, and teams working on the project report to the PM and act at his direction. The PM may delegate authority to the Weston Resident Engineer.

3.1.2 Project Quality Officer

The qualifications of the Project Quality Officer include:

- A minimum of 3 years of working experience in the construction industry, preferably in environmental construction
- Demonstrable expertise in the construction techniques and processes required for the project (e.g., on-site laboratory techniques)
- Working knowledge of applicable federal, state, and local laws, regulations, and guidance
- Formal education and training in construction is preferable.

The Project Quality Officer reports to the Program Quality Assurance Manager regarding quality issues. The Project Quality Officer may delegate some of his quality management responsibilities to another qualified person with prior approval from the Program Quality Assurance Manager and PM.

The Project Quality Officer may be assigned other duties when the level of quality management activities does not warrant full-time dedicated service and the other assigned duties do not conflict with the quality management duties. The Project Quality Officer is the single point of contact responsible for ensuring compliance with the requirements identified in the contract and the CQA Plan. The Project Manager, Project Quality Officer, or Designated Alternate (the Project Quality Control Inspector), is responsible for reviewing and approving site submittals. He is responsible for overall quality management related to the construction work.

The Project Quality Officer, with the assistance of the technical/analytical management personnel, has authority for ensuring the implementation of the CQA Plan as it applies to sampling, testing, monitoring, and analysis performed for the duration of the contract. He has the authority and responsibility to stop specific work activities related to, or affected by, noncompliant conditions until actions can be taken to correct the noncompliant condition or prevent it from affecting related or subsequent work. He has the authority to act for Weston in quality matters related to the construction project. The Project Quality Officer, or his Designated Alternate (the Project Quality Control Inspector) should be physically present at the site as appropriate when construction activities are in progress and should oversee quality management functions.

3.1.3 Project Quality Control Inspector/Other QC Personnel

The Project Quality Control Inspector and/or other QC personnel may be assigned to assist the Project Quality Officer. The identification and qualifications of these QC personnel should be comparable to those of the Project Quality Officer. The Project Quality Officer, Weston QC Inspectors, or third-party inspectors acting under the direction of the Project Quality Officer should conduct inspections and tests, both on-site and off-site. The person performing the inspection or test should be qualified to do so through training or experience. QC Inspectors will not inspect or test their own work or work performed under their supervision. QC Inspectors are responsible for generating applicable signed documentation for their work using standard forms/formats as specified in this site-specific project plan or Weston's Construction QMP.

The QC personnel report to the Project Quality Officer and will be assigned based on background, experience, and availability. The QC personnel (including specialized personnel such as hydrogeologists) should be at the site of work during those times when work activities in their designated areas are occurring, with complete authority to stop work and resolve the actions necessary to ensure compliance with the contract.

3.1.4 Safety and Health Manager

A Safety and Health Manager or designate will be assigned for each project. The Safety and Health Manager will have the following qualifications or satisfy the Client that his education and experience are appropriate:

- A minimum of 3 years of working experience in applicable or relevant activities
- Demonstrable expertise in air monitoring techniques and in development of respiratory protection and personal protective equipment (PPE) programs for working in potentially toxic atmospheres
- Working knowledge of applicable federal, state, and local occupational safety and health regulations, including OSHA hazardous site workers, construction safety, general industry standards, and client standards, as applicable

The responsibilities and authorities of the Safety and Health Manager are to provide consultation to the Site Health and Safety Coordinator (SHSC) on safety issues, regulations or company policy. In addition, he is responsible for the following tasks, as applicable to specific projects:

- Conduct accident investigations and review accident reports.
- Ensure that periodic safety audits are conducted.
- Ensure that the SHSC receives a minimum of 8 hours of annual training.
- Provide consultation to the SHSC for specific elements of the HASP (i.e., standard operating procedures [SOPs] for electrical safety, medical monitoring, etc.).

3.1.5 Site Health and Safety Coordinator (SHSC)

An SHSC will be designated for each field project. The qualifications of the SHSC will either satisfy the following target qualifications or satisfy the Client that his education and experience are appropriate to conduct the duties of SHSC:

- A minimum of 2 years of working experience at hazardous waste sites where EPA Level C and Level D PPE are required
- Specialized training in personal and respiratory protective equipment, program implementation, and proper use of air monitoring instruments, air sampling methods, and interpretation of results
- Certification of training in first aid and cardiopulmonary resuscitation (CPR) by a recognized organization such as the American Red Cross
- Working knowledge of applicable federal, state, and local occupational safety and health laws, regulations, and guidance, including OSHA hazardous site workers, construction safety, and general industry standards

The SHSC will implement the day-to-day enforcement of the HASP. The SHSC will have the following responsibilities:

- Ensure compliance with specified safety and health requirements, federal, state, and Occupational Safety and Health Administration (OSHA) regulations, and pertinent aspects of the SSHP.
- Consult with and coordinate any modifications to the HASP with the Project Manager, Safety and Health Manager and/or the Client.

- Prepare accident reports.
- Review results of daily safety and health findings in the Daily QC Report or logbook as appropriate.
- Recommend corrective actions in coordination with site management and the Project Manager and/or Safety and Health Manager for identified deficiencies and oversee the corrective actions.
- Interpret air monitoring/air sampling data required to upgrade/downgrade personal protective measures.
- Evaluate each feature of work for safety and health risks.

The SHSC is authorized to stop work if unacceptable safety and health conditions exist and to take appropriate measures to reestablish and maintain safe working conditions. The SHSC may not change the HASP or protocols without the approval of the Project Manager and acceptance by the Client, if appropriate.

3.2 CERTIFICATIONS/REGISTRATIONS

As applicable, personnel assigned to perform, review, approve, and/or certify the design of architectural, structural, mechanical, electrical, civil, or other engineering features of the work should be registered to practice in their particular professional field in the state within which the project being designed is located.

3.3 DELEGATION OF QC AUTHORITY

Some projects may require that a letter be completed documenting the delegation of authority to the QC personnel. A letter should describe the responsibilities and delegate sufficient authority to adequately perform the functions of the Project Quality Officer, including the authority to stop work that is not in compliance with the contract.

As necessary, the Project Quality Officer may issue letters of direction to other various QC representatives outlining duties, authorities, and responsibilities.

3.4 RESPONSIBILITIES OF QUALITY MANAGEMENT PERSONNEL

3.4.1 Weston Project Manager

The Weston Project Manager (PM) will have overall responsibility for all technical, contractual, and administrative matters for Weston. The PM will be responsible for ensuring that a high degree of client responsiveness is maintained. Additionally, the PM will be responsible for reviewing and approving planning documents, submittals, overseeing staff selection, and monitoring contract and task funds and schedules. The PM may delegate the day-to-day management aspects of the project to Weston's Resident Engineer.

3.4.2 Project Quality Officer

Through implementation of the CQA Plan and the QAPP, the Project Quality Officer will execute quality assurance programs for administrative, field, construction, and analytical activities. The Project Quality Officer will be responsible for review of submittals, performance of field and office audits, review of construction specifications, and review of analytical data submittals.

The QA procedures for field performance and analytical requirements vary in detail, but not in importance. To provide proficiency in both areas, QA personnel with specialized knowledge in these fields will assist the Project Quality Officer in the management of these activities.

3.4.3 Project Quality Control Inspector

The duties of the Project QC Inspector include periodic inspections of the work being produced and/or materials and equipment delivered to the site, verification of the adherence to the CQA Plan by subcontractors. Weston's PM, along with Weston's Resident Engineer, may share in these duties. It is anticipated that the Project Quality Officer will serve as the Project QC Inspector.

3.4.4 Resident Engineer

Following direction from Weston's PM, the Resident Engineer is responsible for managing all aspects of project implementation, which includes coordinating the activities of the subcontractors, working on the project, and reporting daily to Weston's PM. Subcontractors report to the Resident Engineer and act following his direction. The Resident Engineer will also be responsible for managing the activities of the Weston field crew.

The Resident Engineer (or the designated field engineer) will be assigned to be accessible at the site at all times that field activities are in progress. Pertinent submittals will be reviewed by the Resident Engineer.

3.4.5 Inspectors and Testing Technicians

Inspections and non-chemical tests, both on- and off-site, will be conducted by qualified personnel acting under the direction of the Resident Engineer. In all cases, the person performing the inspection or test will be qualified to do so through training and/or experience. Inspectors and testing technicians will not inspect or test their own work or work done under their direct supervision, and will generate applicable signed documentation for their work, using standard forms/formats as specified in this plan.

3.4.6 Field Engineer

The Field Engineer will assist the Resident Engineer in providing oversight and direction for the daily activities, including subcontractors. The Field Engineer will also serve as the Assistant Resident Engineer and/or the Site Safety Officer when the Resident Engineer is absent. The Field Engineer will also perform confirmation and investigatory sampling as required. Other field

personnel will participate when necessary to provide specialized expertise on work tasks as requested by the PM.

3.4.7 Subcontractors

Subcontracts will be utilized to provide support on completing the tasks associated with the project. Specifically, a licensed contractor (to be determined) will be used as the general contractor responsible for placement of the ISRM wall and for in-situ treatment of source area soil, using a suitable chemical reducing agent and portland cement. Other subcontractors will be utilized to provide analytical, electrical, well drilling, reagent and Geoprobe services. When this occurs, EPA will be notified and approval of the subcontractor will be gained prior to their participation at the FHC site. Furthermore, the analytical laboratory will be EPA or NELAC accredited and capable of providing both hard copy and electronic data submittals, as required.

SECTION 4

CONSTRUCTION QUALITY CONTROL TESTING AND REPORTING

4.1 QUALITY CONTROL TESTING

Quality control tests and checks will be performed during the planned activities to check the validity of the collected data and to confirm site conditions. The quality control checks will generally be performed by the Project QC Inspector, but other project personnel may also perform quality control tests as appropriate. Examples of quality control tests and checks that may be utilized during the project are listed below.

- Collection of quality control/quality assurance (QA/QC) samples for laboratory testing. QA/QC samples may include duplicates, equipment blanks, trip blanks, and ambient (field) blanks.
- Visual inspection of drill string samples to characterize geological horizons
- Checks of reagent addition rates
- ISRM Wall installation depths

4.2 CONSTRUCTION QUALITY CONTROL REPORTING

The Resident Engineer, Field Engineer, or Project QC Inspector will conduct the daily QC duties on-site. These duties include recording in a Daily Construction QC Report: on-site personnel, including subcontractors and visitors, and their corresponding time spent at the project; major equipment on-site; and materials delivered or removed from the location on that day. In addition, the Daily Construction QC Report will record the work performed by Weston and subcontractors, and the results of any inspections or QC tests performed that day. An example Daily Construction QC Report is provided in Figure 4-1. Summaries of the Daily Construction QC Reports will be sent to the EPA Project Manager with the weekly reports, as required. The original will be filed on-site for immediate reference, if needed.

The Weston PM, Resident Engineer, Project QC Inspector, or other competent personnel may perform Quality Control Audits during the project. When audits are performed, a record of the inspection and findings will be recorded on a Quality Assurance Checklist and Audit Form similar to the one presented as Figure 4-2.

SECTION 5

INSPECTIONS AND REVIEWS

Inspections and reviews are the observations used to ensure that the remediation activities and other associated work meets or exceeds the project requirements including any associated design criteria, plans, and specifications. Inspections will generally be conducted based on a three-phased approach consisting of the following:

- Initial
- Follow-up
- Completion

Each type of inspection is discussed separately in the subsections that follow. Inspections will be conducted by one of the project team members, who will ensure that the work complies with the specifications, applicable standards, or good construction practices.

Each inspection will be documented on the appropriate form and will record the following information:

- Contract number
- Project number
- Delivery order number
- Task site/area location
- Inspection number
- Date of inspection
- Name of inspector
- Identification of work inspected
- Factual description of the observation made
- Determination of acceptability/unacceptability
- Actions taken to correct deficiencies

5.1 INITIAL INSPECTION

Before work begins, an initial inspection will be conducted by the Project QC Inspector or designee. The initial inspection will include:

- A review of contract requirements.
- A check to ensure that all materials and/or equipment have been tested or vendor data have been reviewed and approved.
- A check to ensure that provisions have been made to conduct required work tasks (if any).

- Examination of work area to ascertain that all preliminary work (utility clearance, etc.) has been completed.
- A review of safety and quality requirements most relevant to the work.

5.2 FOLLOW-UP INSPECTION

Follow-up inspections will be conducted as required throughout each phase of work to ensure continued compliance with contract requirements, including testing, where appropriate, until completion of the particular feature of work.

5.3 COMPLETION INSPECTION

At the completion of certain work elements, the Resident Engineer and/or Project QC Inspector will conduct a completion inspection and develop a “punch list” of items that do not conform to the approved plans and specifications. A target date to complete punch list items will be established, and a subsequent completion inspection will be conducted. Deficiency correction dates will be consistent with the construction schedule.

5.4 INSPECTION DOCUMENTATION

All inspections will be recorded on a standard inspection form and supplemented with entries in the field logbook as necessary. The inspections will be recorded on the Construction Inspection Report (Figure 5-1). This document will be used to track deficiencies and corrective actions. Any deficiencies that cannot be corrected at the time of their discovery or that otherwise affect the quality or schedule of other work will be treated as a noncompliance condition. The completed forms will be reviewed by the Weston PM, and distributed according to distribution requirements, thus becoming a permanent part of the site records.

5.5 SAMPLING REQUIREMENTS

This Section defines *requirements* for sampling and other measurement activities, sample locations, frequency of testing or measurement, criteria for acceptance or rejection of measurement results, and corrective actions for exceedances of project specifications.

5.5.1 QC Plan

Tables 5-2 a, b, and c provide detail regarding measurement requirements, to include type of measurement, acceptance criteria, and required accuracy. Measurements not meeting the listed criteria will require additional measurement or resampling and reanalysis to comply with specific corrective action procedures outlined in Weston’s Construction QMP (Weston 2002a) and Section 6 below. Specific detail describing number of samples, containers, sample size, and individual analytical method specifications are listed in the Sampling and Analysis Plan (Weston 2003a).

SECTION 6

NONCOMPLIANCE AND CORRECTIVE ACTION

There are several mechanisms to identify services or activities that do not comply with the contract requirements. These mechanisms include:

- CQA Plan inspections
- Non-chemical tests
- Chemical tests
- QA audits

In each case, any noncompliance issue will be specifically identified in documents generated as a result of implementing this CQA Plan. It will be the responsibility of the Resident Engineer, Field Engineer, and/or Project QC Inspector to notify the relevant parties of the noncompliance irrespective of the subsequent disposition of the original report. At a minimum, the Weston Project Manager will be notified of any identical non-compliance issues.

The Project QC Inspector has the authority and responsibility to stop work related to, or affected by, the noncompliance condition until action can be taken to correct it or prevent it from affecting related or subsequent work. The Project QC Inspector may, at his discretion, require that the work be re-tested and/or re-inspected to confirm or disprove the noncompliance condition. Documentation of the original inspections and/or test will be retained as part of the project record. The Project QC Inspector may not permit any subsequent work to continue if that work is, or may be, affected by the noncompliance condition until:

- The work is re-tested and/re-inspected and found to be in compliance.
- The work is redone and subsequently re-tested and/re-inspected and found to be in compliance.
- The EPA PM indicating that the work or condition is acceptable under the terms of the change order accepts a change order.

In addition, the Project QC Inspector will promptly complete a written report providing a determination of the cause and effect of the noncompliance condition. This report will include a review of the CQA Plan procedures, work plans, and other relevant documents and procedures to determine if the systems being used need to be amended. This report will also include, if necessary, specific changes in procedures, work practices, and other actions to be taken to prevent reoccurrence of the noncompliance condition.

SECTION 7

MAINTENANCE OF DOCUMENTATION

All documents generated as a result of the implementation of this CQA Plan will undergo review and sign-off in accordance with a pre-established plan. The original and duplicate copies of these documents are to be maintained in files as specified in this plan. Table 7-1 presents the review and distribution requirements for all CQA Plan documents.

A master file of all CQA Plan documents (copies) will be maintained at the project site. Original documentation will be forwarded to the project file that will be established in Weston's Seattle office. Representatives of EPA and the regulatory agency representatives have the right to inspect this master file at any time. The master CQA Plan file will include the following documents (as applicable):

- CQA Plan and all documents
- Daily Construction QC reports
- Inspection reports (by task)
- Non-chemical test reports
- Shop drawings (by task or assembly)
- Vendor certificates/statements/data
- As-built plans
- QA audit reports
- Analytical data
- Reports of noncompliance

SECTION 8

PROCEDURES FOR SUBMITTALS

Weston will be responsible for total management of construction, remediation, and engineering consulting work identified in the contract. This responsibility includes scheduling, reviewing, certifying, and managing submittals. Weston will also be responsible for ensuring that certifications provided by others (e.g., vendors and subcontractors) are accurate and in compliance with the contract requirements. The procedures for field submittals are discussed in the following subsections.

8.1 SCHEDULE OF SUBMITTALS

Schedule for submittal of client-deliverable documents and other work products are described in the appropriate design documents for the ISRM Wall Installation and the Source Area Treatment.

8.2 SUBMITTAL REVIEW

Weston will review each submittal for contract compliance, including those of subcontractors, off-site laboratories, disposal facilities, suppliers, and purchasing agents. Submittals will be reviewed by the Project Manager or his designated alternate. Submittals that comply with the contract will be forwarded to EPA as appropriate. Submittals that do not comply with the contract will be returned to the originator to be corrected.

8.3 TRANSMITTAL FORMS/CERTIFICATION

Weston will use a Transmittal Form to accompany submittals. An example Transmittal Form is provided as Figure 8-1. The Transmittal Forms will be checked and approved by the Weston PM or designated alternates. The forms will be signed and dated, certifying that the accompanying submittal complies with contract requirements. For submittals that include proposed deviations requested by Weston, the column entitled "Variation/Exception" of Transmittal Form will be checked. The description and justification for deviations will be attached on a separate sheet. Deviations will be annotated in the submittal.

8.4 SUBMITTAL PROCEDURES

The distribution of the submittals will be as prescribed in the appropriate design documents.

SECTION 9

REFERENCES

EPA (United States Environmental Protection Agency), 1986. Construction Quality Assurance for Hazardous Waste Land Disposal Facilities EPA/530-SW-86-031.

Weston (Weston Solutions, Inc.), 2003a. ISRM Wall Installation/Source Area Treatment Sampling and Analysis Plan, Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, Washington. February.

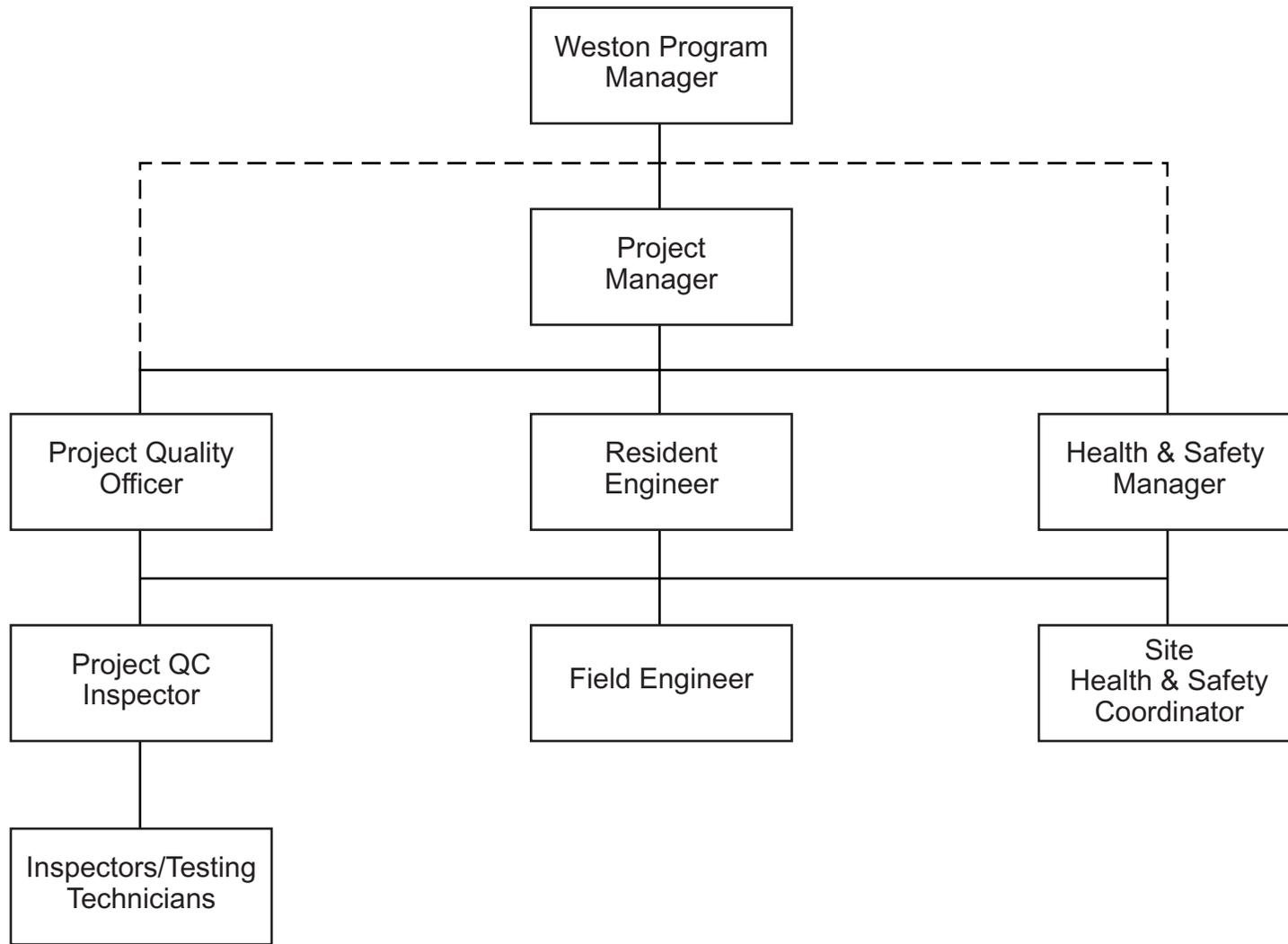
Weston, 2003b. Chemical Stabilization of Chromium in Soil and Groundwater Work Plan, Frontier Hard Chrome, Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, Washington, March.

Weston, 2003c. Frontier Hard Chrome Remediation Design Final Data Evaluation Report. Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, Washington. February.

Weston, 2002a. Corporate Construction Quality Management Plan, West Chester, Pennsylvania. January.

Weston, 2002b. Site Specific Health and Safety Plan, Frontier Hard Chrome, Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, Washington. February.

FIGURES



Organization Chart



Figure 4-1—Daily Construction Report

Daily Construction QC Report		
CONTRACT NO. / D.O. NO.: F41624-97-D-8015 /	WORK ORDER NO.:	DATE:
WEATHER/TEMPERATURE:		
WORK LOCATION:		
WESTON PERSONNEL:	EQUIPMENT:	VISITORS (REPRESENTING):
SUBCONTRACTOR:	TRADE/SERVICE:	
AGREEMENTS MADE/PHONE CONVERSATIONS: _____		
MATERIALS DELIVERED (Amount, Condition, Purpose): _____		
INSPECTION DATA (List items here and results, attach appropriate inspection sheet): _____		
TEST DATA (List items here and results, attach appropriate test data sheet): _____		
WORK COMPLETED BY WESTON: _____		
WORK COMPLETED BY SUBCONTRACTORS: _____		
PROBLEMS/RESOLUTIONS: _____		
OTHER: _____		
PREPARED BY:	SIGNATURE:	

Figure 4-2—Quality Assurance Checklist and Audit Form

1. Audit Number: _____
(Contract No./ Audit No.)
2. Auditor: _____
3. Date and Time: _____
4. Location: _____
5. Persons Contacted: _____
6. Project Consistent with Schedule? (if no, why?): _____

7. Project Staff Consistent with Project Requirements? (if no, why?): _____

8. Documents Available (Circle Yes/No/NA, and include observations):
Y / N / NA CQA PLAN: _____

- Y / N / NA Work Plan specifications: _____

- Y / N / NA Site Specific Health and Safety Plan: _____

- Y / N / NA Drawings, as built (maintained?): _____

- Y / N / NA Daily Construction QC Reports (on file, up-to-date, complete?): _____

- Y / N / NA Inspection records (type of inspection, up-to-date, filed properly, completed properly, signed, follow-up on noncompliance?): _____

- Y / N / NA Test records (type of test, up-to-date, filed properly, completed properly, signed, follow-up on noncompliance?): _____

Figure 4-2—Quality Assurance Checklist and Audit Form (continued)

9. Data Quality Management (Circle Yes/No/NA, and include observations):

Y / N / NA Sample log up to date?: _____

Y / N / NA Chain-of-custody forms on file?: _____

Y / N / NA Field equipment calibration records (up-to-date, complete?): _____

10. Field Inspection:

Type or nature of work observed: _____

Persons and/or subcontractor doing work: _____

Work being done in accordance with applicable specifications and the Work Plan?: _____

Work completed consistent with schedule?: _____

Other issues: _____

11. General Appearance and Safety Issues: _____

12. Permits/Utility Clearance Documentation In Order: _____

Figure 5-1—Construction Inspection Report

Project: _____

Project No.: _____

Date: _____

Inspector's Name: _____ Signature: _____

Inspection Type: Initial _____ Follow-up _____ Completion _____

General Observations: _____

Describe status of work element: _____

Estimate percent complete: _____%

Note workmanship, condition of materials, omissions, or dimensional inconsistencies: _____

Inspection/Testing Result (circle one): Passing / Contingent Passing / Failing

Describe inspection/test conducted and result (attach documentation form for any test conducted): _____

Deficiencies Noted	Corrective Actions Required	Completion Date
a.		
b.		
c.		
d.		

- a.
- b.
- c.
- d.

Reviewed By:

Project Manager: _____ Date: _____

Resident Engineer: _____ Date: _____

Site QC Inspector: _____ Date: _____

Figure 8-1—Transmittal Form for Shop Drawings, Sampling Data, Project Documents, or Manufacturer's Certificates of Compliance

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE	DATE	TRANSMITTAL NO.					
SECTION I—REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS <i>(This section will be initiated by the contractor)</i>							
TO:	FROM: Weston Solutions, Inc. 190 Queen Anne Ave N Suite 200 Seattle, WA 98109	CONTRACT NO. 68-W7-0026/153-RARA-1027	CHECK ONE: <input type="checkbox"/> THIS IS A NEW TRANSMITTAL <input type="checkbox"/> THIS IS A RESUBMITTAL OF TRANSMITTAL _____				
SPECIFICATION SEC. NO. (Cover only one section with each transmittal)							
PROJECT TITLE AND LOCATION Frontier Hard Chrome ISRM Wall Installation/Source Area Treatment, Vancouver, Washington							
ITEM NO.	DESCRIPTION OF ITEM SUBMITTED <i>(Type, Size, Model Number, Etc.)</i>	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO.	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT	CONTRACTOR ACTION CODE	VARIATION/EXCEPTION (Attach Sheet)	
							SPEC. PARA. NO.
a.	b.	c.	d.	e.	f.	g.	h.
REMARKS							
I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.							
NAME AND SIGNATURE OF CONTRACTOR							
SECTION II—APPROVAL ACTION							
ENCLOSURES RETURNED (List by Item No.)					NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE	
					SHEET _____ OF _____		

TABLES

Table 5-2a—Wall Characterization QC Inspections

Inspection Item	Criteria	Frequency	Measurement Method	Accuracy
Probe Locations	Per design drawing	Each location	Tape	+/- 5 feet
Groundwater Sampling	Per FSP, 20 to 40 feet	Each location	Drill string	+/- 3 feet
Probe Depth	Per FSP, 40 feet	Each location	Drill string	+/- 3 feet
Characterize Geological Horizons	Not Applicable	Each location	Drill string	+/- 1 feet

Table 5-2b—Wall Installation QC Inspections

Inspection Item	Criteria	Frequency	Measurement Method	Accuracy
Injection Locations	Per geoprobe locations	Each location	Tape	+/- 3 feet
Injection Well Spacing	Per design, 30 feet	Each location	Tape	+/- 1 foot
Injection Well Depths	Per field decisions based on wall characterization data	Each location	Drill string	+/- 3 feet
Characterize Geological Horizons	Not Applicable	Each location	Drill string	+/- 1 feet
Dithionite Quality	Per PNNL Specification	Provide product data at beginning of project	Engineer review of product specs	Per PNNLs Approval
Water Disposal to POTW	< 100 ppb Cr6	1 sample per batch	Hach™ test kits	Per Method

Table 5-2c—Source Area Treatment QC Inspections

Inspection Item	Criteria	Frequency	Measurement Method	Accuracy
Treatment Location	Per design	Not Applicable	Tape	+/- 5 feet in all directions
Treatment Depths	Per design	1 per day	Auger string	+/- 2 feet
Soil Treatment Goals	< 8 mg/kg Hex Cr	Not Applicable	Samples	Per Method
Groundwater Treatment Goals	< 5000 ug/L Hex Cr	Not Applicable	Samples	Per Method
Fluff Treatment Goals	Less than TCLP Criteria	Not Applicable	Samples, total and TCLP if needed	Per Method
Groundwater Sample Frequency	Not Applicable	1 per 1600 sq. ft.	Tape	100 Sq. Ft
Soil Sample Frequency	Not Applicable	1 per 500 cu. yds.	Tape (area) and auger string (depth)	100 cu. yds.
Fluff Soil Sampling Frequency	Not Applicable	1 per 500 to 1000 cu. yds.	Tape	100 cu. yds.
Haul Truck Inspections	No Visible Soil on Truck Exterior	Daily	Visual	Not Applicable
Final Grading	0.5% slope towards center	Not Applicable	Tape, visual	-0%, +0.5%
Dust Levels During Construction	2.5 mg/Cu. Meter	Continuous	Mini-Ram	Per Instrument Standards
Dust Fixative	Per Approved Submittal	Prior to Application	Visual	Not Applicable
Offsite Contamination Sampling	Less Than MCTA C	1 sample per 50 feet of perimeter 1 sample per 100 feet of road	Tape	-0 feet, +25 feet +/- 10 feet

Table 7-1—Document Review and Distribution Requirements

Document	Prepared By	Reviewed By	Original Held By	Copies Distributed to
CQA Plan	Project Quality Officer or approved alternate	1. Project Manager 2. EPA PM/QAU (as appropriate)	Weston project file	1. EPA PM 2. Weston PM 3. Weston Resident Engineer 4. Weston Project Quality Officer
Daily Construction QC Report	Project Quality Officer or approved alternate	1. Resident Engineer 2. Weston PM (as requested) 3. EPA PM (as requested)	Field Project Files through completion of field work, then Project File	1. Weston PM 2. EPA (as requested) 3. Project File
Inspection Reports: - Preliminary - Startup - Follow-up - Completion	Project Quality Officer or approved alternate	1. Resident Engineer 2. Weston PM (as requested) 3. Project Quality Officer 4. EPA (as requested)	Field Project Files through completion of field work, then Project File	1. Weston PM 2. Project Quality Officer 3. EPA (as requested) 4. Project File
Non-Chemical Test Reports	Project Quality Officer or approved alternate	1. Resident Engineer 2. Weston PM (as requested) 3. Project Quality Officer 4. EPA (as requested)	Field Project Files through completion of field work, then Project File	1. Weston PM 2. Project Quality Officer 3. EPA (as requested) 4. Project File
As-Built Plans	Resident Engineer and Project QC Inspector	1. Weston PM 2. Project Quality Officer 3. EPA (as requested)	Field Project Files through completion of field work, then Project File	1. Resident Engineer 2. Project Quality Officer 3. EPA (as requested) 4. Project File
QA Audit Reports	Project Quality Officer	1. Weston PM 2. Resident Engineer 3. EPA (as requested)	Field Project Files through completion of field work, then Project File	1. Weston PM 2. Project Quality Officer 3. EPA (as requested) 4. Project File

Note: EPA referenced above is meant to include EPA and any required regulatory agencies.