SDMS US EPA REGION V -1

SOME IMAGES WITHIN THIS DOCUMENT MAY BE ILLEGIBLE DUE TO BAD SOURCE DOCUMENTS.

REF 3b

APPENDIX D

ANALYTICAL RESULTS

Explanation For Analytical Data Summary Tables

All ground water results in ug/l.
All soil/sediment organic results in ug/kg
All soil/ sediment inorganic results in mg/kg

For sample location headings, the following qualifiers are used :

- + Denotes blank samples.
- * Denotes duplicate samples.
- ^ Denotes that sample was not analyzed for the compounds listed.

For chemical results, the folling qualifiers are used :

- B Compound detected in blank samples.
- J Estimated value . Result is less than the specified detection limit, but greater than zero.
- E Estimated value. Concentration detected exceeds the calibrated range.
- C Result confirmed by GC/MS.
- * Duplicate analysis not with in control limits.
- R Spike sample recovery not with in control limits.

Ground Water Volatiles

SITE	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE H	SITE H	SITE H	SITE H	SITE G	SITE G
SAMPLE NUMBER	DC-GW-01	DC-GW-02	DC-GW-03	DC-GW-04	DC-GW-05	DC-GW-06	DC-GW-07	DC-GW-08	DC-GW-09	DC-GW-10	DC-GW-11	DC-GW-12	DC-GW 13	DC-GW-14	DC GW-15
WELL NUMBER	EE-06	EE 07	EE-09	EE-10	EE-17	EE-08	EE-19	EE-19	EE-18	EE 01	EE-02	EE-03	EE-04	EE-G101	EE G102
DATE SAMPLED	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-17-87	3-17-87	3-17-87	3-17-87	3-17-87	3 17-87
1 Chloromethane															
2 Bromomethane															
3 Vinyl Chloride															
4 Chloroethane															
5 Methylene Chloride							23 J	61 J	2200 BJ		140 J	18 J	68	6 B	1 BJ
6 Acetone	15	9 BJ	10 B	14 B	12 B	13 B	400 B	210 B	7100 B	170 BJ	910 BJ	8 J	9 BJ		
7 Carbon Disulfide															
8 1,1-Dichloroethene															
9 1,1-Dichloroethane															
10 trans-1,2-Dichloroethene		1 J			4 J										
11 Chloroform					1 J						3000			2 J	9
12 1-2-Dichloroethane									3000						
13 2-Butanone (MEK)															
14 1,1,1-Trichloroethane															
15 Carbon Tetrachloride															
16 Vinyl Acetate															
17 Bromodichloromethane															1 J
18 1,2-Dichloropropane															
19 trans-1,3-Dichloropropene															
20 Trichloroethene					2 J										
21 Dibromochloromethane															
22 1,1,2-Trichloroethane															
23 Benzene	9	24	1 J	14	1 J	1 J	2000	2000	2000 J	1900	4300	2 J		1 J	
24 cis-1,3-Dichloropropene															
25 2-Chloroethyl Vinyl Ether															
26 Bromoform															
27 4-Methyl-2-pentanone							250	290	2700 J	140 J	3600				
28 2-Hexanone		5 J							3500 J						
29 Tetrachloroethene															
30 1,1,2,2-Tetrachloroethane															
31 Toluene		4 J					450	410	1600 J	48 J	7300			2 J	
32 Chlorobenzene	14	1 J	33	380 E	29	7	1500	1400	6700 J	1600	11000	11			5
33 Ethylbenzene		1 J					33 J	28 J		210		1 J			
34 Styrene															
35 Total Xylenes	2	230					180	160		64 J	120 J				

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Ground Water Volatiles

SITE	SITE G	BLANK	SITE L	SITE G	SITE G	SITE G	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	BLANK
SAMPLE NUMBER	DC-GW-16	DC-GW-17 +	DC-GW-18	DC-GW-19	DC-GW-20 *	DC-GW-21	DC-GW-22 +	DC-GW-23	DC-GW-24	DC-GW-25	DC-GW-26	DC-GW 27	DC GW-28	DC-GW-29 *	DC-GW-30 +
WELL NUMBER	EE-G104		EE-G108	EE-G107	EE-G107	EE-05		EE-13	EE-12	EE-G112	EE-14	EE-15	EE 16	EE 12	
DATE SAMPLED	3-17-87	3-17-87	3-18-87	3-18-87	3-18-87	3-18-87	3-18-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87
1 Chloromethane															
2 Bromomethane															
3 Vinyl Chloride										5 J		76	790	6 J	
4 Chloroethane															
5 Methylene Chloride	5 B	1 BJ		110 BJ	250 B		2 BJ				56 J	2 J			2 J
6 Acetone	5 BJ	14 B		620 B	550 B		4 BJ	29 B	40 B	17 B	180 J	10 B	190 B	16 B	23 B
7 Carbon Disulfide															
8 1,1-Dichloroethene												10			
9 1,1-Dichloroethane												120			
10 trans-1,2-Dichloroethene				180 J	200 J						150	310	640		
11 Chloroform	3 J	1 J					1 J				110 J				
12 1-2-Dichloroethane				480	450										
13 2-Butanone (MEK)															
14 1,1,1-Trichloroethane															
15 Carbon Tetrachloride															
16 Vinyl Acetate															
17 Bromodichloromethane															
18 1,2-Dichloropropane															
19 trans-1,3-Dichloropropene															
20 Trichloroethene				320	300						270	4 J			
21 Dibromochloromethane															
22 1,1,2-Trichloroethane															
23 Benzene	1 J		1 J	4100	3700	2 J	3 J		50	28	1400	5	550	75	
24 cis-1,3-Dichloropropene															
25 2-Chloroethyl Vinyl Ether															
26 Bromoform															
27 4-Methyl-2-pentanone				1900	2200						230 J				
28 2-Hexanone							4 J								
29 Tetrachloroethene				420	350	14					470				
30 1,1,2,2-Tetrachloroethane															
31 Toluene	3 J			7300	6300	2 J	4 J				240		740	1 J	
32 Chlorobenzene	5	1 J	1 J	3100	3100	1 J	2 J		270	33	3100	120	550	390	
33 Ethylbenzene				63 J						1 J	190		58	2 J	
34 Styrene				50 J											
35 Total Xylenes				280	240 J						61 J		58		

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Ground Water Volatiles

SITE	SITE I	SITE G	SITE G	SITE G	SITE G	BLANK	SITE H	SITE L	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O
SAMPLE NUMBER	DC-GW-31	DC-GW-32	DC-GW-33	DC-GW-34	DC-GW-34A	DC-GW-35 +	DC-GW-36	DC-GW-37	DC-GW-38	DC-GW-38A	DC-GW-39	DC-GW-39A	DC-GW-40	DC-GW-40A	DC-GW-41	DC-GW-41A
WELL NUMBER	EE-20	EE-11	EE-G106	EE-G102	EE-G102		EE-G110	EE G109	EE-21	EE-21	EE-22	EE-22	EE 23	EE-23	EE-24	EE-24
DATE SAMPLED	3-23-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	7-14-87
1 Chloromethane																
2 Bromomethane																
3 Vinyl Chloride																
4 Chloroethane																
5 Methylene Chloride			440			2 J		44 J			52000	31000				
6 Acetone	29 B	1700 B	210	7 BJ		13 B		650 B	7 J		38000 B	34000	6 J		10	
7 Carbon Disulfide																
8 1,1-Dichloroethene																
9 1,1-Dichloroethane												1700				
10 trans-1,2-Dichloroethene			110									14000				
11 Chloroform						1 J		730			5000 J	1800				
12 1-2-Dichloroethane											4000 J	2600				
13 2-Butanone (MEK)			560		6 BJ					13 B	62000	54000 E		11 B		
14 1,1,1-Trichloroethane			51 J								7800	5000				
15 Carbon Tetrachloride																
16 Vinyl Acetate																
17 Bromodichloromethane																
18 1,2-Dichloropropane																
19 trans-1,3-Dichloropropene																
20 Trichloroethene			800								83000	64000 E				
21 Dibromochloromethane																
22 1,1,2-Trichloroethane																
23 Benzene		460	1800				1 J	150			190000	150000 E			10	20
24 cis-1,3-Dichloropropene																
25 2-Chloroethyl Vinyl Ether																
26 Bromoform																
27 4-Methyl-2-pentanone			150					270 B			38000	28000				
28 2-Hexanone																
29 Tetrachloroethene											10000					
30 1,1,2,2-Tetrachloroethane												12000				
31 Toluene		100 BJ	83 J					970 B			15000	1300		17	1 J	
32 Chlorobenzene		2500	1200	20	36		6				150000	180000 E			5	8
33 Ethylbenzene		840										850				
34 Styrene																
35 Total Xylenes		400									4600 J	2600			2 J	

Ground Water Volatiles

	SITE	SITE D	SITE D	SITE D	SITE R	SITE R	SITE W	SITE R	SITE R	SITE R	SITE R	BLANK	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE
	SAMPLE NUMBER	DC-GW-42 B	DC-GW-43	DC-GW-43A	DC-GW-44	DC-GW-45	DC-GW-46	DC-GW-47	DC-GW-48B	DC-GW-49	DC-GW-50	DC-GW-51+	DC-GW-52	DC-GW-53	DC-GW-54	DC-GW-55	DC-GW-56
	WELL NUMBER	EE-24	EE-25	EE-25	P-1	B-28A	P-7	B-26A	B-26A	B-25A	P-11		WRIGHT	SETTLES	SCHMIDT	McDONALD	CLAYTON
	DATE SAMPLED	3-24-87	3-24-87	7-14-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-26-87	3-26-87	3-26-87	3-26-87	3-26-87
1	Chloromethane																
2	Bromomethane																
3	Vinyl Chloride																17
4	Chloroethane																10
5	Methylene Chloride	310										2 J	4 BJ	12 B		37 B	
6	Acetone	430	5J			71 B	1700 B	3 BJ	36 BJ	1600 B	26 BJ	3 BJ	18 B	10 B	8 BJ	9 BJ	5 J
7	Carbon Disulfide													3 J			
8	1,1-Dichloroethene							7									
9	1,1-Dichloroethane							3 J									
10	trans-1,2-Dichloroethene	94 J															6
11	Chloroform											1 J		2 J			
12	1-2-Dichloroethane									16000							
13	2-Butanone (MEK)	570		5 BJ													
14	1,1,1-Trichloroethane	43 J															
15	Carbon Tetrachloride																
16	Vinyl Acetate																
17	Bromodichloromethane																
18	1,2-Dichloropropane																
19	trans-1,3-Dichloropropene																
20	Trichloroethene	1000															
21	Dibromochloromethane																
22	1,1,2-Trichloroethane																
23	Benzene	1800			2 J		1500	41	44 J		150						94
24	cis-1,3-Dichloropropene																
25	2-Chloroethyl Vinyl Ether																
26	Bromoform																
27	4-Methyl-2-pentanone																9 J
28	2-Hexanone																
29	Tetrachloroethene																
30	1,1,2,2-Tetrachloroethane																
31	Toluene	130					480	7 B	13 BJ	760 J			1 BJ	1 BJ		1 BJ	5
32	Chlorobenzene	1000			350 E	990	5000	190	199	8100	570	1 J					120
33	Ethylbenzene							2 J					4 J				1 J
34	Styrene													2 J		2 J	
35	Total Xylenes	27 J					95 J	7									

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Ground Water Volatiles

SITE	BLANK
SAMPLE NUMBER	DC-GW-57 +
WELL NUMBER	
DATE SAMPLED	7-14-87

1 Chloromethane
2 Bromomethane
3 Vinyl Chloride
4 Chloroethane
5 Methylene Chloride
6 Acetone
7 Carbon Disulfide
8 1,1-Dichloroethene
9 1,1-Dichloroethane
10 trans-1,2-Dichloroethene
11 Chloroform
12 1-2-Dichloroethane
13 2-Butanone (MEK)
14 1,1,1-Trichloroethane
15 Carbon Tetrachloride
16 Vinyl Acetate
17 Bromodichloromethane
18 1,2-Dichloropropane
19 trans-1,3-Dichloropropene
20 Trichloroethene
21 Dibromochloromethane
22 1,1,2-Trichloroethane
23 Benzene
24 cis-1,3-Dichloropropene
25 2-Chloroethyl Vinyl Ether
26 Bromoform
27 4-Methyl-2-pentanone
28 2-Hexanone
29 Tetrachloroethene
30 1,1,2,2-Tetrachloroethane
31 Toluene
32 Chlorobenzene
33 Ethylbenzene
34 Styrene
35 Total Xylenes

Ground Water Semivolatiles

SITE	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE H	SITE H	SITE H	SITE H	SITE G
SAMPLE NUMBER	DC-GW-01	DC-GW-02	DC-GW-03	DC-GW-04	DC-GW-05	DC-GW-06	DC-GW-07	DC-GW-08	DC-GW-09	DC-GW-10	DC-GW-11	DC-GW-12	DC-GW-13	DC-GW-14
WELL NUMBER	EE-06	EE-07	EE-09	EE-10	EE-17	EE-08	EE-19	EE-19	EE-18	EE-01	EE-02	EE-03	EE-04	EE-G151
DATE SAMPLED	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-17-87	3-17-87	3-17-87	3-17-87	3-17-87
1 Phenol							110000 E	190000 E	6100 E	66	950			
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol				4 J			20000 E	33000 E	2600	31 J	47 J			
4 1,3-Dichlorobenzene										120				
5 1,4-Dichlorobenzene				4			220 J	250	70 J	2600	530	11		
6 Benzyl Alcohol							460	490	180		740			
7 1,2-Dichlorobenzene							260	300	2000	560	430	3		
8 2-Methylphenol							190 J	350	10 J	26 J	70 J			
9 bis(2-Chloroisopropyl) ether		3 J												
10 4-Methylphenol							14000 E	23000 E	850	65	620			
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene								100 J	820		97 J			
14 Isophorone											110 J			
15 2-Nitrophenol														
16 2,4-Dimethylphenol		5 J						2800	62		330			
17 Benzoic Acid		10 J							800	140 J	5800 E			
18 bis-(2-Chloroethoxy)methane														
19 2,4-Dichlorophenol							1900 E	14000 E	7600 E		1900			
20 1,2,4-Trichlorobenzene									390	580	720			
21 Naphthalene							41 J	42 J	70	250	240			1 J
22 4-Chloroaniline	120						14000 E	15000 E	4400	6400 E	810	200		
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol														
25 2-Methylnaphthalene										21 J	47 J			
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol							4100	6000	1800	140	1200			
28 2,4,5-Trichlorophenol										27 J	580 J			
29 2-Chloronaphthalene														
30 2-Nitroaniline							1700	1800	2000					

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Ground Water Semivolatiles

SITE	SITE G	SITE G	BLANK	SITE L	SITE G	SITE G	SITE G	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I
SAMPLE NUMBER	DC-GW-15	DC-GW-16	DC-GW-17 +	DC-GW-18	DC-GW-19	DC-GW-20 *	DC-GW-21	DC-GW-22 +	DC-GW-23	DC-GW-24	DC-GW-25	DC-GW-26	DC-GW-27	DC-GW-28
WELL NUMBER	EE-G103	EE-G104		EE-G108	EE-G107	EE-G107	EE-05		EE-13	EE-12	EE-G112	EE-14	EE-15	EE 16
DATE SAMPLED	3-17-87	3-17-87	3-17-87	3-18-87	3-18-87	3-18-87	3-18-87	3-18 87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87
1 Phenol					6600	30000						1800		80
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol					690	1900				5 J		370		
4 1,3-Dichlorobenzene										110				
5 1,4-Dichlorobenzene					570	470 J				640		910	10	110
6 Benzyl Alcohol					5400	8600						230 J		350
7 1,2-Dichlorobenzene					200 J	180 J				110		220 J	4 J	15 J
8 2-Methylphenol					280 J	810						89 J		76
9 bis(2-Chloroisopropyl) ether														
10 4-Methylphenol					2200	9000						350		
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene														
14 Isophorone														
15 2-Nitrophenol														
16 2,4-Dimethylphenol					1400	4300								
17 Benzoic Acid					35000 E	150000 E								
18 bis-(2-Chloroethoxy)methane					2400	7300				2 J		2900		
19 2,4-Dichlorophenol					480 J	450 J				22		1000		
20 1,2,4-Trichlorobenzene					1900	1700						2700		
21 Naphthalene		8 J			21000 E	18000						57 J		230
22 4-Chloroaniline										140	14	8300	18	9600 E
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol												140 J		
25 2-Methylnaphthalene										1 J				9 J
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol						350						290		
28 2,4,5-Trichlorophenol														
29 2-Chloronaphthalene														
30 2-Nitroaniline														

Ground Water Semivolatiles

	SITE	SITE I	BLANK	SITE I	SITE G	SITE G	SITE G	SITE G	BLANK	SITE H	SITE L	SITE O	SITE O	SITE O	SITE O	SITE O
	SAMPLE NUMBER	DC-GW-29	DC-GW-30 +	DC-GW-31	DC-GW-32	DC-GW-33	DC-GW-34	DC-GW-34A	DC-GW-35 +	DC-GW-36	DC-GW-37	DC-GW-38	DC-GW-38A	DC-GW 39	DC-GW-39A	DC-GW 40
	WELL NUMBER	EE-12		EE-20	EE-11	EE G106	EE-G102	EE-G102		EE-G110	EE-G109	EE-21	EE-21	EE 22	EE 22	EE 23
	DATE SAMPLED	3-23-87	3-23-87	3-23-87	3-24-87	3-24-87	3-24-87	7-14 87	3-24-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87
1	Phenol					2 J					150			500	1100	
2	bis(2-Chloroethyl)ether														91	J
3	2-Chlorophenol				130	9 J					130			120	58	J
4	1,3-Dichlorobenzene	110				4 J								320	290	
5	1,4-Dichlorobenzene	830			34 J	350								10000 E	15000	E
6	Benzyl Alcohol															
7	1,2-Dichlorobenzene	110				6 J								7800	11000	E
8	2-Methylphenol										6 J			78 J	120	
9	bis(2-Chloroisopropyl) ether															
10	4-Methylphenol				37 J						75			820	1100	
11	N-Nitroso-n-Dipropylamine															
12	Hexachloroethane															
13	Nitrobenzene															
14	Isophorone															
15	2-Nitrophenol										41					
16	2,4-Dimethylphenol				240									350	400	
17	Benzoic Acid															
18	bis-(2-Chloroethoxy)methane															
19	2,4-Dichlorophenol					11								30 J		
20	1,2,4-Trichlorobenzene					280								270	200	
21	Naphthalene				36 J									160	100	
22	4-Chloroaniline	78			15000 E	110				30	60			780		
23	Hexachlorobutadiene															
24	4-Chloro-3-methylphenol															
25	2-Methylnaphthalene													6 J		
26	Hexachlorocyclopentadiene															
27	2,4,6-Trichlorophenol					3 J										
28	2,4,5-Trichlorophenol															
29	2-Chloronaphthalene															
30	2-Nitroaniline															

Ground Water Semivolatiles

SITE	SITE D	SITE D	SITE D	SITE D	SITE D	SITE D	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	BLANK	PRIVATE	PRIVATE
SAMPLE NUMBER	DC-GW-40A	DC-GW-41	DC-GW-41A	DC-GW-42 *	DC-GW-43	DC-GW-43A	DC-GW-44	DC-GW-45	DC-GW-46	DC-GW-47	DC-GW-48*	DC-GW-49	DC-GW-50	DC-GW-51 *	DC-GW-52	DC-GW-53
WELL NUMBER	EE-23	EE-24	EE-24	EE-24	EE-25	EE-25	P-I	B-28A	P-7	B-26A	B-26A	B-25A	P-II		WRIGHT	SETTLES
DATE SAMPLED	7-14-87	3-24-87	7-14-87	3-24-87	3-24-87	7-14-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-26-87	3-26-87
1 Phenol									25000 E			60000 E				
2 bis(2-Chloroethyl)ether																
3 2-Chlorophenol							4 J	8 J	2100	8 J	9 J	14000 E				
4 1,3-Dichlorobenzene																
5 1,4-Dichlorobenzene							8 J		550	4 J	3 J		54 J			
6 Benzyl Alcohol									750							
7 1,2-Dichlorobenzene									340	1 J	1 J	91 J				
8 2-Methylphenol																
9 bis(2-Chloroisopropyl) ether																
10 4-Methylphenol									120 J			6100				
11 N-Nitroso-n-Dipropylamine																
12 Hexachloroethane									850							
13 Nitrobenzene										35	29	420				
14 Isophorone																
15 2-Nitrophenol																
16 2,4-Dimethylphenol												160				
17 Benzoic Acid									270 J			6800				
18 bis-(2-Chloroethoxy)methane																
19 2,4-Dichlorophenol									5300			14000 E				
20 1,2,4-Trichlorobenzene																
21 Naphthalene									82 J							
22 4-Chloroaniline									25000 E	680	540		4100			
23 Hexachlorobutadiene																
24 4-Chloro-3-methylphenol																
25 2-Methylnaphthalene									200							
26 Hexachlorocyclopentadiene																
27 2,4,6-Trichlorophenol									2100			1500				
28 2,4,5-Trichlorophenol																
29 2-Chloronaphthalene																
30 2-Nitroaniline																

Ground Water Semivolatiles

SITE	PRIVATE	PRIVATE	PRIVATE	BLANK
SAMPLE NUMBER	DC-GW-54	DC-GW-55	DC-GW-56	DC-GW-57 +
WELL NUMBER	SCHMIDT	McDONALD	CLAYTON	
DATE SAMPLED	3-26-87	3-26-87	3-26-87	7-14-87
1 Phenol				
2 bis(2-Chloroethyl)ether				
3 2-Chlorophenol				
4 1,3-Dichlorobenzene				
5 1,4-Dichlorobenzene			5 J	
6 Benzyl Alcohol				
7 1,2-Dichlorobenzene			3 J	
8 2-Methylphenol				
9 bis(2-Chloroisopropyl) ether				
10 4-Methylphenol				
11 N-Nitroso-n-Dipropylamine				
12 Hexachloroethane				
13 Nitrobenzene				
14 Isophorone				
15 2-Nitrophenol				
16 2,4-Dimethylphenol				
17 Benzoic Acid				
18 bis-(2-Chloroethoxy)methane				
19 2,4-Dichlorophenol				
20 1,2,4-Trichlorobenzene				
21 Naphthalene				
22 4-Chloroaniline				
23 Hexachlorobutadiene				
24 4-Chloro-3-methylphenol				
25 2-Methylnaphthalene				
26 Hexachlorocyclopentadiene				
27 2,4,6-Trichlorophenol				
28 2,4,5-Trichlorophenol				
29 2-Chloronaphthalene				
30 2-Nitroaniline				

Ground Water Semivolatiles

SITE	BLANK	SITE L	SITE G	SITE G	SITE G	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	BLANK	SITE I	SITE G
SAMPLE NUMBER	DC-GW-17+	DC-GW-18	DC-GW-19	DC-GW-20#	DC-GW-21	DC-GW-22+	DC-GW-23	DC-GW-24	DC-GW-25	DC-GW-26	DC-GW 27	DC-GW-28	DC GW-29 #	DC GW 30+	DC GW 31	DC GW 32
WELL NUMBER		EE-G108	EE-G107	EE-G107	EE-05		EE-13	EE-12	EE-G112	EE-14	EE-15	EE-16	EE-12		EE-[illegible]	EE-11
DATE SAMPLED	3-17-87	3-18-87	3-18-87	3-18-87	3-18-87	3-18-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-24-87
1 Dimethyl Phthalate																98
2 Acenaphtylene																
3 3-Nitroaniline																
4 Acenaphthene																
5 2,4-Dinitrophenol																
6 4-Nitrophenol																
7 Dibenzofuran																
8 2,4-Dinitrotoluene																
9 2,6-Dinitrotoluene																
10 Diethylphthalate									23 B		13 B	140 B		13 B	8 BJ	
11 4-Chlorophenyl-Phenylether																
12 Fluorene												25 J				
13 4-Nitroaniline																
14 4,6-Dinitro-2-methylphenol																
15 N-Nitrosodiphenylamine																
16 4-Bromophenyl-phenylether																
17 Hexachlorobenzene					6 J											
18 Pentachlorophenol			1300 J	6300	12 J				6 J	2400	7 J	60 J				
19 Phenanthrene																
20 Anthracene											2 JB					
21 Di-n-butyl phthalate		9 BJ			10 B		2 JB	7 BJ	2 JB					2 JB	4 BJ	
22 Fluoranthene																
23 Pyrene																
24 Butyl Benzyl phthalate																
25 3,3'-Dichlorobenzidine																
26 Benzo(a)Anthracene																
27 bis(2-ethylhexyl) phthalate		18 B			10 B	4 BJ	2 JB	5 BJ	3 JB		2	20 BJ		2 JB	5 BJ	
28 Chrysene																
29 Di-n-octyl phthalate														1 J		
30 Benzo(b)Fluoranthene																
31 Benzo(k)Fluoranthene																
32 Benzo(a)Pyrene																
33 Indeno(1,2,3-cd)Pyrene																
34 Benzo(g,h,i)Perylene																
35 Dibenz(a,h)Anthracene																

Ground Water Semivolatiles

SITE	SITE G	SITE G	SITE G	BLANK	SITE H	SITE L	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O
SAMPLE NUMBER	DC-GW-33	DC-GW-34	DC-GW-34A	DC-GW-35 *	DC-GW-36	DC-GW-37	DC-GW-38	DC-GW-38A	DC-GW-39	DC-GW-39A	DC-GW-40	DC-GW-40A	DC-GW-41	DC-GW-41A	DC-GW-42 *	DC-GW-43
WELL NUMBER	EE-G106	EE-G102	EE-G102		EE-G110	EE-G109	EE-21	EE-21	EE-22	EE-22	EE-23	EE-23	EE-24	EE-24	EE-24	EE-25
DATE SAMPLED	3-24-87	3-24-87	7-14-87	3-24-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	3-24-87
1 Diethyl Phthalate																
2 Acenaphtylene																
3 3-Nitroaniline																
4 Acenaphthene																
5 2,4-Dinitrophenol																
6 4-Nitrophenol																
7 Dibenzofuran																
8 2,4-Dinitrotoluene																
9 2,6-Dinitrotoluene																
10 Diethylphthalate																
11 4-Chlorophenyl-Phenylether																
12 Fluorene																
13 4-Nitroaniline																
14 4,6-Dinitro-2-methylphenol																
15 N-Nitrosodiphenylamine																
16 4-Bromophenyl-phenylether																
17 Hexachlorobenzene																
18 Pentachlorophenol									23 J							
19 Phenanthrene																
20 Anthracene																
21 Di-n-butyl phthalate	12 B			6 BJ		6 BJ							10 B	7 J	10 B	
22 Fluoranthene																
23 Pyrene																
24 Butyl Benzyl phthalate																
25 3,3'-Dichlorobenzidine																
26 Benzo(a)Anthracene																
27 bis(2-ethylhexyl) phthalate	4 BJ			2 BJ									3 BJ			
28 Chrysene																
29 Di-n-octyl phthalate	2 BJ			3 BJ									2 BJ		11 B	
30 Benzo(b)Fluoranthene																
31 Benzo(k)Fluoranthene																
32 Benzo(a)Pyrene																
33 Indeno(1,2,3-cd)Pyrene																
34 Benzo(g,h,i)Perylene																
35 Dibenz(a,h)Anthracene																

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Ground Water Semivolatiles

SITE	SITE O	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	BLANK	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	BLANK
SAMPLE NUMBER	DC-GW-43A	DC-GW-44	DC-GW-45	DC-GW-46	DC-GW-47	DC-GW-48B	DC-GW-49	DC-GW-50	DC-GW-51+	*DC-GW-52	DC-GW-53	DC-GW-54	DC-GW-55	DC-GW-56	DC-GW-57 +
WELL NUMBER	EE-25	P-1	B-28A	P-7	B-26A	B-26A	B-25A	P-11		WRIGHT	SETTLES	SCHMIDT	McDONALD	CLAYTON	
DATE SAMPLED	7-14-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-26-87	3-26-87	3-26-87	3-26-87	3-26-87	7-14-87
1 Diaethyl Phthalate															
2 Acenaphtylene															
3 3-Nitroaniline															
4 Acenaphthene															
5 2,4-Dinitrophenol															
6 4-Nitrophenol															
7 Dibenzofuran															
8 2,4-Dinitrotoluene															
9 2,6-Dinitrotoluene															
10 Diethylphthalate															
11 4-Chlorophenyl-Phenylether															
12 Fluorene															
13 4-Nitroaniline															
14 4,6-Dinitro-2-methylphenol															
15 N-Nitrosodiphenylamine															
16 4-Bromophenyl-phenylether															
17 Hexachlorobenzene															
18 Pentachlorophenol															
19 Phenanthrene															
20 Anthracene															
21 Di-n-butyl phthalate		7 J													
22 Fluoranthene															
23 Pyrene															
24 Butyl Benzyl phthalate															
25 3,3'-Dichlorobenzidine															
26 Benzo(a)Anthracene															
27 bis(2-ethylhexyl) phthalate			4 J		37	4			4 J						
28 Chrysene															
29 Di-n-octyl phthalate			4 J		40	26			5 J	2 J		2 J	4 J	6 J	
30 Benzo(b)Fluoranthene															
31 Benzo(k)Fluoranthene															
32 Benzo(a)Pyrene															
33 Indeno(1,2,3-cd)Pyrene															
34 Benzo(g,h,i)Perylene															
35 Dibenz(a,h)Anthracene															

Ground Water Semivolatiles

SITE	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE H	SITE H	SITE H	SITE H	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-GW-01	DC-GW-02	DC-GW-03	DC-GW 04	DC-GW-05	DC-GW-06	DC-GW-07	DC-GW-08#	DC GW-09	DC-GW-10	DC-GW-11	DC-GW-12	DC-GW-13	DC-GW 14	DC-GW-15	DC GW 16
WELL NUMBER	EE-06	EE-07	EE-09	EE-10	EE-17	EE-08	EE-19	EE-19	EE-18	EE 01	EE 02	EE-03	EE 04	EE-G101	EE-G103	EE G104
DATE SAMPLED	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-17-87	3-17-87	3-17-87	3-17-87	3-17-87	3-17-87	3 17-87
1 Dimethyl Phthalate											8 J					
2 Acenaphtylene																
3 3-Nitroaniline							3900		460 J							
4 Acenaphthene																
5 2,4-Dinitrophenol																
6 4-Nitrophenol									80 J							
7 Dibenzofuran										6 J						
8 2,4-Dinitrotoluene																
9 2,6-Dinitrotoluene																
10 Diethylphthalate											22 J					
11 4-Chlorophenyl-Phenylether										20 J						
12 Fluorene																
13 4-Nitroaniline																
14 4,6-Dinitro-2-methylphenol																
15 N-Nitrosodiphenylamine										800						
16 4-Bromophenyl-phenylether																
17 Hexachlorobenzene																
18 Pentachlorophenol							24000 E	35000 E	310	650						
19 Phenanthrene										15 J						
20 Anthracene																
21 Di-n-butyl phthalate	12 BJ	8 BJ	5 BJ	8 BJ	5 BJ	5 BJ									2 BJ	
22 Fluoranthene																
23 Pyrene																
24 Butyl Benzyl phthalate																
25 3,3'-Dichlorobenzidine																
26 Benzo(a)Anthracene														32		
27 bis(2-ethylhexyl) phthalate	95	160	32		26						24 J					24
28 Chrysene														6 J		
29 Di-n-octyl phthalate		7 J	4 J			2 J										
30 Benzo(b)Fluoranthene																
31 Benzo(k)Fluoranthene																
32 Benzo(a)Pyrene																
33 Indeno(1,2,3-cd)Pyrene																
34 Benzo(g,h,i)Perylene																
35 Dibenz(a,h)Anthracene																

Ground Water Pest/PCBs

SITE	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE H	SITE H	SITE H	SITE H	SITE G	SITE G
SAMPLE NUMBER	DC-GW-01	DC-GW-02	DC-GW-03	DC-GW-04	DC-GW-05	DC-GW-06	DC-GW-07	DC-GW-08	DC-GW-09	DC-GW-10	DC-GW-11	DC-GW-12	DC-GW-13	DC-GW-14	DC-GW-15
WELL NUMBER	EE-06	EE-07	EE-09	EE-10	EE-17	EE-08	EE-19	EE-19	EE-18	EE [illegible]	EE-02	EE-03	EE-04	EE-G101	EE-G103
DATE SAMPLED	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-17-87	3-17-87	3-17-87	3-17-87	3-17-87	3-17-87
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248															
25 AROCLOR-1254															
26 AROCLOR-1260															

14 J

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Ground Water Pest/PCBs

SITE	SITE G	BLANK	SITE L	SITE G	SITE G	SITE G	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	BLANK
SAMPLE NUMBER	DC-GW-16	DC-GW-17+	DC-GW-18	DC-GW-19	DC-GW-20 *	DC-GW-21	DC-GW-22 +	DC-GW-23	DC-GW-24	DC-GW-25	DC-GW-26	DC-GW-27	DC GW-28	DC GW-29 *	DC-GW-30 +
WELL NUMBER	EE-G104		EE-G108	EE-G107	EE-G107	EE-05		EE-13	EE-12	EE-G112	EE-14	EE-15	EE-16	EE-12	
DATE SAMPLED	3-17-87	3-17-87	3-18-87	3-18-87	3-18-87	3-18-87	3-18-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248															
25 AROCLOR-1254															
26 AROCLOR-1260				890	650										

Ground Water Pest/PCBs

SITE	SITE I	SITE G	SITE G	SITE G	SITE G	BLANK	SITE H	SITE L	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O
SAMPLE NUMBER	DC-GW-31	DC-GW-32	DC-GW-33	DC-GW-34	DC GW-34A	DC-GW-35 +	DC-GW-36	DC-GW-37	DC-GW-38	DC-GW-38A	DC-GW-39	DC-GW-39A	DC-GW-40	DC-GW-40A	DC-GW-41
WELL NUMBER	EE-20	EE-11	EE-G106	EE-G102	EE-G102		EE-G110	EE-G109	EE-21	EE-21	EE-22	EE-22	EE-23	EE-23	EE-24
DATE SAMPLED	3-23-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87
1 Alpha-BHC			70 C												
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248															
25 AROCLOR-1254															
26 AROCLOR-1260															

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Ground Water Pest/PCBs

SITE	SITE O	SITE O	SITE O	SITE O	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	BLANK	PRIVATE	PRIVATE	PRIVATE	PRIVATE
SAMPLE NUMBER	DC-GW-41A	DC-GW-42	DC-GW-43	DC-GW-43A	DC-GW-44	DC-GW-45	DC-GW-46	DC-GW-47	DC-GW-48	DC-GW-49	DC-GW-50	DC-GW-51+	DC-GW-52	DC-GW-53	DC-GW-54	DC-GW-55
WELL NUMBER	EE-24	EE-24	EE-25	EE-25	P-1	B-28A	P-7	B-26A	B-26A	B-25A	P-11		WRIGHT	SETTLES	SCHMIDT	McDONALD
DATE SAMPLED	7-14-87	3-24-87	3-24-87	7-14-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-26-87	3-26-87	3-26-87	3-26-87
1 Alpha-BHC																
2 Beta-BHC																
3 Delta-BHC																
4 Gamma-BHC (Lindane)																
5 Heptachlor																
6 Aldrin																
7 Heptachlor Epoxide																
8 Edosulfan I																
9 Dieldrin																
10 4,4'-DDE																
11 Endrin																
12 Edosulfan II																
13 4,4'-DDD																
14 Endosulfan Sulfate																
15 4,4'-DDT																
16 Methoxychlor																
17 Endrin Ketone																
18 Chlordane																
19 Toxaphene																
20 AROCLOR-1016																
21 AROCLOR-1221																
22 AROCLOR-1232																
23 AROCLOR-1242																
24 AROCLOR-1248																
25 AROCLOR-1254																
26 AROCLOR-1260																

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Ground Water Pest/PCBs

SITE	PRIVATE	BLANK
SAMPLE NUMBER	DC-GW-56	DC-GW-57 +
WELL NUMBER	CLAYTON	
DATE SAMPLED	3-26-87	7-14-87

1 Alpha-BHC
2 Beta-BHC
3 Delta-BHC
4 Gamma-BHC (Lindane)
5 Heptachlor
6 Aldrin
7 Heptachlor Epoxide
8 Edosulfan I
9 Dieldrin
10 4,4'-DDE
11 Endrin
12 Edosulfan II
13 4,4'-DDD
14 Endosulfan Sulfate
15 4,4'-DDT
16 Methoxychlor
17 Endrin Ketone
18 Chlordane
19 Toxaphene
20 AROCLOR-1016
21 AROCLOR-1221
22 AROCLOR-1232
23 AROCLOR-1242
24 AROCLOR-1248
25 AROCLOR-1254
26 AROCLOR-1260

Ground Water Inorganics

SITE	SITE D	SITE D	SITE D	SITE D	SITE D	SITE D	SITE D	SITE D	SITE D	SITE H	SITE H	SITE H	SITE H	SITE G	SITE G
SAMPLE NUMBER	DC-GW-01	DC-GW-02	DC-GW-03	DC-GW-04	DC-GW-05	DC-GW-06	DC-GW-07	DC-GW-08	DC-GW-09	DC-GW-10	DC-GW-11	DC-GW-12	DC-GW-13	DC-GW-14	DC-GW-15
WELL NUMBER	EE-06	EE-07	EE-09	EE-10	EE-17	EE-08	EE-19	EE-19	EE-18	EE-01	EE-02	EE-03	EE-04	EE G101	EE-G103
DATE SAMPLED	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-16-87	3-17-87	3-17-87	3-17-87	3-17-87	3 17 87	3-17-87
1 Aluminum											11800				
2 Antimony															63 R
3 Arsenic	64	82	18	100			11	11	15		8490	26			
4 Barium	384	482		358		336								219	
5 Beryllium															
6 Boron															
7 Cadmium											70 R				
8 Chromium, trivalent									13		24				
9 Cobalt									148		756				
10 Copper											2410				
11 Iron	8960	54000	15800	20000	571	11300	36700	36500	41200	29600	104000	34900		1280	1150
12 Lead											28 R				
13 Manganese	1320	1600	572	1090	1640	13200	2660	2600	6630	907	8020	1030	1800	2230	242
14 Mercury														1.4	2.1
15 Nickel	64	74							112	261	17200				
16 Selenium															
17 Silver															
18 Thallium															
19 Tin															
20 Vanadium															
21 Zinc	25	326	26	22	313	48	172	171	4.31	57	6840	25	24	31	42
22 Cyanide	1560									460	21			157	101

Ground Water Inorganics

SITE	SITE G	BLANK	SITE L	SITE G	SITE G	SITE G	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	BLANK
SAMPLE NUMBER	DC-GW-16	DC-GW-17 +	DC-GW-18	DC-GW-19	DC-GW-20 *	DC-GW-21	DC-GW-22 +	DC-GW-23	DC-GW-24	DC-GW-25	DC-GW-26	DC-GW-27	DC-GW-28	DC-GW-29 *	DC-GW-30 +
WELL NUMBER	EE-G104		EE-G108	EE G107	EE-G107	EE-05		EE-13	EE-12	EE-G112	EE-14	EE-15	EE-16	EE 12	
DATE SAMPLED	3-17-87	3-17-87	3-18-87	3-18-87	3-18-87	3-18-87	3-18-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87	3-23-87
1 Aluminum															
2 Antimony															
3 Arsenic				14	12			12		20	15	12			
4 Barium			331	610	580					223			956		
5 Beryllium															
6 Boron															
7 Cadmium				22 R	22 R										
8 Chromium, trivalent				24	23										
9 Cobalt				588	572										
10 Copper															
11 Iron	1110		21900	247000	241000			25400	23300	10800	24100	10500	9540	24900	107
12 Lead															
13 Manganese	103		1280	7240	6850	286		1520	1550	1650	1260	1270	1750	1580	
14 Mercury															
15 Nickel				349	328						95				
16 Selenium															
17 Silver															
18 Thallium															
19 Tin															
20 Vanadium				93	94										
21 Zinc	24		24	1910	1820	26					25	26			
22 Cyanide						350									

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INORGANICS GROUND-WATER

SITE	SITE I	SITE G	SITE G	SITE G	SITE G	BLANK	SITE M	SITE L	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O
SAMPLE NUMBER	DC-GW-31	DC-GW-32	DC-GW-33	DC-GW-34	DC-GW-34A	DC-GW-35	DC-GW-36	DC-GW-37	DC-GW-38	DC-GW-38A	DC-GW-39	DC GW-39A	DC-GW-40	DC-GW-40A	DC GW-41	DC-GW-41A
WELL NUMBER	EE-20	EE-11	EE-G106	EE-G102	EE-G102		EE-110	EE-G109	EE-21	EE-21	EE-22	EE 22	EE-23	EE-23	EE-24	EE-24
DATE SAMPLED	3-23-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	3-24-87	3-24-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	7-14-87	3-24-87	7-14-87
1 Aluminum		85								200						
2 Antimony																
3 Arsenic		178	34	27				14000	16		133	123	25	17	18	15
4 Barium			192	48	[51]		173		159	[35]	536	500	[161]	[152]	[170]	204
5 Beryllium																
6 Boron																
7 Cadmium								32			8	11				
8 Chromium, trivalent			41													
9 Cobalt					[10]			84								
10 Copper																
11 Iron	124	43800	49500	3850	2860	111	2160	523000	20400	15900	147000	171000	19600	16800	36400	29200
12 Lead										3270		6350				
13 Manganese		2290	3940	1460	1510		274	7660	4340		5460		1270	1330	4110	1520
14 Mercury																
15 Nickel			37	72			111									
16 Selenium																
17 Silver																
18 Thallium																
19 Tin																
20 Vanadium								159			42	55			504	
21 Zinc		129	58	14	31	10	53	2210	41	57	101	40	95	[15]	23	24
22 Cyanide		26							20							

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Ground Water Inorganics

SITE	SITE D	SITE D	SITE D	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	SITE R	BLANK	PRIVATE	PRIVATE	PRIVATE	PRIVATE	PRIVATE	BLANK
SAMPLE NUMBER	DC-GW-42	DC-GW-43	DC-GW-43A	DC-GW-44	DC-GW-45	DC-GW-46	DC-GW-47	DC-GW-48	DC-GW-49	DC-GW-50	DC-GW-51*	DC-GW-52	DC-GW-53	DC-GW-54	DC-GW-55	DC-GW-56	DC-GW-57
WELL NUMBER	EE-24	EE-25	EE-25	P-1	B-28A	P-7	B-26A	B-26A	B-25A	P-11		WRIGHT	SETTLES	SCHMIDT	McDONALD	CLAYTON	
DATE SAMPLED	3-24-87	3-24-87	7-14-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-25-87	3-26-87	3-26-87	3-26-87	3-26-87	3-26-87	7-14-87
1 Aluminum																	
2 Antimony																	
3 Arsenic	23			34	41		48	45		35				11	26		
4 Barium	[184]	141	[92]	440	[123]	[27]	[194]	201		[168]		[73]	[89]	292	[117]	300	
5 Beryllium																	
6 Boron																	
7 Cadmium																	
8 Chromium, trivalent																	
9 Cobalt						120											
10 Copper													[10]	115			
11 Iron	36600	3930	2360	10800	20800	15500	26900	27500		11800		2990	4600	21600	10600	17400	[87]
12 Lead											[91]		12 R	18 R			
13 Manganese	4300	2300	1520	2190	6840	11200	3530	3570		2640		1060	665	1660	257	1950	
14 Mercury														0.2			
15 Nickel						[18]											
16 Selenium																	
17 Silver																	
18 Thallium																	
19 Tin																	
20 Vanadium						[18]											
21 Zinc	34	26	24	45 R	24 R	102 R	41 R	62 R		39 R	[10]	4140 R	2000 R	377 R	1350 R		
22 Cyanide										14							

Ground Water Inorganics

SITE

SAMPLE NUMBER +
WELL NUMBER
DATE SAMPLED

1 Aluminum
2 Antimony
3 Arsenic
4 Barium
5 Beryllium
6 Boron
7 Cadmium
8 Chromium, trivalent
9 Cobalt
10 Copper
11 Iron
12 Lead
13 Manganese
14 Mercury
15 Nickel
16 Selenium
17 Silver
18 Thallium
19 Tin
20 Vanadium
21 Zinc
22 Cyanide

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Surface Water Volatiles

	SITE	SITE M	SITE M	SITE M	CS-B	CS-B	CS-B	CS-C	CS-C	CS-D	CS-D		CS-A	CS-A
	SAMPLE NUMBER	DC-SW-01 *	DC-SW-02	DC-SW-03	DC-SW-04	DC-SW-05	DC-SW-06 *	DC-SW-07	DC-SW-08	DC-SW-09	DC-SW-10	DC-SW-11 *	DC-SW-12	DC-SW-13
	DATE	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86
1	Chloromethane		—											
2	Bromomethane													
3	Vinyl Chloride													
4	Chloroethane													
5	Methylene Chloride	6 B	— 3 BJ	3 BJ	3 BJ	3 BJ	3 BJ	3 BJ	6 B	5 B	7 B	6 B	4 BJ	4
6	Acetone	12 B	—	7 BJ	9 BJ	12 B	11 B	13 B	13 B	11 B	11 B	17 B	20 B	6
7	Carbon Disulfide		—											
8	1,1-Dichloroethene													
9	1,1-Dichloroethane													3
10	trans-1,2-Dichloroethene													
11	Chloroform	27	—									25	8	7
12	1-2-Dichloroethane													
13	2-Butanone (MEK)													
14	1,1,1-Trichloroethane												33	41
15	Carbon Tetrachloride													31
16	Vinyl Acetate													
17	Bromodichloromethane													
18	1,2-Dichloropropane													
19	trans-1,3-Dichloropropene													
20	Trichloroethene												6	16
21	Dibromochloromethane													
22	1,1,2-Trichloroethane													
23	Benzene												1 J	
24	cis-1,3-Dichloropropene													
25	2-Chloroethyl Vinyl Ether													
26	Bromoform													
27	4-Methyl-2-pentanone												6 J	
28	2-Hexanone													
29	Tetrachloroethene													
30	1,1,2,2-Tetrachloroethane													
31	Toluene													
32	Chlorobenzene												2 J	
33	Ethylbenzene													
34	Styrene													
35	Total Xylenes												2 J	

Surface Water Semivolatiles

SITE	BLANK	SITE M	SITE M	CS-B	CS-B	CS-B	CS-C	CS-C	CS-D	CS-D	BLANK	CS-A	CS-A
SAMPLE NUMBER	DC-SW-01 *	DC-SW-02	DC-SW-03	DC-SW-04	DC-SW-05	DC-SW-06 B	DC-SW-07	DC-SW-08	DC-SW-09	DC-SW-10	DC-SW-11 *	DC-SW-12 *	DC-SW-13
DATE	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86
1 Phenol													
2 bis(2-Chloroethyl)ether													
3 2-Chlorophenol													
4 1,3-Dichlorobenzene													
5 1,4-Dichlorobenzene													
6 Benzyl Alcohol													
7 1,2-Dichlorobenzene													
8 2-Methylphenol													
9 bis(2-Chloroisopropyl) ether													
10 4-Methylphenol													
11 N-Nitroso-n-Dipropylamine													
12 Hexachloroethane													
13 Nitrobenzene													
14 Isophorone													
15 2-Nitrophenol													
16 2,4-Dimethylphenol													
17 Benzoic Acid													
18 bis-(2-Chloroethoxy)methane													
19 2,4-Dichlorophenol													
20 1,2,4-Trichlorobenzene													
21 Naphthalene													
22 4-Chloroaniline												3 J	
23 Hexachlorobutadiene													
24 4-Chloro-3-methylphenol													
25 2-Methylnaphthalene													
26 Hexachlorocyclopentadiene													
27 2,4,6-Trichlorophenol													
28 2,4,5-Trichlorophenol													
29 2-Chloronaphthalene													
30 2-Nitroaniline				9 J									

Surface Water Semivolatiles

	SITE	BLANK	SITE M	SITE M	CS-B	CS-B	CS-B	CS-C	CS-C	CS-D	CS-D	BLANK	CS-A	CS-A
	SAMPLE NUMBER	DC-SW-01 +	DC-SW-02	DC-SW-03	DC-SW-04	DC-SW-05	DC-SW-06 B	DC-SW-07	DC-SW-08	DC-SW-09	DC-SW 10	DC-SW-11 +	DC-SW-12	DC-SW-13
	DATE	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86
1	Dimethyl Phthalate													
2	Acenaphtylene													
3	3-Nitroaniline													
4	Acenaphthene													
5	2,4-Dinitrophenol													
6	4-Nitrophenol													
7	Dibenzofuran													
8	2,4-Dinitrotoluene													
9	2,6-Dinitrotoluene													
10	Diethylphthalate							1 J						
11	4-Chlorophenyl-Phenylether													
12	Fluorene													
13	4-Nitroaniline													
14	4,6-Dinitro-2-methylphenol													
15	N-Nitrosodiphenylamine													
16	4-Bromophenyl-phenylether													
17	Hexachlorobenzene													
18	Pentachlorophenol													
19	Phenanthrene												4 J	
20	Anthracene													
21	Di-n-butyl phthalate	15 B	26 B	25 B	18 B	15 B	16 B	19 B	19 B	19 B	20 B	17 B	5 BJ	27 B
22	Fluoranthene													
23	Pyrene													
24	Butyl Benzyl phthalate												12 J	
25	3,3'-Dichlorobenzidine													
26	Benzo(a)Anthracene													
27	bis(2-ethylhexyl) phthalate												7 J	5 J
28	Chrysene													
29	Di-n-octyl phthalate		4 J	2 J							1 J		36 J	1 J
30	Benzo(b)Fluoranthene													
31	Benzo(k)Fluoranthene													
32	Benzo(a)Pyrene													
33	Indeno(1,2,3-cd)Pyrene													
34	Benzo(g,h,i)Perylene													
35	Dibenz(a,h)Anthracene													

Surface Water Pest/PCBs

SITE	BLANK	SITE M	SITE M	CS-B	CS-B	CS-B	CS-C	CS-C	CS-D	CS-D	BLANK	CS-A	CS-A
SAMPLE NUMBER	DC-SW-01 +	DC-SW-02	DC-SW-03	DC-SW-04	DC-SW-05	DC-SW-06 *	DC-SW-07	DC-SW-08	DC-SW-09	DC-SW-10	DC-SW-11 +	DC-SW-12	DC-SW-13
DATE	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86
1 Alpha-BHC													
2 Beta-BHC													
3 Delta-BHC													
4 Gamma-BHC (Lindane)													
5 Heptachlor													
6 Aldrin													
7 Heptachlor Epoxide													
8 Edosulfan I													
9 Dieldrin													
10 4,4'-DDE													
11 Endrin													
12 Edosulfan II													
13 4,4'-DDD													
14 Endosulfan Sulfate													
15 4,4'-DDT													
16 Methoxychlor													
17 Endrin Ketone													
18 Chlordane													
19 Toxaphene													
20 AROCLOR-1016													
21 AROCLOR-1221													
22 AROCLOR-1232													
23 AROCLOR-1242													
24 AROCLOR-1248													
25 AROCLOR-1254													
26 AROCLOR-1260				3.6	34	44							

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Surface-Water Inorganic

	SITE	BLANK	SITE M	SITE M	CS-B	CS-B	CS-B	CS-C	CS-C	CS-D	CS-D	BLANK	CS-A	CS-A
	SAMPLE NUMBER	DC-SW-01 +	DC-SW-02	DC-SW-03	DC-SW-04	DC-SW-05	DC-SW-06 *	DC-SW-07	DC-SW-08	DC-SW-09	DC-SW 10	DC-SW-11 +	DC-SW-12	DC-SW-13
	DATE	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-6-86	11-6-86
1	Aluminum		464		1090	204	9080		767	5000	1190	323	354	294
2	Antimony												115	
3	Arsenic						31							
4	Barium		200				7130			274				
5	Beryllium													
6	Boron													
7	Cadmium						25			8.1			75	23
8	Chromium, trivalent		14				99			12			81	65
9	Cobalt													
10	Copper		51	46	660	239	17900	226	84	619	57		7030	2410
11	Iron	255	937	350	1510	495	24500	528	2790	7470	1570		2040	724
12	Lead		6.4		77	17	1300	710	30	89	36		3060	76
13	Manganese		97	95	188	66	222	141	234	196	28		68	252
14	Mercury				0.6			1.9	0.2	0.26			0.59	0.2
15	Nickel		46				1500	83		189			2600	667
16	Selenium													
17	Silver												16	
18	Thallium													
19	Tin						60		40				499	
20	Vanadium													
21	Zinc		186	73	404	302	10300	537	247	1090	185		1450	480
22	Cyanide													

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Sediment Volatiles

SITE	CS-B	CS-B	SITE M	SITE M	SITE M	CS-B	CS-B	CS-B	CS-C	CS-C	CS-C	CS-C	CS-D	CS-D	CS-D
SAMPLE NUMBER	DC-SD-13 B	DC-SD-14	DC-SD-15	DC-SD-16	DC-SD-17	DC-SD-18 B	DC-SD-19	DC-SD-20	DC-SD-21	DC-SD-22	DC-SD-23	DC-SD-24	DC-SD-25	DC-SD-26	DC-SD-27
SAMPLE DEPTH	0-6"	2'-3'	0-6"	0-6"	0-6"	0-6"	0-6"	1.5'-2'	0-6"	2'-2.5'	0-6"	2'-2.5'	0-6"	1.5'-2'	0-6"
DATE SAMPLED	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86
1 Chloromethane															
2 Bromomethane															
3 Vinyl Chloride															
4 Chloroethane															
5 Methylene Chloride	11000 B	2200 B	7800 B	10000 B	8400 B	12000 B	13000 B	14000 B	19000 B	18000 B	27000 B	17000 B	25000 B	19000 B	45000 B
6 Acetone	15000 B	820	4900 B	5100 B	5600 B	4100 JB	10000 B	6100 B	6400 B	9900 B	15000 B	7300 B	18000 B	9300 B	30000 B
7 Carbon Disulfide															
8 1,1-Dichloroethene															
9 1,1-Dichloroethane															
10 trans-1,2-Dichloroethene															
11 Chloroform															
12 1-2-Dichloroethane															
13 2-Butanone (MEK)	21000 B	510	11000	14000	13000	14000	14000	10000 B	11000 B	14000 B	22000 B	12000 B	21000 B	16000 B	35000 B
14 1,1,1-Trichloroethane															
15 Carbon Tetrachloride															
16 Vinyl Acetate															
17 Bromodichloromethane															
18 1,2-Dichloropropane															
19 trans-1,3-Dichloropropene															
20 Trichloroethene															
21 Dibromochloromethane															
22 1,1,2-Trichloroethane															
23 Benzene		87 J													
24 cis-1,3-Dichloropropene															
25 2-Chloroethyl Vinyl Ether															
26 Bromoform															
27 4-Methyl-2-pentanone		220 J													
28 2-Hexanone							52000 B			1200 J					
29 Tetrachloroethene															
30 1,1,2,2-Tetrachloroethane															
31 Toluene		810													
32 Chlorobenzene		5200													
33 Ethylbenzene		3600													
34 Styrene															
35 Total Xylenes		990													

Sediment Volatiles

	SITE	CS-D	BLANK	BLANK	CS-A	CS-A	CS-A	CS-A	CS-A
	SAMPLE NUMBER	DC-SD-28	DC-SD-29 +	DC-SD-31 +	DC-SD-32	DC-SD-33 B	DC-SD-34 B	DC-SD-35	DC-SD-36
	SAMPLE DEPTH	1.5'-2'			1.5'-2'	0-6"	0-6"	0-6"	1.5'-2'
	DATE SAMPLED	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86
1	Chloromethane								
2	Bromomethane								
3	Vinyl Chloride								
4	Chloroethane								
5	Methylene Chloride	20000 B	15000 B	14000 B	14000 B	6300 B	6600 B	8800 B	7200 B
6	Acetone	7400 B	6200 B	4700 B	11000 B	12000 B	5300 B	23000 B	6800 B
7	Carbon Disulfide								
8	1,1-Dichloroethene								
9	1,1-Dichloroethane								
10	trans-1,2-Dichloroethene								
11	Chloroform								
12	1-2-Dichloroethane								
13	2-Butanone (MEK)	15000 B	11000 B	5400 B	12000 B	11000 B	9200 B		12000 B
14	1,1,1-Trichloroethane								
15	Carbon Tetrachloride								
16	Vinyl Acetate								
17	Bromodichloromethane								
18	1,2-Dichloropropane								
19	trans-1,3-Dichloropropene								
20	Trichloroethene								
21	Dibromochloromethane								
22	1,1,2-Trichloroethane								
23	Benzene								
24	cis-1,3-Dichloropropene								
25	2-Chloroethyl Vinyl Ether								
26	Bromoform								
27	4-Methyl-2-pentanone								
28	2-Hexanone						930 JB		
29	Tetrachloroethene								
30	1,1,2,2-Tetrachloroethane								
31	Toluene								
32	Chlorobenzene								480 J
33	Ethylbenzene								
34	Styrene								
35	Total Xylenes								

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Sediment Semivolatiles

SITE	CS-B	CS-B	SITE M	SITE M	SITE M	CS-B	CS-B	CS-B	CS-C	CS C	CS-C	CS-C	CS-D	CS-D
SAMPLE NUMBER	DC-SD-13 B	DC-SD-14	DC-SD-15	DC-SD-16	DC-SD-17	DC-SD-18 B	DC-SD-19	DC-SD-20	DC-SD 21	DC-SD-22	DC-SD-23	DC-SD-24	DC-SD-25	DC-SD-26
SAMPLE DEPTH	0-6"	2'-3'	0-6"	0-6"	0-6"	0-6"	0-6"	1.5'-2'	0-6"	2'-2.5'	0-6"	2'-2.5'	0-6"	1.5'-2'
DATE SAMPLED	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86
1 Phenol											580 J	81 J		
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol														
4 1,3-Dichlorobenzene										110 J				
5 1,4-Dichlorobenzene		220000					130 J			690 J				
6 Benzyl Alcohol														
7 1,2-Dichlorobenzene		17000 J												
8 2-Methylphenol														
9 bis(2-Chloroisopropyl) ether														
10 4-Methylphenol														
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene														
14 Isophorone														
15 2-Nitrophenol														
16 2,4-Dimethylphenol														
17 Benzoic Acid														
18 bis-(2-Chloroethoxy)methane														
19 2,4-Dichlorophenol														
20 1,2,4-Trichlorobenzene		5400 J					390 J	76 J		260 J	130 J	64 J		
21 Naphthalene	400 J	9500 J				190 J	120 J			330 J	100 J			
22 4-Chloroaniline														
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol														
25 2-Methylnaphthalene		8400 J								100 J				
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol														
28 2,4,5-Trichlorophenol														
29 2-Chloronaphthalene														
30 2-Nitroaniline														

Sediment Semivolatiles

SITE	CS-D	CG-D	BLANK	BLANK	CS-A	CS-A	CG-A	CG-A	CS-A
SAMPLE NUMBER	DC-SD-27	DC-SD-28	DC-SD-29 *	DC-SD-31 *	DC-SD-32	DC-SD-33 *	DC-SD-34 *	DC-SD-35	DC-SD-36
SAMPLE DEPTH	0-6"	1.5'-2'			1.5'-2'	0-6"	0-6"	0-6"	1.5'-2'
DATE SAMPLED	11-5-86	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86
1 Phenol									
2 bis(2-Chloroethyl)ether									
3 2-Chlorophenol									
4 1,3-Dichlorobenzene					160 J				550 J
5 1,4-Dichlorobenzene					1000		410 J	130 J	2900
6 Benzyl Alcohol									
7 1,2-Dichlorobenzene					480	270 J			
8 2-Methylphenol									
9 bis(2-Chloroisopropyl) ether									
10 4-Methylphenol									
11 N-Nitroso-n-Dipropylamine									
12 Hexachloroethane									
13 Nitrobenzene									
14 Isophorone									
15 2-Nitrophenol									
16 2,4-Dimethylphenol									
17 Benzoic Acid									
18 bis-(2-Chloroethoxy)methane									
19 2,4-Dichlorophenol									
20 1,2,4-Trichlorobenzene					580			90 J	1500 J
21 Naphthalene								130 J	
22 4-Chloroaniline								1000 J	
23 Hexachlorobutadiene									
24 4-Chloro-3-methylphenol									
25 2-Methylnaphthalene							450 J		
26 Hexachlorocyclopentadiene									
27 2,4,6-Trichlorophenol									
28 2,4,5-Trichlorophenol									
29 2-Chloronaphthalene									
30 2-Nitroaniline									

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Sediment Semivolatiles

SITE	C6 A	C6 B	SITE A	SITE A	SITE A	C8 A	C8 A	C9 A	C5 E	C5 E	C5 E	C5 E	C5 D	C6 D
SAMPLE NUMBER	DC-SD-13 A	DC-SD-14	DC-SD-15	DC-SD-16	DC-SD-17	DC-SD-18 A	DC-SD-19	DC-SD-20	DC-SD-21	DC-SD-22	DC-SD-23	DC-SD-24	DC-SD-25	DC-SD-26
SAMPLE DEPTH	0-6"	2'-3'	0-6"	0-6"	0-6"	0-6"	0-6"	1.5'-2'	0-6"	2'-2.5'	0-6"	2'-2.5'	0-6"	1.5'-2'
DATE SAMPLED	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86
1 Dimethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene										130 J				
5 2,4-Dinitrophenol														
6 4-Nitrophenol		2600 J												
7 Dibenzofuran														
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														
11 4-Chlorophenyl-Phenylether														
12 Fluorene		3900 J								370 J				
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine														
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene							1900	210 J						
18 Pentachlorophenol							940 J	370 J						
19 Phenanthrene		15000 J							280 J	810 J		220 J		
20 Anthracene										500 J				
21 Di-n-butyl phthalate			580 B	570 BJ	560 J	300 J		280 J				120 J	130 J	79 J
22 Fluoranthene		11000 J								4600		370 J		130 J
23 Pyrene		13000 J				1400 J		91 J	440 J	4500		290 J		120 J
24 Butyl Benzyl phthalate						830 J								
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene						430 J			380 J	3300	650 J	230 J		
27 bis(2-ethylhexyl) phthalate	9900 J	9500 J		540 J	150 J	5300		95 J	740 J		660 J			72 J
28 Chrysene						1200 J		180 J	550 J	4400	1000	300 J		83 J
29 Di-n-octyl phthalate		2600 J	120 J	270 J		940 J		96 J		170 J				
30 Benzo(b)Fluoranthene		3400 J					2400			7500	2000	1000		200 J
31 Benzo(k)Fluoranthene	720 J					1500 J		410 J	920	660 J				
32 Benzo(a)Pyrene	1100 J	1800 J				490 J	310 J	95 J	480 J	4500	940	350 J		86 J
33 Indeno(1,2,3-cd)Pyrene						850 J	1400 J	200 J	590 J	4300	1700	530 J		100 J
34 Benzo(g,h,i)Perylene							390 J			1500 J	640 J	110 J		
35 Dibenz(a,h)Anthracene						1400 J	1800	210 J	550 J	4000	1700	470 J		91 J

Sediment Semivolatiles

SITE	CS-D	CS-D	BLANK	BLANK	CS-A	CS-A	CS-A	CS-A	CS-A
SAMPLE NUMBER	DC-SD-27	DC-SD-28	DC-SD-29 +	DC-SD-31 +	DC-SD-32	DC-SD-33 *	DC-SD-34 *	DC-SD-35	DC-SD-36
SAMPLE DEPTH	0-6"	1.5'-2'			1.5'-2'	0-6"	0-6"	0-6"	1.5'-2'
DATE SAMPLED	11-5-86	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86
1 Diaethyl Phthalate									
2 Acenaphtylene									
3 3-Nitroaniline									
4 Acenaphthene									170 J
5 2,4-Dinitrophenol									
6 4-Nitrophenol									
7 Dibenzofuran									
8 2,4-Dinitrotoluene									
9 2,6-Dinitrotoluene									
10 Diethylphthalate									
11 4-Chlorophenyl-Phenylether									
12 Fluorene									
13 4-Nitroaniline									
14 4,6-Dinitro-2-methylphenol									
15 N-Nitrosodiphenylamine					220 J				
16 4-Bromophenyl-phenylether									
17 Hexachlorobenzene					110 J			1100 J	
18 Pentachlorophenol								800 J	
19 Phenanthrene					190 J				
20 Anthracene									
21 Di-n-butyl phthalate									900 J
22 Fluoranthene								600 J	
23 Pyrene					110 J			1000 J	1400 J
24 Butyl Benzyl phthalate					520		2400 J		
25 3,3'-Dichlorobenzidine									
26 Benzo(a)Anthracene									
27 bis(2-ethylhexyl) phthalate					280 J	2200 J	2900	130 J	
28 Chrysene					110 J		710 J	1000 J	1700 J
29 Di-n-octyl phthalate	170 J				300 J	420 J	2900	8100	11000
30 Benzo(b)Fluoranthene	500 J						330 J	760 J	1000 J
31 Benzo(k)Fluoranthene									
32 Benzo(a)Pyrene	240 J							430 J	540 J
33 Indeno(1,2,3-cd)Pyrene	310 J							570 J	
34 Benzo(g,h,i)Perylene									
35 Dibenz(a,h)Anthracene	360 J							960 J	

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Sediment Pest/PCBs

SITE	CS-D	CS-D	SITE M	SITE M	SITE M	CS-D	CS-D	CS-D	CS-C	CS-C	CS C	CS-C	CS-D	CS-D	CS-D
SAMPLE NUMBER	DC-SD-13 B	DC-SD-14	DC-SD-15	DC-SD-16	DC-SD-17	DC-SD-18 B	DC-SD-19	DC-SD-20	DC-SD-21	DC-SD-22	DC-SD-23	DC-SD-24	DC-SD-25	DC-SD-26	DC-SD-27
SAMPLE DEPTH	0-6"	2'-3'	0-6"	0-6"	0-6"	0-6"	0-6"	1.5'-2'	0-6"	2'-2.5'	0-6"	2'-2.5'	0-6"	1.5'-2'	0-6"
DATE SAMPLED	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11 5-86	11-5 86	11-5-86
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin													580		
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242				20000											
24 AROCLOR-1248		480000 C	660	8830	5200					8700					
25 AROCLOR-1254			670		4200		141000 C	16000 C		9300	11000	1600 J			7500
26 AROCLOR-1260	10300 J	66000 C	430 J		2700 J	7700	54000 JC	5600 JC		5000 J	7800 J				4500

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Sediment Pest/PCBs

SITE	CS-D	BLANK	BLANK	CS-A	CS-A	CS-A	CS-A	CS-A
SAMPLE NUMBER	DC-SD-28	DC-SD-29 *	DC-SD-31 *	DC-SD-32	DC-SD-33 *	DC-SD-34 *	DC-SD-35	DC-SD-36
SAMPLE DEPTH	1.5'-2'			1.5'-2'	0-6"	0-6"	0-6"	1.5'-2'
DATE SAMPLED	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86
1 Alpha-BHC								
2 Beta-BHC								
3 Delta-BHC								
4 Gamma-BHC (Lindane)								
5 Heptachlor								
6 Aldrin								
7 Heptachlor Epoxide								
8 Edosulfan I								
9 Dieldrin								
10 4,4'-DDE								
11 Endrin								
12 Edosulfan II								
13 4,4'-DDD								
14 Endosulfan Sulfate								
15 4,4'-DDT								
16 Methoxychlor								
17 Endrin Ketone								
18 Chlordane								
19 Toxaphene								
20 AROCLOR-1016								
21 AROCLOR-1221								
22 AROCLOR-1232								
23 AROCLOR-1242								
24 AROCLOR-1248				21000 C	7900	11000		
25 AROCLOR-1254	1900			13000 JC	6500	10600	71000 C	38000
26 AROCLOR-1260					2000 J	2200 J	24000 C	13000 J

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Sediment Inorganic

SITE	CS-D	CS-D	SITE M	SITE M	SITE M	CS-D	CS-D	CS-D	CS-C	CS-C	CS-C	CS-C	CS-D	CS-D	CS-D
SAMPLE NUMBER	DC-SD-13 *	DC-SD-14	DC-SD-15	DC-SD-16	DC-SD-17	DC-SD-18 *	DC-SD-19	DC-SD-20	DC-SD-21	DC-SD-22	DC-SD-23	DC-SD-24	DC-SD-25	DC-SD 26	DC-SD-27
SAMPLE DEPTH	0-6"	2'-3'	0-6"	0-6"	0-6"	0-6"	0-6"	1.5'-2'	0-6"	2'-2.5'	0-6"	2'-2.5'	0-6"	1.5'-2'	0-6"
DATE SAMPLED	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86	11-5-86
1 Aluminum	4800	6380	6560	2430	7510	5380	9750	12900	12600	7530	8450	12600	11250	12500	6400
2 Antimony															
3 Arsenic	14 R	20 R	3.6 R	12 R	16 R	16 R	21	13 R	5.1 R	9 R	33 R	30 R	3.2 R	7.8 *	4.7 R
4 Barium	410	1110	156	131	196	467	17300	3120	376	570	1700	1010	239	622	214
5 Beryllium															
6 Boron															
7 Cadmium	22	36	1.5	11	8	24	30	8.2	17	34	27	42	12	42	23
8 Chromium, trivalent	62	153	15	37	53	79	118	113	41	60	54	68	33	48	34
9 Cobalt	6.6	9.2	7.7	7.2	5	6	11	6.9	7.5	10	6.6	7.2	5	12	
10 Copper	8740 *	6700 *	167 *	1270 *	1780 *	8640 *	15300 *	2610 *	580 *	5910 *	6540 *	2440 *	379 *	1650 *	1320 *
11 Iron	16400	19500	11100	26000	14400	16300	58200	21300	18400	18000	35800	50900	22800	46200	31300
12 Lead	853	931	26	65	71	983	1460	330	467	593	975	661	146	480	304
13 Manganese	197	153	100	97	139	218	82	70	177	98	161	151	190	273	178
14 Mercury	0.73	1.3	0.13	0.56	0	0.9	1.68	0.89	0.71	0.95	1.64	2.81	1	0.89	0.34
15 Nickel	56 R*	502 R*	356 R*	258 R*	309 R*	82	1520 R*	867 R*	116 R*	836 R*	1290 R*	748 R*	174 R*	665 R*	537 R*
16 Selenium	3.3	4.1				4	2					2.5			
17 Silver	10	11				14	15								
18 Thallium							4								
19 Tin	32	28		23			16								
20 Vanadium	23	27	19		19	24	48	25	32	22	27	36	37	32	
21 Zinc	3310	6650	868	872	1010	3410	11900	6610	1370	15600	6880	6430	1010	6590	2380
22 Cyanide		3.8													

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Sediment Organic

	SITE	CS-B	BLANK	BLANK	CS-A	CS-A	CS-A	CS-A	CS-A
	SAMPLE NUMBER	DC-SD-28	DC-SD-29 +	DC-SD-31 +	DC-SD-32	DC-SD-33 *	DC-SD-34 *	DC-SD-35	DC-SD-36
	SAMPLE DEPTH	1.5'-2'			1.5'-2'	0-6"	0-6"	0-6"	1.5'-2'
	DATE SAMPLED	11-5-86	11-5-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86	11-6-86
1	Aluminum	5870	11800	10500	8570	6720	8310	7210	9180
2	Antimony								
3	Arsenic	5.1 R	5.6 R	5.2 R	10 R	30 R	76 R	21 R	12 R
4	Barium	199	362	277	430	287	287	732	328
5	Beryllium								
6	Boron								
7	Cadmium	5.6	2.5	2.1	10	25	22	31	17
8	Chromium, trivalent	13	15	13	34	102	121	206	75
9	Cobalt	6.4	5.8	5.4	8.9	5.2		27	11
10	Copper	247 *	35 *	31 *	2620 *	4630 *	3130 *	11400 *	10300 *
11	Iron	15000	16600	15700	25000	37400	36100	36600	21900
12	Lead	44	47	30	225	1900	2030	1600	910
13	Manganese	191	412	384	123	69	66	296	153
14	Mercury	0.18			2.81	4.06	5.62	3	1.18
15	Nickel	236 R*	18 R*	19 R*	765 R*	310 R*	255 R*	559 R*	307 R*
16	Selenium					3.3		3	
17	Silver				6	26	23	33	13
18	Thallium								
19	Tin				14	76	412	57	
20	Vanadium	17	27	24	24	20	23	25	22
21	Zinc	917	197	172	1590	1510	1230	3420	2740
22	Cyanide								

Surface Soil Volatiles

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-01	DC-SS-02	DC-SS-03	DC-SS-04	DC-SS-05	DC-SS-06	DC-SS-07	DC-SS-08	DC-SS-09	DC-SS-10	DC-SS-11	DC-SS-12	DC-SS-13	DC-SS-14	DC-SS-15
LOCATION/GRID	C-1	G-1	B-2	E-2	H-2	H-2	I-2	I-2	A-3	B-3	C-3	D-3	E-3	F-3	G-3
DATE SAMPLED	11-10-86	11-10-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Chloroethane															
2 Bromomethane															
3 Vinyl Chloride															
4 Chloroethane															
5 Methylene Chloride	34 B	32 B	33 B	35 B	42 B	43 B	41 B	27 B	51 B	59 B	59 B	105 B	43 B	95 B	26 B
6 Acetone	20 BJ	23 BJ	25 BJ		40 B	41 B	25 JB		55 B		37 B	27 BJ	32 B		18 B
7 Carbon Disulfide															
8 1,1-Dichloroethene															
9 1,1-Dichloroethane															
10 trans-1,2-Dichloroethene															
11 Chloroform															
12 1-2-Dichloroethane															
13 2-Butanone (MEK)		43 B			51 B		51 B	37 B	57 B				42 B	61 B	16 B
14 1,1,1-Trichloroethane															
15 Carbon Tetrachloride															
16 Vinyl Acetate															
17 Bromodichloromethane															
18 1,2-Dichloropropane															
19 trans-1,3-Dichloropropene															
20 Trichloroethene															
21 Dibromochloromethane															
22 1,1,2-Trichloroethane															
23 Benzene															
24 cis-1,3-Dichloropropene															
25 2-Chloroethyl Vinyl Ether															
26 Bromoform															
27 4-Methyl-2-pentanone									9 J	8 J	16 J	280			14 J
28 2-Hexanone														22 B	
29 Tetrachloroethene									22	11 J	63	50		24	
30 1,1,2,2-Tetrachloroethane															
31 Toluene								18 B			36 B		30 B		12
32 Chlorobenzene															
33 Ethylbenzene															
34 Styrene															
35 Total Xylenes															

Surface Soil Volatiles

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-16 B	DC-SS-17	DC-SS-18	DC-SS-19	DC-SS-20	DC-SS-21	DC-SS-22	DC-SS-23	DC-SS-24	DC-SS-25 B	DC-SS-26	DC-SS-27	DC-SS-28	DC-SS-29	DC-SS-30
LOCATION/GRID	G-3	H-3	A-4	B-4	C-4	D-4	E-4	F-4	G-4	G-4	H-4	I-4	J-4	A-5	B-5
DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Chloromethane															
2 Bromomethane															
3 Vinyl Chloride															
4 Chloroethane															
5 Methylene Chloride	56 B	90 B	36 B	81 B	73 B	160 B	62 B	58 B	71 B	79 B	68 B	63 B	63 B	60 B	62 B
6 Acetone	28 BJ	13 BJ	67 B	140 B	99 B	400 B		41	39 B	90	14 BJ	17 BJ	13 BJ	37 B	16 BJ
7 Carbon Disulfide															
8 1,1-Dichloroethene															
9 1,1-Dichloroethane															
10 trans-1,2-Dichloroethene															
11 Chloroform															
12 1-2-Dichloroethane															
13 2-Butanone (MEK)	46 B			180 B				42			40 B	46 B	36 B	36 B	
14 1,1,1-Trichloroethane															
15 Carbon Tetrachloride															
16 Vinyl Acetate															
17 Bromodichloromethane															
18 1,2-Dichloropropane															
19 trans-1,3-Dichloropropene															
20 Trichloroethene															
21 Dibromochloromethane															
22 1,1,2-Trichloroethane															
23 Benzene															
24 cis-1,3-Dichloropropene															
25 2-Chloroethyl Vinyl Ether															
26 Bromoform															
27 4-Methyl-2-pentanone			55	220 B	510 B	160	49 B		320	610					47
28 2-Hexanone				17 BJ	58 B	23 BJ	28 BJ	20 J	51 B						
29 Tetrachloroethene				13 J		40 J					12 J				
30 1,1,2,2-Tetrachloroethane															
31 Toluene										45	37				
32 Chlorobenzene															
33 Ethylbenzene															
34 Styrene															
35 Total Xylenes															

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Surface Soil Volatiles

	SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	BLANK	BLANK
	SAMPLE NUMBER	DC-SS-31	DC-SS-32	DC-SS-33	DC-SS-34	DC-SS-35	DC-SS-36	DC-SS-37	DC-SS-38	DC-SS-39	DC-SS-40	DC-SS-41	DC-SS-42	DC-SS-43	DC-SS-44+	DC-SS-45+
	LOCATION/GRID	B-5	C-5	D-5	E-5	F-5	G-5	H-5	A-6	B-6	C-6	D-6	F-6	B-7		
	DATE SAMPLED	11-11-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-13-86	11-11-86
1	Chloromethane															
2	Bromomethane															
3	Vinyl Chloride															
4	Chloroethane															
5	Methylene Chloride	90 B	33 B	230 B	46 B	23 B	55 B	69 B	40 B	63 B	40 B	37 B	60 B	29 B	52 B	65 B
6	Acetone	36 B	30 B	170 B	19 BJ		25 B	48 B	43 B	66 B	150 B	41 B	58 B	21 BJ	18 BJ	28 J
7	Carbon Disulfide															
8	1,1-Dichloroethene															
9	1,1-Dichloroethane															
10	trans-1,2-Dichloroethene															
11	Chloroform															
12	1-2-Dichloroethane															
13	2-Butanone (MEK)		43 B		37 B		48 B	34 B	35 B	59 B	46 B	37 B	39 B	40 B		
14	1,1,1-Trichloroethane															
15	Carbon Tetrachloride															
16	Vinyl Acetate															
17	Bromodichloromethane															
18	1,2-Dichloropropane															
19	trans-1,3-Dichloropropene															
20	Trichloroethene						11 J		19							
21	Dibromochloromethane															
22	1,1,2-Trichloroethane															
23	Benzene							2 J	80					4 J		
24	cis-1,3-Dichloropropene															
25	2-Chloroethyl Vinyl Ether															
26	Bromoform															
27	4-Methyl-2-pentanone	190	29 J	2000	68	100			140	12 J	31	34				
28	2-Hexanone	16 BJ		89 B												
29	Tetrachloroethene	21						12 J								
30	1,1,2,2-Tetrachloroethane															
31	Toluene				32				1400		33					
32	Chlorobenzene				18				40							
33	Ethylbenzene							55	140							
34	Styrene															
35	Total Xylenes							150	170							

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Surface Soil Volatiles

SITE	SITE J	SITE J	SITE J
SAMPLE NUMBER	DC-SS-46	DC-SS-47	DC-SS-48
LOCATION/GRID	SE	NE	NE
DATE SAMPLED	11-13-86	11-13-86	11-13-86
1 Chloromethane			
2 Bromomethane			
3 Vinyl Chloride			
4 Chloroethane			
5 Methylene Chloride	40 B	32 B	24 B
6 Acetone	18 BJ	33 B	12 BJ
7 Carbon Disulfide			
8 1,1-Dichloroethene			
9 1,1-Dichloroethane			
10 trans-1,2-Dichloroethene			
11 Chloroform			
12 1-2-Dichloroethane			
13 2-Butanone (MEK)	94 B	30 B	35 B
14 1,1,1-Trichloroethane			
15 Carbon Tetrachloride			
16 Vinyl Acetate			
17 Bromodichloromethane			
18 1,2-Dichloropropane			
19 trans-1,3-Dichloropropene			
20 Trichloroethene			
21 Dibromochloromethane			
22 1,1,2-Trichloroethane			
23 Benzene			
24 cis-1,3-Dichloropropene			
25 2-Chloroethyl Vinyl Ether			
26 Bromoform			
27 4-Methyl-2-pentanone			
28 2-Hexanone			
29 Tetrachloroethene			
30 1,1,2,2-Tetrachloroethane			
31 Toluene			
32 Chlorobenzene			
33 Ethylbenzene			
34 Styrene			
35 Total Xylenes			

485

Surface Soils Semivolatiles

SITE	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6	SITE 6
SAMPLE NUMBER	DC-SS-01	DC-SS-02	DC-SS-03	DC-SS-04	DC-SS-05	DC-SS-06	DC-SS-07	DC-SS-08	DC-SS-09	DC-SS-10	DC-SS-11	DC-SS-12	DC-SS-13	DC-SS-14
LOCATION/GRID	C-1	G-1	B-2	E-2	H-2	H-2	I-2	I-2	A-3	G-3	C-3	D-3	E-3	F-3
DATE SAMPLED	11-10-86	11-10-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Phenol														
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol														
4 1,3-Dichlorobenzene														
5 1,4-Dichlorobenzene														
6 Benzyl Alcohol														
7 1,2-Dichlorobenzene														
8 2-Methylphenol														
9 bis(2-Chloroisopropyl) ether														
10 4-Methylphenol														
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene														
14 Isophorone														
15 2-Nitrophenol														
16 2,4-Dimethylphenol														
17 Benzoic Acid														
18 bis-(2-Chloroethoxy)methane														
19 2,4-Dichlorophenol														
20 1,2,4-Trichlorobenzene														
21 Naphthalene									810 J		14000			
22 4-Chloroaniline														
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol														
25 2-Methylnaphthalene											1000 J			
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol														
28 2,4,5-Trichlorophenol														
29 2-Chloronaphthalene														
30 2-Nitroaniline														

Surface Soils Semivolatiles

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-15	DC-SS-16 *	DC-SS-17	DC-SS-18	DC-SS-19	DC-SS-20	DC-SS-21	DC-SS-22	DC-SS-23	DC-SS-24	DC-SS-25 *	DC-SS-26	DC-SS-27	DC-SS-28
LOCATION/GRID	G-3	G-3	H-3	A-4	B-4	C-4	D-4	E-4	F-4	G-4	G-4	H-4	I-4	J-4
DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Phenol									78 J					
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol														
4 1,3-Dichlorobenzene														
5 1,4-Dichlorobenzene							22000000							
6 Benzyl Alcohol														
7 1,2-Dichlorobenzene									89 J					
8 2-Methylphenol														
9 bis(2-Chloroisopropyl) ether														
10 4-Methylphenol														
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene														
14 Isophorone														
15 2-Nitrophenol														
16 2,4-Dimethylphenol														
17 Benzoic Acid														
18 bis-(2-Chloroethoxy)methane														
19 2,4-Dichlorophenol									120 J					
20 1,2,4-Trichlorobenzene			990 J						180 J				140 J	1800 J
21 Naphthalene			120000			1800 J			110 J					
22 4-Chloroaniline														
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol														
25 2-Methylnaphthalene														
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol														
28 2,4,5-Trichlorophenol														
29 2-Chloronaphthalene														
30 2-Nitroaniline									1000 J					34000 J

Surface Soils Semivolatiles

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-29	DC-SS-30	DC-SS-31	DC-SS-32	DC-SS-33	DC-SS-34	DC-SS-35	DC-SS-36	DC-SS-37	DC-SS-38	DC-SS-39	DC-SS-40	DC-SS-41	DC-SS-42	DC-SS-43
LOCATION/GRID	A-5	B-5	B-5	C-5	D-5	E-5	F-5	G-5	H-5	A-6	B-6	C-6	D-6	F-6	B-7
DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86
1 Phenol															
2 bis(2-Chloroethyl)ether															
3 2-Chlorophenol															
4 1,3-Dichlorobenzene															
5 1,4-Dichlorobenzene								240 J		2600 J					210 J
6 Benzyl Alcohol															
7 1,2-Dichlorobenzene															
8 2-Methylphenol															
9 bis(2-Chloroisopropyl) ether															
10 4-Methylphenol															
11 N-Nitroso-n-Dipropylamine															
12 Hexachloroethane															
13 Nitrobenzene															
14 Isophorone															
15 2-Nitrophenol															
16 2,4-Dimethylphenol															
17 Benzoic Acid															
18 bis-(2-Chloroethoxy)methane															
19 2,4-Dichlorophenol												6200			
20 1,2,4-Trichlorobenzene						35000		65 J	5300 J		1800 J				
21 Naphthalene								71 J	26000	110000		140 J		290 J	110 J
22 4-Chloroaniline															
23 Hexachlorobutadiene															
24 4-Chloro-3-methylphenol															
25 2-Methylnaphthalene								50 J		850 J					
26 Hexachlorocyclopentadiene															
27 2,4,6-Trichlorophenol												1500 J			
28 2,4,5-Trichlorophenol															
29 2-Chloronaphthalene															
30 2-Nitroaniline								1100 J	220000						

Surface Soils Semivolatiles

SITE	BLANK	BLANK	SITE J	SITE J	SITE J
SAMPLE NUMBER	DC-SS-44+	DC-SS-45+	DC-SS-46	DC-SS-47	DC-SS-48
LOCATION/GRID			SE	NE	NE
DATE SAMPLED	11-13-86	11-11-86	11-13-86	11-13-86	11-13-86
1 Phenol					
2 bis(2-Chloroethyl)ether					
3 2-Chlorophenol					
4 1,3-Dichlorobenzene					
5 1,4-Dichlorobenzene					
6 Benzyl Alcohol					
7 1,2-Dichlorobenzene					
8 2-Methylphenol					
9 bis(2-Chloroisopropyl) ether					
10 4-Methylphenol					
11 N-Nitroso-n-Dipropylamine					
12 Hexachloroethane					
13 Nitrobenzene					
14 Isophorone					
15 2-Nitrophenol					
16 2,4-Diethylphenol					
17 Benzoic Acid					
18 bis-(2-Chloroethoxy)methane					
19 2,4-Dichlorophenol					
20 1,2,4-Trichlorobenzene					
21 Naphthalene					
22 4-Chloroaniline					
23 Hexachlorobutadiene					
24 4-Chloro-3-methylphenol					
25 2-Methylnaphthalene					
26 Hexachlorocyclopentadiene					
27 2,4,6-Trichlorophenol					
28 2,4,5-Trichlorophenol					
29 2-Chloronaphthalene					
30 2-Nitroaniline					

Surface Soil Semivolatiles

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-01	DC-SS-02	DC-SS-03	DC-SS-04	DC-SS-05	DC-SS-06	DC-SS-07	DC-SS-08	DC-SS-09	DC-SS-10	DC-SS-11	DC-SS-12	DC-SS-13	DC-SS-14
LOCATION/GRID	C-1	G-1	B-2	E-2	H-2	H-2	I-2	I-2	A-3	B-3	C-3	D-3	E-3	F-3
DATE SAMPLED	11-10-86	11-10-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Dimethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene											570 J			
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran											920 J			
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														
11 4-Chlorophenyl-Phenylether														
12 Fluorene														
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine														
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene														
18 Pentachlorophenol									2600 J		4700 J	7800 J		
19 Phenanthrene											4800 J			
20 Anthracene														
21 Di-n-butyl phthalate				170 BJ	2800 B		460 BJ	320 BJ						
22 Fluoranthene							480		540 J			1300 J		
23 Pyrene							290 J					1100 J		
24 Butyl Benzyl phthalate														
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene							220 J		950 J					
27 bis(2-ethylhexyl) phthalate		910	230 J	470			170 J	140 J	240 J		6000	820 J		
28 Chrysene							310 J							4400 J
29 Di-n-octyl phthalate										610 BJ	2600 BJ	3100 F		14000 B
30 Benzo(b)Fluoranthene							610		750 J			1200 J		
31 Benzo(k)Fluoranthene								160 J						
32 Benzo(a)Pyrene							190 J	47 J				520 J		
33 Indeno(1,2,3-cd)Pyrene							280 J							
34 Benzo(g,h,i)Perylene							84 J							
35 Dibenz(a,h)Anthracene							230 J		1100 J					

Surface Soil Semivolatiles

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-15	DC-SS-16 *	DC-SS-17	DC-SS-18	DC-SS-19	DC-SS-20	DC-SS-21	DC-SS-22	DC-SS-23	DC-SS-24	DC-SS-25 *	DC-SS-26	DC-SS-27	DC-SS-28
LOCATION/GRID	G-3	G-3	H-3	A-4	B-4	C-4	D-4	E-4	F-4	G-4	G-4	H-4	I-4	J-4
DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Dimethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene		1800 J	1100 J						70 J					
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran														
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														
11 4-Chlorophenyl-Phenylether														
12 Fluorene														
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine														
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene			10000 J											
18 Pentachlorophenol	1200000	1400000							12000		18000 J			25000 J
19 Phenanthrene	40000 J	37000 J	8700 J						1200				180 J	
20 Anthracene									300 J					
21 Di-n-butyl phthalate						3800 BJ		360 BJ	1700 B				330 BJ	
22 Fluoranthene	44000	45000							2200		6700 J	4800 J		
23 Pyrene	85000	71000	3800 J						850	5500 J	9000 J			
24 Butyl Benzyl phthalate														
25 3,3'-Dichlorobenzidine		86000												
26 Benzo(a)Anthracene		27000 J							960		5100 J			
27 bis(2-ethylhexyl) phthalate									660					
28 Chrysene	39000 J	39000 J							1100		6400 J		270 J	
29 Di-n-octyl phthalate								140 BJ	97 BJ					
30 Benzo(b)Fluoranthene	47000	48000							1800					
31 Benzo(k)Fluoranthene										10000 J	10000 J			
32 Benzo(a)Pyrene	22000 J	20000 J							840		4500 J			
33 Indeno(1,2,3-cd)Pyrene									1100					
34 Benzo(g,h,i)Perylene									430					
35 Dibenz(a,h)Anthracene									1200					

Surface Soil Semivolatiles

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-29	DC-SS-30	DC-SS-31	DC-SS-32	DC-SS-33	DC-SS-34	DC-SS-35	DC-SS-36	DC-SS-37	DC-SS-38	DC-SS-39	DC-SS-40	DC-SS-41	DC-SS-42	DC-SS-43
LOCATION/GRID	A-5	B-5	B-5	C-5	D-5	E-5	F-5	G-5	H-5	A-6	B-6	C-6	D-6	F-6	B-7
DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86
1 Diethyl Phthalate															
2 Acenaphtylene															
3 3-Nitroaniline															
4 Acenaphthene								200 J							770 J
5 2,4-Dinitrophenol															
6 4-Nitrophenol												1000000			
7 Dibenzofuran								95 J							460 J
8 2,4-Dinitrotoluene															
9 2,6-Dinitrotoluene															
10 Diethylphthalate															
11 4-Chlorophenyl-Phenylether															
12 Fluorene															1500 J
13 4-Nitroaniline															
14 4,6-Dinitro-2-methylphenol															
15 N-Nitrosodiphenylamine															
16 4-Bromophenyl-phenylether															
17 Hexachlorobenzene															
18 Pentachlorophenol						9900 J		1600 J			21000000	1100 J		20000	25000
19 Phenanthrene								2800	4700 J			970 J			15000
20 Anthracene								600				810 J			4100
21 Di-n-butyl phthalate												880 J			
22 Fluoranthene								4600				2600			20000
23 Pyrene								3100		5800 J		2400			19000
24 Butyl Benzyl phthalate															
25 3,3'-Dichlorobenzidine															
26 Benzo(a)Anthracene								2100				1400 J			10000
27 bis(2-ethylhexyl) phthalate	2900 J				1400 J							2500			
28 Chrysene								2700		8400 J		2500			10000
29 Di-n-octyl phthalate					2000 BJ										
30 Benzo(b)Fluoranthene								4800				3600			15000
31 Benzo(k)Fluoranthene														750 J	
32 Benzo(a)Pyrene								1900		1900 J	3900 J	1700 J		180 J	7800
33 Indeno(1,2,3-cd)Pyrene								1700				2100			5200
34 Benzo(g,h,i)Perylene								550 J				530 J			1500 J
35 Dibenz(a,h)Anthracene								1500				2400			5400

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Surface Soil Semivolatiles

SITE	BLANK	BLANK	SITE J	SITE J	SITE J
SAMPLE NUMBER	DC-SG-44+	DC-SS-45+	DC-SS-46	DC-SS-47	DC-SS-48
LOCATION/GRID			SE	NE	NE
DATE SAMPLED	11-13-86	11-11-86	11-13-86	11-13-86	11-13-86
1 Diethyl Phthalate					
2 Acenaphtylene					
3 3-Nitroaniline					
4 Acenaphthene					
5 2,4-Dinitrophenol					
6 4-Nitrophenol					
7 Dibenzofuran					
8 2,4-Dinitrotoluene					
9 2,6-Dinitrotoluene					
10 Diethylphthalate					
11 4-Chlorophenyl-Phenylether					
12 Fluorene					
13 4-Nitroaniline					
14 4,6-Dinitro-2-methylphenol					
15 N-Nitrosodiphenylamine					
16 4-Bromophenyl-phenylether					
17 Hexachlorobenzene					
18 Pentachlorophenol					
19 Phenanthrene					
20 Anthracene					
21 Di-n-butyl phthalate	150 J	1500 B	1600 B	230 J	
22 Fluoranthene					
23 Pyrene					
24 Butyl Benzyl phthalate					
25 3,3'-Dichlorobenzidine					
26 Benzo(a)Anthracene					
27 bis(2-ethylhexyl) phthalate			240 J		
28 Chrysene					
29 Di-n-octyl phthalate		79 BJ			
30 Benzo(b)Fluoranthene	81 J				
31 Benzo(k)Fluoranthene					
32 Benzo(a)Pyrene					
33 Indeno(1,2,3-cd)Pyrene					
34 Benzo(g,h,i)Perylene					
35 Dibenz(a,h)Anthracene					

Surface Soils Pest/PCBs

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-01	DC-SS-02	DC-SS-03	DC-SS-04	DC-SS-05	DC-SS-06	DC-SS-07	DC-SS-08	DC-SS-09	DC-SS-10	DC-SS-11	DC-SS-12	DC-SS-13	DC-SS-14	DC-SS-15
LOCATION/GRID	C-1	G-1	B-2	E-2	H-2	W-2	I-2	I-2	A-3	B-3	C-3	D-3	E-3	F-3	G-3
DATE SAMPLED	11-10-86	11-10-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE		31 J			79	51	290	84							
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248									2730000 C	44000	24000000 C				184000
25 AROCLOR-1254								1430			29000000 C				
26 AROCLOR-1260		450		751	990	740	3800	1830			21000000 C	174000 C	165000 J	887000	305000 J

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Surface Soils Pest/PCBs

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-16 #	DC-SS-17	DC-SS-18	DC-SS-19	DC-SS-20	DC-SS-21	DC-SS-22	DC-SS-23	DC-SS-24	DC-SS-25 #	DC-SS-26	DC-SS-27	DC-SS-28	DC-SS-29	DC-SS-30
LOCATION/GRID	G-3	H-3	A-4	B-4	C-4	D-4	E-4	F-4	G-4	G-4	H-4	I-4	J-4	A-5	B-5
DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Endosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Endosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248	171000		1700000	3600000 C			145000 JC	110000 C						21000	30300
25 AROCLOR-1254				7500000 C		2700000							246000 J		
26 AROCLOR-1260	232000 J	2700000 JC		8000000 C	639000		547000 C	218000 C	117000 J	122000 J	120000	2200000 C	625000	23000	35600

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Surface Soils Pest/PCBs

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	BLANK	BLANK
SAMPLE NUMBER	DC-SS-31	DC-SS-32	DC-SS-33	DC-SS-34	DC-SS-35	DC-SS-36	DC-SS-37	DC-SS-38	DC-SS-39	DC-SS-40	DC-SS-41	DC-SS-42	DC-SS-43	DC-SS-44 *	DC-SS-45*
LOCATION/GRID	B-5	C-5	D-5	E-5	F-5	G-5	H-5	A-6	B-6	C-6	D-6	F-6	B-7		
DATE SAMPLED	11-11-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-13-86	11-11-86
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248											26600 J		17000		
25 AROCLOR-1254										119000 JC					
26 AROCLOR-1260		12600 J	25600 J	5250000 C	96000	144000 C	151000 J	8700	544000	279000 C	85800	52800	30100		

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Surface Soils Pest/PCBs

SITE	SITE J	SITE J	SITE J
SAMPLE NUMBER	DC-SS-46	DC-SS-47	DC-SS-48
LOCATION/GRID	SE	NE	NE
DATE SAMPLED	11-13-86	11-13-86	11-13-86
1 Alpha-BHC			
2 Beta-BHC			
3 Delta-BHC			
4 Gamma-BHC (Lindane)			
5 Heptachlor			
6 Aldrin			
7 Heptachlor Epoxide			
8 Edosulfan I			
9 Dieldrin			
10 4,4'-DDE			
11 Endrin			
12 Edosulfan II			
13 4,4'-DDD			
14 Endosulfan Sulfate			
15 4,4'-DDT			
16 Methoxychlor			
17 Endrin Ketone			
18 Chlordane			
19 Toxaphene			
20 AROCLOR-1016			
21 AROCLOR-1221			
22 AROCLOR-1232			
23 AROCLOR-1242			
24 AROCLOR-1248			
25 AROCLOR-1254			
26 AROCLOR-1260			

Surface Soil Inorganic

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-01	DC-SS-02	DC-SS-03	DC-SS-04	DC-SS-05	DC-SS-06	DC-SS-07	DC-SS-08	DC-SS-09	DC-SS-10	DC-SS-11	DC-SS-12	DC-SS-13	DC-SS-14
LOCATION/GRID	C-1	G-1	B-2	E-2	H-2	H-2	I-2	I-2	A-3	B-3	C-3	D-3	E-3	F-3
DATE SAMPLED	11-10-86	11-10-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Aluminum	11400	10900	7820	9670	15300	16500	7610	5950	9290	7880	2790	23300	4780	4710
2 Antimony														
3 Arsenic	6.8 R	4.9 R	5.7 R	5.8 R	5.8	5.7 R	7.5	5.6 R	13 R	5.4 R	5.6 R	26 R	12 R	8 R
4 Barium	163	174	151	145	222	224	202	138	13800	575	20200	7340	169000	67500
5 Beryllium														
6 Boron														
7 Cadmium	2.6	3.4	1.8	1.7	6.3	4.8	10	3.3	10	4.4	4.5	8.1	6	4
8 Chromium, trivalent	16	15	12	14	21	22	19	11	119	52	39	46	24	52
9 Cobalt	6.2	7.8	6.4	6.4	8	9.3	6	5.6	15	8.5	12	13	89	27
10 Copper	327	344	162	245	392	572	2220	675	1200	260	487	1430	624	483
11 Iron	19000	20300	15700	17400	25900	27600	20300	13800	38600	18000	29800	45000	22200	22400
12 Lead	103 E	134 E	68 E	99 E	232 E	230 E	514 E	131 E	655 E	334 E	614 E	711 E	310 E	2950 E
13 Manganese	336	295	300	329	339	390	291	217	322	171	96	150	129	191
14 Mercury	0.16	0.23			0.11	0	0		6.6	1.3	1.7	14	2	7.4
15 Nickel	22	25	18	22	35	33	24	16	360	84	61	382	62	48
16 Selenium														
17 Silver									4.2	5				
18 Thallium														
19 Tin														
20 Vanadium	25	26	20	23	35	38	22	16	139	31	75	129	29	46
21 Zinc	299	406	188	281	619	613	975	354	4580	5130	794	23900	8110	1840
22 Cyanide											4.8	3.3	2	2.8

Surface Soil Inorganic

SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-SS-15	DC-SS-16 *	DC-SS-17	DC-SS-18	DC-SS-19	DC-SS-20	DC-SS-21	DC-SS-22	DC-SS-23	DC-SS-24	DC-SS-25 *	DC-SS-26	DC-SS-27	DC-SS-28
LOCATION/GRID	G-3	G-3	H-3	A-4	B-4	C-4	D-4	E-4	F-4	G-4	G-4	H-4	I-4	J-4
DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86	11-11-86
1 Aluminum	6960	6170	8890	4860	4790	9410	6960	4990	9620	4470	5720	16300	5040	14900
2 Antimony	14	21												
3 Arsenic	36 R	38 R	33 R	64 R	57 R	40 R	14 R	23 R	22 R	39 *	24 *	11 *	10 *	11 *
4 Barium	1180	869	1560	13900	1810	4780	10600	19300	4340	6320	2220	3190	1460	1000
5 Beryllium														1.4
6 Boron														
7 Cadmium	46	45	17	7.2	10	11	5	8.7	20	17 R*	20 R*	21 R*	27 R*	5.2 R*
8 Chromium, trivalent	147	98	66	137	47	34	44	81	48	41 R*	50 R*	137 R*	22 R*	92 R*
9 Cobalt	11	11	7.3	15	3.8	6.7	12	18	59		[5.0]	[6.3]	[5.2]	[3.9]
10 Copper	2170	1620	914	246	437	639	444	684	1950	1480	1900	1020	648	4880
11 Iron	75800	108000	46000	46800	48600	25800	33600	15900	39900	26800 *	29200 *	33900 *	28700 *	35600 *
12 Lead	1240 *	1610 *	1470 *	207 *	263 *	1470 *	482 *	296 *	11700 *	418 *	437 *	580 *	440 *	873 *
13 Manganese	770	874	534	193	223	144	116	278	10800	184 R*	204 R*	326 R*	259 R*	247 R*
14 Mercury	3.2	5.8	6.6	0.57	12	2.3	3	2.7	11	1.02	1.13	1.6	26	3
15 Nickel	122	109	87	95	84	39	52	33	50	105 *	135 *	60 *	34 *	86 *
16 Selenium					3									
17 Silver	6.4	5.4	6.1			3.3			33	3.7 R*	3.4 R*	3.5 R*		
18 Thallium					21									
19 Tin	34	34			163						16			43
20 Vanadium	133	140	211	25	19400	20	69	41	166	64	75	108	59	75
21 Zinc	22000	13600	5100	32100	3.9	46700	814	7100	24200	32200	41400	4660	4520	3280
22 Cyanide	1.6						4.4	3.2	2.7	1.3	1.7			2.5

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Surface Soil Inorganic

	SITE	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G	SITE G
	SAMPLE NUMBER	DC-SS-29	DC-SS-30	DC-SS-31	DC-SS-32	DC-SS-33	DC-SS-34	DC-SS-35	DC-SS-36	DC-SS-37	DC-SS-38	DC-SS-39	DC-SS-40	DC-SS-41	DC-SS-42	DC-SS-43
	LOCATION/GRID	A-5	B-5	B-5	C-5	D-5	E-5	F-5	G-5	H-5	A-6	B-6	C-6	D-6	F-6	B-7
	DATE SAMPLED	11-11-86	11-11-86	11-11-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86	11-12-86
1	Aluminum	19500	2890	4790	12700	14300	5720	2030	6370	4560	2630	4890	7640	10300	5540	8960
2	Antimony					19						16	18			
3	Arsenic	10 *	84 *	74 *	8.6 *	16 *	25 *	16 *	4.6 *	5.2 *	4.1 *	17 *	18 *	42 *	12 *	8 *
4	Barium	3760	1830	1250	1590	1340	9200	533	1750	3870	18300	4480	1940	5210	1960	360
5	Beryllium															
6	Boron															
7	Cadmium	8 R*	11 R*	8.7 R*	8.1 R*	5.2 R*	6.5 R*	5.3 R*	15 R*	26 R*	2 R*	9.7 R*	26 R*	8.1 R*	15 R*	14 R*
8	Chromium, trivalent	12 R*	20 R*	29 R*	21 R*	14 R*	24 R*	20 R*	49 R*	45 R*	19 R*	26 R*	106 R*	20 R*	21 R*	66 R*
9	Cobalt	[10]	[3.3]		[4.0]		[12]	[2.4]	[9.7]	[5.9]	[20]	[6.3]	[16]	[4.6]	[10]	[4.4]
10	Copper	489	852	624	1420	596	435	317	5500	2260	327	1090	1660	1510	1090	753
11	Iron	12500 R*	34000 *	82900 *	17500	12400 *	16400 *	23400 *	28400 *	53900 *	9780 *	22000 *	75100 *	15300 *	26500 *	17700 *
12	Lead	279 R*	304 *	232 *	1270 *	417 *	318 *	205 *	689 *	724 *	105 *	725 *	18400 *	516 *	411 *	326 *
13	Manganese	75 R*	238 R*	408 R*	191 R*	43 R*	119 R*	102 R*	243 R*	746 R*	50 R*	193 R*	457 R*	77 R*	331 R*	159 R*
14	Mercury	0.66	23	18	0.91	0.9	2	2.2	5	3	0.49	2.9	2.2	1.2	3	3.4
15	Nickel	111 *	52 *	35 *	29 *		21 *	15 *	95 *	53 *	35 *	159 *	70 *	30 *	145 *	27 *
16	Selenium								1.9	4.1		1.8	1.3			
17	Silver		3.6 R*		5.4 R*	4.1 R*			8.9 R*	8 R*		6.9 R*	19 R*	3.9 R*	3 R*	3 R*
18	Thallium															
19	Tin		12	14					14	18	16	17	22			
20	Vanadium	11	284	632	30	16	112	39	132	118	23	120	33	17	550	16
21	Zinc	3080	67800	20600	1890	44400	12000	21700	4980	4720	239	1660	6350	39000	2360	1500
22	Cyanide						2	22		2.3	1.4		13	1.8	1	

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Surface Soil Inorganic

	SITE	BLANK	BLANK	SITE J	SITE J	SITE J
	SAMPLE NUMBER	DC-SS-44+	DC-SS-45+	DC-SS-46	DC-SS-47	DC-SS-48
	LOCATION/GRID			SE	NE	NE
	DATE SAMPLED	11-13-86	11-11-86	11-13-86	11-13-86	11-13-86
1	Aluminum	7520	9260	4810	630	631
2	Antimony					
3	Arsenic		7 R	5.3 *	9.1 *	6.4 *
4	Barium	441	326	346	25	24
5	Beryllium					
6	Boron					
7	Cadmium	1.5 R*	1.4	2.3 R*	13 R*	9.9 R*
8	Chromium, trivalent	11 R*	13	123 R*	690 R*	500 R*
9	Cobalt	[4.1]	4.9		[19]	[13]
10	Copper	33	31	135	614	[615]
11	Iron	13400 *	16200	52500 *	243000 *	201000
12	Lead	60 *	68 *	34 *	23 *	30 *
13	Manganese	336 R*	381	627 R*	2180 R*	1630 R*
14	Mercury			0.41		
15	Nickel	15 *	16	59 *	350 *	377 *
16	Selenium					
17	Silver					
18	Thallium					
19	Tin					
20	Vanadium	19	22			
21	Zinc	170	162	65	46	34
22	Cyanide					

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Subsurface Soils Volatiles

	SITE	SITE 6	SITE 6	BLANK	SITE 6	SITE 6	SITE 6	BLANK	SITE 6	SITE 6	SITE 6	SITE 6	BLANK	SITE 6	SITE 6	SITE 6
	SAMPLE NUMBER	DC-61-26	DC-61-27	DC-60-29 *	DC-62-30	DC-62-31 *	DC-63-33	DC-60-34	DC-64-35	DC-64-36	DC-65-37 *	DC-66-67	DC-68-68 *	DC-67-69	DC-68-70	DC-69-71
	SAMPLE DEPTH	0-10'	10'-20'		5'-15'	5'-15'	10'-20'		5'-20'	5'-20	5'-15'	20'-30'		10'-25'	10'-20'	35'-40'
	DATE SAMPLED	1-12-87	1-12-87	1-14-87	1-14-87	1-14-87	1-26-87	1-26-87	1-26-87	1-26-87	1-27-87	2-23-87	2-24-87	2-24-87	2-24-87	2-24-87
1	Chloromethane															
2	Bromomethane															
3	Vinyl Chloride															
4	Chloroethane															
5	Methylene Chloride	8 BJ	15 B	9 BJ	6223 B	7112 B	602 B	4 BJ	3 BJ	3 BJ	851 BJ	1082 BJ	48 B	646 BJ	871 BJ	455 BJ
6	Acetone	32 B	266 B		4699 B	3048 BJ	10500 B	20 B	1980 EB	2250 EB	3302 B	4118 B	18 B	15385 B	12857 B	6047 B
7	Carbon Disulfide															
8	1,1-Dichloroethene															
9	1,1-Dichloroethane															
10	trans-1,2-Dichloroethene														700 J	
11	Chloroform															11628
12	1-2-Dichloroethane											435 J				
13	2-Butanone (MEK)	36 B	29 B	27 B	15240 B	17780 B	4100 B		22 B	15 B	3683 B	8941 B	27 B	9692 B	12286	9535 B
14	1,1,1-Trichloroethane															
15	Carbon Tetrachloride															
16	Vinyl Acetate															
17	Bromodichloromethane															
18	1,2-Dichloropropane															
19	trans-1,3-Dichloropropene															
20	Trichloroethene										762 J	1141 J		3846	2000 J	
21	Dibromochloromethane															
22	1,1,2-Trichloroethane															
23	Benzene								3 J	5 J	10160	9882		21538	5143	45749
24	cis-1,3-Dichloropropene															
25	2-Chloroethyl Vinyl Ether															
26	Bromoform															
27	4-Methyl-2-pentanone										635 J	1176 J		4154	6000	
28	2-Hexanone															
29	Tetrachloroethene		9 J		13970	5207					3556	11765		44615	58571	12791
30	1,1,2,2-Tetrachloroethane															581 J
31	Toluene				406 J						27940	117647		38462	12143	94186
32	Chlorobenzene				584 J		1600		107	150	2413	27059 B	1 J	538462 E	100000 B	197674 E
33	Ethylbenzene						164 J				1245 J	988 J		16923	14286	7209
34	Styrene															
35	Total Xylenes						92				2794	2235		41538	25714	16279 B

Subsurface Soils Volatiles

SITE	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	BLANK	SITE H	SITE H	SITE H	SITE H	SITE H	SITE I	SITE I	SITE I
SAMPLE NUMBER	DC-H1-14	DC-H1-15	DC-H2-16	DC-H3-17	DC-H3-18 B	DC-H4-19	DC-HB-20 +	DC-H5-21	DC-H6-22	DC-H7-23	DC-H8-24	DC-H9-28	DC-11-38	DC-12-39	DC-13-40
SAMPLE DEPTH	15'-25'	35'-50'	5'-20'	10'-20'	10'-20'	10'-25'		0-10'	35'-50'	35'-50'	5'-15'	15'-25'	0-10'	5'-25'	5'-15'
DATE SAMPLED	12-18-86	12-18-87	1-5-87	1-6-87	1-6-87	1-6-87	1-7-87	1-7-87	1-8-87	1-8-87	1-9-87	1-13-87	1-27-87	1-28-87	1-29-87
							66								
1 Chloroethane															
2 Bromomethane															
3 Vinyl Chloride															
4 Chloroethane															
5 Methylene Chloride	710 BJ	13 J	13137 B	52 B	38 B	55600 B	59 B	39 B	32 B	38 B	38 B	6 BJ	746 BJ	2160 B	6768 B
6 Acetone	7099 B	30 B	21140 B	461 B	1135 BE	18070 B	49 B	15 BJ	2835 BE	319 B	754 BE	1524 BE	2192 BJ	11340 B	16920 B
7 Carbon Disulfide															
8 1,1-Dichloroethene															
9 1,1-Dichloroethane															
10 trans-1,2-Dichloroethene															
11 Chloroform				192	53										
12 1-2-Dichloroethane				12 J											
13 2-Butanone (MEK)	10968 B		27180 B			25020 B				33		36 B	3562 B	10530 B	16920 B
14 1,1,1-Trichloroethane															1692
15 Carbon Tetrachloride															
16 Vinyl Acetate															
17 Bromodichloromethane															
18 1,2-Dichloropropane															
19 trans-1,3-Dichloropropene															
20 Trichloroethene				10 J											
21 Dibromochloromethane															
22 1,1,2-Trichloroethane															
23 Benzene	61290	4 J	22650	256	71	22240			19				397 J	5265	
24 cis-1,3-Dichloropropene															
25 2-Chloroethyl Vinyl Ether															
26 Bromoform															
27 4-Methyl-2-pentanone			7852 J	909 E	554		14 J		9 J						
28 2-Hexanone															
29 Tetrachloroethene	5645													5265	1754 J
30 1,1,2,2-Tetrachloroethane															
31 Toluene	25806		11174	486	145	76450							658 J	7425	677 BJ
32 Chlorobenzene	451613 E	24	120800	307	77	12788							90420 E	13500	126900
33 Ethylbenzene	10000		4379 J			12788							15070	3375	
34 Styrene															
35 Total Xylenes	19355		1510 J			23630							19180	8100	

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Subsurface Soils Volatiles

	SITE	SITE I	SITE I	SITE I	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE J
	SAMPLE NUMBER	DC-15-41	DC-15-42	DC-16-43	DC-18-44	DC-17-45	DC-17-46	DC-17-47 B	DC-19-48	DC-19-49	DC-110-50	DC-111-51	DC-111-52	DC-112-57	DC-112-58	DC-J1-11
	SAMPLE DEPTH	5'-27.5'	28'-38'	10'-25'		3.5'-12.5'	13'-23'	13'-23'	6'-23'	24'-30'	15'-30'	6'-20'	26'-39'	3.5'-12.5'	18.5'-27.5'	13'-20'
	DATE SAMPLED	1-30-87	1-30-87	2-2-87	2-3-87	2-3-87	2-3-87	2-3-87	2-4-87	2-4-87	2-4-87	2-5-87	2-5-87	2-13-87	2-13-87	12-17-86
1	Chloromethane															
2	Bromomethane															
3	Vinyl Chloride															
4	Chloroethane															
5	Methylene Chloride	5207 B	5310 B	1047 BJ	6 B	7 B	15 B	13 B	1117 BJ	418 BJ	636 BJ	852 BJ	46 B	17 B	17 B	5 BJ
6	Acetone	10541 B	6726 B	13398 B	10 JB	1950 EB	850 EB	914 EB	13377 B	5289 B	6480 B	13861 B	708 B	1461 BE	549 BE	562 BE
7	Carbon Disulfide															
8	1,1-Dichloroethene															
9	1,1-Dichloroethane															
10	trans-1,2-Dichloroethene					3 J										
11	Chloroform															
12	1-2-Dichloroethane															
13	2-Butanone (MEK)	13970 B	9794 B	9702 B	18	30		23	10731 B	4059 B	8640 B	14696 B	168 B	12 B	27 B	22 B
14	1,1,1-Trichloroethane										432 J					
15	Carbon Tetrachloride															
16	Vinyl Acetate															
17	Bromodichloromethane															
18	1,2-Dichloropropane															
19	trans-1,3-Dichloropropene															
20	Trichloroethene	3810									648 J					
21	Dibromochloromethane															
22	1,1,2-Trichloroethane															
23	Benzene	24130	637 J	2156					1000 J	107 J	1008 J	3340	23 J			
24	cis-1,3-Dichloropropene															
25	2-Chloroethyl Vinyl Ether															
26	Bromoform															
27	4-Methyl-2-pentanone			4158											1 BJ	
28	2-Hexanone															
29	Tetrachloroethene	2667	2950								612 J					
30	1,1,2,2-Tetrachloroethane															
31	Toluene	24130 B	1652 JB	5082					77910	1353 B	3120	1837	48			
32	Chlorobenzene	45720	14160	7854		10			3234	935	2640	108550	2040			
33	Ethylbenzene	9779	3068	5082					588 J	283 J	8160	1035 J	96			
34	Styrene															
35	Total Xylenes	11049	1652 J	4158					867 J	102 J	2760	1620 J	80			

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Subsurface Soils Volatiles

SITE	SITE J	SITE J	SITE K	SITE K	SITE K	BLANK	SITE L	SITE L	SITE L	SITE L	SITE L	SITE N	SITE N	BLANK	SITE P
SAMPLE NUMBER	DC-J2-12	DC-J3-13	DC-K1-08	DC-K2-25	DC-K3-32	DC-LB-01 *	DC-L1-02	DC-L2-03	DC-L3-04	DC-L4-09	DC-L4-10 *	DC-N1-05	DC-N2-06	DC-NB-07 *	DC-P1-53
SAMPLE DEPTH	15'-25'	0-10'	0-10'	0-10'	10'-20'		5'-10'	5'-15'	5'-15'	10'-20'	10'-20'	0-10'	5'-15'		0-17'
DATE SAMPLED	12-17-86	12-17-86	12-16-87	1-12-87	1-22-87	12-12-86	12-12-86	12-12-86	12-12-86	12-17-86	12-17-86	12-15-86	12-15-86	12-16-86	2-11-87
1 Chloromethane															
2 Bromomethane															
3 Vinyl Chloride															
4 Chloroethane															
5 Methylene Chloride	372 BJ	3 BJ	6 B	13 B	9 B	17 B	14 B	141 B	2278 B	8	5 J	4 BJ	6 J	4 BJ	18 B
6 Acetone	4487 B	467 BE	212 B	44 B	1003 EB	32 B	907 B	443 B	4557 B	32 B	81 B	45 B	11 BJ	23 B	1025 BE
7 Carbon Disulfide															
8 1,1-Dichloroethene															
9 1,1-Dichloroethane															
10 trans-1,2-Dichloroethene															
11 Chloroform									20253	96	49				13
12 1-2-Dichloroethane															
13 2-Butanone (MEK)	6026 B		25 B	29 B	29 B		16		10000 B	16 B			14 J		188 B
14 1,1,1-Trichloroethane															
15 Carbon Tetrachloride															
16 Vinyl Acetate															
17 Bromodichloromethane															
18 1,2-Dichloropropane															
19 trans-1,3-Dichloropropene															
20 Trichloroethene															
21 Dibromochloromethane															
22 1,1,2-Trichloroethane															
23 Benzene								141	4177	7 J	4 J				49
24 cis-1,3-Dichloropropene															
25 2-Chloroethyl Vinyl Ether															
26 Bromoform															
27 4-Methyl-2-pentanone		4 J	11 J				8 J	167		68 B	49 B	4 J			49
28 2-Hexanone															38
29 Tetrachloroethene															
30 1,1,2,2-Tetrachloroethane															
31 Toluene			15					2179	26582	93	50				413
32 Chlorobenzene															138
33 Ethylbenzene	2051							40 J							119
34 Styrene															
35 Total Xylenes	7949							179	670 J						450

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Subsurface Soils Volatiles

	SITE	SITE P	SITE P	SITE P	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	BLANK	SITE O	SITE O	SITE O	SITE O	SITE O
	SAMPLE NUMBER	DC-P2-54	DC-P5-55	DC-P5-56 *	DC-01-59	DC-02-60	DC-03-61	DC-04-62	DC-05-63	DC-05-64 *	DC-08-65 +	DC-06-66	DC-09-72	DC-09-73	DC-010-74	DC-010-75
	SAMPLE DEPTH	25'-35'	10'-25	10'-25'	15'-25'	20'-30'	10'-20'	0-10'	8.5'-20'	8.5'-20'		15'-25'	0-10'	15'-25'	5'-10'	10'-15'
	DATE SAMPLED	2-11-87	2-12-87	2-12-87	2-16-87	2-17-87	2-17-87	2-17-87	2-17-87	2-17-87	2-18-87	2-18-87	2-26-87	2-26-87	2-26-87	2-26-87
1	Chloroethane															
2	Bromoethane															
3	Vinyl Chloride															
4	Chloroethane															
5	Methylene Chloride	5 BJ	2 BJ	5 BJ		35	10 J	833 BJ		18 J	139 B	4 J	878 BJ	514 BJ	771 BJ	341 BJ
6	Acetone	1036 BE	333 BE	413 BE	1379 BE	9103 BE	4405 BE	7692 B	8659 BE	11463 BE		457 B		2593 B	3846 B	2514 B
7	Carbon Disulfide															
8	1,1-Dichloroethene															
9	1,1-Dichloroethane					10 J										
10	trans-1,2-Dichloroethene					192	6 J									
11	Chloroform															
12	1-2-Dichloroethane					23										
13	2-Butanone (MEK)	76 B	22 B	26 B	30 B	25641 BE	36 B	7179 B	244 B	171 B		20 B		4444 B	7436 B	6705 B
14	1,1,1-Trichloroethane							1410								
15	Carbon Tetrachloride															
16	Vinyl Acetate															
17	Bromodichloroethane															
18	1,2-Dichloropropane															
19	trans-1,3-Dichloropropene															
20	Trichloroethene					69										
21	Dibromochloroethane															
22	1,1,2-Trichloroethane															
23	Benzene					667	24	30769		18 J					1795	
24	cis-1,3-Dichloropropene															
25	2-Chloroethyl Vinyl Ether															
26	Bromoform															
27	4-Methyl-2-pentanone	29 B				1244 B		7692								
28	2-Hexanone	2 BJ				63										
29	Tetrachloroethene															
30	1,1,2,2-Tetrachloroethane					28										
31	Toluene							29487					293 J		4559	
32	Chlorobenzene					1667	62	38462	74	159			841 J		58974	1259
33	Ethylbenzene					46	167	166667 E	37 J	57 J			2439	74 J	9103	341 J
34	Styrene															
35	Total Xylenes					141	976	615385 E	244	256			21951	255 J	29487	1114 J

Subsurface Soils Volatiles

SITE	
SAMPLE NUMBER	
SAMPLE DEPTH	
DATE SAMPLED	
1	Chloromethane
2	Bromomethane
3	Vinyl Chloride
4	Chloroethane
5	Methylene Chloride
6	Acetone
7	Carbon Disulfide
8	1,1-Dichloroethene
9	1,1-Dichloroethane
10	trans-1,2-Dichloroethene
11	Chloroform
12	1-2-Dichloroethane
13	2-Butanone (MEK)
14	1,1,1-Trichloroethane
15	Carbon Tetrachloride
16	Vinyl Acetate
17	Bromodichloromethane
18	1,2-Dichloropropane
19	trans-1,3-Dichloropropene
20	Trichloroethene
21	Dibromochloromethane
22	1,1,2-Trichloroethane
23	Benzene
24	cis-1,3-Dichloropropene
25	2-Chloroethyl Vinyl Ether
26	Bromoform
27	4-Methyl-2-pentanone
28	2-Hexanone
29	Tetrachloroethene
30	1,1,2,2-Tetrachloroethane
31	Toluene
32	Chlorobenzene
33	Ethylbenzene
34	Styrene
35	Total Xylenes

Subsurface Soils Semivolatiles

SITE	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G	SITE G	BLANK	SITE G	SITE G
SAMPLE NUMBER	DC-G1-26	DC-G1-27	DC-G0-29 *	DC-G2-30	DC-G2-31 *	DC-G3-33	DC-G0-34	DC-G4-35	DC-G4-36	DC-G5-37 *	DC-G6-67	DC-G0-68 *	DC-G7-69	DC-G8-70
SAMPLE DEPTH	0-10'	10'-20'		5'-15'	5'-15'	10'-20'		5'-20'	5'-20	5'-15'	20'-30'		10'-25'	10'-20'
DATE SAMPLED	1-12-87	1-12-87	1-14-87	1-14-87	1-14-87	1-26-87	1-26-87	1-26-87	1-26-87	1-27-87	2-23-87	2-24-87	2-24-87	2-24-87
1 Phenol										177800				
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol										9763 J				
4 1,3-Dichlorobenzene														
5 1,4-Dichlorobenzene				3556 J				2376	3750 J					
6 Benzyl Alcohol										6095 J				
7 1,2-Dichlorobenzene														
8 2-Methylphenol										3556 J				
9 bis(2-Chloroisopropyl) ether														
10 4-Methylphenol														
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene														
14 Isophorone														
15 2-Nitrophenol														
16 2,4-Dimethylphenol														
17 Benzoic Acid														
18 bis-(2-Chloroethoxy)methane														
19 2,4-Dichlorophenol										38100	14118 J			141429 J
20 1,2,4-Trichlorobenzene										7874 J	103529		120000 J	
21 Naphthalene				4953 J	4826 J					254000	341176		109231 J	5428571
22 4-Chloroaniline										5969 J			239769 J	
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol														
25 2-Methylnaphthalene										13970 J	8706 J			37143 J
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol										49530				
28 2,4,5-Trichlorophenol														
29 2-Chloronaphthalene														
30 2-Nitroaniline														

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Subsurface Soils Semivolatiles

	SITE	SITE G	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	BLANK	SITE H	SITE H	SITE H	SITE H	SITE H	SITE I
	SAMPLE NUMBER	DC-G9-71	DC-H1-14	DC-H1-15	DC-H2-16	DC-H3-17	DC-H3-18	DC-H4-19	DC-HB-20 +	DC-H5-21	DC-H6-22	DC-H7-23	DC-H8-24	DC-H9-28	DC-I1-38
	SAMPLE DEPTH	35'-40'	15'-25'	35'-50'	5'-20'	10'-20'	10'-20'	10'-25'		0-10'	35'-50'	35'-50'	5'-15'	15'-25'	0-10'
	DATE SAMPLED	2-24-87	12-18-86	12-18-87	1-5-87	1-6-87	1-6-87	1-6-87	1-7-87	1-7-87	1-8-87	1-8-87	1-9-87	1-13-87	1-27-87
1	Phenol						422 J								
2	bis(2-Chloroethyl)ether														
3	2-Chlorophenol														
4	1,3-Dichlorobenzene		241935 J		13288 J			7645 J							
5	1,4-Dichlorobenzene		30645161 E	1190	890000			68110					62 J		10960 J
6	Benzyl Alcohol							7923 J							
7	1,2-Dichlorobenzene		19354839 E	548	90600										8905 J
8	2-Methylphenol														
9	bis(2-Chloroisopropyl) ether														
10	4-Methylphenol						172 J								
11	N-Nitroso-n-Dipropylamine														
12	Hexachloroethane														3014 J
13	Nitrobenzene														
14	Isophorone														
15	2-Nitrophenol														
16	2,4-Dimethylphenol						92 J								
17	Benzoic Acid					1408 J	2640								
18	bis-(2-Chloroethoxy)methane														
19	2,4-Dichlorophenol		741935	167 J		294 J	330 J	8479 J							
20	1,2,4-Trichlorobenzene	15116 J	7580645	4048	211400		145 J	194600			61 J				6713 J
21	Naphthalene	109302			2265000	282 J	1320						44 J		2877 J
22	4-Chloroaniline	8023 J													
23	Hexachlorobutadiene														
24	4-Chloro-3-methylphenol														
25	2-Methylnaphthalene	13953 J			347300		277 J						156 J		3425 J
26	Hexachlorocyclopentadiene														
27	2,4,6-Trichlorophenol		612903	179 J											
28	2,4,5-Trichlorophenol														
29	2-Chloronaphthalene														
30	2-Nitroaniline														

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Subsurface Soils Semivolatiles

SITE	SITE I	SITE I	SITE I	SITE I	SITE I	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I
SAMPLE NUMBER	DC-12-39	DC-13-40	DC-15-41	DC-15-42	DC-16-43	DC-18-44	DC-17-45	DC-17-46	DC-17-47	DC-19-48	DC-19-49	DC-110-50	DC-111-51	DC-111-52
SAMPLE DEPTH	5'-25'	5'-15'	5'-27.5'	28'-38'	10'-25'		3.5'-12.5'	13'-23'	13'-23'	6'-23'	24'-30'	15'-30'	6'-20'	26'-39'
DATE SAMPLED	1-28-87	1-29-87	1-30-87	1-30-87	2-2-87	2-3-87	2-3-87	2-3-87	2-3-87	2-4-87	2-4-87	2-4-87	2-5-87	2-5-87
1 Phenol	27000 J				15246 J									
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol														
4 1,3-Dichlorobenzene	18900 J												70140	
5 1,4-Dichlorobenzene	32400	3666 J	558800	22420	72380								1237000	1596 J
6 Benzyl Alcohol														
7 1,2-Dichlorobenzene	324000	2679 J	139700 J	6490 J	15400 J									
8 2-Methylphenol														
9 bis(2-Chloroisopropyl) ether														
10 4-Methylphenol														
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene														
14 Isophorone														
15 2-Nitrophenol														
16 2,4-Dimethylphenol														
17 Benzoic Acid	62100 J													
18 bis-(2-Chloroethoxy)methane														
19 2,4-Dichlorophenol												9000 J		
20 1,2,4-Trichlorobenzene	1485000		8255000 E	637200 E	477400							116400	100200	112800
21 Naphthalene	58050		63500 J	1100 J	44660 J					514500	1845 J			
22 4-Chloroaniline			43180 J											
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol														
25 2-Methylnaphthalene	7020 J		58470 J	1700 J	169400					5880 J			23380 J	
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol														
28 2,4,5-Trichlorophenol														
29 2-Chloronaphthalene														
30 2-Nitroaniline														

Subsurface Soils Semivolatiles

	SITE	SITE I	SITE I	SITE J	SITE J	SITE J	SITE K	SITE K	SITE K	BLANK	SITE L	SITE L	SITE L	SITE L	SITE L
	SAMPLE NUMBER	DC-I12-57	DC-I12-58	DC-J1-11	DC-J2-12	DC-J3-13	DC-K1-08	DC-K2-25	DC-K3-32	DC-LB-01 *	DC-L1-02	DC-L2-03	DC-L3-04	DC-L4-09	DC-L4-10 *
	SAMPLE DEPTH	3.5'-12.5'	18.5'-27.5'	10'-20'	15'-25'	0-10'	0-10'	0-10'	10'-20'		5'-10'	5'-15'	5'-15'	10'-20'	10'-20'
	DATE SAMPLED	2-13-87	2-13-87	12-17-86	12-17-86	12-17-86	12-16-87	1-12-87	1-22-87	12-12-86	12-12-86	12-12-86	12-12-86	12-17-86	12-17-86
1	Phenol											346 J	1519 J		
2	bis(2-Chloroethyl)ether														
3	2-Chlorophenol												2152		
4	1,3-Dichlorobenzene														
5	1,4-Dichlorobenzene					211 J							215 J		
6	Benzyl Alcohol														
7	1,2-Dichlorobenzene					100 J									
8	2-Methylphenol														
9	bis(2-Chloroisopropyl) ether														
10	4-Methylphenol											88 J	1089 J		
11	N-Nitroso-n-Dipropylamine														
12	Hexachloroethane														
13	Nitrobenzene														49 J
14	Isophorone														
15	2-Nitrophenol														
16	2,4-Dimethylphenol														
17	Benzoic Acid														
18	bis-(2-Chloroethoxy)methane														
19	2,4-Dichlorophenol														
20	1,2,4-Trichlorobenzene						96 J								
21	Naphthalene				17949		153 J	48 J				154 J	532 J		
22	4-Chloroaniline														
23	Hexachlorobutadiene														
24	4-Chloro-3-methylphenol														
25	2-Methylnaphthalene				61538		118 J					333 J	1000 J		
26	Hexachlorocyclopentadiene														
27	2,4,6-Trichlorophenol														
28	2,4,5-Trichlorophenol														
29	2-Chloronaphthalene														
30	2-Nitroaniline														

Subsurface Soils Semivolatiles

SITE	SITE N	SITE N	BLANK	SITE P	SITE P	SITE P	SITE P	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	BLANK
SAMPLE NUMBER	DC-N1-05	DC-N2-06	DC-N6-07 +	DC-P1-53	DC-P2-54	DC-P5-55	DC-P5-56 *	DC-01-59	DC-02-60	DC-03-61	DC-04-62	DC-05-63	DC-05-64 *	DC-08-65 +
SAMPLE DEPTH	0-10'	5'-15'		0-10'	25'-35'	10'-25	10'-25'	15'-25'	20'-30'	10'-20'	0-10'	8.5'-20'	8.5'-20'	
DATE SAMPLED	12-15-86	12-15-86	12 16-86	2-11-87	2-11-87	2-12-87	2-12-87	2-16-87	2-17-87	2-17-87	2 17-87	2-17-87	2-17-87	2-18 87
1 Phenol				3875 J										
2 bis(2-Chloroethyl)ether														
3 2-Chlorophenol														
4 1,3-Dichlorobenzene														
5 1,4-Dichlorobenzene				8875 J										
6 Benzyl Alcohol														
7 1,2-Dichlorobenzene				3625 J							24359 J			
8 2-Methylphenol														
9 bis(2-Chloroisopropyl) ether														
10 4-Methylphenol														
11 N-Nitroso-n-Dipropylamine														
12 Hexachloroethane														
13 Nitrobenzene														
14 Isophorone														
15 2-Nitrophenol														
16 2,4-Dimethylphenol														
17 Benzoic Acid														
18 bis-(2-Chloroethoxy)methane														
19 2,4-Dichlorophenol														
20 1,2,4-Trichlorobenzene											26923 J			
21 Naphthalene											34615 J			
22 4-Chloroaniline														
23 Hexachlorobutadiene														
24 4-Chloro-3-methylphenol														
25 2-Methylnaphthalene											160256			
26 Hexachlorocyclopentadiene														
27 2,4,6-Trichlorophenol														
28 2,4,5-Trichlorophenol														
29 2-Chloronaphthalene														
30 2-Nitroaniline														

Subsurface Soils Semivolatiles

SITE	SITE D	SITE D	SITE D	SITE D	SITE D
SAMPLE NUMBER	DC-06-66	DC-09-72	DC-09-73	DC-010-74	DC-010-75
SAMPLE DEPTH	15'-25'	0-10'	15'-20'	5'-10'	10'-15'
DATE SAMPLED	2-18-87	2-26-87	2-26-87	2-26-87	2-26-87
1 Phenol					
2 bis(2-Chloroethyl)ether					
3 2-Chlorophenol					
4 1,3-Dichlorobenzene					
5 1,4-Dichlorobenzene		4634 J		112821	
6 Benzyl Alcohol					
7 1,2-Dichlorobenzene		32927		100000	
8 2-Methylphenol					
9 bis(2-Chloroisopropyl) ether					
10 4-Methylphenol					
11 N-Nitroso-n-Dipropylamine					
12 Hexachloroethane					
13 Nitrobenzene					
14 Isophorone					
15 2-Nitrophenol					
16 2,4-Dimethylphenol					
17 Benzoic Acid					
18 bis-(2-Chloroethoxy)methane					
19 2,4-Dichlorophenol					
20 1,2,4-Trichlorobenzene		25610			
21 Naphthalene		6707 J			
22 4-Chloroaniline					
23 Hexachlorobutadiene					
24 4-Chloro-3-methylphenol					
25 2-Methylnaphthalene		31707		7308	
26 Hexachlorocyclopentadiene					
27 2,4,6-Trichlorophenol					
28 2,4,5-Trichlorophenol					
29 2-Chloronaphthalene					
30 2-Nitroaniline					

Subsurface Soils Semivolatiles

SITE	SITE 6	SITE 6	BLANK	SITE 6	SITE 6	SITE 6	BLANK	SITE 6	SITE 6	SITE 6	SITE 6	BLANK	SITE 6	SITE 6
SAMPLE NUMBER	DC-61-26	DC-61-27	DC-68-29 *	DC-62-30	DC-62-31 *	DC-63-33	DC-68-34	DC-64-35	DC-64-36	DC-65-37 *	DC-66-67	DC-68-68 *	DC-67-69	DC-68-70
SAMPLE DEPTH	0-10'	10'-20'		5'-15'	5'-15'	10'-20'		5'-20'	5'-20	5'-15'	20'-30'		10'-25'	10'-20'
DATE SAMPLED	1-12-87	1-12-87	1-14-87	1-14-87	1-14-87	1-26-87	1-26-87	1-26-87	1-26-87	1-27-87	2-23-87	2-24-87	2-24-87	2-24-87
1 Dimethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene														
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran													33846 J	
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														22857
11 4-Chlorophenyl-Phenylether														
12 Fluorene														
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine										177800				
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene				40640	27940									
18 Pentachlorophenol				620000 E	990600						23529 J		4769231	185714 J
19 Phenanthrene										26670	12941 J			31429 J
20 Anthracene														
21 Di-n-butyl phthalate	279 BJ	293 BJ	368 BJ								17647 J	10000 B		
22 Fluoranthene											6588 J			
23 Pyrene										19050				
24 Butyl Benzyl phthalate														
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene														
27 bis(2-ethylhexyl) phthalate														
28 Chrysene										22860				
29 Di-n-octyl phthalate														
30 Benzo(b)Fluoranthene														
31 Benzo(k)Fluoranthene														
32 Benzo(a)Pyrene														
33 Indeno(1,2,3-cd)Pyrene														
34 Benzo(g,h,i)Perylene														
35 Dibenz(a,h)Anthracene														

Subsurface Soils Semivolatiles

	SITE	SITE G	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	BLANK	SITE H	SITE H	SITE H	SITE H	SITE H	SITE I
	SAMPLE NUMBER	DC-G9-71	DC-H1-14	DC-H1-15	DC-H2-16	DC-H3-17	DC-H3-18 *	DC-H4-19	DC-H9-20 +	DC-H5-21	DC-H6-22	DC-H7-23	DC-H8-24	DC-H9-28	DC-I1-38
	SAMPLE DEPTH	35'-40'	15'-25'	35'-50'	5'-20'	10'-20'	10'-20'	10'-25'		0-10'	35'-50'	35'-50'	5'-15'	15'-25'	0-10'
	DATE SAMPLED	2-24-87	12-18-86	12-18-87	1-5-87	1-6-87	1-6-87	1-6-87	1-7-87	1-7-87	1-8-87	1-8-87	1-9-87	1-13-87	1-27-87
1	Dimethyl Phthalate														
2	Acenaphtylene				377500		251 J						130 J		
3	3-Nitroaniline														
4	Acenaphthene	2674 J													
5	2,4-Dinitrophenol	13953 J													
6	4-Nitrophenol														
7	Dibenzofuran	9302 J			604000	205 J	1100						143 J		
8	2,4-Dinitrotoluene														
9	2,6-Dinitrotoluene														
10	Diethylphthalate														
11	4-Chlorophenyl-Phenylether														
12	Fluorene	11279			483200		647						247 J		
13	4-Nitroaniline							1834000 E							
14	4,6-Dinitro-2-methylphenol														
15	N-Nitrosodiphenylamine							6681 J							
16	4-Bromophenyl-phenylether														
17	Hexachlorobenzene			714											
18	Pentachlorophenol														191800
19	Phenanthrene	25581			2114000	256 J	1320			947	47 J		169 J		7946 J
20	Anthracene	8400 J			679500		198 J			221 J			129 J		
21	Di-n-butyl phthalate	17442 BJ			25670 BJ	1152 B	1267 B		1126 B	824 B	878 B	1062 B	1014 B	343 BJ	
22	Fluoranthene				1330000		145 J			972			351 J		8905 J
23	Pyrene	7558 J			664400					935			1209		2877 J
24	butyl Benzyl phthalate	23256													
25	3,3'-Dichlorobenzidine														
26	Benzo(a)Anthracene				377500					554			1157		2466 J
27	bis(2-ethylhexyl) phthalate						251 J			541		614		305 J	15070
28	Chrysene				332200					750			3380		3973 J
29	Di-n-octyl phthalate														
30	Benzo(b)Fluoranthene				211400					1021			442		1507 J
31	Benzo(k)Fluoranthene														
32	Benzo(a)Pyrene				271800								780		2466 J
33	Indeno(1,2,3-cd)Pyrene				135900										
34	Benzo(g,h,i)Perylene				113250								494		
35	Dibenz(a,h)Anthracene				31710 J										

Subsurface Soils Semivolatiles

SITE	SITE I	SITE I	SITE I	SITE I	SITE I	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I
SAMPLE NUMBER	DC-12-39	DC-13-40	DC-15-41	DC-15-42	DC-16-43	DC-18-44	DC-17-45	DC-17-46	DC-17-47	DC-19-48	DC-19-49	DC-110-50	DC-111-51	DC-111-52
SAMPLE DEPTH	5'-25'	5'-15'	5'-27.5'	28'-38'	10'-25'		3.5'-12.5'	13'-23'	13'-23'	6'-23'	24'-30'	15'-30'	6'-20'	26'-39'
DATE SAMPLED	1-28-87	1-29-87	1-30-87	1-30-87	2-2-87	2-3-87	2-3-87	2-3-87	2-3-87	2-4-87	2-4-87	2-4-87	2-5-87	2-5-87
1 Diethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene					14014									
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran										5586 J				
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate					16940 J									
11 4-Chlorophenyl-Phenylether														
12 Fluorene					35420 J					6174 J	3075 J			
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine	45900 J		100330 J											
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene	117450		1270000	177000	32340 J							100800	63460	46800
18 Pentachlorophenol														
19 Phenanthrene			48000 J		101640 J					12495 J				1320 J
20 Anthracene			203200		23100 J									
21 Di-n-butyl phthalate			203200		36960 J	9728	15600	8500	10668		10332			11280
22 Fluoranthene			203200		18480 J									
23 Pyrene			24000 J		49280 J					2205 J				
24 Butyl Benzyl phthalate			139000 J											
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene												6720 J		
27 bis(2-ethylhexyl) phthalate	31050 J				130900			2375			5535		48430 J	11000
28 Chrysene									5588					
29 Di-n-octyl phthalate														
30 Benzo(b)Fluoranthene					32430 J									
31 Benzo(k)Fluoranthene														
32 Benzo(a)Pyrene														
33 Indeno(1,2,3-cd)Pyrene														
34 Benzo(g,h,i)Perylene														
35 Dibenz(a,h)Anthracene														

Subsurface Soils Semivolatiles

SITE	SITE I	SITE I	SITE J	SITE J	SITE J	SITE K	SITE K	SITE K	BLANK	SITE L	SITE L	SITE L	SITE L	SITE L
SAMPLE NUMBER	DC-I12-57	DC-I12-58	DC-J1-11	DC-J2-12	DC-J3-13	DC-K1-08	DC-K2-25	DC-K3-32	DC-LB-01 *	DC-L1-02	DC-L2-03	DC-L3-04	DC-L4-09	DC-L4-10 *
SAMPLE DEPTH	3.5'-12.5'	18.5'-27.5'	10'-20'	15'-25'	0-10'	0-10'	0-10'	10'-20'		5'-10'	5'-15'	5'-15'	10'-20'	10'-20'
DATE SAMPLED	2-13-87	2-13-87	12-17-86	12-17-86	12-17-86	12-16-87	1-12-87	1-22-87	12-12-86	12-12-86	12-12-86	12-12-86	12-17-86	12-17-86
1 Dimethyl Phthalate														
2 Acenaphtylene							220 J							
3 3-Nitroaniline														
4 Acenaphthene				2179 J		150 J					44 J			
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran				1013 J		129 J	104 J							
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														310 J
11 4-Chlorophenyl-Phenylether														
12 Fluorene				3462 J			195 J							
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine														
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene														
18 Pentachlorophenol											11538	58228		
19 Phenanthrene				14103		1329 J	1708	559	45 J		602	1772 J		
20 Anthracene				910 J		294 J	415							
21 Di-n-butyl phthalate		134 J					378 BJ	1329 B		171 J	372 J	2784		
22 Fluoranthene						1765 J	2196	1208			448			
23 Pyrene				462 J		1765 J	1342	634			282 J			
24 Butyl Benzyl phthalate														
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene						941 J	878	332 J				911 J		
27 bis(2-ethylhexyl) phthalate			1027	2949 J	1100	21176 E	1074	4681 B			1217		750	1297
28 Chrysene						1035 J	891	544			205 J			
29 Di-n-octyl phthalate						2941	146 J	302 J						
30 Benzo(b)Fluoranthene						1035	1220	619						
31 Benzo(k)Fluoranthene														
32 Benzo(a)Pyrene						929 J	939	378 J						
33 Indeno(1,2,3-cd)Pyrene							610							
34 Benzo(g,h,i)Perylene							598							
35 Dibenz(a,h)Anthracene														

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Subsurface Soils Semivolatiles

SITE	SITE N	SITE N	BLANK	SITE P	SITE P	SITE P	SITE P	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	SITE Q	BLANK
SAMPLE NUMBER	DC-N1-05	DC-N2-06	DC-NB-07 *	DC-P1-53	DC-P2-54	DC-P3-55	DC-P3-56 *	DC-Q1-59	DC-Q2-60	DC-Q3-61	DC-Q4-62	DC-Q5-63	DC-Q5-64 *	DC-QB-65 *
SAMPLE DEPTH	0-10'	5'-15'		0-10'	25'-35'	10'-25	10'-25'	15'-25'	20'-30'	10'-20'	0-10'	8.5'-20'	8.5'-20'	
DATE SAMPLED	12-15-86	12-15-86	12-16-86	2-11-87	2-11-87	2-12-87	2-12-87	2-16-87	2-17-87	2-17-87	2-17-87	2-17-87	2-17-87	2-18-87
1 Dimethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene														
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran														
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														
11 4-Chlorophenyl-Phenylether														
12 Fluorene														
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine											50000 J			
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene														
18 Pentachlorophenol										22619	474359 J			
19 Phenanthrene	434	203 J									217949	963 J		
20 Anthracene										5357				
21 Di-n-butyl phthalate				16750 J	155 J	63 J	325 J	5287				3780 J		2785 J
22 Fluoranthene	684	253 J									43590 J			
23 Pyrene	553	215 J									282051			
24 Butyl Benzyl phthalate														
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene	263 J										121795			
27 bis(2-ethylhexyl) phthalate	934	1266					225 J	1379 BJ		1905 BJ			2439 JB	
28 Chrysene	276 J										282051		1951 J	
29 Di-n-octyl phthalate														
30 Benzo(b)Fluoranthene	289 J	152 J									79487 J			
31 Benzo(k)Fluoranthene														
32 Benzo(a)Pyrene	211 J										66667 J			
33 Indeno(1,2,3-cd)Pyrene														
34 Benzo(g,h,i)Perylene											52564 J			
35 Dibenz(a,h)Anthracene														

Subsurface Soils Semivolatiles

	SITE	SITE D	SITE D	SITE D	SITE D	SITE D
	SAMPLE NUMBER	DC-06-66	DC-09-72	DC-09-73	DC-010-74	DC-010-75
	SAMPLE DEPTH	15'-25'	0-10'	15'-20'	5'-10'	10'-15'
	DATE SAMPLED	2-18-87	2-26-87	2-26-87	2-26-87	2-26-87
1	Dimethyl Phthalate					
2	Acenaphtylene					
3	3-Nitroaniline					
4	Acenaphthene		2561 J			
5	2,4-Dinitrophenol					
6	4-Nitrophenol					
7	Dibenzofuran		1463 J			
8	2,4-Dinitrotoluene					
9	2,6-Dinitrotoluene					
10	Diethylphthalate					
11	4-Chlorophenyl-Phenylether					
12	Fluorene		3049 J			
13	4-Nitroaniline					
14	4,6-Dinitro-2-methylphenol					
15	N-Nitrosodiphenylamine		10244 J			
16	4-Bromophenyl-phenylether					
17	Hexachlorobenzene					
18	Pentachlorophenol		329268	6420 J	112821 J	7159 J
19	Phenanthrene		21951	469 J	42308	863 J
20	Anthracene		4146 J			
21	Di-n-butyl phthalate		7195 J	6049		5000 J
22	Fluoranthene		7317 J		11076 J	
23	Pyrene		62195	1605 J	82051	1477 J
24	Butyl Benzyl phthalate				3846154 E	67045
25	3,3'-Dichlorobenzidine					
26	Benzo(a)Anthracene		25610			
27	bis(2-ethylhexyl) phthalate			914 J		1080 J
28	Chrysene		62195	1605 J	82051	1818 J
29	Di-n-octyl phthalate					
30	Benzo(b)Fluoranthene		17073 J			
31	Benzo(k)Fluoranthene					
32	Benzo(a)Pyrene		19512			
33	Indeno(1,2,3-cd)Pyrene					
34	Benzo(g,h,i)Perylene		17073 J			
35	Dibenz(a,h)Anthracene					

Subsurface Soils Semivolatiles

SITE	SITE I	SITE I	SITE I	SITE I	SITE I	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I
SAMPLE NUMBER	DC-12-39	DC-13-40	DC-15-41	DC-15-42	DC-16-43	DC-18-44	DC-17-45	DC-17-46	DC-17-47	DC-19-48	DC-19-49	DC-110-50	DC-111-51	DC-111-52
SAMPLE DEPTH	5'-25'	5'-15'	5'-27.5'	28'-38'	19'-25'		3.5'-12.5'	13'-23'	13'-23'	6'-23'	24'-30'	15'-30'	6'-20'	26'-39'
DATE SAMPLED	1-28-87	1-29-87	1-30-87	1-30-87	2-2-87	2-3-87	2-3-87	2-3-87	2-3-87	2-4-87	2-4-87	2-4-87	2-5-87	2-5-87
1 Diaethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene					14014									
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran										5586 J				
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate					16940 J									
11 4-Chlorophenyl-Phenylether														
12 Fluorene					35420 J					6174 J	3075 J			
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine	45900 J		100330 J											
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene	117450		1270000	177000	32340 J							100800	63460	46800
18 Pentachlorophenol														
19 Phenanthrene			48000 J		101640 J					12495 J				1320 J
20 Anthracene			203200		23100 J									
21 Di-n-butyl phthalate			203200		36960 J	9728	15600	8500	10668		10332			11280
22 Fluoranthene			203200		18480 J									
23 Pyrene			24000 J		49280 J					2205 J				
24 Butyl Benzyl phthalate			139000 J											
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene												6720 J		
27 bis(2-ethylhexyl) phthalate	31050 J				130900			2375			5535		48430 J	11000
28 Chrysene									5588					
29 Di-n-octyl phthalate														
30 Benzo(b)Fluoranthene					32430 J									
31 Benzo(k)Fluoranthene														
32 Benzo(a)Pyrene														
33 Indeno(1,2,3-cd)Pyrene														
34 Benzo(g,h,i)Perylene														
35 Dibenz(a,h)Anthracene														

Subsurface Soils Semivolatiles

SITE	SITE I	SITE I	SITE J	SITE J	SITE J	SITE K	SITE K	SITE K	BLANK	SITE L	SITE L	SITE L	SITE L	SITE L
SAMPLE NUMBER	DC-112-57	DC-112-58	DC-J1-11	DC-J2-12	DC-J3-13	DC-K1-08	DC-K2-25	DC-K3-32	DC-LB-01 +	DC-L1-02	DC-L2-03	DC-L3-04	DC-L4-09	DC-L4-10 *
SAMPLE DEPTH	3.5'-12.5'	18.5'-27.5'	10'-20'	15'-25'	0-10'	0-10'	0-10'	10'-20'		5'-10'	5'-15'	5'-15'	10'-20	10'-20'
DATE SAMPLED	2-13-87	2-13-87	12-17-86	12-17-86	12-17-86	12-16-87	1-12-87	1-22-87	12-12-86	12-12-86	12-12-86	12-12-86	12-17-86	12-17-86
1 Diaethyl Phthalate														
2 Acenaphtylene							220 J							
3 3-Nitroaniline														
4 Acenaphthene				2179 J		150 J					44 J			
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran				1013 J		129 J	104 J							
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														310 J
11 4-Chlorophenyl-Phenylether														
12 Fluorene				3462 J			195 J							
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine														
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene														
18 Pentachlorophenol											11538	58228		
19 Phenanthrene				14103		1529 J	1708	559	45 J		602	1772 J		
20 Anthracene				910 J		294 J	415							
21 Bi-n-butyl phthalate		134 J					378 BJ	1329 B		171 J	372 J	2784		
22 Fluoranthene						1765 J	2196	1208			448			
23 Pyrene				462 J		1765 J	1342	634			282 J			
24 Butyl Benzyl phthalate														
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene						941 J	878	332 J				911 J		
27 bis(2-ethylhexyl) phthalate			1027	2949 J	1100	21176 E	1074	4681 B			1217		750	1297
28 Chrysene						1035 J	891	544			205 J			
29 Bi-n-octyl phthalate						2941	146 J	302 J						
30 Benzo(b)Fluoranthene						1035	1220	619						
31 Benzo(k)Fluoranthene														
32 Benzo(a)Pyrene						929 J	939	378 J						
33 Indeno(1,2,3-cd)Pyrene							610							
34 Benzo(g,h,i)Perylene							598							
35 Dibenz(a,h)Anthracene														

Subsurface Soils Semivolatiles

SITE	SITE N	SITE N	BLANK	SITE P	SITE P	SITE P	SITE P	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	BLANK
SAMPLE NUMBER	DC-N1-05	DC-N2-06	DC-NB-07 *	DC-P1-53	DC-P2-54	DC-P5-55	DC-P5-56 *	DC-01-59	DC-02-60	DC-03-61	DC-04-62	DC-05-63	DC-05-64 *	DC-OB-65 *
SAMPLE DEPTH	0-10'	5'-15'		0-10'	25'-35'	10'-25	10'-25'	15'-25'	20'-30'	10'-20'	0-10'	8.5'-20'	8.5'-20'	
DATE SAMPLED	12-15-86	12-15-86	12-16-86	2-11-87	2-11-87	2-12-87	2-12-87	2-16-87	2-17-87	2-17-87	2-17-87	2-17-87	2-17-87	2-18-87
1 Diethyl Phthalate														
2 Acenaphtylene														
3 3-Nitroaniline														
4 Acenaphthene														
5 2,4-Dinitrophenol														
6 4-Nitrophenol														
7 Dibenzofuran														
8 2,4-Dinitrotoluene														
9 2,6-Dinitrotoluene														
10 Diethylphthalate														
11 4-Chlorophenyl-Phenylether														
12 Fluorene														
13 4-Nitroaniline														
14 4,6-Dinitro-2-methylphenol														
15 N-Nitrosodiphenylamine											50000 J			
16 4-Bromophenyl-phenylether														
17 Hexachlorobenzene														
18 Pentachlorophenol										22619	474359 J			
19 Phenanthrene	434	203 J									217949	963 J		
20 Anthracene										5357				
21 Di-n-butyl phthalate				16250 J	155 J	63 J	325 J	5287				3780 J		2785 J
22 Fluoranthene	684	253 J									43590 J			
23 Pyrene	553	215 J									282051			
24 Butyl Benzyl phthalate														
25 3,3'-Dichlorobenzidine														
26 Benzo(a)Anthracene	263 J										121795			
27 bis(2-ethylhexyl) phthalate	934	1266					225 J	1379 BJ		1905 BJ			2439 JB	
28 Chrysene	276 J										282051		1951 J	
29 Di-n-octyl phthalate														
30 Benzo(b)Fluoranthene	289 J	152 J									79487 J			
31 Benzo(k)Fluoranthene														
32 Benzo(a)Pyrene	211 J										66667 J			
33 Indeno(1,2,3-cd)Pyrene														
34 Benzo(g,h,i)Perylene											52564 J			
35 Dibenz(a,h)Anthracene														

Subsurface Soils Semivolatiles

SITE	SITE D	SITE D	SITE D	SITE D	SITE D
SAMPLE NUMBER	DC-D6-66	DC-D9-72	DC-D9-73	DC-D10-74	DC-D10-75
SAMPLE DEPTH	15'-25'	0-10'	15'-20'	5'-10'	10'-15'
DATE SAMPLED	2-18-87	2-26-87	2-26-87	2-26-87	2-26-87
1 Dimethyl Phthalate					
2 Acenaphtylene					
3 3-Nitroaniline					
4 Acenaphthene		2561 J			
5 2,4-Dinitrophenol					
6 4-Nitrophenol					
7 Dibenzofuran		1463 J			
8 2,4-Dinitrotoluene					
9 2,6-Dinitrotoluene					
10 Diethylphthalate					
11 4-Chlorophenyl-Phenylether					
12 Fluorene		3049 J			
13 4-Nitroaniline					
14 4,6-Dinitro-2-methylphenol					
15 N-Nitrosodiphenylamine		10244 J			
16 4-Bromophenyl-phenylether					
17 Hexachlorobenzene					
18 Pentachlorophenol		329268	6420 J	112821 J	7159 J
19 Phenanthrene		21951	469 J	42308	863 J
20 Anthracene		4146 J			
21 Di-n-butyl phthalate		7195 J	6049		5000 J
22 Fluoranthene		7317 J		11026 J	
23 Pyrene		62195	1605 J	82051	1477 J
24 Butyl Benzyl phthalate				3846154 E	67045
25 3,3'-Dichlorobenzidine					
26 Benzo(a)Anthracene		25610			
27 bis(2-ethylhexyl) phthalate			914 J		1080 J
28 Chrysene		62195	1605 J	82051	1818 J
29 Di-n-octyl phthalate					
30 Benzo(b)Fluoranthene		17073 J			
31 Benzo(k)Fluoranthene					
32 Benzo(a)Pyrene		19512			
33 Indeno(1,2,3-cd)Pyrene					
34 Benzo(g,h,i)Perylene		17073 J			
35 Dibenz(a,h)Anthracene					

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Subsurface Soils Pest/PCBs

SITE	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-61-26	DC-61-27	DC-GB-29 +	DC-62-30	DC-62-31 #	DC-63-33	DC-GB-34	DC-64-35	DC-64-36	DC-65-37 #	DC-66-67	DC-GB-68 +	DC-67-69	DC-68-70	DC-69-71
SAMPLE DEPTH	0-10'	10'-20'		5'-15'	5'-15'	10'-20'		5'-20'	5'-20	5'-15'	20'-30'		19'-25	10'-20'	35'-40
DATE SAMPLED	1-12-87	1-12-87	1-14-87	1-14-87	1-14-87	1-26-87	1-26-87	1-26-87	1-26-87	1-27-87	2-23-87	2-24-87	2-24-87	2-24-87	2-24-87
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE				3073	3683						52941		135385 J		
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248															174419 C
25 AROCLOR-1254															
26 AROCLOR-1260	130 J						1792 J			57150	764706		661538 J	4428571	267442 C

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Subsurface Soils Pest/PCBs

SITE	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	BLANK	SITE H	SITE H	SITE H	SITE H	SITE H	SITE I	SITE I	SITE I
SAMPLE NUMBER	DC-H1-14	DC-H1-15	DC-H2-16	DC-H3-17	DC-H3-18	DC-H4-19	DC-H8-20	DC-H5-21	DC-H6-22	DC-H7-23	DC-H8-24	DC-H9-28	DC-I1-38	DC-I2-39	DC-I3-40
SAMPLE DEPTH	15'-25'	35'-50'	5'-20'	10'-20'	10'-20'	10'-25'		0-10'	35'-50'	35'-50'	5'-15	15'-25'	0-10	5'-25'	5'-15
DATE SAMPLED	12-18-86	12-18-87	1-5-87	1-6-87	1-6-87	1-6-87	1-7-87	1-7-87	1-8-87	1-8-87	1-9-87	1-13-87	1-27-87	1-28-87	1-29-87
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE								504			780				
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD								431							
14 Endosulfan Sulfate															
15 4,4'-DDT								923			780				
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248															
25 AROCLOR-1254															
26 AROCLOR-1260	905483	1130 J	139524		251	18000000	205	5166	1755					270000 J	185300

465

Subsurface Soils Pest/PCBs

SITE	SITE I	SITE I	SITE I	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE J
SAMPLE NUMBER	DC-I5-41	DC-I5-42	DC-I6-43	DC-I8-44	DC-I7-45	DC-I7-46	DC-I7-47	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58	DC-J1-11
SAMPLE DEPTH	5'-27.5'	20'-30'	10'-25'		3.5'-12.5'	13'-23'	13'-23'	6'-23'	24'-30'	15'-30'	6'-20'	26'-39'	3.5'-12.5	18.5'-27.5	10'-20'
DATE SAMPLED	1-30-87	1-30-87	2-2-87	2-3-87	2-3-87	2-3-87	2-3-87	2-4-87	2-4-87	2-4-87	2-5-87	2-5-87	2-13-87	2-13-87	12/17/86
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD								29694	6642						
14 Endosulfan Sulfate															
15 4,4'-DDT									4305						
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene			492800												
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242															
24 AROCLOR-1248															
25 AROCLOR-1254															
26 AROCLOR-1260	342900 J	86140								20400 J					

4696

Subsurface Soils Pest/PCBs

SITE	SITE J	SITE J	SITE K	SITE K	SITE K	BLANK	SITE L	SITE L	SITE L	SITE L	SITE L	SITE N	SITE N	BLANK	SITE P
SAMPLE NUMBER	DC-J2-12	DC-J3-13	DC-K1-08	DC-K2-25	DC-K3-32	DC-LB-01 *	DC-L1-02	DC-L2-03	DC-L3-04	DC-L4-09	DC-L4-10 *	DC-N1-05	DC-N2-06	DC-NB-07 *	DC-P1-53
SAMPLE DEPTH	15'-25'	0-10'	0-10'	0-10'	10'-20'		5'-10'	5'-15'	5'-15'	10'-20'	10'-20'	0-10'	5'-15'		0-10
DATE SAMPLED	12-17-86	12-17-86	12-16-87	1-12-87	1-22-87	12-12-86	12-12-86	12-12-86	12-12-86	12-17-86	12-17-86	12-15-86	12-15-86	12-16-86	2-11-87
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232															
23 AROCLOR-1242					19000										
24 AROCLOR-1248			117647 C	4880											
25 AROCLOR-1254															
26 AROCLOR-1260		179		6344											

Subsurface Soils Pest/PCBs

SITE	SITE P	SITE P	SITE P	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	BLANK	SITE O	SITE O	SITE O	SITE O	SITE O
SAMPLE NUMBER	DC-P2-54	DC-P5-55	DC-P5-56 *	DC-01-59	DC-02-60	DC-03-61	DC-04-62	DC-05-63	DC-05-64 *	DC-08-65 *	DC-06-66	DC-09-72	DC-09-73	DC-010-74	DC-010-75
SAMPLE DEPTH	25'-35'	10'-25	10'-25'	15'-25'	20'-30'	10'-20'	0-10'	8.5'-20'	8.5'-20'		15'-25'	0-10'	15'-20	5'-10	10'-15
DATE SAMPLED	2-11-87	2-12-87	2-12-87	2-16-87	2-17-87	2-17-87	2-17-87	2-17-87	2-17-87	2-18-87	2-18-87	2-26-87	2-26-87	2-26-87	2-26-87
1 Alpha-BHC															
2 Beta-BHC															
3 Delta-BHC															
4 Gamma-BHC (Lindane)															
5 Heptachlor															
6 Aldrin															
7 Heptachlor Epoxide															
8 Edosulfan I															
9 Dieldrin															
10 4,4'-DDE															
11 Endrin															
12 Edosulfan II															
13 4,4'-DDD															
14 Endosulfan Sulfate															
15 4,4'-DDT															
16 Methoxychlor															
17 Endrin Ketone															
18 Chlordane															
19 Toxaphene															
20 AROCLOR-1016															
21 AROCLOR-1221															
22 AROCLOR-1232								26829 C	30366						
23 AROCLOR-1242							1871795					634146	24691	461539	11764
24 AROCLOR-1248															
25 AROCLOR-1254															
26 AROCLOR-1260								5488 JC	3902 J						

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Subsurface Soil Inorganics

SITE	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G	SITE G	BLANK	SITE G	SITE G	SITE G
SAMPLE NUMBER	DC-G1-26	DC-G1-27	DC-GB-29 +	DC-G2-30	DC-G2-31 *	DC-G3-33	DC-GB-34	DC-G4-35	DC-G4-36	DC-G5-37 *	DC-G6-67	DC-GB-68 +	DC-G7-69	DC-G8-70	DC-G9-71
SAMPLE DEPTH	0-10'	10'-20'		5'-15'	5'-15'	10'-20'		5'-20'	5'-20	5'-15'	20'-30'		10'-25'	10'-20'	35'-40'
DATE SAMPLED	1-12-87	1-12-87	1-14-87	1-14-87	1-14-87	1-26-87	1-26-87	1-26-87	1-26-87	1-27-87	2-23-87	2-24-87	2-24-87	2-24-87	2-24-87
1 Aluminum	9760	18667	12821	5304	3380	12767	14359	8671	8200	9304	1859	6785	16615	4343	966
2 Antimony															
3 Arsenic	4 R	2 R	6 R	3 R	2 R	5	7	4	4	5		6 R	123 R	16 R	
4 Barium	213	168	359	45949	15570	206	424	117	140	233	142	363	1554	284	133
5 Beryllium															
6 Boron															
7 Cadmium			2	2			3					2	14	5	
8 Chromium, trivalent	9	6	13	18	5	16	13	9	7	16	12	11	985	109	11
9 Cobalt				56	19					16					13
10 Copper	16		31	28	8	8	33	18	3	16	18	30	2215	507	10
11 Iron	14000	9853	16282	13544	6392	12712	13846	8829	9900	11410	6035	12354	53692	12243	4056
12 Lead	12 R	8 R	68 R	30 R	16 R	11 *	51 *	8 *	32 *	14 *	25 *	57 *	3123 *	833 *	22 *
13 Manganese	308	179	410	242	92	278 R	382 R	182 R	209 R	461	73 *	357 *	282 *	193 *	43 *
14 Mercury	0.3													24.3	
15 Nickel	13		17	35		15	19	13	13	89	10 *	14	123 *	399 *	
16 Selenium															
17 Silver														12	
18 Thallium															
19 Tin													80	26	
20 Vanadium	28	21	36	22	14	25	28		19	27	31	16	1315	109	
21 Zinc	103	27	167	115	39	44	190	50	65	224	86 *	168 *	2954 *	4257 *	51
22 Cyanide															

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Subsurface Soil Inorganics

SITE	SITE H	SITE H	SITE H	SITE H	SITE H	SITE H	BLANK	SITE H	SITE H	SITE H	SITE H	SITE H	SITE I	SITE I	SITE I
SAMPLE NUMBER	DC-H1-14	DC-H1-15	DC-H2-16	DC-H3-17	DC-H3-18 *	DC-H4-19	DC-HB-20 +	DC-H5-21	DC-H6-22	DC-H7-23	DC-H8-24	DC-H9-28	DC-11-38	DC-12-39	DC-13-40
SAMPLE DEPTH	15'-25'	35'-50'	5'-20'	10'-20'	10'-20'	10'-25'		0-10'	35'-50'	35'-50'	5'-15'	15'-25'	0-10'	5'-25'	5'-15'
DATE SAMPLED	12-18-86	12-18-87	1-5-87	1-6-87	1-6-87	1-6-87	1-7-87	1-7-87	1-8-87	1-8-87	1 9-87	1-13-87	1-27-87	1 28-87	1-29-87
1 Aluminum	2403	1452	4015	450	697	7167	10974	7074	2811	2282	12117	2203	13548	1259	12524
2 Antimony															
3 Arsenic	26 *	3 *	7 R	15 R	13 R	380 R	6 R	42 R			4 R	3 R	11		6
4 Barium	3242	38	1879	85	97	607	372	331	55	46	218	52	3603	919	334
5 Beryllium															
6 Boron															
7 Cadmium	232		5			294		221					11	6	3
8 Chromium, trivalent	100	4	97			51	15	56	6	5	18		115	15	16
9 Cobalt	19	3	105			47	6	8						27	14
10 Copper	374	3	415	13	12	2444	29	972			51		630	84	598
11 Iron	48226	3810	84545	510	564	54167	15641	27160	5905	4741	20519	5215	41507	19135	18732 *
12 Lead	1150 *	4 *	174 R	5 R	4 R	4500 R	44 R	3827 R	4 R	3 R	60 R	5 R	171 *	81 *	373
13 Manganese	2403	51	621	7	9	2292	376	36543	78	71	336	66	256 R	96 R	404 R
14 Mercury	0.8					3.9					1.4		2.2	0.5	
15 Nickel	15097	90	298	6	4	2083	17	42	9	9	16		111	981	28
16 Selenium	2														
17 Silver	4 R					9		44							
18 Thallium								1							
19 Tin	111		14			40							55		55
20 Vanadium	95					28	27	28	9	7	27		553	20	32
21 Zinc	39516	39	248	8	10	3875	153	8099	23	15	308	20	6329	491	331
22 Cyanide	2		2												

Subsurface Soil Inorganics

SITE	SITE I	SITE I	SITE I	BLANK	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE I	SITE J
SAMPLE NUMBER	DC-I5-41	DC-I5-42	DC-I6-43	DC-I8-44	DC-I7-45	DC-I7-46	DC-I7-47 B	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58	DC-J1-11
SAMPLE DEPTH	5'-27.5'	28'-38'	10'-25'		3.5'-12.5'	13'-23'	13'-23'	6'-23'	24'-30'	15'-30'	6'-20'	26'-39'	3.5'-12.5'	13.5'-27.5'	10'-20'
DATE SAMPLED	1-30-87	1-30-87	2-2-87	2-3-87	2-3-87	2-3-87	2-3-87	2-4-87	2-4-87	2-4-87	2-5-87	2-5-87	2-13-87	2-13-87	12-17-86
1 Aluminum	2063	1060	1252	8103	7195	2863	2747	8897	1556	1687	6650	1011	1449	1205	6904
2 Antimony		14	18	15							6663				
3 Arsenic	3		14	7	5	3	2	14		1			2 R		5 B
4 Barium	3544		400	347	338	83	82	519			8				156
5 Beryllium											1530				
6 Boron															
7 Cadmium	2		2	2	2			13							
8 Chromium, trivalent	35		731	12	23	5	5	96	4	6	7		4	4	9
9 Cobalt	22		22					34		13	140				4
10 Copper	157		149	28	258			575			23				9
11 Iron	11418	3553	23231	14744	14935	7300	7468	27647	4667	4687	543	2867	4899	4[illegible]	[illegible]
12 Lead	232 B	6 B	292 B			10 B	10 B	5647 B	704	9 B	23333	29 B	7 B	3 B	7 B
13 Manganese	115 R	35 R	143 R	395 R	248 R	124 R	125 R	240 R	35 R	61 R	5483 B	45 R	98 B	63 B	238
14 Mercury	1.1		1.5					3.2			240 R				
15 Nickel	2405	31	51	15	35		11	206		145	0.9	11			11
16 Selenium											1320				
17 Silver															
18 Thallium															
19 Tin			14	4	11	4	3	24	5	2					
20 Vanadium	20		69	21	18			40							15
21 Zinc	201	13	652	203	439	29	27	1156	125	89	43	18	21 B	20 B	36
22 Cyanide	3							2			3183				

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Subsurface Soil Inorganics

SITE	SITE J	SITE J	SITE K	SITE K	SITE K	BLANK	SITE L	SITE L	SITE L	SITE L	SITE L	SITE N	SITE N	BLANK	SITE P
SAMPLE NUMBER	DC-J2-12	DC-J3-13	DC-K1-08	DC-K2-25	DC-K3-32	DC-LB-01 +	DC-L1-02	DC-L2-03	DC-L3-04	DC-L4-09	DC-L4-10 *	DC-N1-05	DC-N2-06	DC-NB-07 +	DC-P1-53
SAMPLE DEPTH	15'-25'	0-10'	0-10'	0-10'	10'-20'		5'-10'	5'-15'	5'-15'	10'-20'	10'-20'	0-10'	5'-15'		0-10'
DATE SAMPLED	12-17-86	12-17-86	12-16-87	1-12-87	1-22-87	12-12-86	12-12-86	12-12-86	12-12-86	12-17-86	12-17-86	12-15-86	12-15-86	12-16-86	2-11-87
1 Aluminum	5026	2522	4788	9073	10076	9397	10697	5205	7380	1120	1378	4763	1924	9385	5013
2 Antimony								32							
3 Arsenic	2 *	6 *	9 *	8 R	9 R	6 *	5 *		172	55 *	68 *	3 *	2 *	6 *	
4 Barium	106	44	112	202	192	410	197	192	192	114	142	130	46	358	126
5 Beryllium															
6 Boron															
7 Cadmium		4	2	1	4			6						2	4
8 Chromium, trivalent	7	55	351	22	15		16	15	10		3	8	5	13	16
9 Cobalt	4	5	11				6	9	9			4	3	7	
10 Copper	6	83	44	39	129		12	105	141	82	101	10	5	33	50
11 Iron	7320	5489	17765	22439	20000	13846	16053	5564	11899	1500	1446	820	6253	16026	12750
12 Lead	5 *	10 *	107 *	132 R	238 R	43 *	9 *	106	41	5 *	5 *	24	34 *	78 *	
13 Manganese	113	827	499	388	606	343	255	44	149	10	10	164	82	429	201 *
14 Mercury			2.2	0.4	0.2				0.1				9		3.9
15 Nickel	8	72	20	20	21	14	21	408	2392	83	93	11		16	25 *
16 Selenium															
17 Silver															
18 Thallium															
19 Tin					13										
20 Vanadium			16	29	27	22	25	10	19					21	19
21 Zinc	24	70	235	245	503	178	59	144	166	11	10	42	65	182	463 *
22 Cyanide			9												

Subsurface Soil Inorganics

SITE	SITE P	SITE P	SITE P	SITE O	SITE O	SITE O	SITE O	SITE O	SITE O	BLANK	SITE O	SITE O	SITE O	SITE O	SITE O
SAMPLE NUMBER	DC-P2-54	DC-P5-55	DC-P5-56 *	DC-01-59	DC-02-60	DC-03-61	DC-04-62	DC-05-63	DC-05-64 *	DC-06-65 *	DC-06-66	DC-09-72	DC-09-73	DC-010-74	DC-010-75
SAMPLE DEPTH	25'-35'	10'-25	10'-25'	15'-25'	20'-30'	10'-20'	0-10'	8.5'-20'	8.5'-20'		15'-25'	0-10'	15'-20'	5'-10'	10'-15'
DATE SAMPLED	2-11-87	2-12-87	2-12-87	2-16-87	2-17-87	2-17-87	2-17-87	2-17-87	2-17-87	2-18-87	2-18-87	2-26-87	2-26-87	2-26-87	2-26-87
1 Aluminum	1274	6136	5538	2023	1923	3786	5885	3232	3061	6215	2148	4902	3346	5038	2114
2 Antimony															
3 Arsenic		3 R	4 R			4 R		3 R	3 R	8 R	2 R	6 R	3 R	7 R	3 R
4 Barium		81	119	57		131	214	106	101	411		165	125	150	45
5 Beryllium															
6 Boron															
7 Cadmium							31			2		4		11	
8 Chromium, trivalent	3	14	10	5	6	9	18	7	6	10	5	13	6	22	4
9 Cobalt															
10 Copper		16	24			8	205	7		33		59		241	15
11 Iron	4131	15309	13000	5230	5705	9548	11859	8902	8232	12658	4815	11793	7580	11910	5648
12 Lead	4 *	526 *	90 *	3 *	6 *	7 *	147 *	7 *	9 *	54 *	4 *	18 *	5 *	71 *	6 *
13 Manganese	93 *	623 *	710 *	106 *	108 *	233 *	329 *	207 *	187 *	357 *	79 *	190 *	152 *	206 *	101 *
14 Mercury	0.6						6.3					1.7	0.3	1.9	
15 Nickel		15 *	23 *				45 *	11 *	10 *	15 *		38		136 *	11 *
16 Selenium															
17 Silver															
18 Thallium															
19 Tin															
20 Vanadium		22	16			13	18			15		19		15	
21 Zinc	17 *	49 *	74 *	18 *	18 *	54 *	1398	37 *	35 *	181 *	17 *	277	30 *	688 *	43 *
22 Cyanide	13	15													

APPENDIX E

SUMMARY TABLES FOR SITE-SPECIFIC CONTAMINANT LOADING TO THE MISSISSIPPI RIVER

Table E-1

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW IN SITE G

	Area (ft^2)	Horizontal Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	2,420.98	-13.80	35,129.6	-3.03×10^{-2}	2,986.5	-2.58×10^{-3}	4.75	-4.10×10^{-6}	ND	--	-4.10×10^{-6}	83	-7.16×10^{-5}
February	2,378.88	-14.04	35,129.6	-3.08×10^{-2}	2,986.5	-2.62×10^{-3}	4.75	-4.17×10^{-6}	ND	--	-4.17×10^{-6}	83	-7.28×10^{-5}
March	2,473.61	-9.89	35,129.6	-2.17×10^{-2}	2,986.5	-1.85×10^{-3}	4.75	-2.94×10^{-6}	ND	--	-2.94×10^{-6}	83	-5.13×10^{-5}
April	2,431.51	-6.57	35,129.6	-1.44×10^{-2}	2,986.5	-1.23×10^{-3}	4.75	-1.95×10^{-6}	ND	--	-1.95×10^{-6}	83	-3.41×10^{-5}
May	2,652.55	-3.18	35,129.6	-6.98×10^{-3}	2,986.5	-5.94×10^{-4}	4.75	-9.44×10^{-7}	ND	--	-9.44×10^{-7}	83	-1.65×10^{-5}
June	2,736.76	-4.38	35,129.6	-9.12×10^{-3}	2,986.5	-8.18×10^{-4}	4.75	-1.30×10^{-6}	ND	--	-1.30×10^{-6}	83	-2.27×10^{-5}
July	2,747.29	-8.24	35,129.6	-1.81×10^{-2}	2,986.5	-1.54×10^{-3}	4.75	-2.45×10^{-6}	ND	--	-2.45×10^{-6}	83	-4.27×10^{-5}
August	2,663.08	-13.85	35,129.6	-3.04×10^{-2}	2,986.5	-2.30×10^{-3}	4.75	-4.11×10^{-6}	ND	--	-4.11×10^{-6}	83	-7.18×10^{-5}
September	2,494.66	-17.46	35,129.6	-3.83×10^{-2}	2,986.5	-3.26×10^{-3}	4.75	-5.18×10^{-6}	ND	--	-5.18×10^{-6}	83	-9.06×10^{-5}
October	2,420.98	-16.95	35,129.6	-3.72×10^{-2}	2,986.5	-3.16×10^{-3}	4.75	-5.03×10^{-6}	ND	--	-5.03×10^{-6}	83	-8.79×10^{-5}
November	2,473.61	-12.37	35,129.6	-2.72×10^{-2}	2,986.5	-2.31×10^{-3}	4.75	-3.67×10^{-6}	ND	--	-3.67×10^{-6}	83	-6.42×10^{-5}
December	2,484.14	-11.92	35,129.6	-2.62×10^{-2}	2,986.5	-2.22×10^{-3}	4.75	-3.54×10^{-6}	ND	--	-3.54×10^{-6}	83	-6.18×10^{-5}

* Total organic carbon.

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

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Table E-2

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW IN SITE H

	Area (ft^2)	Horizontal Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	8,612.86	-0.465	12,278.20	-3.57×10^{-2}	5,981.60	-1.74×10^{-2}	ND	--	3	-8.72×10^{-6}	-8.72×10^{-6}	10.4	-3.02×10^{-5}
February	8,536.10	-0.504	12,278.20	-3.87×10^{-2}	5,981.60	-1.88×10^{-2}	ND	--	3	-9.45×10^{-6}	-9.45×10^{-6}	10.4	-3.28×10^{-5}
March	8,797.10	-0.369	12,278.20	-2.83×10^{-2}	5,981.60	-1.38×10^{-2}	ND	--	3	-6.92×10^{-6}	-6.92×10^{-6}	10.4	-2.40×10^{-5}
April	8,582.16	-0.275	12,278.20	-2.11×10^{-2}	5,981.60	-1.03×10^{-2}	ND	--	3	-3.44×10^{-6}	-3.44×10^{-6}	10.4	-1.79×10^{-5}
May	9,058.09	-0.127	12,278.20	-9.75×10^{-3}	5,981.60	-4.75×10^{-3}	ND	--	3	-2.38×10^{-6}	-2.38×10^{-6}	10.4	-8.26×10^{-6}
June	9,288.38	-0.167	12,278.20	-1.28×10^{-2}	5,981.60	-6.24×10^{-3}	ND	--	3	-3.13×10^{-6}	-3.13×10^{-6}	10.4	-1.09×10^{-5}
July	9,564.73	-0.287	12,278.20	-2.20×10^{-2}	5,981.60	-1.07×10^{-2}	ND	--	3	-5.38×10^{-6}	-5.38×10^{-6}	10.4	-1.87×10^{-5}
August	9,150.21	-0.458	12,278.20	-3.51×10^{-2}	5,981.60	-1.71×10^{-2}	ND	--	3	-8.59×10^{-6}	-8.59×10^{-6}	10.4	-2.98×10^{-5}
September	9,042.74	-0.597	12,278.20	-4.58×10^{-2}	5,981.60	-2.23×10^{-2}	ND	--	3	-1.12×10^{-5}	-1.12×10^{-5}	10.4	-3.88×10^{-5}
October	8,735.69	-0.577	12,278.20	-4.43×10^{-2}	5,981.60	-2.16×10^{-2}	ND	--	3	-1.08×10^{-5}	-1.08×10^{-5}	10.4	-3.75×10^{-5}
November	8,889.21	-0.462	12,278.20	-3.55×10^{-2}	5,981.60	-1.73×10^{-2}	ND	--	3	-8.66×10^{-6}	-8.66×10^{-6}	10.4	-3.00×10^{-5}
December	9,012.03	-0.424	12,278.20	-3.25×10^{-2}	5,981.60	-1.59×10^{-2}	ND	--	3	-7.95×10^{-6}	-7.95×10^{-6}	10.4	-2.76×10^{-5}

* Total organic carbon.

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

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Table E-3

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW IN SITE I

	Area (ft^2)	Horizontal Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	8,182.99	-0.442	5,736.63	-1.58×10^{-2}	1,204.5	-3.33×10^{-3}	ND	--	3.38	-9.34×10^{-6}	-9.34×10^{-6}	ND	--
February	8,060.17	-0.467	5,736.63	-1.67×10^{-2}	1,204.5	-3.52×10^{-3}	ND	--	3.38	-9.87×10^{-6}	-9.87×10^{-6}	ND	--
March	8,196.34	-0.344	5,736.63	-1.23×10^{-2}	1,204.5	-2.59×10^{-3}	ND	--	3.38	-7.27×10^{-6}	-7.27×10^{-6}	ND	--
April	8,182.99	-0.254	5,736.63	-9.11×10^{-3}	1,204.5	-1.91×10^{-3}	ND	--	3.38	-5.37×10^{-6}	-5.37×10^{-6}	ND	--
May	8,597.51	-0.129	5,736.63	-4.63×10^{-3}	1,204.5	-9.71×10^{-4}	ND	--	3.38	-2.73×10^{-6}	-2.73×10^{-6}	ND	--
June	8,689.62	-0.156	5,736.63	-5.59×10^{-3}	1,204.5	-1.17×10^{-3}	ND	--	3.38	-3.30×10^{-6}	-3.30×10^{-6}	ND	--
July	8,812.45	-0.264	5,736.63	-9.47×10^{-3}	1,204.5	-1.99×10^{-3}	ND	--	3.38	-5.58×10^{-6}	-5.58×10^{-6}	ND	--
August	8,612.86	-0.431	5,736.63	-1.55×10^{-2}	1,204.5	-3.24×10^{-3}	ND	--	3.38	-9.10×10^{-6}	-9.10×10^{-6}	ND	--
September	8,305.80	-0.556	5,736.63	-1.99×10^{-2}	1,204.5	-4.19×10^{-3}	ND	--	3.38	-1.17×10^{-5}	-1.17×10^{-5}	ND	--
October	8,198.34	-0.549	5,736.63	-1.97×10^{-2}	1,204.5	1.97×10^{-2}	ND	--	3.38	-1.16×10^{-5}	-1.16×10^{-5}	ND	--
November	8,229.04	-0.420	5,736.63	-1.51×10^{-2}	1,204.5	-3.16×10^{-3}	ND	--	3.38	-8.87×10^{-6}	-8.87×10^{-6}	ND	--
December	8,459.33	-0.355	5,736.63	-1.27×10^{-2}	1,204.5	-2.67×10^{-3}	ND	--	3.38	-7.50×10^{-6}	-7.50×10^{-6}	ND	--

* Total organic carbon.

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988

Table E-4

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW IN SITE L

	Area (ft^2)	Horizontal Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	2,005.57	-10.83	2,602	-1.76×10^{-3}	1,390	-9.41×10^{-4}	ND	--	ND	--	--	ND	--
February	1,976.40	-11.27	2,602	-1.83×10^{-3}	1,390	-9.79×10^{-4}	ND	--	ND	--	--	ND	--
March	2,022.24	-8.49	2,602	-1.38×10^{-3}	1,390	-7.38×10^{-4}	ND	--	ND	--	--	ND	--
April	1,997.24	-6.39	2,602	-1.04×10^{-3}	1,390	-5.55×10^{-4}	ND	--	ND	--	--	ND	--
May	2,420.85	-3.87	2,602	-6.29×10^{-4}	1,390	-3.36×10^{-4}	ND	--	ND	--	--	ND	--
June	2,226.41	-4.01	2,602	-6.52×10^{-4}	1,390	-3.48×10^{-4}	ND	--	ND	--	--	ND	--
July	2,240.29	-6.72	2,602	-1.09×10^{-3}	1,390	-5.84×10^{-4}	ND	--	ND	--	--	ND	--
August	2,175.02	-10.88	2,602	-1.77×10^{-3}	1,390	-9.45×10^{-4}	ND	--	ND	--	--	ND	--
September	2,080.57	-13.94	2,602	-2.27×10^{-3}	1,390	-1.21×10^{-3}	ND	--	ND	--	--	ND	--
October	2,015.29	-13.50	2,602	-2.20×10^{-3}	1,390	-1.17×10^{-3}	ND	--	ND	--	--	ND	--
November	2,030.57	-10.56	2,602	-1.72×10^{-3}	1,390	-9.17×10^{-4}	ND	--	ND	--	--	ND	--
December	2,044.46	-9.81	2,602	-1.60×10^{-3}	1,390	-8.52×10^{-4}	ND	--	ND	--	--	ND	--

* Total organic carbon

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

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Table E-5

CONTAMINANT LOADING TO RIVER DUE TO VERTICAL FLOW IN SITE G

	Area (ft^2)	Vertical Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	79,751	8,670.29	35,129	19.00	2,986.5	1.61	4.75	2.57×10^{-3}	ND	--	2.57×10^{-3}	83	4.49×10^{-2}
February	79,751	8,826.04	35,129	19.34	2,986.5	1.64	4.75	2.61×10^{-3}	ND	--	2.61×10^{-3}	83	4.57×10^{-2}
March	79,751	8,826.04	35,129	19.34	2,986.5	1.64	4.75	2.61×10^{-3}	ND	--	2.61×10^{-3}	83	4.57 x 10-2
April	79,751	3,841.92	35,129	8.42	2,986.5	0.72	4.75	1.14×10^{-3}	ND	--	1.14×10^{-3}	83	1.99×10^{-2}
May	79,751	7,787.69	35,129	17.06	2,986.5	1.45	4.75	2.31 x 10-3	ND	--	2.31×10^{-3}	83	4.03×10^{-2}
June	79,751	8,826.04	35,129	19.34	2,986.5	1.64	4.75	2.61×10^{-3}	ND	--	2.61×10^{-3}	83	4.57×10^{-2}
July	79,751	8,306.86	35,129	18.20	2,986.5	1.55	4.75	2.46×10^{-3}	ND	--	2.46×10^{-3}	83	4.30×10^{-2}
August	79,751	6,230.15	35,129	13.65	2,986.5	1.16	4.75	1.85×10^{-3}	ND	--	1.85×10^{-3}	83	3.22×10^{-2}
September	79,751	5,191.79	35,129	11.37	2,986.5	0.97	4.75	1.54×10^{-3}	ND	--	1.54×10^{-3}	83	2.69×10^{-2}
October	79,751	6,749.33	35,129	14.79	2,986.5	1.26	4.75	2.00×10^{-3}	ND	--	2.00×10^{-3}	83	3.49×10^{-2}
November	79,751	8,826.04	35,129	19.34	2,986.5	1.64	4.75	2.61×10^{-3}	ND	--	2.61×10^{-3}	83	4.57×10^{-2}
December	79,751	9,345.22	35,129	20.47	2,986.5	1.74	4.75	2.77×10^{-3}	ND	--	2.77×10^{-3}	83	4.84×10^{-2}

* Total organic carbon.

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

Table E-6

CONTAMINANT LOADING TO RIVER DUE TO VERTICAL FLOW IN SITE H

	Area (ft^2)	Vertical Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	116,540	13,656.16	12,270	10.46	5,981.6	5.09	ND	--	3	2.56×10^{-3}	2.56×10^{-3}	10.4	8.86×10^{-3}
February	116,540	14,414.83	12,278	11.04	5,981.6	5.38	ND	--	3	2.70×10^{-3}	2.70×10^{-3}	10.4	9.35×10^{-3}
March	116,540	14,414.83	12,270	11.04	5,981.6	5.38	ND	--	3	2.70×10^{-3}	2.70×10^{-3}	10.4	9.35×10^{-3}
April	116,540	5,007.26	12,270	3.83	5,981.6	1.87	ND	--	3	9.37×10^{-4}	9.37×10^{-4}	10.4	3.25×10^{-3}
May	116,540	10,621.46	12,278	8.13	5,981.6	3.96	ND	--	3	1.99×10^{-3}	1.99×10^{-3}	10.4	6.89×10^{-3}
June	116,540	12,897.48	12,270	9.88	5,981.6	4.81	ND	--	3	2.41×10^{-3}	2.41×10^{-3}	10.4	8.37×10^{-3}
July	116,540	12,897.48	12,278	9.88	5,981.6	4.81	ND	--	3	2.41×10^{-3}	2.41×10^{-3}	10.4	8.37×10^{-3}
August	116,540	11,380.13	12,270	8.71	5,981.6	4.25	ND	--	3	2.13×10^{-3}	2.13×10^{-3}	10.4	7.38×10^{-3}
September	116,540	10,621.46	12,278	8.13	5,981.6	3.96	ND	--	3	1.99×10^{-3}	1.99×10^{-3}	10.4	6.89×10^{-3}
October	116,540	11,380.13	12,270	8.71	5,981.6	4.25	ND	--	3	2.13×10^{-3}	2.13×10^{-3}	10.4	7.38×10^{-3}
November	116,540	12,897.48	12,278	9.88	5,981.6	4.81	ND	--	3	2.41×10^{-3}	2.41×10^{-3}	10.4	8.37×10^{-3}
December	116,540	13,656.16	12,270	10.46	5,981.6	5.09	ND	--	3	2.56×10^{-3}	2.56×10^{-3}	10.4	8.86×10^{-3}

* Total organic carbon.

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

Table E-7

CONTAMINANT LOADING TO RIVER DUE TO VERTICAL FLOW IN SITE I

	Area (ft^2)	Vertical Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	164,441	18,198.69	5,736.6	6.51	1,204.5	1.37	ND	--	3.38	3.84×10^{-3}	3.84×10^{-3}	ND	--
February	164,441	19,269.20	5,736.6	6.89	1,204.5	1.45	ND	--	3.38	4.06×10^{-3}	4.06×10^{-3}	ND	--
March	164,441	19,269.20	5,736.6	6.89	1,204.5	1.45	ND	--	3.38	4.06×10^{-3}	4.06×10^{-3}	ND	--
April	164,441	7,600.63	5,736.6	2.72	1,204.5	0.57	ND	--	3.38	1.60×10^{-3}	1.6×10^{-3}	ND	--
May	164,441	14,987.15	5,736.6	5.36	1,204.5	1.13	ND	--	3.38	3.16×10^{-3}	3.16×10^{-3}	ND	--
June	164,441	18,198.69	5,736.6	6.51	1,204.5	1.37	ND	--	3.38	3.84×10^{-3}	3.84×10^{-3}	ND	--
July	164,441	17,128.17	5,736.6	6.13	1,204.5	1.29	ND	--	3.38	3.61×10^{-3}	3.61×10^{-3}	ND	--
August	164,441	14,987.15	5,736.6	5.36	1,204.5	1.13	ND	--	3.38	3.16×10^{-3}	3.16×10^{-3}	ND	--
September	164,441	13,916.64	5,736.6	4.98	1,204.5	1.05	ND	--	3.38	2.93×10^{-3}	2.93×10^{-3}	ND	--
October	164,441	14,987.15	5,736.6	5.36	1,204.5	1.13	ND	--	3.38	3.16×10^{-3}	3.16×10^{-3}	ND	--
November	164,441	18,198.69	5,736.6	6.51	1,204.5	1.37	ND	--	3.38	3.84×10^{-3}	3.84×10^{-3}	ND	--
December	164,441	19,269.20	5,736.6	6.89	1,204.5	1.45	ND	--	3.38	4.06×10^{-3}	4.06×10^{-3}	ND	--

* Total organic carbon.

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

Table E-8

CONTAMINANT LOADING TO RIVER DUE TO VERTICAL FLOW IN SITE L

	Area (ft^2)	Vertical Flow Rate Q (ft^3/day)	TOCs* Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Ave. Conc. (ug/L)	Loading to River (lb/day)
January	25,678.5	2,942.14	2,602	4.77×10^{-1}	1,390	2.55×10^{-1}	ND	--	ND	--	--	ND	--
February	25,678.5	3,176.17	2,602	5.15×10^{-1}	1,390	2.75×10^{-1}	ND	--	ND	--	--	ND	--
March	25,678.5	3,176.17	2,602	5.15×10^{-1}	1,390	2.75×10^{-1}	ND	--	ND	--	--	ND	--
April	25,678.5	1,153.45	2,602	1.87×10^{-1}	1,390	1.00×10^{-1}	ND	--	ND	--	--	ND	--
May	25,678.5	2,340.34	2,602	3.80×10^{-1}	1,390	2.03×10^{-1}	ND	--	ND	--	--	ND	--
June	25,678.5	2,841.84	2,602	4.61×10^{-1}	1,390	2.46×10^{-1}	ND	--	ND	--	--	ND	--
July	25,678.5	2,841.84	2,602	4.61×10^{-1}	1,390	2.46×10^{-1}	ND	--	ND	--	--	ND	--
August	25,678.5	2,340.34	2,602	3.80×10^{-1}	1,390	2.03×10^{-1}	ND	--	ND	--	--	ND	--
September	25,678.5	2,173.17	2,602	3.53×10^{-1}	1,390	1.88×10^{-1}	ND	--	ND	--	--	ND	--
October	25,678.5	2,340.34	2,602	3.80×10^{-1}	1,390	2.03×10^{-1}	ND	--	ND	--	--	ND	--
November	25,678.5	2,841.84	2,602	4.61×10^{-1}	1,390	2.46×10^{-1}	ND	--	ND	--	--	ND	--
December	25,678.5	3,009.00	2,602	4.88×10^{-1}	1,390	2.61×10^{-1}	ND	--	ND	--	--	ND	--

* Total organic carbon.

** Polynuclear aromatics.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

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Table E-9

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW AT SHALLOW ZONE IN SITE O***

	Area (ft^2)	Flow Rate Q (ft^3/day)	TOCs* Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PHAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PHAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PHAs** Loading to River (lb/day)	Total PCBs Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)
January	95,142	-789.69	132,000	-6.51	119,000	-5.87	ND	--	ND	--	--	ND	--
February	94,729	-672.58	132,000	-5.55	119,000	-5.00	ND	--	ND	--	--	ND	--
March	10,260	-122.83	132,000	-1.01	119,000	-0.91	ND	--	ND	--	--	ND	--
April	105,668	359.27	132,000	2.96	119,000	2.67	ND	--	ND	--	--	ND	--
May	111,833	335.50	132,000	2.77	119,000	2.49	ND	--	ND	--	--	ND	--
June	111,270	-44.51	132,000	-0.37	119,000	-0.33	ND	--	ND	--	--	ND	--
July	107,547	-451.70	132,000	-3.73	119,000	-3.36	ND	--	ND	--	--	ND	--
August	99,691	-917.16	132,000	-7.57	119,000	-6.82	ND	--	ND	--	--	ND	--
September	94,128	-1,035.41	132,000	-8.54	119,000	-7.70	ND	--	ND	--	--	ND	--
October	93,113	-875.27	132,000	-7.22	119,000	-6.51	ND	--	ND	--	--	ND	--
November	99,654	-318.89	132,000	-2.63	119,000	-2.37	ND	--	ND	--	--	ND	--
December	100,029	-470.12	132,000	-3.88	119,000	-3.50	ND	--	ND	--	--	ND	--

* Total Organic Carbon.

** Polynuclear aromatics.

*** Data from monitoring wells EE-21, EE-22, EE-23, and EE-24 were used to calculate weighted average concentrations.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

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Table E-10

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW AT INTERMEDIATE ZONE IN SITE O***

	Area (ft^2)	Flow Rate Q (ft^3/day)	TOCs* Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)
January	52,363	-434.62	100	-0.00259	71	-0.001917	ND	--	ND	--	--	ND	--
February	52,363	-371.78	100	-0.0023	71	-0.00165	ND	--	ND	--	--	ND	--
March	52,363	-62.83	100	-0.00039	71	-0.00028	ND	--	ND	--	--	ND	--
April	52,363	178.03	100	0.00111	71	+0.00079	ND	--	ND	--	--	ND	--
May	52,363	157.09	100	0.00098	71	+0.000697	ND	--	ND	--	--	ND	--
June	52,363	-20.95	100	-0.00013	71	-0.000093	ND	--	ND	--	--	ND	--
July	52,363	-219.93	100	-0.00137	71	-0.000976	ND	--	ND	--	--	ND	--
August	52,363	-481.75	100	-0.003	71	-0.00214	ND	--	ND	--	--	ND	--
September	52,363	-576.00	100	-0.0036	71	-0.00256	ND	--	ND	--	--	ND	--
October	52,363	-492.22	100	-0.0031	71	-0.00218	ND	--	ND	--	--	ND	--
November	52,363	-167.57	100	-0.00104	71	-0.00074	ND	--	ND	--	--	ND	--
December	52,363	-244.18	100	-0.00154	71	-0.00109	ND	--	ND	--	--	ND	--

* Total organic carbon.

** Polynuclear aromatics.

*** Data from monitoring wells GM19B and GM20B (Geraghty & Miller 1986; 1986a) were used to calculate weighted average calculations.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

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Table E-11

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW AT SHALLOW ZONE IN SITE Q***

	Area (ft^2)	Flow Rate Q (ft^3/day)	TOCs* Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)
January	105,370	-1,369.32	235	-0.02011	130	-0.01112	ND	--	ND	--	--	ND	--
February	109,801	-867.42	235	-0.0127	130	-0.00700	ND	--	ND	--	--	ND	--
March	135,036	783.21	235	0.0115	130	0.00636	ND	--	ND	--	--	ND	--
April	146,401	1,551.85	235	0.0228	130	0.01261	ND	--	ND	--	--	ND	--
May	150,783	889.62	235	0.01307	130	0.00723	ND	--	ND	--	--	ND	--
June	140,815	-267.55	235	-0.00393	130	-0.00217	ND	--	ND	--	--	ND	--
July	129,257	-930.65	235	-0.01367	130	-0.00756	ND	--	ND	--	--	ND	--
August	108,549	-1,639.10	235	-0.0241	130	-0.01330	ND	--	ND	--	--	ND	--
September	99,158	-1,556.78	235	-0.0229	130	-0.01265	ND	--	ND	--	--	ND	--
October	103,733	-1,130.68	235	-0.0166	130	-0.00920	ND	--	ND	--	--	ND	--
November	128,390	372.31	235	0.0055	130	0.00300	ND	--	ND	--	--	ND	--
December	121,359	-594.67	235	-0.0087	130	-0.00483	ND	--	ND	--	--	ND	--

* Total organic carbon.

** Polynuclear aromatics.

*** Data from monitoring wells EE-09, EE-10, and EE-06 were used to calculate weighted average concentrations.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

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Table E-12

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW AT SHALLOW ZONE IN SITE H***

	Area (ft^2)	Flow Rate Q (ft^3/day)	TOCs* Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)
January	52,293	-852.38	12,510	-0.67	1,555	-0.083	ND	--	ND	--	--	ND	--
February	54,492	-483.25	12,510	-0.31	1,555	-0.039	ND	--	ND	--	--	ND	--
March	67,015	737.17	12,510	0.58	1,555	0.072	ND	--	ND	--	--	ND	--
April	72,656	1,060.00	12,510	0.84	1,555	0.1038	ND	--	ND	--	--	ND	--
May	74,031	471.43	12,510	0.37	1,555	0.046	ND	--	ND	--	--	ND	--
June	69,803	-230.58	12,510	-0.18	1,555	-0.022	ND	--	ND	--	--	ND	--
July	64,148	-641.48	12,510	-0.50	1,555	-0.062	ND	--	ND	--	--	ND	--
August	53,871	-953.50	12,510	-0.75	1,555	-0.091	ND	--	ND	--	--	ND	--
September	49,210	-536.40	12,510	-0.42	1,555	-0.052	ND	--	ND	--	--	ND	--
October	51,480	-561.16	12,510	-0.44	1,555	-0.054	ND	--	ND	--	--	ND	--
November	63,717	522.47	12,510	0.41	1,555	0.051	ND	--	ND	--	--	ND	--
December	60,229	-361.37	12,510	-0.28	1,555	-0.035	ND	--	ND	--	--	ND	--

* Total Organic Carbon.

** Polynuclear Aromatics.

*** Data from monitoring wells P-1, P-7, P-11, B-26A, and B-28A (Geraghty & Miller 1986; 1986a) were used to calculate weighted average concentrations.

ND Not detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

Table E-13

CONTAMINANT LOADING TO RIVER DUE TO HORIZONTAL FLOW AT INTERMEDIATE ZONE IN SITE H***

	Area (ft^2)	Flow Rate Q (ft^3/day)	TOCs* Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Volatiles Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Carcinogenic PNA** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Non-Carcinogenic PNAs** Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)	Total PNAs** Loading to River (lb/day)	Total PCBs Weighted Ave. Conc. (ug/L)	Loading to River (lb/day)
January	107,700	-74,313	8,998	-41.79	4,440	-20.62	ND	--	ND	--	--	ND	--
February	107,700	-23,694	8,998	-13.32	4,440	-6.57	ND	--	ND	--	--	ND	--
March	107,700	62,466	8,998	35.13	4,440	17.33	ND	--	ND	--	--	ND	--
April	107,700	70,543	8,998	39.67	4,440	19.57	ND	--	ND	--	--	ND	--
May	107,700	30,048	8,998	16.90	4,440	8.34	ND	--	ND	--	--	ND	--
June	107,700	-17,771	8,998	-9.99	4,440	-4.93	ND	--	ND	--	--	ND	--
July	107,700	-42,003	8,998	-23.62	4,440	-11.66	ND	--	ND	--	--	ND	--
August	107,700	-81,852	8,998	-46.03	4,440	-22.71	ND	--	ND	--	--	ND	--
September	107,700	-85,621	8,998	-48.15	4,440	-23.76	ND	--	ND	--	--	ND	--
October	107,700	-37,156	8,998	-20.89	4,440	-10.31	ND	--	ND	--	--	ND	--
November	107,700	48,465	8,998	27.25	4,440	13.45	ND	--	ND	--	--	ND	--
December	107,700	-21,548	8,998	-12.11	4,440	-5.98	ND	--	ND	--	--	ND	--

* Total Organic Carbon.

** Polynuclear Aromatics.

*** Data from monitoring wells GM27B and GM28B (Geraghty & Miller 1986; 1986a) were used to calculate weighted average concentrations.

ND Not Detected.

Negative sign designates contaminant migration toward the river.

Source: Ecology and Environment, Inc. 1988.

APPENDIX F

TOXICITY PROFILES FOR SELECTED CONTAMINANTS OF CONCERN

ARSENIC

Environmental Chemistry and Fate

Arsenic may be released to the atmosphere as a gas or vapor; or absorbed to particulate matter and transported to other media by dry or wet deposition (ATSDR 1987a). Because trivalent arsenic may undergo oxidation in the air, atmospheric arsenic is usually a mixture of trivalent and pentavalent forms. Most airborne arsenic is usually adsorbed on small diameter particulate matter. Photolysis is not considered to be an important fate process for arsenic.

Arsenic in surface water can undergo a complex pattern of transformations: oxidation-reduction, ligand exchange, biotransformation, and precipitation and adsorption (Callahan 1979). As a consequence of these reactions, arsenic is extremely mobile in aquatic systems, and riverborne arsenic is capable of being transported great distances. Factors most strongly influencing the rates of these reactions include: Eh, Ph, metal sulfide and sulfide ion concentrations, iron concentration, presence of phosphorus minerals, temperature, salinity, and distribution and composition of biota (Callahan 1979).

Sorption onto clays, iron oxides, manganese compounds, and organic matter is an important fate in surface water, with sediment serving as a reservoir for most of the arsenic entering surface water. Sediment-bound trivalent and pentavalent arsenic, methylated by aerobic and anaerobic microorganisms, may be released back into the water column.

Soluble forms of arsenic adsorb to soil and travel with the soil matter with which they are associated. Shifts in oxidation state may occur in either direction, depending on the particular characteristics of the soil and groundwater. Volatilization of methylated arsenics from groundwater is possible.

Arsenic in soil is predominantly found in an insoluble, adsorbed form. Clay with high anion-exchange capacity strongly adsorbs pentavalent arsenic. Other important adsorption processes include complexation and chelation by organic material, iron, or calcium. Leaching of arsenic is usually important in the top 30 centimeters of soil, but may also be important at greater depth in sandy soils. Arsenate predominates in aerobic soils; arsenite in slightly reduced soils; arsine,

methylated arsenicals and elemental arsenics in very reduced conditions (e.g., swamps and bogs)(ATSDR 1987a).

As noted above, microorganisms may reduce and methylate arsenicals in water and soil, resulting in volatilization and emission to the air. The volatilization rate is heavily dependant on whether soil is oxygenated or anaerobic, the pH, and the microbe types and concentrations in soils.

In aquatic systems, bioconcentration of arsenic primarily occurs in algae and lower invertebrates, but biomagnification does not appear to be significant (Callahan 1979).

Plants may accumulate arsenic via root uptake, with uptake being dependent on the species, soil arsenic concentration, and soil characteristics.

Noncarcinogenic Effects

At high doses, arsenic compounds have been shown to produce acute and chronic toxic effects including irreversible systemic damage. The trivalent compounds are the most toxic and tend to accumulate in the body. Animal studies have shown that chronic arsenic exposure may cause body weight changes, decreased blood hemoglobin, liver damage, and kidney damage.

There is evidence that arsenic is an essential element enchancing growth and development in certain animal species, and it has been suggested that arsenic may be an essential element for humans (NAS 1980). Whether or not arsenic is an essential element is the subject of continuing research.

Teratogenic effects of arsenic compounds at relatively high exposure levels have been demonstrated in a number of animal species (EPA 1984f, ATSDR 1987a). Generally, these effects have been observed following parenteral (injection) administration; whereas, administration at lower doses by the more relevant oral route has not resulted in any significant reproductive or developmental effects.

Mutagenicity and Carcinogenicity

Arsenic has been shown to be mutagenic in several assay systems and to induce chromosomal aberrations *in vivo* and *in vitro*. Animal carcino-

genicity studies have reported conflicting results. Several studies have reported an increased incidence of bronchogenic carcinomas in rats exposed intratracheally to an arsenic-containing pesticide. Reasons for inconsistent carcinogenicity findings in animals may include inappropriate selection of an animal model, and use of flawed study designs. In humans, epidemiologic studies and case reports have reported that arsenic is associated with tumors of the skin, lungs, genital organs, and visual organs (EPA 1984f, EPA 1985c, ATSDR 1987a).

EPA has classified arsenic in Group A, i.e., a human carcinogen, based on extensive evidence of human carcinogenicity through inhalation and ingestion exposure (EPA 1985c).

Drinking Water Standards and Criteria

Standards. The current MCL for arsenic under the National Interim Drinking Water Regulations is 50 ug/L. The NAS Drinking Water Committee has analyzed the toxicology of arsenic (NAS 1983a). Based upon this evaluation, NAS recommended the retention of the MCL pending resolution of the question whether arsenic is an essential element in the human diet.

NAS also examined the available epidemiologic studies which were designed to investigate the relationship between arsenic exposure and skin cancer in the United States. The conclusion of the report was that these studies lacked statistical power to determine if arsenic causes skin cancer. However, the report stated that precursors of skin cancer, normally seen in cases of arsenic-induced skin cancer, were not seen in these studies.

Consistent with the NAS recommendations, EPA has proposed that the MCLG remain at the current MCL of 50 ug/L. In its determination, EPA stated that the MCL was below concentrations at which noncarcinogenic toxicity had been demonstrated and was within the concentration range which might be, based on further investigation, essential for humans (EPA 1985c).

Criteria. Based upon recommendations of NAS, EPA has proposed that all health advisories for arsenic be set at 50 ug/L (EPA 1985d). The EPA ambient water quality criterion for the protection of human health

is 22 ug/L, corresponding to 1×10^{-5} lifetime excess cancer risk calculated on the basis of an epidemiological study of skin cancer among Taiwanese exposed via drinking water (EPA 1980a).

BENZENE

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of benzene (CAS No. 71-43-2) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	78
Water Solubility (mg/L at 25°C)	1,750
Vapor Pressure (mmHg at 25°C)	95.2
Henry's Law Constant ($atm\text{-}m^3/mole$)	5.6×10^{-3}
Log K_{ow}	2.12
K_{oc}	83
BCF	5.2

Benzene has a high water solubility and vapor pressure. As a consequence of these two properties, benzene can be characterized as a highly mobile chemical. For benzene released to air, some rainwater washout is anticipated. After deposition in water or soil, volatilization is expected to return some portion back to the atmosphere. Based on its high Henry's Law Constant, volatilization will result in substantial loss to the atmosphere following release to water.

Due to its high water solubility and high vapor pressure, transport to sediments is not expected to be major surface water fate process.

Benzene released to soil can be transported to air via volatilization, to surface water via runoff, and to groundwater via leaching. The first two pathways predominate in surficial soil, whereas the latter pathway predominates at lower soil depths.

According to criteria developed by Kenaga (1980), benzene with a K_{oc} of 83 would be considered to be mobile in soils. Other factors

which influence soil mobility include soil type, the amount of rainfall, the depth to groundwater, and the extent of degradation (ATSDR 1987b).

Benzene is rapidly degraded in the atmosphere via reaction with the hydroxy radical. In soils and waters, biodegradation is an important process.

Noncarcinogenic Effects

The best known and longest recognized toxic effect of benzene in humans is depression of bone marrow function. Benzene-exposed individuals have been found to display anemia, leucopenia, and/or thrombocytopenia (EPA 1985c, ATSDR 1987b). When simultaneous depression of all three cell types (pancytopenia) is accompanied by bone marrow necrosis, the syndrome is called aplastic anemia.

Carcinogenicity and Mutagenicity

Excess leukemia mortality, particularly acute myelogenous and monocytic leukemia, has been demonstrated among humans occupationally exposed to benzene. In addition to this definitive human evidence, several long-term bioassays have demonstrated increased incidences of tumors and leukemia following administration in animals. Based primarily upon the direct evidence in man, EPA has classified benzene according to weight-of-evidence carcinogenicity criteria in Group A, human carcinogen-sufficient evidence from epidemiological studies (EPA 1987a).

Benzene has been tested extensively for genotoxic properties. Benzene was not mutagenic in several bacterial and yeast systems. Equivocal results have been reported for clastogenic results *in vitro*; several investigators have reported positive results in mouse micronucleus assays, as well as studies of chromosomal observations in rabbits.

Many investigators have reported significant increases in chromosomal aberrations in symptomatic and asymptomatic workers with either a current or past history of exposure to benzene.

Drinking Water Standards

EPA has established a final drinking water MCL of 5 ug/L (EPA 1987a).

CADMIUM

Environmental Chemistry and Fate

The primary sources of atmospheric cadmium are combustion of coal and petroleum products. Cadmium from these sources is primarily adsorbed on small, highly respirable particles, which can be transported over large distances and transferred to other environmental compartments via wet deposition. Cadmium adsorbed to small particulates is more persistant than that adorbed to larger particulates. Photochemical reactions are apparently not involved in the environmental fate of cadmium (ATSDR, 1987h).

Relative to other metals, cadmium is mobile in surface water. In natural waters, cadmium exists as a hydrated ion, metal-inorganic complexes with carbonate hydroxyl, chlorine or sulfate anions; or as metal-organic complexes with humic acids (ATSDR, 1987h).

Because it exists only as the divalent cation, aqueous cadmium is not strongly influenced by the redox potential of water. However, under reducing conditions forming sulfide, cadmium will precipitate in sediments as cadmium sulfide. The concentration of aqueous cadmium is usually inversely related to the pH value and the amount of organic material present (ATSDR 1987h). Humic acid substances account for most of the organic complexes, with solubility dependant on the nature of the humic substance. Sorption by clays and iron oxides is important in reducing aquatic cadmium concentrations.

Cadmium concentrations are typcially low in groundwater due to several factors. These factors include sorption by mineral matter and clay, binding to humic substances, precipitation as cadmium sulfide in the presence of sulfide, and precipitation as cadmium carbonate at high pHs.

In soil, cadmium may occur as free cadmium compounds or as the divalent ion dissolved in soil. As a consequence of cation exchange, cadmium may be bound to soil minerals or organic constituents. The aerobic nature of topsoils tends to reduce the amount of cadmium bound to sulfide. High soil acidity favors release of the divalent cadmium cation and its uptake by plants.

Cadmium is not reduced or methylated by microorganisms. However, the biological production of sulfide results in cadmium precipitation. Cadmium is strongly accumulated by all organisms, with concentrations in freshwater and marine organisms hundreds to thousands of times higher than in water being typical. Bioaccumulation of cadmium is strongly correlated with soil cation-exchange capacity (CEC), decreasing with increasing CEC. Bioconcentration in aquatic life is greatest for bottom feeders (e.g. mollusks and crustaceons), followed by fish and aquatic plants (ATSDR, 1987h). Bioaccumulation due to the use of cadmium-containing pesticides on food crops has been noted in beef and poultry.

Noncarcinogenic Effects

Acute and chronic exposure to cadmium in animals and humans results in renal dysfunction, hypertension, anemia, and altered liver microsomal activity. The kidney is considered to be the critical target organ in humans chronically exposed to cadmium by ingestion. The early clinical signs of renal injury include proteinuria, glucosuria, and amino-aciduria.

To calculate a drinking water equivalent level (DWEL), EPA used renal dysfunction as an endpoint, and the most widely accepted estimate for the critical (threshold) concentration of cadmium in the renal cortex--200 ug/g. Using a 4.5% absorption of the daily dose and 0.01% excretion in the total body burden per day, EPA calculated an LOAEL of 352 ug/day for renal effects in humans. Incorporating an uncertainty factor of 10, EPA has developed an RfD of 35 ug/day. Adjusting the RfD for consumption of 2 liters of water per day, EPA has derived a provisional DWEL of 18 ug/L (EPA 1985c).

Embryotoxic and teratogenic effects have been demonstrated in many mammalian species following parenteral administration of high doses of cadmium. In contrast, there is little evidence of these effects at lower doses by either of the more relevant inhalation or oral exposure routes (EPA 1981, ATSDR 1987h).

Carcinogenicity and Mutagenicity

Cadmium chloride aerosol administered by inhalation for 18 months produced lung tumors in rats. In contrast, all cancer bioassays in

which cadmium has been administered orally have been negative. Recent epidemiological studies indicated that workers chronically exposed to cadmium are at risk of elevated lung cancer mortality. According to its weight-of-evidence carcinogenicity criteria, EPA has classified cadmium in Group B1 (probable human carcinogen) for inhalation based on the epidemiological data (EPA 1986a).

While the Agency has concluded that cadmium is a carcinogen by the inhalation route, EPA has classified the chemical in Group D, inadequate evidence for carcinogenicity for the oral route of exposure, because of the negative results reported for cancer bioassays in which cadmium was administered orally (EPA 1986a). Consistent with this categorization, EPA has proposed that the MCL for cadmium be set based upon noncarcinogenic toxicological endpoints.

Drinking Water Standards

The current MCL for cadmium, under the National Interim Primary Drinking Water Regulations, is 10 ug/L. This level was designed to prevent renal dysfunction, and was based on a critical value of cadmium in the kidney cortex of 200 ug/g, and assumptions on gastrointestinal absorption, excretion of the absorbed dose, daily excretion of the total body burden, and daily dietary cadmium intakes. The World Health Organization (WHO) guideline for drinking water is 5 ug/L. This value was based on a value for provisional tolerable weekly cadmium intake, assuming that 25% of the total cadmium intake was attributable to drinking water. EPA has proposed an MCLG of 5 ug/L based upon the WHO guidelines and the NAS SNARL (EPA 1985c).

CHLOROBENZENE

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of chlorobenzene (CAS No. 108-90-7) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	113
Water Solubility (mg/L at 25°C)	466
Vapor Pressure (mmHg at 25°C)	11.7
Henry's Law Constant ($atm\text{-}m^3/mole$)	3.7×10^{-3}
Log K_{ow}	2.84
K_{oc}	330
BCF	10

Chlorobenzene's moderate water solubility, vapor pressure, and Henry's Law Constant indicate that volatilization from surficial soils and surface water is a major transport pathway.

Once adsorbed on soil, the moderate solubility and K_{oc} (330) indicate that chlorobenzene will leach and be transported to groundwater. The degree and rate of leaching will depend on a variety of factors including the soil type, organic carbon content, and the presence of organic solvents in the soil. Once chlorobenzene reaches the groundwater, the K_{oc} indicates that retardation relative to the groundwater flow will occur due to partitioning and adsorption to soil particles.

Current data indicate that degradation of chlorobenzene in aquatic systems is slow (EPA 1985). The estimated BCF of 10 indicates that monochlorobenzene is only slightly bioconcentrated in aquatic life.

Noncarcinogenic Effects

Chlorobenzene exerts its toxicity primarily on the central nervous system, liver, and kidney. Liver effects include necrosis and interference with porphyrin metabolism. Kidney effects include swelling of the tubular and glomerular epithelia. Hematopoietic effects (e.g., lymphocytosis and leukopenia) have been reported among chlorobenzene-exposed workers; however, it is uncertain whether these effects can be attributed to chlorobenzene or to other contaminants (EPA 1985g).

Carcinogenicity and Mutagenicity

In a single National Toxicology Program (NTP) bioassay, chlorobenzene was found not to be carcinogenic in mice and rats. The NTP report did note that chlorobenzene induced a statistically significant increased incidence of neoplastic nodules in rates exposed to the highest dose. On this basis, EPA classified chlorobenzene according to weight-of-evidence carcinogenicity criteria in Group C -- limited evidence in animals, no evidence in humans (EPA 1985g).

Most mutagenicity assays of chlorobenzene in bacteria, fungal, and mammalian tissue cultures have been negative (EPA 1985h). One study, however, in *Streptomyces antibioticus* reported that chlorobenzene induced reversion to vitamin B1 prototrophy, and one study in *Saccharomyces cerevisiae* showed increased mitotic crossing (EPA 1985k).

Drinking Water Standards and Criteria

Standards. EPA has not established an MCL or MCLG for chlorobenzene in drinking water.

Criteria. In the absence of suitable data, EPA has not derived a 1-day HA for chlorobenzene. EPA has, however, developed 10-day, longer-term, and lifetime HAs by application of 100-fold uncertainty factors and various intake assumptions and physiological parameters to NOAELs reported in animal studies (EPA 1985g). The 10-day advisory of 1,800 ug/L for a 10-kg child was derived from a NOAEL of 345 mg/m^3 reported in an inhalation teratology study in rats and rabbits; the longer-term HAs of 9,000 ug/L (child) and 30,000 ug/L (adult) were derived using a NOAEL of 125 mg/kg/day reported in a subchronic gavage study in mice and rats.

The lifetime HA of 600 ug/L was derived from the NOAEL used in the derivation of the longer-term HA, using an additional uncertainty factor of 10 and assuming that drinking water comprises 20% of the total daily intake.

NAS has estimated, based upon the draft NTP, that a drinking water concentration of 2.3 ug/L would correspond to an estimated one-in-a-million incremental excess lifetime cancer risk (NAS 1983).

EPA has developed an ambient water quality criterion for the protection of human health of 488 ug/L and for organoleptic (odor and taste) effects of 20 ug/L (EPA 1980a).

CHLOROPHENOLS (2-CHLOROPHENOL AND 2,4-DICHLOROPHENOL)

Environmental Chemistry and Fate

The relevant physical and chemical properties of chlorophenol (CP-CAS No. 95-57-8) and 2,4-dichlorophenol (DCP-CAS No. 12-83-2) are summarized in the Table below (Arthur D. Little, Inc. 1982).

Compound	2-chlorophenol	2,4-dichlorophenol
Molecular Weight (g/mole)	129	163
Water Solubility (mg/L at 25°C)	28,500 (20°C)	4,600 (20°C)
Vapor Pressure (mmHg at 25°C)	2.2	0.11
Henry's Law Constant ($atm\text{-}m^3/mole$)	1.3×10^{-3}	5.0×10^{-6}
Log K_{ow}	2.17	2.75
K_{oc}	No data	380
BCF	214	130

The above data show that both CP and DCP have high water solubilities and low vapor pressures. Additionally, using the K_{oc} of DCP, the two chlorophenols have moderate K_{oc}s. These three values indicate that both volatilization from surface soils and infiltration to groundwater are important transport pathways. The high Henry's law constant, along with the high water solubility and moderate K_{oc}, indicates that volatilization is an important transport pathway from surface water. However, its low Henry's law constant indicates that both volatilization and partitoning to sediments are important pathways in surface water.

Biodegradation in soils and surface water are significant transformation processes (Aurthur D. Little, Inc., 1982). No data were found concerning biodegradation in groundwater.

Bioconcentration factors (BCFs) indicate moderate bioconcentration in aquatic species.

Noncarcinogenic Effects

In rodents subjected to acute high oral exposures, CP and DCP elicited respiratory excitation, clonic convulsions, and/or motor weakness (hypotonia). Few long-term animal studies are available. Those few that are available show reduction in hematological parameters or enzyme changes. No data were found concerning effects of CP and DCP on the developing embryo or the reproductive process.

Carcinogenicity and Mutagenicity

No data were found concerning the potential carcinogenicity of CP or DCP by the oral route. However, CP and DCP were reported to promote tumors following a single dermal application of dimethylbenzanthracene on mouse skin (Boutwell and Bosch, 1959).

CP has been shown to be mutagenic in Sprague Dawley rats fed 130 mg/kg CP every other day for one week (Chung 1978). In these rats a six-fold increased incidence of chromatid deletions (12% vs. 2% in controls) was seen. Complete inhibition of mitosis was reported in bone marrow cells taken from treated rats.

DCP, tested using the Ames *Salmonella* microsomal assay, was reported as not mutagenic with and without activation.

Consequently, whereas CP can be classified as mutagenic, there are insufficient data to evaluate the mutagenicity of DCP.

Drinking Water Standards

EPA has not issued any drinking water standards, health advisories, or other criteria for CP or DCP.

DICHLOROBENZENES

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of 1,2-dichlorobenzene (CAS No. 95-50-1); 1-3-dichlorobenzene (CAS No. 541-73-1); and 1,4-dichlorobenzene (CAS No. 106-16-7) are presented below.

Compound	1,2-DCB	1,3-DCB	1,4-DCB
Molecular Weight (g/mole)	147	147	147
Water Solubility (mg/L at 25°C)	100	123	79
Vapor Pressure (mmHg at 25°C)	1	2.3	1.2
Henry's Law Constant (atm-m^3/mole)	1.9×10^{-3}	3.6×10^{-3}	2.9×10^{-3}
Log K_{ow}	3.6	3.6	3.6
K_{oc}	1700	1700	1700
BCF	5	5	5

The log K_{ow}, high K_{oc}, and low vapor pressure indicate that adsorption onto soils is the major fate process of DCB isomers in soils. Similarly, adsorption to these media will dominate transport and fate of the isomers discharged into aquatic media.

The log K_{ow}s suggest that DCB isomers will bioaccumulate. Biodegradation is not likely to be a significant degradation pathway for DCB isomers, based upon data which indicate that chlorobenzene is resistent to biodegradation and that resistance increases with increasing chlorination of the benzene ring (ATSDR 1987i).

Noncarcinogenic Effects

The principal toxic effects of o-dichlorobenzene (1,2-dichlorobenzene or o-DCB) and p-dichlorobenzene (1,4-dichlorobenzene or p-DCB) in humans and other animals from acute and longer-term exposures include

CNS depression; blood dyscrasias; and lung, kidney, and liver damage. Similar data are not available for m-dichlorobenzene (1,3-dichlorobenzene or m-DCB). However, based upon short-term assays, EPA has determined that short-term assessments developed for o-DCB should apply to m-DCB.

Carcinogenicity and Mutagenicity

The few studies available on the carcinogenic potential of the DCBs have been negative or insufficient to clearly classify any DCB isomer as carcinogenic. Preliminary results of an NTP gavage bioassay indicate that o-DCB was not carcinogenic under the conditions of the experiment. Pending receipt of the final NTP report for o-DCB, EPA has categorized o-DCB according to Agency weight-of-evidence carcinogenicity criteria in Group D, not classifiable as to human carcinogenicity (EPA 1987d). EPA has classified p-DCB in group C, limited evidence of carcinogenicity in animal studies (EPA 1987a).

In general, DCBs have shown little or no mutagenic activity in a range of bacterial systems. However, several studies with mold and plant cultures treated with DCBs have reported mutations and chromosomal alterations (EPA 1987d).

Drinking Water Standards and Criteria

EPA has established a final drinking water MCL for p-dichlorobenzene of 75 ug/l (EPA 1987a). This MCL was based on a reference dose of 0.1 mg/kg/day, an uncertainty factor of 10, allocation of 20% of total human intake from all exposure sources to drinking water and various intake and physiological assumptions. EPA is also in the process of establishing an enforceable MCL for o-DCB and p-DCB, but not m-DCB. As a first step in the process, EPA has issued a proposed MCLG for o-DCB based upon a NOAEL reported in a subchronic gavage study in mice and rats. Based upon a NOAEL of 125 mg/kg/day, an uncertainty factor of 100, and the same assumptions as for p-DCB, EPA has derived a proposed MCLG for o-DCB of 620 ug/L.

In the absence of sufficient data, EPA has not developed, and is not in the process of developing, a drinking water standard for m-DCB.

1,2-DICHLOROETHANE (ETHYLENE DICHLORIDE OR EDC)

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of 1,2-dichloroethane (CAS No. 107-06-2) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	99
Water Solubility (mg/L at 25°C)	8.5×10^{-3}
Vapor Pressure (mmHg at 25°C)	64
Henry's Law Constant ($atm\text{-}m^3/mole$)	9.8×10^{-4}
Log K_{ow}	1.48
K_{oc}	14
BCF	1.2

A half-life of 1,2-dichloroethane from soil could not be located in the available literature; however, based on its moderate vapor pressure, evaporation is expected to be the predominant loss mechanism from the top layer of soil. In subsurface soil, biochemical and chemical biodegradation are expected to be slow. Therefore, based on its low K_{oc}, 1,2-dichloroethane is expected to leach and be transported to groundwater. Once in groundwater, the low K_{oc} indicates 1,2-dichloroethane will be mildly adorbed to soil particulate and will be subject to low retardation relative to the groundwater flow. In addition, its high Henry's Law Constant indicates evaporation from surface water is an important fate mechanism. Based on its low BCF, 1,2-dichloroethane is not expected to bioconcentrate in aquatic life.

Noncarcinogenic Effects

At relatively high doses, 1,2-dichloroethane (EDC) produces CNS depression as well as injury to the liver, kidney, and adrenals. Symptoms of CNS depression typically include headache, dizziness,

nausea, and general weakness. Effects on the liver include necrosis and epithelial cell damage, and on the kidney, degeneration of the proximal tubule (EPA 1985b)

Carcinogenicity and Mutagenicity

In a NCI bioassay, EDC administered by gavage was shown to increase the incidence of tumors in both mice and rats. Based upon these data, EPA has classified EDC according to weight-of-evidence carcinogenicity criteria in Group B_2 - probable human carcinogen (EPA 1987a).

EDC has shown to induce gene mutations in bacteria, plants, *Drosophilia melanogaster*, and cultured Chinese hamster ovary cells (EPA 1985i). In addition, EDC has been reported to cause meiotic chromosomal disjunction in *Drosophilia*. Based upon these data, EPA has determined based upon weight-of-evidence criteria that EDC is a mutagen that may have the potential for causing adverse effects in humans (EPA 1985i).

Drinking Water Standards and Criteria

Standards. In the first stage of a procedure to establish an enforceable MCL for EDC in drinking water, EPA has established a MCLG of 0. This MCLG was predicated on the EPA conclusion that no exposure to a "probable human carcinogen" is acceptable. Based upon considerations of analytical feasibility and feasibility of control, EPA has issued a MCL for EDC of 5 ug/L.

Criteria. In the absence of suitable data, EPA has not developed 1-day or 10-day HAs for EDC. EPA has, however, developed a longer-term HA based upon a NOAEL reported in a rat inhalation study. Based upon a NOAEL of 405 mg/m^3, an uncertainty factor of 100 and various intake assumptions and physiological parameters, EPA derived longer-terms HAs of 740 ug/L (10-kg child) and 2,600 ug/L (70-kg adult) (EPA 1985d). Because EDC was judged to be a probable human carcinogen, EPA did not develop a lifetime HA for noncarcinogenic effects.

EPA has not developed an ambient water quality criterion for EDC for the protection of human health.

HEXACHLOROBENZENE (HCB)

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of hexachlorobenzene (CAS No. 118-74-1) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	285
Water Solubility (mg/L at 25°C)	0.006
Vapor Pressure (mmHg at 25°C)	1.1×10^{-5}
Henry's Law Constant ($atm\text{-}m^3/mole$)	6.8×10^{-4}
Log K_{ow}	5.23
K_{oc}	3900
BCF	8690

Hexachlorobenzene (HCB) has a low water solubility, a high log K_{ow}, and relatively high K_{oc}, indicating that the chemical will be strongly adsorbed in soil or sediments following discharge to surface water. The low vapor pressure and Henry's law constant indicate that votilization will not be a major transport mechanism from either soils or surface water. In addition, based on the log K_{ow} and high K_{oc}, significant leaching from source soils is not anticipated.

HCB is expected to be slowly degraded by soil or sediment microorganisms. HCB is expected to significantly bioconcentrate in aquatic life with BCFs ranging from 5,500 to 44,437 in vertebrates (EPA 1985g).

Noncarcinogenic Effects

Porphyria cutonea tardea (PCT) has been demonstrated in Turkish citizens who accidentally consumed bread contaminated with HCB. PCT-associated symptoms observed included skin lesions and hyperpigmentation. In addition, HCB caused neurotoxicity, liver damage, arthritic conditions, and in children, reduced growth. Studies in rodents re-

ceiving HCB orally reported both fetotoxicity and teratogenicity (EPA 1985g). The effects noted in these studies included cleft palate, reduced fetal viability, reduced neonatal weight gain and reduced relative fetal weight (EPA 1987g).

Carcinogenicity and Mutagenicity

Lifetime animal carcinogenicity studies have revealed that HCB elicited statistically significant increased tumor incidences in rats, mice, and hamsters. Based on these data, EPA has placed HCB in its carcinogenicity category B_2 as a probable human carcinogen.

Drinking Water Standards and Criteria

EPA has not developed a drinking water standard for HCB. The EPA one-day and 10-day and longer health advisories (HAs) for a 10-kg child are each 50 ug/L. The longer-term HA is 175 ug/L for a 70-kg adult. The EPA reference concentration for a potential carcinogen risk of 1×10^{-6} is 0.02 ug/L.

LEAD

Noncarcinogenic Effects

When toxicity information is considered for noncarcinogenic effects of substances, the data are evaluated based on their dose-related response characteristics and the establishment of an exposure level below which no adverse effects are observed. Historically, the observed threshold or no-effect level for lead-induced toxic effects has continued to decline as more sophisicated experimental and clinical measures are employed to detect more subtle effects. These include alterations in physiological functions at blood lead (PbB) levels below the currently accepted maximum safe level for exposure to children, a segment of the population currently regarded to be at highest risk of lead-induced effects (EPA 1985c, ATSDR, 1987j).

The most serious effects associated with markedly elevated PbB levels are severe neurotoxic effects that include irreversible brain damage. For most adults, such damage does not occur until PbB levels exceed 100 to 120 micrograms per deciliter (ug/dl). At these PbB levels, severe gastrointestinal symptoms and effects on several other organ systems are often found. Precise thresholds for occurrence of overt neurological and gastrointestinal signs and symptoms of lead exposure in cases of subencenpthalopathic lead intoxication have yet to be established, but such effects have been observed in chronically exposed adult lead workers at PbB levels as low as 40 to 50 ug/dl.

Toward the lower range of PbB levels associated with overt lead intoxication, less severe but important signs of impairment in normal physiological functioning in several organ systems are evident among apparently asymptomatic lead-exposed adults (EPA 1985c). These include:

- Slowed nerve conduction velocities indicative of peripheral nerve dysfunction (at PbB levels as low as 30 to 40 ug/dl);

- Altered testicular function (at PbB levels of 40 to 50 ug/dl); and

- Reduced hemoglobin production (at approximately 50 ug/dl).

EPA has concluded that all of the above effects point toward a generalized impairment of normal physiological functioning of several different organ systems as adult PbB levels exceed 30 to 40 ug/dl. Evidence of impaired heme synthesis effects in blood occur at even lower levels.

More recent research has indicated that there is a relationship between PbB levels and increases in blood pressure. Preliminary review of this work indicates a statistically significant correlation between PbB levels and diastolic blood pressure in white males, ages 40 to 50, with no threshold apparent in the range of 6 to 30 ug/dl. Of particular concern is the finding of a 2 mm Hg increase in diastolic pressure per incremental PbB level increase of 0.5 ug/dl. Possible increases in risk of more severe medical events (stroke, heart attack, death) associated with lead-induced increases in blood pressure are also estimated in one of the recently published studies.

Children represent a sensitive subpopulation with regard to lead toxicity. As with adults, lead affects many different ogan systems and biochemical/physiological processes across a wide range of exposure levels. Effective PbB levels for producing encephalopathy or death in children are lower than in adults, starting at approximately 80 to 100 ug/dl. Permanent metal retardation and other marked neurological deficits are among lasting neurological sequelae typically seen in cases of nonfatal childhood lead encephalopathy. Other overt neurological signs and symptoms of subencepthalopathic lead intoxication, such as peripheral neuropathies (functional and/or pathological changes in the peripheral nervous system), have been detected in some children at PbB levels as low as 40 to 60 ug/dl. Chronic kidney disease is not evident at PbB levels above 100 ug/dl. Moreover, colic and other overt gastrointestinal symptoms occur in children, at least down to 60 ug/dl. Rank anemia is also evident at 70 ug/dl, representing an extreme manifestation of reduced hemoglobin synthesis at PbB levels as low as 40 ug/dl. All these effects are widely accepted as adverse health effects, and are reflective of widespread marked impact of lead on the normal physiological functioning of many different organ systems (EPA 1984d, 1985c, ATSDR 1987j).

Additional studies demonstrate further important health effects occurring in non-overtly lead-intoxicated children at similar or lower PbB levels than those indicated above. Among the most important and controversial of these electrophysiological and neuropsychlological effects are indications of peripheral nerve dysfunction, indexed by slowed nerve conduction velocities (NCV) found in children with PbB levels lower than 30 ug/dl. EPA has concluded that while none of these studies on CNS effects can individually be regarded as conclusively proving significant cognitive (IQ) or behavioral effects occurring below 30 ug/dl, they clearly indicate likely assoications between neuropsychologic deficits and PbB levels as low as 30 to 50 ug/dl. The magnitude of average observed IQ deficits is approximately 5 points at mean PbB levels of 50 to 70 ug/dl and about 4 points at mean levels of 30 to 50 ug/dl. Whether a smaller risk exists at somewhat lower levels (15 to 30 ug/dl) cannot be determined at this time (EPA 1984d, 1985c).

Many different impacts (representing potentially impaired functioning and depleted reserve capacities of many different tissues and organs) have been noted at PbB levels below 30 ug/dl.

At PbB levels around 10 to 15 ug/dl, initial signs of detectable heme synthesis impairment occur in many different organic systems, indications of increasing degrees of pyrimidine metabolism interference, signs of altered nervous system activity, and interference in vitamin-D metabolism. EPA has stated that, on the basis of these data, these effects might be viewed as becoming sufficiently adverse to warrant avoidance as PbB levels exceed 20 to 25 ug/dl (EPA 1985c).

Reproduction and Development

There is a paucity of data on which to evaluate the effects of lead on reproduction and development in humans. Early studies of pregnant women exposed to high levels of lead indicated toxic, but not teratogenic, effects on the conceptus. One recently reported study hints at birth anomalies possibly associated with exposure to low lead levels (mean cord blood level of 15 ug/dl) among women in the general population. However, the significance of these studies has been questioned because of the absence of reported statistically significant associations between cord blood levels and specific types of minor anomalies or

any major anomalies. There are also no reliable data pointing to adverse effects in human offspring following lead exposure to fathers.

EPA has concluded that the current collective human data regarding lead's effects on reproduction on in utero development are insufficient for accurate estimation of exposure-effect or no-effect levels (EPA 1984d). In the absence of sufficient data, it has been suggested that it would be prudent to avoid lead exposures resulting in PbB levels exceeding 25 to 30 ug/dl to pregnant women and women of child-bearing age in general. This conclusion was based on the known equilibration between maternal and fetal blood lead concentrations and growing evidence of deleterious effects in young children as PbB levels approach 25 to 30 ug/dl. Industrial lead exposure of men with PbB levels of 40 to 50 ug/dl also appears to result in altered testicular function.

Carcinogenicity

Several studies have reported renal tumors in Wistar rats following ingestion of high doses of a lead salt (lead acetate). Lead subacetate (another lead salt) has produced benign tumors (renal carcinomas or adenomas) in Swiss mice and seveal strains of rats, but not golden hamsters. Glimomas (CNS tumors) were also observed in many of these studies.

There have been a number of epidemiological studies which have assessed the mortality experience of lead-exposed workers. In some of the studies, no excess cancer mortality was observed. In one study, non-statistically significant excess cancer mortality of the respiratory system and cancer of the digestive organs and peritoneum was reported which on evaluation by other statistical techniques by another investigator was reported to achieve statistical significance. Another study has reported increased mortality from renal cancer among a group of lead smelting workers. However, this excess mortality, based on only six cases, did not achieve statistical significance. On review of all of these studies, EPA concluded that the absence of good lead exposure documentation made it difficult to assess the contribution of lead to the observed results.

The International Agency for Research on Cancer (IARC) has classified lead in Group 3, inadequate evidence for carcinogenicity in humans,

sufficient evidence for carcinogenicity in animals (for some salts). EPA has classified lead in category B_2 (sufficient evidence in animals, insufficient evidence in humans) according to the Agency's Guidelines for Carcinogen Risk Assessment (EPA, 1986b). However, the Agency noted that the doses inducing kidney tumors in positive rat studies were beyond the human lethal dose, and several epidemiological studies have not demonstrated an association between lead exposure and elevated cancer occupationally exposed workers. Consequently, EPA has recently proposed to set an MCLG in drinking water based on noncarcinogenic endpoints (EPA 1985c).

Drinking Water Standards

The current EPA and drinking water MCL for lead is 50 ug/L. This limit was designed to limit PbB levels in 99.5% of the population to below 30 ug/dl.

NAS (1977) has stated that the current MCL, in view of other environmental sources of exposure, may not provide a sufficient margin of safety, particularly for fetuses and young children.

EPA, in agreement with this assessment, has recently taken the first step in lowering the MCL by issuing a proposed MCLG of 20 ug/L. This level was derived based on a target PbB level of 15 ug/dl for protecting children and infants, using a conversion factor of 6.25 to translate PbB to lead in drinking water (assuming a consumption of 1 liter of water per day) and an uncertainty factor of 5 (EPA 1985c). After finalization of the MCLG, EPA would then factor in other data, such as technological feasibility, to establish a revised MCL.

4-METHYL-2-PENTANONE

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of 4-methyl-2-pentanone are summarized below (Verscheuren 1983).

Molecular Weight (g/mole)	100
Water Solubility (mg/L at 25°C)	19,000
Vapor Pressure (mmHg at 25°C)	6 (20°C)
Henry's Law Constant ($atm\text{-}m^3/mole$)	no data found
Log K_{ow}	no data found
K_{oc}	no data found
BCF	no data found

4-methyl-2-pentanone (MIBK) has a high water solubility and moderate vapor pressure. As a consequence of these two properties, benzene can be characterized as a moderately mobile chemical. For MIBK released to air, some rainwater washout is anticipated. After deposition in water or soil, volatilization is expected to return some portion back to the atmosphere.

Due to its high water solubility and moderate vapor pressure, some transport to sediments is expected.

MIBK released to soil can be transported to air via volatilization, to surface water via runoff, and to groundwater via leaching. The first two pathways predominate in surficial soil whereas the latter pathway predominates at lower soil depths.

Noncarcinogenic Effects

In high concentrations, MIBK produces narcosis with symptoms of headache, nausea, lightheadedness, and vomiting.

Carcinogenicity and Mutagenicity

MIBK has not been tested in a long-term animal carcinogenesis bioassay. Consequently MIBK would be categorized according to EPA carcinogenic risk criteria in group D - insufficient data, MIBK has not been shown to be mutagenic.

Standards and Criteria

There are no EPA drinking water standards, health advisories or ambient water quality criteria for the protection of human health for MIBK.

NAPHTHALENE

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of naphthalene (CAS No. 91-20-3) are summarized below (EPA 1984).

Molecular Weight (g/mole)	128
Water Solubility (mg/L at 25°C)	31.7
Vapor Pressure (mmHg at 25°C)	0.082
Henry's Law Constant ($atm\text{-}m^3/mole$)	no data found
Log K_{ow}	3.37
K_{oc}	no data found
BCF	1.46

Naphthalene has a moderate water solubility and moderate vapor pressure. As a consequence of these two properties, benzene can be characterized as a moderately mobile chemical. For naphthalene release to air, some rainwater washout is anticipated. After deposition in water or soil, volatilization is expected to return some portion back to the atmosphere.

Due to its moderate water solubility and moderate vapor pressure, transport to sediments is expected to be a major surface water fate process.

Naphthalene released to soil can be transported to air via volatilization, to surface water via runoff, and to groundwater via leaching. The first two pathways predominate in surficial soil, whereas the latter pathway predominates at lower soil depths.

Noncarcinogenic Effects

Exposure to naphthalene by the ingestion, inhalation and dermal routes has been reported to result in intravascular hemolysis, corneal

ulceration and cataracts, eye irritation, headache, confusion, malaise, nausea, vomiting, and bladder irritation in humans. In severe cases hemolytic anemia with associated jaundice and occasionally renal disease and death have been reported. Individuals with a deficiency of glucose-6-phosphate dehydrogenase (G6PD) and infants appear to be at greater risk for developing hemolytic anemia.

In a study recently reported by Shopp et al. (1984) male and female CD-1 mice were exposed for 14 or 90 day by gavage to 3 different doses of the compound. Both males and females showed a 5-10% mortality and depressed body weights at the high dose of 133 mg/kg/day. At this dose the males had decreased thymus weights and the females had decreased spleen and increased lung weights. No toxic effects were observed at the two lower doses of 53 mg/kg/day and 27 mg/kg/day. For all exposure groups, no alterations were observed in the hepatic drug metabolizing system except for a dose-related inhibition of aryl hydrocarbon hydroxylase (AHH) activity.

Harris and coworkers (1970 as reported in USEPA 1982) reported a statistically significant increase in retarded cranial ossification and heart development in offspring of Sprague Dawley dams that had received intraperitoneal injections of 395 mg/kg naphthalene on days 1-15 of gestation. In a recent study by Plasterer and coworkers (1985) single doses of naphthalene were administered by gavage to pregnant CD-1 mice on days 7 through 14 of pregnancy. The compound was given at a dose estimated to be at or just below the threshold of adult lethality. A significant reduction in the average number of live pups per litter was reported for the naphthalene-dosed females.

Carcinogenicity and Mutagenicity

Overall, the results of carcinogenicity testing with napthalene have been negative. Knake (1956 as reported in USEPA 1980) treated 40 white rats with 500 mg/kg of coal tar naphthalene in sesame oil subcutaneously every two weeks for a total of seven treatments. Five out of thirty-four rats developed invasive or metastatic lymphosarcoma prior to death. These result are equivocal, however, because the injection sites were first painted with carbolfuchsin (a known carcinogen) prior

to each injection. The naphthalene also contained approximately 10% methylnaphthalene.

In a second study, Knake (1956 as reported in USEPA 1980) painted a group of mice with either benzene or a solution of coal tar naphthalene in benzene and noted an excess of lymphatic leukemia in the group treated with the napthalene/benzene solution as compared to those treated with benzene alone (4 vs. 0 cases, respectively). These results are difficult to interpret because benzene is a known animal carcinogen.

Naphthalene when combined with rat microsomal fractions has been found to be nonmutagenic in bacterial mutagenesis assays (EPA 1980).

Drinking Water Standards and Criteria

EPA has not developed any drinking water standards or health advisories or ambient water quality criteria for human health for napthalene.

NICKEL

Environmental Chemistry and Fate

In the atmosphere, nickel exists predominantly as an aerosol. Atmospheric residence times depend on the nickel concentrations, the density and size of particles, and precipitation. The typical residence times of nickel in the atmosphere ranges from 1 to 21 days. Nickel species in the air most likely include soil minerals, oxide, and sulfates.

Depending on the chemical and physical properties of the water, nicekl exists in numerous soluble and insoluble forms in aqueous systems. Due to precipitation, iron oxide and manganese oxide are the primary determinants of the aqueous mobility of nickel. However, variation of other factors such as sulfate concentration and pH can significantly influence nickel's mobility.

Nickel is persistent in soils and has the potential to leach to groundwater. Sorption of nickel to soil is dependent on soil-water pH, total iron and surface area. Organic complexing agents in soil tend to restrict nickel movement due to formation of organo-nickel complexes. Nickel may also be immobilized as nickel ferrite, as other more common compounds (e.g., carbonates, sulfates, or halides) are too soluble to precipitate out of soil-water.

Nickel is moderately mobile in low pH and high cation-exchange capacity soils, but less mobile in mineral soils and soils with high organic content (ATSDR 1987j). Extractability of nickel from soil effects uptake by plant roots. The extractability is influenced by a number of complex physical, chemical, and biological factors.

Nickel is bioconcentrated in some aquatic organisms. Bioconcentration factors typically range from 20-1,000, with higher values for phytoplankton, algae, and seaweed.

Noncarcinogenic Effects

Laboratory studies in animals have demonstrated depressed body weight gain, alterations in hematology parameters, cytochrome oxidase activity, and iron contents of organs following high oral nickel exposure.

Studies evaluating the effects of nickel administration on animal reproductive systems have produced varying results. Nickel is known to cross the placental barrier in animals, and some data suggest this is also true for humans. Intraperitoneal and intravenous injections of nickel compounds have produced some tetratogenic effects in animals. Increased fetal mortality and reduced fetal weights also were observed. In some studies, high dosages resulted in reduced fetal survival and decreased fetal weights in the absence of frank teratogenesis.

Feeding studies involving administration of various nickel compounds to rats are more applicable to human exposure situations. Various studies have reported a correlation between nickel concentration in food or water and reproductive performance (ATSDR, 1987b). Nickel exposure has also been reported to impair male gametogenesis in mice and rats. No adverse reproductive effects linked to nickel exposure have been reported in humans.

Carcinogenicity and Mutagenicity

The chemical form and route of exposure may be important factors in determining the carcinogenic potential of nickel. Insoluble nickel compounds (e.g., metallic nickel, nickel subsulfide, and nickel carbonyl) have been shown to produce tumors following inhalation exposure. However, multiple studies in which nickel was administered orally to rats and mice have been uniformly negative (EPA 1985c). In humans, excess respiratory cancer mortality has been demonstrated in epidemiological studies of nickel smelting and refining workers.

EPA has classified nickel in group B_2--sufficient evidence for carcinogenicity in animals, limited evidence in humans--according to guidelines for carcinogenic risk assessment (EPA, 1986b) for the inhalation route, based upon the positive animal evidence for nickel subsulfide and carbonyl compounds. However, reflecting the negative animal carcinogenicity data, the Agency has categorized nickel in Group D - inadequate evidence for the oral route of exposure.

Nickel chloride was not mutagenic, whereas nickel sulfate was found to be mutagenic in *in vitro* assays.

Drinking Water Standards

There is no federal drinking water standard for nickel. EPA, however, has established a lifetime drinking water health advisory of 150 ug/L (EPA 1985c).

PENTACHLOROPHENOL (PCP)

Introduction

Commercial pentachlorophenol (PCP) is contaminanted with two chemicals - hexachlorobenzene (HCB), and hexachlorodibenzo-p-dioxin (HxCDD) which are currently categorized by EPA in its category B_2 as probable human carcinogens. Both are also potential reproductive toxins. PCP is also contaminated with polychlorinated dibenzofurans. This profile primarily addresses the toxicity of commercial PCP. The reader is referred to the profiles for HCB, HxCDD, and dibenzofurans for further information relevant to evaluating the potential toxicity of commercial PCP.

Environmental Chemistry and Fate

The relevant physical and chemical properties for pentachlorophenol (CAS No. 87-86-5) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	266
Water Solubility (mg/L at 25°C)	14
Vapor Pressure (mmHg at 25°C)	1.1×10^{-4}
Henry's Law Constant ($atm\text{-}m^3/mole$)	2.8×10^{-6}
Log K_{ow}	5
K_{oc}	53,000
BCF	770

Pentachlorophenol (PCP) has a moderate water solubility, low vapor pressure, low Henry's Law Constant, and high K_{oc}. Based upon its K_{oc} and low vapor pressure, PCB would be strongly bound to surface soil. The K_{oc} of 53,000 indicates that leaching from soils and transport to groundwater is a slow process. PCP is resistant to biodegradation. The low Henry's Law Constant and high K_{oc} indicate that PCP will be strongly partitioned to surface water sediments. Finally, the BCF indicates

that, like many lipophilic organics, PCP will bioconcentrate in aquatic life.

Noncarcinogenic Effects

PCP has elicited a wide variety of symptoms following subchronic oral administration in animals, including: secondary anemia, increased blood sugar levels, hemorrhages and congestion in the lungs and kidneys, degenerative changes in the kidney tubules, and lesions of the brain and spinal cord (EPA 1985n). Commercial PCP containing chlorinated dibenzo-p-dioxins and dibenzofurans are significantly more toxic than the purified pentachlorophenol used in subchronic animal studies.

In humans, local irritation, allergic responses, and systemic effects are found. Pentachlorophenol poisoning is characterized by profuse sweating, accompanied by fever, weight loss, and gastrointestinal distress. Occupational epidemiological studies have revealed an increased incidence of low-grade infections or inflammations, and depression of kidney functions, which are partially reversible (EPA 1985h).

Reproduction and Development

Pentachlorophenol has not been shown to be teratogenic in any of the many animal studies designed to assess the toxicological endpoint.

Fetoxicity has been elicited by both purified and commercial PCP, with the effects probably secondary to maternal toxicity. Fetotoxic effects noted in rat studies include increases in resorptions, alterations in the sex ratio, and a number of skeletal anomalies regarded by the investigators as indicative of fetotoxicity rather than teratogenicity. EPA has developed a NOEL of 3 mg/kg/day (EPA 1987g) based on a one-generation rat study.

HxCDD, an important contaminant in commercial PCP, has elicited both fetotoxicity and teratogenicity in rat studies. Teratogenic effects observed include cleft palate, dilated renal pelvis, and abnormal vertebrae. EPA has derived a NOEL of 0.1 ug/kg/day for fetotoxicity (EPA 1987g), which is lower than the NOEL for teratogenicity.

HCB, another important contaminant of commercial PCP, has elicited fetotoxicity and teratogenicity in rodent studies. Abnormalities ob-

served in fetuses include cleft palate, reduced fetal viability, reduced neonatal weight gain, and reduced relative neonatal weight. Based on these studies, EPA set the NOEL for HCB at 1.0 mg/kg/day (EPA 1987g).

Carcinogenicity and Mutagenicity

Pure pentachlorophenol has not been reported to be carcinogenic in a number of animal studies (EPA 1987g). It has also produced negative results in an initiation/promotion study. These results are consistent with mutagenicity studies which have primarily been negative (EPA 1987g).

However, HxCDD and HCB have both been found to be oncogenic in animal studies (EPA 1987g). The EPA estimated 95% upper bound carcinogenic potencies of 6.2×10^3 and 1.67 mg/kg/day, for HxCDD and HCB, respectively (EPA 1986a, EPA 1987g).

Drinking Water Standards and Criteria

EPA has issued no drinking water standards for PCP, HCB, or HxCDD. EPA has issued a proposed MCLG for PCP of 200 ug/L, based upon a DWEL of 1.01 mg/L, and assuming a drinking water contribution of 20% to total daily PCP intake (EPA 1985a).

EPA has developed health advisories for a 10 kg child and a 70 kg adult for PCP and HCB, but not for HxCDD. The EPA health advisory limits and reference concentrations for potential carcinogens for PCP and its major contaminants are summarized in the following table.

	One-day	Ten-day	Long term		Lifetime	Reference
	10 kg	10 kg	10 kg	70 kg	70 kg	Concentration*
Pentachlorophenol	1000	300	300	1050	1050	--
Hexachlorobenzene	50	50	50	175	--	0.02
HxCDD	--	--	--	--	--	--
Dibenzofurans	--	--	--	--	--	--

Source: EPA, 1986a

- No limit developed.

* Corresponding to a 1×10^{-6} cancer risk.

All concentrations in ug/L.

PHENOL

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of phenol (CAS No. 108-95-2) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	94
Water Solubility (mg/L at 25°C)	93,000
Vapor Pressure (mmHg at 25°C)	0.341
Henry's Law Constant ($atm\text{-}m^3/mole$)	4.5×10^{-7}
Log K_{ow}	1.42
K_{oc}	14.2
BCF	14

Phenol has a high water solubility and vapor pressure. As a consequence of these two properties, phenol can be characterized as a highly mobile chemical. For phenol released to air, some rainwater washout is anticipated. After deposition in water or soil, volatilization is expected to return some portion back to the atmosphere. Based on its low Henry's Law Constant, substantial volatilization loss should not occur to the atmosphere following release to water.

Due to its high water solubility and high vapor pressure, transport to sediments is not expected to be a major surface water fate process.

Phenol released to soil can be transported to air via volatilization, to surface water via runoff, and to groundwater via leaching. The first two pathways predominate in surficial soil, whereas the latter pathway predominates at lower soil depths.

According to criteria developed by Kenaga (1980), phenol with a K_{oc} of 14.2 would be considered to be mobile in soils. Other factors which influence soil mobility include soil type, the amount of rainfall, the depth to groundwater, and the extent of degradation.

Noncarcinogenic Effects

Phenol is a highly toxic compound that may enter the body via skin absorption, vapor inhalation, and ingestion. Based on the available human and animal data, exposure to large doses by any route of exposure can lead to serious illness or death. Toxic doses in human and species exhibit similar symptoms: initial increases in heart rate, labored breathing, cyanosis, and pulmonary edema. The present data do not indicate that phenol to be teratogenic.

Carcinogenicity and Mutagenicity

Based upon the limited animal data, the EPA has classified phenol in category D - inadequate evidence to evaluate carcinogenicity.

The mutagenicity data are equivocal presenting on balance, equivocal evidence of mutagenicity.

Drinking Water Standards and Criteria

EPA has not classified drinking water standards or criteria for phenol.

POLYCHLORINATED BIPHENYLS (PCB)

Introduction

Polychlorinated biphenyls (PCBs) are a class of compounds with varying degrees of chlorine substitution on two phenyl rings bound at the 1-1′ position. PCBs, previously used in commerce, are mixtures of various substituted biphenyls formed by a reaction of chlorine with biphenyl. Because of their heat stability and resistance, low water solubility, and favorable dielectric properties, PCBs found considerable use in hydraulic fluids, compressor lubricants, heat transfer fluids, paints, lacquers, and ink (EPA 1987f).

PCBs have the empirical formula $C_{12}H_{10-n}Cl_n$ with n=1 to 10. The numbering system is based upon ring-ring chlorine bonds, with identical numbering systems on each ring. By convention, the ring with the fewest chlorine substitutes, or substituted in the highest numerical positions, is designated as prime (ATSDR, 19871).

Individual PCB registered trademarks or brand names vary according to both the manufacturer and the country of origin.

PCBs, formerly produced in the United States by a single manufacturer, are called Aroclors. All Aroclors are designated by a four-digit numbering system. The first two digits denote the type of compound; the last two digits give the percentage by weight of chlorine. The only exception is Aroclor 1016. The trademarks by manufacturers in other countries include Phenoclor, Clophen, and Kaneclor.

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fates of polychlorinated biphenyls are summarized in Table 1 (ATSDR 19871).

In water, adsorption to sediments or other organic water is a major fate process for PCBs (EPA 19871). Based on their water solubilities and octanol-water partition coefficients, the lower chlorinated components of the Aroclors will sorb less strongly than the higher chlorinated isomers.

Volatilization is also an important environmental fate process for PCBs dissolved in natural water. The estimated Henry's Law Constants

Table 1

PHYSICAL AND CHEMICAL PROPERTIES OF PCBs*

Aroclor Designation	Molecular Weight (average)	Color	Physical State	Solubility water, mg/L	Density g/cm^3 at 25°C	Partition Coefficient Log Octanol-Water*	Vapor Pressure (mm Hg at 25°C)	Henry's Law** Constant $atm\text{-}m^3/mol$ at 25°C	Biocentration Factor***
1016	257.9	Clear	Oil	0.42	1.33	5.6	4×10^{-4}	2.9×10^{-4}	42,500
1221	200.7	Clear	Oil	0.59 (24°C)	1.15	4.7	6.7×10^{-3}	3.5×10^{-3}	
1232	232.2	Clear	Oil	Unknown	1.24	5.1	4.06×10^{-3}	Unknown	
1242	266.5	Clear	Oil	0.24	1.35	5.6	4.06×10^{-4}	5.2×10^{-4}	
1248	299.5	Clear	Oil	0.054	1.41	6.2	4.94×10^{-4}	2.8×10^{-3}	70,500
1254	328.4	Lt. Yellow	Viscous liquid	0.012	1.50	6.5	7.71×10^{-5}	2.8×10^{-3}	100,000
1260	375.7	Lt. Yellow	Sticky resin	0.0027	1.58	6.8	4.05×10^{-5}	4.6×10^{-3}	190,000

* These log Kow values represent an average value for the major components of the individual Aroclor.

** Henry's Law constants were estimated by dividing the vapor pressure by the water solubilities, and represent average values for the Aroclor mixtures as a whole (ATSDR 1987r).

*** From Lyman, Reehl, and Rosenbladt (1982).

Source: Unless otherwise specified, from ATSDR (1987l).

are indicative of significant volatilization from environmental waters (ATSDR 19871). However, strong adsorption to sediments significantly reduces the concentrations of PCBs available for volatilization, with longer volatilization half-lives for the higher chlorinated PCBs.

The low water solubility, high log K_{ow}s, and demonstrated strong adsorption to soils and sediments indicate that significant leaching should not occur in soil under most conditions. Lower chlorinated PCBs will leach at rates greater than the higher chlorinated PCBs. In the presence of organic solvents, significant leaching of PCBs in soil can occur (ATSDR 19871).

PCBs with vapor pressures ranging from 10^{-3} to 10^{-5} mm Hg should exist almost entirely in the vapor phase in the atmosphere (Eisenreich et al, 1981). The tendency of PCBs to adsorb to particulates increases with increasing degree of chlorination. PCBs in the atmosphere are physically removed by wet and dry deposition (Eisenreich et al, 1981).

In general, the rate of degradation or transformation in the environment decreases with increasing chlorination. In the atmosphere, the vapor phase reaction of PCBs with hydroxyl radicals may be the dominant transformation process (ATSDR 19871). In the aquatic environment PCBs are not significantly degraded by hydrolysis and oxidation, and photolysis appears to be the only potentially important process (ATSDR 19871).

In general, mono-, di-, and trichlorinated biphenyls (Aroclor 1221 and 1232) biodegrade relatively rapidly; tetrachlorinated biphenyls (Aroclors 1016 and 1242) biodegrade slowly; and higher chlorinated biphenyls (Aroclors 1248, 1254 and 1260) are resistant to biodegradation (ATSDR 19871). In addition to the degree of chlorination, chlorine substitution patterns also appear to be important in influencing the rate of biodegradation.

Experimentally determined bioconcentration factors (BCFs) for various Aroclors (1016, 1248, 1254, and 1260) in aquatic species (fish, shrimp, oyster) range from 26,000 to 660,000 (Leifer et al, 1983).

Noncarcingenic Effects

Several complications exist in assessing the toxicity of PCBs. Different mixtures nominally depicted by PCB type and chlorine sub-

stitution may, in fact, vary significantly in isomer composition. Additionally, highly toxic contaminants are often present in PCB mixtures.

In general, however, it can be concluded that short and intermediate-term studies of toxicological effects following oral administration of PCBs to animals result in a variety of physiological and morphological alterations in the liver, including: enlargement, fatty infiltration, centrilobular lesions, and effects on liver porphyrin metabolism. The major biochemical effects include induction of mixed function oxidase enzymes and modification of porphyrin metabolism. PCBs can also inhibit the immune system. Skin applications to rabbits has been shown to cause erythema, keratosis, and chloracne.

Human studies related to PCB exposures have been done on the health of occupationally exposed workers, as well as on health effects noted following two incidents in which cooking oils contaminated with PCBs were ingested. Occupationally exposed workers typically demonstrated dermal problems such as chloracne, rashes, and burning sensations. While most biochemical parameters in these studies were found to be within normal ranges, one study reported an elevation of liver enzymes in exposed workers.

The two incidents, or outbreaks, concerning the ingestion of PCB-tainted cooking oils occurred in east Asia. The first incident, designated as the "Yusho" outbreak, occurred among Japanese (Higachi, 1976; Kurotsone and Shapiro, 1984); while the second, designated "Taichung", occurred among Taiwanese (Hsu et al, 1984; Lu and Wang, 1984). Health effects observed in humans following exposure included: chloracne, increased discharge from the eyes, soreness and weakness of limbs, headaches, dizziness, and general malaise. Because the cooking oil in the Yusho study was also found to be contaminated with highly toxic polychlorinated dibenzofurans, implications cannot be limited to PCBs alone in this study.

Reproduction and Development

The range of reported effects on reproduction in animals include: a lengthening of the estrus cycle, weak estrogenic activity, fetotoxicity, fetal deaths, decreased survival of the neonate, small birth weight, and

a variety of teratogenic effects. Rats and mice appear to be more resistant to reproductive toxicity than mink or monkeys, which have also been used in studies. These differences may possibly be attributable to the duration of the studies and to differences in metabolic rates and pharmacokinetics.

Most of the studies used dosages that were maternally toxic. Maternal toxicity obviously is an important consideration when assessing reproductive and developmental toxicity. This consideration, frequently referred to as Karnofsky's rule, states that "any compound administered at the proper dosage, at the proper stage of development, or to embryos of the proper species will be effective in causing disturbances in embryonic development". This calls attention to the fact that if a pregnant animal is sick, the delicate balance between the mother and fetus is affected or disrupted, and adverse fetal effects can be expected.

There have been studies of the reproductive and developmental effects of combined exposure to PCBs subsequent to outbreaks of poisoning in Japan (Yusho) and Taiwan (Taichung). Findings in newborn children of exposed mothers include: fetal growth inhibition, low birth weight, dry brown skin pigmentation, precocious dentition, gingival hyperplasia, and abnormal calcification of the skull (DHHS 1985a).

Carcinogenicity and Mutagenicity

There have been a number of studies designed to assess carcinogenicity in animals. All but one study have been negative. The positive study by Kimbrough et al. (1975) reported a statistically significant increase in hepatocellular carcinomas among mice and rats administered Aroclor 1260 in the diet.

Epidemiological studies have not reported significant increases in cancer in occupationally exposed workers. Explanations for these findings may include an insufficient latency period and small sample sizes in the studies.

Based upon the above evidence, EPA has classified PCBs in Group B_2, with adequate evidence of carcinogenesis in animals, and inadequate evidence in humans (EPA 1985). IARC (1978) has classified PCBs in category 2B, based on studies indicating inadequate evidence for carcinogenicity

in humans, sufficient evidence in animals, and inadequate evidence of activity in short-term mutagenicity tests.

EPA's cancer assessment group has calculated a unit cancer risk of 4.34 $(mg/kg/day)^{-1}$, using the upper 95 percent value of the doses used in the positive study (Kimbrough et al 1975).

Standards and Criteria

Drinking Water

As the first stage in developing a maximum contaminant level (MCL) for PCBs in drinking water, the EPA has recently proposed an MCLG of zero. EPA will establish an MCL taking into account technological feasibility of control and analytical feasibility (EPA 1988).

Surface Water

The EPA has established ambient water quality criteria for the protection of freshwater and saltwater aquatic life of 0.014 ug/l and 0.03 ug/l, respectively. For human health, EPA has estimated the drinking water concentration corresponding to one-in-a-million cancer excess of 0.0079 ng/l.

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Environmental Chemistry and Fate

In general, most priority pollutant PAHs can be characterized as having low vapor pressure, low water solubility, low Henry's Law Constants, high logarithms of the octanol-water partition coefficients (log K_{ow}s) and high organic carbon partition coefficients (K_{oc}s). The high K_{oc}s indicate that most PAHs are strongly sorbed to organic matter in the soils. This factor, combined with the low water solubilities, indicate that the rate of transport of most PAHs from the unsaturated zone via infiltration to the saturated zone will be extremely low. Low vapor pressure and low Henry's Law Constants indicate that most PAHs will not readily volatilize from surface water, and these factors, in combination with high K_{oc}s, also indicate low volatilization rates from surface soils.

The exceptions to the groundwater transport argument are four PAHs (acenaphthene, fluorene, fluoranthene, and pyrene) with water solubilities greater than 100 ug/L. Although these four compounds have high K_{oc}s (10^3 or greater) relative to other PAHs, their solubilities indicate that they are mobile, and may be observed in groundwater. The chemical and physical properties for the 14 priority pollutant PAHs are presented in Table 1.

Typically, although PAHs are regarded as persistent in the environment, they are degradable by soil microorganisms.

Degradation rates and degree of degradation are influenced by environmental factors, microbial flora and physicochemical properties of the PAHs themselves. Important environmental factors include temperature, pH, oxygen status, soil type, moisture, and nutrient status (Sims and Overcash 1983). Microbial factors include acclimation status, populations present, and the relative proportions of bacteria, fungi, and actinomycetes (Sims and Overcash, 1983). Physico-chemical properties include chemical structure, concentration, and lipophilicity.

Compounds which are easily and rapidly biodegraded include acenaphthene, naphthalene, and phenanthrene. Compounds which are persistent, requiring long time periods or specialized conditions for degradation, include benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene,

Table 2

PHYSICAL AND CHEMICAL PROPERTIES OF SELECTED PAHs*

Chemical Name	Molecular Weight (g)	CAS No.	Vapor Pressure (mm Hg)	Water Solubility (mg/L)	Henry's Law Constant	log Kow	Koc (mL/g)	BCF (L/kg)
acenaphthene	154	83-32-9	1.55×10^{-3}	3.42	9.2×10^{-5}	4.0	4.6×10^{3}	242**
anthracine	178	120-12-7	1.95×10^{-4}	4.5×10^{-2}	1.2×10^{-3}	4.45	1.4×10^{4}	1,210**
benzo(a)anthracene	228	56-55-3	2.2×10^{-8}	5.7×10^{-3}	1.16×10^{-6}	5.6	1.38×10^{6}	11,700**
benzo(b)fluoranthene	252	205-99-2	5.0×10^{-7}	1.4×10^{-2}	1.19×10^{-3}	6.06	5.5×10^{5}	
benzo(k)fluoranthene	252	207-08-9	5.1×10^{-7}	4.3×10^{-3}	3.94×10^{-3}	6.06	5.5×10^{5}	
benzo(g,h,i)perylene	276	191-24-2	1.03×10^{-10}	7.0×10^{-4}	5.34×10^{-8}	6.51	1.6×10^{6}	68,200**
benzo(a)pyrene	252	50-32-8	5.6×10^{-9}	1.2×10^{-3}	1.55×10^{-6}	6.06	5.5×10^{6}	28,200**
chrysene	228	208-01-9	6.3×10^{-4}	1.8×10^{-3}	1.05×10^{-6}	5.61	2.0×10^{5}	11,700**
dibenzo(a,h)anthracene	278	53-70-3	1.0×10^{-10}	5.0×10^{-4}	7.33×10^{-8}	6.8	33×10^{6}	
fluoranthene	202	206-44-0	5.0×10^{-6}	2.6×10^{-1}	6.46×10^{-6}	4.9	3.8×10^{4}	2,920
fluorene	116	86-73-7	7.1×10^{-4}	1.69	6.42×10^{-5}	4.2	7.3×10^{3}	1,300***
indeno(1,2,3-cd)perylene	276	193-39-5	1.0×10^{-10}	5.3×10^{-4}	6.86×10^{-8}	6.5	1.6×10^{6}	
phenanthrene	178	85-01-3	6.8×10^{-4}	1.0	1.59×10^{-4}	4.46	1.44×10^{4}	2,630**
pyrene	202	129-00-3	2.5×10^{-6}	1.32×10^{-3}	5.4×10^{-6}	4.88	3.8×10^{4}	2,800**

* Unless otherwise footnoted, data taken from EPA (1986a).

** EPA (1984i)

*** Lyman, Reihl, and Rosenblatt (1982).

chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene. The ease of biodegradation generally decreases with increasing molecular weight. Biodegradation products generally include hydroxylated PAH derivatives.

Noncarcinogenic Effects

Very little attention has been paid to the noncarcinogenic effects of PAHs. It is known, however, that rapidly proliferating tissues (e.g., bone marrow, lymphoid organs, testes, etc.) appear to be the preferred targets for PAH-induced cytotoxicity.

Acute and chronic exposure to various PAHs classified as carcinogens has resulted in the destruction of specific hematopoietic and lymphoid elements, ovotoxicity, anti-spermagenic effects, adrenal necrosis, and changes in the intestinal and respiratory epithelia. This tissue damage occurs at doses expected to induce carcinogens and malignancy risks predominant in evaluating PAH toxicity. For PAHs classified as noncarcinogenic, very little is known about toxic responses or mechanisms.

Carcinogenicity and Mutagenicity

The EPA has issued finalized carcinogenicity risk assessment guidelines (EPA, 1986b) to establish criteria for evaluating and categorizing chemicals into five groups, according to weight-of-evidence categories. According to this categorization scheme, five of the 15 priority pollutant PAHs have been placed in category B_2 (probable human carcinogens) with sufficient evidence of carcinogenicity in animals, and inadequate data for humans. A sixth PAH (indeno (1,2,3-cd) perylene) has been placed in category C, denoting possible human carcinogenicity based on limited evidence of carcinogenicity in animals in the absence of human data (EPA, 1986b). Table 2 contains EPA's most current categorization of priority pollutant PAHs (EPA, 1986b). Following its risk assessment guidelines, EPA typically performs quantitative risk assessments for groups B or A, and, in some cases (depending on the quality of the data), for group C.

To date, EPA has estimated a carcinogenicity slope (unit cancer risk) for carcinogenic PAHs using data for a single PAH, benzo(a)pyrene (BaP). This limited effort does not take into account the clearly docu-

Table 2

EPA CARCINOGENICITY CATEGORIZATION FOR ORAL AND INHALATION ROUTES OF EXPOSURE FOR THE 15 PRIORITY POLLUTANTS POLYCYCLIC AROMATIC HYDROCARBONS

	EPA Carcinogenicity Classifications*	
Compound	Inhalation	Oral
acenaphthene	D	D
anthracene	D	D
benzo(a)anthracene	B_2	B_2
benzo(b)fluoranthene	B_2	B_2
benzo(k)fluoranthene	D	D
benzo(g,h,i)perylene	D	D
benzo(a)pyrene	B_2	B_2
chrysene	B_2	B_2
dibenzo(a,h)anthracene	B_2	B_2
fluoranthene	D	D
fluorene	D	D
indeno(1,2,3-cd)perylene	C	C
naphthalene	D	D
phenanthrene	D	D
pyrene	D	D

* Unless otherwise footnoted, classification taken from EPA (1986a).

mented differences in quantitative dose-response relationships for the other PAHs. Two specialists in EPA's carcinogenic assessment group have evaluated the relative potency estimates for the other five carcinogenic PAHs to benzo(a)pyrene (Thorslund et al, 1986).

Using a series of sophisticated statistical procedures, these authors have derived estimated relative potencies for the five other "carcinogenic" PAHs relative to BaP. For the potency estimation, the authors used bioassays from individual laboratories in which BaP and the other PAHs were tested in common. The results of this procedure for developing relative potency estimates are summarized in Table 3.

Table 3

RELATIVE POTENCY ESTIMATES DERIVED FOR POLYCYCLIC AROMATIC HYDROCARBONS CATEGORIZED IN GROUP A, B, OR C ACCORDING TO EPA'S WEIGHT OF EVIDENCE CRITERIA

Compound	Relative Potency Estimates
benzo(a)pyrene	1
benzo(a)anthracene	0.145
benzo(b)fluoranthene	0.140
chrysene	0.0044
dibenzo(a,h)anthracene	2.82
indeno(1,2,3-cd)perylene	0.232

Source: Thorslund et. al. (1986)

TETRACHLOROETHENE (PERCHOLOROETHYLENE OR PERC)

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of tetrachloroethene (CAS No. 127-18-4) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	166
Water Solubility (mg/L at 25°C)	150
Vapor Pressure (mmHg at 25°C)	17.8
Henry's Law Constant ($atm\text{-}m^3/mole$)	2.6×10^{-2}
Log K_{ow}	2.6
K_{oc}	364
BCF	31

Tetrachloroethene's moderate water solubility and vapor pressure indicate that volatilization is the major loss mechanism from surface soil and surface water. Its moderate K_{oc} indicates that leaching to groundwater from lower soil depths is an important mechanism. In addition, tetrachloroethene is biodegraded by certain soil microorganisms by a sequential series of monodechlorinations. Once it reaches the groundwater, its moderate K_{oc} indicates that tetrachloroethene will be moderately absorbed to soil particles and will be moderately retarded relative to groundwater transport. Finally, tetrachloroethene is subject to low bioconcentration in aquatic species.

Noncarcinogenic Effects

The principal toxic effects following acute exposure in animals to tetrachloroethene (PERC) are depression of the CNS, ataxia (failure of muscular coordination), and respiratory cardiac arrest (ATSDR 1987m, EPA 1985f). Subchronic and chronic effects in animals include damage to the

liver and kidneys. In humans, the principal effects are CNS depression and liver toxicity.

Carcinogenicity and Mutagenicity

A 1977 NCI bioassay in which PERC was administered by gavage reported increased incidence of liver tumors in mice but not rats (EPA 1985d). A draft report of a NTP inhalation bioassay, currently under internal review, has noted an increased incidence of tumors in mice and rats. Although EPA has previously categorized tetrachloroethylene in Group B_2--probable human carcinogen (EPA 1985b, 1985h)--the Agency is awaiting final results of the NTP bioassay before commencing a rule-making for the chemical in drinking water.

PERC has been evaluated for its ability to cause gene mutation, chromosomal aberrations, unscheduled DNA synthesis, and mitotic recombination. In general, these responses have been weak and were observed at high concentrations that were cytotoxic (EPA 1985h). Additionally, no dose-dependent relationships were demonstrated in these studies (EPA 1985h).

Drinking Water Standards

EPA has not established an MCL for PERC in drinking water. The agency is scheduled to begin rule-making procedures to establish an MCL in the near future.

TOLUENE

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of toluene (CAS No. 108-88-3) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	92
Water Solubility (mg/L at 25°C)	535
Vapor Pressure (mmHg at 25°C)	28.1
Henry's Law Constant ($atm\text{-}m^3/mole$)	6.4×10^{-3}
Log K_{ow}	2.73
K_{oc}	300
BCF	10.7

Toluene has a high water solubility, moderate vapor pressure, high Henry's Law Constant, and moderate K_{oc}. Based on the vapor pressure and K_{oc}, volatilization from surface soils is an important transport pathway. Based on the water solubility and moderate K_{oc}, toluene will be readily transported to groundwater, and upon reaching groundwater, be subject to a low degree of retardation relative to the groundwater flow. Based on the water solubility and high Henry's Law Constant, volatilization will be a major transport pathway from surface water.

Noncarcinogenic Effects

Acute or chronic exposure to high levels of toluene in animals results in CNS depression and effects on the lungs, liver, and kidney.

EPA has derived an AADI for drinking water consumption based upon a 24-month inhalation study in rats (EPA 1985c). Based upon a NOAEL of 1,130 mg/m^3, an uncertainty factor of 100, and assuming 50 percent pulmonary absorption, EPA derived an AADI of 10,100 ug/L (EPA 1985c).

Carcinogenicity and Mutagenicity

Only one long-term carcinogenicity bioassay of toluene has been reported. This study concluded that toluene was not carcinogenic following inhalation in rats. NTP is conducting carcinogenicity studies in which toluene is being administered by inhalation and gavage to rats and mice. In addition, carcinogenicity studies by European investigators are expected to be published in the next few years. According to weight-of-evidence carcinogenicity criteria, EPA has classified toluene in Category D, not classifiable as to human carcinogenicity (EPA 1985c).

Toluene has not been shown to be mutagenic in *in vivo* or *in vitro* assays (EPA 1985c).

Drinking Water Standards and Criteria

Standards. In the first stage of the rule-making process designed to establish a MCL for toluene in drinking water, EPA has issued a proposed MCLG of 2,600 ug/L derived from the AADI of 10,100 ug/L by allocating a 20 percent of drinking water contribution to total intake from all sources of exposure (EPA 1985c). Subsequent to finalization of the MCLG, EPA will evaluate analytical feasibility and feasibility of control in establishing an enforceable MCL.

Criteria. In the absence of adequate dose-response data for oral exposure to toluene, EPA derived a 1-day HA, based on NOAEL of 377 mg/m^3 reported in studies of humans, the subjects of single inhalation exposures of up to 8 hours. Based upon the NOAEL, an uncertainty factor of 100, and a variety of physiological parameters and intake assumptions, EPA derived 1-day HAs of 18,000 ug/L and 63,000 ug/L for a 10-kg child and 70-kg adult, respectively (EPA 1985d).

In the absence of sufficient data, EPA derived 10-day HAs of 6,000 ug/L (child) and 21,000 ug/L (adult), by applying an uncertainty factor of 3 to the 1-day HA. The Agency utilized a three-fold rather than the usual 10-fold uncertainty factor because toluene is rapidly distributed and excreted, and because the chemical presents little bioaccumulation potential relative to typical toxicants (EPA 1985d).

The EPA ambient water quality criterion for the protection of human health is 14,300 ug/L (EPA 1980a).

1,1,1-TRICHLOROETHANE (TCA)

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of 1,1,1-trichloroethane (CAS No. 71-55-6) are summarized below. (EPA 1986a).

Molecular Weight (g/mole)	133
Water Solubility (mg/L at 25°C)	1,500
Vapor Pressure (mmHg at 25°C)	123
Henry's Law Constant ($atm\text{-}m^3/mole$)	1.4×10^{-2}
Log K_{ow}	2.5
K_{oc}	152
BCF	5.6

1,1,1-trichloroethane (TCA) can be characterized as having a high water solubility, a high vapor pressure, a high Henry's Law Constant, and a moderate K_{oc}. The high vapor pressure and moderate K_{oc} indicate that volatilization will be a major transport pathway in surfical soil. In subsurface soils, the high water solubility and moderate K_{oc} indicate that transport to groundwater represents a major pathway, and once the water table is reached, chemical transport will be moderately retarded relative to the groundwater flow. The high vapor pressure, high Henry's Law Constant, and high water solubility indicate that volatilization from surface water will be a major transport pathway.

Noncarcinogenic Effects

The principal noncarcinogenic effects of 1,1,1-trichloroethane (TCA) following exposure in animals and man are depression of the CNS, increase in liver weight, and cardiovascular changes. Current data do not suggest that TCA is a reproductive or developmental toxin.

EPA has developed a risk reference dose (RRfD) of 0.35 mg/kg/day based upon a NOAEL of 1,365 mg/m^3 reported in a study in which mice were exposed by inhalation for 14 weeks. EPA derived the RRfD by application of an uncertainty factor of 100, a 30% absorbed dose, and standard physiological parameters (EPA 1985g).

Carcinogenicity and Mutagenicity

There have been two TCA carcinogenicity bioassays. The first, conducted by NCI, was judged to be inadequate due to poor survival in treated animals. Preliminary results of the second, by NTP, showed elevated incidences of hepatocellular carcinomas. These initial results have been questioned and the study is currently being audited (EPA 1985b). Based upon these results, EPA has classified TCA according to weight-of-evidence criteria in Group D, not classifiable--inadequate human and animal evidence of carcinogenicity (EPA 1987a).

Drinking Water Standards and Criteria

Standards. EPA has established a drinking water MCL for TCA of 200 ug/L.

Criteria. EPA has developed a 1-day HA based upon a LOEL of 1.4 g/kg/day reported in a study of rats receiving a single oral dose of TCA. Based upon the LOEL, and standard weight and intake assumptions, EPA derived a 1-day HA of 14,000 ug/L for a 10-kg child (EPA 1984d). In the absence of sufficient data, EPA has not developed a 10-day HA. EPA has developed longer-term HAs of 35,000 ug/L (child) and 125,000 ug/L (adult), based upon a NOAEL of 0.5 g/kg/day reported in a study in rats receiving TCA by gavage for 12 weeks (EPA 1985d).

The EPA lifetime HA of 200 ug/L is equivalent to and was derived by the same methodology as the RMCL (EPA 1985d).

The EPA ambient water quality criterion for TCA for the protection of human health is 18,700 ug/L (EPA 1980a).

TRICHLOROETHENE (TCE)

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of trichloroethene (TCE) (CAS No. 79-01-6) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	131
Water Solubility (mg/L at 25°C)	1,100
Vapor Pressure (mmHg at 25°C)	57.9
Henry's Law Constant ($atm\text{-}m^3/mole$)	9.1×10^{-3}
Log K_{ow}	2.38
K_{oc}	126
BCF	10.6

The high water solubility and high vapor pressure of TCE indicate that volatilization will be the predominant loss mechanism from surficial soils. In soils and groundwater, trichloroethene is degraded to cis and trans 1,2-dichloroethylene, vinylidene chloride, and vinyl chloride (ATSDR 1987n). TCEs moderate organic-carbon partition coefficient indicates it is moderately adsorbed to soils, and will leach to groundwater. In light of its moderate Henry's Law Constant, volatilization will be the major fate process for TCE from surface water.

Trichloroethene is only moderately bioconcentrated in aquatic life.

Noncarcinogenic Effects

The principal toxicological effect of concern for trichloroethene (TCE) is carcinogenicity. Noncarcinogenic effects include CNS disturbances and kidney and liver damage following exposure to relatively high airborne concentrations (ATSDR 1987n).

Carcinogenicity and Mutagenicity

Six studies of the carcinogenicity of TCE in animals have been published. Two have reported significant increases in liver tumors in mice. EPA has judged three others as technically flawed. A sixth reported that TCE, containing epichlorohydrin and epoxybutane, was carcinogenic in a less responsive mouse strain, but pure TCE was not (EPA 1985b). Recognizing the lower responsiveness of the mice in the latter study, EPA has classified TCE based upon weight-of-evidence carciongenicity guidelines in Category B2--probable human carcinogen (EPA 1987a).

Commercial TCE containing stabilizers has been reported to be weakly mutagenic in a variety of *in vitro* and *in vivo* assays representing a wide evolutionary range of organisms (EPA 1985g). Based on these data, EPA has concluded that commercial TCE may have the potential to cause weak or borderline increases above the spontaneous level of mutagenic effects in exposed human tissues (EPA 1985g).

Drinking Water Standards

EPA has established a drinking water MCL for TCE of 5 ug/l (EPA 1987a).

2,4,6-TRICHLOROPHENOL (TCP)

Environmental Chemistry and Fate

The relevant physical and chemical properties and environmental fate of 2,4,6-trichlorophenol (CAS No. 88-06-2) are summarized below (EPA 1986a).

Molecular Weight (g/mole)	197
Water Solubility (mg/L at 25°C)	800
Vapor Pressure (mmHg at 25°C)	1.2×10^{-2}
Henry's Law Constant ($atm\text{-}m^3/mole$)	3.9×10^{-6}
Log K_{ow}	3.87
K_{oc}	2000
BCF	150

Based upon its high K_{oc} and low vapor pressure, volatilization is not an important fate mechanism for TCP from surface soil. Reportedly, TCP is subject to some degradation. In light of the low vapor pressure and high K_{oc}, degradation may be an important fate mechanism in soils. The high K_{oc} indicates that TCP is only slowly leached and transported to groundwater. Should it reach groundwater, TCP will be strongly absorbed to soil organic carbon, and will be strongly retarded relative to groundwater flow.

In surface water, sorption to sediment appears to be the most important fate mechanism. In addition, based on its BCF, TCP is subject to moderate bioconcentration in aquatic life.

Noncarcinogenic Effects

In preliminary subchronic feeding studies, single strains of mice and rats received TCP ad libitum in the diet for seven weeks. Observations extended one week following cessation of the diet. A significant reduction in growth rate was observed in rats receiving 10,000

ug/g and mice receiving 14,700 ug/g. Assuming that rats weighed 0.4 kg and consumed 0.02 kg/day, NAS estimated a minimum toxic dose of 500 mg/kg/day (NAS 1982).

Carcinogenicity and Mutagenicity

Technical grade TCP was administered in the diet to male and female F344 rats and male $B_6C_3F_1$ mice at concentrations of 5,000 ug/g and 10,000 ug/g, respectively, for 105 to 107 weeks (NCI 1979 as cited in NAS 1982). Female $B_6C_3F_1$ mice received TCP at 10,000 ug/g to 20,000 ug/g, but at 38 weeks, the doses were reduced by a factor of 4 because of reduced weight gain. Under the conditions of the experiment, TCP was reported to be carcinogenic in male F344 rats (lymphomas or leukemias) and $B_6C_3F_1$ mice (hepatocellular carcinomas or adenomas) (NAS 1982). Polychlorinated dibenzofurans and dioxins may be formed during the chemical synthesis of TCP. The dioxin content of the technical grade TCP used in these studies was not reported.

Based upon the positive animal studies, EPA has categorized TCP as a B_2, probable human carcinogen (EPA 1986a).

TCP was not reported as mutagenic in the Ames assay with or without activation by hepatic microsomes (EPA 1984c). TCP did increase the mutation rate but not the intragenic recombination in S. cervisiac (EPA 1984c).

Drinking Water Standards and Criteria

EPA has not developed drinking water standards or health advisories for TCP. EPA has established ambient water quality criteria (AWQC), based upon TCPs carcinogenicity in animals, for the protection of human health. The AWQC criteria are 1.2 ug/L for water and fish consumption, and 3.6 ug/L for fish consumption only. These criteria are equivalent to the estimated incremental increased 1×10^{-6} lifetime cancer risk, based upon the animal carcinogenicity study results (EPA 1986g).