89268

FEB 14 2001

Mr. Dan Wall
Project Manager
Superfund Division
U.S. EPA
Region VII
901 N. 5th Street
Kansas City, Kansas 66101

Dear Mr. Wall:

DRAFT REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR THE INTERIM REMEDIAL ACTION FOR THE GROUNDWATER OPERABLE UNIT

As indicated in our January 8, 2001, letter to you on this subject, we are submitting the draft RD/RA Work Plan to you and MDNR for review. In accordance with the Federal Facilities Agreement, sixty days is afforded for this review and thus comments would be due by April 16, 2001.

As a reminder, DOE, EPA and MDNR have agreed the conceptual design and final design submitted by the specialty subcontractor will meet the Preliminary and Final Design Submittals under CERCLA. We have further agreed that, given the close coordination expected throughout the development of the TCE treatment approach, a one-week review period for these design documents will be adequate.

If you have any questions, please contact Tom Pauling at (636)441-8978.

Sincerely,

Pamela Thompson
Project Manager
Weldon Spring Site
Remedial Action Project

Enclosure:
As stated

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DOE/OR/21548-882
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REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR THE INTERIM REMEDIAL ACTION FOR THE GROUNDWATER OPERABLE UNIT

WELDON SPRING SITE REMEDIAL ACTION PROJECT
WELDON SPRING, MISSOURI

JANUARY 2001 **REV. A**

REVIEW COPY

U.S. Department of Energy
Oak Ridge Operations Office
Weldon Spring Site Remedial Action Project

Prepared by MK-Ferguson Company and Jacobs Engineering Group

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Weldon Spring Site Remedial Action Project

Remedial Design/Remedial Action Work Plan for the Interim Remedial Action for the Groundwater Operable Unit

Revision A – Draft

February 2001

REVIEW COPY

Prepared by

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U.S. DEPARTMENT OF ENERGY
Oak Ridge Operations office
Under Contract DE-AC05-86OR21548

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ABSTRACT

The *Interim Record of Decision for Remedial Action for the Groundwater Operable Unit* specifies in situ chemical oxidation treatment of trichloroethylene (TCE) in groundwater at the chemical plant area. This in-place treatment process is expected to reduce trichloroethylene (TCE) concentrations to the maximum contaminant level (MCL) of 5 µg/l. The remaining contaminants of concern (nitrate, nitroaromatic compounds, and uranium) will be addressed in a final Record of Decision that will be issued at a later date.

This plan is intended to provide the transition from the environmental documentation phase to final design and implementation of the interim remedial action. This plan describes the criteria, design activities, and construction activities for the in situ chemical oxidation process. An overall project schedule and a summary of cost are included for the major components of this action.

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1. INTRODUCTION

The Groundwater Operable Unit (GWOU) is the second of two operable units established for the chemical plant area of the Weldon Spring site. The Chemical Plant Operable Unit, which was the first operable unit, addressed the treatment of sludges, excavation of soil, and placement of these materials and the quarry bulk wastes, treated sludge, contaminated soils, buildings, drums, process equipment, and debris in the on-site engineered disposal cell. The GWOU addresses contaminated groundwater and springs in the chemical plant area.

The *Interim Record of Decision* provides for the remediation of trichloroethylene (TCE)-contaminated groundwater at the chemical plant. The contaminants determined to be of concern (nitrate, nitroaromatic compounds, and uranium) will be addressed, in a final Record of Decision (ROD) that will be issued at a later date. This approach allows for TCE to be remediated in the near-term while further studies are planned and conducted to determine the effectiveness and practicability of remediating the remaining groundwater contaminants.

1.1. Purpose and Scope

This plan is intended to fulfill requirements for both the remedial design and the remedial action work plans for implementation of the *Interim Record of Decision for Remedial Action for the Groundwater Operable Unit at the Weldon Spring Site* (Ref. 1). The U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) signed the *Interim Record of Decision* on September 29, 2000. The State of Missouri concurred with the proposal to implement this interim remedial action.

This *Work Plan* is the primary document used in defining the design and implementation of the selected interim remedial action for the GWOU. This plan has been prepared in accordance with the *Federal Facilities Agreement* between the DOE and the EPA (Ref. 2) and the *Comprehensive Environmental Response, Compensation, and Liability Act* of 1986 (CERCLA).

This *Work Plan* provides the following:

- The design strategy for the selected interim remedy.
- The implementation approach for this activity.
- The major deliverables that will define the design and construction activities of the selected remedy.
- The overall schedule under which the remedial design and remedial action activities will be conducted.

- General cost estimates for this activity.

1.2. Background

The *Interim Record of Decision* presents the selected interim remedial action for the GWOU. The action was selected following the requirements of CERCLA. The selected action specifies in-place treatment of TCE in groundwater at the chemical plant area. Information presented in the *Remedial Investigation/Feasibility Study Work Plan* (Ref. 3), the *Remedial Investigation* (Ref. 4), the *Baseline Risk Assessment* (Ref. 5), the *Feasibility Study* (Ref. 6), the *Supplemental Feasibility Study* (Ref. 7), and the *Proposed Plan* (Ref. 8) prepared for the operable unit was used to develop the selected action.

The objective of the *Feasibility Study* and *Supplemental Feasibility Study* was to identify technologies and develop an alternative that could reduce or remove the groundwater contaminants at the chemical plant to the extent practicable. Seven of the nine preliminary alternatives were retained for detailed analysis in the *Feasibility Study* (Ref. 6). Since the *Interim Record of Decision* addresses TCE contamination only, only the six remedial actions applicable to remediation of TCE were retained for evaluation.

1.3. Document Organization

The remaining sections of this document are:

Section 2 DESIGN CRITERIA –discusses the design criteria for the development of the selected interim remedial action.

Section 3 ENGINEERING DESIGN ACTIVITIES – discusses the design phases for development of the selected interim remedial action.

Section 4 CONSTRUCTION ACTIVITIES - provides a summary and construction specifications for the activities which will be undertaken to implement the selected remedy and quarry reclamation.

Section 5 PROJECT SCHEDULE - provides an overall schedule for design and implementation of the different activities discussed in this plan.

Section 6 SUMMARY OF PROJECT COSTS – summarizes the costs for design and construction of the selected remedy.

Section 7 QUALITY ASSURANCE PROGRAM PLAN - provides a brief abstract of the project quality assurance program plan.

Section 8 CONTINGENCY PLAN - provides a brief abstract of the project emergency preparedness plan.

Section 9 POST-ROD DOCUMENTS - provides a summary of the primary and secondary documents that will be prepared for the remedial design and remedial action phases of the GWOU.

Section 10 REFERENCES - provides a summary of the reference documents used for preparation of this plan.

2. DESIGN CRITERIA

The selected interim remedy provides for active remediation of the trichloroethylene (TCE)-contaminated groundwater via in situ chemical oxidation as described in Alternative 9 of the *Feasibility Study* (Ref. 6). The in situ process shall be performed as the remedial action to reduce the levels of TCE in groundwater to the maximum contaminant level (MCL) of 5 µg/l. This interim remedial action will comply with the *Interim Record of Decision (ROD) for Remedial Action for the Groundwater Operation Unit* (Ref. 1).

2.1. Siting Criteria

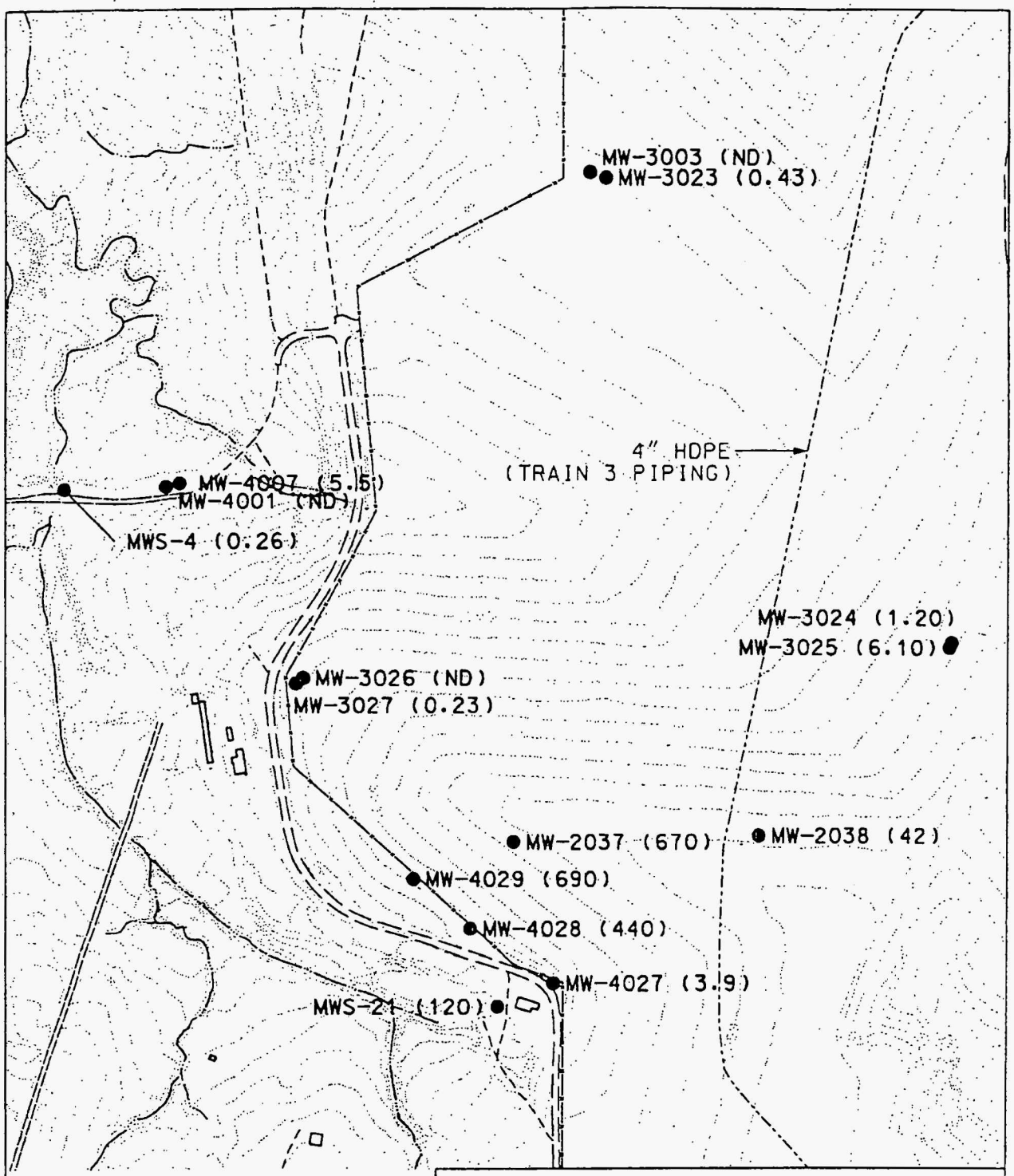
The in situ chemical oxidation process shall be applied in the area of TCE impact at the chemical plant, primarily Zones 1 and 2 at the chemical plant site (Figure 2-1). The treatment shall be applied in the shallow aquifer, which is comprised of saturated overburden and/or weathered Burlington-Keokuk Limestone. Analytical data indicate that the TCE impact is limited to this portion of the shallow aquifer.

2.2. Delivery System

The delivery system (i.e., wells, probes, injection points) shall be located in the weathered portion of the Burlington-Keokuk Limestone. Efforts will be made to limit drilling into the unweathered portions of this unit to prevent downward migration of contaminants. The delivery system shall be constructed to facilitate introduction of oxidant into the saturated thickness of the weathered unit. The system shall be optimally located to intersect the permeable portion of the shallow aquifer to provide rapid delivery of oxidant into the aquifer system. Injection points shall be placed at sufficient intervals to maximize the efficiency of oxidant delivery throughout the TCE-impacted groundwater. Materials used for the construction of the delivery system shall be compatible with the oxidant used.

2.3. System Operation

The oxidant concentration and dose shall be sufficient to reach the target performance goal of 5 ppb within a reasonable timeframe (i.e., less than 1 year). The actual dose and rate of oxidant delivery shall be determined from bench-scale and pilot-scale testing. The concentration of oxidant and the rate of delivery shall be set high enough to deliver sufficient oxidant to satisfy both the target contaminant (TCE) demand and natural oxidant demand of the aquifer to ensure degradation of TCE. Testing and operation of the system shall not cause excessive migration of TCE beyond the boundaries of known contamination or cause conditions within the aquifer that may result in migration or formation of other contaminants of concern. Operation of the system shall not result in excessive residual reagents or otherwise adversely affect the water chemistry of the aquifer in a way that would make conventional water treatment more difficult.



● - MONITORING WELL WITH TCE CONCENTRATIONS

N

0 300 600

SCALE FEET

AREA OF TCE IMPACT IN GROUNDWATER

FIGURE 2 - 1

A/CP/015/0101

ORIGINATOR:	DRAWN BY:	DATE:
RC	GLN	1/31/01

Modifications to the oxidant concentration and delivery rate may be made after field work has begun if it is determined that the system is not performing optimally. Modifications that involve a substantial increase in oxidant concentration and/or delivery rate will be carefully evaluated prior to implementation to ensure that the oxidant will not migrate beyond the treatment area.

2.4. Monitoring

The oxidant delivery system shall be closely monitored to ensure adequate operation. The treatment area will be monitored to ensure that the system does not produce off-gasses or hazardous conditions that would endanger the health and safety of workers or the environment. System maintenance will be performed to ensure efficient operation.

Sampling and analysis of the groundwater shall be performed to monitor the effectiveness of the treatment system during and after oxidant delivery. Sampling may be conducted using the existing monitoring system, injection locations, or new sampling locations.

3. ENGINEERING DESIGN ACTIVITIES

The engineering approach for the in situ chemical oxidation of trichloroethylene (TCE) in groundwater is to provide performance-based specifications to a specialty subcontractor for the design and implementation of a treatment strategy at the chemical plant. The conceptual design and final design submitted by the specialty subcontractor will be referred to as the Preliminary and Final Design Submittals, respectively.

3.1. Preliminary Design Submittal

A conceptual design will be submitted as part of the subcontractor bid package for Work Package 550 – *In Situ Chemical Oxidation of TCE in Groundwater*. This design will be prepared based on the results of the bench-scale testing and site-specific information provided to each subcontractor. The design will consist of the pilot-scale testing approach and a conceptual full-scale design.

The pilot-scale test design should provide specific information on the proposed pilot-scale testing, including testing objectives, injection method, and injection point configuration. Installation of the injection point will be specified. A discussion of the general layout of the oxidant delivery system, oxidant mixing methods, amounts, application rates, and testing duration will be included. Performance monitoring for the pilot-scale system will be defined.

The conceptual approach for full-scale implementation will be discussed with respect to the proposed pilot-scale testing. It should include a general approach for implementation of a full-scale system, such as injection locations, oxidant delivery system, and monitoring system.

3.2. Final Design Submittal

The final design submittal will be made available after performance of the pilot-scale testing. The specialty subcontractor will modify the conceptual design previously submitted based on the results of the pilot-scale test. The final design will discuss the results of the pilot-scale testing and present the modifications required for full-scale operation of the system.

The final design will describe the injection system, including number, location, configuration, and installation method for the injection points. The layout of the oxidant delivery system, including method of application, mixing, and storage will be specified. Application rates and duration of treatment to attain the performance milestones will be defined.

Details of the performance monitoring program, including sample analyses, monitoring locations, data interpretation, and trigger for system optimization will be included in the final design. The monitoring program will focus on ensuring adequate operation of the system. Sampling and analysis of the groundwater shall be performed by the subcontractor to monitor the

effectiveness of the treatment system during and after oxidant delivery. Sampling may be conducted using the existing monitoring system, oxidant injection locations, or new sampling locations.

4. CONSTRUCTION ACTIVITIES

At the Weldon Spring Site Remedial Action Project (WSSRAP), construction tasks are summarized and implemented as work packages. Work packages contain all the specifications, construction drawings, and quality control guidance for the implementation of each project. A safe work plan, bonding, insurance, substance abuse program, subcontractor quality assurance/quality control program, work sequencing forecast, and schedule are required as initial submittals to the Project Management Contractor (PMC) before the subcontractor is given notice to proceed with the work.

Activities associated with the performance of the in situ chemical oxidation of trichloroethylene (TCE) in groundwater are:

- Bench-Scale Testing.
- Pilot Scale-Testing
- Full-Scale System Installation
- Full-Scale Operation
- Performance Monitoring

The bench scale portion of this work will be performed by several specialty subcontractors in order to evaluate the different oxidation methods available. The tasks will be detailed in a statement of work. Samples will be supplied to several specialty subcontractors for analysis at the facilities of their choice. Bench scale testing will not require on-site activities. After completing the bench-scale testing, each subcontractor will present a summary of the results from the testing and a discussion of the applicability of their suggested method of in situ chemical oxidation at the Weldon Spring site.

Work Package 550 will be prepared as performance-based specifications that define the requirements the specialty subcontractor must incorporate into the design and operation for pilot-scale testing and full-scale implementation for the remedial system. Only those subcontractors demonstrating that their suggested method is applicable to the Weldon Spring site will be eligible to bid on the pilot-scale/full-scale portion of the project. The following is an initial list of specifications for Work Package 550, *In Situ Chemical Oxidation of TCE in Groundwater*:

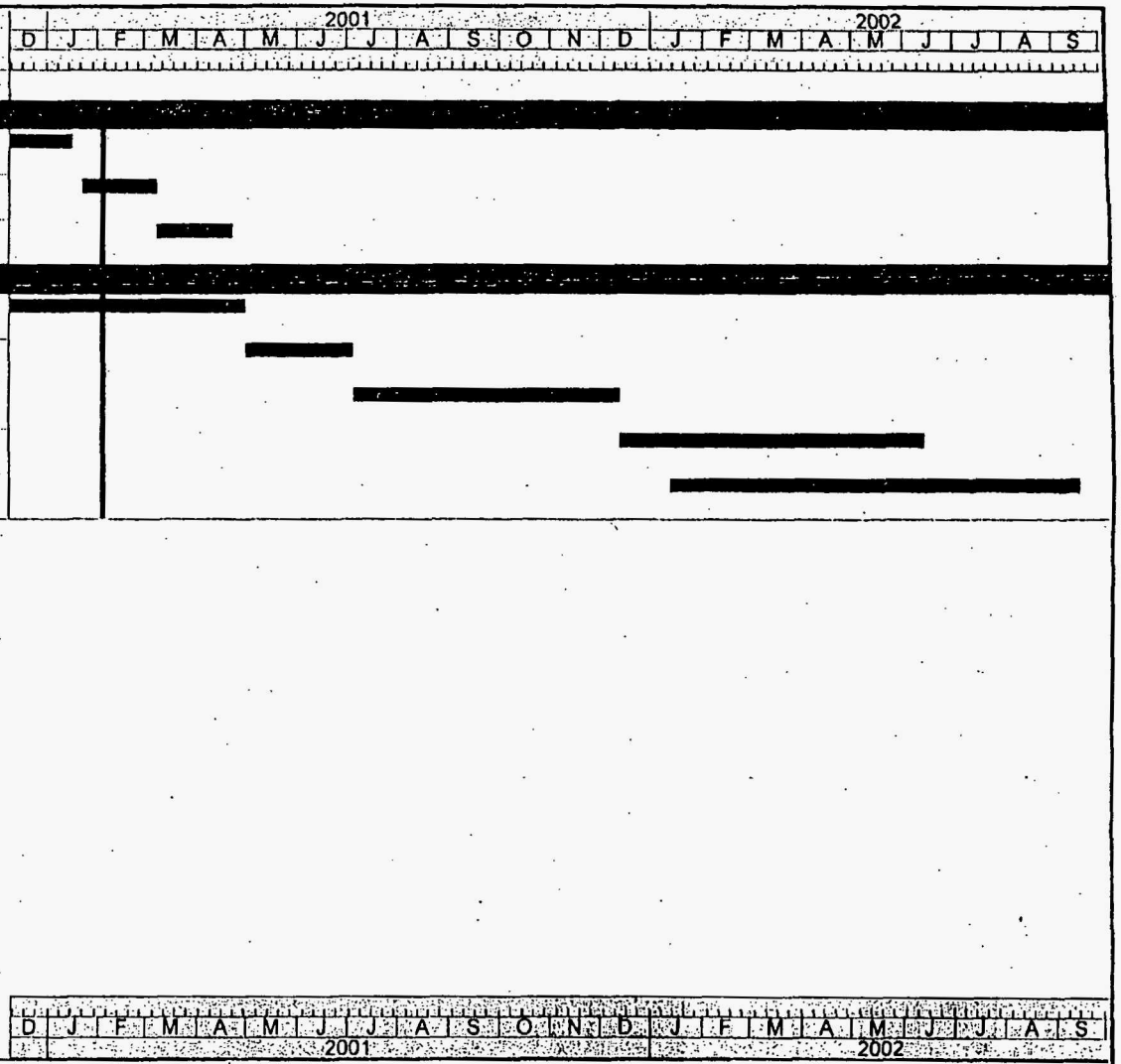
01010	Summary of Work
01025	Measurement and Payment
01300	Submittals
01400	Quality Assurance and Quality Control
01420	Hold and Witness Points
01503	Temporary Utilities
01510	Temporary Facilities
01560	Emission Controls

TBD	Contaminated Water Management and Transportation
02055	Facility Dismantlement/Demolition, Soil Removal and Transportation
02485	Seeding
02733	Well Installation
11220	Pumps
15010	Mechanical General Provisions
15070	Process and Utility Piping
15220	Piping
15100	Valves
15995	Mechanical System Startup and Commissioning
16010	Basic Electrical Requirements
16030	Electrical Testing and Installation Check
16900	Instrumentation

5. PROJECT SCHEDULE

The schedule (Figure 5-1) associated with the design, procurement, and construction of the following activities is provided in this section:

Activity Description	Start Date	Finish Date
Ground Water Operable Unit		
GWOU - Bench Test Purchase Orders WP550a		
GWOU (ICO) Bench Scale Test Engineering	27NOV00A	16JAN01A
GWOU (ICO) Bench Scale Test Procurement	23JAN01A	08MAR01
GWOU (ICO) Bench Scale Test Construction	09MAR01	23APR01
Site Groundwater Remediation WP550		
GWOU (Insitu Chem Oxidation Process) - Eng	01OCT98A	01MAY01
GWOU (Insitu Chem Oxidation Process) - Proc	02MAY01	05JUL01
GWOU (Insitu Chem Oxidation Process) - Const	06JUL01	13DEC01
GWOU (Insitu Chem Oxidation) - Operate/Treat	14DEC01	13JUN02
GWOU - (Insitu Chem Oxidation) Data Evaluation	13JAN02	14SEP02



Start Date	15JUN86
Finish Date	27MAY03
Data Date	04FEB01
Run Date	08FEB01 11:05

Early Bar
Progress Bar
Critical Activity

© Primavera Systems, Inc.

Work Package 550
Project Summary Schedule

FIGURE 5 - 1

6. SUMMARY OF PROJECT COSTS

Costs associated with the design and construction of the selected remedy are provided in the following sections. Costs are provided for the following components:

- Development of specifications
- Testing and design
- Installation
- Operation

Table 6-1 summarizes the costs associated with design and construction for in situ chemical oxidation system.

Table 6-1 Summary of Costs for In Situ Chemical Oxidation

PROJECT	TASK	COST
Bench-Scale Testing for In Situ Chemical Oxidation of TCE	Design	$17,000
	Testing	$50,000
In Situ Chemical Oxidation of TCE in Groundwater	Specifications	$60,000
	Design	$75,000
	Pilot Scale Testing	$75,000
	Full Scale Construction	$250,000
	Operation	$175,000

7. QUALITY ASSURANCE PROGRAM

The Project Management Contractor (PMC), as obligated by Department of Energy (DOE) Order 5700.6C, *Quality Assurance*, has developed the *Project Management Contractor Quality Assurance Program* (QAP) (Ref. 9). This plan describes not only the overall quality assurance program implemented at the Weldon Spring Site Remedial Action Project (WSSRAP), but also includes requirements for personnel training, quality improvement, documents and records, work processes, design, procurement, inspection and acceptance testing, and a routine assessment program.

7.1. Purpose

The PMC develops, implements, and maintains a written QAP. The QAP describes the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, achieving, and assessing adequacies of work. The QAP describes the management system, including planning, scheduling, and cost control considerations.

The QAP satisfies the requirements of:

- Morrison Knudsen Corporation Management
- Jacobs Engineering Group, Inc. Management
- DOE Order 5700.6C, *Quality Assurance*
- 10 CFR 830.120, *Quality Assurance*

American Society of Mechanical Engineers (ASME) NQA-1, U.S. Environmental Protection Agency (EPA) documents, and the American National Standards Institute/American Society for Quality (ANSI/ASQ) - E4 were also used as guidance documents, with the applicable sections being incorporated as appropriate.

7.2. Description

The PMC QAP reflects the mission, policies, and objectives for the WSSRAP. The program is a broad-based program that applies to every aspect and employee of the WSSRAP.

The QAP identifies mechanisms necessary for planning, implementation, and assessment of quality-affecting activities. These mechanisms are applied using a graded approach, which takes into account that not all items, processes, or services have the same impact on the quality, safety, or reliability of an activity. Mechanisms outlined in the QAP are:

- Personnel indoctrination and training
- Quality improvement
- Documents and records

- Work processes
- Design
- Procurement
- Inspection and acceptance testing
- Management assessment
- Independent assessment

7.3. Implementation

The PMC Project Quality Manager and his designees conduct independent assessments of the performance of the project in relation to the requirements of the QAP and departmental standard operating procedures and instructions. These assessments are performed in accordance with the QAP.

The QAP, together with implementing procedures and instructions, form an integrated management system that ensures compliance with specified standards, personnel safety, and protection of the environment. The significant features of the QAP are:

- Quality verification and overview of activities that demonstrate the completeness and appropriateness of achieved quality.

- Assurance that activities are performed to specified requirements.

- Assurance that structures, systems, and components will perform as intended.

Quality is achieved by ensuring that managers at all levels are responsible and accountable for achieving and improving upon quality. All PMC personnel are responsible for the quality of work at the WSSRAP.

The quality assurance/quality control (QA/QC) requirements for specific tasks performed under the scope of this work plan will be addressed in future documents. The QA/QC requirements for construction activities will be presented in the technical specifications for the appropriate work packages. The QA/QC requirements for sampling and characterization activities will be addressed in the appropriate sampling or monitoring plans.

8. CONTINGENCY PLAN

8.1. Purpose

The Project Management Contractor (PMC) has prepared the *Emergency Plan* (Ref. 10), which establishes the planning, preparedness, and response concepts for operational emergencies and other emergencies at the Weldon Spring Site Remedial Action Project (WSSRAP). The emergency management response measures established by the *Emergency Plan* are intended to afford protection for the health and safety of on-site personnel and the public, limit damage to facilities and equipment, minimize impact to on-site operations, and limit adverse impacts on the environment. The plan is implemented whenever an emergency situation is declared or conditions exist that constitute, or could result in, an operational emergency at the WSSRAP. Appropriate parts of the plan may be implemented by a responsible authority for emergencies that do not reach the severity of an Operation Emergency, but require a structured response pursuant to environmental or health and safety regulations or sound management practices. The plan also outlines the interfaces and coordination with off-site private organizations, and Federal, State, and local government agencies with roles in emergency response.

8.2. Description

The *Emergency Plan* is designed to address planning for all categories of emergencies arising at or as a result of, operations conducted by the WSSRAP that could affect people, property, or the environment. The scope and extent of the planning is commensurate with the hazards present at the WSSRAP.

The *Emergency Plan* addresses specific categories of events and defines basic response actions to be followed for each type of incident. Topics discussed are:

- WSSRAP emergency response organization.
- Off-site response interfaces.
- Emergency event classification.
- Notification and communication.
- Hazard assessment process.
- Protective actions.
- Medical support.
- Reentry and recovery.
- Public Information.
- Emergency facilities and equipment.
- Training.
- Drills and exercises.
- Emergency management program administration.

This plan implements the requirements of 40 CFR 264 and 10 CSR 25-7.264 for a *RCRA Contingency Plan*. This plan also incorporates the requirements of 40 CFR 112 for a *Spill Prevention Control and Countermeasures Plan*, and 29 CFR 1910.120 and 29 CFR 1926.65 for an *Emergency Response Plan*. Outside agency hazardous material incident notification guidance is contained in the *WSSRAP Reportable Release Notification Guide* (Ref. 11).

8.3. Implementation

It is the policy of the U.S. Department of Energy (DOE) and WSSRAP management to conduct operations in a responsible manner so as to be protective of human health and the environment. The primary focus of site management is the prevention of accidents, emergency situations, and other incidents, which could adversely affect on-site personnel, the public, property, or the environment. These objectives are attained through implementation of effective planning and preparedness for emergencies during the initial stages of site activities. Also, protective actions and training maintain an awareness of potential emergencies and the appropriate responses required for prevention or mitigation of problems that could occur.

Specific provisions for responding to emergencies that are unique to individual tasks within the remedial action activities are incorporated into job-specific health and safety plans, safe work plans, and/or task specific safety assessments. For each activity, the health and safety plan is the primary working document that governs initial safety, health, and emergency response requirements. The health and safety plan also provides subcontractors with the process for identifying potential emergency conditions and notifying the appropriate WSSRAP contact.

9. POST-ROD DOCUMENTATION

This section outlines the primary and secondary documents that will be prepared to support design and implementation of the selected interim remedy for the Groundwater Operable Unit (GWOU). Primary documents are those that are major, discrete portions of the remedial design and remedial action activities. Secondary documents are typically feeder documents to primary documents. A secondary document may be finalized in the primary document that it supports or it may be issued as a stand-alone document. The schedule for the documents being prepared in support of the design and construction for this operable unit will be included and updated in the quarterly reports prepared in accordance with the *Federal Facilities Agreement* (Ref. 2).

9.1. Primary Documents

9.1.1. Final Design Submittals

The final design submittal for this work will be the final design provided by the specialty subcontractor performing the treatment of trichloroethylene (TCE). The final design will be prepared after performing the pilot-scale testing.

9.1.2. Contingency Plan

The Weldon Spring Site's *Emergency Preparedness Plan* (Ref. 10) will be used to fulfill the requirement for the preparation of a contingency plan for the work being performed for the GWOU.

9.1.3. Remedial Action Report

The remedial action report documents the completion of an operable unit. The report indicates that the operable unit has met the objectives of the *Interim Record of Decision* (Ref. 1) and provides summary information for subsequent inclusion in the preliminary and final closeout reports.

9.2. Secondary Documents

9.2.1. Preliminary Design Submittals

The preliminary design submittal for this work will be the conceptual design provided by the specialty subcontractor performing the treatment of TCE. The conceptual design will be prepared after bench-scale testing. This design will define the pilot-scale testing and a general design for full-scale implementation

9.2.2. Construction Progress Reports

The quarterly reports for the Federal Facilities Agreement will fulfill the requirements for the *Construction Progress Report* for this operable unit. Copies of daily, weekly, and monthly reports submitted by the subcontractor, as well as quality control inspections, are maintained at the site. These documents can be made available upon request to the regulators for inspection.

10. REFERENCES

1. U.S. Department of Energy. *Interim Record of Decision for Remedial Action for the Groundwater Operable Unit at the Chemical Plant Area of the Weldon Spring Site*. No Rev. DOE/OR/21548-798. Prepared by Oak Ridge Operations Office, Weldon Spring Site Remedial Action Project. Weldon Spring, MO. September 2000.

2. U.S. Environmental Protection Agency. *First Amended Federal Facilities Agreement in the Matter of the United States Department of Energy's Weldon Spring Site, St. Charles, Missouri*. DOE/OR/21548-315. Docket No. CERCLA-VII-85-F-0057. United States Environmental Protection Region VII. Kansas City, KN. February 3, 1992.

3. MK-Ferguson Company and Jacobs Engineering Group. *Work Plan for the Remedial Investigation/Feasibility Study for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring Missouri*. Rev. 0. DOE/OR/21548-567. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. August 1995.

4. Argonne National Laboratory. *Remedial Investigation for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring, Missouri*. No Rev. DOE/OR/21548-571. Prepared for U.S. Department of Energy, Weldon Spring Site Remedial Action Project, Weldon Spring, Missouri. July 1997.

5. Argonne National Laboratory. *Baseline Risk Assessment for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring, Missouri*. No. Rev. DOE/OR/21548-568. Prepared by the Environmental Assessment Division for the U.S. Department of Energy and the U.S. Department of the Army. July 1997.

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