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Station #12

ENGINEERING DATA TRANSMITTAL

Page 1 of 1  
1. EDT 135252

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15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
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1	WHC-SD-EN-TC-001		0	Test Procedure for Soil Gas Sampling in Potentially Radiologically and Chemically Contaminated Boreholes and Wells	4	1/2	1	1

16. KEY		
Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 see MRP 5.43 and EP-1.7	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)											
(G)	(H)	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp
2	2	Cog./Proj. Eng J. R. Reeves	<i>J.R. Reeves</i>	11-18-92	N3-05	B. J. Hobbs	<i>B. J. Hobbs</i>		N3-06	1	1
1	1	Cog./Proj. Eng. Mgr. W. H. Price	<i>W.H. Price</i>	11-24-92	N3-05	C. A. Martin	<i>C.A. Martin</i>		N3-06	1	1
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		Safety									

18. <i>J.R. Reeves</i> J. R. Reeves Signature of EDT Originator Date: 11-20-92	19. Not required Authorized Representative for Receiving Organization Date	20. <i>W.H. Price</i> W. H. Price Cognizant/Project Engineer's Manager Date: 11/20/92	21. DOE APPROVAL (if required) Ltr No. NA <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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ORIGINAL

Date Received: <i>11/30/92 mb</i>	<b>INFORMATION RELEASE REQUEST</b>	Reference: WHC-CM-3-4										
Complete for all Types of Release												
<b>Purpose</b> <input type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape	<b>Reference</b> <input type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Flier <input type="checkbox"/> Software/Database <input checked="" type="checkbox"/> Controlled Document <input type="checkbox"/> Other	ID Number (include revision, volume, etc.) <b>WHC-SD-EN-TC-001, Rev. 0</b> List attachments. <b>NONE</b> Date Release Required <p style="text-align: center;"><b>12/15/92</b></p>										
<b>Title</b> TEST PROCEDURE FOR SOIL GAS SAMPLING IN POTENTIALLY RADIOLOGICALLY AND CHEMICALLY CONTAMINATED BOREHOLES AND WELLS		Unclassified Category <b>UC-</b>										
New or novel (patentable) subject matter? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has disclosure been submitted by WHC or other company? <input type="checkbox"/> No <input type="checkbox"/> Yes Disclosure No(s).		Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)										
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<u>Review Required per WHC-CM-3-4</u> Classification/Uncontrolled Nuclear Information Patent - General Counsel Legal - General Counsel Applied Technology/Export Controlled Information or International Program WHC Program/Project Communications RL Program/Project Publication Services Other Program/Project	Yes <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	No <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Reviewer - Signature Indicates Approval <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:40%; text-align: center;">Name (printed)</th> <th style="width:30%; text-align: center;">Signature</th> <th style="width:30%; text-align: center;">Date</th> </tr> </thead> <tbody> <tr> <td>S.W. Berglin</td> <td><i>[Signature]</i></td> <td>12/1/92</td> </tr> <tr> <td>L. Orgill</td> <td><i>[Signature]</i></td> <td>1/13/92</td> </tr> </tbody> </table>	Name (printed)	Signature	Date	S.W. Berglin	<i>[Signature]</i>	12/1/92	L. Orgill	<i>[Signature]</i>	1/13/92
Name (printed)	Signature	Date										
S.W. Berglin	<i>[Signature]</i>	12/1/92										
L. Orgill	<i>[Signature]</i>	1/13/92										
Information conforms to all applicable requirements. The above information is certified to be correct.												
References Available to Intended Audience <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Transmit to DOE-HQ/Office of Scientific and Technical Information <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Author/Requestor (Printed/Signature) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <b>James R. Reeves</b> <i>[Signature]</i> Date <b>11/23/92</b> Intended Audience <input type="checkbox"/> Internal <input type="checkbox"/> Sponsor <input checked="" type="checkbox"/> External Responsible Manager (Printed/Signature) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <b>W. H. Price</b> <i>[Signature]</i> Date <b>11/23/92</b>	<b>INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP</b> Stamp is required before release. Release is contingent upon resolution of mandatory comments. <div style="text-align: center;">  </div>											
Date Cancelled		Date Disapproved										

SUPPORTING DOCUMENT

1. Total Pages 8/10

2. Title

TEST PROCEDURE FOR SOIL GAS SAMPLING IN POTENTIALLY RADIOLOGICALLY AND CHEMICALLY CONTAMINATED BOREHOLES AND WELLS

3. Number

WHC-SD-EN-TC-001

4. Rev No.

0

5. Key Words

Down-hole soil gas sampling, boreholes and wells, gas chromatography, potentially contaminated

6. Author

Name: J. R. Reeves

*J. R. Reeves*  
Signature

Organization/Charge Code 81700/PE5CB

7. Abstract

Sample collection equipment will be lowered to the bottom of the borehole prior to advancement of casing or as directed by the Field Team Leader. A portable gas pump or organic vapor monitor (OVM) will be used to draw soil gas through a down-hole thermal desorption gas collection tube. Gas adsorbed in the thermal desorption tube will be analyzed by gas chromatograph. An OVM will be used to monitor the contaminant gas levels and pump into a gas sampling bag. Gas from the bag will be analyzed by gas detection tube as a check on the gas chromatography and as back-up indication of quantities of gas present. Indications of contaminant gasses may be used to select soil sample intervals for CLP analysis if field screening is included in the work plan.

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10. RELEASE STAMP

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BY WHC  
DATE FEB 04 1993  
*Station #12*

9. Impact Level 4

LEGENDS REMOVED  
PER OFFICE OF GENERAL COUNSEL  
S.W. BERGLIN, by M. Boston  
I.R.A.

APPROVED FOR  
PUBLIC RELEASE  
1/14/93

**WHC-SD-EN-TC-001**  
**Rev. 0**

**TEST PROCEDURE FOR SOIL GAS SAMPLING  
IN POTENTIALLY RADIOLOGICALLY- AND  
CHEMICALLY-CONTAMINATED  
BOREHOLES AND WELLS**

## 1.0 PURPOSE

This test procedure presents the procedure for downhole soil gas sampling for field screening in potentially radiologically and chemically contaminated boreholes and wells.

## 2.0 SCOPE

This test procedure applies to soil gas testing activities conducted by Environmental Field Services personnel.

## 3.0 TEST OBJECTIVES

The objectives of the test are to:

- A. Develop and refine the downhole soil gas testing equipment.
- B. Verify the reliability of downhole soil gas as an indicator of contamination.

## 4.0 TEST METHOD

Sample collection equipment will be lowered into the borehole prior to the advance of casing to draw gas from the uncased interval. A portable gas pump or OVM will be used to draw soil gas from the bottom of the borehole through the thermal desorption tube. The exhaust will be directed into a gas sample bag for sample collection or a tube will return the exhaust gasses to the borehole. Gas may be extracted from the gas sample bag for direct injection into the gas chromatograph or pumped through a gas detection tube.

## 5.0 TEST CONDITION LIMITS

The field screening data generated by this test shall meet EPA Level II field screening data quality objectives as presented in EPA/540/G-87/003 (EPA, 1987). No precision or accuracy limits are set for Level II data, since results are instrument- and analyte-dependent. Data quality shall be assessed by evaluation of internal variations in the data and by consideration of the quality assurance/quality control steps in the process. For purposes of this test procedure, precision and accuracy limits of  $\pm 40$  percent are desirable. Calibration and end-of-test challenge results differing by more than 40 percent render the test data unacceptable.

## 6.0 INSTRUMENTS AND CALIBRATION

Analytical instruments include a portable organic vapor monitor (OVM) and a gas chromatograph with attached thermal desorption unit. The OVM shall be equipped with a 10.6 eV lamp to enable detection of the broadest possible suite of contaminant gasses. Other instrumentation may be used to confirm the

identities or quantities of analyte gasses at the discretion of the Mobile Gas Lab Analyst.

Analytical instruments shall be calibrated and challenged according to EII 3.2 prior to the test and challenged with the calibration gas at the end of the test day. In cold or wet weather the Mobile Gas Lab Analyst may, at his discretion, direct that additional challenges be performed during the test day.

## **7.0 EQUIPMENT AND MATERIALS**

Sampling equipment includes a thermal desorption tube for collecting downhole gas samples for gas chromatography, gas sample bags for collecting gas samples, and a portable gas pump or OVM to pump the gas from downhole into the gas sample bags. Gas detection tubes specific to the probable suite of contaminant gasses shall be used as determined by the Mobile Gas Lab Analyst to determine the presence of ammonia and confirm the presence and concentrations of other gasses.

## **8.0 SAFETY CONSIDERATIONS**

1. The potential for radiological contamination of downhole equipment shall be considered at all times. When required, a Radiation Work Permit for the testing shall be prepared and followed.
2. The potential for the release of toxic or hazardous gasses from the borehole shall be considered at all times. The Site Safety Officer must be notified if the OVM registers concentrations greater than 10 ppm total organic vapor, if unusual odors are detected, or if symptoms possibly indicative of exposure to hazardous gas concentrations are manifested.
3. Toxic or hazardous gasses may be released if the gas sample bag is punctured or the valve is accidentally opened. Care shall be exercised when handling the bag in confined spaces.
4. The broken ends of used gas detection tubes may inflict cuts or penetrate protective gloves, allowing contamination of the skin. Handle the tubes by the middle and do not carry used tubes in pockets.
5. Sample collection shall be aborted when the Site Safety Officer declares conditions unsafe for drilling.

## **9.0 MAINTAINANCE AND FAILURES**

Analytical instrumentation shall be maintained and repaired, if necessary, according to manufacturers' instructions. A spare sample pump

shall be on hand as a backup, and the OVM battery shall be recharged during off-shift hours.

#### 10.0 TEST DATA AND TEST REPORT

Test data shall be presented in the form of printouts of OVM records and graphic presentation of gas chromatography results with concentrations indicated. The Analyst shall sign and date each record when printed. The identity of gases may be hand-written on the chromatograph record if the entry is initialed and dated by the Analyst. Test documentation shall include documentation of blank analyses, calibration standard runs, and challenge runs.

Records of gas detection tube tests may be hand-written but must contain the identifying number and specific analyte of the tube, the effective concentration range, the concentration detected, and the date/time of the test. If conducted by personnel other than the Analyst, the test results must be checked by the Analyst and approved by him. Printed or hand-written summaries of gas detection tube results shall be signed and dated by the Analyst.

All records must be correlatable to depths in the borehole, and if relevant, to the Hanford Environmental Information System (HEIS) numbers of corresponding soil samples. Data from analysis of the corresponding soil samples will provide validation of the field testing results. A test report summarizing the test results and evaluating them against the corresponding soil sample analyses will be prepared.

#### 11.0 PERSONNEL REQUIREMENTS

Gas chromatography shall be performed by a certified chromatograph operator. The OVM operator shall have been trained in the use of the OVM. Gas detection tube tests may be performed by the Mobile Gas Lab Analyst or by personnel under his supervision.

#### 12.0 REVISIONS

Changes in the test procedure shall be documented along with justification for the change by ECN approved by the same level of management approving the original document.

#### 13.0 DEFINITIONS

Gas detection tube. A sealed glass tube containing a compound or compounds that react with a specific gas or class of gasses.

.45 micron filter. A microfine filter for preventing the intake of moisture and radioactive particulates by an OVM or sample pump.

Gas sample bag. An inflatable bag with a gas-tight polypropylene fitting for the collection of gas for analysis.

Thermal desorption tube. A glass or metal tube containing a filament of activated charcoal or other material that absorbs gaseous contaminants for later release by the application of heat.

Standoff collar. A device for protecting the thermal desorption tube and the terminal ends of sampling tubes from contamination through contact with uncased borehole walls or slough.

## 14.0 RESPONSIBILITIES

### 14.1 MOBILE GAS LAB ANALYST

The Mobile Gas Lab Analyst provides technical direction and overall field supervision to the test program in cooperation with the Field Team Leader (FTL). The Analyst is responsible for calibrating or supervising the calibration of analytical instrumentation, supervising the collection of soil gas samples, analyzing the samples, and transmitting the test records to the Field File Custodian. The Analyst shall also provide data to the project geologist for field screening determinations.

### 14.2 SAMPLING SCIENTIST OR TECHNICIAN

The Sampling Scientist or Technician is responsible for operation of the OVM and sample pump and for conveying the gas sample bag and thermal desorption tube to the Mobile Gas Lab Analyst.

### 14.3 HEALTH PHYSICS TECHNICIAN

In terms of this test procedure the Health Physics Technician (HPT) is responsible for surveying down hole test equipment after use and after decontamination (if necessary), surveying sampling devices for radiological contamination and advising test personnel on the decontamination or containment of any contamination detected.

### 14.4 Handler

The handler is responsible for lowering the test equipment into the borehole and removing it from the borehole, decontaminating equipment, and sleeving contaminated equipment. The handler may be the Sampling Scientist or Technician or a laborer, if available.

#### 14.5 FIELD FILE CUSTODIAN

The Field File Custodian is responsible for receiving test records from the Mobile Gas Lab Analyst, retaining the test records in access-controlled storage during the test phase, and retrieving test records as requested for report preparation.

#### 15.0 PROCEDURE

Sampling Scientist  
or Technician

1. Check that .45-micron filters are attached to the lower ends of the gas intake tube and/or the thermal desorption tube. Check that the standoff collar is properly attached. Check that the upper ends of the tubes are properly attached to the OVM and/or sample pump. Attach a 5-liter gas sample gas sample bag to the exhaust outlet of the OVM or sample pump, as needed.

Handler

2. Pass the sampling tubes to the laborer inside the Exclusion Zone.
3. Lower the downhole probe to the bottom of the borehole or to a pre-determined depth as directed by the FTL or Mobile Gas Lab Analyst.

Sampling Scientist  
or Technician

4. Turn on the sample pump and/or OVM and let them run for 10 minutes to load the thermal desorption tube and/or fill the gas sample bag. Operate the OVM in the Auto Log mode.

5. When the 10 minute sampling period is ended, turn off the sample pump and/or OVM.

HPT

6. Survey the gas sample bag for radiological contamination before it is removed from the OVM.
  - A. If the bag is uncontaminated, release it to the Mobile Gas Lab Analyst.

HPT, Cont.

B. If the bag is contaminated, a syringe sample shall be withdrawn through a .45 micron disposable filter. Retain the bag and filter within the Radiation Control Area and dispose as radioactive waste when informed by the Sampling Scientist no further sample is needed.

C. Survey the syringe. If no radiological contamination is detected, release the syringe.

Handler

7. Withdraw the sampling tubes from the borehole slowly so the HPT can survey for radiological contamination.

HPT

8. Survey the sampling tubes for radiological contamination as they are withdrawn. Survey the standoff collar at the end of the tubes prior to removal to access the thermal desorption tube. Survey the thermal desorption tube prior to removal.

Handler

9. If the standoff collar is radiologically contaminated, contain the contamination with a plastic sleeve and remove as directed by the HPT. Tap the sleeve closed and retain in a Radioactive Materials Area for decontamination.

HPT

10. Survey the down hole equipment for radiological contamination as it is disassembled.

A. If no radiological contamination is detected, release the thermal desorption tube to the Sampling Scientist or Technician.

HPT, Cont.

- B. If radiological contamination of the thermal desorption tube is detected, attempt to remove the contamination by wiping the tube with a disposable wipe.
- If the contamination is removed by wiping, unconditionally release the tube to the Sampling Scientist or Technician and dispose of the wipe as radioactive waste.
  - If the radiological contamination is not removed by wiping, retain the tube in the RCA and dispose as radioactive waste.
- C. If the tube or standoff collar is radiologically contaminated, survey the sample pump, exposed sample line, OVM, and vicinity for contamination. Contaminated equipment must be decontaminated, or if decontamination is not possible, bagged and stored as radioactive equipment.
- D. Filters may be discarded and contained with associated soil waste. If the OVM has indicated the presence of organic gases, radiologically contaminated filters will be disposed as potentially mixed waste. Otherwise, they will be disposed as radioactive waste.

Sampling Scientist  
or Technician

11. Convey the thermal desorption tube or syringe to the Mobile Gas Lab Analyst.

- |                        |   |
|------------------------|---|
| Mobile Gas Lab Analyst | 12. <u>Analyze</u> the sample from the thermal desorption tube or syringe with the gas chromatograph.   |
|                        | 13. <u>Analyze</u> the sample from the gas sample bag with a gas detection tube for ammonia and, at the discretion of the Analyst, to confirm the identity and/or presence of other gasses. |
|                        | 14. The Analyst may, at his discretion, analyze the sample from the gas sample bag with another gas chromatograph to confirm identifications of gasses from the thermal desorption tube.    |
|                        | 15. If required for field screening determinations provide the gas detection tube and chromatography results to the geologist.  |
|                        | 16. <u>Transmit</u> chromatograph and OVM printouts and gas detection tube test results to the Field File Custodian (FFC) for storage.  |
| Field File Custodian   | 17. <u>Retain</u> the chromatograph and OVM printouts and the gas detection tube test results in access-controlled storage.   |

#### 16.0 DISPOSITION OF TEST EQUIPMENT

Test equipment that has not been contaminated will be retained for further use. Radiologically and/or chemically contaminated equipment shall be decontaminated and retained for further use. Contaminated equipment that cannot be decontaminated will be stored as radiologically contaminated equipment or disposed as waste, according to the judgement of the Mobile Gas Lab Analyst in cooperation with the FTL.

#### 17.0 REFERENCES

EPA, 1987, Data Quality Objectives for Remedial Activities, EPA/540/G-87/003 (OSWER Directive 9355.0-7B), March, 1987

# DISTRIBUTION SHEET

Date:  
23 November 1992

To:		
1.	W. H. Price	N3-05
2.	D. J. Moak	N3-05
3.	B. J. Hobbs	N3-06
4.	J. R. Freeman-Pollard	<del>H4-55</del> <sup>H4-03</sup>
5.	D. E. Skoglie	N3-05
6.	C. A. Martin	N3-06
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9.	K. R. Tanasse	N3-05
10.	J. R. Reeves	N3-05
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12.	Central Files	L8-04 (2)