DOE/OR/22160--T17

MANAGEMENT PLAN
(Revision 2)

**DEMONSTRATION TESTING AND EVALUATION
OF IN SITU SOIL HEATING**

Contract Number DE-AC05-93OR22160
IITRI Project C06787

RECEIVED

MAR 10 1995

OSTI

For

Department of Energy
Oak Ridge Operations
P. O. Box 2001
Oak Ridge, Tennessee 37831

ATTN: Mr. Johnny Moore

By

Harsh Dev
IIT Research Institute
10 West 35th Street
Chicago, Illinois 60616
March 6, 1995

MASTER

FOREWORD

This is the second revision to the Management Plan for US DOE contract entitled, "Demonstration Testing and Evaluation of In Situ Soil Heating," Contract Number DE-AC05-93OR22160, IITRI Project Number C06787. The cost plan and schedule have been revised herein. The Management Plan was revised once before, in March 1994.

In this project IITRI will demonstrate its in situ soil heating and decontamination technology which uses 60 Hz AC power to heat soil to a temperature of about 90°C. This technology is aimed at the decontamination of soil by the removal of organic hazardous constituents by the action of heat and a vacuum gas collection system.

Respectfully Submitted
IIT Research Institute

Harsh Dev
Science Advisor
Energy and Environmental Sciences

Approved:

G. C. Sresty
Manager
Energy and Environmental Sciences

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I. EXECUTIVE SUMMARY

This document is a revised Management Plan for US DOE contract entitled, "Demonstration, Testing and Evaluation of In Situ Soil Heating," Contract No. DE-AC05-93OR22160, IITRI Project No. C06787.

This contract was signed on September 30, 1993. IITRI started work on it in October 1993. This second revision to the Plan is being made to reflect the delays encountered by this project as a result of personnel and equipment availability conflicts with and delays in another related IITRI project at Sandia National Laboratory. In the Sandia project, the EM heating technology is being demonstrated along with the in situ RF heating process. Some of the delay in this project is also attributable to the effort and revisions required in the development of the required plans and documents. Further, it is IITRI's understanding that power needed for the demonstration will be available in late March due to the re-wiring and up-grading of the electrical distribution systems at the K-25 site and also due to the delivery schedule of a transformer needed for this demonstration site.

This revised plan has been made to show the new schedule and the cost plan. Other technical objectives of the project remain unchanged. The revised completion dates of the project milestones are summarized below. The projected completion date of the project is September 1995.

Milestone Log

No.	Milestone	Revision 2 Completion Dates	Revision 1 Completion Dates	Original Completion Dates
2.8	Submit All Documents	2/1/95*	3/31/94	12/17/93
	All Permits Received	2/1/95*	6/1/94	3/23/94
7.4	Shakedown Completed	5/15/95	7/25/94	6/8/94
12.6	Final Report Submitted	9/27/95	Jan-'95	9/30/94

* Actual Completion Dates. Others are Planned Completion dates

There is a potential for the revised schedule to compete with and/or conflict with another IITRI project aimed at in situ decontamination of soil containing heavy hydrocarbons (diesel), and various solvents. This is the project at Sandia National Laboratory as mentioned above. The Sandia project is scheduled to finish the heating of the soil by first week of April 1995. The revised schedule presented here has been made after taking this into account.

In this project IITRI will demonstrate an in situ soil heating technology for the removal of hazardous organic contaminants present in the soil. In Situ heating will be accomplished by the

application of 60 Hz AC power to the soil. The soil will be heated to a temperature of about 90°C. This technology is suited for the removal of those organic compounds which have a normal boiling point in the range of 100° to 210°C, or else for those which exhibit a pure component vapor pressure of at least 10 mm Hg in the 90° to 100°C temperature range. For example, perchloroethylene, dichlorobenzene, trichlorobenzene, etc. may be removed by in situ AC heating.

It is planned to demonstrate the technology by heating approximately 400 tons of soil in the K-1070 Classified Burial Ground located at DOE's K-25 Site located in Oakridge, TN. It is estimated that the heating portion of the demonstration will take approximately 3 weeks at an average power input rate of 150 to 175 kW. The project objectives will be accomplished by performing the following 12 tasks:

- Task 1: Develop Modify Plans
- Task 2: Permitting
- Task 3: Sub-contract and Supplies
- Task 4: Equipment Testing and Shakedown
- Task 5: Site Preparation and Equipment Mobilization
- Task 6: Pre-Demonstration Soil Sampling and Analysis
- Task 7: Install Treatment System
- Task 8: Conduct Demonstration
- Task 9: Equipment Removal, Decontamination & Demobilization
- Task 10: Post Demonstration Soil Sampling and Analysis
- Task 11: Data Review and Economic Analysis
- Task 12: Final Report Preparation and Draft Review

During the course of this project, under various tasks, the following documents will be or have been submitted:

- Project Management Plan (submitted)
- Milestone Plan (submitted)
- Cost Plan (submitted)
- Work Plan (submitted)
- Review/Comment on NEPA documentation (Done)
- Demonstration Test Plan (submitted)
- Demonstration Design (Submitted)
- QA/QC Plan (submitted)
- Health and Safety Plan (submitted)
- Environmental Monitoring and Compliance Plan (Submitted)
- Waste Management Plan (Submitted)
- Monthly Reports -- Status, Summary, Milestone Schedule, Cost Management
- Conference and Meeting Records
- Hot Line Report (as and when appropriate)
- Draft Final and Final Report

II. REVISED MILESTONE SCHEDULE PLAN

Figure 1 depicts the project schedule along with the planned completion dates for the four major milestones (Tasks 4,7,11, and 18). The figure also shows the progress to date and the estimated start and end dates for the various tasks. Table 1 is a milestone log summarizing the planned completion dates of the four major milestones.

Table 1. Milestone Log

No.	Milestone	Revision 2 Completion Dates	Revision 1 Completion Dates	Original Completion Dates
2.8	Submit All Documents	2/1/95*	3/31/94	12/17/93
	All Permits Received	2/1/95*	6/1/94	3/23/94
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12.6	Final Report Submitted	9/27/95	Jan-'95	9/30/94

* Actual Completion Dates. Others are Planned Completion dates

III. REVISED COST PLAN

The cost plan is shown in Table 2. The estimated rate of project expenditures was calculated in the following manner: For each remaining task the required completion date was estimated in order to assure compliance with the milestone plan. Then the monthly cost of each active task was estimated by multiplying the required percentage completion and the estimate of the Task's total cost as prepared in the proposal. Figures 2 and 3 show the planned rate of monthly and cumulative expenditure.

IIT Research Institute
Project Gantt Chart Report
DT&E OF IN SITU SOIL HEATING

Frame: 1
Page: 1

Symbol legend		Project: DT&E OF IN SITU SOIL HEATING Leader: G. Sresty
■	CRITICAL TASK	
—	Non-critical task	
...	Float time	
■	Completed task	
o	Non-completed milestone	
■	Completed milestone	
T	Today's date	

Figure 1. Revised Project Schedule and Milestone Plan

Table 2. Cost Plan

TITLE Demonstration, Testing and Evaluation of Insitu Heating of Soil														IDENTIFICATION NO. DE-AC05-93OR22160																																																													
PARTICIPANT NAME & ADDRESS IIT Research Institute 10 W. 35th Street Chicago, IL 60616				COST PLAN DATE: 03/06/95 Revision Number 2				START DATE: 9/30/93 COMPLETION DATE (per current contract) 3/31/95 PROJECTED COMPLETION DATE Sep-95																																																																			
<table border="1"> <thead> <tr> <th rowspan="2">ELEMENT REPORTING CODE ELEMENT</th> <th rowspan="2">Plan Prior Fiscal Years</th> <th rowspan="2">Actual Prior Fiscal Years</th> <th rowspan="2">Actual This Fiscal Yr. thru 2/19/95</th> <th colspan="10">PLAN FOR CURRENT FISCAL YEAR (FY'95)</th> <th rowspan="2">Future Fiscal Years</th> <th rowspan="2">Sub- sequent Fiscal Years</th> <th rowspan="2">Total</th> </tr> <tr> <th>Feb after 2/19</th> <th>Mar</th> <th>Apr</th> <th>May</th> <th>Jun</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Total FY 95</th> </tr> </thead> <tbody> <tr> <td>1 DT&E of Insitu Heating of Soil</td> <td>\$863,765</td> <td>\$149,273</td> <td>\$78,337</td> <td>\$21,000</td> <td>\$42,000</td> <td>\$138,000</td> <td>\$118,000</td> <td>\$103,000</td> <td>\$79,000</td> <td>\$98,000</td> <td>\$37,155</td> <td>\$714,492</td> <td>\$0</td> <td>\$0</td> <td>\$863,765</td> </tr> <tr> <td>Total</td> <td>\$863,765</td> <td>\$149,273</td> <td>\$78,337</td> <td>\$21,000</td> <td>\$42,000</td> <td>\$138,000</td> <td>\$118,000</td> <td>\$103,000</td> <td>\$79,000</td> <td>\$98,000</td> <td>\$37,155</td> <td>\$714,492</td> <td>\$0</td> <td>\$0</td> <td>\$863,765</td> </tr> </tbody> </table>																		ELEMENT REPORTING CODE ELEMENT	Plan Prior Fiscal Years	Actual Prior Fiscal Years	Actual This Fiscal Yr. thru 2/19/95	PLAN FOR CURRENT FISCAL YEAR (FY'95)										Future Fiscal Years	Sub- sequent Fiscal Years	Total	Feb after 2/19	Mar	Apr	May	Jun	Jul	Aug	Sep	Total FY 95	1 DT&E of Insitu Heating of Soil	\$863,765	\$149,273	\$78,337	\$21,000	\$42,000	\$138,000	\$118,000	\$103,000	\$79,000	\$98,000	\$37,155	\$714,492	\$0	\$0	\$863,765	Total	\$863,765	\$149,273	\$78,337	\$21,000	\$42,000	\$138,000	\$118,000	\$103,000	\$79,000	\$98,000	\$37,155	\$714,492	\$0	\$0	\$863,765
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DOLLARS EXPRESSED IN: PLAN: Rounded to nearest thousand dollars for FY95 ACTUAL: rounded to nearest dollar				SIGNATURE OF PARTICIPANT'S PROJECT MANAGER AND DATE 3/6/95										SIGNATURE OF PARTICIPANT'S AUTHORIZED FINANCIAL REPRESENTATIVE & DATE 3/6/95																																																													

COST PLAN (REVISION 2)
(March 2, 1995)

Figure 2. Cost Plan, By FY '95 Month

COST PLAN (REVISION 2) (March 2, 1995)

Figure 3. Cost Plan, Cummulative