R-33-2-9-27

FINAL REMEDIAL INVESTIGATION REPORT

VOLUME III OF III: APPENDICES

C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

EPA WORK ASSIGNMENT NUMBER 37-01-3LP4
CONTRACT NUMBER 68-W8-0037

NUS PROJECT NUMBER 9851

JANUARY 1990

APPENDIX F

LABORATORY ANALYTICAL RESULTS

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TABLES

TABLE F-1

DEBRIS PILE SAMPLES - TAL RESULTS

C & R BATTERY SITE - DEBRIS PILE SAMPLES

SAMPLE NUMBER:	CR-DP01-01	CR-DP02-01	CR-DP02-01D	CR-DP03-01	CR-DP04-01
TRAFFIC REPORT NUMBER:	MCL381	MCL382	MCL383	MCL384	MCL385
DESCRIPTION:			DUPLICATE		
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/09/88	09/09/88	09/09/88	09/09/88	09/09/88

*** INORGANICS ***

PP	CAS NO	COMPOUND				
1		ALUMINUM	3880	4180	4500	7180	5440
2		ANTIMONY	469	2820	1410	383	403
3		ARSENIC	62.6	39.1	108	ND	33.9
4		BARIUM	233	98.7	107	161	234
5		BERYLLIUM	B [0.4]	B [0.22]	B [0.29]	B [0.5]	B [0.39]
6		CADMIUM	L 22.5	L 28.2	L 4.1	L 8.2	L 6.2
7		CALCIUM	22800	13800	9180	55400	9560
8		CHROMIUM	13.4	7.6	8.2	10.7	15.4
9		COBALT	[5.4]	[2.9]	[3.4]	[4.2]	[6.5]
10		COPPER	J 362	J 87.0	J 44.3	J 45.0	J 71.3
11		IRON	15300	10200	9910	10400	16900
12		LEAD	65500	79800	53500	47700	60500
13		MAGNESIUM	[945]	[693]	[685]	1260	1760
14		MANGANESE	422	89.5	94.4	123	386
15		MERCURY	1.5	1.4	1.8	0.59	0.86
16		NICKEL	49.2	B 8.9	B 15.7	B 12.0	28.6
17		POTASSIUM	1240	1170	[957]	1360	1830
19		SILVER	ND	B 2.5	ND	ND	ND
20		SODIUM	B [314]	B [139]	B [144]	B [159]	B [118]
23		VANADIUM	21.1	15.6	17.3	20.5	23.0
24		ZINC	179	76.3	70.7	54.0	104

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
J = VALUE IS ESTIMATED
[] = VALUE REPORTED IS LESS THAN THE CONTRACT REQUIRED DETECTION LIMIT
K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - DEBRIS PILE SAMPLES

SAMPLE NUMBER:	CR-DP01-01	CR-DP02-01	CR-DP02-01D	CR-DP03-01	CR-DP04-01
TRAFFIC REPORT NUMBER:					
DESCRIPTION:			DUPLICATE		
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/09/88	09/09/88	09/09/88	09/09/88	09/09/88
*** GEOCHEMICAL PARAMETERS ***					
PH	6.2	5.2	4.8	7.1	6.8
ACIDITY (MG/KG)	190	160	180	160	190
TOTAL ALKALINITY (MG/KG)	125	50	50	190	130
BICARBONATE ALK (MG/KG)	125	50	50	190	130
SIEVE 3.0 IN.	100.0	100.0	NA	100.0	100.0
SIEVE 1.5 IN.	100.0	100.0	NA	100.0	100.0
SIEVE 0.75 IN.	100.0	98.1	NA	100.0	100.0
SIEVE 0.375 IN.	91.3	93.4	NA	99.3	90.4
SIEVE NO. 4	79.5	87.5	NA	91.1	82.6
SIEVE NO. 10	69.0	79.0	NA	82.6	75.8
SIEVE NO. 20	59.7	69.3	NA	73.4	68.9
SIEVE NO. 40	53.6	59.3	NA	66.9	63.5
SIEVE NO. 60	48.0	50.3	NA	61.6	57.3
SIEVE NO. 140	37.7	41.5	NA	52.2	42.4
SIEVE NO. 200	33.2	38.1	NA	48.6	36.2
CEC (MEQ/100g)	8.5	9.4	9.9	1.3	9.3

TABLE F-2

DEBRIS PILE SAMPLES - EP TOXICITY

C & R BATTERY SITE - DEBRIS PILE EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPDP01-01	CR-EPDP02-01	CR-EPDP02-01D
TRAFFIC REPORT NUMBER:			
DESCRIPTION:	EP TOX	EP TOX	EP TOX/DUP
UNITS:	UG/L	UG/L	UG/L
DATE SAMPLED:	09/09/88	09/09/88	09/09/88
*** INORGANICS ***			
PP CAS NO COMPOUND			
3 ARSENIC	118.0	ND	ND
6 CADMIUM	619.1	126.7	80.1
12 LEAD	J 58470.0	J 5788.0	J 4589.0

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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U = VALUE REPORTED IS LESS THAN THE CONTRACT REQUIRED DETECTION LIMIT
K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - DEBRIS PILE EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPDP01-01	CR-EPDP02-01	CR-EPDP02-01D
TRAFFIC REPORT NUMBER:			
DESCRIPTION:			
UNITS:			
DATE SAMPLED:	09/09/88	09/09/88	09/09/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND

NO PARAMETERS FOR THIS CATEGORY

TABLE F-3

SOIL SAMPLES - TAL RESULTS

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-S001-00	CR-S001-03	CR-S001-06	CR-S002-00	CR-S002-03	CR-S002-06	CR-S002-09
TRAFFIC REPORT NUMBER:		MCM681	MCM682	MCM725	MCM677	MCM678	MCM679	MCM680
% SOLIDS:		85	84	86	88	85	87	85
DESCRIPTION:								
UNITS:		MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:		09/22/88	09/22/88	09/22/88	09/22/88	09/22/88	09/22/88	09/22/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	B 5280	19800	13600	B 6490	14300	12400	B 10100
2		ANTIMONY	B 19	L 57	L 50	B 19	L 57	L 51	L 45
3		ARSENIC	K 11	K 10	24	K 4.0	K 9.0	K 10	K 8.9
4		BARIUM	179	100	72	L 84	74	66	137
5		BERYLLIUM	[0.7]	1.3	J [0.84]	L [0.7]	[1.0]	[0.7]	[1.0]
6		CADMIUM	L 2.2	L 6.0	3.9	L 2.5	L 7.6	L 6.2	L 5.1
7		CALCIUM	B [353]	B [588]	B [591]	[1000]	B [515]	B [467]	B [501]
8		CHROMIUM	B 8.6	B 24	B 18	B 19	B 24	B 19	B 16
9		COBALT	[6.3]	7.6	[4.1]	L [8.5]	[5.4]	[5.7]	14
10		COPPER	B [5.7]	B 10	B 14	B 36	B 23	B 11	B 14
11		IRON	J 10400	J 30600	J 26100	J 17800	J 34900	J 30000	J 24700
12		LEAD	J 1670	J 2800	L 39	J 13500	J 447	J 180	J 88
13		MAGNESIUM	[622]	1800	2120	[799]	1850	1560	1970
14		MANGANESE	651	328	J 56	K 472	121	116	313
15		MERCURY	1.0	1.1	0.17	0.9	1.2	1.0	1.1
16		NICKEL	ND	14	15	B 10	13	B 11	B 11
17		POTASSIUM	ND	B [238]	B [1020]	ND	ND	ND	B [235]
19		SILVER	L 33	L 19	B 5.3	L 25	L 9.7	B 9.0	L 17
20		SODIUM	B [475]	B [430]	B [513]	B [551]	B [553]	B [471]	B [510]
23		VANADIUM	B 15	40	19	L 20	39	32	26
24		ZINC	B 23	66	B 52	L 90	B 50	B 45	B 53

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ND = NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S001-00	CR-S001-03	CR-S001-06	CR-S002-00	CR-S002-03	CR-S002-06	CR-S002-09
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/22/88	09/22/88	09/22/88	09/22/88	09/22/88	09/22/88	09/22/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND						
		PH	NA	NA	NA	NA	NA	NA	NA
		SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
		DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
		SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
		PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
		LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
		PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
		SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
		DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
		DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
		CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S002-13	CR-S003-00	CR-S003-03	CR-S004-00	CR-S005-00	CR-S005-03	CR-S005-03D
TRAFFIC REPORT NUMBER:	MCM724	MCM683	MCM726	MCM723	MCM627	MCM628	MCM629
% SOLIDS:	85	84	85	91	89	84	82
DESCRIPTION:							DUPLICATE
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/22/88	09/22/88	09/22/88	09/21/88	09/15/88	09/15/88	09/15/88

*** INORGANICS ***

PP	CAS NO	COMPOUND						
1		ALUMINUM	14800	B 10300	16000	B 8930	B 8580	B 8940	B 8500
2		ANTIMONY	L 48	B 26	L 31	L 60	B 23	B 23	B 22
3		ARSENIC	17	K 8.0	11	2.9	K 14	K 50	K 16
4		BARIUM	123	113	122	143	147	148	129
5		BERYLLIUM	J [0.92]	[0.8]	J [0.63]	J [0.71]	1.2	[1.0]	[1.0]
6		CADMIUM	4.1	L 3.1	2.3	2.3	2.2	2.1	1.7
7		CALCIUM	[1110]	[1160]	B [598]	B [705]	B [940]	4800	4750
8		CHROMIUM	B 17	B 14	B 13	B 13	B 8.6	B 8.8	B 7.7
9		COBALT	[11]	13	[4.3]	[9.0]	[5.3]	[3.8]	[3.6]
10		COPPER	B 19	B 12	B 12	B 8.9	B 17	B 20	B 15
11		IRON	J 26000	J 14800	J 15400	J 13000	J 12700	J 9450	J 10400
12		LEAD	L 129	J 822	L 42	L 168	J 320	J 7200	J 8310
13		MAGNESIUM	2800	[1110]	[1020]	[924]	[970]	[837]	[856]
14		MANGANESE	J 314	1680	J 54	J 544	474	168	220
15		MERCURY	0.18	1.1	0.24	ND	2.2	4.3	23
16		NICKEL	19	ND	B 11	B [5.4]	B [5.6]	B [46]	B [4.6]
17		POTASSIUM	B [1060]	ND	B [541]	B [571]	ND	ND	ND
19		SILVER	L 18	L 83	B 4.1	L 28	L 23	B 8.8	L 12
20		SODIUM	B [545]	B [403]	B [464]	B [442]	B [455]	B [524]	B [445]
23		VANADIUM	B 17	22	B 15	20	19	B 17	B 16
24		ZINC	74	B 49	B 45	B 38	B 52	84	82

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S002-13	CR-S003-00	CR-S003-03	CR-S004-00	CR-S005-00	CR-S005-03	CR-S005-03D
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA			
% SOLIDS:							
DESCRIPTION:							
UNITS:					MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/22/88	09/22/88	09/22/88	09/21/88	09/15/88	09/15/88	09/15/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	NA	NA	NA	NA	4.6	6.0	5.4
SO4 (MG/KG)	NA	NA	NA	NA	350	1700	1800
ACIDITY (MG/KG)	NA	NA	NA	NA	70	ND	ND
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	ND	100	70
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	ND	100	70
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	ND	ND	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	8.7	25.6	19.3

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S005-06	CR-S005-09	CR-S005-13	CR-S005-20	CR-S005-25	CR-S005-30	CR-S005-35
TRAFFIC REPORT NUMBER:	MCM630	MCM701	NA	NA	MCM631	MCM702	MCM703
% SOLIDS:	75	88			84	87	93
DESCRIPTION:							
UNITS:	MG/KG	MG/KG			MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/15/88	09/15/88	09/15/88	09/15/88	09/15/88	09/15/88	09/15/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	13400	B 7460	NA	NA	11800	B 5720	B 2880
2 ANTIMONY	B 25	36	NA	NA	52	69	35
3 ARSENIC	K 2.7	J 26	NA	NA	K 3.1	5.0	ND
4 BARIUM	170	56	NA	NA	188	73	37
5 BERYLLIUM	1.3	J [0.94]	NA	NA	1.8	J [0.87]	J [0.50]
6 CADMIUM	2.2	1.2	NA	NA	5.8	3.5	1.5
7 CALCIUM	1190	B [807]	NA	NA	1290	B [935]	B [635]
8 CHROMIUM	B 17	B 13	NA	NA	B 20	B 7.8	B 4.9
9 COBALT	[5.4]	[5.4]	NA	NA	17	[4.1]	[2.4]
10 COPPER	B 25	B 20	NA	NA	B 30	B 21	B 12
11 IRON	J 13600	J 7810	NA	NA	J 26100	J 16800	J 8400
12 LEAD	J 383	L 23	NA	NA	J 67	L 19	B 7.2
13 MAGNESIUM	1420	1600	NA	NA	2830	1500	[818]
14 MANGANESE	68	J 33	NA	NA	463	J 138	J 110
15 MERCURY	2.9	0.34	NA	NA	1.0	0.11	ND
16 NICKEL	B 12	B 10	NA	NA	34	B 9.9	B [3.8]
17 POTASSIUM	B [282]	B [795]	NA	NA	2830	1240	B [774]
19 SILVER	B 4.5	B 3.0	NA	NA	L 24	B 9.2	B 7.3
20 SODIUM	B [662]	B [768]	NA	NA	B [480]	B [391]	B [393]
23 VANADIUM	24	19	NA	NA	31	20	B 13
24 ZINC	B 44	B 44	NA	NA	118	B 37	B 21

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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S005-06	CR-S005-09	CR-S005-13	CR-S005-20	CR-S005-25	CR-S005-30	CR-S005-35
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/15/88	09/15/88	09/15/88	09/15/88	09/15/88	09/15/88	09/15/88
*** GEOCHEMICAL PARAMETERS ***							
PH	4.5	5.0	5.2	4.6	ND	5.0	4.7
SO4 (MG/KG)	190	5	19	6	6	ND	5
ACIDITY (MG/KG)	50	ND	ND	ND	ND	50	ND
TOTAL ALKALINITY (MG/KG)	25	20	20	20	25	45	20
BICARBONATE ALK (MG/KG)	25	20	20	20	25	45	20
CARBONATE ALK (MG/KG)	ND	ND	ND	ND	ND	ND	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	22.2	28.0	22.6	3.8	15.4	11.4	4.3

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-S005-40	CR-S006-00	CR-S006-03	CR-S006-03D	CR-S006-06	CR-S007-00	CR-S007-03
TRAFFIC REPORT NUMBER:		NA	MCM684	MCM685	MCM686	MCM727	MCM667	MCM668
% SOLIDS:			91	87	89	87	87	86
DESCRIPTION:					DUPLICATE			
UNITS:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:		09/15/88	09/26/88	09/26/88	09/26/88	09/26/88	09/21/88	09/21/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	NA	B 9960	13800	13900	18600	B 4070	B 7870
2		ANTIMONY	NA	B 20	B 28	B 15	L 50	ND	B 16
3		ARSENIC	NA	K 3.7	K 9.9	K 8.7	12	K 16	K 14
4		BARIUM	NA	73	88	84	90	L 40	L 118
5		BERYLLIUM	NA	L [0.7]	L [1.0]	L [0.6]	J [0.78]	ND	L [0.8]
6		CADMIUM	NA	L 2.7	L 3.9	L 2.9	4.0	L 2.7	ND
7		CALCIUM	NA	8280	B [763]	1550	B [816]	15200	1830
8		CHROMIUM	NA	B 11	B 17	B 13	B 20	B 7.3	B 7.7
9		COBALT	NA	[5.8]	[7.4]	[5.0]	[4.7]	ND	ND
10		COPPER	NA	B 6.4	B 9.8	B 19	B 13	B 22	B 19
11		IRON	NA	J 11300	J 18600	J 18000	J 26100	J 6620	J 7720
12		LEAD	NA	J 2780	J 369	J 1470	L 177	J 19000	J 841
13		MAGNESIUM	NA	[808]	1270	1220	1780	[457]	[609]
14		MANGANESE	NA	437	455	451	J 152	K 98	K 222
15		MERCURY	NA	1.3	1.3	1.5	0.23	1.2	1.3
16		NICKEL	NA	B [3.3]	B [6.7]	B [7.2]	15	B [4.6]	ND
17		POTASSIUM	NA	1980	ND	ND	B [690]	ND	ND
19		SILVER	NA	L 23	L 24	L 22	L 9.7	B 5.5	L 12
20		SODIUM	NA	B [375]	B [432]	B [363]	B [499]	B [480]	B [1150]
23		VANADIUM	NA	19	25	B 16	21	B 11	L 18
24		ZINC	NA	B 35	B 44	B 44	B 51	B 20	B 16

AR301879

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S005-40	CR-S006-00	CR-S006-03	CR-S006-03D	CR-S006-06	CR-S007-00	CR-S007-03
TRAFFIC REPORT NUMBER:		NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG						
DATE SAMPLED:	09/15/88	09/26/88	09/26/88	09/26/88	09/26/88	09/21/88	09/21/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	5.2	NA	NA	NA	NA	NA	NA
SO4 (MG/KG)	ND	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	50	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	20	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	20	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	ND	NA	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	3.0	NA	NA	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S007-03D	CR-S007-06	CR-S007-09	CR-S007-13	CR-S008-00	CR-S008-03	CR-S008-06
TRAFFIC REPORT NUMBER:	MCM669	MCM670	MCM671	MCM720	MCM672	MCM721	MCM673
% SOLIDS:	84	84	86	87	81	86	84
DESCRIPTION:	DUPLICATE						
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/21/88	09/21/88	09/21/88	09/21/88	09/21/88	09/21/88	09/21/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	B 6560	B 9820	B 8990	B 7210	B 5140	11900	B 10700
2 ANTIMONY	B [11]	L 34	B 21	L 35	L 6410	L 112	L 39
3 ARSENIC	K [1.7]	K 12	K 8.4	5.6	K 20	28	K 11
4 BARIUM	L 109	L 486	L 157	156	L 225	61	L 67
5 BERYLLIUM	L [0.6]	L [1.1]	L 0.8	J [0.85]	ND	J [0.74]	L [0.7]
6 CADMIUM	ND	L 3.0	L 1.8	1.2	L 5.1	4.8	L 3.8
7 CALCIUM	1940	B [742]	B [806]	1230	64900	B [690]	2020
8 CHROMIUM	B 7.1	B 17	B 13	B 12	B 14	B 18	B 15
9 COBALT	ND	L [2.8]	L [3.4]	[3.1]	L [3.8]	[3.1]	L [6.3]
10 COPPER	B 18	B 20	B 21	B 16	B 81	B 11	B 12
11 IRON	J 7050	J 19400	J 11500	J 7840	J 8840	J 27700	J 22200
12 LEAD	J 504	J 99	J 141	L 341	J 43000	L 42	J 1480
13 MAGNESIUM	[578]	[1070]	[977]	[936]	[1190]	1280	1234
14 MANGANESE	K 233	K 20	K 19	J 18	K 307	J 152	K 294
15 MERCURY	0.8	0.4	0.4	1.3	1.2	ND	1.2
16 NICKEL	ND	B [7.6]	B [7.0]	B [5.6]	B [4.3]	B 10	B [9.2]
17 POTASSIUM	ND	ND	ND	B [874]	ND	B [930]	ND
19 SILVER	L 11	B 3.8	B [2.3]	B 3.2	L 16	L 11	L 16
20 SODIUM	B 1190	B [644]	B [707]	B [641]	B 1250	B [513]	B [518]
23 VANADIUM	B 16	L 34	L 21	20	B [11]	36	L 28
24 ZINC	B 14	B 28	B 26	B 25	L 80	B 34	B 36

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S007-03D	CR-S007-06	CR-S007-09	CR-S007-13	CR-S008-00	CR-S008-03	CR-S008-06
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/21/88	09/21/88	09/21/88	09/21/88	09/21/88	09/21/88	09/21/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND						
		PH	NA	NA	NA	NA	NA	NA	NA
		SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
		DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
		SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
		PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
		LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
		PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
		SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
		DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
		DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
		CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-S008-09	CR-S008-13	CR-S009-00	CR-S009-03	CR-S010-00	CR-S010-03	CR-S010-06
TRAFFIC REPORT NUMBER:		MCM674	MCM675	MCM676	MCM722	MCM663	MCM664	MCM665
% SOLIDS:		87	87	91	82	90	87	89
DESCRIPTION:								
UNITS:		MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:		09/21/88	09/21/88	09/21/88	09/21/88	09/20/88	09/20/88	09/20/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	B 10300	B 7590	B 7230	14500	7250 B	B 7460	B 10500
2		ANTIMONY	L 41	L 38	B 25	L 76	ND	B [13]	L 41
3		ARSENIC	K 16	K 6.4	K 11	6.5	K 12	K 25	K 23
4		BARIUM	L 69	L 74	L 95	121	L 110	L 88	L 80
5		BERYLLIUM	L [0.6]	L [1.1]	ND	J [0.89]	L [0.7]	L [0.6]	L [0.9]
6		CADMIUM	L 2.4	L 3.5	L 4.5	3.3	L 5.8	L 4.7	L 5.1
7		CALCIUM	1930	B [703]	B [791]	B [742]	20500	9080	1800
8		CHROMIUM	B 17	B 15	B 14	B 15	B 12	B 13	B 15
9		COBALT	L [4.9]	L [5.3]	L [4.4]	[5.2]	L [11]	L [11]	L [5.3]
10		COPPER	B 16	B 14	B 33	B 17	B 70	B 37	B 24
11		IRON	J 22000	J 21900	J 16300	J 18600	J 13900	J 16900	J 23500
12		LEAD	J 737	J 247	J 3380	L 40	J 23800	J 13900	J 1840
13		MAGNESIUM	1730	1750	[863]	[846]	[991]	[977]	1770
14		MANGANESE	K 125	K 56	K 200	J 342	K 359	K 318	K 97
15		MERCURY	0.9	0.9	1.3	0.49	0.8	0.5	0.7
16		NICKEL	B [11]	B 11	B [7.7]	B [7.5]	B 11	L 14	L 12
17		POTASSIUM	ND	ND	B [330]	B [634]	ND	B [230]	ND
19		SILVER	B 8.0	B 4.6	L 12	L 18	L 18	L 17	B 7.5
20		SODIUM	B 1220	B [694]	B [501]	B [602]	B [465]	B [482]	B [468]
23		VANADIUM	L 30	L 24	L 21	41	L 17	L 19	L 28
24		ZINC	B 40	B 44	B 42	B 32	B 42	B 35	B 44

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-S008-09	CR-S008-13	CR-S009-00	CR-S009-03	CR-S010-00	CR-S010-03	CR-S010-06
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/21/88	09/21/88	09/21/88	09/21/88	09/20/88	09/20/88	09/20/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND						
		PH	NA	NA	NA	NA	NA	NA	NA
		SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
		DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
		SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
		PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
		LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
		PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
		SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
		DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
		DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
		CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO10-09	CR-SO10-13	CR-SO11-00	CR-SO11-03	CR-SO11-03D	CR-SO11-06	CR-SO11-09
TRAFFIC REPORT NUMBER:	MCM666	MCM719	MCM651	MCM652	MCM653	MCM654	MCM716
% SOLIDS:	89	86	86	86	89	87	89
DESCRIPTION:					DUPLICATE		
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	11400	B 5030	B 6040	B 10700	B 10600	14700	B 7540
2 ANTIMONY	L 42	L 44	L 82	B 18	B [10]	B 28	L 46
3 ARSENIC	K 7.2	5.6	K 44	K 23	K 20	K 16	9.5
4 BARIUM	L 105	78	108	86	81	79	54
5 BERYLLIUM	L [1.1]	J [0.54]	[0.6]	[0.7]	[0.7]	[0.9]	ND
6 CADMIUM	L 5.1	2.0	15	8.9	6.4	6.9	1.6
7 CALCIUM	1200	B [615]	50900	18300	16700	10100	B [522]
8 CHROMIUM	B 24	B 10	B 11	B 18	B 14	B 17	B 12
9 COBALT	L [5.8]	[5.1]	[5.0]	[4.5]	[4.4]	[4.8]	ND
10 COPPER	B 22	B 23	B 41	B 28	B 22	B 16	B 19
11 IRON	J 24900	J 10000	J 13500	J 17000	J 16400	J 21600	J 10400
12 LEAD	J 944	L 27	J 36800	J 19400	J 14900	J 7720	L 148
13 MAGNESIUM	2240	[668]	3130	1430	1280	1440	1350
14 MANGANESE	K 68	J 235	312	195	164	170	J 30
15 MERCURY	1.1	ND	1.3	1.0	1.1	0.8	0.11
16 NICKEL	L 15	B [3.7]	44	25	17	16	B [4.6]
17 POTASSIUM	ND	B [1140]	B [209]	1930	B [404]	B [207]	B [989]
19 SILVER	B 5.8	L 13	L 14	L 11	L 9.4	L 10	B 2.4
20 SODIUM	B [601]	B [454]	B [649]	B [669]	B [632]	B [673]	B [560]
23 VANADIUM	L 32	18	B 13	21	21	30	23
24 ZINC	B 51	84	B 63	B 52	B 47	B 46	B 26

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO10-09	CR-SO10-13	CR-SO11-00	CR-SO11-03	CR-SO11-03D	CR-SO11-06	CR-SO11-09
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO. COMPOUND							
PH	NA	NA	NA	NA	NA	NA	NA
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO11-13	CR-SO12-00	CR-SO12-03	CR-SO12-06	CR-SO12-09	CR-SO12-13	CR-SO13-00
TRAFFIC REPORT NUMBER:	MCM655	MCM642	MCM643	MCM644	MCM645	MCM715	MCM632
% SOLIDS:	85	88	89	85	85	89	75
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/20/88	09/19/88	09/19/88	09/19/88	09/19/88	09/19/88	09/16/88

*** INORGANICS ***

PP	CAS NO	COMPOUND						
1		ALUMINUM	18200	11400	16200	15700	16100	B 7330	B 6500
2		ANTIMONY	L 33	B 24	L 54	L 77	L 83	L 86	B [12]
3		ARSENIC	K 15	K 10	K 11	K 16	K 7.7	6.7	K 19
4		BARIUM	106	49	84	93	131	79	93
5		BERYLLIUM	[1.0]	[0.5]	[0.9]	1.3	1.7	J [0.96]	ND
6		CADMIUM	3.2	3.9	6.6	7.4	6.6	3.4	4.3
7		CALCIUM	B [985]	3300	5870	1530	B [679]	B [583]	70300
8		CHROMIUM	B 25	B 14	B 19	B 21	B 19	B 13	B 8.1
9		COBALT	[4.8]	[4.2]	[6.9]	[7.5]	28	[8.6]	ND
10		COPPER	B 14	B 23	B 22	B 24	B 25	B 20	B 26
11		IRON	J 19500	J 16700	J 26600	J 36400	J 37600	J 19400	J 7700
12		LEAD	J 834	J 4510	J 1270	J 554	J 77	L 23	J 50200
13		MAGNESIUM	2320	[866]	1780	2270	3120	1910	1660
14		MANGANESE	61	105	155	96	249	J 86	49
15		MERCURY	0.2	1.0	1.0	1.0	0.8	0.22	1.7
16		NICKEL	15	B 9.3	16	20	23	13	B [5.8]
17		POTASSIUM	ND	ND	B [292]	B [471]	B [212]	B [1100]	ND
19		SILVER	B 5.5	B 7.1	L 10	L 9.6	L 16	B 5.5	B [2.3]
20		SODIUM	B [852]	B [607]	B [552]	B 679	B 796	B [473]	B [562]
23		VANADIUM	38	26	35	39	37	24	B [9.1]
24		ZINC	B 53	B 37	B 56	65	88	B 48	B 26

AR301887

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO11-13	CR-SO12-00	CR-SO12-03	CR-SO12-06	CR-SO12-09	CR-SO12-13	CR-SO13-00
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	
% SOLIDS:							
DESCRIPTION:							
UNITS:							MG/KG
DATE SAMPLED:	09/20/88	09/19/88	09/19/88	09/19/88	09/19/88	09/19/88	09/16/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	NA	NA	NA	NA	NA	NA	ND
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	8300
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	ND
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	3190
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	3190
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	9.6

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO13-03	CR-SO13-06	CR-SO13-06D	CR-SO13-09	CR-SO13-13	CR-SO13-20	CR-SO13-25
TRAFFIC REPORT NUMBER:	MCM633	MCM 634	MCM635	MCM704	NA	NA	MCM705
% SOLIDS:	84	84	85	86			88
DESCRIPTION:			DUPLICATE				
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG			MG/KG
DATE SAMPLED:	09/16/88	09/16/88	09/16/88	09/16/88	09/16/88	09/16/88	09/16/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	15300	12900	13600	B 10300	NA	NA	B 7830
2 ANTIMONY	67	50	L 61	100	NA	NA	74
3 ARSENIC	K 7.8	K 19	K 7.6	J 14	NA	NA	5.5
4 BARIUM	96	102	88	113	NA	NA	102
5 BERYLLIUM	[1.0]	[1.2]	1.3	J 1.5	NA	NA	J [0.94]
6 CADMIUM	7.3	5.1	6.3	5.5	NA	NA	3.7
7 CALCIUM	3780	1650	[1110]	B [778]	NA	NA	B [936]
8 CHROMIUM	B 20	B 18	B 18	B 16	NA	NA	B 13
9 COBALT	35	35	[11]	[9.7]	NA	NA	[10]
10 COPPER	B 19	B 20	B 18	B 20	NA	NA	B 26
11 IRON	J 29500	J 25500	J 30000	J 25000	NA	NA	J 17600
12 LEAD	J 16400	J 5420	J 875	L 77	NA	NA	L 56
13 MAGNESIUM	1810	2410	2650	2860	NA	NA	2250
14 MANGANESE	102	78	73	J 113	NA	NA	J 168
15 MERCURY	0.5	1.6	1.1	0.12	NA	NA	0.57
16 NICKEL	16	17	19	18	NA	NA	16
17 POTASSIUM	B [357]	B [310]	B [235]	B [860]	NA	NA	1320
19 SILVER	B 7.8	B 5.5	B 6.6	B 8.9	NA	NA	L 11
20 SODIUM	B [458]	B [501]	B [500]	B [656]	NA	NA	B [535]
23 VANADIUM	34	29	34	31	NA	NA	23
24 ZINC	B 58	B 61	B 64	65	NA	NA	64

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO13-03	CR-SO13-06	CR-SO13-06D	CR-SO13-09	CR-SO13-13	CR-SO13-20	CR-SO13-25
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:			DUPLICATE				
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/16/88	09/16/88	09/16/88	09/16/88	09/16/88	09/16/88	09/16/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	4.7	3.9	4.3	4.8	5.0	4.9	4.5
SO4 (MG/KG)	7700	1700	2100	180	52	150	200
ACIDITY (MG/KG)	100	125	130	50	55	ND	60
TOTAL ALKALINITY (MG/KG)	30	15	15	25	20	20	20
BICARBONATE ALK (MG/KG)	30	15	15	25	20	20	20
CARBONATE ALK (MG/KG)	ND	ND	ND	ND	ND	ND	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	23.3	23.5	31.7	27.0	20.8	13.8	17.7

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO13-30	CR-SO13-35	CR-SO13-40	CR-SO14-00	CR-SO14-03	CR-SO14-06	CR-SO14-09
TRAFFIC REPORT NUMBER:	NA	MCM706	NA	MCM646	MCM647	MCM648	MCM649
% SOLIDS:		90		82	86	83	86
DESCRIPTION:							
UNITS:		MG/KG		MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/16/88	09/16/88	09/16/88	09/19/88	09/19/88	09/19/88	09/19/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	NA	B 5840	NA	B 5340	11200	16200	16300
2 ANTIMONY	NA	77	NA	L 111	ND	L 67	L 37
3 ARSENIC	NA	2.6	NA	K 47	K 30	K 3.3	K 7.7
4 BARIUM	NA	78	NA	98	94	70	81
5 BERYLLIUM	NA	J [0.96]	NA	ND	[0.8]	[1.2]	[0.9]
6 CADMIUM	NA	3.7	NA	19	8.3	9.5	4.5
7 CALCIUM	NA	[993]	NA	104000	13700	B [682]	B [609]
8 CHROMIUM	NA	B 11	NA	B 11	B 12	B 23	B 19
9 COBALT	NA	[5.5]	NA	ND	[11]	[4.1]	[4.1]
10 COPPER	NA	B [5.2]	NA	B 80	B 25	B 21	B 21
11 IRON	NA	J 17500	NA	J 6330	J 16300	J 44100	J 22100
12 LEAD	NA	L 20	NA	J 122000	J 14600	J 654	J 312
13 MAGNESIUM	NA	1720	NA	[732]	1400	1320	1410
14 MANGANESE	NA	J 91	NA	106	283	115	104
15 MERCURY	NA	0.11	NA	1.0	1.2	0.8	1.3
16 NICKEL	NA	13	NA	16	15	17	12
17 POTASSIUM	NA	1180	NA	ND	B [558]	ND	ND
19 SILVER	NA	B 6.9	NA	B 4.0	B 14	B 9.1	B 6.7
20 SODIUM	NA	B [395]	NA	B [754]	B [588]	B [674]	B [580]
23 VANADIUM	NA	19	NA	B [23]	22	49	31
24 ZINC	NA	B 46	NA	B 53	B 114	B 51	B 47

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO13-30	CR-SO13-35	CR-SO13-40	CR-SO14-00	CR-SO14-03	CR-SO14-06	CR-SO14-09
TRAFFIC REPORT NUMBER:				NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG				
DATE SAMPLED:	09/16/88	09/16/88	09/16/88	09/19/88	09/19/88	09/19/88	09/19/88
*** GEOCHEMICAL PARAMETERS ***							
PH	5.1	5.1	5.0	NA	NA	NA	NA
SO4 (MG/KG)	8	8	10	NA	NA	NA	NA
ACIDITY (MG/KG)	ND	ND	60	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	20	25	20	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	20	25	20	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	ND	ND	ND	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	15.4	13.0	1.2	NA	NA	NA	NA

PP CAS NO COMPOUND

AR301892

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-SO14-13	CR-SO15-00	CR-SO15-03	CR-SO15-06	CR-SO15-09	CR-SO16-00	CR-SO16-03
TRAFFIC REPORT NUMBER:		MCM650	MCM656	MCM657	MCM658	MCM717	MCM659	MCM660
% SOLIDS:		88	94	84	88	86	93	92
DESCRIPTION:								
UNITS:		MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:		09/19/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	14000	B 8460	15600	16100	B 8170	B 7780	11400
2		ANTIMONY	B 28	L 46	L 44	L 31	L 69	L 898	B [13]
3		ARSENIC	K 2.9	K 17	K 10	K 8.5	6.6	K 60	K 12
4		BARIUM	135	L 163	L 66	L 98	58	L 166	L 129
5		BERYLLIUM	[1.1]	L 1.3	L [0.8]	L 0.9	J [0.58]	L [0.7]	L 1.4
6		CADMIUM	3.4	L 6.2	L 5.6	L 4.9	3.1	L 31	L 5.2
7		CALCIUM	11700	12000	B [914]	3850	B [640]	14200	1780
8		CHROMIUM	B 19	B 13	B 21	B 21	B 16	B 16	B 16
9		COBALT	[4.0]	L [6.9]	L [4.0]	L [5.1]	[3.2]	L [8.2]	L [8.8]
10		COPPER	B 21	B 26	B 19	B 21	B 19	B 109	B 20
11		IRON	J 17300	J 15200	J 27200	J 22700	J 16600	J 23200	J 18800
12		LEAD	J 1110	J 29400	J 921	J 7510	L 137	J 75100	J 10400
13		MAGNESIUM	1470	4120	1510	2550	1800	2450	1190
14		MANGANESE	72	K 306	K 108	K 188	J 43	K 478	K 562
15		MERCURY	1.5	0.7	[0.1]	0.7	0.47	0.9	1.5
16		NICKEL	B 11	L 16	L 13	L 13	B [7.8]	L 34	B 8.9
17		POTASSIUM	ND	7550	ND	1200	B [1070]	1910	ND
19		SILVER	B 6.5	L 16	B 7.9	L 12	B 4.2	L 23	L 29
20		SODIUM	B [833]	B [642]	B [588]	B [615]	B [552]	B [707]	B [555]
23		VANADIUM	29	L 28	L 36	L 39	30	L 37	L 30
24		ZINC	B 47	L 64	B 44	B 52	B 35	L 138	B 44

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO14-13	CR-SO15-00	CR-SO15-03	CR-SO15-06	CR-SO15-09	CR-SO16-00	CR-SO16-03
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/19/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88	09/20/88
*** GEOCHEMICAL PARAMETERS ***							
PH	NA	NA	NA	NA	NA	NA	NA
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

PP CAS NO COMPOUND

AR301894

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO16-06	CR-SO16-09	CR-SO16-13	CR-SO17-00	CR-SO17-03	CR-SO17-06	CR-SO17-09
TRAFFIC REPORT NUMBER:	MCM661	MCM662	MCM718	MCM625	MCM698	NA	NA
% SOLIDS:	87	89	90	89	89		
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG		
DATE SAMPLED:	09/20/88	09/20/88	09/20/88	09/14/88	09/14/88	09/14/88	09/14/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	B 10400	12800	B 9250	11200	B 7160	NA	NA
2 ANTIMONY	L 2290	L 32	L 44	B [11]	92	NA	NA
3 ARSENIC	K 10	K 9.5	3.5	K 13	24	NA	NA
4 BARIUM	L 116	L 73	95	153	175	NA	NA
5 BERYLLIUM	L [0.9]	L [0.8]	J [0.88]	1.2	J 1.9	NA	NA
6 CADMIUM	L 7.0	L 4.7	ND	5.9	5.4	NA	NA
7 CALCIUM	4380	B [437]	B [765]	2010	B [591]	NA	NA
8 CHROMIUM	B 15	B 16	B 16	B 21	B 9.8	NA	NA
9 COBALT	L [8.0]	L [3.2]	[8.1]	[8.1]	17	NA	NA
10 COPPER	B 24	B 15	B 22	B 57	B 5.8	NA	NA
11 IRON	J 17000	J 21400	J 9500	J 23400	J 25100	NA	NA
12 LEAD	J 79400	J 622	L 18	J 17400	L 43	NA	NA
13 MAGNESIUM	1640	1490	2210	2650	[772]	NA	NA
14 MANGANESE	K 523	K 114	J 56	459	J 1760	NA	NA
15 MERCURY	0.3	0.7	1.2	1.0	0.11	NA	NA
16 NICKEL	B [10]	B 9.8	13	12	ND	NA	NA
17 POTASSIUM	B [345]	ND	B [1070]	2000	B [562]	NA	NA
19 SILVER	L 25	B 3.9	B 4.1	L 23	L 87	NA	NA
20 SODIUM	B [736]	B [553]	B [1010]	B [534]	B [418]	NA	NA
23 VANADIUM	L 32	L 33	24	35	41	NA	NA
24 ZINC	L 96	B 38	67	76	B 27	NA	NA

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO16-06	CR-SO16-09	CR-SO16-13	CR-SO17-00	CR-SO17-03	CR-SO17-06	CR-SO17-09
TRAFFIC REPORT NUMBER:	NA	NA	NA				
% SOLIDS:							
DESCRIPTION:							
UNITS:				MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/20/88	09/20/88	09/20/88	09/14/88	09/14/88	09/14/88	09/14/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	NA	NA	NA	5.4	4.6	4.4	4.8
SO4 (MG/KG)	NA	NA	NA	2400	ND	ND	ND
ACIDITY (MG/KG)	NA	NA	NA	140	90	110	100
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	110	25	60	25
BICARBONATE ALK (MG/KG)	NA	NA	NA	110	25	60	25
CARBONATE ALK (MG/KG)	NA	NA	NA	ND	ND	ND	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	13.5	14.9	22.6	23.3

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-SO17-09D	CR-SO17-13	CR-SO17-20	CR-SO17-25	CR-SO17-30	CR-SO17-35	CR-SO17-40
TRAFFIC REPORT NUMBER:		NA	MCM699	NA	MCM626	MCM700	NA	NA
% SOLIDS:			89		86	89		
DESCRIPTION:								
UNITS:			MG/KG		MG/KG	MG/KG		
DATE SAMPLED:		09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	NA	B 7010	NA	13100	B 7570	NA	NA
2		ANTIMONY	NA	B 22	NA	32	66	NA	NA
3		ARSENIC	NA	16	NA	K 18	15	NA	NA
4		BARIUM	NA	77	NA	164	90	NA	NA
5		BERYLLIUM	NA	J [0.90]	NA	2.2	J [1.0]	NA	NA
6		CADMIUM	NA	ND	NA	3.3	3.0	NA	NA
7		CALCIUM	NA	B [629]	NA	1210	[1100]	NA	NA
8		CHROMIUM	NA	B 12	NA	B 21	B 12	NA	NA
9		COBALT	NA	[4.3]	NA	21	[5.6]	NA	NA
10		COPPER	NA	B 19	NA	B 31	B 15	NA	NA
11		IRON	NA	J 4550	NA	J 18200	J 17000	NA	NA
12		LEAD	NA	L 15	NA	J 157	L 23	NA	NA
13		MAGNESIUM	NA	1330	NA	3650	2250	NA	NA
14		MANGANESE	NA	J 25	NA	155	J 104	NA	NA
15		MERCURY	NA	1.2	NA	8.0	0.90	NA	NA
16		NICKEL	NA	B [8.7]	NA	47	12	NA	NA
17		POTASSIUM	NA	B [831]	NA	2120	1190	NA	NA
19		SILVER	NA	B 2.4	NA	L 9.6	B 7.5	NA	NA
20		SODIUM	NA	B [844]	NA	B 509	B [499]	NA	NA
23		VANADIUM	NA	B 14	NA	37	28	NA	NA
24		ZINC	NA	B 43	NA	133	B 48	NA	NA

AR301897

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO17-09D	CR-SO17-13	CR-SO17-20	CR-SO17-25	CR-SO17-30	CR-SO17-35	CR-SO17-40
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:	DUPLICATE						
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88
*** GEOCHEMICAL PARAMETERS ***							
PH	4.6	5.3	5.6	ND	5.0	5.8	5.3
SO4 (MG/KG)	ND	5	7	ND	ND	ND	ND
ACIDITY (MG/KG)	100	110	100	110	100	50	50
TOTAL ALKALINITY (MG/KG)	25	30	30	30	35	10	10
BICARBONATE ALK (MG/KG)	25	30	30	30	35	10	10
CARBONATE ALK (MG/KG)	ND	ND	ND	ND	ND	ND	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	20.3	16.7	7.8	9.0	16.8	9.2	3.1

PP CAS NO COMPOUND

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO18-00	CR-SO18-03	CR-SO18-06	CR-SO18-09	CR-SO19-00	CR-SO19-00D	CR-SO19-03
TRAFFIC REPORT NUMBER:	MCM687	MCM688	MCM689	MCM728	MCM640	MCM641	MCM714
% SOLIDS:	95	92	85	87	95	89	84
DESCRIPTION:						DUPLICATE	
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/26/88	09/26/88	09/26/88	09/26/88	09/18/88	09/18/88	09/18/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	B 8260	B 9000	19100	14700	11900	12500	B 8200
2 ANTIMONY	B 18	B 21	B 22	L 44	L 38	L 39	L 78
3 ARSENIC	K 20	K 10	K 16	J 11	K 20	K 22	7.5
4 BARIUM	125	133	121	99	90	75	54
5 BERYLLIUM	[0.6]	[0.7]	[1.0]	J [0.86]	[0.6]	[0.6]	J [0.79]
6 CADMIUM	L 4.2	L 5.0	L 5.6	3.1	3.3	4.3	2.7
7 CALCIUM	29600	32000	B [1050]	B [551]	B [771]	B [686]	B [538]
8 CHROMIUM	B 10	B 11	B 20	B 18	B 19	B 16	B 11
9 COBALT	[4.2]	[4.7]	[4.5]	[2.9]	[5.9]	9.3	[2.7]
10 COPPER	B 20	B 22	B 13	B 16	B 36	B 25	B 7.6
11 IRON	J 16700	J 17900	J 29300	J 22000	J 18000	J 20000	J 18500
12 LEAD	J 23200	J 23600	J 1130	L 42	J 8940	J 6270	L 83
13 MAGNESIUM	3690	4030	1680	1880	1150	1360	[975]
14 MANGANESE	204	219	404	J 67	224	384	J 152
15 MERCURY	1.4	1.4	1.8	ND	1.2	1.2	ND
16 NICKEL	28	31	14	13	13	12	B [7.1]
17 POTASSIUM	8530	B [696]	B [353]	B [690]	ND	B [404]	B [810]
19 SILVER	L 13	L 13	L 23	B 5.8	L 12	L 20	L 11
20 SODIUM	B [521]	B [567]	B [489]	B [614]	B [572]	B [572]	B [389]
23 VANADIUM	B 13	B 15	26	18	26	35	22
24 ZINC	71	79	B 62	B 50	60	B 57	B 25

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO18-00	CR-SO18-03	CR-SO18-06	CR-SO18-09	CR-SO19-00	CR-SO19-00D	CR-SO19-03
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/26/88	09/26/88	09/26/88	09/26/88	09/18/88	09/18/88	09/18/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	NA	NA	NA	NA	NA	NA	NA
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO20-00	CR-SO20-03	CR-SO20-06	CR-SO20-09	CR-SO20-13	CR-SO21-00	CR-SO21-03
TRAFFIC REPORT NUMBER:	MCM637	MCM712	MCM638	MCM639	MCM713	MCM711	MCM636
% SOLIDS:	94	84	78	83	84	90	86
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/18/88	09/18/88	09/18/88	09/18/88	09/18/88	09/18/88	09/16/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	B 8220	B 6800	23900	16300	B 10900	12200	B 6610
2 ANTIMONY	B 14	L 69	L 31	L 33	L 93	L 100	B [11]
3 ARSENIC	K 13	4.1	K 30	K 21	8.2	11	K 12
4 BARIUM	70	125	190	92	96	81	76
5 BERYLLIUM	[0.5]	J 1.2	[1.1]	[1.0]	J [1.1]	J [0.99]	ND
6 CADMIUM	2.6	2.5	5.5	5.2	4.0	4.9	2.4
7 CALCIUM	[1000]	B [592]	B [606]	B [486]	B [550]	[1090]	B [405]
8 CHROMIUM	B 10	B 11	B 19	B 19	B 14	B 16	B 8.3
9 COBALT	[5.1]	[4.0]	[7.0]	[3.7]	[4.7]	[7.8]	ND
10 COPPER	B 13	B 9.9	B 25	B 25	B 11	B 9.9	B 16
11 IRON	J 13400	J 15200	J 31200	J 32100	J 21200	J 24400	J 11900
12 LEAD	J 825	L 566	J 212	J 112	L 270	L 294	J 81
13 MAGNESIUM	[981]	[871]	1510	1990	1870	1450	[587]
14 MANGANESE	412	J 206	284	77	J 72	J 302	70
15 MERCURY	0.7	ND	1.5	1.0	ND	ND	1.2
16 NICKEL	B [6.6]	B [6.8]	17	15	13	12	B [3.7]
17 POTASSIUM	B [702]	B [714]	B [282]	ND	B [929]	1130	ND
19 SILVER	L 21	L 13	L 16	B 7.6	B 6.9	L 18	B 4.9
20 SODIUM	B [391]	B [412]	B [569]	B [690]	B [536]	B [436]	B [356]
23 VANADIUM	B 11	22	26	21	27	27	B [11]
24 ZINC	B 45	B 30	B 64	B 49	B 46	B 47	B 30

AR301901

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-SO20-00	CR-SO20-03	CR-SO20-06	CR-SO20-09	CR-SO20-13	CR-SO21-00	CR-SO21-03
TRAFFIC REPORT NUMBER:		NA	NA	NA	NA	NA	NA	NA
% SOLIDS:								
DESCRIPTION:								
UNITS:								
DATE SAMPLED:		09/18/88	09/18/88	09/18/88	09/18/88	09/18/88	09/18/88	09/16/88
*** GEOCHEMICAL PARAMETERS ***								
PP	CAS NO	COMPOUND						
		PH	NA	NA	NA	NA	NA	NA	NA
		SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
		DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
		SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
		PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
		LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
		PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
		SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
		DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
		DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
		CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO22-00	CR-SO22-03	CR-SO22-06	CR-SO22-09	CR-SO22-13	CR-SO22-13D	CR-SO22-20
TRAFFIC REPORT NUMBER:	MCM623	MCM624	MCM696	NA	NA	NA	NA
% SOLIDS:	87	90	86				
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG				
DATE SAMPLED:	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	B 6500	B 9340	B 8150	NA	NA	NA	NA
2 ANTIMONY	B [11]	36	48	NA	NA	NA	NA
3 ARSENIC	K 37	K 14	14	NA	NA	NA	NA
4 BARIUM	286	170	56	NA	NA	NA	NA
5 BERYLLIUM	[0.8]	[1.0]	J [0.69]	NA	NA	NA	NA
6 CADMIUM	1.4	4.1	2.5	NA	NA	NA	NA
7 CALCIUM	B [412]	B [996]	B [416]	NA	NA	NA	NA
8 CHROMIUM	B 7.4	B 14	B 12	NA	NA	NA	NA
9 COBALT	[6.6]	[4.1]	ND	NA	NA	NA	NA
10 COPPER	B 11	B 37	B 19	NA	NA	NA	NA
11 IRON	J 9480	J 20300	J 12300	NA	NA	NA	NA
12 LEAD	J 938	J 3700	L 26	NA	NA	NA	NA
13 MAGNESIUM	[554]	[911]	[922]	NA	NA	NA	NA
14 MANGANESE	1540	121	J 42	NA	NA	NA	NA
15 MERCURY	1.3	1.4	0.12	NA	NA	NA	NA
16 NICKEL	B [2.9]	B 9.9	B [5.6]	NA	NA	NA	NA
17 POTASSIUM	2340	ND	B [744]	NA	NA	NA	NA
19 SILVER	B 7.4	B 6.7	B 3.7	NA	NA	NA	NA
20 SODIUM	B [352]	B [487]	B [452]	NA	NA	NA	NA
23 VANADIUM	27	31	B 17	NA	NA	NA	NA
24 ZINC	B 27	B 40	B 35	NA	NA	NA	NA

AR301903

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO22-00	CR-SO22-03	CR-SO22-06	CR-SO22-09	CR-SO22-13	CR-SO22-13D	CR-SO22-20
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:						DUPLICATE	
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88	09/14/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	6.2	5.2	3.4	3.5	4.4	4.5	3.7
SO4 (MG/KG)	2100	700	2600	3500	1700	1600	2000
ACIDITY (MG/KG)	120	120	2040	940	100	100	490
TOTAL ALKALINITY (MG/KG)	190	30	ND	ND	35	25	ND
BICARBONATE ALK (MG/KG)	190	30	ND	ND	35	25	ND
CARBONATE ALK (MG/KG)	ND	ND	ND	ND	ND	ND	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	12.0	13.0	20.0	37.2	29.2	14.7	11.8

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-SO22-30	CR-SO22-35	CR-SO22-40	CR-SO23-00	CR-SO23-03	CR-SO24-00	CR-SO24-00D
TRAFFIC REPORT NUMBER:		MCM697	NA	NA	MCM709	MCM710	MCM707	MCM708
% SOLIDS:		92			85	78	93	91
DESCRIPTION:								DUPLICATE
UNITS:		MG/KG			MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:		09/14/88	09/14/88	09/14/88	09/17/88	09/17/88	09/17/88	09/17/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	B 1480	NA	NA	B 8690	B 8320	B 4990	B 5020
2		ANTIMONY	B [8.5]	NA	NA	L 43	L 74	42	46
3		ARSENIC	5.9	NA	NA	6.2	8.4	4.8	2.4
4		BARIUM	[16]	NA	NA	104	104	85	82
5		BERYLLIUM	ND	NA	NA	J 1.3	J [1.1]	J 1.1	J 1.1
6		CADMIUM	ND	NA	NA	1.9	3.7	1.8	2.6
7		CALCIUM	B [502]	NA	NA	B [920]	B [758]	B [631]	B [649]
8		CHROMIUM	B 3.4	NA	NA	B 16	B 11	B 7.7	B 8.0
9		COBALT	ND	NA	NA	[5.7]	[8.6]	[7.3]	[5.1]
10		COPPER	B 16	NA	NA	B 23	B 14	B 13	B 10
11		IRON	J 2370	NA	NA	J 9050	J 17700	J 10400	J 10700
12		LEAD	B 5.4	NA	NA	L 37	L 108	L 16	L 16
13		MAGNESIUM	[361]	NA	NA	1890	[1130]	[648]	[662]
14		MANGANESE	J 28	NA	NA	J 49	J 552	J 567	J 336
15		MERCURY	1.1	NA	NA	0.24	1.0	0.16	1.6
16		NICKEL	ND	NA	NA	13	B [7.7]	ND	B [2.5]
17		POTASSIUM	B [413]	NA	NA	B [776]	B [923]	B [667]	B [549]
19		SILVER	B [2.1]	NA	NA	B 3.7	L 30	L 29	L 18
20		SODIUM	B [387]	NA	NA	B [683]	B [502]	B [367]	B [378]
23		VANADIUM	B [8.5]	NA	NA	24	21	B 12	B 13
24		ZINC	B 10	NA	NA	B 63	B 55	B 28	B 26

AR301905

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO22-30	CR-SO22-35	CR-SO22-40	CR-SO23-00	CR-SO23-03	CR-SO24-00	CR-SO24-00D
TRAFFIC REPORT NUMBER:				NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG				
DATE SAMPLED:	09/14/88	09/14/88	09/14/88	09/17/88	09/17/88	09/17/88	09/17/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	6.1	6.0	5.6	NA	NA	NA	NA
SO4 (MG/KG)	7	6	ND	NA	NA	NA	NA
ACIDITY (MG/KG)	80	80	90	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	25	30	25	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	25	30	25	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	ND	ND	ND	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	2.5	6.6	2.0	NA	NA	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-SO25-00	CR-SO25-03	CR-SO25-06	CR-SO25-09	CR-SO25-13	CR-SO25-20	CR-SO25-22
TRAFFIC REPORT NUMBER:		MCM614	MCM615	MCM690	NA	NA	MCM616	NA
% SOLIDS:		89	83	84			87	
DESCRIPTION:								
UNITS:		MG/KG	MG/KG	MG/KG			MG/KG	
DATE SAMPLED:		09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	B 6700	B 7770	B 7600	NA	NA	12100	NA
2		ANTIMONY	B 20	B 23	59	NA	NA	38	NA
3		ARSENIC	K 4.9	K 18	10	NA	NA	ND	NA
4		BARIUM	120	87	56	NA	NA	108	NA
5		BERYLLIUM	[0.7]	[0.8]	J 12	NA	NA	1.1	NA
6		CADMIUM	3.6	3.2	3.7	NA	NA	4.5	NA
7		CALCIUM	B [790]	2340	B [478]	NA	NA	B [923]	NA
8		CHROMIUM	B 11	B 13	B 13	NA	NA	B 20	NA
9		COBALT	[7.2]	[4.8]	[3.6]	NA	NA	14	NA
10		COPPER	B 19	B 22	B 18	NA	NA	B 15	NA
11		IRON	J 12500	17000	J 17100	NA	NA	J 21700	NA
12		LEAD	J 2620	J 4220	L 91	NA	NA	J 70	NA
13		MAGNESIUM	[642]	[881]	[1160]	NA	NA	3180	NA
14		MANGANESE	597	280	J 85	NA	NA	368	NA
15		MERCURY	1.6	7.0	1.10	NA	NA	1.7	NA
16		NICKEL	B [2.7]	B [6.1]	B [7.3]	NA	NA	17	NA
17		POTASSIUM	ND	ND	B [833]	NA	NA	1330	NA
19		SILVER	L 29	L 14	B 7.1	NA	NA	L 20	NA
20		SODIUM	B [371]	B [321]	B [409]	NA	NA	B [635]	NA
23		VANADIUM	19	23	21	NA	NA	34	NA
24		ZINC	B 43	B 46	B 29	NA	NA	72	NA

AR301607

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO25-00	CR-SO25-03	CR-SO25-06	CR-SO25-09	CR-SO25-13	CR-SO25-20	CR-SO25-22
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	3.9	5.0	3.6	4.6	4.9	4.9	NA
SO4 (MG/KG)	390	440	6	49	28	6	NA
ACIDITY (MG/KG)	ND	ND	ND	ND	ND	ND	NA
TOTAL ALKALINITY (MG/KG)	20	40	25	25	25	40	NA
BICARBONATE ALK (MG/KG)	20	40	25	25	25	40	NA
CARBONATE ALK (MG/KG)	ND	ND	ND	ND	ND	ND	NA
WATER CONTENT %	NA	NA	14.6	NA	NA	NA	20.3
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	2.72	NA	NA	NA	2.76
PLASTICITY INDEX	NA	NA	10	NA	NA	NA	17
LIQUID LIMIT	NA	NA	25	NA	NA	NA	33
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	3.06X10-8
SIEVE 3.0 IN.	NA	NA	100.0	NA	NA	NA	100.0
SIEVE 1.5 IN.	NA	NA	100.0	NA	NA	NA	100.0
SIEVE 0.75 IN.	NA	NA	100.0	NA	NA	NA	100.0
SIEVE 0.375 IN.	NA	NA	100.0	NA	NA	NA	96.3
SIEVE NO. 4	NA	NA	100.0	NA	NA	NA	94.2
SIEVE NO. 10	NA	NA	100.0	NA	NA	NA	93.4
SIEVE NO. 20	NA	NA	99.0	NA	NA	NA	91.8
SIEVE NO. 40	NA	NA	95.9	NA	NA	NA	89.9
SIEVE NO. 60	NA	NA	88.3	NA	NA	NA	86.0
SIEVE NO. 140	NA	NA	648	NA	NA	NA	67.0
SIEVE NO. 200	NA	NA	56.3	NA	NA	NA	57.6
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	112.0	NA	NA	NA	103.7
CEC (MEQ/100g)	14.8	18.6	19.7	15.5	11.5	17.6	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO25-25	CR-SO25-30	CR-SO25-33B	CR-SO25-33D	CR-SO25-35	CR-SO25-40	CR-SO26-00
TRAFFIC REPORT NUMBER:	MCM617	MCM618	NA	NA	NA	NA	MCM691
% SOLIDS:	84	87					86
DESCRIPTION:							
UNITS:	MG/KG	MG/KG					MG/KG
DATE SAMPLED:	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/06/88

*** INORGANICS ***

PP	CAS NO	COMPOUND						
1		ALUMINUM	12700	B 7860	NA	NA	NA	NA	B 6360
2		ANTIMONY	58	80	NA	NA	NA	NA	50
3		ARSENIC	K 14	K 6.0	NA	NA	NA	NA	4.6
4		BARIUM	168	121	NA	NA	NA	NA	69
5		BERYLLIUM	1.8	1.3	NA	NA	NA	NA	J 11
6		CADMIUM	L 7.7	11	NA	NA	NA	NA	2.7
7		CALCIUM	B [1010]	B [807]	NA	NA	NA	NA	B [694]
8		CHROMIUM	B 22	B 9.7	NA	NA	NA	NA	B 12
9		COBALT	[8.3]	[7.2]	NA	NA	NA	NA	[9.0]
10		COPPER	B 23	B 7.9	NA	NA	NA	NA	B 17
11		IRON	J 34900	J 49700	NA	NA	NA	NA	J 13900
12		LEAD	J 263	J 96	NA	NA	NA	NA	L 101
13		MAGNESIUM	2850	1550	NA	NA	NA	NA	[958]
14		MANGANESE	166	673	NA	NA	NA	NA	J 606
15		MERCURY	10	4.5	NA	NA	NA	NA	0.81
16		NICKEL	B [2.6]	21	NA	NA	NA	NA	B [3.3]
17		POTASSIUM	1740	B [483]	NA	NA	NA	NA	B [767]
19		SILVER	L 11	B 3.5	NA	NA	NA	NA	L 32
20		SODIUM	B [264]	B [367]	NA	NA	NA	NA	B [415]
23		VANADIUM	30	23	NA	NA	NA	NA	22
24		ZINC	97	B 61	NA	NA	NA	NA	B 32

AR301909

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO25-25	CR-SO25-30	CR-SO25-33B	CR-SO25-33D	CR-SO25-35	CR-SO25-40	CR-SO26-00
TRAFFIC REPORT NUMBER:							NA
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	
DATE SAMPLED:	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/01/88	09/06/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	4.6	4.4	NA	NA	5.4	5.2	NA
SO4 (MG/KG)	26	6	NA	NA	6	6	NA
ACIDITY (MG/KG)	ND	ND	NA	NA	ND	ND	NA
TOTAL ALKALINITY (MG/KG)	40	25	NA	NA	20	25	NA
BICARBONATE ALK (MG/KG)	40	25	NA	NA	20	25	NA
CARBONATE ALK (MG/KG)	ND	ND	NA	NA	10	ND	NA
WATER CONTENT %	NA	NA	10.2	18.9	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	2.74	2.75	NA	NA	NA
PLASTICITY INDEX	NA	NA	16	13	NA	NA	NA
LIQUID LIMIT	NA	NA	31	26	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	6.94X10-5	1.98X10-8	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	100.0	100.0	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	100.0	100.0	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	100.0	100.0	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	100.0	100.0	NA	NA	NA
SIEVE NO. 4	NA	NA	99.3	100.0	NA	NA	NA
SIEVE NO. 10	NA	NA	98.4	100.0	NA	NA	NA
SIEVE NO. 20	NA	NA	94.8	95.7	NA	NA	NA
SIEVE NO. 40	NA	NA	77.5	88.9	NA	NA	NA
SIEVE NO. 60	NA	NA	49.4	86.4	NA	NA	NA
SIEVE NO. 140	NA	NA	28.6	76.8	NA	NA	NA
SIEVE NO. 200	NA	NA	24.3	71.3	NA	NA	NA
DEPTH FT.	NA	NA	1.0-1.5	0.6-1.0	NA	NA	NA
DRY DENSITY PCF	NA	NA	99.0	109.0	NA	NA	NA
CEC (MEQ/100g)	17.3	16.8	NA	NA	9.5	14.5	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO26-03	CR-SO26-06	CR-SO26-09	CR-SO26-13	CR-SO26-14	CR-SO26-16	CR-SO26-20
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	NA	NA	NA	NA	NA	NA	NA
2 ANTIMONY	NA	NA	NA	NA	NA	NA	NA
3 ARSENIC	NA	NA	NA	NA	NA	NA	NA
4 BARIUM	NA	NA	NA	NA	NA	NA	NA
5 BERYLLIUM	NA	NA	NA	NA	NA	NA	NA
6 CADMIUM	NA	NA	NA	NA	NA	NA	NA
7 CALCIUM	NA	NA	NA	NA	NA	NA	NA
8 CHROMIUM	NA	NA	NA	NA	NA	NA	NA
9 COBALT	NA	NA	NA	NA	NA	NA	NA
10 COPPER	NA	NA	NA	NA	NA	NA	NA
11 IRON	NA	NA	NA	NA	NA	NA	NA
12 LEAD	NA	NA	NA	NA	NA	NA	NA
13 MAGNESIUM	NA	NA	NA	NA	NA	NA	NA
14 MANGANESE	NA	NA	NA	NA	NA	NA	NA
15 MERCURY	NA	NA	NA	NA	NA	NA	NA
16 NICKEL	NA	NA	NA	NA	NA	NA	NA
17 POTASSIUM	NA	NA	NA	NA	NA	NA	NA
19 SILVER	NA	NA	NA	NA	NA	NA	NA
20 SODIUM	NA	NA	NA	NA	NA	NA	NA
23 VANADIUM	NA	NA	NA	NA	NA	NA	NA
24 ZINC	NA	NA	NA	NA	NA	NA	NA

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO26-03	CR-SO26-06	CR-SO26-09	CR-SO26-13	CR-SO26-14	CR-SO26-16	CR-SO26-20
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	3.9	4.0	4.5	NA	4.6	NA	5.7
SO4 (MG/KG)	27	ND	7	NA	ND	NA	ND
ACIDITY (MG/KG)	90	80	120	NA	90	NA	80
TOTAL ALKALINITY (MG/KG)	260	35	30	NA	100	NA	60
BICARBONATE ALK (MG/KG)	260	35	30	NA	100	NA	60
CARBONATE ALK (MG/KG)	ND	ND	ND	NA	ND	NA	ND
WATER CONTENT %	NA	NA	NA	17.1	NA	14.6	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	95.1	NA	112.3	NA
SPECIFIC GRAVITY	NA	NA	NA	2.72	NA	2.74	NA
PLASTICITY INDEX	NA	NA	NA	15	NA	7	NA
LIQUID LIMIT	NA	NA	NA	30	NA	26	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	1.91X10-7	NA	3.83X10-7	NA
SIEVE 3.0 IN.	NA	NA	NA	100.0	NA	100.0	NA
SIEVE 1.5 IN.	NA	NA	NA	100.0	NA	100.0	NA
SIEVE 0.75 IN.	NA	NA	NA	100.0	NA	92.0	NA
SIEVE 0.375 IN.	NA	NA	NA	100.0	NA	78.3	NA
SIEVE NO. 4	NA	NA	NA	99.2	NA	68.0	NA
SIEVE NO. 10	NA	NA	NA	98.6	NA	59.8	NA
SIEVE NO. 20	NA	NA	NA	97.7	NA	50.7	NA
SIEVE NO. 40	NA	NA	NA	95.5	NA	43.9	NA
SIEVE NO. 60	NA	NA	NA	90.4	NA	40.8	NA
SIEVE NO. 140	NA	NA	NA	74.0	NA	28.7	NA
SIEVE NO. 200	NA	NA	NA	67.4	NA	24.0	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	17.3	14.7	16.2	NA	13.1	NA	11.0

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO26-25	CR-SO26-27	CR-SO26-30	CR-SO26-35	CR-SO26-40	CR-SO27-02	CR-SO27-30
TRAFFIC REPORT NUMBER:	MCM619	NA	MCM692	NA	NA	NA	NA
% SOLIDS:	80		83				
DESCRIPTION:							
UNITS:	MG/KG		MG/KG				
DATE SAMPLED:	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88	09/10/88	09/10/88

*** INORGANICS ***

PP	CAS NO	COMPOUND						
1		ALUMINUM	B 9250	NA	B 10800	NA	NA	NA	NA
2		ANTIMONY	50	NA	105	NA	NA	NA	NA
3		ARSENIC	K 1.7	NA	J 41	NA	NA	NA	NA
4		BARIUM	174	NA	232	NA	NA	NA	NA
5		BERYLLIUM	1.7	NA	J 11	NA	NA	NA	NA
6		CADMIUM	5.8	NA	6.2	NA	NA	NA	NA
7		CALCIUM	1380	NA	1350	NA	NA	NA	NA
8		CHROMIUM	B 16	NA	B 20	NA	NA	NA	NA
9		COBALT	[10]	NA	18	NA	NA	NA	NA
10		COPPER	B 32	NA	B 28	NA	NA	NA	NA
11		IRON	J 28700	NA	J 30600	NA	NA	NA	NA
12		LEAD	J 39	NA	L 41	NA	NA	NA	NA
13		MAGNESIUM	2240	NA	3330	NA	NA	NA	NA
14		MANGANESE	148	NA	J 145	NA	NA	NA	NA
15		MERCURY	1.5	NA	0.60	NA	NA	NA	NA
16		NICKEL	23	NA	34	NA	NA	NA	NA
17		POTASSIUM	B [950]	NA	2960	NA	NA	NA	NA
19		SILVER	B 10	NA	L 11	NA	NA	NA	NA
20		SODIUM	B [360]	NA	B [515]	NA	NA	NA	NA
23		VANADIUM	23	NA	23	NA	NA	NA	NA
24		ZINC	B 10	NA	136	NA	NA	NA	NA

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C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO26-25	CR-SO26-27	CR-SO26-30	CR-SO26-35	CR-SO26-40	CR-SO27-02	CR-SO27-30
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/06/88	09/06/88	09/06/88	09/06/88	09/06/88	09/10/88	09/10/88
*** GEOCHEMICAL PARAMETERS ***							
PH	ND	NA	4.2	4.2	5.4	NA	NA
SO4 (MG/KG)	6	NA	6	6	6	NA	NA
ACIDITY (MG/KG)	70	NA	80	100	100	NA	NA
TOTAL ALKALINITY (MG/KG)	30	NA	40	40	50	NA	NA
BICARBONATE ALK (MG/KG)	30	NA	40	40	50	NA	NA
CARBONATE ALK (MG/KG)	ND	NA	ND	ND	ND	NA	NA
WATER CONTENT %	NA	27.2	NA	NA	NA	24.4	15.0
DRY UNIT WEIGHT PCF	NA	96.1	NA	NA	NA	102.7	112.4
SPECIFIC GRAVITY	NA	2.81	NA	NA	NA	2.69	2.74
PLASTICITY INDEX	NA	31	NA	NA	NA	23	NP
LIQUID LIMIT	NA	53	NA	NA	NA	43	NP
PERMEABILITY TEST CM/SEC	NA	1.26X10-7	NA	NA	NA	9.17X10-8	7.24X10-7
SIEVE 3.0 IN.	NA	100.0	NA	NA	NA	100.0	100.0
SIEVE 1.5 IN.	NA	100.0	NA	NA	NA	100.0	100.0
SIEVE 0.75 IN.	NA	100.0	NA	NA	NA	100.0	100.0
SIEVE 0.375 IN.	NA	100.0	NA	NA	NA	100.0	98.8
SIEVE NO. 4	NA	100.0	NA	NA	NA	100.0	97.6
SIEVE NO. 10	NA	99.8	NA	NA	NA	99.9	96.4
SIEVE NO. 20	NA	99.5	NA	NA	NA	99.7	93.2
SIEVE NO. 40	NA	99.4	NA	NA	NA	98.7	86.8
SIEVE NO. 60	NA	99.2	NA	NA	NA	96.0	70.2
SIEVE NO. 140	NA	97.1	NA	NA	NA	79.6	45.5
SIEVE NO. 200	NA	94.7	NA	NA	NA	75.3	37.5
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	26.5	NA	18.1	19.6	10.0	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:		CR-SO28-00	CR-SO28-03	CR-SO28-06	CR-SO28-09	CR-SO28-13	CR-SO28-20	CR-SO28-26
TRAFFIC REPORT NUMBER:		MCM620	MCM621	MCM695	NA	NA	NA	MCM622
% SOLIDS:		86	83	86				86
DESCRIPTION:								
UNITS:		MG/KG	MG/KG	MG/KG				MG/KG
DATE SAMPLED:		09/12/88	09/12/88	09/12/88	09/12/88	09/12/88	09/12/88	09/12/88
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	B 6800	B 7690	B 8850	NA	NA	NA	15500
2		ANTIMONY	B [11]	210	39	NA	NA	NA	34
3		ARSENIC	K 12	K 17	6.0	NA	NA	NA	K 14
4		BARIUM	158	101	84	NA	NA	NA	158
5		BERYLLIUM	ND	[0.5]	J [0.69]	NA	NA	NA	2.1
6		CADMIUM	3.1	4.8	1.7	NA	NA	NA	3.7
7		CALCIUM	B [684]	10100	B [451]	NA	NA	NA	1220
8		CHROMIUM	B 10	B 13	B 11	NA	NA	NA	B 25
9		COBALT	ND	[8.6]	ND	NA	NA	NA	[7.7]
10		COPPER	B 20	B 80	B 14	NA	NA	NA	B 36
11		IRON	J 12900	J 18200	J 9360	NA	NA	NA	J 20200
12		LEAD	J 2090	J 41400	L 28	NA	NA	NA	J 88
13		MAGNESIUM	[462]	1590	[836]	NA	NA	NA	2940
14		MANGANESE	60	850	J 28	NA	NA	NA	96
15		MERCURY	2.0	1.2	0.29	NA	NA	NA	1.7
16		NICKEL	B [4.8]	B [9.6]	B [4.9]	NA	NA	NA	30
17		POTASSIUM	ND	ND	B [465]	NA	NA	NA	1770
19		SILVER	B 4.3	L 42	B 5.2	NA	NA	NA	B 6.4
20		SODIUM	B [284]	B [341]	B [478]	NA	NA	NA	B [610]
23		VANADIUM	20	23	B 17	NA	NA	NA	40
24		ZINC	B 29	83	B 27	NA	NA	NA	112

AR301915

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO28-00	CR-SO28-03	CR-SO28-06	CR-SO28-09	CR-SO28-13	CR-SO28-20	CR-SO28-26
TRAFFIC REPORT NUMBER:							
% SOLIDS:							
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/12/88	09/12/88	09/12/88	09/12/88	09/12/88	09/12/88	09/12/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	2.8	4.3	4.4	4.7	5.6	5.2	4.8
SO4 (MG/KG)	690	260	ND	5	6	7	ND
ACIDITY (MG/KG)	130	130	90	90	90	80	80
TOTAL ALKALINITY (MG/KG)	ND	20	20	20	25	25	25
BICARBONATE ALK (MG/KG)	ND	20	20	20	25	25	25
CARBONATE ALK (MG/KG)	ND	ND	ND	ND	ND	ND	ND
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	18.7	17.2	12.4	12.6	10.9	8.7	3.5

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO28-30	CR-SO28-35	CR-SO28-40	CR-SO29-00	CR-SO30-00	CR-SO31-00	CR-SO31-03
TRAFFIC REPORT NUMBER:	NA	NA	NA	MDM693	MCM694	MCM319	MCM323
% SOLIDS:				92	94	90.4	81.6
DESCRIPTION:				BACKGROUND	BACKGROUND		
UNITS:				MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/12/88	09/12/88	09/12/88	09/09/88	09/09/88	03/22/89	03/22/89

*** INORGANICS ***

PP	CAS NO	COMPOUND						
1		ALUMINUM	NA	NA	NA	B 6530	B 3220	8090	14500
2		ANTIMONY	NA	NA	NA	38	B 25	ND	ND
3		ARSENIC	NA	NA	NA	4.5	3.1	L 17.0	K 18.9
4		BARIUM	NA	NA	NA	77	[25]	111	76.1
5		BERYLLIUM	NA	NA	NA	J [0.75]	ND	ND	ND
6		CADMIUM	NA	NA	NA	2.2	ND	B 5.8	B 5.7
7		CALCIUM	NA	NA	NA	B [563]	B [439]	3220	[527]
8		CHROMIUM	NA	NA	NA	B 11	B 14	10.1	20.6
9		COBALT	NA	NA	NA	[7.9]	[4.7]	[6.4]	[9.3]
10		COPPER	NA	NA	NA	B 20	B 12	B 11.1	B 14.0
11		IRON	NA	NA	NA	J 10700	J 6550	14500	23800
12		LEAD	NA	NA	NA	L 75	L 54	7680	156
13		MAGNESIUM	NA	NA	NA	[715]	[391]	2280	1230
14		MANGANESE	NA	NA	NA	J 1160	J 451	232	338
15		MERCURY	NA	NA	NA	0.33	0.32	ND	ND
16		NICKEL	NA	NA	NA	ND	ND	ND	ND
17		POTASSIUM	NA	NA	NA	B [652]	B [489]	1330	B [808]
19		SILVER	NA	NA	NA	L 57	L 23	L 2.3	ND
20		SODIUM	NA	NA	NA	B [411]	B [306]	[216]	[258]
23		VANADIUM	NA	NA	NA	20	20	19.5	28.3
24		ZINC	NA	NA	NA	B 25	B 16	B 37.2	47.9

AR301917

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
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ND = NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO28-30	CR-SO28-35	CR-SO28-40	CR-SO29-00	CR-SO30-00	CR-SO31-00	CR-SO31-03
TRAFFIC REPORT NUMBER:						NA	NA
% SOLIDS:							
DESCRIPTION:				BACKGROUND	BACKGROUND		
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG		
DATE SAMPLED:	09/12/88	09/12/88	09/12/88	09/09/88	09/09/88	03/22/89	03/22/89
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	4.7	5.0	5.1	4.3	3.9	NA	NA
SO4 (MG/KG)	13	8	ND	12	13	NA	NA
ACIDITY (MG/KG)	80	80	80	130	120	NA	NA
TOTAL ALKALINITY (MG/KG)	30	30	25	30	25	NA	NA
BICARBONATE ALK (MG/KG)	30	30	25	30	25	NA	NA
CARBONATE ALK (MG/KG)	ND	ND	ND	ND	ND	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	9.0	20.6	17.6	36.1	17.4	NA	NA

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO32-00	CR-SO32-03	CR-SO33-00	CR-SO33-00D	CR-SO36-00
TRAFFIC REPORT NUMBER:	MCM318	MCM324	MCM321	MCM322	MCM320
% SOLIDS:	96.5	80.8	83.8	83.5	82.8
DESCRIPTION:				DUPLICATE	
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	03/22/89	03/22/89	03/22/89	03/22/89	03/22/89
*** INORGANICS ***					
PP CAS NO COMPOUND					
1 ALUMINUM	9210	17900	15700	21400	16900
2 ANTIMONY	71.3	ND	ND	ND	ND
3 ARSENIC	L 9.7	K 13.7	J 10.5	K 12.5	K 9.4
4 BARIUM	112	75.1	70.0	85.1	77.5
5 BERYLLIUM	ND	ND	ND	ND	ND
6 CADMIUM	B 6.9	B 7.8	B 6.8	B 8.5	B 7.9
7 CALCIUM	2780	[416]	[717]	[1200]	[864]
8 CHROMIUM	12.5	31.5	18.3	24.6	16.9
9 COBALT	[7.2]	[11.5]	[6.2]	[9.0]	[7.2]
10 COPPER	B 19.5	B 29.5	B 18.1	B 26.5	B 16.6
11 IRON	15900	30100	25500	32900	26600
12 LEAD	24600	33.8	215	368	43.6
13 MAGNESIUM	1900	1750	1510	2120	1680
14 MANGANESE	219	119	214	267	235
15 MERCURY	0.21	ND	ND	ND	ND
16 NICKEL	ND	[8.5]	ND	ND	ND
17 POTASSIUM	1660	B [817]	B [740]	[1100]	B [894]
19 SILVER	ND	ND	ND	ND	ND
20 SODIUM	[251]	[224]	[263]	[324]	[228]
23 VANADIUM	20.6	40.3	26.9	36.1	26.0
24 ZINC	67.0	56.6	52.0	64.4	54.4

AR301916

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY - SOIL SAMPLES

SAMPLE NUMBER:	CR-SO32-00	CR-SO32-03	CR-SO33-00	CR-SO33-00D	CR-SO36-00
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA
% SOLIDS:					
DESCRIPTION:					
UNITS:					
DATE SAMPLED:	03/22/89	03/22/89	03/22/89	03/22/89	03/22/89
*** GEOCHEMICAL PARAMETERS ***					
PP CAS NO COMPOUND					
PH	NA	NA	NA	NA	NA
SO4 (MG/KG)	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA

TABLE F-4

SOIL SAMPLES - EP TOXICITY

C & R BATTERY SITE - SOIL EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPS005-00	CR-EPS005-03	CR-EPS013-00	CR-EPS013-00D	CR-EPS013-01	CR-EPS017-00	CR-EPS017-03
TRAFFIC REPORT NUMBER:							
DESCRIPTION:	EP TOX	EP TOX	EP TOX	EP TOX/DUP	EP TOX	EP TOX	EP TOX
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/15/88	09/15/88	09/17/88	09/17/88	09/16/88	09/14/88	09/14/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 BARIUM	[125.1]	B [8.3]	[145.6]	[158.3]	B [5.1]	[22.0]	[107.0]
5 CADMIUM	B [3.6]	ND	ND	ND	108.0	B 8.8	ND
9 CHROMIUM	ND	ND	ND	ND	ND	ND	ND
12 LEAD	J 4931	J 50.4	J 2569.0	J 119300	J 5432.0	J 5583.0	J 894.6

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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND - NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY SITE - SOIL EP TOXICITY SAMPLES

SAMPLE NUMBER:		CR-EPS005-00	CR-EPS005-03	CR-EPS013-00	CR-EPS013-00D	CR-EPS013-01	CR-EPS017-00	CR-EPS017-03
TRAFFIC REPORT NUMBER:								
DESCRIPTION:								
UNITS:								
DATE SAMPLED:		09/15/88	09/15/88	09/17/88	09/17/88	09/16/88	09/14/88	09/14/88
*** GEOCHEMICAL PARAMETERS ***								
PP	CAS NO	COMPOUND						
NO PARAMETERS FOR THIS CATEGORY								

C & R BATTERY SITE - SOIL EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPS022-03	CR-EPS022-06	CR-EPS025-00	CR-EPS025-03
TRAFFIC REPORT NUMBER:				
DESCRIPTION:	EP TOX	EP TOX	EP TOX	EP TOX
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/14/88	09/14/88	09/01/88	09/01/88
*** INORGANICS ***				
PP CAS NO COMPOUND				
4 BARIUM	[77.4]	[30.5]	271.9	303.3
6 CADMIUM	B 5.7	B 5.6	B [4.2]	B [3.5]
8 CHROMIUM	ND	ND	ND	[6.3]
12 LEAD	J 25350.0	J 48.3	J 19730	J 5833

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND - NOT DETECTED / NA = NOT ANALYZED / NP = SAMPLE IS NON-PLASTIC AND CANNOT BE ANALYZED FOR ATTERBERG LIMITS

C & R BATTERY SITE - SOIL EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPS022-03	CR-EPS022-06	CR-EPS025-00	CR-EPS025-03
TRAFFIC REPORT NUMBER:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/14/88	09/14/88	09/01/88	09/01/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND

NO PARAMETERS FOR THIS CATEGORY

TABLE F-5

MONITORING WELLS - TAL TOTAL METALS RESULTS

C & R BATTERY - MONITORING WELL SAMPLES, TOTAL METALS

SAMPLE NUMBER:		CR-MW01-1-01T	CR-MW01-1-02T	CR-MW01-1-03T	CR-MW02-1-01DT	CR-MW02-1-01T	CR-MW02-1-02T	CR-MW02-1-03T
TRAFFIC REPORT NUMBER:		MCL377	MCL394	MCM776	MCL380	MCL379	MCM150	MCM775
DESCRIPTION:		TOTAL METALS	TOTAL METALS		TOT MET DUP	TOTAL METALS	TOTAL METALS	TOTAL METALS
UNITS:		UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:		09/15/88	09/28/88	03/30/89	09/15/88	09/15/88	09/28/88	03/30/89
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	J 140000	76000	113000	J 259000	J 157000	220000	313000
2		ANTIMONY	ND	ND	R	ND	ND	120.0	R
3		ARSENIC	L [7.0]	[6.2]	J 59.6	L 14.7	L 15.9	11.1	412
4		BARIUM	J 1740	843	978	J 1260	J 786	1350	1760
5		BERYLLIUM	J 18.2	9.4	8.9	J 46.9	J 32.1	42.4	37.4
6		CADMIUM	J 39.0	L 8.3	[3.2]	J 130	J 78.6	L 63.4	21.4
7		CALCIUM	20600	11600	13700	84600	85800	138000	174000
8		CHROMIUM	291	155	322	ND	ND	416	568
9		COBALT	B 203	83.8	82.3	257	B 209	244	184
10		COPPER	J 216	130	127	J 287	J 197	354	277
11		IRON	J 356000	147000	201000	J 1850000	J 1160000	1340000	1410000
12		LEAD	K 162	B 64.5	79.6	K 180	K 136	J 38.4	187
13		MAGNESIUM	30000	13500	17100	73800	65400	43900	79800
14		MANGANESE	J 4430	2180	2280	J 18600	J 17900	12800	15800
15		MERCURY	0.45	ND	ND	0.43	0.26	ND	0.24
16		NICKEL	J 176	150	210	J 496	J 483	576	761
17		POTASSIUM	J 14200	10100	13500	J 26800	J 21100	124000	39800
18		SELENIUM	L [2.3]	ND	ND	ND	ND	ND	ND
19		SILVER	ND	L 31.7	ND	ND	ND	L 127	ND
20		SODIUM	7670	6720	8730	44100	43500	106000	40800
21		THALLIUM	ND	ND	ND	ND	ND	ND	[2.0]
23		VANADIUM	J 435	239	279	J 713	J 440	779	638
24		ZINC	J 744	442	514	J 1400	J 992	1350	1410

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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL SAMPLES, TOTAL METALS

SAMPLE NUMBER:	CR-MW01-1-01T	CR-MW01-1-02T	CR-MW01-1-03T	CR-MW02-1-01DT	CR-MW02-1-01T	CR-MW02-1-02T	CR-MW02-1-03T
TRAFFIC REPORT NUMBER:							
DESCRIPTION:							
UNITS:	MG/L	MG/L		MG/L	MG/L	MG/L	
DATE SAMPLED:	09/15/88	09/28/88	03/30/89	09/15/88	09/15/88	09/28/88	03/30/89
*** GEOCHEMICAL PARAMETERS ***							
SO4 (MG/KG)	14	11	9.4	390	380	290	404
ACIDITY (MG/KG)	48	52	ND	68	100	ND	ND
TOTAL ALKALINITY (MG/KG)	26	24	35.2	26	25	174	127
BICARBONATE ALK (MG/KG)	26	24	NA	26	25	ND	NA
CARBONATE ALK (MG/KG)	ND	ND	NA	ND	ND	168	NA
TSS	10340	4620	3520	15370	14800	18940	11200
TDS	126	128	156	530	601	660	751
QUICKTURN LEAD (UG/L)	125	NA	NA	98	92	NA	NA

PP | CAS NO | COMPOUND

AR301928

C & R BATTERY - MONITORING WELL SAMPLES, TOTAL METALS

SAMPLE NUMBER:	CR-MW03-1-01T	CR-MW03-1-02T	CR-MW03-1-03T	CR-MW04-1-01T	CR-MW04-1-02DT	CR-MW04-1-02T	CR-MW04-1-03T
TRAFFIC REPORT NUMBER:	MCL378	MCL397	MCM774	MCL376	MCM148	MCM146	MCM773
DESCRIPTION:	TOTAL METALS	TOTAL METALS	TOTAL METALS	TOTAL METALS	TOT MET DUP	TOTAL METALS	TOTAL METALS
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/15/88	09/28/88	03/29/89	09/15/88	09/28/88	09/28/88	03/29/89

*** INORGANICS ***

PP	CAS NO	COMPOUND						
1		ALUMINUM	J 137000	308000	339000	J 205000	219000	292000	407000
2		ANTIMONY	ND	72.3	R	B [50.7]	60.0	86.2	R
3		ARSENIC	L [9.0]	26.1	124	L 23.5	21.5	26.0	260
4		BARIUM	J 1060	2120	1760	J 1150	1240	1830	1950
5		BERYLLIUM	J 14.5	30.9	19.7	J 58.3	43.1	55.4	56.6
6		CADMIUM	J 40.0	L 43.7	11.4	J 64.3	L 36.1	L 47.9	19.4
7		CALCIUM	49000	56000	66700	80900	58400	60600	79400
8		CHROMIUM	319	653	595	374	372	510	643
9		COBALT	B 138	268	164	552	276	336	290
10		COPPER	J 160	401	239	J 225	231	302	270
11		IRON	J 500000	889000	627000	J 618000	624000	929000	873000
12		LEAD	K 9.7	B 146	178	K 600	L 524	B 572	489
13		MAGNESIUM	45400	60700	60400	64300	43100	51100	63600
14		MANGANESE	J 4450	6460	6080	J 37300	20000	22000	15900
15		MERCURY	0.26	ND	0.24	0.26	ND	ND	ND
16		NICKEL	J 150	484	342	J 554	371	519	599
17		POTASSIUM	J 21400	35500	36200	J 27400	49500	56800	37400
18		SELENIUM	ND	ND	ND	ND	ND	ND	ND
19		SILVER	ND	L 209	ND	ND	L 66.9	L 90.4	ND
20		SODIUM	25300	18800	28400	32200	36100	36900	24900
21		THALLIUM	ND	ND	ND	ND	ND	ND	[3.0]
23		VANADIUM	J 372	884	642	J 383	478	681	643
24		ZINC	J 663	1370	988	J 1210	995	1280	1440

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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL SAMPLES, TOTAL METALS

SAMPLE NUMBER:		CR-MW03-1-01T	CR-MW03-1-02T	CR-MW03-1-03T	CR-MW04-1-01T	CR-MW04-1-02DT	CR-MW04-1-02T	CR-MW04-1-03T
TRAFFIC REPORT NUMBER:								
DESCRIPTION:						DUPLICATE		
UNITS:		MG/L	MG/L		MG/L	MG/L	MG/L	
DATE SAMPLED:		09/15/88	09/28/88	03/29/89	09/15/88	09/28/88	09/28/88	03/29/89
*** GEOCHEMICAL PARAMETERS ***								
PP	CAS NO	COMPOUND						
		SO4 (MG/KG)	140	160	198	380	360	360	279
		ACIDITY (MG/KG)	22	36	ND	120	76	80	ND
		TOTAL ALKALINITY (MG/KG)	43	50	71.8	8	30	35	7.8
		BICARBONATE ALK (MG/KG)	43	50	NA	8	30	35	NA
		CARBONATE ALK (MG/KG)	ND	ND	NA	ND	ND	ND	NA
		TSS	8380	17000	9710	21400	15120	14760	9090
		TDS	319	313	429	571	619	593	575
		QUICKTURN LEAD (UG/L)	104	NA	NA	488	NA	NA	NA

C & R BATTERY - MONITORING WELL SAMPLES, TOTAL METALS

SAMPLE NUMBER:	CR-MW05-1-01DT	CR-MW05-1-01T
TRAFFIC REPORT NUMBER:	MCM772	MCM771
DESCRIPTION:	TOT MET DUP	TOTAL METALS
UNITS:	UG/L	UG/L
DATE SAMPLED:	03/28/89	03/28/89

*** INORGANICS ***

PP	CAS NO	COMPOUND		
1		ALUMINUM	126000	1110000
2		ANTIMONY	R 394	B 68.1
3		ARSENIC	262	392
4		BARIUM	2310	2280
5		BERYLLIUM	213	218
6		CADMIUM	ND	ND
7		CALCIUM	68300	64000
8		CHROMIUM	741	740
9		COBALT	627	648
10		COPPER	709	731
11		IRON	2770000	2930000
12		LEAD	1870	2130
13		MAGNESIUM	62100	58500
14		MANGANESE	25600	25700
15		MERCURY	1.1	1.1
16		NICKEL	1100	1110
17		POTASSIUM	36100	30300
18		SELENIUM	ND	ND
19		SILVER	ND	ND
20		SODIUM	14000	13800
21		THALLIUM	[4.0]	[4.3]
23		VANADIUM	1770	1780
24		ZINC	3080	3200

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C & R BATTERY - MONITORING WELL SAMPLES, TOTAL METALS

SAMPLE NUMBER:	CR-MW05-1-01DT	CR-MW05-1-01T
TRAFFIC REPORT NUMBER:		
DESCRIPTION:		
UNITS:		
DATE SAMPLED:	03/28/89	03/28/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND		
		SO4 (MG/KG)	302	290
		ACIDITY (MG/KG)	435	420
		TOTAL ALKALINITY (MG/KG)	ND	ND
		BICARBONATE ALK (MG/KG)	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA
		TSS	26500	23600
		TDS	489	498
		QUICKTURN LEAD (UG/L)	NA	NA

TABLE F-6

MONITORING WELLS - TAL DISSOLVED METALS RESULTS

C & R BATTERY - MONITORING WELL SAMPLES, DISSOLVED METALS

SAMPLE NUMBER:		CR-MW01-1-01	CR-MW01-1-02	CR-MW01-1-03	CR-MW02-1-01	CR-MW02-1-01D	CR-MW02-1-02	CR-MW02-1-03
TRAFFIC REPORT NUMBER:		MCL389	MCL395	MCM783	MCL391	MCL392	MCM151	MCM781
DESCRIPTION:		DIS METALS	DIS METALS	DIS METALS	DIS METALS	DIS MET DUP	DIS METALS	DIS METALS
UNITS:		UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:		09/15/88	09/28/88	03/30/89	09/15/88	09/15/88	09/28/88	03/29/89
*** INORGANICS ***								
PP	CAS NO	COMPOUND						
1		ALUMINUM	B [92.2]	ND	B [107]	B [100]	B [120]	B 512	B [124]
2		ANTIMONY	ND	ND	R	ND	ND	ND	R
3		ARSENIC	[2.2]	ND	B [2.1]	ND	ND	[5.1]	ND
4		BARIUM	[62.5]	[60.8]	[56.8]	[52.2]	[52.2]	B [10.4]	[115]
5		BERYLLIUM	B 0.6	ND	ND	B 0.6	B 0.6	ND	ND
6		CADMIUM	ND	ND	ND	ND	ND	ND	J [0.15]
7		CALCIUM	9320	6460	9580	56500	57000	27000	98600
9		COBALT	[10.9]	[7.1]	ND	53.6	53.6	ND	ND
10		COPPER	B [5.5]	B [7.0]	ND	B [9.5]	B [9.5]	B [7.0]	ND
11		IRON	959	1530	2470	6130	6100	B [17.4]	B [79.8]
12		LEAD	B [2.4]	B 10	B [1.7]	R [8.6]	R [4.3]	ND	B [0.6]
13		MAGNESIUM	[2730]	[2400]	[2630]	34100	34100	[961]	31300
14		MANGANESE	807	767	733	8020	8020	B [4.5]	2300
16		NICKEL	[10.1]	B [10.8]	ND	175	178	ND	[29.9]
17		POTASSIUM	[2390]	B [7530]	[3380]	12100	12500	101000	21000
18		SELENIUM	ND	ND	ND	ND	ND	ND	ND
19		SILVER	ND	ND	ND	ND	ND	ND	ND
20		SODIUM	8650	7050	8380	43000	42700	116000	39200
24		ZINC	J 33.8	B 59.4	64.8	J 42.6	J 121	B [15.6]	ND

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C & R BATTERY - MONITORING WELL SAMPLES, DISSOLVED METALS

SAMPLE NUMBER:	CR-MW01-1-01	CR-MW01-1-02	CR-MW01-1-03	CR-MW02-1-01	CR-MW02-1-01D	CR-MW02-1-02	CR-MW02-1-03
TRAFFIC REPORT NUMBER:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/15/88	09/28/88	03/30/89	09/15/88	09/15/88	09/28/88	03/29/89
*** GEOCHEMICAL PARAMETERS ***							
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TSS	NA	NA	NA	NA	NA	NA	NA
TDS	NA	NA	NA	NA	NA	NA	NA
QUICKTURN LEAD (UG/L)	ND	NA	ND	ND	ND	NA	ND

PP	CAS NO	COMPOUND

C & R BATTERY - MONITORING WELL SAMPLES, DISSOLVED METALS

SAMPLE NUMBER:	CR-MW03-1-01	CR-MW03-1-02	CR-MW03-1-03	CR-MW04-1-01	CR-MW04-1-02	CR-MW04-1-02D	CR-MW04-1-03
TRAFFIC REPORT NUMBER:	MCL390	MCL398	MCM780	MCL388	MCM147	MCM149	MCM779
DESCRIPTION:	DIS METALS	DIS METALS	DIS METALS	DIS METALS	DIS METALS	DIS MET DUP	DIS METALS
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/15/88	09/28/88	03/29/89	09/15/88	09/28/88	09/28/88	03/28/89
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	B [85.0]	ND	B [49.8]	866	B [83.5]	B [125]	771
2 ANTIMONY	ND	ND	R	ND	ND	ND	R
3 ARSENIC	ND	ND	ND	ND	ND	ND	ND
4 BARIUM	[97.5]	[111]	[151]	[63.4]	[80.2]	[79.6]	[179]
5 BERYLLIUM	B 0.6	ND	ND	B 2.0	ND	ND	B [2.8]
6 CADMIUM	ND	ND	J [0.19]	L 6.1	ND	ND	4.7J
7 CALCIUM	29600	35200	44700	54800	46600	46500	56600
9 COBALT	[11.5]	[10.3]	[6.7]	284	82.6	82.9	64.6
10 COPPER	B [5.2]	B [8.0]	ND	B [9.7]	B [10.2]	B [10.2]	ND
11 IRON	346	983	10700	3330	11200	11200	578
12 LEAD	R [9.7]	ND	B [0.9]	R [4.5]	ND	ND	B [1.4]
13 MAGNESIUM	14300	19000	26400	32800	26100	26100	31700
14 MANGANESE	1520	1830	2800	20100	11300	11300	7910
16 NICKEL	[16.1]	ND	ND	331	102	120	156
17 POTASSIUM	5330	B 5170	[4850]	11800	34300	34700	11100
18 SELENIUM	ND	ND	ND	ND	ND	ND	ND
19 SILVER	ND	ND	ND	L 14.7	ND	ND	ND
20 SODIUM	22800	23100	25700	30200	41700	41200	23200
24 ZINC	J 27.2	B 30.3	B [17.9]	J 410	B 102.6	B 97.4	223

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C & R BATTERY - MONITORING WELL SAMPLES, DISSOLVED METALS

SAMPLE NUMBER:		CR-MW03-1-01	CR-MW03-1-02	CR-MW03-1-03	CR-MW04-1-01	CR-MW04-1-02	CR-MW04-1-02D	CR-MW04-1-03
TRAFFIC REPORT NUMBER:								
DESCRIPTION:								
UNITS:								
DATE SAMPLED:		09/15/88	09/28/88	03/29/89	09/15/88	09/28/88	09/28/88	03/28/89
*** GEOCHEMICAL PARAMETERS ***								
PP	CAS NO	COMPOUND						
		SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		TSS	NA	NA	NA	NA	NA	NA	NA
		TDS	NA	NA	NA	NA	NA	NA	NA
		QUICKTURN LEAD (UG/L)	ND	NA	ND	ND	NA	NA	ND

C & R BATTERY - MONITORING WELL SAMPLES, DISSOLVED METALS

SAMPLE NUMBER:	CR-MW05-1-01	CR-MW05-1-01D
TRAFFIC REPORT NUMBER:	MCM777	MCM778
DESCRIPTION:	DIS METALS	DIS MET DUP
UNITS:	UG/L	UG/L
DATE SAMPLED:	03/28/89	03/28/89

*** INORGANICS ***

PP	CAS NO	COMPOUND		
1		ALUMINUM	12200	12300
2		ANTIMONY	B [32.6]	R
3		ARSENIC	ND	ND
4		BARIUM	[44.6]	[45.1]
5		BERYLLIUM	12.0	12.0
6		CADMIUM	J 8.2	J 7.4
7		CALCIUM	43700	43800
9		COBALT	155	155
10		COPPER	[10.8]	[10.8]
11		IRON	155	181
12		LEAD	16.9	16.6
13		MAGNESIUM	26900	27200
14		MANGANESE	9520	9570
16		NICKEL	167	172
17		POTASSIUM	[4140]	[4060]
18		SELENIUM	B [2.2]	ND
19		SILVER	ND	ND
20		SODIUM	10900	10500
24		ZINC	506	506

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C & R BATTERY - MONITORING WELL SAMPLES, DISSOLVED METALS

SAMPLE NUMBER:	CR-MW05-1-01	CR-MW05-1-01D
TRAFFIC REPORT NUMBER:		
DESCRIPTION:		
UNITS:		
DATE SAMPLED:	03/28/89	03/28/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND		
		SO4 (MG/KG)	NA	NA
		ACIDITY (MG/KG)	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA
		TSS	NA	NA
		TDS	NA	NA
		QUICKTURN LEAD (UG/L)	ND	ND

TABLE F-7

DOMESTIC WELLS - TAL TOTAL METALS

C & R BATTERY SITE - RESIDENTIAL WELL SAMPLES

		J SHOOSMITH	CAPITOL OIL	J WADE	F SHOOSMITH
SAMPLE NUMBER:		CR-RW01-01	CR-RW02-01	CR-RW03-01	CR-RW04-01
TRAFFIC REPORT NUMBER:		MCL393	MCL396	MCM152	MCM153
DESCRIPTION:		TOTAL METALS	TOTAL METALS	TOTAL METALS	TOTAL METALS
UNITS:		UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:		09/28/88	09/28/88	09/28/88	09/29/88
*** INORGANICS ***					
PP	CAS NO	COMPOUND			
1		ALUMINUM	ND	B [42.5]	B [57.7]	B [85.2]
4		BARIUM	B [35.1]	B [26.0]	[48.7]	[101]
5		BERYLLIUM	ND	ND	B [0.8]	B [0.8]
7		CALCIUM	[4470]	11300	20600	19000
10		COPPER	B [11.5]	B [8.7]	B [13.8]	204
11		IRON	B 275	4200	B 265	1280
12		LEAD	ND	B [1.6]	ND	ND
13		MAGNESIUM	[3580]	8350	7400	15200
14		MANGANESE	62.1	170	62.3	87.5
16		NICKEL	ND	B [11.2]	B [16.0]	B [15.3]
17		POTASSIUM	B 7720	B 6280	11800	B [4800]
19		SILVER	L 24.5	ND	ND	ND
20		SODIUM	113000	12400	265000	17700
24		ZINC	B [16.6]	B 97.5	B 239	B 137

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C & R BATTERY SITE - RESIDENTIAL WELL SAMPLES

SAMPLE NUMBER:		J SHOOSMITH	CAPITOL OIL	J WADE	F SHOOSMITH
TRAFFIC REPORT NUMBER:		CR-RW01-01	CR-RW02-01	CR-RW03-01	CR-RW04-01
DESCRIPTION:					
UNITS:		MG/L	MG/L	MG/L	MG/L
DATE SAMPLED:		09/28/88	09/28/88	09/28/88	09/29/88
*** GEOCHEMICAL PARAMETERS ***					
PP	CAS NO	COMPOUND			
		SO4 (MG/KG)	19	60	100	59
		ACIDITY, (MG/KG)	20	52	110	24
		TOTAL ALKALINITY (MG/KG)	130	40	24	132
		BICARBONATE ALK (MG/KG)	130	40	24	132
		TSS	ND	12	ND	ND
		TDS	362	170	234	920

TABLE F-8

SURFACE WATER SAMPLES - TAL TOTAL METALS RESULTS

C & R BATTERY SITE - SURFACE WATER SAMPLES - TOTAL METALS

SAMPLE NUMBER:	CR-SW03-01DT	CR-SW03-01T	CR-SW07-01T	CR-SW08-01T
TRAFFIC REPORT NUMBER:	MCR980	MCR986	MCR984	MCR982
DESCRIPTION:	TOT MET DUP	TOTAL METALS	TOTAL METALS	TOTAL METALS
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/07/88	09/07/88	09/07/88	09/07/88

*** INORGANICS ***

PP	CAS NO	COMPOUND				
1		ALUMINUM	10700	10800	B [188]	397
3		ARSENIC	L [4.2]	L [4.4]	ND	ND
4		BARIUM	[46.1]	[48.3]	B [34.2]	B [36.1]
5		BERYLLIUM	[2.1]	[2.1]	ND	ND
6		CADMIUM	34.2	26.9	ND	ND
7		CALCIUM	156000	158000	31800	31100
9		COBALT	[19.1]	[21.5]	ND	ND
10		COPPER	25.6	[22.2]	[6.3]	[9.6]
11		IRON	413	470	313	392
12		LEAD	J 2250	J 2260	B [2.5]	B 9.6
13		MAGNESIUM	12000	12100	5510	5930
14		MANGANESE	1340	1360	41.8	105
16		NICKEL	47.6	43.4	ND	ND
17		POTASSIUM	6720	6500	[3570]	[3330]
20		SODIUM	5030	[4400]	29800	28500
23		VANADIUM	ND	ND	[4.0]	ND
24		ZINC	J 296	J 305	B [8.9]	B 25.3

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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
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C & R BATTERY SITE - SURFACE WATER SAMPLES - TOTAL METALS

SAMPLE NUMBER:	CR-SW03-01DT	CR-SW03-01T	CR-SW07-01T	CR-SW08-01T
TRAFFIC REPORT NUMBER:				
DESCRIPTION:				
UNITS:	MG/L	MG/L	MG/L	MG/L
DATE SAMPLED:	09/07/88	09/07/88	09/07/88	09/07/88
*** GEOCHEMICAL PARAMETERS ***				
PP CAS NO COMPOUND				
ACIDITY (MG/KG)	84	89	ND	ND
TOTAL ALKALINITY (MG/KG)	ND	ND	62	57
BICARBONATE ALK (MG/KG)	ND	ND	62	57
TSS	ND	ND	ND	12
HARDNESS	460	504	103	101
TDS	462	464	234	215

TABLE F-9

SURFACE WATER SAMPLES - TAL DISSOLVED METALS RESULTS

C & R BATTERY SITE - SURFACE WATER SAMPLES - DISSOLVED METALS

SAMPLE NUMBER:	CR-SW03-01	CR-SW03-01D	CR-SW07-01	CR-SW08-01
TRAFFIC REPORT NUMBER:	MCR987	MCR989	MCR985	MCR983
DESCRIPTION:	DIS METALS	DIS MET DUP	DIS METALS	DIS METALS
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/07/88	09/07/88	09/07/88	09/07/88

*** INORGANICS ***

PP	CAS NO	COMPOUND				
1		ALUMINUM	10600	10500	ND	B [106]
3		ARSENIC	L [4.4]	L [3.9]	ND	ND
4		BARIUM	[45.9]	[44.6]	B [29.3]	B [30.9]
5		BERYLLIUM	[2.1]	[2.1]	ND	ND
6		CADMIUM	30.2	35.0	ND	ND
7		CALCIUM	155000	153000	31800	30300
9		COBALT	[20.3]	[19.1]	ND	ND
10		COPPER	[20.8]	[23.2]	[5.3]	[7.7]
11		IRON	249	B 242	B [42.6]	B [35.9]
12		LEAD	J 2210	J 2230	B 5.9	B 7.0
13		MAGNESIUM	12000	11800	5410	5870
14		MANGANESE	1330	1320	ND	69.9
16		NICKEL	44.8	47.6	ND	ND
17		POTASSIUM	6520	6160	[3180]	[3400]
20		SODIUM	[42400]	5000	28300	27200
24		ZINC	J 288	J 286	B 21.3	B 32.8

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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[] = VALUE REPORTED IS LESS THAN THE CONTRACT REQUIRED DETECTION LIMIT
K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SURFACE WATER SAMPLES - DISSOLVED METALS

SAMPLE NUMBER:	CR-SW03-01	CR-SW03-01D	CR-SW07-01	CR-SW08-01
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/07/88	09/07/88	09/07/88	09/07/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND				
		ACIDITY (MG/KG)	NA	NA	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA	NA	NA
		TSS	NA	NA	NA	NA
		HARDNESS	NA	NA	NA	NA
		TDS	NA	NA	NA	NA

TABLE F-10

SEDIMENT SAMPLES - TAL RESULTS

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:	CR-SD01-01	CR-SD02-01	CR-SD03-01	CR-SD03-01D	CR-SD04-01	CR-SD05-01	CR-SD06-01
TRAFFIC REPORT NUMBER:	MCL372	MCL371	MCR994	MCR995	MCL370	MCL369	MCR996
DESCRIPTION:				DUPLICATE			
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/08/88	09/08/88	09/07/88	09/07/88	09/08/88	09/08/88	09/08/88
*** INORGANICS ***							
1 ALUMINUM	J 13400	J 22300	11800	16400	J 16000	J 4970	6120
2 ANTIMONY	ND	B 30.4	ND	ND	ND	B 17.5	B 7.3
3 ARSENIC	L 3.9	L 11.7	17.4	23.2	ND	L 4.5	10.6
4 BARIUM	J 90.9	J 139	104	119	J 97.2	J 91.7	47.6
5 BERYLLIUM	J [0.96]	J [1.6]	ND	ND	ND	ND	ND
6 CADMIUM	B 2.0	B 4.9	2.8	2.6	B 2.1	ND	ND
7 CALCIUM	1490	3800	[671]	[753]	[603]	[374]	[533]
8 CHROMIUM	B 19.7	B 27.0	13.7	16.9	B 19.9	B 6.6	10.6
9 COBALT	B 13.8	B 21.3	[3.6]	[4.3]	B 16.1	B [7.6]	[5.2]
10 COPPER	B 14.7	J 51.1	23.4	26.6	B 10.6	B 8.7	12.2
11 IRON	J 21300	J 39400	13800	16100	J 17300	J 5510	14200
12 LEAD	J 1430	J 14000	1060	1250	J 114	J 238	167
13 MAGNESIUM	1870	4180	[616]	[908]	[596]	[311]	[791]
14 MANGANESE	L 444	L 748	K 44.7	K 54.5	L 41.3	L 33.5	K 128
16 NICKEL	B [5.9]	B 28.2	[5.5]	[7.4]	ND	ND	[5.3]
17 POTASSIUM	J [1110]	J 2530	[546]	[780]	ND	ND	[662]
18 SELENIUM	ND	ND	L [0.47]	[0.33]	ND	ND	ND
23 VANADIUM	J 35.4	J 55.5	26.6	33.6	J 37.8	J [7.7]	25.1
24 ZINC	J 143	J 556	37.5	47.3	J 28.2	J 14.9	32.6

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:	CR-SD01-01	CR-SD02-01	CR-SD03-01	CR-SD03-01D	CR-SD04-01	CR-SD05-01	CR-SD06-01
TRAFFIC REPORT NUMBER:							
DESCRIPTION:				DUPLICATE			
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/08/88	09/08/88	09/07/88	09/07/88	09/08/88	09/08/88	09/08/88
*** GEOCHEMICAL PARAMETERS ***							
PH	5.81	6.51	4.0	4.0	4.32	4.01	5.05
ACIDITY (MG/KG)	28	79	50	51	12	12	15
TOTAL ALKALINITY (MG/KG)	ND	32	ND	ND	ND	ND	ND
TOC	3980	3590	3570	5420	2400	6900	5380
VOLATILE RESIDUE	4920	13200	3340	3940	3640	2790	2040
SIEVE 3.0 IN.	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SIEVE 1.5 IN.	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SIEVE 0.75 IN.	100.0	100.0	100.0	100.0	100.0	93.9	100.0
SIEVE 0.375 IN.	90.9	100.0	100.0	100.0	100.0	88.1	100.0
SIEVE NO. 4	89.0	98.6	100.0	99.7	100.0	82.5	97.2
SIEVE NO. 10	87.9	94.6	99.6	99.3	99.8	76.1	93.6
SIEVE NO. 20	85.8	89.4	98.6	98.3	99.3	68.7	87.6
SIEVE NO. 40	82.7	83.8	96.1	95.6	97.5	63.1	74.1
SIEVE NO. 60	78.5	79.6	91.3	90.7	93.8	58.9	61.2
SIEVE NO. 140	64.5	77.0	71.5	70.5	80.4	48.6	33.7
SIEVE NO. 200	56.8	73.8	61.5	60.4	72.9	43.0	26.1
CEC (MEQ/100g)	16.3	19.8	8.6	12.7	17.7	11.9	8.2

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:	CR-SD07-01	CR-SD08-01	CR-SD09-01
TRAFFIC REPORT NUMBER:	MCR993	MCR992	MCL373
DESCRIPTION:			
UNITS:	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/07/88	09/07/88	09/08/88

*** INORGANICS ***

PP	CAS NO	COMPOUND			
1		ALUMINUM	1830	3190	J 16000
2		ANTIMONY	B [6.8]	ND	ND
3		ARSENIC	2.6	4.5	L 4.4
4		BARIUM	[16.2]	[30.7]	J 69.1
5		BERYLLIUM	ND	ND	J [0.80]
6		CADMIUM	ND	ND	B 3.0
7		CALCIUM	[489]	[98.0]	[1270]
8		CHROMIUM	5.8	5.0	B 19.6
9		COBALT	[2.9]	[3.6]	B 14.9
10		COPPER	8.9	14.2	B 13.0
11		IRON	5890	9280	J 27500
12		LEAD	10.2	18.1	J 1970
13		MAGNESIUM	[166]	[383]	2300
14		MANGANESE	K 112	K 171	L 455
16		NICKEL	[2.7]	[4.1]	B 10.5
17		POTASSIUM	[103]	[494]	J [1060]
18		SELENIUM	ND	ND	ND
23		VANADIUM	[7.9]	[9.9]	J 33.9
24		ZINC	16.4	15.0	J 67.2

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ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:	CR-SD07-01	CR-SD08-01	CR-SD09-01
TRAFFIC REPORT NUMBER:			
DESCRIPTION:			
UNITS:	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/07/88	09/07/88	09/08/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND			
		PH	5.4	3.3	5.48
		ACIDITY (MG/KG)	ND	12	29
		TOTAL ALKALINITY (MG/KG)	15	ND	ND
		TOC	2130	2480	6690
		VOLATILE RESIDUE	6180	11400	5540
		SIEVE 3.0 IN.	100.0	100.0	100.0
		SIEVE 1.5 IN.	100.0	100.0	100.0
		SIEVE 0.75 IN.	100.0	100.0	100.0
		SIEVE 0.375 IN.	88.9	88.9	100.0
		SIEVE NO. 4	59.9	78.4	100.0
		SIEVE NO. 10	50.5	67.9	99.4
		SIEVE NO. 20	31.0	49.1	97.9
		SIEVE NO. 40	15.2	30.5	96.1
		SIEVE NO. 60	8.1	22.3	93.7
		SIEVE NO. 140	2.6	14.0	80.7
		SIEVE NO. 200	1.9	12.4	71.3
		CEC (MEQ/100g)	1.6	12.7	13.8

TABLE F-11

SEDIMENT SAMPLES - EP TOXICITY

C & R BATTERY SITE - SEDIMENT EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPSD03-01	CR-EPSD03-01D	CR-EPSD05-01	CR-EPSD08-01
TRAFFIC REPORT NUMBER:				
DESCRIPTION:	EP TOX	EP TOX/DUP	EP TOX	EP TOX
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/07/88	09/07/88	09/08/88	09/07/88
*** INORGANICS ***				
PP CAS NO COMPOUND				
4 BARIUM	[136.1]	[137.6]	[119.7]	[112.6]
6 CADMIUM	B 10.6	B 11.2	B [3.5]	ND
12 LEAD	J 1682.0	J 2433.0	J 377.4	J 48.6

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SEDIMENT EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPSD03-01	CR-EPSD03-01D	CR-EPSD05-01	CR-EPSD08-01
TRAFFIC REPORT NUMBER:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/07/88	09/07/88	09/08/88	09/07/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND

NO PARAMETERS FOR THIS CATEGORY

TABLE F-12

BLANK SAMPLES

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01F	CR-S000-02F	CR-S000-03F	CR-S000-04F	CR-S000-05F	CR-S000-06F	CR-S000-07F
TRAFFIC REPORT NUMBER:	MCM729	MCM732	MCM734	MCM735	MCM737	MCM739	MCM741
% SOLIDS:							
DESCRIPTION:	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
6 CADMIUM	ND	ND	ND	ND	ND	ND	ND
7 CALCIUM	ND	[560]	[604]	[511]	[516]	[698]	[540]
10 COPPER	40	112	77	66	58	52	71
11 IRON	169	120	530	ND	ND	ND	ND
12 LEAD	[1.9]	ND	ND	ND	[1.0]	[1.2]	[1.2]
14 MANGANESE	ND	ND	ND	ND	ND	ND	ND
19 SILVER	ND	[5.8]	ND	ND	ND	ND	ND
20 SODIUM	ND	[654]	[667]	ND	ND	[786]	[744]
24 ZINC	ND	ND	55	ND	ND	ND	ND

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01F	CR-S000-02F	CR-S000-03F	CR-S000-04F	CR-S000-05F	CR-S000-06F	CR-S000-07F
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	NA	NA	NA	NA	NA	NA	NA
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:				
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:	MCM743	MCM745	MCM325	MCM327
% SOLIDS:				
DESCRIPTION:	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89
*** INORGANICS ***				
6 CADMIUM	ND	ND	8.0	ND
7 CALCIUM	[495]	[506]	ND	ND
10 COPPER	50	64	ND	ND
11 IRON	ND	ND	614	533
12 LEAD	[1.1]	[1.3]	[3.4]	[4.8]
14 MANGANESE	ND	ND	ND	16.9
19 SILVER	ND	[5.1]	ND	ND
20 SODIUM	ND	ND	ND	ND
24 ZINC	ND	ND	ND	[17.9]

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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[] = VALUE REPORTED IS LESS THAN THE CONTRACT REQUIRED DETECTION LIMIT
K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:	NA	NA		
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND				
		PH	NA	NA	ND	ND
		SO4 (MG/KG)	NA	NA	ND	ND
		ACIDITY (MG/KG)	NA	NA	ND	ND
		TOTAL ALKALINITY (MG/KG)	NA	NA	ND	ND
		BICARBONATE ALK (MG/KG)	NA	NA	ND	ND
		CARBONATE ALK (MG/KG)	NA	NA	ND	ND
		WATER CONTENT %	NA	NA	ND	ND
		DRY UNIT WEIGHT PCF	NA	NA	ND	ND
		SPECIFIC GRAVITY	NA	NA	ND	ND
		PLASTICITY INDEX	NA	NA	ND	ND
		LIQUID LIMIT	NA	NA	ND	ND
		PERMEABILITY TEST CM/SEC	NA	NA	ND	ND
		SIEVE 3.0 IN.	NA	NA	ND	ND
		SIEVE 1.5 IN.	NA	NA	ND	ND
		SIEVE 0.75 IN.	NA	NA	ND	ND
		SIEVE 0.375 IN.	NA	NA	ND	ND
		SIEVE NO. 4	NA	NA	ND	ND
		SIEVE NO. 10	NA	NA	ND	ND
		SIEVE NO. 20	NA	NA	ND	ND
		SIEVE NO. 40	NA	NA	ND	ND
		SIEVE NO. 60	NA	NA	ND	ND
		SIEVE NO. 140	NA	NA	ND	ND
		SIEVE NO. 200	NA	NA	ND	ND
		DEPTH FT.	NA	NA	ND	ND
		DRY DENSITY PCF	NA	NA	ND	ND
		CEC (MEQ/100g)	NA	NA	ND	ND

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:	NA	NA		
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND				
		PH	NA	NA	ND	ND
		SO4 (MG/KG)	NA	NA	ND	ND
		ACIDITY (MG/KG)	NA	NA	ND	ND
		TOTAL ALKALINITY (MG/KG)	NA	NA	ND	ND
		BICARBONATE ALK (MG/KG)	NA	NA	ND	ND
		CARBONATE ALK (MG/KG)	NA	NA	ND	ND
		WATER CONTENT %	NA	NA	ND	ND
		DRY UNIT WEIGHT PCF	NA	NA	ND	ND
		SPECIFIC GRAVITY	NA	NA	ND	ND
		PLASTICITY INDEX	NA	NA	ND	ND
		LIQUID LIMIT	NA	NA	ND	ND
		PERMEABILITY TEST CM/SEC	NA	NA	ND	ND
		SIEVE 3.0 IN.	NA	NA	ND	ND
		SIEVE 1.5 IN.	NA	NA	ND	ND
		SIEVE 0.75 IN.	NA	NA	ND	ND
		SIEVE 0.375 IN.	NA	NA	ND	ND
		SIEVE NO. 4	NA	NA	ND	ND
		SIEVE NO. 10	NA	NA	ND	ND
		SIEVE NO. 20	NA	NA	ND	ND
		SIEVE NO. 40	NA	NA	ND	ND
		SIEVE NO. 60	NA	NA	ND	ND
		SIEVE NO. 140	NA	NA	ND	ND
		SIEVE NO. 200	NA	NA	ND	ND
		DEPTH FT.	NA	NA	ND	ND
		DRY DENSITY PCF	NA	NA	ND	ND
		CEC (MEQ/100g)	NA	NA	ND	ND

C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01R	CR-S000-02R	CR-S000-03R	CR-S000-04R	CR-S000-05R	CR-S000-06R	CR-S000-07R
TRAFFIC REPORT NUMBER:	MCM730	MCM731	MCM733	MCM736	MCM738	MCM740	MCM742
% SOLIDS:							
DESCRIPTION:	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	[160]	ND	[164]	ND	6790	ND	ND
2 ANTIMONY	ND	ND	ND	[26]	ND	ND	ND
7 CALCIUM	[762]	[822]	[829]	[656]	[851]	[784]	[733]
8 CHROMIUM	ND	ND	ND	ND	98	ND	[8.5]
10 COPPER	41	37	71	52	49	98	64
11 IRON	ND	ND	308	ND	70.9	113	ND
12 LEAD	[2.0]	[1.0]	[3.1]	6.6	[2.9]	[1.9]	[3.7]
14 MANGANESE	ND	ND	ND	ND	ND	ND	ND
17 POTASSIUM	ND	ND	ND	[1000]	ND	ND	ND
19 SILVER	ND	ND	[6.0]	[7.0]	ND	[8.1]	ND
20 SODIUM	[1060]	[1080]	[1110]	[1040]	[1170]	[1010]	[1030]
24 ZINC	ND	ND	ND	ND	ND	20	ND

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01R	CR-S000-02R	CR-S000-03R	CR-S000-04R	CR-S000-05R	CR-S000-06R	CR-S000-07R
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND						
		PH	NA	NA	NA	NA	NA	NA	NA
		SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
		WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
		DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
		SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
		PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
		LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
		PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
		SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
		SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
		DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
		DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
		CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08R	CR-S000-09R	CR-S000-20R	CR-S000-21R
TRAFFIC REPORT NUMBER:				
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08R	CR-S000-09R	CR-S000-20R	CR-S000-21R
TRAFFIC REPORT NUMBER:	MCM744	MCM746	MCM326	MCM328
% SOLIDS:				
DESCRIPTION:	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

*** INORGANICS ***

PP	CAS NO	COMPOUND				
1		ALUMINUM	ND	9710	ND	ND
2		ANTIMONY	ND	ND	ND	ND
7		CALCIUM	[764]	[915]	ND	ND
8		CHROMIUM	ND	130	ND	ND
10		COPPER	49	50	68.2	ND
11		IRON	ND	1000	792	701
12		LEAD	7.5	[2.6]	[4.0]	[3.7]
14		MANGANESE	ND	ND	ND	26.9
17		POTASSIUM	ND	ND	ND	ND
19		SILVER	[6.9]	[6.1]	ND	ND
20		SODIUM	[1050]	[1180]	ND	ND
24		ZINC	ND	27	36.3	ND

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08R	CR-S000-09R	CR-S000-20R	CR-S000-21R
TRAFFIC REPORT NUMBER:	NA	NA		
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89
*** GEOCHEMICAL PARAMETERS ***				
PP CAS NO COMPOUND				
PH	NA	NA	ND	ND
SO4 (MG/KG)	NA	NA	ND	ND
ACIDITY (MG/KG)	NA	NA	ND	ND
TOTAL ALKALINITY (MG/KG)	NA	NA	ND	ND
BICARBONATE ALK (MG/KG)	NA	NA	ND	ND
CARBONATE ALK (MG/KG)	NA	NA	ND	ND
WATER CONTENT %	NA	NA	ND	ND
DRY UNIT WEIGHT PCF	NA	NA	ND	ND
SPECIFIC GRAVITY	NA	NA	ND	ND
PLASTICITY INDEX	NA	NA	ND	ND
LIQUID LIMIT	NA	NA	ND	ND
PERMEABILITY TEST CM/SEC	NA	NA	ND	ND
SIEVE 3.0 IN.	NA	NA	ND	ND
SIEVE 1.5 IN.	NA	NA	ND	ND
SIEVE 0.75 IN.	NA	NA	ND	ND
SIEVE 0.375 IN.	NA	NA	ND	ND
SIEVE NO. 4	NA	NA	ND	ND
SIEVE NO. 10	NA	NA	ND	ND
SIEVE NO. 20	NA	NA	ND	ND
SIEVE NO. 40	NA	NA	ND	ND
SIEVE NO. 60	NA	NA	ND	ND
SIEVE NO. 140	NA	NA	ND	ND
SIEVE NO. 200	NA	NA	ND	ND
DEPTH FT.	NA	NA	ND	ND
DRY DENSITY PCF	NA	NA	ND	ND
CEC (MEQ/100g)	NA	NA	ND	ND

C & R BATTERY SITE - DEBRIS PILE BLANK SAMPLES

SAMPLE NUMBER:	CR-DP00-01F	CR-DP00-01R
TRAFFIC REPORT NUMBER:	MCL387	MCL386
DESCRIPTION:	FIELD BLANK	RINSATE BLK
UNITS:	UG/L	UG/L
DATE SAMPLED:	09/09/88	09/09/88

*** INORGANICS ***

PP	CAS NO	COMPOUND		
1		ALUMINUM	ND	[51.5]
4		BARIUM	ND	[11.0]
5		BERYLLIUM	ND	[0.60]
9		CALCIUM	[502]	[569]
10		COPPER	ND	[7.2]
11		IRON	[19.1]	[27.9]
12		LEAD	[1.9]	[2.4]
16		NICKEL	[25.2]	[10.4]
19		SILVER	ND	9.3
20		SODIUM	[293]	[683]
24		ZINC	36.6	22.5

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - DEBRIS PILE BLANK SAMPLES

SAMPLE NUMBER:	CR-DP00-01F	CR-DP00-01R
TRAFFIC REPORT NUMBER:	NA	NA
DESCRIPTION:		
UNITS:		
DATE SAMPLED:	09/09/88	09/09/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND		
		PH	NA	NA
		ACIDITY (MG/KG)	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA
		SIEVE 3.0 IN.	NA	NA
		SIEVE 1.5 IN.	NA	NA
		SIEVE 0.75 IN.	NA	NA
		SIEVE 0.375 IN.	NA	NA
		SIEVE NO. 4	NA	NA
		SIEVE NO. 10	NA	NA
		SIEVE NO. 20	NA	NA
		SIEVE NO. 40	NA	NA
		SIEVE NO. 60	NA	NA
		SIEVE NO. 140	NA	NA
		SIEVE NO. 200	NA	NA
		CEC (MEQ/100g)	NA	NA

C & R BATTERY SITE - SURFACE WATER BLANK SAMPLES

SAMPLE NUMBER:	CR-SW00-01FT	CR-SW00-01R
TRAFFIC REPORT NUMBER:	MCR991	MCR990
DESCRIPTION:	TOT MET BLK	DIS MET BLK
UNITS:	UG/L	UG/L
DATE SAMPLED:	09/07/88	09/07/88

*** INORGANICS ***

FP	CAS NO	COMPOUND		
1		ALUMINUM	[61.8]	[67.9]
4		BARIUM	[8.5]	[5.7]
7		CALCIUM	[347]	[447]
11		IRON	ND	[49.8]
12		LEAD	ND	[3.9]
13		MAGNESIUM	[80.4]	[121]
24		ZINC	[3.7]	[7.4]

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SURFACE WATER BLANK SAMPLES

SAMPLE NUMBER:	CR-SW00-01FT	CR-SW00-01R
TRAFFIC REPORT NUMBER:	NA	NA
DESCRIPTION:		
UNITS:		
DATE SAMPLED:	09/07/88	09/07/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND		
		ACIDITY (MG/KG)	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA
		TSS	NA	NA
		HARDNESS	NA	NA
		TDS	NA	NA

C & R BATTERY SITE - SEDIMENT BLANK SAMPLES

SAMPLE NUMBER:	CR-SD00-01F	CR-SD00-01R
TRAFFIC REPORT NUMBER:	MCL375	MCL374
DESCRIPTION:	FIELD BLANK	RINSATE BLK
UNITS:	UG/L	UG/L
DATE SAMPLED:	09/09/88	09/09/88

*** INORGANICS ***

P/P	CAS NO	COMPOUND		
9		CHROMIUM	ND	15.3
9		COBALT	28.1	[23.0]
11		IRON	ND	110
16		NICKEL	[18.0]	ND

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SEDIMENT BLANK SAMPLES

SAMPLE NUMBER:		CR-SB00-01F	CR-SB00-01R
TRAFFIC REPORT NUMBER:			
DESCRIPTION:			
UNITS:		MG/L	MG/L
DATE SAMPLED:		09/09/88	09/09/88
*** GEOCHEMICAL PARAMETERS ***			
PP	CAS NO	COMPOUND	
		PH	NA NA
		ACIDITY (MG/KG)	NA NA
		TOTAL ALKALINITY (MG/KG)	NA NA
		TOC	0.80 0.75
		VOLATILE RESIDUE	NA NA
		SIEVE 3.0 IN.	NA NA
		SIEVE 1.5 IN.	NA NA
		SIEVE 0.75 IN.	NA NA
		SIEVE 0.375 IN.	NA NA
		SIEVE NO. 4	NA NA
		SIEVE NO. 10	NA NA
		SIEVE NO. 20	NA NA
		SIEVE NO. 40	NA NA
		SIEVE NO. 60	NA NA
		SIEVE NO. 140	NA NA
		SIEVE NO. 200	NA NA
		CEC (MEQ/100g)	NA NA

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-03R
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	RINSATE BLK
UNITS:	UG/L
DATE SAMPLED:	03/30/89

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[85.2]
12		LEAD	[1.8]

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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R = VALUE IS REJECTED
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER / L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-03R
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	
UNITS:	
DATE SAMPLED:	03/30/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND

NO PARAMETERS FOR THIS CATEGORY

C & R BATTERY - MONITORING WELL BLANK SAMPLES

SAMPLE NUMBER:	CR-MW00-01-03F
TRAFFIC REPORT NUMBER:	MCM784
DESCRIPTION:	FIELD BLANK
UNITS:	UG/L
DATE SAMPLED:	03/30/89

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[57.8]
11		IRON	[18.3]
12		LEAD	[2.5]

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL BLANK SAMPLES

SAMPLE NUMBER:	CR-MW00-01-03F
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	
UNITS:	
DATE SAMPLED:	03/30/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND

NO PARAMETERS FOR THIS CATEGORY

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-RT
TRAFFIC REPORT NUMBER:	MCL399
DESCRIPTION:	TOT MET BLK
UNITS:	UG/L
DATE SAMPLED:	09/28/88

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[100]
4		BARIUM	[7.2]
5		BERYLLIUM	[0.8]
7		CALCIUM	[762]
10		COPPER	[10.8]
11		IRON	193
12		LEAD	[2.5]
14		MANGANESE	[2.3]
16		NICKEL	[10.7]
17		POTASSIUM	[1460]
20		SODIUM	[722]
24		ZINC	87.6

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOS, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-RT
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	
UNITS:	
DATE SAMPLED:	09/28/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND	
		SO4 (MG/KG)	NA
		ACIDITY (MG/KG)	NA
		TOTAL ALKALINITY (MG/KG)	NA
		BICARBONATE ALK (MG/KG)	NA
		CARBONATE ALK (MG/KG)	NA
		TSS	NA
		TDS	NA

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-FT
TRAFFIC REPORT NUMBER:	MCL400
DESCRIPTION:	TOT MET BLK
UNITS:	UG/L
DATE SAMPLED:	09/28/88

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[62.6]
5		BERYLLIUM	[0.8]
7		CALCIUM	[284]
10		COPPER	[12.2]
11		IRON	[34.1]
12		LEAD	[4.2]
14		MANGANESE	[2.0]
16		NICKEL	[17.8]
17		POTASSIUM	[1950]
20		SODIUM	[269]
24		ZINC	50.6

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-FT
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	FIELD BLANK
UNITS:	MG/L
DATE SAMPLED:	09/28/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND	
		SO4 (MG/KG)	ND
		ACIDITY (MG/KG)	NA
		TOTAL ALKALINITY (MG/KG)	NA
		BICARBONATE ALK (MG/KG)	NA
		CARBONATE ALK (MG/KG)	NA
		TSS	NA
		TDS	NA
		QUICKTURN LEAD (UG/L)	NA

TABLE F-13

SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES

TABLE F-13

SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES
C & R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Boring No.	Sample Depth (feet)									
	0-2		3-5		6-8		9-11		13-15	
	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP
SO-01	2,300	1,670	6,670	2,800	ND	39	ND	NA	ND	NA
SO-02	10,290	13,500	290	447	1,240	180	90	88	ND	129
SO-03	650	822	ND	42	ND	NA	ND	NA	ND	NA
SO-04	ND	168	ND	NA	ND	NA	ND	NA	ND	NA
SO-05	ND	320	8,460	7,200	350	383	ND	23	ND	NA
SO-06	5,110	2,780	630	369	ND	177	ND	NA	ND	NA
SO-07	21,980	19,000	680	841	510	99	90	141	ND	341
SO-08	76,410	43,000	ND	42	1,780	1,480	590	737	70	247
SO-09	2,290	3,380	ND	40	ND	NA	ND	NA	ND	NA
SO-10	20,890	23,800	17,530	13,900	3,870	1,840	830	944	ND	27
SO-11	92,260	36,800	20,670	19,400	15,520	7,720	ND	148	110	834
SO-12	7,280	4,510	650	1,270	650	554	150	77	ND	23
SO-13	127,100	50,200	20,360	16,400	1,360	5,420	ND	77	ND	NA
SO-14	134,500	122,000	17,200	14,500	970	654	910	312	910	1,110
SO-15	22,520	29,400	1,580	920	6,830	7,510	ND	137	ND	NA
SO-16	120,400	75,100	23,600	10,400	13,680	79,400	470	622	ND	18
SO-17	4,860	17,400	ND	43	ND	NA	ND	NA	ND	15
SO-18	14,860	23,200	640	23,600	560	1,130	ND	42	ND	NA
SO-19	14,260	8,940	ND	83	ND	NA	ND	NA	ND	NA
SO-20	870	825	ND	566	80	212	60	112	ND	270
SO-21	350	294	ND	81	ND	NA	ND	NA	ND	NA
SO-22	21,010	938	7,050	3,700	ND	26	ND	NA	ND	NA
SO-23	ND	37	ND	108	ND	NA	ND	NA	ND	NA
SO-24	ND	16	ND	NA	ND	NA	ND	NA	ND	NA
SO-25	3,880	2,620	3,180	4,220	ND	91	ND	NA	ND	NA
SO-26	ND	101	ND	NA	ND	NA	NA	NA	ND	NA
SO-27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-28	1,750	2,090	880	41,400	ND	28	ND	NA	ND	NA
SO-29	ND	75	NA	NA	NA	NA	NA	NA	NA	NA
SO-30	ND	54	NA	NA	NA	NA	NA	NA	NA	NA

TABLE F-13
SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES
C & R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA
PAGE TWO

Boring No.	Sample Depth (feet)									
	20-22		25-27		30-32		35-37		40-42	
	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP
SO-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-05	ND	NA	90	67	ND	19	ND	ND	ND	NA
SO-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-13	ND	NA	ND	56	ND	NA	ND	20	ND	NA
SO-14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-17	ND	NA	80	157	ND	23	ND	NA	ND	NA
SO-18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-22	ND	NA	ND	NA	ND	ND	ND	NA	ND	NA
SO-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-25	300	70	ND	NA	330	263	ND	96	ND	NA
SO-26	ND	NA	170	NA	ND	NA	130	NA	ND	NA
SO-27	NA	NA	NA	39	NA	41	NA	NA	NA	NA
SO-28	ND	NA	80	88	ND	NA	ND	NA	ND	NA
SO-29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE F-13
SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES
C & R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA
PAGE THREE

Notes:

XRF X-ray fluorescence analytical result (detection limit approximately 120 mg/kg)
CLP Contract Laboratory Program analytical result
ND Not Detected
NA Not Analyzed

TABLE F-14

SUMMARY OF XRF LEAD RESULTS (MARCH 1989)

TABLE F-14

SUMMARY OF XRF LEAD RESULTS (MARCH 1989)
C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Boring No.	Sample Depth (feet)									
	0-2	3-5	6-8	9-11	13-15	20-22	25-27	30-32	35-37	40-42
S0-14A	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND
SO-31	27,200 [7,680]	ND [156]	ND	ND	ND	NA	NA	NA	NA	NA
SO-32	20,100 [24,600]	ND [33.8]	ND	ND	ND	NA	NA	NA	NA	NA
SO-33	200 [368]	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-34	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-35	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-36	120 [43.6]	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-37	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND

Samples analyzed by the EPA Region III Central Regional Laboratory (CRL).
All results reported in mg/kg.
ND - Not detected. Detection limit = 100 mg/kg.
NA - Not analyzed.
[7,680] - CLP lead value for same sampling interval.

TABLE F-8

SURFACE WATER SAMPLES - TAL TOTAL METALS RESULTS

C & R BATTERY SITE - SURFACE WATER SAMPLES - TOTAL METALS

SAMPLE NUMBER:		CR-SW03-01DT	CR-SW03-01T	CR-SW07-01T	CR-SW08-01T
TRAFFIC REPORT NUMBER:		MCR988	MCR986	MCR984	MCR982
DESCRIPTION:		TOT MET DUP	TOTAL METALS	TOTAL METALS	TOTAL METALS
UNITS:		UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:		09/07/88	09/07/88	09/07/88	09/07/88
*** INORGANICS ***					
PP	CAS NO	COMPOUND			
1		ALUMINUM	10700	10800	B [188]	397
3		ARSENIC	L [4.2]	L [4.4]	ND	ND
4		BARIUM	[46.1]	[48.3]	B [34.2]	B [36.1]
5		BERYLLIUM	[2.1]	[2.1]	ND	ND
6		CADMIUM	34.2	26.9	ND	ND
7		CALCIUM	156000	158000	31800	31100
9		COBALT	[19.1]	[21.5]	ND	ND
10		COPPER	25.6	[22.2]	[6.3]	[9.6]
11		IRON	413	470	313	392
12		LEAD	J 2250	J 2360	B [2.5]	B 9.6
13		MAGNESIUM	12000	12100	5510	5930
14		MANGANESE	1340	1360	41.8	105
16		NICKEL	47.6	43.4	ND	ND
17		POTASSIUM	6720	6500	[3570]	[3330]
20		SODIUM	5030	[4400]	29800	28500
23		VANADIUM	ND	ND	[4.0]	ND
24		ZINC	J 296	J 305	B [8.9]	B 25.3

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SURFACE WATER SAMPLES - TOTAL METALS

SAMPLE NUMBER:		CR-SW03-01DT	CR-SW03-01T	CR-SW07-01T	CR-SW08-01T
TRAFFIC REPORT NUMBER:					
DESCRIPTION:					
UNITS:		MG/L	MG/L	MG/L	MG/L
DATE SAMPLED:		09/07/88	09/07/88	09/07/88	09/07/88
*** GEOCHEMICAL PARAMETERS ***					
F/P	CAS NO	COMPOUND			
		ACIDITY (MG/KG)	84	89	ND	ND
		TOTAL ALKALINITY (MG/KG)	ND	ND	62	57
		BICARBONATE ALK (MG/KG)	ND	ND	62	57
		TSS	ND	ND	ND	12
		HARDNESS	460	504	103	101
		TDS	462	464	234	215

TABLE F-9

SURFACE WATER SAMPLES - TAL DISSOLVED METALS RESULTS

C & R BATTERY SITE - SURFACE WATER SAMPLES - DISSOLVED METALS

SAMPLE NUMBER:	CR-SW03-01	CR-SW03-01D	CR-SW07-01	CR-SW08-01
TRAFFIC REPORT NUMBER:	MCR987	MCR989	MCR985	MCR983
DESCRIPTION:	DIS METALS	DIS MET DUP	DIS METALS	DIS METALS
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/07/88	09/07/88	09/07/88	09/07/88

*** INORGANICS ***

FP	CAS NO	COMPOUND				
1		ALUMINUM	10600	10500	ND	B [106]
3		ARSENIC	L [4.4]	L [3.9]	ND	ND
4		BARIUM	[45.9]	[44.6]	B [29.3]	B [30.9]
5		BERYLLIUM	[2.1]	[2.1]	ND	ND
6		CADMIUM	30.2	35.0	ND	ND
7		CALCIUM	155000	153000	31800	30300
9		COBALT	[20.3]	[19.1]	ND	ND
10		COPPER	[20.8]	[23.2]	[5.3]	[7.7]
11		IRON	249	B 242	B [42.6]	B [35.9]
12		LEAD	J 2210	J 2230	B 5.9	B 7.0
13		MAGNESIUM	12000	11800	5410	5870
14		MANGANESE	1330	1320	ND	69.9
16		NICKEL	44.8	47.6	ND	ND
17		POTASSIUM	4520	6160	[3180]	[3400]
20		SODIUM	[42400]	5000	28300	27200
24		ZINC	J 288	J 286	B 21.3	B 32.8

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SURFACE WATER SAMPLES - DISSOLVED METALS

SAMPLE NUMBER:	CR-SW03-01	CR-SW03-01D	CR-SW07-01	CR-SW08-01
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/07/88	09/07/88	09/07/88	09/07/88
*** GEOCHEMICAL PARAMETERS ***				
ACIDITY (MG/KG)	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA
TSS	NA	NA	NA	NA
HARDNESS	NA	NA	NA	NA
TDS	NA	NA	NA	NA

TABLE F-10

SEDIMENT SAMPLES - TAL RESULTS

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:	CR-SD01-01	CR-SD02-01	CR-SD03-01	CR-SD03-01D	CR-SD04-01	CR-SD05-01	CR-SD06-01
TRAFFIC REPORT NUMBER:	MCL372	MCL371	MCR994	MCR995 DUPLICATE	MCL370	MCL369	MCR996
DESCRIPTION:							
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/08/88	09/08/88	09/07/88	09/07/88	09/08/88	09/08/88	09/08/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	J 13400	J 22300	11800	16400	J 16000	J 4970	6120
2 ANTIMONY	ND	B 30.4	ND	ND	ND	B 17.5	B 7.3
3 ARSENIC	L 3.9	L 11.7	17.4	23.2	ND	L 4.5	10.6
4 BARIUM	J 90.9	J 139	104	119	J 97.2	J 91.7	47.6
5 BERYLLIUM	J [0.96]	J [1.6]	ND	ND	ND	ND	ND
6 CADMIUM	B 2.0	B 4.9	2.8	2.6	B 2.1	ND	ND
7 CALCIUM	1490	3800	[671]	[753]	[603]	[374]	[533]
8 CHROMIUM	B 19.7	B 27.0	13.7	16.9	B 19.9	B 6.6	10.6
9 COBALT	B 13.8	B 21.3	[3.6]	[4.3]	B 16.1	B [7.6]	[5.2]
10 COPPER	B 14.7	J 51.1	23.4	26.6	B 10.6	B 8.7	12.2
11 IRON	J 21300	J 39400	13800	16100	J 17300	J 5510	14200
12 LEAD	J 1430	J 14000	1060	1250	J 114	J 238	167
13 MAGNESIUM	1870	4180	[616]	[908]	[596]	[311]	[791]
14 MANGANESE	L 444	L 748	K 44.7	K 54.5	L 41.3	L 33.5	K 128
16 NICKEL	B [5.9]	B 28.2	[5.5]	[7.4]	NB	NB	[5.3]
17 POTASSIUM	J [1110]	J 2530	[546]	[780]	ND	ND	[662]
18 SELENIUM	ND	ND	L [0.47]	[0.33]	ND	ND	ND
23 VANADIUM	J 35.4	J 55.5	26.6	33.6	J 37.8	J [7.7]	25.1
24 ZINC	J 143	J 556	37.5	47.3	J 28.2	J 14.9	32.6

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ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:	CR-SD01-01	CR-SD02-01	CR-SD03-01	CR-SD03-01D	CR-SD04-01	CR-SD05-01	CR-SD06-01
TRAFFIC REPORT NUMBER:							
DESCRIPTION:				DUPLICATE			
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/08/88	09/08/88	09/07/88	09/07/88	09/08/88	09/08/88	09/08/88
*** GEOCHEMICAL PARAMETERS ***							
PH	5.81	6.51	4.0	4.0	4.32	4.01	5.05
ACIDITY (MG/KG)	28	79	50	51	12	12	15
TOTAL ALKALINITY (MG/KG)	ND	32	ND	ND	ND	ND	ND
TOC	3980	3590	3570	5420	2400	6900	5380
VOLATILE RESIDUE	4920	13200	3340	3940	3640	2790	2040
SIEVE 3.0 IN.	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SIEVE 1.5 IN.	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SIEVE 0.75 IN.	100.0	100.0	100.0	100.0	100.0	93.9	100.0
SIEVE 0.375 IN.	90.9	100.0	100.0	100.0	100.0	88.1	100.0
SIEVE NO. 4	89.0	98.6	100.0	99.7	100.0	82.5	97.2
SIEVE NO. 10	87.9	94.6	99.6	99.3	99.8	76.1	93.6
SIEVE NO. 20	85.8	89.4	98.6	98.3	99.3	68.7	87.6
SIEVE NO. 40	82.7	83.8	96.1	95.6	97.5	63.1	74.1
SIEVE NO. 60	78.5	79.6	91.3	90.7	93.8	58.9	61.2
SIEVE NO. 140	64.5	77.0	71.5	70.5	80.4	48.6	33.7
SIEVE NO. 200	56.8	73.8	61.5	60.4	72.9	43.0	26.1
CEC (MEQ/100g)	16.3	19.8	8.6	12.7	17.7	11.9	8.2

PP	CAS NO	COMPOUND

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:	CR-SD07-01	CR-SD08-01	CR-SD09-01
TRAFFIC REPORT NUMBER:	MCR993	MCR992	MCL373
DESCRIPTION:			
UNITS:	MG/KG	MG/KG	MG/KG
DATE SAMPLED:	09/07/88	09/07/88	09/08/88

*** INORGANICS ***

PP	CAS NO	COMPOUND			
1		ALUMINUM	1830	3190	J 16000
2		ANTIMONY	B [6.8]	ND	ND
3		ARSENIC	2.6	4.5	L 4.4
4		BARIUM	[16.2]	[30.7]	J 69.1
5		BERYLLIUM	ND	ND	J [0.80]
6		CADMIUM	ND	ND	B 3.0
7		CALCIUM	[489]	[98.0]	[1270]
8		CHROMIUM	5.8	5.0	B 19.6
9		COBALT	[2.9]	[3.6]	B 14.9
10		COPPER	8.9	14.2	B 13.0
11		IRON	5890	9280	J 27500
12		LEAD	10.2	18.1	J 1970
13		MAGNESIUM	[166]	[383]	2300
14		MANGANESE	K 112	K 171	L 455
16		NICKEL	[2.7]	[4.1]	B 10.5
17		POTASSIUM	[103]	[494]	J [1060]
19		SELENIUM	ND	ND	ND
23		VANADIUM	[7.9]	[9.9]	J 33.9
24		ZINC	16.4	15.0	J 67.2

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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY SITE - SEDIMENT SAMPLES

SAMPLE NUMBER:		CR-SD07-01	CR-SD08-01	CR-SD09-01
TRAFFIC REPORT NUMBER:				
DESCRIPTION:				
UNITS:		MG/KG	MG/KG	MG/KG
DATE SAMPLED:		09/07/88	09/07/88	09/08/88
*** GEOCHEMICAL PARAMETERS ***				
PP	CAS NO	COMPOUND			
		PH	5.4	3.3	5.48
		ACIDITY (MG/KG)	ND	12	29
		TOTAL ALKALINITY (MG/KG)	15	NB	ND
		TOC	2130	2480	6690
		VOLATILE RESIDUE	6180	11400	5540
		SIEVE 3.0 IN.	100.0	100.0	100.0
		SIEVE 1.5 IN.	100.0	100.0	100.0
		SIEVE 0.75 IN.	100.0	100.0	100.0
		SIEVE 0.375 IN.	88.9	88.9	100.0
		SIEVE NO. 4	69.9	78.4	100.0
		SIEVE NO. 10	50.5	67.9	99.4
		SIEVE NO. 20	31.0	49.1	97.9
		SIEVE NO. 40	15.2	30.5	96.1
		SIEVE NO. 60	8.1	22.3	93.7
		SIEVE NO. 140	2.6	14.0	80.7
		SIEVE NO. 200	1.9	12.4	71.3
		CEC (MEQ/100g)	1.6	12.7	13.8

TABLE F-11

SEDIMENT SAMPLES - EP TOXICITY

C & R BATTERY SITE - SEDIMENT EP TOXICITY SAMPLES

SAMPLE NUMBER:	CR-EPSD03-01	CR-EPSB03-01D	CR-EPSD05-01	CR-EPSD08-01
TRAFFIC REPORT NUMBER:				
DESCRIPTION:	EP TOX	EP TOX/DUP	EP TOX	EP TOX
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/07/88	09/07/88	09/08/88	09/07/88
*** INORGANICS ***				
PP CAS NO COMPOUND				
1 BARIUM	[136.1]	[137.6]	[119.7]	[112.6]
6 CADMIUM	B 10.6	B 11.2	B [3.5]	ND
12 LEAD	J 1682.0	J 2433.0	J 377.4	J 48.6

NOTES :
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C & R BATTERY SITE - SEDIMENT EP TOXICITY SAMPLES

SAMPLE NUMBER:		CR-EPSD03-01	CR-EPSD03-01D	CR-EPSD05-01	CR-EPSD08-01
TRAFFIC REPORT NUMBER:					
DESCRIPTION:					
UNITS:					
DATE SAMPLED:		09/07/88	09/07/88	09/08/88	09/07/88
*** GEOCHEMICAL PARAMETERS ***					
PP	CAS NO	COMPOUND			
NO PARAMETERS FOR THIS CATEGORY					

TABLE F-12

BLANK SAMPLES

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01F	CR-S000-02F	CR-S000-03F	CR-S000-04F	CR-S000-05F	CR-S000-06F	CR-S000-07F
TRAFFIC REPORT NUMBER:	MCM729	MCM732	MCM734	MCM735	MCM737	MCM739	MCM741
% SOLIDS:							
DESCRIPTION:	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
6 CADMIUM	ND	ND	ND	ND	ND	ND	ND
7 CALCIUM	ND	[560]	[604]	[511]	[516]	[698]	[540]
10 COPPER	40	112	77	66	58	52	71
11 IRON	169	120	530	ND	ND	ND	ND
12 LEAD	[1.9]	ND	ND	ND	[1.0]	[1.2]	[1.2]
14 MANGANESE	ND	ND	ND	ND	ND	ND	ND
19 SILVER	ND	[5.8]	ND	ND	ND	ND	ND
20 SODIUM	ND	[654]	[667]	ND	ND	[786]	[744]
24 ZINC	ND	ND	55	ND	ND	ND	ND

AR302004

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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01F	CR-S000-02F	CR-S000-03F	CR-S000-04F	CR-S000-05F	CR-S000-06F	CR-S000-07F
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88
*** GEOCHEMICAL PARAMETERS ***							
PP CAS NO COMPOUND							
PH	NA	NA	NA	NA	NA	NA	NA
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:				
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:	MCM743	MCM745	MCM325	MCM327
% SOLIDS:				
DESCRIPTION:	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89
*** INORGANICS ***				
PP CAS NO COMPOUND				
6 CADMIUM	ND	ND	8.0	ND
7 CALCIUM	[495]	[506]	ND	ND
10 COPPER	50	64	ND	ND
11 IRON	ND	ND	614	533
12 LEAD	[1.1]	[1.3]	[3.4]	[4.8]
14 MANGANESE	ND	ND	ND	16.9
19 SILVER	ND	[5.1]	ND	ND
20 SODIUM	ND	ND	ND	ND
24 ZINC	ND	ND	ND	[17.9]

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C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:	NA	NA		
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND				
		PH	NA	NA	ND	ND
		SO4 (MG/KG)	NA	NA	ND	ND
		ACIDITY (MG/KG)	NA	NA	ND	ND
		TOTAL ALKALINITY (MG/KG)	NA	NA	ND	ND
		BICARBONATE ALK (MG/KG)	NA	NA	ND	ND
		CARBONATE ALK (MG/KG)	NA	NA	ND	ND
		WATER CONTENT %	NA	NA	ND	ND
		DRY UNIT WEIGHT PCF	NA	NA	ND	ND
		SPECIFIC GRAVITY	NA	NA	ND	ND
		PLASTICITY INDEX	NA	NA	ND	ND
		LIQUID LIMIT	NA	NA	ND	ND
		PERMEABILITY TEST CM/SEC	NA	NA	ND	ND
		SIEVE 3.0 IN.	NA	NA	ND	ND
		SIEVE 1.5 IN.	NA	NA	ND	ND
		SIEVE 0.75 IN.	NA	NA	ND	ND
		SIEVE 0.375 IN.	NA	NA	ND	ND
		SIEVE NO. 4	NA	NA	ND	ND
		SIEVE NO. 10	NA	NA	ND	ND
		SIEVE NO. 20	NA	NA	ND	ND
		SIEVE NO. 40	NA	NA	ND	ND
		SIEVE NO. 60	NA	NA	ND	ND
		SIEVE NO. 140	NA	NA	ND	ND
		SIEVE NO. 200	NA	NA	ND	ND
		DEPTH FT.	NA	NA	ND	ND
		DRY DENSITY PCF	NA	NA	ND	ND
		CEC (MEQ/100g)	NA	NA	ND	ND

C & R BATTERY - FIELD BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08F	CR-S000-09F	CR-S000-20F	CR-S000-21F
TRAFFIC REPORT NUMBER:	NA	NA		
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89
*** GEOCHEMICAL PARAMETERS ***				
PP CAS NO COMPOUND				
PH	NA	NA	ND	ND
SO4 (MG/KG)	NA	NA	ND	ND
ACIDITY (MG/KG)	NA	NA	ND	ND
TOTAL ALKALINITY (MG/KG)	NA	NA	ND	ND
BICARBONATE ALK (MG/KG)	NA	NA	ND	ND
CARBONATE ALK (MG/KG)	NA	NA	ND	ND
WATER CONTENT %	NA	NA	ND	ND
DRY UNIT WEIGHT PCF	NA	NA	ND	ND
SPECIFIC GRAVITY	NA	NA	ND	ND
PLASTICITY INDEX	NA	NA	ND	ND
LIQUID LIMIT	NA	NA	ND	ND
PERMEABILITY TEST CM/SEC	NA	NA	ND	ND
SIEVE 3.0 IN.	NA	NA	ND	ND
SIEVE 1.5 IN.	NA	NA	ND	ND
SIEVE 0.75 IN.	NA	NA	ND	ND
SIEVE 0.375 IN.	NA	NA	ND	ND
SIEVE NO. 4	NA	NA	ND	ND
SIEVE NO. 10	NA	NA	ND	ND
SIEVE NO. 20	NA	NA	ND	ND
SIEVE NO. 40	NA	NA	ND	ND
SIEVE NO. 60	NA	NA	ND	ND
SIEVE NO. 140	NA	NA	ND	ND
SIEVE NO. 200	NA	NA	ND	ND
DEPTH FT.	NA	NA	ND	ND
DRY DENSITY PCF	NA	NA	ND	ND
CEC (MEQ/100g)	NA	NA	ND	ND

C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01R	CR-S000-02R	CR-S000-03R	CR-S000-04R	CR-S000-05R	CR-S000-06R	CR-S000-07R
TRAFFIC REPORT NUMBER:	MCM730	MCM731	MCM733	MCM736	MCM738	MCM740	MCM742
% SOLIDS:							
DESCRIPTION:	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK
UNITS:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88
*** INORGANICS ***							
PP CAS NO COMPOUND							
1 ALUMINUM	[160]	ND	[164]	ND	6790	ND	ND
2 ANTIMONY	ND	ND	ND	[26]	ND	ND	ND
7 CALCIUM	[762]	[822]	[829]	[656]	[851]	[784]	[733]
8 CHROMIUM	ND	ND	ND	ND	98	ND	[8.5]
10 COPPER	41	37	71	52	49	98	64
11 IRON	ND	ND	308	ND	70.9	113	ND
12 LEAD	[2.0]	[1.0]	[3.1]	6.6	[2.9]	[1.9]	[3.7]
14 MANGANESE	ND	ND	ND	ND	ND	ND	ND
17 POTASSIUM	ND	ND	ND	[1000]	ND	ND	ND
19 SILVER	ND	ND	[6.0]	[7.0]	ND	[8.1]	ND
20 SODIUM	[1060]	[1080]	[1110]	[1040]	[1170]	[1010]	[1030]
24 ZINC	ND	ND	ND	ND	ND	20	ND

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C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-01R	CR-S000-02R	CR-S000-03R	CR-S000-04R	CR-S000-05R	CR-S000-06R	CR-S000-07R
TRAFFIC REPORT NUMBER:	NA	NA	NA	NA	NA	NA	NA
% SOLIDS:							
DESCRIPTION:							
UNITS:							
DATE SAMPLED:	09/16/88	09/17/88	09/18/88	09/20/88	09/20/88	09/22/88	09/22/88
*** GEOCHEMICAL PARAMETERS ***							
PH	NA	NA	NA	NA	NA	NA	NA
SO4 (MG/KG)	NA	NA	NA	NA	NA	NA	NA
ACIDITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
TOTAL ALKALINITY (MG/KG)	NA	NA	NA	NA	NA	NA	NA
BICARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
CARBONATE ALK (MG/KG)	NA	NA	NA	NA	NA	NA	NA
WATER CONTENT %	NA	NA	NA	NA	NA	NA	NA
DRY UNIT WEIGHT PCF	NA	NA	NA	NA	NA	NA	NA
SPECIFIC GRAVITY	NA	NA	NA	NA	NA	NA	NA
PLASTICITY INDEX	NA	NA	NA	NA	NA	NA	NA
LIQUID LIMIT	NA	NA	NA	NA	NA	NA	NA
PERMEABILITY TEST CM/SEC	NA	NA	NA	NA	NA	NA	NA
SIEVE 3.0 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 1.5 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.75 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE 0.375 IN.	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 4	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 10	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 20	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 40	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 60	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 140	NA	NA	NA	NA	NA	NA	NA
SIEVE NO. 200	NA	NA	NA	NA	NA	NA	NA
DEPTH FT.	NA	NA	NA	NA	NA	NA	NA
DRY DENSITY PCF	NA	NA	NA	NA	NA	NA	NA
CEC (MEQ/100g)	NA	NA	NA	NA	NA	NA	NA

PP CAS NO COMPOUND

C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08R	CR-S000-09R	CR-S000-20R	CR-S000-21R
TRAFFIC REPORT NUMBER:				
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

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C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08R	CR-S000-09R	CR-S000-20R	CR-S000-21R
TRAFFIC REPORT NUMBER:	MCM744	MCM746	MCM326	MCM328
% SOLIDS:				
DESCRIPTION:	RINSATE BLK	RINSATE BLK	RINSATE BLK	RINSATE BLK
UNITS:	UG/L	UG/L	UG/L	UG/L
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

*** INORGANICS ***

PP	CAS NO	COMPOUND				
1		ALUMINUM	ND	9710	ND	ND
2		ANTIMONY	ND	ND	ND	ND
7		CALCIUM	[764]	[915]	ND	ND
8		CHROMIUM	ND	130	ND	ND
10		COPPER	49	50	68.2	ND
11		IRON	ND	1000	792	701
12		LEAD	7.5	[2.6]	[4.0]	[3.7]
14		MANGANESE	ND	ND	ND	26.9
17		POTASSIUM	ND	ND	ND	ND
19		SILVER	[6.9]	[6.1]	ND	ND
20		SODIUM	[1050]	[1180]	ND	ND
24		ZINC	ND	27	36.3	ND

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C & R BATTERY - RINSATE BLANK SOIL SAMPLES

SAMPLE NUMBER:	CR-S000-08R	CR-S000-09R	CR-S000-20R	CR-S000-21R
TRAFFIC REPORT NUMBER:	NA	NA		
% SOLIDS:				
DESCRIPTION:				
UNITS:				
DATE SAMPLED:	09/26/88	09/26/88	03/22/89	03/22/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND				
		PH	NA	NA	ND	ND
		SO4 (MG/KG)	NA	NA	ND	ND
		ACIDITY (MG/KG)	NA	NA	ND	ND
		TOTAL ALKALINITY (MG/KG)	NA	NA	ND	ND
		BICARBONATE ALK (MG/KG)	NA	NA	ND	ND
		CARBONATE ALK (MG/KG)	NA	NA	ND	ND
		WATER CONTENT %	NA	NA	ND	ND
		DRY UNIT WEIGHT PCF	NA	NA	ND	ND
		SPECIFIC GRAVITY	NA	NA	ND	ND
		PLASTICITY INDEX	NA	NA	ND	ND
		LIQUID LIMIT	NA	NA	ND	ND
		PERMEABILITY TEST CM/SEC	NA	NA	ND	ND
		SIEVE 3.0 IN.	NA	NA	ND	ND
		SIEVE 1.5 IN.	NA	NA	ND	ND
		SIEVE 0.75 IN.	NA	NA	ND	ND
		SIEVE 0.375 IN.	NA	NA	ND	ND
		SIEVE NO. 4	NA	NA	ND	ND
		SIEVE NO. 10	NA	NA	ND	ND
		SIEVE NO. 20	NA	NA	ND	ND
		SIEVE NO. 40	NA	NA	ND	ND
		SIEVE NO. 60	NA	NA	ND	ND
		SIEVE NO. 140	NA	NA	ND	ND
		SIEVE NO. 200	NA	NA	ND	ND
		DEPTH FT.	NA	NA	ND	ND
		DRY DENSITY PCF	NA	NA	ND	ND
		CEC (MEQ/100g)	NA	NA	ND	ND

C & R BATTERY SITE - DEBRIS PILE BLANK SAMPLES

SAMPLE NUMBER:	CR-DP00-01F	CR-DP00-01R
TRAFFIC REPORT NUMBER:	MCL387	MCL386
DESCRIPTION:	FIELD BLANK	RINSATE BLK
UNITS:	UG/L	UG/L
DATE SAMPLED:	09/09/88	09/09/88

*** INORGANICS ***

PP	CAS NO	COMPOUND		
1		ALUMINUM	ND	[51.5]
4		BARIUM	ND	[11.0]
5		BERYLLIUM	ND	[0.60]
7		CALCIUM	[502]	[569]
10		COPPER	ND	[7.2]
11		IRON	[19.1]	[27.9]
12		LEAD	[1.9]	[2.4]
16		NICKEL	[25.2]	[10.4]
19		SILVER	ND	9.3
20		SODIUM	[293]	[683]
24		ZINC	36.6	22.5

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C & R BATTERY SITE - DEBRIS PILE BLANK SAMPLES

SAMPLE NUMBER:	CR-DP00-01F	CR-DP00-01R
TRAFFIC REPORT NUMBER:	NA	NA
DESCRIPTION:		
UNITS:		
DATE SAMPLED:	09/09/88	09/09/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND		
		PH	NA	NA
		ACIDITY (MG/KG)	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA
		SIEVE 3.0 IN.	NA	NA
		SIEVE 1.5 IN.	NA	NA
		SIEVE 0.75 IN.	NA	NA
		SIEVE 0.375 IN.	NA	NA
		SIEVE NO. 4	NA	NA
		SIEVE NO. 10	NA	NA
		SIEVE NO. 20	NA	NA
		SIEVE NO. 40	NA	NA
		SIEVE NO. 60	NA	NA
		SIEVE NO. 140	NA	NA
		SIEVE NO. 200	NA	NA
		CEC (MEQ/100g)	NA	NA

C & R BATTERY SITE - SURFACE WATER BLANK SAMPLES

SAMPLE NUMBER:	CR-SW00-01FT	CR-SW00-01R
TRAFFIC REPORT NUMBER:	MCR991	MCR990
DESCRIPTION:	TOT MET BLK	DIS MET BLK
UNITS:	UG/L	UG/L
DATE SAMPLED:	09/07/88	09/07/88

*** INORGANICS ***

PP	CAS NO	COMPOUND		
1		ALUMINUM	[61.8]	[67.9]
4		BARIUM	[8.5]	[5.7]
7		CALCIUM	[347]	[447]
11		IRON	ND	[49.8]
12		LEAD	ND	[3.9]
13		MAGNESIUM	[80.4]	[121]
24		ZINC	[3.7]	[7.4]

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C & R BATTERY SITE - SURFACE WATER BLANK SAMPLES

SAMPLE NUMBER:	CR-SW00-01FT	CR-SW00-01R
TRAFFIC REPORT NUMBER:	NA	NA
DESCRIPTION:		
UNITS:		
DATE SAMPLED:	09/07/88	09/07/88

*** GEOCHEMICAL PARAMETERS ***

FP	CAS NO	COMPOUND		
		ACIDITY (MG/KG)	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA
		BICARBONATE ALK (MG/KG)	NA	NA
		TSS	NA	NA
		HARDNESS	NA	NA
		TDS	NA	NA

C & R BATTERY SITE - SEDIMENT BLANK SAMPLES

SAMPLE NUMBER:	CR-SD00-01F	CR-SD00-01R
TRAFFIC REPORT NUMBER:	MCL375	MCL374
DESCRIPTION:	FIELD BLANK	RINSATE BLK
UNITS:	UG/L	UG/L
DATE SAMPLED:	09/09/88	09/09/88

*** INORGANICS ***

PP	CAS NO	COMPOUND		
9		CHROMIUM	ND	15.3
9		COBALT	28.1	[23.0]
11		IRON	ND	110
16		NICKEL	[18.0]	ND

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C & R BATTERY SITE - SEDIMENT BLANK SAMPLES

SAMPLE NUMBER:	CR-SD00-01F	CR-SD00-01R
TRAFFIC REPORT NUMBER:		
DESCRIPTION:		
UNITS:	MG/L	MG/L
DATE SAMPLED:	09/09/88	09/09/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND		
		PH	NA	NA
		ACIDITY (MG/KG)	NA	NA
		TOTAL ALKALINITY (MG/KG)	NA	NA
		TOC	0.80	0.75
		VOLATILE RESIDUE	NA	NA
		SIEVE 3.0 IN.	NA	NA
		SIEVE 1.5 IN.	NA	NA
		SIEVE 0.75 IN.	NA	NA
		SIEVE 0.375 IN.	NA	NA
		SIEVE NO. 4	NA	NA
		SIEVE NO. 10	NA	NA
		SIEVE NO. 20	NA	NA
		SIEVE NO. 40	NA	NA
		SIEVE NO. 60	NA	NA
		SIEVE NO. 140	NA	NA
		SIEVE NO. 200	NA	NA
		CEC (MEQ/100g)	NA	NA

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-03R
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	RINSATE BLK
UNITS:	UG/L
DATE SAMPLED:	03/30/89

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[85.2]
12		LEAD	[1.8]

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
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R = VALUE IS REJECTED
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K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER / L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-03R
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	
UNITS:	
DATE SAMPLED:	03/30/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND

NO PARAMETERS FOR THIS CATEGORY

C & R BATTERY - MONITORING WELL BLANK SAMPLES

SAMPLE NUMBER:	CR-MW00-01-03F
TRAFFIC REPORT NUMBER:	MCM784
DESCRIPTION:	FIELD BLANK
UNITS:	UG/L
DATE SAMPLED:	03/30/89

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[57.8]
11		IRON	[18.3]
12		LEAD	[2.5]

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L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL BLANK SAMPLES

SAMPLE NUMBER:	CR-MW00-01-03F
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	
UNITS:	
DATE SAMPLED:	03/30/89

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND

NO PARAMETERS FOR THIS CATEGORY

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-RT
TRAFFIC REPORT NUMBER:	MCL399
DESCRIPTION:	TOT MET BLK
UNITS:	UG/L
DATE SAMPLED:	09/28/88

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[100]
4		BARIUM	[7.2]
5		BERYLLIUM	[0.8]
7		CALCIUM	[762]
10		COPPER	[10.8]
11		IRON	193
12		LEAD	[2.5]
14		MANGANESE	[2.3]
16		NICKEL	[10.7]
17		POTASSIUM	[1460]
20		SODIUM	[722]
24		ZINC	87.6

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L = VALUE IS BIASED LOS, ACTUAL VALUE MAY BE HIGHER
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C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-RT
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	
UNITS:	
DATE SAMPLED:	09/28/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND	
		SO4 (MG/KG)	NA
		ACIDITY (MG/KG)	NA
		TOTAL ALKALINITY (MG/KG)	NA
		BICARBONATE ALK (MG/KG)	NA
		CARBONATE ALK (MG/KG)	NA
		TSS	NA
		TDS	NA

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-FT
TRAFFIC REPORT NUMBER:	MCL400
DESCRIPTION:	TOT MET BLK
UNITS:	UG/L
DATE SAMPLED:	09/28/88

*** INORGANICS ***

PP	CAS NO	COMPOUND	
1		ALUMINUM	[62.6]
5		BERYLLIUM	[0.8]
7		CALCIUM	[284]
10		COPPER	[12.2]
11		IRON	[34.1]
12		LEAD	[4.2]
14		MANGANESE	[2.0]
16		NICKEL	[17.8]
17		POTASSIUM	[1950]
20		SODIUM	[269]
24		ZINC	50.6

NOTES : B = VALUE NOT DETECTED SUBSTANTIALLY ABOVE A LEVEL REPORTED IN A BLANK
J = VALUE IS ESTIMATED / R = VALUE IS REJECTED
[] = VALUE REPORTED IS LESS THAN THE CONTRACT REQUIRED DETECTION LIMIT
K = VALUE IS BIASED HIGH, ACTUAL VALUE MAY BE LOWER
L = VALUE IS BIASED LOW, ACTUAL VALUE MAY BE HIGHER
ND = NOT DETECTED / NA = NOT ANALYZED

C & R BATTERY - MONITORING WELL BLANK SAMPLE

SAMPLE NUMBER:	CR-MW00-01-FT
TRAFFIC REPORT NUMBER:	
DESCRIPTION:	FIELD BLANK
UNITS:	MG/L
DATE SAMPLED:	09/28/88

*** GEOCHEMICAL PARAMETERS ***

PP	CAS NO	COMPOUND	
		SO4 (MG/KG)	ND
		ACIDITY (MG/KG)	NA
		TOTAL ALKALINITY (MG/KG)	NA
		BICARBONATE ALK (MG/KG)	NA
		CARBONATE ALK (MG/KG)	NA
		TSS	NA
		TDS	NA
		QUICKTURN LEAD (UG/L)	NA

TABLE F-13

SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES

TABLE F-13

SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES
C & R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Boring No.	Sample Depth (feet)									
	0-2		3-5		6-8		9-11		13-15	
	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP
SO-01	2,300	1,670	6,670	2,800	ND	39	ND	NA	ND	NA
SO-02	10,290	13,500	290	447	1,240	180	90	88	ND	129
SO-03	650	822	ND	42	ND	NA	ND	NA	ND	NA
SO-04	ND	168	ND	NA	ND	NA	ND	NA	ND	NA
SO-05	ND	320	8,460	7,200	350	383	ND	23	ND	NA
SO-06	5,110	2,780	630	369	ND	177	ND	NA	ND	NA
SO-07	21,980	19,000	680	841	510	99	90	141	ND	341
SO-08	76,410	43,000	ND	42	1,780	1,480	590	737	70	247
SO-09	2,290	3,380	ND	40	ND	NA	ND	NA	ND	NA
SO-10	20,890	23,800	17,530	13,900	3,870	1,840	830	944	ND	27
SO-11	92,260	36,800	20,670	19,400	15,520	7,720	ND	148	110	834
SO-12	7,280	4,510	650	1,270	650	554	150	77	ND	23
SO-13	127,100	50,200	20,360	16,400	1,360	5,420	ND	77	ND	NA
SO-14	134,500	122,000	17,200	14,500	970	654	910	312	910	1,110
SO-15	22,520	29,400	1,580	920	6,830	7,510	ND	137	ND	NA
SO-16	120,400	75,100	23,600	10,400	13,680	79,400	470	622	ND	18
SO-17	4,860	17,400	ND	43	ND	NA	ND	NA	ND	15
SO-18	14,860	23,200	640	23,600	560	1,130	ND	42	ND	NA
SO-19	14,260	8,940	ND	83	ND	NA	ND	NA	ND	NA
SO-20	870	825	ND	566	80	212	60	112	ND	270
SO-21	350	294	ND	81	ND	NA	ND	NA	ND	NA
SO-22	21,010	938	7,050	3,700	ND	26	ND	NA	ND	NA
SO-23	ND	37	ND	108	ND	NA	ND	NA	ND	NA
SO-24	ND	16	ND	NA	ND	NA	ND	NA	ND	NA
SO-25	3,880	2,620	3,180	4,220	ND	91	ND	NA	ND	NA
SO-26	ND	101	ND	NA	ND	NA	NA	NA	ND	NA
SO-27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-28	1,750	2,090	880	41,400	ND	28	ND	NA	ND	NA
SO-29	ND	75	NA	NA	NA	NA	NA	NA	NA	NA
SO-30	ND	54	NA	NA	NA	NA	NA	NA	NA	NA

TABLE F-13
SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES
C & R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA
PAGE TWO

Boring No.	Sample Depth (feet)									
	20-22		25-27		30-32		35-37		40-42	
	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP	XRF	CLP
SO-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-05	ND	NA	90	67	ND	19	ND	ND	ND	NA
SO-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-13	ND	NA	ND	56	ND	NA	ND	20	ND	NA
SO-14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-17	ND	NA	80	157	ND	23	ND	NA	ND	NA
SO-18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-22	ND	NA	ND	NA	ND	ND	ND	NA	ND	NA
SO-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-25	300	70	ND	NA	330	263	ND	96	ND	NA
SO-26	ND	NA	170	NA	ND	NA	130	NA	ND	NA
SO-27	NA	NA	NA	39	NA	41	NA	NA	NA	NA
SO-28	ND	NA	80	88	ND	NA	ND	NA	ND	NA
SO-29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SO-30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE F-13
SUMMARY OF XRF AND CLP LEAD RESULTS FOR SOIL SAMPLES
C & R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA
PAGE THREE

Notes:

XRF X-ray fluorescence analytical result (detection limit approximately 120 mg/kg)
CLP Contract Laboratory Program analytical result
ND Not Detected
NA Not Analyzed

TABLE F-14

SUMMARY OF XRF LEAD RESULTS (MARCH 1989)

TABLE F-14

SUMMARY OF XRF LEAD RESULTS (MARCH 1989)
C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Boring No.	Sample Depth (feet)									
	0-2	3-5	6-8	9-11	13-15	20-22	25-27	30-32	35-37	40-42
S0-14A	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND
SO-31	27,200 [7,680]	ND [156]	ND	ND	ND	NA	NA	NA	NA	NA
SO-32	20,100 [24,600]	ND [33.8]	ND	ND	ND	NA	NA	NA	NA	NA
SO-33	200 [368]	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-34	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-35	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-36	120 [43.6]	ND	ND	ND	ND	NA	NA	NA	NA	NA
SO-37	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND

Samples analyzed by the EPA Region III Central Regional Laboratory (CRL).
All results reported in mg/kg.
ND - Not detected. Detection limit = 100 mg/kg.
NA - Not analyzed.
[7,680] - CLP lead value for same sampling interval.

APPENDIX G

TOXICOLOGICAL PROFILES

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TABLES

G.1 ANTIMONY (Clement Associates, Inc., 1985)

G.1.1 Health Effects

Antimony production has been associated with an increase in lung cancer among exposed workers, and one inhalation study in rats also indicated that antimony trioxide might produce lung and liver tumors. Several studies in bacterial test systems report that various antimony compounds, including antimony trioxide, antimony trichloride, and antimony pentachloride, may be mutagenic. Reports of effects on reproduction are limited. Among the effects on reproduction reported for humans are impairments to the female reproductive system. Female workers exposed to metallic antimony dust, antimony trioxide, and antimony pentoxide had an increased incidence of gynecological disorders and late spontaneous abortions. Antimony was found in the breast milk, placental tissue, amniotic fluid, and blood of the umbilical cord in exposed workers. Decreased weight gain was observed in children born of workers exposed to antimony. The same paper reports a study in which intraperitoneal administration of antimony produced changes in rats that support the findings of human reproductive effects.

Cardiovascular changes associated with exposure to antimony represent a serious health effect. Exposure to either trivalent or pentavalent antimonial compounds can produce electrocardiogram (ECG) changes in humans. Histopathological evidence of cardiac edema, myocardial fibrosis, and other signs of myocardial structural damage indicates that antimony may produce even more severe, possibly permanent myocardial damage in humans. Parallel findings of functional changes in ECG patterns and of histopathological evidence of myocardial structural damage have also been obtained in animal toxicity studies. Pneumoconiosis in response to inhalation exposure and dermatitis in response to skin exposure have also been observed among individuals exposed to antimony or its compounds.

G.1.2 Toxicity to Wildlife and Domestic Animals

Tests with antimony potassium tartrate and antimony trichloride in Daphnia magna reveal no difference in the toxicity of these two compounds. The LC_{50} and EC_{50} values for Daphnia magna and the fathead minnow, both freshwater species, range from 9,000 to 21,900 µg/liter. Chronic values for the fathead minnow and Daphnia magna are 1,600 and 5,400 µg/liter, respectively. Acute-chronic ratios for the fathead minnow and Daphnia magna are 14 and 3.5, respectively. The freshwater alga Selenastrum capricornutum is more sensitive than the animal species tested, with a 96-hour EC_{50} of 610 µg/liter for inhibition of the synthesis of chlorophyll a. No detectable bioconcentration of

antimony by the bluegill was observed. No definitive data concerning the toxicity of antimony to saltwater species or to other wildlife or domestic animals are available.

G.2 ARSENIC (Clement Associates, Inc., 1985)

G.2.1 Health Effects

Arsenic has been implicated in the production of skin cancer in humans. There is also extensive evidence that inhalation of arsenic compounds causes lung cancer in workers. Arsenic compounds cause chromosome damage in animals, and humans exposed to arsenic compounds have been reported to have an elevated incidence of chromosome aberrations. Arsenic compounds have been reported to be teratogenic, fetotoxic, and embryotoxic in several animal species, and an increased incidence of multiple malformations among children born to women occupationally exposed to arsenic has been reported. Arsenic compounds also cause noncancerous, possibly precancerous, skin changes in exposed individuals. Several cases of progressive polyneuropathy involving motor and sensory nerves and particularly affecting the extremities and myelinated long-axon neurons have been reported in individuals occupationally exposed to inorganic arsenic. Polyneuropathies have also been reported after the ingestion of arsenic-contaminated foods.

G.2.2 Toxicity to Wildlife and Domestic Animals

Various inorganic forms of arsenic appear to have similar levels of toxicity; they all seem to be much more toxic than organic forms. Acute toxicity to adult freshwater animals occurs at levels of arsenic trioxide as low as 812 µg/liter and at levels as low as 40 µg/liter in early life stages of aquatic organisms. Acute toxicity to saltwater fish occurs at levels around 15 mg/liter, while some invertebrates are affected at much lower levels (508 µg/liter). Arsenic toxicity does not appear to increase greatly with chronic exposure, and it does not seem that arsenic is bioconcentrated to a great degree.

Arsenic poisoning is a rare but not uncommon toxic syndrome among domestic animals. Arsenic causes pyperemia and edema of the gastrointestinal tract, hemorrhage of the cardiac aerosal surfaces and peritoneum, and pulmonary congestion and edema; and it may cause liver necrosis. Information on arsenic toxicity to terrestrial wildlife was not reported in the literature reviewed.

G.3 CADMIUM (Clement Associates, Inc., 1985)

G.3.1 Health Effects

There is suggestive evidence linking cadmium with cancer of the prostate in humans. In animal studies, inhalation exposure to cadmium caused lung tumors in rats, and exposure by injection produced injection-site sarcomas and/or Leydig-cell tumors. An increased incidence of tumors has not been seen in animals exposed to cadmium orally, but four of the five available studies were inadequate by current standards.

The evidence from a large number of studies on the mutagenicity of cadmium is equivocal, and it has been hypothesized that cadmium is not directly mutagenic but impedes repair. Cadmium is a known animal teratogen and reproductive toxin. It has been shown to cause renal dysfunction in both humans and animals. Other toxic effects attributed to cadmium include immunosuppression (in animals), anemia (in humans), pulmonary disease (in humans), possible effects on the endocrine system, defects in sensory function, and bone damage. The oral LD_{50} in the rat was 225 mg/kg.

G.3.2 Toxicity to Wildlife and Domestic Animals

Laboratory experiments suggest that cadmium may have adverse effects on reproduction in fish at levels present in lightly to moderately polluted waters.

The acute LC_{50} for freshwater fish and invertebrates generally ranged from 100 to 1,000 µg/liter; salmonids are much more sensitive than other organisms. Saltwater species were in general 10-times more tolerant to the acute effects of cadmium. Chronic tests have been performed and show that cadmium has cumulative toxicity and acute-chronic ratios that range from 66 to 431. Bioconcentration factors were generally less than 1,000 but were as high as 10,000 for some freshwater fish species.

No adverse effects on domestic or wild animals were reported.

G.4 LEAD (Clement Associates, Inc., 1985)

G.4.1 Health Effects

There is evidence that several lead salts are carcinogenic in mice or rats, causing tumors of the kidneys after either oral or parenteral administration. EPA has classified lead as a probable human

carcinogen via the inhalation route of exposure. There is equivocal evidence that exposure to lead causes genotoxicity in humans and animals. The available evidence indicates that lead presents a hazard to reproduction and exerts a toxic effect on conception, pregnancy, and the fetus in humans and experimental animals.

Many lead compounds are sufficiently soluble in body fluids to be toxic. Exposure of humans or experimental animals to lead can result in toxic effects in the brain and central nervous system, the peripheral nervous system, the kidneys, and the hematopoietic system. Chronic exposure to inorganic lead by ingestion or inhalation can cause lead encephalopathy, and severe cases can result in permanent brain damage. Lead poisoning may cause peripheral neuropathy in adults and children, and permanent learning disabilities that are clinically undetectable in children may be caused by exposure to relatively low levels. Short-term exposure to lead can cause reversible kidney damage, but prolonged exposure at high concentrations may result in progressive kidney damage and possibly kidney failure. Anemia, due to inhibition of hemoglobin synthesis and a reduction in the life span of circulating red blood cells, is an early manifestation of lead poisoning. Several studies with experimental animals suggest that lead may interfere with various aspects of the immune response.

G.4.2 Toxicity to Wildlife and Domestic Animals

Freshwater vertebrates and invertebrates are more sensitive to lead in soft water than in hard water. At a hardness of about 50 mg/liter $CaCO_3$, the median effect concentrations for nine families range from 140 g/liter to 236,600 µg/liter. Chronic values for Daphnia magna and the rainbow trout are 12.26 and 83.08 µg/liter, respectively, at a hardness of about 50 mg/liter. Acute-chronic ratios calculated for three freshwater species ranged from 18 to 62. Bioconcentration factors, ranging from 42 for young brook trout to 1,700 for a snail, were reported. Freshwater algae show an inhibition of growth at concentrations above 500 µg/liter.

Acute values for twelve saltwater species range from 476 µg/liter for the common mussel to 27,000 µg/liter for the soft-shell clam. Chronic exposure to lead causes adverse effects in mysid shrimp at 37 µg/liter, but not at 17 µg/liter. The acute-chronic ratio for this species is 118. Reported bioconcentration factors range from 17.5 for the Quahog clam to 2,570 for the blue mussel. Saltwater algae are adversely affected at approximate lead concentrations as low as 15.8 µg/liter.

Although lead is known to occur in the tissue of many free-living wild animals, including birds, mammals, fishes, and invertebrates, reports of poisoning usually involve waterfowl. There is evidence that lead, at concentrations occasionally found near roadsides and smelters, can eliminate or reduce

populations of bacteria and fungi on leaf surfaces and in soil. Many of these microorganisms play key roles in the decomposer food chain.

Cases of lead poisoning have been reported for a variety of domestic animals, including cattle, horses, dogs, and cats. Several types of anthropogenic sources are cited as the source of lead in these reports. Because of their curiosity and their indiscriminate eating habits, cattle experience the greatest incidence of lead toxicity among domestic animals.

G.5 NICKEL (Clement Associates, Inc., 1985)

G.5:1 Health Effects

There is extensive epidemiological evidence indicating excess cancer of the lung and nasal cavity for workers at nickel refineries and smelters, and weaker evidence for excess risk in workers at nickel electroplating and polishing operations. Nickel is a Class A carcinogen. Respiratory tract cancers have occurred in excess at industrial facilities that are metallurgically diverse in their operations. The nickel compounds that have been implicated as having carcinogenic potential are insoluble dusts of nickel subsulfide and nickel oxides, the vapor of nickel carbonyl, and soluble aerosols of nickel sulfate, nitrate, or chloride. Inhalation studies with experimental animals suggest that nickel subsulfide and nickel carbonyl are carcinogenic in rats. Evidence for the carcinogenicity of nickel metal and other compounds is relatively weak or inconclusive. Studies with experimental animals indicate that nickel compounds can also produce various types of malignant tumors in experimental animals after administration by other routes, including subcutaneous, intramuscular, implantation, intravenous, intrarenal, and intrapleural. Carcinogenic potential is not strongly dependent on route or site of administration, but appears to be inversely related to the solubility of the compounds in aqueous media. Insoluble compounds, such as nickel dust, nickel sulfide, nickel carbonate, nickel oxide, nickel carbonyl, and nickelocene are carcinogenic, whereas soluble nickel salts such as nickel chloride, nickel sulfate, and nickel ammonium sulfate, are not.

Mammalian cell transformation data indicate that several nickel compounds are mutagenic and can cause chromosomal alterations. The available information is inadequate for assessing teratogenic and reproductive effects of nickel in humans and experimental animals.

Dermatitis and other dermatological effects are the most frequent effects of exposure to nickel and nickel-containing compounds. The dermatitis is a sensitization reaction. Most information regarding acute toxicity of nickel involves inhalation exposure to nickel carbonyl. Clinical manifestations of acute poisoning include both immediate and delayed symptoms. Acute chemical pneumonitis is

produced, and death may occur at exposures of 107 mg/m^3 for 30 minutes. Rhinitis, nasal sinusitis, and nasal mucosal injury are among the effects reported among workers chronically exposed to various nickel compounds. Studies with experimental animals suggest that nickel and nickel compounds have relatively low acute and chronic oral toxicity.

G.5.2 Toxicity to Wildlife and Domestic Animals

In freshwater, toxicity depends on hardness; nickel tends to be more toxic in softer water. Acute values for exposure to a variety of nickel salts, expressed as nickel, range from 510 µg/liter for Daphnia magna to 46,200 µg/liter for banded killifish at comparable hardness levels. Chronic values range from 14.8 µg/liter for Daphnia magna in soft water to 530 µg/liter for the fathead minnow in hard water. Acute-chronic ratios for Daphnia magna range from 14 in hard water to 83 in soft water, and are approximately 50 in both hard and soft water for the fathead minnow. Residue data for the fathead minnow indicate a bioconcentration factor of 61. Freshwater algae experience reduced growth at nickel concentrations as low as 100 µg/liter.

Acute values for saltwater species range from 152 µg/liter for mysid shrimp to 350,000 µg/liter for the mummichog. A chronic value of 92.7 µg/liter is reported for the mysid shrimp, which gives an acute-chronic ratio of 5.5 for the species. Reduced growth is seen in saltwater algae at concentrations as low as 1,000 µg/liter. Bioconcentration factors ranging from 299 to 416 have been reported for the oyster and mussel.

G.6 SILVER (Clement Associates, Inc., 1985)

G.6.1 Health Effects

Only equivocal evidence exists to suggest that silver has carcinogenic activity in experimental animals. Silver implants and injected colloidal suspensions are reported to produce tumors or hyperplasis at the site of application in several studies. However, it is suggested that the effects are due to the physical form of the metal or to its action as an exogenous irritant. There are no studies to suggest that silver is carcinogenic in humans. Silver does not appear to have significant mutagenic or teratogenic activity in humans or experimental animals.

Silver can be absorbed in humans by inhalation or ingestion. The most common and most noticeable effects of excessive absorption are a local or generalized impregnation of the tissues referred to as argyria. In cases of argyria, accumulation of silver can result in a blue-gray pigmentation of the skin, hair, internal organs, and conjunctiva of the eye. Large oral does of silver compounds may produce

serious effects in humans. For example, silver nitrate can cause violent abdominal pain, vomiting, and convulsions, and ingestion of 10 grams is reported to usually be fatal. Lesions of the liver, kidney, bone marrow, and lungs have also been attributed to industrial or medicinal exposure.

Intravenous administration of silver nitrate is reported to produce pulmonary edema and congestion in experimental animals. Liver and kidney damage, central nervous system effects, and death have also been reported in experimental animals exposed to various silver compounds. The intraperitoneal LD_{50} (30 days) for silver as the nitrate in male Swiss albino mice is 13.9 mg/kg. Rats exposed to silver in their drinking water for 11 months showed no toxic effects at concentrations less than 0.4 mg/liter. Hemorrhaging occurred in the kidneys at 0.4 mg/liter. Conditioned reflex activity and immunological resistance were lowered, and brain nucleic acid content was increased at 0.5 mg/liter. Numerous physiological changes, including growth depression, and pathomorphological changes in the liver, kidney, stomach, and small intestine were evident in rats exposed to 20 mg/liter for 5 months.

G.6.2 Toxicity to Wildlife and Domestic Animals

Acute toxicity values for freshwater invertebrates range from 0.25 µg/liter for Daphnia magna to 4,500 µg/liter for the scud Gammarus pseudolimnaeus. Acute values for fish range from 3.9 µg/liter for the fathead minnow in soft water to 280 µg/liter for rainbow trout in hard water. In fresh water, the acute toxicity of silver appears to decrease as hardness increases. Soluble compounds, such as silver nitrate, are generally much more toxic than insoluble compounds. Chronic values ranging from 2.6 to 29 µg/liter are reported for Daphnia magna. Two early life stage studies with rainbow trout report chronic values of 0.12 µg/liter. Acute-chronic ratios for Daphnia magna and rainbow trout are 2.0 and 54, respectively. Fresh water aquatic plaints appear to be more resistant to silver than the more sensitive animals.

Acute values for saltwater organisms range from 4.7 µg/liter for the summer flounder to 1,400 µg/liter for the sheepshead minnow. A chronic value of 18 µg/liter, and an acute-chronic ratio of 14 is reported for the mysid shrimp.

Reduced cell numbers are observed in the saltwater alga Skeletonema costatum after exposure to 130 µg/liter of silver.

Excess silver can induce selenium, vitamin E, and copper deficiency symptoms in animals fed adequate diets, and can aggravate deficiency symptoms in animals whose diets lack one or more of these nutrients. These effects are reported in dogs, sheep, pigs, chicks, turkey poults, and ducklings.

G.7 ZINC (Clement Associates, Inc., 1985)

G.7.1 Health Effects

Testicular tumors have been produced in rats and chickens when zinc salts are injected intratesticularly, but not when other routes of administration are used. Zinc may be indirectly important with regard to cancer since its presence seems to be necessary for the growth of tumors. Laboratory studies suggest that although zinc-deficient animals may be more susceptible to chemical induction of cancer, tumor growth is slower in these animals. There is no evidence that zinc deficiency has any etiological role in human cancer. There are no data available to suggest that zinc is mutagenic or teratogenic in animals or humans.

Zinc is an essential trace element that is involved in enzyme functions, protein synthesis, and carbohydrate metabolism. Ingestion of excessive amounts of zinc may cause fever, vomiting, stomach cramps, and diarrhea. Fumes of freshly formed zinc oxide can penetrate deep into the alveoli and cause metal fume fever. Zinc oxide dust does not produce this disorder. Contact with zinc chloride can cause skin and eye irritation. Inhalation of mists or fumes may irritate the respiratory and gastrointestinal tracts. Zinc in excess of 0.25 percent in the diet of rats causes growth retardation, hypochromic anemia, and defective mineralization of bone. No zinc toxicity is observed at dietary levels below 0.25 percent.

Studies with animals and humans indicate that metabolic changes may occur due to the interaction of zinc and other metals in the diet. Exposure to cadmium can cause changes in the distribution of zinc, with increases in the liver and kidneys, organs where cadmium also accumulates. Excessive intake of zinc may cause copper deficiencies and result in anemia. Interaction of zinc with iron or lead may also lead to changes that are not produced when the metals are ingested individually.

G.7.2 Toxicity to Wildlife and Domestic Animals

Zinc produces acute toxicity in freshwater organisms over a range of concentrations from 90 to 58,100 µg/liter and appears to be less toxic in harder water. Acute toxicity is similar for freshwater fish and invertebrates. Chronic toxicity values range from 47 to 852 µg/liter and appear to be relatively unaffected by hardness. A final acute-chronic ratio for freshwater species of 3.0 has been reported. Although most freshwater plants appear to be insensitive to zinc, one species, the alga Selenastrum capricornutum, exhibited toxic effects at concentrations from 30 to 700 µg/liter. Reported acute toxicity values range from 2,730 to 83,000 µg/liter for saltwater fish and from 166 to 55,000 µg/liter for invertebrate saltwater species. Zinc produces chronic toxicity in the mysid shrimp

at 166 µg/liter. The final acute-chronic ratio for saltwater species is 3.0. Toxic effects are observed in saltwater plant species at zinc concentrations of 50 to 25,000 µg/liter. Bioconcentration factors of edible portions of aquatic organisms range from 43 for the soft-shell clam to 16,700 for the oyster.

Zinc poisoning has occurred in cattle. In one outbreak, poisoning was caused by food accidentally contaminated with zinc at a concentration of 20 g/kg. An estimated intake of 140 g of zinc per cow per day for about 2 days was reported. The exposed cows exhibited severe enteritis, and some died or had to be slaughtered. Postmortem findings showed severe pulmonary emphysema with changes in the myocardium, kidneys, and liver. Zinc concentrations in the liver were extremely high. Based on relatively limited data, some researchers have speculated that exposure to excessive amounts of zinc may constitute a hazard to horses. Laboratory studies and findings in foals living near lead-zinc smelters suggest that excessive exposure to zinc may produce bone changes, joint afflictions, and lameness. In pigs given dietary zinc at concentrations greater than 1,000 mg/kg, decreased food intake and weight gain were observed. At dietary levels greater than 2,000 mg/kg, deaths occurred as soon as 2 weeks after exposure. Severe gastrointestinal changes and brain damage, both of which were accompanied by hemorrhages, were observed, as well as changes in the joints. High concentrations of zinc were found in the liver.

APPENDIX H

RISK ASSESSMENT CALCULATIONS

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APPENDIX H.1

RISK FROM EXPOSURE TO FUGITIVE DUST

RISK ASSESSMENT SPREADSHEET - INHALATION OF FUGITIVE DUST

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 08/03/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURE THROUGH INHALATION OF FUGITIVE DUST IS CONSIDERED.

EXPOSURE SCENARIO NUMBER 01: MODELED FUGITIVE DUST EMISSIONS (WORST CASE)

REFERENCES: APPENDIX I

RELEVANT EQUATIONS: DOSE = X@BR@AF/BW

BR1 =	10
BR2 =	20
AF =	.4375
BW1 =	10
BW2 =	70

DETERMINE TIME-WEIGHTED AVERAGE DOSE:

70	ASSUMING LIFETIME EXPOSURE OF A RESIDENT LIVING DOWNWIND OF THE SITE
365	DAYS OF EXPOSURE/YEAR

ANNUAL LEAD CONCENTRATION (UG/M3)		ANNUAL ARSENIC CONCENTRATION (UG/M3)	
100 M EAST OF SITE	.0029	200 M SOUTH OF SITE	.0082
SCHOOL	.00028	SCHOOL	.0000249

RISK ASSESSMENT SPREADSHEET - INHALATION OF FUGITIVE DUST (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01: MODELED FUGITIVE DUST EMISSIONS (WORST CASE)
CALCULATE DOSES AND RISKS:

CHEMICAL	CMAX (UG/M3)	NONCARCINOGENIC TIME-WEIGHTED DOSE (MG/KG/DAY) CHILD	NONCARCINOGENIC TIME-WEIGHTED DOSE (MG/KG/DAY) ADULT	CARCINOGENIC TIME-WEIGHTED DOSE (MG/KG/DAY) ADULT	RFD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	HAZARD INDEX ADULT	CANCER RISK ADULT
ARSENIC	.0082	3.5875e-6	1.025e-6	1.025e-6		5e1	0	0	5.125e-5
LEAD	.0029	1.2688e-6	3.625e-7	3.625e-7	4.3e-4		2.9504e-3	8.4302e-4	0
TOTAL							2.9504e-3	8.4302e-4	5.125e-5

APPENDIX H.2

RISK FROM INGESTION OF SOIL

APPENDIX H.2.1

INGESTION OF SOIL - SURFACE SOILS

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL
SCENARIO ONE: MAXIMUM SURFACE SOIL CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/25/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE BASED UPON MAXIMUM METAL CONCENTRATIONS
DETECTED IN THE SOIL. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)*(IR)*(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)*(1 KG/1000 G)*(IR G/DAY)/(BW KG)

DOSEchild = (CF)*(C) CFave = 1.6667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)*(4WEEKS/MO.)*(8 MO./YEAR)*70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE: MAXIMUM SURFACE SOIL CONCENTRATIONS
CALCULATE DOSES:

CHEMICAL	CMAX (MG/KG)	ABSORPTION FRACTION	MAXIMUM CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	6410	.15	8.0125e-3	2.4586e-3	1.7562e-4
ARSENIC	60	1	5e-4	1.5342e-4	1.0959e-5
CADMIUM	31	.1	2.5833e-5	7.9269e-6	5.6621e-7
LEAD	122000	.5	5.0833e-1	1.5598e-1	1.1142e-2
MERCURY	2.2	.15	2.75e-6	8.4384e-7	6.0274e-8
NICKEL	44	.1	3.6667e-5	1.1251e-5	8.0365e-7
SILVER	83	.05	3.4583e-5	1.0612e-5	7.5799e-7
ZINC	138	.5	5.75e-4	1.7644e-4	1.2603e-5

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE: MAXIMUM SURFACE SOIL CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RfD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		6.14658e0	0
ARSENIC		1.5e0	0	1.6438e-5
CADMIUM	1.3e-2		6.0976e-4	0
LEAD	1.4e-3		1.11416e2	0
MERCURY	3e-3		2.8128e-4	0
NICKEL	1e-2		1.1251e-3	0
SILVER	3e-3		3.5373e-3	0
ZINC	2.1e-1		8.4018e-4	0
TOTAL			1.17568e2	1.6438e-5

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL
SCENARIO ONE-A: MAXIMUM SURFACE SOIL CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/25/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE BASED UPON MAXIMUM METAL CONCENTRATIONS
DETECTED IN THE SOIL. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)(IR)(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)$(1 KG/1000 G)$(IR G/DAY)/(BW KG)

DOSEchild = (CF)$(C) CFave = 1.6667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)$(4WEEKS/MO.)$(8 MO./YEAR)$70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE-A: MAXIMUM SURFACE SOIL CONCENTRATIONS
CALCULATE DOSES!

CHEMICAL	CMAX (MG/KG)	ABSORPTION FRACTION	AVERAGE CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	6410	.15	1.4025e-3	4.9173e-4	3.5123e-5
ARSENIC	60	1	1e-4	3.0685e-5	2.1918e-6
CADMIUM	31	.1	5.1667e-6	1.5854e-6	1.1324e-7
LEAD	122000	.5	1.0167e-1	3.1196e-2	2.2283e-3
MERCURY	2.2	.15	5.5e-7	1.6877e-7	1.2055e-8
NICKEL	44	.1	7.3333e-6	2.2502e-6	1.6073e-7
SILVER	83	.05	6.9167e-6	2.1224e-6	1.5160e-7
ZINC	138	.5	1.15e-4	3.5288e-5	2.5205e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & D BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE-A: MAXIMUM SURFACE SOIL CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RfD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		1.22932e0	0
ARSENIC		1.5e0	0	3.2877e-6
CADMIUM	1.3e-2		1.2195e-4	0
LEAD	1.4e-3		2.2283le1	0
MERCURY	3e-3		5.6256e-5	0
NICKEL	1e-2		2.2502e-4	0
SILVER	3e-3		7.0746e-4	0
ZINC	2.1e-1		1.6884e-4	0
TOTAL			2.35137e1	3.2877e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL
SCENARIO TWO: AVERAGE SURFACE SOIL CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/25/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE BASED UPON AVERAGE METAL CONCENTRATIONS
DETECTED IN THE SOIL. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)*(IR)*(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)*(1 KG/1000 G)*(IR G/DAY)/(BW KG)

DOSEchild = (CF)*(C) CFave = 1.6667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)*(4WEEKS/MO.)*(8 MO./YEAR)*70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO: AVERAGE SURFACE SOIL CONCENTRATIONS
CALCULATE DOSES:

CHEMICAL	Cavg (MG/KG)	ABSORPTION FRACTION	AVERAGE CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	291	.15	7.275e-5	2.2323e-5	1.5945e-6
ARSENIC	16.5	1	2.75e-5	8.4384e-6	6.0274e-7
CADMIUM	5.4	.1	9e-7	2.7616e-7	1.9726e-8
LEAD	17885	.5	1.4904e-2	4.5733e-3	3.2667e-4
MERCURY	1	.15	2.5e-7	7.6712e-8	5.4795e-9
NICKEL	7	.1	1.1667e-6	3.5799e-7	2.5571e-8
SILVER	10.2	.05	1.5167e-6	4.6533e-7	3.3242e-8
ZINC	21.4	.5	1.7833e-5	5.4721e-6	3.9087e-7

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO: AVERAGE SURFACE SOIL CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RfD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		5.5808e-2	0
ARSENIC		1.5e0	0	9.0411e-7
CADMIUM	1.3e-2		2.1243e-5	0
LEAD	1.4e-3		3.26667e0	0
MERCURY	3e-3		2.5571e-5	0
NICKEL	1e-2		3.5799e-5	0
SILVER	3e-3		1.5513e-4	0
ZINC	2.1e-1		2.6058e-5	0
TOTAL			3.32274e0	9.0411e-7

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL
SCENARIO TWO-A: AVERAGE SURFACE SOIL CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/25/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE BASED UPON AVERAGE METAL CONCENTRATIONS
DETECTED IN THE SOIL. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)*(IR)*(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)*(1 KG/1000 G)*(IR G/DAY)/(BW KG)

DOSEchild = (CF)*(C) CFave = 1.6667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)*(4WEEKS/MO.)*(8 MO./YEAR)*70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO-A: AVERAGE SURFACE SOIL CONCENTRATIONS
CALCULATE DOSES:

CHEMICAL	Cavg (MG/KG)	ABSORPTION FRACTION	MAXIMUM CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	291	.15	3.6375e-4	1.1162e-4	7.9726e-6
ARSENIC	16.5	1	1.375e-4	4.2192e-5	3.0137e-6
CADMIUM	5.4	.1	4.5e-6	1.3806e-6	9.8630e-8
LEAD	17885	.5	7.4521e-2	2.2867e-2	1.6333e-3
MERCURY	1	.15	1.25e-6	3.8354e-7	2.7397e-8
NICKEL	7	.1	5.8333e-6	1.7900e-6	1.2785e-7
SILVER	18.2	.05	7.5833e-6	2.3269e-6	1.6621e-7
ZINC	21.4	.5	8.9167e-5	2.7361e-5	1.9543e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO-A: AVERAGE SURFACE SOIL CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RFD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		2.7904e-1	0
ARSENIC		1.5e0	0	4.5205e-6
CADMIUM	1.3e-2		1.0622e-4	0
LEAD	1.4e-3		1.63333e1	0
MERCURY	3e-3		1.2785e-4	0
NICKEL	1e-2		1.7900e-4	0
SILVER	3e-3		7.7565e-4	0
ZINC	2.1e-1		1.3029e-4	0
TOTAL			1.66137e1	4.5205e-6

APPENDIX H.2.2

INGESTION OF SOIL - DEBRIS PILES

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL FROM THE DEBRIS PILE
SCENARIO ONE: MAXIMUM DEBRIS PILE CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 03/1/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE BASED UPON MAXIMUM METAL CONCENTRATIONS
DETECTED IN THE DEBRIS PILE. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)*(IR)*(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)*(1 KG/1000 G)*(IR G/DAY)/(BW KG)

DOSEchild = (CF)*(C) CFave = 1.4667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)*(4WEEKS/MO.)*(8 MO./YEAR)*70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

FIT ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C[illegible] - BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE: MAXIMUM DEBRIS PILE CONCENTRATIONS
CALCULATE DOSES:

CHEMICAL	CMAX (MG/KG)	ABSORPTION FRACTION	MAXIMUM CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	2820	.15	3.525e-3	1.0816e-3	7.726le-5
ARSENIC	62.6	1	5.2167e-4	1.6007e-4	1.1434e-5
CADMIUM	28.2	.1	2.35e-5	7.2110e-6	5.1507e-7
LEAD	79800	.5	3.325e-1	1.0203e-1	7.2877e-3
MERCURY	1.5	.15	1.875e-6	5.7534e-7	4.1096e-8
NICKEL	49.2	.1	4.1e-5	1.2581e-5	8.9863e-7
SILVER		.05	0	0	0
ZINC	179	.5	7.4583e-4	2.2886e-4	1.6347e-5

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE: MAXIMUM DEBRIS PILE CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RfD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		2.7040	0
ARSENIC		1.5e0	0	1.7151e-5
CADMIUM	1.3e-2		5.5469e-4	0
LEAD	1.4e-3		7.28767e1	0
MERCURY	3e-3		1.9178e-4	0
NICKEL	1e-2		1.2581e-3	0
SILVER	3e-3		0	0
ZINC	2.1e-1		1.0898e-3	0
TOTAL			7.5584e1	1.7151e-5

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL FROM THE DEBRIS PILE
SCENARIO ONE-A: MAXIMUM DEBRIS PILE CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 03/1/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE BASED UPON MAXIMUM METAL CONCENTRATIONS
DETECTED IN THE DEBRIS PILE. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)*(IR)*(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY: .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY: .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)*(1 KG/1000 G)*(IR G/DAY)/(BW KG)

DOSEchild = (CF)*(C) CFave = 1.6667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)*(4WEEKS/MO.)*(8 MO./YEAR)*70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE-A: MAXIMUM DEBRIS PILE CONCENTRATIONS
CALCULATE DOSES:

From the Debris Pile S 3-84

CHEMICAL	CMAX (MG/KG)	ABSORPTION FRACTION	AVERAGE CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	2820	.15	7.0501e-4	2.1633e-4	1.5452e-5
ARSENIC	62.6	1	1.0433e-4	3.2015e-5	2.2868e-6
CADMIUM	28.2	.1	4.7e-6	1.4422e-6	1.0301e-7
LEAD	79800	.5	6.65e-2	2.0405e-2	1.4575e-3
MERCURY	1.5	.15	3.75e-7	1.1507e-7	8.2192e-9
NICKEL	49.2	.1	8.2e-6	2.5162e-6	1.7973e-7
SILVER		.05	0	0	0
ZINC	179	.5	1.4917e-4	4.5772e-5	3.2694e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO ONE-A: MAXIMUM DEBRIS PILE CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RfD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		2.0633e0	0
ARSENIC		1.5e0	0	3.4301e-6
CADMIUM	1.3e-2		1.1094e-4	0
LEAD	1.4e-3		1.4575e1	0
MERCURY	3e-3		3.8356e-5	0
NICKEL	1e-2		2.5162e-4	0
SILVER	3e-3		0	0
ZINC	2.1e-1		2.1796e-4	0
TOTAL			1.6739e1	3.4301e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL FROM THE DEBRIS PILE
SCENARIO TWO: AVERAGE DEBRIS PILE CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 03/02/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET. EXPOSURES THROUGH PICA INGESTION ARE BASED UPON AVERAGE METAL CONCENTRATIONS DETECTED IN THE DEBRIS PILE. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)*(IR)*(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)*(1 KG/1000 G)*(IR G/DAY)/(BW KG)

DOSEchild = (CF)*(C) CFave = 1.6667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)*(4WEEKS/MO.)*(8 MO./YEAR)*70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO: AVERAGE DEBRIS PILE CONCENTRATIONS
CALCULATE DOSES:

CHEMICAL	Cavg (MG/KG)	ABSORPTION FRACTION	AVERAGE CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	1019	.15	2.5475e-4	7.8170e-5	5.5836e-6
ARSENIC	33.9	1	5.65e-5	1.7337e-5	1.2384e-6
CADMIUM	16.3	.1	2.7167e-6	8.3361e-7	5.9543e-8
LEAD	63375	.5	5.2813e-2	1.6205e-2	1.1575e-3
MERCURY	1.09	.15	2.725e-7	8.3616e-8	5.9726e-9
NICKEL	19.4	.1	3.2333e-6	9.9215e-7	7.0868e-8
SILVER		.05	0	0	0
ZINC	103	.5	8.5833e-5	2.6338e-5	1.8813e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO: AVERAGE DEBRIS PILE CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RfD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		1.9542e-1	0
ARSENIC		1.5e0	0	1.8575e-6
CADMIUM	1.3e-2		6.4124e-5	0
LEAD	1.4e-3		1.15753e1	0
MERCURY	3e-3		2.7872e-5	0
NICKEL	1e-2		9.9215e-5	0
SILVER	3e-3		0	0
ZINC	2.1e-1		1.2542e-4	0
TOTAL			1.17711e1	1.8575e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL FROM THE DEBRIS PILE
SCENARIO TWO-A: AVERAGE DEBRIS PILE CONCENTRATIONS

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 03/02/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH PICA INGESTION ARE BASED UPON AVERAGE METAL CONCENTRATIONS
DETECTED IN THE DEBRIS PILE. ASSUMPTIONS ARE OUTLINED BELOW.

REFERENCES: EPA, OCTOBER 1986
LaGOY,1987

RELEVANT EQUATION: DOSE = (C)*(IR)*(AF)/(BW)

ASSUMPTIONS: CHILDREN BETWEEN AGES 6 AND 11 ARE SUBJECT TO EXPOSURE THROUGH THIS ROUTE.

C = CONCENTRATION OF CONTAMINANT IN SOIL (MG/KG)

IR = AVERAGE SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .05
MAXIMUM SOIL INGESTION RATE (LaGOY,1987) IN G/DAY .25

AF = ABSORPTION FRACTION: 0.01 - 1.0 (ASTDR; HEALTH EFFECTS ASSESSMENTS; HEALTH ADVISORIES)

BW = BODY WEIGHT OF CHILD (KG): 30 (AVERAGE AGE GROUP RANGING FROM 6 TO 11 YEARS OF AGES)

DETERMINE CONVERSION FACTORS:

DOSE = (C MG/KG)*(1 KG/1000 G)*(IR G/DAY)/(BW KG)

DOSEchild = (CF)*(C) CFave = 1.6667e-6 CFmax = 8.3333e-6

DETERMINE TIME-WEIGHTED AVERAGE DOSE:

5 YEARS OF EXPOSURE PER 70 YEAR LIFETIME (AGES 6 TO 11 YEARS OLD)
112 DAYS OF EXPOSURE/YEAR (5D/WEEK)*(4WEEKS/MO.)*(8 MO./YEAR)*70% OF THE TIME FOR ONE YEAR (365 DAYS)

TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /ONE YEAR) FOR NONCARCINOGENS: 3.0685e-1
TIME WEIGHTING FACTOR (YEARS OF EXPOSURE /70 YEARS) FOR CARCINOGENS: 2.1918e-2

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE TWO)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO-A: AVERAGE DEBRIS PILE CONCENTRATIONS
CALCULATE DOSES:

CHEMICAL	Cavg (MG/KG)	ABSORPTION FRACTION	MAXIMUM CHILD DOSE (MG/KG/DAY)	NONCARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)	CARCINOGENIC TIME-WEIGHTED AVERAGE DOSE (MG/KG/DAY)
ANTIMONY	1019	.15	1.2738e-3	3.9085e-4	2.7918e-5
ARSENIC	33.9	.1	2.825e-4	8.6685e-5	6.1918e-6
CADMIUM	16.3	.1	1.3583e-5	4.1680e-6	2.9772e-7
LEAD	63375	.5	2.6406e-1	8.1027e-2	5.7877e-3
MERCURY	1.09	.15	1.3625e-6	4.1808e-7	2.9863e-8
NICKEL	19.4	.1	1.6167e-5	4.9607e-6	3.5434e-7
SILVER		.05	0	0	0
ZINC	103	.5	4.2917e-4	1.3169e-4	9.4064e-6

RISK ASSESSMENT SPREADSHEET - ACCIDENTAL INGESTION OF SOIL (PAGE THREE)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
SCENARIO TWO-A: AVERAGE DEBRIS PILE CONCENTRATIONS
DETERMINE HAZARD INDICES AND CANCER RISK:

CHEMICAL	RfD (MG/KG/DAY)	CPF (KG-DAY/MG)	HAZARD INDEX CHILD	CANCER RISK LIFETIME
ANTIMONY	4e-4		9.7712e-1	0
ARSENIC		1.5e0	0	9.2877e-6
CADMIUM	1.3e-2		3.2062e-4	0
LEAD	1.4e-3		5.78767e1	0
MERCURY	3e-3		1.3936e-4	0
NICKEL	1e-2		4.9607e-4	0
SILVER	3e-3		0	0
ZINC	2.1e-1		6.2709e-4	0
TOTAL			5.88554e1	9.2877e-6

APPENDIX H.3

RISK FROM GROUNDWATER USE

TABLE OF CONTENTS

APPENDIX H.3.1

CONTAMINANT CONCENTRATIONS AT DOWNGRADIENT RECEPTOR - RELEVANT EQUATIONS

Using VHS Model as it appears in the Federal Register, November 27, 1985

$$C_y = C_o \operatorname{erf}\sqrt{\frac{Y'}{4Y}} \operatorname{erf}\left[\frac{X}{4\sqrt{\alpha_T Y}}\right]$$

where:

C_y = contaminant concentration at the Wade property (mg/L)

C_o = contaminant concentration in leachate (mg/L), from EP Toxicity results

Y' = width of source area (m) parallel to groundwater flow
- 387.2 m for soils = width of site
- 13.2 m for debris piles

Y = distance to receptor (m) = 95.7 m

X = length of source area (m) perpendicular to groundwater flow
- 61 m for soils
- 7.1 m for debris piles

α_T = transverse dispersivity (m)
- 2 m for worst-case estimate
- 5 m for plausible-case estimate

erf = error function (dimensionless)

for soils, worst-case:

$$C_y = C_o \operatorname{erf}\sqrt{\frac{387.2}{4(95.7)}} \operatorname{erf}\left[\frac{61}{4\sqrt{2(95.7)}}\right]$$

$$C_y = C_o \operatorname{erf}(1.01) \operatorname{erf}(1.10)$$

$$C_y = C_o (0.75)$$

for soils, plausible-case:

$$C_y = C_o \operatorname{erf}\sqrt{\frac{387.2}{4(95.7)}} \operatorname{erf}\left[\frac{61}{4\sqrt{5(95.7)}}\right]$$

$C_y = C_o \text{ erf}(1.01) \text{ erf}(0.697)$
$C_y = C_o (0.54)$

for debris piles, worst-case:

$$C_y = C_o \text{ erf} \sqrt{\frac{13.2}{4(95.7)}} \text{ erf} \left[\frac{7.1}{4\sqrt{2(95.7)}} \right]$$

$C_y = C_o \text{ erf}(0.186) \text{ erf}(0.13)$
$C_y = C_o (0.037)$

for debris piles, plausible-case:

$$C_y = C_o \text{ erf} \sqrt{\frac{13.2}{4(95.7)}} \text{ erf} \left[\frac{7.1}{4\sqrt{5(95.7)}} \right]$$

$C_y = C_o \text{ erf}(0.186) \text{ erf}(0.081)$
$C_y = C_o (0.025)$

APPENDIX H.3.2

GROUNDWATER EXPOSURE - ONSITE SOILS

RISK ASSESSMENT SPREADSHEET - EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 01: BASED ON MAXIMUM EP TOXICITY METAL CONCENTRATIONS IN SOIL

REFERENCES: EPA, OCTOBER 1986
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTDR, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION	.02857143
BW:	70	FACTOR =	

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION	.1
BW:	10	FACTOR =	

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: .75

MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	387.2
LENGTH OF SOURCE AREA (M):	61
TRANSVERSE DISPERSIVITY (M):	2

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR SOIL SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	MAXIMUM EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.108	.081	.1	2.3143e-4	8.1e-4
CHROMIUM (III)	.0063	.004725	.5	6.75e-5	2.3625e-4
LEAD	119.3	89.475	.5	1.27821e0	4.47375e0

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR SOIL SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX
CADMIUM	2.3143e-4	8.1e-4	1.3e-2		1.7802e-2	6.2308e-2
CHROMIUM (III)	6.75e-5	2.3625e-4	1e0		6.75e-5	2.3625e-4
LEAD	1.27821e0	4.47375e0	1.4e-3		9.13010e2	3.19554e3
TOTAL HAZARD INDEX OR RISK					9.13028e2	3.19560e3

RISK ASSESSMENT SPREADSHEET - EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 01: BASED ON MAXIMUM EP TOXICITY METAL CONCENTRATIONS IN SOIL

REFERENCES: EPA, OCTOBER 1986
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTDR, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION	.02857143
BW:	70	FACTOR =	

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION	.1
BW:	10	FACTOR =	

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: .54
MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	387.2
LENGTH OF SOURCE AREA (M):	61
TRANSVERSE DISPERSIVITY (M):	5

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR SOIL SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	MAXIMUM EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.108	.05832	.1	1.6663e-4	5.832e-4
CHROMIUM (III)	.0063	.003402	.5	4.86e-5	1.701e-4
LEAD	119.3	64.422	.5	9.2031e-1	3.2211e0

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR SOIL SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX
CADMIUM	1.6663e-4	5.832e-4	1.3e-2		1.2818e-2	4.4862e-2
CHROMIUM (III)	4.86e-5	1.701e-4	1e0		4.86e-5	1.701e-4
LEAD	9.2031e-1	3.2211e0	1.4e-3		6.57367e2	2.30079e3
TOTAL HAZARD INDEX OR RISK					6.57380e2	2.30083e3

RISK ASSESSMENT SPREADSHEET - EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 02: BASED ON AVERAGE EP TOXICITY METAL CONCENTRATIONS IN SOIL

REFERENCES: EPA, OCTOBER 1986
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTDR, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION FACTOR =	.02857143
BW:	70		

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION FACTOR =	.1
BW:	10		

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: .75
MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	387.2
LENGTH OF SOURCE AREA (M):	61
TRANSVERSE DISPERSIVITY (M):	2

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR SOIL SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	AVERAGE EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.0108	.0081	.1	2.3143e-5	8.1e-5
CHROMIUM (III)	.00063	.0004725	.5	6.75e-6	2.3625e-5
LEAD	7.042	5.2815	.5	7.545e-2	2.6408e-1

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR SOIL SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX
CADMIUM	2.3143e-5	8.1e-5	1.3e-2		1.7802e-3	6.2308e-3
CHROMIUM (III)	6.75e-6	2.3625e-5	1e0		6.75e-6	2.3625e-5
LEAD	7.545e-2	2.6408e-1	1.4e-3		5.38929e1	1.88625e2
TOTAL HAZARD INDEX OR RISK					5.38946e1	1.88631e2

RISK ASSESSMENT SPREADSHEET - EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET, ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 02: BASED ON AVERAGE EP TOXICITY METAL CONCENTRATIONS IN SOIL

REFERENCES: EPA, OCTOBER 1986
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTDR, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION	.02857143
BW:	70	FACTOR =	

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION	.1
BW:	10	FACTOR =	

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: .54

MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	387.2
LENGTH OF SOURCE AREA (M):	61
TRANSVERSE DISPERSIVITY (M):	5

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR SOIL SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	AVERAGE EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.0108	.005832	.1	1.6663e-5	5.832e-5
CHROMIUM (III)	.00063	.0003402	.5	4.86e-6	1.701e-5
LEAD	7.042	3.80268	.5	5.4324e-2	1.9013e-1

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR SOIL SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX
CADMIUM	1.6663e-5	5.832e-5	1.3e-2		1.2818e-3	4.4862e-3
CHROMIUM (III)	4.86e-6	1.701e-5	1e0		4.86e-6	1.701e-5
LEAD	5.4324e-2	1.9013e-1	1.4e-3		3.88029e1	1.3581e2
TOTAL HAZARD INDEX OR RISK					3.88041e1	1.35815e2

APPENDIX H.3.3

GROUNDWATER EXPOSURE - DEBRIS PILES

RI'S ASSE SPREADSHEET - EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 01: BASED ON MAXIMUM EP TOXICITY METAL CONCENTRATIONS IN THE DEBRIS PILE

REFERENCES: EPA, OCTOBER 1986
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTM, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION FACTOR =	.02857143
BW:	70		

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION FACTOR =	.1
BW:	10		

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: 75

MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	13.2
LENGTH OF SOURCE AREA (M):	7.1
TRANSVERSE DISPERSIVITY (M):	2

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHEWSTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR DEBRIS PILE SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	MAXIMUM EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.6191	.464325	.1	1.3266e-3	4.6433e-3
ARSENIC	.118	.0885	1	2.5286e-3	8.85e-3
LEAD	58.47	43.8525	.5	6.2646e-1	2.19263e0

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHEWSTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR DEBRIS PILE SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX	LIFETIME ADULT CANCER RISK
CADMIUM	1.3266e-3	4.6433e-3	1.3e-2		1.0205e-1	3.5717e-1	0
ARSENIC	2.5286e-3	8.85e-3		1.5e0	0	0	3.7929e-3
LEAD	6.2646e-1	3.19263e0	1.4e-3		4.47474e2	1.56616e3	0
TOTAL HAZARD INDEX OR RISK					4.47577e2	1.56652e3	3.7929e-3

RISK ASSTS. SPREADSHEET EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 01: BASED ON MAXIMUM EP TOXICITY METAL CONCENTRATIONS IN THE DEBRIS PILE

REFERENCES: EPA, OCTOBER 1988
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTOR, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION	.02857143
BW:	70	FACTOR =	

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION	.1
BW:	10	FACTOR =	

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: .54

MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	13.2
LENGTH OF SOURCE AREA (M):	7.1
TRANSVERSE DISPERSIVITY (M):	5

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR DEBRIS PILE SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	MAXIMUM EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.6191	.334314	.1	9.5518e-4	3.3431e-3
ARSENIC	.118	.06372	1	1.8206e-3	6.372e-3
LEAD	58.47	31.5738	.5	4.5105e-1	1.57869e0

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 01 FOR DEBRIS PILE SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX	LIFETIME ADULT CANCER RISK
CADMIUM	9.5518e-4	3.3431e-3	1.3e-2		7.3476e-2	2.5716e-1	0
ARSENIC	1.8206e-3	6.372e-3		1.5e0	0	0	2.7309e-3
LEAD	4.5105e-1	1.57869e0	1.4e-3		3.22102e2	1.12764e3	0
TOTAL HAZARD INDEX OR RISK					3.22755e2	1.12789e3	2.7309e-3

RISK ASSE[redacted]SPREADSHEET - EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 02: BASED ON AVERAGE EP TOXICITY METAL CONCENTRATIONS IN THE DEBRIS PILE

REFERENCES: EPA, OCTOBER 1986
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTDR, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION	.02857143
BW:	70	FACTOR =	

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION	.1
BW:	10	FACTOR =	

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: .75
MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	13.2
LENGTH OF SOURCE AREA (M):	7.1
TRANSVERSE DISPERSIVITY (M):	2

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

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RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHEWSTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR DEBRIS PILE SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	AVERAGE EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.3729	.279675	.1	7.9907e-4	2.7968e-3
ARSENIC	.059	.04425	1	1.2643e-3	4.425e-3
LEAD	32.129	24.09675	.5	3.4424e-1	1.20484e0

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHEWSTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR DEBRIS PILE SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX	LIFETIME ADULT CNCER RISK
CADMIUM	7.9907e-4	2.7968e-3	1.3e-2		6.1467e-2	2.1513e-1	0
ARSENIC	1.2643e-3	4.425e-3		1.5e0	0	0	1.8964e-3
LEAD	3.4424e-1	1.20484e0	1.4e-3		2.45885e2	8.60598e2	0
TOTAL HAZARD INDEX OR RISK					2.45947e2	8.60813e2	1.8964e-3

RISK ASSE[illegible]READSHEET - EXPOSURES THROUGH HOUSEHOLD USE OF GROUNDWATER

SITE NAME: C & R BATTERY SITE
LOCATION: CHESTERFIELD COUNTY, VIRGINIA
DATE: 02/27/89

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
ASSUMPTIONS ARE OUTLINED BELOW.

EXPOSURE SCENARIO NUMBER 02: BASED ON AVERAGE EP TOXICITY METAL CONCENTRATIONS IN THE DEBRIS PILE

REFERENCES: EPA, OCTOBER 1986
EPA, JULY 29, 1986
EPA, NOVEMBER 27, 1985
ASTOR, 1987 & 1988

INGESTION: DOSE = (C x IR x AF)/BW

WHERE: C = GROUNDWATER CONCENTRATION (MG/L)
IR = INGESTION RATE (LITERS/DAY)
AF = ABSORPTION FRACTION (DECIMAL FRACTION)
BW = BODY WEIGHT (KG)

ENTER INPUT PARAMETERS:

INGESTION: ADULT EXPOSURE

IR:	2	CONVERSION	.02857143
BW:	70	FACTOR =	

INGESTION: CHILD EXPOSURE

IR:	1	CONVERSION	.1
BW:	10	FACTOR =	

VHS MODEL GENERATES THE FOLLOWING DILUTION FACTOR: .54

MODEL PARAMETERS:

DISTANCE TO RECEPTOR (M):	95.7
WIDTH OF SOURCE AREA (M):	13.2
LENGTH OF SOURCE AREA (M):	7.1
TRANSVERSE DISPERSIVITY (M):	5

(SEE CALCULATION SHEET FOR SUPPLEMENTAL EQUATIONS)

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER (PAGE 2)
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR DEBRIS PILE SOURCE
CALCULATE DOSES:

INORGANIC CHEMICAL	AVERAGE EP TOXICITY CONCENTRATION (MG/L)	RECEPTOR CONCENTRATION (MG/L)	ABSORBED FRACTION	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)
CADMIUM	.3729	.201366	.1	5.7533e-4	2.0137e-3
ARSENIC	.059	.03186	1	9.1029e-4	3.186e-3
LEAD	32.129	17.34966	.5	2.4785e-1	8.674Be-1

RISK ASSESSMENT SPREADSHEET - HOUSEHOLD USE OF GROUNDWATER
C & R BATTERY SITE, CHESTERFIELD COUNTY, VIRGINIA
EXPOSURE SCENARIO NUMBER 02 FOR DEBRIS PILE SOURCE
CALCULATE HAZARD INDICES AND CANCER RISK:

CHEMICAL	ADULT INGESTION DOSE (MG/KG/DAY)	CHILD INGESTION DOSE (MG/KG/DAY)	NONCARCINOGENIC REFERENCE DOSE FOR INGESTION (MG/KG/DAY)	CARCINOGENIC POTENCY FACTOR FOR INGESTION (MG/KG/DAY)	ADULT HAZARD INDEX	CHILD HAZARD INDEX	LIFETIME ADULT CNCER RISK
CADMIUM	5.7533e-4	2.0137e-3	1.3e-2		4.4256e-2	1.5490e-1	0
ARSENIC	9.1029e-4	3.186e-3		1.5e0	0	0	1.3654e-3
LEAD	2.4785e-1	8.674Be-1	1.4e-3		1.77037e2	6.19631e2	0
TOTAL HAZARD INDEX OR RISK					1.77082e2	6.19786e2	1.3654e-3

APPENDIX I

C&R BATTERY AIR QUALITY MODELING ANALYSIS FOR FUGITIVE DUST EMISSIONS

I.1 INTRODUCTION

This section presents a description of the air quality modeling study conducted to estimate ambient lead and arsenic concentrations at exposure points located beyond the C&R Battery property boundary. Ambient concentrations were estimated using a predictive air quality model approved by the U.S. Environmental Protection Agency (EPA). The environmental exposure pathway addressed in this study pertains to the erosion of contaminated surface soil by wind to offsite locations.

I.2 MODELING PROTOCOL

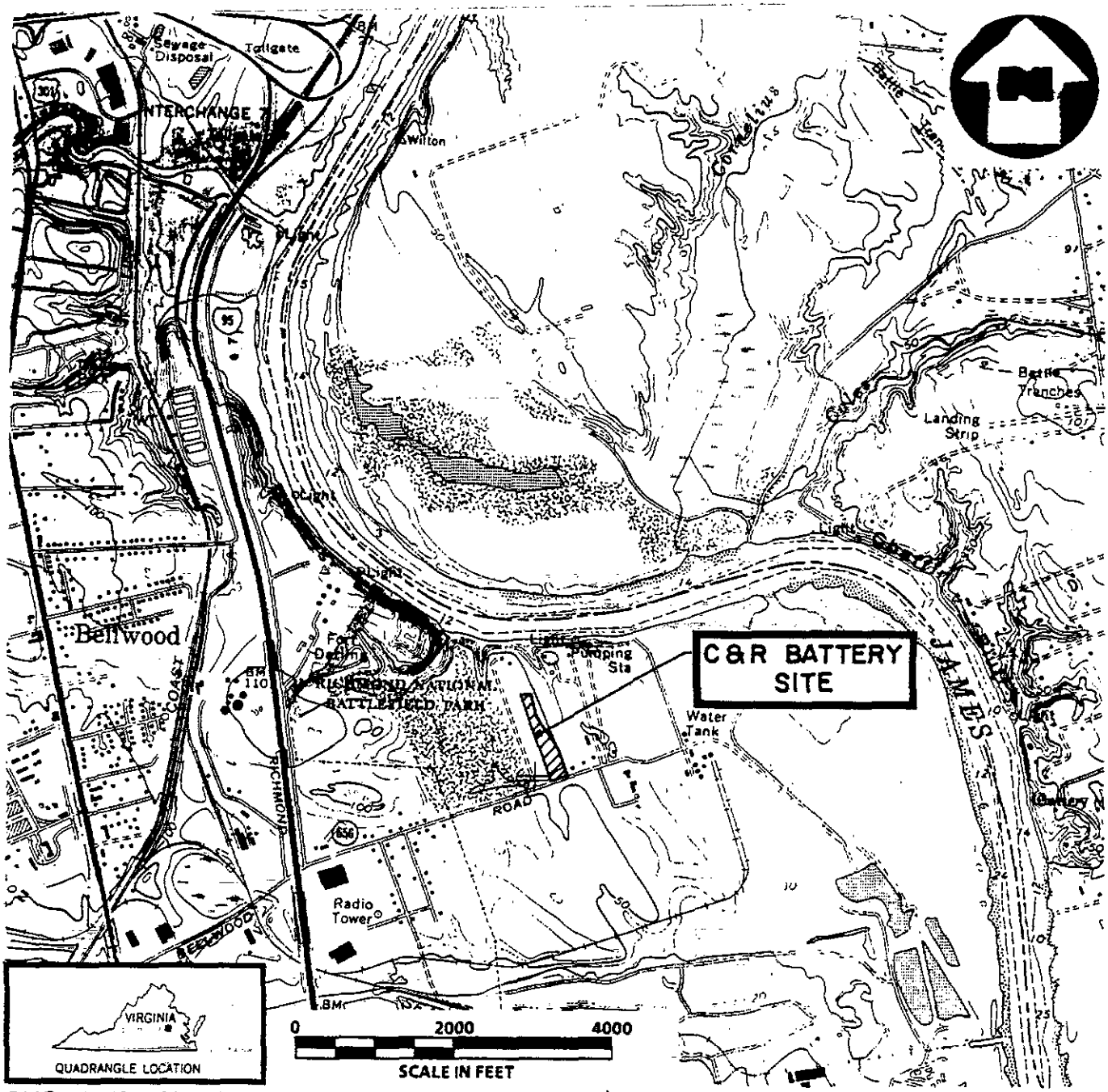
I.2.1 Model Selection

The C&R Battery Site is located on essentially flat terrain in Chesterfield County, Virginia, approximately 6 miles southeast of Richmond, as shown in Figure I-1. The site is located on a 4.5-acre tract of land, approximately 1,260 feet in the north-south direction, and between 100 and 190 feet wide. Figure I-2 depicts the general site layout.

The purpose of this study is to address site soil emissions that will result from wind erosion. Emissions of this nature are commonly referred to as fugitive dust. Fugitive dust usually refers to the dust put into the atmosphere by the wind blowing over areas with little or no vegetation. Fugitive emissions include emissions resulting from a site, such as the C&R Battery Site. Where such fugitive emissions can be properly specified, the Industrial Source Complex (ISC) model is recommended (EPA, 1986, 1987).

The ISC dispersion model combines various algorithms that can be used to assess the air quality impact of emissions from a wide variety of sources associated with an industrial complex. The ISC model can be used to estimate ambient particulate concentrations and dry deposition. The model can be used in either the short-term or the long-term modes. For the purpose of this study, the ISC long-term (ISCLT) mode has been selected because it can calculate concentration values relative to long-term (annual) National Ambient Exposure and Applicable Air Quality Standards (NAAQS). At the present time, lead is regulated on a calendar quarter basis. Quarterly ambient concentrations of lead cannot exceed 1.5 $\mu g/m^3$. No NAAQS currently exists for arsenic.

The ISCLT is a sector-averaged model that uses statistical wind summaries to calculate seasonal (quarterly) and/or annual concentration or deposition values. The model will accept the following source types: stack, area, and volume.



BASE MAP IS A PORTION OF THE USGS 7.5 MINUTE DREWRY'S BLUFF, VIRGINIA QUADRANGLE, 1969 PHOTO-REVISED 1980. CONTOUR INTERVAL 10 FEET.

FIGURE I-1

SITE LOCATION MAP
C & R BATTERY SITE, CHESTERFIELD CO., VA

NUS CORPORATION

ACFILE: 9851\100MARK.DWG
(8/21/88)

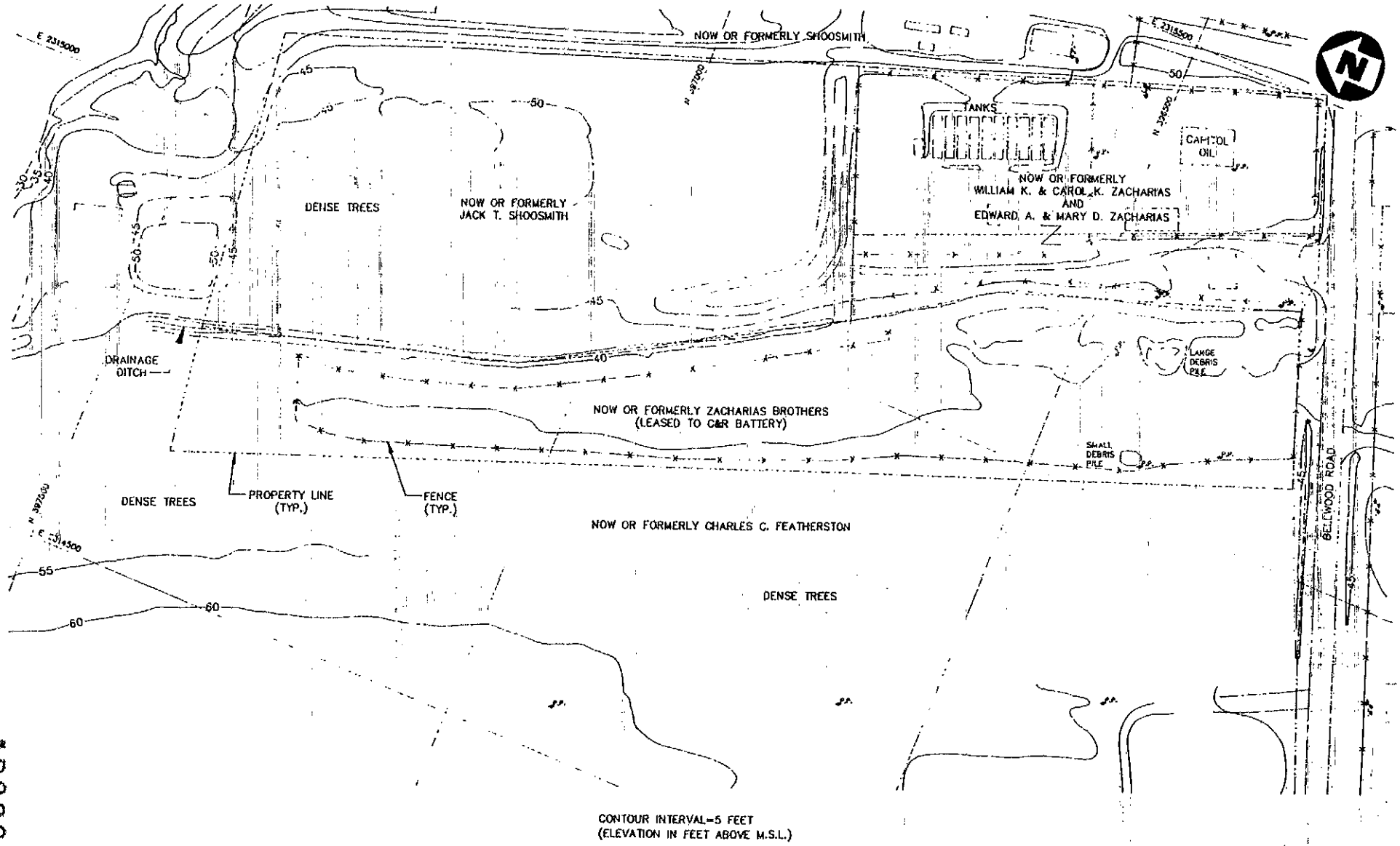


FIGURE I-2

GENERAL ARRANGEMENT
C & R BATTERY SITE, CHESTERFIELD CO., VIRGINIA

0 100 200
SCALE IN FEET

NUS CORPORATION

I-3

AR302104

I.2.2 Model Options

The ISCLT model contains a number of options that are designed to consider complicated source configurations and special atmospheric effects. In this study, the regulatory default option was selected. This option automatically selects stack tip downwash, final-plume rise, buoyancy-induced dispersion, the default vertical potential temperature gradient and appropriate wind profile exponents.

The ISCLT model can be used in either the rural or urban mode. Each option assigns rural or urban dispersion coefficients. Two procedures, based on land use or population density, are used to determine the application of urban or rural dispersion coefficients (EPA, 1986).

Land use characteristics within a one (1) kilometer (km) square area of the C&R Battery Site were reviewed in accordance with procedures specified by EPA using the Auer Method (EPA, 1986). A review of the area using the Drewrys Bluff, Virginia, 7.5 minute series topographic map indicate that less than 25 percent of the total area within one (1) square km can be classified as urban. Therefore, the rural option was used to model fugitive emissions from the site.

I.2.3 Source Emissions

As discussed previously, the source of emissions examined in this study pertains to wind erosion of lead and arsenic from contaminated surface soil. Results of onsite and laboratory analysis of surface soil lead and arsenic concentrations were used to estimate emissions from various locations within the site area. Because of the large spatial variation of surface soil lead concentrations, it was decided to divide the entire site into fifty-four 100-square-foot areas and assign individual emission rates ($g/sec/m^2$) to each area source. An illustration of the 54 area sources overlying the site is shown in Figure I-3.

Lead concentrations are shown in Figure I-4 and ranged from 120 mg/kg to 122,000 mg/kg. Arsenic concentrations ranged from 2.9 mg/kg to 68 mg/kg and are depicted in Figure I-5. Further information regarding the surface soil analyses are contained in Sections 4.1 and 4.2 of this report.

Individual emission rates for each area source were developed in a stepwise manner. Methods (EPA, 1985) are available for estimating the total suspended particulate (TSP) emissions that result during disturbances by strong winds over open ground areas. For emissions from wind erosion, the following TSP emission factor equation is recommended:

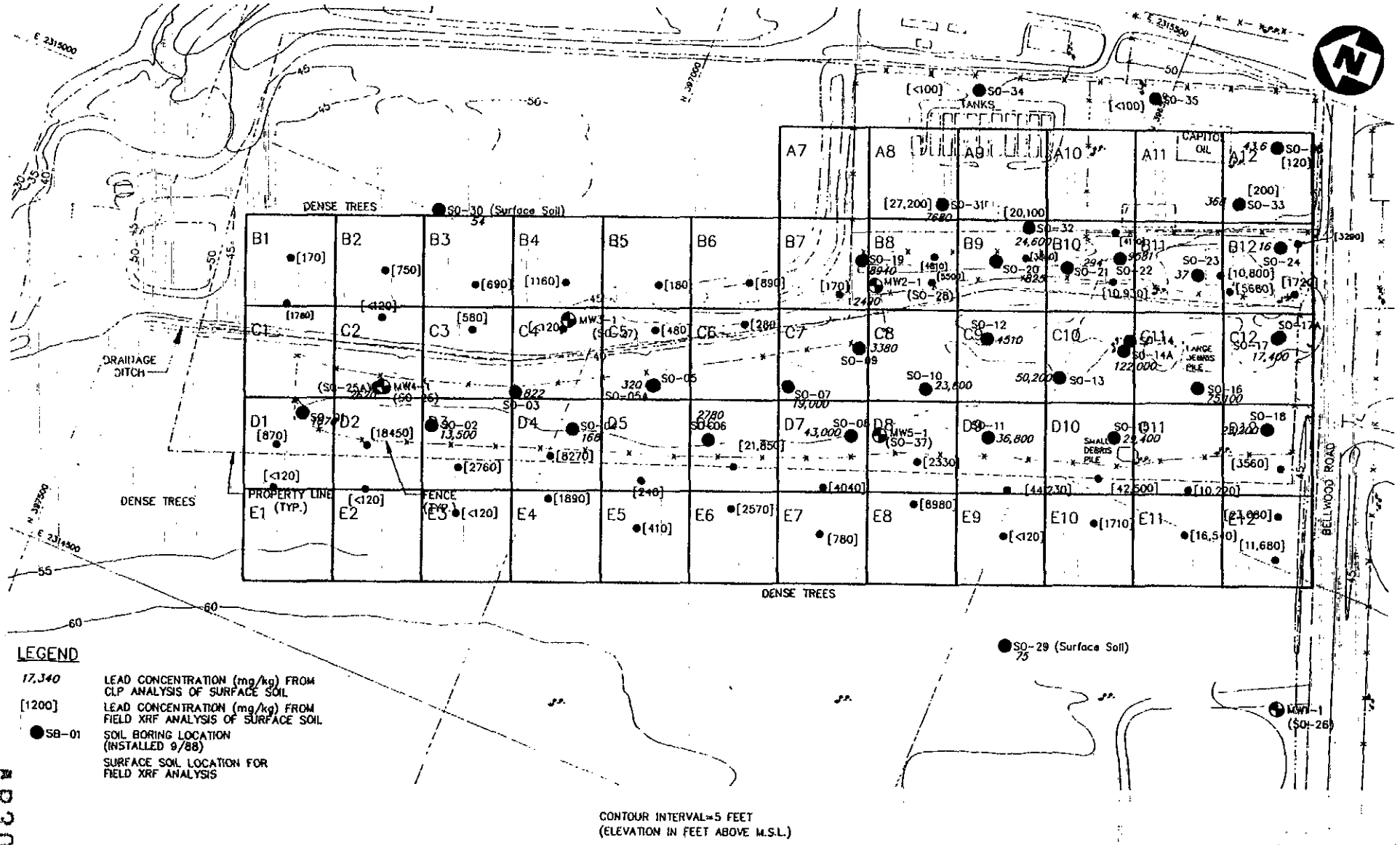


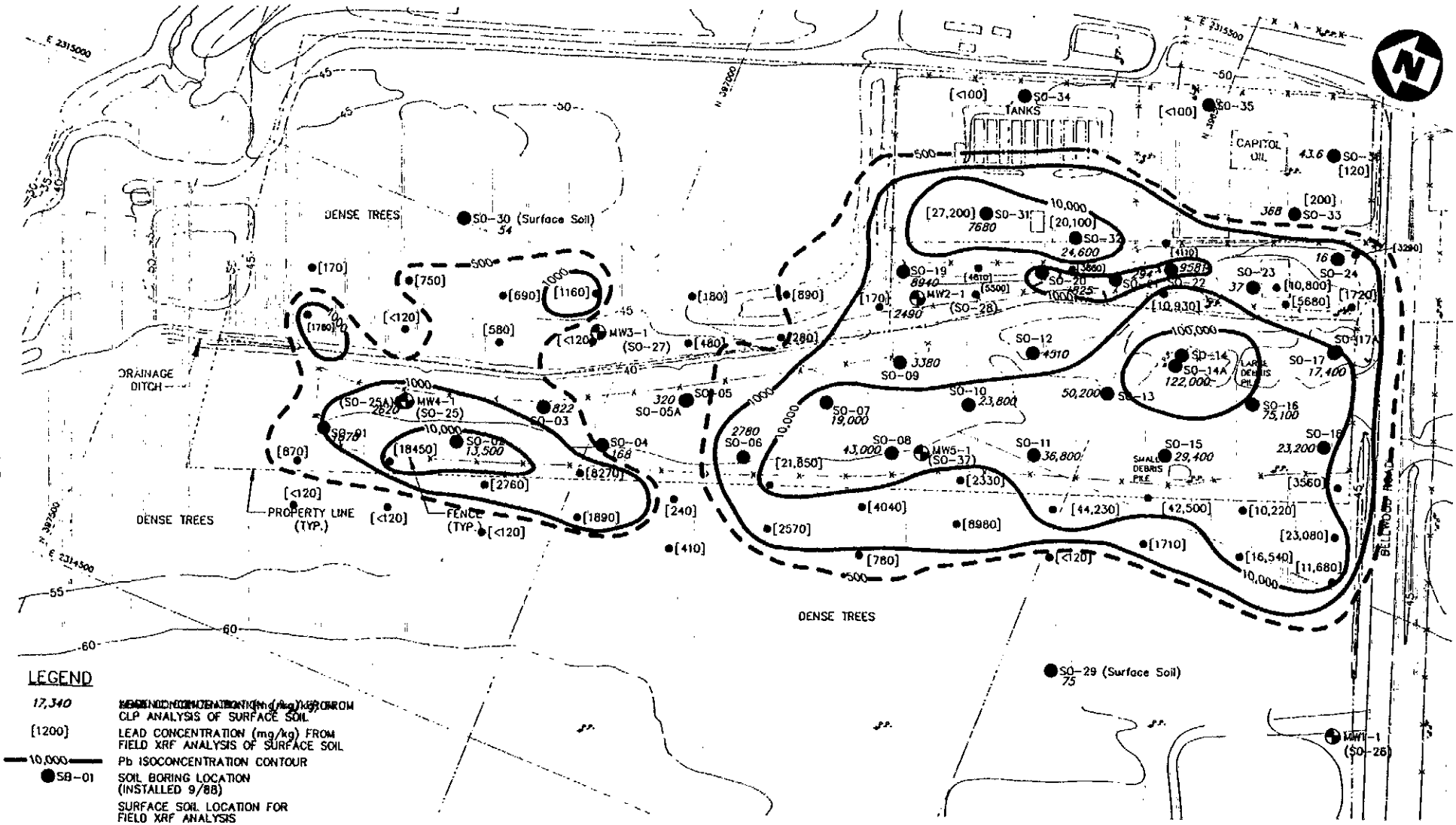
FIGURE 1-3

FUGITIVE DUST AREA SOURCE CONFIGURATION
C & R BATTERY SITE, CHESTERFIELD CO., VIRGINIA

NUS CORPORATION

1-5

AR302106



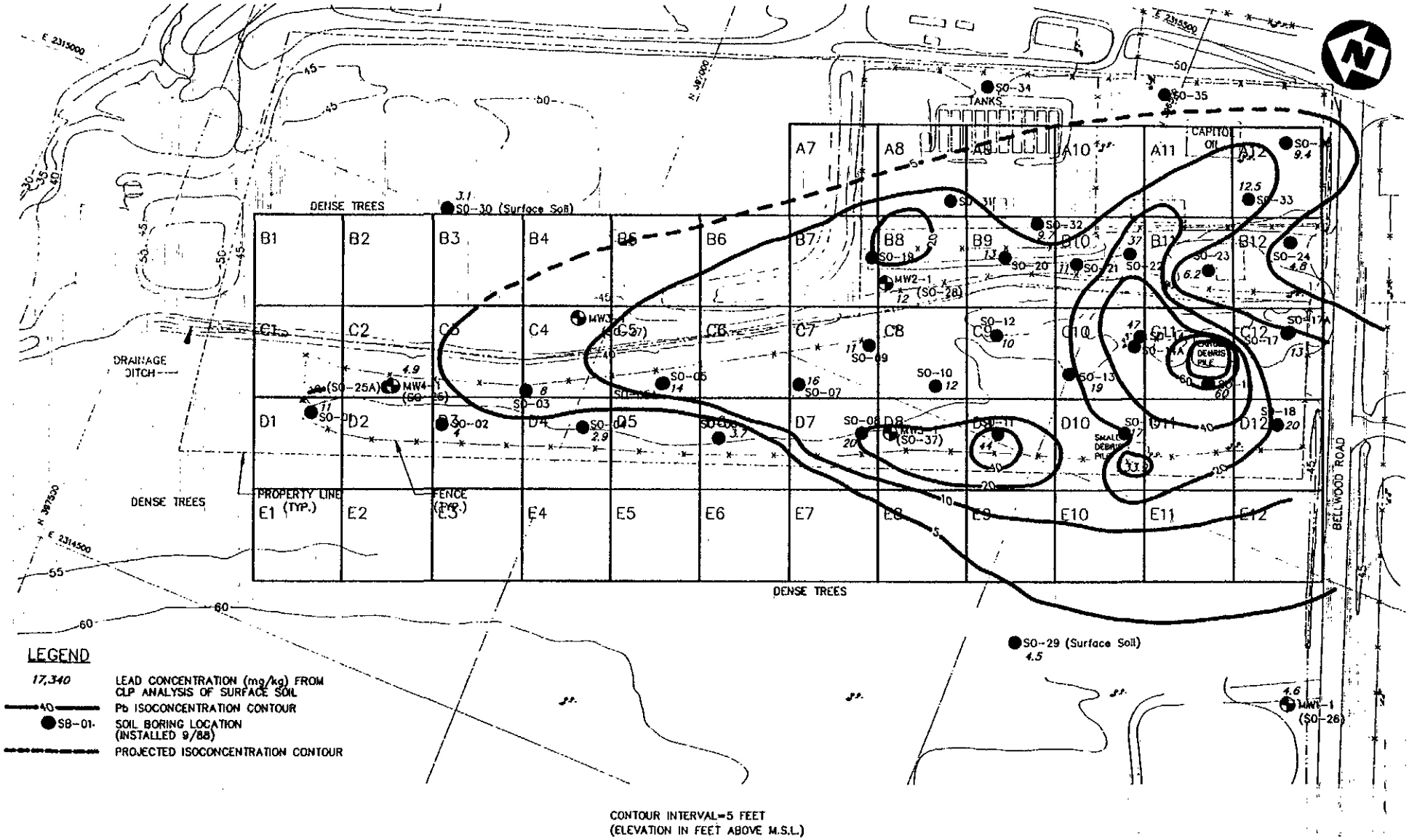
I-6

FIGURE I-4

LEAD ISOCONCENTRATION MAP FOR SURFACE SOILS C & R BATTERY SITE, CHESTERFIELD CO., VIRGINIA

NUS CORPORATION

ACFILE: 9851\100MARK.DWG
(8/26/88)



LEGEND

17,340 — LEAD CONCENTRATION (mg/kg) FROM CLP ANALYSIS OF SURFACE SOIL

40 — Pb ISOCONCENTRATION CONTOUR

SB-01 — SOIL BORING LOCATION (INSTALLED 9/88)

PROJECTED ISOCONCENTRATION CONTOUR

CONTOUR INTERVAL=5 FEET
(ELEVATION IN FEET ABOVE M.S.L.)

FIGURE 1-5

ARSENIC ISOCONCENTRATION MAP FOR SURFACE SOILS
C & R BATTERY SITE, CHESTERFIELD CO., VIRGINIA

0 100 200
SCALE IN FEET

NUS CORPORATION

1-7

AR302108

$$E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{365-p}{235}\right)\left(\frac{f}{15}\right)$$

where E = TSP emission factor (lb/day/acre)

s = silt content of soil (%) = 75%

p = number of days with $\geq$ 0.25mm (0.01 inch) of precipitation = 114 days

f = percentage of time that the unobstructed wind speed exceeds 5.4 m/sec (12 mph) = 12.4%

The coefficient in the above equation is based on sampling of emissions from a sand and gravel area. Silt content was obtained from surface soil samples using the ASTM-C-136 method and was assumed to be uniform over the site area. The number of days with precipitation $\geq$ 0.01 in was obtained from climatological data compiled for Richmond, Virginia (Ruffner and Bair, 1977). The frequency of wind speed exceeding 12 mph was obtained from a 10-year (1964-1973) statistical summary compiled for Richmond, Virginia. Substitution of these values into the above equation resulted in an emission factor of 75.05 pound/day/acre (0.39 g/sec/acre). This TSP emission factor converts to 9.8 E-05 g/sec-m^2 for each 100-square-foot area.

Estimates of lead and arsenic emissions for each area source were made by multiplying the TSP emission factor by the mean percent lead and arsenic content estimated for each area source. Mean percent content was determined by averaging the actual soil analysis concentrations reported within each individual area source. When soil analysis points did not fall within the 100-square-foot area, lead content was estimated from isoconcentrations drawn within the area source. A listing of the mean percent lead and arsenic for each area source is given in Tables I-1 and 1-2, respectively. The respective emission rate for lead and arsenic input into the ISCLT model for each of the 54 area sources is presented in Tables I-3 and I-4.

I.2.4 Meteorological Data

The ISCLT model can use seasonal or annual "STAR" summaries to satisfy meteorological input requirements. STAR summaries are statistical tabulations of the joint frequency of occurrence of wind speed and wind direction categories, classified according to Pasquill stability categories.

The closest available source of meteorological data to the C&R Battery Site is Byrd Field Airport in Richmond. The airport is approximately 20 miles northeast of the C&R Battery Site. A 10-year seasonal STAR summary for the period 1964-1973 was obtained from the National Climatic Data

TABLE I-1

MEAN PERCENT LEAD CONTENT
FOR INDIVIDUAL C&R BATTERY AREA SOURCES
C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Area Source	Mean Percent Lead	Area Source	Mean Percent Lead
A7	0.10	C10	8.61
A8	2.70	C11	7.51
A9	0.10	C12	1.74
A10	0.10	D1	0.13
A11	0.10	D2	1.85
A12	0.02	D3	0.81
B1	0.10	D4	0.42
B2	0.08	D5	0.02
B3	0.07	D6	1.23
B4	0.12	D7	2.35
B5	0.02	D8	0.23
B6	0.09	D9	4.05
B7	0.57	D10	3.60
B8	0.57	D11	1.02
B9	0.24	D12	1.34
B10	0.69	E1	0.01
B11	0.54	E2	0.01
B12	0.27	E3	0.01
C1	0.10	E4	0.19
C2	0.14	E5	0.04
C3	0.06	E6	0.26
C4	0.09	E7	0.08
C5	0.04	E8	0.90
C6	0.03	E9	0.01
C7	1.12	E10	0.17
C8	2.38	E11	1.65
C9	0.45	E12	1.74

TABLE I-2

MEAN PERCENT ARSENIC CONTENT
FOR INDIVIDUAL C&R BATTERY AREA SOURCES
C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Area Source	Mean Percent Lead	Area Source	Mean Percent Lead
A7	0.0008	C10	0.0026
A8	0.0011	C11	0.0058
A9	0.0011	C12	0.0033
A10	0.0010	D1	0.0010
A11	0.0015	D2	0.0011
A12	0.0011	D3	0.0004
B1	0.0003	D4	0.0007
B2	0.0003	D5	0.0006
B3	0.0003	D6	0.0006
B4	0.0005	D7	0.0010
B5	0.0008	D8	0.0020
B6	0.0008	D9	0.0035
B7	0.0035	D10	0.0019
B8	0.0016	D11	0.0031
B9	0.0013	D12	0.0023
B10	0.0019	E1	0.0003
B11	0.0022	E2	0.0003
B12	0.0005	E3	0.0003
C1	0.0003	E4	0.0003
C2	0.0003	E5	0.0003
C3	0.0005	E6	0.0003
C4	0.0008	E7	0.0003
C5	0.0012	E8	0.0003
C6	0.0015	E9	0.0008
C7	0.0016	E10	0.0010
C8	0.0012	E11	0.0010
C9	0.0010	E12	0.0008

TABLE I-3

C&R BATTERY AREA SOURCE
LEAD EMISSION RATES INPUT INTO THE ISCLT MODEL
(g/sec-m^2)
C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Area Source	Emission Rate	Area Source	Emission Rate
A7	9.8E-08	C10	8.4E-06
A8	2.7E-06	C11	7.4E-06
A9	9.8E-08	C12	1.7E-06
A10	9.8E-08	D1	1.2E-06
A11	9.8E-08	D2	1.8E-06
A12	1.6E-08	D3	8.0E-07
B1	9.6E-08	D4	4.1E-07
B2	7.4E-08	D5	2.8E-08
B3	6.8E-08	D6	1.2E-06
B4	1.1E-07	D7	2.3E-06
B5	1.8E-08	D8	2.3E-07
B6	8.7E-08	D9	4.0E-06
B7	5.6E-07	D10	3.5E-06
B8	5.5E-07	D11	1.0E-06
B9	2.3E-07	D12	1.3E-06
B10	6.8E-07	E1	1.2E-08
B11	5.3E-07	E2	1.2E-08
B12	2.6E-07	E3	1.2E-08
C1	9.8E-08	E4	1.9E-07
C2	1.3E-07	E5	4.0E-08
C3	5.7E-08	E6	2.5E-07
C4	9.2E-08	E7	7.6E-08
C5	3.9E-08	E8	8.8E-07
C6	2.7E-08	E9	1.2E-08
C7	1.1E-06	E10	1.7E-07
C8	2.3E-06	E11	1.6E-06
C9	4.4E-07	E12	1.7E-06

TABLE I-4

C&R BATTERY AREA SOURCE
ARSENIC EMISSION RATES INPUT INTO THE ISCLT MODEL
($g/sec-m^2$)
C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Area Source	Emission Rate	Area Source	Emission Rate
A7	7.84E-10	C10	2.55E-09
A8	1.07E-09	C11	5.68E-09
A9	1.07E-09	C12	3.23E-09
A10	9.80E-10	D1	9.80E-10
A11	1.47E-09	D2	1.08E-09
A12	1.07E-09	D3	3.92E-10
B1	2.94E-10	D4	6.86E-10
B2	2.94E-10	D5	5.88E-10
B3	2.94E-10	D6	5.88E-10
B4	4.90E-10	D7	9.80E-10
B5	7.84E-10	D8	1.96E-09
B6	7.84E-10	D9	3.43E-09
B7	3.43E-10	D10	1.86E-09
B8	1.57E-09	D11	3.04E-09
B9	1.25E-09	D12	2.25E-09
B10	1.86E-09	E1	2.94E-10
B11	2.16E-09	E2	2.94E-10
B12	4.90E-10	E3	2.94E-10
C1	2.94E-10	E4	2.94E-10
C2	2.94E-10	E5	2.94E-10
C3	4.90E-10	E6	2.94E-10
C4	7.84E-10	E7	2.94E-10
C5	1.18E-09	E8	2.94E-10
C6	1.47E-09	E9	7.84E-10
C7	1.57E-09	E10	9.80E-10
C8	1.18E-09	E11	9.80E-10
C9	9.8E-10	E12	7.84E-10

Center for use with the ISCLT model. The summary contained joint frequencies for six (6) stability categories (A-F) and six wind speed groups over 16 radial sectors.

Additional meteorological data was obtained for input into the ISCLT model pertaining to mean seasonal ambient air temperatures and seasonal mixing heights from pertinent climatological references (Ruffner and Bair, 1977; EPA, 1972).

I.2.5 Receptor Network

Ambient concentrations of lead and arsenic were calculated at 97 receptors within a 1-km square area surrounding the C&R Battery site. The receptor network was based on a Cartesian coordinate system extending outward from the center of the site at increment of 100 meters. Ambient concentrations were reported only for receptors that were located outside of the source area shown in Figure I-4. Because the maximum ambient impact from ground-level fugitive dust sources is usually within a few hundred meters of the sources, it was decided that a 1 km square receptor grid was adequate to define the maximum ambient impact.

In addition to the receptor points described above, one (1) discrete receptor point was also included. The Drewrys Bluff topographic map was reviewed to locate the nearest public school building. The closest public school to the C&R Battery Site was found in Chimney Corner, approximately 2.3 km southwest of the site. Ambient concentrations at all receptors were reported in micrograms per cubic meter.

I.3 MODELING RESULTS

The ISCLT model was run using the C&R Battery Site lead and arsenic inventories given in Tables I-3 and I-4 and the 10-year meteorological STAR summary for Richmond, Virginia. Ambient lead concentrations were calculated on a seasonal (quarterly) and annual basis, whereas ambient arsenic concentrations were calculated only for the annual period.

The maximum ambient ground-level lead and arsenic concentrations calculated within the 1-km-square receptor grid and the Chimney Corner Public School are reported in Tables I-5 and I-6. Results in Table I-5 indicate that the maximum ground-level lead concentration was found to occur northeast (NE) of the site at coordinate point 100,100 for both the seasonal and annual averaging periods. The maximum annual lead concentration for the 1-km receptor grid was 0.0026 $\mu g/m^3$. The maximum annual lead concentration at the Chimney Corner Public School was 0.00024 $\mu g/m^3$. The

TABLE I-5

RESULTS OF ISCLT MODEL FOR MAXIMUM SEASONAL AND ANNUAL LEAD CONCENTRATIONS C&R BATTERY SITE CHESTERFIELD COUNTY, VIRGINIA

Receptor x,y (meters)	Maximum Concentration ($\mu g/m^3$)	
	Seasonal	Annual
NE (100,100)	0.0029	0.0026
Chimney Corner School	0.00028	0.00024

TABLE I-6

RESULTS OF ISCLT MODEL FOR MAXIMUM ANNUAL AND AMBIENT ARSENIC CONCENTRATIONS
C&R BATTERY SITE
CHESTERFIELD COUNTY, VIRGINIA

Receptor x,y (meters)	Maximum Concentration ($\mu g/m^3$)
South (0,-200)	0.00820
Chimney Corner School	0.0000249

maximum seasonal concentrations of 0.0029 µg/m^3 at receptor point 100,100 and 0.00028 µg/m^3 at Chimney Corner Public School occurred during the July, August, September seasonal quarter.

Table I-6 indicates that the maximum arsenic ground- level concentration was found to occur south of the site at coordinate 0,-200 for the annual period. The maximum annual lead concentration for arsenic was 0.0082 µg/m^3. The maximum annual arsenic concentration at the Chimney Corner School was 0.000025 µg/m^3.

APPENDIX I
REFERENCES

EPA (U.S. Environmental Protection Agency), 1987. Industrial Source Complex (ISC) Dispersion Model Users Guide - Volume I & II - Section Edition (Revised). EPA-450/4-88-0022, Research Triangle Park, North Carolina.

EPA (U.S. Environmental Protection Agency), 1986. Guideline on Air Quality Models (Revised) and Supplement A (1987). EPA-450/2-78-027R, Research Triangle Park, North Carolina.

EPA (U.S. Environmental Protection Agency), 1985. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources. AP-42, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

EPA (U.S. Environmental Protection Agency), 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States. Research Triangle Park, North Carolina.

Ruffner, James A., and Frank E. Bair, 1977. The Weather Almanac, Gale Research Company, Book Tower, Detroit, Michigan.

APPENDIX J

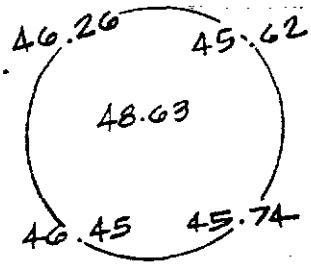
DEBRIS PILE AND TANK FARM DIKE VOLUME CALCULATIONS

NUS CORPORATION AND SUBSIDIARIES | STANDARD CALCULATION SHEET

CLIENT: EPA	FILE NO.: 9851	BY: RTH / MG	PAGE 1 OF
SUBJECT: C & R		CHECKED BY: JRE	DATE: 3-31-89

SMALL DEBRIS PILE VOLUME CALCULATION

SMALL DEBRIS PILE



VOL. OF CONE = $\frac{\pi}{12} d^2 h$

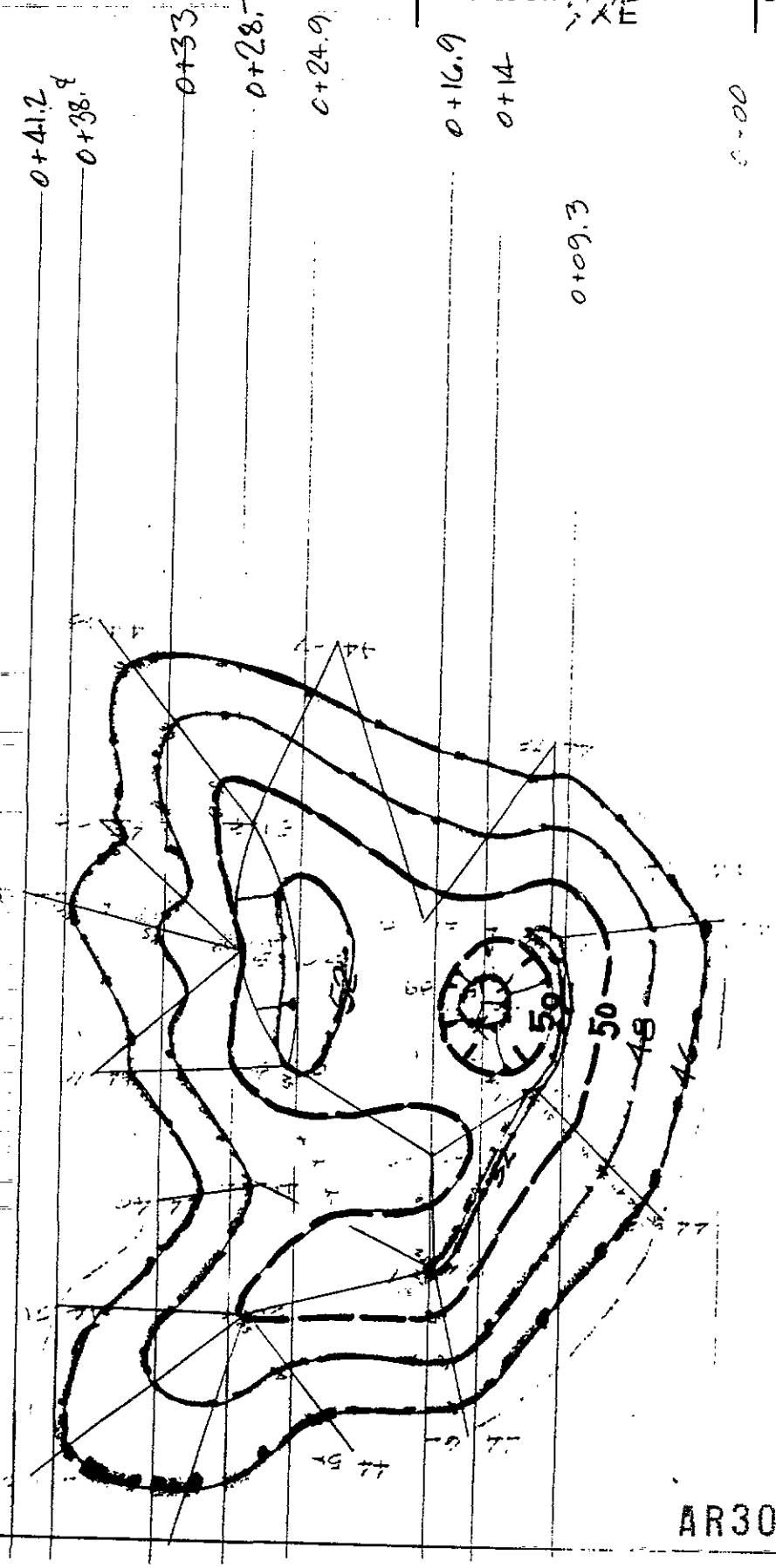
$= \pi/12 (13^2)(2.61)$

$= 115.5\ \text{ft}^3 = 4.28\ \text{CU YD.}$

1" = 10'

AR302120

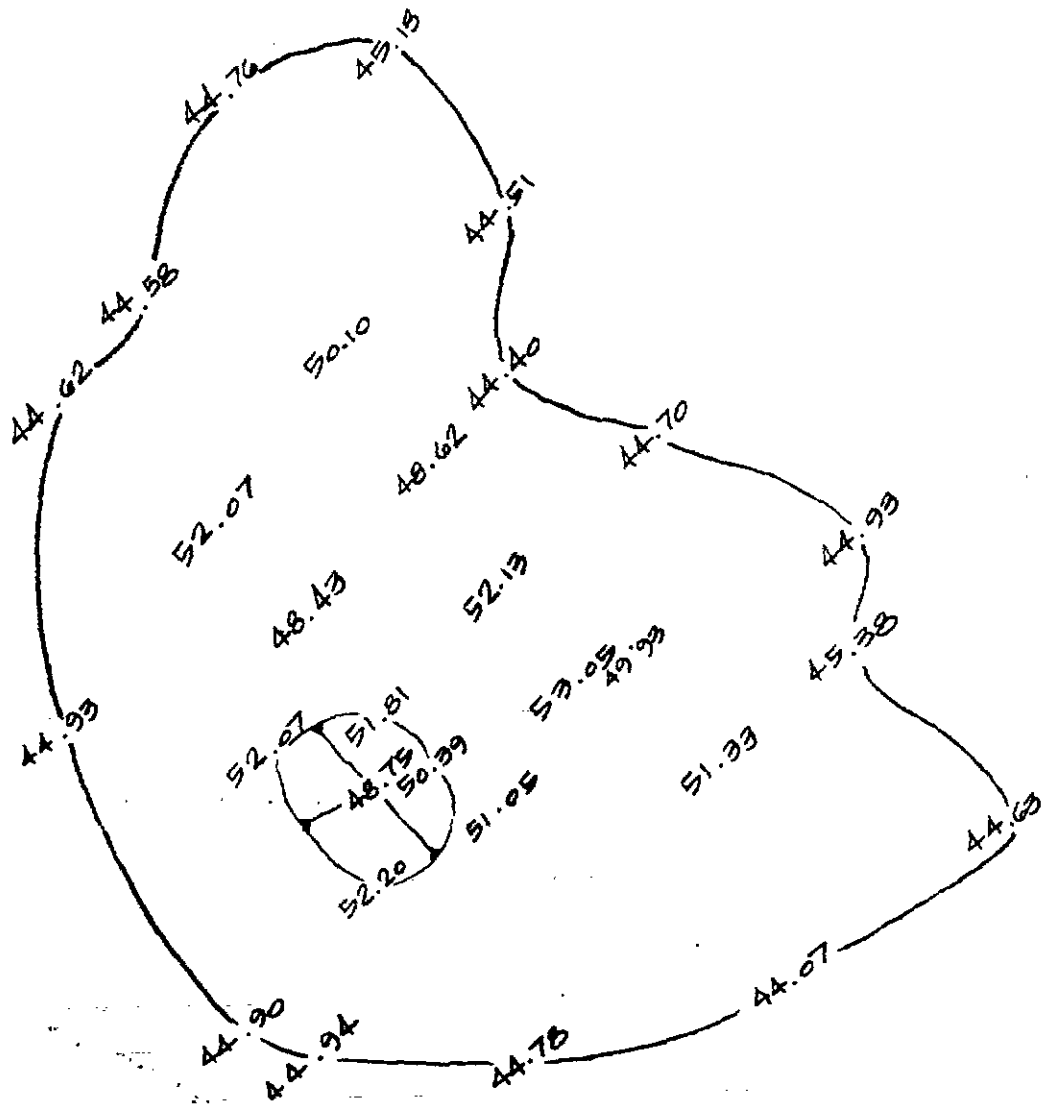
CLIENT: EPA	FILE NO.: 9851	BY: RTH / MLC	PAGE 2 OF
SUBJECT: C + R		CHECKED BY: JXE	DATE: 3-31-87



LARGE DEEKIE PILE
TRANSECT LOCATIONS

SCALE 1" = 10'

NUS CORPORATION AND SUBSIDIARIES			STANDARD CALCULATION SHEET
CLIENT: EPA	FILE NO.: 9851	BY: RTH / MGC	PAGE 3 OF
SUBJECT: LARGE DEBRIS PILE SURVEY ELEVATIONS		CHECKED BY: RE	DATE:



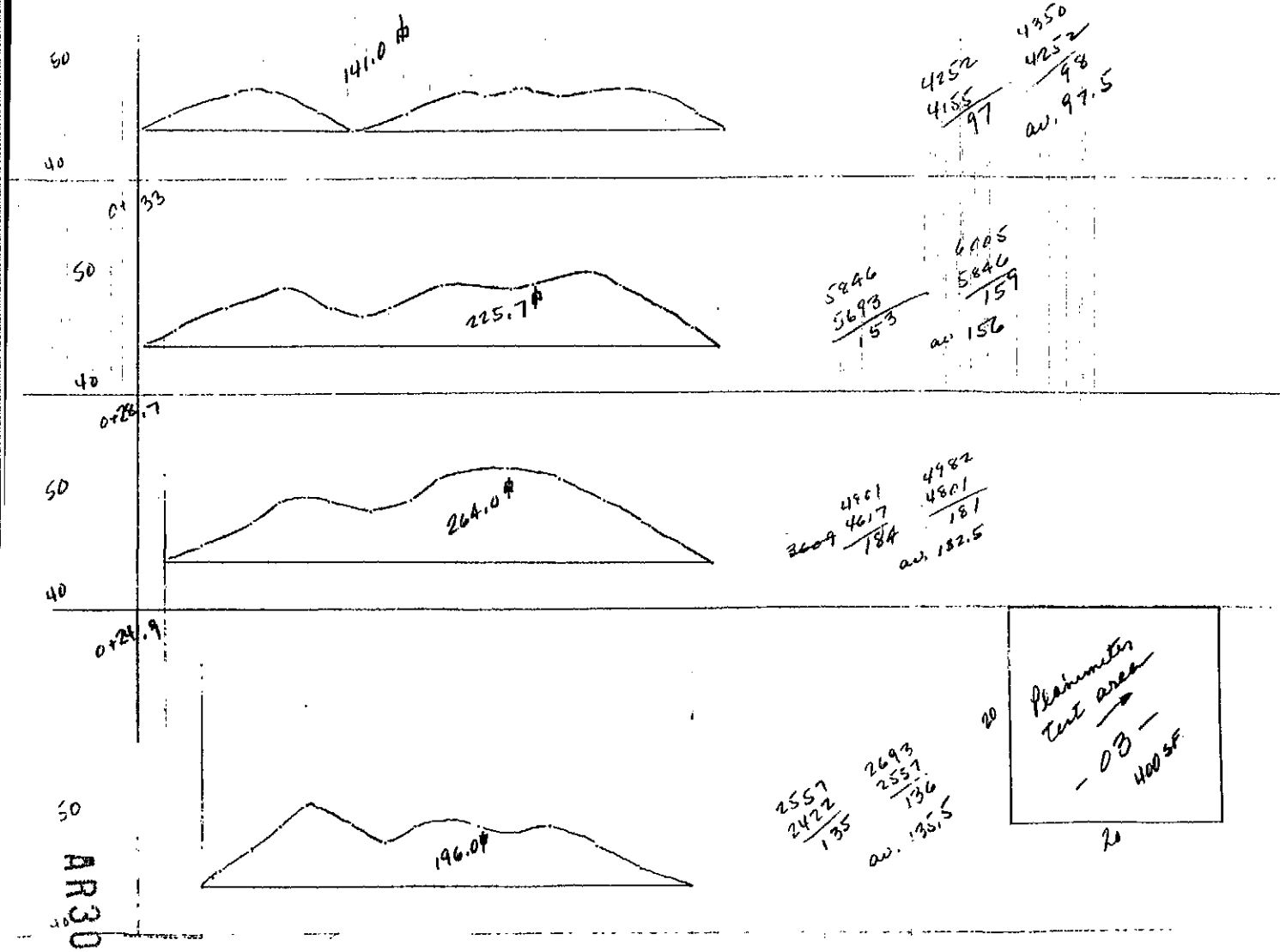
1" = 10'

AR302122

NUS CORPORATION AND SUBSIDIARIES

STANDARD CALCULATION SHEET

CLIENT: EPA	FILE NO.: 9851	BY: RTH / MGC	PAGE 4 OF
SUBJECT: LARGE DEBRIS PILE X-SECTIONS		CHECKED BY: JE	DATE: 3-30-89



4252 / 4155 / 97

4350 / 4252 / 98

av. 97.5

5846 / 5693 / 153

6005 / 5846 / 159

av. 156

4801 / 4617 / 184

4982 / 4801 / 181

av. 182.5

2557 / 2422 / 135

2693 / 2557 / 136

av. 135.5

$\frac{276.5}{400} = \frac{rdg}{x}$

$276.5\,x = 400(rdg)$

$x = \frac{400(rdg)}{276.5}$

3264 / 2990 / 274

3541 / 3264 / 277

3817 / 3541 / 276

av. 276.5 for 400 #

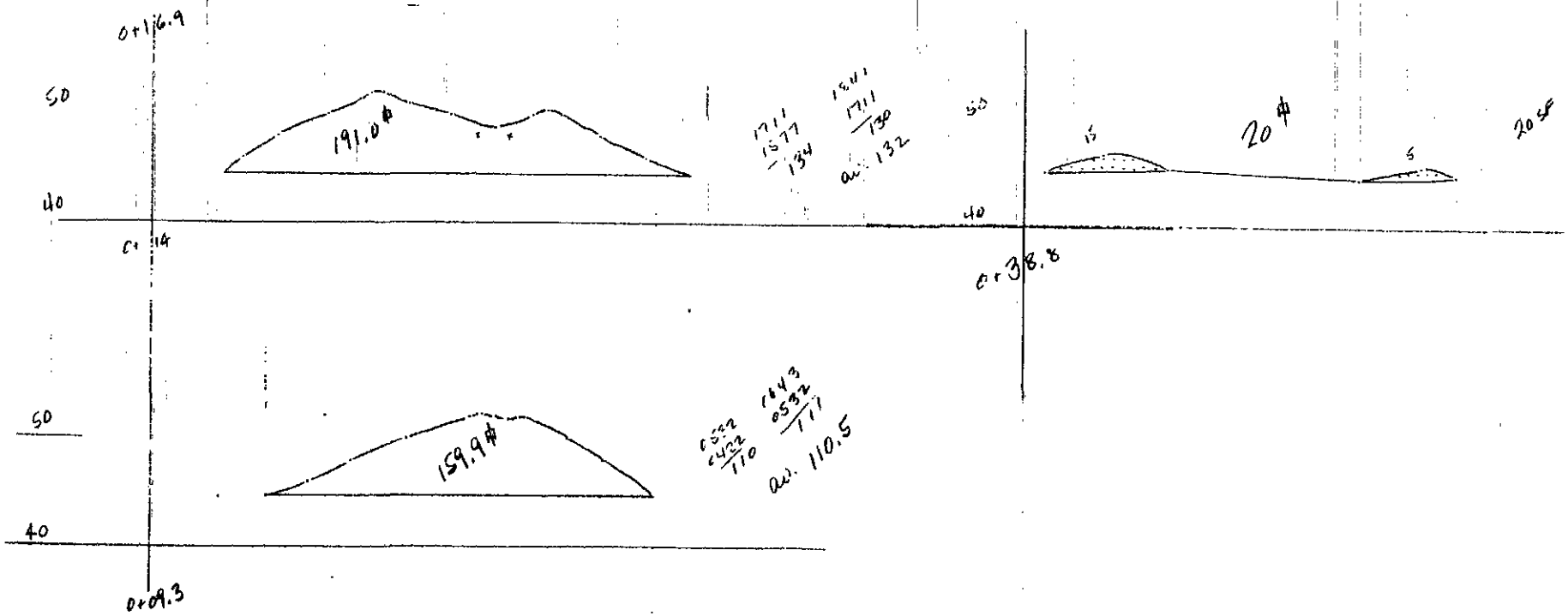
1" = 10' H, 1" = 10' V

AR302123

NUS CORPORATION AND SUBSIDIARIES

STANDARD CALCULATION SHEET

CLIENT: EPA	FILE NO.: 9851	BY: RTH / MGC	PAGE 5 OF
SUBJECT: LANDFILL FERRIS FILE X-SECTIONS		CHECKED BY: JRE	DATE: 3-30-89



1" = 10' H, 1" = 10' V

NUS CORPORATION

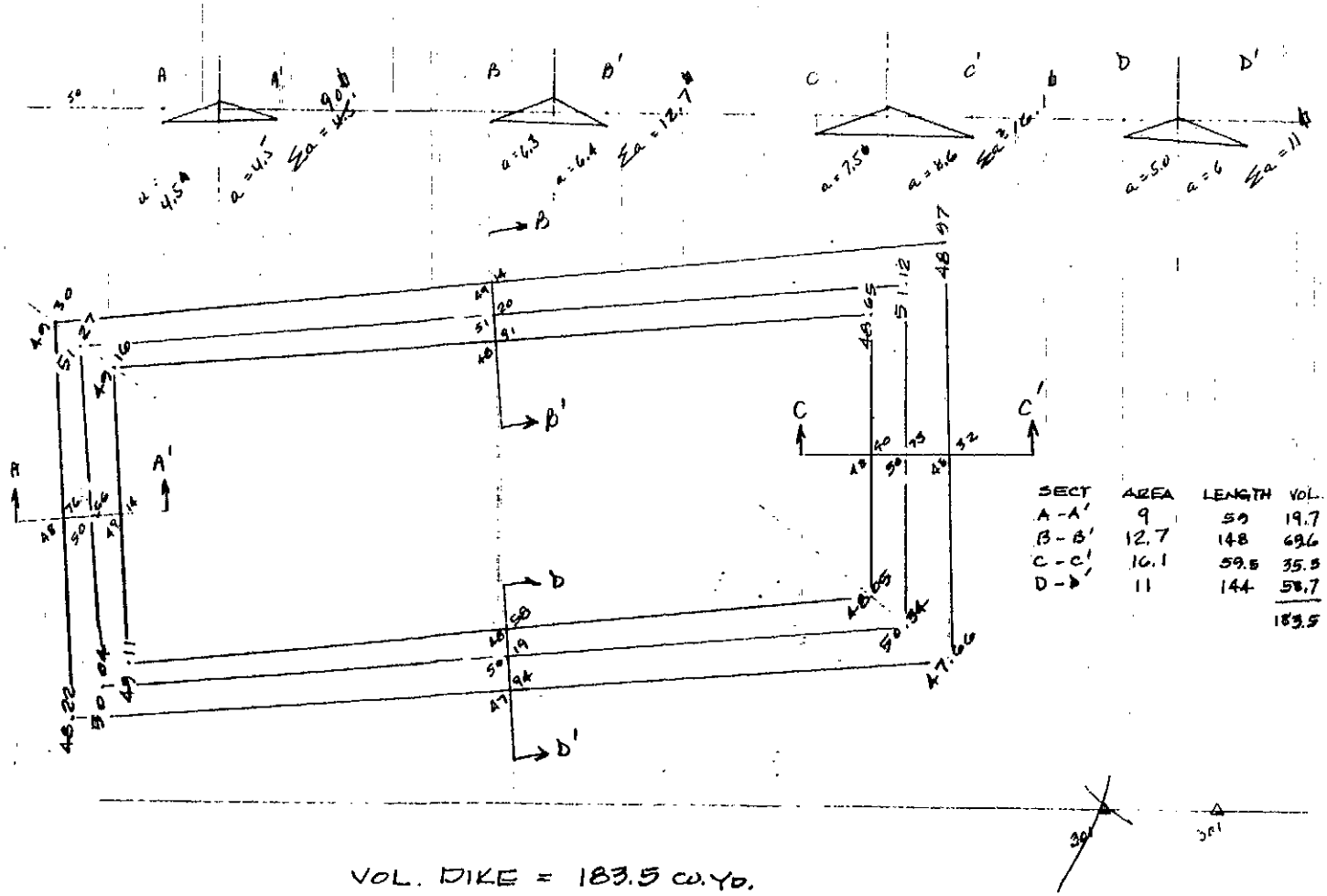
SUBJECT C&R BATTERY SHEET No. 6 OF 1
LARGE DEBRIS PILE BY RTH DATE 03/31/8
VOLUME CHKD DATE

CUT					FILL				
STATION	AREA	AVERAGE	DISTANCE	CU. YD.	STATION	AREA	AVERAGE	DISTANCE	CU. YD.
					0+00	-0-			
							80 #	9.3'	27.6
					0+09.3	159.9 #			
							175.5 #	4.7'	30.6
					0+14	191.0 #			
							193.5 #	2.9'	20.8
					0+16.9	196.0 #			
							230.0 #	8.0'	68.1
					0+24.9	264.0 #			
							244.9 #	3.8'	34.5
					0+28.7	225.7 #			
							183.4 #	4.3'	29.2
					0+33	141.0 #			
							80.5 #	5.8'	17.3
					0+38.8	20.0 #			
							10.8 #	2.4'	0.9
					0+41.2	-0-			
									229.0
	LARGE DEBRIS PILE			VOL. =	229.0	CU. YD.			
	SMALL "		"	" =	4.3	" "	(CONE: d=13', h=2.61'		
	TOTAL "		"	"	233.3	" "			

AR302125

NUS CORPORATION AND SUBSIDIARIES — STANDARD CALCULATION SHEET

CLIENT: EPA	FILE NO.: 9851	BY: RTH/MGC	PAGE OF
SUBJECT: C+R DIKE VOLUME AROUND CAPITOL OIL TANKS		CHECKED BY:	DATE:



SECT	AREA	LENGTH	VOL.
A-A'	9	59	19.7
B-B'	12.7	148	69.6
C-C'	10.1	59.5	35.5
D-D'	11	144	58.7
			183.5

VOL. DIKE = 183.5 CU.YD.

C & R BATTERY
DIKE AROUND TANKS
CAPITOL OIL CO.
1"=20' RTH 3/31/89