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TA-50

Los Alamos

NATIONAL LABORATORY
Environmental Restoration Project
Los Alamos, New Mexico 87545

Date: October 4, 1994
MS: M992
Phone: 505-665-4558
Refer to: EM/ER:94-J408

Ms. Barbara Driscoll
Environmental Protection Agency, Region 6
1445 Ross Avenue
Suite 1200
Dallas, TX 75202-2733

Dear Ms. Driscoll:

SUBJECT: SAMPLING EVENT FOR ACTIVITY DATA SHEET (ADS) 1147

This letter is to inform you of an upcoming sampling event that affects the Resource Conservation and Recovery Act (RCRA) facility investigation work being performed in ADS 1147 at Los Alamos National Laboratory.

Approximately 34 holes will be drilled into decommissioned waste line trenches [Solid Waste Management Units 50-004(a-c); Aggregate 3] to the depth of the tuff, with samples taken in the trench fill and at the fill-tuff interface. All samples will be analyzed for isotopic plutonium, isotopic uranium, tritium, cesium-137, americium-241, and RCRA metals. Selected tuff samples will be analyzed for volatile organic compounds, semi-volatile organic compounds, and polychlorinated biphenyls.

The operation is planned to begin on October 15. We plan to start on a Saturday so that we can complete drilling at locations in heavy-traffic areas on the weekend. The operation will continue on October 18, 19, 25, 27, and November 1. If necessary, it may continue on November 3 and 8. We will keep you and/or your designated representative apprised of the progress should you desire to split samples or observe this operation.

Please feel free to call me or Cheryl Rofer (505-667-2988) with any questions regarding this event.

Sincerely yours,

Edward Norris for

Jorg Jansen, Project Manager
Environmental Restoration

TG/rfr

Cy: T. Taylor, LAAO, MS A316
T. Baca, EM, MS J591
J. Shipley, EM, MS J591
C. Rofer, EES-1, MS D462
D. McInroy, EM/ER, MS M992

should be M83H

Review of analytical data package for RN: 17221
Program code: M76B
Owner: Gary Allen
Lab: RUST Geotech, Project 6LA412525
Reviewer: Donivan Porterfield, 05/20/94

Analyses:

cesium-137 by gamma spectroscopy
isotopic plutonium by alpha spectroscopy
tritium by liquid scintillation

Samples: 94.06579 - 94.06589(ss), 94.06597(ss), 94.06601(ss), 94.06602(ss), 94.09000 - 94.09010(mol).

A review of the data does not preclude a single data point being in error.

Cesium-137 by gamma spectroscopy:

One CST-9 cesium-137 blind QC sample (94.06602) was included in the reported results. This blind QC sample was analyzed in duplicate by the lab. The reported result will result in an "out of control" statement in the final report. The QC sample used by the lab to insure that the analytical system is in control does not contain cesium-137. The associated sample results should be considered ESTIMATED values. The reported results in the final report have been qualified with a (J).

	known	reported	recovery ± 1 sigma
94.06602	47.900 ± 2.600	61.090 ± 1.230 pCi/g	128 ± 7%
94.06602	47.900 ± 2.600	61.710 ± 1.220 pCi/g	129 ± 7%

Tritium by liquid scintillation:

One CST-9 tritium blind QC sample (94.06597) was included in the reported results.

	known	reported	recovery ± 1 sigma
94.06597	11.540 ± 0.3000	10.750 ± 0.1650 pCi/mL	93 ± 3%

The samples in this request number were observed to be contaminated with oil. The documentation indicates that the lab was requested to use a HASL-300 method for tritium but advised CST-9 SMO that it was unable to. Instead, the lab conducted the usual analysis for tritium in soil; these results are reported as pCi/L with the matrix code SS. The lab then

Review of analytical data package for RN: 17221
Program code: M76B Owner: Gary Allen
Lab: RUST Geotech, Project 6LA412525
Reviewer: Donivan Porterfield, 05/20/94

extracted from samples 94.07579 through 94.06589 the contaminant oil using EPA SW-846 Method 3550, revision 0 modified to exclude the grinding of the sample. These oil extracts were then analyzed for tritium. These results will be reported as pCi/g, on the basis of the soil mass from which the oil was extracted, with the matrix code MOL. In order to prevent confusion in our data system, new CST-9 sample numbers, 94.09000 - 94.09010, were assigned to these tritium in oil results but are tied to the same client sample identifiers as the tritium in soil results. The reporting of these tritium in oil results may be delayed slightly to insure correct data entry. While neither CST-9 or the contract lab was able to provide a tritium in oil QC sample, a review of the instrument output does not indicate any problems. The reviewer does not believe qualification of the data is justified.

The reported results represent scientifically valid methods, which have much in common with the LANL CST-9 radiochemistry methods, for quantifying the indicated analytes. However, it should be noted that radiochemistry procedures will vary somewhat from lab to lab due to the lack of precise promulgated radiochemistry procedures Whereas, the EPA CLP SOW methods provided precise promulgated procedures for organics and inorganics.

Data Reviewer: Donni R Porterfield 5/20/94

Peer Reviewer: Pamela Kelly 5/20/94

********** EM-9 ANALYTICAL REPORT **********

Prepared by: MJT on 23-May-1994

ANALYSIS: H-3 REQUEST NUMBER: 17221 MATRIX: MOL ANALYST: 212 PROGRAM CODE: M95B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

ANALYTICAL TECHNIQUE: LS ANALYTICAL PROCEDURE: SOP RC-9 NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB1545	94.09000	36.86	0.74	PCI/G	5/02/94	
AAB1546	94.09001	84.82	1.055	PCI/G	5/02/94	
AAB1547	94.09002	18.74	0.38	PCI/G	5/02/94	
AAB1548	94.09003	66.46	1.1	PCI/G	5/02/94	
AAB1549	94.09004	6.24	0.395	PCI/G	5/02/94	
AAB1550	94.09005	2.46	0.14	PCI/G	5/02/94	
AAB1551	94.09006	32.28	0.685	PCI/G	5/02/94	
AAB1552	94.09007	31.55	0.67	PCI/G	5/02/94	
AAB1553	94.09008	72.24	0.93	PCI/G	5/02/94	
AAB1554	94.09009	0.28	0.04	PCI/G	5/02/94	
AAB1555	94.09010	24.02	0.49	PCI/G	5/02/94	

********** EM-9 QUALITY ASSURANCE REPORT *********

Prepared by: MJT on 23-May-1994

REQUEST NUMBER: 17221 MATRIX: MOL ANALYST: 212 PROGRAM CODE: M95B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Blind QC samples run with this sample batch.

____ No QC samples run with this sample batch.

____ No QC samples for this constituent and matrix type available within EM-9

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

There were no blind Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Open (non-blind) QC samples run with this sample batch.

____ No QC samples run with this sample batch.

____ No QC samples for this constituent and matrix type available within EM-9

REPORT NUMBER: 24864				
	_____	DMP	_____	NK for MAG
	Analyst	Reviewer	Section Leader	QA Officer
	_____	5/23/94	_____	5/23/94
	Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1991,' LA-12436-MS, Vol. I, pp. 21-22.

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********** EM-9 ANALYTICAL REPORT **********

Prepared by: MJT on 20-May-1994

ANALYSIS: H-3 REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

ANALYTICAL TECHNIQUE: LS ANALYTICAL PROCEDURE: SOP RC-9 NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB1545	94.06579	44.44	0.435	PCI/ML	5/02/94	
AAB1546	94.06580	42.91	0.425	PCI/ML	5/02/94	
AAB1547	94.06581	59.22	0.555	PCI/ML	5/02/94	
AAB1548	94.06582	85.44	0.765	PCI/ML	5/02/94	
AAB1549	94.06583	9.72	0.155	PCI/ML	5/02/94	
AAB1550	94.06584	43.71	0.43	PCI/ML	5/02/94	
AAB1551	94.06585	90.42	0.805	PCI/ML	5/02/94	
AAB1552	94.06586	93.76	0.83	PCI/ML	5/02/94	
AAB1553	94.06587	44.23	0.435	PCI/ML	5/02/94	
AAB1554	94.06588	0.56	0.085	PCI/ML	5/02/94	
AAB1555	94.06589	44.29	0.435	PCI/ML	5/02/94	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB1545	94.06579	46.35	0.46	PCI/ML	5/02/94	
AAB1549	94.06583	5.27	0.37	PCI/ML	5/02/94	

********** EM-9 QUALITY ASSURANCE REPORT *********

Prepared by: MJT on 20-May-1994

REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Blind QC samples run with this sample batch.

____ No QC samples run with this sample batch.

____ No QC samples for this constituent and matrix type available within EM-9

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
94.06597	10750.	165.	PCI/L	11540.	300.	5/02/94	WARNING 2-3 SIG

REPORT NUMBER: 24835

Analyst	Reviewer	Section Leader	QA Officer
			NK for MAG
Date	5/23/94 Date	Date	5/23/94 Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1991,' LA-12436-MS, Vol. I, pp. 21-22.

REPORT NUMBER: 24838

********** EM-9 ANALYTICAL REPORT **********

Prepared by: MJT on 20-May-1994

REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB1545	94.06579	PU-238	RAS	0.003	0.0025	PCI/G	5/02/94	
AAB1545	94.06579	PU-239	RAS	0.007	0.003	PCI/G	5/02/94	
AAB1546	94.06580	PU-238	RAS	0.01	0.0035	PCI/G	5/02/94	
AAB1546	94.06580	PU-239	RAS	0.589	0.0425	PCI/G	5/02/94	
AAB1547	94.06581	PU-238	RAS	0.003	0.002	PCI/G	5/02/94	
AAB1547	94.06581	PU-239	RAS	0.02	0.005	PCI/G	5/02/94	
AAB1548	94.06582	PU-238	RAS	0.003	0.0025	PCI/G	5/02/94	
AAB1548	94.06582	PU-239	RAS	0.011	0.004	PCI/G	5/02/94	
AAB1549	94.06583	PU-238	RAS	0.005	0.0025	PCI/G	5/02/94	
AAB1549	94.06583	PU-239	RAS	0.118	0.0145	PCI/G	5/02/94	
AAB1550	94.06584	PU-238	RAS	0.001	0.0015	PCI/G	5/02/94	
AAB1550	94.06584	PU-239	RAS	0.02	0.0055	PCI/G	5/02/94	
AAB1551	94.06585	PU-238	RAS	0.003	0.002	PCI/G	5/02/94	
AAB1551	94.06585	PU-239	RAS	0.017	0.0045	PCI/G	5/02/94	
AAB1552	94.06586	PU-238	RAS	0.002	0.002	PCI/G	5/02/94	
AAB1552	94.06586	PU-239	RAS	0.013	0.004	PCI/G	5/02/94	
AAB1553	94.06587	PU-238	RAS	0.004	0.0025	PCI/G	5/02/94	
AAB1553	94.06587	PU-239	RAS	0.189	0.018	PCI/G	5/02/94	
AAB1554	94.06588	PU-238	RAS	0.001	0.0015	PCI/G	5/02/94	
AAB1554	94.06588	PU-239	RAS	0.005	0.003	PCI/G	5/02/94	
AAB1555	94.06589	PU-238	RAS	0.001	0.0025	PCI/G	5/02/94	
AAB1555	94.06589	PU-239	RAS	0.01	0.004	PCI/G	5/02/94	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB1545	94.06579	PU-238	RAS	0.003	0.002	PCI/G	5/02/94	
AAB1545	94.06579	PU-239	RAS	0.02	0.005	PCI/G	5/02/94	

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REPORT NUMBER: 24838 (continued)

********** EM-9 QUALITY ASSURANCE REPORT *********

Prepared by: MJT on 20-May-1994

REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

NOTEBOOK: PAGE:

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Blind QC samples run with this sample batch.

____ No QC samples run with this sample batch.

____ No QC samples for this constituent and matrix type available within EM-9

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
94.06601	PU-238	0.339	0.03	PCI/G	0.3	0.01	5/02/94	UNDER CONTROL
94.06601	PU-239	0.91	0.0655	PCI/G	0.8	0.02	5/02/94	UNDER CONTROL

REPORT NUMBER: 24838

Analyst	Reviewer	Section Leader	QA Officer
	DP		NK for MAG
Date	5/23/94 Date	Date	5/23/94 Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in

'Quality Assurance for Health and Environmental Chemistry: 1991,' LA-12436-MS, Vol. I, pp. 21-22.

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********** EM-9 ANALYTICAL REPORT **********

Prepared by: MJT on 20-May-1994

ANALYSIS: CS-137 REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

ANALYTICAL TECHNIQUE: G ANALYTICAL PROCEDURE: SOP GS-1 NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB1545	94.06579	< 1.03		PCI/G	5/02/94 J	
AAB1546	94.06580	< 1.19		PCI/G	5/02/94 J	
AAB1547	94.06581	< 1.26		PCI/G	5/02/94 J	
AAB1548	94.06582	< 1.1		PCI/G	5/02/94 J	
AAB1549	94.06583	< 0.72		PCI/G	5/02/94 J	
AAB1550	94.06584	< 0.78		PCI/G	5/02/94 J	
AAB1551	94.06585	< 0.98		PCI/G	5/02/94 J	
AAB1552	94.06586	< 0.78		PCI/G	5/02/94 J	
AAB1553	94.06587	< 0.83		PCI/G	5/02/94 J	
AAB1554	94.06588	1.	0.48	PCI/G	5/02/94 J	
AAB1555	94.06589	1.76	0.655	PCI/G	5/02/94 J	

********** EM-9 QUALITY ASSURANCE REPORT *********

Prepared by: MJT on 20-May-1994

REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Blind QC samples run with this sample batch.

____ No QC samples run with this sample batch.

____ No QC samples for this constituent and matrix type available within EM-9

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
94.06602	61.09	1.23	PCI/G	47.9	2.6	5/02/94	OUT OF CONTROL
94.06602	61.71	1.22	PCI/G	47.9	2.6	5/02/94	OUT OF CONTROL

REPORT NUMBER: 24833

Analyst	Reviewer	Section Leader	QA Officer
	DP		NK for MAG
Date	5/23/94 Date	Date	5/23/94 Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1991,' LA-12436-MS, Vol. I, pp. 21-22.

********** EM-9 ANALYTICAL REPORT **********

Prepared by: MJT on 20-May-1994

ANALYSIS: H2O- REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

ANALYTICAL TECHNIQUE: GRAV ANALYTICAL PROCEDURE: SOP RC-9 NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUMBER	SAMPLE NUMBER	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB1545	94.06579	17.5		%	5/02/94	
AAB1546	94.06580	14.		%	5/02/94	
AAB1547	94.06581	15.5		%	5/02/94	
AAB1548	94.06582	15.9		%	5/02/94	
AAB1549	94.06583	15.1		%	5/02/94	
AAB1550	94.06584	11.3		%	5/02/94	
AAB1551	94.06585	14.8		%	5/02/94	
AAB1552	94.06586	12.2		%	5/02/94	
AAB1553	94.06587	12.3		%	5/02/94	
AAB1554	94.06588	16.9		%	5/02/94	
AAB1555	94.06589	17.2		%	5/02/94	

********** EM-9 QUALITY ASSURANCE REPORT *********

Prepared by: MJT on 20-May-1994

REQUEST NUMBER: 17221 MATRIX: SS ANALYST: 212 PROGRAM CODE: M76B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

There were no open (non-blind) Quality Control materials run with the samples reported above for one of the following reasons:

____ Only qualitative data requested

____ Only Blind QC samples run with this sample batch.

____ No QC samples run with this sample batch.

____ No QC samples for this constituent and matrix type available within EM-9

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
94.06597	2.8		%	2.91	0.26	5/02/94	UNDER CONTROL

REPORT NUMBER: 24834

Analyst	Reviewer	Section Leader	QA Officer
			NK for MtG
Date	5/23/94 Date	Date	5/23/94 Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1991,' LA-12436-MS, Vol. I, pp. 21-22.

EM-9 ANALYTICAL SERVICE AGREEMENT
Samples Assigned Report

REQUEST NBR
17398

ANALYTICAL SECTION: ORGNC
PROGRAM FUND CODE: M95B
PRIORITY CODE: 1
SAMPLE DISPOSAL: Discard
AGREEMENT_DATE: 09-MAY-94
SCREENING DATA: No Screening Data Required
CUSTOMER: GA; Garry Allen
MAIL STOP: E525
PHONE: 667-3394

SIGNATURE: Kyle Gay KG
TOTAL SAMPLES: 4+1QC

COUNTS:

ANALYSIS	TECHNIQUE	ANALYST	DUE	NBR SAMPLES
100414	GCMS	206	13-MAY-94	10
108883	GCMS	206	13-MAY-94	10
1330207	GCMS	206	13-MAY-94	10
71432	GCMS	206	13-MAY-94	10
VOLATILES	GCMS	206	13-MAY-94	4

REMARKS:

.
SHIPPED TO S-CUBED
AIRBILL # 1578633291
100414 EQUALS ETHYLBENZENE
108883 EQUALS TOLUENE
1330207 EQUALS XYLENE
71432 EQUALS BENZENE
PRIORITY 1
.

SAMPLES:

ANALYSIS	SAMPLE	TECHNIQUE	MATRX	TYPE	PRESERVATIVES	HAZARDS	COLLECTED	DUE	ANALST
100414	94.08134-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08134-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08138-Cut-1	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08143-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08144-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08145-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
108883	94.08134-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08134-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206

EM-9 ANALYTICAL SERVICE AGREEMENT

Samples Assigned Report

REQUEST NBR
17398

SAMPLES:

ANALYSIS	SAMPLE	TECHNIQUE	MATRX	TYPE	PRESERVATIVES	HAZARDS	COLLECTED	DUE	ANALST
108883	94.08138-Cut-1	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08143-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08144-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08145-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
1330207	94.08134-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08134-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08138-Cut-1	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08143-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08144-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08145-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
71432	94.08134-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08134-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08135-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-2	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08136-Cut-3	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08138-Cut-1	GCMS	SS		KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08143-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08144-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08145-Cut-1	GCMS	SS	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
VOLATILES	94.08139-Cut-1	GCMS	WU		HCL	NO HAZARDS	06-MAY-94	13-MAY-94	206
					KEEP AT 4 CELSIUS	NO HAZARDS	06-MAY-94	13-MAY-94	206
	94.08140-Cut-1	GCMS	WU	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
					NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08141-Cut-1	GCMS	WU	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206
	94.08142-Cut-1	GCMS	WU	BLANK	NO PRESERVS	NO HAZARDS	09-MAY-94	13-MAY-94	206

EM-9 ANALYTICAL SERVICE AGREEMENT

Samples Assigned Report

REQUEST NBR
17333

SAMPLES:

ANALYSIS	SAMPLE	TECHNIQUE	MATRX	TYPE	PRESERVATIVES	HAZARDS	COLLECTED	DUE	ANALST
U-238	94.07531-Cut-3	RAS	SS		NO PRESERVS	NO HAZARDS	19-APR-94	24-MAY-94	211
	94.07591-Cut-1	RAS	SS		NO PRESERVS	NO HAZARDS	29-MAR-94	24-MAY-94	211

Agreement	Sample Nbr	Customer Number	Date Collected
17398	94.08143	00.27856	09-MAY-94
17398	94.08144	00.27856	09-MAY-94
17398	94.08145	00.27856	09-MAY-94
17398	94.08140	00.27886	09-MAY-94
17398	94.08141	00.27886	09-MAY-94
17398	94.08142	00.27886	09-MAY-94
17398	94.08138	00.30875	06-MAY-94
17398	94.08134	AAB2015	06-MAY-94
17398	94.08136	AAB2016	06-MAY-94
17398	94.08135	AAB2017	06-MAY-94
17398	94.08139	AAB2809	06-MAY-94

EM-9 ANALYTICAL SERVICE AGREEMENT
Samples Assigned Report

REQUEST NUMBER
17397

ANALYTICAL SECTION: INORG
PROGRAM FUND CODE: M95B
SAMPLE DISPOSAL: Discard
PRIORITY CODE: 1
SCREENING DATA: No Screening Data Required
AGREEMENT_DATE: 09-MAY-94
CUSTOMER: GA; Garry Allen
MAIL STOP: E525
PHONE: 667-3394
SIGNATURE: Kyle Gay KG
TOTAL SAMPLES: 3 +1 QC

REMARKS:

PRIORITY-1
SHIPPED TO S-CUBED
FEDEX AIRBILL # 1578633291

COUNT:

TECHNIQUE	ANALYSIS	ANALYST	DUE	NUMBER SAMPLES
CVAA	HG	206	13-MAY-94	4

LE# - CUT#	MATRX TYPE	PRESERVATIVES	HAZARDS	COLLECTED	DUE DATE	TECHNIQUE(ANAL, ANAL,...);
8134-Cut1	SS	NO PRESERVS	NO HAZARDS	06-MAY-94	13-MAY-94	CVAA.
8135-Cut1	SS	NO PRESERVS	NO HAZARDS	06-MAY-94	13-MAY-94	CVAA.
8136-Cut1	SS	NO PRESERVS	NO HAZARDS	06-MAY-94	13-MAY-94	CVAA.
8137-Cut1	SS	NO PRESERVS	NO HAZARDS	19-APR-94	13-MAY-94	CVAA.

Agreement	Sample Nbr	Customer Number	Date Collected
17397	94.08137	00.00608	19-APR-94
17397	94.08134	AAB2015	06-MAY-94
17397	94.08136	AAB2016	06-MAY-94
17397	94.08135	AAB2017	06-MAY-94

HSE-9 Sample Priority Authorization Form

Cutstomer Name : GARRY ALLEN HSE-9 Request#'s: 17397

Group : CST-6 Program Code : M83H Mail Stop : E525

Phone : 7-6080 Sample Matrix : Soil Number of Samples: 23 ea

Requested Analytical Report Due Date : 5/6/94

Comments : ~~Samples to Don Gerth for his analysis~~ Shipped to S-Cubed

==========

PRIORITY 1 - *This is the highest priority level that can be assigned to any sample. Samples assigned a priority 1 status will be moved to the top of the assignment que. The analyst will complete the analysis and issue a final report as soon as possible. This priority level gives the analyst pre-approval for overtime if it is required for the timely completion of the requested analysis.*

Group Leader Authorization: [signature] Date: 5/5/94

HSE-9 Group Leader Authorization: [signature] Date: 5/5/94

==========

PRIORITY 2 - *Samples assigned a priority 2 status will be moved to the top of the analysis que but will not supersede any existing or future priority 1 status samples. The analyst will complete the analysis as soon as possible during the analyst's normal working hours. Overtime will not be authorized for samples with a priority 2 status. Samples with a priority 2 status will be scheduled for analysis on a first-come, first-served basis.*

Group Leader Authorization: _____ Date: _____

==========

QUALITY ASSURANCE

DATA VALIDATION REPORT

INORGANIC

Prepared by

Los Alamos National Laboratory
Chemical Science and Technology (CST-9)
Quality Assurance and Data Management Section
Los Alamos, NM 87545

Prepared for

Data Users
Los Alamos National Laboratory
Los Alamos, NM 87545

Laboratory	Maxwell S-Cubed
Request No.	17397
Review Level	2
Analytical Method	CLP ILM03.0 Metals Hg Only
Date of Review	June 27, 1994
Customer	Garry Allen

CONTENTS

		Page(s)
A.	Introduction	
	1. Data Review Criteria	1
	2. Report Purpose	1
	3. Data Qualifying Codes	1
	4. Data Review Report	2-3
	5. Data Review Comments and Qualifying Statements	3
	6. Data Reviewer's Assessment	3
	7. Data User's Guidance and Reviewer's Signature	3
	8. Acronyms (partial listing)	3-4
B.	Table of Samples Reviewed (Table I)	5
C.	Data Review Report	6-7
D.	Data Review Comments and Qualifying Statements	8
E.	Data Reviewer's Assessment	9
F.	Data User's Guidance and Reviewer's Signature	10

Attachment - Laboratory Final Reports with Applied Qualifiers
Note: Not applicable to level 1 validation reports.

A. Introduction

1. Data Review Criteria.

The review of this sample and quality control data was performed in accordance with any or all of the following documents:

a. USEPA SW-846 Methodologies;

b. USEPA CLP SOW Methodologies;

c. Non-USEPA Methodologies, where approved by the Los Alamos National Laboratory, CST-9 Quality Assurance Section;

d. Los Alamos National Laboratory, Analytical Services Requirements Document;

e. USEPA Functional Guidelines for Evaluating Inorganic/Organic Analyses.

2. Report Purpose.

The Quality Assurance Data Validation Report (QADVR) is suggested for use in conjunction with the original data produced from the laboratory, if verification or greater detail of reported data is required of data users or the responding laboratory. The purpose of the QADVR is to alert data users to failed quality-control criteria, method noncompliance, and qualification or requalification of data. Data users should consider this report final but subject to revisions when data usability can be improved through resolution, clarification, addition, and/or requalification of data.

3. Inorganic Data Qualifying Codes.

If the data reviewers deem it necessary to qualify or requalify sample and/or quality control data due to failed quality control and/or noncompliance of method applications, the following codes will be applied to any analyte(s) in the samples listed in the Attachment. Except for blank quality control data, the remaining quality control data are not qualified.

Code	Description
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
R	The data are not useable.
UJ	The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

4. Data Review Report

The Data Review Report lists the data criteria which are reviewed by the data reviewer. Each element of the Data Review Report is discussed below.

a. Description of criteria reviewed column.

This column narratively describes what data criteria are being reviewed.

b. Review level column.

This column lists the numeric review level code the reviewer is working at when reviewing a particular data criteria. The cover sheet also indicates the review level. Each numeric code is followed by an alphabetic code. The data user should note that the codes change throughout the Data Review Report. Depending on the review level, not every criteria will be examined. The following table explains the meaning of the numeric and alphabetic codes.

Review level numeric	Description
1	Least stringent review of data.
2	More stringent review than level 1 but less stringent review than level 3.
3	Most stringent review of data. More stringent than levels 1 and 2.

Review level alpha	Description
f	Final laboratory reports are reviewed.
r	Raw data are reviewed.

c. Criteria met Y/N column.

If the data under review is acceptable, the data reviewer puts a yes (Y) in the column. If the data is unacceptable, the data reviewer puts a no (N) in the column.

d. Comment number and category column.

If the data reviewer comments on the acceptability or unacceptability of the data reviewed, a sequential numeric value is placed in this column. The data reviewer may comment on any data criteria which does not necessarily pertain to acceptable or unacceptable laboratory performance. The corresponding comment will be listed in Section D of the QADVR. Comments are classified as follows.

Classification Code	Description
CD	Correctable Deficiency (CD) - these are deficiencies that are correctable by the laboratory.

NCD	Noncorrectable Deficiencies (NCD) - these are deficiencies that can be addressed by the laboratory. However, corrections usually cannot be made unless reanalysis is performed.
CPD	Completeness Deficiencies (CPD) - these are deficiencies where data was not provided. Completeness deficiencies can be correctable or noncorrectable, depending on past laboratory performance.
G	General (G) - these are general comments which may or may not affect data.

5. Data Review Comments and Qualifying Statements.

As previously discussed under the Data Review Report, the data reviewer may or may not supply comments. Depending on the type of comment and the deficiency, sample and/or quality-control data can be affected. Should the sample and/or quality-control data be significantly impacted, through failed QC and/or method noncompliance, the data reviewer's comment will be followed by a data qualifying statement (DQS). The DQS informs the data user or QADVR reviewer as to what sample and/or quality-control data was affected, using a narrative discussion and qualifying codes.

6. Data Reviewer's Assessment.

The data reviewer assesses the entire data package for completeness, quality control,and contractual compliance. The data reviewer then issues an explanatory narrative assessment depicting the data package as excellent, good, average, poor, or rejected.

7. Data User's Guidance and Reviewer's Signature.

The data reviewer summarizes how the QADVR was conducted and that data qualification and/or requalification may have been performed. In addition, data users and/or QADVR reviewers are advised to understand the impact of this report on data usability from the analytical standpoint. The QADVR is then signed-off by the reviewer and peer reviewer.

8. Acronyms (partial listing).

Inorganic Acronyms	Description
1. ICP	Inductively Coupled Plasma
2. GFAA	Graphite Furnace Atomic Absorption
3. FAA	Flame Atomic Absorption
4. CvAA	Cold Vapor Atomic Absorption
5. CN	Cyanide Analysis
6. ICV, CCV	Initial and Continuing Calibration Verification
7. ICB, CCB	Initial and Continuing Calibration Blank
8. PB (W, S)	Preparation Blank (water, soil)
9. CRI	Contact Required Detection Limit Standard, ICP

8. Acronyms (partial listing) (cont).

Inorganic Acronyms	Description
10. CRA	Contract Required Detection Limit Standard, (GFAA, FAA & CvAA)
11. ICS	Interferent Check sample, ICP
12. S	Matrix spike
13. D	Duplicate
14. LCS	Laboratory Control Sample
15. LRS	Linear Range Analysis, ICP
16. IDL	Instrument Detection Limit
17. MSA	Method of Standard Additions
18. A	Analytical spike
19. Sx	Standard
20. EDL	Estimated Detection Limit

Common Acronyms	Description
1. SDG	Sample Delivery Group
2. SOW	Statement of Work
3. QC	Quality Control
4. COC	Chain-of-Custody
5. %D	Percent Difference
6. RSD	Relative Standard Deviation
7. RPD	Relative Percentage Difference

B. Table of Samples Reviewed

TABLE I. SAMPLES REVIEWED				
	Customer Sample ID	CST-9 Sample ID	Contract Laboratory ID	Matrix
1.	AAB2015	94.08134	4338-01	S
2.	AAB2017	94.08135	4338-02	S
3.	AAB2016	94.08136	4338-03	S
4.	00.00608	94.08137	4338-04	S
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

Matrix: (S) Soil, (W) Water

C. Review Report

	Description of Criteria Reviewed	Review Level	Criteria Met Y/N	Comment number and Category			
				CD	NCD	CPD	G
1.	Sample delivery group is complete?	1fr,2fr,3fr	Y				
2.	Holding time (sample collection date to date of analysis)?						
	a. Metals 6 months, pH <2?	1fr,2fr,3fr	NA				
	b. Mercury 28 days, pH <2?	1fr,2fr,3fr	Y				
	c. Cyanide 14 days, pH <12?	1fr,2fr,3fr	NA				
3.	Calibrations						
	a. All initial calibrations acceptable?	1f,2f,3fr	Y				
	b. All continuing calibrations acceptable?	1f,2f,3fr	Y				
4.	Blanks						
	a. All initial calibration blanks acceptable?	1f,2f,3fr	Y				
	b. All continuing calibration blanks acceptable?	1f,2f,3fr	Y				
5.	ICP (ICS) check						
	a. ICS AB ± 20% of True Value?	3fr	NA				
6.	Laboratory Control Sample (80-120%).						
	a. ICP LCS acceptable, except Ag/Sb?	1f,2f,3fr	NA				
	b. GFAA LCS acceptable?	1f,2f,3fr	NA				
	c. Hg Cv LCS acceptable?	1f,2f,3fr	Y				
	d. FAA LCS acceptable?	1f,2f,3fr	NA				

C. **Review Report (cont)**

	Description of Criteria Reviewed	Review Level	Criteria Met Y/N	Comment number and Category			
				CD	NCD	CPD	G
7.	Duplicate, according to SOW criteria?						
	a. ICP	3fr	NA				
	b. GFAA	3fr	NA				
	c. Hg (Cv)	3fr	NA				1
	d. FAA	3fr	NA				
8.	Matrix Spike, according to SOW?						
	a. ICP	3fr	NA				
	b. GFAA	3fr	NA				
	c. Hg (Cv)	3fr	NA				1
	d. FAA	3fr	NA				
9.	Sample results correct?						
	a. ICP	1fr,2fr,3fr	NA				
	b. GFAA	1fr,2fr,3fr	NA				
	c. Hg (Cv)	1fr,2fr,3fr	Y				
	d. FAA	1fr,2fr,3fr	NA				
10.	ICP Serial Dilution						
	a. ICP, according to SOW?	3fr	NA				
11.	EDLs correct?	2f,3fr	Y				
12.	QC Blind Sample						
	a. Are the results of the QC blind sample within limits?	1fr,2fr,3fr	N		2		

D. Data Review Comments and Qualifying Statements

Comment number	Comment
1	The laboratory is performing CLP ILM03.0 and should have performed a duplicate and matrix spike per SOW.
2	One blind QC sample (94.08137) was submitted to the laboratory. The laboratory correctly identified and quantitated all analytes, except for the following:

Regarding 94.08137

Analyte	True value mg/Kg	Lab Result mg/Kg	% Recovery
Mercury	1.1	0.58	52.7

Sample data were not qualified.

E. Data Reviewer's Assessment

With the exception of those items discussed in Section D, the data package is complete and accurate. The data package is rated as **AVERAGE.**

F. Data Users Guidance Criteria and Reviewer's Signature

This quality-assurance data review was conducted under the guidelines specified in the introduction section of this report. The data reviewer has reviewed the sample and quality-control analyses and documented the findings in an attempt to assist data users with the assessment, completeness, and accuracy of this original data package. Data qualification and/or requalification may have been performed (see Attachment, Data Reviewer's Comments, and Qualifying Statements).

Report prepared and reviewed by

Victor A. Weiss — 6-27-94
Date

- ☐ Laura Kelly ph. (505) 665-4993
- ☐ Donivan Porterfield ph. (505) 667-4710
- ☑ Victor Weiss ph.(505) 665-4101

Quality Assurance/Data Assessment, CST-9
Los Alamos National Laboratory

Report peer reviewed by

Victor A. Weiss — 6-27-94
Date

- ☐ Laura Kelly ph. (505) 665-4993
- ☐ Donivan Porterfield ph. (505) 667-4710
- ☑ Victor Weiss ph. (505) 665-4101

Quality Assurance/Data Assessment, CST-9
Los Alamos National Laboratory

ATTACHMENT

Laboratory Final Reports with Applied Qualifiers
Note: Not applicable to level 1 validation reports.

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

134

Lab Name: S_CUBED Contract: 32471-46

Lab Code: S3 Case No.: 17397 SAS No.: SDG No.: 4338

Matrix (soil/water): SOIL Lab Sample ID: 4338-01

Level (low/med): LOW Date Received: 05/10/94

% Solids: 85.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.90			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7439-98-7	Molybdenu				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
7440-28-0	Thallium				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

4338-01 94.08134

FORM I - IN

7/88

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

135

Lab Name: S_CUBED Contract: 32471-46

Lab Code: S3 Case No.: 17397 SAS No.: SDG No.: 4338

Matrix (soil/water): SOIL Lab Sample ID: 4338-02

Level (low/med): LOW Date Received: 05/10/94

% Solids: 84.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7439-98-7	Molybdenu				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
7440-28-0	Thallium				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

4338-02 94.08135

FORM I - IN

7/88

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

136

Lab Name: S_CUBED Contract: 32471-46

Lab Code: S3 Case No.: 17397 SAS No.: SDG No.: 4338

Matrix (soil/water): SOIL Lab Sample ID: 4338-03

Level (low/med): LOW Date Received: 05/10/94

% Solids: 85.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	1.2			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7439-98-7	Molybdenu				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
7440-28-0	Thallium				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:
4338-03 94.08136

FORM I - IN

7/88

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

137

Lab Name: S_CUBED Contract: 32471-46

Lab Code: S3 Case No.: 17397 SAS No.: SDG No.: 4338

Matrix (soil/water): SOIL Lab Sample ID: 4338-04

Level (low/med): LOW Date Received: 05/10/94

% Solids: 100.0

Blind QC

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.58			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7439-98-7	Molybdenu				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
7440-28-0	Thallium				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

4338-04 94.08137

FORM I - IN

7/88

REPORT NUMBER: 25697

********** EM-9 ANALYTICAL REPORT **********

Prepared by: MJT on 28-Jun-1994

REQUEST NUMBER: 17397 MATRIX: SS ANALYST: 206 PROGRAM CODE: M95B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
AAB2015	94.08134	HG	CVAA	0.9	0.18	MG/KG	6/18/94	
AAB2017	94.08135	HG	CVAA	< 0.11		MG/KG	6/18/94	
AAB2016	94.08136	HG	CVAA	1.2	0.24	MG/KG	6/18/94	

****

REPORT NUMBER: 25697 (continued)

********** EM-9 QUALITY ASSURANCE REPORT *********

Prepared by: MJT on 28-Jun-1994

REQUEST NUMBER: 17397 MATRIX: SS ANALYST: 206 PROGRAM CODE: M95B

OWNER: Garry Allen GROUP: CST-6 MAIL-STOP: E525 PHONE: 7-3394

NOTEBOOK: PAGE:

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.31069	HG	< 0.1		MG/KG	0.0		6/18/94	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
94.08137	HG	0.58	0.16	UG/G	1.1	0.5	6/18/94	UNDER CONTROL

REPORT NUMBER: 25697

Analyst	Reviewer	Section Leader	QA Officer
	Victor A. Weiss		mag
Date	6-28-94	Date	6/28/94

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

****

APPENDIX B

SOIL VAPOR SAMPLING AND ANALYSIS, STANDARD OPERATING PROCEDURE

Golder Associates SOP TP-2.2-4, Revision 3

Golder Associates Inc.

Technical Procedure

Number: TP-2.2-4

Title: SAMPLING AND ANALYSIS OF SOIL GASES

Prepared By:	Approved	Approved	Effective Date	Rev. Level
			10/16/90	-1-
			11/2/90	-2-
			6-25-91	-3-

TP-2.2-4
RECORD OF REVISIONS

Revision Level -3-

Page	Section	Revision
8	7.4	Added daily temperature checks on the storage refrigerator.
10	8.3 Step 2	Added ambient air blank.
11	8.3 Step 7	Revised number of duplicate requirements.
14	8.3 Step 10	Clarified ambient air and equipment blank collection frequency.
18-20	8.5	Completely rewritten
19	Figure 8-3	Added
20	9	Summarized

TABLE OF CONTENTS

	Page No.
1. PURPOSE	1
2. APPLICABILITY	1
3. DEFINITIONS	1
3.1 Soil Gas Probe	1
3.2 Equipment Blank	1
3.3 Method Blank	1
3.4 Chlorinated Hydrocarbons	3
3.5 BTEX	3
4. REFERENCES	3
5. DISCUSSION	3
6. RESPONSIBILITIES	4
6.1 Sampling Technician	4
6.2 Chemist	4
6.3 Senior Chemist	4
6.4 Field Manager	4
6.5 Technical Reviewer	4
6.6 Health and Safety Officer	4
6.7 Site Safety Officer	5
6.8 Quality Assurance Manager	5
7. REQUIREMENTS	5
7.1 Project Work Plan Requirements	5
7.2 Distribution, Change Control, and Field Change Control Requirements	5
7.3 Safety Requirements	7
7.4 Equipment and Materials Requirements	7
7.5 Records	9
8. PROCEDURE	9
8.1 Daily Briefing	9
8.2 Definition of Sampling Areas	10
8.3 Temporary Probe Installation	10
8.4 Permanent Probe Installation	14
8.4.1 Hollow Stem Auger Procedure	14
8.4.2 Manual Installation Procedure	15

TABLE OF CONTENTS

Page No.

8.4.3 Backhoe Installation Procedure 16
8.4.4 Decontamination Procedures 17
8.5 Sample Analysis 18
8.5.1 Purge and Trap Gas Chromatography PID/ECD Detectors 18
8.5.1.1 Instrument Settings 18
8.5.1.2 Calibration 18
8.5.1.3 Daily Instrument Checks 18
8.5.2 Direct Injection Gas Chromatography with PID/ECD Detectors. 20
8.5.2.1 Instrument Settings 20
8.5.2.2 Calibration 20
8.5.2.3 Daily Instrument Checks 20
8.5.3 Holding Times 20

9. REPORTING REQUIREMENTS 20

LIST OF FIGURES

3-1 Permanent Soil Gas Probe Installation
7-1 Procedure Alteration Checklist
8-1 High Concentration Soil Gas Sampling Detail
8-2 Chain of Custody Form
8-3 Purge Vessel for Soil Gas Analysis

1. PURPOSE

This technical procedure shall be used to detect the presence of volatile organics in soil gas samples retrieved from temporary and permanent soil probe installations. Analytical data so obtained may be used to guide subsequent investigations using more intrusive analytical techniques involving soil sampling, monitoring well installation, or groundwater sampling.

2. APPLICABILITY

When invoked by QA plans, work plans, or work instructions, this technical procedure shall apply to all soil gas sampling activities performed by Golder Associates Inc. (GAI) personnel.

3. DEFINITIONS

3.1 Soil Gas Probe

A soil gas probe is a device used to penetrate the soil horizon for the purposes of extracting soil gas atmospheres for subsequent chemical analysis. For purposes of this procedure, soil gas probes will be constructed of decontaminated 3/8 IPS Schedule 40 steel pipe (.675 in OD X .493 in. ID) with removable tips, 5/8 inch OD x 3/8 inch ID stainless steel, 5/8 inch slotted tip, PVC or other materials compatible with the chemicals being sampled. Permanent installations shall be protected with lockable monuments as shown in Figure 3-1. All probes shall be decontaminated prior to installation in accordance with the procedures outlined in Section 8.4.4.

3.2 Equipment Blank

An equipment blank for a temporary soil probe installation is a sample of air collected from a decontaminated, soil gas probe assembly prior to probe insertion. Equipment blanks are collected as an overcheck on the adequacy of decontamination procedures. A sample of the ambient air will be collected in tandem with the equipment blank in order to monitor and correct for the presence of compounds found in the ambient air.

3.3 Method Blank

A method blank is a sample of ambient laboratory air from a glass sampling vial that is analyzed under the same conditions as the soil gas samples. Method blanks are analyzed in order to assess potential interferences or artifacts from the sample container, the sample injection system, or chromatographic analytical system.

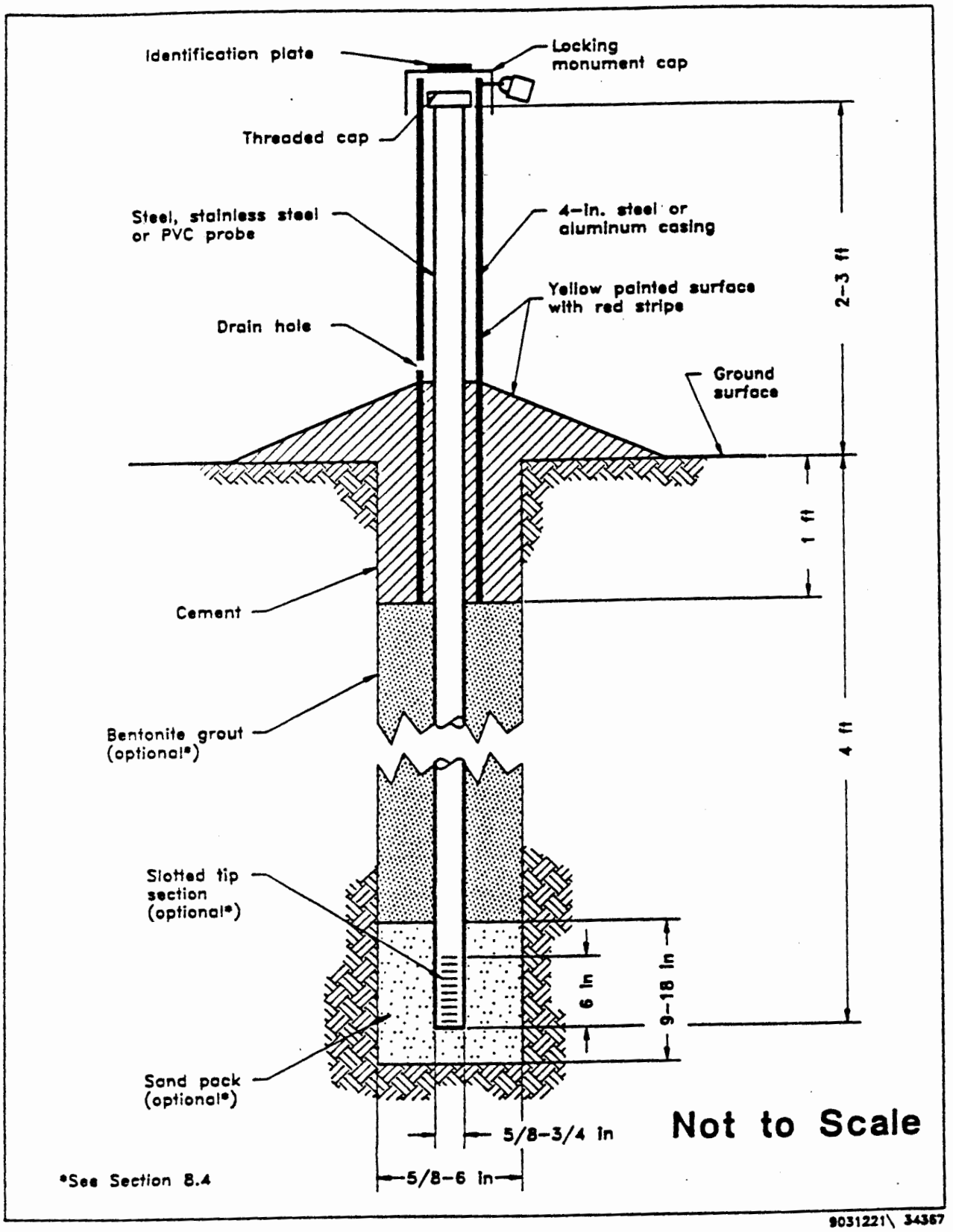

Figure 3-1. Permanent Soil Gas Probe Installation.

3.4 Chlorinated Hydrocarbons

Chlorinated hydrocarbons are generally interpreted to mean those compounds normally analyzed within the scope of EPA Method 624 (EPA 1986). For the purposes of this procedure, however, chlorinated hydrocarbons shall be interpreted to be those that are specific to a particular site, and may include the following compounds:

- trans-1,2-Dichloroethene
- cis-1,2-Dichloroethene
- Carbon Tetrachloride
- Trichloroethene
- 1,1,2-Trichloroethane
- 1,1,1-Trichloroethane
- Tetrachloroethene

3.5 BTEX

This acronym refers to four volatile organics commonly associated with petroleum fuels, specifically, Benzene, Toluene, Ethylbenzene, and Xylenes.

4. REFERENCES

4.1 EPA, 1984, Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act, 40 CFR Part 136, October 26, 1984.

4.2 EPA 1986, Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition, EPA SW-846, U.S. Environmental Protection Agency, Office of Solid Waste, Washington, D.C.

4.3 EPA, 1988, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA/600/4-89/017, U.S. Environmental Protection Agency, Atmospheric Research and Exposure Assessment Laboratory, Research Triangle Park, NC.

4.4 EPA, 1987, Soil Gas Sensing for Detection and Mapping of Volatile Organics, EPA/600/8-87/036, U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory-Las Vegas, Office of Research and Development, Las Vegas, NV.

5. DISCUSSION

Prior to establishing the scope of the survey or implementing soil gas surveys and soil gas sampling, the objectives of the survey and the soil and groundwater characteristics of the project site must be discussed with individuals experienced in field soil gas sampling and analysis. Soil type and characteristics will play an important role in gaining a meaningful

soil gas sample. Consultation with and specific training by knowledgeable GAI staff is required before proceeding to the field.

6. RESPONSIBILITIES

6.1 Sampling Technician

Sampling Technicians are responsible for soil probe decontamination, probe installation, sample acquisition, field chain of custody, maintenance of bound field logs, and other activities as directed by the Senior Chemist.

6.2 Chemist

Chemists are responsible for performing gas chromatographic (GC) analysis of soil gas samples under the direction of the Senior Chemist in compliance with the requirements of this procedure.

6.3 Senior Chemist

The Senior Chemist is responsible for the technical performance of all soil gas sampling and analysis activities conducted under the requirements of this procedure. The Senior Chemist shall serve as the primary technical liaison with the client.

6.4 Field Manager

The Field Manager is responsible for coordination and direction of daily activities. In the absence of the Senior Chemist, the Field Manager shall serve as primary technical liaison as described in 6.3 above.

6.5 Technical Reviewer

The Technical Reviewer is responsible for reviewing and approving all deliverable reports and accompanying data packages produced as a result of the implementation of this procedure, in compliance with applicable project and/or client requirements.

6.6 Health and Safety Officer

The Health and Safety Officer is responsible for preparing a project health and safety plan for all soil-gas sampling and analysis activities conducted by project personnel. The Health and Safety Officer is responsible for obtaining all required project and client approvals prior to plan implementation, and for conducting and documenting all the necessary training for the designated Site Safety Officer and other project personnel as needed.

6.7 Site Safety Officer

The Field Manager shall normally serve as the Site Safety Officer. The Site Safety Officer is responsible for conducting and documenting daily safety briefings for all on-site project staff and for the on-site monitoring of compliance with the project health and safety plan.

6.8 Quality Assurance Manager

The Quality Assurance Manager (QA) Manager is responsible for the distribution and control of this procedure in compliance with the applicable project or site specific QA Program Plan (QAPP). The QA Manager may also conduct surveillance inspections of onsite activity at his discretion or upon request by the Project Manager or Senior Chemist.

7. REQUIREMENTS

7.1 Project Work Plan Requirements

At the Project Manager's or client's direction, this procedure shall be implemented as a project technical requirement and may be incorporated into any applicable project work plan, QA plan, or work instruction.

7.2 Distribution, Change Control, and Field Change Control Requirements

This procedure shall be reviewed, approved, and distributed in compliance with the requirements of applicable QA plan requirements.

Variation from procedure requirements may be necessary due to unique circumstances encountered on individual projects. All variations from established procedures shall be documented on Procedure Alteration Checklists (Figure 7-1) and reviewed by the Project Manager and the QA Manager.

The Senior Chemist may authorize individual Field Managers to initiate necessary variations. If possible, the request for variation shall be reviewed by the Project Manager and the QA Manager prior to implementation. If prior review is not possible, the variation may be implemented immediately at the direction of the authorized Field Manager, provided that the Senior Chemist is notified of the variation within 24 hours of the implementation, and the Procedure Alteration Checklist is forwarded to the Project Manager and QA Manager within 2 working days of implementation. PAC activity shall be noted in the appropriate field logbook. If the variation is unacceptable to either reviewer, the activity shall be reperformed or action shall be taken as indicated in the Comments section of the reviewed Checklist. All completed Procedure Alteration Checklist shall be maintained in project records and provided to the client as part of final activity reports.

Figure 7-1

PROCEDURE ALTERATION CHECKLIST

Job/Task Number: _____

Procedure Reference: _____

Requested Variation: _____

Reason for Variation: _____

Special Equipment, Material or Personnel Required: _____

Alteration Requested By: _____ Date: _____

Title: _____

Reviewed By: _____ Date: _____

Title: GAI Project Manager

Comments: _____

Reviewed By: _____ Date: _____

Title: GAI QA Manager

Comments: _____

7.3 Safety Requirements

All project staff shall be trained in any client site safety requirements. In addition, all project staff shall be trained in the requirements of the site safety plan prepared by the Health and Safety Officer, and, when assigned on-site responsibilities, shall attend safety briefings as part of the daily meetings held by the Senior Chemist or Field Manager.

7.4 Equipment and Materials Requirements

Equipment and materials required to conduct soil gas sampling shall include the following items:

- Temporary office space, electrical power, water, sanitary facilities, portable gas chromatograph (GC), refrigerator, and all required accessories for operation in the field;
- Stakes and colored flagging;
- Syringes, 10 - 1000 µl;
- 3/8 IPS schedule 40 steel, or .675 nominal OD stainless steel or PVC probe tubing, with NPT threading equipment and removable tips, end caps, and fittings;
- 5/8 inch diameter solid hardened steel pilot probes with appropriate fittings.
- Soil gas sampling and calibration vials, 125 ml pyrex glass serum vials with butyl rubber septa, for sample collection and extraction for analysis;
- Stock reference standards; use certified (96% purity or better) reference standard mixtures at the appropriate concentration for preparation of calibration standards. Alternatively, prepare stock standards from "neat" (96% purity or better) reference materials as follows:

  1. Fill a 50 ml volumetric flask to the mark with purge and trap grade methanol.
  2. Fill a certified capillary tube (1 to 10 µl size with 1% accuracy) end to end with the authentic material of interest and drop the filled tube into the filled volumetric flask.
  3. Calculate the concentration of each component in the mixture as follows:

$$\text{Concentration, } \mu g/mL = \frac{D \times V}{Vf/1000}$$

Where: D = density of "neat" material
V = volume of capillary tube in µl
Vf = volumetric flask size in ml

Document the preparation of the standard in the field logbook, and label the standard with the date and initials of the preparer and with the following notation, NNN-PPP-SSS where:

NNN is the field logbook number where the standard preparation is documented;

PPP is the page number of the logbook where the standard preparation information is documented and SSS is a sequential number indicating the number of the standard if more than one standard has been documented on the same page of the field logbook.

After completing and affixing the label to the standard, store in the storage refrigerator at 4°C. Refrigerator temperature shall be checked daily. Temperature checks shall be noted in the field logbook. 3

This standard preparation procedure enables stock reference standards for volatile organic liquids to be prepared quickly and accurately in the field.

- Rotary impact drill and 5/8 inch x 24 inch drill for drilling a pilot hole for installation of the temporary soil gas probe.

- Soil gas probe driver, impact hammer and extension cord; an impact hammer is normally used to drive temporary soil gas probes. The hammer is equipped with an adapter to fit an anvil which threads to the top of the probe assembly. The hammer adapter is set over the anvil and the hammer switched on to drive the probe. If fixed power sources are available, use them in lieu of the portable generation. Permanent installations may require the additional use of a subcontractor-operated auger drilling rig or backhoe.

- Gasoline powered generator, for supplying power to the soil gas probe driver. **Important**: Position the generator downwind of the sampling site so as not to introduce the exhaust into the sampling area.

- Decontamination water (i.e., commercially available distilled deionized water for decontamination of the soil gas probes).

- Reagent methanol, for decontamination of the soil gas probes.

- Purge and trap grade methanol, for preparation of stock standards.

- Dry nitrogen supply (ultrahigh purity (UHP) grade).

- Alconox (or other equivalent, anionic, biodegradable detergent), for decontamination of the soil gas probes.

- Field documentation and support equipment, including sprayers, towels, plastic bags, buckets, waste containers, and tools for decontamination and probe assembly/disassembly.

- Vacuum pump, for purging the soil gas probe prior to sample collection. The pump can be a high-capacity electrically powered pump (10-200 L/min to 25" Hg), or a low-volume battery operated pump (1-2 L/min to 25" Hg).

- Hand-operated vacuum pump (36 cc/stroke to 25" Hg), for evacuating glass sampling vials.

- Disposable luer-tip 60 ml syringes, three-way valves, connectors and 20-22 gauge needles for sample collection.

- Mechanical jack, for removing the sampling probes from the access holes.

7.5 Records

Soil gas sampling activities shall be documented chronologically in bound logbooks. One set of logbooks shall be dedicated to sample acquisition and onsite activity monitoring, and shall provide a chronological record of all onsite activity external to the mobile laboratory operations. Another set of logbooks shall be dedicated to the mobile laboratory and shall serve as a chronological run log for GC operations. All logbook entries shall be copied at least weekly, and copies forwarded to the project quality records for retention in compliance with the applicable work plan or QA plan requirements; all other supporting records (e.g., training records, chromatograms, GC data output sheets, and chain of custody records) shall be retained in a temporary working file in the mobile laboratory. Upon completion of all actions related to individual records, they may be accumulated for no longer than a week prior to transmittal to the project quality records. All logbook and field-generated handwritten records shall be made in indelible black or blue ink; corrections shall be made by single lines and initialed and dated. All logbook entries shall be signed and dated at the end of each day's activity, or upon transfer of logging responsibilities to other personnel.

8. PROCEDURE

8.1 Daily Briefing

The Senior Chemist or Field Manager shall conduct a daily briefing for all project personnel on site. The meeting shall address the proposed scope of the day's activities; location, number, and type of samples to be taken; specific personnel assignments; and shall include a review of pertinent health and safety considerations. Minutes and attendance shall be documented on standard training memoranda and routed to the project records.

8.2 Definition of Sampling Areas

Sampling areas and permanent soil probe locations shall be as defined in the project planning documents or as directed by the Project Manager, Senior Chemist or Field Manager.

8.3 Temporary Probe Installation

If the portable generator is required, position it away from the immediate working area in a downwind direction from any sampling or analytical support activities. Ensure that all activities involving flammable or ignitable materials/vapors are at least 50 feet away from the generator. Use a long power cord rated with proper amperage to distance the generator from the work area. Keep the generator well ventilated, and take all necessary precautions to avoid electrical shock.

Install each probe in the following sequence:

Step 1: Provide an access hole for inserting the sampling probe by drilling a 5/8 inch diameter x 2 foot deep hole at the sampling point with a rotary impact hammer and drill. Alternately, provide an access hole by driving a 5/8 inch solid steel pilot probe to within 1 foot of the target sampling depth (typically 4 feet).

Step 2: Assemble the sampling probe by first taping all fittings with non-adhesive teflon tape (Note: the sampling probe must be completely decontaminated prior to assembly according to the procedures outlined in Step 10 below). Assemble one 5-foot section with the 6-inch blunt hammer tip and tighten the fittings with a wrench. Collect an equipment blank and ambient air blank as noted in Step 7 below. 3

Step 3: Place a removable steel drive point in the end of the probe assembly and insert the probe into the access hole.

Step 4: Drive the probe into the access hole to a depth of 4 feet, attach the removal jack to the probe and lift the probe out of the access hole about 1/2 inch to separate the probe tip from the end of the probe and allow the soil gas to enter.

Step 5: Remove the blunt driver tip from the tip of the probe and attach the luer-tip valve and connectors. Seal the top of the annulus between the probe and the formation with modeling clay.

Step 6: Connect the vacuum pump to the top of the probe and pump for a minimum of 3 purge volumes from the installation; additional purging may be authorized at the direction of the Senior Chemist if the installation response indicates that such action is appropriate. Purging details, including date, time and volume purged, shall be recorded in the field logbook.

Step 7: Close the soil gas probe off from the ambient air with the three-way valve and remove the vacuum hose to the pump. Attach a clean 60 mL syringe to the side port of the three-way valve and turn the valve so as to close off exposure of the soil gas probe to the ambient air (Figure 8-1, Position 1). Attach an evacuated sampling vial to the top of the three-way valve using a clean 20-22 gauge needle. Open the sampling valve to allow soil gas to enter the vial (Figure 8-1, Position 2). Draw up 60 mls of soil gas into the syringe (Figure 8-1, Position 3) and slightly pressurize the vial with ≈20 ml of soil gas (Figure 8-1, Position 4), close off the valve to the vial and remove the vial. Collect a duplicate once per day unless otherwise directed by the Senior Chemist or Project Manager. Discard all the luer-tip fittings, valves, needles and syringe. 3

Step 8: Affix a plain paper label to the vial or cartridge and identify the sample with the sample location, date and time of sampling, and the initials of the person collecting the sample. Record the sample identifier, sample location, date and time of sampling and the name of the person collecting the sample in the field logbook.

Immediately place the sample in a cooler in the dark at 4° C, complete a field chain of custody form (see Figure 8-2) and transport the sample directly to the on-site or close support laboratory and the chemist's custody.

Step 9: If sampling is only being done at 4 feet, immediately remove the soil probe from the access hole with the mechanical jack and plug the access hole with a bentonite plug. If required, stake the access hole for subsequent survey. If sampling at additional depths is required, remove the sampling nipple, attach another 4-foot probe section along with the blunt driver tip, and drive the probe into the desired depth, repeating the previous steps until complete. Note that if the sampling depth exceeds 4 feet, the probes must be removed one section at a time in order to prevent damage to the probes.

Step 10: Once the probe is removed from the access hole it must be decontaminated prior to use at another location. The procedure for decontamination is as follows:

- Remove all teflon tape from the probe threads.
- Brush out any soil particles from the interior of the probe with a narrow wire brush (a gun barrel cleaning brush is suitable for this purpose).
- Rinse the probe exterior and interior with a solution of alconox and decontamination water, scrubbing the interior and exterior with brushes.
- Rinse with decontamination water.
- Rinse with reagent-grade methanol and finally with decontamination water.

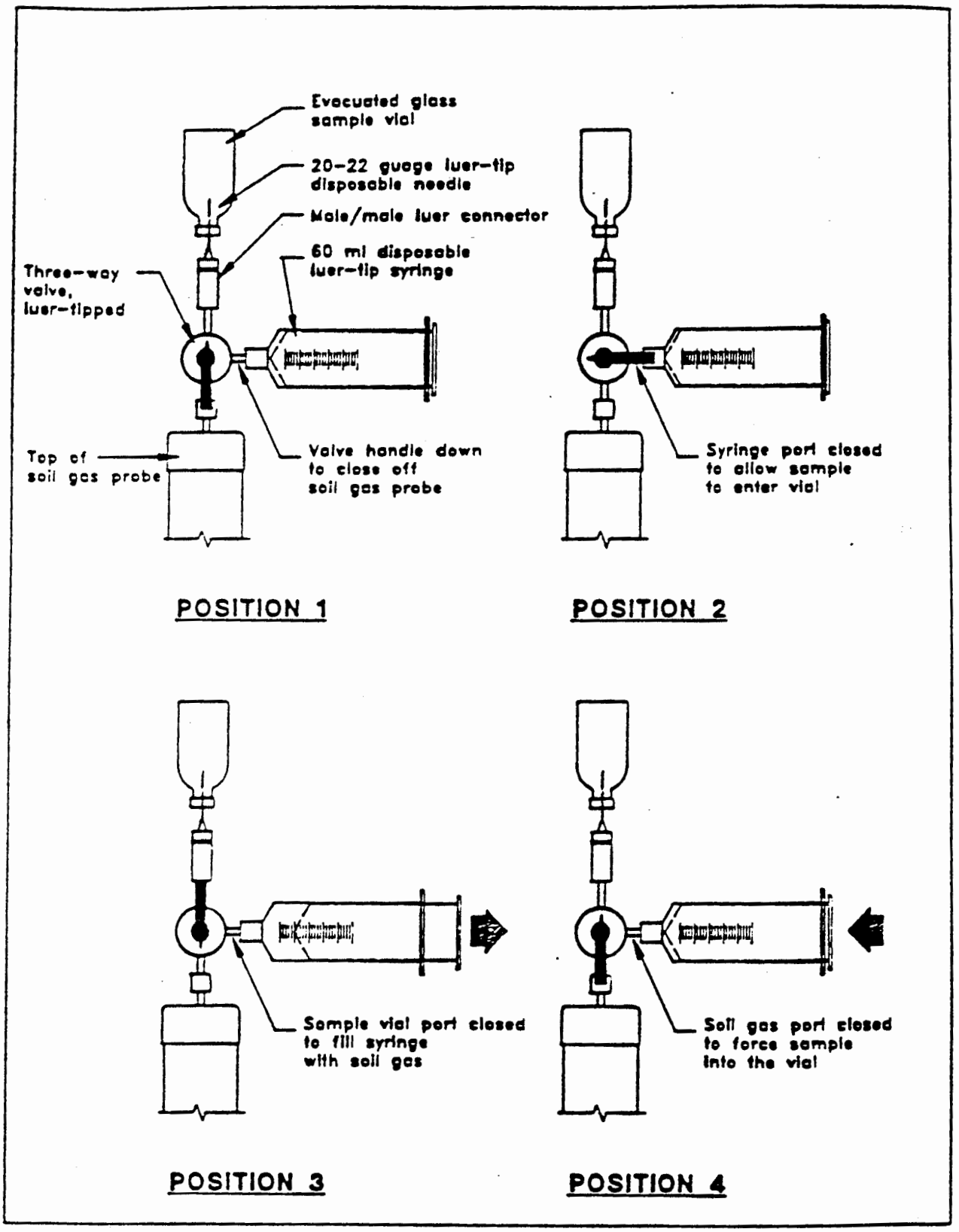

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Figure 8-1. High Concentration Soil Gas Sampling Detail.

Figure 8-2

GOLDER ASSOCIATES INC.
CHAIN OF CUSTODY RECORD

PROJ. NO.	SITE/LOCATION
SAMPLER/LAB TECH (Signature of initiator)	

STA. NO.	DATE	TIME	SAMPLE TYPE	MEDIA	IDENTIFICATION	NO. OF CON-TAINERS	AMOUNT/ PRESERVATIVE							SEAL NO.	SEAL INTACT? (Y or N)	REMARKS (With Initials)

DESTINATION: VIA:

ACKNOWLEDGEMENT OF RECEIPT DUE BY:

Relinquished by: (Signature/Firm)	Date/Time	Received by: (Signature/Firm)	Relinquished by: (Signature/Firm)	Date/Time	Received by: (Signature/Firm)
Relinquished by: (Signature/Firm)	Date/Time	Received by: (Signature/Firm)	Relinquished by: (Signature/Firm)	Date/Time	Received by:

Return Completed Form To:	Remarks: (Attachments if necessary)

993-1024\7817

- Dry the equipment by allowing it to air dry or by blowing a stream of dry nitrogen through the probes. Immediately cover the probe ends and sections with plastic to prevent contamination from the environmental conditions on-site. Once the probes are decontaminated, additional sampling may continue as described above.

- Collect one equipment blank and one ambient air blank per day as noted in Step 7 above. 3

8.4 Permanent Probe Installation

The method of permanent installations shall depend on the site conditions and may require the use of a hollow stem auger/mobile auger unit or backhoe operated by a client-approved site contractor or GAI subcontractor or shall be installed by GAI personnel manually as described in the foregoing sections. When site contractors are used GAI personnel shall direct the installation activity as described in the following sections.

8.4.1 Hollow Stem Auger Procedure

Step 1: Auger to 4 feet in depth;

Step 2: Assemble the sampling probe by first taping all fittings with non-adhesive teflon tape (Note: the sampling probe must be completely decontaminated prior to assembly according to the procedures outlined in Section 8.4.4). Assemble one section with cap and slotted tip, tighten the fittings as necessary, and collect an equipment blank from the assembled probe as described in Step 7 of Section 8.3 above.

Step 3: Place 1 to 2 inches of 8 to 10 mesh silica sand in the bottom of the hole;

Step 4: Insert the soil probe assembly into the hollow stem;

Step 5: Place 12 to 18 inches of sand pack into the hole as the auger is retracted;

Step 6: Place 2 to 3 inches of dry bentonite chips into the hole.

Step 7: Add bentonitic grout and continue retracting the auger in one foot increments until 1 foot below the surface of the ground;

Step 8: Remove the auger;

Step 9: Fill the remainder of the hole with cement. Insert the weather protection monument casing and construct a concrete pad approximately 1 foot in diameter as shown in Figure 3-1. The concrete should slope away from the soil gas probe. Drill a 1/4-inch diameter drain hole in the monument casing directly above the concrete;

Step 10: Place a locking cap on the monument casing;

Step 11: When the cement is cured, paint the cement and monument casing a bright color to identify the monument specifically as a soil-gas probe installation. The color or colors used shall be visually different from the colors of other monuments in the area. Place a location identifier on the top of the monument casing;

Step 12: Sample acquisition, identification, and chain of custody considerations shall be as specified for the temporary installations in Step 7 of Section 8.3 above;

8.4.2 Manual Installation Procedure

Step 1: Provide an access hole for inserting the sampling probe by drilling or driving a 3/4 inch diameter x 3.5 foot deep hole at the sampling point with a rotary impact hammer and drill or solid steel pilot probe.

Step 2: Assemble the sampling probe by first taping all fittings with teflon tape (Note: the sampling probe must be completely decontaminated prior to assembly according to the procedures outlined in Section 8.4.4). Assemble one section with cap and slotted tip and tighten the fittings as necessary and collect an equipment blank from the assembled probe;

Step 3: Place a removeable steel drive point in the end of the probe assembly and insert the probe into the access hole.

Step 4: Drive the probe into the access hole to a depth of 4 feet, attach the removal jack to the probe and lift the probe out of the access hole about 1/2 inch to separate the probe tip from the end of the probe and allow soil gas to enter.

Step 5: Immediately attach the luer-tip valve and connectors and temporarily seal the top of the annulus between the probe and the formation with modeling clay.

Step 6: Connect the hand-operated vacuum pump to the top of the probe and verify that soil gas is entering the probe by pumping two strokes on the vacuum pump. Acceptable flow into the probe will be that the gauge on the vacuum pump indicates atmospheric pressure inside the probe within 5 minutes of drawing a vacuum on the probe assembly. If unacceptable vacuum is indicated the probe will have to be retracted and repositioned until acceptable flow is achieved.

Step 7: Remove the seal from around the probe annulus and excavate a hole around the probe one foot in diameter by one foot in depth.

Step 8: Fill the remainder of the hole with cement. Insert the weather protection monument casing and construct a concrete pad approximately 1 foot in diameter as shown in Figure 3-1. The concrete should slope away from the soil gas probe. Drill a 1/4-inch diameter drain hole in the monument casing directly above the concrete;

Step 9: Place a locking cap on the monument casing;

Step 10: When the cement is cured, paint the cement and monument casing a bright color to identify the monument specifically as a soil-gas probe installation. Place a location identifier tag on the top of the monument casing;

Step 11: Sample acquisition, identification, and chain of custody considerations shall be as specified for the temporary installations in Step 7 of Section 8.3 above.

8.4.3 Backhoe Installation Procedure

The backhoe installation procedure is to be used only if all other installation options are determined to be unsuitable for the site conditions. Prior to use of the procedure throughout the project site a permanent well should be installed using this procedure near a temporary monitoring point where known concentrations of the compounds to be monitored have been detected. This will enable comparison of the effectiveness of the backhoe installation procedure with the temporary monitoring probe procedures. Acceptance of the procedure shall be results comparable within 50 percent difference.

Step 1: Open a backhoe trench approximately 2 ft. W x 4 ft. L x 4 ft in depth;

Step 2: Assemble the sampling probe by taping all fittings with teflon tape (Note: the sampling probe must be completely decontaminated prior to assembly according to the procedures outlined below). Assemble one section with cap and slotted tip and tighten the fittings as necessary and collect an equipment blank from the assembled probe;

Step 3: Place a 6 inch diameter x 5 foot L section of PVC pipe into the trench and add 1 to 2 inches of 8 to 10 mesh silica sand in the bottom of the pipe;

Step 4: Insert the sampling probe into the pipe centering it within the annulus of pipe;

Step 5: Place 12 to 18 inches of sand pack into the hole;

Step 6: Backfill the trench with the soil removed to a depth of two feet up from the bottom of the trench and tamp the soil around the pipe with a tamper;

Step 7: Place 2 to 3 inches of dry bentonite chips.

Step 8: Add bentonitic grout and continue backfilling and tamping the soil around the installation in one foot increments until 1 foot below the surface of the ground;

Step 9: Backfill the trench with the remaining soil and tamp the soil around the pipe with the tamper;

Step 10: Remove the PVC pipe;

Step 11: Fill the remainder of the hole with cement. Insert the weather protection monument casing and construct a concrete pad approximately 1 foot in diameter as shown in Figure 3-1. The concrete should slope away from the soil gas probe. Drill a 1/4-inch diameter drain hole in the monument casing directly above the concrete;

Step 12: Place a locking cap on the monument casing;

Step 13: When the cement is cured, paint the cement and monument casing a bright color to specifically identity the monument as a soil-gas probe installation. Place a location identifier on the top of the monument casing;

Step 14: Sample acquisition, identification, and chain of custody considerations shall be as specified for the temporary installations;

8.4.4 Decontamination Procedures

Step 1: Brush out any soil particles from the interior and exterior of the auger flight(s), probe or backhoe bucket with a wire brush (a gun barrel cleaning brush is suitable for cleaning the soil-gas probes). Capture all waste soil particles and cuttings in a waste basket designated for soil cuttings.

Step 2: Rinse the exterior and interior of the auger flight(s), probe, or backhoe bucket with a solution of detergent and water; scrub with brushes or with a pressurized cleaner, and capture all wash solution in an appropriate container.

Step 3: Rinse the auger flight(s), probe or backhoe bucket with decontamination water and capture all rinseate in an appropriate container.

Step 4: Allow the equipment to air dry or dry by blowing a stream of dry nitrogen through the probes. Immediately wrap the probe sections with plastic to prevent contamination prior to installation.

8.5 Sample Analysis

8.5.1 Purge and Trap Gas Chromatography PID/ECD Detectors

8.5.1.1 Instrument Settings

Oven Temperature:	80°C for 5 mins., 6 °C/min to 110°C, hold until all compounds elute.
ECD Temperature:	250°C
Carrier/makeup:	Nitrogen at 10 psig column head pressure, 30 psig minimum cylinder pressure.
PID:	10.2 eV lamp, 75 mv.
Column:	15m x 0.52mm VOCOL or 30m x 0.52mm DB-624 wide-bore capillary column.
Purge Vessel:	Glass with injection port as shown in Figure 8-3.
Purge time:	Three minutes at ambient temperature.
Desorb settings:	3 minutes at 200°C.

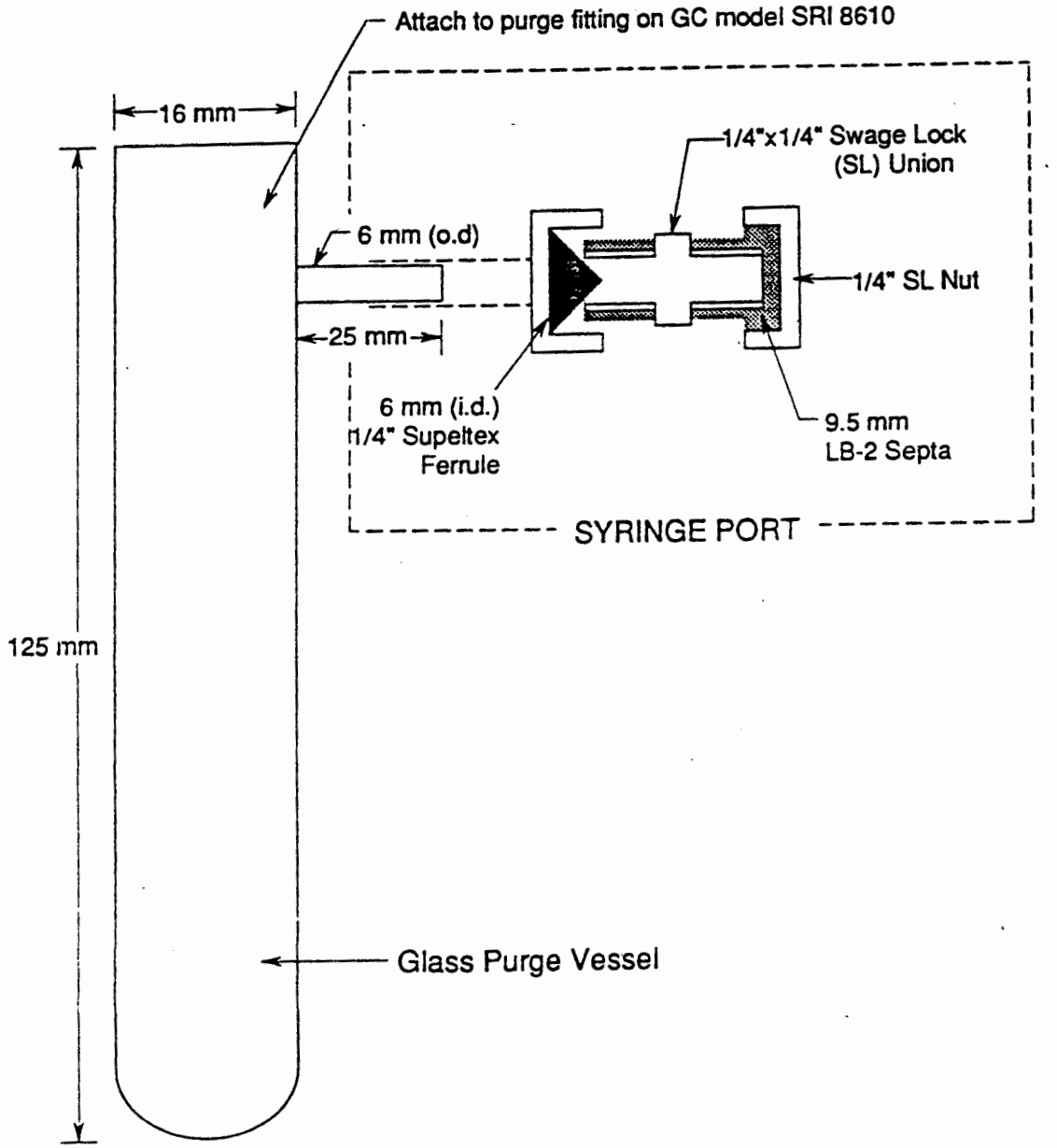
8.5.1.2 Calibration

Analyze a series of three standards by injecting appropriate quantities of a methanolic multi-standard into 5 ml of reagent water in the purge vessel. Calculate the standard concentrations on a microgram per liter basis based on 10ml volume of sample. Update the calibration curve stored in the analytical method file. Immediately after analysis of the calibration curve, analyze a method blank by injection of 10mls of laboratory air into the purge gas stream to determine system artifacts. Acceptable blank analysis shall be no compound present at greater than 5x the sample quantitation limit. 3

8.5.1.3 Daily Instrument Checks

After obtaining an acceptable initial calibration immediately analyze a mid-range calibration standard and method blank, and repeat after every 20 samples. Analyze samples by injection of 10 mls into the purge gas stream. The percent difference between the mid-range calibration concentrations and the initial calibration shall not differ by greater than ±40%. The method blank shall not contain any target compound at a concentration of greater than 5x the sample quantitation limit. In addition, analyze a blank following the analysis of a high concentration sample to determine system contamination levels.

The daily instrument check shall serve to check system performance, syringe cleanliness and blank performance. If the blank or standard check are not within acceptable limits, the syringe must be cleaned and the calibration standards or blank re-analyzed. If the reanalysis fails, the system must be checked for contamination, recalibrated and all samples up to the last in-control point reanalyzed.



Not to scale

FIGURE **8-3**

PURGE VESSEL FOR SOIL GAS ANALYSIS

WHC/SOIL GAS/WA

PROJECT NO. 903-1221 DRAWING NO. 24785 DATE 3/26/91 DRAWN BY TK

Golder Associates

8.5.2 Direct Injection Gas Chromatography with PID/ECD Detectors.

8.5.2.1 Instrument Settings

Oven temperature:	65°C isothermal
ECD Temp:	250°C
Carrier/Makeup:	N2 at 30 psig
PID:	10.2 eV
Column:	15 meter VOCOL or 30 meter DB-624
Injection volume:	500 microliters

8.5.2.2 Calibration

Prepare a series of three standards in 125 ml glass sample vials by injecting appropriate volumes of a methanolic multi-standard in the calibration range of 0.1 to 2.0 µg/l (wt/vol). Analyze the three standards followed by a laboratory air blank to check for system contamination. Update the calibration factors for the method. Acceptable blank analysis shall be no compound present at greater than 5x the sample quantitation limit. 3

8.5.2.3 Daily Instrument Checks

After obtaining an acceptable initial calibration immediately analyze a mid-range calibration standard and method blank, and repeat after every 20 samples. The percent difference between the mid-range calibration concentrations and the initial calibration shall not differ by greater than ±40%. The method blank shall not contain any target compound at a concentration of greater than 5x the sample quantitation limit. In addition, analyze a blank following the analysis of a high concentration sample to determine system contamination levels.

The daily instrument check shall serve to check system performance, syringe cleanliness and blank performance. If the blank or standard check are not within acceptable limits, the syringe must be cleaned and the calibration standards or blank re-analyzed. If the reanalysis fails, the system must be checked for contamination, recalibrated and all samples up to the last in-control point reanalyzed.

8.5.3 Holding Times

All sample analyses must be completed within 72 hours of sample collection.

9. REPORTING REQUIREMENTS

Report all concentrations of chlorinated hydrocarbons to a detection limit of 0.1 microgram per liter and all BTEX compounds to a detection limit of 5 ug/L. Summarize all data on a daily basis in a tabular format including all blank and standard results; append all the chromatograms and other GC output data and present to the Senior Chemist for review. The Senior Chemist or designee, shall, in turn summarize the analytical results in a formal report appended with all applicable supporting data. 3