

11

SEP 13 1993

ENGINEERING DATA TRANSMITTAL

1. EDT 600838

Station # 12

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Env. Restoration	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: ER	6. Cog. Engr.: R. B. Kerkow	7. Purchase Order No.: N/A
8. Originator Remarks: Release to distribution		9. Equip./Component No.: N/A
11. Receiver Remarks:		10. System/Bldg./Facility: NA
		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: N/A



15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-EN-AP-144		0	Solid Waste Landfill Sampling and Analysis Plan	3Q	1/2	1	

16. KEY		
Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	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				(G)	(H)
Reason	Disp.									Reason	Disp.
1/2	1	* Cog. Eng.	R. B. Kerkow	8-27-93	H6-04	R. G. McCain				H6-04	3
1/2	1	Cog. Mgr.	R. C. Roos	8/30/93	H6-04	M. J. Silvia				H6-25	3
1/2	1	QA	R. L. Hand	9/2/93	H4-16	W. A. Skelly				H6-03	3
		Safety				N. G. Thomas				A7-27	3
		Env.				Central Files (2)				L8-04	3
3		L. S. Angerman			G4-07	EDMC (2)				H6-08	3
3		R. G. Anderson			N1-30	ERC				H6-07	3
3		R. G. Ciccone			G4-01	IRA (2)				H4-17	3
3		* I. D. Jacques			H6-04	*B.J. Hobbs				N3-06	6

18. R. B. Kerkow <i>R.B. Kerkow</i> 8-27-93 Signature of EDT Originator Date	19. _____ Authorized Representative Date for Receiving Organization	20. R. C. Roos <i>R.C. Roos</i> 8/30/93 Cognizant/Project Engineer's Manager Date	21. DOE APPROVAL (if required) Ltr. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
--	--	---	--

*Controlled Distribution to be made by EPIC.

SUPPORTING DOCUMENT

1. Total Pages 11

2. Title

Solid Waste Landfill Sampling and Analysis Plan

3. Number

WHC-SD-EN-AP-144

4. Rev No.

0

5. Key Words

landfill gas, Hanford Solid Waste Landfill, soil-gas probes

6. Author

Name: R. B. Kerkow

R. B. Kerkow
Signature

Organization/Charge Code 81353/C08466

**APPROVED FOR
PUBLIC RELEASE**

U. Burkland 9/13/93

7. Abstract

WHC, 1993, *Solid Waste Landfill Sampling and Analysis Plan*, WHC-SD-EN-AP-144, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

~~8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.~~

~~PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.~~

DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC
DATE SEP 13 1993
Station # 12

9. Impact Level 3Q

Complete for all Types of Release

Purpose <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		<input type="checkbox"/> Reference <input checked="" 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 type="checkbox"/> Controlled Document <input type="checkbox"/> Other		ID Number (include revision, volume, etc.) WHC-SD-EN-AP-144, Rev. 0
List attachments. N/A				
Date Release Required September 13, 1993				

Title Solid Waste Landfill Sampling and Analysis Plan Unclassified Category UC- N/A Impact Level 3Q

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)
Copyrights? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has written permission been granted? <input type="checkbox"/> No <input type="checkbox"/> Yes (Attach Permission)	Trademarks? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)

Complete for Speech or Presentation

Title of Conference or Meeting N/A	Group or Society Sponsoring N/A
Date(s) of Conference or Meeting N/A	City/State N/A
Will proceedings be published? <input type="checkbox"/> Yes <input type="checkbox"/> No	Will material be handed out? <input type="checkbox"/> Yes <input type="checkbox"/> No

Title of Journal
N/A

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature	Indicates Approval
			Name (printed)	Signature Date
Classification/Uncontrolled Nuclear Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Patent - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	S. W. Berglin	} <i>S. W. Berglin</i> 9/13/93
Legal - General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	S. W. Berglin	
Applied Technology/Export Controlled Information or International Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
WHC Program/Project	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L. S. Angerman	<i>Russell L. Scott</i> 9/13
Communications	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
RL Program/Project	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N. G. Thomas	<i>N. G. Thomas</i> 9/13/93
Publication Services	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L. A. Brown	<i>L. A. Brown</i> 9/13/93
Other Program/Project	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

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)	Date
R. B. Kerkow <i>R.B. Kerkow</i>	9/10/93
Intended Audience	
<input type="checkbox"/> Internal <input type="checkbox"/> Sponsor <input checked="" type="checkbox"/> External	
Responsible Manager (Printed/Signature)	Date
R. C. Roos <i>R.C. Roos</i>	9/10/93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.



Date Cancelled	Date Disapproved
----------------	------------------

CONTENTS

1.0	INTRODUCTION	1
1.1	SCOPE OF WORK	1
1.2	SITE DESCRIPTION	1
2.0	GENERAL REQUIREMENTS	3
2.1	APPLICABLE PROCEDURES	3
2.2	DATA QUALITY OBJECTIVES	3
3.0	MONITORING STATIONS AND SAMPLING POINTS	3
3.1	LOCATION OF MONITORING STATIONS	3
3.2	IDENTIFICATION OF MONITORING STATIONS AND SAMPLING POINTS	5
3.3	INSTALLATION OF SAMPLING POINTS	5
4.0	SAMPLE ANALYSIS	7
5.0	QA/QC REQUIREMENTS	7
6.0	WORK SCHEDULE	7
6.1	PROBE INSTALLATION SCHEDULE	8
6.2	INITIAL SAMPLING AND ANALYSIS INVESTIGATION SCHEDULE	8
6.3	MONITORING SCHEDULE	8
7.0	CHANGES TO SAMPLING PLAN	8
8.0	REFERENCES	8

FIGURES

1	Location of Solid Waste Landfill and Nonradioactive Dangerous Waste Landfill on the Hanford Site, Washington	2
2	Proposed Locations for Monitoring Stations on the Outer Perimeter of the Solid Waste Landfill	4
3	Typical Monitoring Station and Soil-Gas Probe Assembly	6

ATTACHMENT

1	SWL Sampling and Analysis Plan Change Form	9
---	--	---

1.0 INTRODUCTION

1.1 SCOPE OF WORK

This document specifies the activities and procedures used to investigate and monitor subsurface landfill gas (LFG) at selected locations on the perimeter of the Hanford Solid Waste Landfill (SWL). The SWL is an active landfill disposal facility regulated under the Washington Administrative Code (WAC) 173-304, *Minimum Functional Standards for Solid Waste Handling*. Applicable requirements for monitoring potential offsite migration of LFG are found in WAC 173-304-460, *Landfill Standards*.

The objective of this investigation and monitoring program is to assess and monitor subsurface LFG at the perimeter of the Hanford SWL facility. LFG will be monitored at eight locations identified as monitoring stations. Each monitoring station will consist of two soil-gas probes, one at a depth of approximately 9 feet and the second at approximately 15 feet, as specified in DOE/RL-90-38, Rev. 1, Section 5.4.3.1, Monitoring Network.

1.2 SITE DESCRIPTION

The SWL is a 27-ha (66 acre) landfill facility located near the geographic center of the Hanford Site, in the 600 area, approximately 5.6 km (3.5 mi) southeast of the 200 East Area (Figure 1). Currently, the SWL is divided into sections, identified as phase I and phase II. The phase I portion was operated from 1972 through 1982, and the phase II portion has been operated since 1982. Adjacent to the SWL, on the north side, is the Nonradioactive Dangerous Waste Landfill (NRDWL), an inactive disposal facility governed by Resource Conservation and Recovery Act (RCRA) regulations. The NRDWL facility is separate from the SWL and monitoring of vadose zone gases related to the NRDWL is not part of this investigation.

Waste materials disposed at the SWL consist primarily of solid waste materials including waste paper products, construction debris, asbestos waste, and lunchroom waste. In addition, the SWL has received a limited amount of liquid wastes. Approximately 3,800,000 to 5,700,000 L (1 to 1.5 million gal) of sewage wastes were received between 1975 and 1987 and approximately 380,000 L (100,000 gal) of wash-water wastes were received from the Hanford Site bus-garage between 1985 and 1987. Currently, no sewage or liquids are accepted for disposal and all trenches previously used for liquid disposal are classified as inactive and have operational covers in place. Disposal of radiological and/or dangerous waste at the SWL has never been allowed.

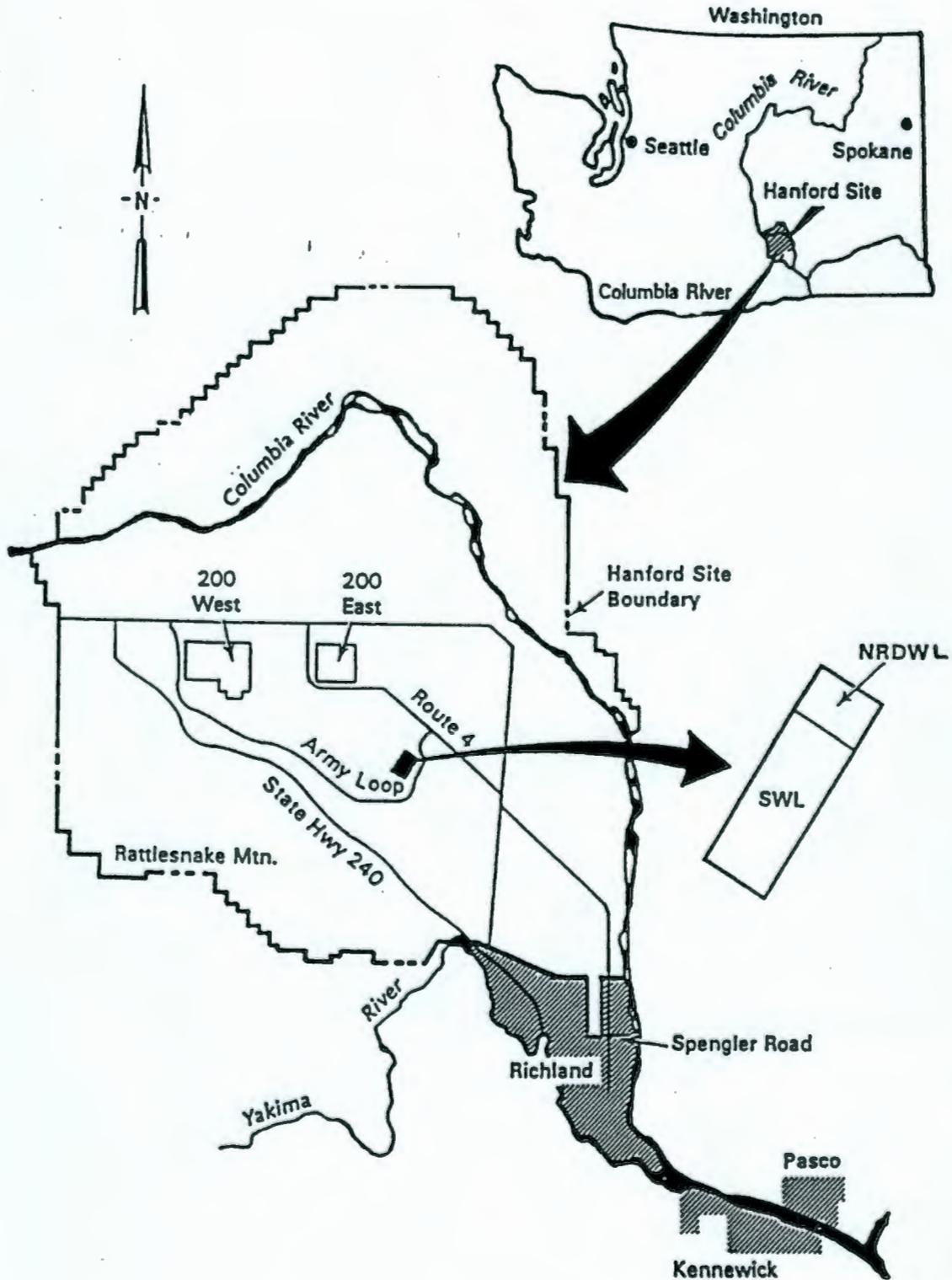


Figure 1. Location of the Solid Waste Landfill and Nonradioactive Dangerous Waste Landfill on the Hanford Site, Washington.

2.0 GENERAL REQUIREMENTS

2.1 APPLICABLE PROCEDURES

All work will be performed in accordance with this sampling and analysis plan and the following WHC documents.

- WHC-EP-0383, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan* (WHC 1990)
- WHC-CM-4-11, *ALARA Program Manual* (WHC 1988a)
- WHC-CM-4-3, *Industrial Safety Manual*, Volumes 1 through 3, (WHC 1987)
- WHC-CM-7-5, *Environmental Compliance Manual* (WHC 1988b)
- WHC-CM-7-7, *Environmental Investigations and Site Characterization Manual* (WHC 1988c)
- Site-specific safety documentation.

2.2 DATA QUALITY OBJECTIVES

The data obtained by this investigation and monitoring program will be used to determine if subsurface Landfill Gases (LFG) are present at the perimeter of the Solid Waste Landfill (SWL) facility in concentrations that warrant further study or remediation, as specified in DOE/RL-90-38, Rev. 1.

Target compound concentrations will be measured at each sample point using a portable infrared LFG analyzer. The infrared LFG analyzer measures LFG concentrations for Methane (CH₄), Carbon Dioxide (CO₂), and Oxygen (O₂) and reports the concentration as percent by volume (% v/v). Data will be recorded in the field logbook as percent by volume to the nearest tenth of a percent (e.g., 00.1%). Any reading less than one tenth of a percent (<00.1%) will be reported as Not Detected (ND). The QA/QC requirements specified in Section 5.0 of this investigation correspond to requirements identified for EPA Level I field screening methods.

3.0 MONITORING STATIONS AND SAMPLING POINTS

3.1 LOCATION OF MONITORING STATIONS

Landfill gas monitoring will be conducted at eight monitoring stations. (Figure 2.) The monitoring station locations are described as follows.

- One station will be placed near the center of the SWL southern boundary, outside the south perimeter fence-line. One station will be placed near the center of the northern SWL perimeter along the boundary of the SWL and NRDWL facilities.

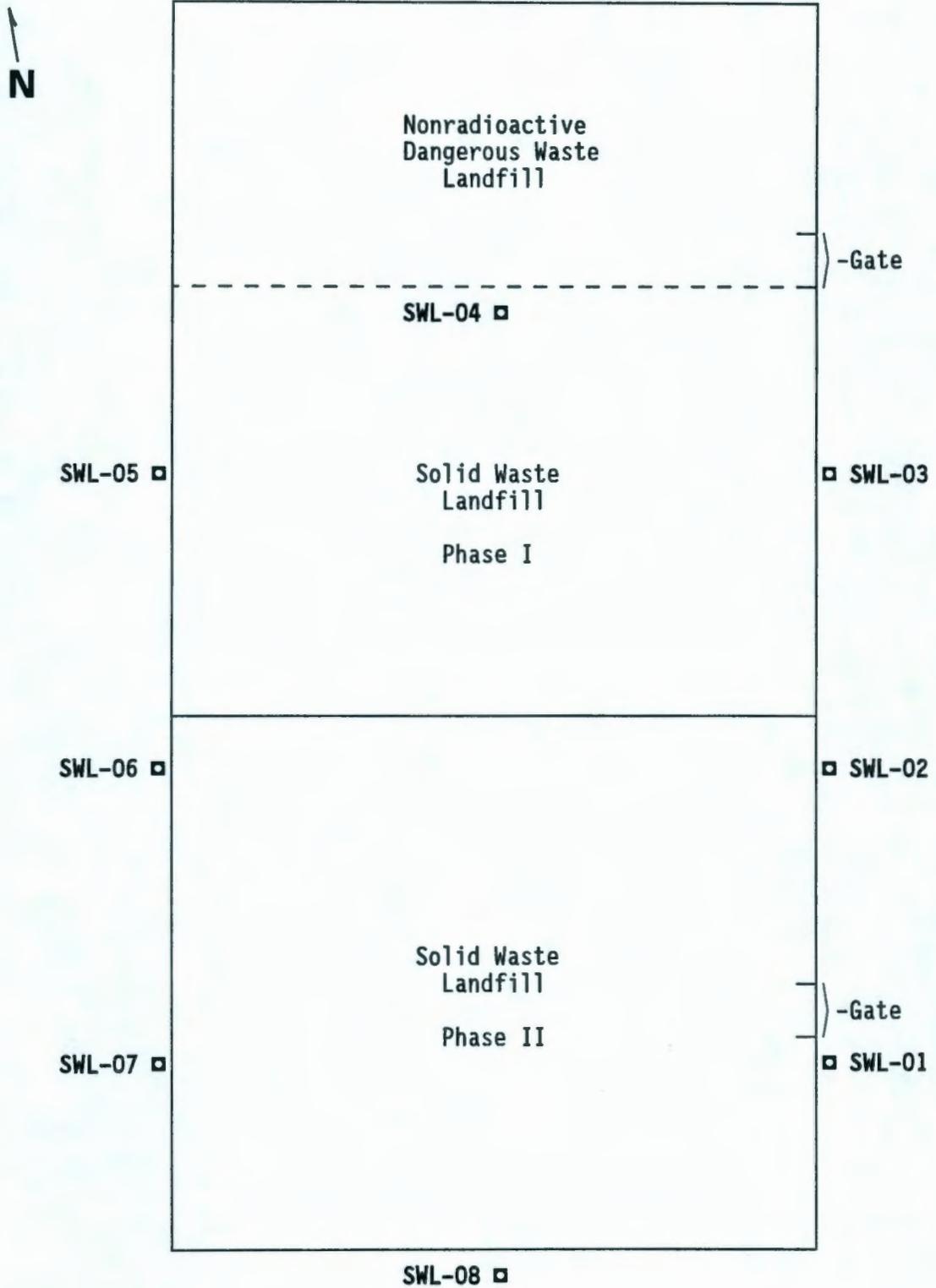


Figure 2. Proposed Locations for Monitoring Stations on the Outer Perimeter of the Solid Waste Landfill.

- Three stations will be placed on the SWL west perimeter, along the outside of the SWL western perimeter fence-line. The central position will be placed near the center of the SWL west perimeter and the other two positions will be placed approximately 935 feet from the central position along the outside of the fence-line. The remaining three stations will be placed on the outside of the SWL east perimeter fence-line in similar positions to the stations on the west perimeter.

3.2 IDENTIFICATION OF MONITORING STATIONS AND SAMPLE POINTS

Monitoring stations will be numbered sequentially starting with "SWL-01" at the station located on the southeast side of the facility, nearest the main entry gate, and continuing counter-clockwise around the facility perimeter. (Figure 2.) Identification of individual soil-gas probes will be based on the monitoring station number and relative depth of the probe. The shallow probe (9-foot depth) will be designated by the letter suffix "A" and the deep probe (15 foot depth) will be designated by the letter suffix "B" (e.g., SWL-01-A would be the shallow probe at monitoring station - 01).

3.3 INSTALLATION OF SOIL-GAS PROBES

Figure 3 depicts a typical monitoring station, in cross-section, with the protective cover installed. Each monitoring station will consist of two soil-gas probes, one driven to a depth of approximately 9 feet and the second driven to a depth of approximately 15 feet. The actual probe depths will depend on field conditions encountered at each monitoring station site. Exact probe depth will be determined at the time each probe is installed and will be documented in the field logbook.

Probes will be installed in accordance with Environmental Investigations Instruction (EII) 5.9, Soil-gas Sampling (WHC 1988c). Each soil-gas probe consists of an expendable stainless-steel point connected to a $\frac{1}{4}$ -inch OD teflon tube (a trademark of E.I. DuPont De Nemours Company), see Figure 3. Probes are driven to depth using a pneumatic probe driver and hollow steel driving rod. Once the probe has been driven to the prescribed depth the driving rod is extracted leaving the probe tip and teflon tubing in place. The teflon tubing must extend 18 to 24 inches above the surface of the soil to allow access for sampling. The annular space between the tubing and the emplacement hole will be backfilled using native soil or clean silica sand to seal the tubing. The tubing will be capped at the surface using a plastic cap. All probes will be allowed to equilibrate with the soil conditions for at least 24 hours before they are sampled.

After the sampling probes have been installed and tested, a permanent housing will be constructed around the probes at each monitoring station. The housing will consist of a lockable protective cover made of steel pipe mounted in a concrete pad with a bentonite seal. (Figure 3.)

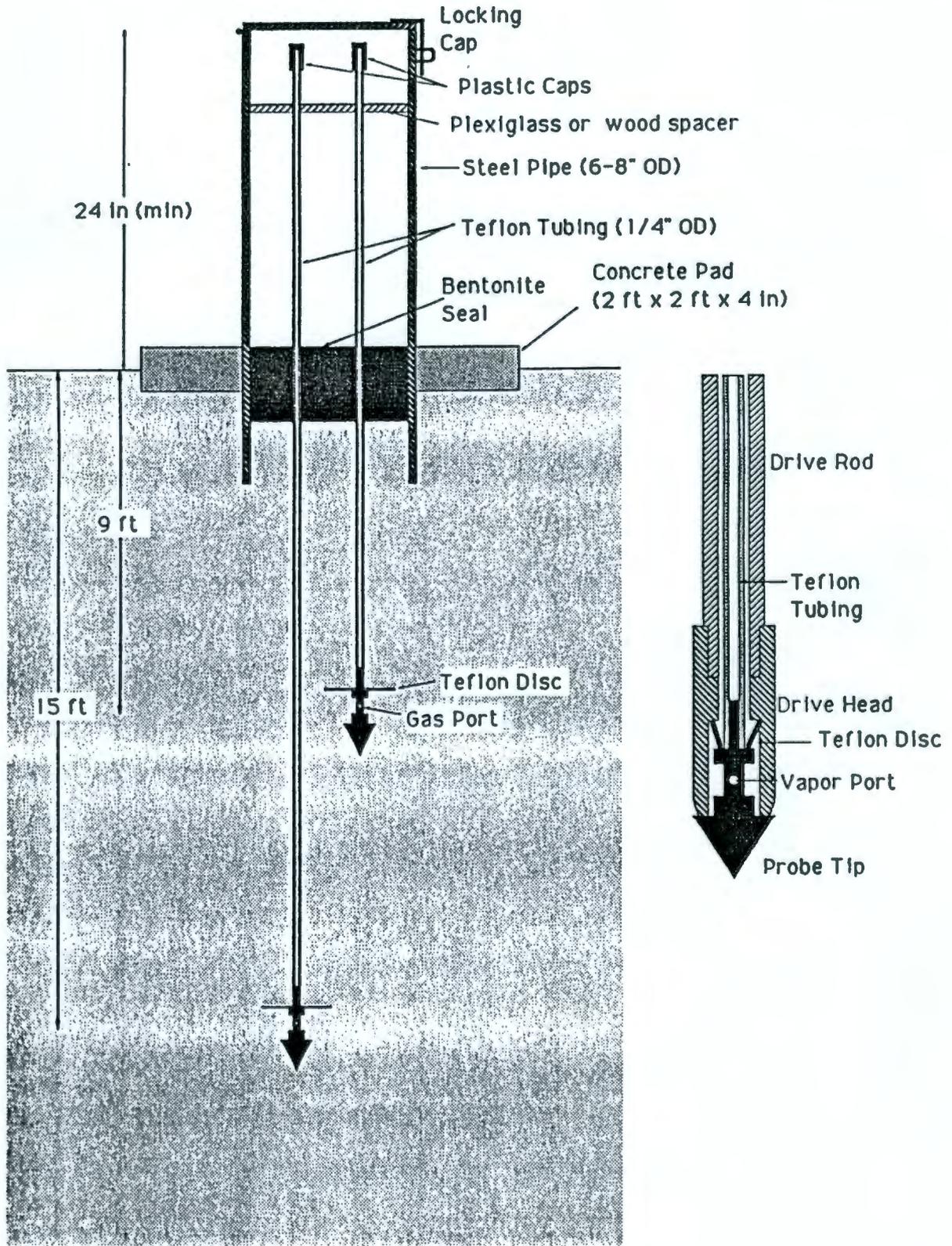


Figure 3. Typical Monitoring Station and Soil-Gas Probe Assembly.

4.0 SAMPLE ANALYSIS

The overall objective of the subsurface SWL-LFG investigation and monitoring program is to assess the subsurface landfill gas concentrations at the SWL perimeter and ensure compliance with explosive gas emission standards of WAC 173-304-460 (2)(b)(i). Soil-vapor from the soil-gas probes will be analyzed in the field, using a portable Infrared LFG Analyzer. The primary instrument will be a Model GA 90 Infrared Gas Analyzer, manufactured by Geotechnical Instruments.

Each sample point will be purged a minimum of three purge-volumes to ensure the sample is representative of the vadose zone vapors at that location. Purge volume for the $\frac{1}{4}$ -inch teflon tubing used with each soil-gas probe is calculated based the length of tubing installed multiplied by a factor of 10 ml/ft. Purge times will be determined by taking into account the purge volume of tubing divided by the flow rate of the instrument used. Purge volume will be calculated and documented in the field log book.

The primary compound of concern is methane gas (CH_4) which must, by regulation, be monitored to assure concentrations do not exceed the lower explosive limit (5% by volume) at the landfill property boundary. Carbon dioxide gas (CO_2) and Oxygen (O_2) have been included as analytes of interest in this investigation because they may serve, indirectly, as indicators of subsurface decomposition activity and are readily detected by an infrared landfill gas analyzer.

5.0 QA/QC REQUIREMENTS

Quality assurance checks will be performed on the Model GA 90 Infrared Gas Analyzer by checking the internal calibration settings against a standard gas mixture which contains 4.24% methane, 5.4% carbon dioxide, and 9.55% oxygen in a nitrogen environment.

Quality assurance checks will be performed daily prior to the start of monitoring, and may be performed at other times as deemed appropriate by the field team leader. The results of all quality assurance checks will be recorded in the field logbook.

6.0 WORK SCHEDULE

6.1 PROBE INSTALLATION SCHEDULE

Installation of the sixteen dedicated soil-gas probes at the eight monitoring stations is scheduled to be accomplished during the week of September 20-24, 1993.

6.2 INITIAL SAMPLING AND ANALYSIS INVESTIGATION SCHEDULE

Sampling and analysis of soil vapors shall not be performed until at least 24 hours after the installation of both probes at a monitoring location, to ensure that the soil-gases have had time to equilibrate following installation.

Once the sampling and analysis investigation starts, all sixteen sample points will be sampled a minimum of twice daily for the first 3 to 5 days, as specified in DOE/RL-90-38, Rev. 1, Section 5.4.3.4 Sampling Frequency. Data from this initial investigation will be used to establish baseline for target LFG concentrations. This phase of the sampling and analysis investigation is scheduled to be completed by September 30, 1993.

6.3 MONITORING SCHEDULE

Based on the results of the initial investigation a routine will be established to monitor all probes at least weekly for the first month, monthly for the first quarter and quarterly thereafter. Monitoring activities may be conducted more frequently at the discretion of Solid Waste Landfill management anytime significant quantities of LFG are detected.

7.0 CHANGES TO SAMPLING PLAN

Changes to this sampling plan will be submitted on the project change form (Attachment 1). The change will require, as a minimum, the verbal approval of the field team leader for this investigation and a representative of Solid Waste Landfill management. The change will be filed as an Engineering Change Notice and a copy will be inserted into the project file. Copies will be submitted to the regulatory agencies and appropriate personnel.

8.0 REFERENCES

- DOE/RL, 1993, *Hanford Site Solid Waste Landfill Permit Application*, DOE/RL-90-38 Rev 1, U.S. Department of Energy, Richland, Washington.
- WHC, 1987, *Industrial Safety Manual*, WHC-CM-4-3, Volumes 1 through 3, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988a, *ALARA Program Manual*, WHC-CM-4-11, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988b, *Environmental Compliance Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988c, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1990, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan*, WHC-EP-0383, Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

SWL SAMPLING AND ANALYSIS PLAN CHANGE FORM

Date: _____

Person Initiating Change: _____

Change: _____

Reason For Change: _____

APPROVAL

Field Team Leader: _____

Closure Plan Coordinator: _____

Other: _____
