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OE ORDER# 4700.1

EG&G ROCKY FLATS, INC.  
ROCKY FLATS PLANT, P.O. BOX 464, GOLDEN, COLORADO 80402-0464 • (303) 966-7000

24 RF 10234

DIST.	LTR EN
MARAL, M.E.	
URLINGAME, A.H.	
USBY, W.S.	X
RANCH, D.B.	
ARNIVAL, G.J.	
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ISING, T.L.	
ANDLIN, N.B.	
CHWARTZ, J.K.	
ETLOCK, G.H.	
TEWART, D.L.	
TIGER, S.G.	X
EBIN, P.M.	X
DORHEIS, G.M.	
ILSON, J.M.	
alk, Robin	XX

October 13, 1994

94-RF-10234

Jessie M. Roberson  
Acting Assistant Manager  
Environmental Restoration Division  
DOE/RFFO

**EVALUATION OF THE POTENTIAL FOR DENSE NON-AQUEOUS PHASE LIQUIDS MIGRATION DURING OPERABLE UNIT 2 SUBSURFACE INTERIM MEASURE/INTERIM REMEDIAL ACTION (IM/IRA) - SGS-538-94**

In response to your letter (09668) regarding the above subject, the following information and cost estimates are being provided.

Because there is the potential for dense non-aqueous phase liquids (DNAPL) to migrate from the vadose zone to the saturated zone during Six Phase Soil Heating of Individual Hazardous Substance Site (IHSS) 110, contaminant fate and transport modeling was included in the schedule to evaluate the potential for DNAPL migration. In addition a peer review to evaluate the potential for mitigation will be performed. The Environmental Institute at the Colorado School of Mines will be contracted to perform the modeling and the peer review. The contract should be in place by the third week in October, 1994. Initial discussions have been held with the Environmental Institute regarding assembly of a panel of experts to assess the potential of DNAPL migration. The Department of Energy will be advised as soon as the peer review is arranged. It is our intent that this be done concurrently with the senior technical review of the entire Soil Vapor Extraction project the week of October 17, 1994.

Cost estimates for performing Six Phase Heating verses excavation/disposal of contaminated soil from IHSS 100 are attached (Attachment I). Preliminary estimates are based on full funding of either Six Phase Soil Heating or excavation/disposal of contaminated soil. A basic comparison of the cost estimates is provided in Attachment 2.

Six Phase Heating may require further remediation activities for other contaminants, thus total cost for remediation of IHSS 110 may be higher than this estimate indicates. Excavation of the trench will not require further remediation actions, but EG&G Rocky Flats, Inc. may not be able to ship contaminated soil offsite without prior treatment. Soil treatment costs have not been addressed in this estimate.

As described in Attachment 1, there are several tasks required to determine if a Technical Impracticability Waiver (TIW) can be pursued. Since IHSS 110 is not the primary source for the groundwater contamination in Operable Unit (OU) 2, it is not feasible to pursue the TIW for this IHSS alone. Therefore, EG&G will assess the Technical Impracticability of remediating the two groundwater plumes during Phase II of the Corrective Measures Study/Feasibility Study for OU 2. EG&G will use computer modeling to assess the effect of removing contamination from the source area trenches and groundwater cleanup technologies in order to determine if groundwater cleanup standards can be achieved.

CORRES. CONTROL	X
ENVIRONMENTAL RESTORATION	X
TRAFFIC	
ATST/130G	

CLASSIFICATION:

UNCLASSIFIED	
CONFIDENTIAL	
SECRET	

AUTHORIZED CLASSIFICATION

SIGNATURE	
DOCUMENT CLASSIFICATION	
REVIEW WAIVER PER	
CLASSIFICATION OFFICE	
DATE 10/10/94	

REPLY TO RFP CC NO:  
09668

POSITION ITEM STATUS

PARTIAL/OPEN	
CLOSED	
APPROVALS:	
SIG & TYPIST INITIALS	
RV: pap	

Jessie M. Roberson  
October 13, 1994  
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If you should have any further questions, please contact Wanda Busby at extension 8522.



for S. G. Stiger, Director  
Environmental Restoration Program Division  
EG&G Rocky Flats, Inc.

RV:pap

Orig. and 1 cc - J. M. Roberson

Attachments:  
As Stated (2)

cc:

E. A. Dille	-	AEI
S. R. Grace	-	DOE/RFFO
M. N. Silverman	-	DOE/RFFO

## TASKS INVOLVED IN PURSUING A TECHNICAL IMPRACTICABILITY WAIVER FOR TRENCH 110

If a Technical Impracticability Waiver (OSWER Directive 9234.2-25) is pursued for the two ground water plumes in OU 2, the following components must be met.

1. Specific Applicable or Relevant and Appropriate Requirements (ARARs) for remedial cleanup standards for which a Technical Impracticability (TI) determinations are sought. Draft ARARs have been developed for the site and negotiations with the Regulatory Agencies will start in November, 1994. Once ARARs are determined, characterization of the trench must be completed to determine existing levels of contamination. (This estimate is based on the installation of 15 boreholes and sample analysis)
2. Spatial area over which the TI decision will apply to all of OU 2, and will most likely be limited to dense non-aqueous phase liquids (DNAPL), further remediation will still be required to meet the ARARs for other contaminants. Costs for further remediation of other contaminants will still be incurred and have not been estimated at this time.
3. Conceptual model that describes site geology, hydrology, groundwater contamination sources, fate and transport will need to be developed. This will be addressed in the OU 2 Feasibility Study (FS).
4. An evaluation of the restoration potential of the site, including data and analyses that support any assertion that attainment of ARARs or media cleanup standards is technically impracticable from an engineering perspective. These would be included in the OU 2 FS and at a minimum, generally includes:
  - a) A demonstration that contamination sources have been identified and have been, or will be, removed and contained to the extent practicable;
  - b) An analysis of the performance of an ongoing or completed remedial action;
  - c) Predictive analyses for the time frames to attain required cleanup levels using available technologies;
  - d) A demonstration that no other remedial technologies (conventional or innovative) could reliably, logically, or feasibly attain the cleanup levels at the site within a reasonable time frame.
5. Estimates of the cost of the existing or proposed remedy options, including construction, operation, and maintenance costs. The cost comparisons for proposed remedy options is \$6,000,000 for Six Phase Heating plus other remediation techniques needed to meet ARAR standards for contaminants other than volatile organics. Excavation costs are estimated to be approximately \$9,000,000.
6. Any additional information or analyses that Environmental Protection Agency (EPA) deems necessary for the TI evaluation. At this time, there is not enough information available to predict further requirements from the EPA.

**COST ESTIMATE FOR EXCAVATION OF TRENCH 110  
AND CONTAMINATED SOIL DISPOSAL**

<u>Task</u>	<u>Cost</u>
Soil to be excavated (This assumes an area of 130' x 30' x 20' to remove the extent of the contamination plus a 30% soil expansion factor)	2,900 cubic yards
Documentation and Permitting (A Health and Safety Plan, and Work Plan must be written and approved before applicable permits can be applied for and work can begin. NEPA issues will also have to be addressed.)	\$750,000
Trench Characterization which will include the installation of 15 boreholes (at \$10,000 per borehole) and analytical sampling.	\$200,000
Excavation (This assumes \$200/cubic yard, an enclosure will not be required and there will not be air emission requirements).	\$580,000
Soil additives to ensure the excavated soils will not have free phase liquids. This assumes an increase in the soil volume by more than 50%.	4,350 cubic yards of soil for disposal
Analytical sampling of containers in order to ship to offsite disposal facility (this assumes \$2,500 per sample, and 450 containers)	\$1,125,000
Transportation (Assumes 10 cubic yards per truck, or 435 trucks, at \$75 per hour for two, ten hour days)	\$652,500
Disposal at ENVIROCARE (This assumes the cost of \$1,500 per cubic yard taken from the Envirocare cost schedule)	\$6,525,000
Total Cost	\$9,832,500

This estimate is highly conservative and assumes an almost perfect scenario. The main assumption is the soil that is removed from the trench will not require any type of treatment except for soil additives to ensure there are not any free phase liquids in the soil. The soil will pass the paint filter test after the mixing of additives to help solidify the liquids. The volume of the excavated soil will increase by a minimum of 50% due to the additives. This estimate does not include an enclosure and off-gas treatment of the excavated area. This would increase the estimate by \$300,000 to \$500,000 dollars.

**COST ESTIMATE FOR SIX PHASE HEATING (SPSH) OF TRENCH 110**

<u>Task</u>	<u>Cost</u>
Project Management	\$453,000
Test Plan	\$140,000
SPSH Design and Proc. Specs.	\$149,000
SPSH Prep, Implementation Plan	\$2,151,000
Documentation/Reporting	\$126,000
Training	\$68,000
Modeling/Peer Review	\$90,000
OTS Design and Proc. Specs	\$95,000
Operations	\$500,000
Analysis	\$400,000
Report Preparation/Review	\$200,000
Demobilization	\$80,000
Off-gas system	\$1,000,000
<u>Off-gas Oversight</u>	<u>\$500,000</u>
Total	\$5,952,000

This estimate includes multiple arrays, design and fabrication of the Off-gas Treatment System, and preparation of TM 2 and TM 4. Costs include documentation preparation, project management, modeling and peer review by Colorado School of Mines, EG&G oversight, subcontractor to implement and operate the system, analytical costs, training, procurement and supplies.

<u>Project</u>	<u>Cost</u>	<u>Scheduled Completion</u>	<u>Assumptions &amp; Scope</u>	<u>Volume Treated</u>
Excava- tion and Disposal	\$9,832,500	3rd quarter FY96	Includes documentation, permitting, analytical costs, characterization, excavation, transportation, and disposal of contaminated soil. Excavation of IHSS 110 will eliminate the need for further remediation of contaminants since they will be removed along with the soil.	2,900 cubic yards
Six Phase Heating	\$6,000,000	1st quarter FY97	Remediation includes performing and purchasing multiple arrays, off- gas treatment system. Includes modeling and peer review of project, all documentation, analytical costs, characterization, mobilization/demobilization and implementation costs, operations, final report, and project management costs. Only for remediation of target contaminant volatile organic compounds.	4,500 cubic yards