

100004

URS
CONSULTANTS, INC.

**Quality Control
Summary Report**

VOLUME 2 OF 2

**Pre-design Investigation
Delaware Sand And Gravel
Superfund Site (Phase II)
New Castle, Delaware**

Prepared for:

**U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska
Contract No. DACW 45-89-C-0518**



Acting for:

**U.S. Environmental Protection Agency
Region III
Philadelphia, Pennsylvania**



Prepared by:

**URS Consultants, Inc.
Buffalo, New York**

March 1993

A-E QUALITY CONTROL SUMMARY REPORT

VOLUME 2

AR302790

A-E QUALITY CONTROL SUMMARY REPORT

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DELAWARE SAND & GRAVEL
VOLATILE ORGANIC COMPOUND
ANALYTICAL RESULTS

SAMPLE-ID SAMPLE TYPE COLLECTION DATE PARAMETER	TBR-1(14)		TBR-1(24)		TBR-1(34)		TBR-3(13)		TBR-3(23)		TBR-3(33)		TBC-1 #		TBC-1 DUP #		TTC-1 #		TTC-1 DUP #		
	BC	2/7/91	BC	2/8/91	BC	2/8/91	TC	2/6/91	TC	2/8/91											
CHLOROMETHANE																					
BROMOMETHANE																					
VINYL CHLORIDE																					
CHLOROETHANE																					
METHYLENE CHLORIDE																					
ACETONE	38000		1800		16000																
CARBON DISULFIDE	30000 J	29000			4400																
1,1-DICHLOROETHENE																					
1,1-DICHLOROETHANE																					
1,2-DICHLOROETHENE (TOTAL)																					
CHLOROFORM																					
1,2-DICHLOROETHANE	230000	450 J	3300		32000																
2-BUTANONE		36000			7300																
1,1,1-TRICHLOROETHANE																					
CARBON TETRACHLORIDE																					
VINYL ACETATE																					
BROMODICHLOROMETHANE																					
1,2-DICHLOROPROPANE																					
CIS-1,3-DICHLOROPROPENE																					
TRICHLOROETHENE																					
DIBROMOCHLOROMETHANE																					
1,1,2-TRICHLOROETHANE																					
BENZENE	6100 J				580 J																
TRANS-1,3-DICHLOROPROPENE																					
BROMOFORM																					
4-METHYL-2-PENTANONE																					
2-HEXANONE																					
TETRACHLOROETHENE																					
1,1,2,2-TETRACHLOROETHANE																					
TOLUENE	390000	210 J			17000																
CHLOROBENZENE					2600																
ETHYLBENZENE	31000				3000																
STYRENE																					
TOTAL XYLENES	180000				14000																

All results reported in µg/kg (ppb).
Only detected results are reported.

BC - Boring Composite
TC - Trench Composite
- Results calculated with holding times exceeded.
- Sample split with USACE.

J - Indicates the value is less than the quantitation limit but greater than zero.
E - Concentration exceeded linear range of calibration.

B-000315

AR302793

DELAWARE SAND & GRAVEL
VOLATILE ORGANIC COMPOUND
DETECTION LIMITS

SAMPLE-ID	TBR-1(14')		TBR-1(24')		TBR-1(24')		TBR-3(13')		TBR-3(23')		TBR-3(33')		TBC-1 #		TTC-1 #		TTC-1 DUP @		
	BC	2/7/91	BC	2/8/91	TC	2/6/91	TC	2/8/91											
PARAMETER																			
CHLOROMETHANE	36000		2700		1700		2400		14000		170000		3200		30000		1600		17000
BROMOMETHANE	36000		2700		1700		2400		14000		170000		3200		30000		1600		17000
VINYL CHLORIDE	36000		2700		1700		2400		14000		170000		3200		30000		1600		17000
CHLOROETHANE	36000		2700		1700		2400		14000		170000		3200		30000		1600		17000
METHYLENE CHLORIDE			1400		860				6800		87000								
ACETONE			1400		860		1200		14000		170000		1600		15000		810		8600
CARBON DISULFIDE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
1,1-DICHLOROETHENE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
1,1-DICHLOROETHANE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
1,2-DICHLOROETHENE (TOTAL)	18000		1400		860		1200		6800		87000		1600		15000		810		8600
CHLOROFORM	18000				860		1200		6800		87000		1600		15000		810		8600
1,2-DICHLOROETHANE					860				6800		87000								
2-BUTANONE	36000								14000		170000		3200		30000				17000
1,1,1-TRICHLOROETHANE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
CARBON TETRACHLORIDE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
VINYL ACETATE	36000		2700		1700		2400		14000		170000		3200		30000		1600		17000
BROMODICHLOROMETHANE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
1,2-DICHLOROPROPANE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
CIS-1,3-DICHLOROPROPENE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
TRICHLOROETHENE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
DIBROMOCHLOROMETHANE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
1,1,2-TRICHLOROETHANE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
BENZENE			1400		860				6800		87000								
TRANS-1,3-DICHLOROPROPENE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
BROMOFORM	18000		1400		860		1200		6800		87000		1600		15000		810		8600
4-METHYL-2-PENTANONE	36000		2700		1700		2400		14000		170000		3200		30000		1600		17000
2-HEXANONE	36000		2700		1700		2400		14000		170000		3200		30000		1600		17000
TETRACHLOROETHENE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
1,1,2,2-TETRACHLOROETHANE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
TOLUENE			1400		860				6800		87000								
CHLOROBENZENE	18000		1400		860				6800		87000								
ETHYLBENZENE	18000		1400		860				6800		87000								
STYRENE	18000		1400		860		1200		6800		87000		1600		15000		810		8600
TOTAL XYLENES			1400		860		1200		6800		87000		1600		15000		810		8600

All results reported in µg/kg (ppb).
Detection limits for positive results not reported.

BC - Boring Composite
TC - Trench Composite
@ - Results calculated with holding times exceeded.
- Sample split with USACE.

AR302794

6000316

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
ANALYTICAL RESULTS

SAMPLE-ID SAMPLE TYPE COLLECTION DATE PARAMETER	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(13')		TBR-3(23')		TBR-3(33')		TBC-1 #		TTC-1 #		TTC-1 DUP	
	BC	2/7/91	BC	2/8/91	TC	2/6/91	TC	2/8/91										
PHENOL			4500		310 J				2800			3000 J		1900		40000		170000
BIS(2-CHLOROETHYL) ETHER	7600 J				160 J						270 J			720 J				
2-CHLOROPHENOL																		
1,3-DICHLOROBENZENE																		
1,4-DICHLOROBENZENE																		
BENZYL ALCOHOL																		
1,2-DICHLOROBENZENE	1800 J																	
2-METHYLPHENOL																		
BIS(2-CHLOROISOPROPYL) ETHER																		
4-METHYLPHENOL																		
N-NITROSO-DI-N-PROPYLAMINE																		
HEXACHLOROETHANE																		
NITROBENZENE																		
ISOPHORONE																		
2-NITROPHENOL																		
2,4-DIMETHYLPHENOL																		
BENZOIC ACID					350 J													
BIS(2-CHLOROETHOXY)METHANE																		
2,4-DICHLOROPHENOL																		
1,2,4-TRICHLOROBENZENE	1700 J																	
NAPHTHALENE																		
4-CHLOROANILINE																		
HEXACHLOROBUTADIENE																		
4-CHLORO-3-METHYLPHENOL																		
2-METHYLNAPHTHALENE	500 J																	
HEXACHLOROCYCLOPENTADIENE																		
2,4,6-TRICHLOROPHENOL																		
2,4,5-TRICHLOROPHENOL																		
2-CHLORONAPHTHALENE																		
2-NITROANILINE																		
DIMETHYLPHTHALATE																		
ACENAPHTHYLENE																		
2,6-DINITROTOLUENE																		

J - Indicates the value is less than the quantitation limit but greater than zero.
 @ - Results calculated with holding times exceeded.

BC - Boring Composite
 TC - Trench Composite
 # - Sample split with USACE.

All results reported in µg/kg (ppb).
 Only detected results are reported.

B-000317

AR302795

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
DETECTION LIMITS

SAMPLE-ID SAMPLE TYPE COLLECTION DATE	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(13')		TBR-3(23')		TBR-3(33')		TBC-1 #		TTC-1 #		TTC-1 DUP @ TC	
	BC	2/7/91	BC	2/8/91	BC	2/8/91		TC										
PARAMETER																		
PHENOL	9400						4700					920						27000
BIS(2-CHLOROETHYL) ETHER	9400						4700			1400								27000
2-CHLOROPHENOL	9400						4700			1400								27000
1,3-DICHLOROBENZENE	9400						4700			1400								27000
1,4-DICHLOROBENZENE	9400						4700			1400								27000
BENZYL ALCOHOL	9400						4700			1400								27000
1,2-DICHLOROBENZENE	9400						4700			1400								27000
2-METHYLPHENOL	9400						4700			1400								27000
BIS(2-CHLOROISOPROPYL) ETHER	9400						4700			1400								27000
4-METHYLPHENOL	9400						4700			1400								27000
N-NITROSO-DI-N-PROPYLAMINE	9400						4700			1400								27000
HEXACHLOROETHANE	9400						4700			1400								27000
NITROBENZENE	9400						4700			1400								27000
ISOPHORONE	9400						4700			1400								27000
2-NITROPHENOL	9400						4700			1400								27000
2,4-DIMETHYLPHENOL	9400						4700			1400								27000
BENZOIC ACID	46000						23000			7000								130000
BIS(2-CHLOROETHOXY)METHANE	9400						4700			1400								27000
2,4-DICHLOROPHENOL	9400						4700			1400								27000
1,2,4-TRICHLOROBENZENE	9400						4700			1400								27000
NAPHTHALENE	9400						4700			1400								27000
4-CHLOROANILINE	9400						4700			1400								27000
HEXACHLOROBUTADIENE	9400						4700			1400								27000
4-CHLORO-3-METHYLPHENOL	9400						4700			1400								27000
2-METHYLNAPHTHALENE	9400						4700			1400								27000
HEXACHLOROCYCLOPENTADIENE	9400						4700			1400								27000
2,4,6-TRICHLOROPHENOL	9400						4700			1400								27000
2,4,5-TRICHLOROPHENOL	46000						23000			7000								130000
2-CHLORONAPHTHALENE	9400						4700			1400								27000
2-NITROANILINE	46000						23000			7000								130000
DIMETHYLPHTHALATE	9400						4700			1400								27000
ACENAPHTHYLENE	9400						4700			1400								27000
2,6-DINITROTOLUENE	9400						4700			1400								27000

- Sample split with USACE.

BC - Boxing Composite

TC - Trench Composite

@ - Results calculated with holding times exceeded.

All results reported in µg/kg (ppb).

Detection limits for positive results not reported.

8-000015

AR302796

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
DETECTION LIMITS

SAMPLE-ID SAMPLE TYPE COLLECTION DATE	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(33')		TBR-3(33')		TBR-3(33')		TTC-1 #		TTC-1 DUP @			
	BC	2/7/91	BC	2/6/91	BC	2/8/91	TC	2/8/91										
PARAMETER																		
3-NITROANILINE	46000	17000	4400	23000	7000	4400	4400	23000	7000	4400	4400	20000	4100	120000	20000	4100	130000	
ACENAPHTHENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
2,4-DINITROPHENOL	46000	17000	4400	23000	7000	4400	4400	23000	7000	4400	4400	20000	4100	120000	20000	4100	130000	
4-NITROPHENOL	46000	17000	4400	23000	7000	4400	4400	23000	7000	4400	4400	20000	4100	120000	20000	4100	130000	
DIBENZOFURAN	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
2,4-DINITROTOLUENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
DIETHYLPHTHALATE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
4-CHLOROPHENYL-PHENYL ETHER	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
FLUORENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
4-NITROANILINE	46000	17000	4400	23000	7000	4400	4400	23000	7000	4400	4400	20000	4100	120000	20000	4100	130000	
4,6-DINITRO-2-METHYLPHENOL	46000	17000	4400	23000	7000	4400	4400	23000	7000	4400	4400	20000	4100	120000	20000	4100	130000	
N-NITROSODIPHENYLAMINE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
4-BROMOPHENYL-PHENYL ETHER	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
HEXACHLOROBENZENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
PENTACHLOROPHENOL	46000	17000	4400	23000	7000	4400	4400	23000	7000	4400	4400	20000	4100	120000	20000	4100	130000	
PHENANTHRENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
ANTHRACENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
DI-N-BUTYLPHTHALATE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
FLUORANTHENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
PYRENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
BUTYLBENZYLPHTHALATE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
3,3'-DICHLOROBENZIDINE	19000	7200	1800	9400	2900	1800	1800	9400	2900	1800	1800	8400	1700	48000	8400	1700	54000	
BENZO(A)ANTHRACENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
CHRYSENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
BIS(2-ETHYLHEXYL)PHTHALATE		3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
DI-N-OCTYL PHTHALATE		3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
BENZO(B)FLUORANTHENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
BENZO(K)FLUORANTHENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
BENZO(A)PYRENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
INDENO(1,2,3-CD)PYRENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
DIBENZ(A,H)ANTHRACENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	
BENZO(G,H,I)PERYLENE	9400	3600	900	4700	1400	900	900	4700	1400	900	920	4200	850	24000	4200	850	27000	

All results reported in µg/kg (ppb).
Detection limits for positive results not reported.

BC - Boring Composite
TC - Trench Composite
@ - Results calculated with holding times exceeded.
- Sample split with USACE.

AR302798

8-000020

DELAWARE SAND & GRAVEL
PESTICIDE/PCB
DETECTION LIMITS

SAMPLE-ID	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(13')		TBR-3(23')		TBR-3(33')		TBC-1 #		TTC-1 #			
	BC	2/7/91	BC	2/8/91	TC	2/6/91	TC	2/8/91										
PARAMETER	2/7/91		2/7/91		2/7/91		2/7/91		2/7/91		2/7/91		2/8/91		2/8/91		2/8/91	
ALPHA-BHC	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
BETA-BHC	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
DELTA-BHC	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
GAMMA-BHC (LINDANE)	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
HEPTACHLOR	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
ALDRIN	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
HEPTACHLOR EPOXIDE	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
ENDOSULFAN I	23	17	22	23	17	22	23	17	22	22	22	20	21	290	330			
DIELDRIN	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
4,4'-DDE	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
ENDRIN	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
ENDOSULFAN II	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
4,4'-DDD	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
ENDOSULFAN SULFATE	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
4,4'-DDT	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
METHOXYCHLOR	230	170	220	230	170	220	230	170	220	220	220	200	210	2900	3300			
ENDRIN KETONE	46	35	44	46	35	44	46	35	44	44	44	41	41	580	660			
ALPHA-CHLORDANE	230	170	220	230	170	220	230	170	220	220	220	200	210	2900	3300			
GAMMA-CHLORDANE	230	170	220	230	170	220	230	170	220	220	220	200	210	2900	3300			
TOXAPHENE	460	350	440	460	350	440	460	350	440	440	440	410	410	5800	6600			
AROCLOR-1016	230	170	220	230	170	220	230	170	220	220	220	200	210	2900	3300			
AROCLOR-1221	230	170	220	230	170	220	230	170	220	220	220	200	210	2900	3300			
AROCLOR-1232	230	170	220	230	170	220	230	170	220	220	220	200	210	2900	3300			
AROCLOR-1242	230	170	220	230	170	220	230	170	220	220	220	200	210	2900	3300			
AROCLOR-1248	170	170	220	170	170	220	170	170	170	170	220	220	210	2900	3300			
AROCLOR-1254	350	350	440	460	350	440	460	350	440	440	440	410	410	5800	6600			
AROCLOR-1260	460	350	440	460	350	440	460	350	440	440	440	410	410	5800	6600			

All results reported in µg/kg (ppb).
Detection limits for positive results not reported.

BC - Boring Composite
TC - Trench Composite
@ - Results calculated with holding times exceeded.
- Sample split with USACE.

AR302800

B 000222

DELAWARE SAND & GRAVEL
 POLYCHLORINATED DIBENZO-P-DIOXIN
 POLYCHLORINATED DIBENZO-P-FURAN
 ANALYTICAL RESULTS

SAMPLE-ID SAMPLE TYPE COLLECTION DATE PARAMETER	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(43')		TBR-3(23)		TBR-3(33')		TBC-1 #		TTC-1 #		TTC-1 DUP		
	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/8/91	TC	2/6/91	TC	2/8/91	
DIOXIN																			
TETRA 2378 TCDD	NA		NA		NA		NA		NA		NA		NA						
TETRA TOTAL TCDD	NA		NA		NA		NA		NA		NA		NA						
PENTA 12378 PeCDD	NA		NA		NA		NA		NA		NA		NA						
PENTA TOTAL PeCDD	NA		NA		NA		NA		NA		NA		NA						
HEXA 123478 HxCDD	NA		NA		NA		NA		NA		NA		NA						
HEXA 123678 HxCDD	NA		NA		NA		NA		NA		NA		NA						
HEXA 123789 HxCDD	NA		NA		NA		NA		NA		NA		NA						
HEXA TOTAL HxCDD	NA		NA		NA		NA		NA		NA		NA						
HEPTA 1234678 HpCDD	NA		NA		NA		NA		NA		NA		NA						
HEPTA TOTAL HpCDD	NA		NA		NA		NA		NA		NA		NA						
OCTA TOTAL OCDD	NA		NA		NA		NA		NA		NA		NA						
FURAN																			
TETRA 2378 TCDF	NA		NA		NA		NA		NA		NA		NA						
TETRA TOTAL TCDF	NA		NA		NA		NA		NA		NA		NA						
PENTA 12378 PeCDF	NA		NA		NA		NA		NA		NA		NA						
PENTA 23478 PeCDF	NA		NA		NA		NA		NA		NA		NA						
PENTA TOTAL PeCDF	NA		NA		NA		NA		NA		NA		NA						
HEXA 123478 HxCDF	NA		NA		NA		NA		NA		NA		NA						
HEXA 123678 HxCDF	NA		NA		NA		NA		NA		NA		NA						
HEXA 123789 HxCDF	NA		NA		NA		NA		NA		NA		NA						
HEXA 234678 HxCDF	NA		NA		NA		NA		NA		NA		NA						
HEXA TOTAL HxCDF	NA		NA		NA		NA		NA		NA		NA						
HEPTA 1234678 HpCDF	NA		NA		NA		NA		NA		NA		NA						
HEPTA 1234789 HpCDF	NA		NA		NA		NA		NA		NA		NA						
HEPTA TOTAL HpCDF	NA		NA		NA		NA		NA		NA		NA						
OCTA TOTAL OCDF	NA		NA		NA		NA		NA		NA		NA						
														1.001					
															0.8218				
															2.9695				
																			2.4415

- Sample split with USACE.

All results reported in µg/kg (ppb).
 Only detected results are reported.
 NA - Not Analyzed

B-000323

AR302801

DELAWARE SAND & GRAVEL
 POLYCHLORINATED DIBENZO-P-DIOXIN
 POLYCHLORINATED DIBENZO-P-FURAN
 DETECTION LIMITS

PARAMETER	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(13)		TBR-3(23')		TBR-3(33)		TBC-1 #		TTC-1 #	
	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/8/91	TC	2/8/91
DIOXIN																
TETRA 2378 TCDD	NA		NA		NA		NA		NA		NA		0.0962	0.1073	0.2116	
TETRA TOTAL TCDD	NA		NA		NA		NA		NA		NA		0.0996	0.1073	0.2116	
PENTA 12378 PcCDD	NA		NA		NA		NA		NA		NA		0.0354	0.1611	0.1137	
PENTA TOTAL PcCDD	NA		NA		NA		NA		NA		NA		0.0771	0.1883	0.0989	
HEXA 123478 HxCDD	NA		NA		NA		NA		NA		NA		0.0232	0.0368	0.0368	
HEXA 123678 HxCDD	NA		NA		NA		NA		NA		NA		0.1328			
HEXA 123789 HxCDD	NA		NA		NA		NA		NA		NA		0.0320	0.0427	0.0981	
HEXA TOTAL HxCDD	NA		NA		NA		NA		NA		NA		0.0940	0.1142	0.0717	
HEPTA 1234678 HpCDD	NA		NA		NA		NA		NA		NA		0.0219	0.0742	0.1363	
HEPTA TOTAL HpCDD	NA		NA		NA		NA		NA		NA		0.1169	0.1670	0.1479	
OCTA TOTAL OCDD	NA		NA		NA		NA		NA		NA		0.0837	0.2732	0.3419	
FURAN																
TETRA 2378 TCDF	NA		NA		NA		NA		NA		NA					
TETRA TOTAL TCDF	NA		NA		NA		NA		NA		NA					
PENTA 12378 PcCDF	NA		NA		NA		NA		NA		NA					
PENTA 23478 PcCDF	NA		NA		NA		NA		NA		NA					
PENTA TOTAL PcCDF	NA		NA		NA		NA		NA		NA					
HEXA 123478 HxCDF	NA		NA		NA		NA		NA		NA					
HEXA 123678 HxCDF	NA		NA		NA		NA		NA		NA					
HEXA 123789 HxCDF	NA		NA		NA		NA		NA		NA					
HEXA 234678 HxCDF	NA		NA		NA		NA		NA		NA					
HEXA TOTAL HxCDF	NA		NA		NA		NA		NA		NA					
HEPTA 1234678 HpCDF	NA		NA		NA		NA		NA		NA					
HEPTA 1234789 HpCDF	NA		NA		NA		NA		NA		NA					
HEPTA TOTAL HpCDF	NA		NA		NA		NA		NA		NA					
OCTA TOTAL OCDF	NA		NA		NA		NA		NA		NA					

- Sample split with USACE.

All results reported in µg/kg (ppb).
 Only detection limits for total isomers are reported.
 NA - Not Analyzed

AR302802

B 000324

DELAWARE SAND & GRAVEL
METAL/CLASSICAL CHEMISTRIES
ANALYTICAL RESULTS

SAMPLE ID	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(13')		TBR-3(23')		TBR-3(33')		TBC-1 #		TBC-1 DUP @		TTC-1 #		TTC-1 DUP @		
	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/8/91	BC	2/8/91	TC	2/6/91	TC	2/8/91	
PARAMETER																					
ALUMINUM	53300	3360	48600	51000	4860	32300	22300 *	13900 *	21100 *	26400 *											
ANTIMONY	1.40 B	1.20 B	1.60 B	3.40 W																	
ARSENIC	123	5.60 B	180	121.00	33.40 B	210 B	2.00 BN	1.25 B	2.90 N	2.90											
BARIUM	1.80	0.50 B	4.00	1.90	0.55 B	4.90	1.20	0.97 B	1.20 B	1.70											
BERYLLIUM																					
CADMIUM	440 B	53.30 B	2690	1060 B	156 B	1940	789	569 B	1960 *	2.08											
CALCIUM	34.20	4.00	214	41.40	6.90	157	27.80	26.32	60.40 E*	426 B*											
CHROMIUM	16.80	2.90 B	12.30 B	14.70	3.50 B	18.00	8.70	8.37 B	14.70	14.80											
COBALT	14.50	5.00 B	66.60	13.90	6.10	96.60	14.40	13.69	366 *	70.90 *											
COPPER	30300	24300	45900	35600	11700	116000	26600 *	19400 *	38600	46700											
IRON	15.30	1.90	11.70	17.00	3.60	12.30	8.00	7.05	141 N*	101 *											
LEAD	1090 B	164 B	9220	1090 B	376 B	5960	952 B	928 B	801 B	890 B											
MAGNESIUM	392	166	448	749	207	1720	389 N	329	746	784											
MANGANESE																					
MERCURY	18.90	5.20 B	62.20	19.50	3.30 B	67.30	13.80	10.44	0.21 *	0.43 *											
NICKEL	672 B	138 B	5900	801 B	405 B	4470	804 B	657 B	2120 *	367 *											
POTASSIUM	4200	401 B	188 B	576 B	283 B	245 B	600 B	520 B	612 B	1095 B											
SELENIUM																					
SILVER																					
SODIUM	66.80	14.40	98.00	81.20	14.80	122	37.70	30.77	51.70	65.01											
THALLIUM	37.40	9.60	150	43.80	10.30	181	29.20 E	24.47	151 NE	148											
VANADIUM																					
ZINC	1200	16	6500	350																	
CYANIDE																					
TRPH																					

All results reported in mg/kg (ppm).
 Only detected results are reported.
 N - Spike recovery not within QC limits.
 W - Post-digestion spike for furnace is out of QC limits, while absorbance is less than 50% of spike absorbance.
 B - Value is less than quantization limit but greater than instrument detection limit.
 E - Value is estimated due to the presence of interference.

@ - Results calculated with holding times exceeded.
 * - Duplicate analysis not within control limits.
 BC - Boring Composite
 TC - Trench Composite
 # - Sample split with USACE.

B-000325

AR302803

DELAWARE SAND & GRAVEL
 METAL/CHEMICAL CHEMISTRIES
 DETECTION LIMITS

SAMPLE-ID	TBR-1(14)		TBR-1(24)		TBR-3(33)		TBR-3(23)		TBR-3(33)		TBC-1 #		TTC-1 #	
	BC	2/7/91	BC	2/8/91	TC	2/6/91								
PARAMETER														
ALUMINUM														
ANTIMONY	4.30		3.30	4.20	4.40	3.30	4.20	3.70	4.20	3.70	3.70	4.20	4.20	4.20
ARSENIC						0.44								
BARIUM														
BERYLLIUM														
CADMIUM	0.57		0.44	0.50	0.59	0.44	0.56	0.50	0.56	0.50	0.50	0.56	0.56	0.56
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY	0.14		0.11	0.14	0.15	0.11	0.14	0.12	0.13	0.12	0.12	0.12	0.12	0.12
NICKEL														
POTASSIUM														
SELENIUM	0.57		0.44	0.56	0.59	0.44	0.56	0.50	0.56	0.50	0.50	0.56	0.56	0.56
SILVER	0.86		0.66	0.84	0.88	0.65	0.84	0.75	0.85	0.75	0.75	0.84	0.84	0.84
SODIUM														
THALLIUM	0.57		0.44	0.56	0.59	0.44	0.56	0.50	0.56	0.50	0.50	0.56	0.56	0.56
VANADIUM														
ZINC														
CYANIDE	2.90		2.10	2.70	2.60	2.00	2.70	2.40	2.70	2.40	2.40	2.60	2.60	2.60
TRPH				10.0			10.0		10.0					

BC - Boring Composite
 TC - Trench Composite
 # - Sample split with USACE.

All results reported in mg/kg (ppm).
 Detection limits for positive results not reported.

B-000326

AR302804

DELAWARE SAND & GRAVEL
 CLASSICAL CHEMISTRIES
 ANALYTICAL RESULTS

SAMPLE-ID	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(13)		TBR-3(23')		TBR-3(33)		TBC-1 #		TTC-1 #			
	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/7/91	BC	2/8/91	TC	2/6/91	TC	2/8/91
PARAMETER																		
IGNITABILITY (degrees F)	NA		NA		NA		NA		NA		NA		>200		82		110	
TOTAL ORGANIC HALOGENS	NA		NA		NA		NA		NA		NA		7.42		1000		1000	
pH (units)	NA		NA		NA		NA		NA		NA		7.59		6.27		6.07	
TOTAL SULFIDE	NA		NA		NA		NA		NA		NA		80.6		288		287	
SPECIFIC GRAVITY (units)	NA		NA		NA		NA		NA		NA		2.48		2.61		2.59	
HEAT OF COMBUSTION (BTU/lb)	NA		NA		NA		NA		NA		NA		33.72		2.99		4.32	
CARBON (%)	NA		NA		NA		NA		NA		NA		4.82		1.14		1.61	
HYDROGEN (%)	NA		NA		NA		NA		NA		NA		0.016		0.018		0.013	
NITROGEN (%)	NA		NA		NA		NA		NA		NA		74.43		0.16		0.05	
SULFUR (%)	NA		NA		NA		NA		NA		NA		71.46		61.21		63.19	
ASH (%)	NA		NA		NA		NA		NA		NA		19.81		5.01		3.30	
OXYGEN BY DIFFERENCE (%)	NA		NA		NA		NA		NA		NA		23.82		29.47		27.51	
MOISTURE (%)	NA		NA		NA		NA		NA		NA		*		*		*	
FUSIBILITY (degrees F)	NA		NA		NA		NA		NA		NA		*		*		*	
PARTICLE SIZE	NA		NA		NA		NA		NA		NA		*		*		*	

All results reported in mg/kg (ppm).
 Only detected results are reported.
 NA - Not analyzed
 BC - Boring Composite
 TC - Trench Composite
 # - Sample split with USACE.
 * - See data package for results

AR302805

B-000327

DELAWARE SAND & GRAVEL
 CLASSICAL CHEMISTRIES
 DETECTION LIMITS

SAMPLE-ID	TBR-1(14')		TBR-1(24')		TBR-1(34')		TBR-3(13')		TBR-3(23')		TBR-3(33')		TBC-1 #		TTC-1 #	
	BC	2/7/91	BC	2/8/91	TC	2/6/91										
PARAMETER	BC	2/7/91	BC	2/8/91	TC	2/8/91										
IGNITABILITY (degrees F)	NA		NA		NA											
TOTAL ORGANIC HALOGENS	NA		NA		NA											
pH (units)	NA		NA		NA											
TOTAL SULFIDE	NA		NA		NA											
SPECIFIC GRAVITY (units)	NA		NA		NA											
HEAT OF COMBUSTION (BTU/lb)	NA		NA		NA											
CARBON (%)	NA		NA		NA											
HYDROGEN (%)	NA		NA		NA											
NITROGEN (%)	NA		NA		NA											
SULFUR (%)	NA		NA		NA											
ASH (%)	NA		NA		NA											
OXYGEN BY DIFFERENCE (%)	NA		NA		NA											
MOISTURE (%)	NA		NA		NA											
FUSIBILITY (degrees F)	NA		NA		NA											
PARTICLE SIZE	NA		NA		NA											

BC - Boring Composite
 TC - Trench Composite
 # - Sample split with USACE.

All results reported in mg/kg (ppm).
 Detection limits for positive results not reported.
 NA - Not applicable

B-000328

AR302806

DELAWARE SAND & GRAVEL
VOLATILE ORGANIC COMPOUND
ANALYTICAL RESULTS

SAMPLE-ID	TR-2
SAMPLE TYPE	AQUEOUS
COLLECTION DATE	1/23/91
PARAMETER	
CHLOROMETHANE	
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	27
ACETONE	9 J
CARBON DISULFIDE	
1,1-DICHLOROETHENE	
1,1-DICHLOROETHANE	
1,2-DICHLOROETHENE (TOTAL)	
CHLOROFORM	
1,2-DICHLOROETHANE	58
2-BUTANONE	84
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
VINYL ACETATE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
CIS-1,3-DICHLOROPROPENE	
TRICHLOROETHENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	4 J
TRANS-1,3-DICHLOROPROPENE	
BROMOFORM	
4-METHYL-2-PENTANONE	
2-HEXANONE	
TETRACHLOROETHENE	
1,1,2-TETRACHLOROETHANE	
TOLUENE	120
CHLOROBENZENE	
ETHYLBENZENE	
STYRENE	2 J
TOTAL XYLENES	14

All results reported in µg/L (ppb).
Only detected results are reported.
J - Indicates the value is less than the quantitation limit
but greater than 1%.

AR302807

B-000323

DELAWARE SAND & GRAVEL
 VOLATILE ORGANIC COMPOUND
 DETECTION LIMITS

SAMPLE-ID	TR-2
SAMPLE TYPE	AQUIFERS
COLLECTION DATE	1/23/91
PARAMETER	
CHLOROMETHANE	10
BROMOMETHANE	10
VINYL CHLORIDE	10
CHLOROETHANE	10
METHYLENE CHLORIDE	
ACETONE	
CARBON DISULFIDE	5
1,1-DICHLOROETHENE	5
1,1-DICHLOROETHANE	5
1,2-DICHLOROETHENE (TOTAL)	5
CHLOROFORM	5
1,2-DICHLOROETHANE	
2-BUTANONE	
1,1,1-TRICHLOROETHANE	5
CARBON TETRACHLORIDE	5
VINYL ACETATE	10
BROMODICHLOROMETHANE	5
1,2-DICHLOROPROPANE	5
CIS-1,3-DICHLOROPROPENE	5
TRICHLOROETHENE	5
DIBROMOCHLOROMETHANE	5
1,1,2-TRICHLOROETHANE	5
BENZENE	
TRANS-1,3-DICHLOROPROPENE	5
BROMOFORM	5
4-METHYL-2-PENTANONE	10
2-HEXANONE	10
TETRACHLOROETHENE	5
1,1,2,2-TETRACHLOROETHANE	5
TOLUENE	
CHLOROBENZENE	5
ETHYLBENZENE	
STYRENE	
TOTAL XYLENES	5

All results reported in µg/L (ppb).
 Detection limits for positive results not reported.

B-000350

AR302808

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
ANALYTICAL RESULTS

SAMPLE-ID	TR-2
SAMPLE TYPE	AQUEOUS
COLLECTION DATE	1/23/91
PARAMETER	
PHENOL	1200
BIS(2-CHLOROETHYL) ETHER	450 J
2-CHLOROPHENOL	
1,3-DICHLOROBENZENE	
1,4-DICHLOROBENZENE	
BENZYL ALCOHOL	
1,2-DICHLOROBENZENE	
2-METHYLPHENOL	
BIS(2-CHLOROISOPROPYL) ETHER	
4-METHYLPHENOL	260 J
N-NITROSO-DI-N-PROPYLAMINE	
HEXACHLOROETHANE	
NITROBENZENE	
ISOPHORONE	
2-NITROPHENOL	
2,4-DIMETHYLPHENOL	
BENZOIC ACID	
BIS(2-CHLOROETHOXYMETHANE	
2,4-DICHLOROPHENOL	
1,2,4-TRICHLOROBENZENE	
NAPHTHALENE	80 J
4-CHLOROANILINE	
HEXACHLOROBUTADIENE	
4-CHLORO-3-METHYLPHENOL	
2-METHYLNAPHTHALENE	
HEXACHLOROCYCLOPENTADIENE	
2,4,6-TRICHLOROPHENOL	
2,4,5-TRICHLOROPHENOL	
2-CHLORONAPHTHALENE	
2-NITROANILINE	
DIMETHYLPHTHALATE	
ACENAPHTHYLENE	
2,6-DINITROTOLUENE	

All results reported in µg/L (ppb).

Only detected results are reported.

J - Indicates the value is less than the quantitation limit but greater than zero.

6000331

AR302809

DELAWARE SAND & GRAVEL
 SEMIVOLATILE ORGANIC COMPOUND
 DETECTION LIMITS

SAMPLE ID	TR-2
SAMPLE TYPE	AQUEOUS
COLLECTION DATE	1/23/91
PARAMETER	
PHENOL	
BIS(2-CHLOROETHYL) ETHER	1000
2-CHLOROPHENOL	1000
1,3-DICHLOROBENZENE	1000
1,4-DICHLOROBENZENE	1000
BENZYL ALCOHOL	1000
1,2-DICHLOROBENZENE	1000
2-METHYLPHENOL	1000
BIS(2-CHLOROISOPROPYL) ETHER	1000
4-METHYLPHENOL	1000
N-NITROSO-DI-N-PROPYLAMINE	1000
HEXACHLOROETHANE	1000
NITROBENZENE	1000
ISOPHORONE	1000
2-NITROPHENOL	1000
2,4-DIMETHYLPHENOL	1000
BENZOIC ACID	5000
BIS(2-CHLOROETHOXY)METHANE	1000
2,4-DICHLOROPHENOL	1000
1,2,4-TRICHLOROBENZENE	1000
NAPHTHALENE	
4-CHLOROANILINE	1000
HEXACHLOROBUTADIENE	1000
4-CHLORO-3-METHYLPHENOL	1000
2-METHYLNAPHTHALENE	1000
HEXACHLOROCYCLOPENTADIENE	1000
2,4,6-TRICHLOROPHENOL	1000
2,4,5-TRICHLOROPHENOL	5000
2-CHLORONAPHTHALENE	1000
2-NITROANILINE	5000
DIMETHYLPHTHALATE	1000
ACENAPHTHYLENE	1000
2,6-DINITROTOLUENE	1000

All results reported in µg/L (ppb).
 Detection limits for positive results not reported.

B-000332

AR302810

DELAWARE SAND & GRAVEL
 SEMIVOLATILE ORGANIC COMPOUND
 ANALYTICAL RESULTS

SAMPLE-ID	TR-2
SAMPLE TYPE	AQUEOUS
COLLECTION DATE	1/23/91
PARAMETER	
3-NITROANILINE	
ACENAPHTHENE	
2,4-DINITROPHENOL	
4-NITROPHENOL	
DIBENZOFURAN	
2,4-DINITROTOLUENE	
DIETHYLPHTHALATE	
4-CHLOROPHENYL-PHENYL ETHER	
FLUORENE	
4-NITROANILINE	
4,6-DINITRO-2-METHYLPHENOL	
N-NITROSODIPHENYLAMINE	
4-BROMOPHENYL-PHENYL ETHER	
HEXACHLOROBENZENE	
PENTACHLOROPHENOL	
PHENANTHRENE	
ANTHRACENE	
DI-N-BUTYLPHTHALATE	
FLUORANTHENE	
PYRENE	
BUTYLBENZYLPHTHALATE	
3,3'-DICHLOROBENZIDINE	
BENZO(A)ANTHRACENE	
CHRYSENE	
BIS(2-ETHYLHEXYL)PHTHALATE	
DI-N-OCTYL PHTHALATE	
BENZO(B)FLUORANTHENE	
BENZO(K)FLUORANTHENE	
BENZO(A)PYRENE	
INDENO(1,2,3-CD)PYRENE	
DIBENZ(A,H)ANTHRACENE	
BENZO(G,H,I)PERYLENE	

All results reported in µg/L (ppb).
 Only detected results are reported.

B-000333

AR302811

DELAWARE SAND & GRAVEL
 SEMI-VOLATILE ORGANIC COMPOUND
 DETECTION LIMITS

SAMPLE-ID	TR-2
SAMPLE TYPE	AGENCY
COLLECTION DATE	1/23/91
PARAMETER	
3-NITROANILINE	5000
ACENAPHTHENE	1000
2,4-DINITROPHENOL	5000
4-NITROPHENOL	5000
DIBENZOFURAN	1000
2,4-DINITROTOLUENE	1000
DIETHYLPHTHALATE	1000
4-CHLOROPHENYL-PHENYL ETHER	1000
FLUORENE	1000
4-NITROANILINE	5000
4,6-DINITRO-2-METHYLPHENOL	5000
N-NITROSODIPHENYLAMINE	1000
4-BROMOPHENYL-PHENYL ETHER	1000
HEXACHLOROBENZENE	1000
PENTACHLOROPHENOL	5000
PHENANTHRENE	1000
ANTHRACENE	1000
DI-N-BUTYLPHTHALATE	1000
FLUORANTHENE	1000
PYRENE	1000
BUTYLBENZYLPHTHALATE	1000
3,3'-DICHLOROBENZIDINE	2000
BENZO(A)ANTHRACENE	1000
CHRYSENE	1000
BIS(2-ETHYLHEXYL)PHTHALATE	1000
DI-N-OCTYL PHTHALATE	1000
BENZO(B)FLUORANTHENE	1000
BENZO(K)FLUORANTHENE	1000
BENZO(A)PYRENE	1000
INDENO(1,2,3-CD)PYRENE	1000
DIBENZ(A,H)ANTHRACENE	1000
BENZO(G,H,I)PERYLENE	1000

All results reported in µg/L (ppb).
 Detection limits for positive results not reported.

5000354

AR302812

DELAWARE SAND & GRAVEL
 PESTICIDE/PCB
 ANALYTICAL RESULTS

SAMPLE-ID	TR-2
SAMPLE TYPE	AQUEOUS
COLLECTION DATE	1/23/91
PARAMETER	
ALPHA-BHC	0.61
BETA-BHC	
DELTA-BHC	
GAMMA-BHC (LINDANE)	
HEPTACHLOR	
ALDRIN	
HEPTACHLOR EPOXIDE	
ENDOSULFAN I	
DIELDRIN	
4,4'-DDE	
ENDRIN	
ENDOSULFAN II	
4,4'-DDD	
ENDOSULFAN SULFATE	
4,4'-DDT	
METHOXYCHLOR	
ENDRIN KETONE	
ALPHA-CHLORDANE	
GAMMA-CHLORDANE	
TOXAPHENE	
AROCLOR-1016	
AROCLOR-1221	
AROCLOR-1232	
AROCLOR-1242	
AROCLOR-1248	
AROCLOR-1254	
AROCLOR-1260	

All results reported in µg/L (ppb).
 Only detected results are reported.

6000335

AR302813

DELAWARE SAND & GRAVEL
 PESTICIDE/PCB
 DETECTION LIMITS

SAMPLE-ID	TR-2
SAMPLE TYPE	Agencies
COLLECTION DATE	1/23/91
PARAMETER	
ALPHA-BHC	0.20
BETA-BHC	0.20
DELTA-BHC	0.20
GAMMA-BHC (LINDANE)	0.20
HEPTACHLOR	
ALDRIN	0.20
HEPTACHLOR EPOXIDE	0.20
ENDOSULFAN I	0.20
DIELDRIN	0.40
4,4'-DDE	0.40
ENDRIN	0.40
ENDOSULFAN II	0.40
4,4'-DDD	0.40
ENDOSULFAN SULFATE	0.40
4,4'-DDT	0.40
METHOXYCHLOR	2.0
ENDRIN KETONE	0.40
ALPHA-CHLORDANE	2.0
GAMMA-CHLORDANE	2.0
TOXAPHENE	4.0
AROCLOR-1016	2.0
AROCLOR-1221	2.0
AROCLOR-1232	2.0
AROCLOR-1242	2.0
AROCLOR-1248	2.0
AROCLOR-1254	4.0
AROCLOR-1260	4.0

All results reported in µg/L (ppb).
 Detection limits for positive results not reported.

6-000336

AR302814

DELAWARE SAND & GRAVEL
 METAL/CLASSICAL CHEMISTRIES
 ANALYTICAL RESULTS

SAMPLE-ID	TR-2
SAMPLE TYPE	AQUEOUS
COLLECTION DATE	1/23/91
PARAMETER	
ALUMINUM	4710 EN
ANTIMONY	
ARSENIC	30.80
BARIUM	940
BERYLLIUM	1.3013
CADMIUM	4.3013
CALCIUM	20200
CHROMIUM	89.80
COBALT	82.80
COPPER	17.70 B
IRON	279000
LEAD	53.20 NW
MAGNESIUM	11200
MANGANESE	9370
MERCURY	
NICKEL	331
POTASSIUM	4960 B
SELENIUM	1.30 B
SILVER	13.4
SODIUM	13500
THALLIUM	
VANADIUM	
ZINC	354 E
CYANIDE	
TRPH	NA

All results reported in $\mu\text{g/L}$ (ppb).

Only detected results are reported.

NA - Not analyzed

B - Value is less than quantitation limit but greater than instrument detection limit.

N - Spike recovery not within QC limits.

E - Value is estimated due to the presence of interference.

W - Post-digestion spike for furance is out of QC limits.

B-000337

AR302815

DELAWARE SAND & GRAVEL
 METAL/CLASSICAL CHEMISTRIES
 DETECTION LIMITS

SAMPLE-ID	TR-2
SAMPLE TYPE	AQUOUS
COLLECTION DATE	1/23/91
PARAMETER	
ALUMINUM	
ANTIMONY	30.00
ARSENIC	
BARIUM	
BERYLLIUM	
CADMIUM	
CALCIUM	
CHROMIUM	
COBALT	
COPPER	
IRON	
LEAD	
MAGNESIUM	
MANGANESE	
MERCURY	0.40
NICKEL	
POTASSIUM	
SELENIUM	
SILVER	
SODIUM	
THALLIUM	10.00
VANADIUM	2.00
ZINC	
CYANIDE	16.70
TRPH	NA

NA - Not analyzed.

All results reported in µg/L (ppb).

Detection limits for positive results not reported.

6-000338

AR302816

DELAWARE SAND & GRAVEL
AIR MONITORING
ANALYTICAL RESULTS

SAMPLE-ID	AS-3A	AS-10A	AS-24A	AS-36A	AS-54A	AS-60A	AS-72A	AS-73A	AS-84A	AS-90A	AS-91A	AS-92A
SAMPLE TYPE	AIR											
COLLECTION DATE	1/24/91	1/24/91	1/24/91	1/24/91	1/25/91	1/25/91	1/25/91	1/25/91	1/28/91	1/28/91	1/28/91	1/28/91
PARAMETER												
Benzene	NA		NA			NA	NA				NA	
Ethylbenzene	NA		NA			NA	NA				NA	
Total Xylenes	NA		NA			NA	NA				NA	
Toluene		NA		NA	NA			NA		NA		NA

All results reported in mg/m³(ppm).
Only detected results are reported.
NA - Not Analyzed

AR302817 000339

DELAWARE SAND & GRAVEL
AIR MONITORING
DETECTION LIMITS

SAMPLE-ID	AS-3A	AS-10A	AS-24A	AS-36A	AS-54A	AS-60A	AS-72A	AS-73A	AS-84A	AS-90A	AS-91A	AS-92A
SAMPLE TYPE	AIR											
COLLECTION DATE	1/24/91	1/24/91	1/24/91	1/24/91	1/25/91	1/25/91	1/25/91	1/25/91	1/28/91	1/28/91	1/28/91	1/28/91
PARAMETER												
Benzene	NA	0.78	NA	0.84	0.86	NA	NA	0.86	NA	0.86	NA	0.84
Ethylbenzene	NA	0.78	NA	0.84	0.86	NA	NA	0.86	NA	0.86	NA	0.84
Total Xylenes	NA	1.1	NA	1.2	1.3	NA	NA	1.3	NA	1.2	NA	1.2
Toluene	2.9	NA	3.3	NA	NA	3.0	3.1	NA	3.1	NA	3.2	NA

All results reported in mg/m³(ppm).
 Detection limits for positive results not reported.
 NA - Not Analyzed

302818 6-000340

DELAWARE SAND & GRAVEL
AIR MONITORING
ANALYTICAL RESULTS

SAMPLE-ID	AS-8A	AS-40A	AS-59A	AS-67A	AS-89A	AS-95A
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/24/91	1/25/91	1/25/91	1/28/91	1/28/91
PARAMETER						
1,2-Dichloroethane						

All results reported in mg/m³(ppm).
Only detected results are reported.

AR302819

B-000341

DELAWARE SAND & GRAVEL
AIR MONITORING
DETECTION LIMITS

SAMPLE-ID	AS-8A	AS-40A	AS-59A	AS-67A	AS-89A	AS-95A
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/24/91	1/25/91	1/25/91	1/28/91	1/28/91
PARAMETER						
1,2-Dichloroethane	2.1	2.0	2.0	2.0	2.2	2.2

All results reported in mg/m³(ppm).
Detection limits for positive results not reported.

AR302820

B 000342

DELAWARE SAND & GRAVEL
AIR MONITORING
ANALYTICAL RESULTS

SAMPLE-ID	AS-1A	AS-32A	AS-57A	AS-76A	AS-81A	AS-93A
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/24/91	1/25/91	1/25/91	1/28/91	1/28/91
PARAMETER						
Methylethyl Ketone						
Methylisobutyl Ketone						

All results reported in mg/m³(ppm).
Only detected results are reported.

AR302821 B-000343

DELAWARE SAND & GRAVEL
AIR MONITORING
DETECTION LIMITS

SAMPLE-ID	AS-1A	AS-32A	AS-57A	AS-76A	AS-81A	AS-93A
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/24/91	1/25/91	1/25/91	1/28/91	1/28/91
PARAMETER						
Methylethyl Ketone	0.80	0.79	0.85	0.86	0.82	0.83
Methylisobutyl Ketone	0.80	0.79	0.85	0.86	0.82	0.83

All results reported in mg/m³(ppm).
Detection limits for positive results not reported.

AR302822

B000344

DELAWARE SAND & GRAVEL
AIR MONITORING
ANALYTICAL RESULTS

SAMPLE-ID	AS-6C	AS-16C	AS-26C	AS-33C	AS-38C	AS-43C
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/25/91	1/28/91	1/25/91	1/24/91	1/28/91
PARAMETER						
Bis(2-ethylhexyl)phthalate						
Di-n-butylphthalate						

All results reported in mg/m³(ppm).
Only detected results are reported.

AR302823

B-000345

DELAWARE SAND & GRAVEL
AIR MONITORING
DETECTION LIMITS

SAMPLE-ID	AS-6C	AS-16C	AS-26C	AS-33C	AS-38C	AS-43C
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/25/91	1/28/91	1/25/91	1/24/91	1/28/91
PARAMETER						
Bis(2-ethylhexyl)phthalate	0.21	0.20	0.22	0.20	0.20	0.22
Di-n-butylphthalate	0.21	0.20	0.22	0.20	0.20	0.22

All results reported in mg/m³(ppm).
Detection limits for positive results not reported.

AR302824

B-000346

DELAWARE SAND & GRAVEL
AIR MONITORING
ANALYTICAL RESULTS

SAMPLE-ID	AS-6	AS-7	AS-13	AS-15	AS-17	AS-20
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/24/91	1/25/91	1/28/91	1/25/91	1/28/91
PARAMETER						
PCB						

All results reported in mg/m³(ppm).
Only detected results are reported.

AR302825

B-000347

DELAWARE SAND & GRAVEL
AIR MONITORING
DETECTION LIMITS

SAMPLE-ID	AS-6	AS-7	AS-13	AS-15	AS-17	AS-20
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/24/91	1/24/91	1/25/91	1/28/91	1/25/91	1/28/91
PARAMETER						
PCB	0.0026	0.0028	0.0029	0.0028	0.0028	0.0028

All results reported in mg/m³(ppm).
Detection limits for positive results not reported.

AR302826

6-000348

DELAWARE SAND & GRAVEL
AIR MONITORING
ANALYTICAL RESULTS

SAMPLE-ID	AS-13C	AS-20C	AS-27C	AS-31C	AS-35C	AS-36C
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/25/91	1/24/91	1/28/91	1/28/91	1/25/91	1/24/91
PARAMETER						
Arsenic						
Cadmium						
Chromium		0.0023 B	0.0030 B	0.0035 B	0.0029 B	0.0027 B
Cobalt						
Copper		0.0110 B	0.0093 B	0.0088 B	0.0085 B	0.0115 B
Lead						
Nickel						
Selenium						
Tin						
Zinc	0.0025 B	0.0034 B	0.0043 B	0.0036 B	0.0031 B	0.0017 B

All results reported in mg/m³(ppm).

Only detected results are reported.

B - Analyte present in associated method blank.

AR302827

6-000349

DELAWARE SAND & GRAVEL
AIR MONITORING
DETECTION LIMITS

SAMPLE-ID	AS-13C	AS-20C	AS-27C	AS-31C	AS-35C	AS-36C
SAMPLE TYPE	AIR	AIR	AIR	AIR	AIR	AIR
COLLECTION DATE	1/25/91	1/24/91	1/28/91	1/28/91	1/25/91	1/24/91
PARAMETER						
Arsenic	0.0009	0.0008	0.0008	0.0008	0.0009	0.0008
Cadmium	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001
Chromium	0.0041					
Cobalt	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005
Copper	0.0155					
Lead	0.0014	0.0013	0.0014	0.0013	0.0014	0.0013
Nickel	0.0010	0.0010	0.0010	0.0010	0.0010	0.0009
Selenium	0.0019	0.0018	0.0019	0.0018	0.0019	0.0017
Tin	0.0017	0.0016	0.0017	0.0017	0.0017	0.0016
Zinc						

All results reported in mg/m³(ppm).
Detection limits for positive results not reported.

B-000350

AR302828

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
ANALYTICAL RESULTS

SAMPLE-ID	TBC-1/1200	TBC-1/1200 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1800	TBC-1/1800 #	TBC-1/1800
TIME (MINUTES)	15	30	45	15	45	15	45
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
PARAMETER							
PHENOL							
BIS(2-CHLOROETHYL) ETHER							
2-CHLOROPHENOL							
1,3-DICHLOROBENZENE							
1,4-DICHLOROBENZENE							
BENZYL ALCOHOL							
1,2-DICHLOROBENZENE							
2-METHYLPHENOL							
BIS(2-CHLOROISOPROPYL) ETHER							
4-METHYLPHENOL							
N-NITROSO-DI-N-PROPYLAMINE							
HEXACHLOROETHANE							
NITROBENZENE							
ISOPHORONE							
2-NITROPHENOL							
2,4-DIMETHYLPHENOL							
BENZOIC ACID							
BIS(2-CHLOROETHOXY)METHANE							
2,4-DICHLOROPHENOL							
1,2,4-TRICHLOROBENZENE							
NAPHTHALENE							
4-CHLOROANILINE							
HEXACHLOROBUTADIENE							
4-CHLORO-3-METHYLPHENOL							
2-METHYLNAPHTHALENE							
HEXACHLOROCYCLOPENTADIENE							
2,4,6-TRICHLOROPHENOL							
2,4,5-TRICHLOROPHENOL							
2-CHLORONAPHTHALENE							
2-NITROANILINE							
DIMETHYLPHTHALATE							
ACENAPHTHYLENE							
2,6-DINITROTOLUENE							

All results reported in µg/kg (ppb).
Only detected results are reported.
- Sample split with USACE.

000351

AR302829

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
DETECTION LIMITS

SAMPLE-ID	TBC-1/1200		TBC-1/1200 #		TBC-1/1500		TBC-1/1500 #		TBC-1/1800		TBC-1/1800 #	
	15	ASH	30	ASH	15	ASH	30	ASH	15	ASH	30	ASH
TIME (MINUTES)												
SAMPLE TYPE												
COLLECTION DATE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
PARAMETER												
PHENOL	990	990	990	990	990	990	990	990	990	990	990	990
BIS(2-CHLOROETHYL) ETHER	990	990	990	990	990	990	990	990	990	990	990	990
2-CHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
1,3-DICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
1,4-DICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
BENZYL ALCOHOL	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
1,2-DICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
2-METHYLPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
BIS(2-CHLOROISOPROPYL) ETHER	990	990	990	990	990	990	990	990	990	990	990	990
4-METHYLPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
N-NITROSO-DI-N-PROPYLAMINE	990	990	990	990	990	990	990	990	990	990	990	990
HEXACHLOROETHANE	990	990	990	990	990	990	990	990	990	990	990	990
NITROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
ISOPHORONE	990	990	990	990	990	990	990	990	990	990	990	990
2-NITROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
2,4-DIMETHYLPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
BENZOIC ACID	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
BIS(2-CHLOROETHOXYMETHANE	990	990	990	990	990	990	990	990	990	990	990	990
2,4-DICHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
1,2,4-TRICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
NAPHTHALENE	990	990	990	990	990	990	990	990	990	990	990	990
4-CHLOROANILINE	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
HEXACHLOROBTADIENE	990	990	990	990	990	990	990	990	990	990	990	990
4-CHLORO-3-METHYLPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
2-METHYLNAPHTHALENE	990	990	990	990	990	990	990	990	990	990	990	990
HEXACHLOROCYCLOPENTADIENE	990	990	990	990	990	990	990	990	990	990	990	990
2,4,6-TRICHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
2,4,5-TRICHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
2-CHLORONAPHTHALENE	990	990	990	990	990	990	990	990	990	990	990	990
2-NITROANILINE	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
DIMETHYLPHTHALATE	990	990	990	990	990	990	990	990	990	990	990	990
ACENAPHTHYLENE	990	990	990	990	990	990	990	990	990	990	990	990
2,6-DINITROTOLUENE	990	990	990	990	990	990	990	990	990	990	990	990

All results reported in µg/kg (ppb).
Detection limits for positive results not reported.
- Sample split with USACE.

6 000352

AR302830

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
ANALYTICAL RESULTS

SAMPLE-ID	TBC-1/1200	TBC-1/1200 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1800 #	TBC-1/1800	TBC-1/1800
TIME (MINUTES)	15	45	15	30	45	15	30	45	45
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
PARAMETER									
3-NITROANILINE									
ACENAPHTHENE									
2,4-DINITROPHENOL									
4-NITROPHENOL									
DIBENZOFURAN									
2,4-DINITROTOLUENE									
DIETHYLPHTHALATE									
4-CHLOROPHENYL-PHENYL ETHER									
FLUORENE									
4-NITROANILINE									
4,6-DINITRO-2-METHYLPHENOL									
N-NITROSODIPHENYLAMINE									
4-BROMOPHENYL-PHENYL ETHER									
HEXACHLOROBENZENE									
PENTACHLOROPHENOL									
PHENANTHRENE									
ANTHRACENE									
DI-N-BUTYLPHTHALATE	2800 B	690 JB	190 JB	1000 B	410 JB	650 JB	890 J	330 J	
FLUORANTHENE									
PYRENE									
BUTYLBENZYLPHTHALATE									
3,3'-DICHLOROBENZIDINE									
BENZO(A)ANTHRACENE									
CHRYSENE									
BIS(2-ETHYLHEXYL)PHTHALATE									
DI-N-OCTYL PHTHALATE	580 JB	260 JB	350 JB	270 JB	1800 B	620 B	250 J		
BENZO(B)FLUORANTHENE									
BENZO(K)FLUORANTHENE									
BENZO(A)PYRENE									
INDENO(1,2,3-CD)PYRENE									
DIBENZ(A,H)ANTHRACENE									
BENZO(G,H,I)PERYLENE									

J - Indicates the value is less than the quantitation limit but greater than zero.

B - Compound present in associated method blank.

All results reported in µg/kg (ppb).
Only detected results are reported.

- Sample split with USACE.

B 000353

AR302831

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
DETECTION LIMITS

PARAMETER	TMC-1/1200		TMC-1/1200 #		TMC-1/1500		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #	
	15	30	ASH	2/8/91	45	ASH	15	ASH	30	ASH	45	ASH	15	ASH
SAMPLE-ID	TMC-1/1200		TMC-1/1200 #		TMC-1/1500		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #	
TIME (MINUTES)	15	30	ASH	2/8/91	45	ASH	15	ASH	30	ASH	45	ASH	15	ASH
SAMPLE TYPE	TMC-1/1200		TMC-1/1200 #		TMC-1/1500		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #	
COLLECTION DATE	TMC-1/1200		TMC-1/1200 #		TMC-1/1500		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #		TMC-1/1500 #	
3-NITROANILINE	5000	5000	990	2/8/91	5000	990	5000	990	5000	990	5000	990	5000	990
ACENAPHTHENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
2,4-DINITROPHENOL	5000	5000	5000	2/8/91	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
4-NITROPHENOL	5000	5000	5000	2/8/91	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
DIBENZOFURAN	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
2,4-DINITROTOLUENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
DIETHYLPHTHALATE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
4-CHLOROPHENYL-PHENYL ETHER	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
FLUORENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
4-NITROANILINE	5000	5000	5000	2/8/91	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
4,6-DINITRO-2-METHYLPHENOL	5000	5000	5000	2/8/91	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
N-NITROSODIPHENYLAMINE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
4-BROMOPHENYL-PHENYL ETHER	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
HEXACHLOROBENZENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
PENTACHLOROPHENOL	5000	5000	5000	2/8/91	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
PHENANTHRENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
ANTHRACENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
DI-N-BUTYLPHTHALATE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
FLUORANTHENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
PYRENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
BUTYLBENZYLPHTHALATE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
3,3'-DICHLOROBENZIDINE	2000	2000	2000	2/8/91	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
BENZO(A)ANTHRACENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
CHRYSENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
BIS(2-ETHYLHEXYL)PHTHALATE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
DI-N-OCTYL PHTHALATE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
BENZO(B)FLUORANTHENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
BENZO(K)FLUORANTHENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
BENZO(A)PYRENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
INDENO(1,2,3-CD)PYRENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
DIBENZ(A,H)ANTHRACENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990
BENZO(G,H,I)PERYLENE	990	990	990	2/8/91	990	990	990	990	990	990	990	990	990	990

All results reported in µg/kg (ppb).
Detection limits for positive results not reported.
- Sample split with USACE.

B-000354

AR302832

DELAWARE SAND & GRAVEL
PESTICIDE/PCB
ANALYTICAL RESULTS

SAMPLE-ID	TBC-1/1200	TBC-1/1200	TBC-1/1200 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1800	TBC-1/1800 #	TBC-1/1800	TBC-1/1800 #
TIME (MINUTES)	15	30	45	15	30	45	15	30	45	15	30
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
PARAMETER											
ALPHA-BHC											
BETA-BHC											
DELTA-BHC											
GAMMA-BHC (LINDANE)											
HEPTACHLOR											
ALDRIN											
HEPTACHLOR EPOXIDE											
ENDOSULFAN I											
DIELDRIN											
4,4'-DDE											
ENDRIN											
ENDOSULFAN II											
4,4'-DDD											
ENDOSULFAN SULFATE											
4,4'-DDT											
METHOXYCHLOR											
ENDRIN KETONE											
ALPHA-CHLORDANE											
GAMMA-CHLORDANE											
TOXAPHENE											
AROCLOR-1016											
AROCLOR-1221											
AROCLOR-1232											
AROCLOR-1242											
AROCLOR-1248											
AROCLOR-1254											
AROCLOR-1260											

All results reported in µg/kg (ppb).
Only detected results are reported.
- Sample split with USACE.

B 000353

AR302833

DELAWARE SAND & GRAVEL
PESTICIDE/PCB
DETECTION LIMITS

SAMPLE-ID	TBC-1/1200		TBC-1/1500		TBC-1/1200 #		TBC-1/1500 #		TBC-1/1500		TBC-1/1500 #		TBC-1/1500		TBC-1/1500 #		TBC-1/1500		
	15	30	15	30	45	ASH	2/8/91	45	ASH	2/8/91	30	ASH	2/8/91	45	ASH	2/8/91	15	ASH	2/8/91
TIME (MINUTES)	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
SAMPLE TYPE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
COLLECTION DATE																			
PARAMETER																			
ALPHA-BHC	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
BETA-BHC	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
DELTA-BHC	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
GAMMA-BHC (LINDANE)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
HEPTACHLOR	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ALDRIN	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
HEPTACHLOR EPOXIDE	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ENDOSULFAN I	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
DIELDRIN	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
4,4'-DDE	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
ENDRIN	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
ENDOSULFAN II	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
4,4'-DDD	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
ENDOSULFAN SULFATE	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
4,4'-DDT	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
METHOXYCHLOR	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
ENDRIN KETONE	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
ALPHA-CHLORDANE	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
GAMMA-CHLORDANE	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
TOXAPHENE	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510	510
AROCLOR-1016	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
AROCLOR-1221	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
AROCLOR-1232	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201
AROCLOR-1242	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
AROCLOR-1248	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
AROCLOR-1254	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
AROCLOR-1260	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99

All results reported in µg/kg (ppb).
Detection limits for positive results not reported.
- Sample split with USACE.

AR302834

B-000356

DELAWARE SAND & GRAVEL
TOTAL METAL
ANALYTICAL RESULTS

SAMPLE-ID	TBC-1/1200		TBC-1/1200 #		TBC-1/1500		TBC-1/1500 #		TBC-1/1800		TBC-1/1800 #	
	15	30	ASH	2/8/91	45	ASH	15	ASH	30	ASH	45	ASH
TIME (MINUTES)												
SAMPLE TYPE	ASH	ASH	ASH	2/8/91	ASH	2/8/91	ASH	2/8/91	ASH	2/8/91	ASH	2/8/91
COLLECTION DATE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
PARAMETER												
ARSENIC	6.8	8.4			5.7	6.9	4.8					
BARIUM	106	133		78.1	125	94.0	125		0.80 B		0.54 B	
CADMIUM	1.6	1.7		1.0	1.7	1.2	1.2		50.6		34.6	
CHROMIUM	66.6	71.6		21.6	35.8	30.1	26.6		4.2		3.9	
LEAD	12.9	12.6		7.7	15.6	6.7	10.0		0.93		0.52	
MERCURY												
SELENIUM												
SILVER												

All results reported in mg/kg (ppm).
Only detected results are reported.

B - Indicates value is less than the quantitation limit
but greater than zero.

- Sample split with USACE.

AR302835

6000357

DELAWARE SAND & GRAVEL
TOTAL METAL
DETECTION LIMITS

SAMPLE-ID	TBC-1/1200	TBC-1/1200 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1800	TBC-1/1800 #	TBC-1/1800	TBC-1/1800
TIME (MINUTES)	15	30	45	30	45	15	30	45	30	45
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
PARAMETER										
ARSENIC			0.22							
BARIUM									0.48	
CADMIUM										
CHROMIUM										
LEAD										
MERCURY	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
SELENIUM	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
SILVER	0.50	0.49	0.50	0.49	0.50	0.49	0.48	0.49	0.48	0.48

All results reported in mg/kg (ppm).
Detection limits for positive results not reported.
- Sample split with USACE.

AR302836

B-000358

DELAWARE SAND & GRAVEL

TCLP METAL

ANALYTICAL RESULTS

SAMPLE-ID TIME (MINUTES)	TBC-1/1200	TBC-1/1200 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1500	TBC-1/1500 #	TBC-1/1800	TBC-1/1800
	15 ASH	30 ASH	15 ASH	30 ASH	45 ASH	15 ASH	30 ASH	45 ASH	30 ASH	45 ASH
COLLECTION DATE	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91	2/8/91
PARAMETER										
ARSENIC		3.2 B		6.8 B		5.9 B	6.7 B		10.5	27.6
BARIUM	282	202	180 B	262	244	318	318	402	282	25.3
CADMIUM										
CHROMIUM		8.6 B	46.1			8.9 B	7.3 B			
LEAD										
MERCURY										
SELENIUM										
SILVER										

All results reported in ug/L (ppb).
Only detected results are reported.

B - Indicates value is less than the quantitation limit
but greater than zero.

- Sample split with USACE.

AR302837

B-000359

DELAWARE SAND & GRAVEL
 TCLP METAL
 DETECTION LIMITS

SAMPLE-ID TIME (MINUTES)	TBC-1/1200		TBC-1/1500		TBC-1/1800 #		TBC-1/1900		TBC-1/1900 #	
	15	30	45	15	30	45	15	30	45	15
SAMPLE TYPE	ASH		ASH		ASH		ASH		ASH	
COLLECTION DATE	2/8/91		2/8/91		2/8/91		2/8/91		2/8/91	
PARAMETER										
ARSENIC	2.2									
BARIUM			5.0		5.0		5.0		5.0	
CADMIUM	5.0		6.5		6.5		6.5		6.5	
CHROMIUM	11.6		11.6		11.6		11.6		11.6	
LEAD	11.6		11.6		11.6		11.6		11.6	
MERCURY	0.1		0.1		0.1		0.1		0.1	
SELENIUM	2.1		2.1		2.1		2.1		2.1	
SILVER	5.0		5.0		5.0		5.0		5.0	

All results reported in ug/L (ppb).
 Detection limits for positive results not reported.
 # - Sample split with USACE.

AR302838

B-000360

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
ANALYTICAL RESULTS

SAMPLE-ID	TTC-1/1/200	TTC-1/1/200 #	TTC-1/1/200 @	TTC-1/1/500 #	TTC-1/1/500 @	TTC-1/1/500 #	TTC-1/1/500 @	TTC-1/1/500 #	TTC-1/1/500 @	TTC-1/1/1800 #	TTC-1/1/1800 @
TIME (MINUTES)	15	30	45	30	45	30	45	30	45	15	30
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91
PARAMETER											
PHENOL	5600				1600						
BIS(2-CHLOROETHYL) ETHER											
2-CHLOROPHENOL											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
BENZYL ALCOHOL											
1,2-DICHLOROBENZENE											
2-METHYLPHENOL	5000				99 J						
BIS(2-CHLOROISOPROPYL) ETHER											
4-METHYLPHENOL	530 J										
N-NITROSO-DI-N-PROPYLAMINE											
HEXACHLOROETHANE											
NITROBENZENE											
ISOPHORONE											
2-NITROPHENOL											
2,4-DIMETHYLPHENOL											
BENZOIC ACID											
BIS(2-CHLOROETHOXY)METHANE											
2,4-DICHLOROPHENOL											
1,2,4-TRICHLOROBENZENE	270 J				600 J					24 J	
NAPHTHALENE											
4-CHLOROANILINE											
HEXACHLOROBUTADIENE											
4-CHLORO-3-METHYLPHENOL											
2-METHYLNAPHTHALENE											
HEXACHLOROCYCLOPENTADIENE											
2,4,6-TRICHLOROPHENOL											
2,4,5-TRICHLOROPHENOL	110 J				400 J						
2-CHLORONAPHTHALENE											
2-NITROANILINE											
DIMETHYLPHTHALATE											
ACENAPHTHYLENE											
2,6-DINITROTOLUENE											

J - Indicates the value is less than the quantitation limit but greater than zero.
@ - Results calculated with holding times exceeded.

All results reported in µg/kg (ppb).
Only detected results are reported.
- Sample split with USACE.

16-000361

AR302839

DELAWARE SAND & GRAVEL
SEMIVOLATILE ORGANIC COMPOUND
DETECTION LIMITS

SAMPLE ID	TTC-1/1200		TTC-1/1200 #		TTC-1/1500 ●		TTC-1/1500 #		TTC-1/1500 @		TTC-1/1800	
	15	30	45	ASH	15	ASH	30	ASH	15	ASH	30	ASH
PARAMETER	2/6/91		2/6/91		2/6/91		2/6/91		2/6/91		2/6/91	
PHENOL		990		990		990		990		990		990
BIS(2-CHLOROETHYL) ETHER	990	990	990	990	990	990	990	990	990	990	990	990
2-CHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
1,3-DICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
1,4-DICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
BENZYL ALCOHOL	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
1,2-DICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
2-METHYLPHENOL		990		990		990		990		990		990
BIS(2-CHLOROISOPROPYL) ETHER	990	990	990	990	990	990	990	990	990	990	990	990
4-METHYLPHENOL		990		990		990		990		990		990
N-NITROSO-DI-N-PROPYLAMINE	990	990	990	990	990	990	990	990	990	990	990	990
HEXACHLOROETHANE	990	990	990	990	990	990	990	990	990	990	990	990
NITROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
ISOPHORONE	990	990	990	990	990	990	990	990	990	990	990	990
2-NITROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
2,4-DIMETHYLPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
BENZOIC ACID	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
BIS(2-CHLOROETHOXY)METHANE	990	990	990	990	990	990	990	990	990	990	990	990
2,4-DICHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
1,2,4-TRICHLOROBENZENE	990	990	990	990	990	990	990	990	990	990	990	990
NAPHTHALENE		990		990		990		990		990		990
4-CHLOROANILINE	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
HEXACHLOROBUTADIENE	990	990	990	990	990	990	990	990	990	990	990	990
4-CHLORO-3-METHYLPHENOL	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
2-METHYLNAPHTHALENE	990	990	990	990	990	990	990	990	990	990	990	990
HEXACHLOROCYCLOPENTADIENE	990	990	990	990	990	990	990	990	990	990	990	990
2,4,6-TRICHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
2,4,5-TRICHLOROPHENOL	990	990	990	990	990	990	990	990	990	990	990	990
2-CHLORONAPHTHALENE	990	990	990	990	990	990	990	990	990	990	990	990
2-NITROANILINE	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
DIMETHYLPHTHALATE	990	990	990	990	990	990	990	990	990	990	990	990
ACENAPHTHYLENE	990	990	990	990	990	990	990	990	990	990	990	990
2,6-DINITROTOLUENE	990	990	990	990	990	990	990	990	990	990	990	990

- Sample split with USACE.

All results reported in µg/kg (ppb).

Detection limits for positive results not reported.

⊙ - Results calculated with holding times exceeded.

6-000362

AR302840

DELAWARE SAND & GRAVEL
SEMI-VOLATILE ORGANIC COMPOUND
DETECTION LIMITS

SAMPLE-ID	TTC-1/1200		TTC-1/1200 #		TTC-1/1500 ●		TTC-1/1500 #												
	15	ASH	30	ASH	15	ASH	30	ASH	15	ASH	30	ASH	15	ASH	30	ASH	15	ASH	
TIME (MINUTES)	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91
SAMPLE TYPE	ASH																		
COLLECTION DATE	2/6/91																		
PARAMETER																			
3-NITROANILINE	5000		5000		5000		5000		5000		5000		5000		5000		5000		5000
ACENAPHTHENE	990		990		990		990		990		990		990		990		990		990
2,4-DINITROPHENOL	5000		5000		5000		5000		5000		5000		5000		5000		5000		5000
4-NITROPHENOL	5000		5000		5000		5000		5000		5000		5000		5000		5000		5000
DIBENZOFURAN	990		990		990		990		990		990		990		990		990		990
2,4-DINITROTOLUENE	990		990		990		990		990		990		990		990		990		990
DIETHYLPHTHALATE	990		990		990		990		990		990		990		990		990		990
4-CHLOROPHENYL-PHENYL ETHER	990		990		990		990		990		990		990		990		990		990
FLUORENE	990		990		990		990		990		990		990		990		990		990
4-NITROANILINE	5000		5000		5000		5000		5000		5000		5000		5000		5000		5000
4,6-DINITRO-2-METHYLPHENOL	5000		5000		5000		5000		5000		5000		5000		5000		5000		5000
N-NITROSODIPHENYLAMINE	990		990		990		990		990		990		990		990		990		990
4-BROMOPHENYL-PHENYL ETHER	990		990		990		990		990		990		990		990		990		990
HEXACHLOROBENZENE	990		990		990		990		990		990		990		990		990		990
PENTACHLOROPHENOL	5000		5000		5000		5000		5000		5000		5000		5000		5000		5000
PHENANTHRENE	990		990		990		990		990		990		990		990		990		990
ANTHRACENE	990		990		990		990		990		990		990		990		990		990
DI-N-BUTYLPHTHALATE	990		990		990		990		990		990		990		990		990		990
FLUORANTHENE	990		990		990		990		990		990		990		990		990		990
PYRENE	990		990		990		990		990		990		990		990		990		990
BUTYLBENZYLPHTHALATE	990		990		990		990		990		990		990		990		990		990
3,3'-DICHLOROBENZIDINE	2000		2000		2000		2000		2000		2000		2000		2000		2000		2000
BENZO(A)ANTHRACENE	990		990		990		990		990		990		990		990		990		990
CHRYSENE	990		990		990		990		990		990		990		990		990		990
BIS(2-ETHYLHEXYL)PHTHALATE	990		990		990		990		990		990		990		990		990		990
DI-N-OCTYL PHTHALATE	990		990		990		990		990		990		990		990		990		990
BENZO(B)FLUORANTHENE	990		990		990		990		990		990		990		990		990		990
BENZO(K)FLUORANTHENE	990		990		990		990		990		990		990		990		990		990
BENZO(A)PYRENE	990		990		990		990		990		990		990		990		990		990
INDENO(1,2,3-CD)PYRENE	990		990		990		990		990		990		990		990		990		990
DIBENZ(A,H)ANTHRACENE	990		990		990		990		990		990		990		990		990		990
BENZO(G,H,I)PERYLENE	990		990		990		990		990		990		990		990		990		990

- Sample split with USACE.

All results reported in µg/kg (ppb).

Detection limits for positive results not reported.

● - Results calculated with holding times exceeded.

AR302842

5000364

DELAWARE SAND & GRAVEL
PESTICIDE/PCB
ANALYTICAL RESULTS

SAMPLE-ID	TTC-1/1200	TTC-1/1200	TTC-1/1200 #	TTC-1/1500	TTC-1/1500 #	TTC-1/1500	TTC-1/1500 #	TTC-1/1800	TTC-1/1800 #	TTC-1/1800
TIME (MINUTES)	15	30	45	15	30	45	15	30	45	15
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91
PARAMETER										
ALPHA-BHC										
BETA-BHC										
DELTA-BHC										
GAMMA-BHC (LINDANE)										
HEPTACHLOR										
ALDRIN										
HEPTACHLOR EPOXIDE										
ENDOSULFAN I										
DIELDRIN										
4,4'-DDE										
ENDRIN										
ENDOSULFAN II										
4,4'-DDD										
ENDOSULFAN SULFATE										
4,4'-DDT										
METHOXYCHLOR										
ENDRIN KETONE										
ALPHA-CHLORDANE										
GAMMA-CHLORDANE										
TOXAPHENE										
AROCLOR-1016										
AROCLOR-1221										
AROCLOR-1232										
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
	5350 P	34		204 *P						

All results reported in µg/kg (ppb).
Only detected results are reported.
- Sample split with USACE.

* - Retention times matched to standard; although, pattern is not clearly defined.
P - Compound concentration estimated due to surrogate outliers.

AR302843

000365

DELAWARE SAND & GRAVEL
PESTICIDE/PCB
DETECTION LIMITS

SAMPLE-ID TIME (MINUTES)	TTC-1/1200		TTC-1/1200 #		TTC-1/1500		TTC-1/1500 #		TTC-1/1500		TTC-1/1800		TTC-1/1800 #	
	15	ASH	45	ASH	15	ASH	30	ASH	45	ASH	15	ASH	30	ASH
COLLECTION DATE	2/6/91		2/6/91		2/6/91		2/6/91		2/6/91		2/6/91		2/6/91	
PARAMETER														
ALPHA-BHC	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
BETA-BHC	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
DELTA-BHC	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
GAMMA-BHC (LINDANE)	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
HEPTACHLOR	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
ALDRIN	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
HEPTACHLOR EPOXIDE	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
ENDOSULFAN I	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
DIELDRIN	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
4,4'-DDE	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
ENDRIN	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
ENDOSULFAN II	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
4,4'-DDD	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
ENDOSULFAN SULFATE	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
4,4'-DDT	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
METHOXYCHLOR	510 P	50	51	51	101 P	50	50	50	51	50	50	51	50	50
ENDRIN KETONE	99 P	10	10	10	20 P	10	10	10	10	10	10	10	10	10
ALPHA-CHLORDANE	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
GAMMA-CHLORDANE	51 P	5	5	5	10 P	5	5	5	5	5	5	5	5	5
TOXAPHENE	5100 P	497	510	510	1006 P	502	502	502	510	496	496	509	496	496
AROCLOR-1016	990 P	96	99	99	195 P	97	97	97	100	96	96	99	96	96
AROCLOR-1221	990 P	96	99	99	195 P	97	97	97	100	96	96	99	96	96
AROCLOR-1232	2010 P	196	201	201	396 P	198	198	198	201	196	196	201	196	196
AROCLOR-1242	990 P	96	99	99	195 P	97	97	97	100	96	96	99	96	96
AROCLOR-1248	990 P	96	99	99	195 P	97	97	97	100	96	96	99	96	96
AROCLOR-1254	990 P	96	99	99	195 P	97	97	97	100	96	96	99	96	96
AROCLOR-1260	990 P	96	99	99	195 P	97	97	97	100	96	96	99	96	96

All results reported in µg/kg (ppb).

Detection limits for positive results not reported.

- Sample split with USACE.

P - Compound concentration estimated due to surrogate outliers.

AR302844

8000366

DELAWARE SAND & GRAVEL

TOTAL METAL

ANALYTICAL RESULTS

SAMPLE-ID	TTC-1/1200		TTC-1/1200 #		TTC-1/1500		TTC-1/1500 #		TTC-1/1800		TTC-1/1800 #	
	TIME (MINUTES)	ASH	30	45	15	ASH	30	ASH	15	ASH	30	ASH
COLLECTION DATE	2/6/91		2/6/91		2/6/91		2/6/91		2/6/91		2/8/91	
PARAMETER												
ARSENIC	4.0			6.2	5.4		4.9		7.0		3.6	9.4
BARIUM	108		128	142	197		158		194		85.6	108
CADMIUM	2.2		2.8	2.6	4.1		4.6		4.4			0.74
CHROMIUM	29.6		45.5	37.5	55.3		43.6		46.8		11.8	16.3
LEAD	49.8		69.5	47.0	94.1		83.9		48.1		6.2	9.8
MERCURY	0.3											
SELENIUM												
SILVER												

All results reported in mg/kg (ppm).

Only detected results are reported.

- Sample split with USACE.

AR302845

0000367

DELAWARE SAND & GRAVEL
 TOTAL METAL
 DETECTION LIMITS

SAMPLE-ID	TTC-1/1200	TTC-1/1200	TTC-1/1200 #	TTC-1/1500	TTC-1/1500 #	TTC-1/1500	TTC-1/1500 #	TTC-1/1900	TTC-1/1900 #	TTC-1/1900
TIME (MINUTES)	15	30	45	15	30	45	15	30	45	45
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/8/91	2/8/91	2/8/91
PARAMETER										
ARSENIC		0.22				0.22				
BARIUM								0.48		
CADMIUM										
CHROMIUM										
LEAD										
MERCURY		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
SELENIUM	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
SILVER	0.50	0.49	0.50	0.50	0.49	0.50	0.49	0.48	0.48	0.50

All results reported in mg/kg (ppm).
 Detection limits for positive results not reported.
 # - Sample split with USACE.

AR302846

6000368

DELAWARE SAND & GRAVEL

TCLP METAL

ANALYTICAL RESULTS

SAMPLE-ID	TTC-1/1200	TTC-1/1200	TTC-1/1200 #	TTC-1/1500	TTC-1/1500 #	TTC-1/1500	TTC-1/1500 #	TTC-1/1800	TTC-1/1800 #
	15	30	45	15	30	45	15	30	45
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/8/91	2/8/91
PARAMETER									
ARSENIC		5.7 B	7.6 B		4.6 B	5.2 B	6.6 B	8.5 B	4.6 B
BARIUM	499	219	235	829	468	364	172 B	109 B	123 B
CADMIUM	23.7	12.5		44.9	7.4				
CHROMIUM									
LEAD	76.8	20.1		44.2		14.9	21.9	25.1	
MERCURY									
SELENIUM									
SILVER									

All results reported in ug/L (ppb).
 Only detected results are reported.
 # - Sample split with USACE.

B - Indicates the value is less than the quantitation limit
 but greater than zero.

AR302847

B-000369

DELAWARE SAND & GRAVEL
 TCLP METAL
 DETECTION LIMITS

SAMPLE-ID	TTC-1/1200		TTC-1/1200 #		TTC-1/1500		TTC-1/1500 #		TTC-1/1800		TTC-1/1800 #	
	15	30	45	ASH	15	30	45	ASH	15	30	45	ASH
TIME (MINUTES)												
SAMPLE TYPE	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH	ASH
COLLECTION DATE	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/6/91	2/8/91	2/8/91	2/8/91
PARAMETER												
ARSENIC	2.2				2.2							
BARIUM												
CADMIUM		6.5	6.5	6.5		5.0	5.0	5.0		5.0	5.0	5.0
CHROMIUM	6.5				6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
LEAD						11.6	11.6	11.6				
MERCURY	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
SELENIUM	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
SILVER	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

All results reported in ug/L (ppb).
 Detection limits for positive results not reported.
 # - Sample split with USACE.

AR302848

B-000370

QUALITY CONTROL DATA

AR302849

TABLE B-1

SAMPLE DELIVERY GROUPS (SDG)

SDG #**	Sample ID	Associated QC Sample ID **
3193	SDD-2, SDD-3, TP-1-1, TP-2-1, UR-1, UR-2, UR-3, UR-4, UR-6 and UR-7	UR-2 Field Dup.
3210/3215	SDR-1, SDR-2, TP-3-1, TP-3-2, TP-3-3, TP-4-1, TP-4-2, TP-4-3, UR-5, UR-8 <u>through</u> UR-21, and UR-23	UR-9 Field Dup., UR-11-MS/MSD, UR-18-MS/MSD, and UR-23 Field Dup.
3238	SDD-1, SDD-5, SDR-3, TP-2-2, TP-5-1, TP-5-2, TP-6-1, TP-6-2, UR-22, and UR-24 <u>through</u> UR-46	TP-6-1 Field Dup., TP-6-2-MS/MSD, UR-27 Field Dup., UR-29-MS/MSD, UR-36-MS/MSD, UR-43 Field Dup., and UR-44-MS/MSD
3338	UD-18-10, UD-18-11, UD-18-12, UD-23-10, and UD-23-12	None
3368	UD-6-10, UD-6-11, UD-6-12, UD-21-11, UD-21-12, and UD-21-13	None
3385	UD-16A-9, UD-16A-10, UD-16A-11, UD-17-9, UD-17-10, UD-17-11, UD-19-8, UD-19-10, UD-19-13, UD-30-10, UD-30-12, and UD-30-13	None
3471	UD-7-10, UD-7-11, UD-7-12, UD-11A-11, UD-11A-12, UD-11A-13, UD-26-8, UD-26-9, UD-26-10, UD-26-10B, UD-27-9, UD-27-10, and UD-27-15	UD-7-10-MS/MSD, UD-7-11 Field Dup., UD-7-12-MS/MSD, UD-11A-11 Field Dup., UD-11A-12-MS/MSD, UD-11A-13 Field Dup., UD-26-8 Field Dup., UD-26-9-MS/MSD, UD-26-10 Field Dup., UD-26-10B-MS/MSD, UD-27-9 Field Dup., UD-27-10-MS/MSD, and UD-27-15
3491	UD-14-8, UD-14-9, UD-14-10, UD-28-8, UD-28-9, and UD-28-10	UD-14-8 Field Dup., UD-14-9-MS/MSD, UD-14-10 Field Dup., UD-28-8-MS/MSD, UD-28-9 Field Dup., and UD-28-10-MS/MSD
3505	UD-13-8, UD-13-10, UD-13-11, UD-20-10, UD-20-11, and UD-20-12	None

AR302850

TABLE B-1 (Continued)

SDG #**	Sample ID	Associated QC Sample ID **
3520	UD-2-8, UD-2-9, UD-2-12, UD-5-7, UD-5-11, and UD-5-12	None
3615	UD-3-10, UD-3-13, UD-3-14, UD-4-10, UD-4-12, and UD-4-16	None
3616	DW-1	DW-1 Dup., RB-1 and TB-1
3617	GT-1 <u>through</u> GT-24	Not Applicable
3620	UD-9-8, UD-9-9, UD-15A-6, UD-15A-8, UD-25-9, and UD-25-10	None
3676/3677	DC-1, DC-2, DW-2	DC-1-MS/MSD
3678	BC-5-1 <u>through</u> BC-5-6, BC-6-1 <u>through</u> BC-6-6, BC-7-1 <u>through</u> BC-7-6, BC-8-1 <u>through</u> BC-8-6, BC-9-1, BC-9-2, BC-10-1, and BC-10-2	BD-5-2 Dup., BC-6-1-MS/MSD, BC-6-3 Dup., BC-6-4-MS/MSD, BC-7-2-MS/MSD, and BC-7-3 Dup.
4875	TR-2	None
5013/5345	TTC-1	TTC-1 Dup., TTC-1-MS/MSD
5014	TBR-1 (14'), TBR-1 (24'), TBR-1 (34'), TBR-3 (13'), TBR-3 (23') and TBR-3 (33')	None
5037/5345	TBC-1	TBC-1 Dup., TBC-1-MS/MSD
12728	(TBC and TTC) -1/1200/15, -1/1200/30, -1/1200/45, -1/1500/15, -1/1500/30, -1/1500/45, -1/1800/15, -1/1800/30, -1/1800/45	6 Samples sent to USACE as Duplicates
11913/12583	Air Monitoring Samples (Stage 1 and 2)	None

NOTES:

- * Corresponds to laboratory report numbers.
 ** URS designated QC (lab QC not included on Table A-1 but located within associated data packages).

AR302851

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: TP-6-2 Level: (low/med) MEDPF
5/30/91

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	9330	0	11400	122	59-172
Trichloroethene	9330	0	8940	96	62-137
Benzene	9330	2820	12300	102	66-142
Toluene	9330	1570	12900	121	59-139
Chlorobenzene	9330	0	9980	107	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	9330	11300	121	1	22 59-172
Trichloroethene	9330	8880	95	1	24 62-137
Benzene	9330	12700	106	-4	21 66-142
Toluene	9330	12700	119	2	21 59-139
Chlorobenzene	9330	10100	108	-1	21 60-133

* Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limitsSpike Recovery: 0 out of 10 outside limitsCOMMENTS: URS TP-6-1
INST:D SWL#3238.42 4

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: TP-6-2 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	17100	0	12600	74	26-90
2-Chlorophenol	17100	0	13400	78	25-102
1,4-Dichlorobenzene	8540	0	7260	85	28-104
N-Nitroso-di-n-prop.(1)	8540	0	7210	84	41-126
1,2,4-Trichlorobenzene	8540	0	7470	87	38-107
4-Chloro-3-methylphenol	17100	0	14600	85	26-103
Acenaphthene	8540	0	6830	80	31-137
4-Nitrophenol	17100	0	13700	80	11-114
2,4-Dinitrotoluene	8540	0	7510	88	28-89
Pentachlorophenol	17100	0	17100	100	17-109
Pyrene	8540	0	9310	109	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	17100	12100	71	4	35 26-90
2-Chlorophenol	17100	12500	73	7	50 25-102
1,4-Dichlorobenzene	8540	6830	80	6	27 28-104
N-Nitroso-di-n-prop.(1)	8540	6620	78	7	38 41-126
1,2,4-Trichlorobenzene	8540	7210	84	4	23 38-107
4-Chloro-3-methylphenol	17100	14500	85	0	33 26-103
Acenaphthene	8540	6490	76	5	19 31-137
4-Nitrophenol	17100	14300	84	-5	50 11-114
2,4-Dinitrotoluene	8540	6450	76	15	47 28-89
Pentachlorophenol	17100	16700	98	2	47 17-109
Pyrene	8540	8920	104	5	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 11 outside limits
 Spike Recovery: 0 out of 22 outside limits

COMMENTS: TP-6-2 URS
 INST:F SWL#3238.37

B-000372

AR302853

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: TP-6-2 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	68.2	0	0	0 *	46-127
Heptachlor	68.2	0	0	0 *	35-130
Aldrin	68.2	0	0	0 *	34-132
Dieldrin	170	0	0	0 *	31-134
Endrin	170	0	0	0 *	42-139
4,4'-DDT	170	0	0	0 *	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	68.2	0	0 *	0	50 46-127
Heptachlor	68.2	0	0 *	0	31 35-130
Aldrin	68.2	0	0 *	0	43 34-132
Dieldrin	170	0	0 *	0	38 31-134
Endrin	170	0	0 *	0	45 42-139
4,4'-DDT	170	0	0 *	0	50 23-134

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 6 outside limits
 Spike Recovery: 12 out of 12 outside limits

COMMENTS: The spike compounds were not found due to matrix interference and dilution of the MS and MSD.

B-000373
8/87 Rev.

FORM III PEST-2

AR302854

AMERICAN ANALYTICAL & TECHNICAL SERVICES
MATRIX SPIKE EVALUATION FORM

URS

SAMPLE ID TP-6-2MS

NET WT. 10.0

	ng added	amount in spl. ppt	amount added ppt	amount detected ppt	% recovery	TARGET recovery limits
2378 TCDF	2.5	0	250	351.8	141.1	60 - 140 %
HPCDF	10	0	1000	1371.0	137	60 - 140 %
OCDF	25	0	2500	2763.6	111	60 - 140 %
2378 TCDD	2.5	0	250	275.9	110	60 - 140 %
PCDD	10	0	1000	1115.4	112	60 - 140 %
HXCDD	10	0	1000	1157.2	116	60 - 140 %

DUPLICATE SAMPLE EVALUATION

SAMPLE ID	TP-6-2MS	TP-6-2MSD	
NET WT.	10.0	10.0	
	amount in spl. ppt	amount in spl. ppt	RPD
2378 TCDF	351.8	373.7	6.0
HPCDF	1371.0	1628.1	17.1
OCDF	2763.6	2993.2	8.0
2378 TCDD	275.9	241.3	13.4
PCDD	1115.4	1067.7	4.4
HXCDD	1157.2	1120.6	3.2

B-000374

AR302855

AMERICAN ANALYTICAL & TECHNICAL SERVICES

MATRIX SPIKE EVALUATION FORM

URS						

SAMPLE ID		TP-3-IMS				

NET WT.		10.0				

	ng added	amount in spl. ppt	amount added ppt	amount detected ppt	% recovery	TARGET recovery limits
2378 TCDF	2.5	0	250	314.5	126	60 - 140 %
HPCDF	10	0	1000	1163.1	116	60 - 140 %
OCDF	25	0	2500	2899.4	116	60 - 140 %
2378 TCDD	2.5	0	250	277.8	111	60 - 140 %
PCDD	10	0	1000	1104.9	110	60 - 140 %
HXCDD	10	0	1000	1540.5	154*	60 - 140 %

DUPLICATE SAMPLE EVALUATION

SAMPLE ID	TP-3-IMS	TP-3-IMSD	

NET WT.	10.0	10.0	

	amount in spl. ppt	amount in spl. ppt	RPD
2378 TCDF	314.5	226.7	32.4
HPCDF	1163.1	1176.4	1.1
OCDF	2899.4	3086.6	6.3
2378 TCDD	277.8	424.3	41.7
PCDD	1104.9	1118.6	1.2
HXCDD	1540.5	1471.8	4.6

B-000375

AR302856

MATRIX SPIKE EVALUATION FORM

URS

SAMPLE ID TP-3-1MSD

WET WT. 10.0

	amount added	amount in spl. ppt	amount added ppt	amount detected ppt	% recovery	TARGET recovery limits
2378 TCDF	2.5	0	250	226.7	91	60 - 140 %
HPCDF	10	0	1000	1176.4	118	60 - 140 %
OCDF	25	0	2500	3086.6	123	60 - 140 %
2378 TCDD	2.5	0	250	424.3	170†	60 - 140 %
PCDD	10	0	1000	1118.6	112	60 - 140 %
HXCDD	10	0	1000	1471.8	147†	60 - 140 %

DUPLICATE SAMPLE EVALUATION

SAMPLE ID	TP-3-1MS	TP-3-1MSB	RPD
WET WT.	10.0	10.0	
	amount in spl. ppt	amount in spl. ppt	
2378 TCDF	314.5	226.7	32.4
HPCDF	1163.1	1176.4	1.1
OCDF	2899.4	3086.6	6.3
2378 TCDD	277.8	424.3	41.7
PCDD	1104.9	1118.6	1.2
HXCDD	1540.5	1471.8	4.6

B-000376

AR302857

MATRIX SPIKE EVALUATION FORM

URS

SAMPLE ID TP-6-2MSD

WET WT. 10.0

	ng added	amount in spl. ppt	amount added ppt	amount detected ppt	% recovery	TARGET recovery limits
2378 TCDF	2.5	0	250	373.7	149%	60 - 140 %
HPCDF	10	0	1000	1628.1	163%	60 - 140 %
OCDF	25	0	2500	2993.2	120	60 - 140 %
2378 TCDD	2.5	0	250	241.3	97	60 - 140 %
PCDD	10	0	1000	1067.7	107	60 - 140 %
HXCDD	10	0	1000	1120.6	112	60 - 140 %

DUPLICATE SAMPLE EVALUATION

SAMPLE ID TP-6-2MS TP-6-2MSD

WET WT. 10.0 10.0

	amount in spl. ppt	amount in spl. ppt	RPD
2378 TCDF	351.8	373.7	6.0
HPCDF	1371.0	1628.1	17.1
OCDF	2763.6	2993.2	8.0
2378 TCDD	275.9	241.3	13.4
PCDD	1115.4	1067.7	4.4
HXCDD	1157.2	1120.6	3.2

B-000377

AR302858

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU3837D

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089 TP 6-2

Lab Code: SWOK Case No.: 32381 SAS No.: SDG No.: MU3801

Matrix (water/soil): SOIL Level (low/med): LOW

% Solids for Sample: 41.7 % Solids for Duplicate: 51.1

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

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	%RPD	QIM
Aluminum		29762.9590	37191.9370	22.2	*IP
Antimony	28.5	79.0829	53.3225	38.9	IP
Arsenic		2.7257	4.0886	40.0	IF
Barium	95.0	258.1931	331.4555	24.8	IP
Beryllium		1.7905	2.1132	16.5	IP
Cadmium	2.4	6.4959	6.2730	3.5	IP
Calcium		944.3550	995.7738	5.3	IP
Chromium		133.0927	173.0695	26.1	*IP
Cobalt		22.1395	22.7933	2.9	IP
Copper		81.3416	70.9173	13.7	IP
Iron		111226.4700	74566.3710	39.5	*IP
Lead		660.0624	631.9645	4.3	IF
Magnesium		1222.7184	1428.4788	15.5	IP
Manganese		729.3603	806.9240	10.1	IP
Mercury		3.3307	4.0876	20.4	*ICV
Nickel		367.2108	502.7947	31.2	*IP
Potassium		573.7049	878.2453	41.9	IP
Selenium		1.4246	1.4246		IF
Silver	4.7	6.9589	4.9047	34.6	IP
Sodium		194.8972	174.2764	200.0	IP
Thallium		1.4246	1.4246		IF
Vanadium	23.7	75.4716	95.3136	23.2	IP
Zinc		464.7225	367.3275	23.4	*IP
Cyanide		4.5940	4.7021		IC

FORM VI - IN

7/88

B-000378

AR302859

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU3837S

TP-6-2

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 323B1

SAS No.:

SDG No.: MU3801

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 41.7

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

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	QIM
Aluminum						NR
Antimony	75-125	91.7500	79.0829	239.81	5.3	N/P
Arsenic	75-125	17.8705	2.7257	19.18	79.0	F
Barium	75-125	1275.8457	258.1931	959.23	106.1	F
Beryllium	75-125	25.4939	1.7905	23.98	98.8	F
Cadmium	75-125	39.6483	6.4959	23.98	138.3	N/P
Calcium						NR
Chromium	75-125	242.2413	133.0927	95.92	113.8	F
Cobalt	75-125	257.6499	22.1395	239.81	98.2	F
Copper	75-125	195.0100	81.3416	119.90	94.8	F
Iron						NR
Lead		480.1918	660.0624	9.59	-1875.6	F
Magnesium						NR
Manganese	75-125	1089.3365	729.3603	239.81	150.1	N/P
Mercury	75-125	5.3085	3.3307	1.09	181.4	N/CV
Nickel	75-125	615.6881	367.2108	239.81	103.6	F
Potassium						NR
Selenium	75-125	3.9281	1.4246	4.80	81.8	F
Silver	75-125	30.0007	6.9589	23.98	96.1	F
Sodium						NR
Thallium	75-125	18.8633	1.4246	23.98	78.7	F
Vanadium	75-125	346.7213	75.4716	239.81	113.1	F
Zinc	75-125	595.4372	464.7225	239.81	54.5	N/P
Cyanide	75-125	44.6995	4.5940	48.54	92.1	C

Comments:

B-000379

AR302860

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany . Suite "C" . Broken Arrow, Oklahoma 74012 . 918-251-2858

ANALYTICAL REPORT

URS CONSULTANTS, INC.
570 Delaware Avenue
Buffalo, New York 14202

REPORT: 3238-1

REPORT DATE: 08/24/90

SWLO IDENTIFICATION

SAMPLE NO.: 3238.01 - 3238.43
DATE RECEIVED: 07/26/90

<u>DESCRIPTION</u>		<u>QA/QC</u> <u>PARAMETER</u>	<u>RESULTS</u>
MATRIX SPIKE	TP-6-2	TOTAL SULFIDE	82% RECOVERY
DUPLICATE	TP-6-2	TOTAL SULFIDE	7.1% RPD

AR302861

B-000380

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: URS CONSULTANTS - MR. JERALD JACOBI

SAMPLE SOURCE: Delaware Sand & Gravel (Project No.: 35214)

SAMPLE TYPE: Spike Recoveries PROJECT NO.: 11913

DATE RECEIVED: 07-25-90 DATE ANALYZED: 08-15/22-90

ANALYST: M. Cooper & J. Tobler LAB NOTEBOOK NO.: 117, Pg. 56

SAMPLE NOS. EHRT NO.	CUSTOMER NO.	ANALYSIS & METHOD	PERCENT RECOVERIES (%)
		NIOSH Method 1300	
		Methyl Ethyl Ketone	68
		Methyl Isobutyl Ketone	91
		NIOSH Method 1003	
		1,2-Dichloroethane	97.3
		NIOSH Method 1501	
		Toluene	113
		NIOSH Method 1501	
		Benzene	111
		Ethylbenzene	115
		Total Benzene	108
		NIOSH Method 5020	
		Bis(2-Ethyl Hexyl) Phthalate	111
		Di-N-Butyl Phthalate	95
		NIOSH Method 5503	
		PCB	84

B-000381

AR302862

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.

SPIKE 1

Contract: URS CONSULTANTS

BLANK SPIKE 1

Lab Code: _____

Case No.: _____

SAS No.: _____

SDG No.: 6/11/91 PF

Matrix : Air

Level (low/med): _____

Concentration Units (ug/ Filter)

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									
Antimony									
Arsenic		8.88		0.5	U	15.0	59		
Barium									
Beryllium									
Cadmium		16.0		0.2	U	15.0	107		
Calcium									
Chromium		15.80		0.85		15.0	100		
Cobalt		15.80		0.14	U	15.0	106		
Copper		13.90		0.32		15.0	91		
Iron									
Lead		15.80		0.5	U	15.0	105		
Magnesium									
Manganese									
Mercury									
Nickel		17.50		0.39		15.0	114		
Potassium									
Selenium		13.70		0.20	U	15.0	91		
Silver									
Sodium									
Thallium									
Vanadium									
Zinc		18.30		0.23	U	15.0	99		
Cyanide									
Tin		0.84		2.3	U	15.0	< 1.0		

Comments:

At 140° recommended by the Niosh method for digestion, arsenic is practically decomposed and tin is completely unstable. The filters were spiked with 1.5 ug/mL or 15 ug/Filter for each element.

FORM V (PART 1) - EN

B 000382

AR302863

U.S. EPA - CLP

EPA SAMPLE NO.

5A
SPIKE SAMPLE RECOVERY
SPIKE 2

BLANK
SPIKE 2

Lab Name: ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.

Contract: URS CONSULTANTS

Lab Code: _____

Case No.: _____

SAS No.: 11913

SDG No.: _____

Matrix : Air

Level (low/med): _____

Concentration Units (ug/Filter)

Analyte	Control Limit \pm R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	\pm R	Q	M
Aluminum									
Antimony									
Arsenic		9.652		0.5	U	15.0	64		
Barium									
Beryllium									
Cadmium		16.3		0.2	U	15.0	109		
Calcium									
Chromium		15.6		0.85		15.0	98		
Cobalt		14.5		0.14	U	15.0	97		
Copper		8.33		0.32		15.0	53		
Iron									
Lead		16.0		0.5	U	15.0	107		
Magnesium									
Manganese									
Mercury									
Nickel		15.9		0.39		15.0	103		
Potassium									
Selenium		14.2		2.0	U	15.0	95		
Silver									
Sodium									
Thallium									
Vanadium									
Zinc		17.4		3.5		15.0	93		
Cyanide									
Tin		1.86		2.3	U	15.0	< 1.0		

Comments:

3D
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-3-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	14500	0	7760	54	26-90
2-Chlorophenol	14500	0	6880	47	25-102
1,4-Dichlorobenzene	7250	0	3650	50	28-104
N-Nitroso-di-n-prop.(1)	7250	0	3500	48	41-126
1,2,4-Trichlorobenzene	7250	0	4010	55	38-107
4-Chloro-3-methylphenol	14500	0	7540	52	26-103
Acenaphthene	7250	0	3840	53	31-137
4-Nitrophenol	14500	0	7610	52	11-114
2,4-Dinitrotoluene	7250	0	3930	54	28-89
Pentachlorophenol	14500	0	7900	54	17-109
Pyrene	7250	0	4440	61	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	14500	9210	64	-17	35 26-90
2-Chlorophenol	14500	8630	60	-24	50 25-102
1,4-Dichlorobenzene	7250	4630	64	-25	27 28-104
N-Nitroso-di-n-prop.(1)	7250	4000	55	-14	38 41-126
1,2,4-Trichlorobenzene	7250	4440	61	-10	23 38-107
4-Chloro-3-methylphenol	14500	7980	55	-6	33 26-103
Acenaphthene	7250	4520	62	-16	19 31-137
4-Nitrophenol	14500	9350	64	-21	50 11-114
2,4-Dinitrotoluene	7250	4920	68	-23	47 28-89
Pentachlorophenol	14500	8700	60	-11	47 17-109
Pyrene	7250	4810	66	-8	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 11 outside limits
 Spike Recovery: 0 out of 22 outside limits

COMMENTS: UD-3-10 URS
 INST:F SWL#3615.01

0000384

FORM III SV-2

1/87 Rev.

AR302865

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS1 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-3-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	5.85	0	3.68	63	46-127
Heptachlor	5.85	0	14.7	251 *	35-130
Aldrin	5.85	0	3.17	54	34-132
Dieldrin	14.6	0	6.32	43	31-134
Endrin	14.6	0	9.51	65	42-139
4,4'-DDT	14.6	0	11.2	77	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	5.85	3.02	52	19	50 46-127
Heptachlor	5.85	19.1	326 *	-26	31 35-130
Aldrin	5.85	3.60	62	-14	43 34-132
Dieldrin	14.6	8.96	61	-35	38 31-134
Endrin	14.6	12.6	86	-28	45 42-139
4,4'-DDT	14.6	12.6	86	-11	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits
 Spike Recovery: 2 out of 12 outside limits

COMMENTS:

U.S. EPA - CLP

7
LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 3505 SAS No.: SDG No.: MU0501

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)		%R	Solid (mg/kg)		Limits	%R
	True	Found		True	Found		
Aluminum				325.0	254.3	225.0 - 424.0	78.2
Antimony				211.0	140.4	127.0 - 294.0	66.5
Arsenic				917.0	882.8	635.0 - 1199.0	96.3
Barium				4.8	5.1	0.0 - 40.0	106.2
Beryllium				19.4	17.4	16.5 - 22.3	89.7
Cadmium				45.4	44.2	35.7 - 55.1	97.4
Calcium				196200.0	151853.6	166800.0 - 225600.0	77.4
Chromium				99.6	93.8	79.2 - 120.0	94.2
Cobalt				144.0	142.7	124.0 - 162.0	99.1
Copper				6910.0	6234.3	6006.0 - 7820.0	90.2
Iron				22430.0	19974.0	17770.0 - 27080.0	89.1
Lead				236.0	225.0	188.0 - 285.0	95.3
Magnesium				118100.0	119420.3	100400.0 - 129900.0	101.1
Manganese				208.0	197.0	177.0 - 239.0	94.7
Mercury				12.7	11.1	8.5 - 17.0	87.4
Nickel				60.9	62.1	49.2 - 72.6	102.0
Potassium				50.0	69.0	0.0 - 1000.0	0.0
Selenium				39.2	27.2	19.1 - 59.4	69.4
Silver				22.2	15.9	15.5 - 29.0	71.6
Sodium				50.0	99.2	0.0 - 1000.0	198.4
Thallium				39.0	41.0	24.6 - 53.5	105.1
Vanadium				65.8	56.6	51.7 - 79.9	86.0
Zinc				187.0	177.5	138.0 - 236.0	94.9
Cyanide				5.6	6.2	4.3 - 6.9	110.7

FORM VII - IN

7/88

B-000386

AR302867

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK Case No.: 3505

SAS No.:

SDG No.: MU0501

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits	%R	
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide				5.6	6.2		4.3	6.9	110.7

FORM VII - IN

7/88

B-000387

AR302868

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089
 Lab Code: SWOK Case No.: 3505 SAS No.: SDG No.: MU0501
 Solid LCS Source: EPA0287
 Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)			Limits	%R
	True	Found	%R	True	Found	C		
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide				5.6	6.6		4.3	6.9 117.9

FORM VII - IN

7/88

B-000388

AR302869

U.S. EPA - CLP

7
LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 36151

SAS No.:

SDG No.: MU1501

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)				%R
	True	Found	%R	True	Found	C	Limits	
Aluminum				325.0	294.6		225.0 424.0	90.6
Antimony				211.0	162.9		127.0 294.0	77.2
Arsenic				917.0	994.3		635.0 1199.0	108.4
Barium				4.8	5.9	B	0.0 40.0	122.9
Beryllium				19.4	17.3		16.5 22.3	89.2
Cadmium				45.4	43.5		35.7 55.1	95.8
Calcium				196200.0	195376.7		166800.0 225600.0	99.6
Chromium				99.6	79.6		79.2 120.0	79.9
Cobalt				144.0	123.1		124.0 162.0	85.5
Copper				6910.0	6699.3		6006.0 7820.0	97.1
Iron				22430.0	17881.7		17770.0 27080.0	79.7
Lead				236.0	240.3		188.0 285.0	101.8
Magnesium				118100.0	121260.7		100400.0 129900.0	102.7
Manganese				208.0	199.1		177.0 239.0	95.7
Mercury				12.7	13.5		8.5 17.0	106.3
Nickel				60.9	50.9		49.2 72.6	83.6
Potassium				50.0	67.6	U	0.0 1000.0	0.0
Selenium				39.2	28.3		19.1 59.4	72.2
Silver				22.2	20.2		15.5 29.0	91.0
Sodium				50.0	416.1	B	0.0 1000.0	832.2
Thallium				39.0	38.1		24.6 53.5	97.7
Vanadium				65.8	55.1		51.7 79.9	83.7
Zinc				187.0	163.2		138.0 236.0	87.3
Cyanide				5.6	6.6		4.3 6.9	117.9

FORM VII - IN

7/88

B-000389

AR302870

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 36151

SAS No.:

SDG No.: MU1501

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)			Limits	%R
	True	Found	%R	True	Found	C		
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury				12.7	9.3		8.5	17.0
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide				5.6	6.1		4.3	6.9

FORM VII - IN

7/88

B 000390

AR302871

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3520a
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLD # 3505.05 (MS)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-2-9 (MS)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	0	570	85%

SAMPLE MATRIX: SOIL
SWLD # 3505.05 (MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-2-9 (MSD)

	MSD CONC. (mg/Kg)	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	570	85	0%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B-000391

AR302872

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

METHOD : TPH (FREON EXTRACTION; ANALYSIS BY IR)
 ANALYSIS DATE : 09/07/90

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LABORATORY BLANK

=====

MATRIX : Soil
 SAMPLE ID. : SBLK09069001
 SAMPLE AMOUNT : 30G DILUTION FACTOR: 1

	QUANTITATION LIMIT (mg/kg)	AMOUNT FOUND (mg/kg)
TPH	10.0	10.0 ND

=====

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

=====

COMPOUND	SPIKE CONC. (mg/kg)	1574.05 SAMPLE CONC. (mg/kg) *	1574.05MS MATRIX SPIKE CONC. (mg/kg) *	PERCENT RECOVERY
TPH	667	0	600	90 %

1574.05MSD MATRIX SPIKE DUPLICATE CONC. (mg/kg) *	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
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TPH	590	88	2 %
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* DILUTION FACTORS NOT APPLIED TO THESE CONCENTRATIONS

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DUPLICATE SAMPLE RESULTS

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COMPOUND	SAMPLE CONC. (mg/kg)	DUPLICATE CONC. (mg/kg)	RELATIVE PERCENT DIFF. %
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TPH			.0
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SAH

6-000392

AR302873

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

METHOD : TPH (FREON EXTRACTION; ANALYSIS BY IR)
 ANALYSIS DATE : 09/07/90

=====

LABORATORY BLANK

=====

MATRIX : Soil
 SAMPLE ID. : SBLK09069002
 SAMPLE AMOUNT : 30G DILUTION FACTOR: 1

	QUANTITATION LIMIT (mg/kg)	AMOUNT FOUND (mg/kg)
TPH	10.0	10.0 ND

=====

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

=====

COMPOUND	SPIKE CONC. (mg/kg)	1580.01 SAMPLE CONC. (mg/kg) *	1580.01MS MATRIX SPIKE CONC. (mg/kg) *	PERCENT RECOVERY
TPH	667	0	620	93 %

1580.01MSD MATRIX SPIKE DUPLICATE CONC. (mg/kg) *	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	94	-2 %

* DILUTION FACTORS NOT APPLIED TO THESE CONCENTRATIONS

=====

DUPLICATE SAMPLE RESULTS

=====

COMPOUND	SAMPLE CONC. (mg/kg)	DUPLICATE CONC. (mg/kg)	RELATIVE PERCENT DIFF. %
TPH			.0

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AR302874 B-000393

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

METHOD : TPH (FREON EXTRACTION; ANALYSIS BY IR)
 ANALYSIS DATE : 09/07/90

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LABORATORY BLANK

=====

MATRIX : Soil
 SAMPLE ID. : SBLK09069002
 SAMPLE AMOUNT : 30G DILUTION FACTOR: 1

	QUANTITATION LIMIT (mg/kg)	AMOUNT FOUND (mg/kg)
TPH	10.0	10.0 ND

=====

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

=====

COMPOUND	SPIKE CONC. (mg/kg)	1580.01 SAMPLE CONC. (mg/kg) *	1580.01MS MATRIX SPIKE CONC. (mg/kg) *	PERCENT RECOVERY
TPH	667	0	620	93 %

1580.01MSD MATRIX SPIKE DUPLICATE CONC. (mg/kg) *	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	94	-2 %

* DILUTION FACTORS NOT APPLIED TO THESE CONCENTRATIONS

=====

DUPLICATE SAMPLE RESULTS

=====

COMPOUND	SAMPLE CONC. (mg/kg)	DUPLICATE CONC. (mg/kg)	RELATIVE PERCENT DIFF. %
TPH			.0

AR302875-000393

3D
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-7-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	16700	0	4170	25 *	26- 90
2-Chlorophenol	16700	0	984	6 *	25-102
1,4-Dichlorobenzene	8340	0	6220	75	28 104
N-Nitroso-di-n-prop.(1)	8340	0	4700	56	41 126
1,2,4-Trichlorobenzene	8340	400	4390	48	38 107
4-Chloro-3-methylphenol	16700	0	8840	53	26 103
Acenaphthene	8340	0	5990	72	31-137
4-Nitrophenol	16700	0	3490	21	11-114
2,4-Dinitrotoluene	8340	0	5990	72	28- 89
Pentachlorophenol	16700	0	13200	79	17-109
Pyrene	8340	0	7200	86	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	16700	3440	21 *	17	35 26- 90
2-Chlorophenol	16700	1290	8 *	-29	50 25-102
1,4-Dichlorobenzene	8340	6580	79	-5	27 28 104
N-Nitroso-di-n-prop.(1)	8340	5720	69	-21	38 41 126
1,2,4-Trichlorobenzene	8340	4650	51	-6	23 38 107
4-Chloro-3-methylphenol	16700	9840	59	-11	33 26 103
Acenaphthene	8340	6250	75	-4	19 31-137
4-Nitrophenol	16700	9420	56	-91 *	50 11-114
2,4-Dinitrotoluene	8340	6310	76	-5	47 28- 89
Pentachlorophenol	16700	13500	81	-2	47 17-109
Pyrene	8340	7630	91	-6	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 1 out of 11 outside limits
 Spike Recovery: 4 out of 22 outside limits

COMMENTS: UD-7-10 URS
 SWL#3471.08 306/0.2

6000391

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: UD-7-12 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	15900	0	11400	72	26-90
2-Chlorophenol	15900	0	9050	57	25-102
1,4-Dichlorobenzene	7940	0	6400	81	28-104
N-Nitroso-di-n-prop.(1)	7940	0	6360	80	41-126
1,2,4-Trichlorobenzene	7940	150	5910	73	38-107
4-Chloro-3-methylphenol	15900	0	12500	79	26-103
Acenaphthene	7940	0	5420	68	31-137
4-Nitrophenol	15900	0	9610	60	11-114
2,4-Dinitrotoluene	7940	0	6180	78	28-89
Pentachlorophenol	15900	0	12700	80	17-109
Pyrene	7940	0	6090	77	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	15900	11300	71	1	35 26-90
2-Chlorophenol	15900	9130	57	0	50 25-102
1,4-Dichlorobenzene	7940	6420	81	0	27 28-104
N-Nitroso-di-n-prop.(1)	7940	6690	84	-5	38 41-126
1,2,4-Trichlorobenzene	7940	6180	76	-4	23 38-107
4-Chloro-3-methylphenol	15900	12300	77	3	33 26-103
Acenaphthene	7940	5570	70	-3	19 31-137
4-Nitrophenol	15900	6220	39	42	50 11-114
2,4-Dinitrotoluene	7940	6690	84	-7	47 28-89
Pentachlorophenol	15900	13200	83	-4	47 17-109
Pyrene	7940	5980	75	3	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limitsRPD: 0 out of 11 outside limitsSpike Recovery: 0 out of 22 outside limitsCOMMENTS: UD-7-12 URS
SWL#3471.13 306/0.9

B-000395

AR302877

3D
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-11A-12 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	15300	0	13600	89	26-90
2-Chlorophenol	15300	0	13400	88	25-102
1,4-Dichlorobenzene	7660	0	7430	97	28-104
N-Nitroso-di-n-prop.(1)	7660	0	7390	96	41-126
1,2,4-Trichlorobenzene	7660	666	7390	88	38-107
4-Chloro-3-methylphenol	15300	0	14000	92	26-103
Acenaphthene	7660	0	6580	86	31-137
4-Nitrophenol	15300	0	8800	58	11-114
2,4-Dinitrotoluene	7660	0	6010	78	28-89
Pentachlorophenol	15300	0	8800	58	17-109
Pyrene	7660	0	7460	97	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	15300	12400	81	9	35 26-90
2-Chlorophenol	15300	10800	71	21	50 25-102
1,4-Dichlorobenzene	7660	5860	76	24	27 28-104
N-Nitroso-di-n-prop.(1)	7660	4860	63	42 *	38 41-126
1,2,4-Trichlorobenzene	7660	5630	65	30 *	23 38-107
4-Chloro-3-methylphenol	15300	10900	71	26	33 26-103
Acenaphthene	7660	5550	72	18	19 31-137
4-Nitrophenol	15300	10100	66	-13	50 11-114
2,4-Dinitrotoluene	7660	3980	52	40	47 28-89
Pentachlorophenol	15300	7620	50	15	47 17-109
Pyrene	7660	5470	71	31	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 2 out of 11 outside limits
 Spike Recovery: 0 out of 22 outside limits

COMMENTS: UD-11A-12 URS
 SWL#3471.03 308/0.9

000396

FORM III SV-2

1/87 Rev

AR302878

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSAContract: 69-D9-0025Lab Code: SWOKCase No.: URS1

SAS No.: _____

SDG No.: _____

Matrix Spike - EPA Sample No.: UD-7-10Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	66.5	0	2.66	4 *	46-127
Heptachlor	66.5	0	17.8	27 *	35-130
Aldrin	66.5	0	5.62	8 *	34-132
Dieldrin	166	0	125	75	31-134
Endrin	166	0	181	109	42-139
4,4'-DDT	166	54.1	234	108	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
gamma-BHC (Lindane)	66.5	2.42	4 *	0	50	46-127
Heptachlor	66.5	18.0	27 *	0	31	35-130
Aldrin	66.5	7.78	12 *	-40	43	34-132
Dieldrin	166	129	78	-4	38	31-134
Endrin	166	176	106	3	45	42-139
4,4'-DDT	166	231	107	1	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limitsSpike Recovery: 6 out of 12 outside limits

COMMENTS:

FORM III PEST-2

B-000397

8/87 Rev.

AR302879

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: 69-D9-0025
 Lab Code: SWOK Case No.: URS1 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-7-12 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	63.3	0	2.99	5 *	46-127
Heptachlor	63.3	0	27.9	44	35-130
Aldrin	63.3	0	6.46	10 *	34-132
Dieldrin	158	0	24.0	15 *	31-134
Endrin	158	0	43.0	27 *	42-139
4,4'-DDT	158	0	76.2	48	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	63.3	3.06	5 *	0	50 46-127
Heptachlor	63.3	23.6	37	17	31 35-130
Aldrin	63.3	6.75	11 *	-10	43 34-132
Dieldrin	158	25.1	16 *	-6	38 31-134
Endrin	158	36.6	23 *	16	45 42-139
4,4'-DDT	158	112	71	-39	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits

Spike Recovery: 8 out of 12 outside limits

COMMENTS:

B-000398

FORM III PEST-2

8/87 Rev.

AR302880

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: 69-D9-0025
 Lab Code: SWOK Case No.: URS1 SAS No.: _____ SDG No.: _____
 Matrix Spike --EPA Sample No.: UD-11A-12 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	61.2	0	16.7	27 *	46-127
Heptachlor	61.2	0	20.9	34 *	35-130
Aldrin	61.2	0	0	0 *	34-132
Dieldrin	153	0	201	131	31-134
Endrin	153	81.7	108	17 *	42-139
4,4'-DDT	153	0	2410	1575 *	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
gamma-BHC (Lindane)	61.2	11.9	19 *	35	50	46-127
Heptachlor	61.2	20.3	33 *	3	31	35-130
Aldrin	61.2	0	0 *	0	43	34-132
Dieldrin	153	155	101	26	38	31-134
Endrin	153	213	86	-134 *	45	42-139
4,4'-DDT	153	1690	1105 *	35	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 1 out of 6 outside limits
 Spike Recovery: 9 out of 12 outside limits

COMMENTS:

U.S. EPA - CLP

EPA SAMPLE NO.

6

DUPLICATES

MU7108D
UD-7-10

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 81.9

% Solids for Duplicate: 81.4

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

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	%RPD	Q/M
Aluminum		7967.3926	6945.4422	13.7	P
Antimony		11.3043	12.1833	7.5	P
Arsenic		1.7265	1.7729	2.7	F
Barium		14.2846	11.7544	19.4	P
Beryllium		.7139	.6662	6.9	P
Cadmium		1.0506	1.1647	10.3	P
Calcium		241.3773	206.1417	15.7	P
Chromium		18.9220	19.1959	1.4	P
Cobalt		3.9388	4.1131	4.3	P
Copper		4.1431	4.3217	4.2	P
Iron		20236.5880	17841.7710	12.6	P
Lead		4.3053	3.7924	12.7	F
Magnesium		268.5371	197.7716	30.4	P
Manganese		34.7977	28.5786	19.6	P
Mercury		1.0175	.1110		CV
Nickel	9.8	15.2351	16.4284	7.5	P
Potassium		370.7795	366.7199	1.1	P
Selenium		.7326	.7326		F
Silver		1.1466	.9381	20.0	P
Sodium		179.4955	168.2156	6.5	P
Thallium		.7326	.7326		F
Vanadium	12.2	16.0468	13.9047	14.3	P
Zinc		106.2992	129.2613	19.5	P
Cyanide		2.2780	2.1726		C

FORM VI - IN

7/88

B 000400

AR302882

F
U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

MU7108S

WD-7-10

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 81.9

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

Analyte	Control	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
	Limit %R								
Aluminum									NR
Antimony	75-125	76.2340		11.3043	B	122.10	53.2	N	P
Arsenic	75-125	7.8266		1.7265	B	9.77	62.4	N	F
Barium	75-125	508.0795		14.2846	B	488.40	101.1		P
Beryllium	75-125	12.8079		.7139	B	12.21	99.0		P
Cadmium	75-125	18.3812		1.0506	B	12.21	141.9	N	P
Calcium									NR
Chromium	75-125	68.7720		18.9220		48.84	102.1		P
Cobalt	75-125	126.0737		3.9388	B	122.10	100.0		P
Copper	75-125	67.2276		4.1431	B	61.05	103.3		P
Iron									NR
Lead	75-125	9.0183		4.3053		4.88	96.6		F
Magnesium									NR
Manganese	75-125	162.7676		34.7977		122.10	104.8		P
Mercury	75-125	.5840		1.0175	U	.53	110.2		CV
Nickel	75-125	143.9410		15.2351		122.10	105.4		P
Potassium									NR
Selenium	75-125	1.9463		.7326	U	2.44	79.8		F
Silver	75-125	13.9207		1.1466	B	12.21	104.6		P
Sodium									NR
Thallium	75-125	12.6789		.7326	U	12.21	103.8		F
Vanadium	75-125	139.7329		16.0468		122.10	101.3		P
Zinc	75-125	227.0570		106.2992		122.10	98.9		P
Cyanide	75-125	24.0751		2.2780	U	22.70	106.1		C

Comments:

FORM V (Part 1) - IN

B 000401

AR302883

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU7113D

40-7-12

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 86.4

% Solids for Duplicate: 84.1

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	%RPD	Q/M
Aluminum		6554.5790		5383.0015		19.6	P
Antimony		6.0185	U	6.0185	U		P
Arsenic		1.1574	U	1.1574	U		F
Barium		21.0170	B	18.3714	B	13.4	P
Beryllium		.7034	B	.6160	B	13.2	P
Cadmium		.6944	U	.6944	U		P
Calcium		522.0623	B	354.6791	B	38.2	P
Chromium		17.0509		15.5471		9.2	P
Cobalt		3.6856	B	4.0344	B	9.0	P
Copper	5.8	7.4167		5.9480		22.0	P
Iron		10269.5300		10347.2900		.8	P
Lead	.7	7.4306		4.9144		40.8	F
Magnesium		527.2055	B	456.4212	B	14.4	P
Manganese		147.5821		202.3202		31.3	*P
Mercury		.0857	U	.0857	U		CV
Nickel	9.3	29.9677		24.4235		20.4	P
Potassium		646.4960	B	527.2021	B	20.3	P
Selenium		.6944	U	.6944	U		F
Silver		.6822	B	.4630	U	200.0	P
Sodium		142.0880	B	141.8010	B	.2	P
Thallium		.6944	U	.6944	U		F
Vanadium	11.6	20.4112		16.3364		22.2	P
Zinc	4.6	23.7738		20.8067		13.3	P
Cyanide	1.7	1.7071	U	1.8974	U		C

FORM VI - IN

7/68

B-000402

AR302884

U.S. EPA - CLP

SA
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

MU7113S

UD-7-12

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 86.4

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

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	QIM
Aluminum						NR
Antimony	75-125	54.0914	6.0185 U	115.74	46.7	NIF
Arsenic	75-125	7.7060	1.1574 U	9.26	83.2	F
Barium	75-125	472.9776	21.0170 B	462.96	97.6	F
Beryllium	75-125	11.7104	.7034 B	11.57	95.1	F
Cadmium	75-125	15.5725	.6944 U	11.57	134.6	NIF
Calcium						NR
Chromium	75-125	64.2725	17.0509	46.30	102.0	F
Cobalt	75-125	116.2145	3.6856 B	115.74	97.2	F
Copper	75-125	65.0241	7.4167	57.87	99.5	F
Iron						NR
Lead	75-125	9.7315	7.4306	4.63	49.7	NIF
Magnesium						NR
Manganese	75-125	331.3440	147.5821	115.74	158.8	NIF
Mercury	75-125	.4897	.0857 U	.44	111.3	CV
Nickel	75-125	147.9721	29.9677	115.74	102.0	F
Potassium						NR
Selenium	75-125	1.4954	.6944 U	2.32	64.5	NIF
Silver	75-125	12.5184	.6822 B	11.57	102.3	F
Sodium						NR
Thallium	75-125	14.2963	.6944 U	11.57	123.6	F
Vanadium	75-125	129.8186	20.4112	115.74	94.5	F
Zinc	75-125	130.6638	23.7738	115.74	92.4	F
Cyanide	75-125	15.2778	1.7071 U	16.08	95.0	C

Comments:

FORM V (Part 1) - IN

B000403

AR302885

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU7103D

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

UD-11A-12

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 86.2

% Solids for Duplicate: 86.9

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

Analyte	Control Limit	Sample (S)	Duplicate (D)	%RPD	QIM
Aluminum		4423.5200	4212.7347	4.9	IP
Antimony		6.0325	6.0325		IP
Arsenic	2.3	2.7285	3.7425	31.3	IF
Barium	46.4	146.2281	152.1421	4.0	IP
Beryllium	-	.4584	.5020	9.1	IP
Cadmium		.6961	.6961		IP
Calcium	1160.1	5587.1194	3292.1782	51.7	*IP
Chromium	2.3	7.8639	8.6496	9.5	IP
Cobalt	11.6	21.8768	23.7064	8.0	IP
Copper	5.8	6.9089	7.7052	10.9	IP
Iron		11541.5730	12181.7570	5.4	IP
Lead		3.7401	3.9165	4.6	IF
Magnesium		449.6563	349.9366	24.9	IF
Manganese		1121.4168	1017.3726	9.7	IF
Mercury	.1	.0892	.0967		ICV
Nickel		5.2697	6.7687	24.9	IP
Potassium		260.3555	298.2839	13.6	IP
Selenium		.6961	.5800		IF
Silver		.5541	.5915	6.5	IP
Sodium		147.0211	211.5406	36.0	IP
Thallium		.6961	.6961		IF
Vanadium		9.8577	10.7300	8.5	IP
Zinc	4.6	17.0119	18.6445	9.2	IP
Cyanide		2.2927	1.8651		IC

FORM VI - IN

7/88

AR302886

B000404

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU7103S

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

UD-11A-12 Spike

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 86.2

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R	Q/M
Aluminum						NR
Antimony	75-125	46.2325	6.0325	116.01	39.9	NIF
Arsenic	75-125	6.5568	2.7285	9.28	41.3	NIF
Barium	75-125	587.9029	146.2281	464.04	95.2	IF
Beryllium	75-125	11.4039	.4584	11.60	94.4	IF
Cadmium	75-125	15.5720	.6961	11.60	134.2	NIF
Calcium						NR
Chromium	75-125	55.6783	7.8639	46.40	103.0	IF
Cobalt	75-125	126.5240	21.8768	116.01	90.2	IF
Copper	75-125	62.6472	6.9089	58.00	96.1	IF
Iron						NR
Lead	75-125	7.4223	3.7401	4.64	79.4	IF
Magnesium						NR
Manganese		923.9978	1121.4168	116.01	-170.2	IF
Mercury	75-125	.4400	.0892	.40	110.0	CV
Nickel	75-125	120.8102	5.2697	116.01	99.6	IF
Potassium						NR
Selenium	75-125	1.3828	.6961	2.32	59.6	NIF
Silver	75-125	12.1700	.5541	11.60	100.1	IF
Sodium						NR
Thallium	75-125	12.0464	.6961	11.60	103.8	IF
Vanadium	75-125	123.6183	9.8577	116.01	98.1	IF
Zinc	75-125	125.8194	17.0119	116.01	93.8	IF
Cyanide	75-125	18.3206	2.2927	18.53	98.9	C

Comments:

FORM V (Part 1) - IN

B-000405

AR302887

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3471f
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3471.8, 9 (MS)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-7-10, UD-7-10 MS (MS)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	9560	9980	63%

SAMPLE MATRIX: SOIL
SWLO # 3471.10 (MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-7-10 MSD (MSD)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	RECOVERY PERCENT DIFFERENCE
TPH	11300	261	-122%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

(3471.6) UD-11A-13 SAMPLE CONC. (mg/Kg)	(3471.7) UD-11A-13 FIELD DUP DUPLICATE CONC RECOVERY	RELATIVE PERCENT DIFFERENCE
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TPH	2790	2877 RR302888	(2.8) B 000406
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SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3471g
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLD # 3471.3, 4 (MS)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-11A-12, UD-11A-12 MS (MS)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	4250	3730	-78%

SAMPLE MATRIX: SOIL
SWLD # 3471.5 (MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-11A-12 MSD (MSD)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	RECOVERY PERCENT DIFFERENCE
TPH	90	73	20.9

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

COMPOUND	(3471.1) UD-11A-11 SAMPLE CONC. (mg/Kg)	(3471.2) UD-11A-11 FIELD DUP DUPLICATE CONC RECOVERY	RELATIVE PERCENT DIFFERENCE
TPH	90	73	20.9

AR302890

6-000408

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL - TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: UD-14-9 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	54.9	0	49.7	91	59-172
Trichloroethene	54.9	0	43.3	79	62-137
Benzene	54.9	2.00	50.9	89	66-142
Toluene	54.9	7.79	54.0	84	59-139
Chlorobenzene	54.9	0	48.2	88	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	54.9	49.1	89	2	22 59-172
Trichloroethene	54.9	45.5	83	-5	24 62-137
Benzene	54.9	54.9	96	-8	21 66-142
Toluene	54.9	56.9	89	-6	21 59-139
Chlorobenzene	54.9	50.5	92	-4	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limitsSpike Recovery: 0 out of 10 outside limitsCOMMENTS: UD-14-9 URS
INST: I SWL#3491.03 5

3D
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL - TULSA Contract: URS
 Lab Code: SWDK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-14-9 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	GC LIMITS REC.
Phenol	14700	0	9900	67	26- 90
2-Chlorophenol	14700	0	9680	66	25-102
1,4-Dichlorobenzene	7330	0	5120	70	28 104
N-Nitroso-di-n-prop. (1)	7330	0	4730	65	41 126
1,2,4-Trichlorobenzene	7330	106	5800	78	38 107
4-Chloro-3-methylphenol	14700	0	10400	71	26 103
Acenaphthene	7330	0	5140	70	31-137
4-Nitrophenol	14700	0	9900	67	11-114
2,4-Dinitrotoluene	7330	0	5210	71	28- 89
Pentachlorophenol	14700	0	11500	78	17-109
Pyrene	7330	0	5270	72	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	GC LIMITS RPD REC.
Phenol	14700	9090	62	8	35 26- 90
2-Chlorophenol	14700	9160	62	6	50 25-102
1,4-Dichlorobenzene	7330	4650	63	11	27 28 104
N-Nitroso-di-n-prop. (1)	7330	4340	59	10	38 41 126
1,2,4-Trichlorobenzene	7330	5250	70	11	23 38 107
4-Chloro-3-methylphenol	14700	9680	66	7	33 26 103
Acenaphthene	7330	5050	69	1	19 31-137
4-Nitrophenol	14700	9310	63	6	50 11-114
2,4-Dinitrotoluene	7330	5200	71	0	47 28- 89
Pentachlorophenol	14700	11100	76	3	47 17-109
Pyrene	7330	5110	70	3	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of GC limits

RPD: 0 out of 11 outside limits
 Spike Recovery: 0 out of 22 outside limits

COMMENTS: UD-14-9 URS
 INST:F SWL#3491.03

B 000410

FORM III SV-2

1/87 Re

AR302892

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSAContract: URSLab Code: SWOKCase No.: URS3

SAS No.: _____

SDG No.: _____

Matrix Spike - EPA Sample No.: UD-14-9Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	58.5	0	0	0 *	46-127
Heptachlor	58.5	0	0	0 *	35-130
Aldrin	58.5	0	0	0 *	34-132
Dieldrin	146	0	0	0 *	31-134
Endrin	146	0	0	0 *	42-139
4,4'-DDT	146	0	0	0 *	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
gamma-BHC (Lindane)	58.5	0	0 *	0	50	46-127
Heptachlor	58.5	0	0 *	0	31	35-130
Aldrin	58.5	0	0 *	0	43	34-132
Dieldrin	146	0	0 *	0	38	31-134
Endrin	146	0	0 *	0	45	42-139
4,4'-DDT	146	0	0 *	0	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limitsSpike Recovery: 12 out of 12 outside limits

COMMENTS:

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU9103D

110-14-9

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 34911

SAS No.:

SDG No.: MU9101

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 91.1

% Solids for Duplicate: 90.5

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

Analvte	Control Limit	Sample (S)	C	Duplicate (D)	C	%RPD	Q:M
Aluminum		2569.0449		2411.4050		6.3	IP
Antimony		5.6515	U	5.6515	U		IP
Arsenic		1.0868	U	1.0868	U		IF
Barium		23.3026	B	22.3454	B	4.2	IP
Beryllium		.3820	B	.3607	B	5.7	IP
Cadmium		.6521	U	.6521	U		IP
Calcium		149.5610	B	174.0695	B	15.1	IP
Chromium	2.2	3.5462		3.3668		5.2	IP
Cobalt		6.2934	B	6.7556	B	7.1	IP
Copper	5.4	5.4353		5.1182	B	6.0	IP
Iron		7284.0824		6788.0080		7.1	IP
Lead	.7	2.2236		1.9346		13.9	IF
Magnesium		217.9826	B	211.8332	B	2.9	IP
Manganese		92.4547		126.8023		31.3	IP
Mercury	.1	.0955	U	.0998	U		ICV
Nickel		4.6413	B	6.9728	B	40.1	IP
Potassium		186.0777	B	229.2743	B	20.8	IP
Selenium		.4347	U	.4347	U		IF
Silver		.6561	B	.6154	B	6.4	IP
Sodium		85.2482	B	104.7275	B	20.5	IP
Thallium		.6521	U	.6521	U		IF
Vanadium		5.3869	B	5.1529	B	4.4	IP
Zinc	4.3	10.3456		10.0640		2.8	IP
Cyanide		1.6532	U	2.1191	U		IC

FORM VI - IN

7/88

B-000412

AR302894

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU9103S

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

UO-4-9

Lab Code: SWOK

Case No.: 34911

SAS No.:

SDG No.: MU9101

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 91.1

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

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q/M
Aluminum						NR
Antimony	75-125	35.5686	5.6515 U	109.77	32.4	N/P
Arsenic	75-125	4.0430	1.0868 U	8.70	46.5	N/P
Barium	75-125	433.4325	23.3026 B	439.08	93.4	P
Beryllium	75-125	10.4351	.3820 B	10.98	91.6	P
Cadmium	75-125	14.4747	.6521 U	10.98	131.8	N/P
Calcium						NR
Chromium	75-125	46.6478	3.5462	43.91	98.2	P
Cobalt	75-125	105.4533	6.2934 B	109.77	90.3	P
Copper	75-125	57.6631	5.4353	54.88	95.2	P
Iron						NR
Lead	75-125	7.9860	2.2236	4.35	132.5	N/P
Magnesium						NR
Manganese	75-125	226.5150	92.4547	109.77	122.1	P
Mercury	75-125	.4757	.0955 U	.46	103.4	CV
Nickel	75-125	105.7328	4.6413 B	109.77	92.1	P
Potassium						NR
Selenium	75-125	1.2629	.4347 U	2.17	58.2	N/P
Silver	75-125	10.3184	.6561 B	10.98	88.0	P
Sodium						NR
Thallium	75-125	10.2423	.6521 U	10.87	94.2	P
Vanadium	75-125	110.0543	5.3869 B	109.77	93.4	P
Zinc	75-125	112.5686	10.3456	109.77	93.1	P
Cyanide	75-125	22.7361	1.6532 U	21.61	105.2	C

Comments:

FORM V (Part 1) - IN

B-000413

AR302895

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
 570 DELAWARE AVE.
 BUFFALO, NY 14202
 ATTN: PETER FAIRBANKS

REPORT: 3505a
 DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
 SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
 DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
 SWLD # 3505.01 (MS)
 PROJECT: DELAWARE SAND & GRAVEL
 SAMPLE ID: UD-13-8 (MS)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	55	700	97%

SAMPLE MATRIX: SOIL
 SWLD # 3505.01 (MSD)
 PROJECT: DELAWARE SAND & GRAVEL
 SAMPLE ID: UD-13-8 (MSD)

	MSD CONC. (mg/Kg)	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	1100	157	-47%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B-000414

AR302896

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3491a
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLD # 3491.03, 04 (MS)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-14-9, UD-14-9 MS (MS)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	25	607	87%

SAMPLE MATRIX: SOIL
SWLD # 3491.05 (MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-14-9 MSD (MSD)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	RECOVERY PERCENT DIFFERENCE
TPH	573	82	6%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

(3491.01) UD-14-8 SAMPLE CONC. (mg/Kg)	(3491.02) UD-14-8 FIELD DUP DUPLICATE CONC RECOVERY	RELATIVE PERCENT DIFFERENCE
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TPH	3630	3260	10.5 6-000415
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AR302897

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

METHOD : TPH (FREON EXTRACTION; ANALYSIS BY IR)
 ANALYSIS DATE : 09/07/90

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LABORATORY BLANK

=====

MATRIX : Soil
 SAMPLE ID. : SBLK09069001
 SAMPLE AMOUNT : 30G DILUTION FACTOR: 1

	QUANTITATION LIMIT (mg/kg)	AMOUNT FOUND (mg/kg)
TPH	10.0	10.0 ND

=====

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

=====

		1574.05 SAMPLE CONC. (mg/kg) *	1574.05MS MATRIX SPIKE CONC. (mg/kg) *	PERCENT RECOVERY
COMPOUND	SPIKE CONC. (mg/kg)			
TPH	667	0	600	90 %

		1574.05MSD MATRIX SPIKE DUPLICATE CONC. (mg/kg) *	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
--	--	--	---------------------	--------------------------------

TPH	590	88	2 %
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* DILUTION FACTORS NOT APPLIED TO THESE CONCENTRATIONS

=====

DUPLICATE SAMPLE RESULTS

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	SAMPLE CONC. (mg/kg)	DUPLICATE CONC. (mg/kg)	RELATIVE PERCENT DIFF. %
COMPOUND			
TPH			.0

=====

GA

AR302898

B000416

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

METHOD : TPH (FREON EXTRACTION; ANALYSIS BY IR)
 ANALYSIS DATE : 09/07/90

=====

LABORATORY BLANK

=====

MATRIX : Soil
 SAMPLE ID. : SBLK09069002
 SAMPLE AMOUNT : 30G DILUTION FACTOR: 1

	QUANTITATION LIMIT (mg/kg)	AMOUNT FOUND (mg/kg)
TPH	10.0	10.0 ND

=====

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

=====

COMPOUND	SPIKE CONC. (mg/kg)	1580.01 SAMPLE CONC. (mg/kg) *	1580.01MS MATRIX SPIKE CONC. (mg/kg) *	PERCENT RECOVERY
TPH	667	0	620	93 %

	1580.01MSD MATRIX SPIKE DUPLICATE CONC. (mg/kg) *	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	630	94	-2 %

* DILUTION FACTORS NOT APPLIED TO THESE CONCENTRATIONS

=====

DUPLICATE SAMPLE RESULTS

=====

COMPOUND	SAMPLE CONC. (mg/kg)	DUPLICATE CONC. (mg/kg)	RELATIVE PERCENT DIFF. %
TPH			.0

=====

Handwritten: C/A

AR302899

B000417

3D
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-16A-9 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	14500	0	8190	56	26- 90
2-Chlorophenol	14500	0	7540	52	25-102
1,4-Dichlorobenzene	7250	0	5020	69	28 104
N-Nitroso-di-n-prop.(1)	7250	0	5180	71	41 126
1,2,4-Trichlorobenzene	7250	0	4710	65	38 107
4-Chloro-3-methylphenol	14500	0	10300	71	26 103
Acenaphthene	7250	0	4460	62	31-137
4-Nitrophenol	14500	0	7760	54	11-114
2,4-Dinitrotoluene	7250	0	4860	67	28- 89
Pentachlorophenol	14500	0	8410	58	17-109
Pyrene	7250	0	5140	71	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	14500	8120	56	0	35 26- 90
2-Chlorophenol	14500	7400	51	2	50 25-102
1,4-Dichlorobenzene	7250	5340	74	-7	27 28 104
N-Nitroso-di-n-prop.(1)	7250	5470	75	-5	38 41 126
1,2,4-Trichlorobenzene	7250	4800	66	-2	23 38 107
4-Chloro-3-methylphenol	14500	10200	70	1	33 26 103
Acenaphthene	7250	3390	47	28 *	19 31-137
4-Nitrophenol	14500	7020	48	12	50 11-114
2,4-Dinitrotoluene	7250	4730	65	3	47 28- 89
Pentachlorophenol	14500	8770	60	-3	47 17-109
Pyrene	7250	5000	69	3	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 1 out of 11 outside limits
 Spike Recovery: 0 out of 22 outside limits

COMMENTS: UD-16A-9 URS
 SWL#3385.07 306/0.9

5000418

AR302900

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS3 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-16A-9 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	57.8	0	32.9	57	46-127
Heptachlor	57.8	0	75.0	130	35-130
Aldrin	57.8	0	45.7	79	34-132
Dieldrin	145	0	118	81	31-134
Endrin	145	0	130	90	42-139
4,4'-DDT	145	0	80.7	56	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	57.8	34.8	60	-5	50 46-127
Heptachlor	57.8	77.1	133 *	-2	31 35-130
Aldrin	57.8	52.0	90	-13	43 34-132
Dieldrin	145	139	96	-17	38 31-134
Endrin	145	154	106	-16	45 42-139
4,4'-DDT	145	105	72	-25	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits
 Spike Recovery: 1 out of 12 outside limits

COMMENTS:

B000419

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OR

Contract: 68-D9-0089

Lab Type: SWP

Case No.: 33851

SAS No.:

SDG No.: MUR501

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)				%R
	True	Found	%R	True	Found	C	Limits	
Aluminum				325.0	301.5		225.0 424.0	92.
Antimony				211.0	175.4		127.0 294.0	83.
Arsenic				917.0	1040.8		635.0 1199.0	113.
Barium				4.8	4.6	B	0.0 40.0	95.
Beryllium				19.4	18.5		16.5 22.3	95.
Cadmium				45.4	45.2		35.7 55.1	99.
Calcium				196200.0	208300.0		166800.0 225600.0	106.
Chromium				99.6	84.1		79.2 120.0	84.
Cobalt				144.0	130.7		124.0 162.0	90.
Copper				6910.0	7324.0		5006.0 7820.0	106.
Iron				22430.0	18578.4		17770.0 27080.0	82.
Lead				236.0	272.5		188.0 385.0	115.
Magnesium				118100.0	128860.0		100400.0 129900.0	109.
Manganese				208.0	208.1		177.0 239.0	100.
Mercury				12.7	10.6		8.5 17.0	83.
Nickel				60.9	53.1		49.2 72.6	87.
Potassium				50.0	69.0	U	0.0 1000.0	0.
Selenium				39.2	43.4		19.1 59.4	110.
Silver				22.2	15.5		15.5 29.0	69.
Sodium				50.0	218.9	B	0.0 1000.0	437.
Thallium				39.0	44.4		24.6 53.5	113.
Vanadium				65.8	58.5		51.7 79.9	88.
Zinc				187.0	160.7		138.0 238.0	85.
Cyanide				5.6	6.3		4.3 6.9	112.

FORM VII - IN

7/88

B-000420

AR302902

U.S. EPA - CLP

7
LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 33851

SAS No.:

SDS No.: MUR501

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide				5.6	6.2	U	4.3	6.9 110.

FORM VII - IN

7/88

B-000421

AR302903

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3385a

DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3385.12 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-19-13 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	0	620	93%
	MSD CONC. (mg/Kg)	MSD PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE	
TPH	610	91%	2%	

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

AR302904

B 000422

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3368a
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLD # 3368.02 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-21-12 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	0	620	93%

	MSD CONC. (mg/Kg)	MSD PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	640	96%	3%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B- 000423

AR302905

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3338a
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3338.04 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-23-10 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	0	590	88%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B000424

AR302906

3B
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-26-9 Level: (low/med) MED

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	7620	0	9130	120	59-172
Trichloroethene	7620	0	6570	86	62-137
Benzene	7620	0	7330	96	66-142
Toluene	7620	20400	29100	114	59-139
Chlorobenzene	7620	0	7470	98	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	7620	9310	122	-2	22 59-172
Trichloroethene	7620	6880	90	-5	24 62-137
Benzene	7620	7450	98	-2	21 66-142
Toluene	7620	32300	156 *	-31 *	21 59-139
Chlorobenzene	7620	7770	102	-4	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 1 out of 5 outside limits
 Spike Recovery: 1 out of 10 outside limits

COMMENTS: URS UD-26-9
 INST:D SWL#3471.18 4

3B
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-26-10B Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	50.0	0	46.5	93	59-172
Trichloroethene	50.0	0	43.4	87	62-137
Benzene	50.0	0	49.4	99	66-142
Toluene	50.0	0	42.5	85	59-139
Chlorobenzene	50.0	0	48.5	97	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	68.5	64.7	94	-1	22 59-172
Trichloroethene	68.5	62.1	91	-4	24 62-137
Benzene	68.5	71.4	104	-5	21 66-142
Toluene	68.5	62.9	92	-8	21 59-139
Chlorobenzene	68.5	69.3	101	-4	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS:

FORM III VOA-2

B 000426
1/87 Rev.

AR302908

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-27-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	53.2	0	49.4	93	59-172
Trichloroethene	53.2	0	47.3	89	62-137
Benzene	53.2	0	54.7	103	66-142
Toluene	53.2	0	45.7	86	59-139
Chlorobenzene	53.2	0	52.4	98	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	53.2	50.2	94	-1	22 59-172
Trichloroethene	53.2	47.0	88	1	24 62-137
Benzene	53.2	55.8	105	-2	21 66-142
Toluene	53.2	48.4	91	-6	21 59-139
Chlorobenzene	53.2	51.5	97	1	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS:

6-000427

3D

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-26-9 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	16300	0	9520	58	26- 90
2-Chlorophenol	16300	0	9270	57	25-102
1,4-Dichlorobenzene	8130	0	5510	68	28 104
N-Nitroso-di-n-prop.(1)	8130	0	5860	72	41 126
1,2,4-Trichlorobenzene	8130	0	5540	68	38 107
4-Chloro-3-methylphenol	16300	0	10500	64	26 103
Acenaphthene	8130	0	5950	73	31-137
4-Nitrophenol	16300	0	9760	60	11-114
2,4-Dinitrotoluene	8130	0	5400	66	28- 89
Pentachlorophenol	16300	0	13700	84	17-109
Pyrene	8130	0	5990	74	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	16300	9350	57	2	35 26- 90
2-Chlorophenol	16300	8950	55	4	50 25-102
1,4-Dichlorobenzene	8130	6080	75	-10	27 28 104
N-Nitroso-di-n-prop.(1)	8130	5580	69	4	38 41 126
1,2,4-Trichlorobenzene	8130	5580	69	-1	23 38 107
4-Chloro-3-methylphenol	16300	10600	65	-2	33 26 103
Acenaphthene	8130	5970	73	0	19 31-137
4-Nitrophenol	16300	11600	71	-17	50 11-114
2,4-Dinitrotoluene	8130	5180	64	3	47 28- 89
Pentachlorophenol	16300	11500	71	17	47 17-109
Pyrene	8130	6150	76	-3	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 11 outside limits
 Spike Recovery: 0 out of 22 outside limits

COMMENTS: UD-26-9 URS
 SWL#3471.18 306/0.9

B-000428

FORM III 5V-2

1/87 Rev

AR302910

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: UD-27-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	14200	0	8090	57	26-90
2-Chlorophenol	14200	0	7240	51	25-102
1,4-Dichlorobenzene	7100	0	5150	73	28 104
N-Nitroso-di-n-prop.(1)	7100	0	4890	69	41 126
1,2,4-Trichlorobenzene	7100	0	5150	73	38 107
4-Chloro-3-methylphenol	14200	0	9150	64	26 103
Acenaphthene	7100	0	5140	72	31-137
4-Nitrophenol	14200	0	9930	70	11-114
2,4-Dinitrotoluene	7100	0	4530	64	28- 89
Pentachlorophenol	14200	0	9440	66	17-109
Pyrene	7100	0	5120	72	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Phenol	14200	7660	54	5	35	26- 90
2-Chlorophenol	14200	6990	49	4	50	25-102
1,4-Dichlorobenzene	7100	4790	67	9	27	28 104
N-Nitroso-di-n-prop.(1)	7100	4650	65	6	38	41 126
1,2,4-Trichlorobenzene	7100	4820	68	7	23	38 107
4-Chloro-3-methylphenol	14200	7590	53	19	33	26 103
Acenaphthene	7100	4720	66	9	19	31-137
4-Nitrophenol	14200	9860	69	1	50	11-114
2,4-Dinitrotoluene	7100	4310	61	5	47	28- 89
Pentachlorophenol	14200	10300	73	-10	47	17-109
Pyrene	7100	5090	72	0	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limitsRPD: 0 out of 11 outside limitsSpike Recovery: 0 out of 22 outside limitsCOMMENTS: UD-27-10 URS
SWL#3471.28 306/0.9

B- 000429

AR302911

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: 69-D9-0025
 Lab Code: SWOK Case No.: URS1 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-26-9 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	64.9	0	7.56	12 *	46-127
Heptachlor	64.9	0	25.6	39	35-130
Aldrin	64.9	0	4.22	7 *	34-132
Dieldrin	162	0	46.9	29 *	31-134
Endrin	162	0	28.8	18 *	42-139
4,4'-DDT	162	0	83.0	51	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
gamma-BHC (Lindane)	64.9	6.42	10 *	18	50	46-127
Heptachlor	64.9	41.0	63	-47 *	31	35-130
Aldrin	64.9	6.22	10 *	-35	43	34-132
Dieldrin	162	26.9	17 *	52 *	38	31-134
Endrin	162	20.4	13 *	32	45	42-139
4,4'-DDT	162	48.5	30	52 *	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 3 out of 6 outside limits
 Spike Recovery: 8 out of 12 outside limits

COMMENTS:

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: 69-D9-0025
 Lab Code: SWOK Case No.: URS1 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-27-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	56.6	0	4.05	7 *	46-127
Heptachlor	56.6	0	17.4	31 *	35-130
Aldrin	56.6	0	4.87	9 *	34-132
Dieldrin	142	0	10.4	7 *	31-134
Endrin	142	0	12.3	9 *	42-139
4,4'-DDT	142	0	15.4	11 *	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	56.6	2.33	4 *	55 *	50 46-127
Heptachlor	56.6	15.9	28 *	10	31 35-130
Aldrin	56.6	2.38	4 *	77 *	43 34-132
Dieldrin	142	8.49	6 *	15	38 31-134
Endrin	142	11.0	8 *	12	45 42-139
4,4'-DDT	142	15.7	11 *	0	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 2 out of 6 outside limits
 Spike Recovery: 12 out of 12 outside limits

COMMENTS:

B-000431

AR302913

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU7118S

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

49-Je-4

Lab Code: SWO

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix: SDIL

Level (low/med): LOW

% Solids for Sample: 82.1

Concentration Units (ug/L or mg/kg dry weight): MG/100

Analyte	Control Limit (CR)	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	RP	QIM
Aluminum						NR
Antimony	75-125	41.1166	9.3898	121.80	26.0	IP
Arsenic	75-125	12.8331	10.3376	8.74	25.6	IP
Barium	75-125	525.8800	44.4749	487.21	98.8	IP
Beryllium	75-125	12.0911	.7279	12.18	93.3	IP
Cadmium	75-125	16.6324	.7236	12.18	136.5	IP
Calcium						NR
Chromium	75-125	63.6065	13.1971	48.72	103.5	IP
Cobalt	75-125	124.9619	16.0449	121.80	89.4	IP
Copper	75-125	71.0625	9.2119	60.90	101.6	IP
Iron						NR
Lead		12.8867	21.5468	4.97	-177.0	IP
Magnesium						NR
Manganese		422.3400	564.0384	121.80	-116.3	IP
Mercury	75-125	.6380	.1059	.58	110.0	CV
Nickel	75-125	125.0394	12.0481	121.80	92.8	IP
Potassium						NR
Selenium	75-125	1.4519	.7236	2.44	59.5	IP
Silver	75-125	13.5486	1.1738	12.18	101.6	IP
Sodium						NR
Thallium	75-125	11.1011	.7236	12.18	91.1	IP
Vanadium	75-125	145.3405	27.0428	121.80	97.1	IP
Zinc	75-125	144.6271	30.5433	121.80	93.7	IP
Cyanide	75-125	22.8327	2.2308	21.22	107.6	IP

FORM V (Part 1) - IN

B000432

AR302914

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU7118D

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

UD-26-9

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 82.1

% Solids for Duplicate: 81.0

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	%RPD	QIM
Aluminum		7833.2704		8310.0126		5.9	P
Antimony		9.3898	B	9.0607	B	3.6	P
Arsenic	2.4	10.3376		7.9635		25.9	F
Barium		44.4749	B	41.9990	B	5.7	P
Beryllium		.7279	B	.7577	B	4.0	P
Cadmium		.7236	U	.7308	U		P
Calcium		197.3684	B	296.6852	B	40.2	P
Chromium		13.1971		12.2747		7.2	P
Cobalt	12.1	16.0449		18.8376		16.0	P
Copper	6.0	9.2119		9.3155		1.1	P
Iron		20811.4500		18275.2110		13.0	P
Lead	.7	21.5468		17.0767		23.1	F
Magnesium		613.1355	B	784.9454	B	24.6	P
Manganese		564.0384		1269.9271		77.0	*P
Mercury		.1059	U	.1160	U		CV
Nickel	9.6	12.0481		11.5899		3.9	P
Potassium		644.2161	B	820.7474	B	24.1	P
Selenium		.7236	U	.7308	U		F
Silver		1.1738	B	1.3165	B	11.5	P
Sodium		128.6086	B	109.0511	B	16.5	P
Thallium		.7236	U	.7308	U		F
Vanadium	12.1	27.0428		25.4772		6.0	P
Zinc		30.5435		29.6771		2.9	P
Cyanide	2.2	2.2308	U	2.3069	U		C

FORM VI - IN

7/88

AR302915

B000433

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU7128D

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

4D-27-10

Lab Code: SWDK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 94.8

% Solids for Duplicate: 94.3

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	%RPD	Q/M
Aluminum		2237.6733		1964.4591		13.0	IF
Antimony		5.7920	B	5.5406	U	200.0	IF
Arsenic	2.1	2.4123		2.3718		1.7	IF
Barium		26.5101	B	24.4178	B	8.2	IF
Beryllium		.2329	B	.2147	B	8.1	IF
Cadmium		.6393	U	.6393	U		IF
Calcium		353.1672	B	140.7698	B	86.0	IF
Chromium	2.1	4.3303		3.3664		25.0	IF
Cobalt		10.4408	B	10.5615	B	1.1	IF
Copper	5.3	7.4102		7.3503		.8	IF
Iron		4181.7016		3685.4094		12.6	IF
Lead	.6	2.3100		1.7496		27.6	IF
Magnesium		201.5872	B	142.7607	B	34.2	IF
Manganese		876.5560		860.8684		1.8	IF
Mercury		.0811	U	.0727	U		ICV
Nickel		4.0951	B	4.0004	B	2.3	IF
Potassium		255.6604	B	204.2921	B	22.3	IF
Selenium		.6393	U	3.1965	U		IF
Silver		.4262	U	.4262	U		IF
Sodium		100.6810	B	109.7978	B	8.7	IF
Thallium		.6393	U	.6393	U		IF
Vanadium		7.4847	B	6.4405	B	15.0	IF
Zinc	4.3	10.2730		9.8552		4.2	IF
Cyanide	1.8	1.7818	U	1.5513	U		IC

FORM VI - IN

7/88

AR302916

B-000434

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU71285

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089 : UO-27-12

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 94.8

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

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q/M
Aluminum						NR
Antimony	75-125	77.5663	5.7920 B	106.55	67.4	NR
Arsenic	75-125	8.7840	2.4123 U	8.52	74.8	IF
Barium	75-125	452.1251	26.5101 B	426.20	99.9	IF
Beryllium	75-125	10.1973	.2329 B	10.66	53.5	IF
Cadmium	75-125	14.7282	.6393 U	10.66	138.2	NR
Calcium						NR
Chromium	75-125	47.4392	4.3303 B	42.62	101.1	IF
Cobalt	75-125	111.0639	10.4408 B	106.55	94.4	IF
Copper	75-125	59.8774	7.4102 B	53.28	98.5	IF
Iron						NR
Lead	75-125	6.2460	2.3100 U	4.26	92.4	IF
Magnesium						NR
Manganese		947.3352	876.5560 B	106.55	66.4	IF
Mercury	75-125	.4001	.0811 U	.36	111.1	CV
Nickel	75-125	105.0147	4.0951 B	106.55	94.7	IF
Potassium						NR
Selenium	75-125	1.8050	.6393 U	2.13	84.7	IF
Silver	75-125	11.2425	.4262 U	10.66	105.5	IF
Sodium						NR
Thallium	75-125	14.9810	.6393 U	10.66	140.5	NR
Vanadium	75-125	113.9135	7.4847 B	106.55	99.9	IF
Zinc	75-125	111.4155	10.2730 B	106.55	94.9	IF
Cyanide	75-125	14.3221	1.7818 U	15.70	91.2	C

Comments:

FORM V (Part 1) - IN

AR302917 B-000435

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 34711

SAS No.:

SDG No.: MU7101

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum				325.0	263.7		225.0 424.0	81.1
Antimony				211.0	142.6		127.0 294.0	67.6
Arsenic				917.0	887.4		635.0 1199.0	96.8
Barium				4.8	5.2	B	0.0 40.0	108.3
Beryllium				19.4	17.9		16.5 22.3	92.3
Cadmium				45.4	47.0		35.7 55.1	103.5
Calcium				196200.0	177133.5		166900.0 225600.0	90.3
Chromium				99.6	100.4		79.2 120.0	100.8
Cobalt				144.0	147.9		124.0 162.0	102.7
Copper				6910.0	6911.8		6006.0 7820.0	100.0
Iron				22430.0	20269.2		17770.0 27080.0	90.4
Lead				236.0	248.9		188.0 285.0	105.5
Magnesium				118100.0	120224.5		100400.0 129900.0	101.8
Manganese				208.0	209.5		177.0 239.0	100.7
Mercury				12.7	11.9		8.5 17.0	93.7
Nickel				60.9	67.3		49.2 72.6	110.5
Potassium				50.0	69.0	U	0.0 1000.0	0.0
Selenium				39.2	23.9		19.1 59.4	61.0
Silver				22.2	17.3		15.5 29.0	77.9
Sodium				50.0	73.4	U	0.0 1000.0	0.0
Thallium				39.0	28.4		24.6 53.5	72.8
Vanadium				65.8	60.5		51.7 79.9	91.9
Zinc				187.0	189.6		138.0 236.0	101.4
Cyanide				5.6	6.4		4.3 6.9	114.3

FORM VII - IN

7/88

AR302918

6000436

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 34711 SAS No.: SDG No.: MU7101

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)			Limits	%R
	True	Found	%R	True	Found	C		
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide				5.6	6.4		4.3	6.9/114.3

FORM VII - IN

7/88

AR302919

B-000437

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3471b

DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

DUPLICATE SAMPLE RESULTS

	(3471.21) UD-26-10 SAMPLE CONC. (mg/Kg)	(3471.22) UD-26-10 FIELD DUP DUPLICATE CONC RECOVERY	RELATIVE PERCENT DIFFERENCE
TPH	47	21	76.5%

B-000439

AR302921

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3471a
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

DUPLICATE SAMPLE RESULTS

	(3471.26) UD-27-9 SAMPLE CONC. (mg/Kg)	(3471.27) UD-27-9 FIELD DUP DUPLICATE CONC RECOVERY	RELATIVE PERCENT DIFFERENCE
TPH	695	660	5.2%

B-000440

AR302922

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3471c
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3471.28, 29 (MS)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-27-10, UD-27-10 MS (MS)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	0	639	96%

SAMPLE MATRIX: SOIL
SWLO # 3471.30 (MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-27-10 MSD (MSD)

COMPOUND	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	RECOVERY PERCENT DIFFERENCE
TPH	595	89	7%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

(3471.31) UD-27-15 SAMPLE CONC. (mg/Kg)	(3471.32) UD-27-15 FIELD DUP DUPLICATE CONC RECOVERY	RELATIVE PERCENT DIFFERENCE
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TPH <10 <10 AR302923 ° B-000441

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL - TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-28-8 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	54.9	0	47.6	87	59-172
Trichloroethene	54.9	0	44.5	81	62-137
Benzene	54.9	0	50.4	92	66-142
Toluene	54.9	4.86	55.4	92	59-139
Chlorobenzene	54.9	0	51.2	93	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	54.9	50.7	92	-6	22 59-172
Trichloroethene	54.9	48.1	88	-8	24 62-137
Benzene	54.9	53.4	97	-5	21 66-142
Toluene	54.9	58.6	98	-6	21 59-139
Chlorobenzene	54.9	54.1	99	-6	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
 Spike Recovery: 0 out of 10 outside limits

COMMENTS: UD-28-8 URS
 INST: I SWL#3491.08 5

b-000442

AR302924

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL - TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike -- EPA Sample No.: UD-28-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	352	0	342	97	59-172
Trichloroethene	352	0	302	86	62-137
Benzene	352	21.3	335	89	66-142
Toluene	352	547	449	-28 *	59-139
Chlorobenzene	352	0	335	95	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	RFD #	QC LIMITS RFD REC.
1,1-Dichloroethene	342	247	72	30 *	22 59-172
Trichloroethene	342	264	77	11	24 62-137
Benzene	342	314	86	3	21 66-142
Toluene	342	890	100	-356 *	21 59-139
Chlorobenzene	342	277	81	16	21 60-133

Column to be used to flag recovery and RFD values with an asterisk

* Values outside of QC limits

RFD: 2 out of 5 outside limitsSpike Recovery: 1 out of 10 outside limitsCOMMENTS: UD-28-10 URS
INST: I SWL#3491.13 1

8000443

AR302925

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL - TULSAContract: URSLab Code: SWOKCase No.: URS

SAS No.: _____

SDG No.: _____

Matrix Spike - EPA Sample No.: UD-28-8Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	GC LIMITS REC.
Phenol	14700	0	9240	63	26-90
2-Chlorophenol	14700	0	8800	60	25-102
1,4-Dichlorobenzene	7330	0	4420	60	28-104
N-Nitroso-di-n-prop.(1)	7330	0	4470	61	41-126
1,2,4-Trichlorobenzene	7330	0	5010	68	38-107
4-Chloro-3-methylphenol	14700	0	8800	60	26-103
Acenaphthene	7330	0	4710	64	31-117
4-Nitrophenol	14700	0	10400	71	11-114
2,4-Dinitrotoluene	7330	0	5000	68	28-89
Pentachlorophenol	14700	0	9820	67	17-109
Pyrene	7330	0	6080	83	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	14700	9970	68	-8	35 26-90
2-Chlorophenol	14700	8430	57	5	50 25-102
1,4-Dichlorobenzene	7330	4680	64	-6	27 28-104
N-Nitroso-di-n-prop.(1)	7330	4940	67	-9	38 41-126
1,2,4-Trichlorobenzene	7330	5090	69	-1	23 38-107
4-Chloro-3-methylphenol	14700	9090	62	-3	33 26-103
Acenaphthene	7330	4830	66	-3	19 31-117
4-Nitrophenol	14700	10500	71	0	50 11-114
2,4-Dinitrotoluene	7330	4980	68	0	47 28-89
Pentachlorophenol	14700	10100	69	-3	47 17-109
Pyrene	7330	5760	79	5	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 11 outside limitsSpike Recovery: 0 out of 22 outside limitsCOMMENTS: UD-28-8 URS
INST:F SWL#3491.08

B 000444

FORM III SV-2

1/87 Rev

AR302926

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL - TULSAContract: URSLab Code: SWOKCase No.: URS

SAS No.:

SDG No.:

Matrix Spike - EPA Sample No.: UD-28-10Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	9390	783	6650	62	26-90
2-Chlorophenol	9390	0	6010	64	25-102
1,4-Dichlorobenzene	4700	0	3060	65	28-104
N-Nitroso-di-n-prop. (1)	4700	0	3010	64	41-126
1,2,4-Trichlorobenzene	4700	0	3160	67	38-107
4-Chloro-3-methylphenol	9390	0	5660	60	26-103
Acenaphthene	4700	0	2950	63	31-137
4-Nitrophenol	9390	0	6310	67	11-114
2,4-Dinitrotoluene	4700	0	3030	64	28-89
Pentachlorophenol	9390	0	6180	66	17-109
Pyrene	4700	0	3340	71	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	18800	13600	68	-9	35 26-90
2-Chlorophenol	18800	10900	58	10	50 25-102
1,4-Dichlorobenzene	9390	6210	66	-2	27 28-104
N-Nitroso-di-n-prop. (1)	9390	6660	71	-10	38 41-126
1,2,4-Trichlorobenzene	9390	6710	71	-6	23 38-107
4-Chloro-3-methylphenol	18800	14400	77	-25	33 26-103
Acenaphthene	9390	6640	71	-12	19 31-137
4-Nitrophenol	18800	17400	93	-33	50 11-114
2,4-Dinitrotoluene	9390	7590	81	-23	47 28-89
Pentachlorophenol	18800	16000	85	-25	47 17-109
Pyrene	9390	7680	82	-14	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of GC limits

RPD: 0 out of 11 outside limitsSpike Recovery: 0 out of 22 outside limits

COMMENTS: UD-28-10 URS
INST:F SWL#3491.13

8000445

AR302927

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS3 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UD-28-8 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	58.5	0	0	0 *	46-127
Heptachlor	58.5	0	0	0 *	35-130
Aldrin	58.5	0	0	0 *	34-132
Dieldrin	146	0	0	0 *	31-134
Endrin	146	0	0	0 *	42-139
4,4'-DDT	146	0	0	0 *	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	58.5	0	0 *	0	50 46-127
Heptachlor	58.5	0	0 *	0	31 35-130
Aldrin	58.5	0	0 *	0	43 34-132
Dieldrin	146	0	0 *	0	38 31-134
Endrin	146	0	0 *	0	45 42-139
4,4'-DDT	146	0	0 *	0	50 23-134

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 6 outside limits
 Spike Recovery: 12 out of 12 outside limits

COMMENTS:

000446

AR302928

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URSLab Code: SWOK Case No.: URS3 SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: UD-28-10 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	74.9	0	0	0 *	46-127
Heptachlor	74.9	0	19.4	26 *	35-130
Aldrin	74.9	0	2.28	3 *	34-132
Dieldrin	187	0	5.57	3 *	31-134
Endrin	187	0	5.63	3 *	42-139
4,4'-DDT	187	0	9.22	5 *	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	74.9	35.1	47	-200 *	50 46-127
Heptachlor	74.9	46.7	62	-82 *	31 35-130
Aldrin	74.9	4.68	6 *	-67 *	43 34-132
Dieldrin	187	11.1	6 *	-67 *	38 31-134
Endrin	187	12.9	7 *	-80 *	45 42-139
4,4'-DDT	187	17.2	9 *	-57 *	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 6 out of 6 outside limitsSpike Recovery: 10 out of 12 outside limits

COMMENTS:

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU9108S
UD-28-8

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 34911

SAS No.:

SDG No.: MU9101

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 92.3

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

Analyte	Control	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q/M
	Limit ZR							
Aluminum								NR
Antimony	75-125	53.9498		5.5780	U	108.34	49.8	N/P
Arsenic	75-125	3.4800		1.0727	U	8.67	40.1	N/P
Barium	75-125	402.0817		13.9001	B	433.37	89.6	P
Beryllium	75-125	9.7774		.3281	B	10.83	87.3	P
Cadmium	75-125	14.0567		.6436	U	10.83	129.8	N/P
Calcium								NR
Chromium	75-125	42.1575		7.7247		43.34	79.4	P
Cobalt	75-125	99.0376		2.8829	B	108.34	88.8	P
Copper	75-125	52.5512		3.4326	U	54.17	97.0	P
Iron								NR
Lead	75-125	26.6956		1.4310		21.67	116.6	P
Magnesium								NR
Manganese	75-125	115.1641		29.6518		108.34	78.9	P
Mercury	75-125	.4899		.0867	U	.47	104.2	CV
Nickel	75-125	97.3223		4.4623	B	108.34	85.7	P
Potassium								NR
Selenium	75-125	.8862	B	.4291	U	2.17	40.8	N/P
Silver	75-125	9.9922		.9660	B	10.83	83.3	P
Sodium								NR
Thallium	75-125	9.4171		.6436	U	10.83	87.0	P
Vanadium	75-125	102.8554		7.6559	B	108.34	87.9	P
Zinc	75-125	101.6433		7.5003		108.34	86.9	P
Cyanide	75-125	19.4760		2.0916	U	18.30	106.4	C

Comments:

FORM V (Part 1) - IN

B-000448

AR302930

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU9108D
LD-28-3

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 34911 SAS No.: SDG No.: MU9101

Matrix (water/soil): SOIL Level (low/med): LOW

% Solids for Sample: 92.3 % Solids for Duplicate: 92.5

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

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	%RPD	Q:M
Aluminum		2522.8166	2023.5802	22.0	*IP
Antimony		5.5780	5.5780		IP
Arsenic		1.0727	1.0727		IF
Barium		13.9001	13.5585	2.5	IP
Beryllium		.3281	.2291	35.5	IP
Cadmium		.6436	.6436		IP
Calcium		141.8867	122.6381	14.6	IP
Chromium	2.1	7.7247	3.1094	85.2	*IP
Cobalt		2.8829	2.2901	22.9	IP
Copper		3.4326	3.4326		IP
Iron		10661.6440	6263.0471	52.0	*IP
Lead	.6	1.4310	1.4009	2.1	IF
Magnesium		114.0137	107.8540	5.6	IP
Manganese		29.6518	26.8876	9.8	IP
Mercury	.1	.0867	.1032		ICV
Nickel		4.4623	3.3205	29.3	IP
Potassium		137.0880	115.4425	17.1	IP
Selenium		.4291	.4291		IF
Silver		.9660	.6766	35.2	IP
Sodium		86.8963	78.7359	200.0	IP
Thallium		.6436	.6436		IF
Vanadium		7.6559	4.9057	43.8	IP
Zinc	4.3	7.5003	5.1727	36.7	IP
Cyanide	2.1	2.0916	1.4256		IC

FORM VI - IN

7/88

B-000443

AR302931

U.S. EPA - CLP

SA
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU9113S
UD-28-12

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089
 Lab Code: SWOK Case No.: 34911 SAS No.: SDG No.: MU9101
 Matrix: SOIL Level (low/med): LOW
 % Solids for Sample: 68.5

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

Analyte	Control	Spiked Sample		Sample		Spike		Q/M
	Limit	Result (SSR)	C	Result (SR)	C	Added (SA)	%R	
Aluminum								NR
Antimony	75-125	38.9629		20.5503		143.12	12.9	NIF
Arsenic	75-125	4.3102		1.4454	U	11.56	37.3	NIF
Barium	75-125	745.5347		192.7841		572.49	96.6	P
Beryllium	75-125	15.7354		2.6492		14.31	91.4	P
Cadmium	75-125	18.2473		2.1389		14.31	112.6	P
Calcium								NR
Chromium	75-125	155.6607		85.7599		57.25	122.1	P
Cobalt	75-125	184.6723		49.9731		143.12	94.1	P
Copper	75-125	127.6200		66.1761		71.56	85.9	P
Iron								NR
Lead	75-125	116.2102		15.8247		5.78	1736.8	NIF
Magnesium								NR
Manganese		1766.6485		1586.4646		143.12	125.9	P
Mercury	75-125	.6901		.1081	U	.66	104.6	CV
Nickel	75-125	193.8230		59.0939		143.12	94.1	P
Potassium								NR
Selenium	75-125	.6967	B	.5782	U	2.89	24.1	NIF
Silver	75-125	17.6264		5.1577		14.31	87.1	P
Sodium								NR
Thallium	75-125	11.5054		.8672	U	14.45	79.6	P
Vanadium	75-125	201.1794		66.3254		143.12	94.2	P
Zinc	75-125	286.3349		144.2490		143.12	99.3	P
Cyanide	75-125	28.7580		2.9197	U	27.44	104.8	C

Comments:

FORM V (Part 1) - IN

B 000450

AR302932

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU9113D
UO-23-10

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089
 Lab Code: SWOK Case No.: 34911 SAS No.: SDG No.: MU9101
 Matrix (water/soil): SOIL Level (low/med): LOW
 % Solids for Sample: 68.5 % Solids for Duplicate: 69.4

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	%RPD	QIM
Aluminum		22371.8510		21768.9520		2.7	IP
Antimony	17.3	20.5503		7.5161	U	200.0	*IP
Arsenic		1.4454	U	1.4454	U		IF
Barium	57.8	192.7841		216.0446		11.4	IP
Beryllium	1.4	2.6492		2.8245		6.4	IP
Cadmium	1.4	2.1389		2.7022		23.3	IP
Calcium	1445.4	1453.7170		1529.2785		5.1	IP
Chromium		85.7599		90.0334		4.9	IP
Cobalt	14.5	49.9731		57.3158		13.7	IP
Copper		66.1761		64.5317		2.5	IP
Iron		72582.1210		73002.0230		.6	IP
Lead	.9	15.8247		23.5039		39.1	*IP
Magnesium	1445.4	4453.2379		4803.0067		7.6	IP
Manganese		1586.4646		1649.2505		3.9	IP
Mercury		.1081	U	.1269	U		CV
Nickel		59.0939		75.7511		24.7	*IP
Potassium	1445.4	3368.2399		3718.2328		9.9	IP
Selenium		.5782	U	.5782	U		IF
Silver	2.9	5.1577		5.1546		.1	IP
Sodium		254.2322	B	255.3464	B	.4	IP
Thallium		.8672	U	.8672	U		IF
Vanadium	14.5	66.3254		73.7967		10.7	IP
Zinc		144.2490		174.5596		19.0	IP
Cyanide	2.9	2.9197	U	2.8402	U		IC

FORM VI - IN

7/88

B-000451

AR302933

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK.

Contract: 68-D9-0089

Lab Code: SWDK Case No.: 34911

SAS No.:

SDG No.: MU9101

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)			Limits	%R
	True	Found	%R	True	Found	C		
Aluminum				325.0	263.0		225.0 424.0	80.9
Antimony				211.0	132.8		127.0 294.0	62.9
Arsenic				917.0	1009.0		635.0 1199.0	110.0
Barium				4.8	5.2	B	0.0 40.0	108.3
Beryllium				19.4	17.1		16.5 22.3	88.1
Cadmium				45.4	45.8		35.7 55.1	100.9
Calcium				196200.0	202735.8		166800.0 225600.0	103.3
Chromium				99.6	95.1		79.2 120.0	95.5
Cobalt				144.0	143.6		124.0 162.0	99.7
Copper				6910.0	7260.1		6006.0 7820.0	105.7
Iron				22430.0	20066.4		17770.0 27080.0	89.5
Lead				236.0	229.7		188.0 285.0	97.3
Magnesium				118100.0	126122.0		100400.0 129900.0	106.8
Manganese				208.0	197.0		177.0 239.0	94.7
Mercury				12.7	12.7		8.5 17.0	100.0
Nickel				60.9	62.4		49.2 72.6	102.5
Potassium				50.0	69.0	U	0.0 1000.0	0.0
Selenium				39.2	22.4		19.1 59.4	57.1
Silver				22.2	15.9		15.5 29.0	71.6
Sodium				50.0	127.0	B	0.0 1000.0	254.0
Thallium				39.0	38.1		24.6 53.5	97.7
Vanadium				65.8	57.6		51.7 79.9	87.5
Zinc				187.0	179.9		138.0 236.0	96.2
Cyanide				5.6	6.3		4.3 6.9	112.5

FORM VII - IN

7/88

6-000452

AR302934

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 34911

SAS No.:

SDG No.: MU9101

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)			Limits	%R
	True	Found	%R	True	Found	C		
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide				5.6	6.2		4.3	6.9 110.7

FORM VII - IN

7/88

B-000453

AR302935

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3491c
DATE: 09-06-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3491.13, 14 (MS)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-28-10, UD-28-10 MS (MS)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	333	0	308	92%

SAMPLE MATRIX: SOIL
SWLO # 3491.15 (MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UD-28-10 MSD (MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	RECOVERY PERCENT DIFFERENCE
TPH	308	92	0%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

	(3491.11) UD-28-9 SAMPLE CONC. (mg/Kg)	(3491.12) UD-28-9 FIELD DUP DUPLICATE CONC RECOVERY	RELATIVE PERCENT DIFFERENCE
TPH	470	428	9.4 B 000455

AR302937

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089
 Lab Code: SWOK Case No.: 31931 SAS No.: SDG No.: MTP101
 Solid LCS Source: EPA0287
 Aqueous LCS Source: EPA-LV

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum				325.0	303.4		225.0 424.0	93.
Antimony				211.0	171.6		127.0 294.0	81.
Arsenic				917.0	794.5		635.0 1199.0	86.
Barium				4.8	4.5	B	0.0 40.0	93.
Beryllium				19.4	18.2		16.5 22.3	93.
Cadmium				45.4	44.8		35.7 55.1	98.
Calcium				196200.0	195687.8		166800.0 225600.0	99.
Chromium				99.6	85.1		79.2 120.0	85.
Cobalt				144.0	129.6		124.0 162.0	90.
Copper				6910.0	6858.1		6006.0 7820.0	99.
Iron				22430.0	18592.6		17770.0 27080.0	82.
Lead				236.0	222.4		188.0 285.0	94.
Magnesium				118100.0	120801.4		100400.0 129900.0	102.
Manganese				208.0	209.6		177.0 239.0	100.
Mercury				12.7	10.7		8.5 17.0	84.
Nickel				60.9	51.8		49.2 72.6	85.
Potassium				50.0	69.7	U	0.0 1000.0	0.
Selenium				39.2	51.5		19.1 59.4	131.
Silver				22.2	16.3		15.5 29.0	73.
Sodium				50.0	220.8	B	0.0 1000.0	441.
Thallium				39.0	42.2		24.6 53.5	108.
Vanadium				65.8	61.8		51.7 79.9	93.
Zinc				187.0	165.5		138.0 236.0	88.
Cyanide				5.6	6.6		4.3 6.9	117.

FORM VII - IN

7/88

B-000456

AR302938

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF-OK Contract: 68-D9-0089
 Lab Code: SWOK Case No.: 31931 SAS No.: SDG No.: MTP101
 Solid LCS Source: EPA0287
 Aqueous LCS Source: EPA-LV

Analyte	Aqueous (ug/L)			Solid (mg/kg)			Limits	%R
	True	Found	%R	True	Found	C		
Aluminum				325.0	305.2		225.0 424.0	93.
Antimony				211.0	175.3		127.0 294.0	83.
Arsenic				917.0	858.4		635.0 1199.0	93.
Barium				4.8	4.6	B	0.0 40.0	95.
Beryllium				19.4	18.2		16.5 22.3	93.
Cadmium				45.4	44.5		35.7 55.1	98.
Calcium				196200.0	204745.2		166800.0 225600.0	104.
Chromium				99.6	83.9		79.2 120.0	84.
Cobalt				144.0	128.4		124.0 162.0	89.
Copper				6910.0	7053.6		6006.0 7820.0	102.
Iron				22430.0	18379.7		17770.0 27080.0	81.
Lead				236.0	270.8		188.0 285.0	114.
Magnesium				118100.0	126189.6		100400.0 129900.0	106.
Manganese				208.0	206.3		177.0 239.0	99.
Mercury								
Nickel				60.9	50.8		49.2 72.6	83.
Potassium				50.0	69.0	U	0.0 1000.0	0.
Selenium				39.2	42.5		19.1 59.4	108.
Silver				22.2	16.2		15.5 29.0	73.
Sodium				50.0	232.2	B	0.0 1000.0	464.
Thallium				39.0	39.7		24.6 53.5	101.
Vanadium				65.8	58.4		51.7 79.9	88.
Zinc				187.0	151.6		138.0 236.0	81.
Cyanide				5.6	6.0		4.3 6.9	107.

FORM VII - IN

7/88

B-000457

AR302939

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3193a
DATE: 08-22-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3193.05 (MS)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UR-1 (MS)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	17	600	87%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B000458

AR302940

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWDK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-11 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	61.0	0	64.0	105	59-172
Trichloroethene	61.0	0	55.0	90	62-137
Benzene	61.0	0	58.8	96	66-142
Toluene	61.0	4.93	61.0	92	59-139
Chlorobenzene	61.0	0	59.9	98	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
1,1-Dichloroethene	61.0	54.8	90	15	22	59-172
Trichloroethene	61.0	48.3	79	13	24	62-137
Benzene	61.0	55.1	90	6	21	66-142
Toluene	61.0	56.1	84	9	21	59-139
Chlorobenzene	61.0	53.5	88	11	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
 Spike Recovery: 0 out of 10 outside limits

COMMENTS: UR-11 URS
 INST: I SWL#3210.11 5

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWDK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-18 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	GC LIMITS REC.
1,1-Dichloroethene	61.0	0	48.2	79	59-172
Trichloroethene	61.0	0	46.8	77	62-137
Benzene	61.0	0	52.3	86	66-142
Toluene	61.0	1.12	52.2	84	59-139
Chlorobenzene	61.0	0	47.9	79	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	GC LIMITS RPD REC.
1,1-Dichloroethene	61.0	52.0	85	-7	22 59-172
Trichloroethene	61.0	48.8	80	-4	24 62-137
Benzene	61.0	56.6	93	-8	21 66-142
Toluene	61.0	60.1	97	-14	21 59-139
Chlorobenzene	61.0	54.9	90	-13	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of GC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS:

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSAContract: URSLab Code: SWOKCase No.: URS

SAS No.: _____

SDG No.: _____

Matrix Spike - EPA Sample No.: UR-11Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	16300	0	10400	64	26- 90
2-Chlorophenol	16300	0	11300	69	25-102
1,4-Dichlorobenzene	8130	0	5570	69	28 104
N-Nitroso-di-n-prop.(1)	8130	0	4900	60	41 126
1,2,4-Trichlorobenzene	8130	0	5940	73	38 107
4-Chloro-3-methylphenol	16300	0	12200	75	26 103
Acenaphthene	8130	0	5170	64	31-137
4-Nitrophenol	16300	0	12800	79	11-114
2,4-Dinitrotoluene	8130	0	6560	81	28- 89
Pentachlorophenol	16300	0	15500	95	17-109
Pyrene	8130	0	7410	91	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Phenol	16300	9840	60	6	35	26- 90
2-Chlorophenol	16300	11300	69	0	50	25-102
1,4-Dichlorobenzene	8130	5610	69	0	27	28 104
N-Nitroso-di-n-prop.(1)	8130	4900	60	0	38	41 126
1,2,4-Trichlorobenzene	8130	5880	72	1	23	38 107
4-Chloro-3-methylphenol	16300	11600	71	5	33	26 103
Acenaphthene	8130	5220	64	0	19	31-137
4-Nitrophenol	16300	13300	82	-4	50	11-114
2,4-Dinitrotoluene	8130	6740	83	-2	47	28- 89
Pentachlorophenol	16300	15700	96	-1	47	17-109
Pyrene	8130	7700	95	-4	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 11 outside limitsSpike Recovery: 0 out of 22 outside limits

COMMENTS: UR-11 URS - 306/1ML/1UL

45/4-300 @12 ESCC DB-5 30M/1UM INSTR:B

b-000461

AR302943

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-18 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	16300	0	10800	66	26- 90
2-Chlorophenol	16300	0	11600	71	25-102
1,4-Dichlorobenzene	8130	0	6180	76	28 104
N-Nitroso-di-n-prop.(1)	8130	0	5390	66	41 126
1,2,4-Trichlorobenzene	8130	0	6070	75	38 107
4-Chloro-3-methylphenol	16300	0	11600	71	26 103
Acenaphthene	8130	0	5380	66	31-137
4-Nitrophenol	16300	0	13200	81	11-114
2,4-Dinitrotoluene	8130	0	6430	79	28- 89
Pentachlorophenol	16300	0	12500	77	17-109
Pyrene	8130	0	6980	86	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	16300	11000	67	-2	35 126- 90
2-Chlorophenol	16300	11200	69	3	50 125-102
1,4-Dichlorobenzene	8130	5780	71	7	27 128 104
N-Nitroso-di-n-prop.(1)	8130	4620	57	15	38 141 126
1,2,4-Trichlorobenzene	8130	6180	76	-1	23 138 107
4-Chloro-3-methylphenol	16300	11200	69	3	33 126 103
Acenaphthene	8130	5380	66	0	19 131-137
4-Nitrophenol	16300	12400	76	6	50 111-114
2,4-Dinitrotoluene	8130	6340	78	1	47 128- 89
Pentachlorophenol	16300	14100	86	-11	47 117-109
Pyrene	8130	8220	101	-16	36 135-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

COMMENTS: UR-18 URS - 306/1ML/1UL
 45/4-300 @12 FSCC DB-5 30M/1UM INSTR:B

B-000462

AR302944

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS2 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-11 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	64.9	0	58.1	90	46-127
Heptachlor	64.9	0	58.3	90	35-130
Aldrin	64.9	0	50.2	77	34-132
Dieldrin	162	0	124	77	31-134
Endrin	162	0	139	86	42-139
4,4'-DDT	162	0	131	81	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	64.9	55.5	86	5	50 46-127
Heptachlor	64.9	61.5	95	-5	31 35-130
Aldrin	64.9	45.7	70	10	43 34-132
Dieldrin	162	115	71	8	38 31-134
Endrin	162	127	78	10	45 42-139
4,4'-DDT	162	127	78	4	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits
 Spike Recovery: 0 out of 12 outside limits

COMMENTS:

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS2 SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-18 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	64.9	0	61.1	94	46-127
Heptachlor	64.9	0	59.8	92	35-130
Aldrin	64.9	0	42.8	66	34-132
Dieldrin	162	0	131	81	31-134
Endrin	162	0	147	91	42-139
4,4'-DDT	162	0	133	82	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	64.9	48.1	74	24	50 46-127
Heptachlor	64.9	47.0	72	24	31 35-130
Aldrin	64.9	33.5	52	24	43 34-132
Dieldrin	162	103	64	23	38 31-134
Endrin	162	113	70	26	45 42-139
4,4'-DDT	162	100	62	28	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits
 Spike Recovery: 0 out of 12 outside limits

COMMENTS:

B'000464

AR302946

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MURO11D
u2-11

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32101

SAS No.:

SDG No.: MURO01

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 81.8

% Solids for Duplicate: 81.7

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

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	%RPD	Q/M
Aluminum		26257.2511	16671.3936	44.7	* F
Antimony		6.2323 U	6.3570 U		F
Arsenic		6.7237 B	1.5379 B	125.5	F
Barium	47.9	70.1049	64.3570	8.5	F
Beryllium		1.1647 B	.9738 B	17.9	F
Cadmium		.7191 U	.7335 U		F
Calcium		370.1479 B	177.3499 B	70.4	F
Chromium		24.8607	18.5755	28.9	* F
Cobalt		8.1521 B	8.1877 B	.4	F
Copper	6.0	9.3177	8.5091	9.1	F
Iron		24798.4190	19575.9970	23.5	* F
Lead		15.8804	16.6846	4.9	F
Magnesium		740.3014 B	585.8698 B	23.3	F
Manganese		334.6542	336.1175	.4	F
Mercury		.1111 U	.1063 U		CV
Nickel	9.6	16.9308	12.1235	33.1	F
Potassium		562.0280 B	364.5459 B	42.6	F
Selenium		.7191 U	.7335 U		F
Silver	2.4	2.5188	2.1093 B	17.7	F
Sodium		143.7088 B	95.6516 B	40.2	F
Thallium		.7191 U	.7335 U		F
Vanadium	12.0	48.5868	41.2530	16.3	F
Zinc		37.1579	27.5274	29.8	* F
Cyanide	4.7	4.6660 U	4.7754 U		C

FORM VI - IN

7/88

AR302947

B-000465

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: SOUTHWEST LAB OF DK

Contract: 68-D9-0089

MUR011S

U2-11

Lab Code: SWOK

Case No.: 32101

SAS No.:

SDG No.: MUR001

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 81.8

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

Analyte	Control	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q/M
	Limit %R							
Aluminum								NR
Antimony	75-125	122.8259		6.2323	U	122.25	100.5	F
Arsenic	75-125	12.8264		6.7237	B	9.78	62.4	N F
Barium	75-125	499.6192		70.1049		489.00	87.8	F
Beryllium	75-125	12.3859		1.1647	B	12.22	91.8	F
Cadmium	75-125	15.2161		.7191	U	12.22	124.5	F
Calcium								NR
Chromium	75-125	66.0600		24.8607		48.90	84.3	P
Cobalt	75-125	120.3339		8.1521	B	122.25	91.8	F
Copper	75-125	64.4564		9.3177		61.12	90.2	F
Iron								NR
Lead	75-125	21.7506		15.8804		4.89	120.0	F
Magnesium								NR
Manganese	75-125	394.6178		334.6542		122.25	49.0	N F
Mercury	75-125	.6296		.1111	U	.61	103.2	CV
Nickel	75-125	129.2566		16.9308		122.25	91.9	P
Potassium								NR
Selenium	75-125	3.1638		.7191	U	2.44	129.7	N F
Silver	75-125	13.4547		2.5188		12.22	89.5	F
Sodium								NR
Thallium	75-125	8.9095		.7191	U	12.22	72.9	N F
Vanadium	75-125	154.2157		48.5868		122.25	86.4	F
Zinc	75-125	141.9919		37.1579		122.25	85.8	F
Cyanide	75-125	46.7665		4.6660	U	48.70	96.0	C

Comments:

FORM V (Part 1) - IN

B-000466

AR302948

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MURO18D
UCL-18

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32101

SAS No.:

SDG No.: MURO01

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 83.4

% Solids for Duplicate: 80.3

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

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	%RPD	Q/M
Aluminum		30348.7903	18793.5252	47.0	* F
Antimony		6.1733 U	6.2350 U		P
Arsenic		2.2224 B	1.1990 U	200.0	F
Barium	47.5	74.4930	60.1522	21.3	P
Beryllium	1.2	1.2091	.9954 B	19.4	P
Cadmium		.8003 B	.7194 U	200.0	F
Calcium		339.1670 B	343.9675 B	1.4	P
Chromium		24.7395	19.6345	23.0	* P
Cobalt		10.0909 B	7.8465 B	25.0	P
Copper	5.9	14.1672	10.6694	28.2	P
Iron		23197.4870	20194.6660	13.8	P
Lead		10.2393	10.5324	2.8	F
Magnesium		712.9946 B	588.0194 B	19.2	P
Manganese		368.1684	331.8914	10.4	P
Mercury		.1142 U	.1090 U		CV
Nickel	9.5	17.8207	12.4859	35.2	P
Potassium		610.3079 B	430.8673 B	34.5	P
Selenium		.7123 U	.7194 U		F
Silver	2.4	2.4739	2.1644 B	13.3	P
Sodium		133.9031 B	113.5546 B	16.4	P
Thallium		.7123 U	.7194 U		F
Vanadium	11.9	47.6826	39.3763	19.1	P
Zinc		36.0384	30.7651	15.8	P
Cyanide	4.8	4.8348 U	4.6838 U		C

FORM VI - IN

7/88

AR302949

B-000467

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MUR0105

Lab Name: SOUTHWEST LAB OF OR

Contract: 68-D9-0089

Lab Code: S90K

Case No.: 32101

SAS No.:

SDS No.: MUR001

Matrix: SOIL

Level (low/med): 1.00

% Solids for Sample: 83.4

Concentration Units (ug/L or mg/kg dry weight): NG/KO

Analyte	Control	Spiked Sample Result (SSP) C	Sample Result (SR) C	Spike Added (SA)	SR	Q/M
	Limit NR					
Aluminum						NR
Antimony	75-125	17.9710	6.1733 U	119.90	15.0	NR
Arsenic	75-125	9.6115	2.2224 B	9.59	77.1	F
Barium	75-125	488.1937	74.2930	470.62	86.3	F
Beryllium	75-125	17.4792	1.2091	11.99	24.0	F
Cadmium	75-125	15.8475	.8003 B	11.99	125.5	F
Calcium						NR
Chromium	75-125	71.0178	94.7395	47.96	76.5	F
Cobalt	75-125	127.9209	16.0909 B	119.90	98.3	F
Copper	75-125	65.7396	14.1672	89.95	86.0	F
Lead	75-125	18.8393	5.1200	4.80	285.9	NR
Magnesium						NR
Manganese	75-125	475.6981	368.1684	119.90	99.7	F
Mercury	75-125	.5144	.1142 U	.50	102.9	CV
Nickel	75-125	156.3593	17.8207	119.90	98.9	F
Potassium						NR
Selenium	75-125	1.9448	.7123 U	2.40	81.0	F
Silver	75-125	13.7178	2.4739	11.99	93.8	F
Sodium						NR
Thallium	75-125	13.6930	.7123 U	11.99	114.2	F
Vanadium	75-125	159.0780	47.6826	119.90	92.9	F
Zinc	75-125	149.6225	36.0384	119.90	94.7	F
Cyanide	75-125	43.5637	4.8348 U	42.37	102.8	C

Comments:

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 32151 SAS No.: SDB No.: MBV501

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum				325.0	307.9		225.0 424.0	94.7
Antimony				211.0	172.6		127.0 294.0	81.8
Arsenic				917.0	828.0		635.0 1199.0	90.3
Barium				4.8	4.4	B	0.0 40.0	91.7
Beryllium				19.4	18.6		16.5 22.3	95.9
Cadmium				45.4	46.3		35.7 55.1	102.0
Calcium				196200.0	204097.6		166800.0 225600.0	104.0
Chromium				99.6	85.5		79.2 120.0	85.8
Cobalt				144.0	131.9		124.0 162.0	91.6
Copper				6910.0	6981.1		6006.0 7820.0	101.0
Iron				22430.0	18908.1		17770.0 27080.0	84.3
Lead				236.0	232.8		188.0 285.0	98.6
Magnesium				118100.0	125823.3		100400.0 129900.0	106.5
Manganese				208.0	212.0		177.0 239.0	101.9
Mercury				12.7	11.9		8.5 17.0	93.7
Nickel				60.9	55.0		49.2 72.6	90.3
Potassium				50.0	69.0	U	0.0 1000.0	0.0
Selenium				39.2	50.4		19.1 59.4	128.6
Silver				22.2	16.1		15.5 29.0	72.5
Sodium				50.0	228.6	B	0.0 1000.0	457.2
Thallium				39.0	38.7		24.6 53.5	99.2
Vanadium				65.8	59.1		51.7 79.9	89.8
Zinc				187.0	170.1		138.0 236.0	91.0
Cyanide				5.6	5.9		4.3 6.9	105.4

FORM VII - IN

7/88

6-000463

AR302951

U.S. EPA - CLP

7
LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32101

SAS No.:

SDG No.: MUR001

Solid LCS Source: EPA0287

Aqueous LCS Source: EPA-LV

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits	%R	
Aluminum				325.0	301.6		225.0	424.0	92.8
Antimony				211.0	170.8		127.0	294.0	80.9
Arsenic				917.0	793.5		635.0	1199.0	86.5
Barium				4.8	4.4	B	0.0	40.0	91.7
Beryllium				19.4	18.1		16.5	22.3	93.3
Cadmium				45.4	45.3		35.7	55.1	99.8
Calcium				196200.0	203100.4		166800.0	225600.0	103.5
Chromium				99.6	84.4		79.2	120.0	84.7
Cobalt				144.0	132.2		124.0	162.0	91.8
Copper				6910.0	6914.0		6006.0	7820.0	100.1
Iron				22430.0	18551.8		17770.0	27080.0	82.7
Lead				236.0	243.4		188.0	285.0	103.1
Magnesium				118100.0	126207.6		100400.0	129900.0	106.9
Manganese				208.0	209.1		177.0	239.0	100.5
Mercury				12.7	13.4		8.5	17.0	105.5
Nickel				60.9	54.3		49.2	72.6	89.2
Potassium				50.0	68.3	U	0.0	1000.0	0.0
Selenium				39.2	35.5		19.1	59.4	90.6
Silver				22.2	16.2		15.5	29.0	73.0
Sodium				50.0	241.1	B	0.0	1000.0	482.2
Thallium				39.0	36.6		24.6	53.5	93.8
Vanadium				65.8	56.7		51.7	79.9	86.2
Zinc				187.0	163.5		138.0	236.0	87.4
Cyanide				5.6	6.4		4.3	6.9	114.3

FORM VII - IN

7/88

D-000470

AR302952

U.S. EPA - CLP

7
LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089
 Lab Code: SWOK Case No.: 32101 SAS No.: SDG No.: MUR001
 Solid LCS Source: EPA0287
 Aqueous LCS Source: EPA-LV

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide				5.6	6.2		4.3	6.9 110.7

FORM VII - IN

7/88

B 000471

AR302953

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32101

SAS No.:

SDG No.: MUR001

Solid LCS Source: EPA0287

Aqueous LCS Source: EPA-LV

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits	%R	
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide				5.6	5.9		4.3	6.9	105.4

FORM VII - IN

7/88

B-000472

AR302954

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3210b
DATE: 08-22-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3210.11/3210.12 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UR-11 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	16	660	97%

	MSD CONC. (mg/Kg)	MSD PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	580	85%	13%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

6-000473

AR302955

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3210a
DATE: 08-22-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3210.01 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UR-18 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	12	600	88%
	MSD CONC. (mg/Kg)	MSD PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE	
TPH	620	91%	-3%	

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B000474

AR302956

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOR Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix: Spike --EPA Sample No.: UR-29 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	63.3	0	60.9	96	59-172
Trichloroethene	63.3	0	52.9	84	62-137
Benzene	63.3	0	57.3	91	66-142
Toluene	63.3	0	63.8	101	59-139
Chlorobenzene	63.3	0	62.4	99	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	50.0	46.3	93	3	22 59-172
Trichloroethene	50.0	42.1	84	0	24 62-137
Benzene	50.0	47.0	94	-3	21 66-142
Toluene	50.0	49.4	99	2	21 59-139
Chlorobenzene	50.0	48.4	97	2	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS: UR-29 URS
INST: I SWL#3238.1B 1

B000475

AR302957

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSAContract: URSLab Code: SWDKCase No.: URS

SAS No.: _____

SDG No.: _____

Matrix Spike - EPA Sample No.: UR-29Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	GC LIMITS REC.
Phenol	16900	0	9370	55	26-90
2-Chlorophenol	16900	0	9880	58	25-102
1,4-Dichlorobenzene	8440	0	4900	58	28-104
N-Nitroso-di-n-prop.(1)	8440	0	5230	62	41-126
1,2,4-Trichlorobenzene	8440	0	5990	71	38-107
4-Chloro-3-methylphenol	16900	0	12000	71	26-103
Acenaphthene	8440	0	4810	57	31-137
4-Nitrophenol	16900	0	11600	69	11-114
2,4-Dinitrotoluene	8440	0	5990	71	28-89
Pentachlorophenol	16900	0	13800	82	17-109
Pyrene	8440	0	6810	81	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	GC LIMITS RPD	REC.
Phenol	16900	10500	62	-12	35	26-90
2-Chlorophenol	16900	10600	63	-8	50	25-102
1,4-Dichlorobenzene	8440	5860	69	-17	27	28-104
N-Nitroso-di-n-prop.(1)	8440	5620	67	-8	38	41-126
1,2,4-Trichlorobenzene	8440	6650	79	-11	23	38-107
4-Chloro-3-methylphenol	16900	13300	79	-11	33	26-103
Acenaphthene	8440	5380	64	-12	19	31-137
4-Nitrophenol	16900	13800	82	-17	50	11-114
2,4-Dinitrotoluene	8440	6700	79	-11	47	28-89
Pentachlorophenol	16900	14700	87	-6	47	17-109
Pyrene	8440	7620	90	-11	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of GC limits

RPD: 0 out of 11 outside limitsSpike Recovery: 0 out of 22 outside limitsCOMMENTS: UR-29 URS
INST:F SWL#3238.18

B-000476

FORM III SV-2

1/87 Rev

AR302958

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSAContract: URSLab Code: SWOKCase No.: URS

SAS No.: _____

SDG No.: _____

Matrix Spike - EPA Sample No.: UR-29Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	67.4	0	27.5	41 *	46-127
Heptachlor	67.4	0	56.1	83	35-130
Aldrin	67.4	0	42.8	64	34-132
Dieldrin	168	0	95.3	57	31-134
Endrin	168	0	139	83	42-139
4,4'-DDT	168	0	79.7	47	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
gamma-BHC (Lindane)	67.4	32.1	48	-16	50	46-127
Heptachlor	67.4	70.4	104	-22	31	35-130
Aldrin	67.4	50.7	75	-16	43	34-132
Dieldrin	168	108	64	-12	38	31-134
Endrin	168	163	97	-16	45	42-139
4,4'-DDT	168	95.0	57	-19	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limitsSpike Recovery: 1 out of 12 outside limits

COMMENTS:

6
DUPLICATES

MU3818D
UR-29

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32381

SAS No.:

SDG No.: MU3801

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 80.8

% Solids for Duplicate: 80.5

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	%RFD	Q	M
Aluminum		12669.7310		9489.6451		28.7	*	P
Antimony		10.7573	B	7.1034	B	40.9		P
Arsenic		1.5968	B	1.2134	U	200.0		F
Barium		38.4616	B	36.6138	B	4.9		P
Beryllium		.5859	B	.4800	B	19.9		P
Cadmium		.7280	U	.8173	B	200.0		F
Calcium	1213.4	415.4685	B	1418.1846		109.4		P
Chromium		15.2248		12.5031		19.6		P
Cobalt		4.7935	B	3.9152	B	20.2		P
Copper		3.8827	U	3.8827	U			P
Iron		11956.7090		10423.1550		13.7		P
Lead	.7	35.1145		64.9146		59.6	*	F
Magnesium		487.2812	B	527.1464	B	7.9		P
Manganese		193.4232		154.9957		22.1	*	F
Mercury		.1076	U	.0952	U			CV
Nickel		7.9070	B	5.8295	B	30.2		P
Potassium		317.8021	B	258.1746	B	20.7		P
Selenium		.7280	U	.7280	U			F
Silver		1.1356	B	.8757	B	25.8		P
Sodium		89.0604	U	89.0604	U			P
Thallium		.7280	U	.7280	U			F
Vanadium	12.1	29.4925		25.3255		15.2		P
Zinc		24.2823		25.0888		3.3		P
Cyanide		2.1637	U	1.8695	U			C

B-000478

AR302960

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU3818S

UL-29

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32381

SAS No.:

SDG No.: MU3801

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 80.8

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

Analyte	Control	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
	Limit %R								
Aluminum									NR
Antimony	75-125	34.0555		10.7573	B	123.76	18.8	N	P
Arsenic	75-125	9.7252		1.5968	B	9.90	82.1	F	F
Barium	75-125	540.0754		38.4614	B	495.05	101.3	P	P
Beryllium	75-125	13.3160		.5859	B	12.38	102.8	P	P
Cadmium	75-125	17.5714		.7280	U	12.38	141.9	N	P
Calcium									NR
Chromium	75-125	65.5982		15.2248		49.50	101.8	P	P
Cobalt	75-125	129.6936		4.7935	B	123.76	100.9	P	P
Copper	75-125	64.4117		3.8827	U	61.88	104.1	P	P
Iron									NR
Lead		38.3663		35.1145		4.95	65.7	F	F
Magnesium									NR
Manganese	75-125	258.8459		193.4232		123.76	52.9	N	P
Mercury	75-125	.5518		.1076	U	.52	106.1	C	V
Nickel	75-125	137.2036		7.9070	B	123.76	104.5	P	P
Potassium									NR
Selenium	75-125	2.6634		.7280	U	2.48	107.4	F	F
Silver	75-125	13.7098		1.1356	B	12.38	101.6	P	P
Sodium									NR
Thallium	75-125	11.5050		.7280	U	12.38	92.9	F	F
Vanadium	75-125	154.8102		29.4925		123.76	101.3	P	P
Zinc	75-125	149.2531		24.2823		123.76	101.0	P	P
Cyanide	75-125	16.5940		2.1637	U	19.98	87.4	C	C

Comments:

FORM V (Part 1) - IN

B-000479

AR302961

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3238b
DATE: 08-22-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3238.19/3238.20 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UR-29 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	20	610	88%
	MSD CONC. (mg/Kg)	MSD PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE	
TPH	590	85%	3%	

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

AR302962

B-000450

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA

Contract: URS

Lab Code: SWOK

Case No.: URS

SAS No.:

SDG No.:

Matrix Spike - EPA Sample No.: UR-36

Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS %	QC LIMITS REC. #
1,1-Dichloroethene	59.5	0	52.4	88	59-172
Trichloroethene	59.5	0	48.3	81	62-137
Benzene	59.5	0	54.0	91	66-142
Toluene	59.5	0	56.2	94	59-139
Chlorobenzene	59.5	0	52.7	89	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD %	RPD #	QC LIMITS RPD	REC.
1,1-Dichloroethene	59.5	55.7	94	-7	22	59-172
Trichloroethene	59.5	49.3	83	-2	24	62-137
Benzene	59.5	55.7	94	-3	21	66-142
Toluene	59.5	57.7	97	-3	21	59-139
Chlorobenzene	59.5	55.0	92	-3	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limitsSpike Recovery: 0 out of 10 outside limits

COMMENTS:

B-000481

AR302963

3D
SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-36 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	15900	0	9690	61	26- 90
2-Chlorophenol	15900	0	10200	64	25-102
1,4-Dichlorobenzene	7940	0	5210	66	28 104
N-Nitroso-di-n-prop.(1)	7940	0	5030	63	41 126
1,2,4-Trichlorobenzene	7940	0	6340	80	38 107
4-Chloro-3-methylphenol	15900	0	13100	82	26 103
Acenaphthene	7940	0	4910	62	31-137
4-Nitrophenol	15900	0	12200	77	11-114
2,4-Dinitrotoluene	7940	0	6260	79	28- 89
Pentachlorophenol	15900	0	15800	99	17-109
Pyrene	7940	0	7010	88	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	15900	10200	64	-5	35 26- 90
2-Chlorophenol	15900	11400	72	-12	50 25-102
1,4-Dichlorobenzene	7940	5900	74	-11	27 28 104
N-Nitroso-di-n-prop.(1)	7940	5730	72	-13	38 41 126
1,2,4-Trichlorobenzene	7940	5800	73	9	23 38 107
4-Chloro-3-methylphenol	15900	12700	80	2	33 26 103
Acenaphthene	7940	5570	70	-12	19 31-137
4-Nitrophenol	15900	11600	73	5	50 11-114
2,4-Dinitrotoluene	7940	6190	78	1	47 28- 89
Pentachlorophenol	15900	6650	42	81 *	47 17-109
Pyrene	7940	6340	105	-18	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 1 out of 11 outside limits
 Spike Recovery: 0 out of 22 outside limits

COMMENTS: UR-36 URS
 INST:F SWL#3238.23

B000482

AR302964

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: UR-36 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	63.3	0	23.3	37 *	46-127
Heptachlor	63.3	0	49.0	77	35-130
Aldrin	63.3	0	34.8	55	34-132
Dieldrin	158	0	79.6	50	31-134
Endrin	158	0	116	73	42-139
4,4'-DDT	158	0	67.2	43	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
gamma-BHC (Lindane)	63.3	25.5	40 *	-8	50	46-127
Heptachlor	63.3	50.0	79	-3	31	35-130
Aldrin	63.3	40.0	63	-14	43	34-132
Dieldrin	158	85.6	54	-8	38	31-134
Endrin	158	123	78	-7	45	42-139
4,4'-DDT	158	79.2	50	-15	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limitsSpike Recovery: 2 out of 12 outside limits

COMMENTS:

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU3823D
u/c-36

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32381

SAS No.:

SDG No.: MU3801

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 45.1

% Solids for Duplicate: 35.0

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

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	%RPD	Q/M
Aluminum		29029.7530	20961.3630	32.3	*IF
Antimony		14.0809	11.5299	200.0	IF
Arsenic		2.6341	2.2173	200.0	IF
Barium	88.7	94.0937	90.4920	3.9	IF
Beryllium		1.2014	1.0426	14.2	IF
Cadmium		1.3304	1.4644	200.0	IF
Calcium		502.4249	522.9091	4.0	IF
Chromium		28.7104	24.4055	16.2	IF
Cobalt		13.8538	13.1625	5.1	IF
Copper	11.1	28.5291	28.4973	.1	IF
Iron		26665.4980	25277.8680	5.3	IF
Lead		20.6475	20.1986	2.2	IF
Magnesium		983.1386	900.2547	8.8	IF
Manganese		490.5392	515.7161	5.0	IF
Mercury	.2	.1774	.1706		ICV
Nickel		16.1720	10.9229	38.7	IF
Potassium		767.0114	540.0680	34.7	IF
Selenium		1.3304	1.3304		IF
Silver		2.4168	1.8623	25.9	IF
Sodium		186.6486	162.7494	200.0	IF
Thallium		1.3304	1.3304		IF
Vanadium	22.2	54.6419	48.7696	11.4	IF
Zinc		56.2147	64.4316	13.6	IF
Cyanide		3.9736	3.8229		IC

FORM VI - IN

7/88

B-000484

AR302966

U.S. EPA - CLP

SA
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU3823S

UR-36

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32381

SAS No.:

SDG No.: MU3801

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 45.1

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R	Q/M
Aluminum						NR
Antimony	75-125	43.2981	14.0809	219.53	13.3	NF
Arsenic	75-125	17.7206	2.6341	17.74	85.0	F
Barium	75-125	969.9728	94.0937	878.14	99.7	F
Beryllium	75-125	22.1600	1.2014	21.95	95.5	F
Cadmium	75-125	30.8983	1.3304	21.95	140.8	NF
Calcium						NR
Chromium	75-125	113.0438	28.7104	87.81	96.0	F
Cobalt	75-125	223.9765	13.8538	219.53	95.7	F
Copper	75-125	143.3277	28.5291	109.77	104.6	F
Iron						NR
Lead	75-125	30.3947	20.6475	8.87	109.9	F
Magnesium						NR
Manganese	75-125	690.9433	490.5392	219.53	91.3	F
Mercury	75-125	1.0440	.1774	.92	113.5	CV
Nickel	75-125	224.1379	16.1720	219.53	94.7	F
Potassium						NR
Selenium	75-125	2.5366	1.3304	4.44	57.1	NF
Silver	75-125	23.6550	2.4168	21.95	96.8	F
Sodium						NR
Thallium	75-125	21.7738	1.3304	22.17	98.2	F
Vanadium	75-125	271.3027	54.6419	219.53	98.7	F
Zinc	75-125	273.3179	56.2147	219.53	98.9	F
Cyanide	75-125	41.8784	3.9736	43.14	97.1	C

Comments:

FORM V (Part 1) - IN

B000485

AR302967

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3238c
DATE: 08-22-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30G
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLO # 3238.24/3238.25 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UR-36 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	0	600	90%
	MSD CONC. (mg/Kg)	MSD PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE	
TPH	600	90%		0%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B-000488

AR302968

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: UR-44 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	GC LIMITS REC.
1,1-Dichloroethene	56.8	0	54.7	96	59-172
Trichloroethene	56.8	0	52.3	92	62-137
Benzene	56.8	0	56.9	100	66-141
Toluene	56.8	1.15	63.3	109	59-172
Chlorobenzene	56.8	0	61.1	108	60-137

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	GC LIMITS RPD	REC.
1,1-Dichloroethene	56.8	51.5	91	5	22	59-172
Trichloroethene	56.8	49.5	87	6	24	62-137
Benzene	56.8	54.5	96	4	21	66-141
Toluene	56.8	60.9	105	4	21	59-172
Chlorobenzene	56.8	57.6	101	7	21	60-137

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of GC limits

RPD: 0 out of 5 outside limitsSpike Recovery: 0 out of 10 outside limits

COMMENTS:

6000487

FORM III VOA-2

1/87 Rev.

AR302969

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-44 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	15200	0	8720	57	26-90
2-Chlorophenol	15200	0	10000	66	25-102
1,4-Dichlorobenzene	7580	0	5320	69	28-104
N-Nitroso-di-n-prop.(1)	7580	0	4340	57	41-126
1,2,4-Trichlorobenzene	7580	0	5620	74	38-107
4-Chloro-3-methylphenol	15200	0	10600	70	26-103
Acenaphthene	7580	0	4540	60	31-137
4-Nitrophenol	15200	0	11200	74	11-114
2,4-Dinitrotoluene	7580	0	5260	69	28-89
Pentachlorophenol	15200	0	11500	76	17-109
Pyrene	7580	0	6400	84	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	15200	10200	67	-16	35 26-90
2-Chlorophenol	15200	10200	67	-2	50 25-102
1,4-Dichlorobenzene	7580	5040	66	4	27 28-104
N-Nitroso-di-n-prop.(1)	7580	4400	58	-2	38 41-126
1,2,4-Trichlorobenzene	7580	5630	74	0	23 38-107
4-Chloro-3-methylphenol	15200	11100	73	-4	33 26-103
Acenaphthene	7580	4970	66	-10	19 31-137
4-Nitrophenol	15200	12500	82	-10	50 11-114
2,4-Dinitrotoluene	7580	5720	75	-8	47 28-89
Pentachlorophenol	15200	12200	80	-5	47 17-109
Pyrene	7580	7030	93	-10	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

COMMENTS: UR-44 URS
INST:F SWL#3238.09

3F
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: UR-44 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	60.4	0	46.3	77	46-127
Heptachlor	60.4	0	68.2	113	35-130
Aldrin	60.4	0	45.0	74	34-132
Dieldrin	151	0	124	82	31-134
Endrin	151	0	137	91	42-139
4,4'-DDT	151	0	125	83	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	60.4	42.8	71	8	50 46-127
Heptachlor	60.4	65.5	108	5	31 35-130
Aldrin	60.4	47.9	79	-7	43 34-132
Dieldrin	151	129	85	-4	38 31-134
Endrin	151	140	93	-2	45 42-139
4,4'-DDT	151	137	91	-9	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits
 Spike Recovery: 0 out of 12 outside limits

COMMENTS:

B-000433

AR302971

U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU3809D
UR-44

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089
 Lab Code: SWOK Case No.: 32381 SAS No.: SDG No.: MU3801
 Matrix (water/soil): SOIL Level (low/med): LOW
 % Solids for Sample: 88.7 % Solids for Duplicate: 87.8

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

Analyte	Control Limit	Sample (S)	Duplicate (D)	%RPD	Q/M
Aluminum		7780.9541	10990.8290	34.2	*P
Antimony		5.8625	5.7475		P
Arsenic		5.6370	1.1053		F
Barium	45.1	58.8247	75.6617	25.0	P
Beryllium		.4359	.4886	11.4	P
Cadmium		.6764	.6632		P
Calcium		410.7929	321.4701	24.4	P
Chromium		11.9042	13.5648	13.0	P
Cobalt		4.2115	4.1887	.5	P
Copper		3.6077	3.5369		P
Iron		11807.4200	12364.9810	4.6	P
Lead	.7	74.0135	71.7886	3.1	P
Magnesium		320.3267	348.1100	8.3	P
Manganese		199.6961	195.8722	1.9	P
Mercury	.1	.4264	.2649	46.7	*CV
Nickel		5.0528	8.4617	50.4	P
Potassium		321.7134	366.8301	13.1	P
Selenium		.6764	.6632		F
Silver		.6084	.7053	14.8	P
Sodium		82.7508	81.1283		P
Thallium		.6764	.6632		F
Vanadium	11.3	20.8301	21.9900	5.4	P
Zinc		25.0729	30.6289	19.9	P
Cyanide	1.9	1.8604	2.0878		C

FORM VI - IN

7/88

B-000430

AR302972

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MU3809S

AR-44

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32381

SAS No.:

SDG No.: MU3801

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 88.7

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R	QIM
Aluminum						NR
Antimony	75-125	116.8702	5.8625 U	111.62	104.7	P
Arsenic	75-125	2.0829 B	5.6370 U	8.93	23.3	NF
Barium	75-125	471.5489	58.8247	446.49	92.4	P
Beryllium	75-125	10.8792	.4359 B	11.16	93.6	P
Cadmium	75-125	14.2190	.6764 U	11.16	127.4	NF
Calcium						NR
Chromium	75-125	56.0626	11.9042	44.65	98.9	P
Cobalt	75-125	106.0665	4.2115 B	111.62	91.3	P
Copper	75-125	53.0721	3.6077 U	55.81	95.1	P
Iron						NR
Lead		47.0158	74.0135	4.46	-605.3	F
Magnesium						NR
Manganese	75-125	313.0247	199.6961	111.62	101.5	P
Mercury	75-125	.2523	.4264	.54	-32.2	NF
Nickel	75-125	110.5212	5.0528 B	111.62	94.5	P
Potassium						NR
Selenium	75-125	2.0516	.6764 U	2.23	92.0	F
Silver	75-125	11.1689	.6084 B	11.16	94.6	P
Sodium						NR
Thallium	75-125	.6697 U	.6764 U	11.16	0.0	NF
Vanadium	75-125	127.6149	20.8301	111.62	95.7	P
Zinc	75-125	126.4397	25.0729	111.62	90.8	P
Cyanide	75-125	14.7471	1.8604 U	18.18	81.1	C

Comments:

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 32381

SAS No.:

SDG No.: MU3801

Solid LCS Source: EPA0287

Aqueous LCS Source: EPA-LV

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits	%R	
Aluminum	2010.0	2039.70	101.5	325.0	304.1		225.0	424.0	93.6
Antimony	1010.0	997.16	98.7	211.0	169.3		127.0	294.0	80.2
Arsenic	47.4	44.46	93.8	917.0	799.2		635.0	1199.0	87.2
Barium	1960.0	1969.40	100.5	4.8	4.6	B	0.0	40.0	95.8
Beryllium	483.0	479.52	99.3	19.4	18.8		16.5	22.3	96.9
Cadmium	502.0	506.55	100.9	45.4	45.8		35.7	55.1	100.9
Calcium	48700.0	47777.00	98.1	196200.0	220818.4		166800.0	225600.0	112.5
Chromium	510.0	507.50	99.5	99.6	86.3		79.2	120.0	86.6
Cobalt	502.0	484.13	96.4	144.0	133.9		124.0	162.0	93.0
Copper	515.0	513.52	99.7	6910.0	7133.5		6006.0	7820.0	103.2
Iron	2040.0	1944.30	95.3	22430.0	18995.1		17770.0	27080.0	84.7
Lead	4500.0	4605.50	102.3	236.0	227.2		188.0	285.0	96.3
Magnesium	24600.0	24119.00	98.0	118100.0	132763.7		100400.0	129900.0	112.4
Manganese	504.0	487.31	96.7	208.0	214.7		177.0	239.0	103.2
Mercury				12.7	14.8		8.5	17.0	116.5
Nickel	480.0	490.44	102.2	60.9	52.1		49.2	72.6	85.6
Potassium	49000.0	47463.00	96.9	50.0	69.0	U	0.0	1000.0	0.0
Selenium	52.6	50.06	95.2	39.2	38.8		19.1	59.4	99.0
Silver	500.0	470.82	94.2	22.2	16.6		15.5	29.0	74.8
Sodium	49600.0	49154.00	99.1	50.0	232.7	B	0.0	1000.0	465.4
Thallium	97.0	84.75	87.4	39.0	33.4		24.6	53.5	85.6
Vanadium	488.0	496.69	101.8	65.8	59.4		51.7	79.9	90.3
Zinc	3100.0	2880.30	92.9	187.0	167.1		138.0	236.0	89.4
Cyanide				5.6	5.9		4.3	6.9	105.4

FORM VII - IN

7/88

B000492

AR302974

LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST LAB OF OK Contract: 68-D9-0089

Lab Code: SWOK Case No.: 32381 SAS No.: SDG No.: MU3801

Solid LCS Source: EPA0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L)			Solid (mg/kg)			Limits	%R	
	True	Found	%R	True	Found	C			
Aluminum				325.0	308.8		225.0	424.0	95.0
Antimony				211.0	163.1		127.0	294.0	77.3
Arsenic				917.0	955.8		635.0	1199.0	104.2
Barium				4.8	4.8	B	0.0	40.0	100.0
Beryllium				19.4	17.8		16.5	22.3	91.8
Cadmium				45.4	46.3		35.7	55.1	102.0
Calcium				196200.0	215861.3		166800.0	225600.0	110.0
Chromium				99.6	83.7		79.2	120.0	84.0
Cobalt				144.0	128.2		124.0	162.0	89.0
Copper				6910.0	7481.2		6006.0	7820.0	108.3
Iron				22430.0	18648.3		17770.0	27080.0	83.1
Lead				236.0	229.2		188.0	285.0	97.1
Magnesium				118100.0	134970.3		100400.0	129900.0	114.3
Manganese				208.0	207.5		177.0	239.0	99.8
Mercury				12.7	11.7		8.5	17.0	92.1
Nickel				60.9	51.4		49.2	72.6	84.4
Potassium				50.0	69.0	U	0.0	1000.0	0.0
Selenium				39.2	37.4		19.1	59.4	95.4
Silver				22.2	16.2		15.5	29.0	73.0
Sodium				50.0	222.9	B	0.0	1000.0	445.8
Thallium				39.0	42.6		24.6	53.5	109.2
Vanadium				65.8	59.3		51.7	79.9	90.1
Zinc				187.0	164.7		138.0	236.0	88.1
Cyanide				5.6	5.0		4.3	6.9	89.3

FORM VII - IN

7/88

B-000493

AR302975

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Suite "C" • Broken Arrow, Oklahoma 74012 • 918-251-2858

CLIENT: URS CONSULTANTS, INC.
570 DELAWARE AVE.
BUFFALO, NY 14202
ATTN: PETER FAIRBANKS

REPORT: 3238a
DATE: 08-22-90

LABORATORY BLANK

SAMPLE MATRIX: SOIL
SAMPLE ID: METHOD BLANK

SAMPLE AMOUNT: 30g
DILUTION FACTOR: 1

COMPOUND	DETECTION LIMIT (mg/Kg)	AMOUNT FOUND (mg/Kg)
TPH	10.0	ND

TPH MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY DATA

SAMPLE MATRIX: SOIL
SWLD # 3238.10/3238.12 (MS/MSD)
PROJECT: DELAWARE SAND & GRAVEL
SAMPLE ID: UR-44 (MS/MSD)

	SPIKE CONC. (mg/Kg)	SAMPLE CONC. (mg/Kg)*	MS CONC. (mg/Kg)*	MS PERCENT RECOVERY
TPH	667	22	590	85%

	MSD CONC. (mg/Kg)	MSD PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TPH	610	88%	-3%

* = DILUTION FACTOR NOT APPLIED TO THESE CONCENTRATIONS

B000494

AR302976

3B
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS

Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: BC-6-1 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	54.4	0	42.6	78	59-172
Trichloroethene	54.4	0	39.2	72	62-137
Benzene	54.4	0	47.5	87	66-142
Toluene	54.4	0	51.8	95	59-139
Chlorobenzene	54.4	0	48.6	89	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	54.4	46.2	85	-9	22 59-172
Trichloroethene	54.4	39.6	73	-1	24 62-137
Benzene	54.4	48.7	90	-3	21 66-142
Toluene	54.4	52.1	96	-1	21 59-139
Chlorobenzene	54.4	48.3	89	0	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS: BC-6-1 URS
INST: I SWL#3678.30 5

SOIL SEMI-VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: BC-6-1 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	14500	0	5430	37	26-90
2-Chlorophenol	14500	0	5150	36	25-102
1,4-Dichlorobenzene	7250	0	2960	41	28-104
N-Nitroso-di-n-prop.(1)	7250	0	2440	34 *	41-126
1,2,4-Trichlorobenzene	7250	0	2850	39	38-107
4-Chloro-3-methylphenol	14500	0	5940	41	26-103
Acenaphthene	7250	0	2810	39	31-137
4-Nitrophenol	14500	0	5340	37	11-114
2,4-Dinitrotoluene	7250	0	2890	40	28-89
Pentachlorophenol	14500	0	3690	25	17-109
Pyrene	7250	0	3030	42	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	14500	5080 5010	35	6	35 26-90
2-Chlorophenol	14500	5280 4800	36 32	5 2	50 25-102
1,4-Dichlorobenzene	7250	2850 2400	39 33	5 2	27 28-104
N-Nitroso-di-n-prop.(1)	7250	2350 2000	32 28 *	6 1	38 41-126
1,2,4-Trichlorobenzene	7250	2480 2600	41 36 *	5 2	23 38-107
4-Chloro-3-methylphenol	14500	5390 4770	37 37	6 2	33 26-103
Acenaphthene	7250	2920 2440	40 34	3 1	19 31-137
4-Nitrophenol	14500	5150 4920	40 34	8	50 11-114
2,4-Dinitrotoluene	7250	3190 2620	44 34	6 1	47 28-89
Pentachlorophenol	14500	3880 4320	27 32	8 1	47 17-109
Pyrene	7250	2970 2760	41 38	2 10	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 11 outside limits
 Spike Recovery: 25 out of 22 outside limits

COMMENTS: BC-6-1 URS
 INST:F SWL#3678.30

DEC 14 1990


SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URSLab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____Matrix Spike - EPA Sample No.: BC-6-1 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	5.78	0	3.49	60	46-127
Heptachlor	5.78	0	6.98	121	35-130
Aldrin	5.78	0	2.75	48	34-132
Dieldrin	14.5	0	20.3	140 *	31-134
Endrin	14.5	0	17.6	121	42-139
4,4'-DDT	14.5	0	7.70	53	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	5.78	4.04	70	-15	50 46-127
Heptachlor	5.78	8.12	140 *	-15	31 35-130
Aldrin	5.78	4.46	77	-46 *	43 34-132
Dieldrin	14.5	9.35	64	75 *	38 31-134
Endrin	14.5	18.9	130	-7	45 42-139
4,4'-DDT	14.5	9.75	67	-23	50 23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 2 out of 6 outside limitsSpike Recovery: 2 out of 12 outside limits

COMMENTS:

AMERICAN ANALYTICAL & TECHNICAL SERVICES
MATRIX SPIKE EVALUATION FORM

URS						
SAMPLE ID		BC-6-1MS				
WET WT.		10.0				
	ng added	amount in spl. ppt	amount added ppt	amount detected ppt	% recovery	TARGET recovery limits
2378 TCDF	2.5	0	250	298.5	119	60 - 140 %
HPCDF	10	0	1000	1513.0	151%	60 - 140 %
OCDF	25	0	2500	3859.0	154%	60 - 140 %
2378 TCDD	2.5	0	250	424.6	170%	60 - 140 %
PCDD	10	0	1000	1596.3	160%	60 - 140 %
HXCDD	10	0	1000	1502.3	150%	60 - 140 %

DUPLICATE SAMPLE EVALUATION

SAMPLE ID	BC-6-1MS	BC-6-1MSD	
WET WT.	10.0	10.0	
	amount in spl. ppt	amount in spl. ppt	RPD
2378 TCDF	298.5	313.8	5.0
HPCDF	1513.0	1390.0	8.5
OCDF	3859.0	3732.0	3.3
2378 TCDD	424.6	385.7	9.6
PCDD	1596.3	1507.7	5.7
HXCDD	1502.3	1520.8	1.2

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MATRIX SPIKE EVALUATION FORM

URS

SAMPLE ID BC-6-1MSD

WET WT. 10.0

	amount ng added	amount in spl. ppt	amount added ppt	amount detected ppt	% recovery	TARGET recovery limits
2378 TCDF	2.5	0	250	313.8	126	60 - 140 %
HPCDF	10	0	1000	1390.0	139	60 - 140 %
OCDF	25	0	2500	3732.0	1492	60 - 140 %
2378 TCDD	2.5	0	250	385.7	1542	60 - 140 %
PCDD	10	0	1000	1507.7	1512	60 - 140 %
HXCDD	10	0	1000	1520.8	1522	60 - 140 %

DUPLICATE SAMPLE EVALUATION

SAMPLE ID BC-6-1MS BC-6-1MSD

WET WT. 10.0 10.0

	amount in spl. ppt	amount in spl. ppt	RPD
2378 TCDF	298.5	313.8	5.0
HPCDF	1513.0	1390.0	8.5
OCDF	3859.0	3732.0	3.3
2378 TCDD	424.6	385.7	9.6
PCDD	1596.3	1507.7	5.7
HXCDD	1502.3	1520.8	1.2

B-000499

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U.S. EPA - CLP

EPA SAMPLE NO.

6
DUPLICATES

MU7814D

00-5-1

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

Lab Code: SWOK

Case No.: 36781

SAS No.:

SDG No.: MU7801

Matrix (water/soil): SDIL

Level (low/med): LOW

% Solids for Sample: 88.4

% Solids for Duplicate: 88.4

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

Analyte	Control Limit	Sample (S)	Duplicate (D)	%RPD	Q/M
Aluminum		9510.9846	4450.8079	72.5	*F
Antimony		11.4336	13.3320	15.3	P
Arsenic		1.1200	1.1312		F
Barium		24.8567	9.1807	92.1	F
Beryllium		.5283	.3338	45.1	F
Cadmium		.6720	.6787		F
Calcium		146.6689	91.2007	46.6	F
Chromium	2.2	10.8979	8.0605	29.9	*F
Cobalt		2.8044	1.3875	67.6	F
Copper	5.6	3.5841	8.9051	200.0	*F
Iron		16912.3700	13433.1690	22.9	*F
Lead	.7	4.7489	2.3643	67.0	*F
Magnesium		219.6590	106.1221	69.7	F
Manganese		82.3686	21.7678	116.4	*F
Mercury					NR
Nickel		6.2668	5.1405	19.7	F
Potassium		173.4436	123.5068	33.6	F
Selenium		.4480	2.2624		F
Silver		1.0961	.9024	19.4	F
Sodium		112.3527	100.8359	10.8	F
Thallium		.6720	.6787		F
Vanadium	11.2	19.3959	9.2842	70.5	F
Zinc	4.5	10.1904	5.1448	65.6	*F
Cyanide		2.1838	1.1312		C

FORM VI - IN

7/88

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B-000500

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPL

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

MU78305

BC-6-1

Lab Code: SWOK

Case No.: 36781

SAS No.:

SDG No.: MU7801

Matrix: SOIL

Level (low/med): LOW

% Solids for Sample: 92.5

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R	QIM
Aluminum						NR
Antimony	75-125	39.7268	9.9595	108.11	27.5	IP
Arsenic	75-125	5.8571	1.2181	8.56	54.2	IF
Barium	75-125	507.0297	27.1645	432.43	111.0	IP
Beryllium	75-125	12.2280	.4011	10.81	109.4	IP
Cadmium	75-125	15.5794	.6422	10.81	144.1	IF
Calcium						NR
Chromium	75-125	57.3297	11.5487	43.24	105.9	IP
Cobalt	75-125	123.3475	2.3619	108.11	111.9	IP
Copper	75-125	69.6523	3.4252	54.05	128.9	IF
Iron						NR
Lead	75-125	10.4619	5.5917	4.28	113.8	IF
Magnesium						NR
Manganese	75-125	181.4773	55.5301	108.11	116.5	IP
Mercury	75-125	.0940	.1029	1.00	0.0	CV
Nickel	75-125	126.8848	5.6712	108.11	112.1	IP
Potassium						NR
Selenium	75-125	1.0425	.4282	2.14	48.7	IF
Silver	75-125	8.6332	1.3207	10.81	67.6	IF
Sodium						NR
Thallium	75-125	11.6628	.6422	10.70	109.0	IF
Vanadium	75-125	133.5738	18.5623	108.11	106.4	IP
Zinc	75-125	132.4586	13.9876	108.11	109.6	IP
Cyanide	75-125	19.7477	1.8575	18.02	109.6	IC

Comments:

75-125
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FORM V (Part 1) - IN

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B-000507

U.S. EPA - CLP

EPA SAMPLE NO

6

DUPLICATES

MU7830D

Lab Name: SOUTHWEST LAB OF OK

Contract: 68-D9-0089

BC-6-L

Lab Code: SWOK

Case No.: 36781

SAS No.:

SDB No.: MU7801

Matrix (water/soil): SOIL

Level (low/med): LOW

% Solids for Sample: 92.5

% Solids for Duplicate: 92.5

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

Analyte	Control Limit	Sample (S)	Duplicate (D)	%RPD	QIM
Aluminum		10611.4480	9397.7990	12.1	IP
Antimony		9.9595	8.5511	15.2	IP
Arsenic		1.2181	1.3124	7.5	IP
Barium		27.1645	25.8074	5.1	IP
Beryllium		.4011	.3632	9.9	IP
Cadmium		.6422	.6486		IP
Calcium		185.4320	187.3804	1.0	IP
Chromium		11.5487	11.2833	2.3	IP
Cobalt		2.3619	3.0387	25.1	IP
Copper	5.4	3.4252	6.8066	200.0	*IP
Iron		15599.1060	15665.0010	.4	IP
Lead		5.5917	6.6422	17.2	IF
Magnesium		284.0903	333.1207	15.9	IP
Manganese		55.5301	60.8643	9.2	IP
Mercury		.1029	.1029		ICV
Nickel		5.6712	7.3242	25.4	IP
Potassium		245.6526	250.5179	2.0	IP
Selenium		.4282	.4324		IF
Silver		1.3207	1.1359	15.0	IP
Sodium		131.0220	112.9765	14.8	IP
Thallium		.6422	.6486		IF
Vanadium	10.7	18.5623	16.6008	11.2	IP
Zinc	4.3	13.9876	14.0658	.6	IP
Cyanide		1.8575	1.8900		IC

FORM VI - IN

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B-000502

3B
SOIL VOLATILE-MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike -- EPA Sample No.: BC-6-4 Level: (low/med) MED

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	6790	0	3440	51 *	59-172
Trichloroethene	6790	0	5560	82	62-137
Benzene	6790	0	6010	89	66-142
Toluene	6790	0	6050	89	59-139
Chlorobenzene	6790	0	5950	88	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	6790	3650	54 *	-6	22 59-172
Trichloroethene	6790	5800	85	-4	24 62-137
Benzene	6790	6260	92	-3	21 66-142
Toluene	6790	6600	97	-9	21 59-139
Chlorobenzene	6790	6820	100	-13	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
 Spike Recovery: 2 out of 10 outside limits

COMMENTS:

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: BC-7-2 Level: {low/med} LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	68.5	0	59.7	87	59-172
Trichloroethene	68.5	0	52.5	77	62-137
Benzene	68.5	0	60.8	89	66-142
Toluene	68.5	11.0	62.1	75	59-139
Chlorobenzene	68.5	9.73	61.5	76	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	68.5	57.9	85	2	22 59-172
Trichloroethene	68.5	52.9	77	0	24 62-137
Benzene	68.5	61.1	89	0	21 66-142
Toluene	68.5	60.7	73	3	21 59-139
Chlorobenzene	68.5	59.2	72	5	21 60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS: BC-7-2 URS
INST: I SWL#3678.25 5

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: URS
 Lab Code: SWOK Case No.: URS SAS No.: _____ SDG No.: _____
 Matrix Spike - EPA Sample No.: BC-6-4 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	7240	0	5650	78	26-90
2-Chlorophenol	7240	0	5210	72	25-102
1,4-Dichlorobenzene	3620	0	2360	65	28-104
N-Nitroso-di-n-prop.(1)	3620	0	1990	55	41-126
1,2,4-Trichlorobenzene	3620	0	2500	69	38-107
4-Chloro-3-methylphenol	7240	0	5790	80	26-103
Acenaphthene	3620	0	2460	68	31-137
4-Nitrophenol	7240	0	6080	84	11-114
2,4-Dinitrotoluene	3620	0	2770	77	28-89
Pentachlorophenol	7240	0	8220	114 *	17-109
Pyrene	3620	0	2890	80	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	7240	5030 5500	69.76	14.7	35 26-90
2-Chlorophenol	7240	5330 5390	73.74	1.7	50 25-102
1,4-Dichlorobenzene	3620	2170 2440	66.67	8.4	27 28-104
N-Nitroso-di-n-prop.(1)	3620	2690 2850	74.84	29.4 *	38 41-126
1,2,4-Trichlorobenzene	3620	2290 2450	63.68	9.4	23 38-107
4-Chloro-3-methylphenol	7240	5580 5790	77.80	4.4	33 26-103
Acenaphthene	3620	2430 2570	67.71	1.4	19 31-137
4-Nitrophenol	7240	6180 6440	85.89	1.6	50 11-114
2,4-Dinitrotoluene	3620	2741 2710	76.80	1.4	47 28-89
Pentachlorophenol	7240	7240 8690	100.12 *	13.4	47 17-109
Pyrene	3620	3252 3190	90.88	12.4	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

RPD: 0 out of 11 outside limits
 Spike Recovery: 13 out of 22 outside limits

COMMENTS: BC-6-4 URS
 INST:F SWL#3678.33

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SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSAContract: URSLab Code: SWOKCase No.: URS

SAS No.: _____

SDG No.: _____

Mat. Spike - EPA Sample No.: BC-7-2Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	9120	880	7870 8820	77 85	26-90
2-Chlorophenol	9120	0	7730 7850	85 84	25-102
1,4-Dichlorobenzene	4560	0	3110 3300	68 77	28-104
N-Nitroso-di-n-prop. (1)	4560	0	3840 4340	84 95	41-126
1,2,4-Trichlorobenzene	4560	0	3420 3680	75 81	38-107
4-Chloro-3-methylphenol	9120	0	7560 7890	83 87	26-103
Acenaphthene	4560	0	3410 3610	75 79	31-137
4-Nitrophenol	9120	0	7490 7800	82 84	11-114
2,4-Dinitrotoluene	4560	0	3760 4010	82 88	28-89
Pentachlorophenol	9120	0	9510 11400	104 125 *	17-109
Pyrene	4560	0	3520 3520	79 77	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	18300	11700	59	26 36 *	35 26-90
2-Chlorophenol	18300	10200	56	27 48	50 25-102
1,4-Dichlorobenzene	9140	6070	66	3 15	27 28-104
N-Nitroso-di-n-prop. (1)	9140	5240	57	38 50 *	38 41-126
1,2,4-Trichlorobenzene	9140	5880	64	16 23	23 38-107
4-Chloro-3-methylphenol	18300	11100	61	31 38 *	33 26-103
Acenaphthene	9140	5890	64	16 21 *	19 31-137
4-Nitrophenol	18300	11100	61	29 34	50 11-114
2,4-Dinitrotoluene	9140	6180	68	19 24	47 28-89
Pentachlorophenol	18300	13000	71	38 55 *	47 17-109
Pyrene	9140	6720	74	7 4	36 35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0.5 out of 11 outside limitsSpike Recovery: 0.4 out of 22 outside limitsCOMMENTS: BC-7-2 URS
INST:F SWL#3678.25

DEC 14 1990