

DOE ORDER# 5/00.1  
94RF11168

**EG&G ROCKY FLATS**

DIST.	LTR	ENC
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November 3, 1994

94-RF-11168

Scott R. Grace  
Environmental Restoration Division  
DOE/RFFO

**RECOMMENDATIONS FROM EG&G SENIOR MANAGEMENT REVIEW OF SOIL VAPOR EXTRACTION AND SIX-PHASE HEATING PROGRAM - WSB-124-94**

Action: None required.

During the week of October 17-21, 1994, EG&G Rocky Flats, Inc. performed a Senior Management Review of the Soil Vapor Extraction (SVE) and Six-Phase Soil Heating (SPSH) programs currently being conducted under the Subsurface Interim Measure/Interim Remedial Action (IM/IRA) Program for Operable Unit No. 2 (OU 2) Closures for removal of subsurface volatile organic compound (VOCs). The program is to be conducted at three test sites within OU 2. Two outside consultants provided a critical review of the planned Subsurface IM/IRA program for fiscal year 1995 (FY95). Recommendations resulting from the review were presented to Department Of Energy/Rocky Flats Field Office (DOE/RFFO) in a meeting held on October 25, 1994. Minutes from the meeting are attached (Attachment A).

To implement the recommendations of the reviewers, EG&G Rocky Flats, Inc. will conduct the following actions regarding the SVE/SPSH program. A schedule for completion of the actions is attached (Attachment B).

Test Site No. 1, which has been conducted at Individual Hazardous Substance Site (IHSS) 110 consists of a conventional SVE system and two alluvial extraction wells, and has been operating approximately eight hours/day, five days/week. Mass removal rates of total VOCs have averaged approximately one pound/hour (eight pounds/day). EG&G Rocky Flats, Inc. is implementing the peer review recommendations by installing a plastic tarp over the test area, to a radius of 20 feet from each well.

In addition to the system optimization, EG&G Rocky Flats, Inc. is recommending performing a limited characterization of the trench at IHSS 110. EG&G Rocky Flats, Inc. will accomplish this task through drilling three small diameter boreholes in the western, central and eastern end of the trench. Soil samples will be taken from two depths (five and 10 feet) and analytical results will be obtained as quickly as possible. Drilling to obtain the samples will be performed on November 2-3, 1994.

Test Site No. 2 was also to have been conducted at IHSS 110 and would include implementation of the SPSH technology with thermal oxidation as an off-gas treatment system. Work on that project has been deferred, pending results of the SVE system optimization and trench characterization. Several open activities associated with the SPSH

E. Madel *EM*  
J. McLaughlin *JM*  
J. Laurin *JL*

CORRESP. CONTROL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DMN RECORD/080	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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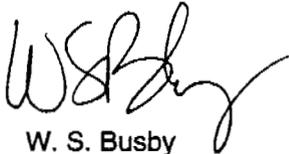
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project, such as electrode design and off-gas treatment system design, will be completed. Test Site No. 3 was to have been conducted at The Mound Area, IHSS 113 and would utilize the available conventional SVE system. All work on Test Site No. 3 has been deferred pending further characterization of the Mound Area. Characterization activities at that location are scheduled to begin in the third quarter of FY95.

The decision regarding what technology will be implemented at IHSS 110 will be made within two weeks of receiving results from both the characterization and optimization. Within one week after the decision is made, a new schedule and associated milestones to match the new scope will be recommended to DOE/RFFO and a change control action will be pursued.

If you have any questions regarding the above recommendations, contact Wanda Busby at extension 8522.



W. S. Busby  
Manager  
Operable Unit 2 Closure

WSB:bll

cc:  
Orig. and 1 cc - S. R. Grace

Attachments:  
As Stated (2)

cc:  
E. A. Dille - SAIC

Attachment A

**SUBSURFACE IM/IRA PROGRAM TEST  
OCTOBER 25, 1994**

Overall Impressions

- Site is not well characterized - even after all the money that has been spent.
- Caveats recommendations are based on limited knowledge of data and limited site specific experience at RFETS
- Are radionuclides really a problem? Some PRGS are ridiculously low. These will drive up costs needlessly. Different PRGs might impact what technologies are utilized. If the rads have to be treated, it might be best to get everything out at once by excavating.

Site 1 - IHSS 110

Budget - \$5 Million

Scope

- A typical demonstration - at an industrial site would cost approximately \$5K - \$15K with a minimal system.
- The SVE system is over-designed - Stan did a quick design; \$250K system should have been installed; blowers and carbon vessels are too large; HEPA filters are restrictive and unnecessary

Recommendation: REMOVE HEPA FILTERS

- aerosol particles should not be extracted in SVE off-gas.
- If this is a demo, why is everything in a trailer? Back of a pickup should work.
- Carbon is appropriate for a demo but not for a remediation.
- Objectives of the project seem to have changed and become blurred; changes in scope impacted costs and schedules. Was this a demonstration or a remediation?

Technical Evaluation

- SVE - lithology in trench is amenable to air stripping; outside trench is not as amenable; also solvents are dissolved in sewage sludge and machine oil - SVE won't work as well on this mixture.
- Oil/Water partitioning keeps solvent in oil phase not in water phase.

- Extraction is less effective.
- Oil NAPL has only been postulated. No evidence exists to support it.
- History of the trench said solvent/oil mixtures in drums were burned but who knows what was left.
- Viscous product was found dripping from auger - oil should move down through profile unless there is a drum/plastic/clay lense at bottom of trench.
- Use a shovel and dig out hot spot and get a sample and use a hydro carbon scan - could be difficult administratively.
- Complications - concentration in vapor phase vs concentration in soil samples. - not a free product - but solvent dissolved in oil.
- Soil gas survey probes mostly outside trench - only one inside trench.

Recommendation: GO CHARACTERIZE THE TRENCH

- SVE system is not optimized
- No cover, WCFS pilot test report calls for cover.

Recommendation: PLACE A PLASTIC COVER OVER SURFACE.

- Extraction points are outside trench - not optimized - usually try to put extraction wells in center of plume, but not in viscous material.
- Vacuums appear to be high given the permeability of soils. May be because screens are small - 10 slot used, 20 slot generally recommended; (need a reference for this; look at EPA, SVE documents) screen length appears okay.
- Running 8 hours/day; 365 days/yr; 1 lb/hr.; 17,000 lbs could take 6 years to treat.
- Could automate; need to characterize better, especially in east end.
- If rate could be increased 3 times by operating 24 hr/day, time to remediate would drop to 2-3 years.
- 11 feet of vacuum could pull water up to 11 feet - this could be a problem.
- Dual phase extraction was attempted but not successful.
- Typically would put an extraction well in trench.

- Based on the outcome of the capping, an extraction well could be installed
- If the work area were capped and an extraction well were put in the trench (in the plume) and operations were conducted for 24 hrs/day, there could be a five fold increase in removal rates (40 lbs/day). Based on a mass of 17,000 lbs in the trench, removal times could be reduced to 1-2 years.

Recommendation: OPTIMIZE THE SYSTEM QUICKLY

- Cover the system.
- Do a quick excavation - characterize

#### SPSH - Site 2

Costs - Some costs appear high, but they may be offset by some low costs.

- Drilling.
- Oversight - Costs due to Battelle and EG&G ( minimize - let Battelle do most).
- EG&G management costs seem high.
- One person full time or two people half-time may be sufficient.
- OBSERVATIONAL APPROACH is useful.
- SPSH is a good technology - should get an order of magnitude increase in removal.
- Containment viscosities will be reduced but not significantly; heat front drops quickly at bottom of array.
- As long as electrode array is above water table, contaminant migration should not be problem.
- Optimize SVE first, then decide where to do SPSH.
- EM surveys - show some metal; could be a potential problem.
- Definitely need a new Off-gas Treatment System for SPSH.
- If system is optimized, GAC may be overloaded; utilize a catox or thermal oxidation system if cost is the same.
- TM-2 identified thermal oxidation as an appropriate technology.

#### Site 2 - SPSH

Recommendation - SPSH IS AN ACCEPTABLE TECHNOLOGY

Site 3 - a lot of money, may not be appropriate until Site 3 is characterized quickly.

- The Mound appears to be a significant source of contamination to ground water in OU 2. The site should be characterized quickly to evaluate whether conventional SVE and/or SPSH is appropriate.
- May have NAPLs, lithology may not be amenable to conventional SVE.
- Would it be feasible to run hoses from mound to IHSS 110? We would be blower limited - 600 feet may be too far.
- Must cross a road, etc., moisture in winter time would not be amenable to hoses - freezing.

Recommendation: DON'T JUMP INTO MOVING TRAILER UNTIL SITE IS CHARACTERIZED QUICKLY

Additional Considerations:

What is the goal of the program?

Just VOCs or later removal of rads?

Could excavate but would have to manage soils.

Recommendations summary

- S1 Optimize SVE at Site 1
  - cover the work area at IHSS 110
  - excavate for a sample - 3 feet
- S2 See if SVE optimization and characterization support SVE, then SPSH may be applied
- S3 Characterize Site 3 quickly before moving trailer

samples to be taken:

moisture content

particle size

TOC

PAH

rads

VOC

hydro carbon scan

Attachment B

Drilling/Sampling/Tarp Installation Schedule

Drill/Sample	November 2-3, 1994
Screen/Ship Samples	November 7, 1994
Receive Preliminary Soil Results	November 17, 1994
Place Tarp on Work Area	November 9-15, 1994
Receive Preliminary Tarp Results	November 17, 1994
Prepare Recommendations to DOE	December 1, 1994