

CORRES. CONTROL
OUTGOING LTR NO.

ORDER# 4700-1
94 RF 11509

EG&G ROCKY FLATS

000046332

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

| DIST. | LTR | ENC |
|-------------------|-----|-----|
| MARAL, M.E. | | |
| MURLINGAME, A.H. | | |
| OSBY, W.S. | X | |
| PANCH, D.B. | | |
| ARNIVAL, G.J. | | |
| AVIS, J.G. | | |
| ERRERA, D.W. | | |
| AY, R.E. | | |
| EIS, J.A. | | |
| OVER, W.S. | | |
| LAN, P.M. | | |
| ANNI, B.J. | | |
| ARMAN, L.K. | | |
| EALY, T.J. | | |
| DAHL, T. | | |
| LBIG, J.G. | | |
| ITCHINS, N.M. | | |
| CKSON, D.T. | | |
| ILL, R.E. | | |
| JESTER, A.W. | | |
| ARX, G.E. | | |
| DONALD, M.M. | | |
| KENNA, F.G. | | |
| NTROSE, J.K. | | |
| RGAN, R.V. | | |
| ITTER, G.L. | | |
| ZUTO, V.M. | | |
| SING, T.L. | | |
| NDLIN, N.B. | | |
| HWARTZ, J.K. | | |
| FLOCK, G.H. | | |
| EWART, D.L. | | |
| IGER, S.G. | | |
| BIN, P.M. | | |
| ORHEIS, G.M. | | |
| LSON, J.M. | | |
| <i>Clayton</i> | X | |
| <i>McDonald</i> | X | |
| <i>McLaughlin</i> | X | |
| RRRES. CONTROL | X | X |
| MIN RECORD/080 | X | |
| AFFIC | | |
| TS/T130G | | |

November 16, 1994

94-RF-11509

Scott R. Grace
Environmental Restoration Division
DOE/RFFO

OPERABLE UNIT NO. 2 SUBSURFACE INTERIM MEASURE/INTERIM REMEDIAL ACTION (IM/IRA) PILOT TEST PROGRAM - WSB-132-94

Action: Review proposals in summary on page three.

The Subsurface IM/IRA Plan identified Soil Vapor Extraction (SVE) as an in-situ method to be demonstrated at three geologically distinct environments within Operable Unit 2 (OU 2). The original objective of the IM/IRA Plan was to collect information that would aid in the selection and design of final remedial actions at OU 2 (Subsurface Interim Measures/ Interim Remedial Action Plan/Environmental Assessment and Decision Document, 1992). Project success was to be gauged by the usefulness of the data collected with respect to the final remedial design and not by the degree of clean-up achieved. Pilot Testing at Test Site 1, performed at Individual Hazardous Substance Site (IHSS) 110, was completed in June, 1994. The SVE unit is currently operating at the Test Site 1 location under an extended operations mode. The scope associated with Test Site 2 is still being evaluated. The location, scope, and schedule associated with Test Site 3 is being evaluated.

Extended operations at IHSS 110 have consisted of operation of a conventional SVE system for eight hours/day, five days/week. Removal rates have averaged approximately one pound/hour, resulting in approximately forty pounds removed per week. A review of the SVE system conducted by a Senior Review Team concluded that the system was over-designed as a demonstration. At some point, the objective of the demonstration became remediation. As a remediation system, the mass removal rates observed in the system as it is currently configured, are low. The low rates observed throughout the test may be due to several factors.

The first factor inhibiting SVE at IHSS 110 is the system design. The system designed was based on a soil permeability that was two orders of magnitude higher than the permeability actually observed. Since the system was originally designed as a demonstration, no attempt was made to optimize the system. The Pilot Test Report for Test Site 1 provides recommendations for re-design of a new system that would provide remediation of the site within a reasonable time frame using conventional SVE. Based on previous assumptions about the nature and extent of the contamination, and given a system designed to remediate the site, the time anticipated to remove the majority of the contamination is approximately four years, assuming unsaturated conditions. However, based on findings of the characterization work performed on November 2 through November 10, 1994, this assumption is invalid.

EG&G Rocky Flats, Inc. will attempt a quick optimization of the existing system by installing a plastic cover over the existing work area. Mass removal rates will be observed before and after installation of the cover and an evaluation will be made as to the effectiveness of the cover.

CLASSIFICATION:

| | | |
|--------------|--|--|
| UNCLASSIFIED | | |
| CLASSIFIED | | |
| CONFIDENTIAL | | |
| SECRET | | |

AUTHORIZED CLASSIFIER SIGNATURE _____
 DOCUMENT CLASSIFICATION _____
 REVIEW WAIVER PER _____
 CLASSIFICATION OFFICE _____

REPLY TO RFP CC NO: _____

OPERATION ITEM STATUS
 PARTIAL/OPEN
 CLOSED *PP*

APPROVALS:

DATE & TYPIST INITIALS
Rem. bit

ADMIN RECORD

In addition to the system design, the contamination itself may be a significant factor inhibiting removal of VOCs. It is believed that the VOCs exist as a mixture with a non-volatile oil contaminant, rather than as a free phase contaminant. Previous characterization activities did not identify the oil; however, previous analyses for petroleum or silicon-based oils were not performed. If the VOCs exist as a mixture with a non-volatile oil, extraction of soil vapor using conventional SVE would not be as effective because the oil would inhibit the ability of the VOCs to exist in a vapor stage.

EG&G Rocky Flats, Inc. has been conducting drilling and sampling activities to characterize the subsurface contamination more completely. In the west end of the trench, a borehole was found to contain a pool of Non-Aqueous Phase Liquid (NAPL) material that consisted of free liquids containing oils, solvents and water. The liquid was sampled and will be analyzed for VOCs, SVOCs, and TPH as a minimum. Other analyses may be performed to give an indication of the nature of the contamination. Additionally, radiation screening samples were evaluated and the liquid was found to contain 749,000 pCi/L alpha and 803,000 pCi/L beta radiation. Given the radioactivity, EG&G Rocky Flats, Inc. is evaluating all available options for pumping, storing and/or treating the liquid. The borehole will be completed and screened to allow liquid extraction if the choice is made to pump and store or treat the liquids.

Four boreholes were drilled in the central part of the trench. Crushed drums that were free of any liquid were encountered randomly from two to twelve feet below ground in all four boreholes. Three of the boreholes were drilled to a depth of approximately 12 to 14 feet and at approximately 9 to 12 feet, a tar-like substance was encountered. The bottom of the trench is believed to be at approximately 12 feet, based on the nature of the drill cuttings from that depth. The boreholes were plugged and abandoned. An additional borehole was drilled to 12 feet in the east end of the trench. No contamination was encountered and the hole was abandoned.

Pending results of both the optimization and the contaminant characterization, EG&G Rocky Flats, Inc. is anticipating minor increases in the removal rate of contaminants using the conventional SVE system. EG&G Rocky Flats, Inc., along with representatives from Battelle-Pacific Northwest Laboratories and the Colorado School of Mines, are evaluating the results of the characterization with respect to the effectiveness of conventional SVE compared to thermally enhanced SVE. It may be expedient to refrain from pumping the NAPL material and instead remove the NAPL using an in-situ technique such as heating enhanced SVE. Laboratory tests are being performed to indicate the effect of temperature on the destruction of the liquid. Various temperatures will be evaluated, up to the approximate temperatures achievable using Six-Phase Soil Heating and Radio-Frequency Heating. The mobility of the radionuclides will also be evaluated. Should heating enhanced SVE be chosen as the method for remediation of the trench, a new off-gas treatment system will be required to process the significantly increased mass removal rates that will be observed.

EG&G Rocky Flats, Inc. has proposed SVE enhanced with Six-Phase Soil Heating to be performed as Test Site 2 of the Pilot Test Program. The demonstration of the Six-Phase Soil Heating technology would be configured to perform a remediation for VOCs within the trench. The scope includes design and purchase of a new off-gas treatment system. This program has been put on hold pending results of the SVE system optimization and trench characterization.

EG&G Rocky Flats, Inc. has also begun scoping a project to fulfill the requirements for Test Site 3. In order to be of any benefit to the Feasibility Study, Test Site 3 will have to be conducted concurrently

S. R. Grace
November 16, 1994
94-RF-11509
Page 3

with Test Site 2. The logistical details associated with implementation of the system would be presented in the Test Plan for Test Site 3. It is anticipated that the planning and construction period for implementation of the SVE system at Test Site 3 would take six to nine months to complete.

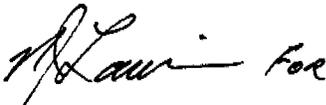
Test Site 3 could be performed at two locations within OU 2 that would fulfill the requirement to evaluate SVE at three geologically distinct environments. The Mound Area and the 903 Pad are the other "geologically distinct" environments which have been determined to contain subsurface VOC contamination. Current data consists of limited groundwater, soil and soil vapor data.

Although there is not sufficient characterization data to completely evaluate the subsurface contamination at either location, available data indicate the presence of vadose zone volatile organic compounds (VOCs). The most frequently observed VOCs are tetrachloroethene (PCE), carbon tetrachloride (CC14) and trichloroethene (TCE). The contamination appears to be acting as a significant source of VOCs to groundwater within OU2. Further characterization is required to identify constituents of concern other than VOCs, to evaluate whether the constituents exist as a free-phase or as a mixture of organics, and if the VOCs exist as free liquids or as residual contamination. Once the characterization has been performed, EG&G Rocky Flats, Inc. will be able to establish whether or not the 903 Pad or the Mound Area are applicable locations for Test Site 3 of the Soil Vapor Extraction Pilot Test Program.

In summary, EG&G Rocky Flats Inc. proposes the following:

- Discontinue extended operations at Site 1 after collection of optimization data. (two to three weeks)
- Based on TM 4 and recent characterization work, determine best course of action for Site 2.
- Proceed with characterization of the 903 Pad and the Mound to determine the best location for the Site 3 demonstration.

EG&G Rocky Flats, Inc. is looking forward to the support and cooperation of the Department Of Energy in this proactive, "SAFER" approach to remediation. If you have any questions regarding the information contained in this letter, please call Robin Madel at extension 6972 or Jim McLaughlin at extension 6995, of the Soil Vapor Extraction Team.



W. S. Busby
Manager
Operable Unit 2 Closure
EG&G Rocky Flats, Inc.

REM:bl

Orig. and 1 cc - N. I. Castaneda

cc:

E. A. Dille' - SAIC
S. R. Grace - DOE/RFFO
M. J. Harris - NFT, Inc.