TABLE C-14. Total Metals Concentrations* in Soil Samples Collected at Khobar Towers, Al Khobar, Saudi Arabia

SAMPLE DESIGNATION+	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
DA-1A	2930	1.14	0.345	65900	1.89	10.3	3250
DA-18	2800	1.2	<0.18	65000	2.9	15	3100
CHANGE +/- %	4.44	5.26	-47.83	1.37	53.44	4S.63	4.62
DA-1A	3160	1.63	0.555	165000	2.96	16.1	3870
DA-2B	3400	1.6	x0.17	13000	3.8	16	3500
CHANGE +/- %	7.59	1.84	69.37	92.12	28.36	0.62	9.56
DA-3A	2060	1.34	0.302	59800	<1.9	7.04	2500
DA-3B	1300	0.87	x0.19	110000	3.5	a.9	1500
CHANGE +/- %	-36.89	-35.07	50.26	83.95	84.21	13.52	40.00
DA-4A	1750	1.12	0.315	43600	1.57	5.19	2000
DA-48	1800	0.83	x0.19	52000	2.4	10	2000
CHANGE +/- %	2.86	25.89	39.68	11.27	52.07	92.68	0.00
DA-5A	2540	1.11	0.384	74600	1.92	a.04	3140
DA-5B	2300	0.92	<0.19	56000	3.0	12	2500
CHANGE +/- %	-9.45	-17.12	-50.52	-24.93	56.25	35.75	-20.38

SAMPLE DESIGNATION+	MERCURY	MAGNESIUM	SODIUM	NICKEL	WAD	VANADIUM	ZINC
DA-1A	co.034	9110	1090	17.7	6.36	12.2	17.4
DA-18	0.092	7800	550	26	11	13	24
CHANGE +/- %	170.59	-14.38	-49.54	46.89	72.96	6.56	37.93
DA-2A	<0.037	12200	16500	18.3	19.5	12.0	36.2
DA-2B	0.052	13000	6900	23	10	16	46
CHAN08 +/- %	40.14	6.56	58.18	21.69	40.72	21.00	27.07
DA-3A	<0.038	7230	721	13.2	8.85	x9.6	B.99
DA-3B	0.039	13000	2600	15	6.5	<9.7	38
CHANGE +/- %	2.63	79.81	260.61	13.64	26.55	1.04	322.69
DA-4A	co.031	4420	253	10.5	8.65	<7.9	7.55
DA-4B	0.037	5100	300	19	5.7	<9.3	30
CHANGE +/- %	19.31	15.38	le.58	80.95	34.10	17.72	297.35
DA-5A	<0.038	9140	654	17.7	11.2	9.61	30.0
DA-58	0.038	6700	580	22	6.2	10	34
CHANGE +/- %	0.00	26.70	11.31	24.29	44.64	4.06	13.33

Footnotes.
* = All total metals concentration8 are expressed in milligrams per kilogram (mg/kg).
+ = An "A" in the sample designation indicates a first round sample; a "B" indicates a second round sample.

TABLE C-15. Total Metals Concentrations* in Soil Samples Collected at Camp 1, Al Jubayl, Saudi Arabia

SAMPLE DESIGNATION+	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
AJ-1A	3060	1.48	0.556	40900	1.85	14.5	3830
N-18	2000	<0.65	2.1	32000	<1.9	26.7	2550
CHANGE +/- %	14.14	56.08	277.70	34.56	2.70	94.14	- 42
AJ-2A	1980	1.53	0.390	71000	1.98	10.4	2940
N-23	1700	<0.64	2.1	60000	Xl.9	17.0	2970
CHANGE +/- %	14.14	58.17	427.64	-15.49	4.04	63.46	1.02
AJ-3A	2540	1.59	0.392	53900	2.35	9.90	3510
N-3B	1100	<0.64	1.1	24000	<1.9	0.87	1760
CHANGE +/- %	-56.69	-59.75	180.61	-55.47	-19.15	-11.12	49.86
AJ-4A	1910	1.09	0.396	42400	<2.0	8.92	2560
AJ-4B	1700	<0.66	1.2	26000	9.7	12.0	1800
CHANGE +/- %	-10.99	-39.45	203.03	-38.68	385.00	34.53	-26.56
AJ-5A	2490	1.73	0.384	39500	1.01	10.4	3000
AJ-5B	1300	<0.64	1.1	28000	1.9	10.2	1060
CHANGE +/- %	-47.79	-63.30	186.46	-29.11	-0.52	-1.92	-39.81

SAMPLE DESIGNATION+	MERCURY	MAGNESIUM	SODIUM	NICKEL	LEAD	VANADIUM	ZINC
AJ-1A	<0.037	6910	813	16.0	28.4	13.5	43.2
AJ-1B	<0.038	4000	350	19	14.0	10	26.7
CHANGE +/- %	0.70	-30.54	- . 8	13.10	-50.70	-25.93	-38.19
AJ-2A	<0.040	13500	11400	16.5	16.2	9.96	34.1
AJ-2B	<0.037	a700	3900	15	19.8	11	17.4
CHANGE +/- %	-7.50	-38.86	-69.79	-9.09	22.22	10.44	- .97
AJ-3A	<0.039	7270	1690	19.0	35.4	11.5	35.2
N-38	<0.038	3200	200	<9.4	0.96	<9.4	8.60
CHANGE +/- %	- .	55.99	01.41	50.53	74.69	-18.26	- .34
N-4h	<0.040	5800	784	11.7	16.4	<9.9	20.0
N-4B	0.039	4300	450	x9.7	6.95	<9.7	12.4
CHANGE +/- %	-2.50	-25.86	-42.60	-17.09	-57.62	-2.02	-40.38
AJ-5A	<0.038	11200	067	12.3	7.39	19.4	12.7
N-58	co.030	4000	250	<9.4	9.66	c9.4	10.0
CHANGE +/- %	0.00	64.29	71.16	23.50	30.72	51.55	14.96

Footnotes.
• = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).
+ = An "A" in the sample designation indicates a first round sample; a "B" indicates a second round sample.

TABLE C-16. **Total Metals Concentrations* in** Soil Samples Collected at Eekan Village, Riyadh, Saudi Arabia

SAMPLE DESIGNATION+	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
R-1A	3700	2.52	0.777	93000	2.33	16.5	5140
R-1B	2520	1.5	0.49	150000	2.2	14	4200
CHANGE +/- %	31.09	**40.40**	36.94	61.29	**5.58**	**-15.15**	18.29
R-2A	3610	2.37	0.765	105000	**1.91**	11.7	5450
R-2B	3000	2.5	0.62	140000	2.1	22	**5400**
R-3A CHANGE +/- %	33[illegible]6.90	8.54	**19.95**9	129[illegible]	**30.33**	9.99	**88.03**	**0.92**
					2.80	15.0	4750
R-3B	3050	2.6	0.53	150000	2.4	15	4300
CHANGE +/- %	**-8.13**	**2.36**	**-11.52**	**16.28**	**-14.29**	**-5.06**	**-9.47**
R-4A	**2420**	**2.71**	**0.518**	**190000**	2.94	10.4	4015
R-4B	3420	**1.6**	0.41	130000	2.3	19	4800
CHANGE +/- %	40[illegible]1.32	**40.98**	**20.0**57	105000	21.58	21.77	**82.69**	**19.55**
					2.07	19.9	5670
R-5B	3130	1.3	**0.46**	60000	x2.0	15	3800
CHANGE +/- %	23.47	**53.24**	**33.04**	35.24	30.31	24.62	**32.98**

SAMPLE DESIGNATION+	MERCURY	MAGNESIUM	SODIUM	NICKEL	LEAD	VANADIUM	ZINC
R-1A	co.039	3200	1450	20.4	6.83	16.7	11.7
R-1B	go.039	2520	**4600**	12	4.0	15	50
CHANGE +/- %	0.00	**21.25**	217.24	41.19	41.43	10.1.	**395.73**
R-2A	0.038	2820	450 .	21.4	19.1	16.1	14.3
R-2B	**<0.038**	2670	**1400**	14	11	**18**	51
CHANGE +/- %	0.00	**5.32**	**205.68**	**34.58**	42.41	**11.80**	**256.64**
R-3A	**0.040**	2750	3660	16.8	14.3	15.6	14.6
R-38	co.039	2630	4800	15	12	16	110
CHANGE +/- %	**2.50**	4.36	31.15	10.71	**16.08**	**2.56**	**653.42**
R-4A	0.035	3090	2180	14.2	5.53	17.0	24.7
R-4B	**<0.039**	3120	7000	16	**11**	19	32
CHANGE +/- %	11.43	0.97	221.10	12.60	.	6.74	**29.55**
R-5A	0.034	4080	2930	24.0	5.86	10.7	20.4
R-58	**<0.040**	3690	220	12	4.3	15	110
CHANGE +/- %	17.65	9.56	92.49	50.00	26.62	19.79	**439.22**

Footnotes.
• = **All** total metals concentrations are expreesed in **milligrams** per kilogram **(mg/kg)**.
+ = An **"A"** in the **sample** designation indicates a **first** round sample; a **"B"** indicates a second round sample.

TABLB C-17. **Total Metals Concentrations*** in Soil **Samples** Collected at King **Khalid Military** City, Saudi Arabia

SAMPLE DESIGNATION*	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
KK-1A	4030	3.25	0.000	53700	2.50	10.1	6010
KK-1B	1630	1.7	0.30	29000	1.9	7.5	2300
CHANGE +/- %	-66.25	-47.69	52.50	46.00	24.36	58.56	61.73
KK-2A	5700	3.21	0.906	93300	3.62	22.3	7360
KK-2B	3750	2.9	0.53	96000	2.0	18	5200
CHANGE +/- %	34.21	9.44	41.90	2.99	44.75	19.08	29.35
KK-3A	9140	3.70	1.57	86200	5.60	31.9	12100'
KK-3B	3060	0.01	0.52	100000	2.1	15	4900
CHANGE +/- %	-57.77	-78.11	-66.88	16.01	-63.03	-52.98	-59.50
KK-4A	5050	2.75	0.995	106000	3.10	22.5	7260
KK-4B	8890	2.7	0.70	93000	3.8	34	12000
CHANGE -	51.97	1.82	21.61	12.24	19.10	51.11	65.29
KK-IA	0500	4.37	1.43	82900	4.64	29.5	10800
KK-5B	3950	1.6	0.43	100000	2.6	30	5600
CHANan +/- %	- 6	63.39	-69.93	20.63	-43.97	1.69	48.15

SAMPLE DESIGNATION*	MERCURY	MAGNESIUM	SODIUM*	NICKEL	LEAD	VANADIUM	ZINC
KK- 1A	<0.032	6020	1280	21.3	9.06	20.6	16.5
KK-1B	0.030	4440	500	<9.4	3.9	10	<9.4
CHANGE -	18.75	34.90	-60.94	-55.87	-56. 5	- .	- .03
KK-2A	<0.036	6145	203	30.6	3.55	2i.4	24.1
KK-2B	0.030	6170	350	16	6.4	20	<9.5
CHANGE +/- %	5.56	0.41	72.41	- .	80.28	-6.54	60.58
KK-3A	0.039	9500	158	47.6	4.50	30.5	30.5
KK-3B	<0.038	5260	190	16	2.7	10	<9.6
CHANGE +/- %	2.54	44.43	20.21	66.39	40.00	37.70	68.52
KK-4A	<0.040	5950	129	29.5	4.92	21.5	17.3
KK-4B	0.060	8500	290	37	5.0	35	20
CHANGE +/- %	SO.00	42.06	124.81	29.42	1.43	.	15.61
KK-5A	0.054	7750	131	42.5	4.21	25.5	23.9
KK-5B	co.039	3000	340	17	66	10	120
CHANGE +/- %	27.70	61.29	159.	60.00	1467.70	29.41	402.09

Footnotes.
* = All total metals **concentrations** are in **expressed milligrams** per kilogram **(mg/kg).**
+ = An **"A" in** the sample designation indicates a **first** round sample; a **"B"** indicates a second round sample.

TABLE C-19. Total **Metals** Concentrations* in Soil Samples Collected at Camp Freedom, Kuwait

SAMPLE DBSIONATION'	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
CF-IA	4000	1.79	0.547	45000	<1.8	17.0	4420
CF-1B	4130	1.1	0.43	43000	<1.9	14	4100
CHANGE +/- %	3.25	38.55	21.38	4.44	5.56	17.65	7.24
CF-2A	3480	1.81	0.591	36200	<2.0	17.1	4060
CF-2B	2320	0.96	0.23	22000	x1.9	17	2700
CHANGE +/- %	33.33	48.96	61.08	39.13	5.00	-0.58	33.50
CF-3A	4380	2.25	0.758	45000	1.89	23.7	5400
CF-3B	4980	1.5	0.43	40000	2.5	24	6500
CHANGE +/- %	13.70	-33.33	-43.27	4.80	32.20	1.27	18.61
CF-IA	5510	1.95	0.799	47800	2.24	26.2	6300
CF-4B	4210	1.1	0.26	37000	<1.9	19	5000
CHANGE +/- %	-23.59	-43.59	-67.46	-22.59	-15.18	-27.48	-20.63
CF-5A	5620	2.22	0.771	43000	2.50	25.8	6130
CF-5B	3590	1.2	0.29	37000	<1.9	47	4500
CHANGE +/- %	-36.12	-45.95	-62.39	13.96	24.00	82.17	26.59
CF-6A	6610	20.4	15.7	40800	33.3	67.4	12700

SAMPLE DESIGNATION'	MERCURY	MAGNESIUM	SODIUM	NICKEL	LEAD	VANADIUM	ZINC
CF-IA	0.036	4830	135	19.9	11.3	26.1	15.9
CF-18	co.039	4500	210	15	6.7	16	12
CHANGE +/- %	a.33	6.03	55.86	24.62	40.71	38.70	24.53
CF-2A	<0.039	4720	172	23.2	8.31	13.7	13.0
CF-2B	co.030	3060	120	16	7.2	10	<9.6
CHANGE +/- %	-2.56	-35.17	-30.23	-31.03	-13.36	-27.01	-26.15
CF-3A	<0.038	6260	187	28.4	17.6	17.4	37.9
CF-3B	<0.037	7020	340	37	5.4	22	240
CHANGE +/- %	2.63	24.92	81.82	30.28	69.32	26.44	533.25
CF-4A	0.032	6040	223	34.4	11.6	20.0	29.4
CF-#B	CO.038	5550	200	28	4.7	18	11
CHANGE +/- %	18.75	18.86	10.31	18.60	59.48	10.00	62.59
CF-5A	<0.039	6300	231	31.4	11.4	20.4	27.7
CF-5B	0.030	5280	210	41	4.8	14	13
CHANGE +/- %	2.56	16.19	9.09	30.57	-17.89	31.37	13.07
CF-CA	49.4	2270	647	82.1	262	10.6	1210

Footnotes.
* = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).
t = An "A" in the sample designation indicates a first round sample; a "B" indicates a second round sample.

TABLE C-19. Total **Metals** Concentrations* **in Soil Samples** Collected at the **Military** Hospital, Kuwait

SAMPLE DESIGNATION+	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
HH-IA	4000	3.2	0.78	24000	<1.98	22.5	4500
MH-1B	5850	2.1	0.43	34000	<1.9	31	6900
CHANGE +/- %	37.25	-34.38	46.15	41.67	4.04	17.78	53.33
HH-IA	3400	3.9	0.39	19000	cl.96	12.5	3000
MH-2B	4840	1.6	0.39	24000	<2.0	22	5500
CHANGE +/- %	42.35	so.97	33.90	24.32	2.04	76.00	44.74
MH-3A	6700	5.0	1.19	40000	2.38	27.3	7500
MH-3 B	3120	1.5	0.22	15000	x2.0	13	3500
CHANGE +/- %	53.43	70.00	81.51	62.50	lb.97	52.38	53.33

SAMPLE DESIGNATION+	MERCURY	MAGNESIUM	SODIUM	NICKEL	LEAD	VANADIUM	ZINC
MH-1A	<0.04	4500	100	22.7	a.3	19.0	13.4
MH-1B	<0.036	7300	330	33	24	25	57
CHANGE +/- %	-5.00	64.00	230.00	45.37	189.16	31.58	325.37
MH-2A	<0.04	3200	40	15.7	4.9	19.6	<6.9
MH-2B	CO. 039	5060	240	23	7.7	10	62
CHANGE +/- %	-2.50	58.13	500.00	46.50	57.14	-8.16	798.55
MH-3A	<0.04	8200	110	19.8	11.0	31.7	18.6
MH-3B	x0.039	3300	120	14	4.9	12	42
CHANGE +/- %	2.50	-	9.09	- 0	-55.45	62.15	125.81

Footnotes.
* = All total **metals** concentratione are expressed in **milligrams** per **kilogram** (lag/kg).
+ = **An "A"** in **the sample designation** indicates a first round **sample;** a **"B"** indicates a second round **sample.**

TABLE C-20. Total Metals Concentration6 in Soil Samples Collected at Camp Thunderock, Doha, Kuwait

SAMPLE DESIGNATION*	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
CT-lb	4440	2.34	0.66	95200	<1.64	13.9	5040
CT-1B	2940	2.2	0.43	160000	3.7	17	3200
CHANGE +/- %	33.70	5.90	34.16	68.07	125.61	22.30	45.21
CT-2A	5520	2.69	0.71	155000	<1.77	17.5	7080
CT-28	4600	2.2	0.42	110000	3.4	23	5100
CHANGE +/- %	16.67	1m.22	40.95	29.03	92.09	31.43	27.97
CT-38	5810	2.50	0.71	131000	x1.77	30.5	6990
CT-38	6720	2.1	0.50	160000	4.2	36	7900
CHANGE +/- %	15.66	-16.00	-29.58	22.14	137.29	18.03	13.02
CT-#A	4150	2.61	0.55	183000	2.02	110	4070
CT-48	2910	2.4	0.53	190000	4.1	14	2900
CHANGE +/- %	-29.9a	8.05	3.64	3.83	102.97	87.27	- 1.65
CT-5A	3850	2.96	0.55	225000	<1.82	26.4	4180
CT-58	2990	2.2	0.43	200000	3.2	15	2900
CHANGE +/- %	23.34	25.68	21.02	11.11	75.82	- 8	- .62

SAMPLE DESIGNATION*	MERCURY	MAGNESIUM	SODIUM	NICKEL	LEAD	VANADIUM	ZINC
CT-1A	0.049	6870	559	24.9	2.74	21.6	11.1
CT-18	CO.038	3790	1300	18	7.3	20	24
CHANGE +/- %	-22.45	- 3	132.86	- .	166.42	- .	116.22
CT-2A	co.035	9170	878	35.8	3.40	34.3	15.4
CT-2B	<0.038	6770	23000	25	3.5	22	45
CHANGE +/- %	8.57	- 7	2519.59	30.17	2.94	31.67	192.21
CT-3A	0.035	8110	731	37.2	3.58	29.2	16.1
CT-38	<0. 039	9280	1400	40	4.0	36	80
CHANGE +/- %	11.43	14.43	91.52		7.53	11.73	23.29	396.89
CT-4A	co.037	0060	32110	51.7	<0.18	20.4	22.2
CT-48	co.039	3580	4900	18	3.0	10	53
CHANGE +/- %	5.41	-55.50	-04.74	-65.16	1566.67	-11.76	138.74
CT-5A	<0.036	7440	25455	25.5	1.6	18.2	14.9
CT-5B	<0.037	4510	13000	16	3.4	15	32
CHANGE +/- %	2.78	39.38	48.93	37.25	112.50	17.58	114.77

Footnotes.
* = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).
t = An "A" in the sample designation indicates a first round sample; a "B" indicates a second round sample.

TABLE c-21. Total **Metals** Concentrations' in Soil Samples Collected at the **U.S. Embassy,** Kuwait City, Kuwait

SAMPLE DESIGNATION*	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
EM-1A	4000	1.6	0.99	94000	2.77	30.1	6000
EM-1B	5570	2.0	0.48	94000	2.6	24	6700
CHANGE +/- %	16.04	23.08	51.52	0.00	6.14	20.27	il.67
EM-2A	5800	2.3	1.17	110000	3.11	114	7200
EM-2B	4900	1.6	0.41	68000	2.3	22	6100
CHANGE +/- %	15.52	30.43	64.96	38.18	26.05	80.70	15.28
EM-3A	3400	1.9	0.59	64000	1.96	15.9	3600
EH-3B	2600	0.88	0.27	74000	<1.9	10	2800
CHANGE +/- %	23.53	-53.68	-54.24	15.63	3.06	37.11	22.22
EM-4A	4300	0.50	0.80	110000	2.20	20.2	4700
EM-4B	5230	1.7	0.36	75000	2.7	22	6200
CHANGE +/- %	21.63	240.00	-55.00	-31.82	22.73	8.91	31.91

SAMPLE DESIGNATION*	MERCURY	MAGNESIUM	SODIUM	NICKEL	LEAD	VANADIUM	ZINC
EM-1A	0.04	6900	610	36.8	21.0	17.8	75.4
EM-1B	0.040	7190	880	25.8	20	21	76
CHANGE +/- %	0.00	7.10	44.26	54.89	4.76	17.98	0.80
EM-2A	0.04	8300	1000		37.0	22.7	109
EM-2B	<0.039	7020	770	32	26	20	66
CHANGE +/- %	-2.50	-15.48	-23.00	-	-	-	- 9.48
EM-3A		5500	560	16.7	33.0	11.8	32.7
EM-3B	<0.038	6190	690	9.8	11	12	11
CHANGE +/- %	-5.00	12.55	23.21	-41.32	-66.67	1.69	-66.36
EM-4A	<0.04	6900	1900	25.0	30.0	14.6	49.4
EM-4B	<0.038	7210	730	30	26	20	82
CHANGE +/- %	5.00	4.49	61.58	20.00	13.33	36.99	65.99

Footnotes.
* = All total metals concentration8 are expressed in milligrams per kilogram (mg/kg).
t = An "A" in the sample designation indicates a first round sample; a "B" indicates a second round sample.

TABLE C-22. Total **Metals** Concentrations' in Soil Samples Collected at Al **Ahmadi** Hospital, Kuwait

SAMPLE DESIGNATION*	ALUMINUM	ARSENIC	BERYLLIUM	CALCIUM	CADMIUM	CHROMIUM	IRON
AH-IA	4250	2.00	0.70	32600	x1.75	53.4	5650
AH-1B	3860	1.5	0.20	26000	X1.8	17	4700
CHANGE +/- %	0.18	25.00	60.00	20.2s	2.06	60.16	16.81
AH-2h	4400	2.52	0.96	33800	x1.92	16.9	0790
AH-2B	3200	1.4	0.25	26000	x2.0	13	4000
CHANGE +/- %	27.27	44.44	73.96	23.08	4.17	23.08	54.49
AH-3h	4100	2.14	0.69	34800	x1.72	6.78	5640
AH-3B	3260	i.6	0.39	30000	<1.9	16	4400
CHANGE +/- %	20.49	-2s.21	-43.48	-13.79	10.47	135.99	21.99

SAMPLE DESIGNATION*	MERCURY	MAGNESIUM	SODIUM	NICKEL	LBAD	VANADIUM	ZINC
AH-1A	0,035	7510	1068	40.4	45.3	21.4	26.0
AH-1B	0.092	5530	1600	24	4.4	20	18
CHANGE +/- %	162.96	-26.34	49.81	-40.59	-90.29	- -6.54	-30.77
AH-IA	0.038	6310	1637	29.6	31.2	28.8	82.1
AH-2B	0.039	5860	750	19	9.9	16	32
CHANGE +/- %	2.43	7.13	54.18	35.81	60.27	44.44	61.02
AH-3h	0.034	6930	3138	22.9	36.7	27.2	34.8
AH-38	*0.039*	6000	680	22	13	15	18
CHANGE +/- %	14.71	13.42	78.33	3.91	64.50	44.05	48.28

Footnotes.
• = **All** total metals concentrations are **expressed** in **milligrams** per kilogram **(mg/kg).**
t = *An* **"A"** in the sample designation indicates a first round sample! a **"B"** indicates a second round sample.

TABLE c-23. Total **Metals Concentrations*** in Soil Sample8 Collected in Saudi Arabia and Kuwait
Round 1

	ALUMINUM		ARSENIC		BERYLLIUM		CALCIUM		CADMIUM	
SITE	Wean	**95%UCI**	Wean	**95%UCI**	**Mean**	**95%UCI**	**Mean**	**95%UCI**	**Mean**	**95%UCI**
Khobar Tower8 Al Khobar, *Sh*	2480	3002.38	1.268	1.464	0.396	0.478	81700	123749.015	1.858	**2.497**
Camp 1 **Al** Jubayl, SA	2396	2807.068	1.484	1.694	0.425	0.409	51140	62043.415	1.818	2.254
Eskan Village **Riyadh, SA**	3428	3977.688	2.584	2.727	1.602	3.356	124400	156526.522	2.57	2.955
KKUC SA	6820	8496.654	3.456	3.992	1.14	1.438	84420	101358.607	3.94	5.018
Camp **Freedom/** Military Hospital Kuwait*	4636.25	5453.276	2.765	3.575	0.753	0.894	37600	44979.520	1.61	2.101
Camp Thunderock **Doha,** Kuwait	4754	5510.09	2.62	2.822	0.636	0.707	157840	201216.957	1.104	1.554
U.S. **Embassy** Kuwait City, Kuwait	4575	5556.224	1.647	2.604	0.867	1.132	94500	115753	2.51	3.024
Al Ahmadi Hospital Kuwait	4250.000	4419.741	2.220	2.524	0.783	0.957	33733.33	34979.814	0.898	0.959

Footnotes. See Page C- .

TABLE C-23. Total **Metals** Concentrations* in Soil **Samples** Collected in Saudi **Arabia** and Kuwait (continued) Round 1

	CHROMIUM		IRON		MERCURY		MAGNESIUM		SODIUM	
SITE	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI
Khobar Towers AA Khobar, SA	9.654	13.21	2952	3503.690	0.018	0.019	0420	10926.157	3043.6	10050.697
Camp **1** Al Jubayl, **SA**	9.04	13.389	3166	3630.157	0.019	0.02	8936	11790.093	3110.8	7105.951
Eskan Village **Riyadh,** SA	14.06	18.232	**5005**	5577.038	0.033	0.04	3188	3654.439	2140	3228.444
KKMC SA	24.66	29.836	8706	10906.48	0.029	0.044	7233	8103.713	360.2	021.078
Camp Freedom/ Military Hospital **Kuwait***	21.513	25.223	5273.75	6171.05	0.023	0.028	5606.25	6703.006	149.75	195.242
Camp Thunderock **Doha,** Kuwait	39.66	74.618	5812	6918.027	0.028	0.04	7430	8682.829	11953.6	25588.179
U.S. Embassy Kuwait City, Kuwait	45.05	90.473	5375	6906.593	0.035	0.045	6900	0020.233	1017.5	1625.436
Al Ahmadi Hospital Kuwait	25.693	53.443	6693.333	0748.075	0.036	0.038	6916.667	7595.756	1950.00	3159.973

Footnotes. See Page C- .

TABLE C-23. Total Metals Concentrations' in Soil Samples Collected in Saudi Arabia and Kuwait (continued) Round 1

	NICKEL		LEAD		VANADIUM		ZINC	
SITE	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI
Khobar Towers Al Khobar, SA	15.40	18.51	10.912	15.30	8.672	12.277	20.028	31.162
camp 1 Al Jubayl, SA	15.26	18.009	20.646	30.509	11.862	16.40	29	40.023
Eskan Village Riyadh, SA	19.36	22.753	10.324	15.655	16.98	18.088	17.14	21.776
KKMC SA	34.3	43.596	5.240	7.166	23.9	27.541	22.46	27.487
Camp Freedom/ Military Hospital Kuwait*	24.438	28.87	10.551	13.095	20.987	24.82	23.031	31,523
Camp Thunderock Doha, Kuwait	35.02	44.588	2.444	3.461	24.72	30.614	15.94	19.446
U.S. Embassy Kuwait City, Kuwait	33.75	50.669	30.25	36,915	16.725	21.309	66.625	99.227
Al Ahmadi Hospital Kuwait	30.967	40.958	37.733	45.775	25.800	30.206	47.633	01.776

Footnote&.
95%UCI = The upper value of the 95 percent confidence interval.
SA = Saudi Arabia.
KKMC = King Khalid Military City.
• = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).
t = Sampling data were combined for Camp Freedom and the Military Hospital.

TABLE C-24. Total Metals Concentrations' in Soil Samples Collected in Saudi Arabia and Kuwait
Round 2

	ALUMINUM		ARSENIC		BERYLLIUM		CALCIUM		CADMIUM	
BITE	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI	Mean	95%UCI
Khobar Towers Al Khobar, SA	2471.429	3015.331	1.094	1.305	0.094	0.097	57875.714	99136.718	3.286	3.778
Camp 1 Al Jubayl, SA	1560	1873.6	0.323	0.327	1.52	1.985	34000	47001.169	2.89	6.246
Eskan Village Riyadh, SA	3210	3516.759	2.157	2.71	0.49	0.541	132571.429	158933.097	1.929	2.408
KKMC Sh	3676.357	5701.131	1.816	2.624	0.464	0.595	78206.414	112375.313	2.257	2.886
Camp Freedom/ Mil itary Hospital Kuwait'	4163.636	4965.38	1.345	1.619	0.351	0.406	32000	38055.561	1.268	1.674
Camp Thunderock Doha, Kuwait	3786.333	5071.911	2.015	2.424	0.428	0.503	151666.667	106514.514	4.933	7.332
U.S. Embassy Kuwait City, Kuwait	4515	5515.877	1.547	1.842	0.398	0.462	85666.667	113006.93	2.225	2.748
Al Ahmadi Hospital Kuwait	3440.000	3852.998	1.500	1.613	0.307	0.390	27333.333	29946,667	0.950	1.007

Footnotes. See Page C- .

TABLE C-24, Total Metals Concentrations' in **Soil Samples** Collected in Saudi Arabia and Kuwait
(continued) Round 2

	CHROMIUM		IRON		MERCURY		MAGNESIUM		SODIUM	
SITE	**Mean**	**95%UCI**	Mean	**95%UCI**	**Mean**	**95%UCI**	Mean	**95%UCI**	Mean	**95%UCI**
~~Khobar Towers~~	~~12.986~~	~~15.01~~	~~2714.286~~	~~3275.917~~	~~0.051~~	0.066	8237.571	11257.794	2472.857	4553.601
Al Khobar, Sh										
Camp 1 Al Jubayl, SA	14.954	21.313	2204	2669.251	0.023	0.031	5000	6883.029	1046	2446.085
Eekan Village **Riyadh,** Sh	17.857	20.216	4714.286	5198.99	0.02	0.02	3031.429	3353.53	4445.714	6426.782
KKMC Sh	18.064	26.515	4957.043	7691.968	0.033	0.044	4889.214	6940.842	282.857	395.346
Camp Freedom/ Military Hospital Kuwait*	21.257	28.674	4845.455	5925.595	0.021	0.024	5176.364	6395.808	214.545	2T7.559
Camp **Thunderock Doha,** Kuwait	19.833	26.724	4133.333	5765.882	0.019	0.019	5195	7089.938	7376.667	14530.034
U.S. Embassy Kuwait City, Kuwait	19.667	24.127	5433.333	6747.817	0.023	0.03	6780	7327.492	811.667	1027.41
Al hhmadi Hospital Kuwait	15.333	17.609	4366.667	4764.074	0.057	0.091	i5796.667	6069.741	**1010.000**	1589.555

Footnotes. **See** Page **C-** .

TABLE C-24. Total **Metals Concentrations*** **in** Soil **Samples** Collected in Saudi Arabia and Kuwait
(continued) Round 2

	NICKEL		LEAD		VANADIUM		ZINC	
SITE	Wean	**95%UCI**	**Mean**	**95%UCI**	**Mean**	**95%UCI**	**Mean**	**95%UCI**
Khobar Towers Al Khobar, **SA**	21	23.566	8.286	9.846	10.5	13.692	38.857	49.338
camp **1** Al Jubayl, SA	9.65	15.661	11.874	16.365	7.05	9.828	15.196	21.499
Eskan Village **Riyadh,** SA	15	16.913	9.329	12.039	17.571	19.275	64.857	88.765
KKMC SA	15.657	23.636	12.664	30.144	17.986	24.965	39.464	75.066
Camp Freedom/ Military Hospital Kuwait'	24.082	31.422	8.336	12.065	17	20.643	47.345	87.084
Camp Thunderock **Doha,** Kuwait	22.333	29.713	4.4	5.689	20.833	27.243	51.667	69.09
U.S. Embassy Kuwait City, Kuwait	27.8	36.085	20.167	25.556	18.5	21.526	60.667	81.641
Al **Ahmadi** Hospital Kuwait	21.667	24.514'	9.100	14.029	17.000	19.994	22.667	31.813

Footnotes.
95%UCI = The upper value of the 95 percent confidence interval.
SA = Saudi Arabia.
KKMC = King Khalid Military City.
***** = All total metals concentrations are expressed in **milligrams** per kilogram **(mg/kg).**
+ = Sampling data were combined for Camp Freedom and the Military Hospital.

TABLE c-25. Change in Total Metals **Concentrations*** between Sampling Rounds
Khobar Towers, Al Khobar, Saudi Arabia

MEAN			
METAL	**ROUND 1**	**ROUND 2**	**CHANGE +/- %**
Aluminum	2488	2471.429	-0.67
Arsenic	1.268	1.094	-13.72
Beryllium	0.396	0.094	-76.26
Calcium	81780	57875.714	-29.23
Cadmium	1.858	3.286	76.86
Chromium	9.654	12.986	34.51
Iron	2952	2714.286	-8.05
Mercury	0.018	0.051	183.33
Magnesium	a420	8237.571	-2.17
Sodium	3843.6	**2472.857**	-35.66
Nickel	15.48	21	35.66
Lead	10.912	8.286	-24.07
Vanadium	8.672	10.5	21.08
Zinc	20.028	38.857	94.01
UPPER VALUE OF THE 95% CONFIDENCE INTERVAL			
Aluminum	3002.38	3015.331	0.43
Arsenic	1.464	1.305	-10.86
Beryllium	0.478	0.097	-79.71
Calcium	123749.015	89136.718	-27.97
Cadmium	2.497	3.778	51.30
Chromium	13.21	15.01	13.63
Iron	3583.698	3275.917	-a.59
Mercury	0.019	0.066	247.37
Magnesium	10926.157	11257.794	3.04
Sodium	10050.697	4553.601	-54.69
Nickel	la.51	23.566	27.31
Lead	15.38	9.846	-35.98
Vanadium	12.277	13.692	11.53
Zinc	31.162	49.338	58.33

Footnote.
* = All total metals concentrations are expressed in milligrams **per** kilogram **(mg/kg).**

TABLE C-26. Change in Total Metals Concentrations*
between Sampling Rounds
Camp 1, Al Jubayl, Saudi Arabia

MEAN			
METAL	ROUND 1	ROUND 2	CHANGE +/- %
Aluminum	2396	1560	-34.89
Arsenic	1.484	0.323	-78.23
Beryllium	0.425	1.52	257.65
Calcium	51140	34000	-33.52
Cadmium	1.818	2.89	58.97
Chromium	9.04	14.954	65.42
Iron	3186	2204	-30.82
Mercury	0.019	0.023	21.05
Magnesium	8936	5000	-44.05
Sodium	3110.8	1046	-66.38
Nickel	15.26	9.65	-36.76
Lead	20.646	11.874	-42.49
Vanadium	11.862	7.05	-40.57
Zinc	29	15.196	-47.60
UPPER VALUE OF THE 95% CONFIDENCE INTERVAL			
Aluminum	2807.068	1873.6	-33.25
Arsenic	1.694	0.327	-80.70
Beryllium	0.489	1.985	305.93
Calcium	62043.415	47001.169	-24.24
Cadmium	2.254	6.246	177.11
Chromium	13.389	21.313	59.18
Iron	3620.157	2669.251	-26.27
Mercury	0.02	0.031	55.00
Magnesium	11798.893	6883.029	-41.66
Sodium	7185.951	2446.085	-65.96
Nickel	18.009	15.661	-13.04
Lead	30.509	16.365	-46.36
Vanadium	16.48	9.828	-40.36
Zinc	40.023	21.499	-46.28

Footnote.
* = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).

TABLE C-27. Change **in Total** Metals Concentrations*
between Sampling Rounds
Eskan Village, Riyadh, Saudi **Arabia**

MEAN			
METAL	**ROUND 1**	**ROUND 2**	**CHANGE +/-** %
Aluminum	3428	3210	-6.36
Arsenic	2.584	2.157	-16.52
Beryllium	1.602	0 . 4 9	-69.41
Calcium	124400	132571.429	6.57
Cadmium	2.57	1.929	-24.94
Chromium	14.86	17.857	20.17
Iron	5005	4714.286	**-5.81**
Mercury	0.033	0.02	-39.39
Magnesium	3188	3031.429	-4.91
Sodium	2140	4445.714	107.74
Nickel	**19.36**	15	-22.52
Lead	10.324	9.329	-9.64
Vanadium	16.98	17.571	3.48
Zinc	17.14	64.857	278.40
UPPER **VALUE** OP **THE** 95% **CONFIDENCE INTERVAL**			
Aluminum	3977.688	3516.759	-11.59
Arsenic	2.727	2.71	-0.62
Beryllium	3.356	0.541	-83.88
Calcium	158526.522	158933.097	0.26
Cadmium	2.955	2.408	**-18.51**
Chromium	18.222	20.216	10.94
Iron	5577.038	5198.99	-6.78
Mercury	0.04	0.02	-50.00
Magnesium	3654.439	3353.53	-a.23
Sodium	3288.444	6426.782	99.07
Nickel	22.753	16.913	-25.67
Lead	15.655	12.039	-23.10
Vanadium	18.088	19.275	6.56
Zinc	21.776	88.765	307.63

Footnote.
* = All total metals concentrations are **expressed** in milligrams per kilogram **(mg/kg).**

TABLE C-28. Change in Total Metals Concentrations*
between Sampling Rounds
King Khalid Military Village, Saudi Arabia

MEAN			
METAL	ROUND 1	ROUND 2	CHANGE +/- %
Aluminum	6820	3676.357	-46.09
Arsenic	3.456	1.816	-47.45
Beryllium	1.14	0.464	-59.30
Calcium	a4420	78286.414	-7.27
Cadmium	3.94	2.257	-42.72
Chromium	24.86	18.064	-27.34
Iron	8706	4957.843	-43.05
Mercury	0.029	0.033	13.79
Magnesium	7233	4889.214	-32.40
Sodium	380.2	282.857	-25.60
Nickel	34.3	15.657	-54.35
Lead	5.248	12.664	141.31
Vanadium	23.9	17.986	-24.74
Zinc	22.46	39.464	75.71
UPPER VALUE OF TEE 95% CONFIDENCE INTERVAL			
Aluminum	8496.654	5701.131	-32.90
Arsenic	3.992	2.624	-34.27
Beryllium	1.438	0.595	-58.62
Calcium	101358.687	112375.313	10.87
Cadmium	5.018	2.886	-42.49
Chromium	29.836	26.515	-11.13
Iron	10986.48	7691.969	-29.99
Mercury	0.044	0.044	0.00
Magnesium	8503.753	6940.842	-18.38
Sodium	821.878	395.346	-51.90
Nickel	43.596	23.636	-45.78
Lead	7.166	30.144	320.65
Vanadium	27.541	24.965	-9.35
Zinc	27.487	75.066	173.10

Footnote.
* = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).

TABLE C-29. Change in Total **Metals** Concentrations*
between Sampling Rounds
Camp Freedom and the Military Hospital, Kuwait

MEAN			
METAL	**ROUND 1**	**ROUND 2**	-GE **+/-** %
Aluminum	4636.25	4163.636	-10.19
Arsenic	2.765	1.345	-51.36
Beryllium	0.753	0.351	-53.39
Calcium	37600	32000	**-14.89**
Cadmium	1.61	1.268	-21.24
Chromium	21.513	21.257	-1.19
Iron	5273.75	4845.455	-8.12
Mercury	0.023	0.021	-8.70
Magnesium	5606.25	5176.364	-7.67
Sodium	149.75	214.545	**43.27**
Nickel	24.438	24.082	-1.46
Lead	10.551	8.336	-20.99
Vanadium	20.987	17	-19.00
Zinc	23.031	47.345	105.57
UPPER **VALUE** OF **THE** 95% **CONFIDENCE INTERVAL**			
Aluminum	5453.276	4965.35	-8.95
Arsenic	3.575	1.619	-54.71
Beryllium	0.894	0.406	-54.59
Calcium	44979.528	38055.561	-15.39
Cadmium	2.101	1.674	-20.32
Chromium	25.223	28.674	**13.68**
Iron	6171.85	5925.595	-3.99
Mercury	0.028	0.024	-14.29
Magnesium	6703.806	6395.808	-4.59
Sodium	195.242	267.559	37.04
Nickel	28.87	31.422	**8.84**
Lead	13.095	12.065	-7.87
Vanadium	24.82	20.643	-16.83
Zinc	31.523	**87.074**	176.26

Footnote.
• = All total metals concentrations are expressed in milligrams per kilogram **(mg/kg).**

TABLE C-30. Change in Total Metals Concentrations* between Sampling Rounds Camp Thunderock, Doha, Kuwait

MEAN			
METAL	ROUND 1	ROUND 2	CHANGE +/- %
Aluminum	4754	3788.333	-20.31
Arsenic	2.62	2.015	-23.09
Beryllium	0.636	0.428	-32.70
Calcium	157840	15166.667	-3.91
Cadmium	1.104	4.933	346.83
Chromium	39.66	19.833	-49.99
Iron	5812	4133.333	-28.88
Mercury	0.028	0.019	-32.14
Magnesium	7430	5195	-30.08
Sodium	11953.6	7376.667	-38.29
Nickel	35.02	22,333	-36.23
Lead	2.444	4.4	80.03
Vanadium	24.72	20.833	-15.72
Zinc	15.94	51.667	224.13
UPPER VALUE OF THE 95% CONFIDENCE INTERVAL			
Aluminum	5510.89	5071.911	-7.97
Arsenic	2.822	2.424	-14.10
Beryllium	0.707	0.503	-28.85
Calcium	201216.957	186514~514	-7.31
Cadmium	1.554	7.332	371.81
Chromium	74.618	26.724	-64.19
Iron	6918,027	5765.882	-16.65
Mercury	0.04	0.019	-52.50
Magnesium	8682.829	7089.938	-18.35
Sodium	2588.179	14560.034	-43.22
Nickel	44.588	29.713	-33.36
Lead	3.461	5.689	64.37
Vanadium	30.614	27.243	-11.01
Zinc	19.446	69.89	259.41

Footnote.
• = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).

TABLE C-31. Change in Total Metals Concentrations*
between Sampling Rounds
U.S. Embassy, Kuwait City, Kuwait

METAL	ROUND 1	ROUND 2	CHANGE +/- %
MEAN			
Aluminum	4575	4515	-1.31
Arsenic	1.647	1.547	-6.07
Beryllium	0.887	0.398	-55.13
Calcium	9450.0	85666.667	-9.35
Cadmium	2.51	2.225	-11.35
Chromium	45.05	19.667	-56.34
Iron	5375	5433.333	1.09
Mercury	0.035	0.023	-34.29
Magnesium	6900	6780	-1.74
Sodium	1017.5	811.667	-20.23
Nickel	33.75	27.8	-17.63
Lead	30.25	20.167	-33.33
Vanadium	16.725	18.5	10.61
Zinc	66.625	60.667	-8.94
UPPER VALUE OF THE 95% CONFIDENCE INTERVAL			
Aluminum	5556.224	5515.877	-0.73
Arsenic	2.604	1.842	-29.26
Beryllium	1.132	0.462	-59.19
Calcium	115753	113006.93	-2.37
Cadmium	3.024	2.748	-9.13
Chromium	90.473	21.127	-73.33
Iron	6906.593	6747.817	-2.30
Mercury	0.045	0.03	-33.33
Magnesium	8020.233	7327.492	-8.64
Sodium	1625.436	1027.41	-36.79
Nickel	50.669	36.085	-28.78
Lead	36.915	25.556	-30.77
Vanadium	21.309	21.526	1.02
Zinc	99.227	81.641	-17.72

Footnote.
* = All total metals concentrations are expressed in milligrams per kilogram (mg/kg).

TABLE C-32. Metals that had a Statistically Significant Increase in Concentration Between Rounds 1 and 2

SAUDI ARABIA	
SITE	METALS
Khobar Towers, Al Khobar	Cadmium Chromium Mercury Nickel Zinc
Camp 1, Al Jubayl	Beryllium
Eskan Village, Riyadh	Zinc
King Khalid Military City	None
KUWAIT	
Camp Freedom	None
Military Hospital	Zinc
Camp Thunderock, Doha	Cadmium Zinc
U.S. Embassy, Kuwait City	None
Al Ahmadi Hospital	None

TABLE C-33. KHOBAR TOWERS
Round 3 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
DA1-C	2400	2.4	0.38	16000	2.3	15	6300	0.019	23000	3400	18	6.4	13	35
DA2-C	2600	1.9	0.36	17000	1.8	13	2600	0.018	15000	4700	24	5.4	14	24
DA3-C	2000	1.6	0.2	74000	1	11	2100	0.02	6000	220	10	4.3	4.95	13
DA4-C	1700	1.2	0.19	59000	0.95	61	2100	0.019	5300	260	42	9.4	4.75	22
DA5-C	1600	0.75	0.195	56000	1	31	1900	0.0195	5600	390	20	4.5	4.9	21
MEAN	2.06E+03	1.57E+00	2.65E-01	4.44E+04	1.41E+00	2.62E+01	3.00E+03	1.91E-02	1.10E+04	1.79E+03	2.28E+01	6.00E+00	8.32E+00	2.30E+01
STD	4.34E+02	6.34E-01	9.62E-02	2.64E+04	6.11E-01	2.10E+01	1.86E+03	7.42E-04	7.85E+03	2.11E+03	1.19E+01	2.07E+00	4.74E+00	7.91E+00
95% UC	2.77E+03	2.61E+00	4.23E-01	8.78E+04	2.41E+00	6.08E+01	6.06E+03	2.03E-02	2.39E+04	5.27E+03	4.23E+01	9.41E+00	1.61E+01	3.60E+01

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-34. **MILITARY** HOSPITAL
Round 3 **Soils** Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	M	PR	V	ZN
MH-1-C	2600	2.4	0.2)	30000	1	13	3400	0.02	5000	200	27	4.7	15	27
MH-2-C	2100	2.6	0.185	24000	1	66	2900	0.0185	3300	140	43	4.5	15	10
MH-3-C	3700	0.18	0.018	44000	0.9	19	4800	0.018	6700	180	30	6	22	23
MEAN	2.80E+03	1.73E+00	7.27E-02	3.27E+04	9.67E-01	3.27E+01	3.70E+03	1.88E-02	5.00E+03	1.73E+02	3.33E+01	5.07E+00	1.73E+01	2.00E+01
STD	8.19E+02	1.34E+00	1.11E-01	1.03E+04	5.77E-02	2.90E+01	9.85E+02	1.04E-03	1.70E+03	3.06E+01	8.50E+00	8.14E-01	4.04E+00	8.89E+00
95% UCL	4.15E+03	3.94E+00	2.55E-01	4.95E+04	1.06E+00	8.04E+01	5.32E+03	2.05E-02	7.80E+03	2.24E+02	4.73E+01	6.41E+00	2.40E+01	3.46E+01

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-35, CAMP **THUNDROCK**
Round **3 Soils** Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	M	PB	V	ZN
CT-1-C	2500	1.5	0.18	93000	0.9	21	3200	0.018	5100	12000	25	4.4	18	16
CT-2-C											64			29
CT-3-C	4900	4.7 3	0.39 0.36	100000	2.3 2.5	93	5700	0.018	15000	36000		4.4	31	
						160	7300	0.0195	22000	65000	100	9.4	34	53
CT-2-C	2200	4.3	0.2	76000	1	86	4300	0.02	6700	26000	58	3.9	21	21
MEAN	3.43E+03	3.38E+00	2.83E-01	9.98E+04	1.68E+00	9.00E+01	5.13E+03	1.89E-02	1.22E+04	3.48E+04	6.18E+01	5.53E+00	2.60E+01	2.98E+01
STD	1.29E+03	1.45E+00	1.08E-01	2.25E+04	8.42E-01	5.68E+01	1.77E+03	1.03E-03	7.84E+03	2.24E+04	3.07E+01	2.59E+00	7.70E+00	1.64E+01
9 5 % **UCL**	5.55E+03	5.75E+00	4.60E-01	1.37E+05	3.06E+00	1.83E+02	8.04E+03	2.06E-02	2.51E+04	7.17E+04	1.12E+02	9.79E+00	3.87E+01	5.67E+01

Note-1/2 the **detection limit entered** for below **detection** limit **samples**

TABLE C-36. **KHOBAR** TOWERS
Round 4 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
DA **OVR COMP**	2990	1.59	0.633	85200	0.1205	16.9	20101	0.05	7340	1690	19.5	39.9	14.8	27.8
DA **15SUB**	3100	1.20	0.612	66300	0.0718	17.8	24001	0.05	4880	496	19.2	37.3	12.7	21.9
MEAN	3.05E+03	1.44E+00	6.23E-01	7.58E+04	9.62E-02	1.74E+01	2.21E+03	5.00E-02	6.11E+03	1.09E+03	1.94E+01	3.86E+01	1.38E+01	2.49E+01

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-37. CAMP 1
Rcud4SdbDat.a

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
AJ11	3550	1.03	0.66	67000	0.0721	19.11	2880	0.05	5720	1590	23.21	46.2	15.3	46.3
AJ TL COM	3460	0.2551	0.633	76500	0.0302	20.7	2980	0.05	6720	1510	24.3	51.6	16.6	45.8
MEAN	3.51E+03	6.43E-01	6.47E-01	7.18E+04	5.12E-02	1.99E+01	2.93E+03	5.00E-02	6.22E+03	1.55E+03	2.38E+01	4.89E+01	1.60E+01	4.61E+01

Note -1/2 the detection limit entered for below detection limit samples

TABLE C-38. **ESKAN** VILLAGE
Round 4 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MC	NA	NI	PB	V	ZN
ESKAN TOTAL CMP	1670	2.31	0.5051	37800	0.012751	9.5	1800	0.05	a471	135	11.91	22.61	7.47	12.1
R15 SUB STE CMP	4460	2.45	0.718	151000	0.03571	20.6	3690	0.05	2220	4760	24.2	46	16.61	23.7
MEAN	3.07E+03	2.38E+00	6.12E-01	9.44E+04	2.42E-02	1.51E+01	2.75E+03	5.00E-02	1.53E+03	2.45E+03	1.81E+01	3.43E+01	1.20E+01	1.79E+01

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-39. CAMP FREEDOM
Round 4 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
CF COMPOS CF 12	4880	1.52	0.455	31000	0.041	18.5	2780	0.05	2930	273	22.61	34.6	14.8	25.4
				24300	0.05	14.5		0.05	2780	114	18.5	29.4	11.1	19.3
MEAN	4.06E+03	1.40E+00	4.29E-01	2.77E+04	4.60E-02	1.65E+01	3.31E+03	5.00E-02	2.86E+03	1.94E+02	2.06E+01	3.21E+01	1.30E+01	2.24E+01

Note - 1/2 the detection limit entered for below detection limit samples

TABLE **C-40. MILITARY HOSPITAL**
Round 4 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
MH 11SUB	7190	3.18	0.561	29000	0.0455	23.1	4880	0.05	4200	260	25.1	38.5	21.71	40.9
MH COMPOS	5730	2.851	0.5331	22600	0.0259	19.41	4040	0.05	2890	121	19.11	30.7	23.3	18.7
MEAN	6.46E+03	3.02E+00	5.47E-01	2.58E+04	3.57E-02	2.13E+01	4.46E+03	5.00E-02	3.55E+03	1.91E+02	2.21E+01	3.46E+01	2.25E+01	2.98E+01

Note - 1/2 the detection Limit entered for below detection limit samples

TABLE C-41. U.S. EMBASSY, **KUWAIT**
Round 4 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
EM **14SUB**	5490	1.68	0.718	140000	0.091	24.8	3940	0.05	3980	974	33.6	76.8	16.5	64.7
EM **COMPOSITE**	5930	1.44	0.567	101000	0.051	25.5	4160	0.05	4160	686	34.21	62.6	17.6	53.4
MEAN	5.71E+03	1.56E+00	6.43E-01	1.21E+05	7.10E-02	2.52E+01	4.05E+03	5.00E-02	4.07E+03	8.30E+02	3.39E+01	6.97E+01	1.71E+01	5.91E+01

Note - 1/2 the detection limit catered for below detection limit **samples**

TABLE C-42. CAMP THUNDEROCK
Round 4 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
CT TISUB	5960	3.44	0.674	136000	0.037	23.2	4050	0.05	4080	16200	30.1	53.2	20.2	30.9
					0.036	26.9		0.05		2750	34.6	56.6	22.2	27.5
MEAN	5.84E+03	3.28E+00	6.72E-01	1.46E+05	3.65E-02	2.51E+01	3.78E+03	5.00E-02	4.28E+03	9.48E+03	3.24E+01	5.49E+01	2.12E+01	2.92E+01

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-43. AL **AHMADI HOSPITAL**
Round 4 Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
AH **12SUB**	10050	3.78	0.765	43300	0.061		6610	0.05	6580	403	43.2	62.8	31.5	
AH **COMPOS**	7260	1.7)	0.609	32000	0.039	36.31	5190	0.05	4640	477	32.91	52	24.71	49.3 33.5
MEAN	8.66E+03	2.74E+00	6.87E-01	3.77E+04	4.80E-02	3.12E+01	5.90E+03	5.00E-02	5.61E+03	4.40E+02	3.81E+01	5.74E+01	2.81E+01	4.14E+01

Note -1/2 tho detection limit entered for below detection limit samplea

TABLE C-44. **KHOBAR** TOWERS
Round 4 **Soils Data - Depth Profile**

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
DA11 0-6"	3690	1.13	0.505	65700	0.0512	18.6	2720	0.05	4530	192	20	37.5	13.7	19.8
DA11 6-12	3560	1.45	0.457	51800	0.0302	18.68	2630	0.05	3750	268	19.2	32.8	12.9	17
DA11 1-2'	3030	1.12	0.408	51000	0.01275	17.3	2250	0.05	3260	249	16.8	30.6	11.3	15.4
DA11 2-3'	4190	1.18	0.503	53300	0.0307	20.9	2900	0.05	4160	302	20.2	34.9	14.1	18.1

Nots - 1/2 the detection limit entered for below detection limit samples

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
AJ14 0-6"	3140	0.92	0.606	43400	0.0357	17.4	2780	0.05	4070	178	19.1	33.8	13.3	26.8
AJ14 6-12"	2680	0.98	0.51	36500	0.0878	16.1	2450	0.05	2960	193	16	27.3	11.4	16.9
AJ14 1-2'	1530	0.85	0.459	26800	0.035	10.1	1390	0.05	2060	185	10.9	19.5	7.04	11.5
AJ14 2-3'	2080	0.89	0.503	36700	0.01255	12.3	1810	0.05	2310	260	14	23.3	8.89	12.5

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-46. **MILITARY HOSPITAL**
Round 4 **Soils** Data - Depth Profile

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
MH11 0-6"	3820	2.9	0.457	**19100**	0.025	13.3	**2860**	0.05	2350	731	**13.4**	23.1	18.8	13.8
MH11 6-12	**3850**	2.7	0.503	**18700**	0.029	13.7	2930	0.05	2190	126	**14.4**	24	19.3	**13.9**
MH11 1-2	**5380**	3.62	**0.553**	22700	0.025 I	**18.1**	3950	0.05	**3090**	350	20	29	22.6	17.2
MH11 2-3'	5260	3.14	**0.515**	22400	0.047	**16.7**	3760	**0.05**	3010	285	17.2	30.1	21.3	**15.6**

Note - **1/2 the detection limit entered** for below **detection** limit **samples**

TABLE C-47. CAMP FREEDOM
Round 4 Soils Data - Depth Profile

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	Ni	PB	V	ZN
CF11 1-2'	5960	1.17	0.556	44100	0.051	24.7	4620	0.05	4160	181	32.3	43.5	18.6	25.8
CF11 0-6"	3600	0.816						0.05	2730	126	22.6	29.2	12.7	18.6
CF11 2-3'	4060	1.01	0.408	34000	0.05	17.9	3190	0.05	2560	107	23.7	28	12.6	15.2
							2990							

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-48. U.S. EMBASSY, KUWAIT
Round 4 Soils Data - Depth Profile

	AL	As	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
EM13 0-6"	7760	1.65	0.612	69900	0.067	30.6	5370	0.05	4780	440	39.4	66.7	21.3	64.8
EM13 6-12"	5340	1.85	0.57	95300	0.072	23.8	3710	0.05	3820	663	30.1	53.5	16.6	44.1
EM13 1-2'	4320	0.725	0.556	141000	0.088	20.3	2740	0.05	3380	1020	25.7	52.6	14	31.8
EM13 2-3'	2460	2.18	0.515	160000	0.0467	15.3	1540	0.05	2230	1190	19.6	45.5	10	22.5

Note - 1/2 the detection limit entered for below detection limit samples

TABLE C-49. CAMP THUNDEROCK
Round 4 **Soils Data -** Depth **Profile**

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
CT13 0-6"	7840	3.32	0.838	**133000**	0.0307	34	5350	0.05	**6430**	8860	45	**64**	28	36.4
CT13 0-12"	**6790**	3.2	0.755	**104000**	**0.067**	32.9	5190	0.05	7050	**5020**	43	58.3	22.7	**32.9**
CT13 l-2'	7450	2.81	0.671	62300	0.03	**34.8**	**5720**	*0.05*	7150	**3890**	42.7	54.6	22.3	31.9
CT13 **2-3'**	7770	2.47	0.663	39308	0.051	**33.9**	**5840**	**0.087**	**6460**	**1840**	42.2	**48**	22.2	28.7

Note - 1/2 the detection limit **enterd** for below **detection limit samples**

TABLE C-50. **KHOBAR** TOWERS
Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
DA-1A	2930	1.14	0.345	65900	1.69	10.3	3250	0.017	9110	1090	17.7	6.36	12.2	17.4
DA-1B	2800	1.2	0.09	65000	2.9	15	3100	0.092	7800	550	26	11	13	24
DA-2A	3160	1.63	0.555	165000	2.96	16.1	3670	0.0185	12200	16500	18.3	19.5	12.8	36.2
DA-2B	3400	1.6	0.065	13000	3.8	16	3500	0.052	13000	6900	23	10	16	46
DA-3A	2060	1.34	0.362	59800	0.95	7.84	2500	0.019	7230	721	13.2	8.85	4.8	8.99
DA-30	1300	0.67	0.095	110000	3.5	8.9	1500	0.039	13000	2600	15	6.5	4.85	38
DA-4A	1750	1.12	0.315	43600	1.57	5.19	2000	0.0155	4420	253	10.5	6.65	3.95	7.55
DA-4B	1800	0.83	0.095	52000	2.4	10	2000	0.037	5100	300	19	5.7	4.65	30
DA-5A	2540	1.11	0.364	74600	1.92	8.84	3140	0.019	9140	654	17.7	11.2	9.61	30
DA-6%	2300	0.92	0.095	56000	3	12	2500	0.038	6700	580	22	6.2	10	34
DA1-C	2400	2.4	0.38	160000	2.3	15	6300	0.019	23000	3400	18	6.4	13	35
DA2-C	2600	1.9	0.36	170000	1.8	13	2600	0.018	15000	4700	24	5.4	14	24
DA3-C	2000	1.6	0.2	74000	1	11	2100	0.02	6000	220	10	4.3	4.95	13
DA4-C	1700	1.2	0.19	59000	0.95	61	2100	0.019	5300	260	42	9.4	4.75	22
DAS-C	1600	0.75	0.195	56000	1	31	1900	0.0195	5600	390	20	4.5	4.9	21
MEAN	2.29E+03	1.31E+00	2.51E-01	8.16E+04	2.13E+00	1.61E+01	2.82E+03	2.95E-02	9.51E+03	2.61E+03	1.98E+01	6.26E+00	8.90E+00	2.58E+01
STD	8.15E+02	4.49E-01	1.48E-01	4.76E+04	9.51E-01	1.38E+01	1.17E+03	2.05E-02	5.01E+03	4.32E+03	7.69E+00	3.84E+00	4.33E+00	1.12E+01
95% UCL	2.57E+03	1.51E+00	3.18E-01	1.03E+05	2.56E+00	2.23E+01	3.38E+03	3.88E-02	1.16E+04	4.57E+03	2.33E+01	1.00E+01	1.09E+01	3.09E+01

Note: **1/2** the **detection limit used for below detection limit samples.**

TABLE **C-51. CAMP** 1
Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
AJ-1A	3060	1.48	0.55	48900	1.65	14.5	3830	0.0185	6910	813	16.8	28.4	13.5	43.2
AJ-1B	2000	0.325	2.1	32000	0.95	26.7	2550	0.019	4800	350	19	14	10	26.7
AJ-2A	1980	1.53	0.398	71000	1.98	10.4	2940	0.02	13500	11400	16.5	16.2	9.86	34.1
AJ-2B	1700	0.32	2.1	60000	0.95	17	2970	0.0185	8700	3900	15	19.8	11	17.4
AJ-3A	2540	1.59	0.392	53900	2.35	9.98	3510	0.0195	7270	1690	19	35.4	11.5	35.2
AJ-3B	1100	0.32	1.1	24000	0.95	8.87	1760	0.019	3200	280	4.7	8.98	4.7	8.68
AJ-4A	1910	1.09	0.398	42400	1	8.92	2560	0.02	5800	784	11.7	16.4	4.95	20.8
AJ-4B	1700	0.33	1.2	26000	9.7	12	1880	0.039	4300	450	4.85	6.95	4.85	12.4
AJ-5A	2490	1.73	0.384	39500	1.91	10.4	3090	0.019	11200	867	12.3	7.39	19.4	12.7
W-69	1300	0.32	1.1	28000	1.9	10.2	1860	0.019	4000	250	4.7	9.68	4.7	10.8
MEAN	1.98E+03	9.04E-01	9.72E-01	4.26E+04	2.35E+00	1.29E+01	2.70E+03	2.12E-02	6.97E+03	2.08E+03	1.25E+01	1.63E+01	9.46E+00	2.22E+01
STD	5.91E+02	6.32E-01	6.79E-01	1.58E+04	2.64E+00	5.49E+00	7.09E+02	6.29E-03	3.33E+03	3.45E+03	5.63E+00	9.39E+00	4.82E+00	1.20E+01
95% UCL	2.32E+03	1.27E+00	1.37E+00	5.17E+04	3.88E+00	1.61E+01	3.11E+03	2.48E-02	8.90E+03	4.08E+03	1.58E+01	2.18E+01	1.22E+01	2.92E+01

Note: 1/2 the detection limit entered for below detection limit samples.

TABLE C-52. **ESKAN** VILLAGE
Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
R-1A	3700	2.52	0.777	93000	2.33	16.5	5140	O.O195	3200	1450	20.4	6.63	16.7	11.7
R-1B	2520	1.5	0.49	150000	2.2	14	4200	O.O195	2520	4600	12	4	15	58
R-2A	3610	2.37	0.765	105000	1.91	11.7	5450	0.038	2820	458	21.4	19.1	16.1	14.3
R-28	3000	2.5	0.62	140000	2.1	22	5400	0.019	2670	1400	14	11	18	51
R-3A	3320	2.54	0.599	129000	2.8	15.8	4750	0.04	2750	3660	16.8	14.3	15.6	14.6
R-38	3050	2.6	0.53	150000	2.4	15	4300	0.0195	2630	4800	15	12	16	110
R-4A	2420	2.71	0.518	190000	2.94	10.4	4015	0.035	3090	2180	14.2	5.53	17.8	24.7
R-4B	3420	1.6	0.41	130000	2.3	19	4800	0.0195	3120	7000	16	11	19	32
R-5A	4090	2.78	0.687	105000	2.67	19.9	5670	0.034	4080	2930	24	5.86	18.7	20.4
R-5B	3130	1.3	0.46	68000	1	15	3800	0.02	3690	220	12	4.3	15	110
MEAN	3.23E+03	2.24E+00	5.86E-01	1.26E+05	2.29E+00	1.59E+01	4.75E+03	2.25E-02	3.06E+03	2.67E+03	1.66E+01	9.39E+00	1.68E+01	4.47E+01
STD	5.17E+02	5.51E-01	1.26E-01	3.46E+04	5.66E-01	3.59E+00	6.55E+02	1.45E-02	4.99E+02	2.16E+03	4.08E+00	4.94E+00	1.49E+00	3.77E+01
95% UCL	3.53E+03	2.56E+00	6.59E-01	1.46E+05	2.61E+00	1.80E+01	5.13E+03	3.00E-02	3.35E+03	4.12E+03	1.89E+01	1.23E+01	1.77E+01	6.65E+01

Note: **1/2** the **detection limit entered for below detection limit samples.**

TABLE C-53. KKMC
Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MC	NA	NI	PB	V	ZN
KK-1A	4830	3.25	0.8	53700	2.58	18.1	6010	0.016	6820	1280	21.3	9.06	20.6	16.5
KK-1B	1630	1.7	0.38	29000	1.9	7.5	2300	0.038	4440	500	4.7	3.9	10	4.7
KK-2A	5700	3.21	0.906	93300	3.62	22.3	7360	0.018	6145	203	30.6	3.55	21.4	24.1
KK-2B	3750	2.9	0.53	96000	2	18	5200	0.038	6170	350	16	6.4	20	4.75
KK-3A	9140	3.7	1.57	86200	5.68	31.9	12100	0.039	9500	158	47.6	4.5	30.5	30.5
KK-3B	3860	0.81	0.52	100000	2.1	15	4900	0.019	5260	190	16	2.7	18	4.8
KK-4A	5850	2.75	0.995	106000	3.18	22.5	7260	0.02	5950	129	29.5	4.92	21.5	17.3
KK-4B	8890	2.7	0.78	93000	3.8	34	12000	0.06	8500	290	37	5	35	20
KK-5A	8590	4.37	1.43	82900	4.64	29.5	10800	0.054	7750	131	42.5	4.21	25.5	23.9
KK-5B	3950	1.6	0.43	100000	2.6	30	5600	0.0195	3000	340	17	66	18	120
MEAN	5.62E+03	2.70E+00	8.34E-01	8.40E+04	3.21E+00	2.29E+01	7.35E+03	3.22E-02	6.35E+03	3.57E+02	2.62E+01	1.10E+01	2.21E+01	2.67E+01
STD	2.54E+03	1.06E+00	4.07E-01	2.42E+04	1.24E+00	8.47E+00	3.28E+03	1.60E-02	1.92E+03	3.45E+02	1.35E+01	1.94E+01	6.96E+00	3.40E+01
95% U C L	7.09E+03	3.32E+00	1.07E+00	9.80E+04	3.93E+00	2.78E+01	9.26E+03	4.14E-02	7.46E+03	5.57E+02	3.41E+01	2.23E+01	2.61E+01	4.64E+01

NOTE: 1/2 the detection limit entered for **below detection limit samples.**

TABLE C-54. MILITARY **HOSPITAL/CAMP** FREEDOM
Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
MH-1A	4000	3.2	0.76	24000	O.99	22.5	4500	0.02	4500	100	22.7	6.3	19	13.4
MH-1B	5850	2.1	0.42	34000	0.95	31	6900	0.019	7360	330	33	24	25	57
MH-2A	3400	3.9	0.59	19000	0.98	12.5	3800	0.02	3200	40	15.7	4.9	19.6	3.45
MH-2B	4840	1.6	0.39	24000	1	22	5500	0.0195	5060	240	23	7.7	16	62
MH-3A	6700	5	1.19	40000	2.38	27.3	7500	0.02	6200	110	19.8	11	31.7	18.6
MH-3B	3120	1.5	0.22	15000	1	13	3500	O.O195	3300	120	14	4.9	12	42
Ml-t-1-C	2600	2.4	0.2	30000	1	13	3400	0.02	5000	200	27	4.7	15	27
MH-2-C	2100	2.6	0.195	24000	1	66	2900	0.0185	3300	140	43	4.5	15	10
MH-3-C	3700	3.6	0.18	44000	0.9	19	4800	0.018	6700	180	30	6	22	23
CF-1A	4000	1.79	0.547	45000	0.9	17	4420	0.036	4830	135	19.9	11.3	26.1	15.9
CF-1B	4130	1.1	0.43	43000	0.95	14	4100	0.0195	4500	210	15	6.7	16	12
CF-2A	3480	1.81	0.591	36200	1	17.1	4060	0.0195	4720	172	23.2	6.31	13.7	13
CF-2B	2320	0.96	0.23	22000	0.95	17	2700	0.019	3060	120	16	7.2	10	4.8
CF-3A	4360	2.25	0.758	45800	1.89	23.7	5480	0.019	6260	187	26.4	17.6	17.4	37.9
CF-3B	4960	1.5	0.43	48000	2.5	24	6500	0.165	7820	340	37	5.4	22	240
CF-4A	5510	1.95	0.799	47800	2.24	26.2	6300	0.032	6840	223	34.4	11.6	20	29.4
CF-4B	4210	1.1	0.28	37000	0.95	19	5000	0.019	5550	200	28	4.7	16	11
CF-5A	5620	2.22	0.771	43000	2.5	25.8	6130	0.0195	6300	231	31.4	11.4	20.4	27.7
CF-5B	3590	1.2	0.29	37000	0.95	47	4500	0.038	5280	210	41	4.8	14	13
CF-SA	6610	20.4	15.7	40800	33.3	67.4	12700	49.4	2270	647	62.1	262	10.6	1210
MEAN	4.26E+03	3.11E+00	1.25E+00	3.50E+04	2.87E+00	2.62E+01	5.23E+03	2.50E+00	5.20E+03	2.07E+02	2.92E+01	2.14E+01	1.83E+01	9.36E+01
STD	1.32E+03	4.20E+00	3.41E+00	1.04E+04	7.19E+00	1.59E+01	2.20E+03	1 .10E+01	1.68E+03	1.27E+02	.51 E+01	5.69E+01	5.42E+00	2.68E+02
95% UCL	4.77E+03	4.73E+00	2.57E+00	3.90E+04	5.65E+00	3.24E+01	6.09E+03	6.77E+00	5.85E+03	2.56E+02	3.51E+01	4.33E+01	2.04E+01	1.97E+02

Nolo: **1/2** the **detection limit** entered for below detection **limit samples**.

TABLE C-55. U.S. EMBASSY, KUWAIT
Kuwait Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
EM-1A	4800	2.6	0.99	94000	2.77	30.1	6000	0.04	6900	610	36.8	21	17.8	75.4
EM-1B	5570	2	0.46	94000	2.8	24	6700	0.04	7390	880	35	20	21	76
EM-2A	5800	2.3	1.17	110000	3.11	114	7200	0.04	8300	1000	56.5	37	22.7	109
EM-2B	4900	1.6	0.41	68000	2.3	22	6100	0.0195	7020	770	32	26	20	66
EM-3A	3400	1.9	0.59	64000	1.96	15.9	3600	0.04	5500	560	16.7	33	11.8	32.7
EM-3B	2600	0.88	0.27	74000	0.95	10	2800	0.019	6190	690	9.8	11	12	11
EM-4A	4300	0.5	0.8	110000	2.2	20.2	4700	0.02	6900	1900	25	30	14.6	49.4
EM-4B	5230	1.7	0.36	75000	2.7	22	6200	0.019	7210	730	30	26	20	82
MEAN	4.58E+03	1.69E+00	5.10E-01	8.81E+04	2.32E+00	3.23E+01	5.41E+03	2.97E-02	6.93E+03	8.93E+02	3.02E+01	2.55E+01	1.75E+01	6.27E+01
STD	1.10E+03	6.99E-01	3.54E-01	1.83E+04	6.62E-01	3.35E+01	1.55E+03	1.10E-02	6.25E+02	4.31E+02	1.41E+01	8.18E+00	4.18E+00	3.07E+01
95% UCL	5.31E+03	2.15E+00	7.47E-01	9.84E+04	2.77E+00	5.47E+01	6.45E+03	3.71E-02	7.48E+03	1.18E+03	3.97E+01	3.10E+01	2.03E+01	8.33E+01

Note: 1/2 thedetection limite ntered for below detection limit samples.

TABLE C-56. CAMP **THUNDEROCK**
Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
CT-1&	4440	2.34	0.66	95200	0.82	13.9	5640	0.049	6870	559	24.9	2.74	21.6	11.1
CT-18	2940	2.2	0.43	160000	3.7	17	3200	0.019	3790	1300	16	7.3	20	24
CT-U	5520	2.69	0.71	155000	0.865	17.5	7080	0.0175	9170	678	35.8	3.4	34.2	15.4
CT-2B	4600	2.2	0.42	110000	3.4	23	5100	0.019	6770	23000	25	3.5	22	45
CT-3A	5810	2.5	0.71	131000	0.685	30.5	6990	0.035	8110	731	37.2	3.58	29.2	16.1
CT-3B	6720	2.1	0.5	160000	4.2	36	7900	0.0195	9280	1400	40	4	36	80
CT-4A	4150	2.61	0.55	183000	2.02	110	4970	0.0165	8060	32110	51.7	0.09	20.4	22.2
CT-48	2910	2.4	0.53	190000	4.1	14	2900	0.0195	3580	4900	18	3	18	53
CT-5A	3850	2.96	0.55	225000	0.91	26.4	4180	0.016	7440	25455	25.5	1.8	18.2	14.9
CT-SB	2990	2.2	0.43	200000	3.2	15	2900	0.0165	4510	13000	16	3.4	15	32
CT-1-C	2500	1.5	0.18	93000	0.9	21	3200	0.018	5100	12000	25	4.4	18	16
CT-2-C	4100	4.7	0.36	130000	2.3	93	5700	0.018	15000	36000	64	4.4	31	29
CT-3-C	4900	3	0.39	100000	2.5	160	7300	0.0195	22000	65000	100	9.4	34	53
CT-2-C	2200	4.3	0.2	76000	1	86	4300	0.02	6700	26000	58	3.9	21	21
MEAN	4.12E+03	2.69E+00	4.73E-01	1.43E+05	2.20E+00	4.74E+01	5.11E+03	2.16E-02	8.31E+03	1.73E+04	3.85E+01	3.91E+00	2.42E+01	3.09E+01
STD	1.33E+03	8.56E-01	.64E-01	4.56E+04	1.32E+00	4.59E+0 t	1.74E+03	9.14E-03	4.88E+03 t	.87E+04	2.33E+01	2.24E+00	7.1 E+00 t	.99E+0 t
95% UCL	4.75E+03	3.10E+00	5.50E-01	1.65E+05	2.83E+00	6.91E+01	5.94E+03	2.60E-02	1.06E+04	2.62E+04	4.95E+01	4.97E+00	2.76E+01	4.03E+01

Note: **1/2** the **detection limit** entered **for** below detection **limit samples.**

TABLE C-57. AL AHMADI HOSPITAL
Soils Data

	AL	AS	BE	CA	CD	CR	FE	HG	MG	NA	NI	PB	V	ZN
AH-1A	4250	2	0.7	32600	0.875	53.4	5650	0.035	7510	1068	40.4	45.3	21.4	26
AH-1B	3860	1.5	0.28	26000	0.9	17	4700	0.092	5530	1600	24	4.4	20	18
AH-2A	4400	2.52	0.98	33800	0.98	16.9	6790	0.038	6310	1637	29.6	31.2	28.8	82.1
AH-28	3200	1.4	0.25	26000	1	13	4000	0.039	5860	750	19	9.9	16	32
AH-3A	4100	2.14	0.69	34800	0.86	6.78	5840	0.034	6930	3138	22.9	36.7	27.2	34.8
AH-3B	3260	1.6	0.39	30000	0.95	16	4400	0.039	6000	680	22	13	15	18
MEAN	3.85E+03	1.86E+00	5.45E-01	3.05E+04	9.24E-01	2.05E+01	5.53E+03	4.62E-02	6.36E+03	1.48E+03	2.63E+01	2.34E+01	2.14E+01	3.52E+01
STD	5.09E+02	4.34E-01	2.82E-01	3.86E+03	5.44E-02	1.66E+01	1.73E+03	2.26E-02	7.37E+02	9.09E+02	7.72E+00	1.65E+01	5.67E+00	2.40E+01
95% UCL	4.26E+03	2.22E+00	7.77E-01	3.37E+04	9.69E-01	3.41E+01	6.95E+03	6.47E-02	6.96E+03	2.23E+03	3.27E+01	3.70E+01	2.61E+01	5.49E+01

Note: 1/2 the **detection limit entered for below detection limit samples.**

rounds 1 and 2. The one possible exception is the lead data that seems to have increased at almost all the sites. This finding mirrors the air data, and may be reflective of an increase in vehicular traffic and subsequent emissions of lead. The depth profiles from all the sites for all the metals are also very similar with increasing depth. This may indicate some stability of pollutants over time, with increasing depths being representative of older material.

(4) To help resolve the chromium species issues and more clearly define the health risk associated with Chromium, during the return trip soil samples collected during the return trip were from the same sites where they had been collected in 1991, with the exception of KKMC. The soil samples were analyzed in the field using a Hach Hexavalent Chromium Field Test Kit (see Appendix E, Annex E-20, for details of the methodology, QA/QC method validation studies, and analytical results). The field analysis was necessary to overcome the short analytical holding time for $Cr+^{6}$ that prevented it's analysis during the first trip. Seventy-six soil samples were analyzed in the field for $Cr+^{6}$ with a detection limit of 100 parts per billion (ppb). All sample results were below the 100 ppb detection limit.

b. Organic Results. The soil samples analysis for semi-volatile organics revealed the presence of very few target compounds. On those rare occasions when detections of target analytes occurred they were usually phthalates [i.e., bii (2-ethylhexly) phthalate or di-n-octyl phthalate], which are common laboratory contaminants; they were also usually found in the method blanks. There were considerable detections of tentatively identified compounds (TICs). The most common of these (1,1-dimethylethylhydroperoxide and 3-hexene-2,5-dione) were also detected in the method blanks and were attributed to residues of solvents and solvent preservatives used in the extraction procedure. Various types of hydrocarbon TICs were detected (i.e., alkyl hydrocarbons, alkanes, carboxylic acids, and phthalates). These hydrocarbon TICs (straight and branched-chain), with concentrations ranging from ppb to tens of parts per million (ppm), were probably derived from petroleum (i.e., burning and/or gushing. oil and industrial activities). There was one detection of 2-methyl-1,3,5-trinitro-benzene in a sample at the U.S. Embassy in Kuwait City at an estimated concentration of 4 ppm. This compound was not found during soil sampling round 2 at this site or at any other site. Because there were virtually no detections of target semivolatile analytes in soil, and those detected were also found in the method blank and/or were common laboratory contaminants, there were no organics in soil to select as contaminants of concern. This situation is not totally surprising considering the harsh environmental conditions in the region for organic chemical survival. The high temperature, particularly on the desert floor, and the high level of ultraviolet radiation will contribute to the breakdown of semi-volatile organic compounds. In addition, from the low levels of these compounds detected in the air sampling [i.e., nanograms (1E-9) per cubic meter of air), one would not expect to find any appreciable levels of semivolatile organics in the soil. Other contributing factors to the absence of these compounds in the soil environment are the high winds and loose soil matrix which causes the dispersion and dilution of these potentially labile chemicals, and the lack of adequate adsorption/absorption sites on sand particles. The soil samples from round 3 reflected the results from rounds 1 and 2. For this reason, the soil samples collected during the return trip (round 4) were not analyzed for semivolatile organics.

5. CONCLUSIONS.

a. There is no consistent increase in soil metals concentrations between sampling rounds at the monitoring sites in Kuwait and Saudi Arabia.

b. The few increases in metals concentrations that occurred were mainly for metals not associated with Kuwait crude oil and are therefore probably not fire related, but of natural or anthropogenic background.

c. There were very few semivolatile target analytes detected in soil samples at the monitoring sites in Kuwait and Saudi Arabia. When detections occurred they were related to common laboratory contaminants and usually were also present in the laboratory method blanks.

d. There were considerable detections of TICs, but the most common of these were also associated with the method blank and attributed to solvent residues. There were some hydrocarbon TICs detected at the monitoring sites that could be attributed to the oil fires and/or industrial activities.

e. There were no semivolatile organics detected in soil selected as contaminants of concern. This was due to the extremely small number of detections of target analytes and because those detected were considered laboratory co[redacted].

f. There were no detections of Cr^{+6} in 76 soil samples analyzed in the field, using a Hach Hexavalent Chromium Field Test Kit, with a detection limit of 100 ppb.

g. There were no apparent increases in metals levels with increasing depth, from soil borings conducted in Kuwait and Saudi Arabia;

JACK M. HELLER Ph.D.
Master Consultant
Environmental Scientist
Waste Disposal Engineering Division

APPROVED:

Jessie B. Caballero, LTC, MS
for ARTHUR P. LEE
MAJ, MS
Chief, Health Risk Assessment Branch
Waste Disposal Engineering Division

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO ATTENTION OF

HSHB-ME-SR

PROTOCOL
HEALTH RISK ASSESSMENT STUDY NO. 39-22-L192-93
SOIL SAMPLING IN KUWAIT AND SAUDI ARABIA
FOR DETERMINATION OF SPECIES OF CHROMIUM
15-30 SEPTEMBER 1993

1. PURPOSE. As part of a multimedia environmental sampling effort to assess the health risk from oil fires to U.S. troops involved in Operation Desert Storm soil samples were collected to determine the risk from-the dermal and ingestion routes of exposure. To further define the potential carcinogenic risk and remove uncertainty the species of chromium (i.e., trivalent or hexavalent) in the soil will be determined.

2. GENERAL.

a. Background.

(1) In response to concerns for the health of the troops exposed to smoke and residues from the burning oil wells in Kuwait the U.S. Army Surgeon General, as lead for the Tri-Service working group, has tasked the U.S. Army Environmental Hygiene Agency (USAEHA) to perform a health risk assessment on the impact of the oil well fires on DOD troops.

(2) To continue meeting this objective the following protocol is presented that will describe the methodology for

collecting soil samples that'will be used to refine the dermal and ingestion routes of exposure to chromium in the health risk assessment. The data obtained from the soil sampling effort will be combined with the air monitoring data to perform a final comprehensive health risk assessment that will evaluate all pathways/routes of exposure.

b. Exposed Populations. The teams mandate is to assess the exposure and subsequent risk to DOD troops and civilians. Therefore our sampling will continue to be concentrated at locations where troops were stationed. Sampling locations will therefore duplicate the sites that were sampled during the first trip.

c. contaminants of Concern, Soil samples are being collected to refine the exposure to and potential health risk from chromium (trivalent and hexavalent), Therefore sampling will be concentrated on this particular contaminant. Although chromium is the primary focus of this trip, a portion (5 from each site) of the samples will also be analyzed for the same suite of metals as the first trip (see Table 1). This will serve as an indicator of the current level of soil metals now that the region is functioning in a normal mode.

TABLE 1. METALS ANALYSIS FOR SOIL SAMPLES

METAL	LIMIT OF QUANTITATION (mg/kg)
Aluminum	50.0
Arsenic	0.2
Beryllium	0.2
Calcium	10.0
cadmium	2.0
Iron	10.0
Mercury	0.04
Magnesium	50.0
Sodium	20.0
Nickel	10.0
Lead	0.2
Vanadium	10.0
Zinc	4.0

d. Analytical Support. Samples collected in the field will be analyzed in the field using a Hach Kit designed for hexavalent chromium in soil. Analysis is being conducted in the field due to the instability of hexavalent chromium in the environment and its short holding time (i.e., 24 hours in water). Split samples will be returned to USAEHA for laboratory analysis of total chromium, with subsequent determination of trivalent chromium by the difference between total chromium and hexavalent chromium. In addition, a portion of the samples from each site will be analyzed for the same suite of metals as was done for the samples from the first trip.

3. SAMPLING CONCEPT. The following describes the approach that will be used to conduct the soil sampling:

a. Sampling. At each troop concentration area where samples were previously collected 15 to 25 new soil samples will be

collected. They will be discrete surface samples collected from the 100 yard by 100 yard subsites where samples were collected during the first trip. Discrete samples will be collected, as compared to composites for *the first* phases of sampling, because mixing subsamples to form composites might alter the chromium constituents of the sample thru oxidation. This method of collection will give a good representation of the contaminants the troops were exposed to during their stay at each site. Surface soil samples represent what troopswould be exposed to by the dermal and ingestion routes better than core samples. The depth of sampling is best determined in theater on a site by site basis. This will be dependant on how hard the soil matrix is at each site. If the soil is very hard and compact the troops would only be exposed to the top 1 or 2 centimeters, depending of course on what task the soldier was performing. However, if the soil is very soft and sandy the depth of exposure would be much greater (i.e., 2 to 4 inches or more). Therefore, sampling depth will be determined on a site by site basis following observation of the soil matrix by the sampling team. Some modification of the above sampling procedures may have to be implemented on a site by site basis depending on existing conditions. These changes will all be noted and explained in a sample log book. In addition to the surface samples, three 4 to 5 foot soil/sand borings will be conducted at each site. These borings will give a representation of the historical pattern of metals deposition

at each site. Each boring will be analyzed at one foot intervals, except for the top foot that will be analyzed at six inch intervals.

b. Sample Collection Methodology. Once the soil collection parameters have been determined for the specific site (i.e., sample depth and number of samples per site) the 15 to 25 surface sample and 3 boring locations will be selected. These sample locations will be within the previously selected 100 yard by 100 yard locations within the troop areas. Samples will be collected in pre-cleaned 16 ounce bottles with Teflon lined lids. Samples will be collected with disposable plastic scoops and/or spatulas to avoid metal contamination from the sampling equipment and cross contamination between sampling sites. Location of surface samples and borings within the sample site will be selected at random. Sample bottles will be labeled with pertinent information (i.e., identification number, sample type, date and time, location, name of collector) and placed in ice chests for shipment to the laboratory. At the same time the glass bottle is being filled for laboratory analysis, a plastic bag will be filled with sand/soil from the exact same sample location for field chromium analysis.

c. Sampling Locations. Locations selected for sampling were based on their proximity to where large concentrations of U.S. troops and DOD civilians were located for extended periods of

time during and after the war [Figures 1 and 2 (see Appendix A) an Table 23. The only exception to this was the Ahmadi Hospital site that was selected due to it's close proximity to the fires (less than 400 meters) and it's use by other agencies including the EPA, Harvard School of public Health and the Kuwait Environmental Protection Division. This site can be used to compare near-source soil data with that collected from sites at varying distances from the fires. In addition to sites selected for sampling, Table 2 also contains sample locations within each site. Figures 3 through 12 (see Appendix) show the locations of the individual sample sites within the larger sampling locations.

TABLE 2. SUMMARY OF PROJECT SAMPLING LOCATIONS

Sample Site Location	Sampling sub-site
Khobar Towers Al Khobar, SA	1. 600 yards southwest of main gate
	2. North end of soccer field west of Bldg. 414
	3. Parking area closest to southwest gate (due west of Bldg. 305)
	4. Due west of Bldg. 133, southeast of rear gate
	5. Around Bldg. 207
Camp 1 Al Jubayl, SA	1. camp Command Post (Office 1 Complex)
	2. Around Wastewater Treatment Plant, east corner of camp
	3. Around transformers near Bldg. 910 A, on southeast side of camp
	4. Volleyball court area, south corner of camp
	5. Recreation Center 3 around Bldg. 912 A

TABLE 2. SUMMARY OF PROJECT SAMPLING LOCATIONS (CONTINUED)

Sample Site location	Sampling sub-site
Eskan Village Riyadh, SA	1. Army side. Bldg. B5-09, physical training area 2. AF side, median strip across from (Army side) Bldgs. 432 and 433 3. AF side, median and sidevalk strip opposite Bldg. 425 4. Army side Vadi, near C Street gate 5. AF side, play area by Villa 2-16
KKMC Laboratory SA	1. Field vest of PM laboratory trailer (Padgett Laboratory) 2. Hardball intersection near Hotel Panza 3. POMCUS site at King Khalid Military City 4. 2nd AD (P), 2nd ACR, site near 22nd SUP COM Support Center 5. East of caterer site for 3rd AD BIVOUAC, near KKMC
Camp Freedom Kuwait	1. Southvest side of camp, across from helipad 2. South side of camp, near outside wall 3. Due south of mosque 4. Strip south of Bldg. F1006 5. Strip south of Bldg. 2008
Military Hospital Kuwait	1. East of hospital, vest of temporary helipad, almost directly betveen hospital and helipad 2. Southeast of mosque 3. South and east of permanent helipad, on vest side of hospital
Camp Thunderock Doha, Kuvait	1. Near road to entertainment city, tast of camp. directly vest of road, in line with south perimeter of camp 2. Directly east of camp, between camp and CT-1A/1B sampling location, in lint vith south perimeter of camp 3. East of camp, vest of road to entertainment city, in line vith north perimeter of camp 4. In line with old recreation area, nov no mans land due to ammo storage explosion 5. In line vith old recreation area, nov no mans land due to ammo storage explosion

See footnotes on page 8.

TABLE 2. SUMMARY OF PROJECT SAMPLING LOCATIONS (CONTINUED)

Sample Site Location	Sampling Sub-Site
U.S. Embassy K.C., Kuwait	1. Between volleyball court and pool building 2. Between volleyball court, playground equipment, and camp perimeter 3. Behind guard house, between guard house and Arabian Gulf St. 4. Behind Ambassadors House, between house and camp perimeter
Al Ahmadi Hospital Kuwait	1. North of parking area 2. West of parking area 3. East of parking area

SA - Saudi Arabia.
KKMC - King Khalid Military City.
K.C. - Kuwait City.

d. Quality Assurance/Quality Control (QA/QC). QA/QC measures for sampling and analysis must be followed to support any conclusions regarding risk drawn from this study. The following standard QA/QC procedures will be implemented throughout this study; chain of custody, spiked samples in the laboratory, duplicate samples (10 percent), split samples (5 percent), sample collection information (see paragraph c. above), sample preservation (cooling to 4 degrees C), and holding time (6 months for total metals, except for hexavalent chromium which will be analyzed in the field).

4. The point of contact for this information is Dr. Jack M. Heller, Waste Disposal Engineering Division, DSN 584-3651 or commercial (301) 671-4651. Additional information may be directed to MAJ William E. Legg, Chief, Health Risk Assessment Branch, at DSN 584-2953 or commercial (410) 671-2953.

JACK M. HELLER, Ph.D.
Master Consultant
Health Risk Assessment Branch
Waste Disposal Engineering Division

APPROVED:

WILLIAM E. LEGG
MAJ, MS
Kuwait Task Force Leader

APPENDIX A

SAMPLING LOCATION MAPS

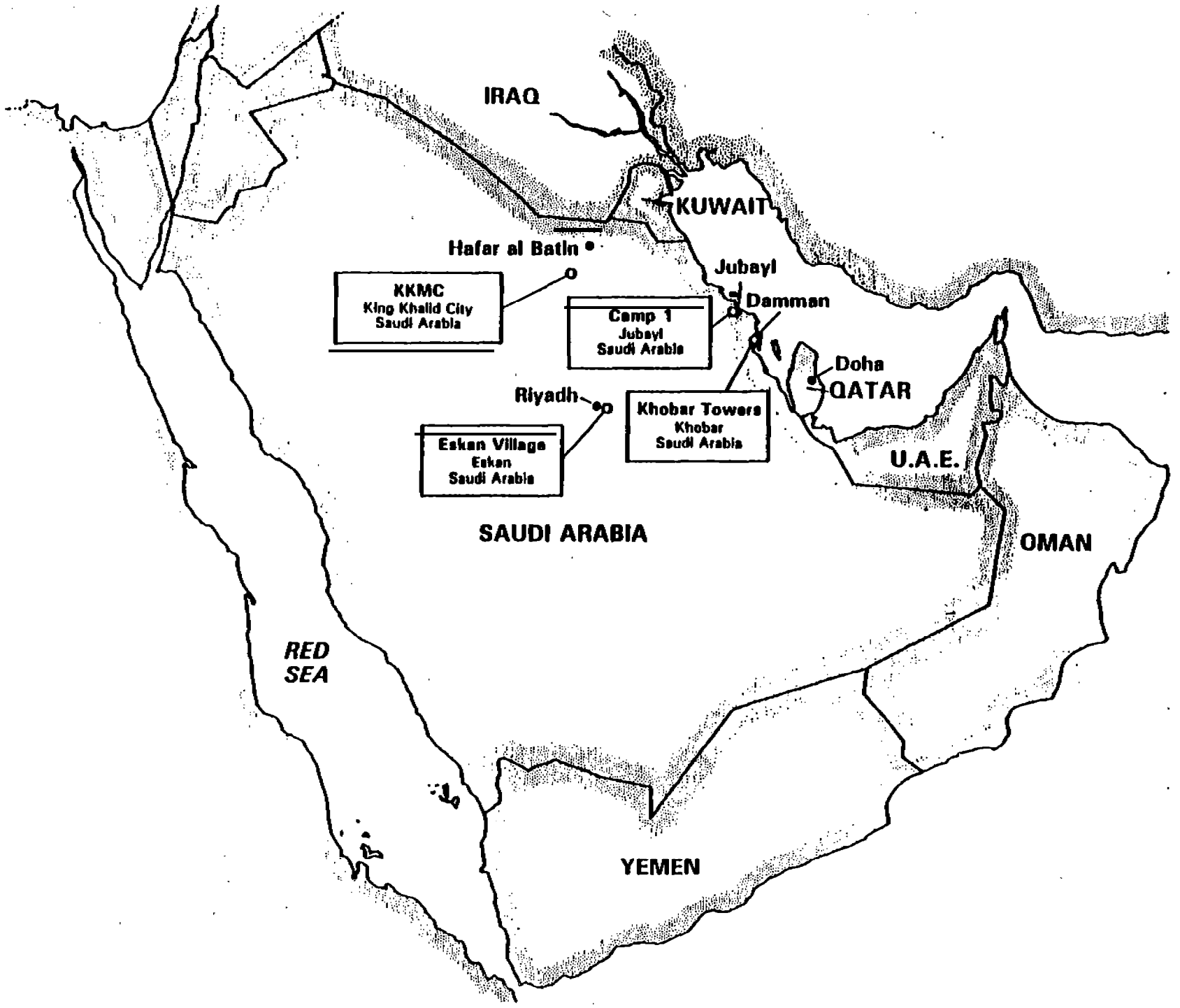


Figure 1. Soil Sampling Sites in Saudi Arabia

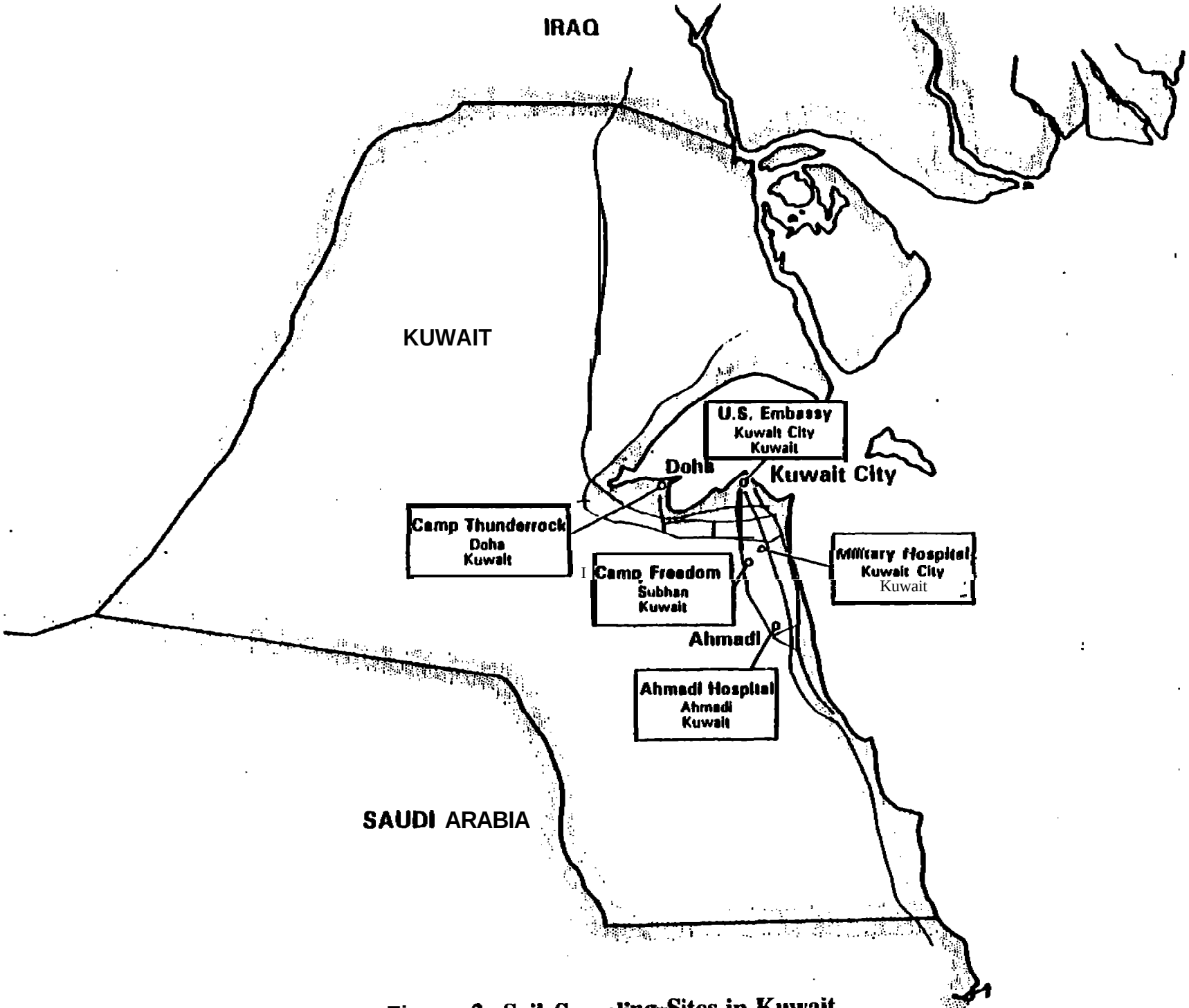


Figure 2. Soil Sampling Sites in Kuwait.

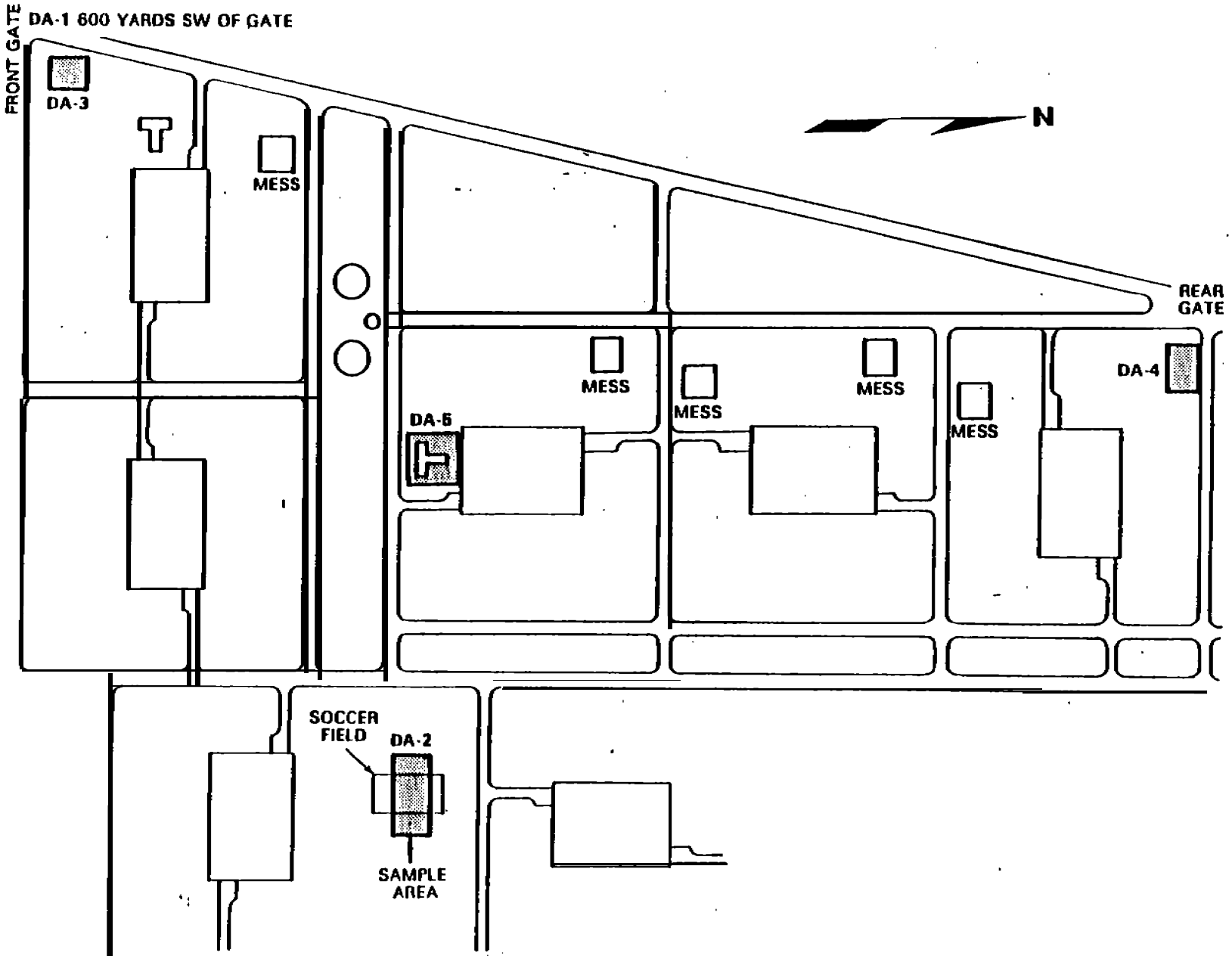


Figure 3. Soil Sampling Locations, Kobar Towers, Daharan, Saudi Arabia.

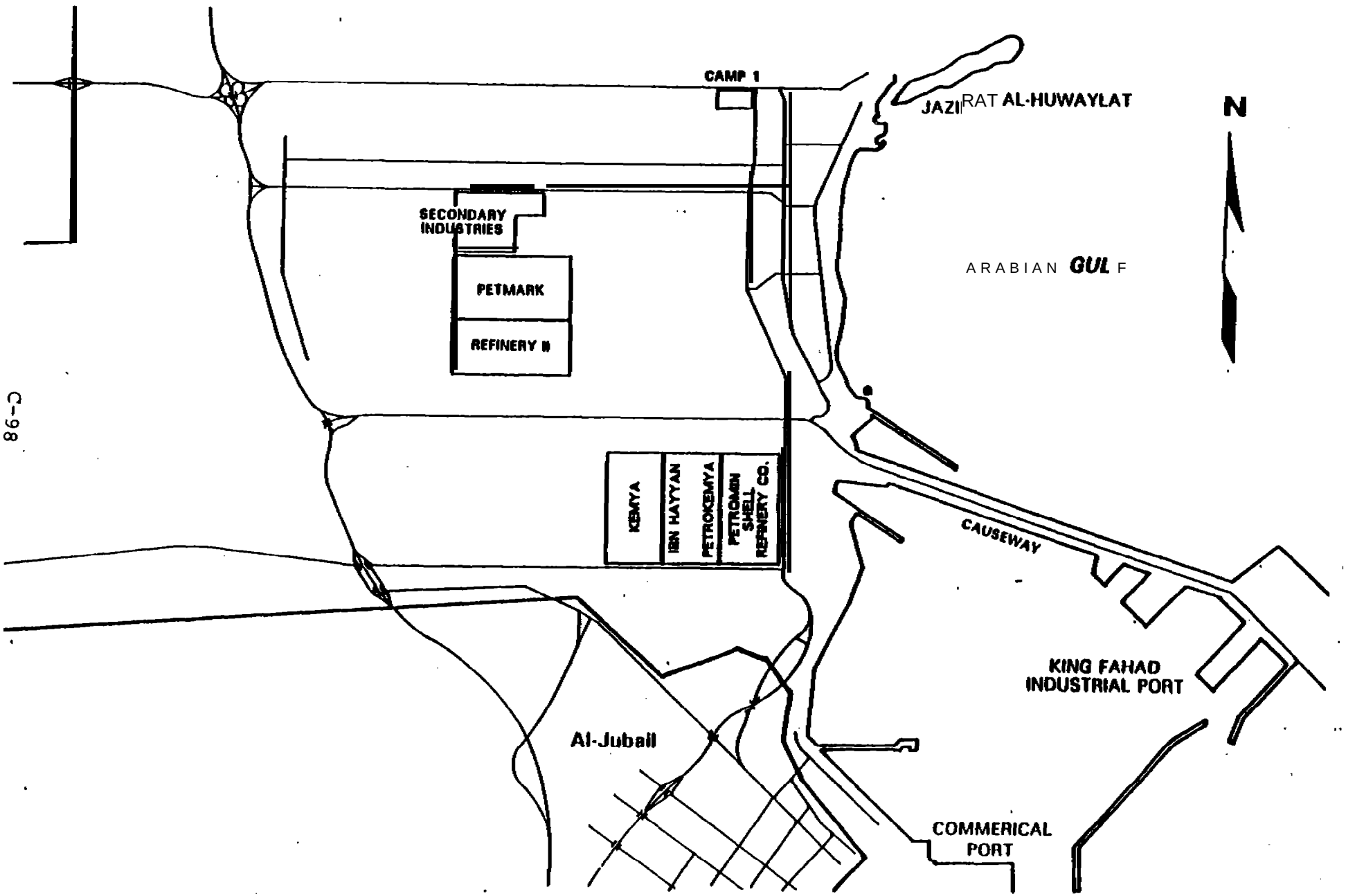


Figure 4 . Location of Camp 1, Al Jubail, Saudi Arabia.

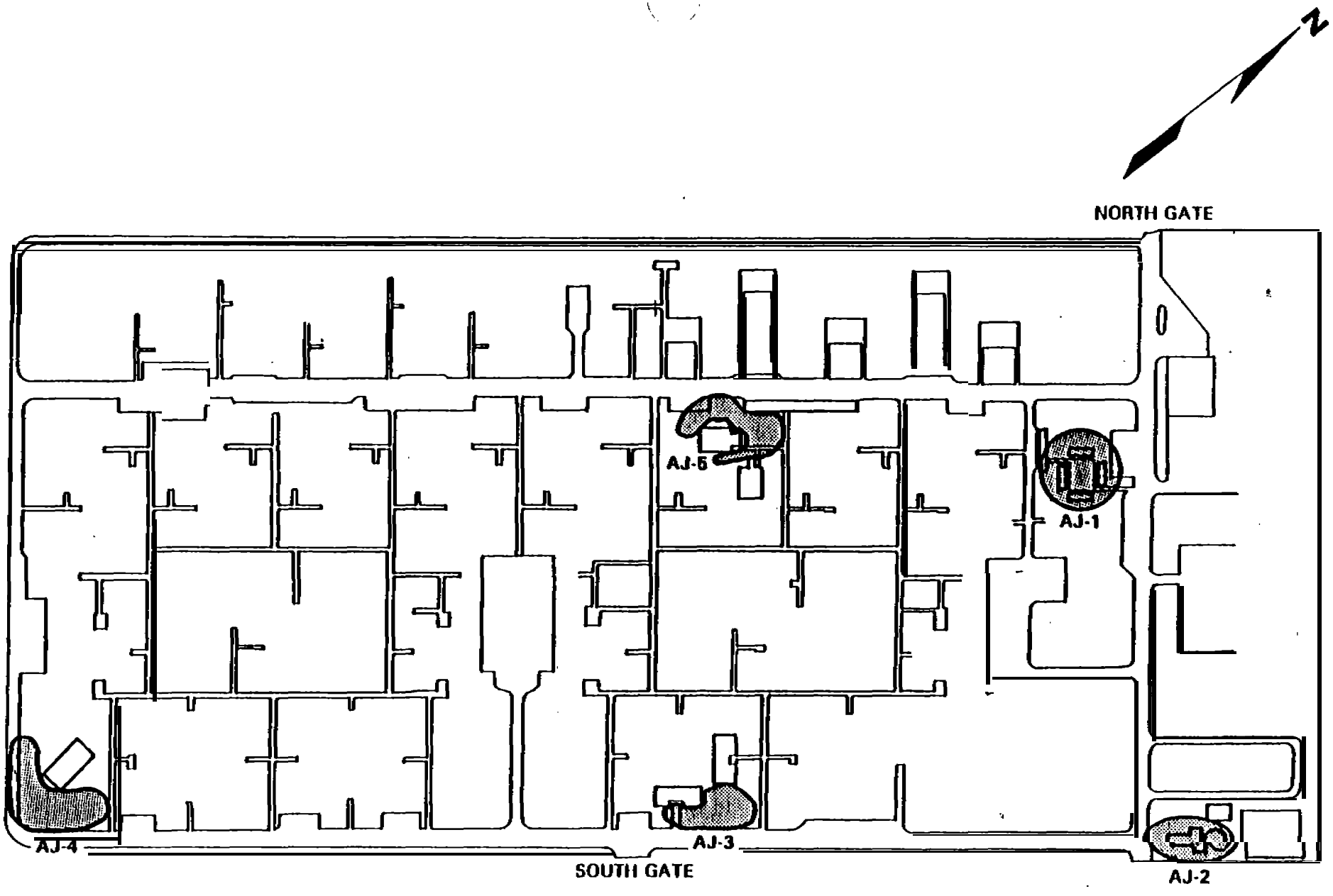


Figure 5. Soil Sampling Locations at Camp 1, Al Jubail, Saudi Arabia.

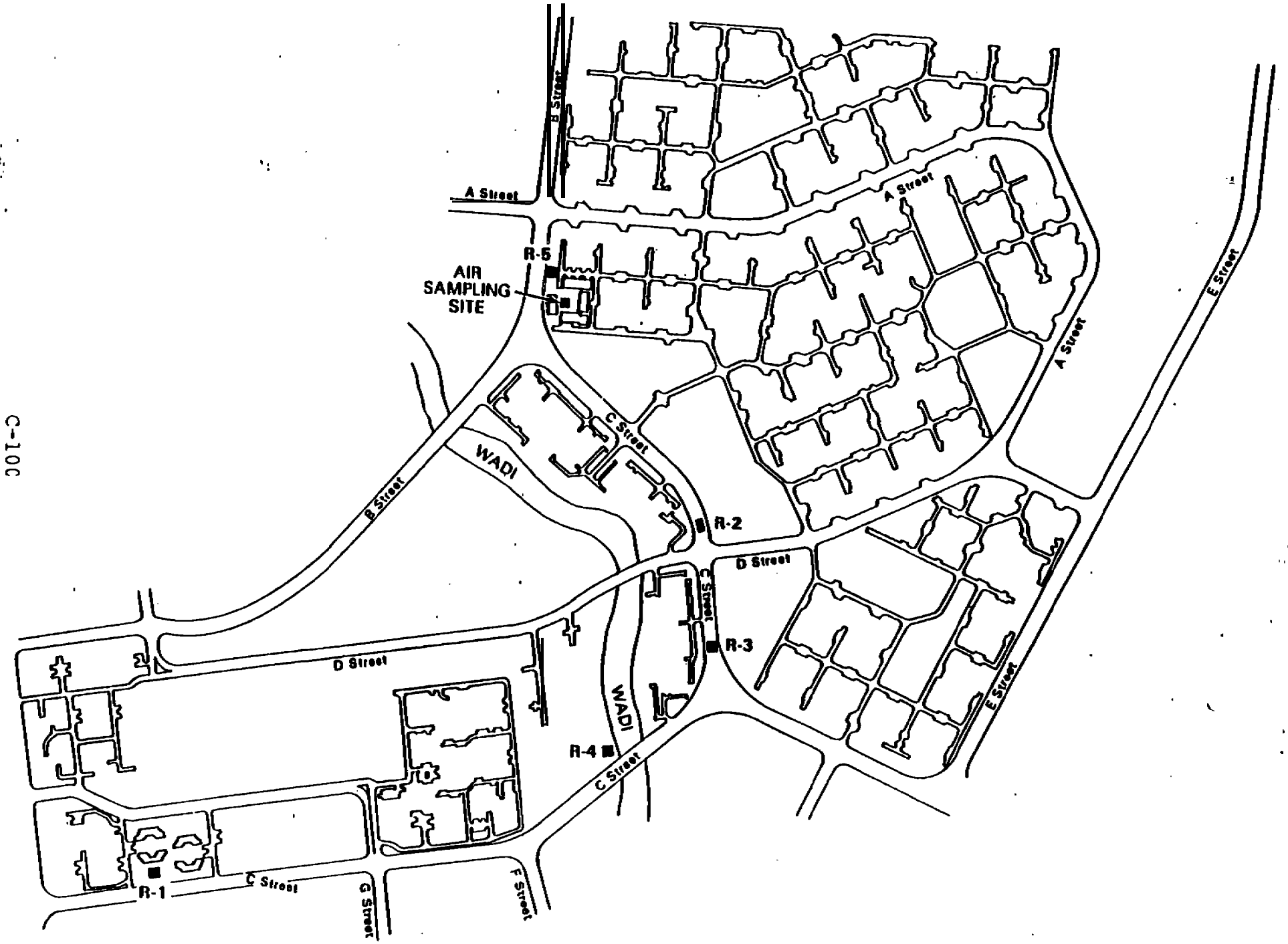


Figure 6. Soil Sampling Locations, Es[illegible] Village, Riyhad, Saudi Arabia.

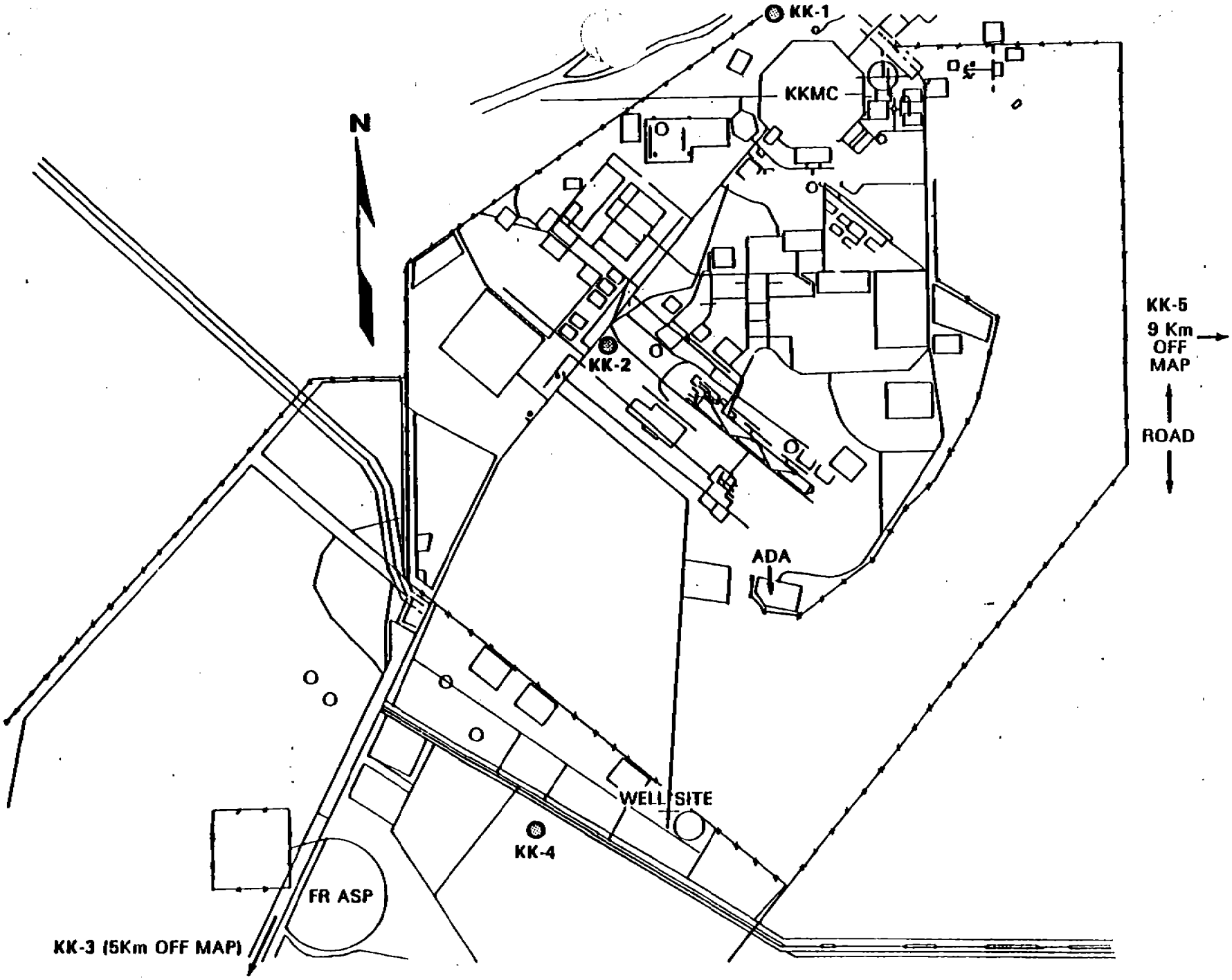


Figure 7. Soil Sampling Locations, King Kahlid Military City, Saudi Arabia.

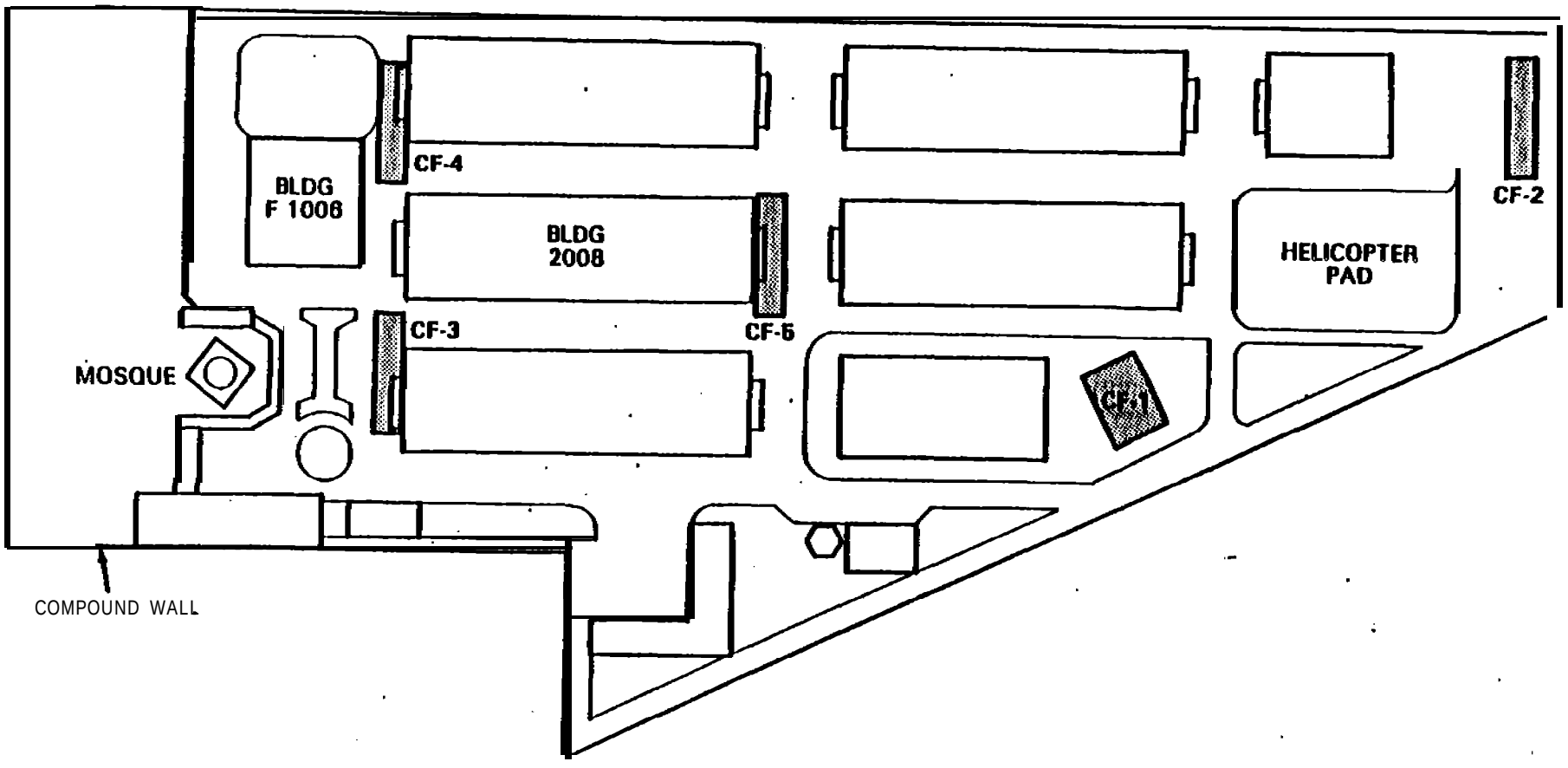
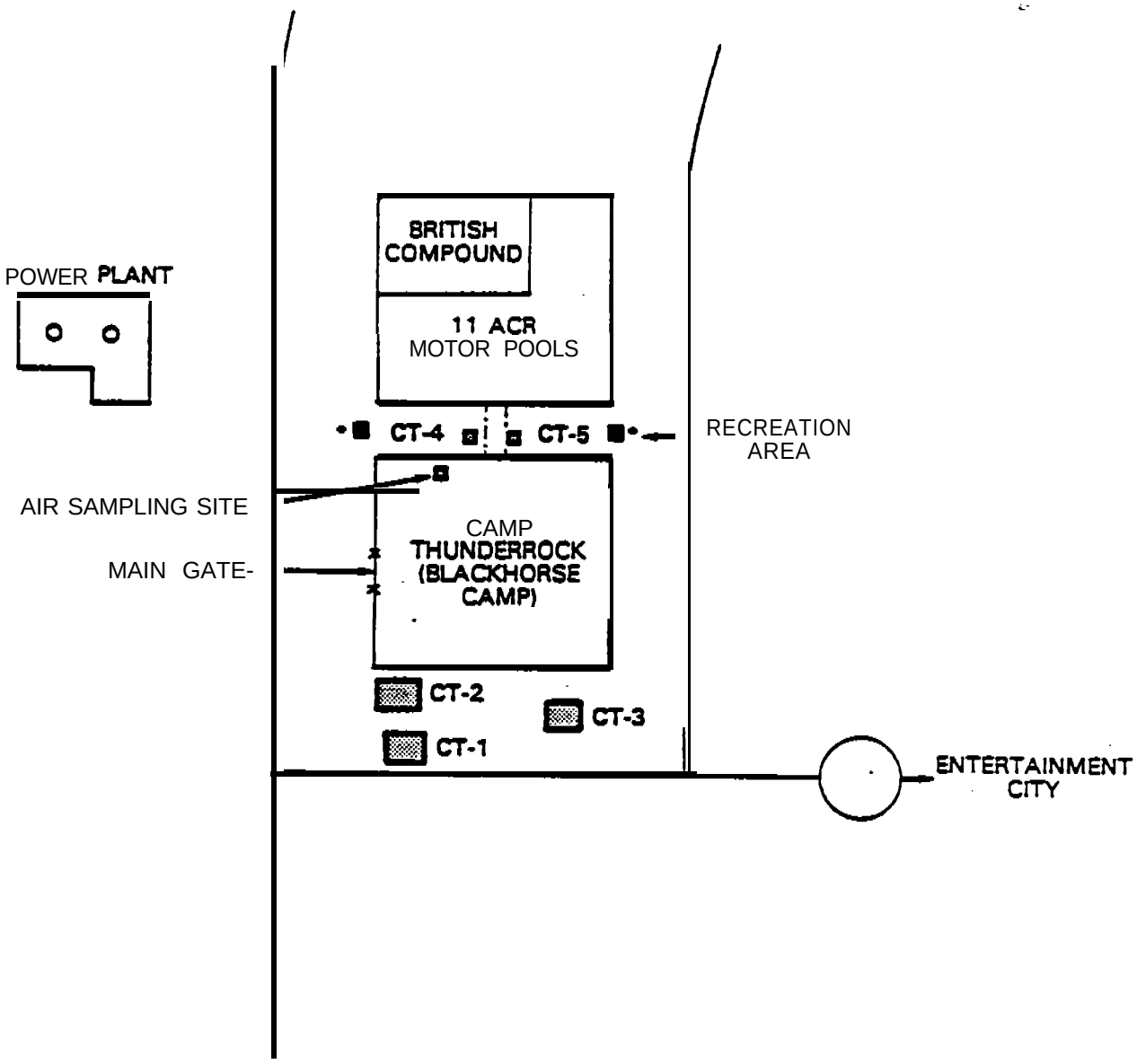


Figure 8. Soil Sampling Locations at Camp Freedom, Kuwait.



* NEW CT-4 & CT-5 SAMPLING LOCATION FOLLOWING EXPLOSION AT CAMP THUNDERROCK 22 AUG 91.

Figure 9. **Soil Sampling Locations at Camp Thunderrock, Doha, Kuwait.**

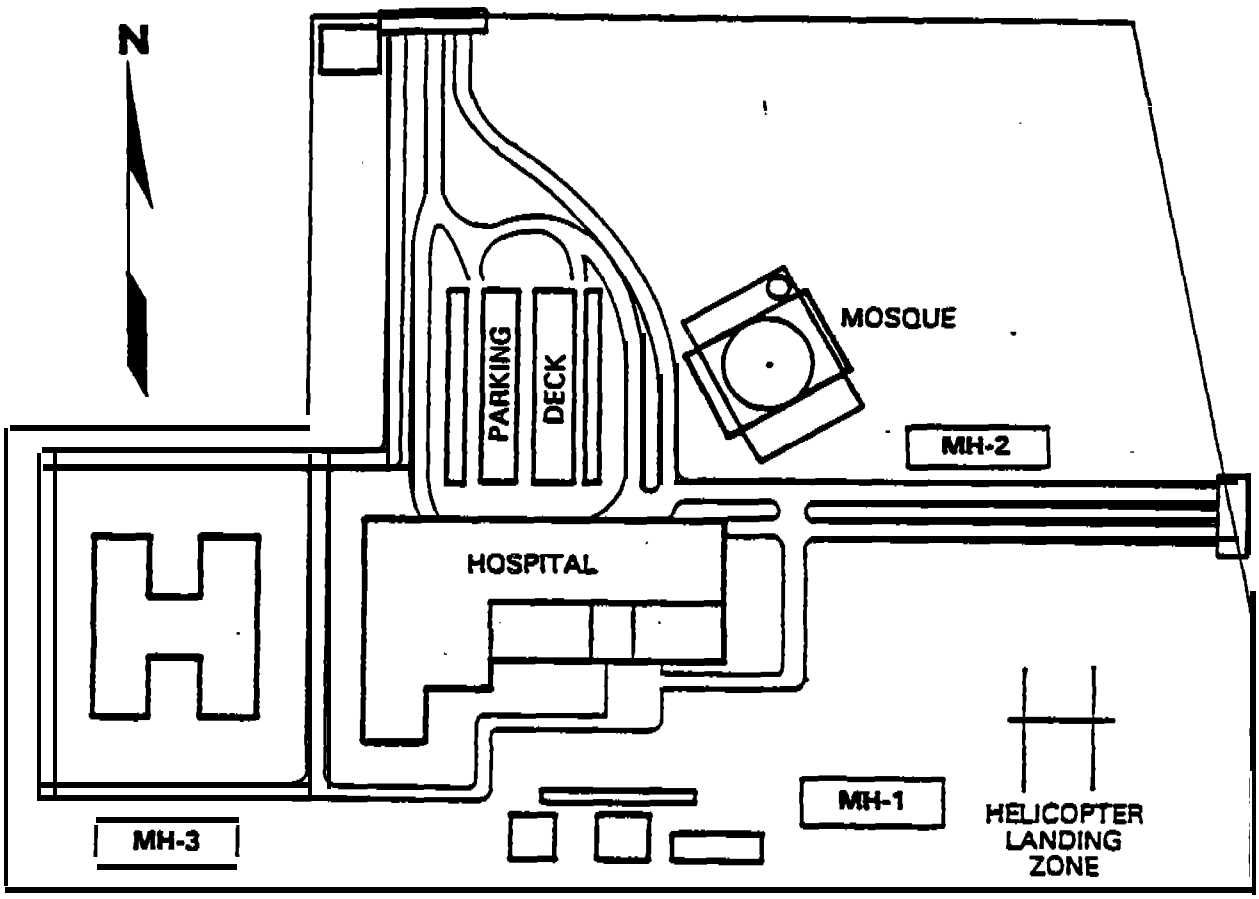


Figure 10. **Soil Sampling Locations at Kuwait Military Hospital.**

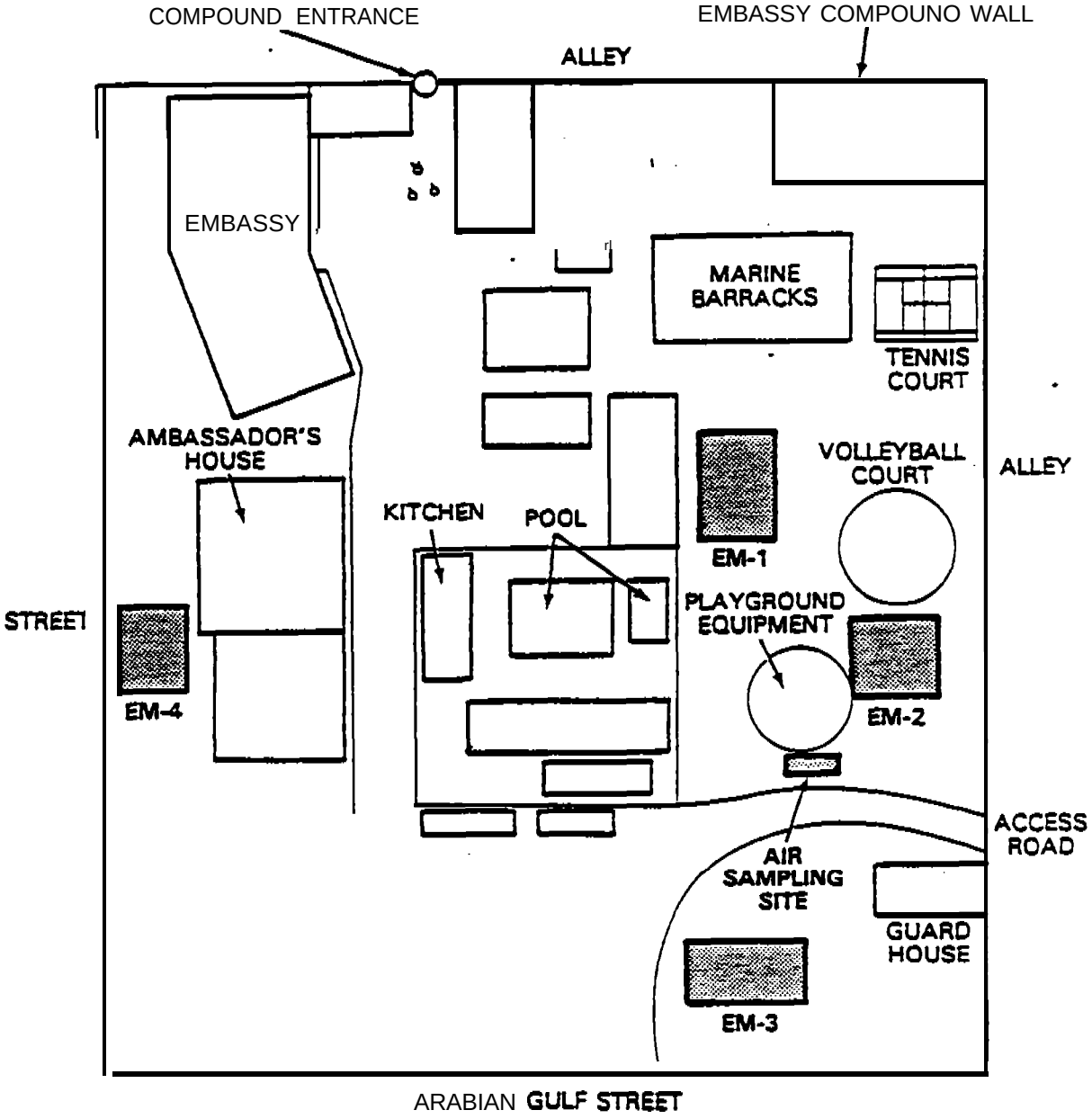


Figure 11. Soil Sampling Locations at U.S. Embassy, Kuwait City.

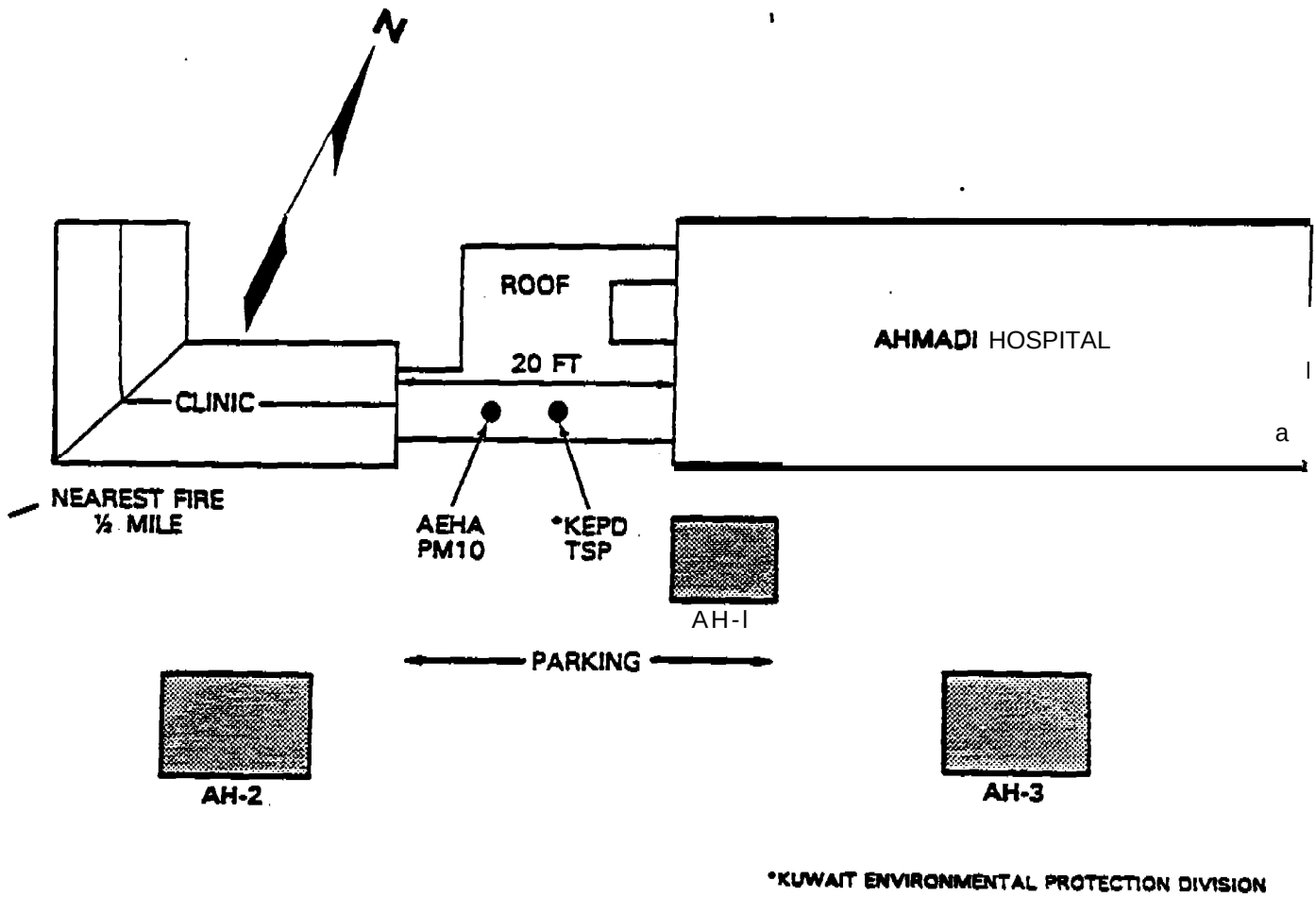


Figure 12. **Soil Sampling Locations at Al Ahmadi Hospital, Kuwait.**

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND. MARYLAND 21010-5422

ATTENTION OF

HSHB-MI-W

FINAL REPORT
KUWAIT OIL FIRE HEALTH RISK ASSESSMENT NO. 39-26-L192-91
5 MAY - 3 DECEMBER 1991

APPENDIX D
INDUSTRIAL HYGIENE AIR SAMPLING

1. INTRODUCTION.

a. The Office of The Surgeon General tasked a team of industrial hygienists to monitor and characterize occupational exposures to DOD service members who had potential high risk exposure to the Kuwait oil fire emissions. This three-man industrial hygiene team supplemented the larger U.S. Army Environmental Hygiene Agency (USAEHA) assessment team who monitored the general ambient air environment.

b. The team, who entered Saudi Arabia on 3 May 1991 and departed on 17 June 1991, conducted industrial hygiene air sampling at various locations within Kuwait and Saudi Arabia.

c. The focus of the sampling was on areas where DOD service members were working outdoors and on worst-case situations within the oil fields next to Kuwait City.

2. REFERENCES.

a Threshold Limit Values and Biological Exposure Indices with Intended Changes for 1990-91, ACGIH, Cincinnati, Ohio.

b. USAEHA Technical Guide 141, December 1990, Industrial Hygiene Air Sampling and Bulk Sampling Instructions.

3. OCCUPATIONAL SITUATION.

a. At the time of this assessment most DOD service members were preparing to move themselves and their equipment out of the theater of operations.

(1) In Saudi Arabia much of the work activity centered around the port cities of Dammam and Jubayl. Large numbers of troops were moved into Khobar Towers, Saudi Arabia, to outprocess and prepare for redeployment.

(2) Approximately 2,000 soldiers were left in Kuwait City. While the industrial hygiene team was in Kuwait City, the bulk of these U.S. forces were consolidated and moved to an industrial site (Doha) northwest of Kuwait City named Camp Thunderock.

b. The DOD personnel at greatest risk to oil fire emission exposures were those people whose jobs required them to remain outdoors. This meant our team was interested in sampling personnel performing various security duties and preparing equipment for shipment. The industrial hygiene team also arranged to sample locations within the oil fields to provide a worst-case exposure situation.

4. OIL FIELD ENVIRONMENT.

a. Our team sampled the air at locations within the oil fields south of Kuwait City, and these samples serve as worst- case examples.

b. At the time of this assessment, DOD personnel were not working or living within the oil fields. The workers in the oil fields were employees of various oil well fire fighting companies, the Bectel Corporation, and the Kuwait Oil Company.

c. Traveling and sampling within the oil fields was dangerous due to a combination of oil well fires, lakes of crude oil, unexploded ordnance, and the lack of a central control. The industrial hygiene team was able to conduct general area and breathing zone sampling within this environment because of the cooperation of the Bectel Corporation and the Kuwait Oil Company.

d. The air samples from this environment serve as examples of potential exposures soldiers may have experienced while maneuvering and fighting near oil well fires.

5. SAMPLING METHODOLOGY.

a. Table D-l contains a description of the contaminants sampled and the air sampling methods used by the team.

TABLE D-1. INDUSTRIAL HYGIENE SAMPLING

Contaminant	Media/Method	Flow Rate L/Win	Volume (l)	Standard-ACGIH mg/m³
Total Particulate	Preweighed PVC	1-2	400-1000	10
Respirable Particulate	Preweighed PVC with Cyclone	1.7	400-1000	Specific Compound
Oxides of Nitrogen	Orbo® 76 Tube	.02-.05	2-4	NO, 5.6
Oxides of Sulfur	Orb 76 Tube	.02-.05	2-12	so, 5.2
PAH	Orbo 43 Tube PTFE Prcfilter	2	200-100	16 Specific Compounds
Coal Tar Pitch Volatiles	Fikrglass Filter	2	200-960	0.2
Hydrocarbons	Charcoal Tubes and OVM	SO-500	25-40	Xylene 434 Benzene 32 Toluene 377
Vanadium Pentoxide	CE Filter	1-2	25-40	0.05
Sulfuric Acid	Orbo 53 Tube	200-500	24-48	1
Nitric Acid	Orbo 53 Tube	200-500	24-48	5.2

(1) Sampling methods and procedures are detailed in USAEHA Technical Guide 141. Our team used direct reading instruments to screen potential sampling sites. Those instruments included a respirable particulate sampler (TSI® respirable aerosol mass monitor), a carbon monoxide sampler (Enerac® pocket 60 monitor), and a hydrogen sulfide sampler (Gastech® GX4000).

(2) Carbon monoxide measurements indicated spikes up to 4 parts per million in some oil fire plumes. Air samples outside the plumes were negative for carbon monoxide. All hydrogen sulfide results were negative. The r&-time respirable particulate monitor recorded results from 0.18 milligrams per cubic meter (mg/m³) to 0.63 mg/m³ within the Kuwait City area, and these results agreed with the gravimetric results.

® Orbo is a registered trademark of Supelco Co., Inc., East Bellefonte, Pennsylvania.
® TSI is a registered trademark of Thermo-Systems, Inc., St. Paul, Minnesota.
® Enerac is a registered trademark of Energy Efficiency Systems, Inc., Bethpage, New York.
® Gastech is a registered trademark of Gastech, Inc., Newark, California.

b. Table D-2 and Table D-3 list the sampling locations in Saudi Arabia and Kuwait, respectively, and the operation performed at the time of sampling. The sampling point location number will be used to relate location and results in maps, charts, and tables.

TABLE D-2. SAUDI ARABIA SAMPLE SITES

Site No.	Location	Operation
S-l	Khobar Towers, Balcony 207	Residential
s-2	Khobar Towers, Main Gate	Guards
s-3	Khobar Towers, Roof 305	Guards
S-4	Khobar Towers, Roof 207	Residential
S-5	Northwest Jubayl Near ASP1	Supply Points
S-6	Damman Port Area	Equipment Handling
s-7	Northwest Jubay1826 Ordnance	Ammunition Loading
S-8	Jubayl Port Area	Equipment Handling

TABLE D-3. KUWAIT SAMPLE SITES

Site No.	Location	Operation
K-l	Camp Freedom F1006	Residential
K-2	Camp Freedom Main Gate	Guards
K-3	EOD Safe Holding Area	Ammunition Storage
K-4	U.S. Embassy	Guards
K-5	Military Hospital Roof	Guards
K-6	Military Hospital Gate	Guards
K-7	Al Ahmadi Hospital Roof	General Area
K-8	Doha Camp Thunderock	Guards
K-9	Oil Field Gathering Center 1	Field Work
K-10	Oil Field Gathering Center 2	Field Work
K-11	Al Wafra Road Intersection	General Area
K-12	Oil Field Gathering Center 11	Field Work
K-13	Kuwait Area OVM Monitor	General Area

c. Figure 'D-l and Figure D-2 depict the sampling locations in Saudi Arabia and Kuwait, respectively. The Saudi Arabian sites were 300 miles away from the Kuwait oil well fires. Industrial hygiene sampling results from the Saudi Arabian sites will serve as the background data for comparison to the sampling results from in and around Kuwait City.

6. SAMPLING RESULTS.

a. Tables D-4 and D-5 summarize the results of industrial hygiene air sampling in Kuwait and Saudi Arabia. The tables list the average values in mg/m^3 as pooled for Saudi Arabia and Kuwait. Standard deviations for the measured air contaminants are also listed.

TABLE D-4. INDUSTRIAL HYGIENE RESULTS, AVERAGE VALUES mg/m^3

Sample	Kuwait		Saudi Arabia	
Total Particulate		(0.66)	0.59	(0.41)
Resp. Particulate	0.37	(0.64)	0.46	(0.24)
Coal Tar Pitch	0.06	(0.96)	0.10	(0.09)
Nitrogen Dioxide	1.65	(1.30)	0.40	(0.24)
Sulfur Dioxide	0.47	(0.72)	0.53	(0.65)
Nitric Acid	0.05	(0.02)	0.04	(0.05)
Sulfuric Acid	0.04	(0.01)	0.03	(0.01)

Standard Deviations (0.XX)

TABLE D-5. INDUSTRIAL HYGIENE RESULTS, AVERAGE VALUES mg/m^3

Sample	Kuwait		Saudi Arabia	
PAH	BDL*		BDL	
Hydrocarbon				
Benzene	0.04	(.01)	0.03*	(0.03)
Toluene	0.13	(0.06)	0.08*	(0.16)
Xylene	0.37	(0.08)	0.11*	(0.60)

standard Deviations (0.XX)
* BDL - Below Detectable Limit

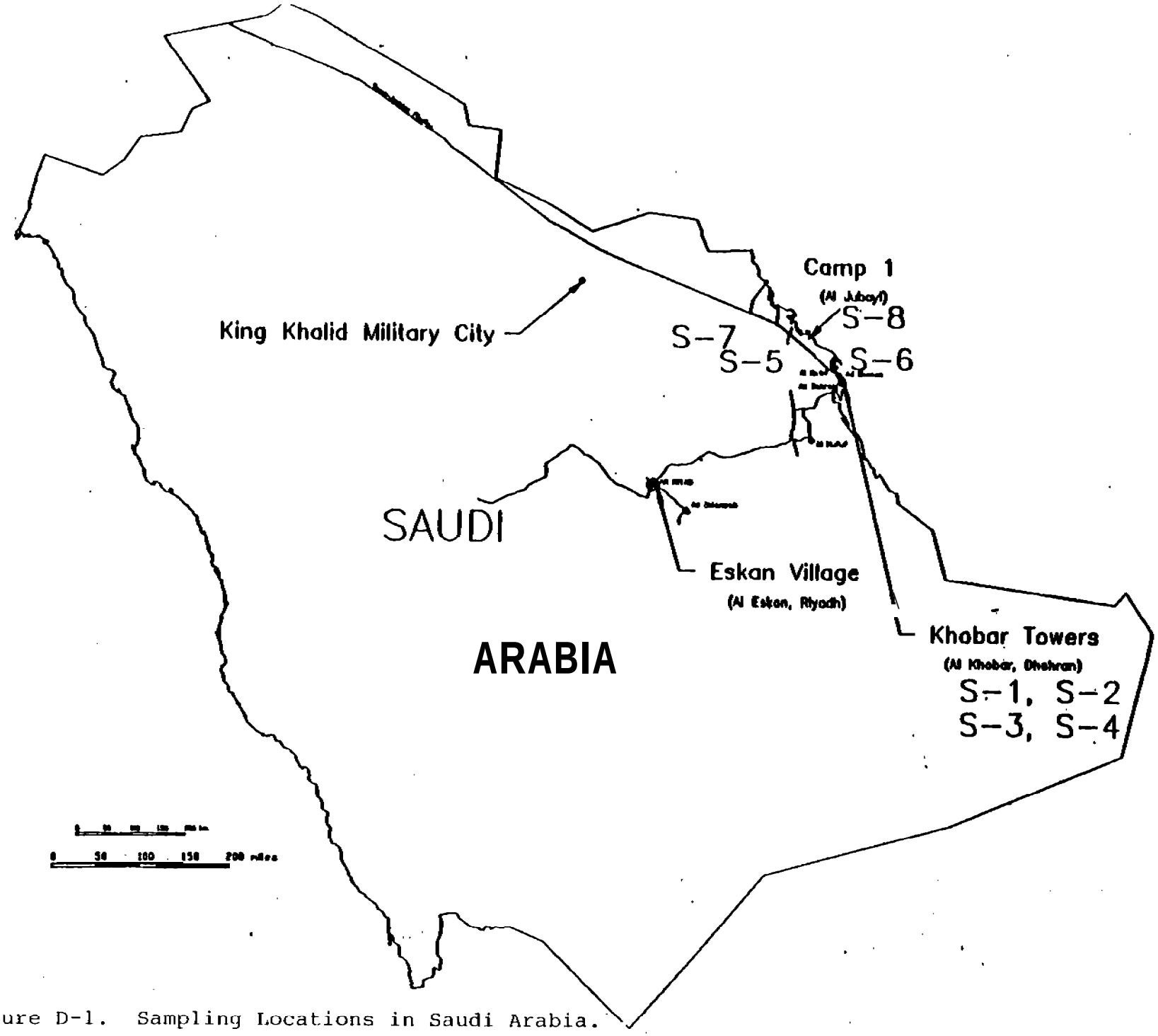


Figure D-1. Sampling Locations in Saudi Arabia.

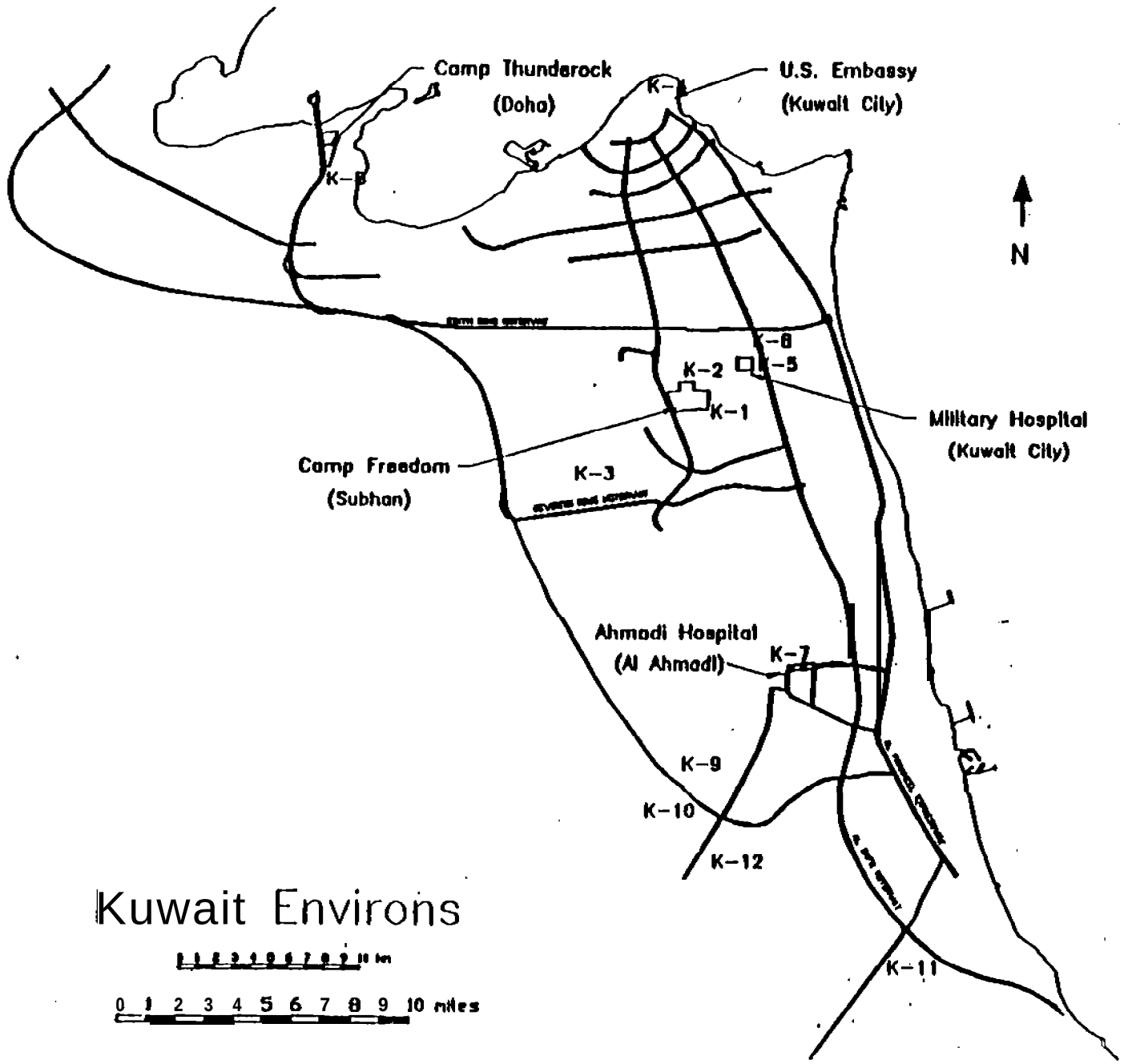


Figure D-2. Sampling Locations in Kuwait.

(1) A high percentage of the samples were below detectable limits. The reported detectable limits were used to calculate the average results in those cases without a positive result.

(2) The great majority of polycyclic aromatic hydrocarbons (PAH) were below detectable limits in the samples from both Saudi Arabia and Kuwait. Naphthalene was the only PAH reported at the detectable limit in three samples within Kuwait and one sample in Saudi Arabia.

(3) All the hydrocarbon results in Saudi Arabia were below detectable limits while, in the Kuwait hydrocarbon samples, some positive results were reported.

b. Table D-6 lists (by Julian date and location) the highest single values recorded for the various parameters measured during the assessment. The purpose of Table D-6 is to compare these worst-case values to the threshold limit values (TLV®) set by the American Conference of Governmental Industrial Hygienists (ACGIH).

TABLE D-6. MAXIMUM SAMPLE RESULTS, DATA REPORTED AS mg/m^3

Sample #	Location	Analysis	Results	TLV
152-05	s-07	Total Part.	2.30	10
152-06	S-07	Resp. Part.	2.00	cs*
134-24	K-01	Benzene	0.19	32
134-24	K-01	Toluene	0.75	377
155-01	K-07	Xylene	3.21	434
152-19	S-07	Coal Tar	0.21	0.2
137-13	K-05	NO_2	6.70	5.6
13614	K-01	SO_2	1.90	5.2
140-22	K-09	Nitric Acid	0.12	5.2
157-06	K-09	sulfuric	0.05	1.0

*CS - Compound Specific

c. The average results of the pooled Kuwait and Saudi Arabia data showed no statistically significant difference between the two general areas. The average results never approached an occupational health standard.

® TLV is a registered trademark of the ACGIH, Cincinnati, Ohio.

7. CONCLUSIONS.

a. The industrial hygiene air sampling results showed no statistical difference between the outdoor occupational environment in Saudi Arabia and Kuwait.

b. The oil well fires in and around Kuwait City did have a measurable impact on the occupational environment in specific circumstances, based on local weather conditions and proximity to oil fire plumes. This impact was measurable by standard industrial hygiene air sampling methods used in the ambient environment.

c. The magnitude of the exposures was low compared to recognized occupational health standards. Adverse health effects would not be expected based on the assumptions inherent in such standards.

d. The question of long-term health risk is best answered by the accompanying comprehensive health risk assessment.

for GEORGE R. MURNYAK
LTC, MS
Chief, Industrial Hygiene Division

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

HSHB-ML-O

FINALREPORT
KUWAIT OIL FIRE HEALTH RISK ASSESSMENT NO. 39-26-L192-91
5 MAY - 3 DECEMBER 1991

APPENDIX E

PHASE 1
METHODOLOGIES, ANALYTICAL RESULTS AND QUALITY ASSURANCE

1. METHODOLOGY USED FOR SAMPLING AND ANALYSIS. The majority of the air and soil sampling and analyses were performed in accordance with established U.S. Environmental Protection Agency (EPA), National Institute for Occupational Safety and Health (NIOSH), or Occupational Safety and Health Administration (OSHA) guidelines. There were also several procedures used which followed methodology described in open literature publications or which were variations on standard procedures. The various analytical methodology and sampling media used are briefly described below, and references for all procedures are listed in the Annex.

a. Ambient Air Methods.

(1) Acid gases for inorganic acids were collected on OREO 53 silica gel tubes (reference 1). These tubes were desorbed with the same eluent solution (carbonate/bicarbonate) as used within the ion chromatographs (ICs) used for analysis. The IC systems used anion separators, guard columns, anion suppressor columns, and conductivity detectors with data processing by integrator or computer.

(2) Acid gases for organic acids were initially monitored using carbonate-treated firebrick tubes (ORB0 70) (reference 2). These tubes were sampled in series with the ORBO 53 tubes (as the back section). As the assessment progressed, it was discovered that silica gel tubes are effective for organic acids collection (reference 3). Therefore, the ORBO 70 tubes were discontinued and only silica gel tubes were used for all acids. The analytical procedure used for inorganic acids was also used for organic acids.

(3) Three types of passive dosimeters manufactured by OGAWA & Co., and used by the EPA, were employed during this assessment to monitor criteria gaseous pollutants. The ozone (reference 4) and sulfur dioxide (SO_2) (reference 5) dosimeters were analyzed by ion chromatography, after chemical reactions of the analytes with the dosimeter filters, to produce nitrate and sulfate ions, respectively. The analytical system used was the same as that described above for acid gases. The double filter dosimeters for nitrogen dioxide (NO_2) and nitrogen oxides (NO_x) employ a classical Saltzmann colorimetric technique to measure nitrite ion produced through chemical absorption and reaction on the filters (reference 6).

(4) Extensive high volume filter sampling (reference 7) was conducted for a series of 6 metals, which was later expanded to 13. Collection was generally for a 24-hour period at approximately 1.5 M^3 per minute. One-half of a sampled filter was prepared for metals analysis; acid digestion with nitric acid was used to put the metals into solution. All metals except arsenic were analyzed by inductively-coupled plasma spectrophotometry (references 8 and 9); arsenic was analyzed by furnace atomic absorption (reference 10). Additionally, one high volume filter was fluoride-pyrosulfate fused and fluorometrically tested for uranium content (reference 11). .

(5) High volume filters could not be employed for mercury sampling, so collection was done on mercury solid sorbent tubes containing hydrar (reference 12). The sampled tubes were acid desorbed with a combination of nitric and hydrochloric acids. Analysis was performed by atomic absorption using the cold vapor and mercury hydride techniques.

(6) A number of high volume filters that had been sampled for metals analyses were also tested for anion content (this was possible because only one-half filter is generally used in metals analysis). The filters were desorbed with the IC eluent buffer solution and analyzed the same as acid gases (reference 1). The anions tested were nitrate, sulfate, and chloride.

(7) Ambient air sampling for polynuclear aromatic hymns (PAHs) was done several ways. A modified version of the EPA Method TO13 procedure which specifies the use of polyurethane foam (PUF) or XAD-2 resin cartridges was used (reference 13). The actual PUF cartridges employed were those manufactured for EPA Method TO10 (for pesticides), but were virtually identical to the design specified in EPA Method TO13. The XAD-2 tubes initially used, however, were smaller in size than the cartridges specified in EPA Method T013, and could not accommodate the large air sampling volumes recommended. Larger (EPA Method TO13 specified) cardridges were procured and used during the October-November timeframe. In order to look for very low levels of PAHs, 24-hour high volume filter samples were also collected (reference 14). All three media were Sohxlet-extracted for 18 hours (PUFs with ethyl ether/hexane filters and XAD-2 with methylene chloride). The extracts were concentrated to one milliliter (mL). Filter extracts had to be

taken through a cleanup procedure by passing them through a silica gel column to separate the PAH-containing aromatic fraction from the large amount of aliphatic hydrocarbons present. Sample extracts were analyzed by gas chromatography using flame ionization and photoionization detectors, with mass spectral confirm&ions performed on approximately 25 percent of positive samples.

(8) Ambient air monitoring for volatile organic compounds was performed with Tenax adsorption cartridges (reference 15). These cartridges were sampled two-in-series, with the back cartridge serving as a check on sample breakthrough. The analytical technique consisted of thermal desorption of the tubes to deposit collected vapors onto a trapping material. The trap was in turn thermally desorbed, and the vapors passed through a gas chromatograph into a mass spectrometer. Seven target hydrocarbon analytes were quantitated in all samples, and all samples were screened for the presence of nontarget analytes as tentively identified compounds (TICs).

b. Industrial Hygiene Methods.

(1) Acid gases were sampled using silica gel tubes [see paragraph la(l)]. .

(2) Asbestos fibers were sampled on 25 millimeter (mm) cellulose ester membrane filters with a conductive cowl on the cassettes. Counting was done with a phase contrast microscope (reference 16). Bulk samples for asbestos qualitative identification were analyzed using polarized light microscopy (reference 17).

(3) Benzene, toluene, xylene, and light hydrocarbons were collected on standard charcoal tubes (reference 18 and 19) and passive sampling badges (reference 20) (3M® Company 3520 Organic Vapor Monitors). Samples were desorbed with carbon disulfide and analyzed using gas chromatography with flame ionization detection. Standards of benzene, toluene, and xylene were used to quantify these compounds and to estimate the other chromatographic peaks as "total hydrocarbons."

(4) Coal tar pitch volatiles were measured as the percent benzene soluble fraction of the weight of material collected from air on a glass fiber filter (reference 21). These filters were desorbed with benzene, and the weight of benzene soluble r&due was determined gravimetrically. Samples found to contain amounts in excess of the OSHA Permissible

---

® 3M is a registered trademark of Minnesota Mining and Manufacturing Company, St. Paul, Minnesota.

Exposure Limit (PEL) were solvent exchanged into acetonitrile and re-analyzed for PAH content by High Performance Liquid Chromatography (HEW) using fluorescence and ultraviolet (UV) detection.

(5) There were several cellulose ester filters sampled for vanadium (V) or lead (Pb) (references 8 and 22); these were analyzed by inductively-coupled plasma (V) or by graphite furnace atomic absorption (Pb). There were also a small number of polyvinyl chloride (PVC) membrane filters sampled for respirable quartz and analyzed by x-ray diffraction (reference 23).

(6) Industrial hygiene sampling for PAHs was conducted on PTFE (Teflon) filters in series with XAD-2 tubes (ORB0 43, Supelco, Inc.) (reference 24). Both media were desorbed with acetonitrile and analyzed via HPLC using a reverse phase C-18 type column, acetonitrile/water eluent, and UV and fluorescence detection.

(7) Personal monitoring for exposure to NO, and SO, was performed using chemically-treated molecular sieve tubes (ORB0 76, Supelco, Inc.) (reference 25). The gases were oxidized to nitrate or sulfate and analyzed by ion chromatography in a manner analogous to the acid gases analysis.

c. Soil Methods.

(1) Soil samples were analyzed for 14 metals. Samples were digested using a procedure employing nitric acid, hydrogen peroxide, and hydrochloric acid (reference 26). Analyses were performed using techniques appropriate to the particular metal: atomic absorption cold vapor for mercury, graphite furnace atomic absorption for Pb and arsenic, and inductively-coupled plasma for the remaining metals (references 9, 10, 12, 22, and 26). Additionally, the quartz content of several of these soil samples was estimated using x-ray diffraction spectroscopy (reference 27).

(2) Gas chromatography/mass spectroscopy (GC/MS) was used to analyze soil extracts for semivolatile organic compounds. The soils (30 gram samples) were extracted ultrasonically with a solvent mix of methylene chloride and acetone, and the extract concentrated to 1 mL (reference 28). The GC/MS was standardized to search for and quantitate 63 target analytes, and to perform a search for other TICs with an estimation of their amounts (reference 29).

2. QUALITY ASSURANCE.

a. General Protocol was made to maintain the integrity of samples and to provide high quality data throughout the laboratory portion of this health risk assessment. All samples were kept under chain-of-custody from the time of sampling until their analyses were complete. Samples were transported from Saudi Arabia to the laboratories in coolers containing dry ice, and those samples requiring continued refrigeration were stored at 4 °C. Various external quality controls were provided by laboratory quality control coordinators for analysis along with the samples. There were also external quality controls submitted by the U.S. Army Environmental Hygiene Agency Analytical Quality Assurance Division (USAEHA AQAD). Additionally, the analysts made controls of their own to maintain a check on instrumental and procedural performances. Known outlier values were r-e-analyzed whenever possible, duplicate instrumental analyses were often conducted, and check standards were run frequently throughout the course of all batch analyses. Specific quality assurance as applied to the various methodologies are discussed below.

(1) Ambient Air Samples.

(a) Acid gases were sampled primarily on silica gel tubes and analyzed by ion chromatography. The ORBO 70 tubes were also used as a backup to the silica gel tubes to check for the presence of organic acids. However, we discontinued using these tubes when it was discovered that silica gel effectively traps organic acid vapors. Internal quality controls were analyzed with most sets of samples to measure instrumental performance and to monitor the desorption efficiencies of the acids (nitric, sulfuric, acetic, and formic) from the tubes. These efficiencies were used as a correction factor for samples analyzed in conjunction with these controls. External quality controls were also analyzed with most sets of samples as a check on overall laboratory proficiency.

(b) Three types of passive dosimeters were used to measure concentrations of EPA criteria gaseous pollutants. Dosimeters used for NO, and NO, were analyzed by a colorimetric procedure. The internal quality control for this procedure involved analyzing a known spike concentration prepared from a different chemical source than the standard concentrations. This was tested with each batch of samples as an instrumental check. External controls were independently submitted as dosimeters spiked with known concentrations of nitrite. Both the ozone dosimeters and the after reactions of their chemically-treated filters to nitrate SO_2 dosimeters were analyzed by ion chromatography and sulfate, respectively. Internal and external controls consisted of spikes of nitrate or sulfate on dosimeter filters.

(c) Extensive quality assurance was applied to the metals analyses of high volume filters and mercury tubes. Precision of the analytical instrumentation was tested by duplicate analyses of many prepared filter sample solutions. Additionally, some filters were split in half and the two sides acid-digested and analyzed separately in order to give an indication of the precision of the entire sampling and analytical method. There were also numerous filters split in half, and one-half was spiked with known amounts of the analyte metals as a measure of matrix effects on recoveries. Finally, there were blanks and external controls tested with all batches of samples. Blank mercury tubes were spiked with known amounts of mercury to determine the desorption efficiency from the tubes. These efficiencies were used to correct sample results. External quality control spikes were analyzed to measure laboratory proficiency with the procedures used.

(d) There were three different sampling media used for sampling PAHs: polyurethane foam cartridges, XAD-2 resin tubes and cartridges, and high volume quark or glass fiber filters. Method recoveries were monitored by spiking known quantities of the target PAHs on sampling media and putting them through the entire, extraction and analysis procedures. In the case of the filters, this included a rigorous sample cleanup step. There were also externally prepared control spikes run with some of the sets of samples. In addition to controls prepared at the laboratory, some travel controls were prepared by spiking sampling media in the field to indicate the effects of travel conditions on samples. These controls were shipped back to USAEHA with the regular samples for analysis. Samples were analyzed by GC using flame ionization and photoionization detectors. Some samples which had chromatographic peaks corresponding to the retention times of target PAHs and those with many interfering peaks were re-analyzed using a different chromatographic column. A GC mass spectrophotometer was employed for verifications of positive hits on many samples. Check standards were run after every five samples (three for filters) to ensure proper instrumental performance.

(e) The Tenax tubes sampled for EPA Method TO1 method had surrogate compounds added to every sample, blank, and check standard to monitor the instrumental performance during their GC mass spectral analyses. Mass spectrometer performance was also verified through tuning checks every workshift and through the analysis of check standards. Recalibration using a full range of standards was performed when required. All quantitation was conducted using internal standards added to each sample, and the peak areas of these standards were monitored to maintain proper instrumental sensitivity. External controls prepared by spiking Tenax tubes with target compounds were analyzed with most sets of samples. Several travel controls from the field were also analyzed.

(f) High volume filters were tested for their inorganic anion content (chloride, nitrate, sulfate) via ion chromatography. There were filters spiked with these target anions and carried through the analytical procedure to monitor method performance. The basic extraction and analytical method used was the same method used for silica gels for acid gases-

(2) Industrial Hygiene Samples.

(a) Several sets of silica gel tubes for acid mists were collected as personal monitoring samples. These tubes were similar to the ambient silica gel tubes described above and were analyzed with them.

(b) Asbestos was analyzed by fiber counting. Quality controls from NIOSH proficiency testing rounds were run with each set. Analyses included duplicates and cross-duplicates (analysis by a second analyst).

(c) Internal and external controls regulated the quality of the GC analyses of charcoal tubes and passive monitors for benzene, toluene, and xylenes, and estimation of total hydrocarbons. Spiked tubes and monitors prepared by the analysts were analyzed with each batch of samples and used for determination of desorption efficiencies. External controls were also analyzed to check analytical proficiency. Duplicate injections were made of positive samples and qualitative confirmations made by injections onto a second chromatographic column of different polarity than the quantitating column.

(d) Coal tar pitch volatiles were analyzed by a gravimetric procedure for weight of percent benzene soluble fraction on sampled glass fiber filters. Calibration of the analytical balance used was checked before each use. The accuracy and sensitivity of the procedure was checked through a series of repetitive weighings of calibration standards. Samples found to have an amount of benzene soluble fraction exceeding 0.2 milligrams per square meter (mg/m^3) were then analyzed by the HPLC procedure used to monitor polynuclear aromatic h y m n s .

(e) Industrial hygiene monitoring for exposure to PAHs was done with Teflon filters @articulates) and ORBO 43 XAD-2 tubes (vapors). Spikes containing 16 target compounds were made onto blanks of both media types to correct solvent desorption efficiencies of samples and to check instrument performance. Externally prepared control spikes were also run with the various sample sets. Two types of HPLC detectors, W and fluorescence, were used in series to determine PAHs during chromatographic runs. Most compounds could be found by either detector, so one served as a check of the other. Some samples were further confirmed by GC mass spectroscopy. Several travel control spikes on PTFE (Teflon) filters were prepared in Saudi Arabia and sent with samples for analysis.

(f) The quality assurance accompanying the analysis of ORBO 76 tubes for NO, and SO, was similar to that applied to the other tube methods. Internal spikes and external quality control samples were analyzed along with the samples. The analysis of blank sampling media from each set was especially important since this particular sampling medium often has interfering background problems.

(g) The few metals analyses performed for V and Pb on cellulose ester filters were analyzed with the same degree of quality control as the ambient air samples. An NIOSH proficiency testing filter was run with the filters analyzed for respirable quartz.

(3) soil Samples.

(a) The same general analytical techniques used to analyze filter samples for metals were used for soil samples, and the same degree of quality assurance was applied. There were analyses of duplicate sample aliquots, duplicate injections of extracted soil solutions, extracted soil solutions which were spiked prior to analysis, and external control samples. Matrix spikes on portions of some of the actual samples were also analyzed as a check on accuracy and matrix effects of the soils. Check standards were re-analyzed throughout the processing of each batch of samples.

(b) Quality assurance for soil semivolatiles analyses was conducted through using duplicate injections into the GC mass spectrometer, analyzing matrix-spiked soils, and analyzing duplicate matrix-spiked soils. Surrogate compounds were added to every soil sample to monitor the recoveries of the target analytes from the soil during the extraction process. Quantitations were performed using internal standards added to each sample solution after extraction.

b. Problem Areas. An assessment of this magnitude and urgency could not be conducted without some difficulties arising which may occasionally have some negative impact on data quality. There were two general areas where the laboratories could not always maintain desired surety of quality.

(1) Sample Holding Times.

(a) The recommended holding times for some types of samples could not always be met due to the enormous logistical difficulty in getting a sample from field to the laboratory. The Tenax tubes for EPA Method TO1 method and soil samples for semivolatiles often exceeded the 2-week recommended time by a few days. Sampling media for PAHs should be extracted for analysis within 1 week of sampling, but this was seldom the case.

Fortunately, spiked PAH and EPA Method TO1 travel controls submitted from the field indicate that there was little loss of target analytes from any of the media even after several weeks.

(b) Although dry ice was added to the cooler prior to shipping the samples, it usually disappeared by the time the cooler arrived at the laboratory. Therefore, it is likely that some samples were briefly maintained at temperatures higher than recommended for storage. Again, Tenax tubes and PAH samples would be those most impacted,

(2) Analytical Data.

(a) Controls were analyzed for each type of sampling media and laboratory analysis procedure. However, fewer controls than desired could be prepared due to a shortage of blank sampling media during the sampling and analyses period. For example, only one internal and one external control for SO, dosimeters were available for this parameter during all the sample analyses.

(b) Some PAH high volume filters had to be used as part of the method implementation process for this procedure rather than as controls. Therefore, not much spike data is available for this preliminary assessment. Only two XAD-2 spiked travel wntrols survived shipment; several others arrived broken and could not be salvaged. A few other controls of the various types were lost during analyses due to instrument failures, breakage, or analytical interferences.

(c) Most of the analyses were conducted following recommended EPA, NIOSH, or OSHA procedures, but the PAH analysis from high volume filters was taken from literature and is not standard to the USAEHA laboratories. The PAH method was added to the list of tests after the sample survey had already begun, so it has not been fully validated by this laboratory. The request to analyze high volume filters for inorganic anions was also an afterthought; this is not a standard procedure, although it is similar enough to other filter sampling and analysis procedures that it probably produces reasonably good results.

3. QUALITY CONTROL DATA.

a. Tables E-l through E-38 contain the analytical quality control data for all samples collected from May through November 1991 in support of the Kuwait Oil Fire Risk Assessment.

b. The USAEHA AQAD assigns sample numbers to all samples sent to the laboratories for analysis. The columns labeled "Relevant Samples" (Lab #s) in these tables indicate the specific quality controls that were analyzed in conjunction with particular batch(es) of samples.

c. There are several types of table column headings for the nonmetals analytes and mercury tubes. These headings vary according to the types of quality assurance being performed on the assorted types of samples:

(1) Desorption Efficiencies were determined by the laboratory analysts by spiking known amounts of analytes onto blank sampling media and analyzing for the percent recoveries. These efficiencies were used to correct sample and control results.

(2) Control Recoveries Were the results of analyses of externally (nonanalyst) prepared spiked blank sample media or standard reference materials. They give an indication of the precision and bias of the analytical method.

(3) Surrogate Recoveries were those for known amounts of spiked compounds that were added to the samples prior to processing for mass spectral analysis. They give an indication of sample matrix effects on recoveries of target analytes.

(4) Internal Controls were analyst-prepared analyte solutions used to evaluate method instrument performance.

d. There are four kinds of quality assurance tables provided for the metals results of high volume filter analyses:

(1) External Controls were prepared by spiking one-half of a high volume air filter sample and analyzed for percent spike recovery. The results were corrected for background determined from the unspiked half filter analysis.

(2) Prepped Duplicate results were generated by independent analyses of both halves of a sample filter.

(3) Instrument Duplicate analysis data reflect the results of duplicate analyses of a single-prepared filter or mercury tube sample solution.

(4) Post-Digested Instrument Spike data were recovery data for split prepared filter or mercury tube sample solutions where one-half were spiked with known amounts of target analytes prior to instrumental analysis. Results were corrected for background determined from the unspiked portion analyses.

RICHARD W. BISHOP
Senior Chemist
Organic Environmental Chemistry Division

TABLE E-l. ACID GASES ON SILICA GEL TUBES

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent1		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		HNO3		
10 µg	91	8 µg	113	Y1634-48
		11 µg	107	Y1642
15 µg	114	10 µg	100	Y1800-04, Y2068-74
7 µg	107	6 µg	95	Y1892-Y1901
		14 µg	92	Y1902
8 µg	111	1 µg	95	Y2075-84
10 µg	97	10 µg	101	Y2566-74, Y3054-66
11 µg	108	10 µg	92	Y2718-24, Y2990-93
		8 µg	-94	Y2992
13 µg	106	8 µg	105	Y2739-47, Y3351-54
12 µg	108	11 µg	104	Y3326-30
10 µg	110			Y3623-29, Y4723-37
12 µg	100	8 µg	100	Y4179-83, Y5064-76
12 µg	99	10 µg	102	Y4074-94
		24 µg	137*	Y4737
12 µg	105	12 µg	108	Y5563-82
10 µg	100	14 µg	100	Y6065-76
		7.5 µg	97	Y7356-68
		14 µg	100	Y8119-34, Y8443-56
10 µg	100	12 µg	100	Y8486-90, Y9074-80
				Y8896-Y8902
12 µg	98	11.5 µg	116	Y9749-68
10 µg	100	13 µg	108	Y9998-Z0016
10 µg	117	14 µg	93	20839-68
10 µg	84	12 µg	109	21213-22
10 µg	85	13 µg	108	Z1504-10
10 µg	85	13 µg	108	21621-26
10 µg	88	12 µg	92	Z2085-98
10 µg	90	10 µg	100	Z2501-07,Z2697-702
10 µg	95	12 µg	108	Z3236-42
10 µg	96	8 µg	112	23379-83
8 µg	96			23673-79, Z4011-23
8 µg	95	20 µg	100	Z4097-Z4111
8 µg	112	20 µg	101	Z5302-19, Z5640-42
8 µg	95	20 µg	95	Z5930-42, Z6523-32

• = outlier

Mean	99.7%	Mean	102.9%
SD	9.1%	SD	9.0%
cv	0.091	CV	0.088

TABLE E-l. ACID GASES ON SILICA GEL TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		H2SO4		
9 µg	122	8 µg	97	Y1634-48
		14 µg	84*	Y1642
1 µg	96	6 µg	95	Y1800-04, Y2068-74
15 µg	102	10 µg	104	Y1892-Y1902
		11 µg	128*	Y1902
11 µg	104	10 µg	106	Y2075-84
10 µg	103	10 µg	94	Y2566-74, Y3054-66
7 µg	94	10 µg	106	Y2718-24, Y2990-93
		8 µg	106	Y2992
11 µg	106	8 µg	82	Y2739-47, Y3351-54
10 µg	93	11 µg	111	Y3326-30
10 µg	120			Y3623-29, Y4723-37
		24 µg	93	Y4737
12 µg	90	8 µg	105	Y4179-83, Y5064-76
12 µg	103	10 µg	103	Y4074-94
12 µg	101	12 µg	100	Y5563-82
10 µg	100	15 µg	107	Y6065-76
		7.5 µg	99	Y7356-68
		14 µg	107	Y8119-34, Y8443-56
10 µg	108	12 µg	108	Y8486-90, Y9074-80
		13 µg	108	Y8896-Y8902
12 µg	98	11.5 µg	110	Y9749-68
10 µg	100	12 µg	100	Y9998-Z0016
10 µg	115	14 µg	100	Z0839-68
10 µg	80	11 µg	100	Z1213-22
10 µg	85	13 µg	108	Z1504-10
10 µg	85	13 µg	108	Z1621-26
10 µg	89	12 µg	100	Z2085-98
10 µg	101	9 µg	88	Z2501-07,Z2697-702
10 µg	100	10 µg	110	23236-42
10 µg	100	8 µg	106	Z3379-83
8 µg	103	20 µg	102	Z3673-79, Z4011-23
8 µg	81	20 µg	109	Z4097-Z4111
8 µg	110	20 µg	102	Z5302-19, Z5640-42
8 µg	100	20 µg	110	Z5930-42, Z6523-32
* = outlier				
Mean	99.6%	Mean	102.8%	
SD	10.4%	SD	8.6%	
cv	0.104	CV	0,083	

TABLE E-l. ACID GASES ON SILICA GEL TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		HCl		
10 µg	88	9 µg	111	Z2697-Z2702
10 µg	120	11 µg	91	Z3236-42
8 µg	100	10 µg	70	Z3379-83
8 µg	81	20 µg	117	Z3673-79, Z4011-23
8 µg	112	20 µg	84	Z4097-Z4111
8 µg	91	20 µg	94	Z5302-19, 25640-42
8 µg	103	20 µg	110	Z5930-42, Z6523-32
Mean	99.3%	Mean	96.7%	
SD.	13.8%	SD	16.9%	
cv	0.139	cv	0.174	
		Acetic		
10 µg	100	10 µg	100	Y6065-76
10 µg	100	10 µg	100	Y8119-34, Y8443-56
10 µg	100	12 µg	100	Y8486-90, Y9074-80
				Y8896-Y8902
10 µg	100	10 µg	100	Y9998-Z0016
10 µg	86	6 µg	83	Z0859-68
10 µg	89	9 µg	82	Z1213-22
10 µg	87	12 µg	100	Z1504-10
10 µg	87	12 µg	100	Z1621-26
10 µg	100	14 µg	114	Z2085-98
10 µg	109			Z2501-07,Z2697-702
10 µg	120	8 µg	100	Z3236-42
8 µg	88	20 µg	147*	Z3379-83
12 µg	75	9 µg	117	Z3673-79, Z4011-23
12 µg	83	10 µg	135	Z4097-Z4111
10 µg	98	10 µg	109	Z5302-19, Z5640-42
10 µg	110	10 µg	89	Z5930-42, Z6523-32
* = outlier				
Mean	95.8%	Mean	105.1%	
SD	11.6%	SD	17.6%	
cv	0.121	cv	0.168	

TABLE E-1. ACID GASES ON SILICA GEL TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.		
		Formic		
10 µg	100	10 µg	100	Y6065-76
10 µg	80	10 µg	80	Y8119-34, Y8443-56
12 µg	91	12 µg	92	Y8486-90, Y9074-80 Y8896-Y8902
10 µg	100	10 µg	100	Y9998-Z0016
10 µg	97	8 µg	100	Z0859-68
10 µg	100	10 µg	90	Z1213-22
10 µg	100	12 µg	83	Z1504-10
10 µg	100	12 µg	83	Z1621-26
10 µg	100	14 µg	86	Z2085-98
10 µg	108	14 µg	107	Z2501-07, Z2697-Z2702
10 µg	90	10 µg	110	Z3236-42
12 µg	100	9 µg	96	Z3379-83
10 µg	80	9 µg	125	Z3673-79, Z4011-23
14 µg	78	10 µg	128*	Z4097-Z4111
10 µg	89	10 µg	88	Z5302-19, Z5640-42
10 µg	103	10 µg	102	Z5930-42, Z6523-32
• = outlier				
Mean	94.8%	Mean	98.1%	
SD	9.0%	SD	14.2%	
CV	0.095	cv	0.144	

TABLE E-2. ORGANIC ACIDS ON ORBO 70 TUBES

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt	%	Amt.	%	
		Acetic		
11 µg	64	8 µg	100	Y1626-33
10 µg	102	14 µg	91	Y2088-100,Y2557-75
9 µg	104			Y2748-57
		10 µg	90	Y2757
9 µg	104			Y4095-115
Mean	93.5%	Mean	93.7%	
SD	19.7%	SD	5.5%	
cv	0.211	CV	0.059	
		Formic		
12 µg	100	8 µg	93	Y1626-33
12 µg	129			Y2748-57
12 µg	129			Y4095-115
Mean	119.3%			
SD	16.7%			
CV	0.140			

TABLE E-3. ANIONS ON HIGH VOLUME AIR FILTERS

Cl-		NO3-		SO4-	
Desorption Efficiencies (Average Percent)		Desorption Efficiencies (Average Percent)		Desorption Efficiencies (Average Percent)	
Amt.	%	Amt.	%	Amt.	%
8.6 µg	86	8 µg	80	10 µg	100
10 µg	110	10 µg	70	10 µg	90
10 µg	90			10 µg	100
				11 µg	110
Mean	95.3%	Mean	75.0%	Mean	100.0%
SD	12.9%	SD	7.1%	SD	8.2%
cv	0.135			CV	0.082
		Control Recoveries (Average Percent)			
20 µg	110	20 µg	90	20 µg	110
25 µg	88	25 µg	76	25 µg	108
10 µg	100	10 µg	80	10 µg	120
		10 µg	70	10 µg	130
Mean	99.3%	Mean	79.0%	Mean	117.0%
SD	11.0%	SD	8.4%	SD	10.1%
CV	0.111	CV	0.106	cv	0.087

Relevant samples: Selected filters were analyzed from sets Y5607-Y5706, Y6461-87, Y8241-64, Y8532-48, Y8944-Y9117, Y9819-36, Z0074-89, Z0764-94, Z4351-66, Z5461-80, Z5895-5970, and Z6542-51.

TABLE E-4. ASBESTOS FIBERS ON CE FILTERS

Controls Analyzed (NIOSH PAT Samples)	Fibers* Counted	Relevant Samples (Lab #s)
QS2739	107	Y1983-86
QS2743	108	"
QS2738	212	Y4196-Y4206

* Fiber count within NIOSH specified control limits.

TABLE E-5. BTX ON CHARCOAL TUBES/OVMs

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzene - CT		
1.76 mg	95	1.76 mg	84	Y0885-90,Y1100-02
		0.2 mg	92	Y1101
1.76 mg	82	1.76 mg	110	Y1598-Y1605
		1.75 mg	106	Y1713
0.176 mg	103	1.76 mg	85	Y1790-99
0.87 mg	79	0.176 mg	91	Y2711-17
0.44 mg	97	0.176 mg	102	Y3019-22
		2.6 mg	102	Y3021
0.26 mg	100	0.176 mg	88	Y3331-45
0.26 mg	79	0.29 mg	104	Y6079-87,Y6560-85
0.35 mg	101			
0.87 mg	83	0.24 mg	90	Y5125-30,Y8491-98, Y7397-Y7403
0.44 mg	80	0.20 mg	92	Y9059-61, Y9735-44
1.73 mg	92	0.176 mg	88	Y9972-82, 20800-16
		0.211 mg	105	"
		0.246 mg	a9	"
0.176 mg	93	0.53 mg	103	21204-12
Mean	90.3%	Mean	95.7%	
SD	9.2%	SD	8.6%	
CV	0.102	cv	0.089	
		Benzene - OVM		
0.176 mg	99	1.76 mg	97	Y1606-13,Y1781-89
0.44 mg	97	0.176 mg	94	Y3008-11
O-264 mg	96			Y3339-45
Mean	97.3%	Mean	95.5%	
SD	1.5%	SD	2.1%	
cv	0.016	cv	0.022	

TABLE E-5. BTX ON CHARCOAL TUBES/OVMs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Am	%	Am	%	
		Toluene - CT		
1.73 mg	99	1.91 mg	a5	Y0885-90,Y1100-02
		0.2 mg	91	Y1101
1.732 mg	7 9	1.74 mg	115	Y1598-Y1605
		1.75 mg	110	Y1713
0.173 mg	109	1.91 mg	al	Y1790-99
0.87 mg	80	1.73 mg	a7	Y2711-17
0.44 mg	97	1.73 mg	103	Y3019-22
		2.6 mg	101	Y3021
0.26 mg	105	1.73 mg	91	Y3331-45
0.26 mg	81	0.29 mg	102	Y6079-87,Y6560-85
0.35 mg	106			
0.87 mg	a4	0.25 mg	9s	Y5125-30,Y8491-98, Y7397-Y7403
0.44 mg	75	0.21 mg	97	Y9059-61, Y9735-44
0.173 mg	66	1.73 mg	141*	Y9972-82, 20800-16
		2.08 mg	148*	"
		2.43 mg	141*	"
0.173 mg	102	1.04 mg	95	Z1204-12
Mean	90.2%	mean	96.4%	
SD	14.3%	SD	9.8%	
cv	0.159	CV	0.101	
		Toluene - OVM		
0.173 mg	106	1.73 mg	9 0	Y1606-13,Y1781-89
0.44 mg	100	1.73 mg	9 7	Y3008-11
0.260 mg	103			Y3339-45
Mean	103.0%	Mean	93.5%	
SD	3.0%	SD	5.0%	
CV	0.029	CV	0.053	

• outliers

TABLE E-5. BTX ON CHARCOAL TUBES/OVMs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Xylene - CT		
1.74 mg	91	2.61 mg	94	Y0885-90,Y1100-02
		0.2 mg	102	Y1101
1.738 mg	84	2.32 mg	106	Y1598-Y1605
		1.75 mg	103	Y1713
1.738 mg	100	2.61 mg	91	Y1790-99
1.76 mg	80	1.74 mg	a9	Y2711-17
0.44 mg	95	1.73 mg	106	Y3019-22
		2.6 mg	105	Y3021
0.26 mg	108	2.61 mg	98	Y3331-45
0.26 mg	83	0.29 mg	99	Y6079-87,Y6560-85
0.35 mg	106			
0.87 mg	85	0.24 mg	94	Y5125-30,Y8491-98, Y7397-Y7403
0.44 mg	76	0.21 mg	97	Y9059-61, Y9735-44
1.738 mg	94	1.74 mg	103	Y9972-82, Z0800-16
		2.09 mg	106	"
		2.43 mg	100	"
1.738 mg	101	1.04 mg	99	Z1204-12
Mean	91.9%	Mean	99.5%	
SD	10.5%	SD	5.4%	
cv	0.114	cv	0.054	
		Xylene - OVM		
1.738 mg	107	1.738 mg	96	Y1606-13,Y1781-89
0.44 mg	100	1.74 mg	98	Y3008-11
0.261 mg	106			Y3339-45
Mean	104.3%	Mean	97.0%	
SD	3.8%	SD	1.4%	
cv	0.036	CV	0.015	

TABLE E-6. COAL TAR PITCH VOLATILES ON GLASS FIBER FILTERS

Statistics for Gravimetric Determination of Benzene Solubles

	20 mg Weight	50 mg Weight	100 mg Weight
	20.0314	50.056	100.122
	20.0310	50.057	100.121
	20.0304	50.053	100.122
	20.0301	50.052	100.121
	20.0303	50.054	100.119
	20.0300	50.054	100.120
	20.0304	50.057	100.117
	20.0309	50.053	100.120
	20.0300	50.054	100.119
	20.0275	50.053	100.118
Mean	20.0302	50.054	100.120
SD	0.001056	0.001767	0.001663
cv	0.0000527	0.0000353	0.0000166
VAR	0.0000011	0.0000031	0.0000027

Cahn Model 29 Automatic Electrobalance used:
Date Calibrated: 31 Oct 90
Expiration of Calibration: 31 Oct 91

OSHA Method 58 states that the detection limit of the analytical method corresponds to twice the standard deviation of the precision data for the 50 mg weight (taking a dilution factor of 2 into account). Therefore the detection limit for the procedure is 0.007 mg/sample x2 x2, or 7 µg/sample.

Relevant Samples (Lab #s)

Y0891-95	Y3003-09	Y9052-58
Y1094-96	Y3302-07	Y9721-30
Y1590-97	Y5606-50	Y9987-97
Y1825-29	Y7404-09	Z0822-38
Y2702-10	Y8475-85	Z1188-95

TABLE E-7. CRITERIA POLLUTANTS (GASEOUS) ON DOSIMETERS

Internal Controls (Average Recoveries)		Control Recoveries* (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Am	%	
		NO/NO2		
0.6 µg/mL	96	6 µg	102	Y1841-45, Y4041-49 Y4192-95
0.6 µg/mL	101	6 µg	88	Y2019-22, Y2700
0.6 µg/mL	101			Y2586-90
0.6 µg/mL	99	6 µg	96	Y3084-85, Y3359-65
0.6 µg/mL	108			Y4655-56, Y5592
		6 µg	98	Y7351-55, Y8228
		6 µg	95	Y8421-25
		2 µg	98	Z3690-92,Z3994-01,
		2 µg	90	Z4140-51,Z5353-56, Z5661-67,Z5957-58
Mean	101.0 %	Mean	95.3 %	
SD	4.4 %	SD	4.9 %	
cv	0.044	CV	0.051	
		SO2		
12 µg	102	10 µg	114	Y4017-28,Y7346-50, Y8227, Y8416-20 .
10 µg	130			Z3684-86,Z3986-93
10 µg	97			Z4128-39,Z5357-62
10 µg	120	4 µg	100	Z5668-73
Mean	112.3 %	Mean	107.0 %	
SD	15.4 %	SD	9.9 %	
cv	0.137	CV	0.093	

- External controls (spiked filters)

TABLE E-7. CRITERIA POLLUTANTS (GASEOUS) ON DOSIMETERS (Continued)

Internal Controls (Average Recoveries)		Control Recoveries* (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Am	%	
		Ozone		
20 µg	120			Y1851-55
5 µg	70			Y3088-89, Y3346-50
5 µg	88			Y4029-40
20 µg	92			
20 µg	107			
5 µg	75			
		20 µg	128	Y2027-30, Y2580-82
20 µg	95			Y4184-87, Y4662-66
				Y5586-88, Y7342-45
10 µg	80	10 µg	95	Y4043, Y8226
				Y8412-15
10 µg	90			Z3687-89,Z3978-85
10 µg	98			24116-27
15 µg	100			"
10 µg	120			Z3547-52
10 µg	110			Z5654-60
Mean	95.8 %	Mean	111.5 %	
SD	15.8 %	SD	23.3 %	
CV	0.165	CV	0.209	

• External controls (spiked filters)

TABLE E-8. NOx/SO2 ON OREO 76 TUBES

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples. (Lab #s)
Amt.	%	Amt.	%	
		NOx		
		6 µg	108	Y1614-20
12 µg	95	10 µg	97	Y1819-24
10 µg	100	12 µg	70	Y2031-44
10 µg	80	11 µg	127	Y3013-18
15 µg	100	3.5 µg	140	Y3017
Mean	93.8%	Mean	108.4%	
SD	9.5%	SD	27.2%	
CV	0-101	CV	0.250	
		SO2		
		6 µg	98	Y1614-20
13 µg	85	10 µg	71	Y1819-24
10 µg	130	12 µg	100	Y2031-44
10 µg	110			Y3013-18
11 µg	45*			Y3294-Y3301
Mean	108.3%	Mean	85.5%	
SD	22.6%	SD	20.5%	
CV	0.208	cv	0.240	

• outlier (interference, value not used to correct samples)

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt	%	Amt.	%	
		Naphthalene		
20 µg	<5			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	<5	14 µg	<5	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	<5	9 µg	<5	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, 20887-88
3 Spikes (<5%) Average				Y5602, 20017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
		2-Methylnaphthalene		
10 µg	<5	9 µg	<5	Y7327-29 thru 25333
		1-Methylnaphthalene		
10 µg	<5	9 µg	cs	Y7327-29 thru 25333
		Biphenyl		
10 µg	<5	9 µg	<5	Y7327-29 thru 25333.

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Am	%	
		2,6-Dimethylnaphthalene		
10 µg	<5	9 µg	<5	Y7327-29 thru 25333
		Acenaahthylene		
20 µg	<5			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	<5	14 µg	<5	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	5	9 µg	144	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes Average	(<5%)			Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
		Acenaphthene		
20 µg	<5			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	<5	14 µg	<5	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Acenaphthene (Continued)		
10 µg	25	9 µg	44	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes (<12%) Average				Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
		Fluorene		
20 µg	42			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	14	14 µg	36	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	42	9 µg	92	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes (33%)				Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
Mean	32.7%			
SD	16.2%			
CV	0.495			

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Dibenzofuran		
10 µg	15	9 µg	103	Y7327-29 thru 25333
		Phenanthrene		
20 µg	105			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	20	14 µg	64	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	89	9 µg	101	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes Average	(71%)			Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
Mean	71.3%			
SD	48.8%			
CV	0-684			
		Anthracene		
20 µg	90			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	42	14 µg	65	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Anthracene (Continued)		
10 µg	98	9 µg	100	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes Average	(77%)			Y5602, Z0017-19, Z0072-73, Z0869-86, 21223-28, Z1500-03, 2X649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, Z5333
Mean	76.7%			
SD	39.6%			
cv	0.516			
		Carbazole		
10 µg	68	9 µg	167	Y7327-29 thru Z5333
		Fluoranthene		
20 µg	150			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	152	14 µg	70	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	110	9 µg	100	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Fluoranthene (Continued)		
3 Spikes (137%) Average				Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, Z4277, 25333
Mean	137.3%			
SD	23.7%			
CV	0.173			
		Pyrene		
20 µg	130			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	120	14 µg	51	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	120	9 µg	102	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes (123%) Average				Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
Mean	123.3			
SD	s.8%			
CV	0.047			
		Benzo(a)anthracene		
20 µg	94			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benz anthracene (Continued)		
5 µg	108	14 µg	73	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	120	9 µg	102	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes (107%) Average				Y5602, 20017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, 21649-54, Z2117-19, Z2508-10, Z2730-35, 23017-19, 24277, 25333
Mean	107.3%			
SD	13.0%			
CV	0.121			
		Chrysene		
20 µg	91			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	102	14 µg	112	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	120	9 µg	102	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt	%	Amt.	%	
		Chrysene (Continued)		
3 Spikes (104%) Average				Y5602, 20017-19, 20072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
Mean	104.3%			
SD	14.6%			
cv	0.140			
		Benzo(b)fluoranthene		
20 µg	100			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	114	14 µg	94	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	120	9 µg	102	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes (111%) Average				Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
Mean	111.3%			
SD	10.3%			
CV	0.092			

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(k)fluoranthene		
20 µg	80			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	118	14 µg	79	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	120	9 µg	102	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes (106%) Average				Y5602, 20017-19, X0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, 23017-19, 24277, 25333
Mean	106.0%			
SD	22.5%			
CV	0.213			
		Benzo(e)pyrene		
10 µg	120	9 µg	102	Y7327-29 thru 25333
		Benzo(a)pyrene		
20 µg	91			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	72	14 µg	99	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(a)pyrene (Continued)		
10 µg	93	9 µg	119	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes Average				Y5602, Z0017-19, 20072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
Mean	85.3%			
SD	11.6%			
CV	0.136			
		Indeno(1,2,3-cd)pyrene		
20 µg	60			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	92	14 µg	101	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	110	9 µg	111	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes Average	(87%)			Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, Z5333
Mean	87.3%			
SD	25.3%			
CV	0.290			

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Dibenzo(ah)anthracene		
20 µg	85			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	92	14 µg	101	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	110	9 µg	111	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88
3 Spikes (96%) Average				Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, Z5333
Mean	95.7%			
SD	12.9%			
CV	0.135			
		Benzo(ghi)perylene		
20 µg	90			Y3369, Y3373-34, Y4450-57, Y4755-59, Y5140-45, Y5733-40
5 µg	92	14 µg	101	Y5593-Y5601, Y5603-06, Y6488-97, Y7317-26, Y8231-39
10 µg	110	9 µg	111	Y7327-29, Y8229-30, Y8240, Y8457-65, Y8936, Y9100-05, Y9716-20, Z0887-88

TABLE E-9. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(ghi)perylene (Continued)		
3 Spikes Average	(97%)			Y5602, Z0017-19, Z0072-73, Z0869-86, Z1223-28, Z1500-03, Z1649-54, Z2117-19, Z2508-10, Z2730-35, Z3017-19, 24277, 25333
mean	97.3%			
SD	11.0%			
cv	0.113			

TABLE E-10. PAHs ON HIGH VOLUME AIR FILTERS

Travel Spike Recoveries

Theo. Amt.	Amt. Found	% Recovered	Sample #
	Naphthalene		
7.0 µg	< 20 µg	N/A	01H238939
7.0 µg	< 20 µg	N/A	LCSpike2
	Acenaphthylene		
6.9 µg	< 4 µg	N/A	01H238939
6.9 µg	< 4 µg	N/A	LCSpike2
	Acenaphthene		
6.2 µg	< 1.5 µg	N/A	01H238939
6.2 µg	< 1.5 µg	N/A	LCSpike2
	Fluorene		
6.4 µg	8.0 µg	125	01H238939
6.4 µg	11.0 µg	172	LCSpike2
	Phenanthrene		
7.4 µg	8.1 µg	109	01H238939
7.4 µg	7.8 µg	105	LCSpike2
	Anthracene		
6.6 µg	6.6 µg	100	01H238939
6.6 µg	5.2 µg	79	LCSpike2

TABLE E-JO. PAHs ON HIGH VOLUME AIR FILTERS (Continued)

Travel Spike Recoveries

Theo. Amt.	Found	% Recovered	Snike #
	Fluoranthene		
6.3 µg	6.6 µg	105	01H238939
6.3 µg	6.4 µg	102	LCSpike2
	Pyrene		
7.2 µg	5.8 µg	81	01H238939
7.2 µg	5-0 µg	69	LCSpike2
	Benzo(a)anthrancene		
6.3 µg	4.4 µg	70	01H238939
6.3 µg	4.2 µg	67	LCSpike2
	Chrysene		
2.4 µg	2.7 µg	133	01H238939
2.4 µg	2.5 µg	104	LCSpike2
	Benzo(b)fluoranthene		
6.4 µg	5.6 µg	88	01H238939
6.4 µg	5.7 µg	89	LCSpike2

TABLE E-10. PAHs ON HIGH VOLUME-AIR FILTERS (Continued)

Travel Spike Recoveries

Theo. Amt.	Amt. Found	% Recovered	Spike #
	Benzo(k)fluoranthene		
5.2 µg	4.6 µg	88	01H238939
5.2 µg	4.4 µg	85	LCSpike2
	Benzo(a)pyrene		
10.2 µg	10.0 µg	98	01H238939
10.2 µg	7.2 µg	71	LCSpike2
	Indeno(1,2,3-cd)pyrene		
6.3 µg	7.3 µg	116	01H238939
6.3 µg	6.4 µg	102	LCSpike2
	Dibenzo(ah)anthracene		
2.1 pg.	3.8 µg	181	01H238939
2.1 µg	3.1 µg	148	LCSpike2
	Benzo(ghi)perylene		
6.4 µg	4.8 µg	75	01H238939
6.4 µg	4.7 µg	73	LCSpike2

TABLE E-11. PAHs ON PUFs

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Naphthalene		
6 µg	33	6 µg	150	Y1643-48, Y1712 Y1876-83, Y2008-18
		6 µg	•	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	*	Y4682
6 µg	74	6 µg	95	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	74	8 µg	76	Y5124 Y5106-24
		3.7 µg 4.2 µg	74 *	Y5476-Y5503
Mean	60.3%	Mean	98.8%	
SD	23.7%	SD	35.4%	
CV	0.392	CV	0.359	
		Acenaphthylene		
6 µg	37	6 µg	108	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	86	6 µg	68	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	107	Y4682
6 µg	96	6 µg	100	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	86	8 µg	84	Y5124 Y5106-24
		3.7 µg 4.1 µg	57 *	Y5476-Y5503
Mean	76.2%	Mean	87.3%	
SD	26.6%	SD	21.4%	
CV	0.349	CV	0.244	

• interference

TABLE E-11. PAHs ON PUFs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Acenaphthene		
6 µg	40	6 µg	112	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	87	6 µg	105	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	100	Y4682
6 µg	69	6 µg	108	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	78	8 µg	102	Y5124 Y5106-24
		3.3 µg	64	Y5476-Y5503
		3.7 µg	*	
Mean	68.5%	Mean	98.5%	
SD	20.4%	SD	17.4%	
CV	0.297	CV	0.177	
		Fluorene		
6 µg	42	6 µg	107	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	88	6 µg	107	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	103	Y4682
6 µg	78	6 µg	118	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	83	8 µg	12s	YS124 Y5106-24
		3.4 µg	64	Y5476-Y5503
		3.9 µg	44	
Mean	72.8%	Mean	95.4%	
SD	20.9%	SD	29.8%	
cv	0.287	CV	0.313	

• interference

TABLE E-11. PAHs ON PUFs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Phenanthrene		
6 µg	43	µg		Y1876-83, Y2008-18
6 µg	92	6 µg	105	Y2549-52, Y2671-84
		6	108	Y3090-Y3100
		6 µg	105	Y1643-48, Y1712 Y4682
6 µg	82	6 µg	103	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	87	8 µg	104	Y5124 Y5106-24
		3.9 µg	110	Y5476-Y5503
		4.4 µg	61	
Mean	76.0%	Mean	99.4%	
SD	22.4%	SD	17.1%	
CV	0.294	CV	0.172	
		Anthracene		
6 µg	43	6 µg	101	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	82	6 µg	103	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	115	Y4682
6 µg	76	6 µg	108	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	79	8 µg	102	Y5124 Y5106-24
		3.5 µg	118	Y5476-Y5503
		4-0 µg	91	
Mean	70.0%	Mean	105.4%	
SD	18.2%	SD	9.1%	
CV	0.260	CV	0-087	

TABLE E-11. PAHs ON PUFs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Fluoranthene		
6 µg	48	6 µg	101	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	97	6 µg	107	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	103	Y4682
6 µg	82	6 µg	107	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	90	8 µg	111	Y5124 Y5106-24
		3.4 µg	66	Y5476-Y5503
		3.8 µg	79	
Mean	79.2%	Mean	96.3%	
SD	21.7%	S D	17.0%	
CV	0.274	CV	0.176	
		Pyrene		
6 µg	47	6 µg	103	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	100	6 µg	100	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	95	Y4682
6 µg	81	6 µg	107	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	91	8 µg	106	Y5124 Y5106-24
		3.8 µg	65	Y5476-Y5503
		4.3 µg	81	
Mean	79.8%	Mean	93.9%	
SD	23.2%	SD	15.5%	
cv	0.291	CV	0.165	

TABLE E-11. PAHs ON PUFs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt	%	
		Benzo(a)anthrancene		
6 µg	so	6 µg	97	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	93	6 µg	105	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	113	Y4682
6 µg	83	6 µg	108	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	88	8 µg	100	YS124 Y5106-24
		3.4 µg	71	Y5476-Y5503
		3.8 µg	90	
Mean	78.5%	Mean	97.7%	
SD	19.4%	SD	14.0%	
CV	0.248	CV	o-143	
		Chrysene		
6 µg	50	6 µg	97	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	107	6 µg	107	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	100	Y4682
6 µg	85	6 µg	107	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	93	8 µg	122	YS124 Y5106-24
		1.3 µg	59	Y5476-Y5503
		l-4 µg	90	
Mean	03.8%	Mean	97.4%	
SD	24.3%	SD	19.7%	
cv	0.290	cv	0,202	

TABLE E-11. PAHs ON PUFs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(b)fluoranthene		
6 µg	53	6 µg	157	Y1643-48, Y1712
				Y1876-83, Y2008-18
6 µg	77	6 µg	108	Y2549-52, Y2671-84
				Y3090-Y3100
		6 µg	1 0 7	Y4682
6 µg	84	6 µg	108	Y3279-81, Y3292-93
				Y3644-48
				Y4050-73, Y4162-66
6 µg	81	8 µg	97	YS124
				Y5106-24
		3.4 µg	81	Y5476-Y5503
		3.9 µg	108	
Mean	73.8%	Mean	109.4%	
SD	14.1%	SD	23.2%	
cv	0.192	CV	0.212	
		Benzo(k)fluoranthene		
6 µg	SO	6 µg	100	Y1643-48, Y1712
				Y1876-83, Y2008-18
6 µg	100	6 µg	100	Y2549-52, Y2671-84
				Y3090-Y3100
		6 µg	108	Y4682
6 µg	82	6 µg	105	Y3279-81, Y3292-93
				Y3644-48
				Y4050-73, Y4162-66
6 µg	91	8 µg	12s	Y5124
				Y5106-24
		2.8 µg	68	Y5476-Y5503
		3.2 µg	89	
Mean	80.8%	Mean	99.3%	
SD	21.8%	SD	17.6%	
cv	0.270	cv	0.177	

TABLE E-11. PAHs ON PUFs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(a)pyrene		
6 µg	47	6 µg	96	Y1643-48, Y1712
				Y1876-83, Y2008-18
6 µg	88	6 µg	107	Y2549-52, Y2671-84
				Y3090-Y3100
		6 µg	117	Y4682
6 µg	78	6 µg	112	Y3279-81, Y3292-93
				Y3644-48
				Y4050-73, Y4162-66
6 µg	83	8 µg	88	YS124
				Y5106-24
		5.4 µg	64	Y5476-Y5503
		6.1 µg	83	
Mean	74.0%	Mean	95.3%	
SD	18.5%	SD	18.6%	
CV	0.249	CV	0.19s	
		Indeno(1,2,3-cd)pyrene		
6 µg	43	6 µg	101	Y1643-48, Y1712
				Y1876-83, Y2008-18
6 µg	83	6 µg	100	Y2549-52, Y2671-84
				Y3090-Y3100
		6 µg	100	Y4682
6 µg	80	6 µg	110	Y3279-81, Y3292-93
				Y3644-48
				Y4050-73, Y4162-66
6 µg	82	8 µg	96	YS124
				Y5106-24
		3.4 µg	74	Y5476-Y5503
		3.8 µg	93	
Mean	72.0%	Mean	96.3%	
SD	19.4%	SD	11.2%	
CV	0.269	CV	0.116	

TABLE E-11. PAHs ON PUFs (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Dibenzo(ah)anthracene		
6 µg	43	6 µg	105	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	83	6 µg	107	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	112	Y4682
6 µg	83	6 µg	100	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	83	8 µg	97	YS124 Y5106-24
		1.1 µg	74	Y5476-Y5503
		l-3 µg	103	
Mean	73.0%	Mean	99.7%	
SD	20.0%	SD	12.3%	
CV	0.274	CV	0.124	
		Benzo(ghi)perylene		
6 µg	45	6 µg	96	Y1643-48, Y1712 Y1876-83, Y2008-18
6 µg	131	6 µg	103	Y2549-52, Y2671-84 Y3090-Y3100
		6 µg	105	Y4682
6 µg	79	6 µg	110	Y3279-81, Y3292-93 Y3644-48 Y4050-73, Y4162-66
6 µg	79	8 µg	112	YS124 Y5106-24
		3.4 µg	76	Y5476-Y5503
		3.9 µg	111	
Mean	83.5%	Mean	101.9%	
SD	35.5%	SD	12.7%	
CV	0.425	CV	0.125	

TABLE E-12. PUF TRAVEL SPIKE RECOVERIES

Theo. Amt.	Amt. Found	% Recovered	Saike #
	Naphthalene		
2.4 µg	3.6 µg	150	LCSpikel
2.4 µg	3.0 µg	125	LCSpike2
2.4 µg	2.2 µg	92	LCSpike3
2.4 µg	5.2 µg	217	LCSpike4
2.4 µg	3.8 µg	158	LCSpikeS
4.8 µg	6.1 µg	127	LCSpike7
	Mean	144.8%	
	SD	42.2%	
	CV	0.292	
	Acenaphthylene		
2.3 µg	2.3 µg	100	LCSpikel
2.3 µg	2.2 µg	96	LCSpike2
2.3 µg	1-4 µg	61	LCSpike3
2-3 µg	3.6 µg	157	LCSpike4
2.3 µg	2.0 µg	87	LCSpikeS
4.6 µg	4.8 µg	104	LCSpike7
	Mean	100.7%	
	SD	31.4%	
	cv	0.312	
	Acenaphthene		
2.1 µg	2.9 µg	138	LCSpikel
2.1 µg	2.8 µg	133	LCSpike2
2.1 µg	1.1 µg	52	LCSpike3
2.1 µg	3.2 µg	152	LCSpike4
2.1 µg	2.2 µg	105	LCSpikeS
4.2 µg	4.4 µg	105	LCSpike7
	Mean	114.3%	
	SD	35.8%	
	CV	0.313	

TABLE E-12. PUF TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Spike #
		Fluorene	
2.2 µg	3-l µg	141	LCSpikel
2.2 µg	2.6 µg	118	LCSpike2
2.2 µg	1.4 µg	64	LCSpike3
2.2 µg	3.2 µg	14s	LCSpike4
2.2 µg	2.2 µg	100	LCSpikeS
4.4 µg	4.4 µg	100	LCSpike7
	Mean	111.4%	
	SD	30.4%	
	CV	0.273	
		Phenanthrene	
2.5 µg	4.0 µg	160	LCSpikel
2.5 µg	3.5 µg	140	LCSpike2
2.5 µg	1.6 µg	64	LCSpike3
2.5 µg	3.7 µg	148	LCSpike4
2.5 µg	2.4 µg	96	LCSpike5
4.9 µg	4.9 µg	100	LCSpike7
	Mean	118.0%	
	SD	37.1%	
	cv	0.314	
		Anthracene	
2.2 µg	2.9 µg	132	LCSpikel
2.2 µg	2-7 µg	123	LCSpike2
2.2 µg	1.2 µg	55	LCSpike3
2.2 µg	3.3 µg	150	LCSpike4
2.2 µg	2.2 µg	100	LCSpike5
4.4 µg	4.4 µg	100	LCSpike7
	Mean	109.8%	
	SD	33.2%	
	CV	0.302	

TABLE E-12. PUF TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Found	% Recovered	Spike #
		Fluoranthene	
2.1 µg	2.9 µg	138	LCSpikel
2.1 µg	2.4 µg	114	LCSpike2
2.1 µg	2.0 µg	9s	LCSpike3
2.1 µg	3.0 µg	143	LCSpike4
2.1 µg	2.0 µg	95	LCSpikeS
4-2 µg	4.2 µg	100	LCSpike7
	Mean	114.3%	
	SD	21.5%	
	CV	0.188	
		Pyrene	
2.4 µg	3-4 µg	142	LCSpikel
2.4 µg	2.9 µg	121	LCSpike2
2.4 µg	1.5 µg	63	LCSpike3
2.4 µg	3.5 µg	146	LCSpike4
2.4 µg	2.2 µg	92	LCSpike5
4.8 µg	4.8 µg	100	LCSpike7
	Mean	110.4%	
	SD	31.9%	
	cv	0.289	
		Benzo(a)anthrancene	
2.1 µg	3.0 µg	143	LCSpikel
2.1 µg	2.4 µg	114	LCSpike2
2.1 µg	1.4 µg	67	LCSpike3
2.1 µg	3-4 µg	162	LCSpike4
2.1 µg	2.2 µg	105	LCSpikeS
4.2 µg	4-6 µg	110	LCSpike7
	Mean	116.7%	
	SD	33.0%	
	CV	0.282	

TABLE E-12. PUF TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt. a	Amt. Found	%kRecovered e	#
	Chrysene		
0.8 µg	1.1 µg	138	LCSpikel
0.8 µg	1.0 µg	119	LCSpike2
0.8 µg	0.6 µg	70	LCSpike3
0.8 µg	1.2 µg	150	LCSpike4
0.8 µg	0.7 µg	91	LCSpikeS
1.6 µg	1 . 5 µg	94	LCSpike7
	Mean	110.2%	
	SD	30.5%	
	CV	0.277	
	Benzo (b)fluoranthene		
2.2 µg	3-l µg	141	LCSpikel
2.2 µg	2.6 µg	118	LCSpike2
2.2 µg	1.6 µg	73	LCSpike3
2.2 µg	3-a µg	173	LCSpike4
2.2 µg	2.6 µg	118	LCSpikeS
4.3 µg	5.2 µg	121	LCSpike7
	Mean	123.9%	
	SD	32.8%	
	cv	0.264	
	Bnzo(k)fluoranthene		
1.8 µg	2.7 µg	150	LCSpikel
1.8 µg	2.1 µg	117	LCSpike2
1.8 µg	1.1 µg	61	LCSpike3
1.8 µg	2.6 µg	144	LCSpike4
1.8 µg	1.5 µg	83	LCSpike5
3.5 µg	3.5 µg	100	LCSpike7
	Mean	109.3%	
	SD	34.7%	
	CV	0.318	

TABLE E-12. PUF TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Spike #
		Benzo(a)pyrene	
3.4 µg	4.7 µg	138	LCSpikel
3.4 µg	3.8 µg	112	LCSpike2
3.4 µg	1.9 µg	56	LCSpike3
3.4 µg	5.3 µg	156	LCSpike4
3.4 µg	3.2 µg	94	LCSpike5
6.8 µg	7.3 µg	107	LCSpike7
	Mean	110.5%	
	SD	34.9%	
	CV	0.316	
		Indeno(1,2,3-cd)pyrene	
2.1 µg	3.2 µg	152	LCSpikel
2.1 µg	2.5 µg	119	LCSpike2
2.1 µg	1.5 µg	71	LCSpike3
2.1 µg	3.6 µg	-171	LCSpike4
2.1 µg	2.3 µg	110	LCSpikeS
4.2 µg	4.9 µg	117	LCSpike7
	Mean	123.4%	
	SD	34.9%	
	CV	0.283	
		Dibenzo(ah)anthracene	
0.7 µg	1.1 µg	157	LCSpikel
0.7 µg	0.6 µg	91	LCSpike2
0.7 µg	0.6 µg	79	LCSpike3
0.7 µg	1.2 µg	171	LCSpike4
0.7 µg	0.8 µg	117	LCSpikeS
1.4 µg	1.7 µg	1 2 1	LCSpike7
	Mean	122.9%	
	SD	36.1%	
	CV	0.294	

TABLE E-12, PUF TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Spike #
	Benzo(ghi)perylene		
2.2 µg	3.4 µg	155	LCSpike1
2.2 µg	2.6 µg	118	LCSpike2
2.2 µg	1.5 µg	68	LCSpike3
2.2 µg	3.7 µg	168	LCSpike4
2.2 µg	2.4 µg	109	LCSpike5
4.3 µg	5.1 µg	119	LCSpike7
	Mean	122.8%	
	SD	35.4%	
	CV	0.288	

TABLE E-13. PAHs ON XAD2 TUBES

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Naphthalene		
6 µg	37			Y1667-69, Y1884-91
6 µg	35	6 µg	112	Y2045-53, Y2553-56,
		3.8 µg	55	Y2661-88, Y3075-83,
		3.3 µg	6	Y3282-86, Y3637-43
6 µg	54	4.2 µg	13	Y4116-36
		6 µg	9	Y8895
Mean	42.0%	Mean	39.0%	
SD	10.4%	SD	45.4%	
cv	0.249	cv	1.164	
		Acenaphthylene		
6 µg	33			Y1667-69, Y1884-91
6 µg	37	6 µg	108	Y2045-53, Y2553-56,
		3.7 µg	49	Y2661-88, Y3075-83,
		3.2 µg	13	Y3282-86, Y3637-43
6 µg	57	4.1 µg	116	Y4116-36
		6 µg	28	Y8895
Mean	42.3%	Mean	62.8%	
SD	12.8%	SD	46.8%	
cv	0.304	CV	0.745	
		Acenaphthene		
6 µg	38			Y1667-69, Y1884-91
6 µg	38	6 µg	109	Y2045-53, Y2553-56,
		3.3 µg	48	Y2661-88, Y3075-83,
		2.9 µg	27	Y3282-86, Y3637-43
6 µg	50	3.7 µg	122	Y4116-36
		6 µg	33	Y8895
Mean	42.0%	Mean	67.8%	
SD	6.9%	SD	44.4%	
CV	0.165	cv	0.656.	

TABLE E-13. PAHs ON XAD2 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Fluorene		
6 µg	39			Y1667-69, Y1884-91
6 µg	38	6 µg	113	Y2045-53, Y2553-56,
		3.4 µg	56	Y2661-88, Y3075-83,
		3-0 µg	47	Y3282-86, Y3637-43
6 µg	52	3.9 µg	*	Y4116-36
		6 µg	87	Y8895
Mean	43.0%	Mean	75.8%	
SD	7.8%	SD	30.2%	
CV	0.182	CV	0.398	
		Phenanthrene		
6 µg	45			Y1667-69, Y1884-91
6 µg	40	6 µg	102	Y2045-53, Y2553-56,
		3.9 µg	62	Y2661-88, Y3075-83,
		3.4 µg	71	Y3282-86, Y3637-43
6 µg	62	4.4 µg	116	Y4116-36
		6 µg	58	Y8895
Mean.	49.0%.	Mean	81.8%	
SD	11.5%	SD	25.8%	
CV	0.235	cv	0.315	
		Anthracene		
6 µg	43			Y1667-69, Y1884-91
6 µg	40	6 µg	90	Y2045-53, Y2553-56,
		3.5 µg	60	Y2661-88, Y3075-83,
		3.1 µg	52	Y3282-86, Y3637-43
6 µg	56	4-0 µg	119	Y4116-36
		6.0 µg	58	Y8895
Mean	46.3%	Mean	75.8%	
SD	8.5%	SD	28.3%	
CV	0.184	cv	0.373	

• interference

TABLE E-13. PAHs ON XAD2 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Fluoranthene		
6 µg	53			Y1667-69, Y1884-91
6 µg	47	6 µg	100	Y2045-53, Y2553-56,
		3.4 µg	59	Y2661-88, Y3075-83,
		2.9 µg	93	Y3282-86, Y3637-43
6 µg	89	3.9 µg	98	Y4116-36
		6 µg	85	Y8895
Mean	63.0%	Mean	87.0%	
SD	22.7%	SD	16.7%	
CV	0.361	CV	0.192	
		Pyrene		
6 µg	54			Y1667-69, Y1884-91
6 µg	48	6 µg	105	Y2045-53, Y2553-56,
		3.8 µg	60	Y2661-88, Y3075-83,
		3.4 µg	94	Y3282-86, Y3637-43
6 µg	92	4.3 µg	127	Y4116-36
		6 µg	77	Y8895
Mean	64.7%	Mean	92.6%	
SD	23.9%	SD	25.7%	
CV	0.369	CV	0.278	
		Benzo(a)anthracene		
6 µg	47			Y1667-69, Y1884-91
6 µg	47	6 µg	114	Y2045-53, Y2553-56,
		3.4 µg	62	Y2661-88, Y3075-83,
		2.9 µg	103	Y3282-86, Y3637-43
6 µg	69	3.8 µg	135	Y4116-36
		6 µg	*	Y8895
Mean	54.3%	Mean	103.5%	
SD	12.7%	SD	30.7%	
CV	0.234	CV	0.296	

* interference

TABLE E-13. PAHs ON XAD2 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Chrysene		
6 µg	53			Y1667-69, Y1884-91
6 µg	42	6 µg	103	Y2045-53, Y2553-56,
		1.3 µg	59	Y2661-88, Y3075-83,
		1.1 µg	109	Y3282-86, Y3637-43
6 µg	43	1.4 µg	•	Y4116-36
		6 µg	*	Y8895
Mean	46.0%	Mean	90.3%	
SD	6.1%	SD	27.3%	
CV	0.132	CV	0.302	
		Benzo(b)fluoranthene		
6 µg	127			Y1667-69, Y1884-91
6 µg	80	6 µg	107	Y2045-53, Y2553-56,
		3.4 µg	68	Y2661-88, Y3075-83,
		3.0 µg	113	Y3282-86, Y3637-43
6 µg	75	3.9 µg	83	Y4116-36
		6 µg	138	Y8895
Mean	94.0%	Mean	101.8%	
SD	28.7%	SD	27.2%	
CV	0.305	cv	0.267	
		Benzo(k)fluoranthene		
6 µg				Y1667-69, Y1884-91
6 µg	52	6 µg	100	Y2045-53, Y2553-56,
		2.8 µg	61	X2661-88, Y3075-83,
		2.4 µg	108	Y3282-86, Y3637-43
6 µg	30	3.2 µg	•	Y4116-36
		6 µg	123	Y8895
Mean	41.7%	Mean	98.0%	
SD	11.1%	SD	26.4%	
cv	0.266	CV	0.270	

• interference

TABLE E-13. PAHs ON XAD2 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(a)pyrene		
6 µg	43			Y1667-69, Y1884-91
6 µg	40	6 µg	92	Y2045-53, Y2553-56,
		5.4 µg	54	Y2661-88, Y3075-83,
		4.8 µg	88	Y3282-86, Y3637-43
6 µg	76	6.1 µg	134	Y4116-36
		6 µg	155	Y8895
Mean	53.0%	Mean	104.6%	
SD	20.0%	SD	40.0%	
cv	0.377	CV	0.382	
		Indeno(1,2,3-cd)pyrene		
6 µg	48			Y1667-69, Y1884-91
6 µg	38	6 µg	110	Y2045-53, Y2553-56,
		3.4 µg	62	Y2661-88, Y3075-83,
		2.9 µg	100	Y3282-86, Y3637-43
6 µg	56	3.8 µg	111	Y4116-36
		6 µg	78	Y8895
Mean	47.3%	Mean	92.2%	
SD	9.0%	SD	21.5%	
cv	0.190	Cv	0.233	
		Dibenzo(ah)anthracene		
6 µg	52			Y1667-69, Y1884-91
6 µg	37	6 µg	103	Y2045-53, Y2553-56,
		1.1 µg	63	Y2661-88, Y3075-83,
		1.0 µg	110	Y3282-86, Y3637-43
6 µg	58	1.3 µg	111	Y4116-36
		6 µg	83	Y8895
Mean	49.0%	Mean	94.0%	
SD	10.8%	SD	20.7%	
CV	0.221	cv	0,220	

TABLE E-13. PAHs ON XAD2 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(ghi)perylene		
6 µg	53			Y1667-69, Y1884-91
6 µg	47	6 µg	103	Y2045-53, Y2553-56,
		3.4 µg	62	Y2661-88, Y3075-83,
		3.0 µg	113	Y3282-86, Y3637-43
6 µg	61	3.9 µg	127	Y4116-36
		6.0 µg	87	Y8895
Mean	53.7%	Mean	98.4%	
SD	7.0%	SD	25.0%	
cv	0.131	CV	0.254	

TABLE E-14. XAD2 TUBES, TRAVEL SPIKE RECOVERIES

Theo. Amt.	Amt. Found	% Recovered	Swike #
		Nawhthalene	
2.4 µg	3.8 µg	158	LCSpikel
2.4 µg	3.4 µg	142	LCSpike2
		Acenawhthvlene	
2.3 µg	6.0 µg	261	LCSpikel
2.3 µg	4.3 µg	187	LCSpike2
		Acenaphthene	
2.1 µg	2.6 µg	124	LCSpikel
2.1 µg	1.8 µg	86	LCSpike2
		Fluorene	
2.2 µg	3.0 µg	136 136	LCSpikel
µg	µg		LCSpike2
		Phenanthrene	
2.5 µg	3.6 µg	144	LCSpikel
2.5 µg	3.9 µg	156	LCSpike2
		Anthracene	
2.2 µg	3.3 µg	150	LCSpikel
2.2 µg	3.6 µg	164	LCSpike2

TABLE E-14. XAD2 TUBES, TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Spike #
	Fluoranthene		
2.1 µg	2.6 µg	124	LCSpikel
2.1 µg	f-7 µg	271	LCSpike2
	Pyrene		
2.4 µg	2.5 µg	104	LCSpikel
2.4 µg	4.3 µg	179	LCSpike2
	Benzo(a)anthrancene		
2.1 µg	4.0 µg	190	LCSpikel
2.1 µg	0.6 µg	30	LCSpike2
	Chrysene		
0.8 µg	2.3 µg	288	LCSpikel
0.8 µg	0.8 µg	104	LCSpike2
	Benzo(b)fluoranthene		
2.2 µg	3.2 µg	145	LCSpikel
2.2 µg	2.4 µg	109	LCSpike2

TABLE E-14. XAD2 TUBES, TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Snike #
	Benzo(k)fluoranthene		
1.8 µg	3.2 µg	178	LCSpikel
1.8 µg	7.4 µg	411	LCSpike2
	Benzo (a)pyrene		
3.4 µg	3.3 µg	97	LCSpikel
3.4 µg	3.8 µg	112	LCSpike2
	Indeno(1,2,3-cd)pyrene		
2.1 µg	1.9 µg	90	LCSpikel
2.1 µg	1.4 µg	67	LCSpike2
	Dibenzo(ah)anthracene		
0.7 µg	1.2 µg	171	LCSpikel
0.7 µg	1.5 µg	214	LCSpike2
	Benzo (ghi)perylene		
2.2 µg	2.2 µg	100	LCSpikel
2.2 µg	2.2 µg	100	LCSpike2

TABLE E-15. PAHs ON XAD2 CARTRIDGES

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Naphthalene		
10 µg	28	9 µg	71	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		2-Methylnaphthalene		
10 µg	72	3.2 µg	66	Z3680-83, Z4078-91, 24152-59, Z4302-15
		1-Methylnaphthalene		
10 µg	58	5.8 µg	130	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Biphenyl		
10 µg	89	9 µg	78	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		2,6-Dimethylnaphthalene		
10 µg	90	9 µg	81	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Acenaphthalene		
10 µg	83	9 µg	79	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Acenaphthene		
10 µg	87	9 µg	78	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Dibenzofuran		
10 µg	84	9 µg	79	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Fluorene		
10 µg	91	9 µg	76	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Phenanthreng		
10 µg	94	9 µg	73	Z3680-83, Z4078-91, Z4152-59, Z4302-15

TABLE E-15. PAHs ON XAD2 CARTRIDGES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Anthracene		
10 µg	91	9 µg	74	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Carbazole		
10 µg	91	9 µg	72	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Fluoranthene		
10 µg	96	9 µg	71	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Pyrene		
10 µg	94	9 µg	72	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Benzo(a)anthracene		
10 µg	92	9 µg	72	Z3680-83, Z4078-91, 24152-59, Z4302-15
		Chrysene		
10 µg	96	9 µg	74	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Benzo(b)fluoranthene		
10 µg	86	9 µg	71	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Benzo(k)fluoranthene		
10 µg	100	9 µg	80	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Benzo(e)pyrene		
10 µg	96	9 µg	76	Z3680-83, Z4078-91, Z4152-59, Z4302-15
		Benzo(a)pyrene		
10 µg	92	9 µg	76	Z3680-83, Z4078-91, Z4152-59, Z4302-15

TABLE E-15. PAHs ON XAD2 CARTRIDGES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Indeno(1,2,3-cd)pyrene		
10 µg	94	9 µg	78	Z3680-83, Z4078-91, X4152-59, Z4302-15
		Dibenzo(ah)anthracene		
10 µg	94	9 µg	78	Z3680-83, Z4078-91, 24152-59, Z4302-15
		Benzo(ghi)perylene		
10 µg	93	9 µg	78	Z3680-83, Z4078-91, Z4152-59, Z4302-15

TABLE E-16. PAHs ON XAD2 CARTRIDGES, FIELD SPIKE RECOVERIES

Theo- Amt.	Amt. Found	% Recovered	Spike #
		Naphthalene	
13 µg	39 µg	300	XAD-02
12 µg	35 µg	292	XAD-01
14 µg	25 µg	178	XAD-04
		Acenaphthalene	
13 µg	13 µg	100	XAD-02
12 µg	14 µg	117	XAD-01
14 µg	15 µg	107	XAD-04
		Acenaphthene	
13 µg	13 µg	100	XAD-02
12 µg	23 µg	192	XAD-01
14 µg	20 µg	143	XAD-04
		Fluorene	
13 µg	11 µg	85	XAD-02
12 µg	22 µg	183	XAD-01
14 µg	20 µg	143	XAD-04
		Phenanthrene	
13 µg	12 µg	92	xX0-02
12 µg	26 µg	217	XAD-01
14 µg	23 µg	164	XAD-04
		Anthracene	
13 µg	11 µg	85	XAD-02
12 µg	13 µg	108	XAD-01
14 µg	15 µg	107	XAD-04

XAD-01 and XAD-04 were cartridges which were spiked in the field with analyte PAHs and then air sampled for 24 hours, XAD-02 was also spiked in the field but had no air pulled through it-

TABLE E-16. PAHs ON XAD2 CARTRIDGES, FIELD SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Snike #
		Fluoranthene	
		85	
13 µg	11 µg	600	XAD-02
12 µg	72 µg		XAD-01
14 µg	20 µg	143	XAD-04
		Pyrene	
13 µg	12 µg	92	XAD-02
12 µg	35 µg	292	XAD-01
14 µg	16 µg	114	XAD-04
		Benzo(a)anthracene	
13 µg	12 µg	92	XAD-02
12 µg	11 µg	93	XAD-01
14 µg	13 µg		XAD-04
		Chrysene	
13 µg	11 µg	85	AD-02
12 µg	11 µg	92	XAD-01
14 µg	14 µg	100	XAD-04
		Benzo(b)fluoranthene	
13 µg	12 µg	92	XAD-02
12 µg	12 µg	100	XAD-01
14 µg	14 µg	100	XAD-04
		Benzo(k)fluoranthene	
13 µg	11 µg	85	XAD-02
12 µg	9.7 µg	81	XAD-01
14 µg	12 µg	86	XAD-04

XAD-01 and XAD-04 were cartridges which were spiked in the field with analyte PAHs and then air sampled for 24 hours. XAD-02 was also spiked in the field but had no air pulled through it.

TABLE E-16. PAHs ON XAD2 CARTRIDGES, FIELD SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Spike #
		Benzo(a)pyrene	
13 µg	12 µg	92	XAD-02
12 µg	10 µg	83	XAD-01
14 µg	13 µg	93	XAD-04
		Indeno(1,2,3-cd)pyrene	
13 µg	12 µg	92	XAD-02
12 µg	11 µg	92	XAD-01
14 µg	13 µg	93	XAD-04
		Dibenzo(a,h)anthracene	
13 µg	13 µg	100	XAD-02
12	12	100	XAD-01
14 µg	14 µg	100	XAD-04
		Benzo(g,h,i)perylene	
13 µg	12 µg	92	XAD-02
12 µg	11 µg	92	XAD-01
14 µg	13 µg	93	XAD-04

• XAD-01 and XAD-04 were cartridges which were spiked in the field with analyte PAHs and then air sampled for 24 hours. XAD-02 was also spiked in the field but had no air pulled through it.

TABLE E-17, PAHs ON ORBO 43 TUBES

Deeorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Naphthalene		
		1 µg	104	Y0897-Y0900
6 µg	97			Y1097-99
4 µg	72	6 µg	11.0	Y1570-89
4 µg	135	6 µg	73	Y1805-18
6 µg	88	6 µg	102	Y2054-67
6 µg	93	6 µg	107	Y2591-Y2606
		6 µg	107	Y2607
4 µg	98	6 µg	108	Y2725-38
6 µg	93	5.2 µg	112	Y2994-Y3001
		8 µg	73	Y3002
6 µg	92	6 µg	107	Y3310-25
6 µg	116	5 µg	93	Y9066-69
6 µg	123			Y9731-34
6 µg	93	14 µg	107	Y9968-71
6 µg	92	6 µg	98	Z0817-21
4 µg	90	10 µg	97	Z1200-03
4 µg	95	4 µg	98	Z1617-20
4 µg	88	4 µg	102	Z2703-05
6 µg	93	6 µg	104	Z2987-93
6 µg	87	6 µg	102	Z3243-47
Mean	96.8%	Mean	100.2%	
SD	14.9%	SD	11.3%	
CV	0.154	CV	0.113	
		Acenaphthylene		
		1 µg	100	Y0897-Y0900
6 µg	88			Y1097-99
4 µg	128	6 µg	90	Y1570-89
4 µg	130	6 µg	65	Y1805-18
6 µg	83	6 µg	106	Y2054-67
6 µg	87	6 µg	110	Y2591-Y2606
		6 µg	113	Y2607
4 µg	90	6 µg	115	Y2725-38
6 µg	85	5.2 µg	112	Y2994-Y3001

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples Gab #s)
Amt.	%	Amt.	%	
		Acenanhthvlene (Continued)		
		8 µg	70	Y3002
6 µg	88	6 µg	103	Y3310-25
6 µg	107	5 µg	86	Y9066-69
6 µg	118			Y9731-34
6 µg	92	14 µg	107	Y9968-71
6 µg	88	6 µg	98	Z0817-21
4 µg	82	10 µg	98	21200-03
4 µg	92	4 µg	95	Z1617-20
4 µg	88	4 µg	100	Z2703-05
6 µg	93	6 µg	100	Z2987-93
6 µg	83	6 µg	100	Z3243-47
Mean	95.4%	Mean	98.2%	
SD	15.5%	SD	14.0%	
cv	0.163	cv	0.142	
		Acenaphthene		
		1 µg	112	Y0897-Y0900
6 µg	88			Y1097-99
4 µg	•	6 µg	*	Y1570-89
4 µg	121	6 µg	80	Y1805-18
6 µg	85	6 µg	91	Y2054-67
6 µg	85	6 µg	82	Y2591-Y2606
		6 µg	57	Y2607
6 µg	100	6 µg	87	Y2725-38
6 µg	58	5.2 µg	115	Y2994-Y3001
		8 µg	60	Y3002
6 µg	83	6 µg	114	Y3310-25
6 µg	96	5 µg	98	Y9066-69
6 µg	118			Y9731-34
6 µg	90	14 µg	100	Y9968-71
6 µg	88	6 µg	97	Z0817-21
4 µg	88	10 µg	89	Z1200-03
4 µg	102	4 µg	90	Z1617-20
4 µg	92	4 µg	100	Z2703-05

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Acenaphthene (Continued)		
6 µg	93	6 µg	98	Z2987-93
6 µg	83	6 µg	102	Z3243-47
Mean	91.9%	Mean	92.5%	
SD	14.5%	SD	16.3%	
cv	0.158	cv	0.177	
		Flu-=-		
		1 µg	104	Y0897-Y0900
6 µg	94			Y1097-99
4 µg	48	6 µg	159	Y1570-89
4 µg	128	6 µg	65	Y1805-18
6 µg	85	6 µg	102	Y2054-67
6 µg	87	6 µg	107	Y2591-Y2606
		6 µg	100	Y2607
4 µg	92	6 µg	107	Y2725-38
6 µg	82	5.2 µg	110	Y2994-Y3001
		8 µg	70	Y3002
6 µg	85	6 µg	104	Y3310-25
6 µg	105	5 µg	88	Y9066-69
6 µg	118			Y9731-34
6 µg	90	14 µg	107	Y9968-71
6 µg	88	6 µg	97	20817-21
4 µg	80	10 µg	96	Z1200-03
4 µg	90	4 µg	98	Z1617-20
4 µg	88	4 µg	102	Z2703-05
6 µg	92	6 µg	104	Z2987-93
6 µg	80	6 µg	108	Z3243-47
Mean	90.1%	Mean	101.6%	
SD	16.9%	SD	18.9%	
CV	0.188	cv	0.187	

* interference

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent),		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Phenanthrene		
		1 µg	108	Y0897-Y0900
6 µg	82			Y1097-99
4 µg	48	6 µg	143	Y1570-89
4 µg	115	6 µg	70	Y1805-18
6 µg	80	6 µg	104	Y2054-67
6 µg	85	6 µg	108	Y2591-Y2606
		6 µg	100	Y2607
4 µg	88	6 µg	107	Y2725-38
6 µg	77	5.2 µg	110	Y2994-Y3001
		8 µg	70	Y3002
6 µg	79	6 µg	104	Y3310-25
6 µg	100	5 µg	86	Y9066-69
6 µg	113			Y9731-34
6 µg	85	14 µg	107	Y9968-71
6 µg	85	6 µg	97	X0817-21
4 µg	75	10 µg	96	Z1200-03
4 µg	85	4 µg	95	Z1617-20
4 µg	82	4 µg	102	Z2703-05
6 µg	87	6 µg	102	Z2987-93
6 µg	75	6 µg	105	Z3243-47
Mean	84.8%	Mean	100.8%	
SD	15.1%	SD	15.9%	
cv	0.178	CV	0.157	
		Anthracene		
		1 µg	108	Y0897-Y0900
6 µg	90			Y1097-99
4 µg	32	6 µg	*	Y1570-89
4 µg	118	6 µg	67	Y1805-18
6 µg	78	6 µg	104	Y2054-67
6 µg	83	6 µg	108	Y2591-Y2606
		6 µg	100	Y2607
4 µg	88	6 µg	107	Y2725-38

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Anthracene (continued)		
6 µg	75	5.2 µg	113	Y2994-Y3001
		8 µg	70	Y3002
6 µg	78	6 µg	104	Y3310-25
6 µg	98	5 µg	86	Y9066-69
6 µg	110			Y9731-34
6 µg	83	14 µg	107	Y9968-71
6 µg	82	6 µg	93	Z0817-21
4 µg	72	10 µg	99	21200-03
4 µg	85	4 µg	95	21617-20
4 µg	80	4 µg	102	22703-05
6 µg	a7	6 µg	102	Z2987-93
6 µg	73	6 µg	105	23243-47
Mean	83.1%	Mean	98.2%	
SD	18.1%	SD	12.9%	
CV	0.217	CV	0.131	
		Fluoranthene		
		1 µg	108	Y0897-Y0900
6 µg	86			Y1097-99
4 µg	55	6 µg	119	Y1570-89
4 µg	111	6 µg	68	Y1805-18
6 µg	73	6 µg	105	Y2054-67
6 µg	a2	6 µg	108	Y2591-Y2606
		6 µg	107	Y2607
4 µg	82	6 µg	103	Y2725-38
6 µg	73	5.2 µg	112	Y2994-Y3001
		8 µg	70	Y3002
6 µg	72	6 µg	105	Y3310-25
6 µg	93	5 µg	88	Y9066-69
6 µg	108			Y9731-34
6 µg	80	14 µg	107	Y9968-71
6 µg	82	6 µg	93	Z0817-21
4 µg	70	10 µg	96	Z1200-03

• outlier (interfering peak)

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Fluoranthene (Continued)		
4 µg	82	4 µg	88	Z1617-20
4 µg	78	4 µg	95	Z2703-05
6 µg	83	6 µg	97	Z2987-93
6 µg	70	6 µg	100	Z3243-47
Mean	81.2%	Mean	98.3%	
SD	13.6%	SD	13.4%	
CV	0.167	CV	0.136	
		Pyrene		
		1 µg	104	Y0897-Y0900
6 µg	84			Y1097-99
4 µg	43	6 µg	146	Y1570-89
4 µg	102	6 µg	70	Y1805-18
6 µg	70	6 µg	108	Y2054-67
6 µg	72	6 µg	123	Y2591-Y2606
		6 µg	120	Y2607
4 µg	80	6 µg	100	Y2725-38
6 µg	78	5.2 µg	113	Y2994-Y3001
		8 µg	70	Y3002
6 µg	59	6 µg	105	Y3310-25
6 µg	90	5 µg	86	Y9066-69
6 µg	103			Y9731-34
6 µg	73	14 µg	107	Y9968-71
6 µg	77	6 µg	95	Z0817-21
4 µg	65	10 µg	94	Z1200-03
4 µg	78	4 µg	90	Z1617-20
4 µg	75	4 µg	98	Z2703-05
6 µg	78	6 µg	98	Z2987-93
6 µg	65	6 µg	105	Z3243-47
Mean	76.0%	Mean	101.8%	
SD	14.5%	SD	18.0%	
CV	0.191	cv	0,177	

* interference

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Deeorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(a)anthracene		
		1 µg	180	Y0897-Y0900
6 µg	82			Y1097-99
4 µg	64	6 µg	35	Y1570-89
4 µg	105	6 µg	62	Y1805-18
6 µg	43	6 µg	95	Y2054-67
6 µg	53	6 µg	100	Y2591-Y2606
		6 µg	107	Y2607
4 µg	62	6 µg	92	Y2725-38
6 µg	70	5.2 µg	113	Y2994-Y3001
		8 µg	70	Y3002
6 µg	67	6 µg	102	Y3310-25
6 µg	93	5 µg	84	Y9066-69
6 µg	90			Y9731-34
6 µg	72	14 µg	114	Y9968-71
6 µg	73	6 µg	93	20817-21
4 µg	65	10 µg	97	Z1200-03
4 µg	78	4 µg	92	Z1617-20
4 µg	68	4 µg	102	Z2703-05
6 µg	75	6 µg	107	Z2987-93
6 µg	58	6 µg	110	Z3243-47
Mean	71.6%	Mean	97.5%	
SD	15.1%	SD	28.6%	
cv	0.211	cv	0.293	
		Chrysene		
		1 µg	116	Y0897-Y0900
6 µg	84			Y1097-99
4 µg	27	6 µg	*	Y1570-89
4 µg	112	6 µg	57	Y1805-18
6 µg	60	6 µg	94	Y2054-67
6 µg	72	6 µg	102	Y2591-Y2606
		6 µg	93	Y2607
4 µg	65	6 µg	105	Y2725-38
6 µg	70	5.2 µg	113	Y2994-Y3001

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Chrysene (Continued)		
		8 µg	75	Y3002
6 µg	64	6 µg	100	Y3310-25
6 µg	85	5 µg	85	Y9066-69
6 µg	92			Y9731-34
6 µg	62	14 µg	120	Y9968-71
6 µg	73	6 µg	85	Z0817-21
4 µg	62	10 µg	90	Z1200-03
4 µg	72	4 µg	95	Z1617-20
4 µg	70	4 µg	100	Z2703-05
6 µg	75	6 µg	102	Z2987-93
6 µg	60	6 µg	,108	Z3243-47
Mean	70.9%	Mean	96.5%	
SD	17.6%	SD	15.5%	
. cv	0.248	CV	0.161	
		Benzo(b)fluoranthene		
		1 µg	112	Y0897-Y0900
6 µg	68			Y1097-99
4 µg	48	6 µg	101	Y1570-89
4 µg	90	6 µg	67	Y1805-18
6 µg	57	6 µg	100	Y2054-67
6 µg	67	6 µg	110	Y2591-Y2606
		6 µg	100	Y2607
4 µg	62	6 µg	110	Y2725-38
6 µg	55	5.2 µg	119	Y2994-Y3001
		8 µg	75	Y3002
6 µg	38	6 µg	89	Y3310-25
6 µg	77	5 µg	85	Y9066-69
6 µg	88			Y9731-34
6 µg	63	14 µg	114	Y9968-71
6 µg	65	6 µg	90	Z0817-21
4 µg	52	10 µg	100	Z1200-03

• outlier (interfering peak)

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(b)fluoranthene (Continued)		
4 µg	68	4 µg	92	21617-20
4 µg	62	4 µg	105	Z2703-05
6 µg	68	6 µg	103	Z2987-93
6 µg	52	6 µg	112	Z3243-47
Mean	63.5%	Mean	99.1%	
SD	13.3%	SD	13.9%	
CV	0.209	CV	0.140	
		Benzo(k)fluoranthene		
		1 µg	112	Y0897-Y0900
6 µg	67			Y1097-99
4 µg	54	6 µg	88	Y1570-89
4 µg	90	6 µg	67	Y1805-18
6 µg	57	6 µg	100	Y2054-67
6 µg	65	6 µg	110	Y2591-Y2606
6 µg	107			Y2607
4 µg	62	6 µg	113	Y2725-38
6 µg	57	5.2 µg	112	Y2994-Y3001
		8 µg	70	Y3002
6 µg	58	6 µg	102	Y3310-25
6 µg	78	5 µg	82	Y9066-69
6 µg	87			Y9731-34
6 µg	63	14 µg	114	Y9968-71
6 µg	68	6 µg	88	Z0817-21
4 µg	55	10 µg	96	Z1200-03
4 µg	65	4 µg	92	Z1617-20
4 µg	62	4 µg	105	Z2703-05
6 µg	68	6 µg	103	Z2987-93
6 µg	53	6 µg	110	Z3243-47
Mean	65.2%	Mean	98.4%	
SD	10.8%	SD	14.5%	
CV	0.165	cv	0.147	

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(a)pyrene		
		1 µg	116	Y0897-Y0900
6 µg	59			Y1097-99
4 µg	27	6 µg	145	Y1570-89
4 µg	80	6 µg	67	Y1805-18
6 µg	50	6 µg	97	Y2054-67
6 µg	60	6 µg	108	Y2591-Y2606
		6 µg	107	Y2607
4 µg	55	6 µg	112	Y2725-38
6 µg	48	5.2 µg	115	Y2994-Y3001
		8 µg	73	Y3002
6 µg	37	6 µg	102	Y3310-25
6 µg	47	5 µg	85	Y9066-69
6 µg	75			Y9731-34
6 µg	53	14 µg	120	Y9968-71
6 µg	57	6 µg	90	Z0817-21
4 µg	50	10 µg	96	Z1200-03
4 µg	62	4 µg	88	Z1617-20
4 µg	60	4 µg	100	Z2703-05
6 µg	65	6 µg	92	Z2987-93
6 µg	47	6 µg	113	Z3243-47
Mean	54.8%	Mean	101.4%	
SD	12.7%	SD	18.3%	
cv	0.232	cv	0.180	
		Dibenzo(ah)anthracene		
		1 µg	116	Y0897-Y0900
6 µg	57			Y1097-99
4 µg	72	6 µg	52	Y1570-89
4 µg	92	6 µg	50	Y1805-18
6 µg	37	6 µg	92	Y2054-67
6 µg	50	6 µg	90	Y2591-Y2606
		6 µg	127	Y2607
4 µg	60	6 µg	103	Y2725-38
6 µg	50	5.2 µg	119	Y2994-Y3001

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
6 µg				
6 µg				
6 µg				
6 µg				
6 µg				
4 µg				
4 µg				
4 µg				
6 µg				
6 µg				
Mean				
SD				
CV				
6 µg				
4 µg				
4 µg				
6 µg				
6 µg				
4 µg				
6 µg				
6 µg				
6 µg				
6 µg				
6 µg				
6 µg				
4 µg				
4 µg				

TABLE E-17. PAHs ON ORBO 43 TUBES (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Am	%	Amt.	%	
		Benzo(ghi)perylene (Continued)		
4 µg	50	4 µg	100	Z2703-05
6 µg	50	6 µg	107	Z2987-93
6 µg	37	6 µg	117	Z3243-47
Mean	49.1%	Mean	95.9%	
SD	9.2%	SD	17.8%	
cv	0.188	CV	0.185	
		Indeno(1,2,3-cd)pyrene		
		1 µg	116	Y0897-Y0900
6 µg	52			Y1097-99
4 µg	42	6 µg	80	Y1570-89
4 µg	75	6 µg	67	Y1805-18
6 µg	47	6 µg	96	Y2054-67
6 µg	57	6 µg	108	Y2591-Y2606
		6 µg	93	Y2607
4 µg	50	6 µg	113	Y2725-38
6 µg	45	5.2 µg	119	Y2994-Y3001
8 µg	80			Y3002
6 µg	50	6 µg	95	Y3310-25
6 µg	67	5 µg	81	Y9066-69
6 µg	72			Y9731-34
6 µg	52	14 µg	114	Y9968-71
6 µg	55	6 µg	88	Z0817-21
4 µg	45	10 µg	96	Z1200-03
4 µg	62	4 µg	88	Z1617-20
4 µg	55	4 µg	100	Z2703-05
6 µg	57	6 µg	105	Z2987-93
6 µg	45	6 µg	107	Z3243-47
Mean	54.6%	Mean	97.0%	
SD	9.6%	SD	14.6%	
CV	0.177	cv	0.150	

TABLE E-18. PAHs ON PTFE FILTERS

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Naphthalene		
4 µg	*	6 µg	*	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	107			Y2725-38
6 µg	90	5.2 µg	73	Y2994-Y3002
4 µg	81	6 µg	117	Y3310-25
6 µg	92	6 µg	74	Y5131-39
6 µg	97	4.8 µg	85	Y6551-59
6 µg	92	5 µg	87	Y7410-14
6 µg	86	7 µg	60	Y8466-74, Y9062-65
6 µg	117	4 µg	65	Y9745-48
4 µg	60			Y9983-86, Z0795-99
6 µg	73			21196-99
6 µg	88			21637-40
4 µg	80			Z2721-24
6 µg	93			Z2994-Z3000
4 µg	82			Z3217-47
Mean	88.4%	Mean	80.1%	
SD	13.9%	SD	18.9%	
cv	0.157	cv	0.236	
		Acenaphthylene		
4 µg	64	6 µg	126	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	103			Y2725-38
6 µg	97	5.2 µg	9 4	Y2994-Y3002
4 µg	88	6 µg	120	Y3310-25
6 µg	92	6 µg	107	Y5131-39
6 µg	98	4.8 µg	92	Y6551-59
6 µg	90	5 µg	109	Y7410-14
6 µg	89	7 µg	93	Y8466-74
6 µg	112	4 µg	95	Y9745-48
4 µg	48			Y9983-86, Z0795-99

* interference

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Acenaphthylene (Continued)		
6 µg	63			Z1196-99
6 µg	87			Z1637-40
4 µg	82			Z2721-24
6 µg	93			Z2994-Z3000
4 µg	80			Z3217-47
Mean	85.7%	Mean	104.5%	
SD	19.0%	SD	13.2%	
cv	0.222	CV	0.126	
		Acenanhthene		
4 µg	*	6 µg	•	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	90			Y2725-38
6 µg	125	5.2 µg	96	Y2994-Y3002
4 µg	86	6 µg	130	Y3310-25
6 µg	90	6 µg	109	Y5131-39
6 µg	100	4.8 µg	92	Y6551-59
6 µg	92	5 µg	109	Y7410-14
6 µg	102	7 µg	96	Y8466-74
6 µg	112	4 µg	102	Y9745-48
4 µg	50			Y9983-86,Z0795-99
6 µg	63			Z1196-99
6 µg	88			Z1637-40
4 µg	92			Z2721-24
6 µg	93			Z2994-Z3000
4 µg	88			Z3217-47
Mean	90.8%	Mean	104.9%	
SD	21.4%	SD	'12.9%	
CV	0.235	cv	0.123	

• interference

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Deeorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Fluorene		
4 µg	70	6 µg	120	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	103			Y2725-38
6 µg	97	5.2 µg	98	Y2994-Y3002
4 µg	96	6 µg	113	Y3310-25
6 µg	88	6 µg	113	Y5131-39
6 µg	100	4.8 µg	92	Y6551-59
6 µg	92	5 µg	109	Y7410-14
6 µg	94	7 µg	99	Y8466-74
6 µg	115	4 µg	105	Y9745-48
4 µg	70			Y9983-86,Z0795-99
6 µg	78			Z1196-99
6 µg	92			Z1637-40
4 µg	90			Z2721-24
6 µg	96			Z2994-Z3000
4 µg	88			Z3217-47
Mean	91.3%	Mean	106.1%	
SD	13.6%	SD	9.4%	
CV	0-149	cv	0.088	
		Phenanthrene		
4 µg	84	6 µg	107	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	105			Y2725-38
6 µg	97	5.2 µg	102	Y2994-Y3002
4 µg	98	6 µg	112	Y3310-25
6 µg	90	6 µg	111	Y5131-39
6 µg	100	4.8 µg	92	Y6551-59
6 µg	92	5 µg	109	Y7410-14
6 µg	96	7 µg	100	Y8466-74
6 µg	118	4 µg	102	Y9745-48
4 µg	85			Y9983-86,Z0795-99

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Phenanthrene (Continued)		
6 µg	85			Z1196-99
6 µg	93			Z1637-40
4 µg	95			Z2721-24
6 µg	98			Z2994-Z3000
4 µg	92			Z3217-47
Mean	95.2%	Mean	104.4%	
SD	9.9%	SD	6.7%	
CV	0.104	CV	0.064	
		Anthracene		
4 µg	94	6 µg	100	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	105			Y2725-38
6 µg	97	5.2 µg	102	Y2994-Y3002
4 µg	100	6 µg	107	Y3310-25
6 µg	90	6 µg	111	Y5131-39
6 µg	102	4.8 µg	90	Y6551-59
6 µg	92	5 µg	109	Y7410-14
6 µg	96	7 µg	99	Y8466-74
6 µg	118	4 µg	102	Y9745-48
4 µg	100			Y9983-86, Z0795-99
6 µg	95			Z1196-99
6 µg	97			Z1637-40
4 µg	98			Z2721-24
6 µg	90			Z2994-Z3000
4 µg	95			Z3217-47
Mean	90.5%	Mean	102.5%	
SD	7.6%	SD	6.7%	
CV	0.077	CV	0.065	

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Fluoranthene		
4 µg	94	6 µg	100	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	107			Y2725-38
6 µg	98	5.2 µg	102	Y2994-Y3002
4 µg	102	6 µg	112	Y3310-25
6 µg	90	6 µg	114	Y5131-39
6 µg	102	4.8 µg	90	Y6551-59
6 µg	88	5 µg	114	Y7410-14
6 µg	95	7 µg	99	Y8466-74
6 µg	122	4 µg	102	Y9745-48
4 µg	100			Y9983-86,Z0795-99
6 µg	93			21196-99
6 µg	97			21637-40
4 µg	100			22721-24
6 µg	98			Z2994-Z3000
4 µg	98			23217-47
Mean	98.9%	Mean	104.1%	
SD	9.3%	SD	8.5%	
CV	0.094	CV	0.082	
		Pyrene		
4 µg	98	6 µg	107	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	103			Y2725-38
6 µg	102	5.2 µg	106	Y2994-Y3002
4 µg	93	6 µg	88	Y3310-25
6 µg	90	6 µg	115	Y5131-39
6 µg	102	4.8 µg	90	Y6551-59
6 µg	90	5 µg	112	Y7410-14
6 µg	89	7 µg	101	Y8466-74
6 µg	123	4 µg	102	Y9745-48
4 µg	100			Y9983-86,Z0795-99

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Pyrene (Continued)		
6 µg	93			Z1196-99
6 µg	97			Z1637-40
4 µg	98			Z2721-24
6 µg	96			Z2994-Z3000
4 µg	98			23217-47
Mean	97.5%	Mean	102.6%	
SD	10.0%	SD	9.6%	
cv	0.103	CV	0.094	
		Benzo (a)anthracene		
4 µg	98	6 µg	100	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	103			Y2725-38
6 µg	120	5.2 µg	98	Y2994-Y3002
4 µg	110	6 µg	86	Y3310-25
6 µg	98	6 µg	108	Y5131-39
6 µg	100	4.8 µg	90	Y6551-59
6 µg	92	5 µg	109	Y7410-14
6 µg	95	7 µg	97	Y8466-74
6 µg	115	4 µg	105	Y9745-48
4 µg	102			Y9983-86, Z0795-99
6 µg	100			Z1196-99
6 µg	103			Z1637-40
4 µg	98			Z2721-24
6 µg	102			Z2994-Z3000
4 µg	98			Z3217-47
Mean	102.3%	Mean	99.1%	
SD	8.5%	SD	8.2%	
cv	0.084	CV	0.083	

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Chrysene		
4 µg	98	6 µg	107	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	102			Y2725-38
6 µg	100	5.2 µg	104	Y2994-Y3002
4 µg	102	6 µg	105	Y3310-25
6 µg	93	6 µg	115	Y5131-39
6 µg	102	4.8 µg	08	Y6551-59
6 µg	82	5 µg	109	Y7410-14
6 µg	99	7 µg	95	Y8466-74
6 µg	122	4 µg	98	Y9745-48
4 µg	90			Y9983-86,Z0795-99
6 µg	97			Z1196-99
6 µg	100			Z1637-40
4 µg	100			Z2721-24
6 µg	100			Z2994-Z3000
4 µg	100			Z3217-47
Mean	99.1%	Mean	102.6%	
SD	9.7%	SD	8.6%	
CV	0.097	CV	0.083	
		Benzo(b)fluoranthene		
4 µg	93	6 µg	100	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	105			Y2725-38
6 µg	100	5.2 µg	98	Y2994-Y3002
4 µg	105	6 µg	99	Y3310-25
6 µg	92	6 µg	110	Y5131-39
6 µg	102	4.8 µg	90	Y6551-59
6 µg	90	5 µg	112	Y7410-14
6 µg	99	7 µg	99	Y8466-74
6 µg	127	4 µg	98	Y9745-48
4 µg	102			Y9983-86,Z0795-99

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(b)fluoranthene (Continued)		
6 µg	97			Z1196-99
6 µg	100			Z1637-40
4 µg	102			Z2721-24
6 µg	100			Z2994-Z3000
4 µg	98			Z3217-47
Mean	100.8%	Mean	100.8%	
SD	9.8%	SD	7.1%	
CV	0.097	cv	0.070	
		Benzo(k)fluoranthene		
4 µg	93	6 µg	93	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	107			Y2725-38
6 µg	103	5.2 µg	98	Y2994-Y3002
4 µg	105	6 µg	114	Y3310-25
6 µg	93	6 µg	115	Y5131-39
6 µg	102	4.8 µg	90	Y6551-59
6 µg	90	5 µg	112	Y7410-14
6 µg	101	7 µg	99	Y8466-74
6 µg	123	4 µg	100	Y9745-48
4 µg	102			Y9983-86, Z0795-99
6 µg	97			Z1196-99
6 µg	98			Z1637-40
4 µg	102			Z2721-24
6 µg	100			Z2994-Z3000
4 µg	100			Z3217-47
Mean	101.1%	Mean	102.6%	
SD	8.9%	SD	9.7%	
CV	0.088	cv	0,095	

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Benzo(a)pyrene		
4 µg	88	6 µg	100	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	110			Y2725-38
6 µg	105	5.2 µg	98	Y2994-Y3002
4 µg	75	6 µg	68	Y3310-25
6 µg	87	6 µg	106	Y5131-39
6 µg	103	4.8 µg	92	Y6551-59
6 µg	90	5 µg	109	Y7410-14
6 µg	98	7 µg	97	Y8466-74
6 µg	118	4 µg	102	Y9745-48
4 µg	100			Y9983-86, Z0795-99
6 µg	98			Z1196-99
6 µg	100			Z1637-40
4 µg	100			Z2721-24
6 µg	102			Z2994-Z3000
4 µg	100			23217-47
Mean	98.3%	Mean	96.5%	
SD	11.8%	SD	12.7%	
cv	0.120	CV	0.131	
		Dibenzo(ah)anthracene		
4 µg	83	6 µg	80	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	110			Y2725-38
6 µg	97	5.2 µg	106	Y2994-Y3002
4 µg	80	6 µg	120	Y3310-25
6 µg	88	6 µg	113	Y5131-39
6 µg	100	4.8 µg	81	Y6551-59
6 µg	87	5 µg	112	Y7410-14
6 µg	97	7 µg	94	Y8466-74
6 µg	128	4 µg	95	Y9745-48
4 µg	110			Y9983-86, Z0795-99

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent)		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Dibenzo(ah)anthracene (Continued)		
6 µg	100			Z1196-99
6 µg	107			Z1637-40
4 µg	108			Z2721-24
6 µg	100			Z2994-Z3000
4 µg	102			Z3217-47
Mean	99.8%	Mean	100.1%	
SD	14.3%	SD	15.0%	
CV	0.143	CV	0.150	
		Benzo(ghi)perylene		
4 µg	89	6 µg	93	Y0897-Y0904, Y1097-99, Y1570-89, Y1805-18, Y2054-67
6 µg	103			Y2725-38
6 µg	98	5.2 µg	98	Y2994-Y3002
4 µg	106	6 µg	107	Y3310-25
6 µg	92	6 µg	111	Y5131-39
6 µg	100	4.8 µg	94	Y6551-59
6 µg	78	5 µg	110	Y7410-14
6 µg	99	7 µg	100	Y8466-74
6 µg	137	4 µg	102	Y9745-48
4 µg	102			Y9983-86, Z0795-99
6 µg	100			Z1196-99
6 µg	88			Z1637-40
4 µg	105			Z2721-24
6 µg	98			Z2994-Z3000
4 µg	95			Z3217-47
Mean	99.3%	Mean	101.9%	
SD	14.7%	SD	6.9%	
cv	0.148	cv	0.068	

TABLE E-18. PAHs ON PTFE FILTERS (Continued)

Desorption Efficiencies (Average Percent)		Control Recoveries (Average Percent1		Relevant Samples (Lab #s)
Amt.	%	Amt.	%	
		Indeno(1,2,3-cd)pyrene		
4 µg	89	6 µg	93	Y0897-Y0904, Y1097-99,Y1570-89, Y1805-18,Y2054-67
6 µg	103			Y2725-38
6 µg	100	5.2 µg	98	Y2994-Y3002
4 µg	106	6 µg	112	Y3310-25
6 µg	88	6 µg	112	Y5131-39
6 µg	98	4.8 µg	92	Y6551-59
6 µg	92	5 µg	109	Y7410-14
6 µg	96	7 µg	99	Y8466-74
6 µg	121	4 µg	100	Y9745-48
4 µg	102			Y9983-86,Z0795-99
6 µg	95			28X96-99
6 µg	110			Z1637-40
4 µg	102			Z2721-24
6 µg	98			Z2994-Z3000
4 µg	98			Z3217-47
Mean	99.9%	Mean	101.9%	
SD	9.6%	SD	8.1%	
cv	0.097	cv	0.079	

TABLE E-19. PTFE TRAVEL SPIKE RECOVERIES

Theo. Amt.	Amt. Found	% Recovered	Spike #
		Naphthalene	
2.4 µg	1.2 µg	50	LCSpikel
2.4 µg	<0.8 µg	c34	LCSpike2
2.4 µg	<0.8 µg	<34	LCSpike3
	Mean	N/A	
	SD	N/A	
	CV	N/A	
		Acenaghthvlene	
2.3 µg	0.5 µg	23	LCSpikel
2.3 µg	co.4 µg	<17	LCSpike2
2.3 µg	co.4 µg	<17	LCSpike3
	Mean	N/A	
	SD	N/A	
	cv	N/A	
		Acenaphthene	
2.0 µg	<0.8 µg	<40	LCSpikel
2.0 µg	CO.8 µg	<40	LCSpike2
2.0 µg	<0.8 µg	<40	LCSpike3
	Mean	N/A	
	SD	N/A	
	CV	N/A	
		Fluorene	
2.2 µg	1.4 µg	64	LCSpikel
2.2 µg	0.7 µg	33	LCSpike2
2.2 µg	0.7 µg	33	LCSpike3
	Mean	43.3%	
	SD	17.6%	
	cv	0.406	

TABLE E-19. PTFE TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Spike #
		Phenanthrene	
2.5 µg	2.1 µg	a4	LCSpikel
2.5 µg	0-9 µg	37	LCSpike2
2.5 µg	1.3 µg	52	LCSpike3
	Mean	57.6%	
	SD	24.1%	
	CV	0,418	
		Anthracene	
2.2 µg	1.7 µg	77	LCSpikel
2.2 µg	l-4 µg	64	LCSpike2
2.2 µg	l-5 µg	68	LCSpike3
	Mean	69.7%	
	SD	6.9%	
	CV	0.100	
		Fluoranthene	
2.1 µg	1.6 µg	76	LCSpikel
2.1 µg	0.7 µg	33	LCSpike2
2.1 µg	1.2 µg	57	LCSpike3
	Mean	55.6%	
	SD	21.5%	
	cv	0.386	
		Pyrene	
2.4 µg	2.0 µg	83	LCSpikel
2.4 µg	0.8 µg	35	LCSpike2
2.4 µg	1.4 µg	58	LCSpike3
	Mean	58.8%	
	SD	24.4%	
	CV	0.415	

TABLE E-19. PTFE TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Spike #
	Benzo(a)anthracene		
2.1 µg	2.1 µg	100	LCSpikel
2.1 µg	1.7 µg	81	LCSpike2
2.1 µg	l-4 µg	67	LCSpike3
	Mean	82.5%	
	SD	16.7%	
	CV	0.203	
	Chrysene		
0.8 µg	1.1 µg	138	LCSpikel
0.8 µg	1.0 µg	125	LCSpike2
0.8 µg	1.0 µg	125	LCSpike3
	Mean	129.2%	
	SD	7.2%	
	cv	0.056	
	Benzo(b)fluoranthene		
2.2 µg	2.0 µg	91	LCSpikel
2.2 µg	1.9 µg	86	LCSpike2
2.2 µg	2.0 µg	91	LCSpike3
	Mean	89.4%	
	SD	2.6%	
	cv	0.029	
	Benzo(k)fluoranthene		
1.8 µg	1.6 µg	89	LCSpikel
1.8 µg	1.6 µg	89	LCSpike2
1.8 µg	1.6 µg	89	LCSpike3
	Mean	89.0%	
	SD	0.00%	
	CV	0.000	

TABLE E-19. PTFE TRAVEL SPIKE RECOVERIES (Continued)

Theo. Amt.	Amt. Found	% Recovered	Snike #
		Benzo (a)pyrene	
3-4 µg	3.4 µg	100	LCSpikel
3.4 µg	3.2 µg	94	LCSpike2
3.4 µg	3-5 µg	103	LCSpike3
	Mean	99.0%	
	SD	4.5%	
	cv	0.045	
		Dibenzo(ah)anthracene	
0-7 µg	0.6 µg	91	LCSpikel
0-7 µg	0.5 µg	76	LCSpike2
0.7 µg	0.6 µg	86	LCSpike3
	Mean	84.3%	
	SD	8.0%	
	CV	0.094	
		Benzo(ghi)perylene	
2.2 µg	2.1 µg	95	LCSpikel
2.2 µg	2.2 µg	100	LCSpike2
2.2 µg	2.1 µg	95	LCSpike3
	Mean	97.0%	
	SD	2.6%	
	cv	0.027	
		Indeno(1,2,3-cd)pyrene	
2.1 µg	2.0 µg	95	LCSpikel
2.1 µg	l-9 µg	90	LCSpike2
2.1 µg	1.9 µg	90	LCSpike3
	Mean	92.1%	
	SD	2.8%	
	CV	0.030	

TABLE E-20. SEMIVOLATILES IN SOILS

Surrogate Recoveries (%)						
NBZ	FBP	TPH	PHL	2FP	TBP	Lab #s
44	46	50	19*	31	35	Y2165
76	81	85	71	77	7s	Y2166
62	6 9	83	58	66	54	Y2167
77	89	99	68	75	76	Y2168
62	77	90	61	68		
74	82	104	65	66	63 65	Y2170
69	75	91	57	55	54	Y2171
79	82	120	69	74	25	BLANK
59	65	74	54	61	55	Y2172
55	67	70	53	55	50	Y2173
65	74	83	61	67	61	Y2174
62	70	91	62	68	69	Y2175
63	79	98	31	19*	9*	Y2176
50	58	76	46	53	25	Y2177
67	76	103	18	6*	3*	Y2176dup
61	70	89	57	60	2*	BLANK
59	65	76	57	63	51	Y2178
66	69	83	56	60	49	Y2179
29	27*	42	14*	21*	4*	Y2180
68	69	83	46	56	39	Y2181
45	50	66	28	32	2*	Y2183
75	83	95	55	61	0*	BLANK
42	51	67	13*	12*	0f	Y2184
89	90	12'2	64	90	80	Y2185
73	84	99	66	75	46	Y2186
74	80	98	64	77	51	Y2187
68	77	95	64	69	23	Y2188
55	63	76	53	61	15*	Y2189
58	70	82	53	61	22	Y2189M
60	65	88	53	63	27	Y2189MD

Compound	QC Limits
NBZ = Nitrobenzene-d5	23 - 120
FBP = 2-Fluorobiphenyl	30 - 115
TPH = Terphenyl-d14	18 - 137
PHL = Phenol-d5	24 - 113
2FP = 2-Fluorophenol	25 - 121
TBP = 2,4,6-Tribromophenol	19 - 122

- Values outside EPA CLP required QC limits.
  Surrogates diluted out of Y2182.

TABLE E-20. SEMIVOLATILES IN SOILS (Continued)

Surrogate Recoveries (%)						
NBZ	FBP	TPH	PHL	2FP	TBP	Lab #s
31	33	41	28	35	12*	Y2190
64	67	94	51	45	0f	BLANK
66	76	55	75	60	76	Y4846
76	82	73	83	74	79	Y4847
70	75	73	76	67	72	Y4848
39	46	41	38	36	39	Y4849
65			67	62	31	Y4850
39	49 72	63 82	43	41	13*	Y4851
51	65	52	54	51	32	Y4852
62	70	69	54	41	29	Y4853
37	50	77	40	31	19	Y4854
48	64	37	28	27	28	Y4850M
62	72	43	34	34	35	Y4850MD
46	54	36	25	24*	21	BLANK
68	83	101	80	73	61	Y6705
57	69	80	67	64	57	Y6706
62	76	97	72	66	68	Y6707
46	56	70	34	18*	24	Y6708
56	70	87	48	25	19	Y6709
69	82	129	74	80	77	Z0090
57	66	103	62	64	62	zoo91
63	81	126	78	77	76	zoo92
62	74	131	68	72	75	zoo93
56	70	130	62	60	74	zoo94
61	71	128	63	60	49	BLANK
63	76	108	75	73	49	BLANK
79	80	89	78	77	66	BLANK
96	106	103	90	89	54	Z0684
87	110	114	79	83	64	Z0684MS
88	110	106	81	86	64	Z0684MSD

Compound	QC Limits
NBZ = Nitrobenzene-d5	23 - 120
FBP = 2-Fluorobiphenyl	30 - 115
TPH = Terphenyl-d14	18 - 137
PHL = Phenol-d5	24 - 113
2FP = 2-Fluorophenol	25 - 121
TBP = 2,4,6-Tribromophenol	19 - 122

* Values outside EPA CLP required QC limits, Surrogates diluted out of Y6710-14.

TABLE E-20. SEMIVOLATILES IN SOILS (Continued)

Surrogate Recoveries (%)						
NBZ	FBP	TPH	PHL	2FP	TBP	Lab #s
88	96	129	88	87	69	Z0685
86	92	123	85	84	76	Z0685RE
87	93	113	82	82	84	Z0686
92	96	122	86	86	71	Z0686RE
86	97	103	84	82	78	20687
88	94	135	85	83	79	Z0688
88	93	106	85	85	85	Z0688RE
86	96	101	84	82	84	Z0689
74	104	108	73	72	69	20690
78	92	129	76	72	82	Z0690RE
79	98	98	75	78	57	20691
85	87	108	81	79	7s	Z0691RE
89	92	109	86	85	86	20692
91	93	113	85	84	76	20693
86	89	93	85	83	79	Z0694
83	a7	95	85	84	85	20695
76	89	8 7	76	71	81	BLANK
66	72	109	60	60	46	20696
80	91	127	73	69	65	20697
93	94	128	82	81	85	Z0698
92	92	123	9 3	88	79	Z0698RE
88	93	121	76	75	76	20699
85	88	110	85	83	73	Z0699RE
87	92	109	46	30	35	20700
79	82	108	69	70	81	20701
78	84	109	75	71	92	20702
90	92	104	41	61	52	INST BLK
74	79	116	71	65	70	BLANK
83	93	101	76	73	84	20703
75	88	86	79	78	79	20704
79	82	87	78	79	83	Z0704MS

Compound	QC Limits
NBZ = Nitrobenzene-d5	23 - 120
FBP = 2-Fluorobiphenyl	30 - 115
TPH = Terphenyl-d14	18 - 137
PHL = Phenol-d5	24 - 113
2FP = 2-Fluorophenol	25 - 121
TBP = 2,4,6-Tribromophenol	19 - 122

* Values outside EPA CLP required QC limits.

TABLE E-20. SEMIVOLATILES IN SOILS (Continued)

Surrogate Recoveries (%)						
NBZ	FBP	TPH	PHL	2FP	TBP	Lab #s
69	83	84	75	72	89	Z0704MSD
75	85	89	77	74	91	20705
77	9 1	76	79	79	87	20706
77	79	96	19*	10*	8*	20707
74	82	70	76	74	81	BLANK
63	67	55	7*	7*	2*	Z0707RE
69	76	72	Of	0*	Of	Z0707RERE
80	81	97	37	41	47	20708
76	79	109	73	68	52	20709
76	82	113	63	53	27	20710
79	84	122	70	65	36	20711
66	74	83	47	34	44	20712
78	91	93	30	31	35	20713
74	88	98	34	33	28	Z0713RE
70	80	86	77	76	81	20714
64	68	72	60	61	66	20715
67	78	88	66	66	71	Z0716
65	77	93	64	64	76	20717
77	84	86	77	77	76	BLANK
76	84	88	67	60	51	20718
67	77	80	61	62	64	20719
87	106	97	45	34	32	20720
78	93	94	76	76	77	20721
84	96	99	72	68	56	20722
88	96	102	81	78	68	20723
78	88	123	79	81	81	20724
78	90	121	78	84	84	Z0724RE
83	87	100	83	81	84	Z0724DL
88	89	103	87	83	89	BLANK
84	79	105	72	71	74	BLANK
81	84	92	80	74	67	SB1
83	86	95	83	77	97	SB1MS

Compound	QC Limits
NBZ = Nitrobenzene-d5	23 - 120
FBP = 2-Fluorobiphenyl	30 - 115
TPH = Terphenyl- d14	18 - 137
PHL = Phenol-d5	24 - 113
2FP = 2-Fluorophenol	25 - 121
TBP = 2,4,6-Tribromophenol	19 - 122

• Values outside EPA CLP required QC limits.

TABLE E-20. SEMIVOLATILES IN SOILS (Continued)

Surrogate Recoveries (%)						
NBZ	FBP	TPH	P H L	2FP	TBP	Lab #s
96	87	98	84	81	96	SB1MSD
102	91	101	82	81	79	21664
113	104	110	81	86	78	21665
110	107	112	77	78	61	21666
89	91	99	81	78	72	21667
91	94	103	87	82	81	21668
90	92	97	83	80	69	21669
97	97	118	87	82	80	21670
56	56	65	51	50	43	21671
95	94	122	83	71	56	Z1666RE
39	45	52	40	40	34	Z1671DL
55	57	71	56	49	51	BLANK
68	71	104	70	62	56	BLANK
70	73	89	68	63	65	26819
69	72	86	60	46	29	Z5819MS
72	72	87	63	53	-38	Z6819MSD
67	69	85	65	55	51	Z6820
71	71	87	69	64	71	26821
70	71	90	66	60	49	Z6822
71	72	89	66	55	35	26823
64	66	87	59	55	53	26824
70	103	171 •	8 *	6 "	2 *	26825
64	110	193 *	10 •	12 •	10 *	Z6825RE
73	78	99	4 *	□ •	0 *	26826
71	87	115	13 •	11 *	3 *	Z6826RE
65	67	91	41	29	6 *	Z6827
54	88	136	13 •	14 •	5 *	Z5827RE
87	90	90	□	79	73	26828
79	84	84	64	46	24	Z6829

Compound	QC Limits
NBZ = Nitrobenzene-d5	23 - 120
FBP = 2-Fluorobiphenyl	30 - 115
TPH = Terphenyl-d14	18 - 137
PHL = Phenol-d5	24 - 113
2FP = 2-Fluorophenol	25 - 121
TBP = 2,4,6-Tribromophenol	19 - 122

* Values outside EPA CLP required QC limits.

TABLE E-21. SOIL SEMIVOLATILES MATRIX SPIKE RECOVERIES (%)

Compound	M	MDUP	M	MDUP	M	MDUP
Phenol	58	64	58	75	64	66
2-Chlorophenol	54	56	57	73	66	66
1,4-Dichlorobenzene	58	58	54	74	76	76
N-Nitroso-di-n-propylamine	64	66	65	81	71	71
1,2,4-Trichlorobenzene	50	54	54	67	82	81
4-Chloro-3-methylphenol	54	58	55	64	57	58
Acenaphthene	56	60	61	75	86	81
4-Nitrophenol	0*	0*	48	59	39	41
2,4-Dinitrotoluene	42	40	55	65	75	74
Pentachlorophenol	o*	o*	48	61	97	97
Pyrene	64	72	64	77	116	104
Relevant Samples (Lab #s)	Y2165-Y2190		Y4846-Y4851		Z0684-20724	

Compound	QC LIMITS
Phenol	26 - 90 %
2-Chlorophenol	25 - 102
1,4-Dichlorobenzene	28 - 104
N-Nitroso-di-n-propylami	41 - 126
1,2,4-Trichlorobenzene	38 107
4-Chloro-3-methylphenol	26 - 103
Acenaphthene	31 - 1 3 7
4-Nitrophenol	11 114
2,4-Dinitrotoluene	28 - 89
Pentachlorophenol	17 - 109
Pyrene	35 - 142

M = Matrix Spike MD = Matrix Duplicate Spike

• Values outside EPA CLP required QC limits.

TABLE E-21. SOIL SEMIVOLATILES MATRIX SPIRE RECOVERIES (%)

Compound	M	MDUP	M	MDUP	M	MDUP
Phenol	66	35	65	66	57	62
2-Chlorophenol	59	50	63	65	48	53
1,4-Dichlorobenzene	69	27*	71	77	64	67
N-Nitroso-di-n-propylamine	63	38*	65	66	69	72
1,2,4-Trichlorobenzene	72	23*	77	83	67	69
4-Chloro-3-methylphenol	63	33	66	67	58	62
Acenaphthene	75	19*	80	81	71	71
4-Nitrophenol	67	50	70	65	79	82
2,4-Dinitrotoluene	74	47	86	83	68	68
Pentachlorophenol	76	47	84	77	85	88
Pyrene	76	36	89	93	74	76
Relevant Samples (Lab #s)	Z0684-20724		Z1664-21671		Z6819-Z6831	

Compound	QC LIMITS
Phenol	26 - 90 %
2-Chlorophenol	25 - 102
1,4-Dichlorobenzene	28 - 104
N-Nitroso-di-n-propylami	41 - 126
1,2,4-Trichlorobenzene	38 - 107
4-Chloro-3-methylphenol	26 - 103
Acenaphthene	31 - 137
4-Nitrophenol	11 - 114
2,4-Dinitrotoluene	28 - 89
Pentachlorophenol	17 - 109
Pyrene	35 - 142

M = Matrix Spike MD = Matrix Duplicate Spike

* Values outside EPA CLP required QC limits.

TABLE E-22. TENAX CARTRIDGES FOR TO1.

Lab Spike Amt.	BZ %	EB %	HPT %	Relevant Samples (Lab #s)
	Control Recoveries			
150 ng	100	140	113	Y2144-64
300 ng	100	137	103	"
400 ng	98	130	95	Y2576-79
500 ng	110	132	112	Y2689-98
300 ng	100	123	103	"
250 ng	92	120	88	Y3023-39
150 ng	93	120	87	"
400 ng	113	130	113	Y3270-78
300 ng	153	107	153	"
200 ng	120	140	120	Y3654-61
350 ng	91	123	91	"
150 ng	93	127	93	Y3982-Y4016
350 ng	114	126	106	Y4144-61
350 ng	88	131	83	Y4698-Y4722
200 ng	100	130	90	"
300 ng	100	140	97	Y5077-Y5105
750 ng	90	128	88	"
400 ng	100	132	93	Y5505-37
400 ng	95	122	88	"
150 ng	100	127	100	Y6039-48
350 ng	83	123	80	"
150 ng	93	133	120	Y7387-92
750 ng	83	129	92	Y8186-91
350 ng	86	134	80	Y8192-97
600 ng	95	138	95	Y8199-Y8203
400 ng	83	132	92	Y8204-09
250 ng	92	120	92	Y8499-05
500 ng	98	140	96	Y8506-12
400 ng	80	118	82	Y8513-20
500 ng	86	140	96	Y8909-13
600 ng	93	127	89	Y8914-19
750 ng	84	113	95	Y9081-86
500 ng	92	132	94	Y9087-93
400 ng	108	140	108	Y9810-18
250 ng	96	136	100	Y9804-09

BZ - benzene
EB - ethyl benzene
HPT - n-heptane

TABLE E-22. TENAX CARTRIDGES FOR TO1 (Continued)

Lab Spike Amt.	Control Recoveries BZ %	EB %	HPT %	Relevant Samples (Lab #s)
400 ng	110	202 #	125	Z0039-44
250 ng	108	148	111	Z0045-50
400 ng	78	128	80	Z0051-57
600 ng	83	113	87	Z0058-64
500 ng	100	146	102	Z0065-71
600 ng	97	142	110	21229-33
500 ng	100	152	106	Z1234-40
200 ng	90	125	120	Z1519-22
500 ng	82	136	86	Z1665-63
500 ng	80	130	80	Z2061-67
600 ng	73	115	70	Z2068-74
150 ng	87	127	87	Z2078-83
350 ng	103	146	106	Z2075-77
500 ng	88	136	90	Z2511-18
600 ng	75	127	68	Z2683-95
400 ng	9s	162	88	"
500 ng	100	140	86	Z3025-29
600 ng	80	133	98	Z3031-35
500 ng	76	114	76	Z3037-42
600 ng	82	122	85	Z3044-49
400 ng	72	125	80	Z3248-52
250 ng	76	120	84	Z3254-58
500 ng	76	134	72	Z3365-70
600 ng	77	140	80	Z3372-78
200 ng	80	125	90	Z3697-3708
300 ng	63	123	63	"
600 ng	95	155	89	24040-50
400 ng	94	158	88	"
500 ng	86	138	92	24059
250 ng	92	132	100	Z4282-87
150 ng	173 #	140	180 #	Z4288-4301
350 ng	83	117	80	"

= outlier
BZ - benzene
EB - ethyl benzene
HPT - n-heptane

TABLE E-22. TENAX CARTRIDGES FOR TO1 (Continued)

	Control Recoveries			
Lab Snike Amt.	BZ %	EB %	HPT %	Relevant Samples (Lab #s)
600 ng	77	113	78	Z5366-79
500 ng	112	156	110	"
750 ng	107	160	103	Z5380-83
400 ng	85	112	102	Z5674-85
400 ng	92	138	98	"
250 ng	80	116	92	Z5686-94
250 ng	93	128	93	Z5694-97
600 ng	80	120	77	25914-17
500 ng	104	150	114	Z5918-23
750 ng	76	123	79	Z5924-29
300 ng	73	123	93	Z6533-41
Mean	89.1%	130.5%	92.4%	
SD	23.6%	20.3%	22.4%	
CV	0.266	0.156	0.243	

= outlier
BZ - benzene
EB - ethyl benzene
HPT - n-heptane

TABLE E-23. TENAX CARTRIDGES FOR TO1

Lab Spike Amt.*	Control Recoveries TOL %	MP XYL %	O XYL %	Relevant Samples (Lab #s)
150 ng	113	113	113	Y2144-64
300 ng	103	10s	107	"
400 ng	100	111	110	Y2576-79
500 ng	112	120	108	Y2689-98
300 ng	107	108	103	"
200 ng	100	100	100	Y3023-39
150 ng	93	107	107	"
400 ng	125	114	100	Y3270-78
300 ng	143	95	113	"
200 ng	135	120	115	Y3654-61
350 ng	97	104	103	"
150 ng	100	113	107	Y3982-Y4016
350 ng	114	109	106	Y4144-61
			108	Y4698-Y4722
350 200 ng ng	100 115	114 110	110	"
3D0 ng	107	116	112	Y5077-Y5105
750 ng	98	113	105	"
400 ng	110	109	108	Y5505-37
400 ng	100	101	100	"
150 ng	107	110	107	Y6039-48
350 ng	94	117	94	"
150 ng	107	113	120	Y7387-92
750 ng	101	107	105	Y8186-91
350 ng	97	108	108	Y8192-97
600 ng	97	100	117	Y8199-Y8203
400 ng	98	101	102	Y8204-09
250 ng	104	104	96	Y8499-05
500 ng	108	110	114	Y8506-12
400 ng	85	98	95	Y8513-20
500 ng	100	110	110	Y8909-13
600 ng	102	117	107	Y8914-19
750 ng	99	93	95	Y9081-86
500 ng	94	110	104	Y9087-93
400 ng	112	102	115	Y9810-18

• double amount for m/p xylenes.

TOL - toluene
MP XYL - m/p xylenes
OXYL - o-xylene

TABLE E-23. TENAX CARTRIDGES FOR TO1 (Continued)

Lab Spike Amt *	TOL %	MP XYL %	OXYL %	Relevant Samples (Lab #s)
	Control Recoveries			
250 ng	100	106	112	Y9804-09
400 ng	138	175#	172#	20039-44
250 ng	116	124	144	20045-50
400 ng	93	109	108	20051-57
600 ng	a7	92	90	Z0058-64
500 ng	102	110	112	Z0065-71
600 ng	103	108	115	Z1229-33
500 ng	112	120	126	Z1234-40
200 ng	100	105	100	Z1519-22
500 ng	98	120	128	Z1665-63
500 ng	94	110	110	Z2061-67
600 ng	82	100	95	Z2068-74
150 ng	93	103	100	Z2078-83
350 ng	108	124	111	Z2075-77
500 ng	100	130	118	Z2511-18
600 ng	90	100	110	Z2683-95
400 ng	112	125	138	"
500 ng	104	110	116	Z3025-29
600 ng	88	100	105	Z3031-35
500 ng	86	96	94	
600 ng	90	100	92	Z3044-49
400 ng	90	95	98	Z3248-52
250 ng	88	90	92	Z3254-58
500 ng	90	110	112	Z3365-70
600 ng	88	100	113	Z3372-78
200 ng	165	98	100	Z3697-3708
300 ng	77	95	93	"
600 ng	94	125	115	Z4040-50
400 ng	94	124		"
500 ng	84	100	116	Z4059
250 ng	112	118	128	Z4282-87
150 ng	80	120	173	Z4288-4301
		91	97	"
800 ng	88	92	93	Z5366-79

• double amount for m/p xylenes.

TOL - toluene
MP XYL - m/p xylenes
O XYL - o-xylene

TABLE E-23. TENAX CARTRIDGES FOR TO1 (Continued)

	Control Recoveries			
Lab Spike Amt.*	TOL %	MP XYL %	O XYL %	Relevant Samples (Lab #s)
500 ng	146	120	132	"
750 ng	108	120	117	25380-83
400 ng	98	91	100	Z5674-85
400 ng	115	112	122	"
250 ng	92	92	100	Z5686-94
250 ng	109	109	112	Z5694-97
600 ng	97	92	97	Z5914-17
500 ng	112	110	116	Z5918-23
750 ng	89	93	101	Z5924-29
300 ng	87	100	110	26533-41
Mean	99.1%	106.7%	108.6%	
SD	21.4%	17.0%	18.9%	
CV	0.216	0.159	0.174	

* double amount for m/p xylenes.
# Outlier.

TOL - toluene
MP XYL - m/p xylenes
O XYL - o-xylene

TABLE E-24. TO1 TRAVEL CONTROL SPIKES

200 ng spikes	Chloroform* %	n-Heptane %	Toluene %
Spike 1	100	95	120
Spike 2	47	100	120
Spike 3		100	105
Spike 4	115	90	135
Spike 7		110	105
Mean	87.3%	99.0%	117.0%
SD	29.2%	6.6%	11.2%
CV	0.334	0.067	0.096

* Chloroform estimated from TIC scan only, detected but not quantified in spikes 3 and 7.

TABLE E-25. TENAX CARTRIDGES FOR TO1

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	Lab #s
102	88	Y1649	116	130	Y1650
al	51*	Y1651	141*	97	Y1652
33*	27*	Y1654	108	106	Y1655
126	96	Y1656	96	106	Y1657
109	101	Y1658	98	95	Y1659
234"	89	Y1660	102	97	Y1661
269f	62*	Y1662	107	105	Y1663
99	99	Y1664	91	105	Y1665
98	95	Y1666	99	100	BLANK
99	91	50 STD	80	116	100 STD
105	89	150 STD	108	97	800 STD
94	103	Y1913	87	79	Y1914
110	108	Y1915	96	118.	Y1917
107	118	Y1918	40*	48*	Y1919
102	93	Y1920	95	101	Y1922
94	110	Y1923	98	78	Y1924
105	105	Y1925	117	78	Y1926
151*	95	Y1927	98	-91	Y1928
104	113	Y1930	118	122	Y1932
114	103	Y1933	112	99	Y1934
105	98	Y1936	108	97	Y1937
102	106	Y1938	97	102	Y1939
99	102	Y1940	97	102	Y1941
105	103	To1 CHK	107	108	1ASTD
94	95	TO1 CHK	73	72	10STD
103	96	80STD	84	52*	Y2144A
90	98	Y2144B	70	88	Y2145A
87	98	Y2145B	a7	91	Y2146A
85	112	Y2147A	85	101	Y2147B
84	105	Y2148A	94	86	Y2148B
102	91	Y2149A	61*	78	Y2149B
91	84	Y2150A	73	56*	Y2150B
102	99	Y2151A	94	111	Y2151B
110	107	Y2152	102	106	Y2153
121	92	Y2154	147*	108	Y2155
112	121	Y2156	100	100	Y2157

* Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #A	BZE-d6	CBE-d5	La4 #s
123	114	Y2158	119	119	Y2159
119	100	Y2160	117	101	Y2161
145*	106	Y2162	98	93	Y2361
96	100	Y2362	91	98	Y2363
115	101	100STD	113	104	TO1 CHK
113	96	TO1 CHK	110	111	Y2576A
105	105	Y2576B	102	104	Y2577A
99	108	Y2577B	93	95	Y2578
96	110	Y2579	94	95	TO1 CHK
95	105	Y2689	0*	0*	Y2690
112	110	Y2691	114	109	Y2692
97	105	Y2694	99	103	Y2695
125	95	Y2696	138*	92	Y2697
118	93	Y2698	104	101	Y2758
110	111	Y2759	93	100	TO1 CHK
100	100	TO1 CHK	115	109	Y3023A
118	126	Y3023B	98	103	Y3024
114	97	Y3025A	103	101	Y3025B
89	107	Y3026A	96	105	Y3026B
105	117	Y3027	111	109	Y3028
96	103	Y3029	95	108	Y3030
92	97	Y3032	98	116	Y3033
90	102	Y3034	115	114	Y3036
110	97	Y3037	97	95	Y3038
102	110	Y3039	100	100	TO1 CHK
101	104	100 STD	97	103	Y3270
97	98	Y3271A	98	104	Y3271B
111	100	Y3272	101	102	Y3273
99	100	Y3274	125	115	Y3275
112	114	Y3276	154*	97	Y3277
121	118	Y3278	112	110	TO1 CHK
83	97	Y3649A	90	103	Y3649B
151*	108	Y3650	127	101	Y3651
102	102	Y3652	130	107	Y3653
103	106	Y3654	108	96	Y3655
117	105	Y3656	111	105	Y3657

• value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Jab #s	BZE-d6	CBE-d5	Lab #s
114	107	Y3658	96	107	Y3659
95	104	Y3660	119	119	Y3661
100	100	100 STD	104	84	Y3982
110	94	Y3983	95	85	Y3984
117	90	Y3985	103	87	Y3986
114	93	Y3987	98	96	Y3988
103	91	Y3989	97	90	Y3990
103	99	Y3991	97	89	Y3992
111	100	Y3993	116	104	Y3994
105	94	Y3995	145*	91	Y3996
103	95	Y3997	121	103	Y3998
99	85	Y3999	111	122	Y4000
122	94	Y4001	91	88	Y4002
107	99	Y4003	97	97	Y4004
118	76	Y4005	101	138	Y4006
101	101	Y4007	113	87	Y4008
110	100	Y4009	99	93	Y4010
109	92	Y4011	113	98	Y4012
54*	50*	Y4013	107	124	Y4014
118	101	Y4015	103	96	Y4016
96	119	100 STD	100	100	100 STD
100	100	To1 CHK	106	103	Y4144
106	106	Y4145B	104	95	Y4146
108	112	Y4147	104	106	Y4148
111	114	Y4149	104	112	Y4150
96	128	Y4151	110	112	Y4152
104	105	Y4153	117	106	Y4154
114	123	Y4155	119	102	Y4156
113	109	Y4157	106	117	Y4158
98	101	Y4159	112	107	Y4160
115	116	Y4161	120	106	100 STD
100	100	100 STD	84	93	Y4698
97	102	Y4699	108	106	Y4700
a9	101	Y4701	98	104	Y4702
100	103	Y4703	96	105	Y4704
91	100	Y4705	90	85	Y4706

* Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BCBE-d5	-	Lab #s	BZR-d6	CBE-d5	Lab #s
109	105	Y4707	90	98	Y4708
96	112	Y4710	99	105	Y4711
97	113	Y4712	92	97	Y4713
107	101	Y4714	101	101	Y4715
104	99	Y4716	114	97	Y4717
105	97	Y4718	106	95	Y4719
111	105	Y4720	96	113	Y4721
110	106	Y4722	102	97	100 CHE
102	98	100 STD	102	102	100 STD
100	97	Y5077A	98	94	Y5077B
96	98	Y5078B	95	92	Y5079A
92	75	Y5079B	92	97	Y5080A
96	100	Y5080B	92	98	Y5081A
94	113	Y5081B	94	97	Y5082A
97	99	Y5082B	106	96	Y5083
101	94	Y5084	103	100	Y5085
98	95	Y5086	97	99	Y5087
96	93	Y5088	102	103	Y5089
102	100	Y5090	97	98	Y5091
98	107	Y5092	120	98	Y5093
94	99	Y5094	96	98	Y5095
-114	102	Y5096	107	110	Y5097
99	120	Y5098	95	106	Y5099
102	99	Y5100	94	100	Y5102
89	95	Y5104	90	107	Y5105
102	102	100 STD	93	101	100 STD
109	96	100 STD	110	90	Y5505A
100	58*	Y5505B	110	105	Y5506A
103	97	Y5506B	100	101	Y5507
109	104	Y5508A	125	125	Y5508B
105	99	Y5509A	101	103	Y5509B
109	106	Y5510	107	102	Y5511A
100	107	Y5511B	92	95	Y5512A
104	106	Y5512B	111	107	Y5513A
75	a3	Y5513B	94	93	Y5514A
104	96	Y5514B	107	106	Y5515

• Value outside established QC limits.

BZE-d6 = Benzene- d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	Lab #s
113	110	Y5516A	90	89	Y5516B
90	90	Y5517A	109	110	Y5517B
113	109	Y5518A	102	100	Y5518B
111	100	Y5519A	121	104	Y5519B
91	94	Y5520	108	106	Y5521A
107	106	Y5521B	95	88	Y5522
67	79	5523B	9 6	99	Y5524A
105	102	Y5525A	108	98	Y5526B
108	106	Y5527	108	98	Y5528B
99	94	Y5529A	101	97	Y5530A
94	94	Y5531B	106	101	Y5532
104	104	Y5534	109	108	Y5535
110	108	Y5536	100	98	Y5537
102	101	100 STD	100	97	100 STD
102	107	BLANK	101	102	100 STD
103	107	BLANK	99	97	100 STD
101	100	BLANK	101	101	100 STD
99	103	BLANK	76	76	Y6039A
106	112	Y6039B	145*	149*	Y6040A
96	113	Y6040B	106	110	Y6041
115	113	Y6042A	102	108	Y6042B
89	89	Y6044A	87	107	Y6044B
115	110	Y6045A	88	109	Y6045B
94	102	Y6046	107	108	Y6047
89	107	Y6048	100	93	100 STD
109	108	BLANK	112	88	100 STD
90	109	BLANK	102	103	Y7381A
79	132	Y7381B	102	133	Y7382
95	113	Y7383A	89	104	Y7383B
88	101	Y7384A	92	108	Y7384B
91	107	Y7385	100	100	100 STD
106	98	BLANK	101	102	Y7387A
104	98	Y7387B	105	97	Y7388A
113	98	Y7388B	103	101	Y7389A
102	102	Y7389B	101	104	Y7390A
105	105	Y7392	99	101	100 STD

* Value outside established QC limits-

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	Lab #s
93	89	BLANK	103	104	Y8186
101	109	Y8187A	93	97	Y8187B
102	106	Y8188A	81	83	Y8188B
94	97	Y8189A	100	104	Y8189B
102	109	Y8190	102	107	Y8191
102	102	100 STD	97	95	BLANK
103	112	Y8192	112	101	Y8193A
99	101	Y8193B	106	109	Y8194A
109	112	Y8194B	97	101	Y8195
106	111	Y8196A	105	110	Y8196B
103	104	Y8197A	116	115	Y8197B
96	97	100 STD	90	85	BLANK
99	96	Y8198	110	105	Y8199A
107	104	Y8199B	108	115	Y8200A
116	127	Y8200B	143*	156*	Y8201A
106	97	Y8202A	116	116	Y8202B
97	101	Y8203A	113	120	Y8203B
101	99	100 STD	98	96	BLANK
96	106	Y8204	102	103	Y8205A
97	101	Y8205B	106	105	Y8206A
100	106	Y8206B	110	100	Y8207A
114	107	Y8207B	98	102	Y8208A
99	100	Y8208B	106	113	Y8209
102	102	100 STD	97	95	BLANK
104	103	Y8499A	114	113	Y8499B
111	109	Y8501A	111	110	Y8501B
101	105	Y8502	122	121	Y8503A
111	109	Y8503B	109	111	Y8504
105	106	Y8505	92	95	100 STD
98	92	BLANK	95	101	Y8506A
103	107	Y8506B	107	110	Y8507A
93	95	Y8508A	106	99	Y8508B
89	92	Y8509A	106	105	Y8509B
102	107	Y8510A	98	115	Y8512
97	98	100 STD	98	94	BLANK
99	100	Y8513A	98	99	Y8513B

• Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	Lab #s
89	85	Y8514B	116	113	Y8515A
100	101	Y8516A	91	92	Y8516B
98	97	Y8517A	90	92	Y8517B
94	97	Y8520	102	103	100 STD
96	94	BLANK	104	99	Y8909A
113	111	Y8909B	115	113	Y8910A
61*	55*	Y8910B	113	111	Y8911
109	106	Y8912A	118	120	Y8912B
208*	214*	Y8913	92	95	100 STD
85	89	BLANK	99	96	Y8914A
107	112	Y8914B	102	102	Y8915
106	102	Y8916A	98	-95	Y8917A
113	106	Y8917B	136	127	Y8918A
96	98	Y8918B	101	106	Y8919
97	94	100 STD	97	95	BLANK
16*	67*	Y9081A	100	95	Y9081B
96	94	Y9082A	105	96	Y9082B
106	106	Y9083A	102	106	Y9083B
98	103	Y9084A	97	98	Y9084B
. 95	97	Y9085	95	100	Y9086
99	98	100 STD	87	88	BLANK
111	97	Y9087A	108	106	Y9087B
106	106	Y9088A	103	103	Y9088B
96	97	Y9089	108	109	Y9090A
94	97	Y9090B	109	108	Y9091A
109	107	Y9091B	103	100	Y9092A
95	96	Y9092B	103	102	Y9093
93	92	100 STD	102	102	BLANK
103	108	Y9798	94	100	Y9799A
94	106	Y9800A	93	107	Y9801A
107	115	Y9802B	100	100	100 STD
94	94	BLANK	120	126	Y9804A
84	82	Y9805B	169*	153*	Y9806A
29*	23*	Y9806B	129	119	Y9807A
111	110	Y9807B	109	110	Y9808A
110	115	Y9808B	108	109	Y9809

* Value outside established QC limits-

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
ab #s	d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	L
87	97	100 STD	91	99	BLANK
94	99	Y9810A	103	96	Y9812A
101	93	Y9813B	93	88	Y9814
117	120	Y9815A	91	93	Y9815B
91	89	Y9816	102	94	Y9817
138	110	Y9818	96	97	50 STD
100	105	200 STD	101	114	400 STD
91	103	800 STD	86	88	BLANK
99	89	Z0039A	101	96	Z0039B
101	107	Z0040A	97	105	Z0040B
98	106	Z0041A	96	109	Z0041B
94	98	Z0042	93	100	Z0043A
109	113	Z0043B	112	148*	zoo44
101	88	100 STD	96	83	BLANK
83	82	Z0045A	117	119	Z0045B
102	120	Z0046A	118	99	Z0046B
102	101	Z0047A	124	117	Z0047B
101	104	Z0048A	102	98	Z0049A
114	113	Z0049B	124	130	Z0050
96	88	100 STD	96	88	BLANK
92	95	Z0051A	46*	50*	Z0051B
108	105	Z0052A	104	100	Z0052B
100	101	Z0053A	72	84	Z0053B
92	98	zoos4	105	101	zoo55
111	110	Z0056A	100	103	Z0056B
93	103	zoo57	97	86	100 STD
103	99	BLANK	104	95	Z0058A
103	99	Z0058B	114	106	Z0059A
79	77	Z0059B	100	99	Z0060A
101	100	Z0060B	95	93	Z0061
92	93	Z0062A	96	95	Z0062B
102	101	Z0063	95	94	Z0064
107	102	100 STD	86	82	BLANK
92	100	Z0065A	103	106	Z0065B
67*	84	Z0066A	99	105	Z0066B
105	108	Z0067A	-104	112	Z0067B

* Value outside established QC limits.

BZE-d6 = Benzene-d; QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate.Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	Lab #s
111	114	Z0068	99	110	Z0069B
117	126	Z0070A	110	110	Z0070B
104	114	zoo71	100	100	100 STD
92	93	BLANK	96	99	Z0962A
96	96	Z0962B	90	95	Z0963A
86	86	Z0963B	101	103	Z0964B
107	100	Z0965A	98	98	Z0965B
93	101	20966	98	108	20967
96	105	Z0968	105	98	100 STD
92	86	BLANK	97	99	Z1229A
109	102	Z1229B	109	109	Z1230A
94	94	Z1230B	112	117	Z1231A
113	117	Z1231B	131	113	Z1232A
114	110	Z1232B	101	114	21233
99	91	100 STD	109	91	BLANK
96	107	Z1234A	106	121	Z1234B
100	113	Z1235A	103	116	Z1235B
107	116	Z1236A	102	113	Z1236B
2*	0*	Z1238	101	114	21239
110	125	21240	93	95	Z1519A
103	98	Z1519B	100	106	Z1520A
88	97	Z1521	96	106	21522
101	103	100 STD	100	89	BLANK
92	102	Z1655A	103	112	Z1655B
82	97	Z1656A	100	106	Z1656B
91	108	21657	109	143*	Z1658A
97	116	Z1658B	99	120	Z1659A
105	127	Z1659B	115	134*	Z1660A
123	146*	Z1660B	184*	145*	Z1661A
104	126	Z1661B	104	122	21662
96	121	21663	103	91	100 STD
93	94	BLANK	97	107	Z2061A
113	114	Z2061B	111	122	Z2062A
101	109	Z2062B	93	104	22063
102	111	Z2064A	108	122	Z2064B
108	122	Z2065A	105	119	ZZO65B

• Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued1

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab BZE	-d6	CBE-d5	Lab #s
100	113	22066	94	119	22067
97	86	100 STD	100	96	BLANK
142*	136	Z2068A	102	108	Z2069A
99	104	Z2069B	106	116	Z2070A
127	138	Z2070B	110	106	Z2071A
97	104	Z2071B	124	135	22072
112	131	22074	92	90	100 STD
102	91	BLANK	88	86	Z2075A
119	110	Z2075B	98	103	Z2076B
121	123	Z2077A	114	106	Z2077B
114	122	Z2084	88	86	100 STD
Of	0*	BLANK	103	111	Z2078A
108	117	Z2078B	105	111	Z2079A
125	139	220798	96	100	Z2080A
104	107	Z2080B	106	110	Z2081A
76	94	Z2081B	106	113	Z2082
100	107	22083	87	86	100 STD
103	96	BLANK	104	105	Z2511A
96	95	Z2511B	89	95	Z2512A
90	96	Z2512B	76*	90	Z2513A
85	91	Z2513B	82	87	Z2514A
97	97	Z2514B	92	101	Z2515A
95	110	Z2515B	200*	227*	Z2516A
106	123	Z2516B	121	108	22517
97	109	22518	101	95	100 STD
99	92	BLANK	111	102	Z2683A
115	105	Z2683B	107	100	Z2684A
106	105	Z2684B	83	99	Z2685A
100	106	Z2685B	103	112	Z2686A
133	138	Z2686B	119	129	Z2687A
109	114	Z2687B	94	102	Z2688A
110	116	Z2688B	104	110	Z2689A
107	114	Z2689B	95	96	100 STD
107	100	BLANK	95	96	2269 OA
111	113	Z2690B	101	105	Z2691B
63'	70	Z2692B	100	104	Z2693A

• Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	Lab #s
99	105	226938	104	117	Z2694A
104	118	226948	106	114	22695
150*	188*	20942	111	140*	20948
98	90	100 STD	106	94	BLANK
114	103	Z3 025A	115	105	Z3025B
123	97	Z3026A	124	112	Z3026B
101	94	Z3027A	93	108	Z3027B
106	115	Z3028A	148*	139*	Z3028B
158*	148*	23029	121	118	23030
86	98	100 STD	107	93	BLANK
98	101	Z3031A	103	109	Z3031B
102	109	Z3032A	118	120	Z3032B
119	121	Z3033A	115	114	Z3033B
101	125	Z3034A	120	121	Z3034B
137	141*	Z3035	130	133	23036
94	96	100 STD	100	99	BLANK
107	115	Z3037A	101	104	Z3037B
97	101	Z3038A	93	96	Z3038B
97	101	Z3039A	105	106	Z3039B
99	103	Z3040A	100	100	Z3040B
109	112	23041	104	110	Z3 042A
93	95	Z3042B	87	100	23043
94	87	100 STD	92	96	BLANK
83	89	Z3044A	101	101	Z3044B
109	106	Z3045B	99	96	Z3046A
102	97	Z3046B	100	94	Z3047A
99	98	230478	96	94	Z3048A
103	99	Z3048B	100	111	23049
93	96	23050	94	88	100 STD
96	91	BLANK	102	97	Z3248A
119	121	Z3248B	104	108	Z3249A
95	97	Z3249B	108	111	Z3250A
102	110	Z3250B	105	115	Z3251A
94	106	23252	93	110	23253
94	95	100 STD	102	92	BLANK
115	109	Z3254A	111	110	Z3254B

* Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZB-d6	CBE-d	Lab #s
112	118	Z3255A	94	104	Z3255B
103	113	Z3256A	123	113	Z3256B
97	107	Z3257B	107	123*	Z3258
133*	155*	Z3259	92	89	100 STD
103	99	BLANK	87	92	Z3365A
115	110	Z3365B	114	118	Z3366A
97	102	23366B	108	113	Z3367A
109	119	233678	98	106	Z3368A
100	113	23368B	117	122	Z3369A
101	113	Z3369B	102	114	23370
92	115	2 3 3 7 1	95	91	100 STD
100	96	BLANK	225*	215*	Z3372A
102	106	Z3372B	107	104	Z3373A
113	116	Z3373B	123	113	Z3374A
99	102	Z3374B	105	102	Z3375A
102	104	Z3375B	110	115	Z3376A
93	102	Z3376B	106	112	23377
102	114	23378	94	95	100 STD
95	90	BLANK	112	119	Z3698A
103	107	Z3698B	171*	155*	Z3699A
92	84	Z3699B	103	114	Z3700A
103	120	Z3700B	104	122	23701
94	112	23702	107	100	Z3703A
93	104	Z3703B	88	95	Z3704A
107	117	Z3704B	94	109	Z3705A
93	110	Z3705B	95	115	Z3706A
100	124	Z3706B	110	116	23707
81	109	23708	100	93	100 STD
95	96	BLANK	97	101	Z4040A
96	104	Z4040B	97	110	Z4041A
93	106	Z4041B	95	110	24042A
97	109	Z4042B	100	121	24044
112	121	Z4045	110	119	Z4046A
102	118	Z4046B	100	116	Z4047A
104	118	Z4047B	104	104	Z4049A
102	117	Z4049B	109	118	24050

• Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC •⌘○⌘♦□ 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 mg Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d5	Lab #s
100	93	100 STD	119	98	Z4051A
112	100	Z4051B	106	110	Z4052A
112	111	Z4052B	122	107	Z4054A
122	112	Z4054B	102	106	24055
107	108	Z4057A	106	110	Z4057B
220*	235*	Z4058	110	119	24059
94	92	100 STD	100	99	BLANK
109	101	Z4282A	98	98	Z4282B
97	109	Z4283A	96	107	Z4283B
100	107	Z4284A	105	122	Z4285B
100	113	24287	112	80	100 STD
98	88	BLANK	121	119	Z4288A
98	86	Z4288B	147*	112	Z4290A
98	86	Z4290B	119	119	Z4291A
123	116	Z4291B	178*	113	24293
115	125	Z4294A	114	124	Z4294B
113	106	242951	111	110	Z4296A
114	120	242971	124	114	Z4297B
116	124	Z4298A	109	113	Z4298B
200*	225*	24300	95	107	24301
105	105	100 STD	95	76	BLANK
101	102	Z5366A	107	115	Z5366B
106	114	Z5367A	123	123	Z5367B
121	120	Z5368A	96	121	Z5368B
101	117	Z5369A	118	121	Z5369B
101	111	25370	95	89	100 STD
95	93	BLANK	91	98	Z5371
106	108	Z5372A	104	110	Z5372B
113	117	Z5373A	119	117	Z5373B
121	124	253743	115	103	Z5374B
113	101	Z5375A	124	117	Z5375B
124	115	25376	121	123	25377
122	118	Z5378A	119	113	Z5378B
121	116	Z5379A	107	93	Z5379B
93	94	100 STD	96	93	BLANK
105	105	Z5380A	105	107	Z5380B

* Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recoveries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab ab #s			
84	85	25381	108	109	Z5382A
111	112	Z5382B	121	123	25383
97	88	100 STD	98	92	BLANK
81	95	Z5674A	92	104	Z5674B
110	100	Z5676A	114	106	Z5676B
106	97	Z5677A	100	98	25679
91	92	Z5680A	79	78	Z5680B
89	83	Z5681A	102	94	25683
110	100	Z5684A	108	101	Z5684B
112	123	25685	107	93	100 STD
91	89	Z5686A	86	88	Z5686B
99	102	Z5687A	91	94	Z5688A
106	110	Z5688B	108	113	25689
96	109	25690	104	112	Z5691A
9s	105	Z5692A	92	103	Z5692B
95	117	Z5693A	109	116	Z5693B
76	90	Z5694A	91	80	BLANK
110	90	100 STD	94	94	Z5694B
106	108	25695	106	120	Z5696A
116	117	Z5696B	107	117	25697
97	100	100 STD	105	99	Z5914A
104	102	Z5914B	99	102	Z5915A
63	66*	Z5915B	112	116	25916
94	102	25917	97	93	BLANK
96	98	100 STD	108	85	Z5919A
115	94	259198	106	94	Z5920A
125	106	Z5920B	122	122	Z5921A
118	110	259218	115	104	25922
123	120	Z5923	104	88	BLANK
99	88	100 STD	182*	207*	Z5924A
92	97	Z5924B	98	109	Z5925A
102	109	Z5925B	124	114	Z5926A
124	122	Z5926B	113	125	Z5927
100	108	Z5928A	99	111	Z5928B
90	110	25929	94	88	BLANK
104	94	100 STD	109	97	Z6533A

* Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-25. TENAX CARTRIDGES FOR TO1 (Continued)

Surrogate Recweries (%) - 200 ng Spikes					
BZE-d6	CBE-d5	Lab #s	BZE-d6	CBE-d	Lab #s
109	98	Z6533B	108	102	Z6534A
103	101	Z6534B	120	120	Z6535A
111	113	Z6535B	123	118	Z6536A
119	117	Z6536B	105	113	26537
151*	163*	Z6538A	110	105	Z6538B
127	151*	Z6539A	103	116	Z6539B
124	108	26540	83	122	26541
100	90	BLANK	117	76	100 STD
Benzene-d6			Chlorobenzene-d5		
Mean		103.75%	Mean		104.20%
SD		17.90%	SD		17.16%
CV		0.1725	CV		0.1647

* Value outside established QC limits.

BZE-d6 = Benzene-d6 QC limit: 68 - 140
CBE-d5 = Chlorobenzene-d5 QC limit: 70 - 138

TABLE E-26. METALS ON HIGH VOLUME AIR FILTERS

External Quality Controls

Spike Param.	Prepped Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
Al	24360	0.4	0.7	0.4	75	Z4351-66
	25464	1.6	2.0	0.4	100	Z5461-80
	25474	3.7	3.9	0.4	50	"
	25964	0.7	1.1	0.4	100	Z6542-51
				Mean	81%	
				SD	24%	
				CV	0.29	
As	Y9829	0.0025	2.0200	2.00	100.9	Y9819-36
	Z0076	0.0012	0.8900	1.00	88.9	Z0074-89
	20768	0.0021	1.5000	2.00	74.9	Z0764-94
	Z0776	0.0020	1.4000	2.00	69.9	"
	21264	0.0039	1.5000	2.00	74.8	Z1255-6[illegible]
	21525	0.0016	1.5000	2.00	74.9	Z1523-
	22142	0.0019	0.7840	0.80	97.8	Z2133-4[illegible]
	24360	<0.0004	0.0180	0.02	90.0	Z4351-66
	25464	0.0043	0.0239	0.02	98.0	Z5461-80
	z5474	0.0018	0.0189	0.02	85.5	"
	25964	0.0010	0.0200	0.02	95.0	Z5959-70
				Mean	86.4%	
				SD	11.1%	
				CV	0.129	
Be	Y9829	0.003	0.041	0.050	75.6	Y9819-36
	Z0076	0.003	0.021	0.025	72.8	Z0074-89
	20768	0.005	0.038	0.050	65.6	Z0764-94
	Z0776	0.003	0.039	0.050	72.4	"
	21264	<0.001	0.035	0.050	70.0	Z1255-65
	Z1525	<0.001	0.035	0.050	70.0	Z1523-25
	22142	<0.001	0.018	0.020	90.0	Z2133-42
	24360	co.001	0.011	0.010	110.0	Z4351-66
	25464	<0.001	0.010	0,010	100.0	25461-80
	Z5474	<0.001	0.010	0.010	100.0	"
	25964	<0.001	0.010	0.010	100.0	Z5959-70
				Mean	84.2%	
				SD	15.9%	
				cv	0.189	

TABLE E-26. METALS ON HIGH VOLUME AIR FILTERS (Continued)

External Quality Controls

Spike Param.	Prepped Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
Ca	24360	2.6	11.0	10.0	84.0	Z4351-66
	25464	16.0	27.4	10.0	114.0	Z5461-80
	25474	18.0	31.0	10.0	130.0	"
	Z5964	11.0	20.3	10.0	93.0	Z5959-70
				Mean	105.3%	
				SD	20.7%	
				cv	0.197	
Cd	BLK FILTER	CO.004	co.004	0.005	0.00 **	Y1674-80
	Y3105	0.006	0.016	0.010	100.0	Y3101-34
	Y3124	0.012	0.022	0.010	100.0	"
	Y3739	CO.004	0.012	0.010	120.0	Y3735-52
	Y4376	0.006	0.024	0.020	90.0	Y4360-84
	Y4387	co.004	0.022	0.020	110.0	Y4385-434
	Y4410	co.004	0.021	0.020	105.0	"
	Y4423	0.006	0.020	0.020	70.0 *	"
	Y4429	0.006	0.024	0.020	90.0	"
	Y4465	0.006	0.009	0.010	30.0 **	Y4458-72
	Y4763	0.005	0.022	0.020	85.0	Y4760-87
	Y4783	0.008	0.045	0.040	92.5	"
	Y5152	0.004	0.024	0.020	100.0	Y5148-91
	Y5163	0.009	0.025	0.020	80.0	"
	Y5178	0.013	0.028	0.020	75.0	"
	Y5626	co.004	0.021	0.020	105.0	Y5607-706
	Y5637	<0.004	0.005	0.020	25.0 • ⊠	"
	Y5651	co.004	CO.004	0.020	[illegible] • ⊠	"
	Y5686	<0.004	0.020	0.020	100.0	"
	Y6475	co.004	0.004	0.020	20.0 **	Y6461-87
	Y6483	0.006	0.025	0.020	95.0	"
	Y8258	CO.004	0.037	0.040	92.5	Y8241-64
	Y8546	0.004	0.070	0.040	165.0 **	Y8532-48
	Y9829	co.004	0.108	0.100	108.0	Y9819-36
	Z0076	0.005	0.024	0.025	76.8	Z0074-89
	20768	co.004	0.108	0.100	108.0	Z0764-94
	20776	co.004	0.109	0.100	109.0	"
	21264	0.004	0.043	0.100	39.0 • ⊠	Z1255-65
	Z1525	co.004	0.040	0.100	40.0 **	Z1523-25
	22142	0.007	0.026	0.020	95.0	Z2133-42
	24360	co.004	0.011	0.010	110.0	Z4351-66

* Value greater than two standard deviations from mean
** Outlier, excluded from statistics

TABLE E-26. METALS ON HIGH VOLUME AIR FILTERS (Continued)

[a] External Quality Controls

Spike Param.	Prepped Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
Cd	25464	<0.004	0.011	0.010	110.0	Z5461-80
	25474	co.004	0.012	0.010	120.0	"
	25964	co.004	0.009	0.010	90.0	Z5959-70
				Mean	97.6%	
				SD	13.2%	
				CV	0.135	
Cr	BLK FILTER	<0.008	0.018	0.020	92.0	Y1674-80
	Y3105	0.266	0.096	0.040	0.0 **	Y3101-34
	Y3124	0.161	0.177	0.040	40.0 *	"
	Y3739	0.012	0.057	0.040	112.5	Y3735-52
	Y4376	0.056	0.120	0.080	80.0	Y4360-84
	Y4387	<0.008	0.086	0.080	107.5	Y4385-434
	Y4410	0.008	0.100	0.080	115.0	"
	Y4423	0.027	0.091	0.080	80.0	"
	Y4429	0.072	0.153	0.080	101.3	"
	Y4465	0.044	0.054	0.040	25.0 **	Y4458-72
	Y4763	<0.008	0.082	0.080	102.5	Y4760-87
	Y4783	0.100	0.255	0.160	96.9	"
	Y5152	0.023	0.119	0.080	120.0	Y5148-91
	Y5163	0.073	0.162	0.080	111.3	"
	Y5178	0.082	0.162	0.080	100.0	"
	Y5626	0.110	0.015	0.080	0.0 **	Y5607-706
	Y5637	0.028	0.111	0.080	103.8	"
	Y5651	0.013	0.090	0.080	96.3	"
	Y5686	0.015	0.023	0.080	10.0 **	"
	Y6475	0.022	0.117	0.080	118.8	Y6461-87
	Y6483	0.101	0.075	0.080	0.0 **	"
	Y8258	0.016	0.027	0.016	68.8	Y8241-64
	Y8546	0.019	0.019	0.000	[illegible]	Y8532-48
	Y9829	0.020	0.182	0.200	81.0	Y9819-36
	Z0076	0.014	0.082	0.100	68.0	Z0074-89
	20768	0.021	0.178	0.200	78.5	Z0764-94
	20776	0.018	0.172	0.200	77.0	"
	21264	0.021	0.188	0.200	83.5	Z1255-65
	21525	0.019	0.179	0.200	80.0	Z1523-25
				Mean	93.9%	
				SD	19.6%	
				CV	0.212	

* Value greater than two standard deviations from mean
** Outlier, excluded from statistics

TABLE E-26. METALS ON HIGH VOLUME AIR FILTERS (Continued)

External Quality Controls

Spike Param.	Prepped Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
Fe	24360	0.59	0.60	0.020	50	Z4351-66
	25464	2.10	2.15	0.020	250	Z5461-80
	25474	4.90	4.36	0.020	0	"
	Z5964	0.86	1.01	0.020	750 **	Z5959-70
				Mean	100%	
				SD	132%	
				cv	1.32	
Mg	24360	0.1	10.0	10.0	99.4	Z4351-66
	25464	3.7	13.3	10.0	96-O	Z5461-80
	25474	5.1	14.3	10.0	92.0	"
	25964	1.8	11.6	10.0	98.0	Z5959-70
				Mean	96.4%	
				SD	3.2%	
				cv	0.033	

* Outlier, excluded from statistics

TABLE E-26. METALS ON HIGH VOLUME AIR FILTERS (Continued)

External Quality Controls

Spike Param.	Prepped Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
Ni	BLR FILTER	0.050	0.059	0.05	17.6 **	Y1674-80
	Y3105	0.174	0.194	0.10	20.0 **	Y3101-34
	Y3124	0.198	0.252	0.10	54.0 •	"
	Y3739	0.026	0.110	0.10	84.0	Y3735-52
	Y4376	0.082	0.266	0.20	92.0	Y4360-84
	Y4387	0.044	0.221	0.20	80.5	Y4385-434
	Y4410	<0.020	0.200	0.20	100.0	"
	Y4423	0.050	0.218	0.20	84.0	"
	Y4429	0.126	0.333	0.20	103.5	"
	Y4465	0.043	0,119	0.10	76.0	Y4458-72
	Y4763	0.020	0.206	0.20	93.0	Y4760-87
	Y4783	0.160	0.563	0.40	100.7	"
	Yf152	0.032	0.258	0.20	113.0	Y5148-91
	Y5163	0.111	0.295	0.20	92.0	"
	Y5178	0.104	0.290	0.20	93.0	"
	Y5626	co.020	0.204	0.20	102.0	Y5607-70
	Y5637	0.036	0.046	0.20	5.0 **	"
	Y5651	<0.050	0.022	0.20	11.0 • *	"
	Y5686	co.020	0.217	0.20	108.5	"
	Y6475	0.036	0.052	0.20	8.0 **	Y6461-87
	Y6483	0.117	0.330	0.20	106.5	"
	Y8258	0.140	0.680	0.40	135.0 •	Y8241-64
	Y8546	0.180	0.360	0.20	[illegible]	Y8532-48
	Y9829	co.020	0.339	0.50	67.0	Y9819-36
	20076	co.020	0.181	0.25	72.4	20074-89
	20768	co.020	0.404	0.50	80.8	Z0764-94
	20776	co.020	0.393	0.50	78.6	"
	21264	0.130	0.765	0.50	127.0	Z1255-65
	21525	0.166	0.588	0.50	84.4	Z1523-25
	22142	0.150	0.300	0.20	75.0	Z2133-42
	24360	<0.020	0.066	0.09	82.5	Z4351-66
	25464	0.078	0.140	0.08	77.5	Z5461-80
	25474	0.150	0.180	0.08	37.5 •	"
	25964	0.041	0.092	0.08	63.8	Z5959-70
				Mean	90.2%	
				SD	18.1%	
				cv	0.201	

• Value greater than two standard deviations [illegible] mean
** Outlier, excluded from statistics

TABLE E-26. METALS ON HIGH VOLUME AIR FILTERS (Continued)

External Quality Controls

Spike Param.	Prepped. Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
Pb	!0518	NA	1.600	1.413	113.2	Y1681-711
	!0519	NA	1.150	1.062	108.3	"
	BLK FILTER	<0.080	<0.080	0.05	[illegible] • [illegible]	Y1674-80
	6538 CRT	NA	0.960	1.00	[illegible]	Y2618-35
	AA1-8092	NA	1.585	1.39	114.0	Y2762-91
	Y3105	0.275	0.385	0.10	110.0	Y3101-34
	Y3124	0.345	0.400	0.10	55.0	"
	Y3739	O-956	1.080	0.10	124.0	Y3735-52
	Y4376	<0.080	o-290	0.20	145.0	Y4360-84
	Y4387	0.840	1.070	0.20	115.0	Y4385-434
	Y4410	0.920	1.260	0.20	170.0 •	"
	Y4423	0.080	0.250	0.20	85.0	"
	Y4429	0.300	0.640	0.20	170.0 *	"
	Y4465	0.090	0.238	0.10	148.0	Y4458-72
	Y4763	1.680	1.960	0.20	90.0	Y4760-87
	Y4783	0.860	1.270	0.40	102.5	"
	Y5152	0.208	0.499	0.20	145.5	Y5148-91
	Y5163	0.843	1.040	0.20	98.5	"
	Y5178	0.249	0.457	0.20	104.0	"
	Y5626	0.831	1.180	0.20	174.5 **	Y5607-706
	Y5637	0.197	0.203	0.20	3.0 • [illegible]	"
	Y5651	0.611	0.640	0.20	14.5 **	"
	Y5686	0.252	0.392	0.20	70.0	"
	Y6475	0.242	0.249	0.20	3.5 • [illegible]	Y6461-87
	Y6483	0.337	0.582	0.20	122.5	"
	Y8258	0.341	0.704	0.40	90.7	Y8241-64
	Y8546	0.052	0.190	0.20	69.0	Y8532-48
	Y9829	0.150	1.010	1.00	86.0	Y9819-36
	Z0076	0.520	0.900	0.50	76.0	Z0074-89
	Z0768	0.380	0.760	1.00	38.0	Z0764-94
	20776	0.630	1.040	1.00	41.0	"
	21264	1.000	1.840	1.00	84.0	Z1255-65
	21525	0.170	0.550	1.00	38.0	Z1523-25
	22142	1.300	1.300	0.40	0.0 **	Z2133-42
	24360	0.420	0.410	0.01	[illegible] • [illegible]	Z4351-66
	25464	0.590	0.628	0.01	380.0 **	Z5461-80
	25474	0.360	0.956	0.01	[illegible] • [illegible]	"
	25964	0.850	0.280	0.01	[illegible] • [illegible]	Z5959-70
				Mean	100.3%	
				SD	35.8%	
				CV	0.357	

• Value greater than two standard deviations from mean
** Outlier, excluded from statistics

TABLE E-26. METALS ON HIGH VOLUME AIR FILTER!3 (Continued)

External Quality Controls

Spike Param.	Prepped Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
V	BLR FILTER	co.020	0.045	0.05	90.4	Y1674-80
	BLK FILTER	co.050	0.945	1.00	94.5	"
	Y3105	0.061	0.144	0.10	83.0	Y3101-34
	Y3124	0.072	0.150	0.10	78.0	"
	Y3739	co.020	0.108	0.10	108.0	Y3735-52
	Y4376	0.037	0.210	0.20	86.5	Y4360-84
	Y4387	0.056	0.240	0.20	92.0	Y4385-434
	Y4410	0.035	0,226	0.20	95.5	"
	Y4423	0.023	0.198	0.20	87.5	"
	Y4429	0.040	0.236	0.20	98.0	"
	Y4465	0.029	0.122	0.10	93.0	Y4458-72
	Y4763	<0.020	0.191	0.20	95.5	Y4760-87
	Y4783	0.078	0.416	0.40	84.5	"
	Y5152	0.041	0.266	0.20	112.5	Y5148-91
	YS163	0.052	0.237	0.20	92.5	"
	Y5178	0.058	0.236	0.20	89.0	"
	YS626	co.020	co.020	0.20	•	Y5607-706
	Y5637	0.021	0.204	0.20	91.5	"
	Y5651	<0.020	0.194	0.20	97.0	"
	Y5686	co.020	co.020	0.20	•	"
	Y6475	<0.020	0.207	0.20	103.5	Y6461-87
	Y6483	0.060	0.072	0.20	6-0 **	"
	Y8258	co.020	co.020	0.40	•	Y8241-64
	Y8546	0.037	0.410	0.20	186.5 **	Y8532-48
	Y9829	0.023	0.404	0.50	76.2	Y9819-36
	ZOO76	co.020	0.200	0.25	80.0	Z0074-89
	Z0768	0.024	0.383	0.50	71.8	Z0764-94
	20776	0.021	0.388	0.50	73.4	"
	21264	0.044	0.430	0.50	77.2	Z1255-65
	Z1525	0.022	0.230	0.50	41.6 •	Z1523-25
	22142	0.031	0.220	0.20		Z2133-42
	24360	<0.020	0.076	0.10	76.0	Z4351-66
	25464	co-020	0.115	0.10	115.0	Z5461-80
	25474	co.020	0.116	0.10	116.0	"
	25964	co.020	0.102	0.10	102.0	Z5959-70
				Mean	91.5%	
				SD	12.1%	
				CV	0.167	

* Value greater than two standard deviations from mean
• * Outlier, excluded from statistics

TABLE E-26. METALS ON HIGH VOLUME AIR FILTERS (Continued)

External Quality Controls

Spike Param.	Prepped Sample #	Unspiked Amount	Spiked Amount	mg Added	% Recovery	Relevant Samples
Zn	BLK FILTER	0.035	0.076	0.05	81.6	Y1674-80
	Y3105	0.086	0.178	0.10	92.0	Y3101-34
	Y3124	0.115	0.278	0.10	163.0 *	"
	Y3739	0.074	0.136	0.10	62.0	Y3735-52
	Y4376	0.056	0.245	0.20	94.5	Y4360-84
	Y4387	0.738	0.956	0.20	109.0	Y4385-434
	Y4410	0.060	0,254	0.20	97.0	"
	Y4423	0.084	0.231	0.20	73.5	"
	Y4429	0.102	0.295	0.20	96.5	"
	Y4465	0.046	0.124	0.10	78.0	Y4458-72
	Y4763	0.108	0.282	0.20	87.0	Y4760-87
	Y4783	0.752	1.290	0.40	134.5	"
	Y5152	0.153	o-397	0.20	122.0	Y5148-91
	Y5163	0.128	0.315	0.20	93.5	"
	Y5178	0.146	0.400	0.20	127.0	"
	Y5626	0.050	0.246	0.20	98.0	Y5607-706
	YS637	0.067	0.086	0.20	9.5 **	"
	Y5651	0.057	0.052	0.20	[illegible] *	"
	Y5686	0.052	0.238	0.20	[illegible]	"
	Y6475	0.063	0.067	0.20	2.0 **	Y6461-87
	Y6483	0.110	0.316	0.20	103.0	"
	Y8258	0.017	0.260	0.40	60.8	Y8241-64
	Y8546	0.028	0.190	0.20	81-0	Y8532-48
	Y9829	0.110	0.530	0.50	84.0	Y9819-36
	Z0076	0.014	0.182	0.25	67.2	Z0074-89
	Z0768	0.093	0.510	0.50	83.4	Z0764-94
	20776	0.270	0.660	0.50	78.0	"
	21264	0.270	0.710	0.50	88.0	Z1255-65
	21525	0.077	0.480	0.50	80.6	Z1523-25
	22142	0.210	0.410	0.20	100.0	Z2133-42
	24360	0.028	0.059	0.04	77.5	Z4351-66
	25464	0.093	0.140	0.04	117.5	Z5461-80
	25474	0.095	0.150	0.04	137.5	"
	25964	0.150	O-200	0.04	125.0	Z5959-70
				Mean	96.3%	
				SD	23.6%	
				cv	0.245	

* Value greater than two standard deviations from mean
** Outlier, excluded from statistics

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Val	RPD	Relevant Samples (Lab #s)
		Parameter: Al		
Y9823	2.3	2.6	12.2	Y9819-36
Y9831	3.6	2.8	25.0	"
Z0081	4.8	3.8	23.0	Z0074-89
zoo07	11.5	10.7	7.2	"
20764	5.0	4.3	15.1	"
Z0771	2.7	3.1	13.8	"
Z0787	2.4	1.7	34.1	"
Z1255	6.2	4.9	23.4	Z1255-65, Z1523-25
21524	3.6	5.0	32.6	A
Z1672	19.0	16.0	17.1	Z1672-75
22137	4.3	3.7	15.0	Z2133-42
Z2528	2.6	3.0	14.3	Z2528-32
Z3053	4.7	4.5	4.3	Z3051-59
23265	4.6	4.0	4.3	Z3265-69
23392	1.9	2.5	27.3	Z3389-92
23712	3.7	3.7	0.0	Z3709-13
24162	3.3	3.4	3.0	Z4160-68
24353	1.5	2.3	42.1	Z4351-66
24364	1.1	1.3	16.7	"
25464	0.9	0.7	25.0	Z5461-80
25474	1.9	2.0	5.1	W
Z5896	0.6	0.7	15.4	Z5895-98, Z5959-70
Z5967	1.2	0.9	28.6	"
26547	3.3	3.1	6.2	Z6542-51
		Parameter: As		
Y9823	0.0019	0.0020	5.13	Y9819-36
Y9831	0.0016	0.0012	28.57	"
Z0081	0.0024	0.0046	62.86	Z0074-89
Z0087	0.0057	0.0060	5.13	"
20764	0.0018	0.0024	28.57	"
Z0771	0.0016	0.0020	22.22	"
Z0787	0.0010	0.0007	35.29	"
21255	0.0028	0.0020	33.33	Z1255-65, Z1523-25
21524	0.0018	0.0020	10.53	"
21672	O-0072	0.0054	28.57	Z1672-75

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: As (Continued)		
22137	0.0030	0.0025	18.18	Z2133-42
Z2528	0.0030	0.0031	3.28	Z2528-32
Z3053	0.0003	0.0030	168.10	Z3051-59
23265	0.0024	0.0240	163.64	Z3265-69
23392	0.0017	0.0018	5.71	Z3389-92
23712	0.0018	0.0016	11.76	Z3709-13
24162	0.0088	0.0088	0.00	Z4160-68
24353	0.0008	0.0016	66.67	Z4351-66
24364	0.0022	0.0024	8.70	"
25464	0.0018	<0.0004	127.27	Z5461-80
25474	0.0016	0.0009	56.00	"
25896	0.0068	0.0008	157.89	Z5895-98, Z5959-70
25967	0.0010	0.0008	22.22	"
26547	0.0027	0.0020	29.79	Z6542-51
		Parameter: Be		
Y9823	0.002	0.002	0.00	Y9819-36
Y9831	0.004	0.002	40.00	"
Z0081	0.005	0.004	8.70	Z0074-89
Z0087	0.013	0.016	20.69	"
20764	0.005	0.004	8.70	"
20771	0.002	0.002	0.00	"
20787	0.002	0.002	0.00	"
21255	<0.001	<0.001	0.00	Z1255-65, Z1523-25
21524	<0.001	co.001	0.00	"
21672	0.018	0.016	11.76	Z1672-75
22137	co.001	<0.001	0.00	Z2133-42
22528	co.001	co.001	0.00	Z2528-32
23053	co.001	co.001	0.00	Z3051-59
23265	<0.001	<0.001	0.00	Z3265-69
23392	<0.001	<0.001	0.00	Z3389-92
23712	co.001	co.001	0.00	Z3709-13
24162	<0.001	<0.001	0.00	Z4160-68
24353	co.001	<0.001	0.00	Z4351-66
24364	<0.001	<0.001	0.00	"
25464	<0.001	co.001	0.00	Z5461-80

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Be (Continued)		
25474	co.001	co.001	0.00	Z5461-80
Z5896	co.001	<0.001	0.00	Z5895-98, Z5959-70
25967	co.001	<0.001	0.00	"
26547	60.001	<0.001	0.00	Z6542-51
		Parameter: Ca		
Y9823	16.0	16.0	0.00	Y9819-36
Y9831	42.0	38.0	10.00	A
20081	35.0	34.0	2.90	Z0074-89
Z0087	63.0	81.0	25.00	"
20764	29.0	29.0	0.00	"
20771	29.0	27.0	7.14	"
20787	27.0	25.0	7.69	"
21255	49.0	41.0	-17.78	Z1255-65, Z1523-25
21524	30.0	29.0	3.39	"
24353	11.0	11.0	0.00	Z4351-66
24364	15.0	12.0	22.22	"
25464	5.7	5.6	1.77	Z5461-80
35474	9.2	10.3	11.28	"
25896	8.2	9.0	9.30	Z5895-98, Z5959-70
25967	6.3	6.5	3.13	"
26547	16.0	15.8	1.26	Z6542-51
		Parameter: d		
Y1681	0.006	co.004	40.00	Y1681-711
Y1683	0.005	0.005	0.00	"
Y1694	0.008	0.006	28.57	"
Y1695	0.012	0.014	12.12	"
Y1711	0.010	0.009	16.67	"
Y1859	<0.008	<0.008	0.00	Y1858-75
Y1873	<0.008	<0.008	0.00	"
Y1675	<0.004	co.004	0.00	Y1674-80, Y1973-82
Y1973	0.013	0.024	59.46	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cd (Continued)		
Y1976	0.013	0.008	47.62	Y1674-80, Y1973-82
Y1980	co.004	<0.004	0.00	"
Y2103	co.020	<0.020	0.00	Y2101-28
Y2108	co.020	co.020	0.00	"
Y2112	<0.020	co.020	0.00	"
Y2117	<0.020	<0.020	0.00	"
Y2124	0.024	co.020	18.18	"
Y2623	co.004	<0.004	0.00	Y2618-35, Y2762-91
Y2635	0.007	0.005	33.33	"
Y2767	co.004	<0.004	0.00	"
Y2782	0.006	0.005	18.18	"
Y2790	0.006	<0.004	40.00	"
Y3104	0.011	0.014	24.00	Y3101-34
Y3113	co.004	co.004	0.00	"
Y3122	0.011	0.012	8.70	"
Y3130	co.004	co.004	0.00	"
Y3371	0.004	0.006	40.00	Y3370-77,Y3735-52,
Y3742	co.004	co.004	0.00	Y4458-72
Y3747	0.004	co.004	0.00	"
Y4461	0.006	co.004	40.00	"
Y4469	0.007	0.005	33.33	"
Y4365	0.006	0.004	40.00	Y4360-84, Y4760-87
Y4371	0.014	0.014	0.00	"
Y4383	0.006	co.004	40.00	"
Y4768	0.021	0.015	33.33	"
Y4781	co.004	0.010	85.71	"
Y4389	co.004	co.004	0.00	Y4385-434, Y4462
Y4394	0.009	0.013	36.36	"
Y4415	0.005	co.004	22.22	"
Y4424	0.006	co.004	40.00	"
Y4432	co.004	co.004	0.00	"
Y5150	0.006	co.004	40.00	Y5148-91
Y5158	0.005	0.004	22.22	"
Y5169	co.004	<0.004	0.00	"
Y5189	0.006	co.004	40.00	"
Y5611	0.005	0.034	140.72	Y5607-706
Y5615	0.006	0.005	18.18	"
Y5622	co.004	0.005	-22.22	"
Y5632	co.004	0.005	22.22	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cd (Continued)		
Y5647	0.007	0.007	0.00	Y5607-706
Y5662	0.009	0.007	25.00	"
Y5678	<0.004	0.004	0.00	"
Y5693	0.006	<0.004	40.0-o	"
Y5701	0.005	0.007	33.33	"
Y6465	0.005	0.004	22.22	Y6461-87
Y6472	0.008	0.010	22.22	"
Y6485	0.004	0.008	66.67	"
Y8242	co.004	co.004	0.00	Y8241-64,Y8532-48
Y8250	0.014	0.012	15.38	Y8944-9114
Y8537	0.006	0.005	18.18	"
Y9107	0.006	0.008	28.57	"
Y9823	co.004	<0.004	0.00	Y9819-36
Y9831	co.004	co.004	0.00	"
Z0081	0.004	<0.004	0.00	Z0074-89
Z0087	0.006	0.006	0.00	"
20764	co.004	co.004	0.00	Z0764-94
20771	co.004	co.004	0.00	"
20787	co.004	co.004	0.00	"
21255	co.004	co.004	0.00	Z1255-65, Y1523-25
21524	<0.004	co.004	0.00	"
21672	0.010	0.016	46.15	Z1672-75
22137	0.005	0.004	22.22	Z2133-42
22528	co.004	<0.004	0.00	Z2528-32
23053	co.004	co.004	0.00	Z3051-59
23265	co.004	co.004	0.00	Z3265-69
23392	co.004	co.004	0.00	Z3389-92
23712	<0.004	co.004	0.00	Z3709-13
24162	co.004	0.004	0.00	Z4160-68
24353	co.004	co.004	0.00	Z4351-66
24364	0.004	co.004	0.00	n
25464	<0.004	co.004	0.00	Z5461-80
25474	co.004	co.004	0.00	"
25896	co.004	co.004	0.00	Z5895-98, Z5959-70
25967	co.004	co.004	0.00	"
26547	co.004	co.004	0.00	Z6542-51

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cr		
Y1681	co.040	co.040	0.00	Y1681-711
Y1683	0.045	co.040	11.76	"
Y1694	co.040	co.040	0.00	"
Y1695	co.040	co.040	0.00	"
Y1711	0.084	0.089	5.78	"
Y1859	0.074	0.054	31.25	Y1858-75
Y1873	0.048	0.034	34.15	"
Y1675	<0.008	0.010	22.22	Y1674-80, Y1973-82
Y1973	0.097	0.144	39.00	"
Y1976	0.056	0.053	5.50	"
Y1980	0.014	0.022	44.44	"
Y2103	0.074	co.040	59.65	Y2101-28
Y2108	<0.040	co.040	0.00	"
Y2112	0.059	0.082	-32.62	"
Y2117	co.040	0.076	62.07	"
Y2124	0.098	co.040	84.06	"
Y2623	0.018	0.018	0.00	Y2618-35, Y2762-91
Y2635	0.039	0.029	29.41	"
Y2767	0.022	0.130	142.11	"
Y2782	0.100	0.068	38.10	"
Y2790	0.056	0.113	67.46	"
Y3104	0.046	0.079	52.80	Y3101-34
Y3113	0.022	0.026	16.67	"
Y3122	0.100	0.100	0.00	"
Y3130	<0.008	0.010	22.22	"
Y3371	0.031	0.049	45.00	Y3370-77,Y3735-52,
Y3742	0.013	<0.010	26.09	Y4458-72
Y3747	0.038	0.024	45.16	"
Y4461	0.047	0.048	2.11	"
Y4469	0.041	0.044	7.06	"
Y4365	0.039	0.032	19.72	Y4360-84, Y4760-87
Y4371	0.158	0.169	6.73	"
Y4383	<0.008	<0.008	0.00	"
Y4768	0.145	0.108	29.25	"
Y4781	0.087	0.084	3.51	"
Y4389	0.012	0.019	45.16	Y4385-434, Y4462
Y4394	0.139	0.173	21.79	"
Y4415	0.016	<0.008	66.67	"
Y4424	0.058	0.038	41.67	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cr (Continued)		
Y4432	0.058	<0.008	151.52	Y4385-434, Y4462
Y5150	0.028	0.030	6.90	Y5148-91
Y5158	0.029	0.033	12.90	"
Y5169	0.027	0.028	3.64	"
Y5189	0.031	0.018	53.06	"
Y5611	0.042	0.042	0.00	Y5607-706
Y5615	0.042	0.043	2.35	"
Y5622	0.037	0.042	12.66	"
Y5632	0.021	0.035	50.00	"
Y5647	0.022	0.024	8.70	"
Y5662	0.063	0.057	10.00	"
YS678	0.020	0.021	4.88	"
Y5693	0.013	0.019	37.50	"
Y5701	0.054	0.058	7.14	"
Y6465	0.060	0.048	22.22	Y6461-87
Y6472	0.080	0.105	27.03	"
Y6485	0.039	0.040	2.53	"
Y8242	0.014	0.016	13.33	Y8241-64,Y8532-48,
Y8250	0.160	0.140	13.33	Y8944-9114
Y8537	0.038	0.026	37.50	"
Y9107	0.064	0.073	13.14	"
Y9823	0.018	0.017	5.71	Y9819-36
Y9831	0.018	0.022	20.00	"
Z0081	0.026	0.023	3.92	Z0074-89
Z0087	0.055	0.056	1.80	"
20764	0.024	0.023	4.26	Z0764-94
20771	0.014	0.015	6.90	"
20787	0.019	0.010	62.07	"
21255	0.038	0.032	17.14	Z1255-65, Z1523-25
21524	0.017	0.026	41.86	"
21672	0.110	0.090	20.00	Z1672-75
82137	0.040	0.029	31.88	Z2133-42
22528	0.018	0.018	0.00	Z2528-32
23053	0.020	0.018	10.53	Z3051-59
23265	0.024	0.024	0.00	Z3265-69
23392	0.014	0.013	7.41	Z3389-92
Z3712	0.019	0.015	23.53	Z3709-13
24162	0.020	0.020	0.00	Z4160-68
24353	0.010	0.015	40.00	Z4351-66

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cr (Continued)		
24364	0.014	0.013	7.41	Z4351-66
25464	<0.008	0.008	0.00	Z5461-80
25474	<0.008	0.021	89.66	"
25896	<0.008	<0.008	0.00	Z5895-98, Z5959-70
25967	0.008	<0.008	0.00	"
26547	0.012	0.010	18.18	Z6542-51
		Parameter: Fe		
Y9823	2.40	2.93	19.89	Y9819-36
Y9831	3.80	2.79	30.65	"
Z0081	5.40	4.64	15.14	Z0074-89
Z0087	11.50	12.50	8.33	"
20764	5.00	4.56	9.21	Z0764-94
20771	2.30	2.71	16.37	"
20787	2.40	1.74	31.88	"
Z1255	7.20	5.70	23.26	Z1255-65, Z1523-25
21524	3.70	5.10	31.82	"
21672	25.00	19.00	27.27	Z1672-75
22137	3.20	3.30	3.08	Z2133-42
22528	3.20	3.30	3.08	Z2528-32
23053	5.00	4.90	2.02	Z3051-59
23265	5.00	5.10	1.98	Z3265-69
23392	2.40	3.00	22.22	Z3389-92
23712	4.20	4.30	2.35	Z3709-13
24162	3.90	4.20	7.41	Z4160-68
24353	1.80	2.50	32.56	Z4351-66
24364	1.40	1.60	13.33	"
25464	0.90	0.76	16.87	Z5461-80
25474	2.50	2.66	6.20	"
25896	0.62	0.80	25.35	Z5895-98, Z5959-70
25967	1.40	0.78	56.88	"
26547	3.30	3.15	4.65	Z6542-51

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Mg		
Y9823	3.5	3.7	5.56	Y9819-36
Y9831	4.3	3.7	15.00	"
Z0081	9.6	9.5	1.05	Z0074-89
Z0087	20.0	19.0	5.13	"
20764	6.0	5.8	3.39	Z0764-94
20771	4.8	5.0	4.08	"
20787	3.3	2.9	12.90	"
Z1255	10.0	8.5	16.22	Z1255-65, Z1523-25
21524	5.6	6.5	14.88	"
21672	29.0	23.0	23.08	Z1672-75
22137	4.4	5.0	12.77	Z2133-42
22528	4.3	4.2	2.35	Z2528-32
23053	4.8	4.5	6.45	Z3051-59
23265	4.6	4.8	4.26	Z3265-69
23392	3.3	3.4	2.99	Z3389-92
23712	3.9	4.0	2.53	Z3709-13
24162	4.2	4.6	9.09	Z4160-68
24353	2.6	3.2	20.69	Z4351-66
Z4364	2.4	2.5	4.08	"
25464	1.3	1.2	8.00	Z5461-80
25474	2.5	2.7	7.69	"
Z5896	1.3	1.5	14.29	Z5895-98, Z5959-70
25967	1.7	1.5	12.50	"
26547	4.2	4.2	0.00	Z6542-51
		Parameter: Na		
Y9823	29.0	32.0	9.84	Y9819-36
Y9831	20.0	17.0	16.22	"
Z0081	41.0	38.0	7.59	Z0074-89
Z0087	24.0	28.0	15.38	"
20764	32.0	30.0	6.45	Z0764-94
20771	23.0	29.0	23.08	"
20787	16.0	14.0	13.33	"
Z1255	27.0	25.0	7.69	Z1255-65, Z1523-25
21524	39.0	46.0	16.47	"
21672	35.0	28.0	22.22	X1672-75

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Na (Continued)		
22137	19.0	22.0	14.63	Z2133-42
22528	6.5	6.8	4.51	Z2528-32
23053	8.6	8.7	1.16	Z3051-59
23265	8.9	9.2	3.31	Z3265-69
23392	3.5	3.9	10.81	Z3389-92
23712	16.0	17.0	6.06	Z3709-13
24162	5.1	5.7	11.11	Z4160-68
24353	2.2	2.6	16.67	Z4351-66
84364 ,	3.5	3.6	2.82	"
Z5464	3.5	3.2	8.96	Z5461-80
25474	2.9	3.2	9.84	"
25896	2.5	2.6	3.92	Z5895-98, Z5959-70
25967	4.0	3.3	19.18	"
26547	4.7	4.6	2.15	Z6542-51
		Parameter: Ni		
Y1681	0,022	0.027	22.95	Y1681-711
Y1683	0.049	0.048	2.49	"
Y1694	co.020	0.059	98.73	"
Y1695	0.028	0.032	13.16	"
Y1711	0.147	0.166	12.14	"
Y1859	0.043	0.055	24.49	Y1858-75
Y1873	0.052	0.038	31.11	"
Y1675	<0.040	co.040	0.00	Y1674-80, Y1973-82
Y1973	0.124	0.197	45.48	"
Y1976	co.040	0.054	29-78	"
Y1980	<0.040	co.040	0.00	"
Y2103	0.167	0.083	67.20	Y2101-28
Y2108	0.044	0.044	0.00	"
Y2112	0.169	0.210	21.64	"
Y2117	0.117	0.196	50.48	"
Y2124	0.220	0.094	80.25	"
Y2623	co.020	co.020	0.00	Y2618-35, Y2762-91
Y2635	0.025	<0.020	22.22	"
Y2767	co.020	0.049	84.06	"
Y2782	0.050	0.055	9.52	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Ni (Continued)		
Y2790	co.020	0.049	84.06	Y2618-35, Y2762-91
Y3104	0.073	0.117	46.32	Y3101-34
Y3113	0.032	0.040	22.22	"
Y3122	0.169	0.174	2.92	"
Y3130	<0.020	0.025	22.22	"
Y3371	0.040	0.053	27.96	Y3370-77,Y3735-52,
Y3742	0.026	co.020	26.09	Y4458-72
Y3747	0.036	0.039	8.00	"
Y4461	0.050	0.048	4.08	"
Y4469	0.060	0.060	0.00	"
Y4365	0.042	0.046	9.09	Y4360-84, Y4760-87
Y4371	0.274	0.282	2.88	"
Y4383	<0.020	<0.020	0.00	•
Y4768	0.217	0.173	22.56	"
Y4781	0.134	0.145	7.89	"
Y4389	0.044	0.096	74.29	Y4385-434, Y4462
Y4394	0.283	0.307	8.14	"
Y4415	0.031	0.036	14.93	"
Y4424	0.096	0.088	8.70	"
Y4432	0.040	0.038	5.13	"
Y5150	0.041	0.049	17.78	Y5148-91
Y5158	0.052	0.052	0.00	"
Y5169	0.032	0.028	13.33	"
Y5189	0.042	0.03s	18.18	"
Y5611	0.065	0.071	8.82	Y5607-706
Y5615	0.069	0.069	0.00	"
Y5622	0.060	0.074	20.90	"
Y5632	0.051	0.062	19.47	"
YS647	0.030	0.033	9.52	"
Y5662	0.101	0.090	11.52	"
Y5678	0.022	0.027	20.41	"
Y5693	co.020	0.014	35.29	"
Y5701	0.078	0.080	2.53	"
Y6465	0.092	0.085	7.91	Y6461-87
Y6472	0.143	0.166	14.89	"
Y6485	0.048	0.064	28.57	"
Y8242	0.250	0.190	27.27	Y8241-64,Y8532-48,
Y8250	0.520	0.640	20.69	Y8944-9114
Y8537	0.170	0.240	34.15	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Ni (Continued)		
Y9107	0.260	0.380	37.50	Y8944-9114
Y9823	co.020	co.020	0.00	Y9819-36
Y9831	co.020	co.020	0.00	"
Z0081	0.040	0.032	22.22	Z0074-89
Z0087	0.082	0.078	5.00	"
20764	0.020	co.020	0.00	Z0764-94
Z0771	<0.020	<0.020	0.00	"
20787	<0.020	co.020	0.00	"
21255	0.307	0.281	8.84	Z1255-65, Z1523-25
Zlf24	0.137	0.304	75.74	"
21672	0.460	0.370	21.69	Z1672-75
Z2137	0.230	0.230	0.00	Z2133-42
22528	0.130	0.120	8.00	Z2528-32
23053	0.120	0.096	22.22	Z3051-59
23265	0.160	0.110	37.04	Z3265-69
23392	0.160	0.098	48.06	Z3389-92
23712	0.210	0.140	40.00	Z3709-13
24162	0.150	0.130	14.29	Z4160-68
24353	<0.020	co.020	0.00	Z4351-66
24364	co.020	co.020	0.00	"
25464	0.034	0.029	15.87	Z5461-80
Z5474	0.086	0.094	8.89	"
25896	co.020	0.023	13.95	Z5895-98, Z5959-70
25967	0.060	0.035	52.63	"
26547	0.130	0.160	20.69	Z6542-51
		Parameter: Pb		
Y1681	0.620	0.660	6.25	Y1681-711
Y1683	0.680	0.740	8.45	"
Y1694	1.000	1.020	1.98	"
Y1695	0.400	0.410	2.47	"
Y1711	0.870	0.890	2.27	"
Y1859	0.844	1.030	19.85	Y1858-75
Y1873	0.626	0.642	2.52	"
Y1675	<0.080	0-083	3.68	Y1674-80, Y1973-82
Y1973	0.438	0.604	31.86	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Pb (Continued)		
Y1976	0.292	0.294	0.68	Y1674-80, Y1973-82
Y1980	<0.080	<0.080	0.00	"
Y2103	0.392	0.781	66.33	Y2101-28
Y2108	0.323	0.224	36.20	"
Y2112	0.450	0.492	8.92	"
Y2117	0.283	0.659	79.83	"
Y2124	0.719	0.358	67.04	"
Y2623	0.640	0.616	3.82	Y2618-35, Y2762-91
Y2635	0.188	0.177	6.03	"
Y2767	0.676	0.776	13.77	"
Y2782	0.260	0.380	37.50	"
Y2790	0.086	0.096	10.99	"
Y3104	0.832	0.992	17.54	Y3101-34
Y3113	0.164	0.202	20.77	"
Y3122	0.361	0.399	10.00	"
Y3130	0.111	0.128	14.23	"
Y3371	1.750	1.700	2.90	Y3370-77,Y3735-52,
Y3742	1.840	1.700	7.91	Y4458-72
Y3747	0.134	0,173	25.41	"
Y4461	0.162	0.202	21.98	"
Y4469	0.084	0.112	28.57	"
Y4365	0.200	0.120	50.00	Y4360-84, Y4760-87
Y4371	0.250	0.390	43.75	"
Y4383	<0.080	<0.080	0.00	"
Y4768	0.680	0.610	10.85	"
Y4781	0.560	0.590	5.22	"
Y4389	1.100	1.030	6.57	Y4385-434, Y4462
Y4394	0.270	6.340	22.95	"
Y4415	<0.080	0.090	11.76	"
Y4424	0.120	0.090	28.57	"
Y4432	0.130	0.156	18.18	"
Y5150	0.768	0.740	3.71	Y5148-91
Y5158	0.429	0.508	16.86	"
Y5169	0.204	0.194	5.03	"
Y5189	0.376	0.405	7.43	"
Y5611	0.741	0.746	0.67	Y5607-706
Y5615	0.821	0.852	3.71	"
Y5622	0.197	0.184	6.82	"
Y5632	0.467	0.502	7.22	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RED	Relevant Samples (Lab #s)
		Parameter: Pb (Continued)		
Y5647	0.656	0.700	6.49	Y5607-706
Y5662	0.522	0.497	4.91	"
Y5678	0.274	0.251	8.76	"
Y5693	0.262	0.279	6.28	"
Y5701	0.616	0.547	11.87	"
Y6465	0.130	0.114	13.11	Y6461-87
Y6472	0.523	0.554	5.76	"
Y6485	0.897	0.870	3.06	"
Y8242	0.752	0.792	5.18	Y8241-64,Y8532-48,
Y8250	0.424	0.392	7.84	Y8944-9114
Y8537	0.276	0.276	0.00	"
Y9107	0.932	0.964	3.38	"
Y9823	0.320	0.343	6.94	Y9819-36
Y9831	0.920	0.832	10.05	"
Z0081	0.440	0.460	4.44	Z0074-89
Z0087	0.610	0.600	1.65	"
20764	0.160	0.135	16.95	Z0764-94
20771	0.150	0.139	7.61	"
20787	1.200	1.110	7.79	"
21255	0.490	0.420	15.38	Z1255-65, Z1523-25
21524	0.990	0.950	4.12	"
21672	0.490	0.413	17.05	Z1672-75
22137	0.920	0.890	3.31	Z2133-42
22528	1.200	1.100	8.70	Z2528-32
23053	0.380	0.390	2.60	Z3051-59
23265	0.650	0.660	1.53	23265-69
23392	1.000	1.000	0.00	Z3389-92
23712	1.000	1.000	0.00	Z3709-13
24162	0.870	0.940	7.73	Z4160-68
24353	0.660	0.670	1.50	Z4351-66
24364	0.840	0.870	3.51	"
25464	0.930	0.890	4.40	Z5461-80
25474	1.600	1.640	2.47	"
25896	0.510	0.580	12.84	Z5895-98, Z5959-70
25967	0.280	0.580	69.77	"
26547	0.840	0.880	4.65	Z6542-51

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: V		
Y1681	0.022	0.023	4.44	Y1681-711
Y1683	-0.028	0.022	24.00	"
Y1694	0.025	0.026	3.92	"
Y1695	0.028	0.028	0.00	"
Y1711	0.077	0.066	15.38	"
Y1859	0.025	0.035	33.33	Y1858-75
Y1873	0.057	0.048	17.14	"
Y1675	0.020	0.041	68.85	Y1674-80, Y1973-82
Y1973	0.091	0.121	28.30	"
Y1976	0.050	co.020	85.71	"
Y1980	co.020	co.020	0.00	"
Y2103	0.104	0.114	9.17	Y2101-28
Y2108	0.032	0.030	6.45	"
Y2112	0.106	0.149	33.73	"
Y2117	0.070	0.146	70.37	"
Y2124	0.125	0.063	65.96	"
Y2623	0.038	0.034	11.11	Y2618-35, Y2762-91
Y2635	0.035	0.026	29.51	"
Y2767	0.031	0.031	0.00	"
Y2782	0.038	0.039	2.60	"
Y2790	<0.020	co.020	0.00	"
Y3104	0.056	0.078	32.84	Y3101-34
Y3113	co.020	0.024	18.18	"
Y3122	0.085	0.084	1.18	"
Y3130	0.029	0.024	18.87	"
Y3371	0.026	0.035	29.51	Y3370-77,Y3735-52,
Y3742	<0.020	co.020	0.00	Y4458-72
Y3747	0.023	0.021	9.09	"
Y4461	0.033	0.030	9.52	"
Y4469	0.043	0.045'	4.55	"
Y4365	0.038	0.036	5.41	Y4360-84, Y4760-87
Y4371	0.106	0.109	2.79	"
Y4383	co.020	co.020	0.00	"
Y4768	0.127	0.086	38.50	"
Y4781	0.079	0.074	6.54	"
Y4389	0.034	0.034	0.00	Y4385-434, Y4462
Y4394	0.098	0.111	12.44	"
Y4415	0.020	<0.020	0.00	"
Y4424	0.038	0.035	8.22	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter V: (Continued)		
Y4432	0.054	0.051	5.71	Y4385-434, Y4462
Y5150	0.040	0.038	5.13	Y5148-91
Y5158	0.032	0.034	6.06	"
Y5169	0.022	0.026	16.67	"
Y5189	0.079	0.076	3.87	"
Y5611	0.061	0.059	3.33	Y5607-706
Y5615	0.044	0.048	8.70	"
Y5622	0.025	0.024	4.08	"
Y5632	0.080	0.088	9.52	"
Y5647	0.026	0.028	7.41	"
Y5662	0.068	0.061	10.85	"
Y5678	0.025	0.025	0.00	"
Y5693	co.020	<0.020	0.00	"
Y5701	0.058	0.049	16.82	"
Y6465	0.037	0.035	5.56	Y6461-87
Y6472	0.050	0.068	30.51	"
Y6485	0.026	0.033	23.73	"
Y8242	co.020	co.020	0.00	Y8241-64,Y8532-48,
Y8250	0.100	0.096	4.08	Y8944-9114
Y8537	0.027	0.023	16.00	"
Y9107	0.059	0.067	12.70	"
Y9823	0.030	0.032	6.45	Y9819-36
Y9831	co.020	co.020	0.00	"
Z0081	0.025	0.024	4.08	Z0074-89
Z0087	0.056	0.056	0.00	"
20764	0.037	0.035	5.56	Z0764-94
Z0771	co.020	co.020	0.00	"
20787	<0.020	<0.020	0.00	"
Z1255	0.030	0.023	26.42	Z1255-65, Z1523-25
Z1524	0.042	0.023	58.46	"
21672	0.071	0.054	27.20	Z1672-75
22137	0.026	0.025	3.92	Z2133-42
22528	0.025	0.021	17.39	Z2528-32
23053	0.022	0.021	4.65	Z3051-59
23265	co.020	so.020	0.00	Z3265-69
23392	<0.020	0.021	4.88	Z3389-92
23712	0.047	0.042	11.24	Z3709-13
24162	co.020	co.020	0.00	Z4160-68
24353	co.020	co.020	0.00	Z4351-66

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter V: (Continued)		
24364	co.020	co.020	0.00	Z4351-66
35464	co.020	co.020	0.00	Z5461-80
25474	co.020	co.020	0.00	"
25896	co.020	<0.020	0.00	Z5895-98, Z5959-70
25967	<0.020	co.020	0.00	"
26547	co.020	co.020	0.00	Z6542-51
		Parameter: Zn		
Y1681	0.936	0.932	0.43	Y1681-711
Y1683	0.208	0.234	11.76	"
Y1694	0.174	0.172	1.16	"
Y1695	0.209	0.258	20.99	"
Y1711	0.309	0.386	22.16	"
Y1859	0.512	0.480	6.45	Y1858-75
Y1873	0.372	0.504	30.14	"
Y1675	<0.040	0.041	2.44	Y1674-80, Y1973-82
Y1973	0.221	0.293	28.02	"
Y1976	0.090	0.076	16.87	"
Y1980	co.040	co.040	0.00	"
Y2103	0.170	0.197	14.71	Y2101-28
Y2108	0.105	0.101	3.88	"
Y2112	0.142	0.200	33.92	"
Y2117	0.095	0.168	55.51	"
Y2124	0.223	0.114	64.69	"
Y2623	0.106	0.102	3.85	Y2618-35, Y2762-91
Y2635	0.094	0.076	21.18	"
Y2767	0.109	0.126	14.47	"
Y2782	0.115	0.111	3.54	"
Y2790	0.079	0.050	44.96	"
Y3104	0.176	0.232	27.45	Y3101-34
Y3113	0.078	0.118	40.82	"
Y3122	0.098	0.132	29.57	"
Y3130	<0.025	0.038	41.27	"
Y3371	0.123	0.132	7.06	Y3370-77,Y3735-52,
Y3742	0.089	0.070	23.90	Y4458-72
Y3747	0.064	0.056	13.33	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Zn (Continued)		
Y4461	0.070	0.056	22.22	Y4458-72
Y4469	0.126	0.087	36.62	"
Y4365	0.094	0.085	10.06	Y4360-84, Y4760-87
Y4371	0.165	0.148	10.86	"
Y4383	0.040	0.082	68.85	"
Y4768	0.249	0.192	25.85	"
Y4781	0.129	0.127	1.56	"
Y4389	0.102	0.099	2.99	Y4385-434, Y4462
Y4394	0.157	0.179	13.10	"
Y4415	0.036	0.034	5.71	"
Y4424	0.098	0.100	2.02	"
Y4432	0.068	0.063	7.63	"
Y5150	0.096	0.096	0.00	Y5148-91
Y5158	0.147	0.162	9.71	"
Y5169	0.061	0.072	16.54	"
Y5189	0.124	0.118	4.96	"
Y5611	0.151	0.156	3.26	Y5607-706
Y5615	0.147	0.143	2.76	"
Y5622	0.055	0.062	11.97	"
Y5632	0.121	0.152	22.71	"
Y5647	0.128	0.135	5.32	"
Y5662	0.144	0.126	13.33	"
Y5678	0.093	0.112	18.54	"
Y5693	0.048	0.072	40.00	"
Y5701	0.093	0.083	11.36	"
Y6465	0.106	0.091	15.23	Y6461-87
Y6472	0.113	0.131	14.75	"
Y6485	0.161	0.167	3.66	"
Y8242	0.013	0.014	7.41	Y8241-64,Y8532-48,
Y8250	0.160	0.140	13.33	Y8944-9114
Y8537	0.036	0.025	36.07	"
Y9107	0.063	0.071	11.94	"
Y9823	0.068	0.080	16.22	Y9819-36
Y9831	0.093	0.116	22.01	"
Z0081	0.026	0.025	3.92	Z0074-89
Z0087	0.055	0.056	1.80	"
20764	0.160	0.157	1.89	Z0764-94
Z0771	0.090	0.101	11.52	"
20787	0.120	0.054	75.86	"

TABLE E-27. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Prepped Duplicate (Split Filter) Data
(units are mg/filter)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Zn (Continued)		
21255	0.110	0.075	37.84	Z1255-65, Z1523-25
21524	0.120	0.110	8.70	"
21672	0.170	0.150	12.50	Z1672-75
22137	0.120	0.130	8.00	Z2133-42
22528	0.390	0.360	8.00	Z2528-32
23053	0.071	0.069	2.86	Z3051-59
23265	0.098	0.036	92.54	23265-69
23392	0.410	0.390	5.00	Z3389-92
23712	0.120	0.110	8.70	23709-U
24162	0.180	0.190	5.41	Z4160-68
Z4353	0.053	0.050	5.83	Z4351-66
24364	0.097	0.084	14.36	"
25464	0.150	0.140	6.90	Z5461-80
25474	0.120	0.130	8.00	"
Zf896	0.026	0.028	7.41	Z5895-98, Z5959-70
Z5967	0.110	0.045	83.87	"
26547	0.069	0.081	16.00	Z6542-51

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Al		
Y9824	1.3	1.3	0.0	Y9819-36
Y9835	5.3	5.5	3.9	"
20077	6.3	6.1	3.2	Z0074-89
Z0085	18.2	17.3	5.1	"
20765	8.3	8.3	0.0	Z0764-94
20774	7.9	7.9	0.0	"
Z0781	9.5	9.9	4.0	"
20794	9.8	9.8	0.0	"
21257	10.6	10.6	0.0	Z1255-65, Z1523-25
21525	10.6	10.7	0.9	"
21672	48.4	48.7	0.6	Z1672-75
22142	5.3	5.0	5.8	Z2133-42
22529	6.4	6.7	4.6	Z2528-32
Z3051	12.9	12.9	0.0	Z3051-59
23265	il.4	11.4	0.0	Z3265-69
23710	9.7	9.8	1.0	Z3709-13
24164	13.8	13.7	0.7	Z4160-68
24352	6.4	6.6	3.1	Z4351-66
24359	4.1	4.1	0.0	"
25465	2.6	2.7	3.8	Z5461-80
25479	3.2	3.3	3.1	"
25959	3.5	3.5	0.0	Z5895-98, Z5959-70
25969	3.1	3.1	0.0	"
26543	1.9	1.9	0.0	Z6542-51
		Parameter: As		
Y9819	0.0046	0.0045	2.20	Y9819-36
Y9832	0.0062	0.0058	6.67	"
Z0081	0.0030	0.0030	0.00	Z0074-89
Z0089	0.0104	0.0097	6.97	"
20768	0.0052	0.0058	10.91	Z0764-94
20775	0.0065	0.0064	1.55	"
20785	0.0088	0.0085	3.47	"
21255	0.0069	0.0071	2.86	Z1255-65, Z1523-25
21264	0.0097	0.0092	5.29	"
21672	0.0180	0.0174	3.39	Z1672-75
22133	0.0048	0.0043	10.99	Z2133-42
22139	0.0059	0.0065	9.68	Z2133-42

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: As (Continued)		
22531	0.0082	0.0080	2.47	Z2528-32
23051	0.0091	0.0087	4.49	Z3051-59
23056	0.0157	0.0153	2.58	Z3051-59
23391	0.0059	0.0062	4.96	Z3389-92
24164	0.0053	0.0052	1.90	Z4160-68
24353	0.0021	0.0023	9.09	Z4351-66
24363	0.0024	0.0029	18.87	"
25464	0.0046	0.0044	4.44	Z5461-80
25474	0.0039	0.0043	9.76	"
25959	0.0028	0.0032	13.33	Z5895-98, Z5959-70
25969	0.0042	0.0034	21.05	"
26547	0.0068	0.0068	0.00	26542-51
		Parameter: Be		
Y9821	0.011	----	----	Y9819-36
Y9832	0.008	0.008	0.00	"
zoo77	0.006	0.005	18.18	Z0074-89
Z0088	0.040	0.041	2.47	"
20764	0.012	0.012	3.47	Z0764-94
20774	0.008	0.008	0.00	"
20784	0.012	0.012	0.00	"
20794	0.010	0.009	10.53	"
21257	<0.001	co.001	0.00	21255-65, Z1523-25
21525	<0.001	<0.001	0.00	"
21673	0.034	0.033	0.90	Z1672-75
22142	<0.001	co.001	0.00	Z2133-42
82529	<0.001	co.001	0.00	Z2528-32
23051	<0.001	co.001	0.00	23051-59
23265	<0.001	<0.001	0.00	Z3265-69
23710	0.001	0.001	0.00	Z3709-13
24164	0.001	0.001	0.00	Z4160-68
24354	0.002	0.002	0.00	Z4351-66
24365	0.003	0.003	0.00	"
25465	0.001	0.001	0.00	25461-80
25479	0.002	0.001	66.67	"
z5959	<0.001	0.001	0.00	Z5895-98, Z5959-70
25969	0.001	0.001	0.00	"
26550	0.001	0.001	0.00	26542-51

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Ca		
Y9824	5.7	5.7	0.00	Y9819-36
Y9835	35.3	35.2	0.28	"
Z0076	44.2	44.6	0.90	Z0074-89
Z0080	81.8	80.4	1.73	"
20765	58.6	59.7	1.86	Z0764-94
20770	54.2	54.4	0.37	"
20784	68.5	70.1	2.31	"
20787	66.7	67.2	0.75	"
21258	44.9	44.0	2.02	Z1255-65, Z1523-25
21525	49.6	49.4	0.40	"
21675	96.6	95.6	1.04	Z1672-75
22142	42.6	42.7	0.23	Z2133-42
Z2532	9.0	8.9	0.45	Z2528-32
22737	76.2	75.9	0.39	Z2736-39
23052	27.9	28.0	0.36	Z3051-59
23266	24.3	24.3	0.00	Z3265-69
Z3711	27.4	27.2	0.73	Z3709-13
24168	26.2	26.0	0.77	Z4160-68
24353	27.3	27.6	1.06	Z4351-66
24358	29.0	29.8	2.79	"
25465	14.0	13.7	2.17	Z5461-80
25479	19.8	19.7	0.51	"
25896	20.6	21.1	2.40	Z5895-98, Z5959-70
25966	22.4	22.6	0.89	"
26543	9.9	9.9	0.10	Z6542-51
		Parameter: Cd		
Y1678	0.018	0.020	10.53	Y1674-80, Y1973-82
Y1681	0.014	0.015	6.90	Y1681-1711
Y1690	0.016	0.018	11.76	"
Y1693	0.979	1.008	2.92	"
Y1698	0.018	0.019	5.41	"
Y1709	0.021	0.022	4.65	"
Y1864	co.020	<0.020	0.00	Y1858-75
Y1874	0.023	0.020	13.95	"
Y1977	0.028	0.028	0.00	Y1674-80, Y1973-82
Y2102	co.050	co.050	0.00	Y2101-28

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: d (Continued)		
Y2116	co.050	<0.050	0.00	Y2101-28
Y2124	co.050	<0.050	0.00	"
Y2618	<0.010	<0.010	0.00	Y2618-35, Y2762-91
Y2619	<0.010	<0.010	0.00	"
Y2627	0.023	0.021	9.09	"
Y2635	0.018	0.015	18.18	"
Y2769	<0.010	co.010	0.00	"
Y2783	0.018	0.016	11.76	"
Y2787	0.028	0.021	28.57	"
Y3102	0.022	0.020	9.52	Y3101-34
Y3112	0.018	0.025	32.56	"
Y3124	0.031	0.034	9.23	"
Y3133	0.014	0.011	24.00	"
Y3370	0.018	0.017	5.71	Y3370-77, Y3735-52
Y3736	0.027	0.026	3.77	Y4458-72
Y3747	0.011	0.010	9.52	"
Y4367	0.017	0.015	12.50	x4360-84, Y4760-87
Y4377	0.026	0.026	0.00	"
Y4391	<0.010	co.010	0.00	Y4385-434, Y4462
Y4398	0.026	0.030	14.29	"
Y4403	0.011	0.013	16.67	"
Y4423	0.016	0.014	13.33	"
Y4430	0.018	0.021	15.38	"
Y4461	0.016	0.016	0.00	Y3370-77, Y3735-52 .
Y4470	0.015	0.015	0.00	Y4458-72
Y4764	0.018	0.018	0.00	Y4360-84, Y4760-87
Y4775	0.026	0.029	10.91	"
Y4786	0.017	0.016	6.06	"
Y5154	0.024	0.023	6.42	Y5148-91
Y5164	0.016	0.015	3.85	"
Y5176	0.026	0.026	0.76	"
Y5178	0.032	0.030	7.19	"
Y5190	0.016	0.015	2.61	"
Y5607	0.018	0.018	3.33	Y5607-706
Y5623	0.012	0.012	0.87	"
Y5629	0.019	0.019	0.00	"
Y5639	<0.010	<0.010	0.00	"
Y5651	<0.010	<0.010	0.00	"
Y5677	<0.010	<0.010	0.00	"

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cd (Continued)		
Y5689	0.012	0.014	11.67	Y5607-706
Y5696	<0.010	<0.010	0.00	"
Y5705	0.013	0.012	2.41	"
Y6463	0.017	0.017	0.00	Y6461-87
Y6470	0.050	0.048	4.08	"
Y6478	0.012	0.010	18.18	"
Y6486	<0.010	co.010	0.00	"
Y8245	<0.010	<0.010	0.00	Y8241-64,Y8532-48,
Y8255	<0.010	co.010	0.00	Y8944-9114
Ya539	<0.010	co.010	0.00	"
Y8946	0.012	0.011	8.70	"
Y9113	<0.010	<0.010	0.00	"
Y9823	co.010	<0.010	0.00	Y9819-36
Y9835	<0.010	<0.010	0.00	"
Z0076	0.012	0.012	0.00	Z0074-89
Z0088	0.018	0.018	0.00	"
20765	<0.010	<0.010	0.00	Z0764-94
20771	<0.010	co.010	0.00	"
20785	co.010	<0.010	0.00	"
20792	0.010	<0.010	0.00	"
21260	0.010	0.010	0.00	Z1255-65, Z1523-25
21525	0.010	0.010	0.00	"
21675	<0.010	0.011	9.52	Z1672-75
22141	0.012	0.011	8.70	Z2133-42
22737	0.015	0.016	6.45	Z2736-39
23051	co.010	0.010	0.00	Z3051-59
23059	co.010	<0.010	0.00	Z3051-59
23711	<0.010	<0.010	0.00	Z3709-13
24168	<0.010	<0.010	0.00	Z4160-68
24354	<0.010	co.010	0.00	Z4351-66
24362	0.011	0.012	11.16	"
25465	<0.010	co.010	0.00	Z5461-80
25479	<0.010	co.010	0.00	"
25896	<0.010	<0.010	0.00	Z5895-98, Z5959-70
25966	<0.010	<0.010	0.00	"
26542	<0.010	<0.010	0.00	Z6542-51

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value2	%RPD	Relevant Samples
		Parameter: Cr		
Y1674	0.047	0.049	4.17	Y1674-80, Y1973-82
Y1681	0.059	0.057	3.45	Y1681-1711
Y1692	0.068	0.067	1.48	"
Y1701	0.386	0.382	1.04	"
Y1709	0.262	0.261	0.38	"
Y1861	0.066	0.067	1.50	"
Y1865	0.105	0.114	8.22	Y1858-75
Y1975	0.098	0.096	2.06	"
Y2102	0.102	0,105	2.90	Y1674-80, Y1973-82
Y2107	0.087	0.086	1.16	Y2101-28
Y2119	0.517	0.514	0.58	"
Y2618	0.116	0.113	2.62	"
Y2622	0.089	0.091	2.22	Y2618-35, Y2762-91
Y2631	0.083	0.089	6.98	"
Y2774	0.079	0.080	1.26	"
Y2781	0.054	0.048	11.76	"
Y2790	0.139	0.136	2.18	"
Y3102	0.154	0.151	1.97	n
Y3113	0.055	0.052	5.61	"
Y3116	0.052	0.058	10.91	Y3101-34
Y3132	0.059	0.060	1.68	"
Y3370	0.134	0.132	1.50	"
Y3737	0.078	0.077	1.29	"
Y3747	0.116	0.120	3.39	Y3370-77,Y3735-52,
Y4366	0.057	0.059	3.45	Y4458-72
Y4377	0.216	0.227	4.97	"
Y4392	0.051	0.048	6.06	Y4360-84, Y4760-87
Y4402	0.032	0.036	11.76	"
Y4412	0.051	0.050	1.98	Y4385-434, Y4462
Y4423	0.067	0.079	16.44	"
Y4462	0.067	0.066	1.50	n
Y4463	0.062	0.059	4.96	"
Y4472	0.110	0.110	0.00	"
Y4764	0.089	0.071	22.50	Y3370-77, Y3735-52
Y4775	0.236	0.231	2.14	Y4458-72
Y4786	0.209	0.211	0.95	Y4360-84, Y4760-87
Y5154	0.092	0.092	0.76	"
Y5164	0.113	0.110	1.97	"
Y5176	0.219	0.218	0.69	Y5148-91

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cr (Continued)		
Y5178	0.204	0.207	1.60	Y5148-91
Y5190	0.074	0.075	0.67	"
Y5607	0.084	0.086	2.48	"
Y5623	0.066	0.063	5.58	"
Y5629	0.178	0.175	1.70	Y5607-706
Y5639	0.057	0.059	3.96	"
Y5651	0.032	0.036	11.94	"
Y5664	0.119	0.116	2.39	"
Y5677	0.080	0.078	1.52	"
Y5689	0.120	0.123	2.89	"
Y5696	0.034	0.035	3.46	"
Y5705	0.118	0.124	4.88	"
Y6463	0.174	0.176	1.14	"
Y6470	0.506	0.510	0.79	Y6461-87
Y6478	0.107	0.112	4.57	"
Y6486	0.068	0.068	0.00	"
Y8245	0.049	0.050	2.02	"
Y8255	0.064	0.067	4.58	Y8241-64,Y8532-48,
Y8262	0.059	0.057	3.45	Y8944-9114
Y8539	0.040	0.037	7.79	"
Y8946	0.077	0.086	11.04	"
Y9113	0.039	0.039	0.00	"
Y9823	0.044	0.038	14.63	Y9819-36
Y9835	0.030	0.022	30.77	"
20074	0.061	0.065	6.35	Z0074-89
20075	0.113	0.113	0.00	"
Z0087	0.136	0.131	3.75	Z1255-65, Z1523-25
20764	0.034	0.039	13.70	Z0764-94
20771	0.035	0.036	2.82	"
20785	0.136	0.129	5.28	"
20792	0.080	0.076	5.13	"
21260	0.069	0.070	1.44	"
21675	0.056	0.059	5.22	Z1672-75
22141	0.045	0.049	8.51	Z2133-42
22737	0.104	0.108	3.77	Z2736-39
23051	0.067	0.066	1.50	Z3051-59
23059	0.063	0.066	4.65	Z3051-59
Z3711	0.029	0.028	3.51	Z3709-13
24168	0.033	0.030	9.52	Z4160-68

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Cr (Continued)		
24354	0.025	0.027	7.69	Z4351-66
24359	0.032	0.033	3.08	"
25467	0.045	0.048	6.45	Z5461-80
25477	0.033	0.032	3.08	"
25899	co.020	co.020	0.00	Z5895-98, Z5959-70
25967	0.021	co.020	4.88	"
26542	co.020	<0.020	0.00	Z6542-51
		Parameter: Fe		
Y9823	6.06	6.04	0.33	Y9819-36
Y9835	5.16	5.15	0.19	"
zoo74	14.50	13.50	7.14	Z0074-89
zoo75	26.70	26.20	1.89	"
Z0087	28.80	28.40	1.40	"
20765	8.84	8.69	1.71	Z0764-94
20775	9.57	9.48	0.94	"
20785	21.50	21.00	2.35	"
20793	9.88	9.53	3.61	"
Z1258	4.88	4.83	1.03	Z1255-65, Z1523-25
Z1525	10.80	10.40	3.77	"
21672	63.64	62.79	1.34	Z1672-75
22138	13.49	13.49	0.00	Z2133-42
22532	0.30	0.35	15.38	Z2528-32
Z3052	5.41	5.21	3.77	Z3051-59
23267	6.64	6.45	2.90	Z3265-69
Z3 711	6.03	6.13	1.64	Z3709-13
24167	12.50	12.70	1.59	Z4160-68
24354	4.94	4.90	0.81	Z4351-66
24362	1.89	1.93	2.09	"
25464	2.26	2.25	0.44	Z5461-80
25471	3.64	3.72	2.17	"
25895	4.84	4.88	0.82	Z5895-98, Z5959-70
25964	2.15	2.15	0.00	"
26542	1.22	1.26	3.23	Z6542-51

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Mg		
Y9824	1.62	1.62	0.00	Y9819-36
Y9835	6.92	6.87	0.73	"
Z0076	10.30	10.30	0.00	Z0074-89
Z0080	9.37	9.51	1.48	"
20765	13.00	12.80	1.55	Z0764-94
20770	9.87	10.10	2.30	"
Z0784	16.50	16.50	0.00	"
Z0787	8.34	8.41	0.84	"
Z1258	8.62	8.54	0.93	Z1255-65, Z1523-25
21525	11.90	11.90	0.00	"
Z1675	24.80	24.30	2.04	Z1672-75
22142	7.20	6.90	4.26	Z2133-42
22532	2.40	2.50	4.08	Z2528-32
22737	28.70	30.60	6.41	Z2736-39
23052	7.80	8.00	2.53	Z3051-59
23266	7.80	7.80	0.00	Z3265-69
23711	6.50	6.50	0.00	Z3709-13
Z4168	6.80	6.80	0.00	Z4160-68
24354	6.60	6.80	2.99	Z4351-66
24362	2.90	2.90	0.00	"
Z5465	3.40	3.20	6.06	Z5461-80
25479	4.70	4.70	0.00	"
Z5896	3.40	3.40	0.00	Z5895-98, Z5959-70
25966	5.90	5.90	0.00	"
26543	3.80	3.90	2.60	Z6542-51
		Parameter: Na		
Y9824	60.6	60.3	0.50	Y9819-36
Y9829	41.3	39.0	5.73	"
zoo77	49.8	48.9	1.82	Z0074-89
Z0078	64.3	58.5	9.45	"
Z0083	65.7	67.5	2.70	"
Z0764	81.0	81.4	0.49	Z0764-94
Z0775	62.2	61.9	0.48	"
20777	36.7	38.4	4.53	"
Z0786	32.1	32.0	0.31	"
Z1258	55.8	54.0	3.28	Z1255-65, Z1523-25

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued

Instrument Duplicate Analysis: Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Na (Continua		
21523	12.0	12.7	5.67	21255-65, Z1523-25
21674	23.0	23.9	3.84	Z1672-75
22137	47.2	56.0	17.05	Z2133-42
22736	48.3	49.0	1.44	Z2736-39
23052	18.9	19.0	0.53	Z3051-59
23265	22.3	22.4	0.45	Z3265-69
23710	20.6	20.8	0.97	Z3709-13
24167	18.0	17.8	1.12	Z4160-68
24354	5.7	6.0	5.13	Z4351-66
24360	4.7	4.2	11.24	"
25466	4.0	4.0	0.00	Z5461-80
25479	5.6	5.2	7.41	"
Z5898	5.6	5.4	3.64	Z5895-98, Z5959-70
25970	7.0	7.4	5.56	"
26545	10.9	10.8	0.92	Z6542-51
		Parameter: Ni		
Y1674	0.147	0.122	18.59	Y1674-80, Y1973-82
Y1681	0.054	0.054	0.00	Y1681-1711
Y1692	co.050	so.050	0.00	"
Y1702	0.051	co.050	1.98	W
Y1707	0.107	0.108	0.93	W
Y1861	0.090	0.083	8.09	W
Y1872	0.079	0.076	3.87	Y1858-75
Y1974	0.209	0.226	7.82	W
Y2105	0.418	0.448	6.93	Y1674-80, Y1973-82
Y2111	0.499	0.490	1.82	Y2101-28
Y2115	0.618	0.617	0.16	W
Y2124	0.551	0.536	2.76	"
Y2618	0.104	0.106	1.90	Y2618-35, Y2762-91
Y2623	0.082	0.082	0.00	"
Y2633	0.082	0.084	2.41	"
Y2773	0.091	0.088	3.35	"
Y2780	0.064	0.065	1.55	"
Y2788	0.085	0.081	4.82	"
Y3102	0.179	0.182	1.66	"
Y3109	0.142	0.148	4.14	Y3101-34

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Ni (Continued)		
Y3123	0.198	0.192	3.08	Y3101-34
Y3134	0.064	0.066	3.08	"
Y3370	0.157	0.155	1.28	"
Y3737	0.087	0.090	3.39	Y3370-77, Y3735-52
Y3747	0.089	0.090	1.12	Y4458-72
Y4368	co.050	co.050	0.00	"
Y4378	0.114	0.112	1.77	Y4360-84, Y4760-87
Y4388	0.173	0.165	4.73	"
Y4395	0.316	0.328	3.73	Y4385-434, Y4462
Y4407	0.065	0.063	3.13	"
Y4418	0.255	0.241	5.65	"
Y4425	0.138	0.147	6.32	"
Y4462	0.098	0.089	9.63	"
Y4463	0.081	0.078	3.77	Y3370-77,Y3735-52,
Y4472	0.100	0.099	1.01	Y4458-72
Y4764	0.131	0.139	5.93	Y4360-84, Y4760-87
Y4774	0.201	0.196	2.52	"
Y4787	0.143	0.144	0.70	"
Y5154	0.157	0.159	1.27	Y5148-91
Y5164	0.139	0.148	6.40	"
Y5176	0.307	0.309	0.04	"
Y5178	0.259	0.267	2.93	"
Y5190	0.141	0.152	7.70	"
Y5607	0.124	0.114	7.73	Y5607-706
Y5623	0.120	0.109	9.86	"
Y5629	0.243	0.244	0.45	"
Y5639	<0.050	co.050	0.00	"
Y5651	0.056	0.052	7.93	"
Y5664	0.156	0.157	0.70	"
Y5677	0.086	0.095	9.76	"
Y5689	0.110	0.111	0.81	"
Y5696	0.057	0.056	3.01	"
Y5705	0.215	0.226	4.99	Y6461-87
Y6463	0.295	0.294	0.34	"
Y6470	0.881	0.904	2.58	"
Y6478	0.127	0.139	9.02	"
Y6486	0.073	0.070	4.20	Y8241-64,Y8532-48,
Y8241	0.328	0.330	0.61	Y8944-9114
Y8262	0.443	0.422	4.86	"

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Ni (Continued1		
Y8538	0.332	0.327	1.52	Y8944-9114
Y8548	0.237	0.240	1.26	"
Y8946	0.371	0.390	4.99	"
Y9114	0.353	0.356	0.85	"
Y9823	co.050	<0.050	0.00	Y9819-36
Y9823	<0.050	co.050	0.00	"
zoo74	0.061	0.068	10.85	Z0074-89
zoo75	0.146	0.149	2.03	"
Z0087	0.204	0.196	4.00	"
20765	co.050	co.050	0.00	Z0764-94
20771	co.050	co.050	0.00	"
Z0785	0.193	0.197	2.05	"
20792	0.108	0.098	9.71	"
21260	0.586	0.413	34.65	Z1255-65, Z1523-25
21525	0.416	0.406	2.53	"
21675	0.541	0.567	4.69	Z1672-75
22141	0.594	0.636	6.83	Z2133-42
22737	0.436	0.445	2.04	Z2736-39
23051	0.402	0.403	0.25	Z3051-59
23059	0.357	0.350	1.98	Z3265-69
23711	0.343	0.359	4.56	Z3709-13
Z4168	0.384	0.347	10.12	Z4160-68
24351	0.063	0.063	0.00	Z4351-66
24361	0.081	0.083	2.44	"
25467	0.279	0.267	4.40	Z5461-80
25477	0.368	0.339	8.20	"
25959	0.227	0.236	3.89	Z5895-98, Z5959-70
25967	0.150	0.133	12.01	"
26542	0.062	0.063	1.60	26542-51
		Parameter: Pb		
Y1678	0.848	0.898	5.73	Y1674-80, Y1973-82
Y1681	1.551	1.561	0.64	Y1681-711
Y1685	2.318	2.248	3.07	"
Y1698	1.630	1.548	5.16	"
Y1709	2.738	2.871	4.74	"
Y1860	0.988	0.990	0.20	Y1858-75

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Pb (Continued)		
Y1875	1.171	1.138	2.86	Y1858-75
Y1977	0.709	0.689	2.86	Y1674-80, Y1973-82
Y2102	0.926	0.942	1.71	Y2101-28
Y2116	1.595	1.712	7.08	"
Y2124	1.797	1.757	2.25	"
Y2618	1.997	2.108	5.41	Y2618-35, Y2762-91
Y2632	0.512	0.564	9.67	"
Y2770	0.241	0.225	6.87	"
Y2781	0.479	0.532	10.48	"
Y2787	0.329	0.329	0.00	"
Y3103	1.851	1.762	4.93	Y3101-34
Y3112	0.683	0.721	5.41	"
Y3120	0.556	0.541	2.73	"
Y3131	0.607	0.623	2.60	"
Y3370	7.320	7.074	3.42	Y3370-77, Y3735-52
Y3737	0.925	0.977	5.47	Y4458-72
Y3743	0.616	0.642	4.13	"
Y4368	0.365	0.405	10.39	Y4360-84, Y4760-87
Y4375	0.285	0.335	16.13	"
Y4379	2.046	1.970	3.78	"
Y4386	0.988	1.060	7.03	Y4385-434, Y4462
Y4402	0.258	0.258	0.00	"
Y4412	1.030	0.844	19.85	"
Y4422	0.375	0.388	3.41	"
Y4430	0.741	0.751	1.34	"
Y4463	0.454	0.390	15.17	Y3370-77, Y3735-52
Y4472	0.547	0.588	7.22	Y4458-72
Y4773	0.610	0.572	6.43	Y4360-84, Y4760-87
Y4787	0.722	0.622	14.88	"
Y5154	1.563	1.574	0.70	Y5148-91
Y5161	2.902	2.840	2.16	"
Y5171	1.013	1.070	5.47	"
Y5183	2.812	2.880	2.39	"
Y5190	1.054	1.094	3.72	"
Y5608	3.740	3.706	0.91	Y5607-706
Y5619	1.419	1.385	2.43	"
Y5623	0.463	0.456	1.52	"
Y5634	0.942	0.923	2.04	"
Y5643	1.685	1.589	5.86	"

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Pb (Continued)		
Y5653	2.253	2.315	2.71	Y5607-706
Y5667	1.284	1.206	6.27	"
Y5687	1.397	1.424	1.91	"
Y5695	3.761	3.705	1.50	"
Y5700	1.938	1.920	0.93	"
Y6463	0.738	0.783	5.92	Y6461-87
Y6468	1.040	1.090	4.69	"
Y6481	1.580	11590	0.63	"
Y6486	4.390	4.250	3.24	"
Y8241	1.650	1.670	1.20	Y8241-64, Y8532-48
Y8251	1.170	1.130	3.48	Y8944-9114
Y8261	3.140	2.980	5.23	"
Y8538	0.399	0.445	10.90	"
Y8945	0.968	0.904	6.84	"
Y9106	1.040	1.070	2.84.	"
Y9823	0.789	0.754	4.54	Y9819-36
Y9835	0.846	0.778	8.37	"
Z0076	1.310	1.520	14.84	Z0074-89
20088	2.890	2.860	1.04	"
20765	0.291	0.244	17.57	Z0764-94
Z0775	1.950	2.020	3.53	"
20785	1.080	0.998	7.89	"
20793	2.640	2.580	2.30	"
Z1258	0.274	0.233	16.17	Z1255-65, Z1523-25
Z1525	0.421	0.397	5.87	"
21674	1.547	1.534	0.84	Z1672-75
Z2135	0.944	0.951	0.74	22133-42
22137	2.290	2.292	0.09	Z2133-42
22736	1.560	1.500	3.92	Z2736-39
23052	0.816	0.780	4.51	Z3051-59
23267	2.550	2.520	1.18	Z3265-69
23711	3.410	3.520	3.17	Z3709-13
24167	2.890	2.790	3.52	Z4160-68
24354	0.782	0,776	0.77	Z4351-66
24362	0.531	0.557	4.78	"
25464	2.320	2.280	1.74	Z5461-80
25471	2.810	2.. 970	5.54	"
25895	2.010	2.030	0.99	Z5895-98, Z5959-70
25964	2.130	2.200	3.23	"
26542	0.380	0.404	6.12	Z6542-51

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: V		
Y1676	<0.050	0.050	0.00	Y1674-80, Y1973-82
Y1681	0.056	0.053	5.48	Y1681-711
Y1684	<0.050	co.050	0.00	"
Y1694	0.063	0.062	1.60	"
Y1704	0.219	0.224	2.44	"
Y1832	co.050	co.050	0.00	Y1858-75
Y1859	0.099	0.098	1.32	"
Y1864	0.123	0.124	0.81	"
Y1868	0.452	0.471	4.25	"
Y1981	0.066	0.061	7.87	Y1674-80, Y1973-82
Y2104	0.091	0.096	5.3s	Y2101-28
Y2111	0.218	0.219	0.46	"
Y2125	0.072	0.073	1.38	"
Y2618	0.047	0.043	8.89	Y2618-35, Y2762-91
Y2630	0.055	0.049	11.54	"
Y2767	0.078	0.077	1.29	"
Y2778	0.069	0.055	22.58	"
Y2782	0.096	0.089	7.57	"
Y3103	0.180	0.176	2.25	Y3101-34
Y3112	0.141	0.140	0.71	"
Y3123	0.087	0.079	9.64	"
Y3133	0.136	0.136	0.00	"
Y3370	0.084	0.091	8.00	Y3370-77, Y3735-52
Y3735	0.067	0.066	1.50	Y4458-72
Y3746	0.059	0.058	1.71	"
Y4367	0.079	0.082	3.73	Y4360-84, Y4760-87
Y4378	0.077	0.067	13.89	"
Y4392	0.066	0.058	12.90	Y4385-434, Y4462
Y4402	0.061	0.058	5.04	"
Y4411	0.064	0.064	0.00	"
Y4423	0.057	0.054	5.41	"
Y4433	0.053	0.051	3.85	"
Y4461	0.083	0.082	1.21	Y3370-77,Y3735-52,
Y4471	0.080	0.084	4.88	Y4458-72
Y4765	0.055	0.058	5.31	Y4360-84, Y4760-87
Y4776	0.068	0.072	5.71	"
Y4787	0.094	0.096	2.11	"
Y5157	0.053	o.oso	5.83	Y5148-91
YS167	0.075	0.069	8.33	"

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: V (Continued]		
Y5178	0.146	0.145	0.69	Y5148-91
Y5190	0.219	0.210	4.20	"
Y5614	0.065	0.063	3.61	Y5607-706
YS619	0.183	0.180	1.60	"
YS632	0.199	0.194	2.59	"
YS639	<0.050	<0.050	0.00	"
Y5655	0.053	0.054	0.75	"
Y5662	0.169	0.167	1.43	"
Y5676	0.092	0.088	4.46	"
Y5688	co.050	<0.050	0.00	"
Y6463	0.127	0.139	9.02	Y6461-87
Y6474	0.061	0.061	0.00	"
Y6487	0.063	0.058	8.26	"
Y8245	0.084	0.094	11.24	Y8241-64,Y8532-48,
Y8255	<0.050	co.050	0.00	Y8944-9114
Y8262	0.029	0.032	9.84	"
Y8539	0.052	0.056	7.41	"
Y8946	0.092	0.096	4.26	"
Y9113	<0.050	<0.050	0.00	"
Y9821	0.071	0.070	1.42	Y9819-36
Y9832	0.089	0.085	4.60	"
Z00-75	0.090	0.092	2.20	Z0074-89
Z0089	0.136	0.139	2.18	"
20764	0.092	0.092	0.00	Z0764-94
20774	0.062	0.065	4.72	"
20784	0.056	0.055	1.80	"
20794	0.069	0.067	2.94	"
21260	0.088	0.075	15.78	Z1255-65, 21523-25
Z1525	0.056	0.058	2.28	"
21675	0.058	0.056	3.51	Z1672-75
22141	0.076	0.077	1.31	Z2133-42
22737	0.094	0.091	3.24	Z2736-39
23051	0.051	0.055	7.55	Z3051-59
23059	0.084	0.086	2.35	Z3051-59
23711	0.054	<0.050	7.69	Z3709-13
Z4168	<0.050	<0.050	0.00	Z4160-68
24354	co.050	co.050	0.00	Z4351-66
24361	0.225	0.226	0.44	"
24365	co.050	<0.050	0.00	"

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: V (Continued)		
25467	<0.050	<0.050	0.00	Z5461-80
Z5477	<0.050	co.050	0.00	"
Z5959	co.050	<0.050	0.00	Z5895-98, Z5959-70
25967	<0.050	<0.050	0.00	"
26550	<0.050	<0.050	0.00	Z6542-51
		Parameter: Zn		
Y1674	0.337	0.330	2.10	Y1674-80, Y1973-82
Y1681	2.440	2.520	3.23	Y1681-711
Y1683	0.620	0.612	1.30	"
Y1694	0.536	0.499	7.21	"
Y1703	0.557	0.559	0.36	"
Y1858	1.377	1.397	1.44	Y1858-75
Y1861	0.349	0.359	2.82	"
Y1864	0.830	0.826	0.48	"
Y1871	0.556	0.583	4.74	"
Y1974	0.311	0.314	0.96	Y1674-80, Y1973-82
Y2105	0.453	0.477	5.16	Y2101-28
Y2112	0.383	0.384	0.26	"
Y2115	1.004	0.988	1.61	"
Y2127	0.973	0.987	1.43	"
Y2618	0.371	0.373	0.54	Y2618-35, Y2762-91
Y2619	0.383	0.385	0.52	"
Y2627	0.562	0.561	0.18	"
Y2635	0.285	0.275	3.57	"
Y2769	0.166	0.165	0.60	"
Y2783	0.383	0.388	1.30	"
Y2787	0.316	0.316	0.00	"
Y3102	0.411	0.410	0.24	Y3101-34
Y3112	0.276	0.280	1.44	"
Y3124	0.362	0.358	1.11	"
Y3133	0.237	0.236	0.42	"
Y3370	0.370	0.369	0.27	Y3370-77, Y3735-52
Y3736	0.342	0.339	0.88	Y4458-72
Y3747	0.210	0.209	0.48	"
Y4368	0.197	0.196	0.51	Y4360-84, Y4760-87
Y4378	0.464	0.473	1.92	"

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Zn (Continued)		
Y4390	0.466	0.472	1.28	Y4385-434, Y4462
Y4398	0.650	0.656	0.92	"
Y4409	0.218	0.219	0.46	"
Y4418	0.280	0.276	1.44	"
Y4426	0.201	0.205	1.97	"
Y4433	0.298	0.300	0.67	"
Y4461	0.226	0.223	1.34	Y3370-77, Y3735-52
Y4470	0.212	0.212	0.00	Y4458-72
Y4764	0.671	0.686	2.21	Y4360-84, Y4760-87
Y4774	0.216	0.212	1.87	"
Y4787	0.367	0.377	2.69	"
Y5154	0.663	0.675	1.81	Y5148-91
Y5164	0.530	0.544	2.57	"
Y5176	0.381	0.389	2.13	"
Y5178	0.399	0.414	3.72	"
Y5190	0.382	0.378	1.00	"
Y5607	0.493	0.519	5.16	Y5607-706
Y5623	0.330	0.330	0.09	"
YS629	0.489	0.482	1.40	"
YS639	0.190	0.191	0.47	"
Y5651	0.183	0.186	2.06	"
Yf664	0.953	0.982	3.00	"
Y5677	0.569	0.566	0.42	"
Y5689	0.379	0.386	1.80	"
YS696	0.376	0.381	1.32	"
Y5705	0.353	0.361	2.38	"
Y6463	0.271	0.274	1.10	Y6461-87
Y6470	0.739	0.729	1.36	"
Y6478	0.313	0.324	3.45	"
Y6486	0.371	0.379	2.13	"
Y8245	0.046	0.050	8.33	Y8241-64, Y8532-48
Y8255	0.065	0.064	1.55	Y8944-9114
Y8262	0.054	0.056	3.64	"
Y8539	0.036	0.039	8.00	"
Y8946	0.081	0.085	4.82	"
Y9113	0.034	0.036	5.71	"
Y9823'	0.221	0.215	2.75	Y9819-36
Y9835	0.227	0.226	0.44	"
zoo74	0.056	0.052	7.41	Z0074-89

TABLE E-28. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Instrument Duplicate Analysis Data
(units are mg/L)

Lab Sample #	Value 1	Value 2	% RPD	Relevant Samples (Lab #s)
		Parameter: Zn (Continued)		
zoo75	0.114	0.111	2.67	Z0074-89
Z0087	0.137	0.129	6.02	"
20765	0.362	0.353	2.52	Z0764-94
20771	0.366	0.357	2.49	"
20785	0.501	0.519	3.53	"
20792	0.347	0.333	4.12	"
21260	0.300	0.279	7.32	Z1255-65, Z1523-25
21525	0.231	0.229	0.91	"
21675	0.194	0.197	1.53	Z1672-75
22141	0.317	0.311	1.91	Z2133-42
22737	0.254	0.252	0.79	Z2736-39
Z3051	0.330	0.326	1.22	Z3051-59
23059	0.282	0.283	0.35	Z3051-59
23711	0.264	0.263	0.38	Z3709-13
24168	0.254	0.256	0.78	Z4160-68
24354	0.153	0.144	6.06	Z4351-66
24362	0.152	0.152	0.00	"
25467	0.186	0.185	0.54	Z5461-80
25477	0.258	0.258	0.00	"
25959	0.267	0.270	1.12	Z5895-98, Z5959-70
25967	0.292	0.286	2.08	"
26542	0.208	0.213	2.38	Z6542-51

TABLE E-29. METALS ON HIGH VOLUME AIR FILTERS

Post-Digested Instrument Spike Data
(units are mg/L)

Lab Sample#	Unspiked Value	Spiked Value	% Recovery	Relevant Samples (Lab #s)
		Parameter: Al		
Y9824	1.3	3.1	91.3	Y9819-36
Y9835	5.3	7.4	105.2	"
zoo77	6.3	11.2	99.9	Z0074-89
Z0085	18.2	22.6	90.3	"
20765	8.3	10.4	107.0	Z0764-94
'20774	7.9	10.0	106.0	"
20781	9.5	11.6	107.2	"
20794	9.8	11.9	108.2	"
21257	10.6	15.6	101.6	Z1255-65, Z1523-25
21525	10.6	15.6	101.6	"
21673	33.3	41.7	87.9	Z1672-75
22142	5.3	7.2	94.2	Z2133-42
Z2529	6.4	8.1	89.3	Z2528-32
23051	12.9	18.1	105.8	Z3051-59
23265	11.4	16.1	95.6	Z3265-69
23710	9.7	14.3	93.8	Z3709-13
24164	13.8	18.5	95.9	Z4160-68
24352	6.4	8.9	102.1	Z4351-66
Z4359	4.1	5.8	96.3	"
Z5462	1.6	2.0	96.1	"
25465	2.6	4.5	96.5	Z5461-80
25479	3.2	5.1	97.0	"
Z5959	3.5	5.3	88.5	Z5895-98, Z5959-70
25969	3.1	5.0	97.5	"
26543	1.9	2.8	89.8	Z6542-51
		Mean	97.8 %	
		SD	6.4 %	
		cv	0.066	
		Parameter: As		
Y9821	0.0058	0.0159	102.6	Y9819-36
Y9832	0.0062	0.0153	92.5	"
Z0081	0.0030	0.0139	110.4	Z0074-89
Z0086	0.0053	0.0157	105.6	"
20764	0.0044	0.0147	104.5	Z0764-94

TABLE E-29. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Post-Digested Instrument Spike Data
(units are mg/L)

Lab Sample#	Unspiked Value	Spiked Value	% Recovery	Relevant Samples (Lab #s)
		Parameter: As (Continued)		
20776	0.0051	0.0142	92.4	Z0764-94
20791	0.0057	0.0152	96.5	"
21256	0.0087	0.0179	93.8	Z1255-65, Z1523-25
21265	0.0059	0.0159	101.6	"
21673	0-0155	0.0248	95.5	Z1672-75
22134	0.0061	0.0152	92.5	Z2133-42
22141	0.0056	0.0149	94.5	Z2133-42
22531	0.0082	0.0175	94.9	Z2528-32
23051	0.0091	0.0180	90.8	Z3051-59
23056	0.0157	0.0256	101.6	Z3051-59
z-3391	0.0059	0.0158	100.6	Z3389-92
24164	0.0053	0.0146	94.5	Z4160-68
24355	<0.0010	0.0105	106.1	Z4351-66
24365	0.0027	0.0123	97.2	"
25464	0-0046	0.0128	83.3 *	Z5461-80
25474	0.0039	0.1350	97.4	"
25959	0.0028	0.0127	100.3	Z5895-98, Z5959-70
25969	0.0042	0.0204	94.8	"
26547	0.0068	0.0169	102.7	Z6542-51
		Mean	97.8 %	
		SD	6.0 %	
		CV	0.061	
		Parameter: Be		
Y9821	0.011	0.020	92.0	Y9819-36
Y9832	0.008	0.017	91.7	"
zoo77	0.006	0.015	91.5	Z0074-89
Z0088	0.040	0.526	97.7	"
20764	0.012	0.021	92.1	Z0764-94
20774	0.008	0.018	101.8	"
20784	0-012	0.022	102.2	"

* Value greater than two standard deviations from mean

TABLE E-29. METALS ON HIGH VOLUME AIR FILTERS (Continued)

Post-Digested Instrument Spike Data
(units are mg/L)

Lab Sample#	Unspiked Value	Spiked Value	% Recovery	Relevant Samples (Lab #a)
		Parameter:		
20794	0.010	0.019	91.9	Z0764-94
21257	co.001	0.007	70.7 *	Z1255-65, Z1523-25
Z1525	<0.001	0.010	101.0	"
21672	0.046	0.066	108.1	Z1672-75
22142	<0.001	0.009	90.9	Z2133-42
22529	<0.001	0.010	101.0	Z2528-32
23051	<0.001	0.009	90.9	23051-59
23265	<0.001	0.010	101.0	Z3265-69
23710	0.001	0.012	111.2	23709-13
24164	0.001	0.011	101.1	Z4160-68
24354	0.002	0.012	101.2	Z4351-66
24365	0.003	0.013	101.3	"
25465	0.001	0.010	91.0	Z5461-80
25479	0.002	0.011	91.1	"
25959	co.001	0.009	90.9	Z5895-98, Z5959-70
25969	0.001	0.012	111.2	"
26550	0.001	0.011	101.1	Z6542-51
		Mean	96.9 %	
		SD	8.6 %	
		CV	0.089	
		Parameter: Ca		
Y9824	5.7	6.6	92.6	Y9819-36
Y9835	35.3	39.8	94.0	"
20080	81.8	86.8	108.7	Z0074-89
20765	58.6	76.1	88.3	Z0764-94
20770	54.2	75.9	109.3	"
20784	68.5	87.4	95.4	"
20787	66.7	88.6	110.4	"
21258	44.9	64.1	96.6	Z1255-65, Z1523-25
21525	49.6	69.2	98.7	"
21675	96.6	104.0	84.4 *	Z1672-75

* Value greater than two standard deviations from mean