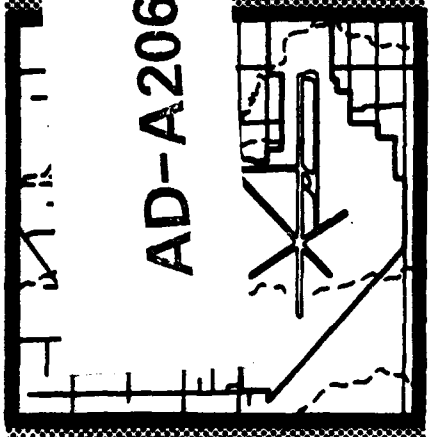

INSTALLATION RESTORATION PROGRAM
STAGE 3
McCLELLAN AIR FORCE BASE

PREPARED BY:
Radian Corporation
10395 Old Placerville Road
Sacramento, California 95827

DECEMBER 1988

SOLID WASTE ASSESSMENT TESTING

FINAL

November 1987 to December 1988

PREPARED FOR:
HEADQUARTERS AFLC/DEV
WRIGHT-PATTERSON AFB, OHIO 45433

United States Air Force
Occupational and Environmental Health Laboratory (USAFOEHL)
Technical Services Division (TS)
Brooks Air Force Base, Texas 78235-5501

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INSTALLATION RESTORATION PROGRAM
STAGE 3
McCLELLAN AIR FORCE BASE, CALIFORNIA
SOLID WASTE ASSESSMENT TESTING

FINAL

HEADQUARTERS AFLC/DEV
WRIGHT-PATTERSON AFB, OHIO 45433

December 1988

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This document reports the sampling and analytical results of the gas generation and gas migration testing at 13 inactive landfills, and the vapor wells and gas vents associated with the Area D clay cap remedial action. This report and testing were performed at McClellan AFB in compliance with the California Health and Safety Code Section 41805.5.

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PREFACE

Radian Corporation is a contractor for the RI/FS program at McClellan AFB, California. This work was performed for the USAF Occupational and Environmental Health Laboratory (USAFOEHL) under USAF Contract No. F33615-87-D-4023, Delivery Order 0006.

The background sections presented in this technical memorandum were developed for inclusion in the future RI report(s). The sections cover historical activities, as previously presented by other IRP contractors, site features, and contaminant characteristics at McClellan AFB.

Key Radian project personnel were:

Nelson H. Lund, P.E. -- Contract Program Manager
Jack D. Gouge' -- Delivery Order Manager
Morey Lewis, P.E. -- Project Manager
Mark T. Galloway -- Task Leader

The work presented herein was accomplished between January 1988 and December 1988. 1st Lt, J.E. Styles, Technical Services Division, USAFOEHL, was the Technical Program Manager.

Approved:

Nelson H. Lund, P.E.
Contract Program Manager

Jack Gouge'
Delivery Order Manager

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TABLE OF CONTENTS

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TABLE OF CONTENTS (Continued)

RADIAN CORPORATION

LIST OF TABLES

RADIAN CORPORATION

LIST OF TABLES

RADIAN CORPORATION

LIST OF TABLES

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LIST OF FIGURES

1.0 INTRODUCTION

This document reports the results of landfill testing performed at the McClellan Air Force Base (AFB) in compliance with the California Health and Safety Code Section 41805.5. This section requires the testing and preparation of a solid waste assessment report for all active California solid waste sites. McClellan AFB requested Radian Corporation to perform an investigation to evaluate inactive landfills, and Area D perimeter vapor wells and gas vent systems that are associated with the Area D clay cap at McClellan AFB. The testing reported in this document was performed in accordance with the procedures given in the "McClellan AFB Calderon Investigation Draft Quality Assurance Project Plan" (Radian, 1987). This quality assurance project plan (QAPP) was prepared in accordance with the requirements for landfill testing outlined in "Testing Guidelines for Active Solid Waste Disposal Sites" (California Air Resources Board, 1987). The QAPP was approved by a Sacramento County Air Pollution Control Officer and the U.S. Air Force prior to initiation of field testing activities. The testing was specifically designed to determine the gas generation and migration potential of landfills at the base, and to assess the impact, if any, of landfill gas on the atmosphere.

Thirteen inactive landfills were sampled. In addition, nine Area D perimeter soil-gas monitor wells and 14 gas vents located within the Area D cap were sampled. Figure 1-1 shows the approximate locations of these sites.

The landfills were evaluated for landfill gas generation and migration potentials only. No ambient air sampling was performed.

Tracer Research Corporation (TRC), a subcontractor to Radian Corporation, to performed the subsurface soil investigation and analytical activities of the testing program.

Section 2.0 of this document presents an overview of the sampling and analytical strategy used during the investigation. Analytical results also are presented. Section 3.0 provides a general description of the

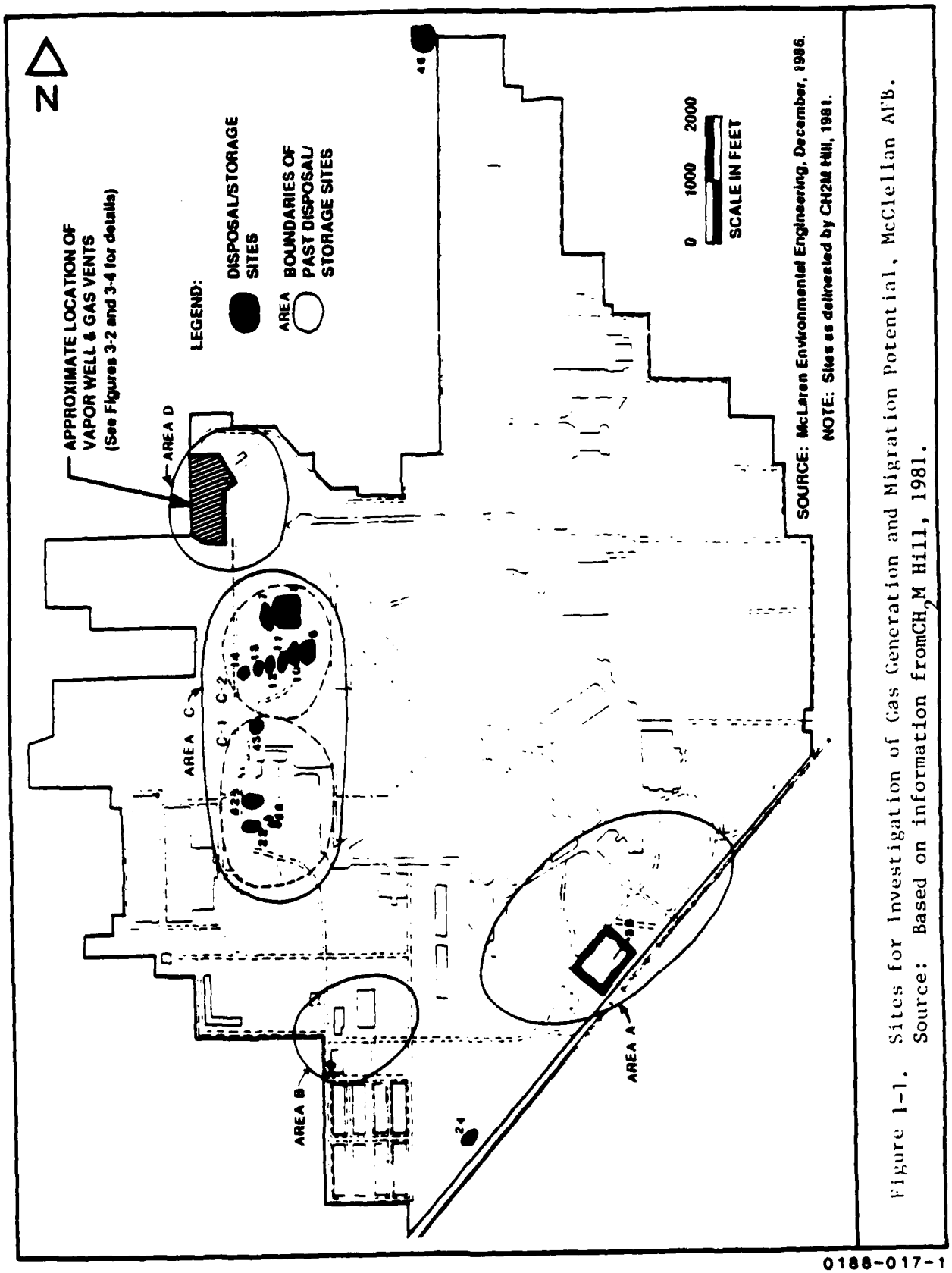

Figure 1-1. Sites for Investigation of Gas Generation and Migration Potential, McClellan AFB.
Source: Based on information from CH_2M Hill, 1981.

landfill and other test sites that were investigated, and also provides information about the land use and population surrounding McClellan AFB. Section 4.0 presents a more detailed review of the sampling approach, including soil-gas probe installation, sampling procedures, and analytical procedures. Section 5.0 presents a summary of sampling and analytical results. A result summary is presented in Section 5.0 for those sites where sampling detected concentrations of any specified air contaminant compounds above the limit of quantitation. Section 5.0 also discusses the use of the limit of detection and limit of quantitation for data interpretation and briefly discusses quality assurance issues. Section 6.0 briefly discusses the status of remedial actions for each of the landfills and the Area D vapor wells and gas vent system test sites.

Appendix A presents the tabulated analytical results. Appendix B presents the raw analytical data, including quality assurance and quality control samples. Appendix C presents field notes and maps. Appendix D presents site photographs. And Appendix E presents the calculations used to estimate the volumes of air purged for the vapor wells and gas vents.

1.1 Project Description

Field testing at McClellan AFB included the collection of data to satisfy the gas generation and migration compliance requirements of the California Health and Safety Code Section 41805.5 (AB 3375, Calderon, 1984) for the 13 sites.

The field testing was designed to determine:

- The gas generation potential of each of the landfills investigated; and
- The gas migration potential of landfill gas from each of the landfills tested to the respective surrounding areas.

In general, the gas generation potential of each landfill was determined by installing and sampling of up to five ground probes per site to a depth of eight feet. Surface coverings were removed, where possible, to facilitate probe installation. At least one probe was installed in the center of each landfill site, and other probes were installed in other areas of the landfill. The soil-gas samples were analyzed for methane, carbon dioxide, oxygen, nitrogen, and other specified air contaminant compounds which are listed in Table 1-1. These specified air contaminant compounds are based on Attachment 1 of the "Testing Guidelines for Active Solid Waste Disposal Sites" (California State Air Resources Board, 1987).

Gas migration potential was determined by installing and sampling perimeter landfill probes (with a maximum of three probes per landfill site). When appropriate, these perimeter probes were placed between landfills and in the direction of occupied structures. These soil-gas samples were analyzed for methane and the specified air contaminant compounds.

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TABLE 1-1. SPECIFIED AIR CONTAMINANT COMPOUNDS ANALYZED IN SOIL-GAS SAMPLES

Compound
Chloroethene (Vinyl Chloride)
Benzene
1,2-Dibromoethane (Ethylene Dibromide)
1,2-Dichloroethane (Ethylene Dichloride)
Dichloromethane (Methylene Chloride)
Tetrachloroethene (Perchloroethylene)
Tetrachloromethane (Carbon Tetrachloride)
1,1,1-Trichloroethane (Methyl Chloroform)
Trichloroethene (Trichloroethylene)
Trichloromethane (Chloroform)

2.0 SUMMARY OF RESULTS

This section presents a brief overview of the sampling and analytical strategy used during the landfill testing and evaluation of the Area D perimeter vapor wells and gas vent system, which is within the Area D clay cap. This section also presents general analytical results of all landfill, soil-gas monitor well, and gas vent testing performed at McClellan Air Force Base (AFB). These results are summarized in Tables 2-1 through 2-15. Maximum values for site-specific analytical results that exceeded the limit of quantitation concentration are presented in Section 5.0. A discussion of the limit of quantitation (LOQ) criteria is presented in Section 5.1.2.

The tests performed included landfill gas characterization and gas migration testing. Ambient air testing for the landfills was not performed as part of the landfill testing program. Landfill gas characterization included screening emissions of the entire disposal area with a portable gas chromatograph containing a flame ionization detector, and landfill gas testing for specified air contaminant compounds (identified in Table 1-1), as well as methane, carbon dioxide, oxygen, and nitrogen at the center of each of the sites. Gas migration testing included landfill gas testing for the specified air contaminant compounds listed in Table 1-1, plus methane, carbon dioxide, oxygen, and nitrogen at perimeter locations at each of the sites.

The analytical procedure for the analysis of soil-gas used was a field gas chromatography technique developed and performed by Tracer Research Corporation of Tucson, Arizona. The technique provides immediate analysis of syringe samples collected directly from subsurface sampling probes after purging two probe volumes prior to sampling. The analytical detection limits and quality assurance activities demonstrated that the technique was sufficient to meet the testing objectives. Limits of detection and quantification were equal to or less than the detection limits for the specified air contaminant compoundsidentified in the "Testing Guidelines for Active Solid Waste Disposal Sites" (California Air Resources Board, 1987). The limits of detection, limits of quantitation, and analytical results are presented in Section 5.0. Results of tests conducted on landfill sites are discussed below:

TABLE 2-1. ANALYTICAL RESULTS OF SITE NO. 7 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit[a] (ppbv)	Landfill - Sample No. 7(1) (ppbv)	7(2) (ppbv)	7(3) (ppbv)	7(4) (ppbv)	7(5) (ppbv)	Perimeter - Sample No. 7(6) (ppbv)
Vinyl Chloride	18	2,000	80	80	2,000	<80	<30
Benzene	13	<2	<10	<10	<10	<20	<10
Ethylene Dibromide	0.12	<5	<0.3	<0.3	<3	<0.4	<0.3
Ethylene Dichloride	18	<20	<20	<20	<200	<50	<20
Methylene Chloride	24	3,000	<30	9,000	5,000	3,000	100
Perchloroethylene	0.14	300	60	40	200	<40	<0.08
Carbon Tetrachloride	0.029	<0.5	<0.03	<0.03	<0.3	<0.08	0.1
Methyl Chloroform	0.17	20	0.8	100	<2	6	0.4
Trichloroethylene	0.17	400	10	40	400	40	1
Chloroform	0.38	<4.0	<0.4	4	4	0.8	0.4
Methane (%)[b]	0.29	3.2	<0.11	<0.21	9.9	<0.11	<0.11
Carbon Dioxide (%)[b]	0.67	1.9	0.63	0.91	3.5	1.1	0.074
Oxygen (%)[b]	1.0	9.4	16	11	1.7	9.4	23
Nitrogen (%)[b]	1.1	67	80	82	43	80	82

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
7(1)	SG8-7L	7.5'	12/04/87
7(2)	SG9-7L	7'	12/05/87
7(3)	SG10-7L	6'	12/05/87
7(4)	SG11-7L	7.5'	12/05/87
7(5)	SG12-7L	8'	12/05/87
7(6)	SG13-7P	2'	12/05/87

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TABLE 2-2. ANALYTICAL RESULTS OF SITE NO. 8 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection[a] Limit (ppbv)	Landfill - Sample No. 8(2) (ppbv)	8(3) (ppbv)	8(6) (ppbv)	8(7) (ppbv)	8(8) (ppbv)	Perimeter - Sample No. 8(1) (ppbv)	8(4) (ppbv)	8(5) (ppbv)
Vinyl Chloride	18	<10	<30	<80	<20	120,000	<10	<40	<20
Benzene	13	<6	<10	<30	2	2,000	<6	<20	200
Ethylene Dibromide	0.12	<0.3[b]	<4[b]	<0.3	<0.05	<3	<0.1[b]	<3[b]	<0.5
Ethylene Dichloride	18	<20[b]	<800[b]	<20	<8	<20	<20[b]	<200[b]	<8
Methylene Chloride	24	<30	<900	<30	<10	<300	<20	<300	<10
Perchloroethylene	0.13	1,000	7,000	300	90	600	10	200	40
Carbon Tetrachloride	0.029	<0.05	<0.8	<0.05	<0.01	<0.5	<0.02	<0.5	<0.01
Methyl Chloroform	0.17	400	10,000	9	2	2,000	2	20	9
Trichloroethylene	0.17	400	400	40	8	800	8	20	4
Chloroform	0.38	<0.4	<8	<0.4	<0.1	<4	<0.2	<4	<0.1
Methane (%)[c]	0.29	<0.51	<0.51	<0.54	<0.54	<0.54	<0.51	<0.51	<0.54
Carbon Dioxide (%)[c]	0.67	1.2	1.0	1.2	0.18	1.5	<0.22	0.11	0.07
Oxygen (%)[c]	1.0	11	9.4	10	20	4.2	17	16	16
Nitrogen (%)[c]	1.1	78	78	75	87	80	74	75	78

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Reagent blank did not meet the required detection limit of ≤20 ppbv on December 10, 1987.

[c] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
8(1)	SG39-8P	4'	12/10/87
8(2)	SG39-8I	8'	12/10/87
8(3)	SG41-8I	8'	12/10/87
8(4)	SG42-8P	4'	12/10/87
8(5)	SG43-8P	4'	12/11/87
8(6)	SG44-8I	8'	12/11/87
8(7)	SG45-8I	7'	12/11/87
8(8)	SG46-8I	8'	12/11/87

TABLE 2-3. ANALYTICAL RESULTS OF SITE NO. 10 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit[a] (ppbv)	Landfill - Sample No.	Perimeter - Sample No. 10(1) (ppbv)	10(2) (ppbv)	10(3) (ppbv)
Vinyl Chloride	18	b	<20	<30	<30
Benzene	13	b	<6	<10	<10
Ethylene Dibromide	0.12	b	<0.06	<0.3	<0.3
Ethylene Dichloride	18	b	<10	<20	<20
Methylene Chloride	24	b	<10	<30	<30
Perchloroethylene	0.13	b	0.09	<0.08	<0.08
Carbon Tetrachloride	0.029	b	0.1	<0.03	<0.03
Methyl Chloroform	0.17	b	0.4	<0.2	<0.2
Trichloroethylene	0.17	b	0.4	<0.4	<0.4
Chloroform	0.38	b	<0.2	<0.4	<0.4
Methane (%)[c]	0.29	b	<0.11	<0.11	<0.11
Carbon Dioxide (%)[c]	0.67	b	<0.049	0.12	0.15
Oxygen (%)[c]	1.0	b	23	20	22
Nitrogen (%)[c]	1.1	b	82	78	80

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Field conditions prohibited sample collection.

[c] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
10(1)	SG14-10P	4'	12/05/87
10(2)	SG15-10P	6'	12/05/87
10(3)	SG16-10P	6'	12/05/87

TABLE 2-4. ANALYTICAL RESULTS OF SITE NO. 11 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit[a] (ppbv)	Landfill - Sample No.	Perimeter - Sample No. 11(1) (ppbv)	Perimeter - Sample No. 11(2) (ppbv)
Vinyl Chloride	18	b	<20	<30
Benzene	13	b	<6	<10
Ethylene Dibromide	0.12	b	<0.06	<0.1
Ethylene Dichloride	18	b	<10	<20
Methylene Chloride	24	b	<10	<20
Perchloroethylene	0.14	b	<0.03	3
Carbon Tetrachloride	0.029	b	<0.02	<0.02
Methyl Chloroform	0.17	b	<0.08	0.6
Trichloroethylene	0.17	b	<0.2	4
Chloroform	0.38	b	<0.2	<0.2
Methane (%)[c]	0.29	b	<0.11	2.6
Carbon Dioxide (%)[c]	0.67	b	0.97	0.63
Oxygen (%)[c]	1.0	b	11	1.9
Nitrogen (%)[c]	1.1	b	85	84

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Field conditions prohibited sample collection.

[c] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
11(1)	SG17-11P	6'	12/05/87
11(2)	SG26-11P	2'	12/07/87

Rev. 01/27/88

TABLE 2-5. ANALYTICAL RESULTS OF SITE NO. 12 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection[a] Limit (ppbv)	Landfill - Sample No.	Perimeter - Sample No. 12(1) (ppbv)	12(2) (ppbv)	12(3) (ppbv)	12(4) (ppbv)
Vinyl Chloride	18	b	<30	56,000	52,000	22,000
Benzene	13	b	100	32,000	<600	1,000
Ethylene Dibromide	0.12	b	<0.1	<4	<3	<0.06
Ethylene Dichloride	18	b	<20	<500	<200	<8
Methylene Chloride	24	b	<20	<600	1,000	1,000
Perchloroethylene	0.14	b	3	4,000	4,000	100
Carbon Tetrachloride	0.029	b	<0.02	60	10	<0.02
Methyl Chloroform	0.17	b	4	<4	80	2
Trichloroethylene	0.17	b	4	8,000	5,000	200
Chloroform	0.38	b	<0.2	2,000	40	1
Methane (%)[c]	0.29	b	<0.46	3.7	1.9	4.5
Carbon Dioxide (%)[c]	0.67	b	0.29	1.3	1.2	0.32
Oxygen (%)[c]	1.0	b	17	3.0	4.4	6.1
Nitrogen (%)[c]	1.1	b	85	80	65	62

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Field conditions prohibited sample collection.

[c] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
12(1)	SG24-12P	5'	12/07/87
12(2)	SG25-12P	5'	12/07/87
12(3)	SG64-12P	6'	12/15/87
12(4)	SG65-12P	5'	12/15/87

Rev. 01/27/88

TABLE 2-6. ANALYTICAL RESULTS OF SITE NO. 13 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit[a] (ppbv)	Landfill - Sample No. 13(2) (ppbv)	Perimeter - Sample No. 13(1) (ppbv)	Perimeter - Sample No. 13(3) (ppbv)
Vinyl Chloride	18	<30	<20	5,000
Benzene	13	<200	<60	600
Ethylene Dibromide	0.12	<0.2	<0.1	<0.2
Ethylene Dichloride	18	<20	<10	<20
Methylene Chloride	24	<30	<10	200
Perchloroethylene	0.14	0.2	4	6
Carbon Tetrachloride	0.029	<0.05	<0.02	<0.05
Methyl Chloroform	0.17	0.4	0.8	4
Trichloroethylene	0.17	1	4	40
Chloroform	0.38	<0.4	<0.2	<0.4
Methane (%)[b]	0.29	<0.21	<0.21	7.4
Carbon Dioxide (%)[b]	0.67	0.2	0.91	2.8
Oxygen (%)[b]	1.0	19	9.4	4.8
Nitrogen (%)[b]	1.1	84	87	55

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
13(1)	SG5-13P	5'	12/04/87
13(2)	SG6-13L	5'	12/04/87
13(3)	SG7-13P	5'	12/04/87

Rev. 02/12/88
Calderon (SWAT)

TABLE 2-7. ANALYTICAL RESULTS OF SITE NO. 14 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit[a] (ppbv)	Landfill - Sample No. 14(2) (ppbv)	Landfill - Sample No. 14(3) (ppbv)	Perimeter - Sample No. 14(1) (ppbv)	Perimeter - Sample No. 14(4) (ppbv)	Perimeter - Sample No. 14(5) (ppbv)
Vinyl Chloride	18	<10	<20	<10	<20	<20
Benzene	13	<10	<1	<10	<60	<60
Ethylene Dibromide	0.12	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylene Dichloride	18	<20	<20	<20	<10	<10
Methylene Chloride	24	<30	100	<30	<10	<10
Perchloroethylene	0.14	<0.2	10	0.2	0.1	0.4
Carbon Tetrachloride	0.029	0.05	<0.02	0.06	0.1	<0.02
Methyl Chloroform	0.17	<0.2	4	<0.2	0.4	0.8
Trichloroethylene	0.17	<0.4	2	<0.4	<0.2	<0.2
Chloroform	0.38	<0.4	40	<0.4	<0.2	<0.2
Methane (%)[b]	0.29	<0.51	<0.42	<0.51	<0.21	<2.1
Carbon Dioxide (%)[b]	0.67	<2.1	5.3	<2.1	<0.091	0.22
Oxygen (%)[b]	1.0	12	17	14	22	20
Nitrogen (%)[b]	1.1	70	82	75	84	84

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
14(1)	SG1-14P	6'	12/02/87
14(2)	SG2-14L	5.5'	12/02/87
14(3)	SG2B-14L	8'	12/03/87
14(4)	SG3-14P	5.25'	12/04/87
14(5)	SG4-14P	5.5'	12/04/87

TABLE 2-8. ANALYTICAL RESULTS OF SITE NO. 22 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit[a] (ppbv)	Landfill - Sample No. 22(1) (ppbv)	22(2) (ppbv)	22(3) (ppbv)	22(5) (ppbv)	Perimeter - Sample No. 22(4) (ppbv)
Vinyl Chloride	18	<10	<10	<30	4,000	<10
Benzene	13	<6	<6	<10	1	<6
Ethylene Dibromide	0.12	<0.1[b]	<0.1[b]	<0.3[b]	<0.3[b]	<0.1[b]
Ethylene Dichloride	18	<20[b]	<20[b]	<20[b]	<20[b]	<20[b]
Methylene Chloride	24	<20	<20	<30	<30	<20
Perchloroethylene	0.14	<0.04	30	3	3	6
Carbon Tetrachloride	0.029	<0.02	<0.02	<0.05	<0.05	<0.02
Methyl Chloroform	0.17	4	4	2	<0.2	8
Trichloroethylene	0.17	40	10	4	400	400
Chloroform	0.38	<0.2	<0.2	<0.4	<0.4	<0.2
Methane (%)[c]	0.29	<0.51	<0.51	<0.51	<0.51	<0.51
Carbon Dioxide (%)[c]	0.67	1.1	0.91	0.18	0.17	0.055
Oxygen (%)[c]	1.0	7.2	7.5	6.9	4.5	15
Nitrogen (%)[c]	1.1	79	80	84	85	68

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Reagent blank did not meet the required detection limit of ≤20 ppbv on December 10, 1987.

[c] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
22(1)	SG34-22L	7'	12/10/87
22(2)	SG35-22L	8'	12/10/87
22(3)	SG36-22L	7'	12/10/87
22(4)	SG37-22P	5'	12/10/87
22(5)	SG38-22L	8'	12/10/87

Rev. 01/27/88

TABLE 2-9. ANALYTICAL RESULTS OF SITE NO. 24 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection[a] Limit (ppbv)	Landfill - Sample No. 24(3) (ppbv)	24(4) (ppbv)	24(5) (ppbv)	24(6) (ppbv)	Perimeter - Sample No. 24(1) (ppbv)	24(2) (ppbv)
Vinyl Chloride	18	<20	<20	<20	<20	<20	<20
Benzene	13	10	10	10	10	10	10
Ethylene Dibromide	0.12	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylene Dichloride	18	<10	<10	<10	<10	<10	<10
Methylene Chloride	24	<20	<20	<20	<20	<20	<20
Perchloroethylene	0.14	<0.04	<0.04	3	<0.04	2	4
Carbon Tetrachloride	0.029	<0.02	<0.02	<0.02	<0.02	<0.02	0.2
Methyl Chloroform	0.17	10	0.8	200	2	2	0.8
Trichloroethylene	0.17	80	8	40	4	20	20
Chloroform	0.38	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methane (%)[c]	0.29	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58
Carbon Dioxide (%)[c]	0.67	0.068	<0.27	1.2	0.27	<0.27	<0.27
Oxygen (%)[c]	1.0	18	18	6.9	20	19	19
Nitrogen (%)[c]	1.1	71	69	76	73	75	73

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
24(1)	SG58-24P	2'	12/14/87
24(2)	SG59-24P	3'	12/14/87
24(3)	SG60-24L	8'	12/14/87
24(4)	SG61-24L	8'	12/14/87
24(5)	SG62-24L	8'	12/14/87
24(6)	SG63-24L	3'	12/14/87

Rev. 01/27/88

TABLE 2-10. ANALYTICAL RESULTS OF SITE NO. 38 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection[a] Limit (ppbv)	Landfill - Sample No. 38(1) (ppbv)	38(2) (ppbv)	38(3) (ppbv)	38(4) (ppbv)	Perimeter - Sample No. 38(5) (ppbv)	38(6) (ppbv)
Vinyl Chloride	18	<20	<200	<200	<20	b	b
Benzene	13	<6	<60	<60	<20	b	b
Ethylene Dibromide	0.12	<0.05	<0.5	<0.5	<0.05	b	b
Ethylene Dichloride	18	<8	<80	<80	<8	b	b
Methylene Chloride	24	<10	<100	<100	<10	b	b
Perchloroethylene	0.14	300	90	90	<0.02	b	b
Carbon Tetrachloride	0.029	<0.01	8	<0.1	<0.01	b	b
Methyl Chloroform	0.17	10	100	6	0.8	b	b
Trichloroethylene	0.17	20	100	10	4	b	b
Chloroform	0.38	<0.1	<1	<1	<0.1	b	b
Methane (%)[c]	0.29	<0.54	<0.54	<0.54	<0.54	b	b
Carbon Dioxide (%)[c]	0.67	0.57	<0.13	<0.14	0.25	b	b
Oxygen (%)[c]	1.0	8.6	17	17	20	b	b
Nitrogen (%)[c]	1.1	85	80	84	84	b	b

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Field conditions prohibited sample collection.

[c] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
38(1)	SG54-38L	6'	12/11/87
38(2)	SG55-38L	4'	12/11/87
38(3)	SG56-38L	4'	12/11/87
38(4)	SG57-38L	2'	12/11/87
38(5)	(No sample) = water at 3'		
38(6)	" "	" "	

TABLE 2-11. ANALYTICAL RESULTS OF SITE NO. 42 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection[a] Limit (ppbv)	Landfill - Sample No. 42(1) (ppbv)	42(2) (ppbv)	42(3) (ppbv)	42(4) (ppbv)	42(5) (ppbv)	Perimeter - Sample No.
Vinyl Chloride	18	<200	<20	<200	<20	<20	b
Benzene	13	<60	<6	<60	<6	<6	b
Ethylene Dibromide	0.12	<0.5	<0.05	<0.5	<0.05	<0.05	b
Ethylene Dichloride	18	<80	<8	<80	<8	<8	b
Methylene Chloride	24	<100	<10	<100	<10	<10	b
Perchloroethylene	0.14	30	3	20	3	6	b
Carbon Tetrachloride	0.029	<0.1	<0.01	<0.1	<0.01	<0.01	b
Methyl Chloroform	0.17	200	2	40	10	0.4	b
Trichloroethylene	0.17	200	80	3,000	40	4	b
Chloroform	0.38	<1	<0.1	<1	<0.1	<0.1	b
Methane (%)[c]	0.29	<0.54	<0.54	<0.54	<0.54	<0.54	b
Carbon Dioxide (%)[c]	0.67	1.0	0.63	0.35	0.68	<0.25	b
Oxygen (%)[c]	1.0	18	15	19	17	12	b
Nitrogen (%)[c]	1.1	87	89	87	84	78	b

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Field conditions prohibited sample collection.

[c] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
42(1)	SG47-42L	4'	12/11/87
42(2)	SG48-42L	4'	12/11/87
42(3)	SG49-42L	3'	12/11/87
42(4)	SG50-42L	6'	12/11/87

Rev. 01/27/88

TABLE 2-12. ANALYTICAL RESULTS OF SITE NO. 43 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection[a] Limit (ppbv)	Landfill - Sample No. 43(2) (ppbv)	43(4) (ppbv)	43(6) (ppbv)	43(1) (ppbv)	Perimeter - Sample No. 43(3) (ppbv)	43(5) (ppbv)
Vinyl Chloride	18	<30	<30	<30	<30	<30	<30
Benzene	13	<10	600	<10	30	<10	<10
Ethylene Dibromide	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylene Dichloride	18	<20	<20	<20	<20	<20	<20
Methylene Chloride	24	<20	<20	<20	<20	<20	<20
Perchloroethylene	0.14	1	<0.04	0.6	1	<0.04	<0.04
Carbon Tetrachloride	0.029	<0.06	0.1	<0.02	<0.05	0.1	<0.03
Methyl Chloroform	0.17	0.2	0.4	<0.8	0.2	0.8	0.4
Trichloroethylene	0.17	2	2	4	1	4	1
Chloroform	0.38	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methane (%)[b]	0.29	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46
Carbon Dioxide (%)[b]	0.67	0.68	0.21	0.057	0.21	0.18	0.08
Oxygen (%)[b]	1.0	16	13	20	19	16	16
Nitrogen (%)[b]	1.1	89	44	87	89	82	66

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
43(1)	SG18-43P	5.5'	12/07/87
43(2)	SG19-43L	7'	12/07/87
43(3)	SG20-43P	7'	12/07/87
43(4)	SG21-43L	7'	12/07/87
43(5)	SG22-43P	4'	12/07/87
43(6)	SG23-43L	4'	12/07/87

Rev. 01/27/88

TABLE 2-13. ANALYTICAL RESULTS OF SITE NO. 69 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION TESTS

Compound	Detection Limit[a] (ppbv)	Landfill - Sample No. 69(1) (ppbv)	69(3) (ppbv)	69(4) (ppbv)	69(5) (ppbv)	69(6) (ppbv)	69(7) (ppbv)	Perimeter - Sample No. 69(2) (ppbv)	69(8) (ppbv)
Vinyl Chloride	18	<20	400	<20	<20	<20	<20	<20	<10
Benzene	13	<10	1,000	<10	<10	<10	<10	<10	<6
Ethylene Dibromide	0.12	<0.1	<0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylene Dichloride	18	<20	<50	<20	<20	<20	<20	<20	<20
Methylene Chloride	24	<20	<60	<20	<20	<20	<20	<20	<20
Perchloroethylene	0.14	<0.06	<0.1	4	3	<0.06	<0.06	<0.06	<0.04
Carbon Tetrachloride	0.029	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.02
Methyl Chloroform	0.17	1	1	2	4	1	1	2	4
Trichloroethylene	0.17	4	8	40	20	6	4	8	6
Chloroform	0.38	<0.4	<0.6	<0.4	<0.4	<0.4	<0.4	<0.4	<0.2
Methane (%)[b]	0.29	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.51
Carbon Dioxide (%)[b]	0.67	<0.25	1.2	0.57	0.41	0.97	1.9	0.28	0.11
Oxygen (%)[b]	1.0	20	5.8	14	16	7.8	19	14	16
Nitrogen (%)[b]	1.1	84	85	77	77	87	82	87	78

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

The following summary is presented to assist in using the tabulated analytical results in Appendix A and the raw analytical results in Appendix B. The second alpha character in the Field ID No. SG8-7L designates a landfill or perimeter probe sample: L = landfill probe, P = perimeter probe.

Sample No. Reporting ID Number	Field ID No.	Depth of Probe	Date Sampled
69(1)	SG27-69L	7'	12/09/87
69(2)	SG28-69P	5'	12/09/87
69(3)	SG29-69L	8'	12/09/87
69(4)	SG30A-69L	8'	12/09/87
69(5)	SG30B-69L	8'	12/09/87
69(6)	SG31-69L	8'	12/09/87
69(7)	SG32-69L	8'	12/09/87
69(8)	SG33-69P	3'	12/10/87

TABLE 2-15. ANALYTICAL RESULTS OF THE AREA D GAS VENT COLLECTION SYSTEM TESTS

Compound	Detection Limit	Gas Vent - Sample No. VC1-3 (ppbv)	VC-NS.1 (ppbv)	VC2.3 (ppbv)	VC2.7 (ppbv)	VC3.1 (ppbv)	VC3.5 (ppbv)	VC3.7 (ppbv)	VC3.9 (ppbv)	VC4.1 (ppbv)	VC4.2 (ppbv)	VC4.4 (ppbv)	VC6.1 (ppbv)	VC6.2 (ppbv)	VC6.3 (ppbv)
Vinyl Chloride	18	<20	<30	<20	<20	<40	<40	<30	<100	<40	<20	<20	<200	<200	<200
Benzene	13	10	<10	<10	<6	<30	<20	<10	<60	<30	<10	<10	100	100	100
Ethylene Dibromide	0.12	<0.08	<0.06	<0.1	<0.05	<0.4	<0.3	<0.1	<0.4	<0.4	<0.1	<0.1	<0.8	<0.8	<0.8
Ethylene Dichloride	18	<10	<8	<20	<8	<50	<50	<20	<50	<50	<20	<20	<100	<100	<100
Methylene Chloride	24	<20	<9	<20	<10	<60	<60	<20	<60	<60	<20	<20	<200	<200	<200
Perchloroethylene	0.14	<0.04	0.9	<0.06	<0.6	<0.1	<0.1	<0.1	0.2	<0.102	<0.06	<0.06	9	<0.4	<0.4
Carbon Tetrachloride	0.029	<0.02	<0.02	<0.03	<0.01	<0.06	<0.06	<0.02	<0.08	<0.06	<0.03	<0.03	<0.2	<0.2	<0.2
Methyl Chloroform	0.17	2	20	200	2,000	200	80	6	20	20	20	<0.1	2,000	1,000	400
Trichloroethylene	0.17	4	9	20	2,000	10	20	1	4	<0.6	<0.2	<0.2	80	40	40
Chloroform	0.38	<0.2	<0.2	<0.4	<0.1	<0.6	<0.6	<0.2	<0.8	<0.6	<0.4	<0.4	<2	<2	<2
Methane (%)[b]	0.29	<0.58	<0.53	<0.58	<0.54	<0.58	<0.54	<0.46	<0.46	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58
Carbon Dioxide (%)[b]	0.67	0.097	1.0	0.57	0.25	1.1	0.63	0.16	0.34	0.4	0.47	0.16	0.34	0.44	0.47
Oxygen (%)[b]	1.0	19	3.2	16	17	7.8	14	20	19	16	16	19	17	17	15
Nitrogen (%)[b]	1.1	72	75	79	73	84	8.2	85	82	79	81	80	77	77	75

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

Analytical results for the gas vents located throughout the Area D clay cap area are identified by the same sample as reporting and field identification numbers. The range numbers can be used to review the analytical results in Appendix A and the raw analytical results in Appendix B. The "VC" designation in the sample number corresponds to a "vent cap" on gas vent samples.

Rev. 02/12/88
Calderon (SWAT)

TABLE 2-14. ANALYTICAL RESULTS OF THE AREA D SOIL-GAS MONITOR WELLS TESTS

Compound	Dectection Limit	Vapor Monitor Wells - Sample No. VW-1 (ppbv)	VW-2 (ppbv)	VW-3 (ppbv)	VW-4 (ppbv)	VW-5 (ppbv)	VW-6 (ppbv)	VW-7 (ppbv)	VW-8 (ppbv)	VW-9 (ppbv)
Vinyl Chloride	18	<300	<400	<40	<30	<300	<30	<300	<300	<300
Benzene	13	<100	<200	<20	<10	<100	<10	<100	<100	<100
Ethylene Dibromide	0.12	<1	<3	<0.3	<0.06	<0.6	<0.06	<0.6	<0.6	<0.6
Ethylene Dichloride	18	<200	200	<6	<8	<80	<8	<80	<80	<80
Methylene Chloride	24	<20	<300	<30	<9	<90	<9	<90	<90	<90
Perchloroethlyene	0.14	<0.4	<0.9	<0.09	2	<0.3	<0.03	90	30	20
Carbon Tetrachloride	0.029	3	30	10	<0.02	<0.2	<0.02	<0.2	<0.2	<0.2
Methyl Chloroform	0.17	<0.8	<2	<0.2	1	8	10	800	900	80
Trichloroethlyene	0.17	<2	80	10	600	800	100	6,000	1,000	100
Chloroform	0.38	<2	<4	<0.4	<0.2	<2	<0.2	<2	<2	<2
Methane (%)[b]	0.29	<0.46	<0.46	<0.46	<0.53	<0.53	<0.53	<0.53	<0.53	<0.53
Carbon Dioxide (%)[b]	0.67	<0.21	0.054	0.091	0.22	0.63	0.19	0.5	0.41	0.35
Oxygen (%)[b]	1.0	20	20	20	11	11	11	2.8	6.6	9.4
Nitrogen (%)[b]	1.1	84	87	87	76	75	69	77	78	76

[a] Detection Limit--Same as the analytical detection limit presented in Table 5-1. These detection limit values were based on an average detection limit for the field sampling period. Detection limits for any single day may be lower than the average value.

[b] Units are percent (%).

Analytical results for the soil-gas monitor wells are identified by the same sample reporting and field identification numbers. These sample numbers can be used to review the analytical results in Appendix A and the raw analytical results in Appendix B. The "VW" designation in the sample number corresponds to a vapor well sample.

- The emission screening survey using the organic vapor analyzer (OVA) did not detect landfill gases within three inches of the landfill surface at concentrations exceeding the background level of 3.5 ppmv total hydrocarbons calibrated as methane in air for any of the landfills tested or at the clay cap in Area D.

- Landfill gas testing detected some specified air contaminant compounds above the laboratory limit of quantitation. See Section 5.2 for further detail.

- Gas migration testing for the inactive landfill sites detected some specified air contaminant compounds above the limit of quantitation. Gas migration testing of the sites within the Area D cap was performed by sampling the 9 vapor wells and 14 on-site gas vents. See Section 5.3 for further detail.

3.0 DISPOSAL SITES DESCRIPTION

This section presents a general description of each of the disposal sites tested and the provides a general discussion of the land use in the areas within and adjacent to the McClellan Air Force Base (AFB). Figure 3-1 shows the locations of landfill sites and Area D where soil-gas testing was performed. Sites 7, 8, 10, 11, 12, 13, 14, 22, 42, 43, and 69 are within Area C designated in Figure 3-1. Site 38 is within Area A, Site 24 is within the designated Other Area, and the vapor wells and gas vents are within Area D. Individual site descriptions, maps, and sampling results are presented for each of the sites in Section 5.0. Table 3-1 presents a summary of the site names, descriptions, and dimensions.

3.1 Area D Vapor Monitor Well Sites and Gas Collection System

Two of the 13 sites tested are located within and adjacent to the Area D clay capped area. These vapor monitor wells and gas vents were constructed as part of a remedial action for Area D of McClellan AFB. Nine vapor monitor wells and 14 gas vents were sampled under this testing program. The locations of these vapor wells are presented in Figure 3-2. A schematic diagram of the Area D vapor well completion is presented in Figure 3-3. The locations of the Area D gas vent sampling are shown in Figure 3-4. Figure 3-4 also illustrates the pathway traveled during the site emission survey for Area D. Similar information is provided for the other sites in Appendix C.

3.2 Surrounding Land Use

3.2.1 Population

McClellan AFB is surrounded by three tract communities in Sacramento County. The communities surrounding the base include Rio Linda and Elverta to the northwest, North Sacramento to the west and southwest, and North Highlands to the east. All of these communities are. Rio Linda and North Highlands are unincorporated areas.

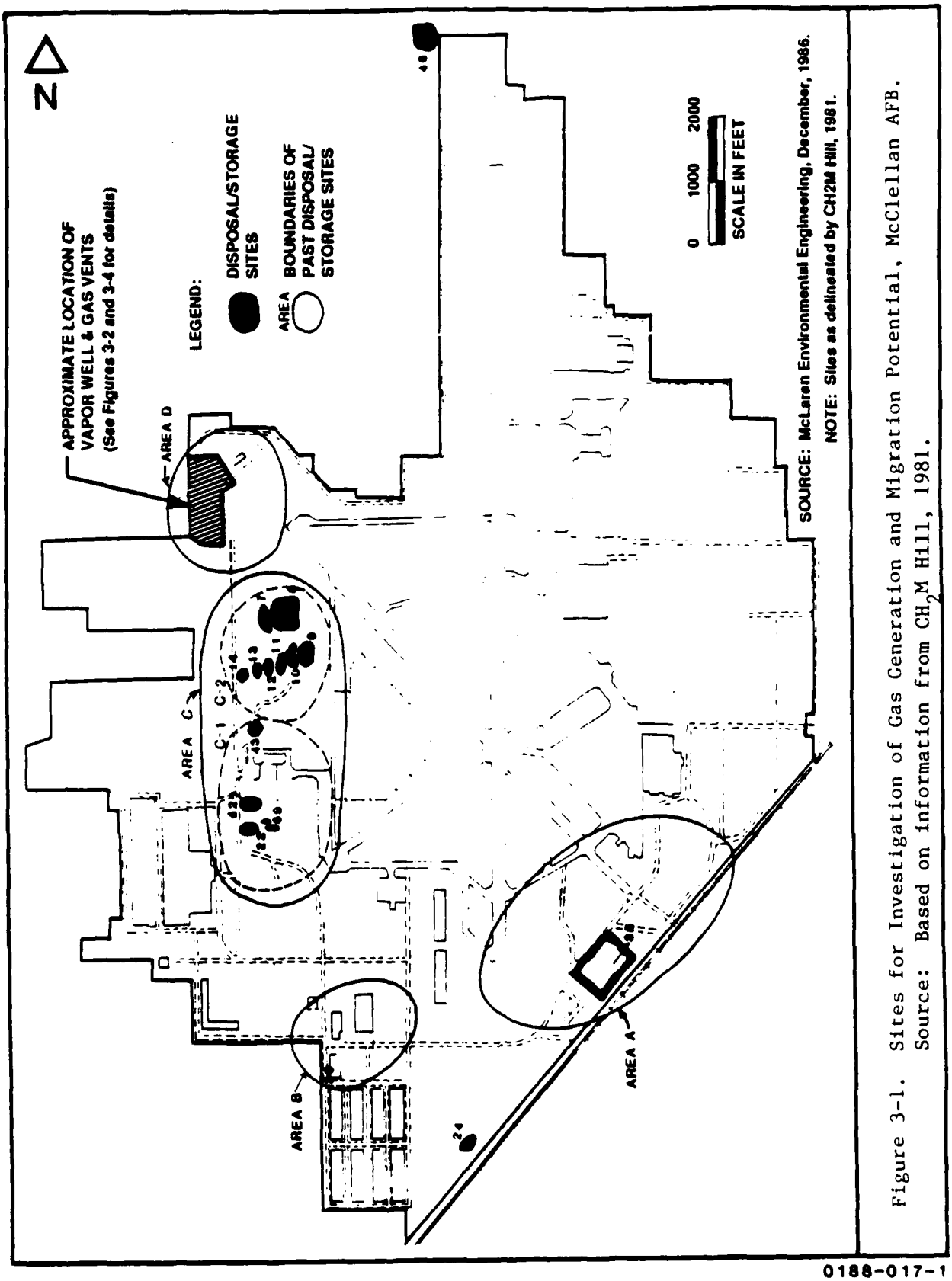


Figure 3-1. Sites for Investigation of Gas Generation and Migration Potential, McClellan AFB.
Source: Based on information from CH_2M Hill, 1981.

TABLE 3-1. INVESTIGATED SITES FOR GAS GENERATION AND MIGRATION POTENTIAL AT McCLELLAN AFB

Site	Area	Description	Location	Dimensions (ft)	Identified Contaminants[a]
7	C	Southludge/Oil Pit	East of Building 701	380 x 93 x 23	PP/OG/PCB
8	C	Southludge & Refuse Landfill	600 ft northwest of Building 774	435 x 135 x 20	VOC/BN
10	C	Landfill	500 ft west of Building 774	530 x 100 x 15	PP/PCB
11	C	Landfill	600 ft west of Building 774	405 x 80 x 6	PP
12	C	Landfill	900 ft southwest of Building 774	610 x 90 x 12	PP
13	C	Landfill	1,000 ft west of Building 774	600 x 90 x 15	PP
14	C	Landfill	Near Patrol Road, 300 ft south of Building 701	600 x 90 x 14	PP
22	C	Burn Pit & Landfill	South of IWTP Aeration Basin	400 x 100	PP/PCB/OG
24	Other	Landfill	East of Building 621	515 x 80 x 11	PP
38	A	Underground Tanks/Sludge Landfill	Building 475	600 x 400	VOC/BN
42	C	Oil Southtorage/Landfill	Under IWTP Aeration Basin	210 x 50 x 6	PP/OG/PCB
43	C	Landfill	Northwest of Building 704	405 x 50 x 10	PP
69	C	Burn Pit	SouthEast of Building 704	N/A	PP
N/A	D	Area D Vapor Wells	Perimeter of Area D	N/A	N/A
N/A	D	Area D Gas Vent System	Perimeter & Interior of Area D	N/A	N/A

[a] Key to identified contaminants:

BN = Base/neutral priority pollutants
PCB = Polychlorinated biphenyls
VOC = Volatile organic compounds
OG = Oil and grease
PP = Priority pollutants

IWTP = Industrial Wastewater Treatment Plant
N/A = Not available

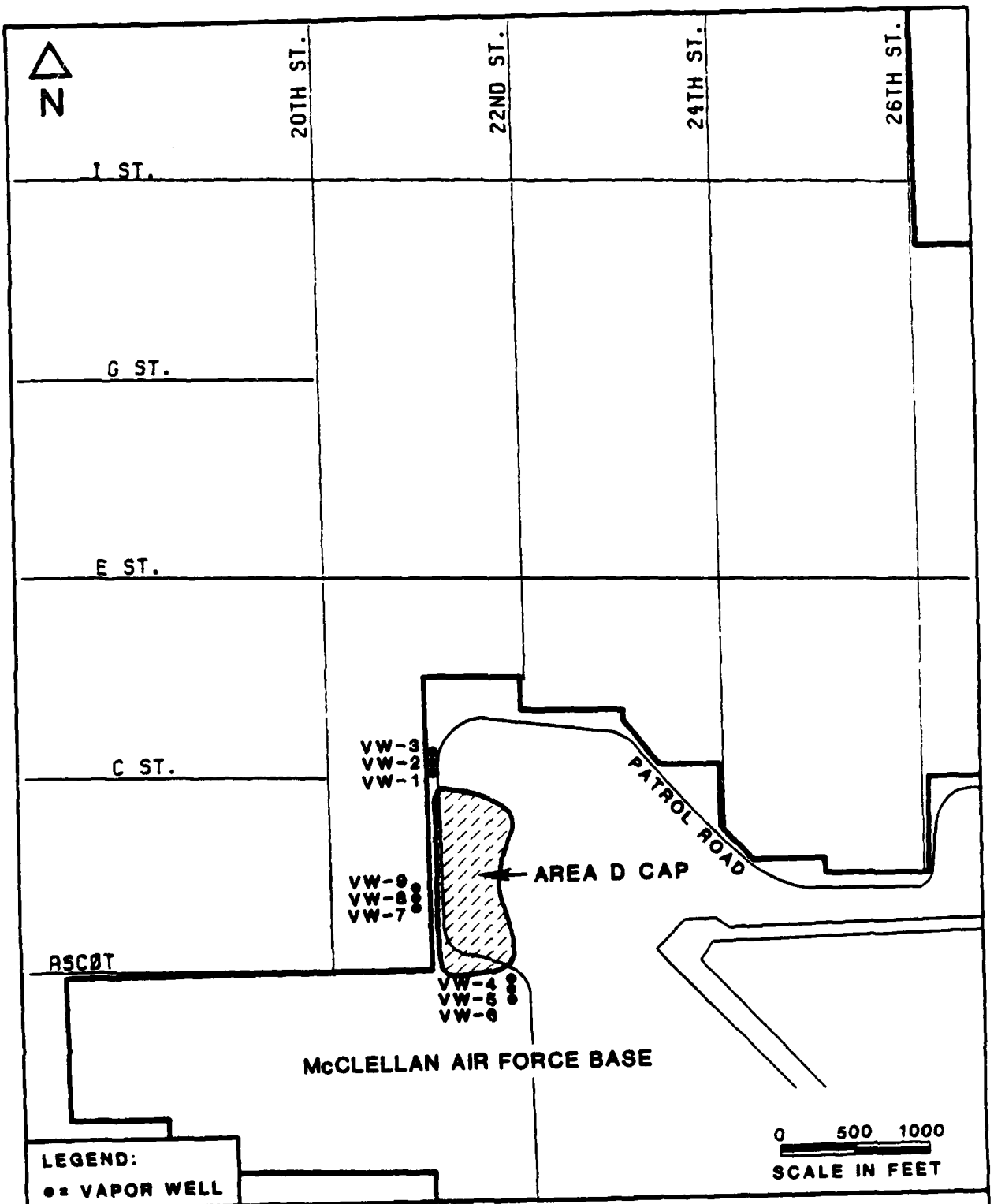


Figure 3-2. Area D, Vapor Monitor Wells at McClellan AFB.

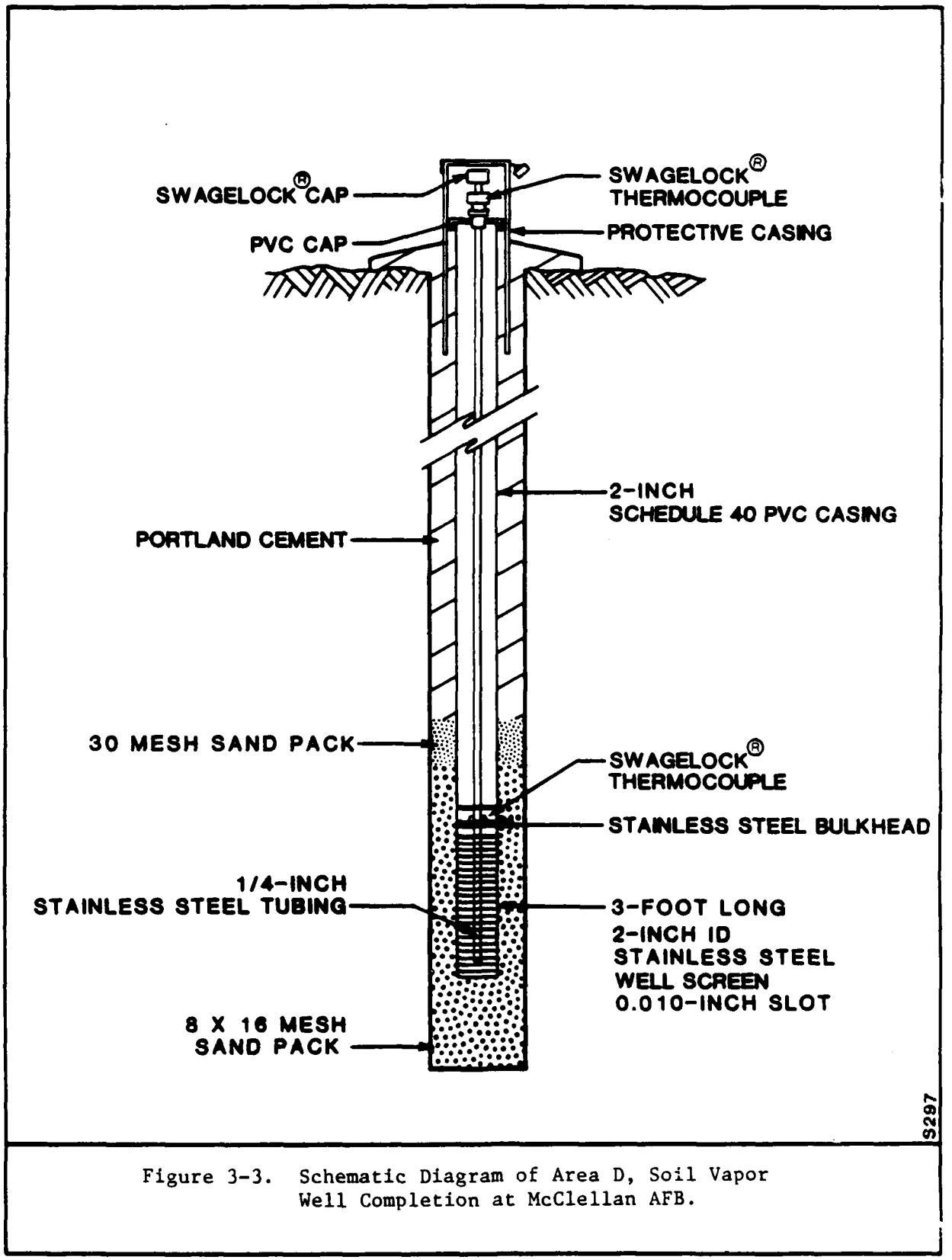


Figure 3-3. Schematic Diagram of Area D, Soil Vapor Well Completion at McClellan AFB.

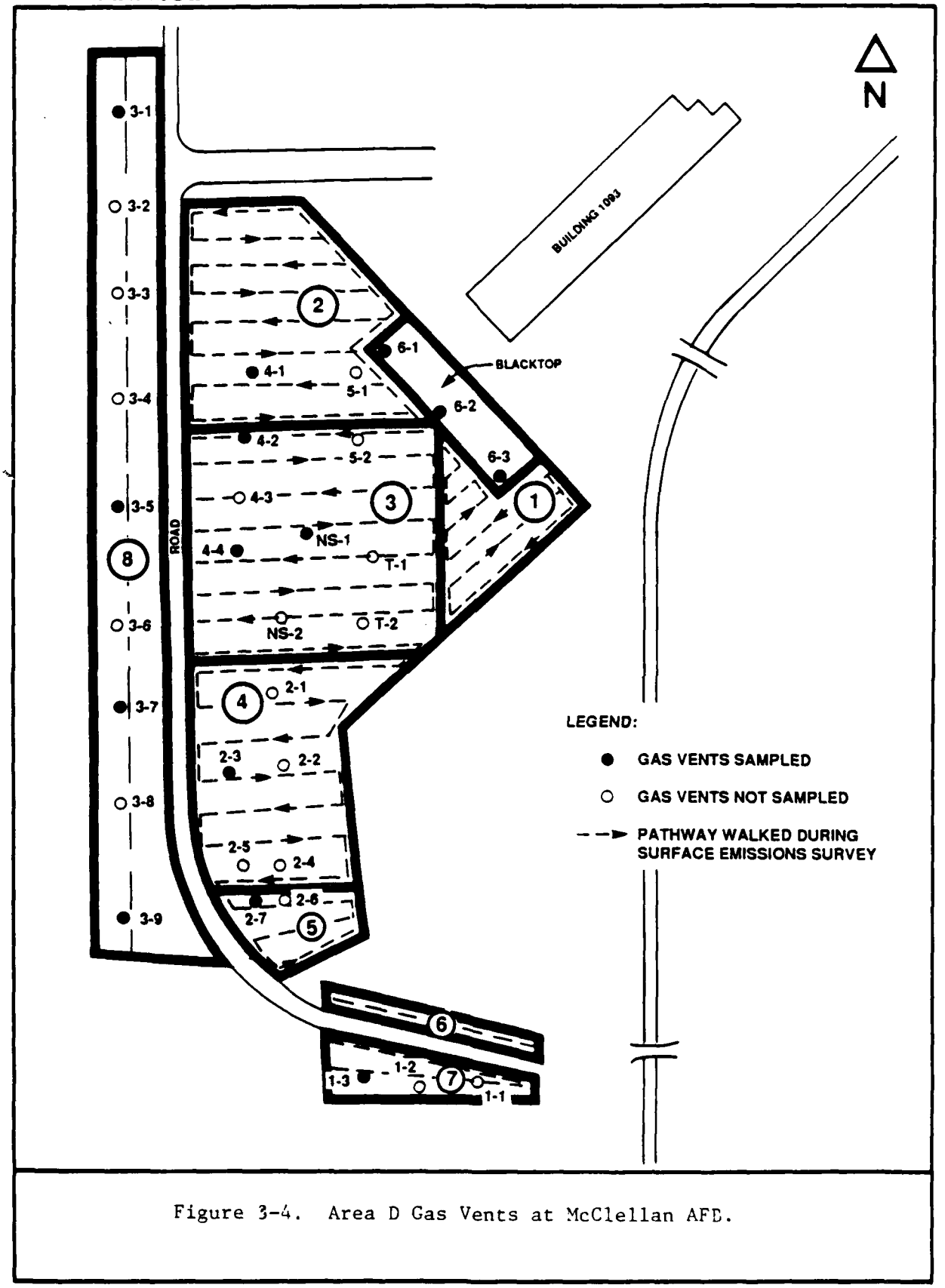


Figure 3-4. Area D Gas Vents at McClellan AFB.

0188-017-3

The population of the surrounding communities, as determined by the 1980 Census, is 107,822. A summary of population by community and tract number, as well as projected populations for the year 2005, is presented in Table 3-2. The tract areas presented in this table are shown in Figure 3-5.

3.2.2 Land Use

Land use in the vicinity of the base consists of a complex combination of military, industrial, commercial, residential, and agricultural zones, as presented in Figure 3-6.

The majority of the land use surrounding the base is residential. In the Rio Linda area northwest of the base, most of the land is used for agricultural-residential purposes. This land category identifies areas that are reserved for large-lot, rural, residential uses where animals may be kept and crops may be raised for recreational, educational, personal consumption, or income-supplement purposes (Sacramento County, 1985).

Several Rio Linda lots directly adjacent to the base have been zoned as industrial-intensive. This land category identifies areas reserved for research, manufacturing, processing, and warehousing activities. Necessary public services, such as sewer and water systems, are available in industrial-intensive areas.

Most of the land use to the southwest and east of the base consists of low density residential zones. These areas are reserved for a planned population density range of 5 to 30 persons per acre, or a housing density range of 1 to 12 dwelling units per acre.

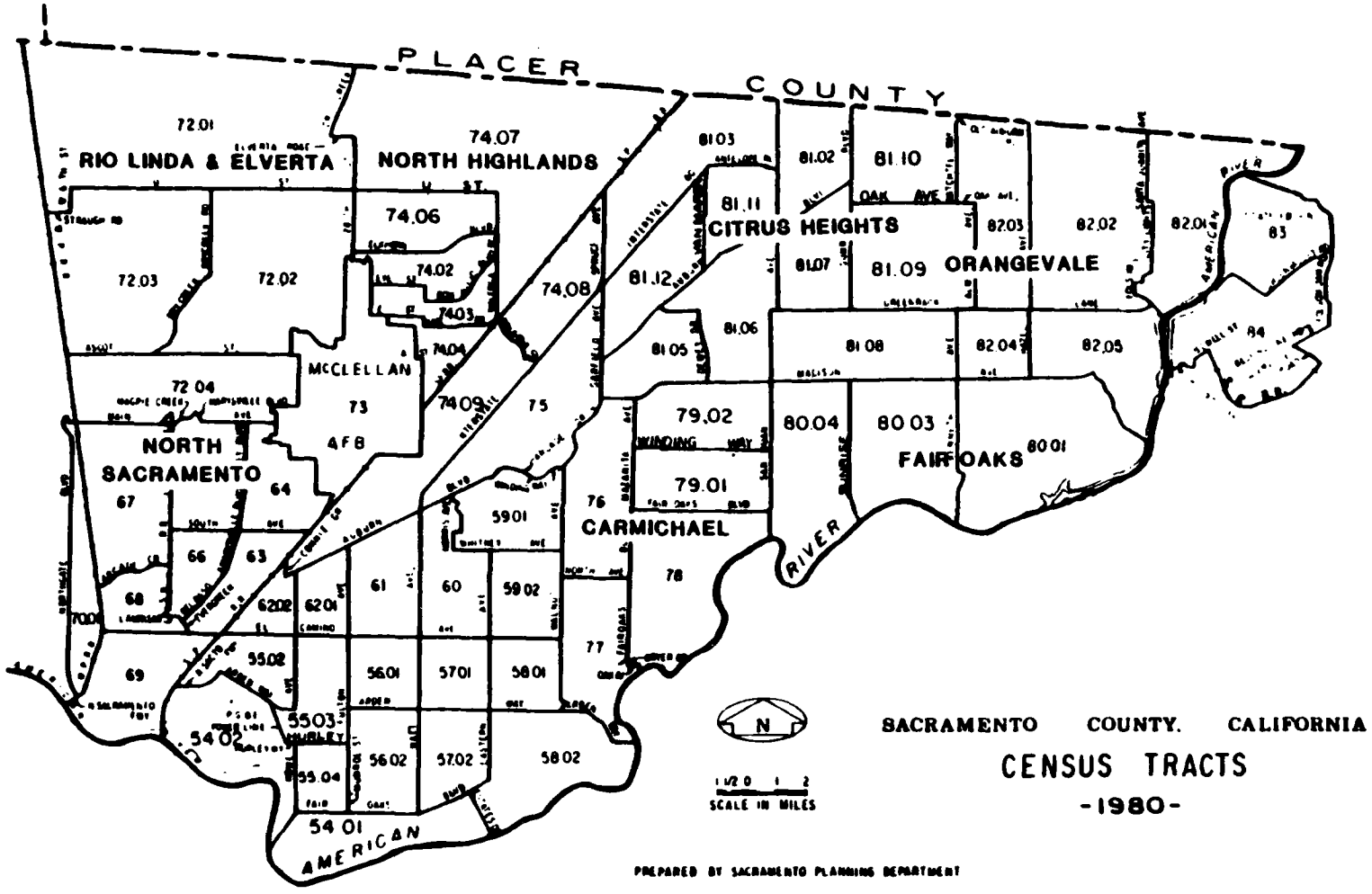
Also found to the southwest and east of McClellan AFB are parcels designated for commercial and office use. This land use category includes shopping centers, large office complexes, and major concentrations of strip commercial development.

RADIAN CORPORATION

TABLE 3-2. POPULATION DATA AND PROJECTIONS FOR THE COMMUNITIES SURROUNDING McCLELLAN AFB

Tract Community	1980 Census Tract Number	Projected 2005 Population	Projected Population
Rio Linda and Elverta	72.01	3,689	
	72.02	3,547	
	72.03	6,737	
	TOTAL	13,973	26,529
North Highlands	73.00	1,541	
	74.02	6,207	
	74.03	4,451	
	74.04	3,511	
	74.06	7,044	
	74.07	7,959	
	74.08	9,819	
	74.09	7,262	
	75.00	11,010	
	TOTAL	58,804	118,861
North Sacramento	72,04	1,613	
	63.00	3,578	
	64.00	4,514	
	65.00	3,406	
	66.00	4,621	
	67.00	7,365	
	68.00	5,644	
	69.00	4,304	
	TOTAL	35,045	52,682

Source: Sacramento County, 1985.



SOURCE: Sacramento County, 1985.

Figure 3-5. Census Tracts Surrounding McClellan AFB.

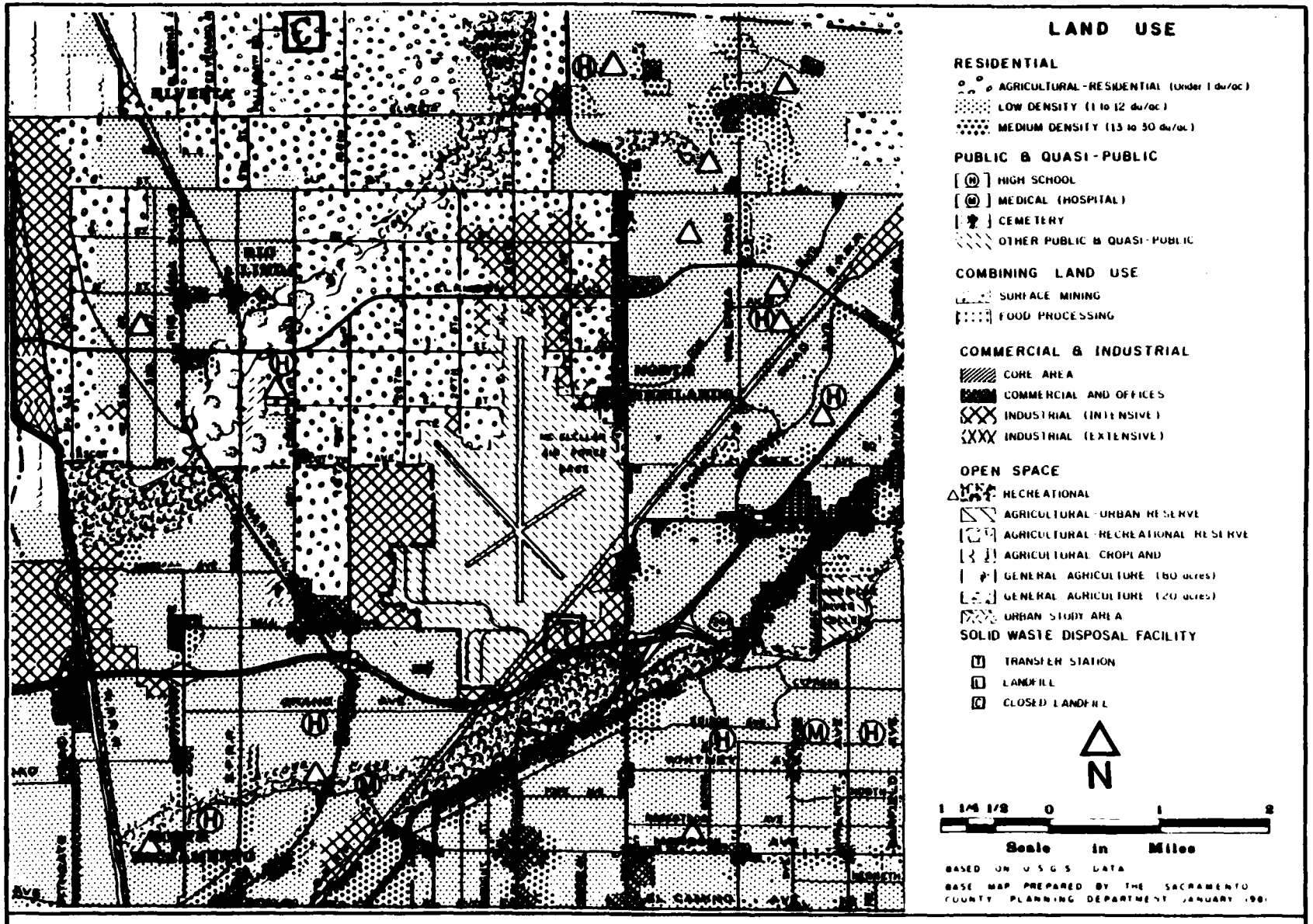


Figure 3-6. Land Use in the Vicinity of McClellan AFB.

SOURCE: Sacramento County, 1985

Del Paso Park, designated as a recreational area, is located within one mile southeast of the base. Additional agricultural-recreational reserve areas are located along Dry Creek, which is approximately two miles west of the base.

4.0 MONITORING SYSTEM

This section describes the sampling and analysis methods used to collect and analyze soil-gas samples at the 13 inactive landfills.

4.1 Sampling Approach

The objective of the sampling effort was to provide a preliminary characterization of the air emissions, landfill gas generation, and landfill gas migration potentials for 13 sites on base. The sampling approach was developed in accordance with the Testing Guidelines for Active Solid Waste Disposal Sites (California State Air Resources Board, 1987).

Screening of landfill emissions was conducted at the surface of each landfill using a Foxboro Corporation Model OVA-108 real-time organic-vapor analyzer. Screening for total hydrocarbon concentrations near the landfill surface was performed to identify areas of landfill gas emissions. This information was used to assist in the selection of soil-gas probe sampling locations, and to obtain representative gas generation and migration information.

To determine the composition of landfill gases, soil-gas probes were installed in the interior of each landfill (landfill soil-gas probes). It was proposed that each probe be installed to a depth of eight feet below the land surface. The locations of the probes within the landfill were selected to provide spatial coverage of the landfill. For some landfills with physical obstructions or barriers, this procedure was not possible. In the event that probes could be installed and sampled in the interior areas of the landfill, additional perimeter probes were installed and sampled. Landfill gas samples were analyzed for methane, fixed gases (carbon dioxide, nitrogen, and oxygen), and the 10 specified air contaminant compounds listed in Table 1-1.

To determine whether subsurface migration of landfill gas had occurred outside of the landfill boundary, soil-gas probes were installed on the perimeter of each landfill site (perimeter soil-gas probes). As required

by California Air Resources Board (ARB) guidelines, it was proposed that each perimeter soil-gas probe would be installed to a depth of six feet below the landfill surface. A frequency of one probe per 1,000 feet of perimeter was used when applicable. At least one perimeter probe was installed per site. The selection of perimeter ground probe locations considered the location and proximity of occupied buildings. One or more perimeter soil-gas probes was located between the landfill and any nearby buildings. In some cases, perimeter probes were used to further identify the perimeter of each landfill, augment characterization of landfill gas generation potentials, and identify the perimeter of a clustering of landfills located close to one another. Soil-gas samples taken from perimeter probes were analyzed for methane, carbon dioxide, nitrogen, oxygen, and the specified air contaminant compounds listed in Table 1-1.

Soil-gas sampling from the Area D vapor wells and gas collection systems was performed to determine if landfill gas generation and migration was occurring. Each of the 9 vapor monitor wells were sampled, and 14 of the 32 gas vents were sampled at random. Prior to sampling, a volume of air equivalent to two well volumes was purged from each of the wells and vents.

Prior to installation of landfill and perimeter soil-gas probes, sampling locations were checked against historical site data to accurately locate the landfill site in an effort to avoid buried pipelines, tanks, and electrical and water service. Base "digging permits" were obtained to ensure that soil-gas probes were located so as not to interfere with existing underground utilities. McClellan AFB Environmental Management (EM) personnel were often present to verify these clearances prior to initiation of the soil-gas probe installation. In addition, a Fisher m-scope pipe and cable locator were used as a final check prior to installing soil-gas probes. Landfill probe locations were generally selected along the centerline of each landfill area in order to minimize any error resulting from incorrectly identifying landfill locations from historical aerial photographs and site location maps. Landfill perimeter probe locations were selected based on approximate estimates for each landfill area but are most impacted from any error resulting from incorrectly identifying each landfill boundary. Therefore, the landfill perimeter probe locations and results should be evaluated from this perspective.

4.2 Probe Description

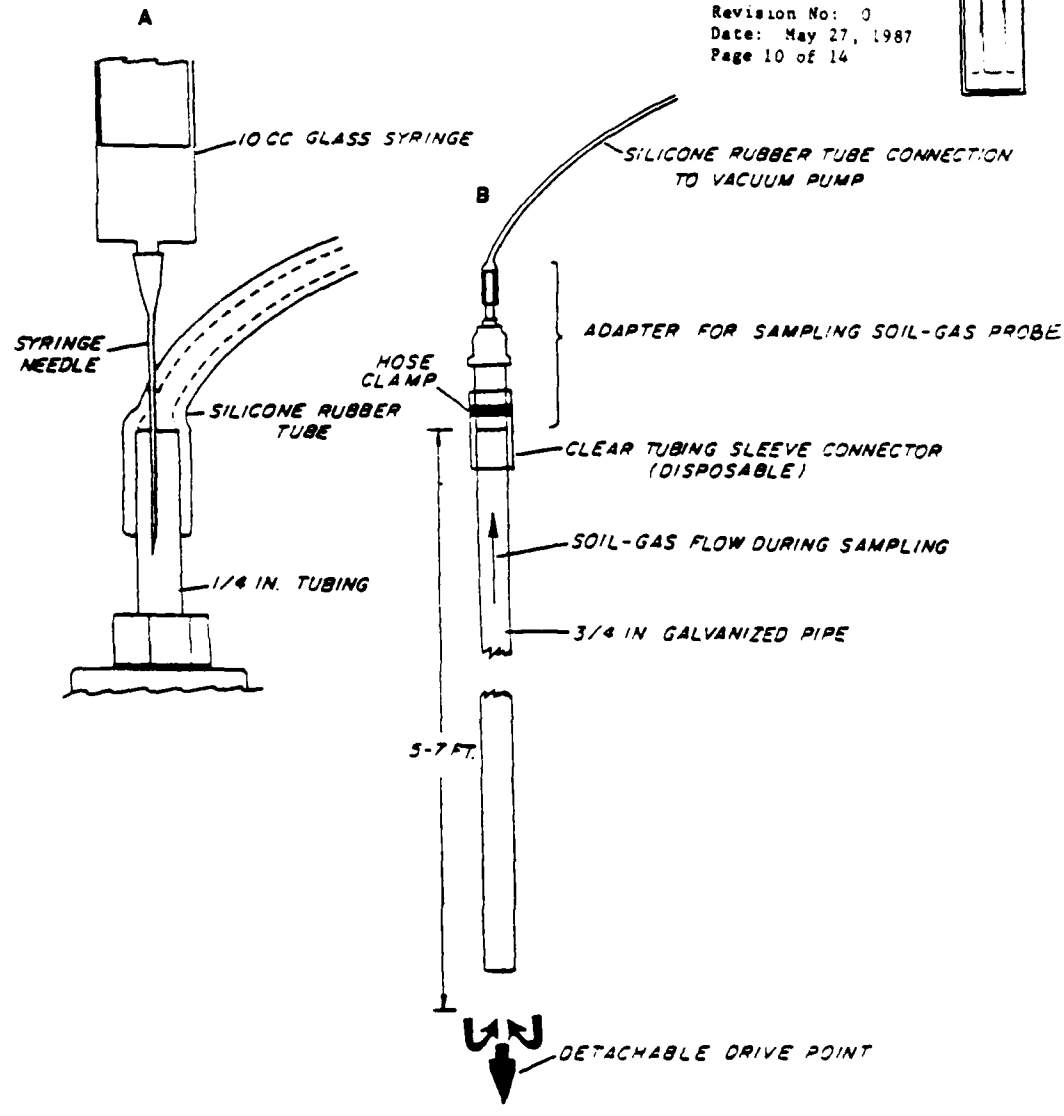
This section describes the sampling procedures for the soil-gas monitoring probes used at each of the 13 inactive landfill sites investigated. Figure 3-1 presents the locations of the 13 inactive landfills and identifies the approximate location of the vapor wells and gas vents in Area D. Individual site maps that present the sampling locations are found in Section 5.0.

Landfill and perimeter probes were driven into the ground by a hydraulically driven pusher/puller mechanism. The probes were then purged by withdrawing two probe volumes using a vacuum pump. After purging, and while the soil gas was being drawn through the probe, a gas sample was taken using a glass syringe, which was inserted through a section of silicone tubing (leading to the pump) and into the stainless steel tubing in the adaptor. A schematic diagram of the probe, silicon tubing and syringe sampling system is presented in Figure 4-1. Gas samples only came into contact with steel surfaces and were never came into contact with potentially sorbing materials (e.g., tubing, hose, pump diaphragm). A vacuum gauge monitored the negative pressure in the evacuation line to determine if there was any impedance to the gas flow caused by the attempt to sample in clay or water-saturated soils.

One or two 10 ml gas samples were collected from each sampling probe after one to four minutes of pumping. These 10 ml samples were subsampled according to analytical requirements, and replicates were injected into the gas chromatograph for documentation of reproducibility. More than two injections may have been necessary where there were multiple contaminants that required different sample sizes for chromatographic analysis. The reproducibility of soil-gas samples from the same probe is typically within 20 percent and always within a factor of two.

Closure of the subsurface gas sampling sites involved removing the probe and filling the probe hole with native fill materials.

A brief description of the Tracer Research Standard Operating Procedure as performed in the field, is presented below:



A. Close up of syringe soil gas sampling through evacuation line.

B. Diagram of soil gas sampling probe with adapter for sampling and evacuation of the probe after it is driven into the ground.

Figure 4-1. Soil-Gas Sampling Schematic.

- Probe Placement

  - A clean probe (pipe) was removed from the "clean" storage tube on top of the van.

  - The soil-gas probe was placed in the jaws of the hydraulic pusher/puller mechanism.

  - A drive point was attached to the bottom of the probe.

  - A hydraulically driven pushing mechanism was used to drive the probe into the ground.

  - If the mechanism would not drive the probe into the ground to a required depth for sampling, a hydraulically activated hammer was used to pound the probe into the ground.

- Sample Extraction

  - An adaptor was put onto the top of the soil-gas probe (see Figure 4-1[B]).

  - A vacuum pump was hooked onto the adaptor and turned on and used to evacuate soil.

  - For samples having evacuation pressures less than 15 inches of mercury, evacuation took at least 30 seconds, but never more than five minutes. Evacuation times were at least one minute, but no more than five minutes, for samples having evaluation pressures greater than 15 inches of mercury.

  - Gauges on the vacuum pump were checked for excessive soil resistance by monitoring pressure reading (inches of

mercury). A reading of at least two inches of mercury less than maximum vacuum was used to extract sufficient soil gas to collect a valid sample.

- Sample Collection

  - With the vacuum pump running, a hypodermic syringe needle was inserted through the silicone rubber and into the stainless steel tubing of the adaptor (see Figure 4-1[A]).

  - Gas samples only came into contact with steel surfaces, never with potentially sorbing materials (e.g., tubing, hose, pump diaphragm).

  - The syringe was purged with soil gas. Without removing the syringe needle from the adaptor, a 2 to 10 ml soil-gas sample was collected.

  - A second 10 ml sample was collected using the same procedure.

- Demobilization

  - The vacuum pump was turned off and disconnected from the adaptor.

  - The adaptor was removed and stored with equipment to be cleaned.

  - Using the hydraulically operated puller mechanism, the probe was removed from the ground.

- The probe was stored in the "used" probe tube on top of the van.

- The probe hole was backfilled, if required.

- A field log book was completed at the end of each day. The type of infromation supplied in this log book included:

  - Time (military notation) of sample;

  - Sample number;

  - Location of sample;

  - Sampling depth;

  - Evacuation time before sampling;

  - Inches of mercury on vacuum pump gauge;

  - Probe and adaptor numbers;

  - Number of sampling points used;

  - Observations (e.g., ground conditions, concrete, asphalt, soil appearance, surface water, odors, vegetation, etc.); and

  - Backfill procedure and materials, if used.

- Determination of Sampling Locations. The quality control procedures for reusable equipment usage are described below.

- Steel probes were used only once and then washed with high-pressure soap and hot water spray or steam-cleaned at the end of the day to eliminate the possibility of cross-contamination. Forty-two probes were carried on each van so that no probes would have to be reused during the day.

- Probe adaptors (steel reducer and tubing) were used once during the course of the day and cleaned at the end of each working day by baking in the gas chromotography oven. The tubing was replaced periodically as needed during the job to ensure cleanliness and good fit.

- Silicone tubing (connecting the adaptor to the vacuum pump) was replaced as needed to ensure proper sealing around the syringe needle. This tubing did not directly contact soil-gas samples.

  Glass syringes were usually used for only one sample per day and were washed and baked-out at night. If they were used twice, they were purged with carrier gas (nitrogen) and baked-out between probe samplings.

- The septa through which soil-gas samples were injected into the chromatograph were replaced daily to prevent possible gas leaks from the chromatographic column.

- Subsampling syringes (2 cc) were checked for contamination prior to sampling each day by injecting nitrogen carrier gas into the gas chromatograph.

- All sampling syringes and 2 cc subsampling syringes were decontaminated each day, and none were reused before being decontaminated. Microliter-size subsampling syringes were reused only after a nitrogen carrier gas blank was run to ensure they were not contaminated by the previous sample.

- Soil-gas pumping was monitored by a vacuum gauge to insure that an adequate gas flow from the vadose zone was maintained.

4.3 Analytical Instrumentation

Two Varian Model 3300 gas chromatographs were used for each gas analyses. The analysis of the non-fixed gas compounds was performed on one column with the electron capture detector and the photoionization detector placed in series. Specific instrumentation used for analyzing specific gases are described below:

- Carbon dioxide (CO_2), oxygen (O_2), nitrogen (N_2), and methane (CH_4) were all analyzed on an Alltech CTR I column and analyzed by gas chromatography using a Thermal Conductivity Detector (TCD).

- Benzene and vinyl chloride were analyzed on a 6-foot by 0.125-inch column packed with 60/80 mesh 0.1% SP-1000 on Carbon B using a photoionization detector (PID) manufactured by Photovac.

- Methylene chloride, 1,2-dichloroethane (DCA), chloroform, methyl chloroform (TCA), carbon tetrachloride, trichloroethylene (TCE), ethylene dibromide (EDB), and perchloroethylene (PCE) were analyzed on a 6-foot by 0.125-inch column packed with 60/80 mesh 0.1% SP-1000 on Carbopac B and analyzed by gas chromatography using an Electron Capture Detector (ECD).

The gas chromatograph instruments have been modified by the addition of a dryer, composed of ionic polymer materials, situated between the injector and the head of the column. Thus, the sample was injected using a syringe inserted through a septum into the injector, where liquid samples are vaporized. The vapors proceeded through the dryer, where all water vapor from the liquid sample or soil-gas sample was absorbed, and then proceeded through the gas chromatography column to the detector.

4.4 Analysis Methods

The analytical operating procedures used by Tracer Research Corporation (TRC) for testing program included: gas chromatography-photoionization detection (GC-PID); gas chromatography-electron capture detection (GC-ECD); and gas chromatography-themoconductivity detection (GC-TCD).

TRC uses analytical standards from chemical standard from Chem Services, Inc. of Westchester, Pennsylvania that are pre-analyzed for certified purities and lot numbered for quality control assurance. Each vial or gas cylinder is marked with an expiration date. All analytical standards are the highest grade available. Certified purities are typically 99 percent.

The preparation of standards and a description of quality control procedures are given below.

- Liquid Standards:

  1. A fresh standard was prepared each day. The standards were made by serial dilution.

     a. First, a stock solution containing the standard in methanol was prepared at TRC offices in Tucson. The stock solution was prepared by pipetting the pure chemical into 250 ml of methanol in a volumetric flask at room temperature. The absolute mass was determined from the product of volume and density calculated at room temperature. Hamilton microliter syringes, with a manufacturer's stated accuracy of ±1 percent, were used for pipetting. Information on density was obtained from the Chemical Rubber Company (CRC Handbook). Once the stock solution was prepared, typically in concentration range of 50 to 1,000 ppm, a working standard was prepared in water each day. The solute in the stock solution has a

strong affinity to remain in methanol so there was no need to refrigerate the stock solution. Additionally, the solute tends not to biodegrade or volatize out of the stock solution.

b. The working standards were prepared in 42 ml volatile organic analysis (VOA) septum vials by diluting the appropriate ug/l quantity of the standard solution into 42 ml of water.

2. The standard water was analyzed for contamination before making the aqueous standard each day.

3. The aqueous standard was prepared in a clean vial using the same syringe each day. The syringe was only used for that standard.

4. Final dilutions of the calibration standards were made in water in a VOA vial having a Teflon® coated septum instead of in an evacuated container. The VOA bottle permits mixing of the standard solution and subsequent syringe sampling throughout the day without opening the bottle or exposing it to air. The measurement uncertainty inherent in the use of a VOA bottle instead of a volumetric flask is approximately 1 percent.

5. The aqueous standard contained the compounds of interest in the range of 5 to 100 ppb, depending on the detectability of the individual components. The standard was analyzed at least three times at the start of each day to determine the mean response factor (RF) for each component The standard was injected again after every fifth sample to check detector response and chromatographic performance of the instrument throughout the day.

6. The RF allowed conversion of peak areas into concentrations for the contaminants of interest. The RF used was changed if the standard response varied 20 percent. If the standard injections varied by more than 20 percent, the standard was repeated.

   If the mean of the two standard injections was greater than a 20 percent difference, a third standard was injected and a new RF was calculated from the three standard injections. A new data sheet was started with the new RFs and calibration date.

   Percent relative percent difference =

$$\frac{\text{A Area} - \text{B Area}}{(\text{A Area} + \text{B Area}/2)} \times 100$$

   Where: A = mean peak area of standard injection from first calibration

   B = peak area of subsequent standard injection

7. The low ppb aqueous standards that were made fresh daily need not be refrigerated during the day because they do not change significantly in a 24-hour period. Often, the unrefrigerated 24-hour old standards have been compared with fresh standards and no difference has been measurable. If the standards were made at high ppm levels in water, the problem of volatilization would probably be more pronounced in the absence of refrigeration.

8. Primary standards were kept in the hotel room when in the field.

- Syringe Blanks

1. Each microliter syringe was blanked before use.

2. If ambient air concentrations were <.01 ug/1 for components of interest, a representative sample of at least two syringes of each size (10 cc and 2 cc) were blanked at the start of each day. If representative syringes were "clean" (no detectable contaminants) remaining syringes were not blanked. If any of representative syringes show contamination, all 2 cc and 10 cc syringes were blanked prior to use.

3. Syringe blanks were run with nitrogen.

4. If it was necessary for any syringe to be used again before cleaning, it was blanked prior to its second use.

- System Blanks

1. System blanks consisted of ambient air drawn through the probe and complete sampling apparatus and analyzed by the same procedure as a soil-gas sample. The probe was above the ground.

2. One system blank was run at the start of each day.

3. An ambient air sample was collected at the same time and at the same location as the system blank.

4. The ambient air sample was also analyzed. A comparison of results did not indicate contamination within the sampling equipment.

5. The system blanks were taken at locations away from actual soil-gas sampling locations.

- Samples

1. All unknown samples were analyzed at least twice, or until reproducibility was within 25 percent, computed as follows:

$$\text{Relative Difference} = \frac{A - B}{(A + B)/2}$$

Where: A = is first measurement result
B = is second measurement result

If the difference was greater than 0.25, a subsequent sample was run until two measurements were made that had a difference of less than 0.25. Those two measurements were used in the final calculation for that sample.

2. The injection volume was adjusted so that the mass of analyte was as near as possible to the mass that is contained in the standard (at least within a factor of 10).

3. Whenever possible, the attenuation for unknown samples was kept constant through the day to provide a visual check of integrations.

4. A water plug was used as a gas seal in microliter syringes.

5. A seal was established between syringes when subsampling.

6. All sample analyses were documented (Appendix B).

7. Separate data sheet are used if chromatographic conditions changed.

8. Everything was labeled in ug/1, mg/1, etc. PPM and PPB notations were avoided.

- Daily System Preparation

1. Integrator parameters were initialized according to the following criteria:

   a. Point evaluation
   b. Attenuation
   c. Peak markers
   d. Auto zero
   e. Baseline offset (mininum 10 percent of full scale)

2. The baseline was checked for drift, noise, etc.

3. The following system parameters were set:

   a. Gas flows (Note: N_2, air, and He tank pressures).
   b. Temperatures

      1) Injector
      2) Column
      3) Detector

4. After the last analysis of the day, conditioned septa were rotated into injection ports used during the day and replaced with fresh septa.

5. Column and injector temperatures were increased to bake out residual contamination.

6. Syringes were cleaned each day.

   a. 2 cc and 10 cc syringes were cleaned with Alconox or equivalent detergent and brush.

   b. Microliter syringes were cleaned daily with IPA or MeOH and purged with N_2. Syringe Kleen was used to remove metal deposits in the barrel.

   c. Syringes were baked in the gas chromatograph oven overnight at a minimum temperature of 60°C to drive off organic contaminants which may have absorbed onto the syringe material.

5.0 RESULTS

This section presents the results of testing activities conducted December 2nd through December 15th, 1987 at the McClellan Air Force Base (AFB) for 15 sites (13 landfills and 2 gas monitoring systems associated with Area D cap). Testing was conducted following the procedures described in "McClellan AFB Calderon Investigation Draft Quality Assurance Project Plan (QAPP)" (Radian Corporation, 1987). This project plan was approved by a Sacramento County Air Pollution Control Officer.

The general sampling information provided in Section 5.1 is pertinent to all samples collected. This section provides information on ambient air monitoring, data evaluation, sampling conditions, emissions screening, and land use surrounding the base. Section 5.2 contains site-specific results for all 13 landfill sites sampled. The detailed information provided in this subsection includes a site description, the number of samples analyzed, the results of sampling and daily weather information for the period just prior to and during the field activities.

5.1 General Sampling Information

5.1.1 Ambient Air

Ambient air testing was not performed as part of the landfill testing program for any of the sites. The decision to proceed with subsequent ambient air testing will be based on the interpretation of the landfill gas characterization and gas migration results presented in this document.

5.1.2 Data Interpretation

All analytical data were evaluated on the basis of the limits of detection and quantitation. This evaluation protocol is an accepted practice when sample results are at or near method detection limits. Detection and quantitation limits are defined as follows:

- Limit of Detection (LOD) - the minimum concentration of a compound that can be determined to be statistically different from a blank. At a confidence level of 99 percent, the LOD = (average blank concentration) + (3 x standard deviation of blanks). For compounds not detected in any blank, the LOD is assumed to equal the method detection limit or analytical detection limit.

- Limit of Quantitation (LOQ) - the concentration of a compound above which quantitative results are obtained with a specified degree of accuracy. For an uncertainty of ± 30 percent and a confidence level of 99 percent, the LOQ = (average blank concentration) + (10 x standard deviation of blanks). For compounds not detected in any blank, the LOQ equals 3.3 times the method detection limit.

  The analytical detection limit and the required detection limits are given in Table 5-1. The limits of detection and quantitation are also given in Table 5-1. The raw data used to calculate the limits of detection and quantitation are given in Appendix B. Limits of detection and quantitation for oxygen and nitrogen have not been calculated because these compounds are naturally occurring at concentrations.

The analytical results are presented in Tables 2-1 through 2-15 (condensed analytical results are included in Appendix A; raw analytical data are included in Appendix B). Additional sampling result summaries are presented in this section for each of the investigated sites. The focus of these additional tables is to present the maximum concentration values that exceeded the limit of quantitation and are considered valid results with a high degree of certainty.

5.1.2.1 Quality Assurance

Quality assurance activities associated with the testing program include a multipoint (three point) calibration of the field gas chromatograph

TABLE 5-1. LIMITS OF DETECTION AND QUANTITATION[a]

Compound	Required Detection Limits[b] (ppbv)	Analytical Detection Limit[c] (ug/l)	Analytical Detection Limit[c] (ppbv)	Average Reagent Blank Concentration (ug/l)	Standard Deviation of Blank Concentrations	Limit of Detection[d] (ug/l)	Limit of Detection[d] (ppbv)	Limit of Quantitation[e] (ug/l)	Limit of Quantitation[e] (ppbv)
Vinyl Chloride	500	0.050	17.9	N/D	N/A	0.050	17.9	0.165	59.1
Benzene	500	0.045	12.9	N/D	N/A	0.045	12.9	0.149	42.6
Ethylene Dibromide	1	0.001	0.119	N/D	N/A	0.001	0.119	0.003	0.393
Ethylene Dichoride	20	0.08	18.1	N/D	N/A	0.08	18.1	0.264	59.7
Methylene Chloride	60	0.089	23.5	N/D	N/A	0.089	23.5	0.294	77.6
Perchloroethylene	10	0.001	0.135	N/D	N/A	0.001	0.135	0.003	0.446
Carbon Tetrachloride	5	0.0002	0.029	N/D	N/A	0.0002	0.029	0.001	0.096
Methyl Chloroform	10	0.001	0.168	N/D	N/A	0.001	0.168	0.003	0.554
Trichloroethylene	10	0.001	0.17	N/D	N/A	0.001	0.17	0.003	0.561
Chloroform	2	0.002	0.376	N/D	N/A	0.002	0.376	0.007	1.24
Methane (%)[f]	N/S	0.29	N/A	N/D	N/A	0.29	N/A	0.96	N/A
Carbon Dioxide (%)[f]	N/S	0.67	N/A	N/D	N/A	0.67	N/A	2.2	N/A
Oxygen (%)[f]	N/S	1.0	N/A	N/D	N/A	1.0[d]	N/A	3.3	N/A
Nitrogen (%)[f]	N/S	1.1	N/A	N/D	N/A	1.1[d]	N/A	3.6	N/A

[a] Limits were calculated based on analytical detection limits.

[b] These method detection limits are required by Attachment 2 of the Hazardous Waste Disposal Site Testing Guidelines, ARB, 1987.

[c] Analytical detection limit is equivalent to the method detection limit.

[d] The limit of detection is defined as the minimum concentrations that can be determined to be statistically different from a blank. For compounds not detected in any blank, the LOD equals the analytical detection limit.

[e] The limit of quantitation is defined as the concentration above which quantitative results are obtained with a specified degree of confidence. For compounds not detected in any blank, the LOQ equals 3.3 times the analytical detection limit.

[f] Units are percent (%).

N/A = Not applicable.
N/D = Not detected in any blank.
N/S = Not specified.

NOTE: Compliance with the required detection limits is demonstrated by comparison of the required detection limits to the analytical detection limits.

(GC) daily response factor checks, daily system (probe) and air blanks, each sample analyzed in duplicate, and duplicate sampling and analysis using duplicate probes. The results of these activities for the period of December 2 through December 15, 1987 are presented in Appendix B and discussed below.

Prior to initiating field sampling and analysis, a three-point calibration of the field GC was performed for all 14 test species, except vinyl chloride. The correlation coefficient for the multipoint calibration ranged from 0.949 to 0.999 for nitrogen. The average correlation coefficient was 0.993, which was slightly below the target correlation coefficient of 0.994. Twelve of the 14 compounds had correlation coefficients greater than 0.995. A summary of the instrument, detector and column, and the multipoint calibration information, provided by the Tracer Research Corporation, is presented in Appendix F.

A single-point calibration was performed daily to determine the daily average response factor for each compound. This single-point check was repeated after ten samples to determine instrument drift. All 14 compounds were within the acceptance criteria of $\pm$ 20 percent change in response factor. All single-point calibration data are considered acceptable.

Daily system blank checks (through the probe) and air blank samples were performed to determine if probe contamination existed. The system blank concentrations were equivalent to the air blank concentration except for trichloroethylene. For trichlorethylene, the system blank concentrations were one order of magnitude higher than the air blank.

The reagent blank data were used to determine the limits of detection and quantitation for the individual compounds as discussed in Section 5.2. The calculated limits of detection and quantitation were less than or equal required detection limits for all compounds listed in the "Hazardous Waste Disposal Site Testing Guideline," ARB, 1987. These results indicate that the sampling and analysis methodologies were sufficient to meet the testing program objectives.

Duplicate samples were collected using a separate sampling probe, one foot apart from the original sampling point. Six of the 14 components were detected in both samples. The recommended acceptance criteria for the precision of a field activity is a coefficient of variation (CV) of $\leq$50 percent. This allows for any sampling variability. The CVs for the duplicate sample ranged from 0 to 47 percent, meeting the recommended acceptance criteria.

A daily checklist was completed by the field technician. The list was prepared at the end of the day as a final check to ensure all the Quality Control (QC) checks had been performed by the field personnel.

5.1.3 Sampling Conditions

The "Hazardous Waste Disposal Site Testing Guidelines" identify specific and minimum sampling conditions for collecting surface landfill, and perimeter gas samples (California Air Resources Board, 1987). Precipitation and temperature are both important factors in assessing the usefulness of the sample results. Table 5-2 summarizes the temperature and precipitation data collected by the McClellan AFB, Detachment 8, 17th Weather Squadron for the months of November and December 1987.

The weather conditions summarized in Table 5-2 indicate rain periods throughout the sampling program (December 4th through 15th). The only sampling events that had no rain 72 hours prior to sampling occurred on December 14th and 15th. Hand augers were used whenever possible to determine how deep, the zone of water saturation extended. In almost all cases the zone extended no more than three feet. Discussions of the hand augering performed on each day of sampling can be found in Section 5.2.

5.1.4 Gas Characterization

Landfill gas characterization consisted of an emissions screening survey and landfill gas testing. An emissions screening survey of each

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TABLE 5-2. WEATHER CONDITIONS FOR McCLELLAN AFBa

Date	Number of Samples Collected	Precipitation (inches)	Peak Wind (knots)	Temperature Range (°F)	Mean Temperature (°F)
NOVEMBER					
20	--	0.31	14	57 - 50	54
21	--	0.01	7	57 - 48	53
22	--	0	2	55 - 39	47
23	--	0	6	5 - 37	46
24	--	0	12	60 - 44	52
25	--	0	0	61 - 42	52
26	--	0	0	59 - 35	47
27	--	0.02	0	58 - 34	46
28	--	0	0	59 - 40	50
29	--	0	0	57 - 43	50
30	--	1.27	0	53 - 47	50
DECEMBER					
1	--	0.35	0	60 - 49	55
2	2P	0.06	0	65 - 56	61
3	1P	0	10	67 - 56	62
4	6P	0.33	12	60 - 51	56
5	9P	0.01	0	58 - 53	56
6	--	0.54	0	59 - 52	56
7	5V/9P	0	0	59 - 48	54
8	1V	0.49	0	54 - 39	47
9	5V/7P	0.1	0	60 - 52	56
10	10P	Trace	0	65 - 52	59
11	13P/1V	0	0	58 - 44	51
12	--	0	0	56 - 41	49
13	--	0	0	53 - 36	45
14	6P/4V	0	0	48 - 35	42
15	2P/7V	0.05	0	53 - 38	46
16	--	1.12	0	51 - 44	48
17	--	0	7	57 - 37	47
18	--	0.02	6	53 - 38	46
19	--	0.01	8	58 - 42	50
20	--	0	8	48 - 37	43
21	--	0.07	6	52 - 42	47
22	--	0.18	16	54 - 43	49

SOURCE: McClellan AFB, Detachment 8, 17th Weather Squadron.

[a] Data obtained from on-base monitoring.
[b] 1987.

P - Probe
V - Vapor well
-- - No samples collected.

landfill was performed on November 23, 1987. During the survey, a technician walked over each disposal site surface with a portable flame ionization detector. The detector used was a Foxboro Corporation Model OVA-108 Organic Vapor Analyzer, which has a calibrated range of 1 to 10,000 parts per million volume (ppmv) total hydrocarbons (calibrated as methane in air). The technician measured for landfill gas by holding the instrument probe within three inches of the landfill surface while walking a grid pattern over the entire site. The technician measured background levels before and after the survey by standing at the upwind end of the disposal site, holding the detector probe ten feet above the ground, and noting the reading after one minute.

The background level measured before and after the emissions screening survey was equal to or less than 3.5 ppm. During the emissions screening survey, no levels exceeding the background level were measured. No readings above the 50 ppm methane criteria were observed. The emissions screening included measurements across each landfill and along the perimeter of the landfill. In some cases only the perimeter was accessible due to physical barriers such as buildings or stored construction materials. The path traveled for each landfill during this screening is presented in Appendix C. The path traveled for Area D is presented in Figure 5-17. Meteorological observations during the survey were: 3-4 mph wind, no rain, and temperatures ranging from 47 to 70°F (see Table 5-2). The emission screening data sheet and instrument calibration sheet are also included as Appendix C.

5.1.4.1 Analytical Results and Field Identification Numbering System

The following numbering system has been established for identifying the sample results of the field testing. Two corresponding sets of numbers have been identified for each set of soil-gas analytical results. The analytical results numbering system is used to identify the locations of the landfill and gas migration samples in each of the site maps and in the analytical results summaries. The analytical results identification (ID) numbering system is a two-number sequence. The first number corresponds to the site number and is followed by a number in parenthesis identifying a

unique sample location. For example, the sample number 12(2) identifies the sample location "(2)" for Site 12. The field ID numbering system is footnoted in the data summaries in Section 2.0. The raw data is presented in Appendices A and B and were generated by Tracer Research Inc., a subcontractor to Radian Corporation.

The field ID number is an alpha numeric designation, beginning with a two digit alpha code (i.e., SG for soil gas, VW for vapor well, and VC for vent cap) describing the type of sample source. This alpha code is followed by a three digit alpha numeric code which identifies the site number and whether it is a landfill gas probe location (designated L) or a gas migration perimeter probe (designated by a P). For example, a landfill probe for Site 15 would be designated as SG-15L. The analytical results summaries presented in Section 2.0 provide footnotes that identify the analytical results ID number and the corresponding field ID number for ease in reviewing the raw data tables in the appendices.

5.2 Individual Landfill, Vent Cap and Vapor Well Sample Results

This section contains detailed information about the 65 soil-gas probe samples and the 23 vapor well samples collected. Information included in each subsection includes site location, site description, number of samples taken, sample depths, soil gas characterization, daily precipitation data, and hand augering information. Figures 5-1 through 5-17 contain area maps and sample locations.

Soil probe samples were driven as close to the 6-foot (perimeter) or 8-foot (landfill) goal as possible; however, two conditions necessitated a shallower sample depth. The first is refusal of the probe by the underlying ground formations or site debris (a second attempt was made before a sample was taken). The second reason for a shallower sample depth was poor soil-gas migration indicated by a high vacuum at the vacuum pump. The probe was pulled up until the vacuum fell below the maximum 23 pounds per square inch (psi) to approximately 17 psi. The drop in the vacuum indicated a soil-gas flow

through the sampling probe; however, sometimes this vacuum reading would not drop until the probe had been pulled up one or more feet past the six- or eight-foot depth. The high vacuum conditions were caused by the tightly packed nature of the clay soils and in some instances, the presence of saturated conditions.

Landfill gas samples were all analyzed for methane, fixed gases (carbon dioxide, nitrogen, and oxygen), and the 10 specified air contaminant compounds listed in Table 1-1. Perimeter probes were also included in this full spectrum analysis, even though California Air Resources Board (ARB) guidelines allow for methane only to be sampled if the landfill samples have no detectable amounts of the compounds listed in Table 1-1. This more conservative approach was used in the event that a perimeter sample was located over a landfill, and to provide more complete information about any off-site soil-gas migration.

The analytical results for the probe, gas vent, and vapor well are presented in Tables 2-1 through 2-17. The quality control measures used for the project are described in Subsection 5.1.

5.2.1 Landfill Gas Testing Results for Site 7

Site 7 is located on the west side of the base, east of Building 701. The site is flat, except for a small mound of rubble in the center, and is covered with native vegetation. The site was previously used as a sludge and oil pit and measured approximately 380 feet by 93 feet by 23 feet deep. Samples of the waste showed low concentrations of a variety of VOCs, base/neutral and acid extractable compounds. One PCB was detected in one sample. Elevated concentrations of phenanthrene and Aroclor 1254 in composite waste samples were detected.

The landfill and gas migration testing locations for Site 7 are presented in Figure 5-1.

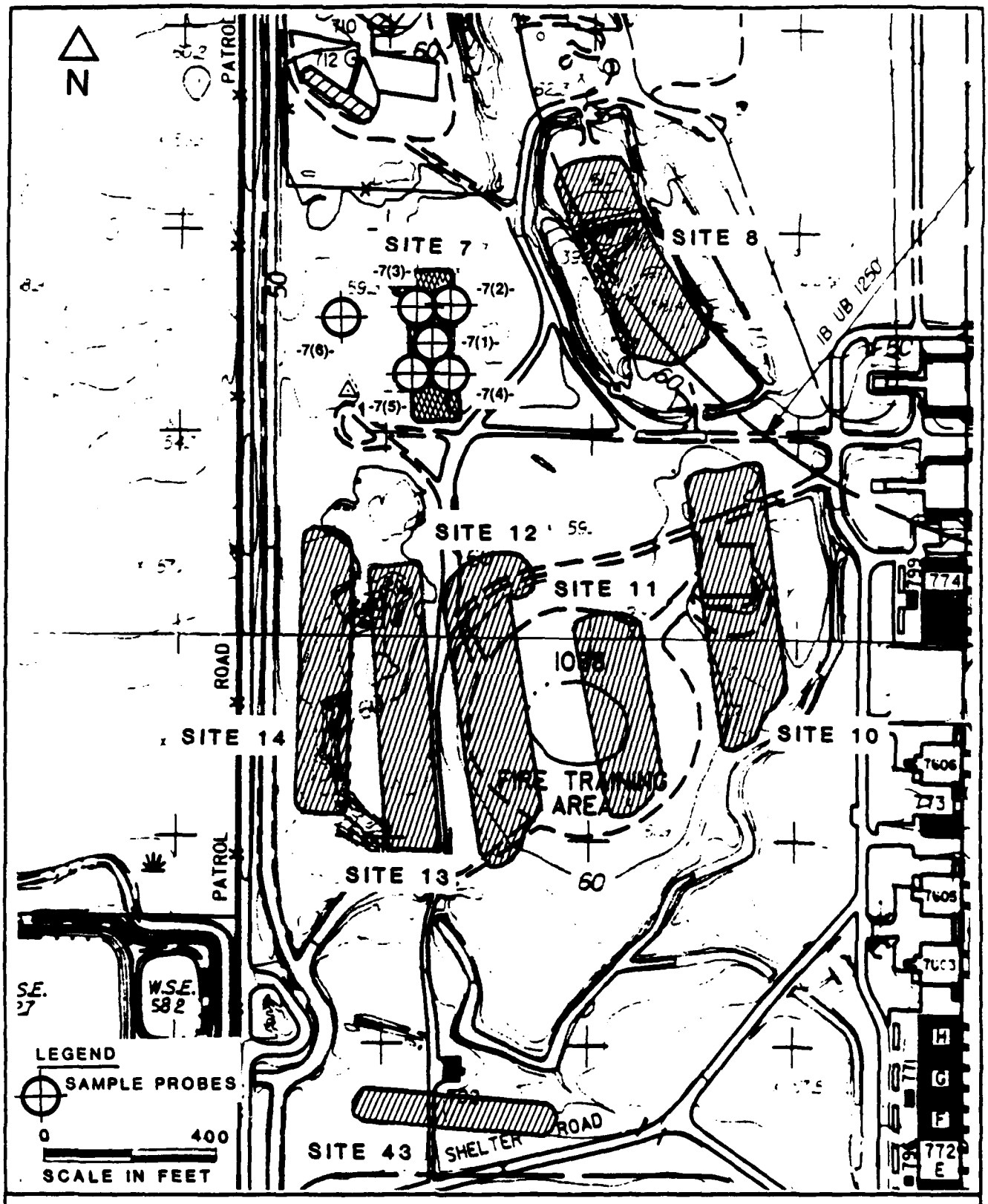

Figure 5-1. Sample Locations for Area C, Site 7 at McClellan AFB.

5.2.1.1 Samples

A total of six probes samples were taken at Site 7; five in the area of the landfill and one in the western perimeter.

As shown in Figure 5-1, the Site 7 samples are labeled 7(1) through 7(6). Probe depths ranged from two to eight feet; the two foot sample was from the perimeter probe and due to probe refusal. The cause for this probe refusal is thought to be a layer of shallow sandstone which the probes are unable to penetrate. Other sites in the area had similar problems at similar depths. This layer of sandstone was noted at Site 43.

Landfill and perimeter probe samples for Site 7 were all collected on December 4th and 5th. Rainfall had occurred in the 72 hours prior to December 4th and December 5th, and it rained both sampling days. Approximately 0.33 inches of precipitation occurred on the 4th, and a lighter precipitation of 0.01 inches fell on the 5th. The cumulative rainfall for the preceding 72 hours to December 4th was 0.41 inches, the cumulative rainfall for the preceding 72 hours to December 5th was 0.34 inches. In accordance with the sampling protocol for conditions where rainfall occurred during sampling or 72 hours prior to sampling, hand augers were used to bore and collect soil samples for inspection of soil moisture in the sampling areas on December 4th and 5th at Site 7; dry soil was found at 3 and 2 feet, respectively.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, are given in Table 2-1. Table 5-3 further summarizes the Table 2-1 results. Table 5-3 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other air contaminants tested below the limit of quantitation. It should be noted that the Site 7 perimeter sample is also part of a series of perimeter sample locations surrounding a cluster of seven sites. Sixteen perimeter samples were located to detect off-site gas migration at Sites 7, 8, 10, 11,

TABLE 5-3. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 7 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	5	2,000	0	0
Benzene	1	<2,000[d]	0	0
Ethylene Dibromide	2	<5[d]	0	0
Ethylene Dichloride	1	<200[d]	0	0
Methylene Chloride	4	9,000	1	100
Perchlorethylene	5	300	0	0
Carbon Tetrachloride	2	<0.8[d]	0	0
Methyl Chloroform	5	100	0	0
Trichloroethylene	5	400	1	1
Chloroform	3	4	0	0

[a] Five landfill probes and one perimeter probe were sampled at this site. All analytical results are presented in Table 2-1, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

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12, 13, and 14 as shown in Figure 5-2. It was felt that a greater number of perimeter probes around these sites could offset an inability to install landfill probes and still provide useful information for these three sites.

5.2.2 Landfill Gas Testing Results for Site 8

Site 8 is located on the west side of the base, 280 feet east of Site 7 and 700 feet northwest of Building 774. The site area is approximately 435 feet by 135 feet by 20 feet deep, and was previously a sludge and refuse landfill. Site 8 is covered by natural vegetation and some construction debris. A significant feature of this site is the large berm that encompasses the site, making some perimeter areas inaccessible. Historical soil samples of the waste showed very few VOCs, including benzene, toluene, trans-1,2-dichloroethylene, and acetone, up to 10 base/neutral compounds of which chrysene, phenanthrene, 3,4-benzofluoroanthene (560 ug/kg), dibenzo(a,h) anthracene (1,500 ug/kg), and indeno(1,2,3-cd)pyrene (1,200 ug/kg) were detected in elevated levels. No acid extractable compounds or pesticides and PCBs were detected. Elevated concentrations of oil and grease (300-6,170 ug/kg) and three heavy metals also were detected. All heavy metal concentrations were below total threshold limit concentration (TTLC) values, as established by the California Department of Health Services (DOHS). Currently, the bermed area appears to be used as a military training ground.

An area map of Site 8, along with the sample probe locations, is presented in Figure 5-3.

A total of eight probe samples were taken at Site 8; five in the area of the landfill and three around the perimeter. As shown in Figure 5-3 the samples are labeled 8(1) through 8(8). Probe depths ranged from 4 to 8 feet; the eight-foot target depths were achieved on four of the probes as Table 2-2 indicates.

Landfill and perimeter probe samples for Site 8 were all collected on December 10th and 11th. Rainfall had occurred in the 72 hours prior to

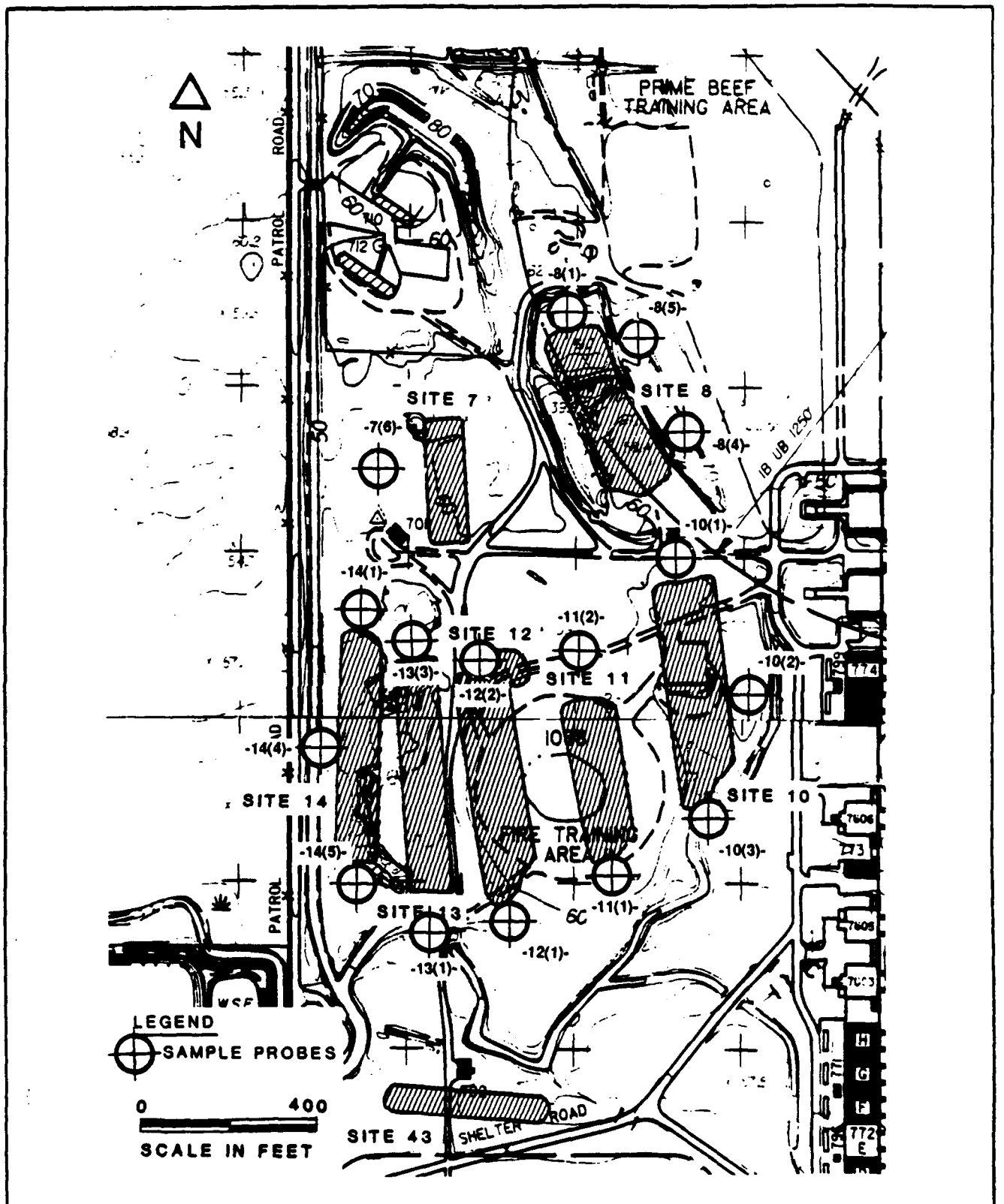

Figure 5-2. Sample Locations for Area C, Sites 7, 8, 10, 11, 12, 13, and 14 at McClellan AFB.

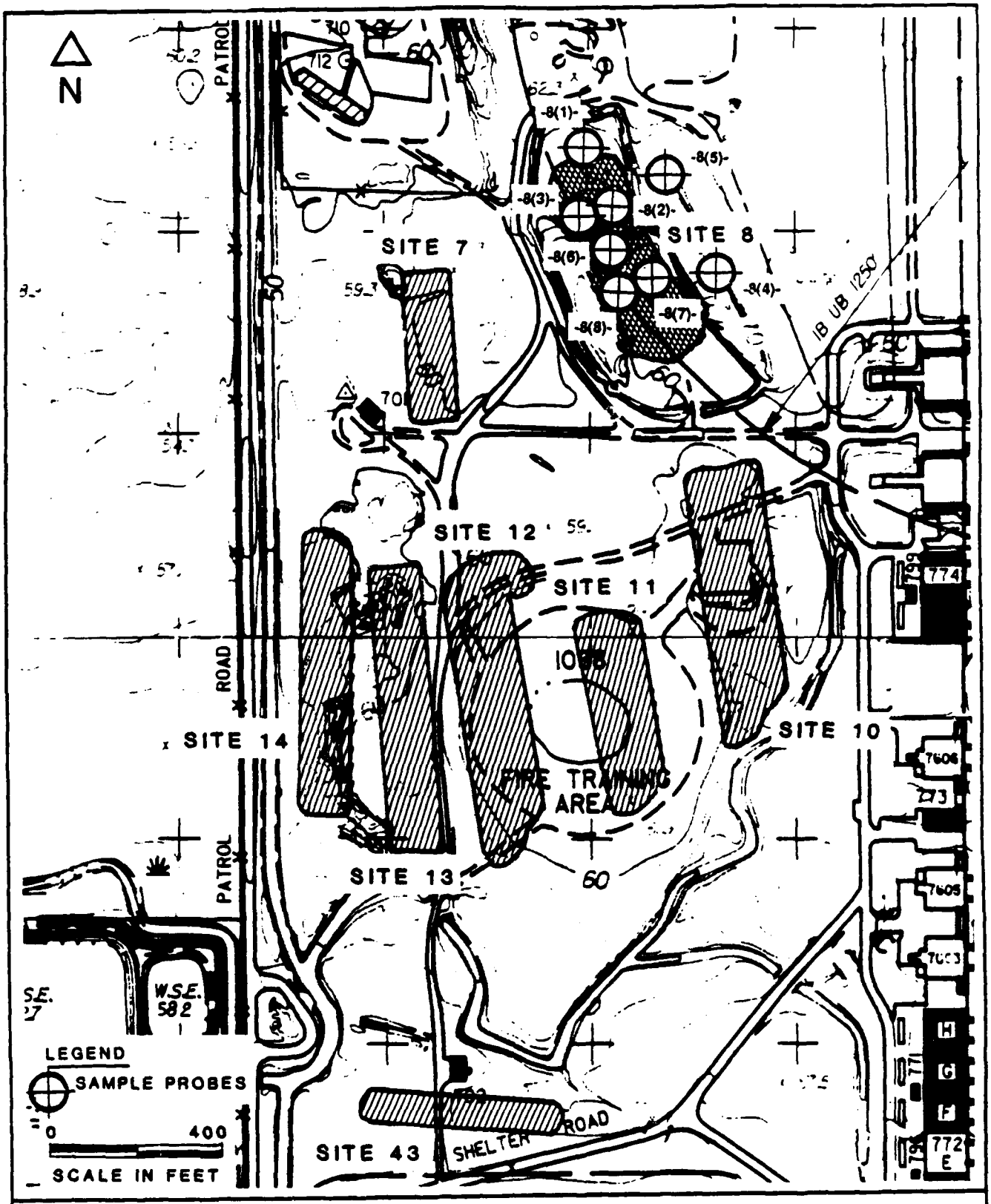

Figure 5-3. Sample Locations for Area C, Site 8, at McClellan AFB.

sampling, and trace rainfall occurred on December 10. Approximately 0.50 inches of precipitation occurred in the 72 hours prior to December 10, and 0.50 inches of precipitation had occurred prior to December 11. A hand auger sample was taken in Site 8 on December 7th prior to sampling and showed dry soil at 2.5 feet; and a hand auger on December 10th in Site 8 also showed dry soil at 3 feet. Since only trace rainfall occurred on December 11th, no repeat augering was performed on that day.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes are given in Table 2-2. Table 5-4 further summarizes the Table 2-2 results. Table 5-4 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.3 Landfill Gas Testing Results for Sites 10, 11, and 12

Sites 10, 11, and 12 are located near Site 7 and 8. These three sites are very close together and were studied as a group rather than discrete sites. Because the sites are close together, attempts to distinguish between them for this field investigation proved to be difficult or impossible.

Site 10 is located about 140 feet south of Site 8 on the west side of the base and is 500 feet west of Building 774 (see Figure 5-4). The site area is approximately 530 feet by 100 feet by 15 feet deep and was used as a solid waste landfill. It is covered by natural vegetation and some construction refuse. Historical soil samples collected from the area by McLaren Engineering contained a variety of compounds including 8 VOCs, 15 base/neutral compounds, 2 acid extractable compounds, 2 non-priority compounds, and one PCB. Elevated concentrations of chloroform (41-890 ug/kg), acenaphthene (140 ug/kg), anthracene (110 ug/kg), chrysene (400 ug/kg), fluorene (230 ug/kg), naphthalene (210 ug/kg), phenanthrene (500 ug/kg), pyrene (930 ug/kg) and Aroclor 1260 (PCB 1260) (1,490-150,000 ug/kg) were detected. The waste samples also showed a variety of heavy metals. Total concentrations of cadmium, copper, lead, and zinc were above DHS TTLC values. Soluble concentrations of antimony, cadmium, copper, lead, and zinc were detected at

TABLE 5-4. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 8 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	2	120,000	0	0
Benzene	1	2,000	1	200
Ethylene Dibromide	2	<4[d]	1	<3[d]
Ethylene Dichloride	1	<800[d]	1	<200[d]
Methylene Chloride	2	<900[d]	1	<300[d]
Perchloroethylene	5	7,000	3	200
Carbon Tetrachloride	2	<0.8[d]	1	<0.5
Methyl Chloroform	5	10,000	3	20
Trichloroethylene	5	800	3	20
Chloroform	2	<8[d]	1	<4[d]

[a] Five landfill probes and three perimeter probes were sampled at this site. All analytical results are presented in Table 2-2, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

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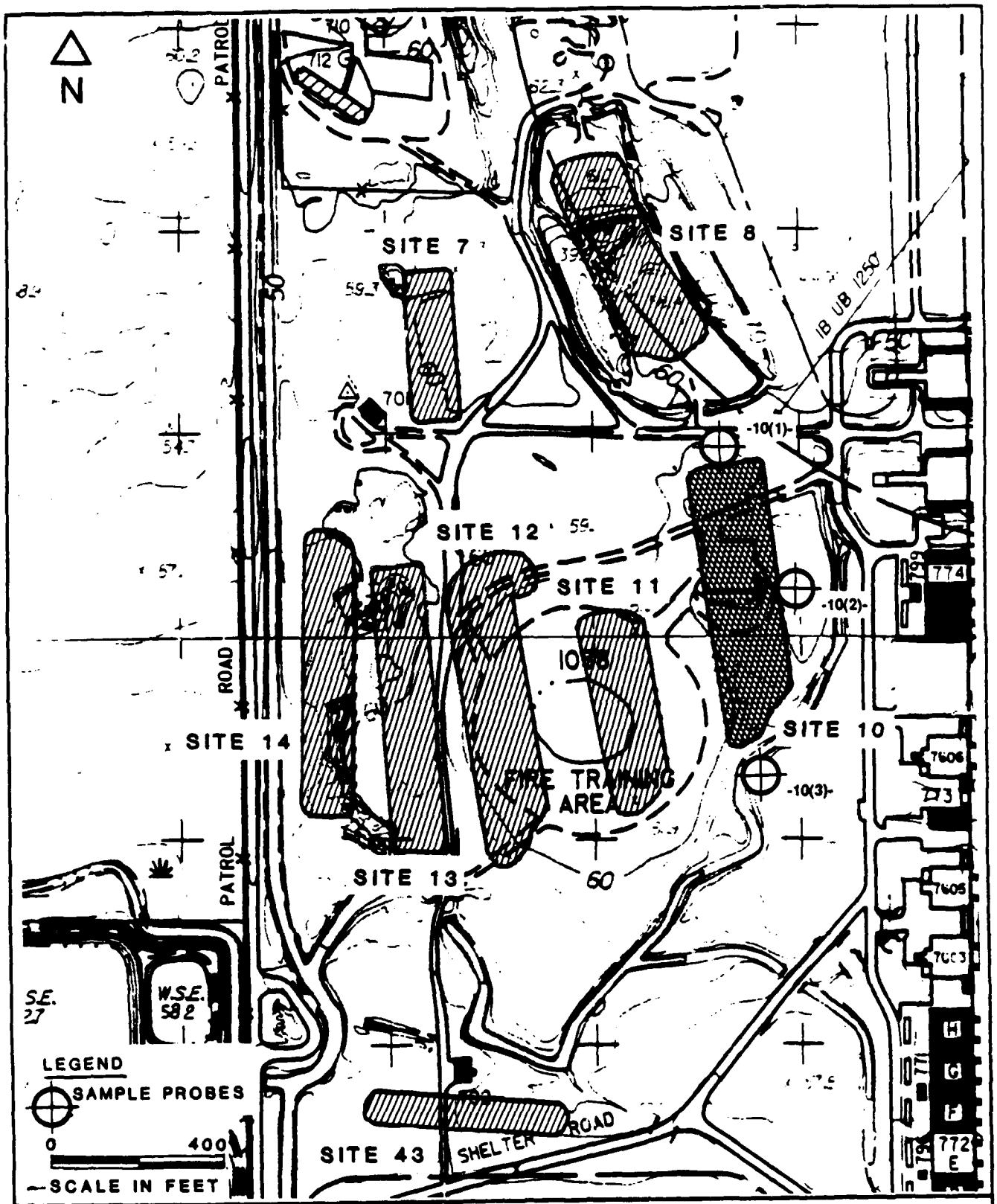

Figure 5-4. Sample Locations for Area C, Site 10, McClellan AFB.

concentrations above soluble threshold limit concentration (STLC) values, as established by DHS. Currently, a portion of Site 10 is being used as a secured storage area for low level contaminanted soils.

Site 11 is located 90 feet west of Site 10 and 600 feet west of Building 774 (see Figure 5-5). The site area is 405 feet by 80 feet by 6 feet deep, and was previously used as a solid waste landfill. Currently, a large portion of this site is being used as a secured storage area for low-level contaminated soils. Historical soil samples collected from the area by McClaren Engineering contained low concentrations of VOCs, and a variety of acid extractable compounds, PCBs, base/neutral extractable compounds, and metals. VOCs detected included chloroform (53-140 ug/kg), chlorobenzene (190-380 ug/kg), and dichloromethane (260 ug/kg). Elevated concentrations of phenanthene (370 ug/kg), fluorene (240 ug/kg), and pyrene (240 ug/kg) were detected. Oil and grease (220-6,430 mg/kg) and phenolic compounds were detected. Concentrations of total lead were above TTLC values. Concentrations of soluble lead were above STLC values. Concentrations of total and soluble chromium were above TTLC and STLC values for chromium VI but below TTLC and STLC values for chromium III.

Site 12 is located 90 feet west of Site 11 and 900 feet southwest of Building 774 (see Figure 5-6). The site area is 610 feet by 90 feet by 12 feet deep, and was previously used as a solid waste landfill. A large portion of Site 12 is also being used as a secured storage area for low-level contaminated soil. Historical site samples collected from the area by McLaren contained a variety of VOC and non-VOC compounds and heavy metals. Dichloromethane (methylene chloride) (200-210 ug/kg) was detected in and immediately below the waste at elevated concentrations. The waste samples also showed anthracene (5,900 ug/kg), benzo(a)anthracene (13,000 ug/kg), chrysene (12,000 ug/kg), fluoranthene (28,000 ug/kg), and fluorene (5,400 ug/kg) at elevated concentrations. Soluble lead was above STLC values. Analyses of soil samples from around the pit indicated little lateral migration from the pit, except possibly to the east where moderate levels of VOCs were detected. The compound 1,1-dichloroethylene (2,200 ug/kg) was detected in a boring to the east

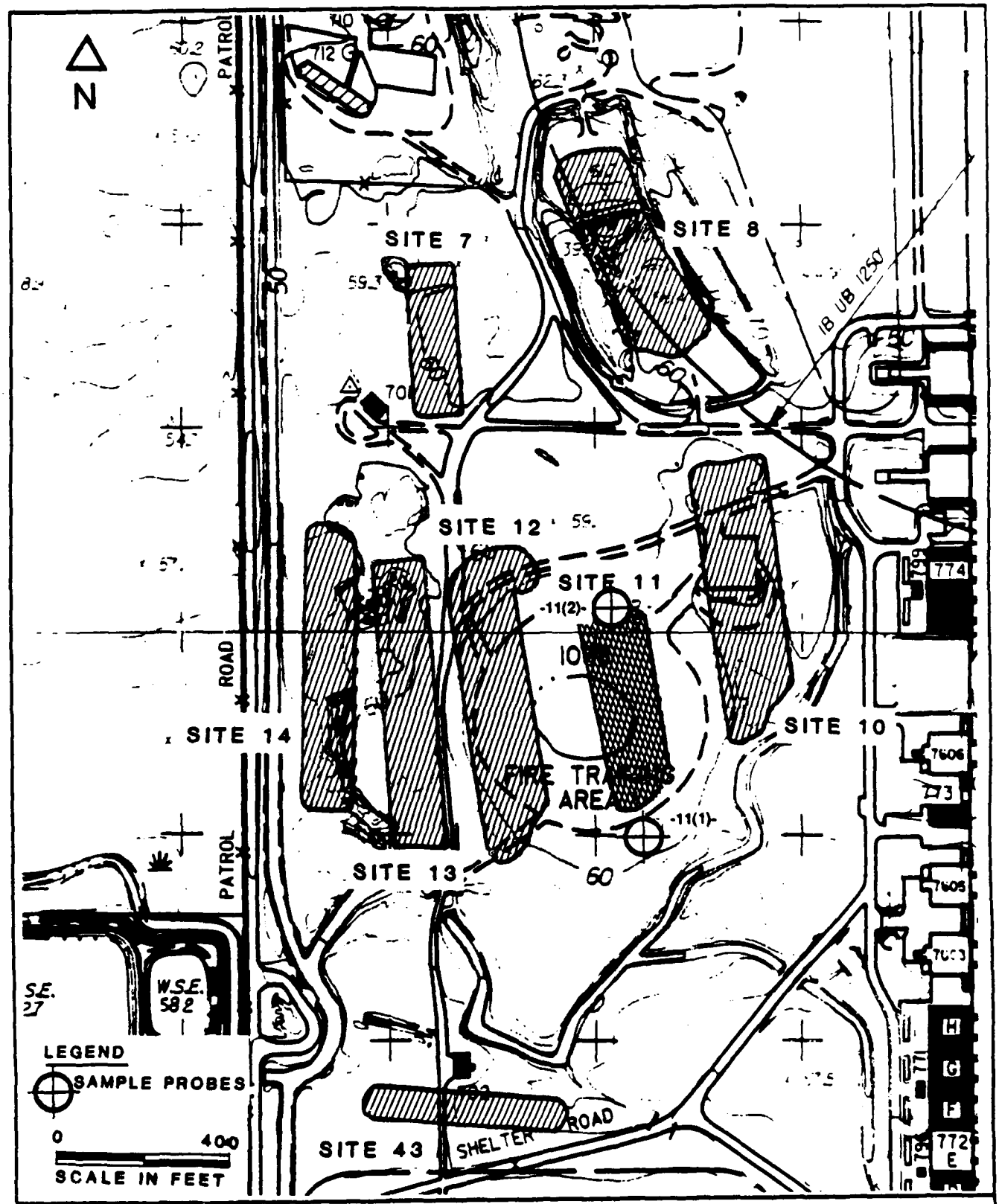

Figure 5-5. Sample Locations for Area C, Site 11, at McClellan AFB.

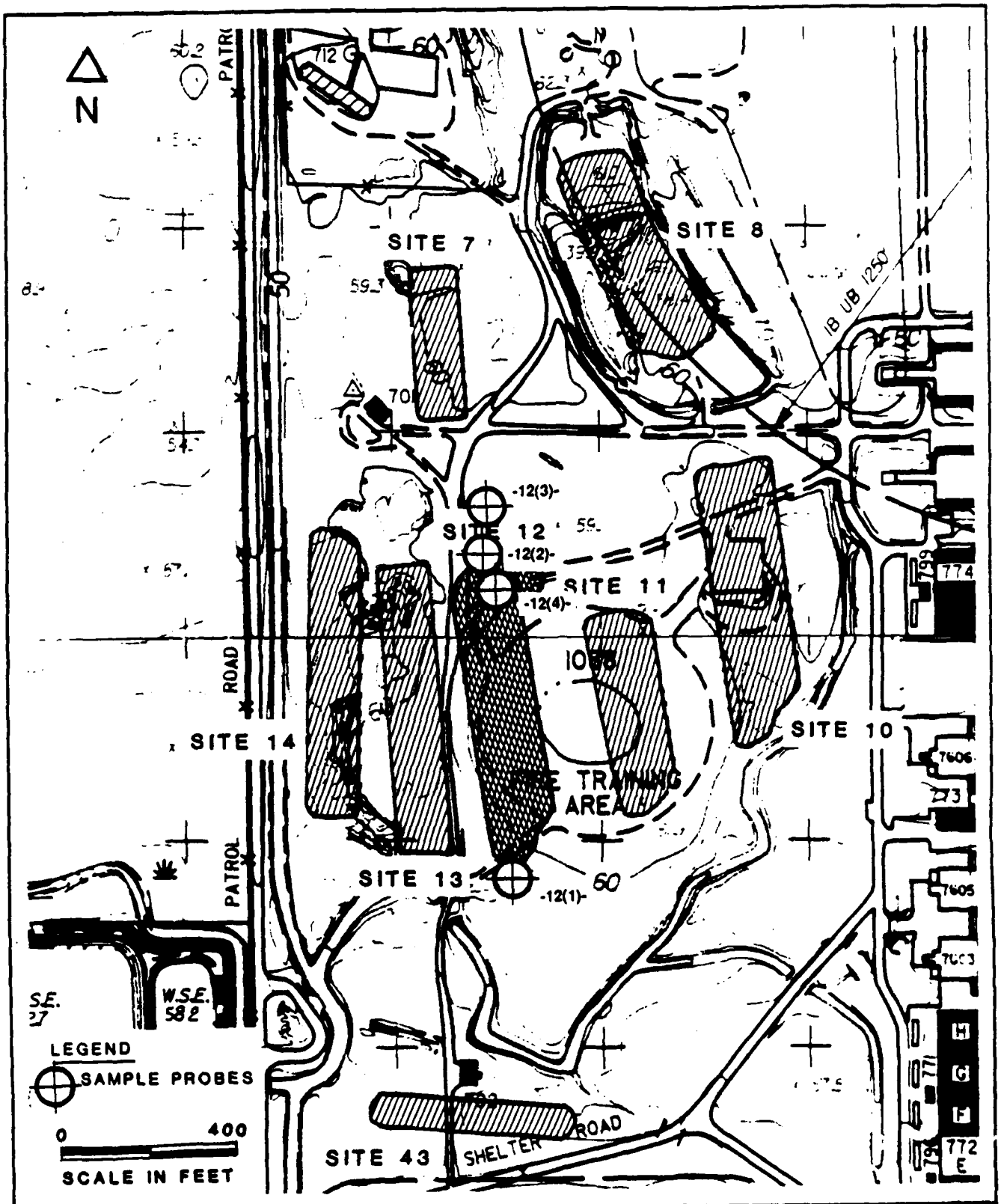

Figure 5-6. Sample Locations for Area C, Site 12, at McClellan AFB.

of the pit at elevated concentrations but was not detected in the waste. The soil sample borings indicated that the extent of the buried waste was wider than shown in the 1968 photograph. The actual width was approximately 90 feet.

Area maps for these three sites along with sample locations can be found in Figures 5-4 through 5-6. As Figures 5-4 through 5-6 show, Sites 10, 11, and 12 consisted of perimeter probe samples only. Landfill samples were not collected because of access problems to the landfill areas. Portions of each of these sites are being used as a secured storage area for low-level contaminated soils. A total of nine perimeter probe samples were placed around the site; two extra probes were placed at the north end of Site 12 since the probe 12(2) showed elevated levels of vinyl chloride and benzene. The probe samples are labeled 10(1) through 10(3) 11(1) and 11(2); and 12(1) through 12(4).

Perimeter probe depths ranged from 2 to 6 feet. Shallow probe depths resulted when the probes encountered a sandstone formation. This sandstone formation was also encountered during probe installation at nearby sites.

Probe samples for these three sites were collected on December 5, 7, and 15. Rainfall occurred within a 72-hour period prior to sampling on December 5 and December 7. Rainfall occurred on December 15. A light precipitation of 0.01 inches occurred on December 5 and a cumulative 0.39 inches of rainfall occurred in the 72 hours prior to December 5. Approximately 0.88 inches of precipitation had occurred in a 72-hour period prior to December 7. Approximately 0.05 inches of rainfall was recorded on December 15. No rainfall had occurred in the previous 72 hours to December 15. Hand augers were used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling areas. Hand auger samples were collected on December 5 at Site 7. Dry soil was noted at a 2-foot depth. Hand auger samples were also taken on December 7 between Sites 11 and 12. Dry soil was noted at a 3-foot depth.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Sites 10, 11, and 12 are given in Tables 2-3, 2-4, and 2-5. Tables 5-5, 5-6 and 5-7 further summarize the Table 2-4 through 2-6 results. Tables 5-5 through 5-7 each presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1 for Sites 10, 11, and 12, respectively. All other tested air contaminants were below the limit of quantitation.

5.2.4 Landfill Gas Testing Results For Sites 13 and 14

Site 13 is located 20 feet west of Site 12 and 1,000 feet west of Building 774 (see Figure 5-7). The site area is 600 feet by 90 feet by 15 feet deep, and was previously used as a solid waste landfill. Site 13 is divided by an asphalt road that leads to Sites 7 and 9. Historical site samples collected from the area by McLaren contained metal pieces, wood, burlap, plastic, paper, and carbonaceous (burned) material. Releases of an unknown gas were observed while drilling the cased borings. The first cased boring was terminated. The gas from the second cased boring was sampled twice, and analyses showed the gas was predominantly methane. Composite analyses of the waste showed low to high concentrations of VOCs, including acetone and 2-butanone above 40,000 ug/kg. Dichloromethane (27-96 ug/kg) was also detected. These samples also showed a variety of base/neutral and acid extractable, non-priority, pesticide, and PCB compounds. Elevated concentrations of acenaphthene (100 ug/kg), chrysene (170 ug/kg), phenanthrene (190 ug/kg), pyrene (150 ug/kg), n-nitrosodiphenylamine (220 ug/kg), chlordane (720 ug/kg), and PCB 1260 (1,000-1,800 ug/kg) were detected.

Site 14 is located 90 feet west of Site 13, adjacent to Patrol Road and south of Building 701 (see Figure 5-8). The site area is approximately 600 feet by 90 feet by 14 feet deep, and was previously used as a solid waste landfill. Site 14 is covered by grass and natural vegetation; a large, 15-foot high mound of soil covers the length of the site. Historical soil samples collected from the area by McLaren contained buried burn debris

TABLE 5-5. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 10 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Carbon Tetrachloride	d	d	1	0.1

[a] One landfill probe and three perimeter probes were sampled at this site. All analytical results are presented in Table 2-3 including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] Site conditions prohibited collection of samples.

TABLE 5-6. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 11 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Perchloroethylene	d	d	1	3
Methylene Chloroform	d	d	1	0.6
Trichloroethylene	d	d	1	4

[a] No landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-4, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] Site conditions prohibited collection of samples.

TABLE 5-7. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 12 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	d	d	3	56,000
Benzene	d	d	4	32,000
Ethylene Dibromide	d	d	2	<4[e]
Ethylene Dichloride	d	d	2	<500[e]
Methylene Chloride	d	d	3	1,000
Perchloroethylene	d	d	4	4,000
Carbon Tetrachloride	d	d	2	60
Methyl Chloroform	d	d	4	80
Trichloroethylene	d	d	4	8,000
Chloroform	d	d	2	2,000

[a] No landfill probes and four perimeter probes were sampled at this site. All analytical results are presented in Table 2-5, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] Site conditions prohibited collection of samples.

[e] This value represents the highest daily analytical detection limit [method detection limit]; no quantitate data were available.

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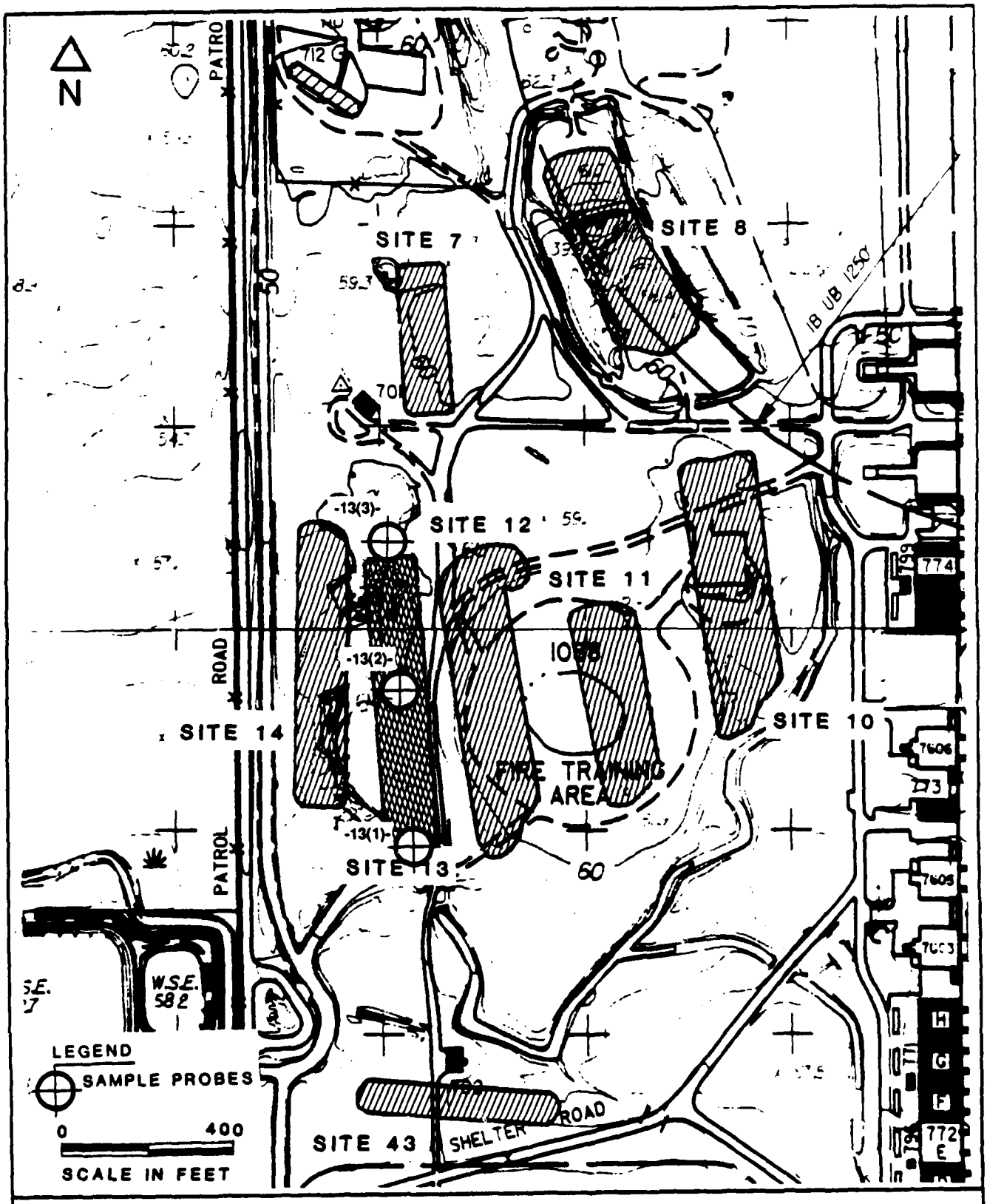

Figure 5-7. Sample Locations for Area C, Site 13, at McClellan AFB.

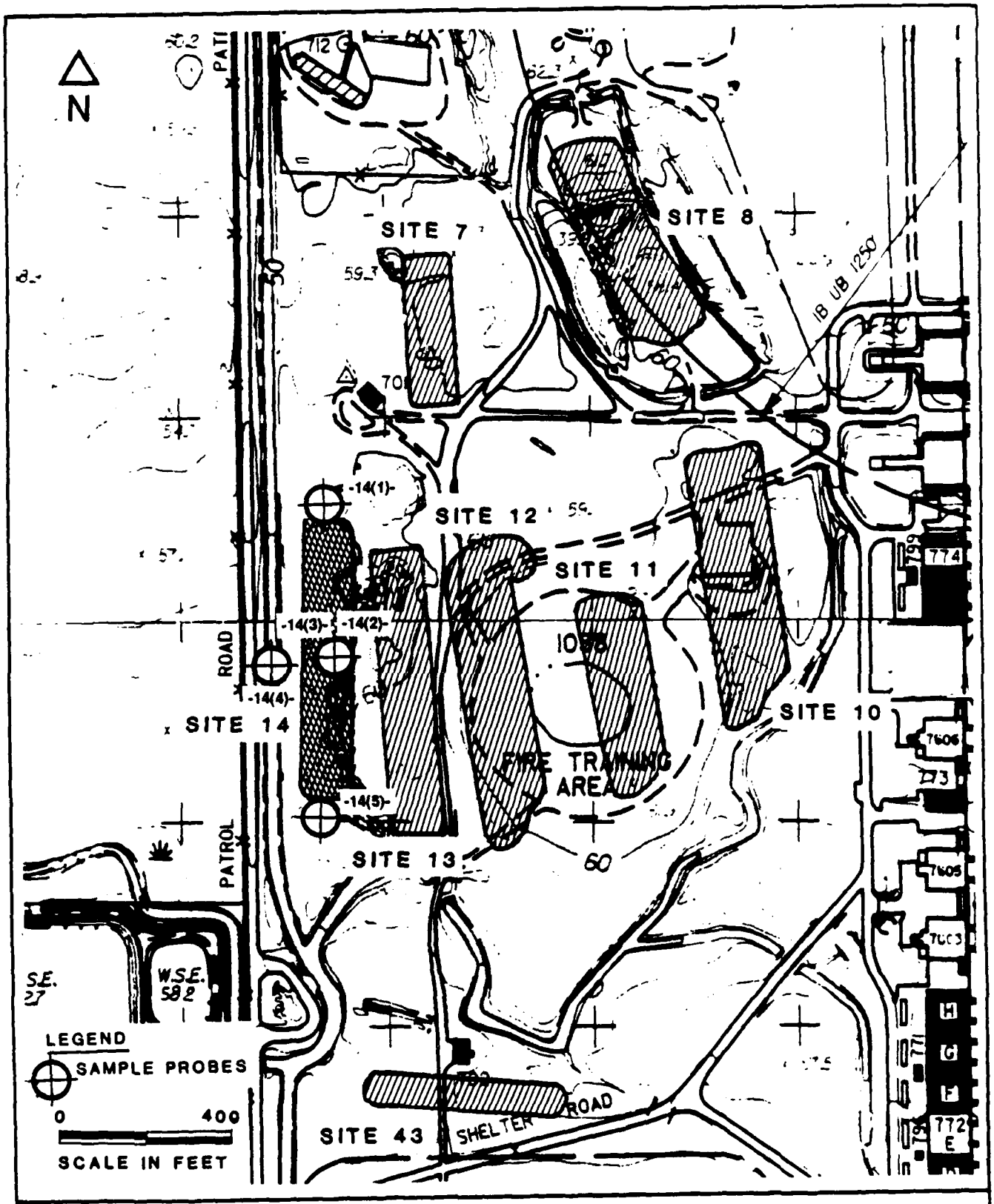

Figure 5-8. Sample Locations for Area C, Site 14, at McClellan AFB.

consisting of metal, glass, wood, cloth, paper, and vegetative debris. Composite analyses of the waste showed low concentrations of VOCs and a variety of non-VOC compounds. VOCs detected included dichloromethane (48-140 ug/kg), toluene (22-43 ug/kg), and chlorobenzene (13-46 ug/kg). Elevated concentrations of acenaphthene (210 ug/kg), anthracene (150 ug/kg), fluorene (300 ug/kg), phenanthrene (1,300 ug/kg), and pyrene (240 ug/kg) were detected. A concentration of total mercury was above TTLC values, and concentrations of soluble cadmiumand soluble lead were above STLC values.

Sites 13 and 14 had a total of 8 soil gas probe samples collected. Three were located in the landfill area and five at the perimeter. The samples are designated as 13(1) through 13(3) and 14(1) through 14(5), an extra landfill sample was taken in an attempt to reach the target sampling depth of 8 feet. Sample depths ranged from 5 to 8 feet; three of the eight samples reached the target sampling depths. The landfill and perimeter probe samples were collected on December 2, 3, and 4 for these sites.

Rainfall occurred on two of the three sampling days. Rainfall had occurred 72 hours prior to each of the sampling days. Approximately 0.06 inches of precipitation occurred on December 2. In the 72 hours prior to December 2, 1.7 inches of rain occurred. No rain fell on December 3, but approximately 1.7 inches of rain had fallen within the previous 72 hours. Approximately 0.33 inches of rain fell on December 4. In the 72 hours prior to December 4, 0.41 inches of rain had occurred.

Hand augers were used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling areas. Hand auger samples were collected on December 4 at Sites 13 and 14. Dry soil was noted at a depth of 2 feet in Site 13 and at a depth of 1.5 feet in Site 14.

The analytical results for Sites 13 and 14 for gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, are given in Table 2-6 and 2-7. Tables 5-8 and 5-9 further

TABLE 5-8. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 13 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	0	0	1	5,000
Benzene	1	<200[d]	2	600
Methylene Chloride	0	0	1	200
Perchloroethylene	0	0	2	6
Methyl Chloform	0	0	2	4
Trichloroethylene	1	1	2	40

[a] One landfill probe and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-6, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

TABLE 5-9. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 14 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Benzene	0	0	2	<60[d]
Methylene Chloriue	1	100	0	0
Perchloroethylene	1	10	0	0
Methyl Chloforom	1	4	1	0.8
Trichloroethylene	1	2	0	0
Chloroform	1	40	0	0

[a] Two landfill probes and three perimeter probes were sampled at this site. All analytical results are presented in Table 2-7, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit [method detection limit]; no quantitate data were available.

summarize the Table 2-6 and 2-7 results. Tables 5-8 and 5-9 each present the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1 for Sites 13 and 14, respectively. All other tested air contaminants were below the limit of quantitation.

5.2.5 Landfill Gas Testing Results for Site 22

Site 22 is located on the west side of the base, 140 feet east of Patrol Road and south of Waste Treatment Plant Aeration Basin. The site area is approximately 400 feet by 100 feet. Previously it was used as a burn pit and solid waste landfill. Site 22 and the surrounding area are being used to store construction materials. For the most part, the site is flat and covered with bare soil. Historical soil samples collected from this area by McLaren contained metal and wire pieces, concrete and asphalt, rubble, burned wood, glass, rubber, and sludge-like material. Composite analyses of the waste showed low to high concentrations of VOC and non-VOC compounds and elevated concentrations of heavy metals. Elevated concentrations of 13 base/neutral compounds and one PCB was detected. Base/neutral compounds included fluorene (170-510 ug/kg), acenaphthene (130-340 ug/kg), and phenanthrene (160-3,200 ug/kg). Total lead exceeded the TTLC value, and soluble antimony exceeded the STLC value. Oil and grease concentrations in the waste ranged from 2,910 mg/kg to 27,000 mg/kg.

Soil sample borings were drilled around the burn pit to characterize lateral migration from the site. These borings showed moderate to high concentrations to 80 feet. Analyses of soil samples around the pit showed a variety of volatile organic and nonvolatile organic compounds. Trichloroethylene was detected in all three borings at concentrations ranging from 55 to 4,600 ug/kg. Elevated concentrations from one to three base/neutral extractable compounds were detected. The results indicated significant lateral migration of contaminants, invluding chlorobenzene (23-6,600 ug/kg), ethylbenzene, TCE, toluene (12-5,200 ug/kg), total xylenes (380-31,000 ug/kg), acenaphthene (130-340 ug/kg), fluorene (170-510 ug/kg), phenanthrene

(160-3,200 ug/kg), and 2-methylnaphthalene. An area map with the sample locations and site area can be found in Figure 5-9.

A total of five probe samples were analyzed at Site 22, four samples were taken from inside the landfill area, and one taken at the west perimeter.

Five landfill samples originally were proposed for Site 22. The presence of surface water at the southeast end of the site resulted in a modification to the sampling strategy. Four landfill probe samples and one perimeter probe were sampled. The sampling depths ranged from 5 to 8 feet.

Landfill and perimeter probes were collected for Site 22 on December 10. A trace of rain occurred on that day. In the 72 hours prior to December 10, approximately 0.50 inches of rain occurred. Because Site 22 is covered with packed gravel, the Site 22 sampling area could not be hand augered to collect soil samples to inspect the soil moisture conditions at depth. Instead, soil conditions were estimated by collecting a hand auger sample at Site 8 the same day. The Site 8 hand auger sample indicated dry soil conditions at a 3-foot depth.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 22, are given in Table 2-8. Table 5-10 further summarizes the Table 2-8 results. Table 5-10 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below LOQ.

5.2.6 Landfill Gas Testing Results for Site 24

Site 24 is located approximately 900 feet east of Building 621 at the southern end of the base. The site area is approximately 515 feet by 80 feet by 11 feet deep. It was previously used as a solid waste landfill.

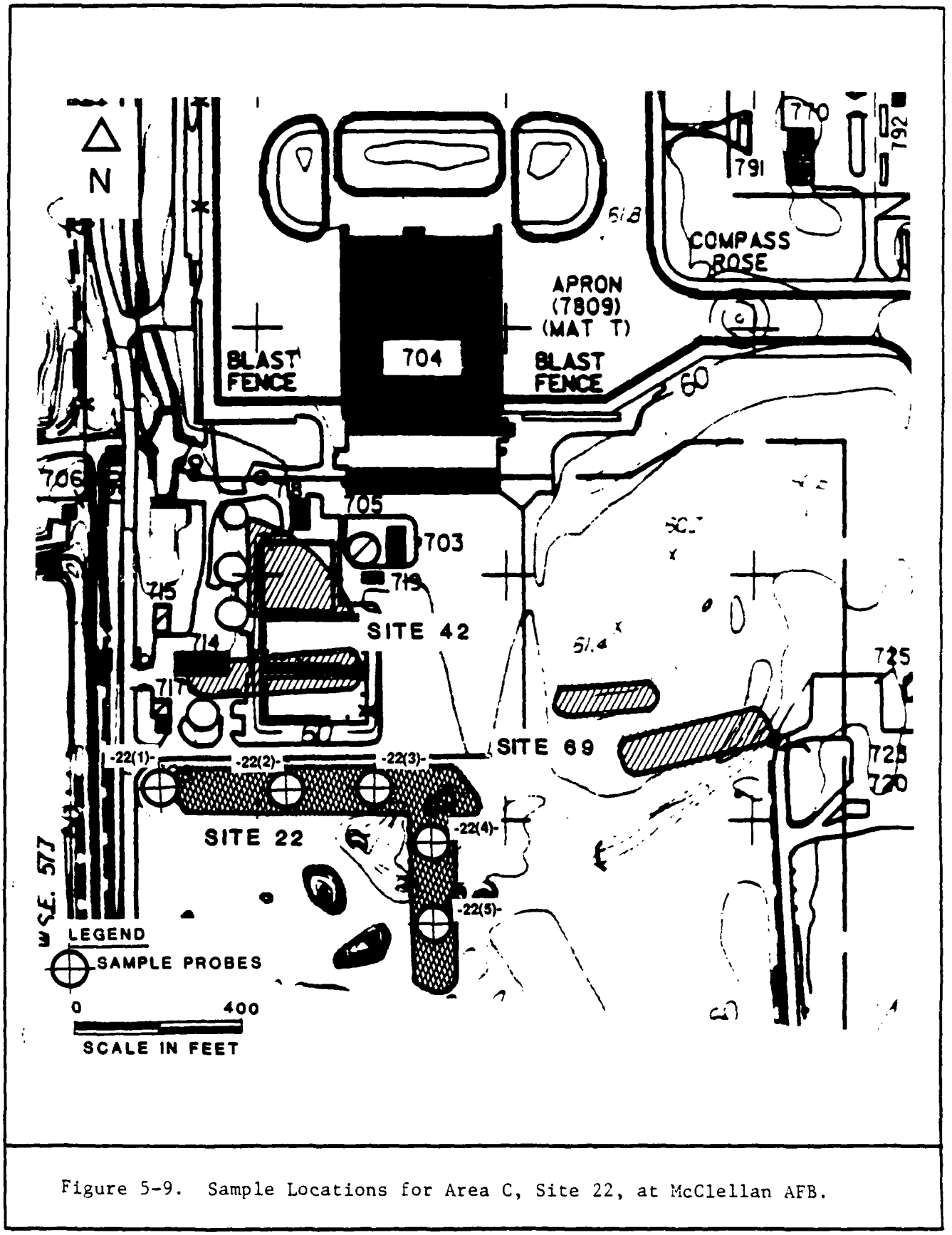

Figure 5-9. Sample Locations for Area C, Site 22, at McClellan AFB.

TABLE 5-10. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 22 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	1	4,000	0	0
Perchloroethylene	3	30	1	6
Methyl Chloform	3	4	1	8
Trichloroethylene	4	400	1	400

[a] Four landfill probes and one perimetsr probe were sampled at this site. All analytical results are presented in Table 2-8, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

The site is partially covered by a drainage ditch and an asphalt parking lot. The remainder of the site is covered by native vegetation and is not currently in use. Historical soil samples collected from the area by McLaren contained low concentrations of three VOCs. One composite waste sample showed concentrations of four base/neutral extractable compounds and one acid extractable compound. An elevated concentrations of benzo(a)pyrene (1,200 ug/kg) was detected in this sample. Elevated total concentrations of five heavy metals were detected in composite waste samples. Total lead in one composite waste sample exceeded the DHS TTLC.

Figure 5-10 shows the area around the landfill, the landfill and the probe locations.

A total of six probe samples were taken in the area of Site 24. Four probe samples were taken inside the landfill area and two were taken at the perimeter. The samples are labeled 24(1) through 24(6). The sample depths ranged from 2 to 8 feet; eight-foot sampling depths were reached on three of the six samples.

Landfill and perimeter probe samples were collected for Site 24 on December 14. No precipitation occurred on the sampling day or in the 72-hour period prior to December 14.

A hand auger was used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling area. Hand auger samples collected on December 14 showed dry soil conditions at the 3-foot depth.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 24, are given in Table 2-9. Table 5-11 further summarizes the Table 2-9 results. Table 5-11 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

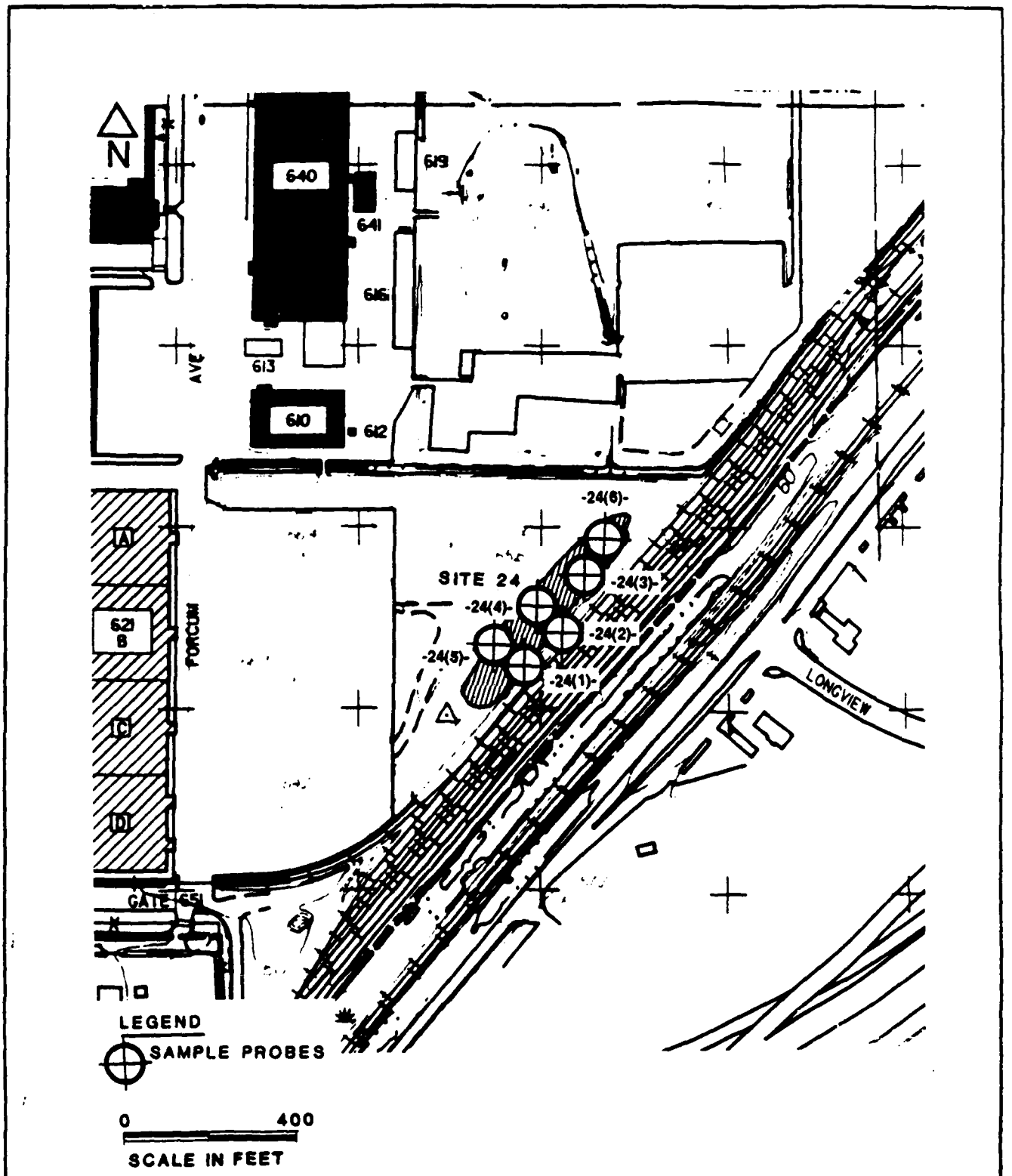

Figure 5-10. Sample Locations for Other Areas, Site 24, at McClellan AFB.

TABLE 5-11. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 24 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Perchloroethylene	1	3	2	4
Carbon Tetrachloride	0	0	1	0.2
Methyl Chloroform	4	200	2	2
Trichloroethylene	4	80	2	20

[a] Four landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-9, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

5.2.7 Landfill Gas Testing Results for Site 38

Site 38 is located in the southeast corner of the base under Building 475. The site was previously used as a sludge landfill, which also contained underground storage tanks. It measured approximately 600 feet long by 400 feet wide. The landfill currently is beneath an aircraft engine shop. The major features of the area include buildings 475, 473, and 429, which cover about 70 percent of the landfill area. Historical soil samples collected by McLaren, contained VOCs in soil samples from eight borings. Base/neutral compounds were detected in soil samples from seven borings. Non-priority pollutant compounds were detected in one boring. Elevated concentrations of total heavy metals were detected in two borings. Elevated concentrations of oil and grease were detected in two borings.

The sample from 9 feet in one boring contained concentrations of 13 VOCs ranging from 180 ug/kg for chloroform to 430,000 ug/kg for total xylenes. Chlorobenzene, ethylbenzene, toluene, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and total xylenes were detected at concentrations over 10,000 ug/kg. This sample also showed concentrations of four base/neutral extractable compounds ranging from 130 ug/kg for phenanthrene to 230 ug/kg for dinitrotoluene, and concentrations of four non-priority pollutant compounds ranging from 100 ug/kg for dibenzofuran to 580 ug/kg for 2-methylnaphthalene. Oil and grease were detected at a concentrations of 540 mg/kg.

Sampling of the headspace over auger boring cuttings with an HNu instrument and at borehole locations indicated low readings (<10 ppm) in 12 borings, moderate (10-100 ppm) in six borings, and high (>100 ppm) in two borings.

HNu cutting and headspace readings varied from less than 10 to 300 ppm. Strong odors were noted in six borings. Discolored soil was observed near the surface in six borings.

Figure 5-11 contains an area map, the landfill boundaries and the soil probe locations. The eight-foot sampling target depth was reached on one probe only; the range of probe depths was 2 to 6 feet. Two perimeter probes 38(6) and 38(7) were driven to 3 feet. Water was encountered at this depth and was sucked into the vacuum pump which prevented sampling at these perimeter locations.

Landfill probe samples were collected for Site 38 on December 11. No precipitation occurred on the sampling day; however, in the 72 hours prior to December 11, approximately 0.50 inches plus a "trace" of rain had fallen. Site 38 is covered by asphalt, concrete and/or gravel-packed parking lots. No hand auger samples were taken to determine the soil moisture conditions at depth prior to collecting landfill and perimeter probe samples.

The analytical results for gas characterization sampling, using landfill probes, for Site 38, is given in Table 2-10. Table 5-12 further summarizes the Table 2-10 results. Table 5-12 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.8 Landfill Gas Testing Results for Site 42

Site 42 is located 140 feet north of Site 22 under the Waste Treatment Plant on the west side of the base. Site 42 is approximately 210 feet by 50 feet by 6 feet deep. Previously it was used as an oil storage area and solid waste landfill. Historical soil samples collected from the area by McLaren contained low to high concentrations of VOCs, elevated levels of chloroform, and low concentrations of base/neutral extractable compounds. PCB 1254 was detected in one sample at an elevated concentration.

The burn pit at Site 42 was found to contain buried debris consisting of burnt debris, wood, plastic, and metal fragments. Analysis of the waste showed low to moderate concentrations of VOCs and non-VOCs. Elevated

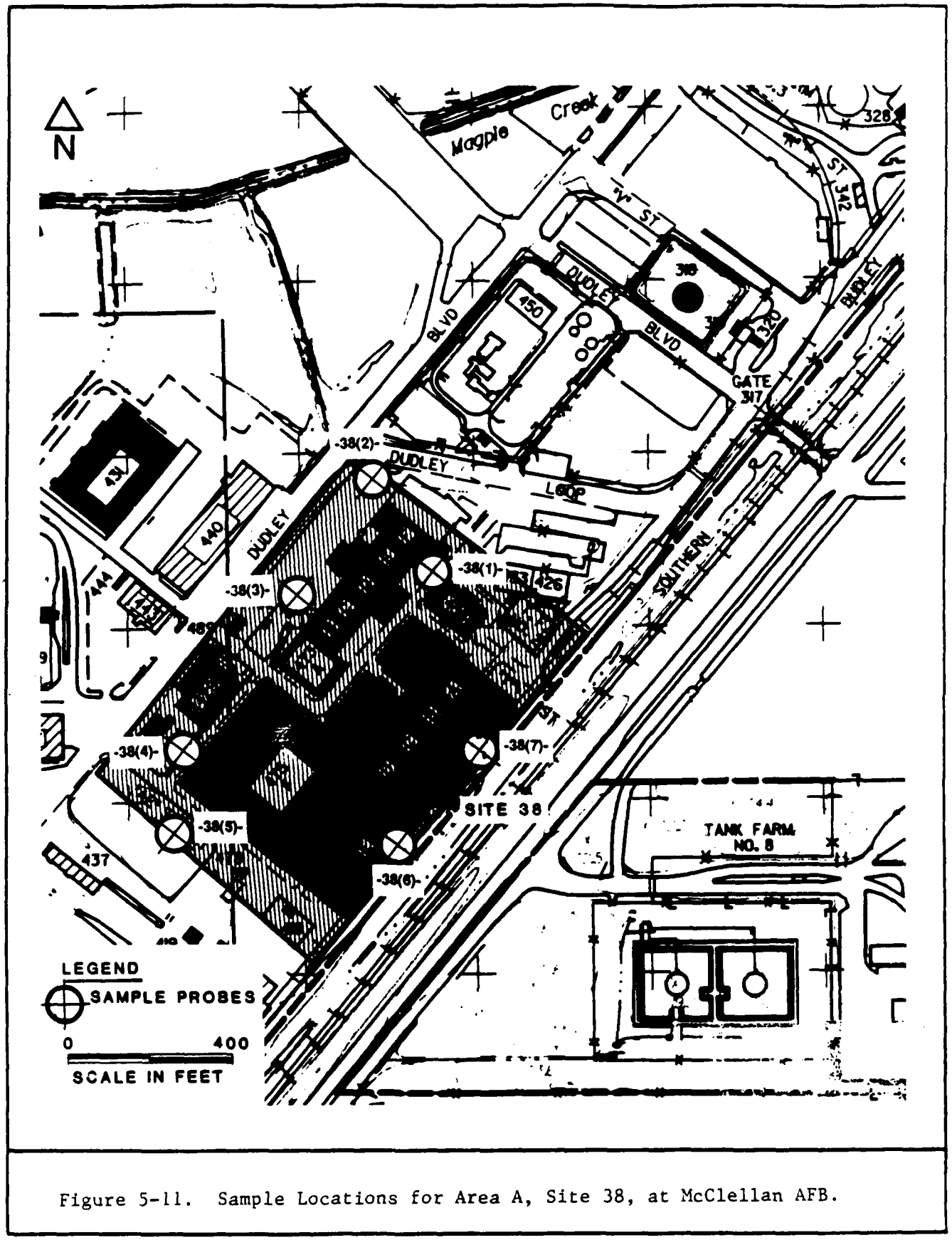

Figure 5-11. Sample Locations for Area A, Site 38, at McClellan AFB.

TABLE 5-12. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 38 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	2	<200[d]	e	e
Benzene	2	<60[d]	e	e
Ethylene Dibromide	2	<0.5[d]	e	e
Ethylene Dichloride	2	<80[d]	e	e
Methylene Chloride	2	<100[d]	e	e
Perchloroethylene	3	300	e	e
Carbon Tetrachloride	1	8	e	e
Methyl Chloroform	4	100	e	e
Trichloroethylene	4	100	e	e

[a] Four landfill probes and no perimeter probes were sampled at this site. All analytical results are presented in Table 2-10, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

[e] Site conditions prohibited collection of samples.

concentrations of phenanthrene was detected. Elevated concentrations of oil and grease and heavy metals also were detected, including total copper above TTLC values, and soluble cadmium and soluble lead above STLC values.

Analyses of soil samples from around Site 42 detected a variety of VOC and non-VOC compounds. VOCs detected in shallow soils include trichloroethylene (640-5,400 ug/kg) and trans-1,2-dichloroethylene (880-3,400 ug/kg). One soil sample boring to the southeast of the Site 42 oil storage ponds showed a number of VOC and non-VOC compounds, of which elevated concentrations of acenaphthylene (150 ug/kg), fluorene (240-560 ug/kg), and phenanthrene (160-520 ug/kg) were detected.

Figure 5-12 is an area map of the landfill location and the sample points 42(1) through 42(4). A total of four probe samples were taken; one landfill probe and three perimeter probes. Probe sample depths ranged from 3 to 6 feet with refusal on all but one sample, possibly due to subsurface construction material.

Landfill and perimeter probe samples were collected for Site 42 on December 11. No precipitation occurred on the sampling day; however in the 72 hours prior to December 11, approximately 0.50 inches plus a "trace" of rain had fallen. Site 42 is a covered site. No hand auger samples were taken to determine the soil moisture conditions at depth prior to collecting landfill and perimeter probe samples.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, are given in Table 2-12. Table 5-13 further summarizes the Table 2-12 results. Table 5-13 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

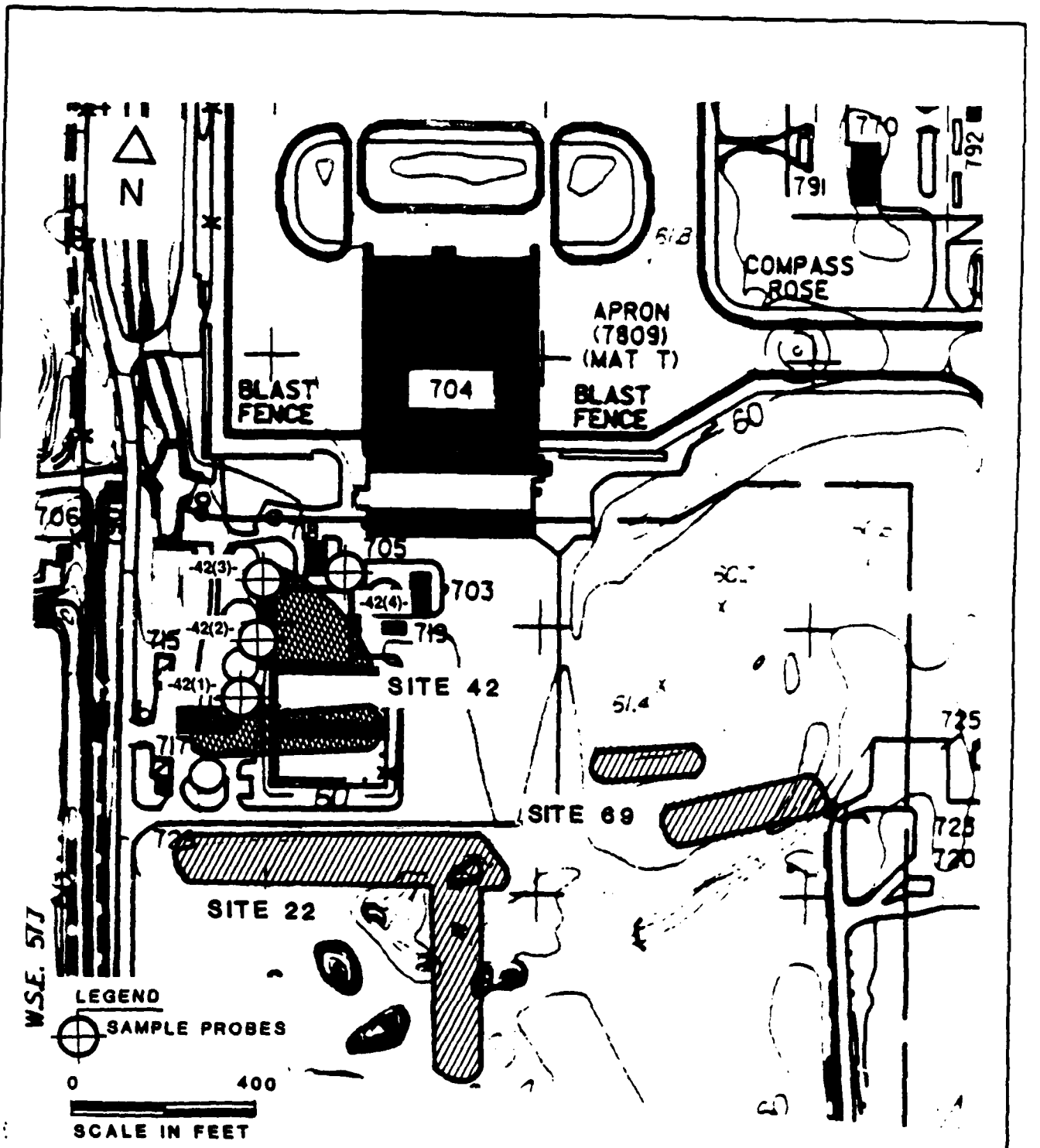

Figure 5-12. Sample Locations for Area C, Site 42, at McClellan AFB.

TABLE 5-13. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 42 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	2	<200[d]	e	e
Benzene	2	<60[d]	e	e
Ethylene Dibromide	2	<0.5[d]	e	e
Ethylene Dichloride	2	<80[d]	e	e
Methylene Chloride	2	<100[d]	e	e
Perchloroethylene	5	30	e	e
Methyl Chloroform	4	200	e	e
Trichloroethylene	5	3,000	e	e

[a] Five landfill probes and no perimeter probes were sampled at this site. All analytical results are presented in Table 2-11, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

[e] Site conditions prohibited collection of samples.

5.2.9 Landfill Gas Testing Results for Site 43

Site 43 is located on the west side of the base, 800 feet south of Site 13 and 600 feet northwest from Building 704. The site area is approximately 405 feet by 50 feet by 10 feet deep. Previously it was used as a solid waste landfill. Some construction rubble is lying over the site. Historical soil samples collected from the area by McLaren Engineering contained burned wood, metal pieces, wire, glass, and plastic. Most of the waste appeared burned. Analyses of the waste showed a variety of VOCs. Also detected were a number of base/neutral extractable compounds, of which acenaphthene (370 ug/kg), benzo(a)anthracene (130-1,100 ug/kg), chrysene (260-1,500 ug/kg), 2,4-dinitrotoluene (1,000 ug/kg), fluorene (380-460 ug/kg), nitrobenzene (750 ug/kg), and phenanthrene (1,400-1,800 ug/kg) were detected at elevated levels. A number of other non-VOC compounds were detected, including PCB 1254 in one boring at 4,600 ug/kg. Also, elevated concentrations of oil and grease up to 17,000 mg/kg and heavy metals were detected. Concentraitons of total cadmium and total lead were above TTLC values. Concentrations of soluble cadmium and soluble lead were above STLC values.

Figure 5-13 contains an area map, reflecting the landfill area and sample locations 43(1) through 43(6).

A total of six probes were taken; three landfill and three perimeter. The depth of the probes ranged 4 to 7 feet. During installation, all of the probes had refusal problems from what appeared to be sandstone a few feet below the surface.

Landfill and perimeter probe samples were collected for Site 43 on December 7. No precipitation occurred on the sampling day, but, in the 72-hour period prior to sampling, approximately 0.88 inches of rain had fallen. Hand augers were used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling area. Hand auger samples were collected on December 7 on the western portion of Site 43. They showed dry soil conditions at a 2-foot depth.

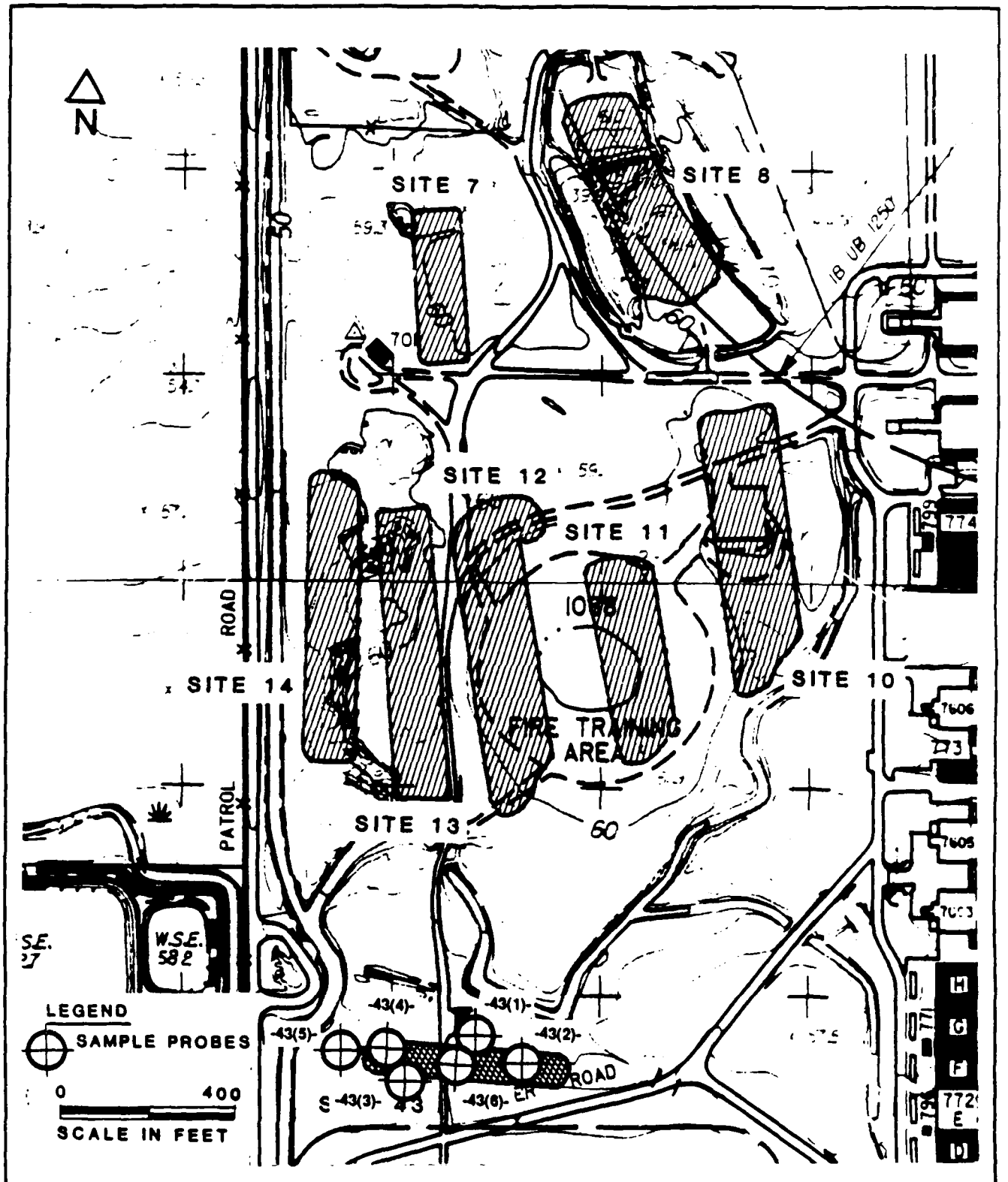

Figure 5-13. Sample Locations for Area C, Site 43, at McClellan AFB.

The analytical results for both gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 43, are given in Table 2-12. Table 5-14 further summarizes the Table 2-12 results. Table 5-14 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.10 Landfill Gas Testing Results for Site 69

Site 69 is located 380 feet northwest of Building 704 on the west side of the base. The site area consists of two burn pits: one is 180 feet by 36 feet, and the other is 350 feet by 60 feet. The two sites are approximately 40 feet apart and have been treated as one site. The site does not appear to have any current use. Historical soil samples collected from the east pit by McLaren contained metal pieces, plastic, rubber, concrete, and wood. A composite analysis of the waste showed a variety of VOC and non-VOC compounds. VOC detected included vinyl chloride (260-850 ug/kg), trichloroethylene (420-440 ug/kg), and trans-1,2-dichloroethylene (210-370 ug/kg). This sample also showed elevated concentrations of five total heavy metals, and concentrations of soluble cadmium and soluble lead above STLC values. Historical soil samples collected from the west pit by McLaren contained metals pieces, sludge, rubber, plastic, and glass. A composite analysis of the waste showed a variety of VOC and non-VOC compounds, including phenanthrene (200 ug/kg) and pyrene (250 ug/kg) at elevated levels. This sample also showed elevated concentrations of four total heavy metals, including total lead above TTLC values. The concentration of soluble lead was above STLC values.

Figure 5-14 contains an area map reflecting the landfill area and sample locations, labeled 69(1) through 69(8). A total of eight probe samples were taken; six landfill and two perimeter probes. The range of probe sampling depths was three to eight feet; and eight-foot target depth was reached on five of the eight probes.

TABLE 5-14. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 43 LANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Benzene	1	600	0	0
Perchloroethylene	2	1	0	0
Methyl Chloroform	1	<0.80[d]	1	0.8
Trichloroethylene	3	4	3	4

[a] Four landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-12, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

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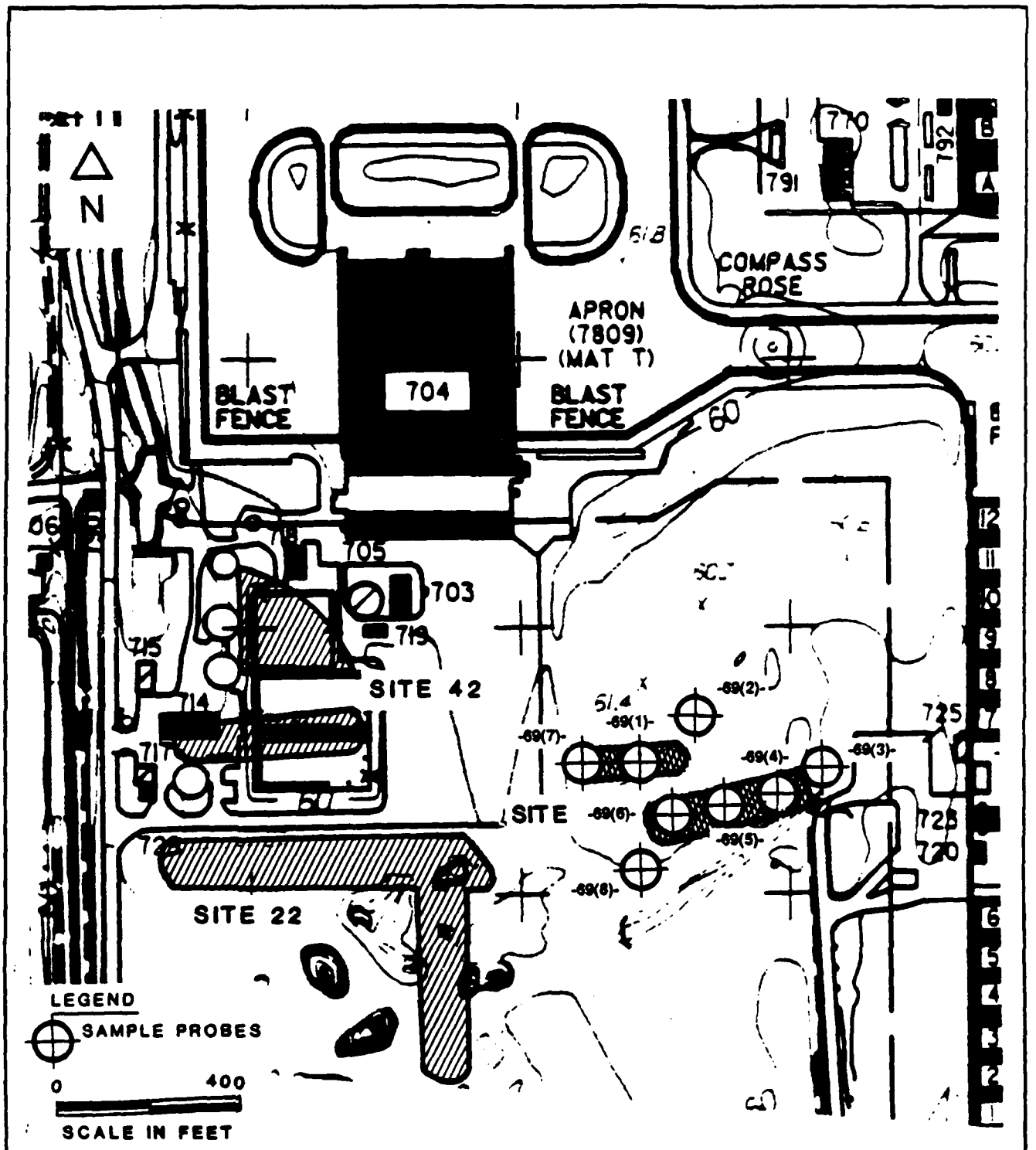

Figure 5-14. Sample Locations for Area C, Site 69, at McClellan AFB.

Landfill and perimeter probe samples were collected for Site 69 on December 9 and 10. Approximately 0.1 inch of rain occurred on December 9, and a "trace" of rain fell on December 10. In the 72 hours prior to sampling on the 9th, approximately 1.0 inches of precipitation occurred. In the 72 hours prior to sampling on the 10th, approximately 0.50 inches plus a "trace" of rain occurred.

A hand auger was used to bore and collect soil samples which were inspected to determine the soil moisture conditions at depth in the sampling area. Hand auger samples were collected on December 9. The soil was saturated to an approximate depth of 4 feet. Below this depth was an impenetrable layer of gravel was encountered.

The analytical results for landfill gas characterization sampling, using landfill probes, and off-site gas migration sampling, using perimeter probes, for Site 69, are given in Table 2-13. Table 5-15 further summarizes the Table 2-13 results. Table 5-15 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.11 Soil-Vapor Wells

There are nine vapor wells located west of the Area D cap. The locations of these wells are shown in Figure 5-15. These nine wells are grouped into three sets of three-well clusters. Each cluster is made up of a shallow, middle, and deep monitoring zone well of respective depths of 10 to 20 feet, 35 to 50 feet, and 65 to 80 feet. A schematic diagram of the well construction is given in Figure 5-16. One air sample was collected from each of the nine vapor wells. Sampling of these vapor well samples constituted gas migration testing for the Area D cap. No ground probes were installed in the Area D clay cap.

TABLE 5-15. SUMMARIZED ANALYTICAL RESULTS OF SITE NO. 69 ANDFILL GENERATION AND OFF-SITE GAS MIGRATION[a]

Compound	Landfill		Perimeter	
	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]	Number of Probes Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	1	400	0	0
Benzene	1	1,000	0	0
Perchloroethylene	2	4	0	0
Methyl Chloroform	6	4	2	4
Trichloroethylene	6	40	2	8

[a] Six landfill probes and two perimeter probes were sampled at this site. All analytical results are presented in Table 2-13, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

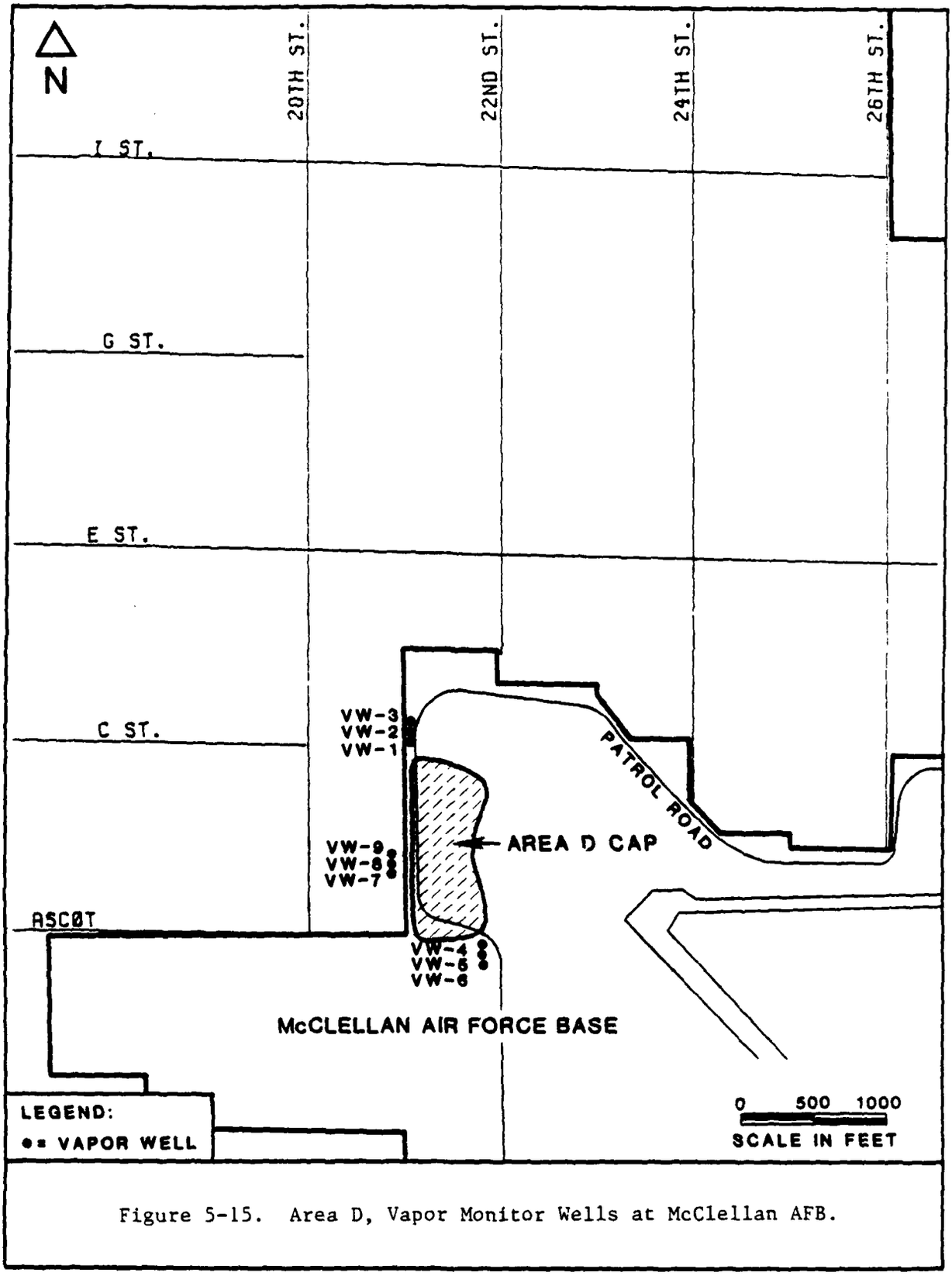

Figure 5-15. Area D, Vapor Monitor Wells at McClellan AFB.

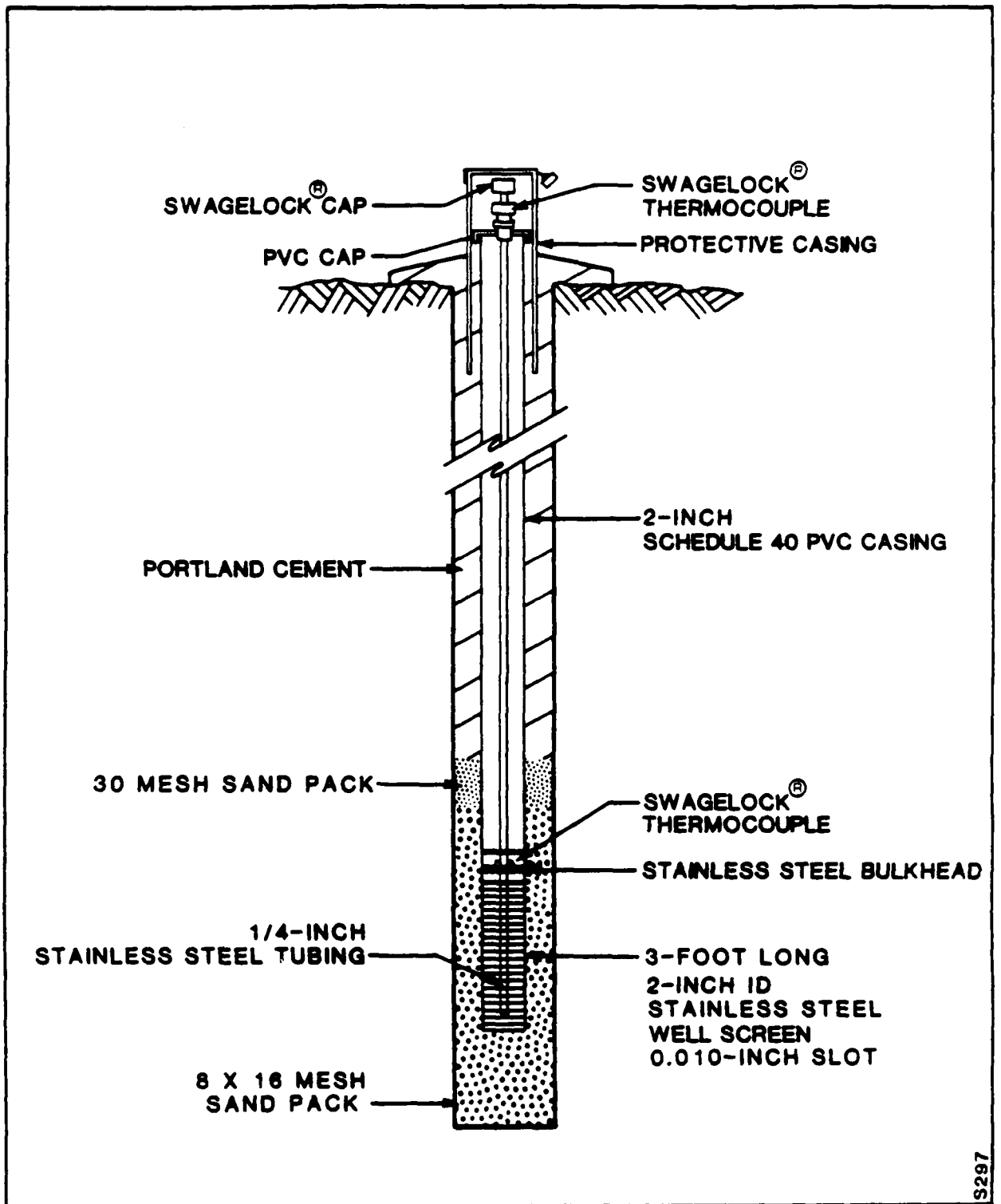

Figure 5-16. Schematic Diagram of Area D, Soil Vapor Well Completion at McClellan AFB.

The nine vapor wells were sampled by taking soil gas samples as follows. The vapor wells were calculated to hold approximately two liters of volume (see calculation sheet Appendix E). The vacuum pump used by Tracer to evacuate air from soil probes evacuated well in excess of 4 liters per minute (1pm). A rotometer was used by Tracer to measure the air flow. A 4.1 1pm air flow was achieved. The vacuum pump was allowed to run for approximately two minutes to ensure soil gases were being sampled; while the vacuum pump continued to run, a syringe sample was collected and analyzed the same way a soil probe sample was. The dates of sample collection at the Radian Vapor wells were December 7th and 15th.

The analytical results for the vapor wells are given in Table 2-14. Table 5-16 further summarizes the Table 2-14 results. Table 5-16 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

5.2.12 Gas Vents in Area D

Area D contains a gas collection and monitoring system that consists of 32 gas vents which extend into the solid waste under the Area D cap. Each gas vent is designed to allow for the measurement of gas pressure. However, the gas generated from the landfill can also be collected. No ground probes were installed in the Area D clay cap. The soil-gas generation potential of this area was assessed by collecting soil-gas samples directly from the pressure port of each vent.

A total of 14 gas vents were sampled; Figure 5-17 shows their exact locations.

Gas vent samples were collected December 7, 8, 9, 11, 14 and 15th. The gas vents were calculated to contain approximately 17 liters of gas (see Appendix E for worksheet); although the system is interconnected, the purge volume was calculated for the length of vertical pipe extending over the land

TABLE 5-16. SUMMARIZED ANALYTICAL RESULTS OF AREA D SOIL-GAS MONITOR WELLS[a]

Compound	Number of Samples Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	6	<400[d]
Benzene	6	<100[d]
Ethylene Dibromide	6	<3[d]
Ethylene Dichloride	6	<200[d]
Methylene Chloride	5	<300[d]
Perchloroethylene	5	90
Carbon Tetrachloride	7	30
Methyl Chloroform	8	900
Trichloroethylene	9	6,000
Chloroform	6	<4[d]

[a] Nine soil gas monitor wells were sampled at this site. All analytical results are presented in Table 2-14, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

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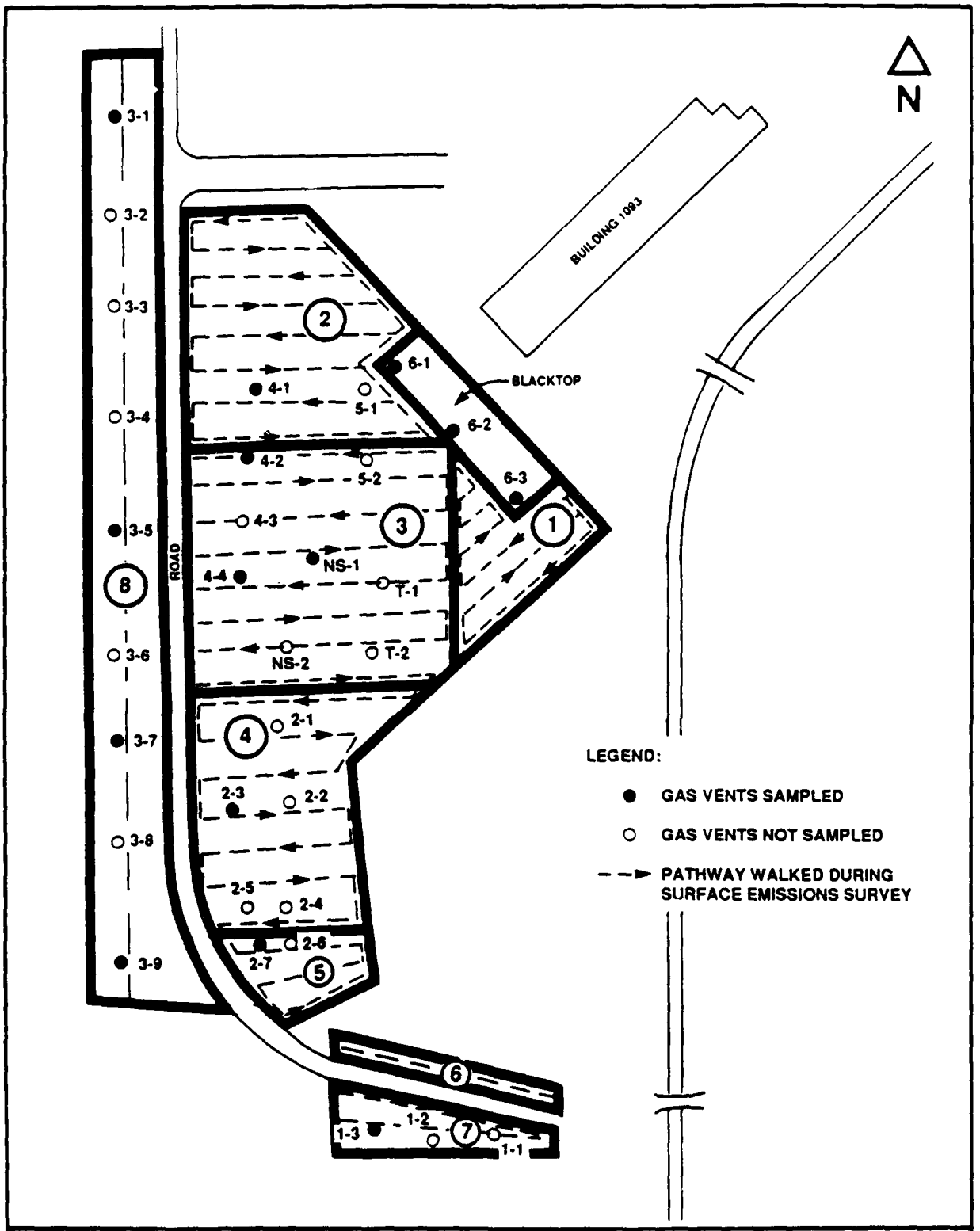

Figure 5-17. Area D Gas Vents at McClellan AFB.

0188-017-3

surface. A flow rate of 4.1 lpm was achieved by the vacuum pump. Over two gas vent volumes were evacuated by running the vacuum pump at the well for nine minutes per sample. The syringe sample was taken while the vacuum pump continued to run.

The analytical results for the vapor wells are given in Table 2-15. Table 5-17 further summarizes the Table 2-15 results. Table 5-17 presents the maximum concentration value detected above the limit of quantitation (LOQ) for the specified air contaminants listed in Table 1-1. All other tested air contaminants were below the limit of quantitation.

TABLE 5-17. SUMMARIZED ANALYTICAL RESULTS OF AREA D GAS COLLECTION SYSTEM[a]

Compound	Number of Samples Above Average LOQ[b]	Highest Concentration (ppbv)[c]
Vinyl Chloride	4	<200[d]
Benzene	4	100
Ethylene Dibromide	3	<0.8[d]
Ethylene Dichloride	3	<100[d]
Methylene Chloride	3	<200[d]
Perchloroethylene	3	9
Carbon Tetrachloride	3	<0.2[d]
Methyl Chloform	13	2,000
Trichloroethylene	11	2,000
Chloroform	3	<2.0[d]

[a] Fourteen gas vents were sampled at this site. All analytical results are presented in Table 2-15, including the sampling depths for the landfill and perimeter probes.

[b] LOQ = Limit of quantitation.

[c] ppbv = Parts per billion volume; original field data in units of ug/L.

[d] This value represents the highest daily analytical detection limit (method detection limit); no quantitate data were available.

6.0 REMEDIAL ACTION

No remedial action has been performed at the McClellan AFB landfill sites numbered in this report Sites 7, 8, 10, 11, 12, 13, 14, 22, 38, 43, and 69. The Area D vapor monitor wells, identified as VW-1 through VW-9 and the gas vents identified as VC-1 through VC-6.3 are components of the Area D remedial action.

6.1 Ordered

No remedial action has been ordered at the landfill sites evaluated in this investigation.

6.2 Results

Because no remedial action has been ordered at the sites evaluated in this migration, no results for remedial action exist.

Each of the 13 landfill sites assessed in this field testing program and the Area D soil-vapor wells and gas vent system have been and will continue to be evaluted under the USAF's Installation Restoration Program and in accordance with the Comprehensive Environmental Response and Liability Act of 1980, the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Waste Contingency Plan. It is anticipated that the field sampling techniques and analytical procedures used in this assessment to determine the gas generation and gas migration potential for each site will be interpreted using risk assessment techniques to help qualify the relative risk posed by each site to public health and the environment.

7.0 REFERENCES

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APPENDIX A

Condensed Analytical Results
(ppmv)

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CH2Cl2 ppm	CHCl3 ppm	1,2-DCA ppm	TCA ppm	CCl4 ppm	TCE ppm	EDB ppm	PCE ppm	Benzene ppm	Vinyl Chloride ppm
S61-14P	6'	12/02	<0.03	<0.0004	<0.02	<0.0002	0.00006	<0.0004	<0.0001	0.0002	<0.01	<0.01
S62-14L	5.5'	12/02	<0.03	<0.0004	<0.02	<0.0002	0.00005	<0.0004	<0.0001	<0.0002	<0.01	<0.01
S62B-14L	8'	12/03	0.1	0.04	<0.02	0.004	<0.00002	0.002	<0.0001	0.01	<0.001	<0.02
S63-14P	5.25'	12/04	<0.01	<0.0002	<0.01	0.0004	0.0001	<0.0002	<0.0001	0.0001	<0.06	<0.02
S64-14P	5.5'	12/04	<0.01	<0.0002	<0.01	0.0008	<0.00002	<0.0002	<0.0001	0.0004	<0.06	<0.02
S65-13P	5'	12/04	<0.01	<0.0002	<0.01	0.0008	<0.00002	0.004	<0.0001	0.004	<0.06	<0.02
S66-13L	5'	12/04	<0.03	<0.0004	<0.02	0.0004	<0.00005	0.001	<0.0002	0.0002	<0.2	<0.03
S67-13P		12/04	0.2	<0.0004	<0.02	0.004	<0.00005	0.04	<0.0002	0.006	0.6	5
S68-7L	7.5'	12/04	3	<0.004	<0.02	0.02	<0.0005	0.4	<0.005	0.3	<2	2
S69-7L	7'	12/05	<0.03	<0.0004	<0.02	0.0008	<0.00003	0.01	<0.0003	0.06	<0.01	0.08
S610-7L	6'	12/05	9	0.004	<0.02	0.1	<0.00003	0.04	<0.0003	0.04	<0.01	0.08
S611-7L	7.5'	12/05	5	<0.004	<0.2	<0.002	<0.0003	0.4	<0.003	0.2	<0.01	2
S612-7L	8'	12/05	3	<0.0008	<0.05	0.006	<0.00008	0.04	<0.0004	0.04	<0.02	<0.08
S613-7P	2'	12/05	0.1	<0.0004	<0.02	0.0004	0.0001	0.001	<0.0003	<0.00008	<0.01	<0.03
S614-10P	4'	12/05	<0.01	<0.0002	<0.01	0.0004	0.0001	0.0004	<0.00006	0.00009	<0.006	<0.02
S615-10P	6'	12/05	<0.03	<0.0004	<0.02	<0.0002	<0.00003	<0.0004	<0.0003	<0.00008	<0.01	<0.03
S616-10P	6'	12/05	<0.03	<0.0004	<0.02	<0.0002	<0.00003	<0.0004	<0.0003	<0.00008	<0.01	<0.03
S617-11P	6'	12/05	<0.01	<0.0002	<0.01	<0.00008	<0.00002	<0.0002	<0.00006	<0.00003	0.006	<0.02
VW-3		12/07	<0.03	<0.0004	<0.006	<0.0002	0.01	0.01	<0.0003	<0.00009	<0.02	<0.04
VW-2		12/07	<0.3	<0.004	0.2	<0.002	0.03	0.08	<0.003	<0.0009	<0.2	<0.4
VW-1		12/07	<0.02	<0.002	<0.2	<0.0008	0.009	<0.002	<0.001	<0.0004	<0.1	<0.3
VC-3	5'	12/08	<0.06	<0.0006	<0.05	0.08	<0.00006	0.02	<0.0003	<0.0001	<0.02	<0.04
VC-3	7'	12/07	<0.02	<0.0002	<0.02	0.006	<0.00002	0.001	<0.0001	<0.0001	<0.01	<0.03
VC-3	9'	12/07	<0.06	<0.0008	<0.05	0.02	<0.00008	0.004	<0.0004	0.0002	<0.06	<0.1
S618-43P	5.5'	12/07	<0.02	<0.0002	<0.02	0.0002	<0.00005	0.001	<0.0001	0.0001	0.03	<0.03
S619-43L	7'	12/07	<0.02	<0.0002	<0.02	0.0002	<0.00006	0.002	<0.0001	0.001	<0.01	<0.03
S620-43P	7'	12/07	<0.02	<0.0002	<0.02	0.0008	0.0001	0.004	<0.0001	<0.00004	0.01	<0.03
S621-43L	7'	12/07	<0.02	<0.0002	<0.02	0.0004	0.0001	0.002	<0.0001	<0.00004	0.6	<0.03
S622-43P	4'	12/07	<0.02	<0.0002	<0.02	0.0004	0.00003	0.001	<0.0001	<0.00004	<0.01	<0.03
S623-43L	4'	12/07	<0.02	<0.0002	<0.02	<0.0006	<0.00002	0.004	<0.0001	0.0006	<0.01	<0.03
S624-12P	5'	12/07	<0.02	<0.0002	<0.02	0.004	<0.00002	0.004	<0.0001	0.003	0.1	0.03
S625-12P	6'	12/07	<0.6	2	<0.5	<0.004	0.06	8	<0.004	4	32	56
S626-11P	2'	12/07	<0.02	<0.0002	<0.02	0.0006	<0.00002	0.004	<0.0001	0.001	0.01	0.03

Tracer Research Corporation

Notations:
J interference with adjacent peaks
NA not analyzed

Analyzed by D. Abramovic

Checked by J. Tangeman

Proofed by L. Laplander

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CO2 ppm	O2 ppm	N2 ppm	CH4 ppm
SG1-14P	6'	12/02	<21,000	140,000	750,000	<5,100
SG2-14L	5.5'	12/02	<21,000	120,000	700,000	<5,100
SG2B-14L	8'	12/03	53,000	170,000	820,000	<4,200
SG3-14P	5.25'	12/04	<910	220,000	840,000	<2,100
SG4-14P	5.5'	12/04	2,200	200,000	840,000	<2,100
SG5-13P	5'	12/04	9,100	94,000	870,000	<2,100
SG6-13L	5'	12/04	2,000	190,000	840,000	<2,100
SG7-13P	'	12/04	23,000	48,000	550,000	74,000
SG8-7L	7.5'	12/04	19,000	94,000	670,000	32,000
SG9-7L	7'	12/05	6,300	160,000	800,000	<1,100
SG10-7L	6'	12/05	9,100	110,000	820,000	2,100
SG11-7L	7.5'	12/05	35,000	17,000	430,000	99,000
SG12-7L	8'	12/05	11,000	94,000	800,000	<1,100
SG13-7P	2'	12/05	740	230,000	820,000	<1,100
SG14-10P	4'	12/05	<490	230,000	820,000	<1,100
SG15-10P	6'	12/05	1,200	200,000	780,000	<1,100
SG16-10P	6'	12/05	1,500	220,000	800,000	<1,100
SG17-11P	6'	12/05	9,700	110,000	850,000	<1,100
VW-3		12/07	910	200,000	870,000	<4,600
VW-2		12/07	540	200,000	870,000	<4,600
VW-1		12/07	<2,100	200,000	840,000	<4,600
VC-3	5'	12/08	6,300	140,000	82,000	<5,400
VC-3	7'	12/07	1,600	200,000	850,000	<4,600
VC-3	9'	12/07	3,400	190,000	820,000	<4,600
SG18-43P	5.5'	12/07	2,100	190,000	890,000	<4,600
SG19-43L	7'	12/07	6,800	160,000	890,000	<4,600
SG20-43P	7'	12/07	1,800	160,000	820,000	<4,600
SG21-43L	7'	12/07	2,100	130,000	440,000	<4,600
SG22-43P	4'	12/07	800	160,000	660,000	<4,600
SG23-43L	4'	12/07	570	200,000	870,000	<4,600
SG24-12P	5'	12/07	2,900	170,000	850,000	<4,600
SG25-12P	6'	12/07	13,000	30,000	800,000	37,000
SG26-11P	2'	12/07	6,300	19,000	840,000	26,000

Tracer Research Corporation

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by D. Abramovic

Checked by J. Tangeman

Proofed by L. Leglander

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CHCl2 ppm	CHCl3 ppm	1,2-DCA ppm	TCA ppm	CCl4 ppm	TCE ppm	EDB ppm	PCE ppm	Benzene ppm	Vinyl Chloride ppm
VC-3-1		12/09	<0.06	<0.0006	<0.05	0.2	<0.00006	0.01	<0.0004	<0.0001	<0.03	<0.04
VC-4-1		12/09	<0.06	<0.0006	<0.05	0.02	<0.00006	<0.0006	<0.0004	<0.0001	<0.03	<0.04
VC-4-2		12/09	<0.02	<0.0004	<0.02	0.02	<0.00003	<0.0002	<0.0001	<0.00006	<0.01	<0.02
VC-4-4		12/09	<0.02	<0.0004	<0.02	<0.0001	<0.00003	<0.0002	<0.0001	<0.00006	<0.01	<0.02
VC-2-3		12/09	<0.02	<0.0004	<0.02	0.2	<0.00003	0.02	<0.0001	<0.00006	<0.01	<0.02
SG27-69L	7'	12/09	<0.02	<0.0004	<0.02	0.001	<0.00003	0.004	<0.0001	<0.00006	<0.01	<0.02
SG28-69P	5'	12/09	<0.02	<0.0004	<0.02	0.002	<0.00003	0.008	<0.0001	<0.00006	<0.01	<0.02
SG29-69L	8'	12/09	<0.06	<0.0006	<0.05	0.001	<0.00006	0.008	<0.0004	<0.0001	1	0.4
SG30A-69L	8'	12/09	<0.02	<0.0004	<0.02	0.002	<0.00003	0.04	<0.0001	0.004	<0.01	<0.02
SG30B-69L	8'	12/09	<0.02	<0.0004	<0.02	0.004	<0.00003	0.02	<0.0001	0.003	<0.01	<0.02
SG31-69L	8'	12/09	<0.02	<0.0004	<0.02	0.001	<0.00003	0.006	<0.0001	<0.00006	<0.01	<0.02
SG32-69L	8'	12/09	<0.02	<0.0004	<0.02	0.001	<0.00003	0.004	<0.0001	<0.00006	<0.01	<0.02
SG33-69P	3'	12/10	<0.02	<0.0002	<0.02	0.004	<0.00002	0.006	<0.0001	<0.00004	<0.006	<0.01
SG34-22L	7'	12/10	<0.02	<0.0002	<0.02	0.004	<0.00002	0.04	<0.0001	<0.00004	<0.006	<0.01
SG35-22L	8'	12/10	<0.02	<0.0002	<0.02	0.004	<0.00002	0.01	<0.0001	0.03	<0.006	<0.01
SG36-22L	7'	12/10	<0.03	<0.0004	<0.02	0.002	<0.00005	0.004	<0.0003	0.003	<0.01	<0.03
SG37-22P	5'	12/10	<0.02	<0.0002	<0.02	0.008	<0.00002	0.4	<0.0001	0.006	<0.006	<0.01
SG38-22L	8'	12/10	<0.03	<0.0004	<0.02	<0.0002	<0.00005	0.4	<0.0003	0.003	1	4
SG39-8P	4'	12/10	<0.02	<0.0002	<0.02	0.002	<0.00002	0.008	<0.0001	0.01	<0.006	0.01
SG40-8I	8'	12/10	<0.03	<0.0004	<0.02	0.4	<0.00005	0.4	<0.0003	1	0.006	<0.01
SG41-8I	8'	12/10	<0.9	<0.008	<0.8	10	<0.0008	0.4	<0.004	7	<0.01	<0.03
SG42-8P	4'	12/10	<0.3	<0.004	<0.2	0.02	<0.0005	0.02	<0.003	0.2	<0.02	<0.04
SG43-8P	4'	12/11	<0.01	<0.0001	<0.008	0.009	<0.00001	0.004	<0.00005	0.04	0.2	<0.02
VC-2-7		12/11	<0.01	<0.0001	<0.008	2	<0.00001	2	<0.00005	0.0006	<0.006	<0.02
SG44-8I	8'	12/11	<0.03	<0.0004	<0.02	0.009	<0.00005	0.04	<0.0003	0.3	<0.03	0.08
SG45-8I	7'	12/11	<0.01	<0.0001	<0.008	0.002	<0.00001	0.008	<0.00005	0.09	0.002	<0.02
SG46-8I	8'	12/11	<0.3	<0.004	<0.02	2	<0.0005	0.8	<0.003	0.6	2	80
SG47-42L	4'	12/11	<0.1	<0.001	<0.08	0.2	<0.0001	0.2	<0.0005	0.03	<0.06	<0.2
SG48-42L	4'	12/11	<0.01	<0.0001	<0.008	0.002	<0.00001	0.08	<0.00005	0.009	<0.006	<0.02
SG49-42I	3'	12/11	<0.1	<0.001	<0.08	0.04	<0.0001	3	<0.0005	0.02	<0.06	<0.2
SG50-42L	6'	12/11	<0.01	<0.0001	<0.008	0.01	<0.00001	0.04	<0.00005	0.003	<0.006	0.02
SG53-42L	8'	12/11	<0.01	<0.0001	<0.008	0.0004	<0.00001	0.004	<0.00005	0.006	<0.006	0.02
SG54-38L	6'	12/11	<0.01	<0.0001	<0.008	0.01	<0.00001	0.02	<0.00005	0.3	<0.006	0.02
SG55-38L	4'	12/11	<0.1	<0.001	<0.08	0.1	0.008	0.1	<0.0005	0.09	0.06	0.2
SG56-38L	4'	12/11	<0.1	<0.001	<0.08	0.006	<0.0001	0.01	<0.0005	0.09	0.06	0.2
SG57-38L	2'	12/11	<0.01	<0.0001	<0.008	0.0008	<0.00001	0.004	<0.00005	0.00002	<0.02	<0.02

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by D. Abramovic

Checked by S. Cherba

Proofed by L. Laplander

Tracer Research Corporation

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CO2 ppm	O2 ppm	N2 ppm	CH4 ppm
VC-3-1		12/09	11,000	78,000	840,000	<5,800
VC-4-1		12/09	4,000	160,000	790,000	<5,800
VC-4-2		12/09	4,700	160,000	810,000	<5,800
VC-4-4		12/09	1,600	190,000	800,000	<5,800
VC-2-3		12/09	5,700	160,000	790,000	<5,800
SG27-69L	7'	12/09	<2,500	200,000	840,000	<5,800
SG28-69P	5'	12/09	2,800	140,000	870,000	<5,800
SG29-69L	8'	12/09	12,000	58,000	850,000	<5,800
SG30A-69L	8'	12/09	5,700	140,000	770,000	<5,800
SG30B-69L	8'	12/09	4,100	160,000	770,000	<5,800
SG31-69L	8'	12/09	9,700	78,000	870,000	<5,800
SG32-69L	8'	12/09	19,000	190,000	820,000	<5,800
SG33-69P	3'	12/10	1,100	160,000	780,000	<5,100
SG34-22L	7'	12/10	11,000	72,000	790,000	<5,100
SG35-22L	8'	12/10	9,100	75,000	800,000	<5,100
SG36-22L	7'	12/10	1,800	69,000	840,000	<5,100
SG37-22P	5'	12/10	550	150,000	680,000	<5,100
SG38-22I	8'	12/10	1,700	45,000	850,000	<5,100
SG39-8P	4'	12/10	<2,200	170,000	740,000	<5,100
SG40-8I	8'	12/10	12,000	110,000	780,000	<5,100
SG41-8I	8'	12/10	10,000	94,000	780,000	<5,100
SG42-8P	4'	12/10	1,100	160,000	750,000	<5,100
SG43-8P	4'	12/11	740	160,000	780,000	<5,400
VC-2-7	'	12/11	2,500	170,000	730,000	<5,400
SG44-8I	8'	12/11	12,000	100,000	750,000	<5,400
SG45-8I	7'	12/11	1,800	200,000	870,000	<5,400
SG46-8I	8'	12/11	15,000	42,000	800,000	<5,400
SG47-42L	4'	12/11	10,000	180,000	870,000	<5,400
SG48-42I	4'	12/11	6,300	150,000	890,000	<5,400
SG49-42L	3'	12/11	3,500	190,000	870,000	<5,400
SG50-42I	6'	12/11	6,800	170,000	840,000	<5,400
SG53-42L	3'	12/11	<2,500	120,000	780,000	<5,400
SG54-38I	6'	12/11	5,700	86,000	850,000	<5,400
SG55-38I	4'	12/11	<1,300	170,000	800,000	<5,400
SG56-38I	4'	12/11	<1,400	170,000	840,000	<5,400
SG57-38I	2'	12/11	2,500	200,000	840,000	<5,400

Notations:
1 interference with adjacent peaks
NA not analyzed

Analyzed by D. Abramovic

Checked by S. Cherba

Proofed by L. Landrade

Tracer Research Corporation

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CH2Cl2 ppm	CHCl3 ppm	1,2-DCE ppm	TCA ppm	CCl4 ppm	TCE ppm	EDB ppm	PCE ppm	Benzene ppm	Vinyl Chloride ppm
SG58-24P	2'	12/14	<0.02	<0.0002	<0.01	0.002	<0.00002	0.02	<0.00008	0.002	0.01	<0.02
SG59-24P	3'	12/14	<0.02	<0.0002	<0.01	0.0008	0.0002	0.02	<0.00008	0.004	0.01	<0.02
SG60-24L	3'	12/14	<0.02	<0.0002	<0.01	0.01	<0.00002	0.08	<0.00008	<0.00004	0.01	<0.02
SG61-24L	8'	12/14	<0.02	<0.0002	<0.01	0.0008	<0.00002	0.008	<0.00008	<0.00004	0.01	<0.02
SG62-24L	8'	12/14	<0.02	<0.0002	<0.01	0.2	<0.00002	0.04	<0.00008	0.003	0.01	<0.02
SG63-24L	3'	12/14	<0.02	<0.0002	<0.01	0.002	<0.00002	0.004	<0.00008	<0.00004	0.01	<0.02
VC-1-3		12/14	<0.02	<0.0002	<0.01	0.002	<0.00002	0.004	<0.00008	<0.00004	0.01	<0.02
VC-6-3		12/14	<0.2	<0.002	<0.1	0.4	<0.0002	0.04	<0.0008	<0.0004	0.1	<0.2
VC-6-2		12/14	<0.2	<0.002	<0.1	1	<0.0002	0.04	<0.0008	<0.0004	0.1	<0.2
VC-6-1		12/14	<0.2	<0.002	<0.1	2	<0.0002	0.08	<0.0008	0.009	0.1	<0.2
SG64-12P	6'	12/15	1	0.04	<0.2	0.08	0.01	5	<0.003	4	<0.6	52
SG65-12P	5'	12/15	1	0.001	<0.008	0.002	<0.00002	0.2	<0.00006	0.1	1	22
VC NS-1		12/15	<0.009	<0.0002	<0.008	0.02	<0.00002	0.009	<0.00006	0.0009	<0.01	<0.03
VW-4		12/15	<0.009	<0.0002	<0.008	0.001	<0.00002	0.6	<0.00006	0.002	<0.01	<0.03
VW-5		12/15	<0.09	<0.002	<0.08	0.008	<0.0002	0.8	<0.0006	<0.0003	<0.1	<0.3
VW-6		12/15	<0.009	<0.0002	<0.008	0.01	<0.00002	0.1	<0.00006	<0.00003	<0.01	<0.03
VW-9		12/15	<0.09	<0.002	<0.08	0.08	<0.0002	0.1	<0.0006	0.02	<0.1	<0.3
VW-8		12/15	<0.09	<0.002	<0.08	0.9	<0.0002	1	<0.0006	0.03	<0.1	<0.3
VW-7		12/15	<0.09	<0.002	<0.08	0.8	<0.0002	6	<0.0006	0.09	<0.1	<0.3

Notations:
I   interference with adjacent peaks
NA   not analyzed

Analyzed by A. Abramovic

Checked by S. Cherba

Proofed by S. Cherba

Tracer Research Corporation

RADIAN CORPORATION/SACRAMENTO, CALIFORNIA

Sample	Depth	Date	CO2 ppm	O2 ppm	N2 ppm	CH4 ppm
SB58-2-IP	2'	12/14	<2,700	190,000	750,000	<5,800
SB59-2-IP	3'	12/14	<2,700	190,000	730,000	<5,800
SB61-2-IP	3'	12/14	680	180,000	710,000	<5,800
SB61-2-IP	3'	12/14	<2,700	180,000	690,000	<5,800
SB62-2-IP	3'	12/14	12,000	69,000	760,000	<5,800
SB63-2-IP	3'	12/14	2,700	20,000	730,000	<5,800
VE-1-3	'	12/14	970	190,000	720,000	<5,800
VE-6-3	'	12/14	4,700	150,000	750,000	<5,800
VE-6-2	'	12/14	4,400	170,000	770,000	<5,800
VE-6-1	'	12/14	3,400	170,000	770,000	<5,800
SB64-1.5P	6'	12/15	12,000	44,000	650,000	19,000
SB65-1.5P	5'	12/12	3,200	61,000	620,000	45,000
VE-NS-1	'	12/15	10,000	32,000	750,000	<5,300
VW-4	'	12/15	2,200	110,000	760,000	<5,300
VW-5	'	12/15	6,300	110,000	750,000	<5,300
VW-6	'	12/15	1,900	110,000	690,000	<5,300
VW-7	'	12/15	3,500	94,000	760,000	<5,300
VW-8	'	12/15	4,100	66,000	780,000	<5,300
VW-7	'	12/15	5,000	38,000	770,000	<5,300

Tracer Research Corporation

Notations:

I - interference with adjacent peaks
NA not analyzed

Analyzed by D. Abramovic

Checked by S. Cherba

Reviewed by S. Cherba

RADIAN
CORPORATION

APPENDIX B

Raw Analytical Results
(ug/l)

Job EADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/2/87 Page 1a

	2.67 CH_2Cl_2			5.03 $CHCl_3$			5.33 1,2 DCA			5.9 TCA		
standard conc.	200 µg/l			10 µg/l			200 µg/l			5 µg/l		
response from 10ul injection	1 404464 area			1 1019000 area			1 413032 area			1 1477956 area		
	2 408421 area			2 886083 area			2 395256 area			2 1500000 E area		
	3 398374 area			3 1015805 area			3 393072 area			3 1503294 area		
RFs for this sheet	4.95×10^{-14} g/area			1.03×10^{-16} g/area			4.99×10^{-15} g/area			3.35×10^{-17} g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	1044	1000	<50000	<.2	<.2	<50000	<.005	<.005	<50000	<.2	<.2	<50000	<.002	<.002
in sample	1102	2000	<50000	<.1	<.1	<50000	<.002	<.002	<25000	<.06	<.06	~~<50000~~ 60000 E	.001	.001
N_2 blank	1418	2000	<50000	<.1	<.1	<50000	<.002	<.002	<25000	<.06	<.06	<50000	<.0008	<.0008
system blank	1433	2000	<50000	<.1	<.1	<50000	<.002	<.002	<25000	<.06	<.06	55000 E	.0009	
SG-1-14P,6'	1451	2000	<50000	<.1	<.1	<50000	<.002	<.002	<25000	<.06	<.06	<50000	<.0008	<.0008
SG-1-14P,6	1510	2000	<50000	<.1	~~<.1~~	<50000	<.002	~~<.002~~	<25000	<.06	~~<.06~~	<50000	<.0008	
SG-2-14L,5.5	1558	2000	<50000	<.1	<.1	<50000	<.002	<.002	<25000	<.06	<.06	<50000	<.0008	<.0008
SG-2-14L,5.5'	1615	2000	<50000	<.1		<50000	<.002		<25000	<.06		<50000	<.0008	
air sample	1633	2000	<50000	<.1	<.1	<50000	<.002	<.002	<25000	<.06	<.06	60000 E	.001	.001
STD	1659	10	433540			1185105			431871			1676521		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 6/2/87 Page 1b

	6.06 CCl4			7.12 TCE			7.82 EDB			10.16 PCE		
standard conc.	2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from 10 ul injection	1 2280608		area	1 907774		area	1 4222602		area	1 1100000 F		area
	2 2400000 F		area	2 1000000 E		area	2 4016712		area	2 1264224		area
	3 2321060		area	3 1039136		area	3 4176092		area	3 1100000 F		area
RFs for this sheet	8.57×10^{-18}		g/area	1.02×10^{-16}		g/area	4.83×10^{-17}		g/area	4.33×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	1044	1000	<50000	<.0004	<.0004	<50000	<.005	<.005	<50000	<.002	<.002	<100000	<.004	<.004
in sample	1102	2000	8000 E	.0003	.0003	<50000	<.002	<.002	<50000	<.001	<.001	50000 F	.001	.001
N_2 blank	1418	2000	<50000	<.0004	<.0004	<50000	<.002	<.002	<50000	<.001	<.001	<50000	<.001	<.001
system blank	1433	2000	60000 E	.0003	.0003	<50000	<.002	<.002	<50000	<.001	<.001	50000 F	.001	.001
1-14P 6'	1451	2000	90000 E	.0004	.0004	<50000	<.002	<.002	<50000	<.001	<.001	60000 E	.001	.001
1-14P 6'	1510	2000	85000 E	.0004		<50000	<.002		<50000	<.001		60000 E	.001	
2-14, 5.5'	1558	2000	80000 E	.0003	.0003	<50000	<.002	<.002	<50000	<.001	<.001	<50000	<.001	<.001
2-14, 5.5'	1615	2000	79703	.0003		<50000	<.002		<50000	<.001		<50000	<.001	
in sample	1633	2000	80000 E	.0003	.0003	<50000	<.002	<.002	<50000	<.001	<.001	<50000	<.001	<.001
Std	1657	10	252844			1364848			4339104			4363343		

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tangeman

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/2/87 Page 1a

7.31

	BENZENE				
standard conc.	1000 µg/l	µg/l	µg/l	µg/l	µg/l
response from	1 15078066 area	1 area	1 area	1 area	
10 ul injection	2 ~~15864706~~ 15676881 area	2 area	2 area	2 area	
	3 15864706 area	3 area	3 area	3 area	
RFs for this sheet	6.44×10^{-11} g/area	g/area	g/area	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	1044	1000	<100000	<.06	<.06									
air sample	1102	2000	<100000	<.03	<.03									
N_2 blank	1417	2000	<100000	<.03	<.03									
system blank	1433	2000	<100000	<.03	<.03									
SC-1-14P,6	1451	2000	<100000	<.03	<.03									
SC-1-14P,6	1510	2000	<100000	<.03										
SC-2-14L S.S	1558	2000	<100000	<.03	<.03									
SC-2-14L S.S	1615	2000	<100000	<.03										
air sample	1633	2000	<100000	<.03	<.03									
STD	1659	10	17344379											

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Bingham

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 10/2/87 Page 1

	VINYL CHLORIDE											
standard conc.	25 µg/l											
response from 100 ul injection	1 3850593 area											
	2 4150664 area											
	3 3272924 area											
RFs for this sheet	6.65×10^{-10} g/area											
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	1044	1000	<100000	<.07	<.07									
sw sample	1102	2000	<100000	<.03	<.03									
N_2 blank	1418	2000	<100000	<.03	<.03									
system blank	1433	2000	<100000	<.03	<.03									
S6-1-14PL	1451	2000	<100000	<.03	<.03									
S6-1-14PL	1510	2000	<100000	<.03										
S6-2-14L 5.5	1558	2000	<100000	<.03	<.03									
S6-2-14L 5.5	1615	2000	<100000	<.03										
sw sample	1633	2000	<100000	<.03	<.03									
Std	1656	100	3497837											

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tanguma

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/2/87 Page 1

	.39 CO_2		1.11 O_2		1.41 N_2		2.5' CH_4	
standard conc.	264000	µg/l	89600	µg/l	739200	µg/l	28,800	µg/l
response from 1µl injection	1 748207	area	1 1109271	area	1 6724363	area	1 951565	area
	2 720231	area	2 1035630	area	2 6814678	area	2 931471	area
	3 653223	area	3 1097285	area	3 6916875	area	3 855304	area
RFs for this sheet	3.73×10^{-10}	g/area	8.29×10^{-11}	g/area	1.07×10^{-10}	g/area	3.16×10^{-11}	g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
1 blank	1411	2000	<100000	<19,000	<19000	~~<100000~~ <4100	<4100	<4100	~~<100000~~ <100000	~~<5400~~ <5410	~~<5400~~ <5410	<100000	<7600 <5410	<7600 <5410
2 blank	1417	1000	<100000	<37000	<37000	<100000	<8300	<8300	<100000	<11000	<11000	<100000	<3200 <1x10⁻¹⁰	<3200 <1x10⁻¹⁰
1 sample	1429	1000	<100000	<37000	<37000	2234256	190000	190000	7899200	850000	850000	<100000	<3200	<3200
1 standard	1434	1000	<100000	<37000	<37000	1600848	130000	130000	4902150	530000	530000	<100000	<3200	<3200
1-14P 6'	1452	1000	<100000	<37000	<37000	2116147	180000	180000	7714207	830000	840000	<100000	<3200	<3200
1-14P 6'	1503	1000	<100000	<37000		2122197	180000		7796111	840000		<100000	<3200	
2-14P 5.5'	1559	1000	<100000	<37000	<37000	2032978	170000	160000	7462201	800000	790000	<100000	<3200	<3200
2-14P 5.5'	1605	1000	<100000	<37000		1952786	160000		7292474	780000		<100000	<3200	
1 sample	1611	1000	<100000	<37000	<37000	2087890	170000	170000	7707816	830000	830000	<100000	<3200	<3200
Std	1618	1000	685761			734351			6215604			923560		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangerman

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/2/87 Page 1

CONDENSED DATA

standard conc.					µg/l			µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
	depth		CH_2Cl_2	$CHCl_3$	1,2 DCA	TCA	CCl_4	TCE	EDB	PCE	BENZENE	VINYL CHLORIDE	CO_2	O_2
SG-1-14P	6'		<.1	<.002	<.06	<.0008	.0004	<.002	<.001	.001	<.03	<.03	<37000	180000
SG-2-14i	5.5'		<.1	<.002	<.06	<.0008	.0003	<.002	<.001	<.001	<.03	<.03	<37000	160000

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E [redacted] es[redacted]ed [redacted] an[redacted]

Analysed by John Tangeman

Checked by [redacted]

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/2/87 Page 2

CONDENSED DATA

standard conc.				µg/l			µg/l			µg/l			µg/l	
response from			1	area		1	area		1	area		1	area	
ul injection			2	area		2	area		2	area		2	area	
			3	area		3	area		3	area		3	area	
RFs for this sheet				g/area			g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
	depth		N_2	CH_4										
SG-1-14P	6		840000	< 3200										
SG-2-14L	5.5		790000	< 3200										

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/3/87 Page 1

CONDENSED DATA

standard conc.				µg/l			µg/l			µg/l			µg/l				
response from			1		area	1		area	1		area	1		area	1		area
ul injection			2		area	2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area						g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
	depth		CH_2Cl_2	$CHCl_3$	1,2 DCA	TCA	CCl_4	TCE	EDB	PCE	Benzene	vinyl chloride	CO_2		O_2		
SG-2B-HL	8'		.4	.2	<.06	.02	<.0001	.009	<.0008	.09	<.03	<.04	93000		22000		
~~SG-2B-HL~~	~~8~~																

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by _____

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/3/87 Page 2

CONDENSED DATA

standard conc.				µg/l			µg/l			µg/l			µg/l		
response from			1	area		1	area		1	area		1	area		
ul injection			2	area		2	area		2	area		2	area		
			3	area		3	area		3	area		3	area		
RFs for this sheet				g/area			g/area			g/area			g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	
	depth		N_2	CH_4											
SC-2B-14L	8'		920000	23600											

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by _____

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/3/87 Page 1a

	2.65 CH_2Cl_2			5.01 $CHCl_3$			5.31 1,2 DCA			5.89 TCA		
standard conc.	200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from 10 µl injection	1 458712	area		1 1198358	area		1 457787	area		1 1627632	area	
	2 454514	area		2 1157689	area		2 443194	area		2 1617589	area	
	3 ~~467~~ 470441	area		3 1187592	area		3 452472	area		3 1571244	area	
RFs for this sheet	4.34×10^{-15}	g/area		8.47×10^{-17}	g/area		4.43×10^{-15}	g/area		3.11×10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2O blank	1410	10	–	–	–	–	–	–	–	–	–	–	–	–
N_2 blank	~~1000~~ 1435	1000	–	–	–	–	–	–	–	–	–	–	–	–
N_2 blank	~~1000~~ 1440	2000	–	–	–	–	–	–	–	–	–	–	–	–
air sample	1453	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.06	<.06	<25000	<.0004	<.000
Dyotin blk	1547	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.06	<.06	<25000	<.0004	<.000
SG-28-146,8	1631	2000	193331	.4	.4	3834440	.2	.2	<25000	<.06	<.06	R93418	.01	.0
SG-28-M-1	1648	2000	244928	.5		4360013	.2		<25000	<.06		1016324	.02	
air sample	1705	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.001	<.001	<25000	<.0004	<.000
STD	1721	~~1000~~ 10	481571			1203830			457716			1659202		

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tangerman

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/3/87 Page 16

	6.05 CCl4			7.11 TCE			7.82 EDB			10.14 PCE		
standard conc.	2 µg/l			10 µg/l			20 µg/l			5 µg/l		
response from 1µl injection	1 2283784 area			1 1339005 area			1 3037535 area			1 2528225 area		
	2 2268333 area			2 1322693 area			2 2988280 area			2 2480209 area		
	3 2237143 area			3 1327785 area			3 2995125 area			3 2369579 area		
RFs for this sheet	8.84×10^{-18} g/area			7.52×10^{-17} g/area			6.65×10^{-17} g/area			2.03×10^{-17} g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2O blank	1410	10	–	–	–	–	–	–	–	–	–	–	–	–
N_2 blank	1425	1000	–	–	–	–	–	–	–	–	–	–	–	–
N_2 blank	1440	2000	–	–	–	–	–	–	–	–	–	–	–	–
air sample	1453	2000	<25000	<.0001	<.0001	<25000	<.0009	<.0009	<25000	<.0008	<.0008	<25000	<.0002	<.00
system blank	1547	2000	<25000	<.0001	<.0001	<25000	<.0009	<.0009	<25000	<.0008	<.0008	<25000	<.0002	<.00
SG-2B-14,8'	1631	2000	~~<25000~~ ~~<100000~~	<.0001	<.0001	210604	.008	.009	<25000	<.0008	<.0008	7843643	.08	.09
SG-2B-14C	1648	2000	~~<25000~~ ~~<100000~~	<.0001		259717	.01		<25000	<.0008		9948137	.1	
air sample	1705	2000	<25000	<.0001	<.0001	<25000	<.0009	<.0009	<25000	<.0008	<.0008	<25000	<.0002	<.000
Std	1721	~~2000~~ 10	2148313			1300792			3273362			~~2150488~~ 2372781		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by _____

Job RADIAN (SAGREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/3/87 Page 1c

	BENZENE (7.34)		
standard conc.	500 µg/l	µg/l	µg/l	µg/l
response from 10ul injection	1 ~~9924927~~ 9000000 E area	1 area	1 area	1 area
	2 ~~126~~ ~~9924927~~ ~~7000000~~ E area	2 area	2 area	2 area
	3 9000000 E area	3 area	3 area	3 area
RFs for this sheet	5.37×10^{-16} g/area	g/area	g/area	g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2O blank	1410	10	–	–	–									
N_2 blank	1425	1000	–	–	–									
N_2 blank	1440	2000	–	–	–									
air sample	1453	2000	<100000	<.03	<.03									
system blank	1547	2000	<100000	<.03	<.03									
SG-2B-14.8'	1631	2000	<100000	<.03	<.03									
SG-2B-14.8'	1648	2000	<100000	<.03										
air sample	1705	2000	<100000	<.03	<.03									
Std	1721	~~2000~~ 10	1100000											

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
[redacted]imat[redacted]peak[redacted]a

Analysed by John Tongeman

Checked by [redacted]

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/3/87 Page 1

			1,28 VINYL CHLORIDE												
standard conc.			25 µg/l			µg/l			µg/l			µg/l			
response from			1 3453722 area			1 area			1 area			1 area			
100 ul injection			2 3634810 area			2 area			2 area			2 area			
			3 3625094 area			3 area			3 area			3 area			
RFs for this sheet			7.00 X 10^{-16} g/area			g/area			g/area			g/area			
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	
N_2 blank	1425	1000	–	–	–										
N_2 blank	1440	2000	–	–	–										
air sample	1453	2000	<100000	<.04	<.04										
system blank	1547	2000	<100000	<.04	<.04										
SG-2B-14,8	1631	2000	<100000	<.04	<.04										
SG-2B-14,8	1648	2000	<100000	<.04											
air sample	1705	2000	<100000	<.04	<.04										
Std	1721	100	3530335												

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

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TRACER RESEARCH CORPORATION

Date 12/3/87 Page 1

			.46 CO_2			1.34 O_2			1.7 N_2			3.04 CH_4		
standard conc.			264000 µg/l			89600 µg/l			739,200 µg/l			28800 µg/l		
response from 1.0 ml injection			1 799089 area			1 801238 area			1 7601730 area			1 1132394 area		
			2 793782 area			2 799422 area			2 7259288 area			2 1055015 area		
			3 798315 area			3 711564 area			3 7305865 area			3 1078762 area		
RFs for this sheet			3.31×10^{-10} g/area			1.21×10^{-10} g/area			1.00×10^{-10} g/area			2.65×10^{-11} g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2 blank	1403	1000	–	–	–	–	–	–	–	–	–	–	–	–
H_2 blank	1407	2000	–	–	–	–	–	–	–	–	–	–	–	–
air sample	1454	1000	<100000	<33000	<33000	249589	300000	300000	9431564	940000	940000	<100000	<2600	<2600
cyote blank	1545	1000	<100000	<33000	<33000	249101	300000	300000	9461128	950000	950000	<100000	<2600	<2600
S6-2B-14,8'	1636	1000	253388	94000	93000	738609	210000	220000	8844646	880000	920000	<100000	<2600	<2600
S6-2B-14,8'	1641	1000	278604	92000		1824110	220000		9551762	960000		<100000	<2600	
air sample	1655	1000	<100000	<33000	<33000	1947111	240000	240000	7510001	750000	750000	<100000	<2600	<2600
STD	1649	1000	790680			701054			7387503			1094327		

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tangeman

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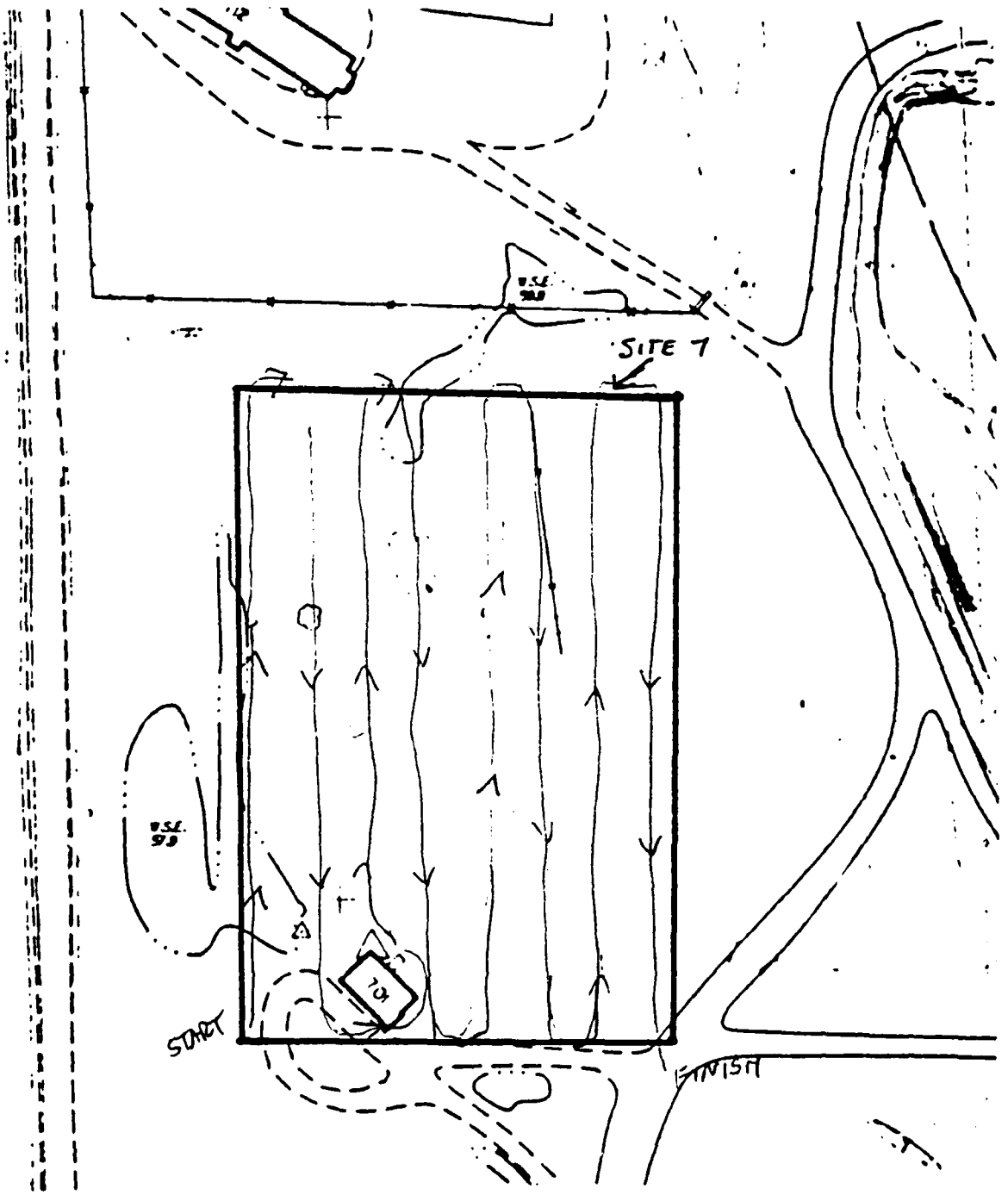
APPENDIX C

Emission Screening Field Notes, Observations and Maps

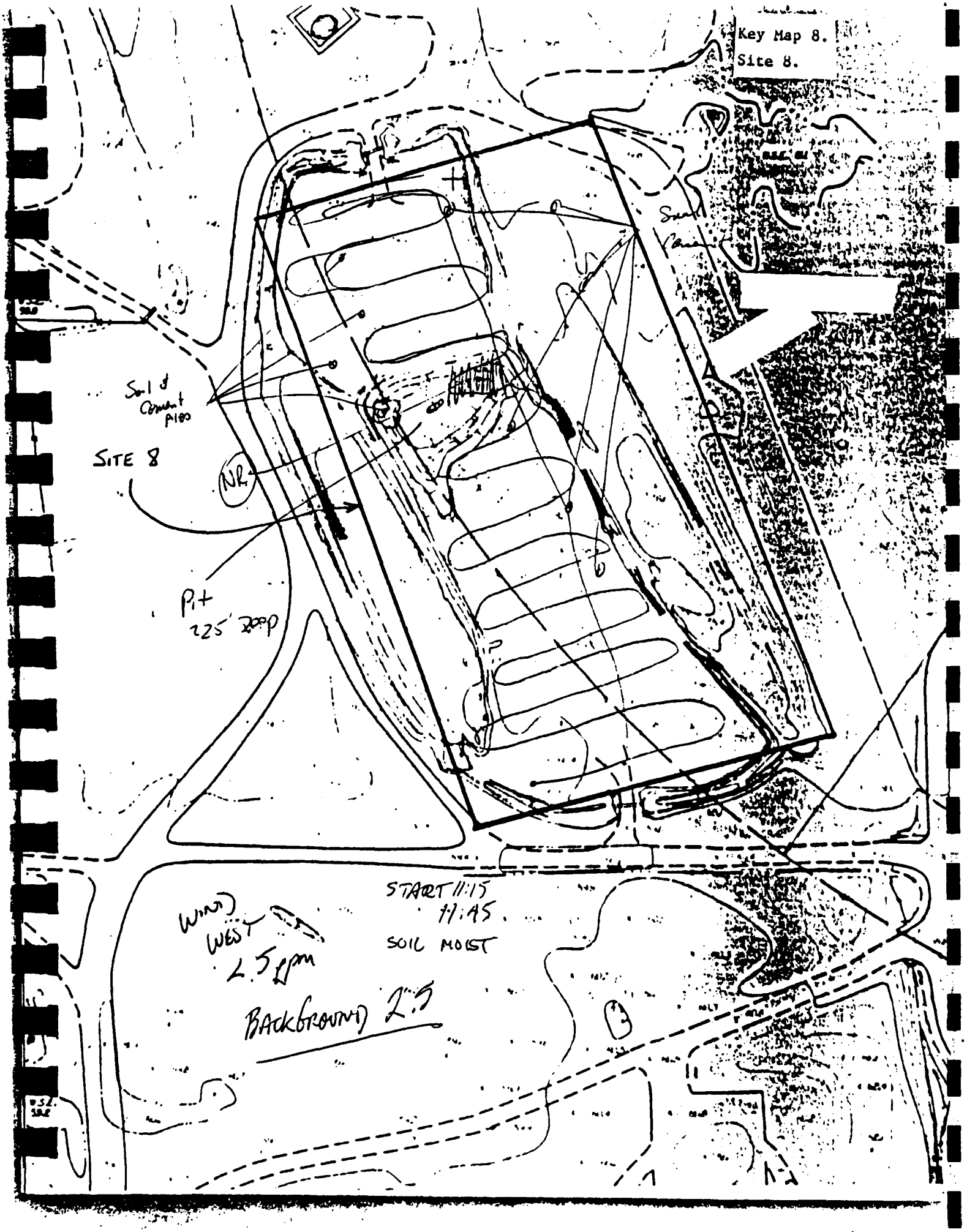
Note: This appendix contains field test observation sheets and presents the walking patterns performed during the surface monitoring of landfills Nos. 7, 8, 10, 11, 12, 13, 14, 22, 38, 42, 43, and 69. Surface monitoring was not required for the remediated sites in Area D.

Key Map 8.
Site 7.

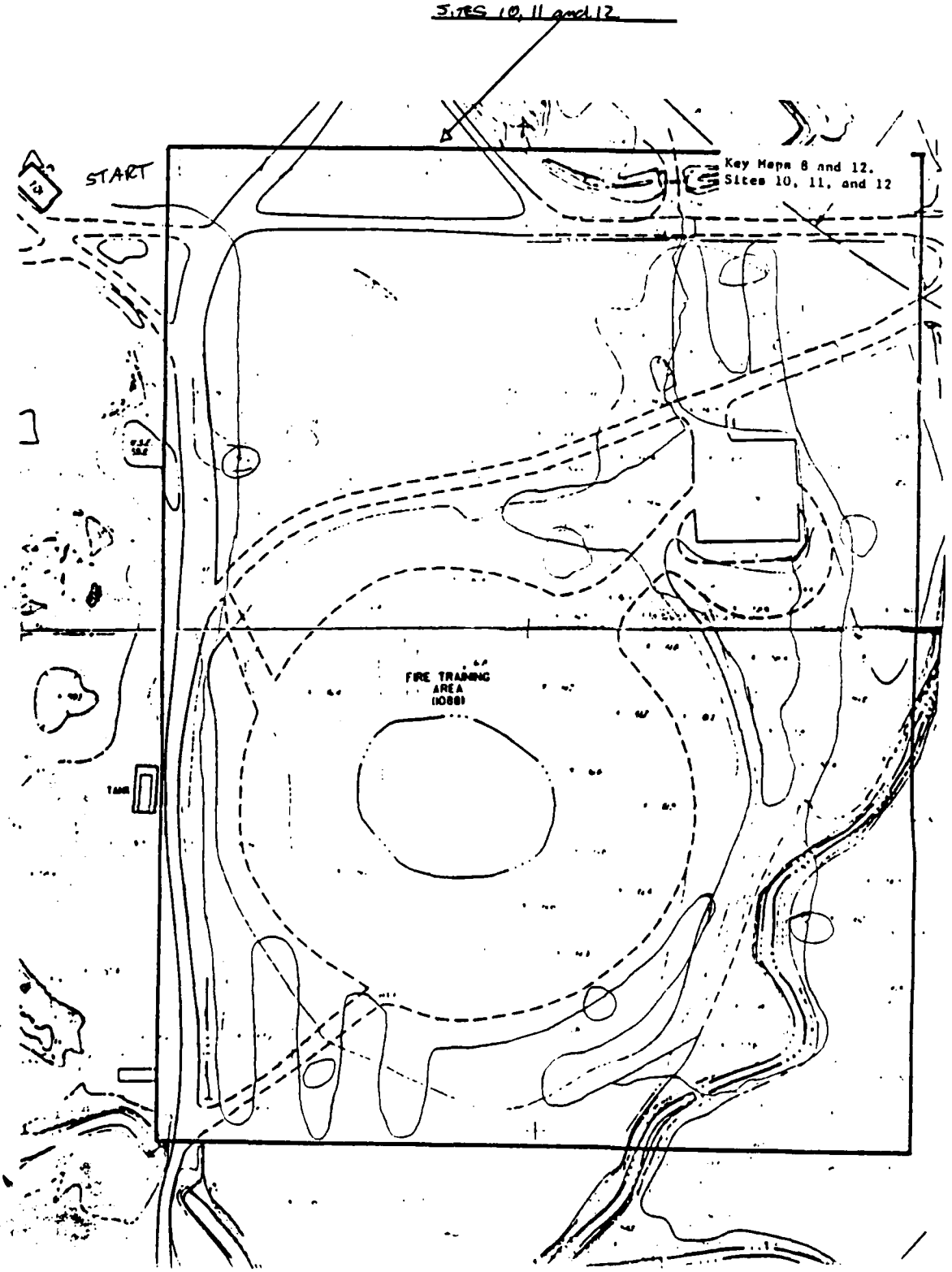


0945 ARRIVED ON SITE
SET UP OVA
PRE CALIBRATION - UP AIR - 5 PPM
482 PPM METHANE - 95 PPM

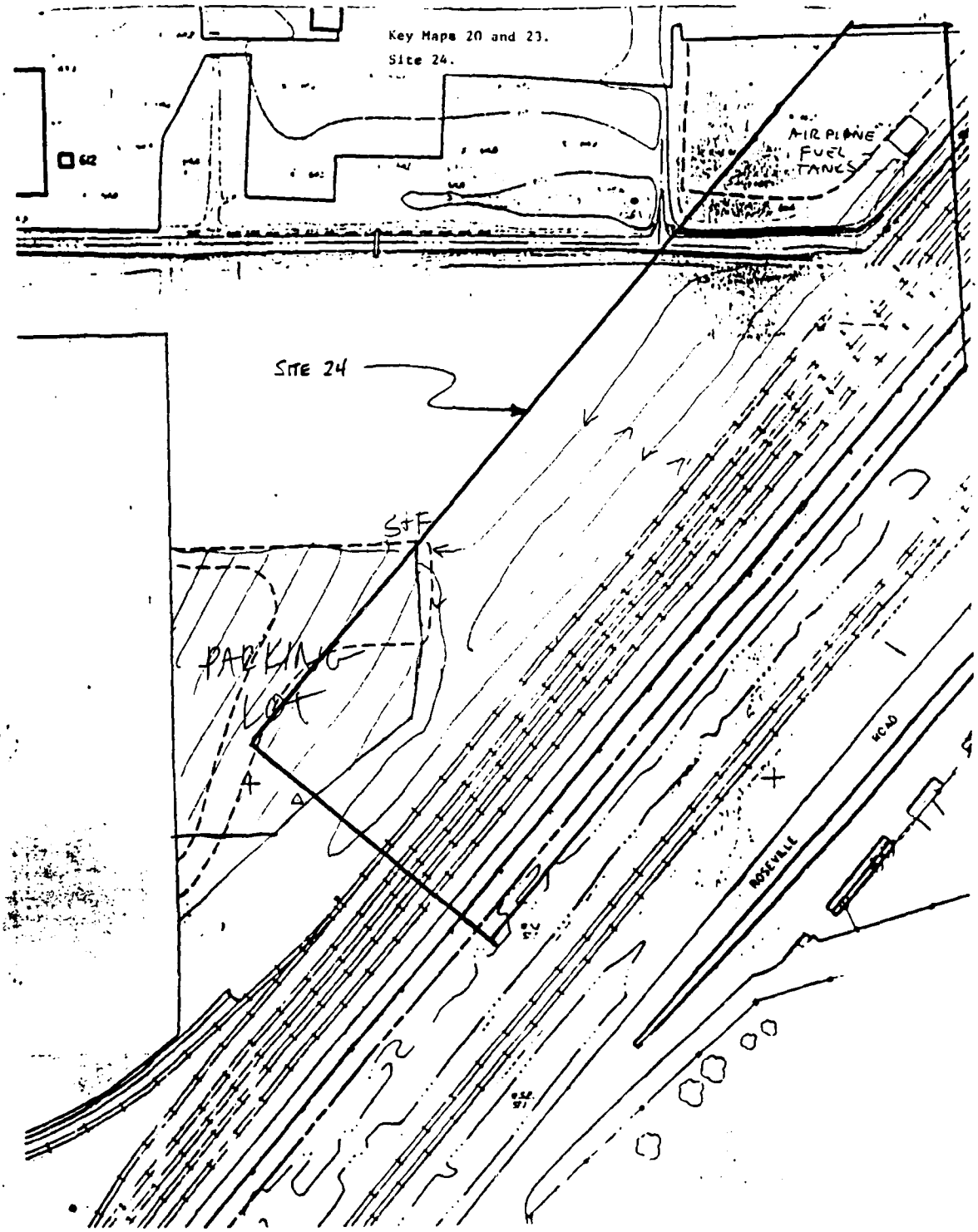
WIND - SOUTH 3-5 MPH
INITIAL BACKGROUND READING - 4 PPM
FINAL " " - 2.5 PPM
NO READINGS GREATER THAN 4 PPM, FINISH 10.37


Key Map 8.
Site 8.
Soil & Cement Pile
SITE 8
NR
Pit
225' Deep
START 11:15
11:45
WIND WEST 2.5 ppm
SOIL MOIST
BACKGROUND 2.5

START 10 40
INITIAL BACKGROUND 2.5 PPM
FINAL " 2.5 PPM
NO READINGS OVER 3 PPM
SOIL MOIST



START: 1350
BACKGROUND 3.0
FINISH 1420
BACKGROUND 3.0
SOIL MOIST
NO READINGS ABOVE 3.5



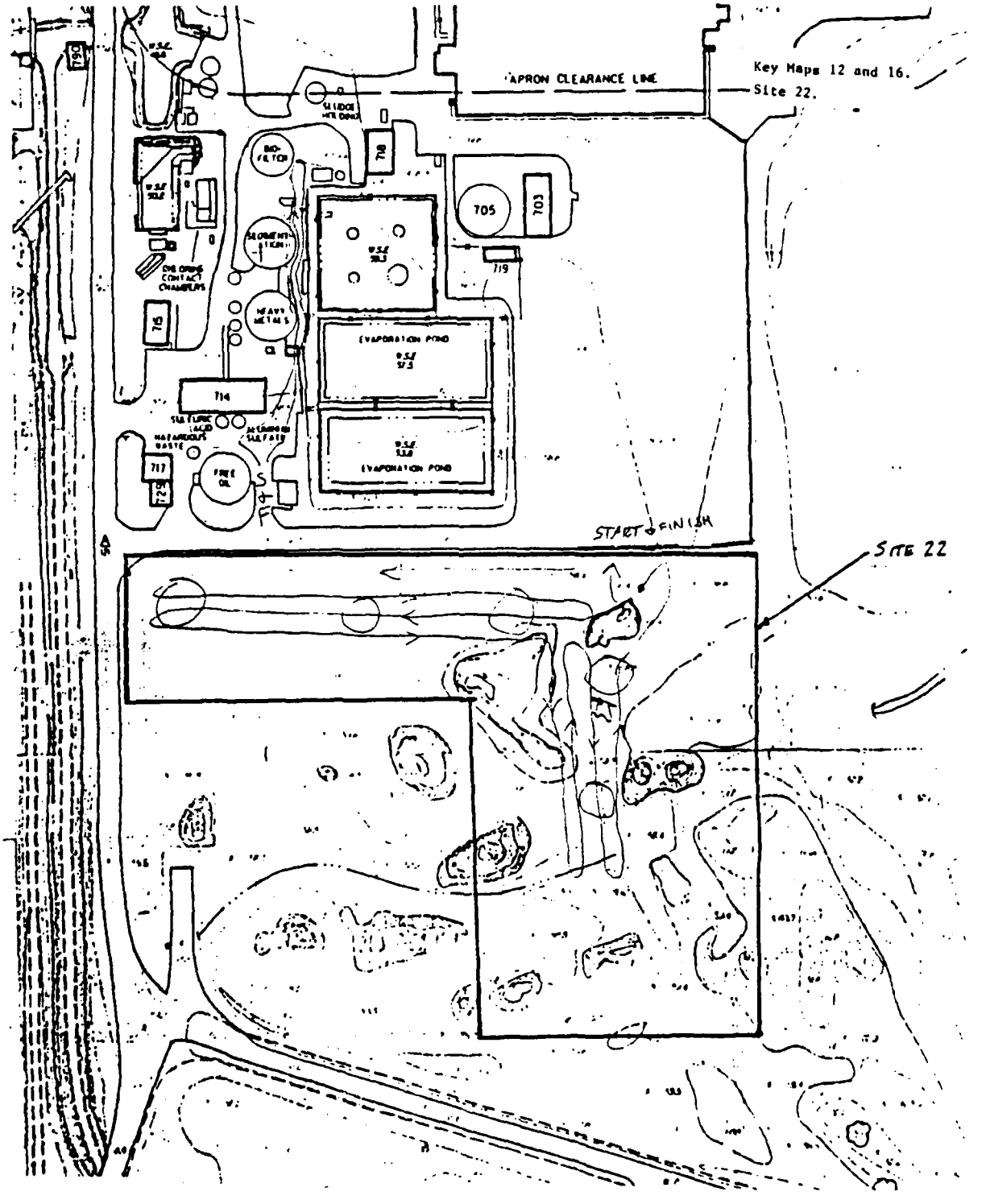
SITES 22 & 42
START - 12:50
BACKGROUND 3.0 PPM
FINISH - 13:20
BACKGROUND 3.0 PPM

SITE 22 SOIL MOIST, LOTS OF STANDING WATER AND MUD

SITE 42 MOSTLY PAVED OR UNDER EVAPORATION PONDS, A FEW GRAVEL & DIRT AREAS

NO READINGS ABOVE 3.5 PPM

SITE 69 SEE MAP ON NEXT PAGE
START 13:20
BACKGROUND 3.0 PPM
FINISH
BACKGROUND 3.0 PPM
NO READINGS OVER 3.5 PPM
SOIL MOIST



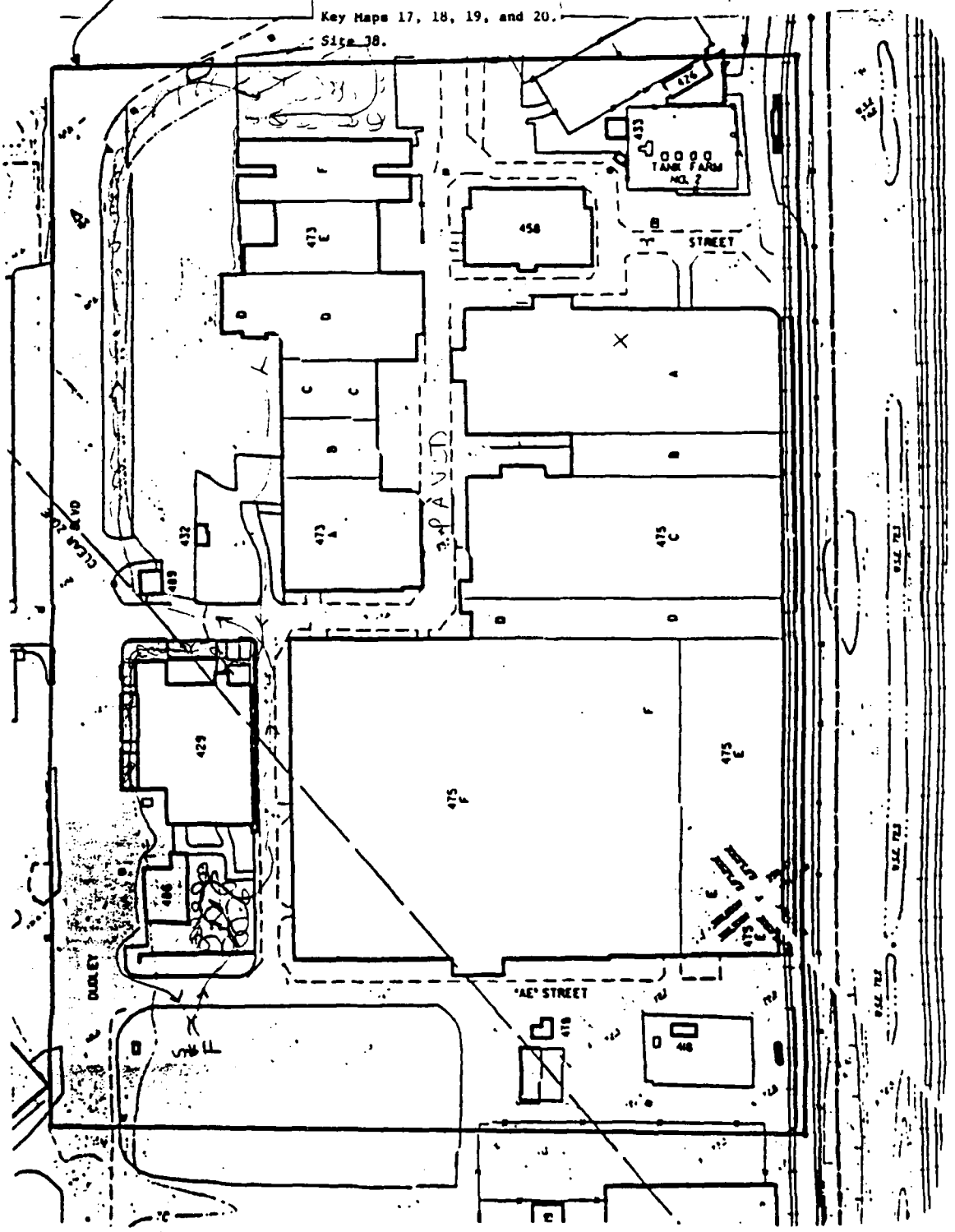
START 1425
BACKGROUND 3.0 PPM
FINISH 1455
BACKGROUND 3.0 PPM

FINAL CALIBRATION: 1520
UP AIR - 3 PPM
~~FUEL~~ 98.2 PPM - 90 PPM

SEE 38

MOST PAVED, ~~25%~~ - GRAVEL AREAS
NO READINGS OVER 3.5 PPM

Key Maps 17, 18, 19, and 20.
Site 38.



START

13 of 14

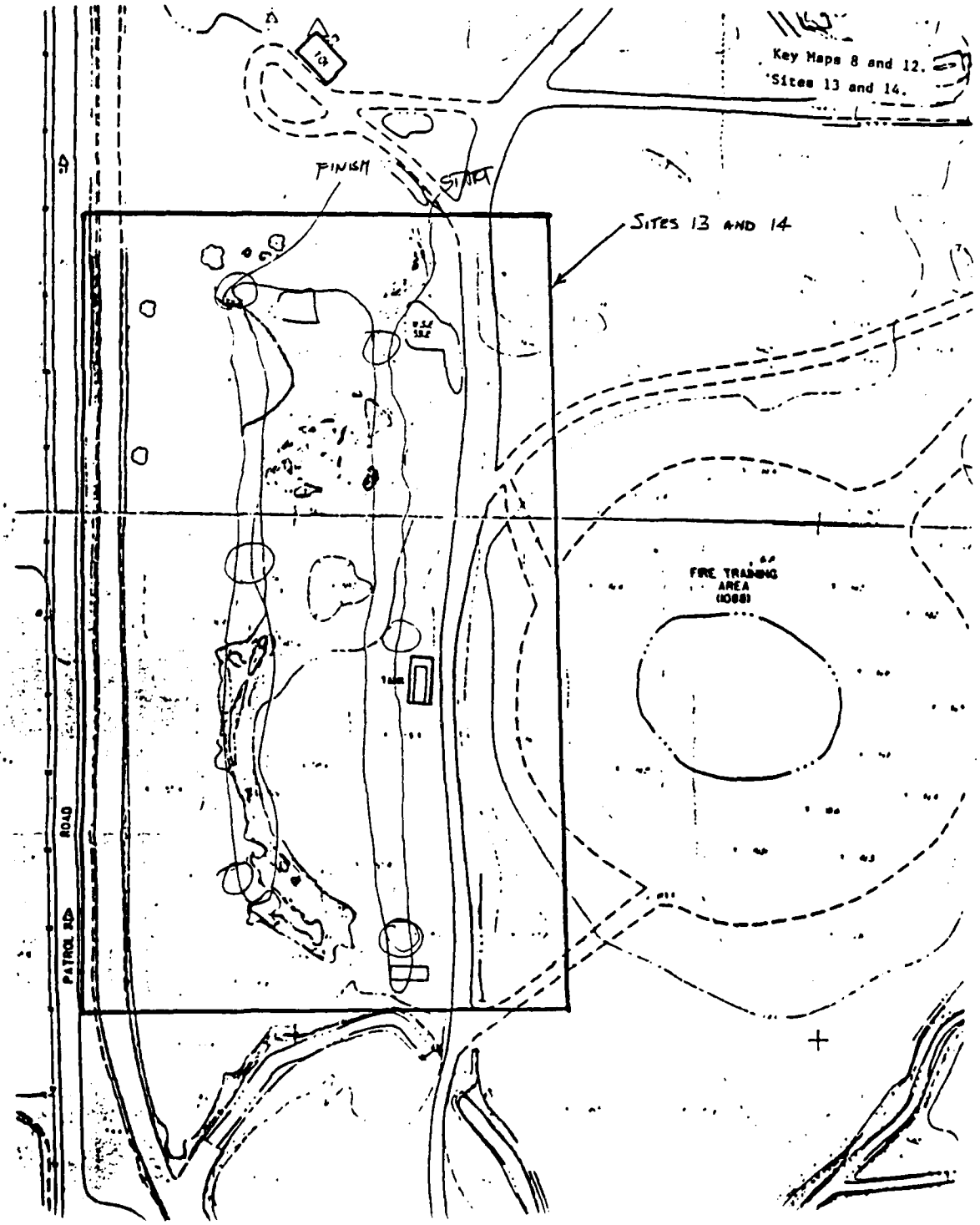
START 1204
BACKGROUND 2.5 PPM
FINISH 1230
BACKGROUND 2.5 PPM

NO READINGS ABOVE 3 PPM
SOIL-MOIST

SITE 43: START 12:36
BACKGROUND 3.0 PPM
FINISH 1247
BACKGROUND 3.0 PPM

NO READINGS ABOVE 4 PPM
SOIL MOIST

SEE MAP ON PREVIOUS PAGE



ORGANIC VAPOR ANALYZER DAILY QUALITY CONTROL CHECK

Instrument: 17 Site: Chevron S/N: 20162 Calibration Species: Methane

Date	Time	Initials	PRETEST QC CHECK Low Level: UHP Zero	Input Conc.	Measured Conc. Actual Value	Measured Conc. Zero Corrected[a]	Error[b]	PRETEST QC CHECK High Level: Input Conc.	Measured Conc.	Error[b] (%)	POSTTEST QC CHECK High Level: UHP Zero	Input Conc.	Measured Conc.	Error[b] (%)	DRIFT: Zero[c]	High[d]
2-9	0809	ADM	<1	100	100	100	0	10,000	10,000	0	NOT	IN	USE	—	—	—
2-10	0512	ADM	<1	100	100	100	0	10,000	10,000	0	NOT	IN	USE	—	—	—
* 2-11	0522	ADM	<1	100	100	100	0	10,000	10,000	0	<1	10,000	10,000	0	0	0
2-12	0512	ADM	<1	100	100	100	0	10,000	10,000	0	<1	10,000	10,000	0	0	0
2-13	0506	ADM	<1	100	100	100	0	10,000	10,000	0	<1	10,000	10,000	0	0	0

Had to make internal adj.

MULTIPOINT CALIBRATION DATA

Date	Time	Initials	0: UHP Zero	0: Instr. Response Actual Value	0: Instr. Response Zero[a] Correct.	1: Input Conc.	1: Instr. Response Actual Value	1: Instr. Response Zero[a] Correct.	2: Input Conc.	2: Inst. Resp.	3: Input Conc.	3: Inst. Resp.	4: Input Conc.	4: Inst. Resp.	5: Input Conc.	5: Inst. Resp.	Correlation Coefficient (r)
11/23	1700	FOW	00			10			100		1000						
1/23	1700	FOW	00	4		10.2	12		98.2	100	993	950	9,890	10,000			

[a]Zero Correction - For OVA response ≤30 ppm, subtract the zero response before calculating % error or correlation coefficient.
[b]Error (%) = (Measured Conc. - Input Conc./Input Conc.) x 100. Acceptance criterion is -20% ≤% Error ≤+20%.
[c]Zero drift = |Posttest Conc. - Pretest Conc.|, expressed in ppm. Acceptable if drift ≤20 ppm.
[d]High level drift = (|Posttest Conc. - Pretest Conc.|/Input Concentration) x 100, expressed in %. Acceptable if drift ≤20%.
[redacted] ≥20[redacted].

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 1

CONDENSED DATA

standard conc.				µg/l			µg/l			µg/l			µg/l				
response from ul injection			1	area		1	area		1	area		1	area				
			2	area		2	area		2	area		2	area				
			3	area		3	area		3	area		3	area				
RFs for this sheet				g/area			g/area			g/area			g/area				
sample	time	amt inj	area ✓	µg/l ✓	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean			
	depth		CH_2Cl_2	$CHCl_3$	1,2 DCA	TCA	CCl_4	TCE	EDB	PCE	BENZENE	VINYL CHLORIDE	CO_2	O_2			
S6-3-14P	5.25'		<.05	~~<.001~~ <.002	<.05	.002	.0006	<.001	<.001	.0007	<.2	<.04	<1600	28000			
S6-4-14P	5.5		<.05	<.001	<.05	.004	<.0001	<.001	~~<.001~~ <.002	.003	<.2	<.04	3900	26000			
S6-5-13P	5'		<.05	<.001	<.05	.004	<.0001	.02	<.001	.03	<.2	<.04	16000	12000			
S6-6-13L	5'		<.1	<.002	<.1	.002	<.0003	.006	<.002	.0006	<.5	<.07	3500	24000			
S6-7-13P	·		.8	<.002	<.1	.02	<.0003	.2	<.002	.04	2	12	41000	6100			
S6-8-7L	7.5'		10	<.02	<1	.1	<.003	2	<.04	2	<5	5	34000	10000			

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by _____

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 2

CONDENSED DATA

standard conc.				µg/l			µg/l			µg/l			µg/l			
response from ul injection			1	area		1	area		1	area		1	area			
			2	area		2	area		2	area		2	area			
			3	area		3	area		3	area		3	area			
RFs for this sheet				g/area			g/area			g/area			g/area			
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
	depth		N_2	CH_4												
SG-3-14P	5.25'		940000	<1300												
SG-4-14P	5.5'		940000	<1300												
SG-5-13P	5'		980000	<1300												
SG-6-13L	5'		940000	<1300												
SG-7-13P			620000	46000												
SG-8-7L	7.5'		750000	20000												

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by _____

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 1a

	2.61 CH_2Cl_2			4.96 $CHCl_3$			5.26 1,2 DCA			5.84 FCA		
standard conc.	200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from 10 ul injection	1 459129	area		1 1035031	area		1 ~~463132~~ 463570	area		1 1389215	area	
	2 475755	area		2 976497	area		2 463132	area		2 1389934	area	
	3 479688	area		3 1005410	area		3 474447	area		3 1342340	area	
RFs for this sheet	4.24×10^{-15}	g/area		9.94×10^{-17}	g/area		4.22×10^{-15}	g/area		3.64×10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H2O blank	827	10	—	—	—	—	—	—	—	—	—	—	—	—
N2 blank	~~950~~ 932	1000	~~<25000~~	—	—	—	—	—	—	—	—	—	—	—
N2 blank	900	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	<25000	<.0004	<.00
air sample	914	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	<25000	<.0004	<.00
system blank	930	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	<25000	<.0004	<.00
SG-3-14P,5.25	~~1017~~ 1014	1000	<25000	~~<.05~~ <.1	<.05	~~<25000~~	~~<.001~~ <.002	~~<.001~~ <.001	<25000	~~<.05~~ <.1	<.05	~~<25000~~ 60000 E	.002	.0
SG-3-14P,5.25	~~1034~~ 1031	2000	<25000	<.05		~~<25000~~ <25000	~~<.001~~ <.001	~~<.001~~ <.001	<25000	<.05		<25000	.002	
SG-4-14P,5.5	1107	1000	<25000	<.1	<.05	<25000	<.002	<.001	<25000	<.1	<.05	120391	.004	.0
SG-4-14P,5.5	1121	2000	<25000	<.05		<25000	<.001		<25000	<.05		161761	.003	
SG-5-13P,5.5	1137	1000	<25000	<.1	<.05	<25000	<.002	<.001	<25000	<.1	<.05	104079	.004	.0
SG-5-13P,5.5	1152	2000	<25000	<.05		<25000	<.0001		<25000	<.05		207736	.004	
SG-6-13L,5	1307	1000	<25000	<.1	<.1	<25000	<.002	<.002	<25000	<.1	<.1	60000 F	.002	.0
SG-6-13L,5	1321	1000	<25000	<.1		<25000	<.002		<25000	<.1		60000 E	.002	
SG-7-13P,5	1337	1000	177339	.8	.8	<25000	<.002	<.002	<25000	<.1	<.1	403427	.01	.0
SG-7-13P,5	1420	1000	210297	.9		<25000	<.002		<25000	<.1		462669	.02	
Std	1619	10	407068			1259358			397284			1447482		
SG-8-7L,7.5	1713	100	242599	10	10	<25000	<.02	<.02	<25000	<1	<1	405661	.1	.1
SG-8-7L,7.5	1729	50	120384	10		<25000	<.05		<25000	<2		194109	.1	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangerman

Checked by _____

TRACER RESEARCH CORPORATION

Job RADIAN (SACREMENTO, CA)

Date 12/4/87 Page 16

			6.03 CCl4			7.08 TCE			7.76 EDB			10.06 PCE		
standard conc.			2 µg/l			10 µg/l			20 µg/l			5 µg/l		
response from 10 ul injection			1 1753797 area			1 1163435 area			1 2795798 area			1 2400000^E area		
			2 1783004 area			2 1215576 area			2 2524467 area			2 2353740 area		
			3 1743846 area			3 1108673 area			3 2413676 area			3 2350000^E area		
RFs for this sheet			1.14×10^{-17} g/area			8.60×10^{-17} g/area			7.76×10^{-17} g/area			2.11×10^{-17} g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2O blank	827	10												
N_2 blank	842	1000												
N_2 blank	900	2000	<25000	<.0001	<.0001	<25000	<.001	<.001	<25000	<.001	<.001	<25000	<.0003	<.000
air sample	914	2000	75000^E	.0004	.0004	<25000	<.001	<.001	<25000	<.001	<.001	~~<25000~~ 600000	.0006	.000
system blank	930	2000	70000^E	.0004	.0004	<25000	<.001	<.001	<25000	<.001	<.001	<25000	<.0003	<.000
SG-3-14P,5.25'	1013	1000	50000^E	.0006	.0006	<25000	<.002	<.001	<25000	<.002	<.001	<25000	<.0005	.00
SG-3-14P,5.25'	1034	2000	95000^E	.0005		<25000	<.001		<25000	<.001		70000	.0007	
SG-4-14P,5.5'	1107	1000	<25000	<.0003	<.0001	<25000	<.002	<.001	<25000	<.002	<.001	100000^E	.003	.00
SG-4-14P,5.5'	1121	2000	<25000	<.0001		<25000	<.001		<25000	<.001		314296	.003	
SG-5-13P,5'	1137	1000	<25000	<.0003	<.0001	246342	.02	.02	<25000	<.002	<.001	1400000	.03	.0
SG-5-13P,5'	1152	2000	<25000	<.0001		584053	.03		<25000	<.001		2435255	.03	
SG-6-13L,5'	1307	1000	<25000	<.0003	<.0003	75000^E	.006	.006	<25000	<.002	<.002	60000^E	.0006	.00
SG-6-13L,5'	1321	1000	<25000	<.0003		80000^E	.007		<25000	<.002		60000^E	.0006	
SG-7-13P,5'	1337	1000	<25000	<.0003	<.0003	1926313	.2	.2	<25000	<.002	<.002	1955490	.04	.0
SG-7-13P,5'	1420	1000	<25000	<.0003		2339845	.2		<25000	<.002		1850871	.04	
Std	1619	10	1844268			2221757			2737026			2207238		
SG-8-7L,7.5'	1713	100	<25000	<.003	<.003	2341162	2	2	<25000	<.02	<.04	1417069	3	2
SG-8-7L,7.5'	1729	50	<25000	<.006		1156224	2		<25000	<.04		5296366	2	

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
mat eak a

Analysed by John Langeman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 1C

	BENZENE											
standard conc.	500 µg/l		µg/l		µg/l		µg/l		µg/l			
response from 10ul injection	1 1000000 E area	1	area	1	area	1	area	1	area			
	2 1000000 E area	2	area	2	area	2	area	2	area			
	3 1100000 E area	3	area	3	area	3	area	3	area			
RFs for this sheet	4.84×10^{-15} g/area		g/area		g/area		g/area		g/area			

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2O blank	827	10	–	–	–									
N_2 blank	842	1000	–	–	–									
N_2 blank	900	2000	<100000	<.2	<.2									
air sample	914	2000	<100000	<.2	<.2									
system blank	930	2000	<100000	<.2	<.2									
SG-3-14P, 5.25'	1013	1000	<100000	<.5	<.2									
SG-3-14P, 5.25'	1034	2000	<100000	<.2										
SG-4-14P, 5.5'	1107	1000	<100000	<.5	<.2									
SG-4-14P, 5.5'	1121	2000	<100000	<.2										
SG-5-13P, 5'	1137	1000	<100000	<.5	<.2									
SG-5-13P, 5'	1150	2000	<100000	<.2										
SG-6-13L, 5'	1307	1000	<100000	<.5	<.5									
SG-6-13L, 5'	1321	1000	<100000	<.5										
SG-7-13P, 5'	1337	1000	500000 E	2	2									
SG-7-13P, 5'	1421	1000	500000 E	2										
std	1620	10	1100000 E											
SG-8-7L, 7.5'	1714	100	<1000000	<5	<5									
SG-8-7L, 7.5'	1730	50	<1000000	<10										

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by _____

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 1

	VINYL CHLORIDE				
standard conc.	25 µg/l	µg/l	µg/l	µg/l	µg/l
response from	1 3392959 area	1 area	1 area	1 area	1 area
100 ul injection	2 3581854 area	2 area	2 area	2 area	2 area
	3 3428884 area	3 area	3 area	3 area	3 area
RFs for this sheet	7.21×10^{-16} g/area	g/area	g/area	g/area	g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	842	1000	<100000	<.07	<.07									
N_2 blank	900	2000	<100000	<.04	<.04									
air sample	914	2000	<100000	<.04	<.04									
system blank	930	2000	<100000	<.04	<.04									
SG-3-14P, 5.25'	1013	1000	<100000	<.07	<.04									
SG-3-14P, 5.25'	1034	2000	<100000	<.04										
SG-4-14P, 5.5'	1107	1000	<100000	<.07	<.04									
SG-4-14P, 5.5'	1121	2000	<100000	<.04										
SG-5-13P, 5'	1137	1000	<100000	<.07	<.04									
SG-5-13P, 5'	1152	2000	<100000	<.04										
SG-6-13L, 5'	1307	1000	<100000	<.07	<.07									
SG-6-13L, 5'	1321	1000	<100000	<.07										
SG-7-13P, 5'	1337	1000	1685168	12	12									
SG-7-13P, 5'	1421	1000	1742001	13										
STD			293348											
SG-8-7L, 7.5'	1714	100	679749	5	5									
SG-8-7L, 7.5'	1730	50	351080	5										
air sample	1804	2000	<100000	<.04	<.04									

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tangeman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 1

	CO2 (.44)			O2 (1.29)			N2 (1.65)			CH4 (2.95)		
standard conc.	26400	µg/l		89600	µg/l		739200	µg/l		28800	µg/l	
response from 1000 ul injection	1 857147	area		1 789191	area		1 7704561	area		1 1185793	area	
	2 813163	area		2 737349	area		2 7241428	area		2 1128956	area	
	3 789689	area		3 732636	area		3 7133774	area		3 1103252	area	
RFs for this sheet	3.22 x 10^-11	g/area		1.19 x 10^-10	g/area		1.00 x 10^-10	g/area		2.53 x 10^-11	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H2O blank	829	1000	—	—	—	—	—	—	—	—	—	—	—	—
H2O blank	836	2000	<110000	<1600	<1600	<100000	<5900	<5900	<100000	<5000	<5000	<100000	<1300	<13
air sample	916	1000	119864	3900	3900	2559286	300000	300000	9438924	950000	950000	<100000	<1300	<130
System blank	935	1000	186932	6000	6000	2460893	290000	290000	9552891	960000	960000	<100000	<1300	<130
SG-3-14p, 5.25'	1014	1000	<100000	<1600	<1600	2447462	290000	280000	9810603	990000	940000	<100000	<1300	<13
SG-3-14p, 5.25'	1031	1000	<100000	<1600		2266601	270000		8753106	880000		<100000	<1300	
SG-4-14p, 5.5'	1105	1000	126346	4100	3900	2111421	250000	260000	9474389	950000	940000	<100000	<1300	<13
SG-4-14p, 5.5'	1112	1000	114517	3700		2216088	260000		9075157	930000		<100000	<1300	
SG-5-13p, 5'	1136	1000	519349	17000	16000	875644	100000	120000	9791916	980000	980000	<100000	<1300	<13
SG-5-13p, 5'	1140	1000	494778	16000		1075858	130000		9730807	980000		<100000	<1300	
SG-6-13L, 5'	1243	1000	126233	4100	3500	2109275	250000	240000	9553625	960000	940000	<100000	<1300	<13
SG-6-13L, 5'	1308	1000	91645	2900		2015715	240000		9288791	930000		<100000	<1300	
SG-7-13p	1337	1000	1291018	42000	41000	358108	43000	61000	6173806	620000	620000	1855606	47000	46
SG-7-13p	1347	1000	1243644	40000		659932	79000		6262806	630000		1784431	45000	
STD	1411	1000	773686			728935			6943111			1071184		
SG-8-7L, 7.5'	1751	1000	1059569	34000	34000	1013956	120000	120000	7397336	740000	750000	773176	20000	200
SG-8-7L, 7.5'	1755	1000	1068948	34000		1043333	120000		7572319	760000		778042	20000	
air sample	1758	1000	<100000	<1600	<1600	2560542	300000	300000	9519335	960000	960000	<100000	<1300	<130

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangerman

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 2a

	CH_2Cl_2			$CHCl_3$			1,2 DCA			TCA		
standard conc.			µg/l			µg/l			µg/l			µg/l
response from	1		area	1		area	1		area	1		area
ul injection	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet			g/area			g/area			g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
an sample	1804	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	90000 E		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 26

			CCl4			TCE			EDB			PCE		
standard conc.				µg/l			µg/l			µg/l			µg/l	
response from			1	area		1	area		1	area		1	area	
ul injection			2	area		2	area		2	area		2	area	
			3	area		3	area		3	area		3	area	
RFs for this sheet				g/area			g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
air sample	1804	2000	92000			<25000	<.001	<.001	<25000	<.001	<.001	<25000	<.0003	<.000

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tingerman

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/4/87 Page 2c

	BENZENE											
standard conc.		µg/l		µg/l			µg/l			µg/l		
response from	1	area	1	area		1	area		1	area		
ul injection	2	area	2	area		2	area		2	area		
	3	area	3	area		3	area		3	area		
RFs for this sheet		g/area		g/area			g/area			g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
air sample	1804	2000	400000	2.2	2.2									

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by

MJ

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 1

CONDENSED DATA

standard conc.					µg/l			µg/l			µg/l			µg/l	
response from			1		area	1		area	1		area	1		area	
ul injection			2		area	2		area	2		area	2		area	
			3		area	3		area	3		area	3		area	
RFs for this sheet					g/area			g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	
	depth		~~CH_2Cl_2~~ ~~CHCl₃~~	$CHCl_3$	1,2 DCA	TCA	CCl_4	TCE	EDB	PCE	BENZENE	VINYL CHLORIDE	CO_2	O_2	
S6-9-7L	7'		<.1	<.002	<.1	.004	<.0002	.06	<.002	.4	<.04	.2	11000	200,000	
S6-10-7L	6'		30	.02	<.1	.6	<.0002	.2	<.002	.3	<.04	.2	16,000	140,000	
S6-11-7L	7.5		16	<.02	<1	<.008	<.002	2	<.02	1	<.4	4	62000	2,200,000	
S6-12-7L	8'		9	<.004	<.2	.03	<.0005	.2	<.003	.3	<.08	<.2	20000	120,000	
S6-13-7P	2'		.5	<.002	<.1	.002	.0007	.005	<.002	<.0005	<.04	<.08	1300	300,000	
S6-14-10P	4'		<.05	<.001	<.05	.002	.0006	.002	<.0005	.0006	<.02	<.04	<860	300,000	
S6-15-10P	6'		<.1	<.002	<.1	<.0008	<.0002	<.002	<.002	<.0005	<.04	<.08	2200	260,000	
S6-16-10P	6'		<.1	<.002	<.1	<.0008	<.0002	<.002	<.002	<.0005	<.04	<.08	2600	280,000	
S6-17-11P	6'		<.05	<.001	<.05	<.0004	<.0001	<.0008	<.0005	<.0002	<.02	<.04	1700	140,000	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 2

CONDENSED DATA

standard conc.				µg/l			µg/l			µg/l			µg/l		
response from ul injection			1	area		1	area		1	area		1	area		
			2	area		2	area		2	area		2	area		
			3	area		3	area		3	area		3	area		
RFs for this sheet				g/area			g/area			g/area			g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	
	depth		N_2	CH_4											
S6-9-7L	7'		900000	<670											
S6-10-7L	6'		920000	1300											
S6-11-7L	7.5'		480000	62000											
S6-12-7L	8'		900000	<670											
S6-13-7P	2'		920000	<670											
S6-14-10P	4'		920000	<670											
S6-15-10P	6'		880000	<670											
S6-16-10P	6'		900000	<670											
S6-17-11P	6'		960000	<670											

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 1a

	2.58 CH_2Cl_2 ✓			4.95 $CHCl_3$ ✓			5.28 1,2 DCA ✓			5.82 TCA ✓		
standard conc.	200 µg/l			10 µg/l			200 µg/l			5 µg/l		
response from 10ul injection	1 493404 area			1 1170125 area			1 488745 area			1 1653602 area		
	2 478528 area			2 1187044 area			2 469321 area			2 1585543 area		
	3 444947 area			3 1160663 area			3 445229 area			3 1638140 area		
RFs for this sheet	4.23×10^{-15} g/area			8.53×10^{-17} g/area			4.28×10^{-15} g/area			3.08×10^{-17} g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	612	1000												
N_2 blank	625	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	~~<25000~~	<.0004	<.00
air sample	735	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	⇔ 80000 E	.001	.00
oyster blank	806	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	80000 E	.001	.001
SG-9-7L, 7'	859	1000	<25000	<.1	<.1	<25000	<.002	<.002	<25000	<.1	<.1	139663	.004	.00
SG-9-7L, 7'	927	1000	<25000	<.1		<25000	<.002		<25000	<.1		145587	.004	
SG-10-7L, 6'	1009	1000	~~<25000~~	~~<135~~	~~<135~~	200000 E	.02	.02	<25000	<.1	<.1	2492560 E	.8	.6
SG-10-7L, 6'	1023	100	~~<25000~~	⇔ 24	30	<25000	<.02		<25000	<.1		1628481	.5	
SG-11-7L, 7.5'	1114	50	179303	15	16	<25000	<.04	<.02	<25000	<.2	<.1	<25000	<.02	<.0
SG-11-7L, 7.5'	1129	100	406766	17		<25000	<.02		<25000	<.1		<25000	<.008	
SG-12-7L, 8'	1206	500	1098682	9	9	<25000	<.004	<.004	<25000	<.2	<.2	538711	.03	.0
SG-12-7L, 8'	1221	500	1045455	9		<25000	<.004		<25000	<.2		511196	.03	
SG-13-7L, 2'	~~1230~~ 1306	1000	108701	.5	.5	<25000	<.002	<.002	<25000	~~<.05~~	<.1	70000 E	.002	.00
SG-13-7L, 2'	1321	1000	115243	.5		<25000	<.002		<25000	<.1		70000 E	.002	
Std	1337	10	426791			1070486			429424			1378550		
SG-14-10L, 4'	1438	1000	<25000	<.1	<.05	<25000	<.002	<.001	<25000	<.1	<.05	50000 E	.002	.00
SG-14-10L, 4'	1452	2000	<25000	<.05		<25000	<.001		<25000	<.05		80000 E	.001	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangyman

Checked by _____

Job KADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 16

	5.94 CCl_4 ✓			7.01 TCE ✓			7.71 EDB			ACE		
standard conc.	2	µg/l		10	µg/l		20	µg/l		5	µg/	
response from 1µl injection	1 2084845	area		1 1517720	area		1 3000000 E	area		1 2600000 E	area	
	2 2066244	area		2 1523542	area		2 3100000 E	area		2 ~~2955976~~ 2500000 E	area	
	3 1993078	area		3 1510287	area		3 3363360	area		3 2955976	area	
RFs for this sheet	9.77×10^{-18}	g/area		6.59×10^{-17}	g/area		6.34×10^{-17}	g/area		1.86×10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
~~N_2 blank~~	612	1000												
N_2 blank	625	2000	<25000	<.0001	<.0001	<25000	<.0008	<.0008	<25000	<.0008	<.0008	<25000	<.0002	<.000
~~air purge~~ N_2 blank	735	2000	~~1000008~~	.0005	.0005	<25000	<.0008	<.0008	<25000	<.0008	<.0008	<25000	<.0002	<.000
system blank	806	2000	101000	.0005	.0005	<25000	<.0008	<.0008	<25000	<.0008	<.0008	<25000	<.0002	<.000
S6-9-7L 7'	857	1000	<25000	<.0002	<.0002	1043353	.07	.06	<25000	<.002	<.002	9102169	.2	.4
S6-9-7L, 7'	727	1000	<25000	<.0002		886042	.06		<25000	<.002		11286429	.7	
S6-10-7L, 6'	1009	1000	<25000	<.0002	<.0002	2666858	.2	.2	<25000	<.002	<.002	14537732	.3	.3
S6-10-7L, 6'	1023	~~1000~~	<25000	<.002		154089	.1		<25000	<.02		1800260	.3	
S6-11-7L 7.5'	1114	50	<25000	<.005	<.002	1486853	.2	.2	<25000	<.03	<.02	25032224	.9	1
S6-11-7L 7.5'	1129	100	<25000	<.002		3647069	.2		<25000	<.02		5196865	1	
S6-12-7L 8'	1206	500	<25000	<.0005	<.0005	1491485	.2	.2	<25000	<.003	<.003	7633572	.3	.3
S6-12-7L 8'	1221	500	<25000	<.0005		1633899	.2		<25000	<.003		7867979	.3	
S6-13-7L 2'	~~1304~~ 1305	~~1000~~ #0	70000 E	.0007	.0007	70000 E	.005	.005	<25000	<.002	<.002	<25000	<.0005	<.00
S6-13-7L 2'	1321	1000	70000 E	.0007		70000	.005		<25000	<.002		<25000	<.0005	
Std	1337	10	1726272			1158880			2439974			2707304		
S6-14-10L 4'	1438	1000	60000 E	.0006	.0006	35000 E	.002	.002	<25000	<.002	<.0008	30000 E	.0006	.00
S6-14-10L 4'	1452	2000	100000 E	.0005		68192	.002		<25000	<.0008		60000 E	.0006	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

Checked by _____

Job RADIAN (SACRAMENTO, CA)

TRACER RESEARCH CORPORATION

Date 10/5/87 Page 1c

7.23

	BENZENE											
standard conc.	500 µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
response from	1 13000000E area	1	area	1	area	1	area	1	area	1	area	
10 ul injection	2 12613571 area	2	area	2	area	2	area	2	area	2	area	
	3 11316779 area	3	area	3	area	3	area	3	area	3	area	
RFs for this sheet	4.06 X 10^{-16} g/area		g/area		g/area		g/area		g/area		g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	612	1000												
N_2 blank	625	2000	<~~250000~~ 500	<.02	<.02									
air sample	735	2000	<100000	<.02	<.02									
Dynatech blk	806	2000	<100000	<.02	<.02									
SL-9-7L, 7'	859	1000	<100000	<.04	<.04									
SL-9-7L, 7'	927	1000	<100000	<.04										
SL-10-7L, 6'	1009	1000	<100000	<.04	<.04									
SL-10-7L, 6'	1023	100	<1000000	<.4										
SL-11-7L, 7.5	1114	50	<100000	<.8	<.4									
SL-11-7L, 7.5	1129	100	<100000	<.4										
SL-12-7L, 8'	1206	500	<100000	<.08	<.08									
SL-12-7L, 8'	1221	500	<100000	<.08										
SL-13-7L, 2'	~~1346~~ 1346	1000	<100000	<.04	<.04									
SL-13-7L, 2'	1321	1000	<100000	<.04										
Std	1406	10	10401600											
SL-14-10L, 4'	1438	1000	<100000	<.04	<.02									
SL-14-10L, 4'	1452	2000	<100000	<.02										

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 1

	VINYL CHLORIDE											
standard conc.	25 µg/l		µg/l		µg/l		µg/l		µg/l		µg/l	
response from 100ul injection	1 3243484 area		1 area		1 area		1 area		1 area		1 area	
	2 3422168 area		2 area		2 area		2 area		2 area		2 area	
	3 3321188 area		3 area		3 area		3 area		3 area		3 area	
RFs for this sheet	7.51×10^{-16} g/area											

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	612	1000												
N_2 blank	625	2000	<100000	<.04	<.04									
air sample	735	2000	<100000	<.04	<.04									
system blank	806	2000	<100000	<.04	<.04									
SG-9-7L, 7'	859	1000	269815	.2	.2									
SG-9-7L, 7'	927	1000	213481	.2										
SG-10-7L, 6'	1009	1000	449207	.3	.2									
SG-10-7L, 6'	1023	100	27823	.2										
SG-11-7L, 7.5	1114	50	187636	3	4									
SG-11-7L, 7.5'	1129	100	583529	4										
SG-12-7L, 8'	1206	500	<100000	<.2	<.2									
SG-12-7L, 8'	1221	500	<100000	<.2										
SG-13-7P, 2'	1306	1000	<100000	<.08	<.08									
SG-13-7P, 2'	1321	1000	<100000	<.08										
std	1334	100	3661703											
SG-14-10P, 4'	1438	1000	<100000	<.08	<.04									
SG-14-10P, 4'	1452	2000	<100000	<.04										

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 1

	CO_2			O_2			N_2			CH_4		
standard conc.	26400	µg/l		89600	µg/l		739200	µg/l		28800	µg/l	
response from	1 780874	area		1 695047	area		1 7385598	area		1 1090112	area	
1000 ul injection	2 760457	area		2 680468	area		2 7231206	area		2 1065053	area	
	3 754698	area		3 685503	area		3 7219556	area		3 1065741	area	
RFs for this sheet	3.45×10^{-11}	g/area		1.30×10^{-10}	g/area		1.02×10^{-10}	g/area		2.68×10^{-11}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2O blank	722	1000	<25000	<860	<860	<25000	<3300	<3300	<25000	<2500	<2500	<25000	<670	<67
H_2O blank	726	2000	—	—	—	—	—	—	—	—	—	—	—	—
air sample	730	1000	225000	~~<860~~	~~<860~~	2396062	~~310000~~	~~310000~~	9328577	940000	940000	<25000	<670	<670
System blank	828	1000	<25000	~~<860~~	~~<860~~	2316047	300000	300000	8977669	910000	910000	<25000	<670	<670
SG-9-TL 7'	940	1000	314898	11000	11000	1550296	200000	200000	9059195	920000	900000	<25000	<670	<67
SG-9-TL 7'	944	1000	313774	11000		1525628	200000		8800532	890000		<25000	<670	
SG-10-TL 6'	1000	1000	490923	17000	16000	957002	120000	140000	9109337	930000	920000	50000 E	1300	130
SG-10-TL 6'	1005	1000	437429	15000		1129250	150000		9086606	920000		50000 E	1300	
SG-11-TL 7.5'	1106	1000	177173	61000	62000	146112	19000	22000	4770672	480000	480000	2272196	61000	620
SG-11-TL 7.5'	1110	1000	1805609	62000		186265	24000		4773510	480000		2316917	62000	
SG-12-TL 8'	1159	1000	598098	21000	20000	872156	110000	120000	8802226	890000	900000	<25000	<670	<6
SG-12-TL 8'	1203	1000	583143	20000		991837	130000		8813493	900000		<25000	<670	
SG-13-TL 2'	1259	1000	36841	1300	1300	227845	300000	300000	9092989	920000	920000	<25000	<670	<67
SG-13-TL 2'	1302	1000	38166	1300		223748	290000		9040664	920000		<25000	<670	
STD	1332	1000	749788			696268			7338181			1086841		
SG-14-TL 4'	1428	1000	<25000	<860	<860	2315360	~~300000~~	300000	9045468	920000	920000	<25000	<670	<67
SG-14-TL 4'	1433	1000	<25000	<860		2287676	300000		9003868	910000		<25000	<670	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 2a

	CH_2Cl_2			$CHCl_3$			1,2 DCA			TCA		
standard conc.			µg/l			µg/l			µg/l			µg/l
response from	1		area	1		area	1		area	1		area
ul injection	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet			g/area			g/area			g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
S6-15-10P,6'	1523	1000	<25000	<.1	<.1	<25000	<.002	<.002	<25000	<.1	<.1	<25000	<.0008	<.0
S6-15-10P,6'	1537	1000	<25000	<.1		<25000	<.002		<25000	<.1		<25000	<.0008	
S6-16-10P6'	1558	1000	<25000	<.1	<.1	<25000	<.002	<.002	<25000	<.1	<.1	<25000	<.0008	<.0
S6-16-10P6'	1613	1000	<25000	<.1		<25000	<.002		<25000	<.1		<25000	<.0008	
S6-17-11P,6'	1633	1000	25000	<.1	<.05	<25000	<.002	<.001	<25000	<.1	<.05	<25000	<.0008	<.0
S6-17-11P,6'	1649	2000	<25000	<.05		<25000	<.001		<25000	<.05		<25000	<.0004	
air sample	1708	2000	<25000	<.05	<.05	<25000	<.001	<.001	<25000	<.05	<.05	<25000	<.0004	<.0
STD	1720	10	706412			1344280			954182			1751074		

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Engeman

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 26

			CCl_4			TCE			EDB			PCE		
standard conc.				µg/l			µg/l			µg/l			µg/l	
response from			1	area		1	area		1	area		1	area	
ul injection			2	area		2	area		2	area		2	area	
			3	area		3	area		3	area		3	area	
RFs for this sheet				g/area			g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
S6-15-10P, 6'	1523	1000	<25000	<.0002	<.0002	<25000	<.002	<.002	<25000	<.002	<.002	<25000	<.0005	<.00
S6-15-10P, 6'	1537	1000	<25000	<.0002		<25000	<.002		<25000	<.002		<25000	<.0005	
S6-16-10P, 6'	1558	1000	<25000	<.0002	<.0002	<25000	<.002	<.002	<25000	<.002	<.002	<25000	<.0005	<.00
S6-16-10P, 6'	1613	1000	<25000	<.0002		<25000	<.002		<25000	<.002		<25000	<.0005	
S6-17-11P, 6'	1633	1000	<25000	<.0002	<.0001	<25000	<.002	<.0008	<25000	<.0005	<.0005	<25000	<.0005	<.00
S6-17-11P, 6'	1649	2000	<25000	<.0001		<25000	<.0008		<25000	<.0005		<25000	<.0002	
air sample	1708	2000	<25000	<.0001	<.0001	<25000	<.0008	<.0008	<25000	<.0005	<.0005	<25000	<.0002	<.00
Std	1722	10	1694574			1500706			1260016			2700000		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- F estimated peak area

Analysed by John Tangeman

Checked by _____

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 2f

	BENZENE											
standard conc.	500 µg/l			µg/l			µg/l			µg/l		
response from	1 area			1 area			1 area			1 area		
ul injection	2 area			2 area			2 area			2 area		
	3 area			3 area			3 area			3 area		
RFs for this sheet			g/area			g/area			g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-15-10P,6'	1523	1000	<100000	<.04	<.04									
SG-15-10P,6'	1537	1000	<100000	<.04										
SG-16-10P,6'	1558	1000	<100000	<.04	<.04									
SG-16-10P,6'	1613	1000	<100000	<.04										
SG-17-11P,6'	1633	1000	<100000	<.04	<.02									
SG-17-11P,6'	1649	2000	<100000	<.02										
air sample	1708	2000	<100000	<.02	<.02									
STD	1720	10	9712122											

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
[redacted]mat[redacted]peak[redacted]a

Analysed by John Tsugawa

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 2

	VINYL CHLORIDE											
standard conc.		µg/l		µg/l		µg/l		µg/l				
response from	1	area	1	area	1	area	1	area				
ul injection	2	area	2	area	2	area	2	area				
	3	area	3	area	3	area	3	area				
RFs for this sheet		g/area		g/area		g/area		g/area				

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-15-10P,6'	1523	1000	<100000	<.08	<.08									
SG-15-10P,6	1537	1000	<100000	<.08										
SG-16-10P,6'	1558	1000	<100000	<.08	<.08									
SG-16-10P,6'	1613	1000	<100000	<.08										
SG-17-11P,6'	1633	1000	<100000	<.08	<.04									
SG-17-11P,6'	1649	2000	<100000	<.04										
air sample	1708	2000	<100000	<.04	<.04									
STD	1742	700	2118557											

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangerman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/5/87 Page 2

	CO₂			O₂			N₂			CH₄		
standard conc.			µg/l			µg/l			µg/l			µg/l
response from ul injection	1		area	1		area	1		area	1		area
	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet			g/area			g/area			g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-15-10P,6'	1514	1000	65423	2300	2200	1972683	260000	260000	8446832	860000	890000	<25000	<670	<67
SG-15-10P,6	1518	1000	61048	2100		2102494	270000		8916945	910000		<25000	<670	
SG-16-10P,6	1549	1000	73605	2500	2600	2058098	270000	280000	8805283	890000	900000	<25000	<670	<67
SG-16-10P,6'	1554	1000	74636	2600		2123168	280000		8952783	910000		<25000	<670	
SG-17-11P,6'	1624	1000	531659	18000	17000	906251	120000	140000	9403205	950000	960000	<25000	<670	<67
SG-17-11P,6	1628	1000	491038	16000		1152217	150000		9439073	960000		<25000	<670	
air sample	1700	1000	<25000	<860	<860	2324853	300000	300000	9018817	920000	920000	<25000	<670	<67
std	1704	1000	723768			632604			6910074			1036534		

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
[redacted]mat[redacted]eak[redacted]a

Analysed by John Tangeman

Checked by [redacted]

MG

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/87 Page 1

CONDENSED DATA

standard conc.					µg/l			µg/l			µg/l			µg/l		
response from			1		area	1		area	1		area	1		area		
ul injection			2		area	2		area	2		area	2		area		
			3		area	3		area	3		area	3		area		
RFs for this sheet					g/area			g/area			g/area			g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean		
	depth		$CHCl_2$	$CHCl_3$	1,2 DCA	TCA	CCl_4	TCE	EDB	PCE	BENZENE	VINYL CHLORIDE	CO_2	O_2		
VW-3			<.1	<.002	<.1	<.0009	.06	.06	<.002	<.0006	<.08	<.1	1600	260000		
VW-2			<1	<.02	<1	<.009	.2	.4	<.02	<.006	<.8	<1	940	250000		
VW-1			<.06	<.01	<.6	<.004	.02	<.009	<.008	<.003	<.4	<.7	<3700	250000		
VC-3-9			<.2	<.004	<.2	.1	<.0005	.02	<.003	<.001	<.2	<.3	6000	240000		
VC-3-7			<.06	<.001	<.06	.03	<.0001	.006	<.0008	.0007	<.04	<.07	2800	260000		
SG-18-43P	5.5'		<.06	<.001	<.06	.001	.0003	.006	<.0008	.0007	.1	<.07	3700	240000		
SG-19-43L	7'		<0.06	<0.001	<0.06	0.001	0.0004	0.01	<0.0008	0.008	<0.04	<0.07	12000	200000		
SG-20-43P	7'		<0.06	<0.001	<0.06	0.004	0.0006	0.03	<0.0008	<0.0003	<0.04	<0.07	3100	200000		
SG-21-43L	7'		<0.06	<0.001	<0.06	0.002	0.0008	0.008	<0.0008	<0.0003	2	<0.07	3700	170000		
SG-22-43P	4'		<0.06	<0.001	<0.06	0.002	0.0002	0.005	<0.0008	<0.0003	<0.04	<0.07	1400	200000		
SG-23-43L	4'		<0.06	<0.001	<0.06	<0.004	<0.0001	0.02	<0.0008	0.004	<0.04	<0.07	1000	260000		
SG-24-12P	5'		<0.06	<0.001	<0.06	0.02	<0.0001	0.02	<0.0008	0.02	0.4	<0.07	5100	220000		
SG-25-12P	6'		<2	10	<2	<0.02	0.4	44	<0.03	27	100	140	23000	39000		
SG-26-11P	2'		<0.06	<0.001	<0.06	0.003	<0.0001	0.02	<0.0008	0.02	<0.04	<0.07	11000	24000		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tengoma

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/87 Page 1a

	2.69 CH_2Cl_2			5.00 $CHCl_3$			5.30 1,2 DCA			5.88 TCA		
standard conc.	200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from 10ul injection	1 447388	area		1 1122757	area		1 433902	area		1 1444120	area	
	2 441040	area		2 1145525	area		2 434898	area		2 1448895	area	
	3 433442	area		3 1150216	area		3 439963	area		3 1453971	area	
RFs for this sheet	4.54×10^{-15}	g/area		8.78×10^{-17}	g/area		4.58×10^{-15}	g/area		3.45×10^{-17}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	603	1000												
N_2 blank	616	2000	<25000	<.06	<.06	<25000	<.001	<.001	<25000	<.06	<.06	<25000	<.0004	<.00
air sample	704	2000	<25000	<.06	<.06	<25000	<.001	<.001	<25000	<.06	<.06	<25000	<.0004	<.00
system blank	731	2000	<25000	<.06	<.06	<25000	<.001	<.001	<25000	<.06	<.06	<25000	<.0004	<.00
VW-3	804	1000	<25000	<.1		<25000	<.002		<25000	<.1		<25000	<.0009	
VW-3	818	100	<25000	<1	<.1	<25000	<.02	<.002	<25000	<1	<.1	<25000	<.009	<.0
VW-3	831	100	<25000	<1		<25000	<.02		<25000	<1		<25000	<.009	
VW-2	845	100	<25000	<1	<1	<25000	<.02	<.02	<25000	<1	<1	<25000	<.009	<.0
VW-2	858	100	<25000	<1		<25000	<.02		<25000	<1		<25000	<.009	
VW-1	913	100	<25000	<1	<.06	<25000	<.02	<.01	<25000	<1	<.6	<25000	<.009	<.0
VW-1	927	200	<25000	<.06		<25000	<.01		<25000	<.6		<25000	<.004	
VC-3-9	940	500	<25000	<.2	<.2	<25000	<.004	<.004	<25000	<.2	<.2	[illegible]	.1	.1
VC-3-9	953	250	<25000	<.5		<25000	<.009		<25000	<.5		[illegible]	.1	
VC-3-7	1007	1000	<25000	<.1	<.06	<25000	<.002	<.001	<25000	<.1	<.06	763717	.03	.0
VC-3-7	1021	2000	<25000	<.06		<25000	<.001		<25000	<.06		1559687	.03	
Std	1036	10	404082			1074013			413069			1328267		
S6-18-43, 5.5	1057	1000	22500	<.1	<.06	<25000	<.002	<.001	<25000	<.06	<.06	35000 E	.001	.00
S6-18-43R, 5.5	1112	2000	<25000	<.06		<25000	<.001		<25000	<.1		70000 E	.001	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangeman

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TRACER RESEARCH CORPORATION

Date 12/7/87 Page 18

1.32 p.97

			VINYL CHLORIDE													
standard conc.			~~500~~ 25	µg/l			µg/l			µg/l			µg/l			µg/l
response from			1 1857334	area		1	area		1	area		1	area		1	area
100 ul injection			2 1859253	area		2	area		2	area		2	area		2	area
			3 1818916	area		3	area		3	area		3	area		3	area
RFs for this sheet			1.35×10^{-15}	g/area			g/area			g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	~~813~~	1000														
N_2 blank	616	2000	~~<120000~~ <35000	<.07	<.07											
ambient	704	2000	~~<120000~~ <35000	<.07	<.07											
system blank	731	2000	~~<120000~~ <35000	<.07	<.07											
VW-3	804	1000	<100000	<.1												
VW-3	818	100	<100000	<1	<.1											
VW-3	831	100	<100000	<1												
VW-2	845	100	<100000	<1	<1											
VW-2	858	100	<100000	<1												
VW-1	913	100	<100000	<1	<.7											
VW-1	927	200	<100000	<.7												
VC-3-9	940	500	<100000	<.3	<.3											
VC-3-9	953	250	<100000	<.5												
VC-3-7	1007	1000	<100000	<.1	<.07											
VC-3-7	1021	2000	<100000	<.07												
Std	1047	100	1597144													
SC-18-43p, 5.5	1057	1000	<100000	<.1	<.07											
SC-18-43p, 5.5	1112	2000	<100000	<.07												

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- F estimated peak area

Analysed by John Trigema

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TRACER RESEARCH CORPORATION

Date 2/7/87 Page 1c

41

	CO_2		O_2		N_2		CH_4	
standard conc.	26400	µg/l	89600	µg/l	739200	µg/l	28800	µg/l
response from 1000ul injection	1 700789	area	1 831855	area	1 6816415	area	1 999253	area
	2 703394	area	2 597778	area	2 6435827	area	2 959374	area
	3 718581	area	3 616415	area	3 6594073	area	3 992376	area
RFs for this sheet	3.73×10^{-11}	g/area	1.31×10^{-10}	g/area	1.12×10^{-10}	g/area	2.93×10^{-11}	g/area

sample	time	amt inj	CO_2 area	CO_2 µg/l	CO_2 mean	O_2 area	O_2 µg/l	O_2 mean	N_2 area	N_2 µg/l	N_2 mean	CH_4 area	CH_4 µg/l	CH_4 mean
H_2 blank	742	1000	<100000	<3700	<3700	<100000	<13000	<13000	<100000	<11000	<11000	<100000	<2900	<2900
H_2 blank	745	2000	ED											
air sample	748	1000	<100000	<3700	<3700	2250096	300000	300000	8795995	980000	980000	<100000	<2900	<2900
Syste Blk	752	1000	<100000	<3700	<3700	2235132	290000	290000	8697555	970000	970000	<100000	<2900	<2900
VW-3	804	1000	44593	1700	1600	2032279	270000	260000	8419848	1000000	980000	<100000	<2900	<2900
VW-3	807	1000	42293	1600		1982995	260000		8649383	970000		<100000	<2900	
VW-2	848	1000	25336	950	940	1877171	250000	250000	8821140	990000	980000	<100000	<2900	<2900
VW-2	851	1000	24692	920		1882594	250000		8744216	980000		<100000	<2900	
VW-1	911	1000	<100000	<3700	<3700	1870992	250000	250000	8371555	940000	940000	<100000	<2900	<2900
VW-1	915	1000	<100000	<3700		1908550	250000		8473317	950000		<100000	<2900	
VC-3-9	940	1000	161093	6000	6000	1808752	240000	240000	8256817	920000	920000	<100000	<2900	<2900
VC-3-7	1007	1000	78410	2900	2800	2066495	270000	260000	8628558	960000	960000	<100000	<2900	<2900
VC-3-7	1019	1000	74772	2800		1994272	260000		8677532	970000		<100000	<2900	
Std	1030	100	635176			620720			6157168			863717		
SC-18-43, 5.5	1054	1000	101480	3800	3700	6910029	250000	240000	9054992	1000000	1000000	<100000	<2900	<2900
SC-18-43, 5.5	1101	1000	97800	3600		1812580	240000		9015733	1000000		<100000	<2900	

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Tangeman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/87 Page 1b

	6.04 CCl4			7.11 TCE			7.80 EDB			10.14 PCE		
standard conc.	2	µg/l		10	µg/l		20	µg/l		5	µg/l	
response from 10 ul injection	1 1863140	area		1 1332177	area		1 3009775	area		1 2247861	area	
	2 1883216	area		2 1366113	area		2 3060186	area		2 2401360	area	
	3 1859209	area		3 1353826	area		3 3074762	area		3 2145716	area	
RFs for this sheet	1.07x10^{-17}	g/area		7.40x10^{-17}	g/area		~~6.65~~ 6.56x10^{-17}	g/area		2.21x10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	603	1000												
N_2 blank	616	2000	<25000	<.0001	<.0001	<25000	<.0009	<.0009	<25000	<.0008	<.0008	<25000	<.003	<.003
air sample	704	2000	138337	.0007	.0007	<25000	<.0009	<.0009	<25000	<.0008	<.0008	6000 F	.0007	.0007
System blank	731	2000	205237	.001	.001	<25000	<.0009	<.0009	<25000	<.0008	<.0008	7500	.0008	.0008
VW-3	804	100	OL R			72473	.05		<25000	<.02		<25000	<.006	
VW-3	818	100	530055	.06	.06	75000 E	.06	.06	<25000	<.02	<.02	<25000	<.006	<.006
VW-3	831	100	571116	.06		75000	.06		<25000	<.02		<25000	<.006	
VW-2	845	100	2061691	.2	.2	610465	.5	.4	<25000	<.02	<.02	<25000	<.006	<.006
VW-2	858	100	1818487	.2		522194	.4		<25000	<.02		<25000	<.006	
VW-1	913	100	142329	.02	.02	<25000	<.02	<.009	<25000	<.02	<.008	<25000	<.008	<.008
VW-1	927	200	272693	.01		<25000	<.009		<25000	<.008		<25000	<.003	
VC-3-9	940	500	<25000	<.0005	<.0005	14806	.02	.02	<25000	<.003	<.003	<25000	<.001	<.001
VC-3-9	953	250	<25000	<.001		75000 E	.02		<25000	<.007		<25000	<.002	
VC-3-7	1007	1000	<25000	<.0003	<.0001	70000 E	.005	.006	<25000	<.002	<.0008	~~<25000~~ 20000 F	~~<.0003~~ .0007	~~<.001~~ .0007
VC-3-7	1021	2000	<25000	<.0001		150000 E	.006		<25000	<.0008		~~<25000~~ 60000 E	~~<.0003~~ .0007	.0007
Std	1036	10	1708036			1206604			2615629			2204991		
SG-18-43p, 5.5	1057	1000	30000 E	.0003	.0003	75000 E	.006	.006	<25000	<.002	<.0008	30000 E	.0007	.0007
SG-18-43p, 5.5	1112	2000	60000 E	.0003		195729	.007		<25000	<.0008		60000 E	.0007	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- F estimated peak area

Analysed by John Tongeman

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TRACER RESEARCH CORPORATION

Date 12/7/87 Page 1c

7.29

	BENZENE							
standard conc.	500	µg/l		µg/l		µg/l		µg/l
response from	1 5841898	area	1	area	1	area	1	area
10 ul injection	2 6032094	area	2	area	2	area	2	area
	3 6011004	area	3	area	3	area	3	area
RFs for this sheet	8.39 x 10^{-16}	g/area		g/area		g/area		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 blank	603	1000												
N_2 blank	616	2000	[illegible]	<.04	<.04									
air sample	704	2000	[illegible]	.08	.08									
system blank	731	2000	125000	.05	.05									
VW-3	804	1000	<100000	<.08										
VW-3	818	100	<100000	<.8	<.08									
VW-3	831	100	<100000	<.8										
VW-2	845	100	<100000	<.8	<.8									
VW-2	858	100	<100000	<.8										
VW-1	913	100	<100000	<.8	<.4									
VW-1	927	200	<100000	<.4										
VC-3-9	940	500	<100000	<.2	<.2									
VC-3-9	953	250	<100000	<.3										
VC-3-7	1007	1000	<100000	<.08	<.04									
VC-3-7	1021	2000	<100000	<.04										
Std	1036	10	5020498											
SG-18-43p, 5.5	1057	1000	110000E	.09	.1									
SG-18-43p, 5.5	1112	2000	250000E	.1										

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
[redacted] mat[redacted]eak[redacted]a

Analysed by John Tangeman

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TRACER RESEARCH CORPORATION

Date 12/7/87 Page 2a

			2.70 CH_2Cl_2			5.02 $CHCl_3$			5.32 1,2 DCA			5.9 TCA		
standard conc.					µg/l			µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
10 ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-19-43L,7	11:12	500	<25000	<0.2	<0.06	<25000	<0.004	<0.001	<25000	<0.2	<0.06	<25000	<0.002	0.001
SG-19-43L,7	11:35	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		E 60000	0.001	
SG-20-43R7	12:07	1000	<25000	<0.1	<0.06	<25000	<0.002	<0.001	<25000	<0.1	<0.06	E 100000	0.003	0.004
SG-20-43R7	12:21	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		E 214120	0.004	
SG-21-43L-7	12:39	1000	<25000	<0.1	<0.06	<25000	<0.002	<0.001	<25000	<0.1	<0.06	E 50000	0.002	0.002
SG-21-43L-7	12:52	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		E 104725	0.002	
SG-22-43P-4	13:44	1000	<25000	<0.1	<0.06	<25000	<0.002	<0.001	<25000	<0.1	<0.06	E 50000	0.002	0.002
SG-22-43P-4	13:58	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		E 100000	0.002	
STD	14:14	10	392981	-		1029767	-		401763	-		1338495	-	
SG-23-43L-4	15:17	1000	<25000	<0.1	<0.06	<25000	<0.002	<0.001	<25000	<0.1	<0.06	<25000	<0.0009	<0.0004
SG-23-43L-4	15:30	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		<25000	<0.0004	
SG-24-12P-5	15:43	1000	<25000	<0.1	<0.06	<25000	<0.002	<0.001	<25000	<0.1	<0.06	350800	0.01	0.02
SG-24-12P-5	15:56	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		1272911	0.02	
SG-25-12P-6	16:30	50	<25000	< 2	< 2	4303492	8	10	<25000	< 2	< 2	<25000	< .02	< .02
SG-25-12P-6	16:43	50	<25000	< 2		6365983	11		<25000	< 2		<25000	< .02	
SG-26-11P 2'	17:00	1000	<25000	<0.1	<0.06	<25000	<0.002	<0.001	<25000	<0.1	<0.06	E 101000	0.003	0.003
SG-26-11P 2'	17:13	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		190854	0.003	
STD	17:27	10	272221	-		916406	-		332232	-		1292978	-	
air	18:03	2000	<25000	<0.06		<25000	<0.001		<25000	<0.06		200000	0.003	

RF response factor

Notations:
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by John Langford

Checked by _____

Job CADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/87 Page 2b

			6.06 CCl4			7.12 TCE			7.82 EDB			10.16 PCE		
standard conc.				µg/l			µg/l			µg/l			µg/l	
response from ul injection			1	area		1	area		1	area		1	area	
			2	area		2	area		2	area		2	area	
			3	area		3	area		3	area		3	area	
RFs for this sheet				g/area			g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-19-43L,7'	11:12	500	E <25000	<0.0005	0.0004	E 50000	0.007	0.01	<25000	<0.003	<0.0008	E 250000	<0.001	0.008
SG-19-43L,7'	11:35	2000	E 70000	0.0004		261058	0.01		<25000	<0.0008		718463	0.008	
SG-20-43P-7'	12:07	1000	E 52004	0.0006	0.0006	211530	0.02	0.02	<25000	<0.002	<0.0008	<25000	<0.0006	<0.000
SG-20-43P-7'	12:21	2000	E 100000	0.0005		592050	0.02		<25000	<0.0008		<25000	<0.0003	
SG-21-43L-7'	12:39	1000	E 70000	0.0008	0.0008	E 100000	0.007	0.008	<25000	<0.002	<0.0008	<25000	<0.0006	<0.000
SG-21-43L-7'	12:52	2000	E 150000	0.0008		220685	0.008		<25000	<0.0008		<25000	<0.0003	
SG-22-43P-4'	13:44	1000	E 25000	0.0003	0.0002	E 70000	0.005	0.005	<25000	<0.002	<0.0008	<25000	<0.0006	<0.000
SG-22-43P-4'	13:58	2000	E 36745	0.0002		144484	0.005		<25000	<0.0008		<25000	<0.0003	
STD	14:14	10	1702259	-		1227346	-		2627882	-		2433490	-	
SG-23-43L-4'	15:17	1000	<25000	<0.0003	<0.0001	128369	0.01	0.02	<25000	<0.002	<0.0008	373231	0.004	0.004
SG-23-43L-4'	15:30	2000	<25000	<0.0001		570943	0.02		<25000	<0.0008		708381	0.004	
SG-24-12P-5'	15:43	1000	<25000	<0.0003	<0.0001	152479	0.01	0.02	<25000	<0.002	<0.0008	1351322	0.03	0.02
SG-24-12P-5'	15:56	2000	<25000	<0.0001		547217	0.02		<25000	<0.0008		2065897	0.02	
SG-25-12P-6'	16:30	50	1434006	.3	.4	28899593	43	44	<25000	<.03	<.03	59386527	26	27
SG-25-12P-6'	16:43	50	2251727	.5		31103608	46		<25000	<.03		63651041	28	
SG-26-11P-2'	17:00	1000	<25000	<0.0003	<0.0001	F 200000	0.02	0.02	<25000	<0.002	<0.0008	1473376	0.03	0.02
SG-26-11P-2'	17:13	2000	<25000	<0.0001		433868	0.02		<25000	<0.0008		1642400	0.02	
STD	17:27	10	1582579	-		1219536	-		2367661	-		2481689	-	
Air Samp	18:05	2000	51601	0.0006		105299	0.007		<25000	<0.0008		<25000	<0.0003	

RF response factor

Notations: I interference with adjacent peaks

NA not analysed

E [illegible] estimated [illegible] a

Analysed by John Langsma

Checked by

Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/87 Page 2c

	BENZENE											
standard conc.		µg/l		µg/l		µg/l		µg/l				
response from	1	area	1	area	1	area	1	area				
ul injection	2	area	2	area	2	area	2	area				
	3	area	3	area	3	area	3	area				
RFs for this sheet		g/area		g/area		g/area		g/area				

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-19-43L,7	11:34	500	<100000	<0.2	<0.04									
SG-19-43L,7'	11:48	2000	<100000	<0.04										
SG-20-43P7	12:07	1000	<100000	<0.08	<0.04									
SG-20-43P7	12:21	2000	<100000	<0.04										
SG-21-43L7	12:38	1000	2304603	2	2									
SG-21-43L7	12:51	2000	3805330	2										
SG-22-43P-4	13:43	1000	<100000	<0.08	<0.04									
SG-22-43P4	13:57	2000	<100000	<0.04										
STD	14:13	10	5632719	-										
SG-23-43L-4	15:18	1000	<100000	<0.08	<0.04									
SG-23-43L-4	15:31	2000	<100000	<0.04										
SG-24-12P-5	15:44	1000	500000	0.4	0.4									
SG-24-12P-5	15:57	2000	1000240	0.4										
SG-25-12P-6	16:31	50	6495981	/10	100									
SG-25-12P6	16:45	50	6074322	/100										
SG-26-11P2	17:02	1000	<100000	<0.08	<0.04									
SG-26-11P2	17:15	2000	<100000	<0.04										
STD	17:29	10	4430307	-										
AIR.	18:05	2000	<100000	<0.04										

RF response factor

Notations:
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tanguay

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TRACER RESEARCH CORPORATION

Date 12/7/87 Page 2d

	VINYL CHLORIDE		
standard conc.	µg/l	µg/l	µg/l	µg/l
response from ul injection	1 area 2 area 3 area	1 area 2 area 3 area	1 area 2 area 3 area	1 area 2 area 3 area
RFs for this sheet	g/area	g/area	g/area	g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-19-43L,7'	11:34	500	<100000	<0.3	<0.07									
SG-19-43L,7'	11:48	2000	<100000	<0.07										
SG-20-43P-7	12:09	1000	<100000	<0.1	<0.07									
SG-20-43P-7	12:21	2000	<100000	<0.07										
SG-21-43L-7	12:38	1000	<100000	<0.1	<0.07									
SG-21-43L-7	12:51	2000	<100000	<0.07										
SG-22-43P-4'	13:43	1000	<100000	<0.1	<0.07									
SG-22-43-P-4'	13:57	2000	<100000	<0.07										
STD	14:27	100	1205559	-										
SG-23-43L-4'	15:18	1000	<100000	<0.1	<0.07									
SG-23-43L-4'	15:30	2000	<100000	<0.07										
SG-24-12P-5'	15:44	1000	<100000	<0.1	<0.07									
SG-24-12P-5'	15:57	2000	<100000	<0.07										
SG-25-12P-6'	16:31	50	4908575	130	140									
SG-25-12P-6'	16:45	50	5293202	140										
SG-26-11P,2'	17:02	1000	<100000	<0.1	<0.07									
SG-26-11P,2'	17:15	2000	<100000	<0.07										
STD	17:51	100	1597834	-										
Air	18:05	2000	<100000	<0.07										

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by John Tangman

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Job RADIAN (SACREMENTO, CA)

TRACER RESEARCH CORPORATION

Date 12/7/81 Page 2e

			0.41 CO_2			1.20 O_2			1.52 N_2			2.72 CH_4		
standard conc.				µg/l			µg/l			µg/l			µg/l	
response from			1	area		1	area		1	area		1	area	
ul injection			2	area		2	area		2	area		2	area	
			3	area		3	area		3	area		3	area	
RFs for this sheet				g/area			g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-19-43L, 7'	11:32	1000	313096	12000	12000	1508624	200000	200000	8099512	1000000	1000000	<100000	<2900	<2
SG-19-43L, 7'	11:38	1000	309416	12000		1411219	190000		9092111	1000000		<100000	<2900	
SG-20-43P-7'	12:09	1000	88454	3300	3100	1698003	220000	200000	8410700	940000	920000	<100000	<2900	<290
SG-20-43P-7'	12:23	1000	76143	2800		1363997	180000		8000000	890000		<100000	<2900	
SG-21-43L-7'	12:40	1000	<100000	<3700	<3700	986882	130000	170000	3395275	380000	450000	<100000	<2900	<290
SG-21-43L-7'	12:54	1000	<100000	<3700		1605446	210000		5470327	610000		<100000	<2900	
SG-22-43P-4'	13:47	1000	37577	1400	1400	1386823	180000	200000	5733176	640000	740000	<100000	<2900	<290
SG-22-43P-4'	13:53	1000	34396	1300		1802449	240000		7549770	840000		<100000	<2900	
STD	15:07	1000	692363	-		619228	-		6474190	-		908851	-	
SG-23-43L-4'	15:16	1000	30184	1100	1000	2062786	270000	260000	8685529	970000	980000	<100000	<2900	<290
SG-23-43L-4'	15:21	1000	27827	1000		1994831	260000		8791317	980000		<100000	<2900	
SG-24-12P-5'	15:54	1000	141702	5300	5100	1664736	230000	220000	8704075	970000	960000	<100000	<2900	<290
SG-24-12P-5'	15:59	1000	131420	5900		1700480	220000		8513041	950000		<100000	<2900	
SG-25-12P-6'	16:11	1000	603532	23000	23000	1242083	320000	390000	8037464	900000	900000	770527	23000	230
SG-25-12P-6'	16:33	1000	614423	23000		1346864	460000		8118947	910000		778094	23000	
SG-26-11P-2'	17:05	1000	282483	11000	11000	1144397	190000	240000	8382625	940000	940000	538691	16000	160
SG-26-11P-2'	17:01	1000	284592	11000		2105211	280000		8291506	930000		538538	16000	
STD	17:37	1000	627075	-		703893	-		6442013	-		786799	-	
AIR	18:04	1000	<100000	<3700		1178478	150000		1961194	220000		<100000	<2900	

RF response factor

Notations: I interference with adjacent peaks
NA not analysed
F estimated peak area

Analysed by John Langmaier

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Job Radian Sacramento Ca (Condensed Data)

TRACER RESEARCH CORPORATION

Date 12/08/87 Page 1

standard conc.				µg/l			µg/l			µg/l			µg/l			
response from ul injection			1	area		1	area		1	area		1	area			
			2	area		2	area		2	area		2	area			
			3	area		3	area		3	area		3	area			
RFs for this sheet				g/area			g/area			g/area			g/area			
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean		
Compound	CH_2Cl_2	$CHCl_3$	1,2 DCA	TCA	CCl_4	TCE	EDB	PCE	Vinyl Cl	Benzene	CO_2	O_2	N_2	CH_4		
VC-3-5	<0.2	<0.003	<0.2	0.4	<0.0004	0.09	<0.002	<0.0008	<0.1	<0.07	11000	180000	920000	<3400		
VC-3-3	<0.2	<.003	<0.2		<0.0004		<0.002	<0.0008	<0.1	<.07	11 000	160 000	920,000	<3400		

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Ahranovic

Checked by

MS

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/08/87 Page 1a

	2.64			4.97			5.26			5.84		
	CH_2Cl_2			$CHCl_3$			1,2-DCA			TCA		
standard conc.	200		µg/l	10		µg/l	200		µg/l	5		µg/l
response from	1358322		area	1866194		area	1352945		area	1983556		area
ul injection 10	2207220		area	2703590		area	2199260		area	2887970		area
	3265129		area	3131669		area	3275797		area	3120000		area
RFs for this sheet	7.22×10^{-15}		g/area	1.04×10^{-16}		g/area	7.25×10^{-15}		g/area	4.88×10^{-17}		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BIK I	6:15	2000	<25000	<0.09		<25000	<0.001		<25000	<0.09		<25000	<0.0006	
N_2 BIK II	6:27	2000	<25000	<0.09		<25000	<0.001		<25000	<0.09		<25000	<0.0006	
AIR Samp	6:48	2000	<25000	<0.09		<25000	<0.0001		<25000	<0.09		<25000	<0.0006	
VC-3-5	8:11	1,000	<25000	<0.2	<0.2	<25000	<0.003	<0.003	<25000	<0.2	<0.2	10174133	0.5	0.4
VC-3-5	8:37	1000	<25000	<0.2		<25000	<0.003		<25000	<0.2		6842687	0.3	
VC-3-3	9:34	1000	<25000	<0.2	<0.2	<25000	<0.003	<0.003	<25000	<0.2	<0.2	16883069	(	>
VC-3-3	9:48	1000	<25000	<0.2		<25000	<0.003		<25000	<0.2		15457312	(	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

Checked by _____

Job Radian Sacramento Ca.

TRACER RESEARCH CORPORATION

Date 12/08/87 Page 16

	6.0 CCl4			7.06 TCE			7.76 EDB			10.06 PCE		
standard conc.	2	µg/l		10	µg/l		20	µg/l		5	µg/l	
response from ul injection	1123521	area		1853792	area		1227476	area		1156188	area	
	2105063	area		2733361	area		2195473	area		2132330	area	
	3155799	area		3125072	area		3226881	area		3155338	area	
RFs for this sheet	1.56×10^{-17}	g/area		1.06×10^{-16}	g/area		9.23×10^{-17}	g/area		3.38×10^{-17}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BlK I	6:15	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
N_2 BlK II	6:27	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
AIR Samp	6:47	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
VC-3-5	8:10	1000	<25000	<0.0004	<0.0004	711420	0.08	0.09	<25000	<0.002	<0.002	<25000	<0.0008	<0.0006
VC-3-5	8:36	1000	<25000	<0.0004		974408	0.1		<25000	<0.002		<25000	<0.0008	
VC-3-3	9:34	1000	<25000	<0.0004	<0.0004	891202			<25000	<0.002	<0.002	<25000	<0.0008	<0.0008
VC-3-3	9:48	1000	<25000	<0.0004		852037			<25000	<0.002		<25000	<0.0008	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- B estimated blank a

Analysed by David Abranovic

Checked by

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/08/87 Page 1c

			Vinyl Chloride			Benzene								
standard conc.			25	µg/l		500	µg/l		µg/l			µg/l		
response from			1 1800044	area		1 8438604	area		1	area		1	area	
µl injection Vinyl 100µl Ben 10µl			2 2090212	area		2 6318987	area		2	area		2	area	
			3 2213962	area		3 E 7000000	area		3	area		3	area	
RFs for this sheet			1.23 x 10^{-15}	g/area		6.89 x 10^{-16}	g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BIK I	06:15	2000	<100000	<0.06		<100000	<0.03							
N_2 BIK II	06:27	2000	<100000	<0.06		<100000	<0.03							
AIA BIK	06:47	2000	<100000	<0.06		<100000	<0.03							
VC-3-5	08:10	1000	<100000	<0.1	<0.1	<100000	<0.07	<0.07						
VC-3-5	08:36	1000	<100000	<0.1		<100000	<0.07							
VC-3-3	09:35	1000	<100000	<0.1	<0.1	<100000	<0.07	<0.07						
VC-3-3	09:49	1000	<100000	<0.1		<100000	<0.07							

Notations:
- RF response factor
- I interfere e with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

Checked by _____

Job Radian Sacramento Co.

TRACER RESEARCH CORPORATION

Date 12/08/87 Page 1d

	0.4 CO_2			1.17 O_2			1.49 N_2			2.68 CH_4		
standard conc.	26400	µg/l		89600	µg/l		739200	µg/l		28800	µg/l	
response from	1 624359	area		1 667940	area		15999030	area		1 838912	area	
ul injection	2 634206	area		2 680924	area		2 609 4245	area		2 860850	area	
1000	3 627156	area		3 674003	area		3 6079034	area		3 851723	area	
RFs for this sheet	4.20×10^{-11}	g/area		1.33×10^{-10}	g/area		1.22×10^{-10}	g/area		3.39×10^{-11}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2 BlkI	09:07	1000	<100000	<4200		<100000	<13600		<100000	<2000		<100000	<3460	
H_2 BlkII	09:15	1000	<100000	<4200		<100000	<13000		<100000	<2000		<100000	<3400	
AIRSamp	09:10	1000	<100000	<4200		1858345	250000		6899004	840000		<100000	<3400	
VC-3-5	08:12	1000	276452	12000	11000	1305863	170000	180000	7552877	920000	920000	<100000	<3400	<3400
VC-3-5	08:19	1000	231904	9700		1386349	180000		7534551	920000		<100000	<3400	
VC-3-3	08:06	1000	253308	11000	11000	1173465	160000	160000	6889093	910000	920000	<100000	<3600	<3600
VC-3-3	08:10	1000	263487	11000		1169352	160000		6935800	920000		<100000	<3600	
	ndi		→ This sample was run using calibration from 12/09/87 ie see chromatograms from that day →											

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E [illegible] es[illegible]ed [illegible]k a[illegible]

Analysed by David Abranakis

Checked by

MJ

Job Raytheon Sacramento Ca. (Condensed Data)

TRACER RESEARCH CORPORATION

Date 12/09/87 Page 1

standard conc.				µg/l			µg/l			µg/l			µg/l		
response from			1	area		1	area		1	area		1	area		
ul injection			2	area		2	area		2	area		2	area		
			3	area		3	area		3	area		3	area		
RFs for this sheet				g/area			g/area			g/area			g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	
—	CH_2Cl_2	$CHCl_3$	1,2 DCA	TCA	CCl_4	TCE	EDB	PCE	Vinyl Cl	Benzene	CO_2	O_2	N_2	CH_4	
VC-3-1	<0.2	<0.003	<0.2	0.9	<0.0004	0.06	<0.003	<0.0009	<0.1	<0.08	19000	100000	940000	<3600	
VC-4-1	<0.2	<0.003	<0.2	0.1	<0.0004	<0.003	<0.003	<0.0009	<0.1	<0.08	7000	210000	890000	<3600	
VC-4-2	<0.08	<0.002	<0.08	0.1	<0.0002	<0.001	<0.001	<0.0004	<0.05	<0.04	8200	200000	910000	<3600	
VC-4-4	<0.08	<0.002	<0.08	<0.0007	<0.0002	<0.001	<0.001	<0.0004	<0.05	<0.04	2800	240000	900000	<3600	
VC-2-3	<0.08	<0.002	<0.08	0.8	<0.0002	0.08	<0.001	<0.0004	<0.05	<0.04	10000	210000	890000	<3600	
SG-27-69L-7'	<0.08	<0.002	<0.08	0.007	<0.0002	0.02	<0.001	<0.0004	<0.05	<0.04	<4300	260000	940000	<3600	
SG-28-69R-5'	<0.08	<0.002	<0.08	0.01	<0.0002	0.04	<0.001	<0.0004	<0.05	<0.04	4900	180000	980000	<3600	
SG-29-69L-8'	<0.2	<0.003	<0.2	0.007	<0.0004	0.04	<0.003	<0.0009	0.9	4	21000	74000	960000	<3600	
SG-30a-69L-8'	<0.08	<0.002	<0.08	0.01	<0.0002	0.2	<0.001	0.03	<0.05	<0.04	10000	180000	860000	<3600	
SG-30b-69L-8'	<0.08	<0.002	<0.08	0.02	<0.0002	0.1	<0.001	0.02	<0.05	<0.04	7200	200000	860000	<3600	
SG-31-69L-8'	<0.08	<0.002	<0.08	0.006	<0.0002	0.03	<0.001	<0.0004	<0.05	<0.04	17000	100000	980000	<3600	
SG-32-69L-8'	<0.08	<0.002	<0.08	0.006	<0.0002	0.02	<0.001	<0.0004	<0.05	<0.04	33000	240000	920000	<3600	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramowicz

Checked by _____

Job Radian Sacramento Co

TRACER RESEARCH CORPORATION

Date 12/09/87 Page 1a

			2.65 CH_2Cl_2			4.98 $CHCl_3$			5.28 1-2 DCA			5.86 TCA		
standard conc.			200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from			1283310	area		1722154	area		1331144	area		1857534	area	
ul injection 10			2325164	area		2752299	area		2310047	area		2853348	area	
			3324349	area		3727899	area		3278768	area		3956145	area	
RFs for this sheet			6.43×10^{-15}	g/area		1.36×10^{-16}	g/area		6.52×10^{-15}	g/area		5.62×10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BIK I	06:17	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		<25000	<0.0007	
N_2 BIK II	06:30	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		<25000	<0.0007	
AIR Samp	07:50	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		<25000	<0.0007	
VC-3-1	08:22	1000	<25000	<0.2	<0.2	<25000	<0.003	<0.003	<25000	<0.2	<0.2	1585994	0.9	0.9
VC-3-1	08:37	1000	<25000	<0.2		<25000	<0.003		<25000	<0.2		1655674	0.9	
VC-4-1	08:52	1000	<25000	<0.2	<0.2	<25000	<0.003	<0.003	<25000	<0.2	<0.2	2395738	0.1	0.1
VC-4-1	09:05	1000	<25000	<0.2		<25000	<0.003		<25000	<0.2		1878184	0.1	
VC-4-2	09:19	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.002	<25000	<0.2	<0.08	2710835	0.2	0.1
VC-4-2	09:31	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		2608474	0.07	
VC-4-4	09:48	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.002	<25000	<0.2	<0.08	<25000	<0.001	<0.001
VC-4-4	10:00	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		<25000	<0.0007	
VC-2-3	10:15	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.002	<25000	<0.2	<0.08	1804686	1	0.8
VC-2-3	10:27	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		2621715	0.7	
STD	10:52	10	334250	-		838465	-		348617	-		1035849	-	
Syst BIK	11:46	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		75000	0.002	
AIR Samp	11:36	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		100000	0.003	
SG-27-691-7	11:59	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.002	<25000	<0.2	<0.08	117153	0.007	0.007
SG-27-691-7	12:11	2000	<25000	<0.08		<25000	<0.002		<25000	<0.08		233329	0.007	

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
B estimated [illegible]k a[illegible]

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Date 12/09/87 Page 1b

	6.02 CCl4		7.08 TCE		7.28 EDB		PCE	
standard conc.	2	µg/l	10	µg/l	20	µg/l	5	µg/l
response from	1125548	area	1863905	area	1929891	area	1423044	area
ul injection	2041855	area	2801478	area	2913145	area	2326898	area
	3131632	area	3857066	area	3951782	area	3421486	area
RFs for this sheet	1.75×10^{-17}	g/area	1.19×10^{-16}	g/area	1.04×10^{-16}	g/area	3.60×10^{-17}	g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BlK I	06:17	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
N_2 BlK II	06:30	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
Air Samp	07:50	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
VC-3-1	08:22	1000	<25000	<0.0004	<0.0004	412443	0.05	0.06	<25000	<0.003	<0.003	<25000	<0.0009	<0.0009
VC-3-1	08:37	1000	<25000	<0.0004		547564	0.07		<25000	<0.003		<25000	<0.0009	
VC-4-1	08:52	1000	<25000	<0.0004	<0.0004	<25000	<0.003	<0.003	<25000	<0.003	<0.003	<25000	<0.0009	<0.0009
VC-4-1	09:05	1000	<25000	<0.0004		<25000	<0.003		<25000	<0.003		<25000	<0.0009	
VC-4-2	09:19	1000	<25000	<0.0004	<0.0002	<25000	<0.003	<0.001	<25000	<0.003	<0.001	<25000	<0.0009	<0.0009
VC-4-2	09:31	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
VC-4-4	09:48	1000	<25000	<0.0004	<0.0002	<25000	<0.003	<0.001	<25000	<0.003	<0.001	<25000	<0.0009	<0.0009
VC-4-4	10:00	2000	<25000	<0.0002		<25000	<0.001		<25000	<0.001		<25000	<0.0004	
VC-2-3	10:15	1000	<25000	<0.0004	<0.0002	531926	0.06	0.08	<25000	<0.003	<0.001	<25000	<0.0009	<0.0009
VC-2-3	10:27	2000	<25000	<0.0002		1637375	0.1		<25000	<0.001		<25000	<0.0004	
STD	10:52	10	1224968	-		952764	-		2181894	-		1863759	-	
Syst BlK	11:46	2000	<25000	<0.0002		E100000	0.006		<25000	<0.001		<25000	<0.0004	
AIR Samp	11:36	2000	<25000	<0.0002		141669	0.008		<25000	<0.001		<25000	<0.0004	
S6-27-69L-7	11:59	1000	<25000	<0.0004	<0.0002	189962	0.02	0.02	<25000	<0.003	<0.001	<25000	<0.0009	<0.0009
S6-27-69L-7	12:11		<25000	<0.0002		284243	0.02		<25000	<0.001		<25000	<0.0004	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Date 12/09/87 Page 1c

728

	Vinyl Chloride			Benzene								
standard conc.	25		µg/l	500		µg/l			µg/l			µg/l
response from	12777499		area	14988855		area	1		area	1		area
ul injection V.Cl-100ul Ben-10 ul	22366669		area	27816448		area	2		area	2		area
	32736154		area	36000000		area	3		area	3		area
RFs for this sheet	9.52×10^{-16}		g/area	7.98×10^{-16}		g/area			g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BlkI	06:17	2000	<100000	<0.05		<100000	<0.04							
N_2 Blk II	06:30	2000	<100000	<0.05		<100000	<0.04							
Air Samp.	07:50	2000	<100000	<0.05		<100000	<0.04							
VC-3-1	08:17	1000	<100000	<0.1	<0.1	<100000	<0.08	<0.08						
VC-3-1	08:37	1000	<100000	<0.1		<100000	<0.08							
VC-4-1	08:52	1000	<100000	<0.1	<0.1	<100000	<0.08	<0.08						
VC-4-1	09:05	1000	<100000	<0.1		<100000	<0.08							
VC-4-2	09:19	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
VC-4-2	09:31	2000	<100000	<0.05		<100000	<0.04							
VC-4-4	09:48	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
VC-4-4	10:00	2000	<100000	<0.05		<100000	<0.04							
VC-2-3	10:15	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
VC-2-3	10:27	2000	<100000	<0.05		<100000	<0.04							
STD	10:39	10	2254148	-		6937559	-							
Syst Blk.	11:11	2000	<100000	<0.05		<100000	<0.04							
AIR Samp	11:24	2000	<100000	<0.05		<100000	<0.04							
SG-2762-7'	11:59	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
SG-27-692-7'	12:11	2000	<100000	<0.05		<100000	<0.04							

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Date 12/09/87 Page 1d

	0.36 CO_2			1.07 O_2			1.35 N_2			.42 CH_4		
standard conc.	26400	µg/l		89600	µg/l		739200	µg/l		28800	µg/l	
response from ul injection /1000	1600000 E	area		1656985	area		15606586	area		1780676	area	
	2603055	area		2652993	area		25558002	area		2786042	area	
	3625402	area		3610643	area		35573336	area		3828072	area	
RFs for this sheet	4.33×10^{-11}	g/area		1.40×10^{-10}	g/area		1.32×10^{-10}	g/area		3.61×10^{-11}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2 BlK I	07:39	1000	<100000	<4300		<100000	<14000		<100000	<13000		<100000	<3600	
H_2 BlK II	07:45	1000	<100000	<4300		<100000	<14000		<100000	<13000		<100000	<3600	
AIR BlK	08:01	1000	<100000	<4300		1789553	250000		6674037	880000		<100000	<3600	
VC-3-1	08:33	1000	471675	20000	19000	714208	100000	100000	7204580	950000	940000	<100000	<3600	<3600
VC-3-1	08:45	1000	421427	18000		803324	110000		7002021	930000		<100000	<3600	
VC-4-1	09:01	1000	167093	7200	7000	1509980	210000	210000	6786293	900000	890000	<100000	<3600	<3600
VC-4-1	09:14	1000	157607	6800		1493167	210000		6644940	880000		<100000	<3600	
VC-4-2	09:27	1000	196792	8500	8200	1453835	200000	200000	6994505	930000	910000	<100000	<3600	<3600
VC-4-2	09:39	1000	181428	7900		1420724	200000		6716966	890000		<100000	<3600	
VC-4-4	09:56	1000	66757	2900	2800	1747779	240000	240000	6833879	910000	900000	400000	<3600	<3600
VC-4-4	10:12	1000	61978	2700		1763238	250000		6677712	880000		<100000	<3600	
VC-2-3	10:24	1000	244912	11000	10000	1518289	210000	210000	6905178	910000	890000	<100000	<3600	<3600
VC-2-3	10:35	1000	214599	9300		1475766	210000		6557948	870000		<100000	<3600	
STD	11:08	1000	601354	–		667718	–		5606410	–		801199	–	
Syst BlK	11:12	1000	<100000	<4300		1876918	260000		6789545	900000		<100000	<3600	
In Samp.	11:32	1000	<100000	<4300		1790979	250000		6461199	860000		<100000	<3600	
SG-27-69L-7'	12:09	1000	<100000	<4300	<4300	1807520	250000	260000	7027948	930000	940000	<100000	<3600	<3600
SG-27-69L-7'	12:20	1000	<100000	<4300		1856108	260000		7162419	950000		<100000	<3600	

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

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Date 12/09/87 Page 2a

	CH_2Cl_2		$CHCl_3$		1,2-DCA		TCA	
standard conc.	200	µg/l	10	µg/l	200	µg/l	5	µg/l
response from 10 ul injection	1	area	1	area	1	area	1	area
	2	area	2	area	2	area	2	area
	3	area	3	area	3	area	3	area
RFs for this sheet	6.43×10^{-15}	g/area	1.36×10^{-16}	g/area	6.52×10^{-15}	g/area	5.62×10^{-17}	g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-28-69P-5'	12:25	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.001	<25000	<0.2	<0.08	199825	0.01	0.01
SG-28-69P-5'	12:40	2000	<25000	<0.08		<25000	<0.001		<25000	<0.08		475160	0.01	
SG-29-69L-8'	13:40	1000	<25000	<0.2	<0.2	<25000	<0.003	<0.003	<25000	<0.2	<0.2	141566	0.008	0.007
SG-29-69L-8'	13:52	1000	<25000	<0.2		<25000	<0.003		<25000	<0.2		E 100000	0.006	
SG-30a-69L-8'	14:12	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.001	<25000	<0.2	<0.08	191572	0.01	0.01
SG-30a-69L-8'	14:31	2000	<25000	<0.08		<25000	<0.001		<25000	<0.08		430000	0.01	
SG-30b-69L-8'	14:48	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.001	<25000	<0.2	<0.08	249986	0.01	0.02
SG-30b-69L-8'	15:01	2000	<25000	<0.08		<25000	<0.001		<25000	<0.08		747720	0.02	
STD	15:20	10	266460	-		6817:31	-		265413			811294	-	
SG-31-69L-8'	15:50	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.001	<25000	<0.2	<0.08	E 100000	0.006	0.006
SG-31-69L-8'	16:02	2000	<25000	<0.08		<25000	<0.001		<25000	<0.08		226016	0.007	
SG-32-69L-8'	16:19	1000	<25000	<0.2	<0.08	<25000	<0.003	<0.001	<25000	<0.2	<0.08	120148	0.007	0.006
SG-32-69L-8'	16:32	2000	<25000	<0.08		<25000	<0.001		<2500	<0.08		157929	0.004	
STD	16:48	10	220256	-		603883	-		240794	-		750699	-	
AIR Samp	17:19	2000	<25000	<0.08		<25000	<0.001		<25000	<0.08		<25000	<0.001	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Date 12/09/87 Page 2b

	CCl4			TCE			EDB			PCE		
standard conc.	2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from 10 ul injection	1		area	1		area	1		area	1		area
	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	1.75×10^{-17}		g/area	1.19×10^{-16}		g/area	1.04×10^{-16}		g/area	3.60×10^{-17}		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-28-69P-5'	12:25	1000	<25000	<0.0004	<0.0002	250900	0.03	0.04	<25000	<0.003	<0.001	<25000	<0.0009	<0.0004
SG-28-69P5'	12:40	2000	<25000	<0.0002		659886	0.04		<25000	<0.001		<25000	<0.0004	
SG-29-69L-8'	13:40	1000	<25000	<0.0004	<0.0004	354244	0.04	0.04	<25000	<0.003	<0.003	<25000	<0.0009	<0.0009
SG-29-69L-8	13:52	1000	<25000	<0.0004		362750	0.04		<25000	<0.003		<25000	<0.0009	
SG-30a-69L-8'	14:12	1000	<25000	<0.0004	<0.0002	1354527	0.2	0.2	<25000	<0.003	<0.001	E 800000	0.03	0.03
SG-30a-69L-8'	14:31	2000	<25000	<0.0002		2907191	0.2		<25000	<0.001		1859364	0.03	
SG-30b-69L-8'	14:48	1000	<25000	<0.0004	<0.0002	1124335	0.1	0.1	<25000	<0.003	<0.001	647503	0.02	0.02
SG-30b69L-8'	15:01	2000	<25000	<0.0002		2268123	0.1		<25000	<0.001		1217198	0.02	
STD	15:20	10	1004197	-		837752	-		1695145	-		1370555	-	
SG-31-69L-8'	15:50	1000	<25000	<0.0004	<0.0002	249907	0.03	0.03	<25000	<0.003	<0.001	<100000	<0.0009	<0.0004
SG-31-69L-8'	16:02	2000	<25000	<0.0002		447208	0.03		<25000	<0.001		<100000	<0.0004	
SG-32-69L-8'	16:19	1000	<25000	<0.0004	<0.0002	186662	0.02	0.02	<25000	<0.003	<0.001	<100000	<0.0009	<0.0004
SG-32-69L-8'	16:32	2000	<25000	<0.0002		425577	0.03		<25000	<0.001		<100000	<0.0009	
STD	16:48	10	919130	-		707079	-		1339780	-		1225534	-	
AIR Samp	17:19	2000	<25000	<0.0002		E 50000	0.004		<25000	<0.001		<25000	<0.0004	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

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TRACER RESEARCH CORPORATION

Date 12/09/87 Page 2c

			Vinyl Chloride			Benzene								
standard conc.			25 µg/l			500 µg/l			µg/l			µg/l		
response from ul injection			1 area			1 area			1 area			1 area		
			2 area			2 area			2 area			2 area		
			3 area			3 area			3 area			3 area		
RFs for this sheet			9.52×10^{-16} g/area			7.98×10^{-16} g/area			g/area			g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-28-691-5'	12:25	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
SG-28-691-5'	12:40	2000	<10000	<0.05		<100000	<0.04							
SG-29-691-8'	13:40	1000	9122440	0.9	0.9	5822407	5	4						
SG-29-691-8'	13:52	1000	9137211	0.9		E 5000000	4							
SG-30a-691-8'	14:12	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
SG-30a-691-8'	14:31	2000	<100000	<0.05		<100000	<0.04							
SG-30b-691-8'	14:48	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
SG-30b-691-8'	15:01	2000	<100000	<0.05		<100000	<0.04							
STD	15:32	10	2645521	–		E 6000000	–							
SG-31-691-8'	15:50	1000	<100000	<0.1		<100000	<0.08	<0.04						
SG-31-691-8'	16:02	2000	<100000	<0.05		<100000	<0.04							
SG-32-691-8'	16:19	1000	<100000	<0.1	<0.05	<100000	<0.08	<0.04						
SG-32-691-8'	16:32	2000	<100000	<0.05		<100000	<0.04							
STD	17:15	10	2513247	–		E 6000000	–							
AIR Samp	17:18	2000	<100000	<0.05		<100000	<0.04							

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated area

Analysed by David Abramovic

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TRACER RESEARCH CORPORATION

Date 12/09/87 Page 2d

	CO_2			O_2			N_2			C_2H_4		
standard conc.	26400	µg/l		89600	µg/l		739200	µg/l		28800	µg/l	
response from	1	area		1	area		1	area		1	area	
ul injection	2	area		2	area		2	area		2	area	
	3	area		3	area		3	area		3	area	
RFs for this sheet	4.33×10^{-11}	g/area		1.40×10^{-10}	g/area		1.32×10^{-10}	g/area		3.61×10^{-11}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-28-69R-5	12:33	1000	122841	5300	4900	1233569	170000	180000	7434158	980000	980000	<100000	<3600	<3600
SG-28-69R-5	12:36	1000	105015	4500		1388403	190000		7324618	970000		<100000	<3600	
SG-29-69L-8	14:01	1000	481890	21000	21000	543181	76000	74000	7393133	980000	960000	<100000	<3600	<3600
SG-29-69L-8	14:04	1000	487368	21000		503981	71000		7240470	940000		100000	<3600	
SG-30-69L-8	14:40	1000	239262	10000	10000	1314482	180000	180000	6550171	870000	860000	<100000	<3600	<3600
SG-30-69L-8	14:44	1000	255183	11000		1307238	180000		6438192	850000		<100000	<3600	
SG-30-69L-8	14:57	1000	152330	6600	7200	1476197	210000	200000	6489679	860000	860000	<100000	<3600	<3600
SG-30-69L-8	15:13	1000	182035	7900		1410842	200000		6578681	870000		<100000	<3600	
STD	15:44	1000	642615	-		1770547	-		6028752	-		881578	-	
SG-31-69L-8	15:59	1000	367903	16000	17000	813225	110000	110000	7297621	970000	980000	<100000	<3600	<3600
SG-31-69L-8	16:14	1000	408240	18000		641717	90000		7406215	980000		<100000	<3600	
SG-32-69L-8	16:29	1000	77967	3400	3300	1698438	240000	240000	6891501	910000	920000	<100000	<3600	<3600
SG-32-69L-8	16:41	1000	73445	3200		1643905	230000		6973115	920000		<100000	<3600	
STD	17:28	1000	625322	-		725318	-		6014818	-		848345	-	
AIR	17:31	1000	33088			1793604			6613045			<100000	<3600	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

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Date 12/10/87 Page 1a

	2.68 CH_2Cl_2			4.99 $CHCl_3$			5.29 1,2-DCA			5.86 TCA		
standard conc.	200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from ul injection 10	1 164051	area		1 546656	area		1 150000 E	area		1 519363	area	
	2 149086	area		2 352509	area		2 121296	area		2 574034	area	
	3 165320	area		3 506077	area		3 202902	area		3 665506	area	
RFs for this sheet	1.25×10^{-14}	g/area		2.13×10^{-16}	g/area		1.27×10^{-14}	g/area		8.53×10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
Na BIK I	06:13	2000	<25000	<0.2		<25000	<0.003		<25000	<0.2		<25000	<0.001	
Na BIK II	06:25	2000	<25000	<0.2		<25000	<0.003		<25000	<0.2		<25000	<0.001	
AIR Samp.	06:38	2000	<25000	<0.2		<25000	<0.003		<25000	<0.2		E 20000	0.0008	
Syst BIK	07:38	2000	<10000	<0.06		<10000	<0.001		<10000	<0.06		365278	0.02	0.02
SG-33-69R-3'	08:08	2000	<10000	<0.06	<0.06	<10000	<0.001	<0.001	<10000	<0.06	<0.06	224365	0.01	
SG-33-69R-3'	08:08	2000	<10000	<0.06		<10000	<0.001		<10000	<0.06		318264	0.03	0.02
SG-34-22L-7'	08:35	1000	<10000	<0.1	<0.06	<10000	<0.002	<0.001	<10000	<0.1	<0.06	525446	0.02	
SG-34-22L-7'	08:48	2000	<10000	<0.06		<10000	0.001		<10000	<0.06		179528	0.02	0.02
SG-35-22L-8'	09:00	1000	<10000	<0.1	<0.06	<10000	<0.002	<0.001	<10000	<0.1	<0.06	381588	0.02	
SG-35-22L-8'	09:13	2000	<10000	<0.06		<10000	<0.001		<10000	<0.06		91472	0.008	0.009
SG-36-22L-7'	09:36	1000	<10000	<0.1	<0.1	<10000	<0.002	<0.002	<10000	<0.1	<0.1	135446	0.01	
SG-36-22L-7'	09:48	1000	<10000	<0.1		<10000	<0.002		<10000	<0.1		660731	0.06	0.04
SG-37-22P-5'	10:03	1000	<10000	<0.1	<0.06	<10000	<0.002	<0.001	<10000	<0.1	<0.06	525390	0.02	
SG-37-22P-5'	10:16	2000	<10000	<0.06		<10000	<0.001		<10000	<0.06		934625	-	
STD	10:29	10	224327	-		734844	-		287800	-		<10000	<0.0009	<0.0009
SG-38-22L-8'	10:45	1000	<10000	<0.1	<0.1	<10000	<0.002	<0.002	<10000	<0.1	<0.1	<10000	<0.009	
SG-38-22L-8'	11:13	100	<10000	<1		<10000	<0.02		<10000	<1				

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abranovic

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NOTE: Detection limits were lowered by lowering

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TRACER RESEARCH CORPORATION

Date 12/10/87 Page 1b

	6.02 CCl4		2.08 TCE		2.78 EDB		10.1 PCE	
standard conc.	2	µg/l	10	µg/l	20	µg/l	5	µg/l
response from ul injection	1656269	area	1493084	area	10377719	area	1841452	area
	2748590	area	2614746	area	21245456	area	2932298	area
	3829861	area	3705863	area	31313998	area	3931457	area
RFs for this sheet	2.69×10^{-17}	g/area	1.65×10^{-16}	g/area	1.67×10^{-16}	g/area	5.54×10^{-17}	g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BIK I	06:13	2000	<25000	<0.0003		<25000	<0.002		<25000	<0.002		<25000	<0.0007	
N_2 BIK II	06:25	2000	<25000	<0.0003		<25000	<0.002		<25000	<0.002		<25000	<0.0007	
AER Samp.	06:38	2000	<25000	<0.0003		E100000	0.008		<25000	<0.002		<25000	<0.0007	
Syst BIK	07:38	2000	E20000	0.0003		136769	0.01		<10000	<0.0008		E20000	0.0006	
SG-33-69P-3	08:08	2000	<10000	<0.0001	<0.0001	501495	0.04	0.03	<10000	<0.0008	<0.0008	<10000	<0.0003	<0.0006
SG-33-69P-3	08:22	2000	<10000	<0.0001		297567	0.02		<10000	<0.0008		<10000	<0.0003	
SG-34-22L-7	08:35	1000	<10000	<0.0003	<0.0001	1177127	0.2	0.2	<10000	<0.002	<0.0008	685106	0.04	0.04
SG-34-22L-7	08:48	2000	<10000	<0.0001		785011	0.1		<10000	<0.0008		1086671	0.03	
SG-35-22L-8	09:00	1000	<10000	<0.0003	<0.0001	448341	0.07	0.06	<10000	<0.002	<0.0008	3621726	0.2	0.2
SG-35-22L-8	09:13	2000	<10000	<0.0001		688663	0.06		<10000	<0.0008		7622990	0.2	
SG-36-22L-7	09:36	1000	<10000	<0.0003	<0.0003	145737	0.02	0.02	<10000	<0.002	<0.002	E350000	0.02	0.02
SG-36-22L-7	09:48	1000	<10000	<0.0003		195431	0.03		<10000	<0.002		350719	0.02	
SG-37-22P-5	10:03	1000	<10000	<0.0003	<0.0001	13569320	2	2	<10000	<0.002	<0.0008	722113	0.04	0.04
SG-37-22P-5	10:16	2000	<10000	<0.0001		20493929	2		<10000	<0.0008		1025181	0.03	
STD	10:29	10	1250017	-		967430	-		1752160	-		2012272	-	
SG-38-22L-8	10:45	1000	<10000	<0.0003	<0.0003	8854906	2	2	<10000	<0.002	<0.002	304766	0.02	0.02
SG-38-22L-8	11:13	100	<10000	<0.003		631692	1		<10000	<0.02		<10000	<0.006	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

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NOTE: Detection limits were lowered by lowering

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TRACER RESEARCH CORPORATION

Date 12/10/87 Page 1c

	4.28 Vinyl Chloride			7.28 Benzene								
standard conc.	25	µg/l		500	µg/l			µg/l			µg/l	
response from	13759292	area		116948147	area		1	area		1	area	
ul injection	2 382 3971	area		216919266	area		2	area		2	area	
Benzene · 10 µg/l Vinyl Cl · 100	3 338 8329	area		3 E 15000000	area		3	area		3	area	
RFs for this sheet	6.84 × 10⁻¹⁶	g/area		3.07 × 10⁻¹⁶	g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BLK I	06:13	2000	<100000	<0.03		<100000	<0.02							
N_2 BLK II	06:25	2000	<100000	<0.03		<100000	<0.02							
AIR Samp	06:38	2000	<100000	<0.03		<100000	<0.02							
SYST BLK	07:39	2000	<100000	<0.03		<100000	<0.02							
SG-33-69P-3'	08:09	2000	<100000	<0.03	<0.03	<100000	<0.02	<0.02						
SG-33-69P-3'	08:23	2000	<100000	<0.03		<100000	<0.02							
SG-34-22L-7'	08:37	1000	<100000	<0.0	<0.03	<100000	<0.03	<0.02						
SG-34-22L-7'	08:49	2000	<100000	<0.03		<100000	<0.02							
SG-35-22L-8'	09:01	1000	<100000	<0.07	<0.03	<100000	<0.03	<0.02						
SG-35-22L-8'	09:14	2000	<100000	<0.03		<100000	<0.02							
SG-36-22L-7'	09:37	1000	<100000	<0.07	<0.07	<100000	<0.03	<0.03						
SG-36-22L-7'	09:49	1000	<100000	<0.07		<100000	<0.03							
SG-37-22P-5'	10:02	1000	<100000	<0.07	<0.03	<100000	<0.03	<0.02						
SG-37-22P-5'	10:17	2000	<100000	<0.03		<100000	<0.02							
STD	10:30	100	3073786	-		E 15000000	-							
SG-38-22L-8'	10:46	1000	14493134	10	10	I								
SG-38-22L-8'	11:14	100	1563078	11		I								

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated [illegible] ar[illegible]

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Date 12/10/87 Page 1d

	0.36 CO_2			1.06 O_2			1.34 N_2			2.41 CH_4		
standard conc.	26400	µg/l		89600	µg/l		739200	µg/l		28800	µg/l	
response from	1670221	area		1847038	area		15959085	area		1921538	area	
ul injection	2673437	area		2848175	area		25915547	area		2904975	area	
1000	3670763	area		3844900	area		35907989	area		3903392	area	
RFs for this sheet	3.93×10^{-11}	g/area		1.06×10^{-10}	g/area		1.25×10^{-10}	g/area		3.16×10^{-11}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N BLK I	06:22	1000	<100000	<3900		<100000	<11000		<100000	<13000		<100000	<3200	
H_2 BLK II	06:34	1000	<100000	<3900		<100000	<11000		<100000	<13000		<100000	<3200	
AIR Samp.	07:39	1000	<100000	<3900		2138111	230000		6883552	860000		<100000	<3200	
SYST BLK	07:48	1000	<100000	<3900		2043544	220000		6766828	850000		<100000	<3200	
SG-33-69P-3'	08:20	1000	52129	2000	1900	1962303	210000	210000	6990240	870000	880000	<100000	<3200	<3200
SG-33-69P-3'	08:31	1000	46299	1800		1970119	210000		7026694	880000		<100000	<3200	
SG-34-22L-7'	08:46	1000	534743	21000	19000	7791754	84000	92000	7146969	890000	890000	<100000	<3200	<3200
SG-34-22L-7'	08:57	1000	434251	17000		983047	100000		7146340	890000		<100000	<3200	
SG-35-22L-8'	09:10	1000	427587	17000	16000	875989	93000	96000	7213760	900000	900000	<100000	<3200	<3200
SG-35-22L-8'	09:23	1000	394971	15000		999168	100000		7177660	900000		<100000	<3200	
SG-36-22L-7'	09:58	1000	79422	3100	3200	820022	87000	89000	7634001	950000	950000	<100000	<3200	<3200
SG-36-22L-7'	10:01	1000	80434	3200		863808	91000		7582450	950000		<100000	<3200	
SG-37-22P-5'	10:13	1000	26960	1100	970	1788797	190000	190000	5993480	750000	760000	<100000	<3200	<3200
SG-37-22P-5'	10:25	1000	21285	840		1831777	190000		6052411	760000		<100000	<3200	
STD	10:38	1000	652064	-		923874	-		5897702	-		854004	-	
SG-38-22L-8'	10:55	1000	80759	3200	3000	411663	44000	58000	7952221	990000	960000	<100000	<3200	<3200
SG-38-22L-8'	11:22	1000	70681	2800		684370	72000		7535237	940000		<100000	<3200	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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TRACER RESEARCH CORPORATION

Date 12/10/87 Page 2a

	CH_2Cl_2			$CHCl_3$			1,2-DCA			TCA		
standard conc.	200		µg/l	10		µg/l	200		µg/l	5		µg/l
response from	1		area	1		area	1		area	1		area
ul injection 10	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	1.25×10^{-14}		g/area	213×10^{-16}		g/area	1.27×10^{-14}		g/area	5.83×10^{-17}		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-39-8P-4'	11:29	1000	<10000	<0.1	<0.06	<10000	<0.002	<0.001	<10000	<0.1	<0.06	69409	0.006	0.01
SG-39-8P-4'	11:45	2000	<10000	<0.06		<10000	<0.001		<10000	<0.06		360112	0.02	
SG-40-8I-8'	12:02	1000	<10000	<0.1	<0.1	<10000	<0.002	<0.002	<10000	<0.1	<0.1	26149223	2	2
SG-40-8I-8'	12:20	50	<10000	<3		<10000	<0.04		<10000	<3		1225226	2	
SG-41-8I-8'	12:48	50	<10000	<3	<3	<10000	<0.04	<0.04	<10000	<3	<3	30353269	52	51
SG-41-8I-8'	13:12	50	<10000	<3		<10000	<0.04		<10000	<3		29323245	50	
SG-42-8P-4'	13:44	50	<10000	<3	<1	<10000	<0.04	<0.02	<10000	<3	<1	1214.18	0.2	0.1
SG-42-8P-4'	14:00	100	<10000	<1		<10000	<0.02		<10000	<1		133809	0.1	
STD	14:38	10	199858	–		639030	–		342772	–		701643	–	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated [illegible]

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Date 12/10/87 Page 2b

	CCl4			TCE			EDB			PCE		
standard conc.	2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from	1		area	1		area	1		area	1		area
ul injection	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	2.69×10^{-17}		g/area	1.65×10^{-16}		g/area	1.67×10^{-16}		g/area	5.54×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-39-8P-4'	11:29	1000	<10000	<0.0003	<0.0001	316729	0.05	0.04	<10000	<0.002	<0.0008	1388962	0.08	0.08
SG-39-8P-4'	11:45	2000	<10000	<0.0001		497005	0.04		<10000	<0.0008		2779268	0.08	
SG-40-8I-8'	12:02	1000	<10000	<0.0003	<0.0003	11742190	2	2	<10000	<0.002	<0.002	705553924	4	8
SG-40-8I-8'	12:20	50	<10000	<0.005		374039	1		<10000	<0.03		9914611	11	
SG-41-8I-8'	12:48	50	<10000	<0.005	<0.005	302806	1	2	<10000	<0.03	<0.03	43912585	49	46
SG-41-8I-8'	13:12	50	<10000	<0.005		561978	2		<10000	<0.03		38085407	42	
SG-41-8P-4'	13:44	50	<10000	<0.005	<0.003	20651	0.07	0.1	<10000	<0.03	<0.02	786238	0.9	1
SG-41-8P-4'	14:00	100	<10000	<0.003		143388	0.2		<10000	<0.02		1940479	1	
STD	14:38	10	1073270	-		E700000			E1300000			E1000000		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Date 12/10/87 Page 2C

			Vinyl Chloride			Benzene								
standard conc.			25		µg/l	500		µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
ul injection (Vinyl 100 ul, Benz 10 ul)			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet			6.84×10^{-16}		g/area	3.07×10^{-16}		g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-39-8P-4'	11:30	1000	<100000	<0.07	<0.03	<100000	<0.03	<0.02						
SG-39-8P-4'	11:46	2000	<100000	<0.03		<100000	<0.02							
SG-40-8I-8'	12:03	1000	<100000	<0.07	<0.07	<100000	<0.03	<0.03						
SG-40-8I-8'	12:21	50	<100000	<1.0		<100000	<0.6							
SG-41-8I-8'	12:36	500	<100000	<0.1	<0.1	<100000	<0.06	<0.06						
SG-41-8I-8'	13:13	50	<10000	<1		<100000	<0.6							
SG-42-8P-4'														
SG-42-8P-4'														

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E [illegible] [illegible] [illegible]

Analysed by David Abramovic

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TRACER RESEARCH CORPORATION

Date 12/10/87 Page 2d

	CO_2			O_2			N_2			CH_4		
standard conc.	26400		µg/l	89600		µg/l	739200		µg/l	28800		µg/l
response from	1		area	1		area	1		area	1		area
ul injection	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	3.93×10^{-11}		g/area	1.06×10^{-10}		g/area	1.25×10^{-10}		g/area	3.16×10^{-11}		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-39-8P-4'	11:40	1000	<100000	<3900	<3900	2098418	220000	220000	671289	840000	840000	<100000	<3200	<3200
SG-39-8P-4'	11:55	1000	<100000	<3900		2076473	220000		666196	830000		<100000	<3200	
SG-40-8I-8'	12:12	1000	576613	23000	22000	1284070	140000	140000	662183	830000	830000	<100000	<3200	<3200
SG-40-8I-8'	12:28	1000	533735	21000		1405436	150000		667251	830000		<100000	<3200	
SG-41-8I-8'	12:46	1000	486833	19000	18000	1033853	110000	120000	716570	900000	880000	<100000	<3200	<3200
SG-41-8I-8'	13:04	1000	449117	18000		1123762	120000		697471	870000		<100000	<3200	
SG-42-8P-4'	13:54	1000	54004	2100	2000	2025855	210000	210000	677329	850000	840000	<100000	<3200	<3200
SG-42-8P-4'	14:00	1000	50625	2000		2031308	210000		667058	830000		<100000	<3200	
STD	14:39	1000	632830	–		1262176	–		633346	–		869497	–	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Condensed Data

Date 12/10/87 Page 1

standard conc.				µg/l			µg/l			µg/l			µg/l				
response from			1	area		1	area		1	area			1	area			
ul injection			2	area		2	area		2	area			2	area			
			3	area		3	area		3	area			3	area			
RFs for this sheet				g/area			g/area			g/area				g/area			
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean		area	µg/l	mean		
-	CH_2Cl_2	$CHCl_3$	12DCA	TCA	CCl_4	TCE	EDB	PCE	Vinyl Chl	Benzene	CO_2		O_2	N_2	CH_4		
SG-33-69P-3	<0.06	<0.001	<0.06	0.02	<0.0001	0.03	<0.0008	<0.0003	<0.03	<0.02	1900		210000	880000	<3200		
SG-34-22L-7	<0.06	<0.001	<0.06	0.02	<0.0001	0.2	<0.0008	<0.0003	<0.03	<0.02	19000		92000	890000	<3200		
SG-35-22L-8	<0.06	<0.001	<0.06	0.02	<0.0001	0.06	<0.0008	0.2	<0.03	<0.02	16000		96000	900000	<3200		
SG-36-22L-7	<0.1	<0.002	<0.1	0.009	<0.0003	0.02	<0.002	0.02	<0.07	<0.03	3200		89000	950000	<3200		
SG-37-22P-5	<0.06	<0.001	<0.06	0.04	<0.0001	2	<0.0008	0.04	<0.03	<0.02	970		190000	760000	<3200		
SG-38-22L-8	<0.1	<0.002	<0.1	<0.0009	<0.0003	2	<0.002	0.02	10	I	3000		58000	960000	<3200		
SG-39-8P-4	<0.06	<0.001	<0.06	0.01	<0.0001	0.04	<0.0008	0.08	<0.03	<0.02	3900		220000	840000	<3200		
SG-40-8I-8	<0.1	<0.002	<0.1	2	<0.0003	2	<0.002	8	<0.03	<0.02	22000		140000	830000	<3200		
SG-41-8I-8	<3	<0.04	<3	51	<0.005	2	<0.03	46	<0.07	<0.03	18000		120000	880000	<3200		
SG-42-8P-4	<1	<0.02	<1	0.1	<0.003	0.1	<0.02	1	<0.1	<0.06	2000		210000	840000	<3200		

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E [illegible]

Analysed by David Abramovic

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TRACER RESEARCH CORPORATION

Date 12/11/87 Page 1

standard conc.				µg/l			µg/l			µg/l			µg/l		
response from			1	area		1	area		1	area		1	area		
ul injection			2	area		2	area		2	area		2	area		
			3	area		3	area		3	area		3	area		
RFs for this sheet				g/area			g/area			g/area					g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l		mean
--	CH_2Cl_2	$CHCl_3$	1,2-DCA	TCA	CCl_4	TCE	EDB	PCE	Vinyl Chl.	Benzene	CO_2	O_2	N_2		CH_4
SG-43-8P-4	<0.04	<0.0006	<0.03	0.05	<0.00007	0.02	<0.0004	0.3	<0.05	0.7	1300	210000	880000		<3400
VC-2-7	<0.04	<0.0006	<0.03	8	<0.00007	8	<0.0004	0.004	<0.05	<0.02	<4400	220000	820000		<3400
SG-44-8I-8	<0.1	<0.002	<0.1	0.05	<0.0003	0.2	<0.002	2	<0.2	<0.08	21000	130000	840000		<3400
SG-45-8I-7	<0.04	<0.0006	<0.03	0.01	<0.00007	0.04	<0.0004	0.6	<0.05	0.006	3200	260000	980000		<3400
SG-46-8I-8	<1	<0.02	<1	10	<0.003	4	<0.02	4	200	6	27000	54000	900000		<3400
SG-47-42I-4	<0.4	<0.006	<0.3	1	<0.0007	1	<0.004	0.2	<0.5	<0.2	18000	230000	980000		<3400
SG-48-42I-4	<0.04	<0.0006	<0.03	0.01	<0.00007	0.4	<0.0004	0.02	<0.05	<0.02	11000	190000	1000000		<3400
SG-49-42I-3	<0.4	<0.006	<0.3	0.2	<0.0007	14	<0.004	0.1	<0.5	<0.2	6100	250000	980000		<3400
SG-50-42I-6	<0.04	<0.0006	<0.03	0.06	<0.00007	0.2	<0.0004	0.02	<0.05	<0.02	12000	220000	940000		<3400
SG-53-42I-3	<0.04	<0.0006	<0.03	0.002	<0.00007	0.02	<0.0004	0.04	<0.05	<0.02	<4400	150000	880000		<3400
SG-54-38I-6	<0.04	<0.0006	<0.03	0.06	<0.00007	0.08	<0.0004	2	<0.05	<0.02	10000	110000	960000		<3400
SG-55-38I-4	<0.4	<0.006	<0.3	0.6	0.05	0.7	<0.004	0.6	<0.5	<0.2	7600	220000	900000		<3400
SG-56-38I-4	<0.4	<0.006	<0.3	0.03	<0.0007	0.07	<0.004	0.6	<0.5	<0.2	7700	220000	940000		<3400
SG-57-38I-2	<0.04	<0.0006	<0.03	0.004	<0.00007	0.02	<0.0004	<0.0001	<0.05	<0.05	<4400	260000	940000		<3400

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Date 12/11/87 Page 1a

			2.63 CH_2Cl_2			4.95 $CHCl_3$			5.25 1,2-DCA			5.82 TCA		
standard conc.			200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from ul injection 10			1261220	area		1765925	area		1373704	area		1786241	area	
			2328532	area		2844776	area		2330980	area		2105428	area	
			3239789	area		3870130	area		3299869	area		3100 0000 E	area	
RFs for this sheet			7.23×10^{-15}	g/area		1.21×10^{-16}	g/area		5.97×10^{-15}	g/area		5.28×10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BlK I	06:16	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		<10000	<0.0003	
N_2 BlK II	06:28	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		<10000	<0.0003	
AIR Samp.	07:12	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		100000 E	0.003	
Syst BlK	07:25	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		100000 E	0.003	
SG-43-8P4	07:44	50	<100000	<1	<0.04	<100000	<0.02	<0.0006	<100000	<1	<0.03	50000 E	0.05	0.05
SG-43-8P4	07:59	2000	<100000	<0.04		<100000	<0.0006		<100000	<0.03		1984300	0.05	
VC-2-7	08:27	2000	<10000	<0.04	<0.04	<10000	<0.0006	<0.0006	<10000	<0.03	<0.03	8124049	2	8
VC-2-7	08:40	200	<10000	<0.4		<10000	<0.006		<10000	<0.3		53263932	14	
SG-44-8I-8	09:02	50	<10000	<1	<0.1	<10000	<0.02	<0.002	<10000	<1	<0.1	<10000	<0.01	<0.05
SG-44-8I-8	09:15	500	<10000	<0.1		<10000	<0.002		<10000	<0.1		433609	0.05	
SG-45-8I-7	09:32	50	<10000	<1	<0.04	<10000	<0.02	<0.0006	<10000	<1	<0.03	<10000	<0.01	<0.01
SG-45-8I-7	09:49	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		473804	0.01	
SG-46-8I-8	10:05	50	<10000	<1	<1	<10000	<0.02	<0.02	<10000	<1	<1	10755287	11	10
SG-46-8I-8	10:19	50	<10000	<1		<10000	<0.02		<10000	<1		4598516	10	
Std	10:35	10	294532	-		860446	-		311365	-		100000 E	-	
SG-47-42I-4	11:11	200	<10000	<0.4	<0.4	<10000	<0.006	<0.006	<10000	<0.3	<0.3	5531211	1	1
SG-47-42I-4	11:25	200	<10000	<0.4		<10000	<0.006		<10000	<0.3		5521851	1	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Date 12/11/87 Page 1b

			5.98 CCl4			7.05 TCE			7.74 EOB			10.02 PCE		
standard conc.			2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from ul injection 10			1151502		area	11055186		area	12201302		area	11894839		area
			2129 4410		area	2955220		area	2219 4975		area	2181 9022		area
			3137 5199		area	3104 3101		area	3225 1680		area	3194 8600		area
RFs for this sheet			1.43 x 10^-17		g/area	9.82 x 10^-17		g/area	9.03 x 10^-17		g/area	2.65 x 10^-17		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N2 BLK I	06:16	2000	<10000	<0.00007		<10000	<0.0005		<10000	<0.0004		<10000	<0.0001	
N2 BLK II	06:28	2000	<10000	<0.00007		<10000	<0.0005		<10000	<0.0004		<10000	<0.0001	
AIR Samp.	07:12	2000	E 100000	0.0007		399506	0.02		<10000	<0.0004		E 200000	0.003	
Syst. BLK.	07:25	2000	E 100000	0.0007		38176			<10000	<0.0004		E 200000	0.003	
SG-43-8P-4	07:44	50	<10000	<0.003	<0.00007	E 10000	0.02	0.02	<10000	<0.02	<0.0004	E 500000	0.3	0.3
SG-43-8P-4'	07:59	2000	<10000	<0.00007		347962	0.02		<10000	<0.0004		23640377	0.3	
VC-2-7	08:27	2000	<10000	<0.00007	<0.00007	42464217	2	8	<10000	<0.0004	<0.004	271078	0.004	0.004
VC-2-7	08:40	200	<10000	<0.0007		25643049	13		<10000	<0.004		<10000	<0.001	
SG-44-8I-8'	09:02	50	<10000	<0.003	<0.0003	E 80000	0.2	0.2	<10000	<0.02	<0.002	1872914	1	2
SG-44-8I-8'	09:15	500	<10000	<0.0003		802456	0.2		<10000	<0.002		40438844	3	
SG-45-8I-7'	09:32	50	<10000	<0.003	<0.00007	273972	0.02	0.04	<10000	<0.02	<0.0004	NA 432011	0.006	0.6
SG-45-8I-7'	09:49	2000	<10000	<0.00007		1076187	0.05		<10000	<0.0004		41939116	0.6	
SG-46-8I-8'	10:05	50	<10000	<0.003	<0.003	2053589	4	4	<10000	<0.02	<0.02	7823190	4	4
SG-46-8I-8'	10:19	50	<10000	<0.003		1911026	4		<10000	<0.02		8137670	4	
STD	10:35	10	1545357	-		1054159	-		1913361	-		1850304	-	
SG-47-42L-4'	11:11	200	<10000	<0.0007	<0.0007	2720762	1	1	<10000	<0.004	<0.004	1336866	0.2	0.2
SG-47-42L-4'	11:25	200	<10000	<0.0007		2660637	1		<10000	<0.004		1077483	0.1	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

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Date 12/11/87 Page 1C

	1.37 Vinyl Chloride			7.24 Benzene								
standard conc.	25 µg/l			500 µg/l			µg/l			µg/l		
response from ul injection (Vinyl Chl ·100, Benzene ·10)	12389052 area			113288722 area			1 area			1 area		
	22336046 area			212284843 area			2 area			2 area		
	32252109 area			312364298 area			3 area			3 area		
RFs for this sheet	1.07×10^{-15} g/area			3.95×10^{-16} g/area			g/area			g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BLK. I	06:16	2000	<100000	<0.05		<100000	<0.02							
N_2 BLK II	06:28	2000	<100000	<0.05		<100000	<0.02							
ATR Sand	07:12	2000	<100000	<0.05		<100000	<0.02							
SYST. BLK.	07:25	2000	<100000	<0.05		<100000	<0.02							
SG-43-8P-4'	07:44	50	<100000	< 2	<0.05	<100000	<0.8	<0.7						
SG-43-8P-4'	07:59	2000	<100000	<0.05		3627574	0.7							
VC-2-7	08:27	2000	<100000	<0.05	<0.05	<100000	<0.02	<0.02						
VC-2-7	08:40	200	<100000	<0.5		<100000	<0.2							
SG-44-8I-8'	09:02	50	<100000	< 2	<0.2	<100000	<0.8	<0.08						
SG-44-8I-8'	09:15	500	<100000	<0.2		<100000	<0.08							
SG-45-8I-7'	09:32	50	<100000	< 2	<0.05	<100000	<0.7	<0.006						
SG-45-8I-7'	09:49	2000	<100000	<0.05		27860	0.006							
SG-46-8I-8'	10:05	50	14176916	300	200	830123	7	6						
SG-46-8I-8'	10:19	50	13242491	105		679623	5							
STD	10:58	10	2170989	–		11031615	–							
SG-47-42L-4'	11:11	200	<100000	<0.5	<0.5	<100000	<0.2	<0.2						
SG-47-42L-4'	11:25	200	<100000	<0.5		<100000	<0.2							

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovic

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TRACER RESEARCH CORPORATION

Date 12/11/87 Page 1d

	0.36 CO_2			1.04 O_2			1.32 N_2			2.37 CH_4		
standard conc.	26400	µg/l		89600	µg/l		7392 00	µg/l		28800	µg/l	
response from	1589236	area		1912043	area		15496767	area		1844705	area	
ul injection	2607587	area		2905792	area		25522229	area		2865409	area	
1000	3595481	area		3937957	area		35542482	area		3841550	area	
RFs for this sheet	4.42×10^{-11}	g/area		9.75×10^{-11}	g/area		1.34×10^{-10}	g/area		3.39×10^{-11}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2 BlK I	06:25	1000	<100000	<4400		<100000	<9800		<100000	<13000		<100000	<3400	
H_2 BlK II	06:47	1000	<100000	<4400		<100000	<9800		<100000	<1300		<100000	<3400	
AIR Samp.	06:51	1000	<100000	<4400		2308434	230000		6528487	870000		<100000	<3400	
Syst Blk.	07:35	1000	<100000	<4400		2457495	240000		7190557	960000		<100000	<3400	
SG-43-8P-4	08:08	1000	30187	1300	1300	2176511	210000	210000	6674371	890000	880000	<100000	<3400	<3400
SG-43-8P-4'	08:11	1000	29871	1300		2142045	210000		6543545	880000		<100000	<3400	
VC-2-7	08:54	1000	<100000	<4400	<4400	2205594	220000	220000	6103355	820000	820000	<100000	<3400	<3400
VC-2-7	08:58	1000	<100000	<4400		2089310	210000		6211345	830000		<100000	<3400	
SG44-8I-8'	09:24	1000	474405	21000	21000	1336348	130000	130000	6264686	840000	840000	<100000	<3400	<3400
SG-44-8I-8'	09:28	1000	476093	21000		1289639	130000		6332981	850000		<100000	<3400	
SG-45-8I-7'	09:41	1000	75076	3300	3200	2759905	270000	260000	7478870	1000000	980000	<100000	<3400	<3400
SG-45-8I-7'	09:46	1000	68253	3100		2670101	260000		7150861	960000		<100000	<3400	
SG-46-8I-8'	10:13	1000	621319	27000	27000	550209	54000	54000	6728943	900000	900000	<100000	<3400	<3400
SG-46-8I-8'		1000			Lost	Sample	no	second	run!					
STD	10:31	1000	655019	—		1191970	—		5947373			915318	-	
SG-47-42L-4'	11:35	1000	407455	18000	18000	2333286	230000	230000	7425584	990000	980000	<100000	<3400	<3400
SG-47-42L-4'	11:39	1000	410035	18000		2309381	230000		7148992	960000		<100000	<3400	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

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Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/11/87 Page 2a

	2.6 CH_2Cl_2			4.91 $CHCl_3$			5.2 1,2-DCA			5.79 TCA		
standard conc.	200		µg/l	10		µg/l	200		µg/l	5		µg/l
response from ul injection 10	1		area	1		area	1		area	1		area
	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	7.23×10^{-15}		g/area	1.21×10^{-16}		g/area	5.97×10^{-15}		g/area	5.28×10^{-17}		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-48-42L-4	11:54	200	<10000	<0.4	<0.04	<10000	<0.006	<0.0006	<10000	<0.3	<0.03	632737	0.2 NA	0.01
SG-48-42L-4	12:07	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		444664	0.01	
SG-49-42L-3	12:28	200	<10000	<0.4	<0.4	<10000	<0.006	<0.006	<10000	<0.3	<0.3	597068	0.2	2.2
SG-49-42L-3	12:41	200	<10000	<0.4		<10000	<0.006		<10000	<0.3		564724	0.1	
SG-50-42L-6	12:56	200	<10000	<0.4	<0.04	<10000	<0.006	<0.0006	<10000	<0.3	<0.03	480808	0.1	0.06
SG-50-42L-6	13:10	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		851574	0.02	
STD	14:10	10	310657	–		833348	–		339188	–		1392623	–	
SYST BLK	14:57	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		E 15000	0.0004	
SG-53-38L-3	15:14	200	<10000	<0.4	<0.04	<10000	<0.006	<0.0006	<10000	<0.3	<0.03	<10000	<0.003	0.01
SG-53-38L-3	15:25	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		77800	0.002	
SG-54-38L-6	16:00	200	<10000	<0.4	<0.04	<10000	<0.006	<0.0006	<10000	<0.3	<0.03	152523	0.04	0.06
SG-54-38L-6	16:14	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		3190541	0.08	
SG-55-38L-4	16:28	200	<10000	<0.4	<0.4	<10000	<0.006	<0.006	<10000	<0.3	<0.3	2093685	0.6	0.6
SG-55-38L-4	16:43	200	<10000	<0.4		<10000	<0.006		<10000	<0.3		2436337	0.6	
SG-56-38L-4	16:56	200	<10000	<0.4	<0.4	<10000	<0.006	<0.006	<10000	<0.3	<0.3	E 100000	0.03	0.03
SG-56-38L-4	17:10	200	<10000	<0.4		<10000	<0.006		<10000	<0.3		116875	0.03	
SG-57-38L-2	17:25	200	<10000	<0.4	<0.04	<10000	<0.006	<0.0006	<10000	<0.3	<0.03	E 15000	0.004	0.004
SG-57-38L-2	17:39	2000	<10000	<0.04		<10000	<0.0006		<10000	<0.03		146604	0.004	
STD	17:53	10 RF	305326	–		807657			331533			1075115	–	

Notations: RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovic

Checked by

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/11/87 Page 2b

	CCl4			TCE			EDB			PCE		
standard conc.	2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from 10 ul injection	1		area	1		area	1		area	1		area
	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	1.43×10^{-17}		g/area	9.82×10^{-17}		g/area	9.03×10^{-17}		g/area	2.65×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-48-426-4	11:54	200	<10000	<0.0007	<0.00007	971381	0.5	0.4	<10000	<0.004	<0.0004	213362	0.03	0.02
SG-48-426-4'	12:07	2000	<10000	<0.00007		4575026	0.2		<10000	<0.0004		833301	0.01	
SG-49-426-3	12:28	200	<10000	<0.0007	<0.0007	29521559	15	14	<10000	<0.004	<0.004	994093	0.1	0.1
SG-49-426-3'	12:41	200	<10000	<0.0007		29034867	14		<10000	<0.004		1039744	0.1	
SG-50-426	12:56	200	<10000	<0.0007	<0.00007	887079	0.4	0.2	<10000	<0.004	<0.0004	161720	0.02	0.02
SG-50-426	13:10	2000	<10000	<0.00007		2886784	0.1		<10000	<0.0004		2007588	0.03	
STD	14:10	10	1092665	–		1287073	–		1899970	–		1387691	–	
1ST BLK	14:57	2000	E 15000			<10000			<10000			E 100000	0.001	
SG-53-381-3	15:14	200	<10000	<0.0007	<0.00007	E 50000	0.02	0.02	<10000	<0.004	<0.0004	E 300000	0.04	0.04
SG-53-381-3'	15:25	2000	<10000	<0.00007		523986	0.03		<10000	<0.0004		2891526	0.03	
SG-54-381-6	16:00	200	<10000	<0.0007	<0.00007	228968	0.1	0.08	<10000	<0.004	<0.0004	16521292	2	2
SG-54-381-6'	16:14	2000	<10000	<0.00007		1511689	0.07		<10000	<0.0004		QR		
SG-55-381-4	16:28	200	667994	0.05	0.05	1223179	0.6	0.7	<10000	<0.004	<0.004	5845656	0.8	0.6
SG-55-381-4'	16:43	200	662881	0.05		1565011	0.8		<10000	<0.004		4138109	0.5	
SG-56-381-4	16:56	200	<10000	<0.0007	<0.0007	E 150000	0.07	0.07	<10000	<0.004	<0.004	3941940	0.5	0.6
SG-56-381-4'	17:10	200	<10000	<0.0007		146285	0.07		<10000	<0.004		4737206	0.6	
SG-57-381-2	17:25	200	E 40000	0.0007	0.0008	E 40000	0.02	0.02	<10000	<0.004	<0.0004	<10000	<0.001	<0.001
SG-57-381-2'	17:39	2000	139370	<0.001		406658	0.02		<10000	<0.0004		<10000	<0.0001	
STD	17:53	RF	1371242	response factor		1136701			1873467	–		2140477	–	

Notations:
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

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TRACER RESEARCH CORPORATION

Date 12/11/87 Page 2C

			1.27 Vinyl Chloride			7.24 Benzene								
standard conc.			25		µg/l	500		µg/l			µg/l			µg/l
response from ul injection (undil-100, Benz-10)			1		area	1		area	1		area	1		area
			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet			1.07×10^{-15}		g/area	3.95×10^{-16}		g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-48-42L-4'	11:54	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02						
SG-48-42L-4'	12:07	2000	<1000000	<0.05		<100000	<0.02							
SG-4-42L-3'	12:28	200	<100000	<0.5	<0.5	<100000	<0.2	<0.2						
SG-4-42L-3'	12:41	200	<100000	<0.5		<100000	<0.2							
SG-50-42L-6'	12:56	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02						
SG-50-42L-6'	13:13	2000	<100000	<0.05		<100000	<0.02							
STD	14:10	10	2186903	–		4360919	–							
SYST BLK	14:57	2000	<100000	<0.05		<100000	<0.02							
SG-53-38L-3'	15:14	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02						
SG-53-38L-3'	15:25	2000	<100000	<0.05		<100000	<0.02							
SG-54-38L-6'	16:00	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02						
SG-54-38L-6'	16:14	2000	<100000	<0.05		<100000	<0.02							
SG-55-38L-4'	16:28	200	<100000	<0.5	<0.5	<100000	<0.2	<0.2						
SG-55-38L-4'	16:43	200	<100000	<0.5		<100000	<0.2							
SG-56-38L-4'	16:56	200	<100000	<0.5	<0.5	<100000	<0.2	<0.2						
SG-56-38L-4'	17:10	200	<100000	<0.5		<100000	<0.2							
SG-57-38L-2'	17:25	200	<100000	<0.5	<0.05	<100000	<0.2	<0.02						
SG-57-38L-2'	17:39	2000	<100000	<0.05		<100000	<0.02							
STD	17:53	RF	response factor			3536003	–							

Notations: I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovic

Checked by

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/11/87 Page 2d

			0.36			1.04			1.32			2.37		
			CO_2			O_2			N_2			CH_4		
standard conc.			26400		µg/l	89600		µg/l	739200		µg/l	28800		µg/l
response from			1		area	1		area	1		area	1		area
ul injection		1000	2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet			4.42×10^{-11}		g/area	9.75×10^{-11}		g/area	1.34×10^{-10}		g/area	3.39×10^{-11}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG-48-42L-4	12:03	1000	249877	11000	11000	1987534	190000	190000	7528514	1000000	1000000	<100000	<3400	<3400
SG-48-42L-4	12:16	1000	241915	11000		1980315	190000		7504000	1000000		<100000	<3400	
SG-49-42L-3	12:37	1000	138986	6100	6100	2546998	250000	250000	7348493	980000	980000	<100000	<3400	<3400
SG-49-42L-3			Lost	Sample	no duplicate run									
SG-50-42L-6	13:05	1000	295091	13000	12000	2251107	220000	220000	7095169	950000	940000	<100000	<3400	<3400
SG-50-42L-6	13:21	1000	275431	12000		2266924	220000		6931704	930000		<100000	<3400	
STD	14:18	1000	630722	-		1333819	-		6102427	-		895263	-	
SG-53-38L-3	15:25	1000	<100000	<4400	<4400	2537478	250000	250000	6598084	880000	880000	<100000	<3400	<3400
SG-53-38L-3	15:56	1000	<100000	<4400		522198	51000		6562569	880000		<100000	<3400	
SG-54-38L-6	1608	1000	233528	10000	10000	988898	96000	110000	7367423	990000	960000	<100000	<3400	<3400
SG-54-38L-6	16:23	1000	214024	9000		1269956	120000		6969420	930000		<100000	<3400	
SG-55-38L-4	16:40	1000	193579	8600	7600	2341271	230000	220000	6932530	930000	900000	<100000	<3400	<3400
SG-55-38L-4	16:51	1000	152413	6700		2242306	220000		6402663	860000		<100000	<3400	
SG-56-38L-4	17:05	1000	178508	7900	7700	2212770	220000	220000	7122494	950000	940000	<100000	<3400	<3400
SG-56-38L-4	17:08	1000	170000	7500		2248659	220000		7005348	940000		<100000	<3400	
SG-57-38L-2	17:34	1000	<100000	<4400	<4400	2698375	260000	260000	7006250	940000	940000	<100000	<3400	<3400
SG-57-38L-2	17:37	1000	<100000	<4400		2762943	270000		6947613	930000		<100000	<3400	
STD		1000										<100000	<3400	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

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MG

Job Radian Sacramento Ca (condensed Data)

TRACER RESEARCH CORPORATION

Date 12/14/87 Page 1

standard conc.				µg/l			µg/l			µg/l			µg/l			
response from			1	area		1	area		1	area		1	area			
ul injection			2	area		2	area		2	area		2	area			
			3	area		3	area		3	area		3	area			
RFs for this sheet				g/area			g/area			g/area			g/area			
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean		
-	CH_2Cl_2	$CHCl_3$	12-DCA	TCA	CCl_4	TCE	EDB	PCE	Vinyl Chlor	Benzene	CO_2	O_2	N_2	CH_4		
SG-58-24P-2'	<0.06	<0.0009	<0.04	0.008	<0.0001	0.08	<0.0006	0.01	<0.05	<0.03	<4700	240000	840000	<3600		
SG-59-24P-3'	<0.06	<0.0009	<0.04	0.004	0.001	0.08	<0.0006	0.03	<0.05	<0.03	<4700	240000	820000	<3600		
SG-60-24L-8'	<0.06	<0.0009	<0.04	0.05	<0.0001	0.4	<0.0006	<0.0003	<0.05	<0.03	1200	230000	800000	<3600		
SG-61-24L-8'	<0.06	<0.0009	<0.04	0.004	<0.0001	0.04	<0.0006	<0.0003	<0.05	<0.03	<4700	230000	780000	<3600		
SG-62-24L-8'	<0.06	<0.0009	<0.04	0.8	<0.0001	0.2	<0.0006	0.02	<0.05	<0.03	21000	88000	850000	<3600		
SG-63-24L-3'	<0.06	<0.0009	<0.04	0.01	<0.0001	0.02	<0.0006	<0.0003	<0.05	<0.03	14700	260000	820000	<3600		
VC-1-3	<0.06	<0.0009	<0.04	0.008	<0.0001	0.02	<0.0006	<0.0003	<0.05	<0.03	1700	240000	810000	<3600		
VC-6-3	<0.6	<0.009	<0.4	2	<0.001	0.2	<0.006	<0.003	<0.5	<0.3	8200	190000	840000	<3600		
VC-6-2	<0.6	<0.009	<0.4	~~7800~~ 6	<0.001	0.2	<0.006	<0.003	<0.5	<0.3	7800	220000	870000	<3600		
VC-6-1	<0.6	<0.009	<0.4	~~6000~~ 11	<0.001	0.4	<0.006	0.06	<0.5	<0.3	6000	220000	870000	<3600		

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovic

Checked by _____

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/14/87 Page 1a

	2.6			4.9			5.2			5.78		
	CH_2Cl_2			$CHCl_3$			1,2-DCA			TCA		
standard conc.	200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from	1 15 0000	area		1590964	area		1 E 250000	area		1 E 65 0000	area	
ul injection 10	2 18 7374	area		2 E 500000	area		2 251767	area		2 658893	area	
	3207270	area		3604370	area		3256790	area		3669508	area	
RFs for this sheet	1.10×10^{-14}	g/area		1.77×10^{-16}	g/area		7.91×10^{-15}	g/area		7.58×10^{-17}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BIK I	07:02	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		<10000	<0.0004	
N_2 BIK II	07:15	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		<10000	<0.0004	
Air Samp.	07:27	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		49768	0.002	
Syst BIK.	07:40	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		E 74352	0.003	
SG-58-24P-2'	09:15	2000	<10000	<0.06	<0.06	<10000	<0.0009	<0.0009	<10000	<0.04	<0.04	209038	0.008	0.008
SG-58-24P-2'	09:28	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		E 200000	0.008	
SG-59-24P-3'	09:43	200	<10000	<0.6	<0.06	<10000	<0.009	<0.0009	<10000	<0.4	<0.04	<10000	<0.004	<0.004
SG-59-24P-3'	09:57	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		E 94018	0.004	
SG-60-24L-8'	10:10	200	<10000	<0.6	<0.06	<10000	<0.009	<0.009	<10000	<0.4	<0.04	1187763	0.05	0.05
SG-60-24L-8'	10:23	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		<10000	<0.004 NA	
SG-61-24L-8'	10:39	200	<10000	<0.6	<0.06	<10000	<0.009	<0.0009	<10000	<0.4	<0.04	<10000	<0.004	<0.004
SG-61-24L-8'	10:52	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		E 100000	0.004	
SG-62-24L-8'	11:08	200	<10000	<0.6	<0.06	<10000	<0.009	<0.009	<10000	<0.4	<0.04	1457212	0.6	0.8
SG-62-24L-8'	11:21	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		22521464	0.9	
STD	12:16	10	263476	-		64485	-		253169	-		713966	-	
SG-63-24L-3'	12:56	200	<10000	<0.6	<0.06	<10000	<0.009	<0.0009	<10000	<0.4	<0.04	E 30000	0.01	0.01
SG-63-24L-3'	13:12	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		275557	0.01	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

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TRACER RESEARCH CORPORATION

Date 12/14/87 Page 16

	5.94 CCl4			7.0 TCE			7.7 EDB			9.94 PCE		
standard conc.	2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from	1 E75 0000		area	1 622144		area	1 E1680000		area	1 803137		area
ul injection 10	2787118		area	2675329		area	2170 7940		area	2 843750		area
	381119		area	369 5900		area	3171 7296		area	3 9378 30		area
RFs for this sheet	2.56×10^{-17}		g/area	1.50×10^{-16}		g/area	11.8×10^{-16}		g/area	5.80×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BIK I	07:02	2000	<10000	<0.0001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003	
N_2 BIK II	07:15	2000	<10000	<0.0001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003	
AIR Samp.	07:2	2000	E 10 0000	0.001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003	
Syst BIK.	07:40	2000	E 100000	0.001		<10000	<0.0008		<10000	<0.0006		<10000	<0.0003	
Sb-58-24P-2'	09:15	2000	40000	<0.0001	<0.0001	1151056	0.09	0.08	<10000	<0.0006	<0.0006	379363	0.01	0.01
Sb-58-24P-2'	09:28	2000	<10000	<0.0001		1046409	0.08		<10000	<0.0006		344713	0.01	
Sb-59-24P-3'	09:43	200	<10000	<0.001	0.001	172364	0.1	0.08	<10000	<0.006	<0.0006	<10000	<0.003	0.03
Sb-59-24P-3'	09:57	2000	100000	0.001		901374	0.07		<10000	<0.0006		100000	0.03	
Sb-60-24L-8'	10:10	200	<10000	<0.001	<0.0001	475574	0.4	0.4	<10000	<0.006	<0.0006	<10000	<0.003	<0.0003
Sb-60-24L-8'	10:23	2000	<10000	<0.0001		5637229	0.4		<10000	<0.0006		<10000	<0.0003	
Sb-61-24L-8'	10:39	200	<10000	<0.001	<0.0001	<10000	<0.008	0.04	<10000	<0.006	<0.0006	<10000	<0.003	<0.0003
Sb-61-24L-8'	10:52	2000	<1000	<0.001		595445	0.04		<10000	<0.0006		<10000	<0.0003	
Sb-62-24L-8'	11:08	200	<10000	<0.001	<0.0001	472741	0.4	0.2	<10000	<0.006	<0.0006	E 50000	0.01	0.02
Sb-62-24L-8'	11:21	2000	<10000	<0.0001		122641 2	0.09		<10000	<0.0006		522979	0.02	
STD	12:16	10	805089	-		621438	-		1500828	-		839668	-	
Sb-63-24L-3'	12:56	200	<10000	<0.0001	<0.0001	E 30000	0.02	0.02	<10000	<0.006	<0.0006	<10000	<0.003	<0.0003
Sb-63-24L-3'	13:12	2000	<10000	<0.0001		284235	0.02		<10000	<0.0006		<10000	<0.0003	

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abramovich

Checked by

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/14/87 Page 1c

	1.37 Vinyl Chloride			7.2 Benzene								
standard conc.	25	µg/l		500	µg/l			µg/l			µg/l	
response from	12433349	area		112308805	area		1	area		1	area	
ul injection	22773837	area		21514637	area		2	area		2	area	
Vinyl Cl 100 / Benzene 10	32955643	area		31725292	area		3	area		3	area	
RFs for this sheet	4.19 × 10⁻¹⁶	g/area		5.65 × 10⁻¹⁶	g/area			g/area			g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BlK I	07:03	2000	<100000	<0.05		<100000	<0.03							
N_2 BlK II	07:16	2000	<100000	<0.05		<100000	<0.03							
Air Samp	07:29	2000	<100000	<0.05		<100000	<0.03							
SYST BlK.	07:41	2000	<100000	<0.05		<100000	<0.03							
SG-58-24P-2'	07:16	2000	<100000	<0.05	<0.05	<100000	<0.03	<0.03						
SG-58-24P-2'	07:29	2000	<100000	<0.05		<100000	<0.03							
SG-59-24P-3'	09:44	200	<100000	<0.5	<0.05	<100000	<0.3	<0.03						
SG-59-24P-3'	09:57	2000	<100000	<0.05		<100000	<0.03							
SG-60-24L-8'	10:11	200	<100000	<0.5	<0.05	<100000	<0.3	<0.03						
SG-60-24L-8'	10:24	2000	<100000	<0.05		<100000	<0.03							
SG-61-24L-8'	10:40	200	<100000	<0.5	<0.05	<100000	<0.3	<0.03						
SG-61-24L-8'	10:53	2000	<100000	<0.05		<100000	<0.03							
SG-62-24L-8'	11:08	200	<100000	<0.5	<0.05	<100000	<0.3	<0.03						
SG-62-24L-8'	11:21	2000	<100000	<0.05		<100000	<0.03							
STD	12:15	100	1881511	—		2212377	—							
SG-63-24L-	12:57	200	<100000	<0.5	<0.05	<100000	<0.3	<0.03						
SG-63-24L-3'	13:13	2000	<100000	<0.05		<100000	<0.03							

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

Checked by _____

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/14/87 Page 1d

	0.34 CO_2			1.02 O_2			1.18 N_2			2.3 CH_4		
standard conc.	26400	µg/l		89600	µg/l		739200	µg/l		28800	µg/l	
response from	1574174	area		1605691	area		15517409	area		1793711	area	
ul injection 1000	2561197	area		2569292	area		25345958	area		2809857	area	
	3560724	area		3622977	area		35524420	area		3800206	area	
RFs for this sheet	4.67×10^{-11}	g/area		1.50×10^{-10}	g/area		1.35×10^{-10}	g/area		3.59×10^{-11}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2 BlK I	07:13	1000	<100000	<4700		<100000	<15000		<100000	<14000		<100000	<3600	
H_2 BlK II		1000	<100000	<4700		<100000	<15000		<100000	<14000		<100000	<3600	
Air Samp.	07:37	1000	<100000	<4700		1736072	260000		6296409	850000		<100000	<3600	
Syst Blk	07:52	1000	<100000	<4700		1750506	260000		6435546	870000		<100000	<3600	
S6-58-24P-2'	09:17	1000	<100000	<4700	<4700	1646679	250000	240000	6298298	850000	840000	<100000	<3600	3600
S6-58-24P-2'	09:38	1000	<100000	<4700		1596793	240000		6185146	840000		<100000	<3600	
S6-59-24P-3'	09:53	1000	<100000	<4700	<4700	1662808	250000	240000	6217671	840000	820000	<100000	<3600	<3600
S6-59-24P-3'	10:06	1000	<100000	<4700		1596473	240000		5958621	810000		<100000	<3600	
S6-60-24L-8'	10:21	1000	24778	1200	1200	1524902	230000	230000	5989928	810000	800000	<100000	<3600	<3600
S6-60-24L-8'	10:35	1000	<100000	<4700		1560214	230000		5971410	800000		<100000	<3600	
S6-61-24L-8'	10:48	1000	<100000	<4700	<4700	1554840	230000	230000	5748783	780000	780000	<100000	<3600	<3600
S6-61-24L-8'	11:01	1000	<100000	<4700		345234	5200 NA		1105498	15000 NA		<100000	<3600	
S6-62-24L-8'	11:18	1000	458633	21000	21000	502661	75000	98000	6138119	830000	850000	<100000	<3600	<3600
S6-62-24L-8'	11:43	1000	439840	21000		691349	100000		6401564	870000		<100000	<3600	
STD	12:38	1000	562596	–		686877			5325217	–		798890	–	
S6-63-24L-3'	13:08	1000	<100000	<4700	<4700	1716655	260000	260000	5972610	810000	820000	<100000	<3600	<3600
S6-63-24L-3'	13:25	1000	<100000	<4700		1769347	260000		6038420	820000		<100000	<3600	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

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Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/14/87 Page 2a

	2.6 CH_2Cl_2			4.9 $CHCl_3$			5.2 1,2-DCA			5.78 TCA		
standard conc.	200		µg/l	10		µg/l	200		µg/l	5		µg/l
response from ul injection 10	1		area	1		area	1		area	1		area
	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	1.10×10^{-14}		g/area	1.77×10^{-16}		g/area	7.91×10^{-15}		g/area	7.58×10^{-17}		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
VC-1-3	13:43	200	<10000	<0.6	<0.06	<10000	<0.009	<0.0009	<10000	<0.4	<0.04	E 20000	0.008	0.008
VC-1-3	13:55	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		194262	0.007	
VC-6-3	14:09	200	<10000	<0.6	<0.6	<10000	<0.009	<0.009	<10000	<0.4	<0.4	6230301	2	2
VC-6-3	14:22	200	<10000	<0.6		<10000	<0.009		<10000	<0.4		7603777	3	
VC-6-2	14:38	200	<10000	<0.6	<0.6	<10000	<0.009	<0.009	<10000	<0.4	<0.4	12170933	5	6
VC-6-2	14:52	200	<10000	<0.6		<10000	<0.009		<10000	<0.4		14790332	6	
VC-6-1	15:05	200	<10000	<0.6	<0.6	<10000	<0.009	<0.009	<10000	<0.4	<0.4	19418518	11	11
VC-6-1	15:17	200	<10000	<0.6		<10000	<0.009		<10000	<0.4		27715355	11	
STD	15:45	10	157643	-		838097	-		E 250000	-		658443	-	
Air Samp	16:11	2000	<10000	<0.06		<10000	<0.0009		<10000	<0.04		E 100000	0.004	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

Checked by _____

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/14/87 Page 2b

			5.94 CCl4			7.0 TCE			7.7 EOB			9.94 PCE		
standard conc.			2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from 10 ul injection			1		area	1		area	1		area	1		area
			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet			2.56×10^{-17}		g/area	1.50×10^{-16}		g/area	11.8×10^{-16}		g/area	5.80×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
VC-1-3	13:43	200	<10000	<0.001	<0.001	E 20000	0.02	0.02	<10000	<0.006	<0.006	<10000	<0.003	<0.003
VC-1-3	13:55	2000	<10000	<0.0001		213230	0.02		<10000	<0.0006		<10000	<0.0003	
VC-6-3	14:09	200	<10000	<0.001	<0.001	286324	0.2	0.2	<10000	<0.006	<0.006	<10000	<0.003	<0.003
VC-6-3	14:22	200	<10000	<0.001		251225	0.2		<10000	<0.006		<10000	<0.003	
VC-6-2	14:38	200	<10000	<0.001	<0.001	228852	0.2	0.2	<10000	<0.006	<0.006	<10000	<0.003	<0.003
VC-6-2	14:52	200	<10000	<0.001		295211	0.2		<10000	<0.006		<10000	<0.003	
VC-6-1	15:05	200	<10000	<0.001	<0.001	474412	0.4	0.4	<10000	<0.006	<0.006	269167	0.08	0.06
VC-6-1	15:17	200	<10000	<0.001		420127	0.3		<10000	<0.006		174735	0.05	
STD	15:45	10	220077	–		706159	–		1537889	–		767752	–	
Air Samp	16:11	2000	100000	0.001		<10000	<0.0008		<10000	<0.0006		<10000	0.0003	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

Checked by _____

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/14/87 Page 2c

1.27 7.2

	Vinyl Chloride			Benzene								
standard conc.	25		µg/l	500		µg/l			µg/l			µg/l
response from	1		area	1		area	1		area	1		area
ul injection Vinyl Chl 100 Benzene 10	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	9.19×10^{-16}		g/area	5.65×10^{-16}		g/area			g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
VC-1-3	13:42	200	<100000	<0.6	<0.05	<100000	<0.3	<0.03						
VC-1-3	13:56	2000	<100000	<0.05		<100000	<0.03							
VC-6-3	14:09	200	<100000	<0.5	<0.5	<100000	<0.3	<0.3						
VC-6-3	14:22	200	<100000	<0.5		<100000	<0.3							
VC-6-2	14:39	200	<100000	<0.5	<0.5	<100000	<0.3	<0.3						
VC-6-2	14:53	200	<100000	<0.5		<100000	<0.3							
VC-6-1	15:06	200	<100000	<0.5	<0.5	<100000	<0.3	<0.3						
VC-6-1	15:18	200	<100000	<0.5		<100000	<0.3							
STD	15:59	100	1797175	-		6552236	-							
Air Samp	16:12	2000	<100000	<0.05		<100000	<0.03							

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

Checked by _____

Job Andian Sacramento Co

TRACER RESEARCH CORPORATION

Date 2/14/87 Page 2d

	CO_2		O_2		N_2		CH_4	
standard conc.	26400	µg/l	89600	µg/l	739200	µg/l	28800	µg/l
response from	1	area	1	area	1	area	1	area
ul injection 1000	2	area	2	area	2	area	2	area
	3	area	3	area	3	area	3	area
RFs for this sheet		g/area		g/area		g/area		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
VC-1-3	13:51	1000	37384	1700	1700	1573685	240000	240000	5934049	800000	810000	<100000	<3600	<3600
VC-1-3	14:05	1000	35830	1700		1688646	250000		6081826	820000		<100000	<3600	
VC-6-3	14:09	1000	181623	8500	8200	1280794	190000	190000	6231099	840000	840000	<100000	<3600	<3600
VC-6-3	14:22	1000	171067	8000		1292842	190000		6226027	840000		<100000	<3600	
VC-6-2	14:49	1000	169747	7900	7800	1529757	230000	220000	6475000	880000	870000	<100000	<3600	<3600
VC-6-2	15:00	1000	165143	7700		1466044	220000		6321542	860000		<100000	<3600	
VC-6-1	15:43	1000	128731	6000	6000	1501423	220000	220000	6445162	870000	870000	<100000	<3600	<3600
VC-6-1	1	1000				Lost Samp, no second run!						<100000	<3600	
STD	16:04	1000	575920	-		716557	-		5489443	-		833844	-	
Air Samp	16:20	1000	<100000	<4400		1835457			6309818			<100000	<3600	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

Checked by

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Job Radian Sacramento Co. (Condensed Data)

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 1

standard conc.				µg/l			µg/l			µg/l				µg/l		
response from			1	area		1	area		1	area			1	area		
ul injection			2	area		2	area		2	area			2	area		
			3	area		3	area		3	area			3	area		
RFs for this sheet				g/area			g/area			g/area				g/area		
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean		area	µg/l	mean	
—	CH_2Cl_2	$CHCl_3$	1,2-DCA	TCA	CCl_4	TCE	EDB	PCE	Vinyl Chloride	Benzene	CO_2		O_2	N_2	CH_4	
SG-64-12P-6	4	0.2	<1	0.4	0.08	24	<0.02	28	130	<2	22000		56000	730000	12000	
SG-65-12P-5	4	0.006	<0.03	0.01	<0.0001	1	<0.0005	0.8	54	4	5600		78000	700000	28000	
VC-NS-1	<0.03	<0.0007	<0.03	0.1	<0.0001	0.05	<0.0005	0.006	<0.08	<0.04	18000		41000	840000	<3300	
WW-4	<0.03	<0.0(1)	<0.03	0.007	<0.0001	3	<0.0005	0.01	<0.08	<0.04	3900		140000	860000	<3300	
VW-5	<0.3	<0.007	<0.3	0.04	<0.001	4	<0.005	<0.002	<0.8	<0.4	11000		140000	840000	<3300	
VW-6	<0.03	<0.0007	<0.03	0.06	<0.0001	0.7	<0.0005	<0.0002	<0.08	<0.04	3400		140000	780000	<3300	
VW-9	<0.3	<0.007	<0.3	0.4	<0.001	0.6	<0.005	0.1	<0.8	<0.4	6200		120000	860000	<3300	
VW-8	<0.3	<0.007	<0.3	5	<0.001	6	<0.005	0.2	<0.8	<0.4	7200		85000	880000	<3300	
VW-7	<0.3	<0.007	<0.3	4	<0.001	30	<0.005	0.6	<0.8	<0.4	8700		36000	870000	<3300	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abrudovic

Checked by _____

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 1a

	2.56			4.89			5.19			5.76		
	CH_2Cl_2			$CHCl_3$			1,2-DCA			TCA		
standard conc.	200		µg/l	10		µg/l	200		µg/l	5		µg/l
response from 10 ul injection	1304229		area	1768709		area	1320487		area	1856698		area
	2302776		area	2759888		area	2312800		area	2866976		area
	3275837		area	3748878		area	3327980		area	3809896		area
RFs for this sheet	6.8×10^{-15}		g/area	1.32×10^{-16}		g/area	6.24×10^{-15}		g/area	5.92×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BlK I	08:49	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		<10000	<0.0003	
N_2 BlK II	09:03	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		<10000	<0.0003	
AIR Samp.	10:31	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		E65000	0.002	
SYST BlK.	10:45	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		E65000	0.002	
SS-64-12P-6'	10:59	50	28761	4	4	111242	0.3	0.2	<10000	< 1	<1	E344188	0.4	0.4
SS-64-12P-6	11:14	50	24716	3		60388	0.2		<10000	< 1		E300000	0.4	
SS-65-12P-5'	11:47	50	37313	5	4	<10000	<0.03	0.006	<10000	< 1	<0.03	<10000	<0.01	<0.01
SS-65-12P-5'	12:01	2000	929641	3		97844	0.006		<10000	<0.03		371086	0.01	
VC-NS-1	12:17	200	<10000	<0.3	<0.03	<10000	<0.007	<0.0007	<10000	<0.3	<0.03	E350000	0.1	0.1
VC-NS-1	12:35	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		3597886	0.1	
VW-4	12:50	200	<10000	<0.3	<0.03	<10000	<0.007	<0.0007	<10000	<0.3	<0.03	E25000	0.007	0.007
VW-4	13:05	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		238829	0.007	
VW-5	13:21	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	91138	0.03	0.04
VW-5	13:35	200	<10000	<0.3		<10000	<0.007		<10000	<0.3		142696	0.04	
STD	13:49	10	287400	—		703956	—		288387	—		E800000	-	
VW-6	14:05	200	<10000	<0.3	<0.03	<10000	<0.007	<0.0007	<10000	<0.3	<0.03	287998	0.09	0.06
VW-6	14:20	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		924424	0.03	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

Checked by

Job Radian Sacramento Ca.

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 16

	5.92			6.96			7.68			9.9		
	CCl4			TCE			EDB			PCE		
standard conc.	2		µg/l	10		µg/l	20		µg/l	5		µg/l
response from	1885615		area	1772335		area	1211021		area	1342277		area
ul injection	2885082		area	2742253		area	2080692		area	2140254		area
10	3875623		area	3708029		area	3198398		area	3E120000		area
RFs for this sheet	2.27×10^{-17}		g/area	1.35×10^{-16}		g/area	9.39×10^{-17}		g/area	3.8×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BlkI	08:49	2000	<10000	<0.0001		<10000	<0.0007		<10000	<0.0005		<10000	<0.0002	
N_2 BlkII	09:03	2000	<10000	<0.0001		<10000	<0.0007		<10000	<0.0005		<10000	<0.0002	
AIR Samp.	10:31	2000	E65000	0.0007		196467	0.01		<10000	<0.0005		<10000	<0.0002	
Syst Blk.	10:45	2000	E65000	0.0007		194312	0.01		<10000	<0.0005		<10000	<0.0002	
SG-64-12P-6	10:59	50	200000	0.09	0.08	10601491	29	24	<10000	<0.02	<0.02	37312163	28	28
SG-64-12P-6	11:14	50	E50000	0.07		7377074	20		<10000	<0.02		35000000	27	
SG-65-12P-5	11:37	50	<10000	<0.005	<0.0001	856075	2	1	<10000	<0.02	<0.0005	1500000	1	0.8
SG-65-12P-5	12:01	2000	<10000	<0.0001		12207173	0.8		<10000	<0.0005		28892426	0.5	
VC-NS-1	12:17	200	<10000	<0.001	<0.0001	E80000	0.05	0.05	<10000	<0.005	<0.0005	E30000	0.006	0.001
VC-NS-1	12:35	2000	<10000	<0.0001		779932	0.05		<10000	<0.0005		295130	0.006	
VW-4	12:50	200	<10000	<0.001	<0.0001	E400000	3	3	<10000	<0.005	<0.0005	E50000	0.01	0.01
VW-4	13:05	2000	<10000	<0.0001		37719188	3		<10000	<0.0005		540835	0.01	
VW-5	13:21	200	<10000	<0.001	<0.001	5267782	4	4	<10000	<0.005	<0.005	<10000	<0.002	<0.001
VW-5	13:35	200	<10000	<0.001		5264085	4		<10000	<0.005		<10000	<0.002	
STD	13:49	10	E800000	-		1081236	-		1616857	-		E10000	-	
VW-6	14:05	200	<10000	<0.001	<0.0001	1437691	1	0.7	<10000	<0.005	<0.0005	<10000	<0.002	<0.001
VW-6	14:20	2000	<10000	<0.0001		6391653	0.4		<10000	<0.0005		<10000	<0.0002	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

Checked by _____

Job Radian Sacramento Co.

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 1c

	1.26 Vinyl chloride			7.18 Benzene								
standard conc.	25	µg/l		500	µg/l			µg/l			µg/l	
response from	1527815	area		16625738	area		1	area		1	area	
ul injection (Vinyl Cl · 100, Benzene · 10)	2195846	area		2569875	area		2	area		2	area	
	3763850	area		35627205	area		3	area		3	area	
RFs for this sheet	1.50×10^{-15}	g/area		8.36×10^{-16}	g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BLK I	08:49	2000	<100000	<0.08		<100000	<0.04							
N_2 BLK II	09:02	2000	<100000	<0.08		<100000	<0.04							
AIR Samp	09:41	2000	<100000	<0.08		<100000	<0.04							
SYST BLK	10:18	2000	<100000	<0.08		<100000	<0.04							
SG-64-12P-6'	10:59	50	4718075	140	130	<100000	<2	<2						
SG-64-12P-6'	11:14	50	4034924	120		<100000	<2							
SG-65-12P-5'	11:33	50	3001638	90	54	E 2500000	4	4						
SG-65-12P-5'	12:01	2000	23250821	17		10717320	4							
VC-NS-1	12:17	200	<100000	<0.8	<0.08	<100000	<0.4	<0.04						
VC-NS-1	12:35	2000	<100000	<0.08		<100000	<0.04							
VW-4	12:50	200	<100000	<0.8	<0.08	<100000	<0.4	<0.04						
VW-4	13:05	2000	<100000	<0.08		<100000	<0.04							
VW-5	13:21	200	<100000	<0.8	<0.8	<100000	<0.4	<0.4						
VW-5	13:35	200	<100000	<0.8		<100000	<0.4							
STD	13:49	10	1524634	–		3925153	–							
VW-6	14:05	200	<100000	<0.8	<0.08	<100000	<0.4	<0.04						
VW-6	14:20	2000	<100000	<0.08		<100000	<0.04							

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by David Abranovic

Checked by

Job Radian Sacramento Ca.

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 1d

	0.32 CO_2			0.47 O_2			1.23 N_2			2.32 CH_4		
standard conc.	26400	µg/l		89600	µg/l		7392000	µg/l		28800	µg/l	
response from	1608525	area		11845268	area		15962643	area		1842514	area	
ul injection	2658513	area		21704821	area		25965094	area		2872602	area	
1000	3661660	area		31684796	area		35976587	area		3865405	area	
RFs for this sheet	4.11×10^{-11}	g/area		5.13×10^{-11}	g/area		1.24×10^{-10}	g/area		3.35×10^{-11}	g/area	

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
H_2 BLK I	10:34	1000	<100000	<4100		<100000	<5100		<100000	<12000		<100000	<3300	
H_2 BLK II	10:37	1000	<100000	<4100		<100000	<5100		<100000	<12000		<100000	<3300	
AIR Samp.	10:40	1000	<100000	<4100		2856383	150000		6231302	770000		<100000	<3300	
SYST BLK	10:54	1000	400000	<4100		2815128	140000		6376833	790000		<100000	<3300	
S6-64-12P-6'	11:08	1000	567374	23000	22000	918609	47000	56000	5817121	720000	730000	368804	12000	12000
S6-64-12P-6'	11:26	1000	542382	22000		1265327	65000		5941592	740000		331775	11000	
S6-65-12P-5'	11:43	1000	137088	5600	5600	1313556	67000	78000	5578107	690000	700000	972452	33000	28000
S6-65-12P-5'	12:11	1000	136272	5600		1731528	89000		5845202	720000		719283	24000	
VC-NS-1	12:27	1000	456233	19000	18000	670447	34000	41000	6742185	840000	840000	<100000	<3300	<3300
VC-NS-1	12:43	1000	432895	18000		934605	48000		6686949	830000		<100000	<3300	
VW-4	13:01	1000	92833	4000	3900	2822853	140000	140000	7014920	870000	860000	<100000	<3300	<3300
VW-4	13:13	1000	91764	3800		2825459	150000		6920208	860000		<100000	<3300	
VW-5	13:31	1000	96811	4000 NA	11000	2726068	140000	140000	6792622	840000	840000	<100000	<3300	3300
VW-5	13:44	1000	262427	11000		2846225	150000		6780319	840000		<100000	<3300	
STD	13:57	1000	599382	—		1590861	—		5689810	—		803574	—	
VW-6	14:16	1000	80192	3300	3400	2628022	130000	140000	6336935	780000	780000	<100000	<3300	<3300
VW-6	14:28	1000	81638	3400		2641963	140000		6290355	780000		<100000	<3300	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

Checked by _____

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TRACER RESEARCH CORPORATION

Date 12/15/87 Page 2a

	CH_2Cl_2			$CHCl_3$			1,2-DCA			TCA		
standard conc.	200	µg/l		10	µg/l		200	µg/l		5	µg/l	
response from	1	area		1	area		1	area		1	area	
ul injection 10	2	area		2	area		2	area		2	area	
	3	area		3	area		3	area		3	area	
RFs for this sheet	6.8×10^{-15}	g/area		1.32×10^{-16}	g/area		6.24×10^{-15}	g/area		5.92×10^{-17}	g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
VW-9	14:20	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	1303923	0.4	0.4
VW-9	14:52	200	<10000	<0.3		<10000	<0.007		<10000	<0.3		1352357	0.4	
VW-8	15:10	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	12162275	4	5
VW-8	15:24	200	<10000	<0.3		<10000	<0.007		<10000	<0.3		18694919	6	
VW-7	15:51	200	<10000	<0.3	<0.3	<10000	<0.007	<0.007	<10000	<0.3	<0.3	13962601	4	4
VW-7	16:05	200	<10000	<0.3		<10000	<0.007		<10000	<0.3		13400094	4	
STD	16:18	10	328477	–		761027	–		287589	–		E 850000	–	
AIR Samp	16:46	2000	<10000	<0.03		<10000	<0.0007		<10000	<0.03		<10000	<0.0003	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

Checked by

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 2b

	CCl4			TCE			EDB			PCE		
standard conc.	2		µg/l	10		µg/l	20		µg/l	10		µg/l
response from	1		area	1		area	1		area	1		area
ul injection	2		area	2		area	2		area	2		area
10	3		area	3		area	3		area	3		area
RFs for this sheet	2.27×10^{-17}		g/area	1.35×10^{-16}		g/area	9.39×10^{-17}		g/area	3.8×10^{-17}		g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
BW-9	14:20	200	<10000	<0.001	<0.001	759351	0.5	0.6	<10000	<0.005	<0.005	653358	0.1	0.1
VW-9	14:52	200	<10000	<0.001		907912	0.6		<10000	<0.005		E 650000	0.1	
VW-8	15:10	200	<10000	<0.001	<0.001	7290190	5	6	<10000	<0.005	<0.005	694639	0.1	0.2
VW-8	15:24	200	<10000	<0.001		10455486	7		<10000	<0.005		866975	0.2	
VW-7	15:51	200	<10000	<0.001	<0.001	44347058	30	30	<10000	<0.005	<0.005	3142264	0.6	0.6
VW-7	16:05	200	<10000	<0.001		45160957	30		<10000	<0.005		3766079	0.7	
STD	16:18	10	E 850000	-		1497830	-		1845219	-		1505640	-	
Air Samp	16:46	2000	<10000	<0.0001		<10000	<0.00007		<10000	<0.0005		<10000	<0.003	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abramovic

Checked by _____

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 2c

	Vinyl Chloride			Benzene								
standard conc.	25	µg/l		500	µg/l			µg/l			µg/l	
response from	1	area		1	area		1	area		1	area	
µl injection (Benzene · 10, Vinyl Cl · 100)	2	area		2	area		2	area		2	area	
	3	area		3	area		3	area		3	area	
RFs for this sheet	1.50×10^{-15}	g/area		8.36×10^{-16}	g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
VW-9	14:20	200	<100000	<0.8	<0.8	<100000	<0.4	<0.4						
VW-9	14:52	200	<100000	<0.5		<100000	<0.4							
VW-8	15:10	200	<100000	<0.8	<0.8	<100000	<0.4	<0.4						
VW-8	15:24	200	<100000	<0.8		<100000	<0.4							
VW-7	15:51	200	<100000	<0.8	<0.8	<100000	<0.4	<0.4						
VW-7	16:05	200	<100000	<0.8		<100000	<0.4							
STD	16:18	10	155917	-		4994658	-							
AIRCorp	16:46		<100000	<0.08		<100000	<0.04							

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak

Analysed by David Abranovic

Checked by

Job Radian Sacramento Ca

TRACER RESEARCH CORPORATION

Date 12/15/87 Page 2d

	CO_2		O_2		N_2		CH_4	
standard conc.	264 00	µg/l	896 00	µg/l	7392 00	µg/l	288 00	µg/l
response from	1	area	1	area	1	area	1	area
ul injection / 1000	2	area	2	area	2	area	2	area
	3	area	3	area	3	area	3	area
RFs for this sheet	4.11×10^{-11}	g/area	5.13×10^{-11}	g/area	1.24×10^{-10}	g/area	3.35×10^{-11}	g/area

sample	time	amt inj	CO_2 area	CO_2 µg/l	CO_2 mean	O_2 area	O_2 µg/l	O_2 mean	N_2 area	N_2 µg/l	N_2 mean	CH_4 area	CH_4 µg/l	CH_4 mean
VW-9	14:46	1000	153122	6300	6200	2280182	120000	120000	7082004	880000	860000	<1000000	<3300	<3300
VW-9	15:00	1000	148598	6100		2287123	120000		6879265	850000		<1000000	<3300	
VW-8	15:18	1000	177431	7300	7200	1637499	84000	85000	7158350	890000	880000	<1000000	<3300	<3300
VW-8	15:32	1000	171980	7100		1670629	86000		7085470	880000		<1000000	<3300	
VW-7	16:00	1000	221107	9100	8900	528658	27000	36000	7068036	880000	870000	<1000000	<3300	<3300
VW-7	16:14	1000	211051	8700		868463	45000		7148686	860000		<1000000	<3300	
STD	16:26	1000	604718	–		1626128	–		5757468	–		802552	–	
AIR Samp	17:04	1000	<1000000	<4100		1983616	90000	–	6218489	770000		<1000000	<3300	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by David Abranovic

Checked by _____

Date 12-2-87
Initials NHR

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	✓	—	
Was the standard water analyzed for contamination prior to making standards?	✓	—	
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	
Was the RF ≤20 percent?	✓	—	N/A
If not, was corrective action taken?	—	—	N/A
DOCUMENTATION			
Is the sample ID written on every chromatogram?	—	—	
Was the probe number noted in the log book?	—	—	
Can the field data sheets be tracked to the original chromatograms?	—	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	—	—	
Have all of the chemists' calculations been checked by the field technician?	—	—	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	—	—	
Were the ambient air concentrations <.01 ug/l?	✓	—	O_2 & N_2 NO
Was pure nitrogen used as the blank gas?	✓	—	
Have the syringes been properly cleaned?	✓	—	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	—	—	WILL DO.
Was a system blank run after every 10 samples?	—	—	
Was the system blank collected concurrent with the ambient air sample?	—	—	
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓	✓ NR	NO
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓	—	
Was the relative difference ≤25 percent?	—	—	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	—	—	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓		
Were all adaptors cleaned prior to use?	✓		

ADDITIONAL COMMENTS

TI

Date 12.9.87
Initials MAR
Page 1 of 3

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

1ST CHECK 0859

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	✓	✓ (N/A)	
Was the standard water analyzed for contamination prior to making standards?	✓	—	
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	✓	NOT BASED ON PREVIOUS RESPONSES (WILL BE)
Was the standard injected after every fifth sample?	✓	—	N/A
Was the RF ≤20 percent?	✓	—	N/A
If not, was corrective action taken?	—	—	N/A
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	—	—	N/A NOT APPLICABLE NOT AT THIS TIME

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓		
Were the ambient air concentrations <.01 ug/l?	✓		EXCEPT CO_2 O_2 N_2
Was pure nitrogen used as the blank gas?	✓		
Have the syringes been properly cleaned?	✓		
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓		NATT
Was a system blank run after every 10 samples?			~~NATT~~ N/A
Was the system blank collected concurrent with the ambient air sample?	✓		NATT
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓*		* WILL BE
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓		NATT
Was the relative difference ≤25 percent?	✓		NATT
If not, was corrective action taken? (See QAPP Section 1.8.3.4)			N/A

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓		
Were all adaptors cleaned prior to use?	✓		

ADDITIONAL COMMENTS

Date 12·587
Initials _____

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	—	✓	As discussed checked against prev.
Was the standard water analyzed for contamination prior to making standards?	—	✓	(yesterday's water)
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	NATT
Was the RF ≤20 percent?	✓	—	
If not, was corrective action taken?	—	—	NA
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	—	✓	NEED PROF. CALC.

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓		
Were the ambient air concentrations <.01 ug/l?	✓		
Was pure nitrogen used as the blank gas?	✓		
Have the syringes been properly cleaned?	✓		
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓		
Was a system blank run after every 10 samples?			NA ~~NA~~
Was the system blank collected concurrent with the ambient air sample?	✓		
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓		
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓		
Was the relative difference ≤25 percent?			
If not, was corrective action taken? (See QAPP Section 1.8.3.4)			

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	—	✓	PROBES ✓ AS CLEAN BEEN "BRANCHED"
Were all adaptors cleaned prior to use?	✓	—	

ADDITIONAL COMMENTS

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	—	✓	NO AS DISCUSSED PRIOR
Was the standard water analyzed for contamination prior to making standards?	—	✓	SAME WATER AS BEFORE
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	
Was the RF ≤20 percent?	✓	—	
If not, was corrective action taken?	—	—	
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	—	—	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓	—	
Were the ambient air concentrations <.01 ug/l?	✓	—	
Was pure nitrogen used as the blank gas?	✓	—	
Have the syringes been properly cleaned?	✓	—	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓	—	
Was a system blank run after every 10 samples?	✓	—	
Was the system blank collected concurrent with the ambient air sample?	✓	—	
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓	—	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓	—	
Was the relative difference ≤25 percent?	—	—	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	—	—	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓		
Were all adaptors cleaned prior to use?	✓		

ADDITIONAL COMMENTS

KEN TOLMAN SHOULD DO PPM CALC.'S

Date 12-9-87
Initials DLP

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	—	✓	PREPARED 12-7-87
Was the standard water analyzed for contamination prior to making standards?	✓	—	12-7-87
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	
Was the RF ≤20 percent?	✓	—	
If not, was corrective action taken?	—	—	
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	—	✓	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓		
Were the ambient air concentrations <.01 ug/l?	✓		[redacted]
Was pure nitrogen used as the blank gas?	✓		in ECD
Have the syringes been properly cleaned?	✓		
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓		
Was a system blank run after every 10 samples?			
Was the system blank collected concurrent with the ambient air sample?	✓		
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓		
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓		Every sample analyzed twice
Was the relative difference ≤25 percent?	✓		
If not, was corrective action taken? (See QAPP Section 1.8.3.4)			

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓	—	
Were all adaptors cleaned prior to use?	✓	—	

ADDITIONAL COMMENTS

Duplicate probe taken at SG3069L.
Dup Probe was drilled 1ft away from original

Date 10-16-87
Initials DLP

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	✓	—	
Was the standard water analyzed for contamination prior to making standards?	✓	—	
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	
Was the RF ≤20 percent?	✓	—	
If not, was corrective action taken?	—	—	
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	✓	—	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓		
Were the ambient air concentrations <.01 ug/l?	✓		
Was pure nitrogen used as the blank gas?	✓		
Have the syringes been properly cleaned?	✓		
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓		
Was a system blank run after every 10 samples?	✓		
Was the system blank collected concurrent with the ambient air sample?	✓		
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓		
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓		
Was the relative difference ≤25 percent?	✓		
If not, was corrective action taken? (See QAPP Section 1.8.3.4)			

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓		
Were all adaptors cleaned prior to use?	✓		

ADDITIONAL COMMENTS

Date 12-11-87
Initials SLD

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	—	✓	12-10-87
Was the standard water analyzed for contamination prior to making standards?	✓	—	
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	
Was the RF ≤20 percent?	✓	—	
If not, was corrective action taken?	—	—	
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	✓	—	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓	—	
Were the ambient air concentrations <.01 ug/l?	—	✓	DETECTION LIMITS VARY
Was pure nitrogen used as the blank gas?	✓	—	
Have the syringes been properly cleaned?	✓	—	
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓	—	
Was a system blank run after every 10 samples?	✓	—	
Was the system blank collected concurrent with the ambient air sample?	✓	—	
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓	—	
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓	—	all twice
Was the relative difference ≤25 percent?	✓	—	
If not, was corrective action taken? (See QAPP Section 1.8.3.4)	—	—	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓		
Were all adaptors cleaned prior to use?	✓		

ADDITIONAL COMMENTS

Date 12-14-87
Initials DLP

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	—	✓	(12-10-87) Area counts compared to previous day
Was the standard water analyzed for contamination prior to making standards?	✓	—	
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	
Was the RF ≤20 percent?	✓	—	
If not, was corrective action taken?	—	—	
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	—	✓	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓		
Were the ambient air concentrations <.01 ug/l?	✓		
Was pure nitrogen used as the blank gas?	✓		
Have the syringes been properly cleaned?	✓		
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓		
Was a system blank run after every 10 samples?	✓		
Was the system blank collected concurrent with the ambient air sample?	✓		
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓		
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓		
Was the relative difference ≤25 percent?	✓		
If not, was corrective action taken? (See QAPP Section 1.8.3.4)			

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓		
Were all adaptors cleaned prior to use?	✓		

ADDITIONAL COMMENTS

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
CALIBRATION PROCEDURES			
Was a fresh standard prepared today?	—	✓	12-10-87 area counts checked with previous day
Was the standard water analyzed for contamination prior to making standards?	✓	—	
Was the standard analyzed three times at the start of the day?	✓	—	
Was the response factor (RF) calculated for each component? (See example field data sheet)	✓	—	
Was the standard injected after every fifth sample?	✓	—	
Was the RF ≤20 percent?	✓	—	
If not, was corrective action taken?	—	—	
DOCUMENTATION			
Is the sample ID written on every chromatogram?	✓	—	
Was the probe number noted in the log book?	✓	—	
Can the field data sheets be tracked to the original chromatograms?	✓	—	
Has the field log book been filled out with the correct information? (See QAPP Section 1.8.3.8)	✓	—	
Have all of the chemists' calculations been checked by the field technician?	—	✓	

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
ANALYTICAL AND SYSTEM QC			
Were at least two syringes of each size blanked at the start of the day?	✓		
Were the ambient air concentrations <.01 ug/l?	✓		
Was pure nitrogen used as the blank gas?	✓		
Have the syringes been properly cleaned?	✓		
Was a system blank run at the start of the day? (See QAPP Section 1.8.3.3)	✓		
Was a system blank run after every 10 samples?	✓		
Was the system blank collected concurrent with the ambient air sample?	✓		
Were system blanks taken at locations away from actual soil-gas sampling locations?	✓		
Was the first soil-gas probe at each site used as the "unknown" sample and analyzed twice (duplicate anayses)? (Use first perimeter if gas probe is not taken)	✓		
Was the relative difference ≤25 percent?	✓		
If not, was corrective action taken? (See QAPP Section 1.8.3.4)			

FIELD TECHNICIAN CHECKLIST
CALDERON INVESTIGATION
SOIL-GAS PROBE SAMPLING

Question	YES	NO	Comment
SAMPLING QC			
Were all probes cleaned prior to use?	✓		
Were all adaptors cleaned prior to use?	✓		

ADDITIONAL COMMENTS

RADIAN
CORPORATION

APPENDIX D

Site Photographs

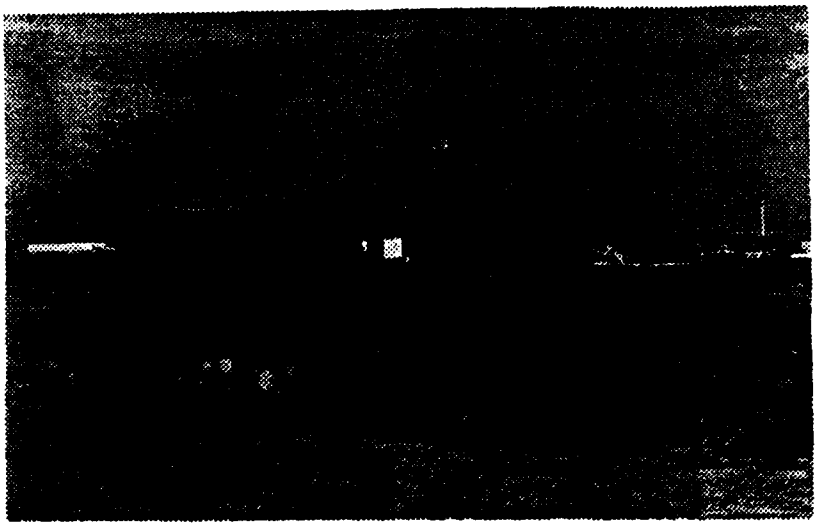

FIGURE 1. Photograph taken at the southern edge of Site No. 7, looking from south to north across the site.

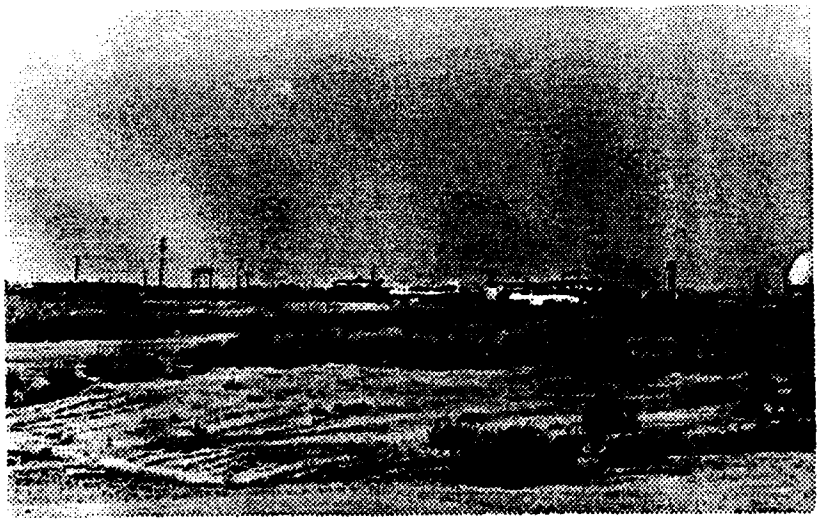

FIGURE 2. Photograph taken west of Sites No. 10, 11 12 & 13 which are in the background. Photo taken 150 feet west of Building 779, looking from northeast to southwest.

FIGURE 3. Photograph taken on the north side of Site No. 14 looking from northeast to southwest. Patrol Road is in the background.

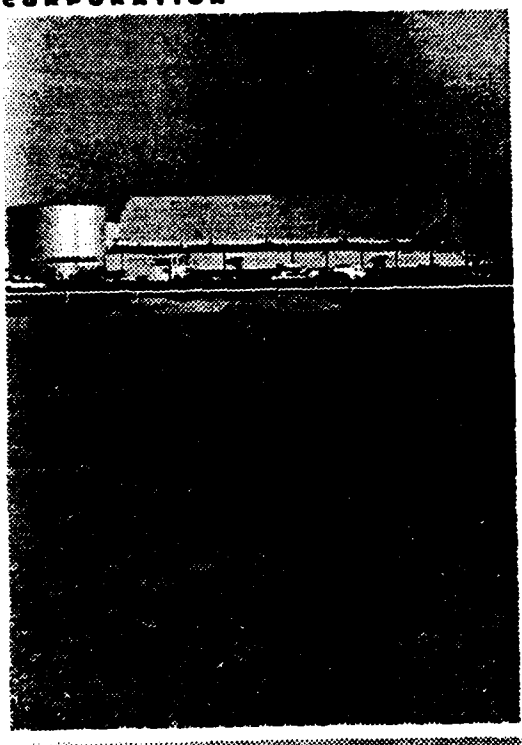

FIGURE 4. Photograph across the middle of Site No. 22 looking from south to north toward Building 704.

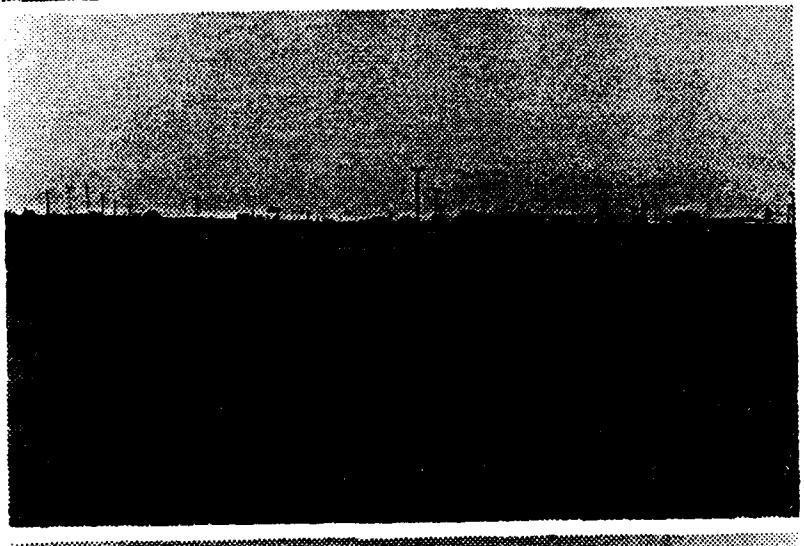

FIGURE 5. Photograph taken on Site No. 24, looking from northeast to southwest toward Building 621.

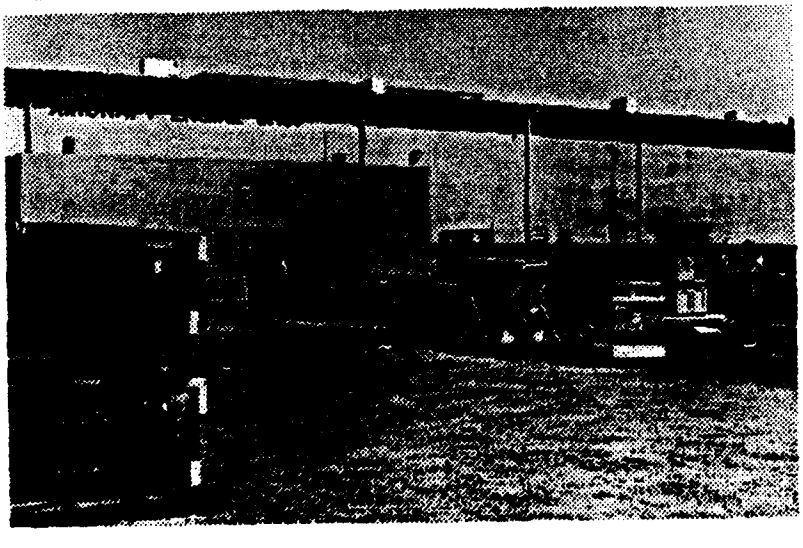

FIGURE 6. Photograph taken at the southern edge of Site No. 38, looking from southwest to northeast toward Building 475.

FIGURE 7. Photograph taken at the southern edge of Site No. 42, looking from south to north across the western tip of the site. Building 704 is at the right in the background.

FIGURE 8. Photograph taken at the eastern edge of Site No. 43, looking from east to west toward Patrol Road. The four posts in the center of the picture mark Monitor Well 34S.

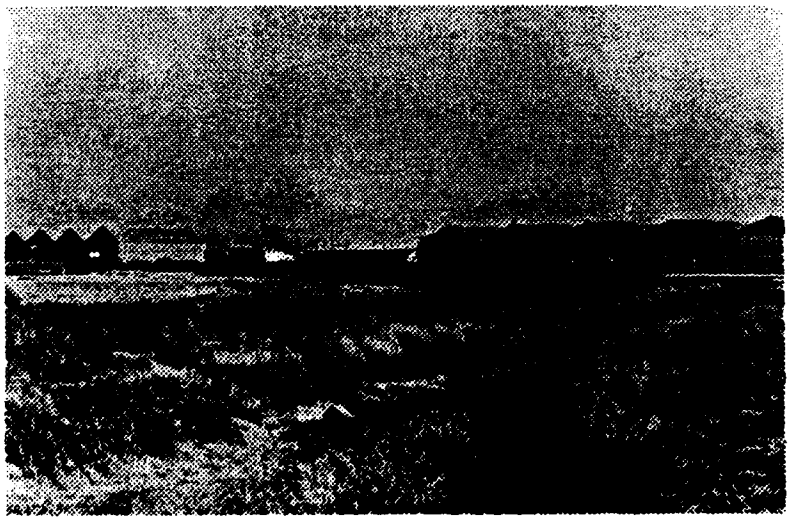

FIGURE 9. Photograph taken at the western edge of Site No. 69, looking from southwest to northeast across the site toward Building 792.

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APPENDIX E

Radian Vapor Well Volume and Vent Cap Calculations

Note: The following calculation sheet presents the calculations used to estimate the volumes of air purged from the vapor well and vent cap sampling points prior to sampling.

RADIAN CORPORATION

GENERAL COMPUTATION SHEET

CLIENT NAME McCLELLAN AFB

PROJECT NAME CALDERON SWAT

CALCULATION SET		
Prelim.		
Final		
Sheet 1 Of 2		
Charge #		
Rev.	Comp. By	Chk'd By
	Date	Date
	Date	Date

RADIAN VAPOR WELL VOLUME CALCULATIONS

VOLUME OF A CYLINDER: $V = \pi r^2 h$

WHERE $h = 3$ FEET

$r = 1$ INCH OR 0.083 FEET

$\pi = 3.142$

1 CUBIC FOOT = 28.32 LITERS

VOLUME = $3.142(0.083)^2(3)$

= 0.0649 CUBIC FEET

= 1.837 LITERS

VOLUME OF TUBING TO CAP

$h = 100$ (MAXIMUM)

$r = 0.125$ INCHES = 0.01042 FEET

$V = 3.142(0.01042)^2(100)$

$V = 0.0341$ CUBIC FEET

$V = 0.966$ LITERS

1-85-18743

RADIAN CORPORATION

GENERAL COMPUTATION SHEET

CLIENT NAME McCLELLAN AFB

PROJECT NAME CALDERON SWAT

CALCULATION SET		
Prelim.		
Final		
Sheet 2 Of 2		
Charge #		
Rev.	Comp. By	Chk'd By
	Date	Date
	Date	Date

AREA D VENT CAP VOLUME

$h = 3 + 2 + 1.5 + 0.5 = 7$ FEET

$r = 2$ INCHES $= 0.1667$ FEET

$V = 3.142 (0.1667)^2 (7)$

$V = 0.611$ CUBIC FEET

$V = 17.3$ LITERS

1-95-18743

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APPENDIX F

Quality Assurance/Quality Control Checklist,
Single-Point and Multi-Point Calibration Curves

INSTRUMENT, DETECTOR AND COLUMN FOR EACH ANALYTE

Two Varian model 3300 gas chromatographs were used for each analysis.

Carbon Dioxide (CO2), Oxygen (O2), Nitrogen (N2) and Methane (CH4) were all analyzed on an Alltech CTR I column using a Thermal Conductivity Detector (TCD).

Methylene Chloride (CH2C12), 1,2-Dichloroethane (DCA), Chloroform (CHC13), 1,1,1-Trichloroethane (TCA), Carbon Tetrachloride (CC14), Trichloroethene (TCE), 1,2-Dibromoethane (EDB) and Tetrachloroethene (PCE) were analyzed on a 6 foot by 0.125 inch stainless steel column packed with 68/80 mesh 0.1% SP-1000 on Carbopac B using an Electron Capture Detector (ECD).

Benzene and Vinyl Choloride were analyzed on the above column using a Photo Ionization Detector (PID) manufactured by Photovac.

MULTIPOINT CALIBRATION DATA

COMPOUND	RELATIVE MASSES/ RESPONSES	CORRELATION (R)
CO2	1/364501, 2/698301, 4/1141666	0.994
O2	1/490047, 2/814260, 4/1681639	0.997
N2	1/3328125, 2/6461679, 4/13086719	0.999
CH4	1/462476, 2/973511, 4/1895332	0.999
Benzene	1/2500000*, 1.4/5200000*, 2/10500000*	0.998
EDB	1/537668, 1.4/757249, 2/1163340	0.998
DCA	1/90000*, 1.4/99157, 2/183301	0.949
CH2C12	1/95000*, 1.4/135306, 2/191218	0.999
PCE	1/524457, 1.4/704770, 2/1096821	0.995
CC14	1/342041, 1.4/547650, 2/866588	0.999
TCA	1/330510, 1.4/437469, 2/654567	0.997
TCE	1/293761, 1.4/441874, 2/651279	0.999
CHC13	1/205175, 1.4/307595, 2/505777	0.998
Vinyl Chloride	1/680000*, 2/1200000*, 4/2119192	0.999

* Estimated peak area