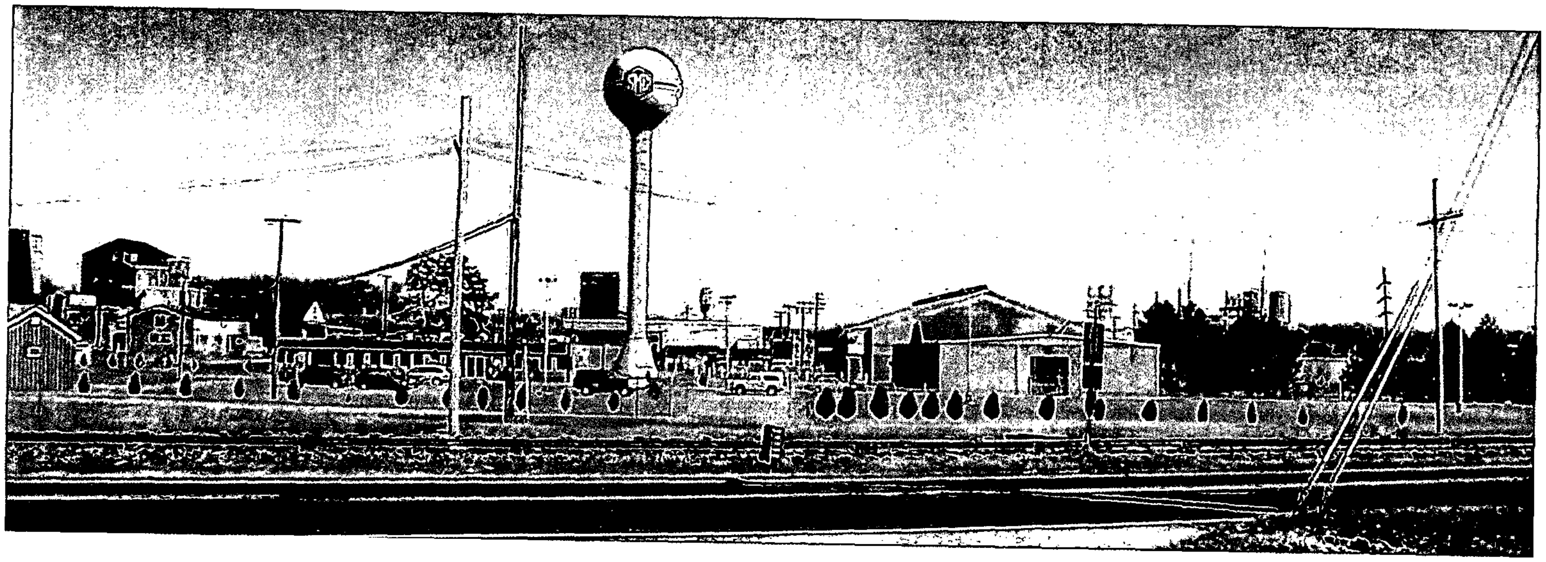


DECOMMISSIONING PLAN

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

REVISION 1b: AUGUST 2009

Appendix 19.1 ENVIRONMENTAL REPORT
Appendix D-O

Volume 2 of 2

Prepared by

Integrated Environmental Management, Inc. *and* **TRC Environmental Corporation**

APPENDIX D - SELECTED GEOLOGIC/SOIL DATA

APPENDIX D - SELECTED GEOLOGIC/SOIL DATA

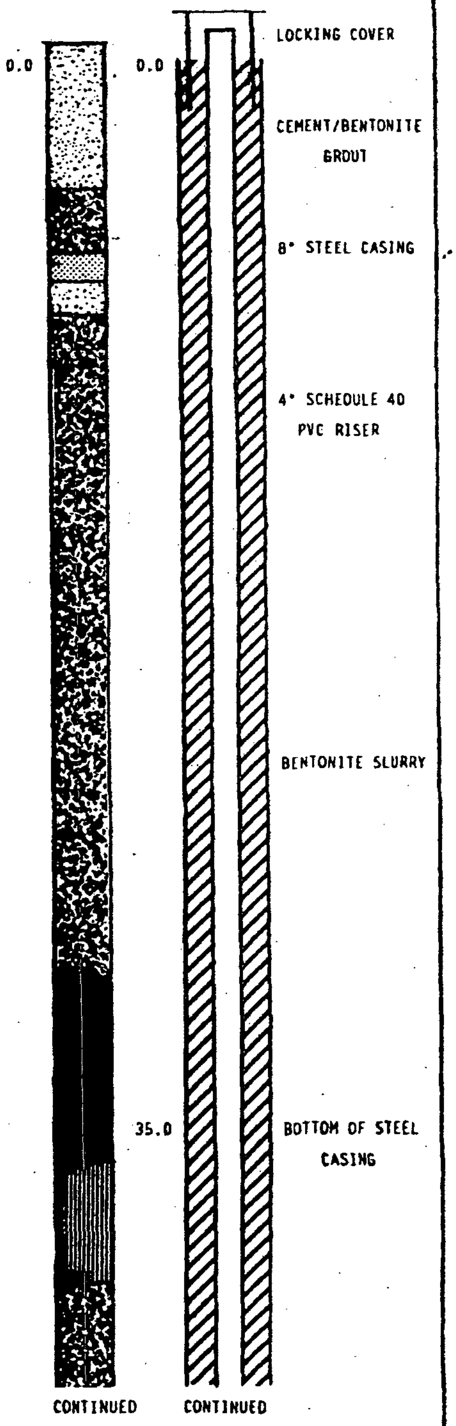
BORING NO.: SC-12D
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ
BORING DEPTH: 142 FT

CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: MUD ROTARY
GROUND ELEVATION: 102.16
INNER CASING ELEVATION: 103.19

DATE STARTED: 11/16/90
DATE COMPLETED: 11/19/90
WATER TABLE LEVEL: 9.0 FT
LOCATION: N 258008.45
E 1901049.83
NJDEP PERMIT NUMBER: 3135226-0

DEPTH (FT)	BLOWS	SOIL DESCRIPTION
0 - 2	9 11 5 7	DARK BROWN, FINE TO MEDIUM SAND, TRACE SILT, MOIST RECOVERY - 22"
2 - 4	7 6 6 6	BROWN FINE TO MEDIUM SAND, MOIST RECOVERY - 18"
4 - 6	5 8 9 8	BROWN/ORANGE FINE TO COARSE SAND, TRACE GRAVEL, MOIST RECOVERY - 22"
6 - 8	6 5 10 15	0-12" BROWN FINE SAND, LITTLE SILT, TRACE CLAY, MOIST 12-20" BROWN/ORANGE FINE TO MEDIUM SAND, MOIST
8 - 10	13 11 8 8	BROWN/ORANGE FINE TO COARSE SAND, TRACE SILT, WET RECOVERY - 24"
15 - 17	4 5 4 6	BROWN FINE TO COARSE SAND, TRACE GRAVEL, WET RECOVERY - 8"
20 - 22	8 7 7 6	BROWN/ORANGE FINE TO COARSE SAND RECOVERY - 10"
25 - 27	10 9 8 11	BROWN/ORANGE FINE TO COARSE SAND, LITTLE GRAVEL RECOVERY - 6"
30 - 32	6 1 1 3	0-3" SAME AS ABOVE 3-10" DARK GRAY CLAY, VERY STIFF
35 - 37	3 4 5 8	0-12" LT. GRAY CLAY, LITTLE SILT 12-18" BROWN SILT, SOME FINE SAND, TRACE CLAY, MOIST
40 - 42	2 3 3 5	BROWN FINE TO COARSE SAND RECOVERY - 8"

LITHOLOGY WELL CONSTRUCTION



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DEPTH (FT)	BLOWS	SOIL DESCRIPTION
45 - 47	2 8 9 13	BROWN FINE TO COARSE SAND RECOVERY - 12"
50 - 52	3 5 30 30	LT. BROWN FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 4"
55 - 57	5 11 15 20	SAME AS ABOVE WITH THIN WHITE LAYERS OF SILT THROUGHOUT RECOVERY - 14"
60 - 62	10 15 20 20	LT. BROWN TO WHITE FINE TO MEDIUM SAND RECOVERY - 14"
65 - 67	9 15 21 21	LT. BROWN FINE TO MEDIUM SAND RECOVERY - 12"
70 - 72	10 15 33 37	SAME AS ABOVE RECOVERY - 8"
75 - 77	22 24 28 32	SAME AS ABOVE RECOVERY - 12"
80 - 82	20 19 17 18	BROWN FINE SAND, TRACE SILT RECOVERY - 2"
85 - 87	10 12 11 20	LT. BROWN FINE SAND, TRACE SILT RECOVERY - 22"
90 - 92	15 29 16 18	LT. BROWN FINE TO COARSE SAND RECOVERY - 12"

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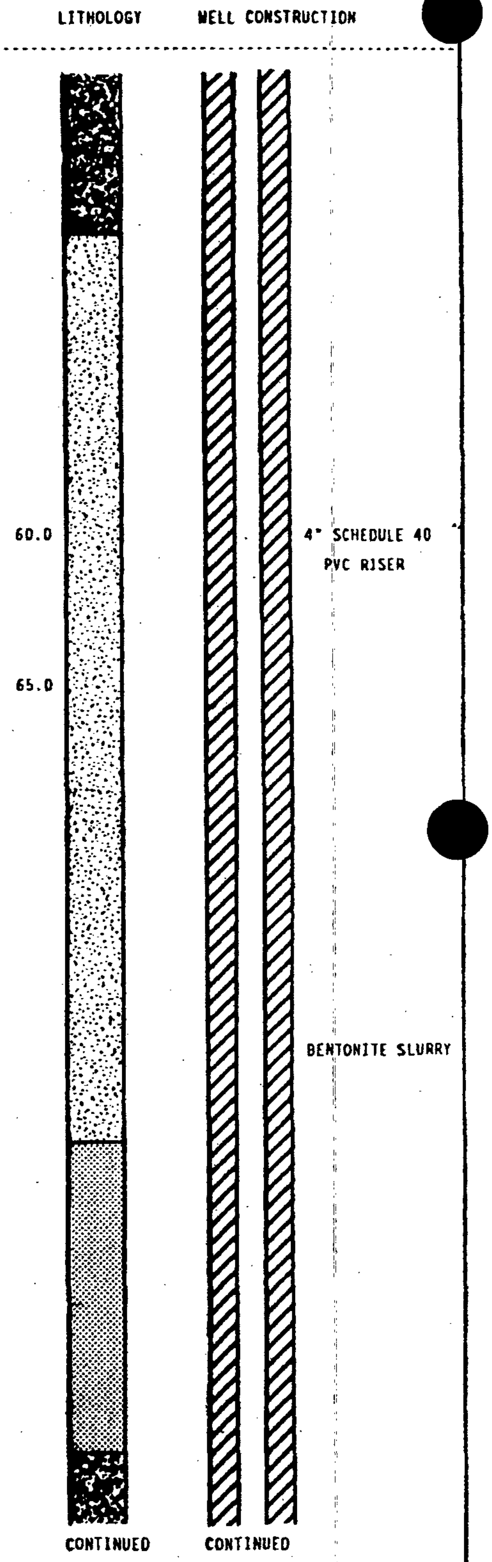
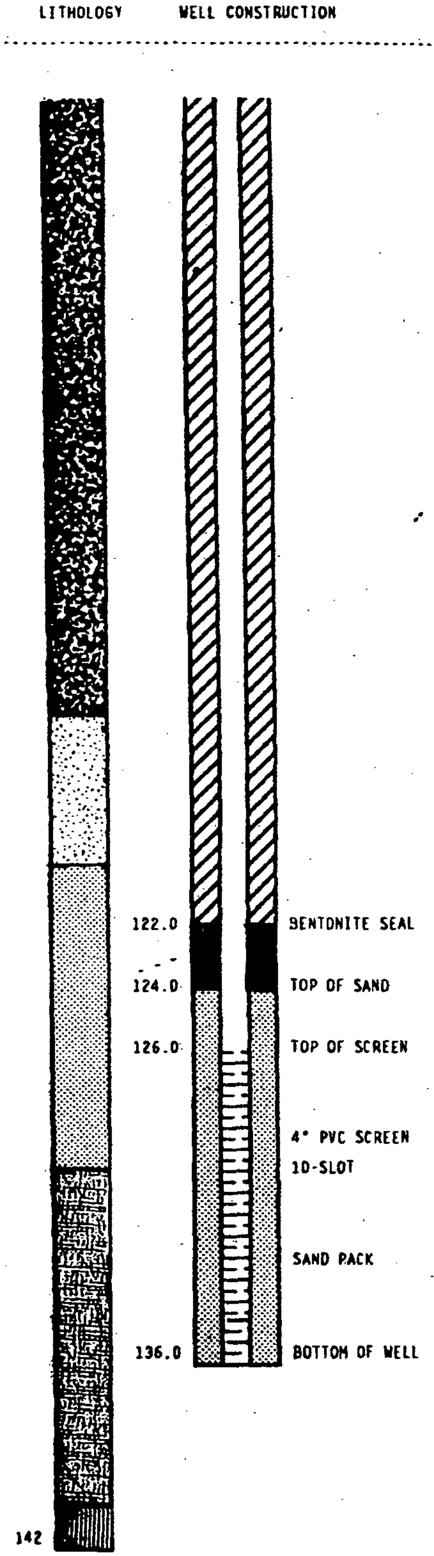


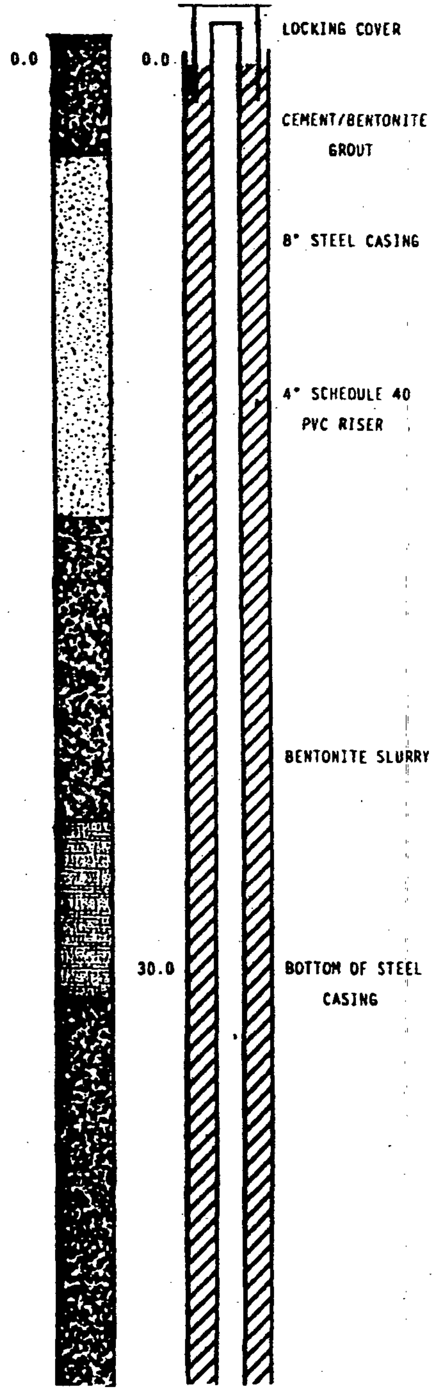
DEPTH (FT)	BLOWS	SOIL DESCRIPTION
95 - 97	19 21 32 29	LT. BROWN FINE TO COARSE SAND RECOVERY - 12"
100 - 102	35 42 67 65	BROWN/ORANGE FINE TO COARSE SAND, TRACE SILT RECOVERY - 8"
105 - 107	25 52 67 100	SAME AS ABOVE RECOVERY - 14"
110 - 112	34 100/5"	SAME AS ABOVE RECOVERY - 8"
115 - 117	100/5"	BROWN/RED FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 3"
120 - 122	12 11 19 28	BROWN FINE SAND, LITTLE SILT RECOVERY - 10"
125 - 127	12 22 20 18	LT. BROWN FINE SAND, LITTLE SILT RECOVERY - 12"
130 - 132	6 6 9 9	DARK GRAY FINE SAND AND SILT RECOVERY - 14"
135 - 137	5 6 5 8	SAME AS ABOVE RECOVERY - 20"
140 - 142	3 5 12 16	0-18" SAME AS ABOVE 18-24" DARK GRAY SILT, SOME CLAY END OF BORING - 142 FT



BORING NO.:	SC-13D	CONTRACTOR:	EMPIRE SOILS	DATE STARTED:	11/20/90
PROJECT NO.:	7650-N51	DRILLERS:	KENNEY, EDWARDS	DATE COMPLETED:	11/21/90
PROJECT:	SHIELD ALLOY	TRC INSPECTOR:	MCMORROW	WATER TABLE LEVEL:	5.5 FT
CLIENT:	SMC	DRILLING METHOD:	MUD ROTARY	LOCATION:	N 257662.57
LOCATION:	NEWFIELD, NJ	GROUND ELEVATION:	99.67		E 1901067.82
BORING DEPTH:	142 FT	INNER CASING ELEVATION:	101.99	NJDEP PERMIT NUMBER:	3135227-8

DEPTH (FT)	BLOWS	SOIL DESCRIPTION
0 - 2	2 3	BROWN/ORANGE FINE TO COARSE SAND, TRACE GRAVEL, MOIST
	3 3	RECOVERY - 18"
2 - 4	4 1	0-8" SAME AS ABOVE
	2 3	8-12" DARK BROWN FINE TO MEDIUM SAND, TRACE SILT
4 - 6	4 2	0-12" SAME AS 8-12" ABOVE
	2 2	12-24" GRAY FINE TO MEDIUM SAND, TRACE SILT, WET
10 - 12	10 8	BROWN FINE TO MEDIUM SAND, TRACE SILT, TRACE GRAVEL
	15 12	RECOVERY - 8"
15 - 17	4 4	BROWN/ORANGE FINE TO COARSE SAND, TRACE GRAVEL
	4 4	RECOVERY - 6"
20 - 22	3 4	LT. BROWN FINE TO COARSE SAND, TRACE SILT
	4 6	RECOVERY - 8"
25 - 27	1 1	0-4" BLACK FINE TO MEDIUM SAND, TRACE SILT
	1 2	4-8" DARK GRAY SILT AND FINE SAND
30 - 32	3 7	0-12" GRAY SILT, LITTLE FINE SAND, LITTLE CLAY
	12 15	12-24" BROWN FINE TO COARSE SAND, TRACE SILT
35 - 37	7 8	LT. BROWN FINE TO COARSE SAND, TRACE SILT
	13 16	RECOVERY - 12"
40 - 42	7 13	LT. BROWN FINE TO COARSE SAND
	11 12	RECOVERY - 8"

LITHOLOGY WELL CONSTRUCTION



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DEPTH (FT)	BLOWS	SOIL DESCRIPTION
45 - 47	10 14 17 25	LT. BROWN FINE TO COARSE SAND RECOVERY - 8"
50 - 52	8 19 21 24	LT. BROWN FINE TO COARSE SAND, TRACE SILT RECOVERY - 10"
55 - 57	8 14 21 25	SAME AS ABOVE RECOVERY - 10"
60 - 62	5 15 18 19	SAME AS ABOVE, COLORS RANGE FROM REDDISH BROWN, TO WHITE, TO LT. BROWN 60.0 BACK TO REDDISH BROWN. RECOVERY - 8"
65 - 67	15 20 30 30	REDDISH BROWN FINE TO MEDIUM SAND, TRACE COARSE SAND, TRACE SILT 65.0 RECOVERY - 12"
70 - 72	21 44 64 62	SAME AS ABOVE RECOVERY - 18"
75 - 77	23 36 34 39	SAME AS ABOVE RECOVERY - 14"
80 - 82	23 30 50/5"	SAME AS ABOVE RECOVERY - 14"
85 - 87	20 30 33 37	SAME AS ABOVE RECOVERY - 12"
90 - 92	17 35 32 30	RED FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 12"

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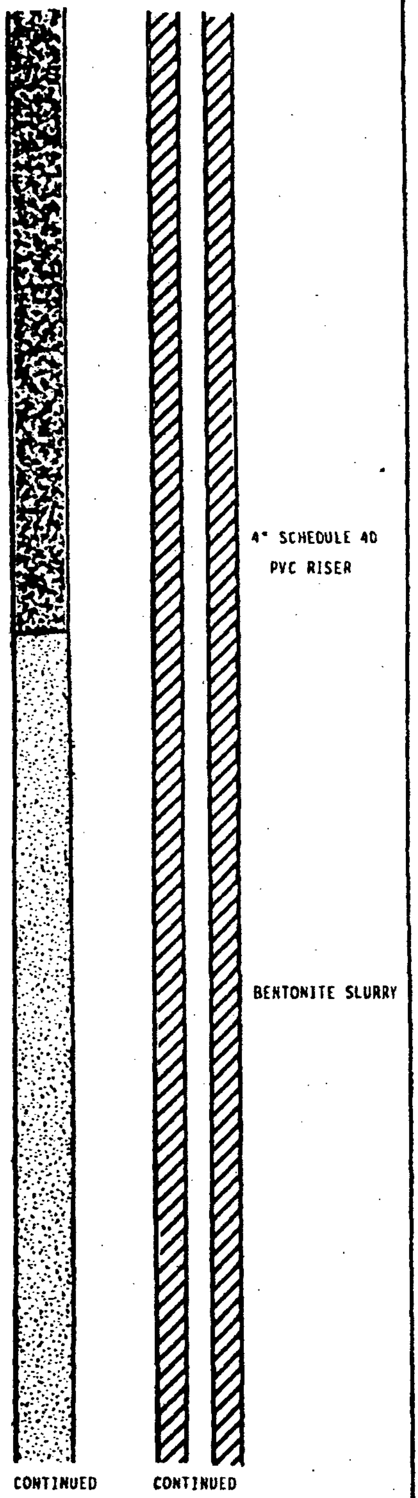
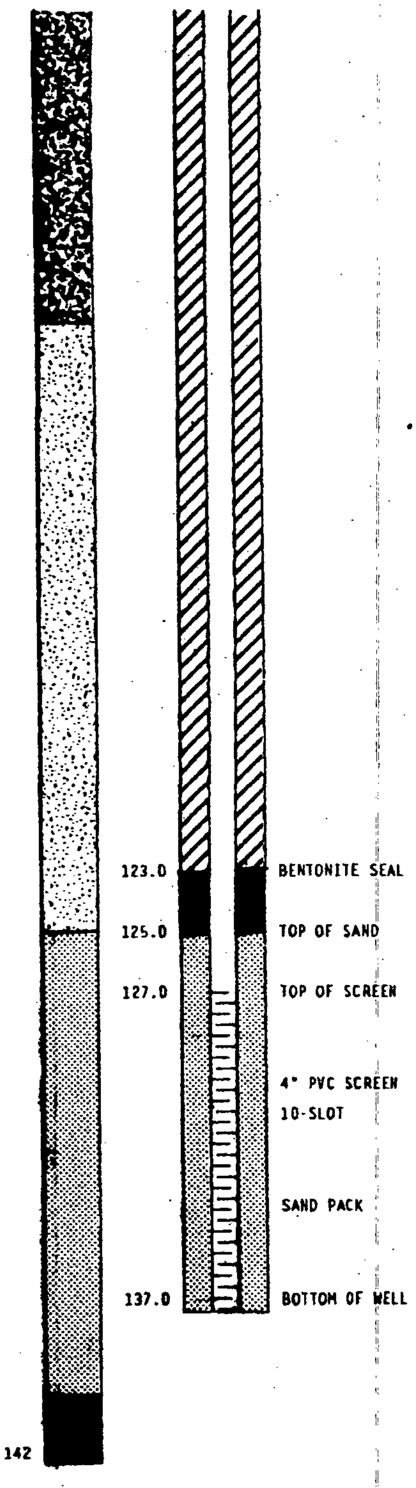
LITHOLOGY WELL CONSTRUCTION



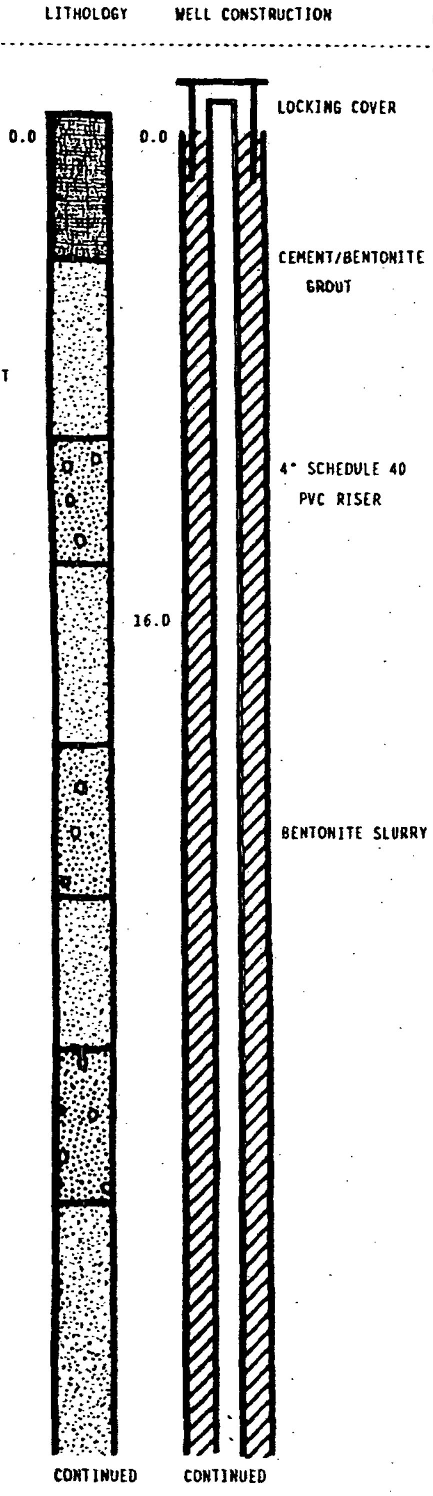
DEPTH (FT)	BLOWS	SOIL DESCRIPTION
95 - 97	22 30 16 30	0-12" RED/BROWN FINE TO COARSE SAND, TRACE SILT 12-18" RED/BROWN FINE SAND, LITTLE SILT, TRACE CLAY
100 - 102	13 20 24 36	RED/BROWN FINE TO COARSE SAND, TRACE SILT RECOVERY - 14"
105 - 107	21 63 53 69	BROWN/ORANGE FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 16"
110 - 112	15 29 45 50/1"	SAME AS ABOVE RECOVERY - 18"
115 - 117	17 80 100/5"	BROWN/ORANGE FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 12"
120 - 122	8 20 22 22	LT. BROWN FINE TO MEDIUM SAND WITH STRINGS OF GRAY CLAY AT 2" RECOVERY - 8"
125 - 127	13 23 33 30	LT. BROWN FINE SAND, TRACE SILT RECOVERY - 12"
130 - 132	WOR 17 25 24	DARK GRAY FINE SAND, TRACE SILT RECOVERY - 14"
135 - 137	5 8 17 16	SAME AS ABOVE RECOVERY - 20"
140 - 142	6 6 10 9	DARK GRAY SILT AND CLAY RECOVERY - 24" END OF BORING - 142 FT

LITHOLOGY WELL CONSTRUCTION



BORING NO.:	SC-17D	CONTRACTOR:	EMPIRE SOILS	DATE STARTED:	11/14/90
PROJECT NO.:	7650-N51	DRILLERS:	EMPSON, SNYDER	DATE COMPLETED:	11/28/90
PROJECT:	SHIELD ALLOY	TRC INSPECTOR:	GLEZEN	WATER TABLE LEVEL:	16.0 FT
CLIENT:	SMC	DRILLING METHOD:	MUD ROTARY	LOCATION:	N 257933.78
LOCATION:	NEWFIELD, NJ	GROUND ELEVATION:	106.48		E 1899201.04
BORING DEPTH:	155 FT	INNER CASING ELEVATION:	108.07	NJDEP PERMIT NUMBER:	3135223-5

DEPTH (FT)	BLOWS	SOIL DESCRIPTION
0 - 2	3 1 2 5	ORANGE/BROWN SILT AND FINE SAND, SOME WOOD FRAGMENTS IN TIP RECOVERY - 3"
2 - 4	6 10 8 11	ORANGE FINE SAND AND SILT, TRACE MEDIUM SAND, TRACE GRAVEL RECOVERY - 12"
4 - 6	14 22 24 28	ORANGE FINE TO MEDIUM SAND AND GRAVEL, TRACE COBBLES RECOVERY - 12"
6 - 8	17 26 28 28	ORANGE FINE TO MEDIUM SAND, SOME GRAVEL, TRACE COBBLES RECOVERY - 18"
8 - 10	17 24 26 27	ORANGE FINE TO MEDIUM SAND, SOME COARSE SAND, LITTLE GRAVEL, TRACE SILT RECOVERY - 22"
10 - 12	6 5 9 12	ORANGE MEDIUM TO COARSE SAND, SOME GRAVEL RECOVERY - 18"
12 - 14	12 7 13 13	SAME AS ABOVE RECOVERY - 18"
14 - 16	16 22 20 27	ORANGE FINE TO MEDIUM SAND, TRACE SILT, MOIST RECOVERY - 19"
16 - 18		ORANGE FINE TO MEDIUM SAND, SOME COARSE SAND, TRACE SILT, WET RECOVERY - 18"
20 - 22	11 18 22 29	LT. BROWN MEDIUM TO COARSE SAND, LITTLE GRAVEL RECOVERY - 18"
25 - 27	10 12 11 26	LT. TAN FINE TO MEDIUM SAND, TRACE COARSE SAND, 1" OF WHITE SILTY CLAY IN TIP OF SPOON. RECOVERY - 8"
30 - 32	10 16 16 21	BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE CLAY RECOVERY - 14"
35 - 37		LT. BROWN/PINK FINE TO MEDIUM SAND RECOVERY - 12"
40 - 42	28 54 73 78	LT. TAN/PINK FINE TO MEDIUM SAND, TRACE COARSE SAND, TIGHT RECOVERY - 12"



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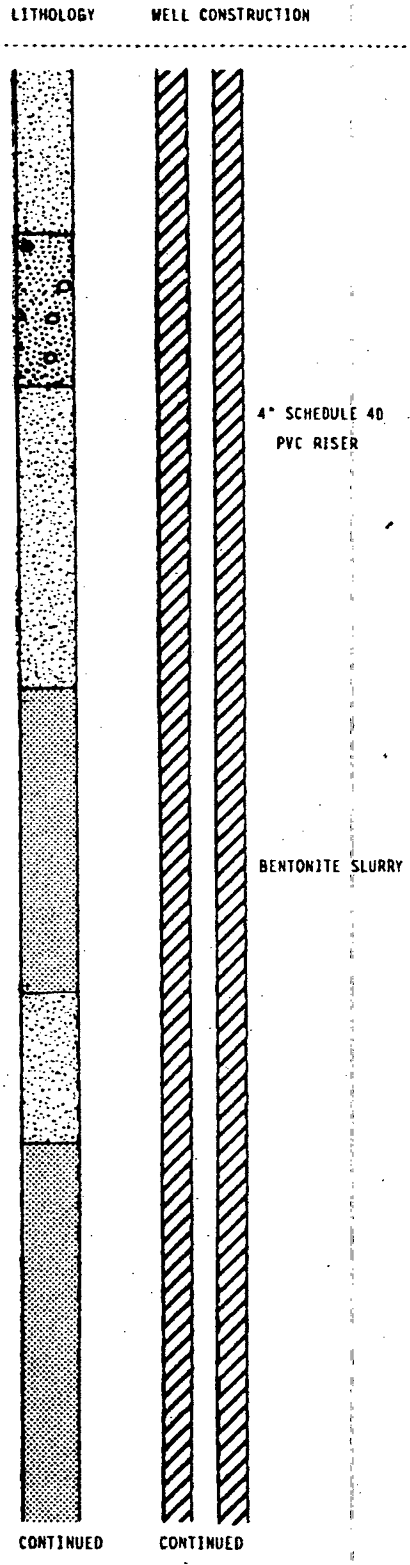
DEPTH (FT)	BLOWS	SOIL DESCRIPTION
45 - 47	15 35 65 65	LT. TAN/PINK FINE TO MEDIUM SAND, TRACE COARSE SAND, TIGHT RECOVERY - 5"
50 - 52	12 14 25 32	LT. BROWN MEDIUM TO COARSE SAND, LITTLE GRAVEL RECOVERY - 12"
55 - 57	21 35 100/6"	TAN/PINK FINE TO MEDIUM SAND, TRACE COARSE SAND RECOVERY - 4"
60 - 62	22 43 44 59	LT. TAN/PINK FINE TO MEDIUM SAND, TRACE COARSE SAND, TIGHT RECOVERY - 12"
65 - 67	18 60 71 60	LT. TAN/PINK FINE SAND, TRACE MEDIUM SAND, TIGHT RECOVERY - 8"
70 - 72	24 26 35 32	SAME AS ABOVE, SOME COARSE SAND RECOVERY - 8"
75 - 77	35 22 28 28	LT. TAN/PINK FINE TO MEDIUM SAND, SOME COARSE SAND, LITTLE GRAVEL RECOVERY - 8"
80 - 82	18 22 26 26	LT. TAN/PINK FINE SAND, SOME SILT, WITH FINE LAMINATIONS OF WHITE SILT RECOVERY - 14"
85 - 87	6 13 16 35	LT. TAN FINE TO VERY FINE SAND, SOME SILT, WITH SMALL WHITE SILT LAYERS RECOVERY - 14"
88 - 90	18 35 75/6"	PINK/TAN FINE TO VERY FINE SAND, LITTLE SILT RECOVERY - 8"



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DEPTH (FT)	BLOWS	SOIL DESCRIPTION
93 - 95	14 26 34 35	BROWN/ORANGE FINE SAND, TRACE SILT, SOME SMALL WHITE SILTY CLAY LAMINATIONS. RECOVERY - 18"
98 - 100	30 50 75/6"	LT. TAN FINE SAND, LITTLE MEDIUM SAND, TRACE SILT, SOME SMALL VARVED CLAY LAYERS. RECOVERY - 14"
103 - 105	35 75/6"	BROWN/ORANGE FINE TO MEDIUM SAND, SOME COARSE SAND, TRACE CLAY RECOVERY - 12"
108 - 110	32 55 75/6"	LT. TAN FINE TO COARSE SAND, LITTLE FINE GRAVEL RECOVERY - 12"
113 - 115	38 75/6"	BROWN/ORANGE FINE TO MEDIUM SAND, SOME COARSE SAND, TRACE GRAVEL RECOVERY - 6"
118 - 120	38 75/6"	BROWN/ORANGE FINE TO MEDIUM SAND, LITTLE SILT RECOVERY - 4"
123 - 125	46 62 48 30	LT. TAN FINE TO MEDIUM SAND, SOME COARSE SAND, LITTLE GRAVEL RECOVERY - 14"
128 - 130	46 26 16 10	NO RECOVERY
133 - 135	15 22 24 30	LT. TAN FINE TO VERY FINE SAND, SOME MEDIUM SAND, LITTLE SILT RECOVERY - 12"

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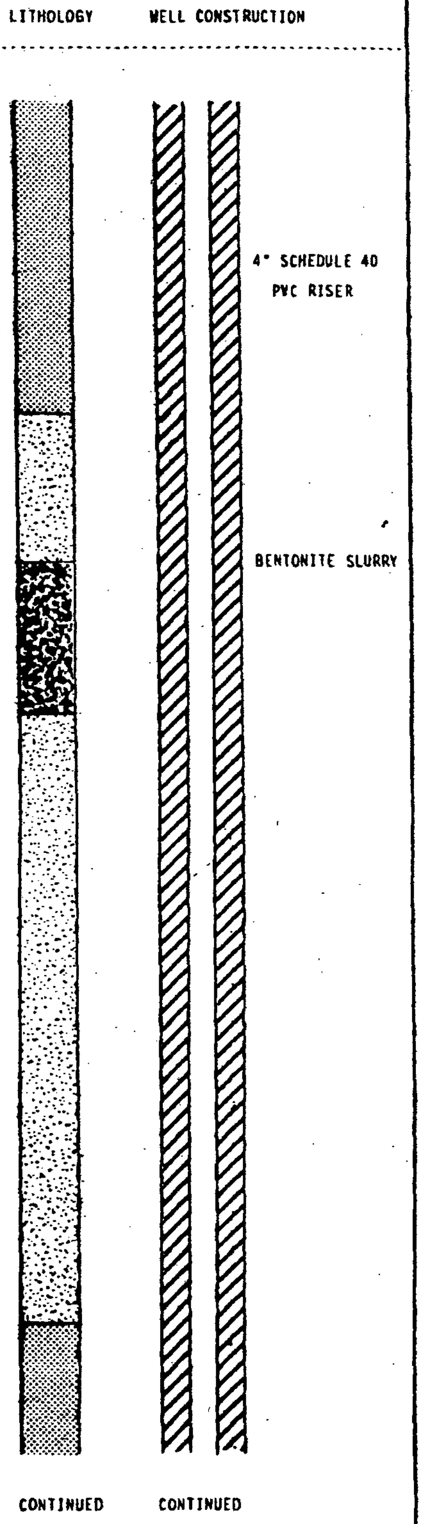
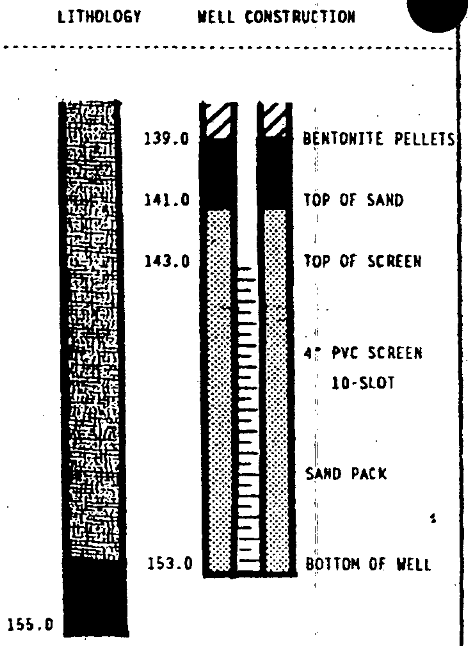


DEPTH (FT)	BLOWS	SOIL DESCRIPTION
138 - 140	26 16 15 10	LT. TAN/GRAY FINE TO VERY FINE SAND AND SILT, TRACE CLAY RECOVERY - 12"
143 - 145	12 27 27 23	SAME AS ABOVE
148 - 150	69 92 29 30	0-8" LT. TAN FINE TO COARSE SAND AND GRAVEL 8-12" LT. TAN FINE SAND AND SILT, LITTLE CLAY
153 - 155	8 10 17 23	VARVED DARK GRAY SILTY CLAY, WITH SMALL SILT LAYERS



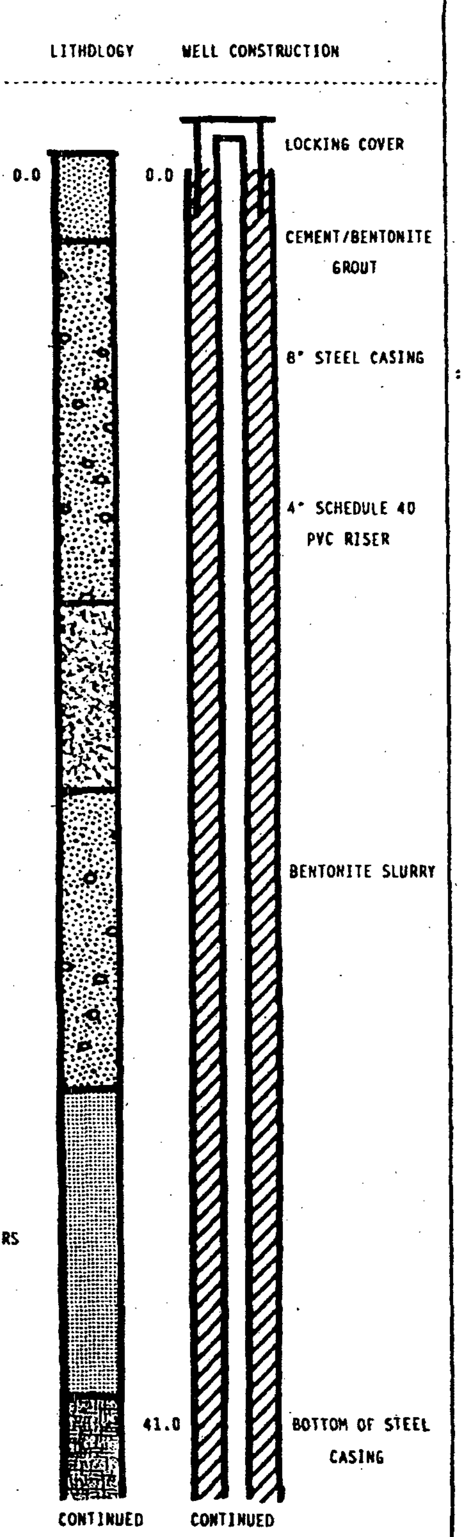
END OF BORING - 155 FT

BORING NO.: SC-22D
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ
BORING DEPTH: 122 FT

CONTRACTOR: EMPIRE SOILS
DRILLERS: EMPSON, SNYDER
TRC INSPECTOR: GLEZEN
DRILLING METHOD: MUD ROTARY
GROUND ELEVATION: 96.18
INNER CASING ELEVATION: 98.72

DATE STARTED: 11/16/90
DATE COMPLETED:
WATER TABLE LEVEL: 5.0 FT
LOCATION: N 257593.05
E 1900417.75
NJDEP PERMIT NUMBER: 3135222-7

DEPTH (FT)	BLOWS	SOIL DESCRIPTION
0 - 2	3 3 2 2	BROWN MEDIUM SAND, SOME GRAVEL, MOIST RECOVERY - 10"
2 - 4	1 1 2 2	BROWN COARSE TO MEDIUM SAND, SOME GRAVEL, MOIST RECOVERY - 10"
4 - 6	3 3 5 6	SAME AS ABOVE, WET RECOVERY - 10"
9 - 11	2 2 4 3	SAME AS ABOVE RECOVERY - 16"
14 - 16	2 2 4 6	TAN/ORANGE COARSE SAND, TRACE GRAVEL
20 - 22	13 17 17 21	ORANGE MEDIUM TO COARSE SAND, TRACE GRAVEL RECOVERY - 5"
25 - 27	16 18 17 15	BROWN/ORANGE MEDIUM TO COARSE SAND, SOME FINE SAND, TRACE GRAVEL RECOVERY - 12"
30 - 32	5 4 6 7	0-4" LT. BROWN/RED SILT AND CLAY, SOME FINE SAND 4-20" BROWN/RED FINE SAND, SOME SILT, SOME CLAY NOTE: CLAY OCCURS IN WHITE/PINK LAYERS
35 - 37	7 7 8 7	ORANGE/PINK FINE TO VERY FINE SAND, SOME SILT, SOME CLAY WITH STRINGERS RECOVERY - 16"
40 - 42	2 2 3 2	ORANGE SILT AND FINE SAND WITH WHITE/GRAY CLAY LAYERS RECOVERY - 24"



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DEPTH (FT)	BLOWS	SOIL DESCRIPTION
45 - 47	33 33 48 42	RED/ORANGE MEDIUM TO COARSE SAND, SOME FINE SAND, TRACE GRAVEL RECOVERY - 18"
50 - 52	34 43 48 53	ORANGE MEDIUM SAND, SOME COARSE SAND, LITTLE FINE SAND, TRACE GRAVEL RECOVERY - 14"
55 - 57	8 12 19 24	LT. TAN/PINK FINE TO MEDIUM SAND, SOME COARSE SAND, TRACE GRAVEL RECOVERY - 18"
60 - 62	18 23 26 30	ORANGE MEDIUM TO COARSE SAND, SOME FINE SAND, TRACE SILT RECOVERY - 14"
65 - 67	13 25 28 28	LT. TAN FINE TO MEDIUM SAND, TRACE COARSE SAND, TRACE SILT RECOVERY - 12"
70 - 72	8 12 13 13	TAN FINE TO MEDIUM SAND, LITTLE SILT RECOVERY -12"
75 - 77	24 43 38 50	TAN/PINK MEDIUM TO COARSE SAND, SOME FINE SAND, LITTLE GRAVEL RECOVERY - 14"
80 - 82	15 9 7 7	ORANGE FINE TO MEDIUM SAND, TRACE CLAY RECOVERY - 7"
85 - 87	60 100/6"	BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, LITTLE FINE SAND RECOVERY - 12"
90 - 92	43 100/6"	BROWN/PINK FINE TO MEDIUM SAND, SOME COARSE SAND RECOVERY - 12"

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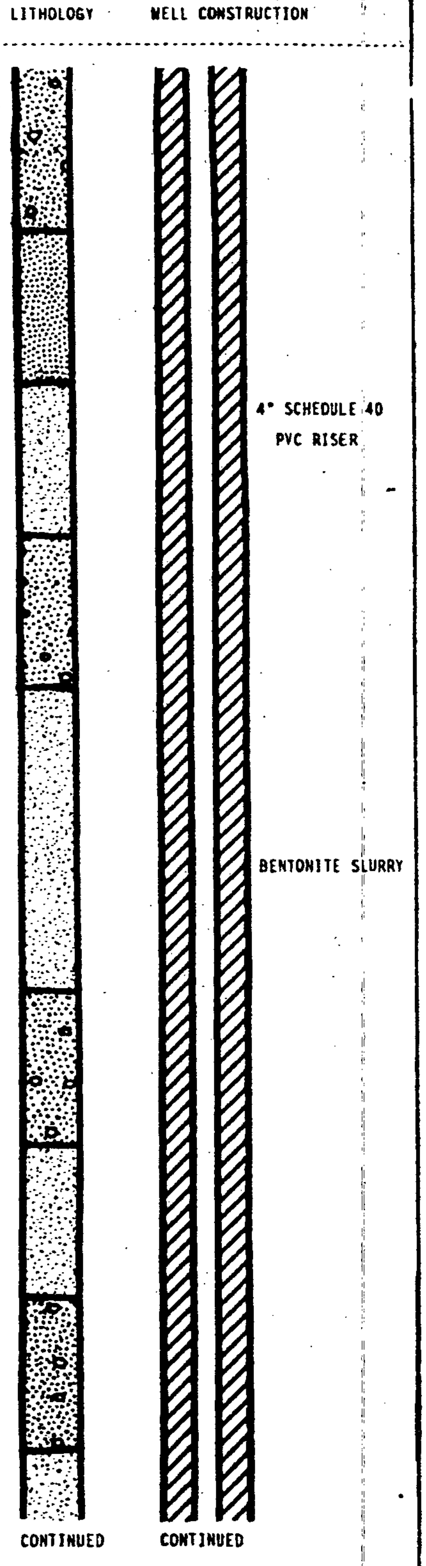
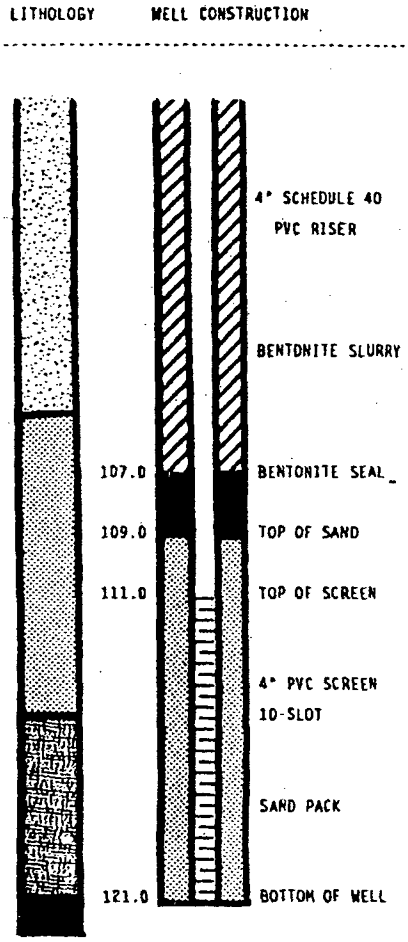


DEPTH (FT)	BLOWS	SOIL DESCRIPTION
95 - 97	100/6"	LT. BROWN/ORANGE FINE TO MEDIUM SAND, TRACE3 COARSE SAND RECOVERY - 6"
100 - 102	43 100/6"	LT. BROWN FINE TO MEDIUM SAND, LITTLE COARSE SAND, TRACE GRAVEL RECOVERY - 12"
105 - 107	100/6"	LT. BROWN FINE SAND, LITTLE MEDIUM SAND, TRACE SILT RECOVERY - 6"
110 - 112	22 30 75/6"	LT. TAN/ORANGE FINE TO VERY FINE SAND, LITTLE SILT RECOVERY - 12"
115 - 117	50 60 75/6"	ORANGE/RED VERY FINE SAND AND SILT, DENSE RECOVERY - 6"
120 - 122	20 23 25 27	0-12" LT. TAN FINE TO VERY FINE SAND WITH LIGHT GRAY CLAY INTERBEDS 12-14" DARK GRAY SILTY CLAY, STIFF

END OF BORING - 122 FT



PROJECT: **Storage Yard Geotechnical Investigation**	**GB-1**	TRC
BORING LOCATION: SMC Storage Yard	COORDINATES (NJ PLANE SYSTEM - NAD83) EASTERLY: 346,446 NORTHERLY: 258,328	
DRILLING CONTRACTOR: Unitech: Mike Conover/Tom Brown	DATE STARTED: 1/28/09	DATE FINISHED: 1/28/09
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 34	MEASURING POINT: Ground Surface
DRILLING EQUIPMENT: Track-mounted CME 55 LC	DEPTH TO WATER (ft): 12	GROUND SURFACE ELEVATION (NAVD 88): 102
SAMPLING METHOD: 2" Split-spoon	LOGGED BY: Chris Carlson	

Depth (feet)	Observed Groundwater	Recovery 0 1 2	Blow Counts	Lithology	DESCRIPTION Field	DESCRIPTION Laboratory
0		1.5	12 9 11 7		0.0'-2.0' Light brown F-SAND, little silt, little m-sand, trace slag, little concrete, trace wood	0.0'-2.0' Sample not submitted for analysis
		1.1	13 7 6 5		2.0'-4.0' Light green brown F-SAND, trace silt, little m-sand, trace slag, trace wood	2.0'-4.0' Sample not submitted for analysis
5		0.5	2 2 2 3		4.0'-6.0' Light brown F-SAND, little m-sand, trace silt, trace c-sand, trace f-gravel	4.0'-6.0' Poorly graded sand with silt and gravel (SP-SM) (ASTM)
		0.6	7 5 5 4		6.0'-8.0' Orange brown F-M SAND, trace silt, trace clay, little f-gravel (black)	6.0'-8.0' Sample not submitted for analysis
		1.8	5 6 6 9		8.0'-10.0' Orange brown F-M SAND, little c-sand, little clay, little f-gravel	8.0'-10.0' Silty sand (SM) (ASTM)
10		1.1	4 4 6 9		10.0'-12.0' Orange brown F-M SAND, little silt, trace c-sand, trace f-gravel	10.0'-12.0' Silty sand (SM) (ASTM)
	▼ 12	1.7	2 3 5 5		12.0'-14.0' Orange yellow-brown F-M SAND, little c-sand, trace silt	12.0'-14.0' Poorly graded sand with silt (SP-SM)(ASTM)
15		2.0	5 8 8 9		14.0'-16.0' Orange yellow-brown M-C SAND, little f-sand, trace silt	14.0'-16.0' Poorly graded sand with silt (SP-SM)(ASTM)
		2.0	10 12 12 14		16.0'-18.0' Yellow brown M-C SAND, little f-sand, trace silt, trace f-gravel	16.0'-18.0' Sample not submitted for analysis
		1.5	9 10 11 11		18.0'-20.0' Orange yellow-brown M-C SAND, little f-sand, trace silt, trace f-gravel	18.0'-20.0' Sample not submitted for analysis
20		1.7	5 6 11 14		20.0'-22.0' Orange yellow-brown F-M SAND, little c-sand, trace silt, trace f-gravel	20.0'-22.0' Silty sand (SM) (ASTM)
		1.9	11 13 17 22		22.0'-24.0' Orange yellow-brown F-M SAND, little c-sand, trace silt, trace f-gravel	22.0'-24.0' Sample not submitted for analysis
25		1.0	9 10 10 15		24.0'-26.0' Yellow brown M-C SAND, little f-sand, little f-gravel, trace silt	24.0'-26.0' Silty sand with gravel (SM) (ASTM)
		0.8	5 3 2 3		26.0'-28.0' Orange yellow-brown M-C SAND, little f-sand, little f-gravel	26.0'-28.0' Poor graded sand (SP) (ASTM)
		1.2	2 2 3 4		28.0'-28.7' Yellow orange-brown M-C SAND, little f-sand, trace clay, trace f-gravel	28.0'-29.0' Silty sand (SM) (ASTM)
					28.7'-30.0' Light red gray CLAY	29.0'-30.0' Sample not submitted for analysis
30		1.1	3 2 2 3		30.0'-32.0' Light red-gray CLAY	30.0'-32.0' Fat Clay (CH) (ASTM)
		0.9	4 6		32.0'-33.0' Light red gray CLAY	32.0'-33.0' Sample not submitted for analysis
			7 12		33.0'-34.0' Light yellow-brown M-C SAND, little f-sand, trace clay	33.0'-34.0' Silty sand (SM) (ASTM)

PROJECT: **Storage Yard Geotechnical Investigation**		**GB-2**	TRC
BORING LOCATION: SMC Storage Yard		COORDINATES (NJ PLANE SYSTEM - NAD83) EASTERLY: 346,857	NORTHERLY: 258,372
DRILLING CONTRACTOR: Unitech: Mike Conover/Tom Brown		DATE STARTED: 1/28/09	DATE FINISHED: 1/29/09
DRILLING METHOD: Hollow Stem Auger		TOTAL DEPTH (ft.): 34	MEASURING POINT: Ground Surface
DRILLING EQUIPMENT: Track-mounted CME 55 LC		DEPTH TO WATER (ft): 15	GROUND SURFACE ELEVATION (NAVD 88): 106
SAMPLING METHOD: 2" Split-spoon		LOGGED BY: Chris Carlson	

Depth (feet)	Observed Groundwater	Recovery 0 1 2	Blow Counts	Lithology	DESCRIPTION Field	DESCRIPTION Laboratory
0		1.8	18 13 14 19		0.0'-0.5' Grey F-GRAVEL, some f-sand 0.5'-2.0' Light brown F-SAND, little m-sand, trace slag	0.0'-2.0' Silty sand (SM) (ASTM)
		1.4	8 5 4 7		2.0'-4.0' Brown F-SAND, trace clay, trace silt, trace f-gravel	2.0'-4.0' Silty clayey sand (SC-SM) (ASTM)
5		1.6	3 3 5 5		4.0'-6.0' Orange brown F-SAND, trace clay, tace silt, trace f-gravel	4.0'-6.0' Sample not submitted for analysis
		1.2	4 5 4 5		6.0'-8.0' Orange brown F-SAND, trace c-sand, trace f-gravel	6.0'-8.0' Silty sand (SM) (ASTM)
		1.5	3 4 5 6		8.0'-10.0' Orange brown F-SAND, trace c-sand, trace f-gravel	8.0'-10.0' Poorly graded sand with silt (SP-SM) (ASTM)
10		0.5	1 1 1 4		10.0'-12.0' Orange brown F-SAND, trace m-sand, trace c-sand	10.0'-12.0' Well-graded sand with silt (SW-SM) (ASTM)
		2.0	15 21 22 11		12.0'-14.0' Orange brown F-SAND, little m-sand, trace silt, trace f-gravel	12.0'-14.0' Silty sand (SM) (ASTM)
15	▼ 15	1.7	5 7 9 10		14.0'-16.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	14.0'-16.0' Sample not submitted for analysis
		1.0	7 8 11 9		16.0'-18.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	16.0'-18.0' Sample not submitted for analysis
		1.2	3 5 5 7		18.0'-20.0' Orange brown F-M SAND, little c-sand, little f-gravel	18.0'-20.0' Silty sand with gravel (SM) (ASTM)
20		1.0	6 4 4 5		20.0'-22.0' Orange brown F-M SAND, little c-sand, little f-gravel	20.0'-22.0' Sample not submitted for analysis
		1.3	4 7 7 7		22.0'-24.0' Orange brown M-C SAND, little f-sand, little f-gravel	22.0'-24.0' Poorly graded sand with silt and gravel (SP-SM) (ASTM)
25		1.0	5 7 6 8		24.0'-26.0' Orange brown M-C SAND, trace f-sand, trace f-gravel	24.0'-26.0' Sample not submitted for analysis
		2.0	4 5 4 6		26.0'-28.0' Orange brown C-SAND, some f-gravel, little f-m sand	26.0'-28.0' Well-graded sand with silt and gravel (SW-SM) (ASTM)
		0.4	12 10 11 12		28.0'-30.0' Orange brown C-SAND, little f-gravel, little f-m sand, trace c-gravel	28.0'-30.0' Sample not submitted for analysis
30		1.5	4 3 5 7		30.0'-30.5' Orange brown M-C SAND, little f-sand, trace f-gravel 30.5'-32.0' Orange gray brown F-M SAND, little c-sand	30.0'-32.0' Well-graded sand with silt (SW-SM) (ASTM)
		1.3	2 5 5 6		32.0'-34.0' Orange brown F-M SAND, little c-sand	32.0'-34.0' Poorly graded sand with silt (SP-SM) (ASTM)

PROJECT:
Storage Yard Geotechnical Investigation

GB-3

TRC

BORING LOCATION: SMC Storage Yard

COORDINATES (NJ PLANE SYSTEM - NAD83) EASTERLY: 347,014 NORTHERLY: 258,151

DRILLING CONTRACTOR: Unitech: Mike Conover/Chuck Searles

DATE STARTED: 1/29/09

DATE FINISHED: 1/29/09

DRILLING METHOD: Hollow Stem Auger

TOTAL DEPTH (ft.): 38

MEASURING POINT: Ground Surface

DRILLING EQUIPMENT: Track-mounted CME 55 LC

DEPTH TO WATER (ft): 19

GROUND SURFACE ELEVATION (NAVD 88): 110

SAMPLING METHOD: 2" Split-spoon

LOGGED BY: Chris Carlson

Depth (feet)	Observed Groundwater	Recovery 0 1 2	Blow Counts	Lithology	DESCRIPTION Field	DESCRIPTION Laboratory
0		1.7	11 9 9 11		0.0'-0.5' Gray brown F-SAND, some silt, trace f-gravel 0.5'-1.1' Orange brown F-M SAND, trace silt, trace f-gravel 1.1'-2.0' Gray brown F-SAND, trace f-gravel	0.0'-2.0' Well-graded sand with silt and gravel (SW-SM) (ASTM)
		2.0	9 9 12 16		2.0'-2.9' Dark gray brown F-SAND, trace f-gravel 2.9'-4.0' Dark brown F-SAND, little silt, little clay, little f-gravel	2.0'-2.9' Sample not submitted for analysis 2.9'-4.0' Sample not submitted for analysis
5		1.6	9 12 12 18		4.0'-6.0' Dark brown F-SAND, little silt, little clay, trace f-gravel	4.0'-6.0' Silty clayey sand (SC-SM) (ASTM)
		1.7	17 18 22 16		6.0'-6.5' Dark brown F-SAND, little silt, little clay, trace f-gravel 6.5'-8.0' Orange brown F-M SAND, little silt, little clay, trace f-gravel	6.0'-8.0' Clayey sand (SC) (ASTM)
		0.9	14 12 12 13		8.0'-10.0' Dark brown F-SAND, little silt, little clay, trace f-gravel	8.0'-10.0' Sample not submitted for analysis
10		2.0	8 7 6 7		10.0'-11.5' Orange brown F-C SAND, little silt, little clay, trace f-gravel 11.5'-12.0' Orange brown F-SAND, trace m-c sand	10.0'-12.0' Silty sand (SM) (ASTM)
		1.5	7 12 10 9		12.0'-14.0' Orange brown F-M SAND, little c-sand, trace f-gravel	12.0'-14.0' Sample not submitted for analysis
15		1.5	7 9 9 9		14.0'-16.0' Orange brown F-M SAND, little c-sand, trace f-gravel	14.0'-16.0' Sample not submitted for analysis
		1.8	10 6 7 9		16.0'-18.0' Orange brown F-M SAND, little c-sand, trace f-gravel	16.0'-18.0' Silty sand (SM) (ASTM)
	19	1.6	6 8 7 7		18.0'-20.0' Orange brown F-SAND, little m-c sand, trace f-gravel	18.0'-20.0' Sample not submitted for analysis
20		1.8	5 5 5 7		20.0'-22.0' Orange brown M-C SAND, little f-sand, trace silt, trace f-gravel	20.0'-22.0' Silty sand (SM) (ASTM)
		1.5	6 11 8 8		22.0'-24.0' Orange brown M-C SAND, little f-gravel, little f-sand	22.0'-24.0' Sample not submitted for analysis
25		2.0	7 6 8 9		24.0'-26.0' Orange brown M-C SAND, little f-gravel, little f-sand	24.0'-26.0' Poorly graded sand with silt and gravel (SP-SM) (ASTM)
		0.3	5 8 10 11		26.0'-28.0' Orange brown C-SAND, little f-m sand, little f-gravel	26.0'-28.0' Sample not submitted for analysis
		1.6	6 8 10 12		28.0'-30.0' Orange brown C-SAND, some f-gravel, little f-m sand	28.0'-30.0' Well-graded sand with silt and gravel (SW-SM) (ASTM)
30		1.6	8 7 7 12		30.0'-32.0' Orange brown C-SAND, some f-gravel, little f-m sand	30.0'-32.0' Sample not submitted for analysis
		1.2	6 6 7 7		32.0'-34.0' Orange brown C-SAND, some f-gravel, little f-m sand	32.0'-34.0' Well-graded sand with silt and gravel (SW-SM) (ASTM)
35		2.0	6 12 12 14		34.0'-35.7' Orange brown C-SAND, some f-gravel, little f-m sand 35.7'-36.0' Light yellow brown F-M SAND, trace c-sand, trace f-gravel	34.0'-35.7' Sample not submitted for analysis 35.7'-36.0' Sample not submitted for analysis
		2.0	5 10 7 5		36.0'-37.1' Orange brown C-SAND, some f-gravel, little f-m sand 37.1'-38.0' Orange brown F-SAND, trace m-c sand, trace f-gravel	36.0'-38.0' Poorly graded sand with silt (SP-SM) (ASTM)

PROJECT:
Storage Yard Geotechnical Investigation

GB-4

BORING LOCATION: SMC Storage Yard

COORDINATES (NJ PLANE SYSTEM - NAD83)
EASTERLY: 346,775 NORTHERLY: 258,159

DRILLING CONTRACTOR: Unitech: Mike Conover/Chuck Searles

DATE STARTED: 1/30/09

DATE FINISHED: 1/30/09

DRILLING METHOD: Hollow Stem Auger

TOTAL DEPTH (ft.): 36

MEASURING POINT: Ground Surface

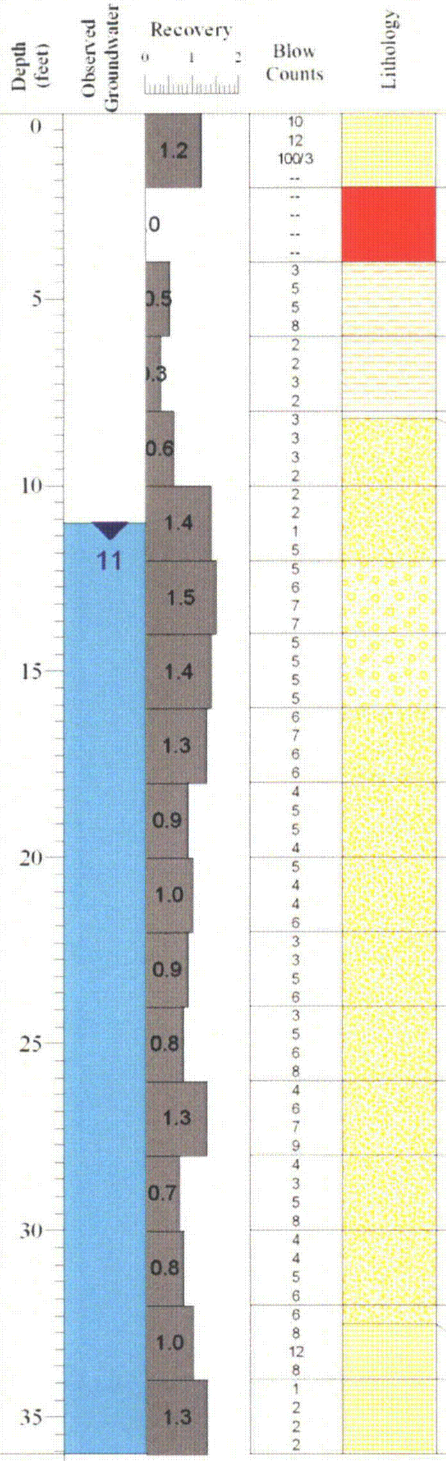
DRILLING EQUIPMENT: Track-mounted CME 55 LC

DEPTH TO WATER (ft): 11

GROUND SURFACE ELEVATION (NAVD 88): 108

SAMPLING METHOD: 2" Split-spoon

LOGGED BY: Chris Carlson



DESCRIPTION

Recovery	Blow Counts	Field	Laboratory
1.2	10 12 100/3 --	0.0'-2.0' Gray brown F-SAND & SILT, little f-gravel (slag)	0.0'-2.0' Silty sand with gravel (SM) (ASTM)
0	-- -- -- --	2.0'-4.0' NO RECOVERY; Augered through obstruction	2.0'-4.0' No Recovery
0.5	3 5 5 8	4.0'-6.0' Gray brown F-SAND & SILT, little f-gravel (slag)	4.0'-6.0' Silty sand with gravel (SM) (ASTM)
0.3	2 2 3 2	6.0'-8.0' Gray brown F-SAND & SILT, little f-gravel (slag)	6.0'-8.0' Sample not submitted for analysis
0.6	3 3 3 2	8.0'-8.2' Black SLAG 8.2'-10.0' Orange brown F-M SAND, trace c-sand, trace f-gravel	8.0'-10.0' Silty sand (SM) (ASTM)
1.4	2 2 1 5	10.0'-12.0' Orange brown F-M SAND, little c-sand, trace f-gravel	10.0'-12.0' Silty sand (SM) (ASTM)
1.5	5 6 7 7	12.0'-14.0' Orange brown M-C SAND, little f-sand, trace f-gravel	12.0'-14.0' Sample not submitted for analysis
1.4	5 5 5 5	14.0'-16.0' Orange brown M-C SAND, little f-sand, trace f-gravel	14.0'-16.0' Silty sand (SM) (ASTM)
1.3	6 7 6 6	16.0'-18.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	16.0'-18.0' Sample not submitted for analysis
0.9	4 5 5 4	18.0'-20.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	18.0'-20.0' Poorly graded sand with silt (SP-SM) (ASTM)
1.0	5 4 4 6	20.0'-22.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	20.0'-22.0' Sample not submitted for analysis
0.9	3 3 5 6	22.0'-24.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	22.0'-24.0' Poorly graded sand with silt (SP-SM) (ASTM)
0.8	3 5 6 8	24.0'-26.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	24.0'-26.0' Sample not submitted for analysis
1.3	4 6 7 9	26.0'-28.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	26.0'-28.0' Poorly graded sand with silt (SP-SM) (ASTM)
0.7	4 3 5 8	28.0'-30.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	28.0'-30.0' Sample not submitted for analysis
0.8	4 4 5 6	30.0'-32.0' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel	30.0'-32.0' Poorly graded sand with silt (SP-SM) (ASTM)
1.0	6 8 12 8	32.0'-32.5' Orange brown F-M SAND, little c-sand, trace silt, trace f-gravel 32.5'-34.0' Orange brown F-SAND, trace m-c sand, trace silt	32.0'-32.5' Sample not submitted for analysis 32.5'-34.0' Sample not submitted for analysis
1.3	1 2 2 2	34.0'-36.0' Orange brown F-SAND, trace m-c sand, trace f-gravel, trace silt	34.0'-36.0' Silty sand (SM) (ASTM)

PROJECT: Storage Yard Geotechnical Investigation	**GB-5**		TRC
BORING LOCATION: SMC Storage Yard	COORDINATES (NJ PLANE SYSTEM - NAD83) EASTERLY: 346,649	NORTHERLY: 258,014	
DRILLING CONTRACTOR: Unitech: Mike Conover/Kinard Lopez	DATE STARTED: 1/29/09	DATE FINISHED: 1/30/09	
DRILLING METHOD: Hollow Stem Auger	TOTAL DEPTH (ft.): 32	MEASURING POINT: Ground Surface	
DRILLING EQUIPMENT: Track-mounted CME 55 LC	DEPTH TO WATER (ft): 11	GROUND SURFACE ELEVATION (NAVD 88): 102	
SAMPLING METHOD: 2" Split-spoon	LOGGED BY: Chris Carlson		

Depth (feet)	Observed Groundwater	Recovery 0 1 2	Blow Counts	Lithology	DESCRIPTION Field	 Laboratory
0		0.0	5 6 50/2 --	🟥	0.0'-2.0' NO RECOVERY; Likely due to boulder/slag	0.0'-2.0' No Recovery
		0.5	100/6 -- -- --	🟨	2.0'-4.0' Gray F-SAND & SILT, some f-c gravel (pulverized)	2.0'-4.0' Well-graded gravel with silt and sand (GW-GM) (ASTM)
5		0.0	-- -- -- --	🟥	4.0'-6.0' NO RECOVERY; Augered through obstruction	4.0'-6.0' No Recovery
		1.7	3 2 2 10	🟨	6.0'-8.0' Light brown gray F-SAND, some silt, some clay, trace f-gravel	6.0'-8.0' Silty sand (SM) (ASTM)
		1.8	11 8 10 10	🟨 🟨	8.0'-8.9' Dark gray black F-SAND, little silt, little clay, trace f-gravel 8.9'-10.0' Orange brown F-M SAND, trace c-sand, trace f-gravel	8.0'-9.0' Sample not submitted for analysis 9.0'-10.0' Silty sand (SM) (ASTM)
10	11	1.5	8 6 5 8	🟨	10.0'-12.0' Orange brown F-M SAND, trace c- sand, trace f-gravel	10.0'-12.0' Sample not submitted for analysis
		1.7	4 5 5 7	🟨	12.0'-14.0' Orange brown F-M SAND, little c-sand, trace f-gravel	12.0'-14.0' Poorly graded sand with silt (SP-SM) (ASTM)
15		1.7	3 4 5 5	🟨	14.0'-16.0' Orange brown F-M SAND, little c-sand, trace f-gravel	14.0'-16.0' Sample not submitted for analysis
		1.9	3 5 8 8	🟨	16.0'-18.0' Orange brown F-M SAND, little c-sand, trace f-gravel	16.0'-18.0' Poorly graded sand with silt (SP-SM) (ASTM)
		1.1	7 5 7 8	🟨	18.0'-20.0' Orange brown F-M SAND, little c-sand, trace f-gravel	18.0'-20.0' Sample not submitted for analysis
20		1.2	5 5 7 8	🟨	20.0'-22.0' Orange brown F-M SAND, little c-sand, trace f-gravel	20.0'-22.0' Poorly graded sand with silt (SP-SM) (ASTM)
		1.2	5 7 9 7	🟨	22.0'-24.0' Orange brown F-M SAND, little c-sand, trace f-gravel	22.0'-24.0' Silty sand (SM) (ASTM)
25		1.2	7 6 6 7	🟨	24.0'-26.0' Orange brown F-M SAND, little c-sand, trace f-gravel	24.0'-26.0' Sample not submitted for analysis
		1.9	4 8 10 10	🟨 ▤	26.0'-27.5' Orange brown F-M SAND, little c-sand, trace f-gravel 27.5'-28.0' Red gray CLAY, trace f-gravel	26.0'-28.0' Silty sand with gravel (SM) (ASTM)
		2.0	4 5 8 8	🟨 ▤	28.0'-29.0' Orange brown F-M SAND, little c-sand, trace f-gravel 29.0'-30.0' Red gray CLAY	28.0'-29.0' Sample not submitted for analysis 29.0'-30.0' Sample not submitted for analysis
30		1.4	4 5 6 9	▤	30.0'-32.0' Red gray CLAY	30.0'-32.0' Fat clay with sand (CH) (ASTM)

Project No. 105106.0100.0000

GeoTesting express
a subsidiary of Geocomp Corporation

Boston
Atlanta
New York
www.geocomp.com/geotesting

May 14, 2009

Ms. Jean Oliva
TRC Environmental Corp.
21 Griffin Road North
Windsor, CT 06095

Re: SMC Project (GTX-8990)

Dear Ms. Oliva:

Enclosed are the test results you requested for the above referenced project. GeoTesting Express, Inc. (GTX) received seven soil samples from you on April 29, 2009. These samples were labeled as follows:

GB-2 (4-6 ft)
GB-2 (14-16 ft)
GB-3 (8-10 ft)
GB-3 (12-14 ft)
GB-3 (18-20 ft)
GB-5 (8-9 ft)
GB-5 (10-12 ft)

GTX performed the following tests on each of these samples:

Grain Size Analysis (ASTM D 422) with hydrometer
Atterberg Limits (ASTM D 4318)
USCS Soil Classification (ASTM D 2487)

A copy of your test request is attached.

The results presented in this report apply only to the item tested. This report shall not be reproduced except in full, without written approval from GeoTesting Express. The remainder of the sample will be retained for a period of sixty (60) days and will then be discarded unless otherwise notified by you. Please call me if you have any questions or require additional information. Thank you for allowing GeoTesting Express the opportunity of providing you with testing services. We look forward to working with you again in the future.

Respectfully yours,

Joe T

Joe Tomei
Laboratory Manager

GeoTesting
express
a subsidiary of Geocomp Corporation

1145 Massachusetts Avenue
Boxborough, MA 01719
978 635 0424 Tel
978 635 0266 Fax

Geotechnical Test Report

May 14, 2009

GTX-8990
SMC
Project

Newfield, NJ

Prepared for:

TRC Environmental Corp.

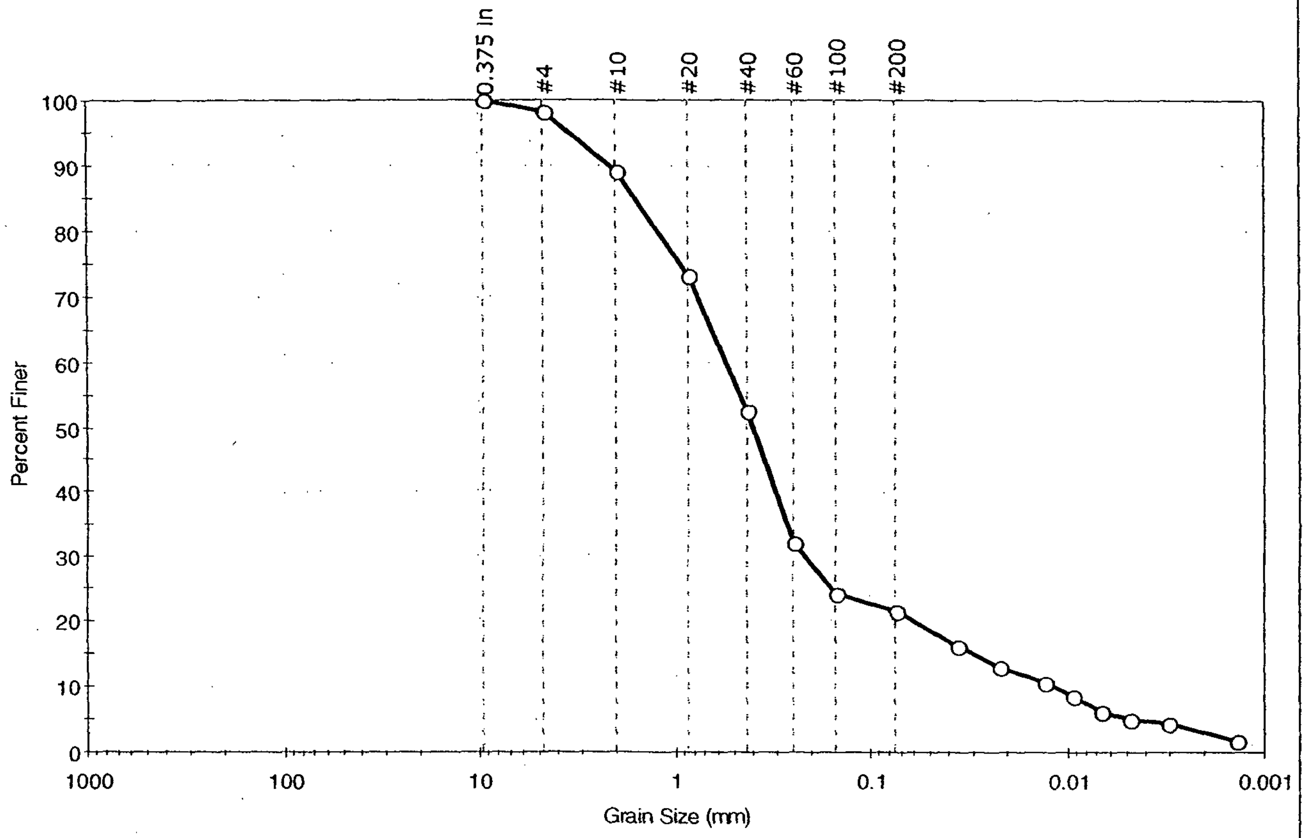
GeoTesting express
a subsidiary of Geocomp Corporation

Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990

Boring ID: ---
Sample ID:GB-2
Depth : 4-6 ft
Sample Type: bag
Test Date: 05/08/09
Test Id: 151750
Tested By: jbr
Checked By: jdt

Test Comment: ---
Sample Description: Moist, dark yellowish brown silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.7	76.6	21.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	89		
#20	0.85	73		
#40	0.42	52		
#60	0.25	32		
#100	0.15	24		
#200	0.075	22		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0366	16		
---	0.0225	13		
---	0.0132	11		
---	0.0095	8		
---	0.0067	6		
---	0.0048	5		
---	0.0031	5		
---	0.0014	2		

Coefficients

D_{85} =1.6106 mm	D_{30} =0.2170 mm
D_{60} =0.5474 mm	D_{15} =0.0301 mm
D_{50} =0.3991 mm	D_{10} =0.0119 mm
C_u =N/A	C_c =N/A

Classification

ASTM	Silty sand (SM)
AASHTO	Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---

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Client:	TRC Environmental Corp.				
Project:	SMC				
Location:	Newfield, NJ			Project No:	GTX-8990
Boring ID:	---	Sample Type:	bag	Tested By:	cam
Sample ID:	GB-2	Test Date:	05/07/09	Checked By:	n/a
Depth :	4-6 ft	Test Id:	151757		

Test Comment: ---
Sample Description: Moist, dark yellowish brown silty sand
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	GB-2	---	4-6 ft	9	n/a	n/a	n/a	n/a	Silty sand (SM)

48% Retained on #40 Sieve

Dry Strength: NONE

Dilentancy: RAPID

Toughness: n/a

The sample was determined to be Non-Plastic

Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990

Boring ID: ---
Sample ID:GB-2
Depth : 4-6 ft
Sample Type: bag
Test Date: 05/12/09
Test Id: 151764
Tested By: cam
Checked By: jdt

Test Comment: ---
Sample Description: Moist, dark yellowish brown silty sand
Sample Comment: ---

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GB-2	4-6 ft	Silty sand	SM	1.7	76.6	21.7

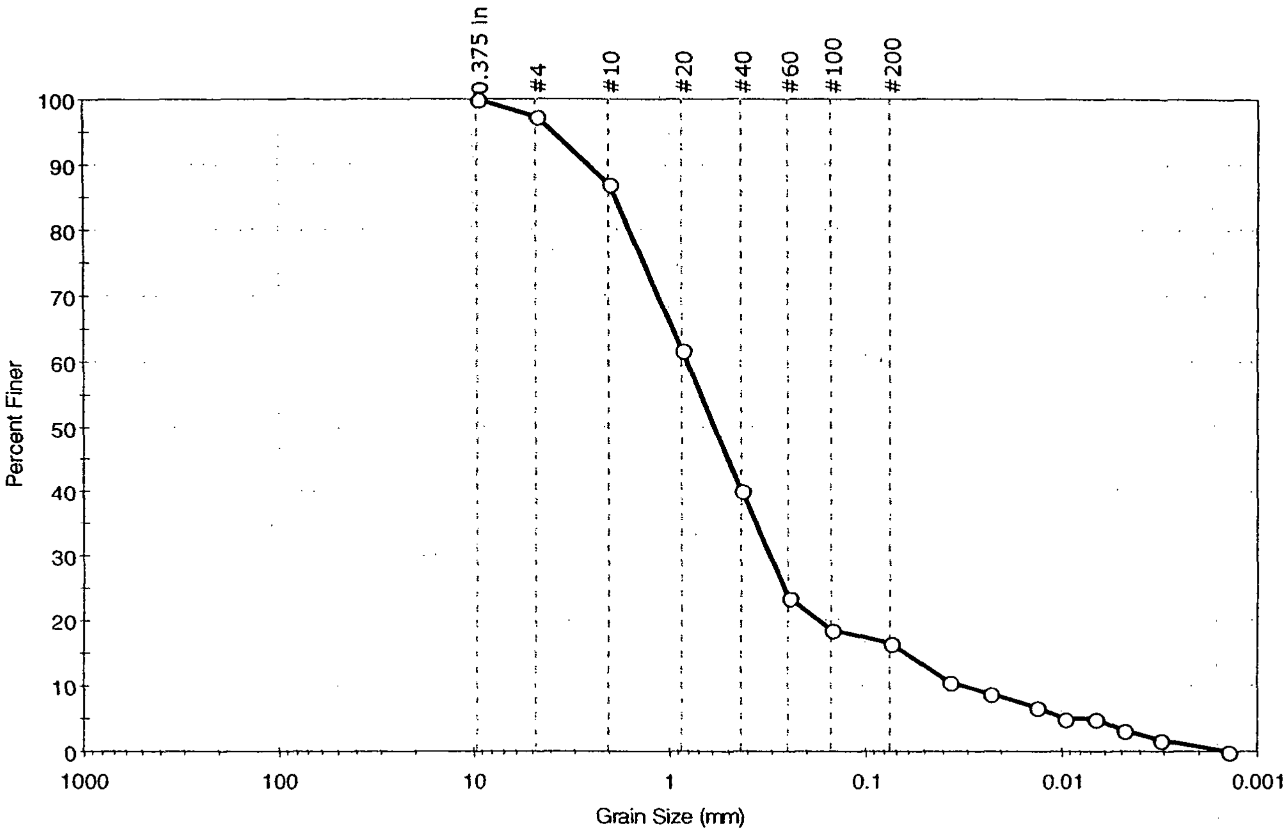
Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	TRC Environmental Corp.				
Project:	SMC				
Location:	Newfield, NJ			Project No:	GTX-8990
Boring ID: ---		Sample Type:	bag	Tested By:	jbr
Sample ID:GB-2		Test Date:	05/11/09	Checked By:	jdt
Depth :	14-16 ft	Test Id:	151751		

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.7	80.7	16.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	97		
#10	2.00	87		
#20	0.85	62		
#40	0.42	40		
#60	0.25	24		
#100	0.15	18		
#200	0.075	17		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0375	11		
---	0.0232	9		
---	0.0135	7		
---	0.0096	5		
---	0.0067	5		
---	0.0048	3		
---	0.0031	2		
---	0.0014	0		

Coefficients

D_{85} =1.8639 mm	D_{30} =0.3063 mm
D_{60} =0.8047 mm	D_{15} =0.0627 mm
D_{50} =0.5829 mm	D_{10} =0.0325 mm
C_u =N/A	C_c =N/A

Classification

ASTM	Silty sand (SM)
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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Client:	TRC Environmental Corp.		
Project:	SMC		
Location:	Newfield, NJ	Project No:	GTX-8990

Boring ID:	---	Sample Type:	bag	Tested By:	cam
Sample ID:	GB-2	Test Date:	05/07/09	Checked By:	n/a
Depth :	14-16 ft	Test Id:	151758		

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	GB-2	---	14-16 ft	11	n/a	n/a	n/a	n/a	Silty sand (SM)

60% Retained on #40 Sieve

Dry Strength: NONE

Dilentancy: RAPID

Toughness: n/a

The sample was determined to be Non-Plastic

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a subsidiary of Geocomp Corporation

Client: TRC Environmental Corp.			
Project: SMC			
Location: Newfield, NJ		Project No:	GTX-8990
Boring ID: ---	Sample Type: bag	Tested By:	cam
Sample ID:GB-2	Test Date: 05/12/09	Checked By:	jdt
Depth : 14-16 ft	Test Id: 151765		

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GB-2	14-16 ft	Silty sand	SM	2.7	80.7	16.6

Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

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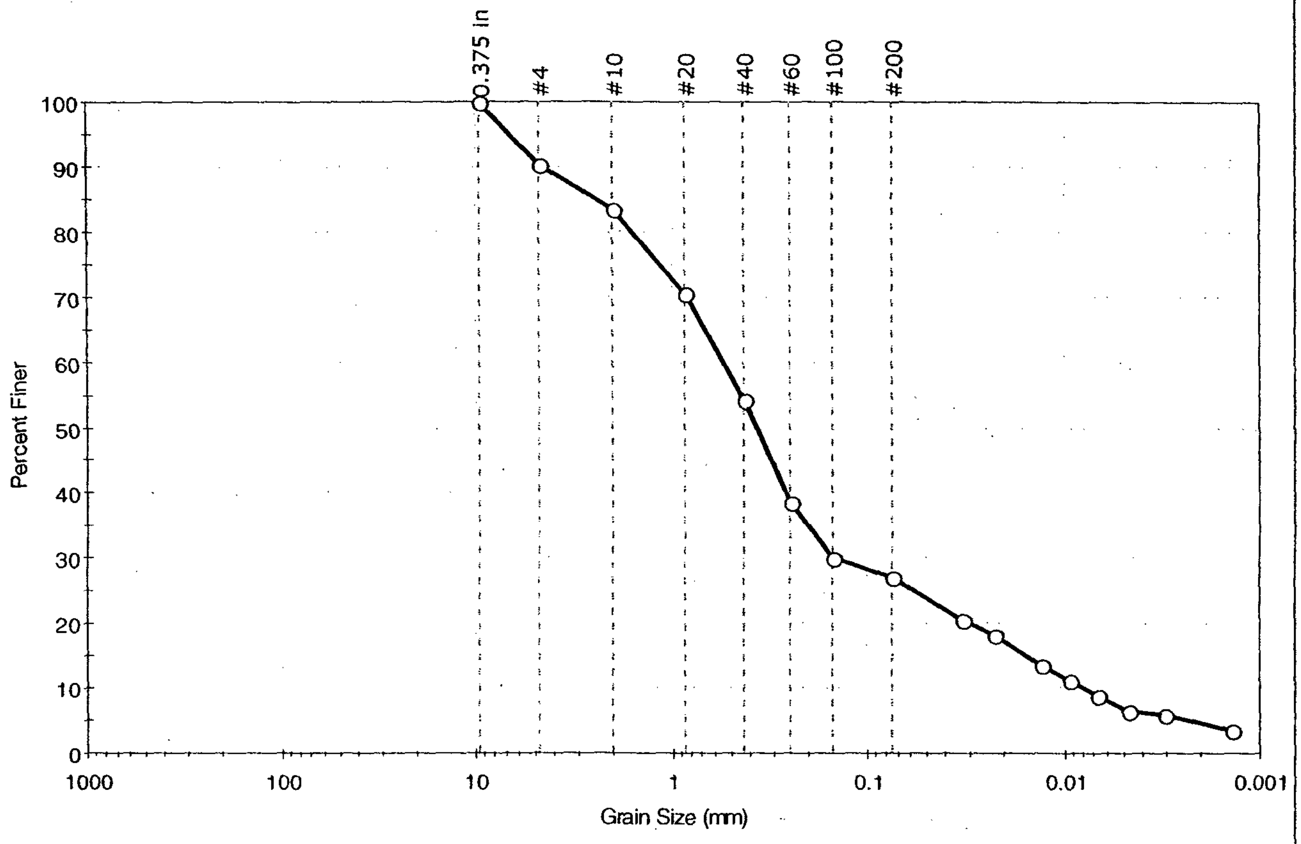
Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990

Boring ID: ---
Sample Type: bag
Tested By: jbr
Sample ID:GB-3
Test Date: 05/11/09
Checked By: jdt
Depth : 8-10 ft
Test Id: 151752

Test Comment: ---
Sample Description: Moist, dark yellowish brown silty, clayey sand
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	9.8	63.0	27.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	90		
#10	2.00	84		
#20	0.85	71		
#40	0.42	54		
#60	0.25	39		
#100	0.15	30		
#200	0.075	27		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0336	21		
---	0.0230	18		
---	0.0132	14		
---	0.0094	11		
---	0.0067	9		
---	0.0048	7		
---	0.0031	6		
---	0.0014	4		

Coefficients

D_{85} =2.4208 mm	D_{30} =0.1477 mm
D_{60} =0.5436 mm	D_{15} =0.0155 mm
D_{50} =0.3685 mm	D_{10} =0.0079 mm
C_u =N/A	C_c =N/A

Classification

ASTM Silty, clayey sand (SC-SM)

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---

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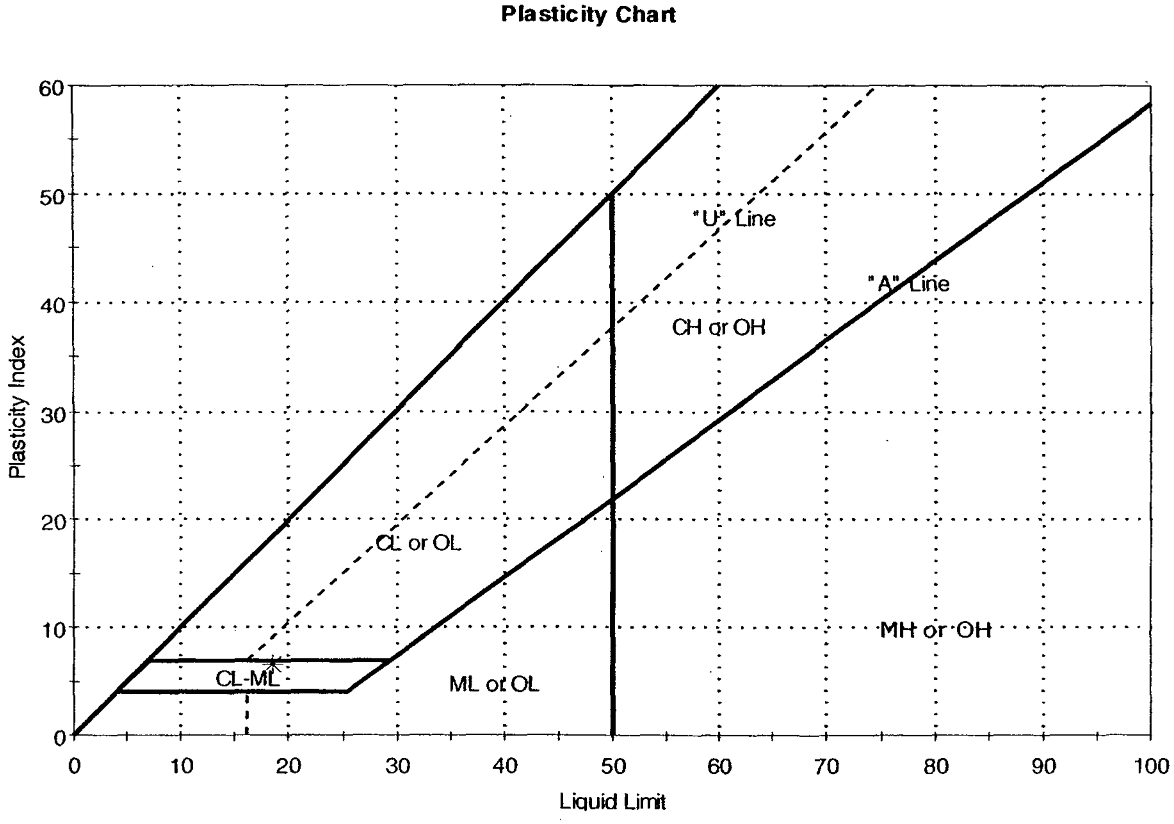
Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990
Boring ID: ---
Sample Type: bag
Tested By: cam
Sample ID:GB-3
Test Date: 05/07/09
Checked By: n/a
Depth : 8-10 ft
Test Id: 151759
Test Comment: ---
Sample Description: Moist, dark yellowish brown silty, clayey sand
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	GB-3	---	8-10 ft	9	19	12	7	0	Silty, clayey sand (SC-SM)

Sample Prepared using the WET method
46% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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Client:	TRC Environmental Corp.			
Project:	SMC			
Location:	Newfield, NJ		Project No:	GTX-8990
Boring ID: ---	Sample Type:	bag	Tested By:	cam
Sample ID:GB-3	Test Date:	05/12/09	Checked By:	jdt
Depth : 8-10 ft	Test Id:	151766		

Test Comment: ---
Sample Description: Moist, dark yellowish brown silty, clayey sand
Sample Comment: ---

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GB-3	8-10 ft	Silty, clayey sand	SC-SM	9.8	63.0	27.2

Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

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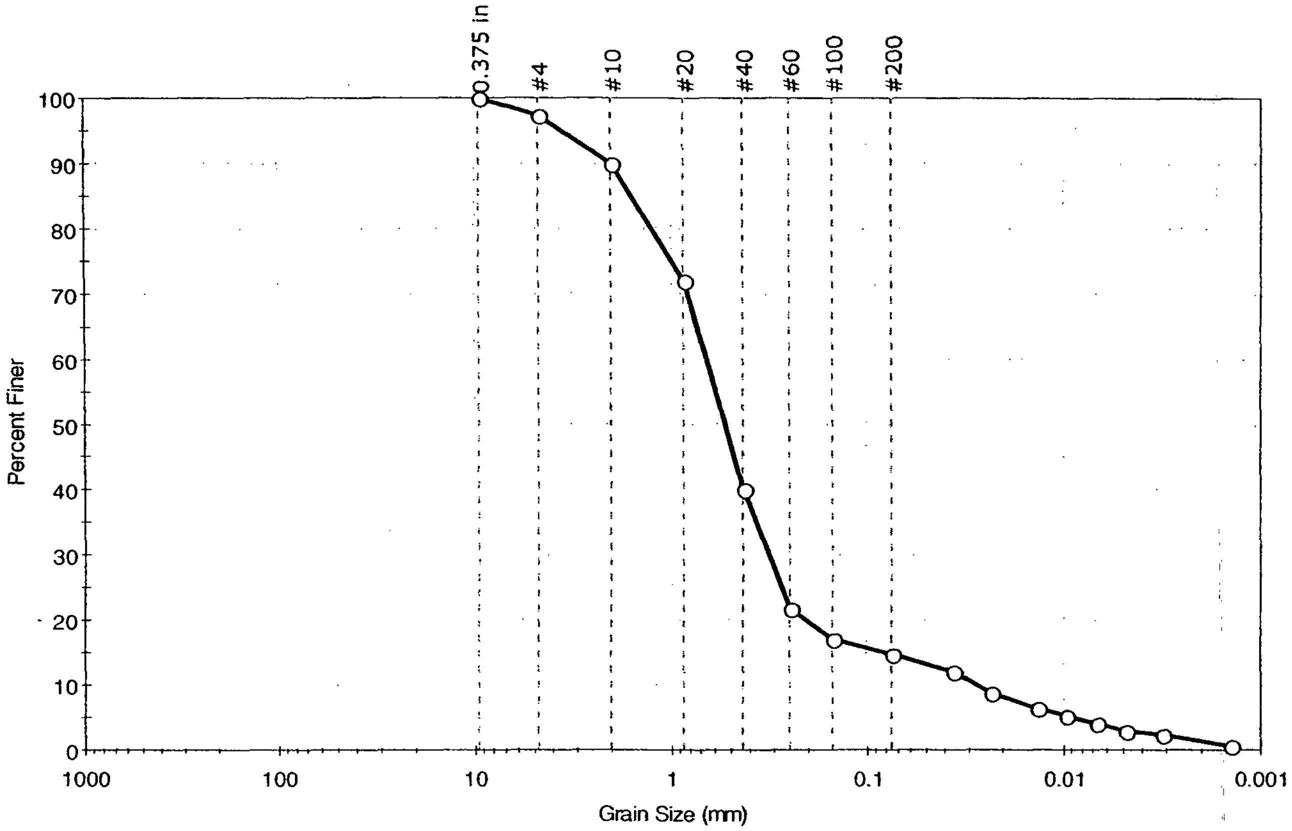
Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990
Boring ID: ---
Sample Type: bag
Tested By: jbr
Sample ID:GB-3
Test Date: 05/11/09
Checked By: jdt
Depth : 12-14 ft
Test Id: 151753
Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel	%Sand	%Silt & Clay Size
—	2.8	82.6	14.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	97		
#10	2.00	90		
#20	0.85	72		
#40	0.42	40		
#60	0.25	22		
#100	0.15	17		
#200	0.075	15		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0364	12		
---	0.0234	9		
---	0.0136	6		
---	0.0096	5		
---	0.0068	4		
---	0.0048	3		
---	0.0031	2		
---	0.0014	1		

Coefficients

D_{85} =1.5765 mm
D_{30} =0.3168 mm
D_{60} =0.6547 mm
D_{15} =0.0830 mm
D_{50} =0.5275 mm
D_{10} =0.0275 mm
C_u =N/A
C_c =N/A

Classification

ASTM	Silty sand (SM)
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990

Boring ID: ---
Sample ID:GB-3
Depth : 12-14 ft
Sample Type: bag
Test Date: 05/07/09
Test Id: 151760
Tested By: cam
Checked By: n/a

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	GB-3	---	12-14 ft	6	n/a	n/a	n/a	n/a	Silty sand (SM)

60% Retained on #40 Sieve

Dry Strength: NONE

Dilentancy: SLOW

Toughness: n/a

The sample was determined to be Non-Plastic

Client: TRC Environmental Corp.			
Project: SMC			
Location: Newfield, NJ		Project No:	GTX-8990
Boring ID: ---	Sample Type: bag	Tested By:	cam
Sample ID:GB-3	Test Date: 05/12/09	Checked By:	jdt
Depth : 12-14 ft	Test Id: 151767		

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GB-3	12-14 ft	Silty sand	SM	2.8	82.6	14.6

Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

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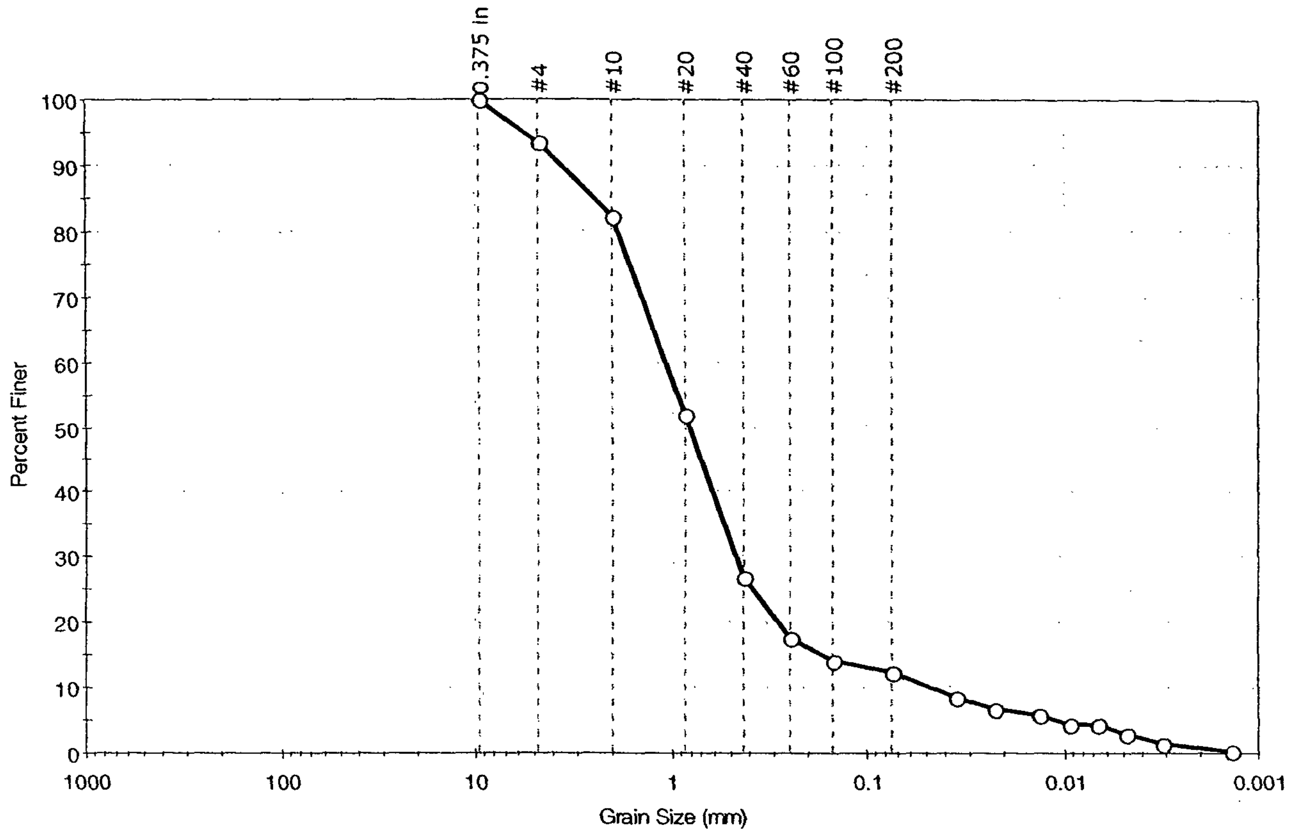
Client:	TRC Environmental Corp.				
Project:	SMC				
Location:	Newfield, NJ			Project No:	GTX-8990
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	GB-3	Test Date:	05/11/09	Checked By:	jdt
Depth :	18-20 ft	Test Id:	151754		

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	6.5	81.0	12.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	93		
#10	2.00	82		
#20	0.85	52		
#40	0.42	27		
#60	0.25	18		
#100	0.15	14		
#200	0.075	12		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0361	8		
---	0.0225	7		
---	0.0135	6		
---	0.0095	4		
---	0.0067	4		
---	0.0048	3		
---	0.0031	2		
---	0.0014	0		

Coefficients

D_{85} =2.4765 mm	D_{30} =0.4637 mm
D_{60} =1.0676 mm	D_{15} =0.1698 mm
D_{50} =0.8058 mm	D_{10} =0.0479 mm
C_u =N/A	C_c =N/A

Classification

ASTM	Silty sand (SM)
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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Client:	TRC Environmental Corp.				
Project:	SMC				
Location:	Newfield, NJ			Project No:	GTX-8990
Boring ID:	---	Sample Type:	bag	Tested By:	cam
Sample ID:	GB-3	Test Date:	05/07/09	Checked By:	jdt
Depth :	18-20 ft	Test Id:	151761		

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	GB-3	---	18-20 ft	13	n/a	n/a	n/a	n/a	Silty sand (SM)

73% Retained on #40 Sieve
Dry Strength: NONE
Dilentancy: RAPID
Toughness: n/a
The sample was determined to be Non-Plastic

Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990

Boring ID: ---
Sample ID: GB-3
Depth : 18-20 ft
Sample Type: bag
Test Date: 05/12/09
Test Id: 151768
Tested By: cam
Checked By: jdt

Test Comment: ---
Sample Description: Moist, brownish yellow silty sand
Sample Comment: ---

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GB-3	18-20 ft	Silty sand	SM	6.5	81.0	12.5

Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

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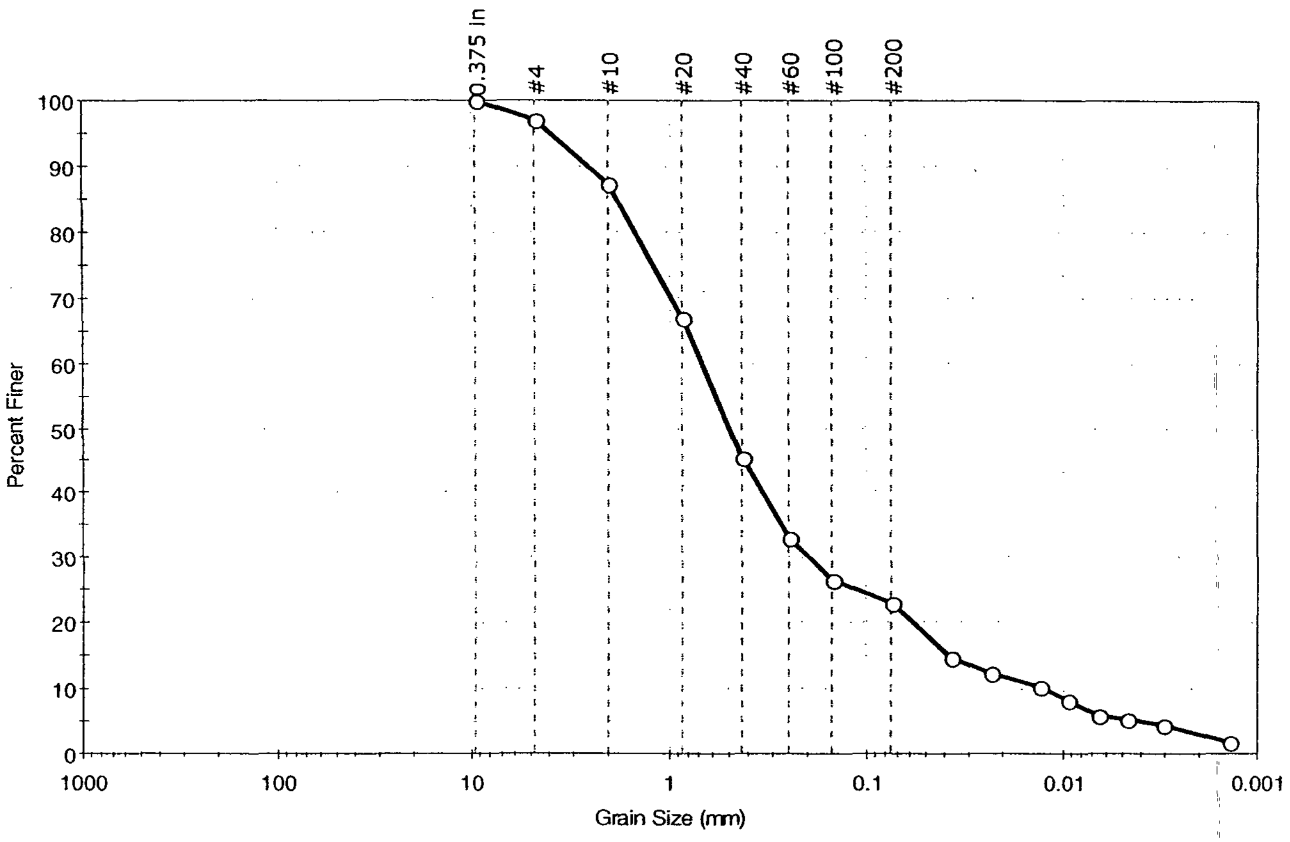
Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990
Boring ID: ---
Sample Type: bag
Tested By: jbr
Sample ID:GB-5
Test Date: 05/11/09
Checked By: jdt
Depth : 8-9 ft
Test Id: 151755
Test Comment: ---
Sample Description: Moist, dark yellowish brown silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	3.0	74.1	22.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	97		
#10	2.00	87		
#20	0.85	67		
#40	0.42	46		
#60	0.25	33		
#100	0.15	27		
#200	0.075	23		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0373	15		
---	0.0231	13		
---	0.0131	10		
---	0.0095	8		
---	0.0066	6		
---	0.0047	5		
---	0.0031	4		
---	0.0014	2		

Coefficients

D_{85} =1.8177 mm	D_{30} =0.1960 mm
D_{60} =0.6793 mm	D_{15} =0.0383 mm
D_{50} =0.4914 mm	D_{10} =0.0125 mm
C_u =N/A	C_c =N/A

Classification

ASTM	Silty sand (SM)
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

printed 5/12/2009 11:27:01 AM

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Client: TRC Environmental Corp.
Project: SMC
Location: Newfield, NJ
Project No: GTX-8990

Boring ID: ---
Sample ID:GB-5
Depth : 8-9 ft
Sample Type: bag
Test Date: 05/07/09
Test Id: 151762
Tested By: cam
Checked By: jdt

Test Comment: ---
Sample Description: Moist, dark yellowish brown silty sand
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	GB-5	---	8-9 ft	8	n/a	n/a	n/a	n/a	Silty sand (SM)

54% Retained on #40 Sieve
Dry Strength: HIGH
Dilentancy: RAPID
Toughness: n/a
The sample was determined to be Non-Plastic

printed 5/12/2009 11:33:22 AM

GeoTesting express
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Client:	TRC Environmental Corp.				
Project:	SMC				
Location:	Newfield, NJ			Project No:	GTX-8990
Boring ID:	---	Sample Type:	bag	Tested By:	cam
Sample ID:	GB-5	Test Date:	05/12/09	Checked By:	jdt
Depth :	8-9 ft	Test Id:	151769		
Test Comment:	---				
Sample Description:	Moist, dark yellowish brown silty sand				
Sample Comment:	---				

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GB-5	8-9 ft	Silty sand	SM	3.0	74.1	22.9

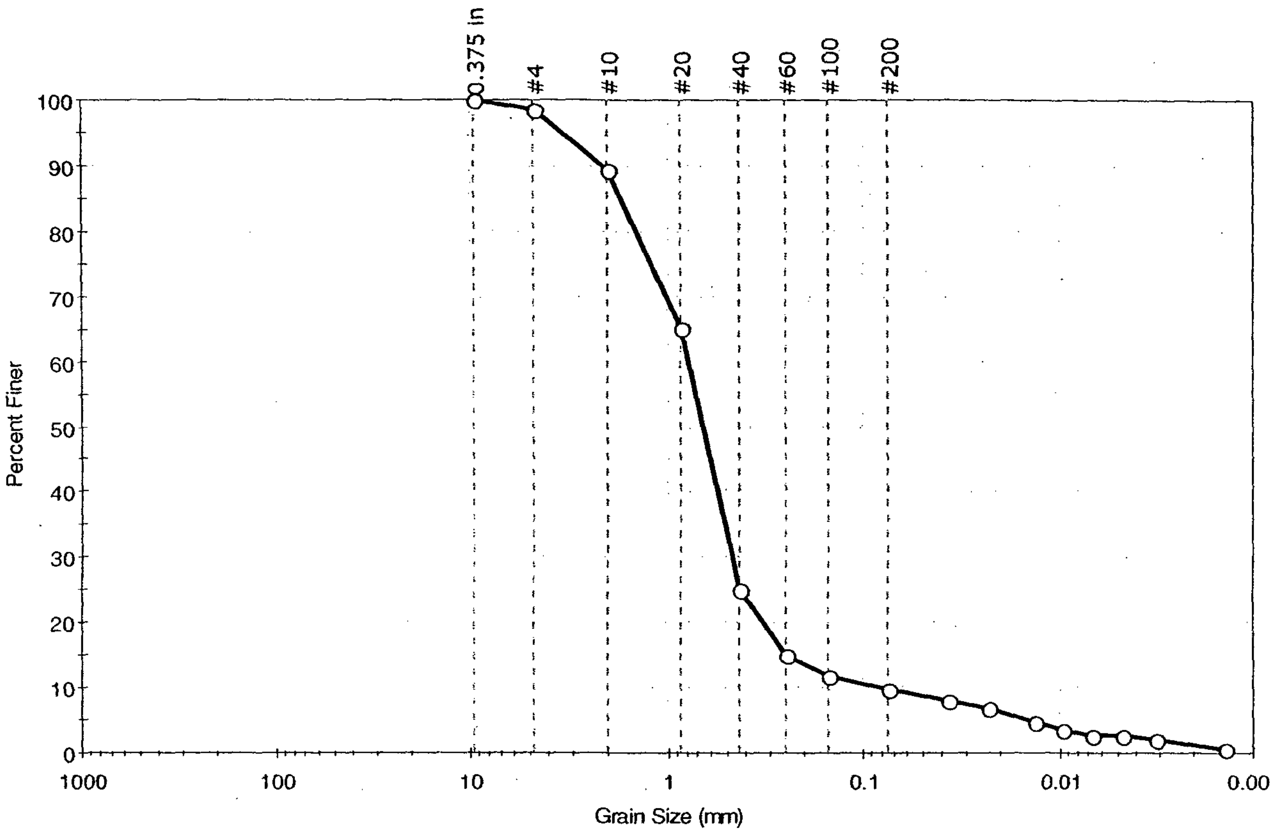
Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	TRC Environmental Corp.				
Project:	SMC				
Location:	Newfield, NJ			Project No:	GTX-8990
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	GB-5	Test Date:	05/12/09	Checked By:	jdt
Depth :	10-12 ft	Test Id:	151756		

Test Comment: ---
Sample Description: Moist, brownish yellow sand with silt
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.6	88.8	9.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	89		
#20	0.85	65		
#40	0.42	25		
#60	0.25	15		
#100	0.15	12		
#200	0.075	10		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0378	8		
---	0.0233	7		
---	0.0135	5		
---	0.0096	4		
---	0.0067	3		
---	0.0047	3		
---	0.0031	2		
---	0.0014	1		

Coefficients

D_{85} =1.7183 mm	D_{30} =0.4629 mm
D_{60} =0.7759 mm	D_{15} =0.2488 mm
D_{50} =0.6531 mm	D_{10} =0.0849 mm
C_u =9.139	C_c =3.253

Classification

ASTM	Poorly graded sand with silt (SP-SM)
AASHTO	Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

printed 5/14/2009 12:20:09 PM

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Client:	TRC Environmental Corp.		
Project:	SMC		
Location:	Newfield, NJ	Project No:	GTX-8990

Boring ID:	---	Sample Type:	bag	Tested By:	cam
Sample ID:	GB-5	Test Date:	05/07/09	Checked By:	jdt
Depth :	10-12 ft	Test Id:	151763		

Test Comment: ---
Sample Description: Moist, brownish yellow sand with silt
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	GB-5	---	10-12 ft	12	n/a	n/a	n/a	n/a	Poorly graded sand with silt (SP-SM)

75% Retained on #40 Sieve
Dry Strength: NONE
Dilentancy: RAPID
Toughness: n/a
The sample was determined to be Non-Plastic

printed 5/12/2009 11:33:30 AM

Client:	TRC Environmental Corp.				
Project:	SMC				
Location:	Newfield, NJ			Project No:	GTX-8990
Boring ID:	---	Sample Type:	bag	Tested By:	cam
Sample ID:	GB-5	Test Date:	05/12/09	Checked By:	jdt
Depth :	10-12 ft	Test Id:	151770		

Test Comment: ---
Sample Description: Moist, brownish yellow sand with silt
Sample Comment: ---

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GB-5	10-12 ft	Poorly graded sand with silt	SP-SM	1.6	88.8	9.6

Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

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SOIL CHAIN OF CUSTODY & TEST REQUEST

CLIENT

Company: TRC
Address: 21 Griffin Road North
City, State, Zip: Windsor, CT, 06095
Contact: Larry Butlien
E-mail: lbutlien@trcsolutions.com
Phone: 860-298-6225
Fax: 860-298-6399

PROJECT

Project Name: Shieldalloy Metallurgical Corporation, Storage Yard
Address:
Client Project #:
City, State, Zip: Newfield, NJ
On-site Contact:
E-mail:
Phone:
Fax:

GeoTesting Express, Inc.
1145 Massachusetts Avenue
Boxborough, MA 01719
800 434 1062 Toll Free
978 635 0266 Fax

2662 Holcomb Bridge Road, Suite 310
Alpharetta, GA 30022
770 645 6575 Tel
770 645 6570 Fax

www.geotesting.com

INVOICE (complete if different from client)

Company:
Address:
City, State, Zip:
Contact:
E-mail:
Phone:
Fax:

GENERAL

Purchase Order #:
GTX Sales Order #:
Shipped By:
Date Shipped:
Mode of Shipment:
Requested Turnaround:
Send Results To: ☒ CLIENT OFFICE ☐ PROJECT OFFICE
Send Results Via: ☒ E-MAIL ☐ FAX ☐ VERBAL ☐ HARD COPY

SOIL

*please include boring # and depth if known

	Sample ID	* Atterberg Limits (ASTM D 4318)	California Bearing Ratio (ASTM D 1883) *specify conditions below	USCS – Classification (ASTM D 2487)	Density (ASTM D 2937)	Direct Shear (ASTM D 3080) *specify conditions below	Direct Simple Shear (ASTM D 6528) *specify conditions below	Electrical Resistivity (ASTM G 57)	Grain Size (ASTM D 422) Sieve Only / [✓ Sieve & Hydrometer] please circle one	Incremental Consolidation (ASTM D 2435)	Moisture Content (ASTM D 2216)	Organic Content (ASTM D 2974)	Permeability/ Hydraulic Conductivity (Fixed Wall - ASTM D 2434) (Flexible Wall – ASTM D 5084) please circle one	Ph (ASTM D 4972)	Proctor Compaction (Standard – ASTM D 698) (Modified – ASTM D 1557) please circle one	Specific Gravity (ASTM D 854)	Triaxial Shear (UU – ASTM D 2850) (CU – ASTM D 4767) (CD – US COE EM1110) *specify conditions below please circle one	Unconfined Compression (ASTM D 2166)	Other:	Other:
1	GB-2 (4-6)	X		X					X											
2	GB-2 (14-16)	↓		↓					↓											
3	GB-3 (8-10)	↓		↓					↓											
4	GB-3 (12-14)	↓		↓					↓											
5	GB-3 (18-20)	↓		↓					↓											
6	GB-5 (8-9)	↓		↓					↓											
7	GB-5 (10-12)	↓		↓					↓											

*Specify Test Conditions (Undisturbed or Remolded, Density and moisture, Test Normal Loads, Test Confining Stresses, etc.):

* If enough soil present

AUTHORIZE BY SIGNING AND DATING:

SIGNATURE:
PRINT NAME: Chris Lindahl
DATE: 4/28/09

Relinquished By:
DATE: 4/28/09
TIME: 1645
Received By:
DATE: 4/29/09
TIME:

Relinquished By:
DATE:
TIME:
Received By:
DATE:
TIME:

GeoTesting
express

WARRANTY and LIABILITY

GeoTesting Express (GTX) warrants that all tests it performs are run in general accordance with the specified test procedures and accepted industry practice. GTX will correct or repeat any test that does not comply with this warranty. GTX has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

GTX may report engineering parameters that require us to interpret the test data. Such parameters are determined using accepted engineering procedures. However, GTX does not warrant that these parameters accurately reflect the true engineering properties of the *in situ* material. Responsibility for interpretation and use of the test data and these parameters for engineering and/or construction purposes rests solely with the user and not with GTX or any of its employees.

GTX's liability will be limited to correcting or repeating a test which fails our warranty. GTX's liability for damages to the Purchaser of testing services for any cause whatsoever shall be limited to the amount GTX received for the testing services. GTX will not be liable for any damages, or for any lost benefits or other consequential damages resulting from the use of these test results, even if GTX has been advised of the possibility of such damages. GTX will not be responsible for any liability of the Purchaser to any third party.

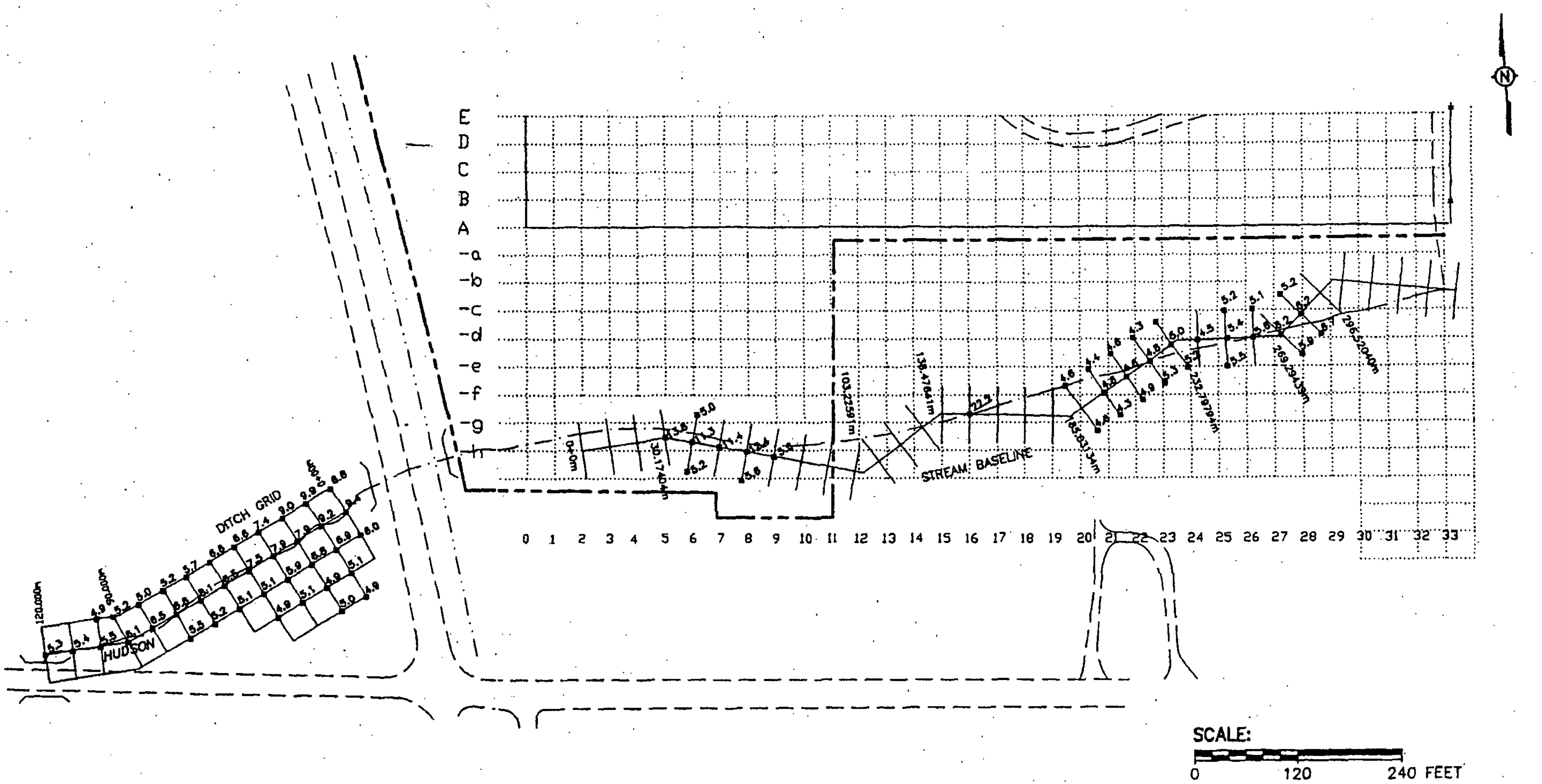
Commonly Used Symbols

A	pore pressure parameter for $\Delta\sigma_1 - \Delta\sigma_3$
B	pore pressure parameter for $\Delta\sigma_3$
CIU	isotropically consolidated undrained triaxial shear test
CR	compression ratio for one dimensional consolidation
C_c	coefficient of curvature, $(D_{30})^2 / (D_{10} \times D_{60})$
C_u	coefficient of uniformity, D_{60}/D_{10}
C_c	compression index for one dimensional consolidation
C_α	coefficient of secondary compression
c_v	coefficient of consolidation
c	cohesion intercept for total stresses
c'	cohesion intercept for effective stresses
D	diameter of specimen
D_{10}	diameter at which 10% of soil is finer
[illegible]	diameter at which 15% of soil is finer
[illegible]	diameter at which 30% of soil is finer
D_{50}	diameter at which 50% of soil is finer
D_{60}	diameter at which 60% of soil is finer
D_{85}	diameter at which 85% of soil is finer
d_{50}	displacement for 50% consolidation
d_{90}	displacement for 90% consolidation
d_{100}	displacement for 100% consolidation
E	Young's modulus
e	void ratio
e_c	void ratio after consolidation
e_o	initial void ratio
G	shear modulus
G_s	specific gravity of soil particles
H	height of specimen
PI	plasticity index
i	gradient
K_o	lateral stress ratio for one dimensional strain
k	permeability
LI	Liquidity Index
m_v	coefficient of volume change
n	porosity
PI	plasticity index
P_c	preconsolidation pressure
p	$(\sigma_1 + \sigma_3) / 2$, $(\sigma_v + \sigma_h) / 2$
p'	$(\sigma'_1 + \sigma'_3) / 2$, $(\sigma'_v + \sigma'_h) / 2$
p'_c	p' at consolidation
Q	quantity of flow
q	$(\sigma_1 . \sigma_3) / 2$
[illegible]	q at failure
q_i	initial q
q_c	q at consolidation
S	degree of saturation
SL	shrinkage limit
s_u	undrained shear strength
T	time factor for consolidation

T	temperature
t	time
U, UC	unconfined compression test
UU, Q	unconsolidated undrained triaxial test
u_a	pore gas pressure
u_e	excess pore water pressure
u, u_w	pore water pressure
V	total volume
V_g	volume of gas
V_s	volume of solids
V_v	volume of voids
V_w	volume of water
V_o	initial volume
v	velocity
W	total weight
W_s	weight of solids
W_w	weight of water
w	water content
w_c	water content at consolidation
w_f	final water content
w_l	liquid limit
w_n	natural water content
w_p	plastic limit
w_s	shrinkage limit
w_o, w_i	initial water content
α	slope of q_f versus p_f
α'	slope of q_f versus p_f'
γ_t	total unit weight
γ_d	dry unit weight
γ_s	unit weight of solids
γ_w	unit weight of water
ε	strain
ε_{vol}	volume strain
ε_h, ε_v	horizontal strain, vertical strain
μ	Poisson's ratio, also viscosity
σ	normal stress
σ'	effective normal stress
σ_c, σ'_c	consolidation stress in isotropic stress system
σ_h, σ'_h	horizontal normal stress
σ_v, σ'_v	vertical normal stress
σ_1	major principal stress
σ_2	intermediate principal stress
σ_3	minor principal stress
τ	shear stress
φ	friction angle based on total stresses
φ'	friction angle based on effective stresses
φ'_r	residual friction angle
φ_{ult}	φ for ultimate strength

DWG. NO.: 464409-B-05
PROJ. NO.: 464409
INITIATOR: H. PRICHARD
PROJ. MGR.: C. BERGER
DRAFT. CHCK. BY: J. HUBBARD
ENGR. CHCK. BY: H. PRICHARD
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 03/17/92
DRAWN BY: G. PACHECO

46440905 03/18/92 2:58pm EWB



MAP 4

HUDSON'S BRANCH EXPOSURE RATES (μR/hr)

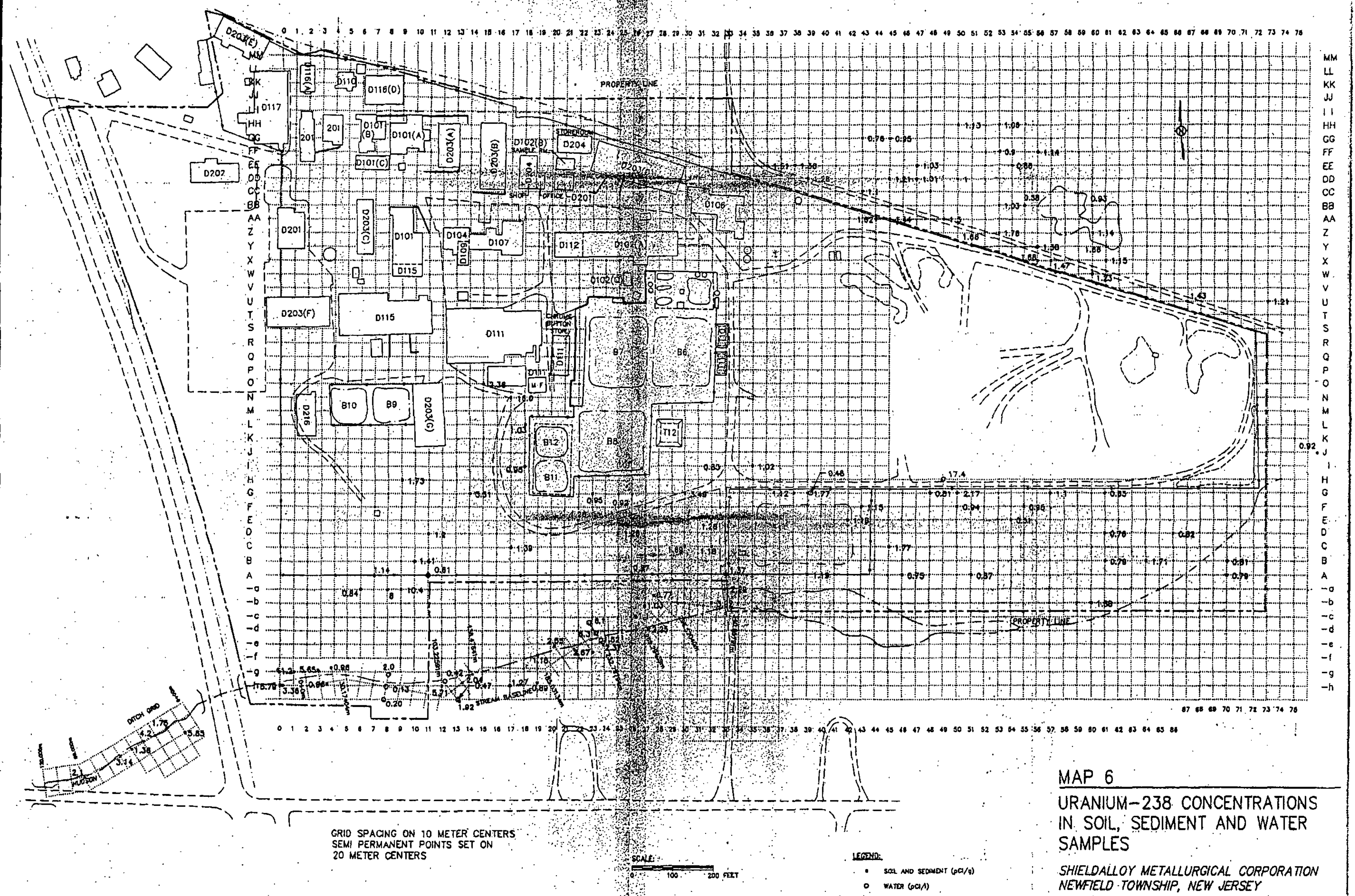
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD TOWNSHIP, NEW JERSEY

IT INTERNATIONAL TECHNOLOGY CORPORATION

NOTE: THIS MAP IS BASED ON DATA TRANSMITTED ELECTRONICALLY FROM SMC TO IT CORPORATION IN FEBRUARY, 1992

DRAWING NO.: 4644090-D-04
PROJECT NO.: 4644090
INITIATOR: H. PRICHARD
PROJECT MGR.: C. BERGER
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 03/04/92
DRAWN BY: J. TABLER

46440904 03/30/92 2:52pm DJH



GRID SPACING ON 10 METER CENTERS
SEMI PERMANENT POINTS SET ON
20 METER CENTERS

NOTE: THIS MAP IS BASED ON DATA TRANSMITTED ELECTRONICALLY FROM SMC TO IT CORPORATION IN FEBRUARY, 1992.

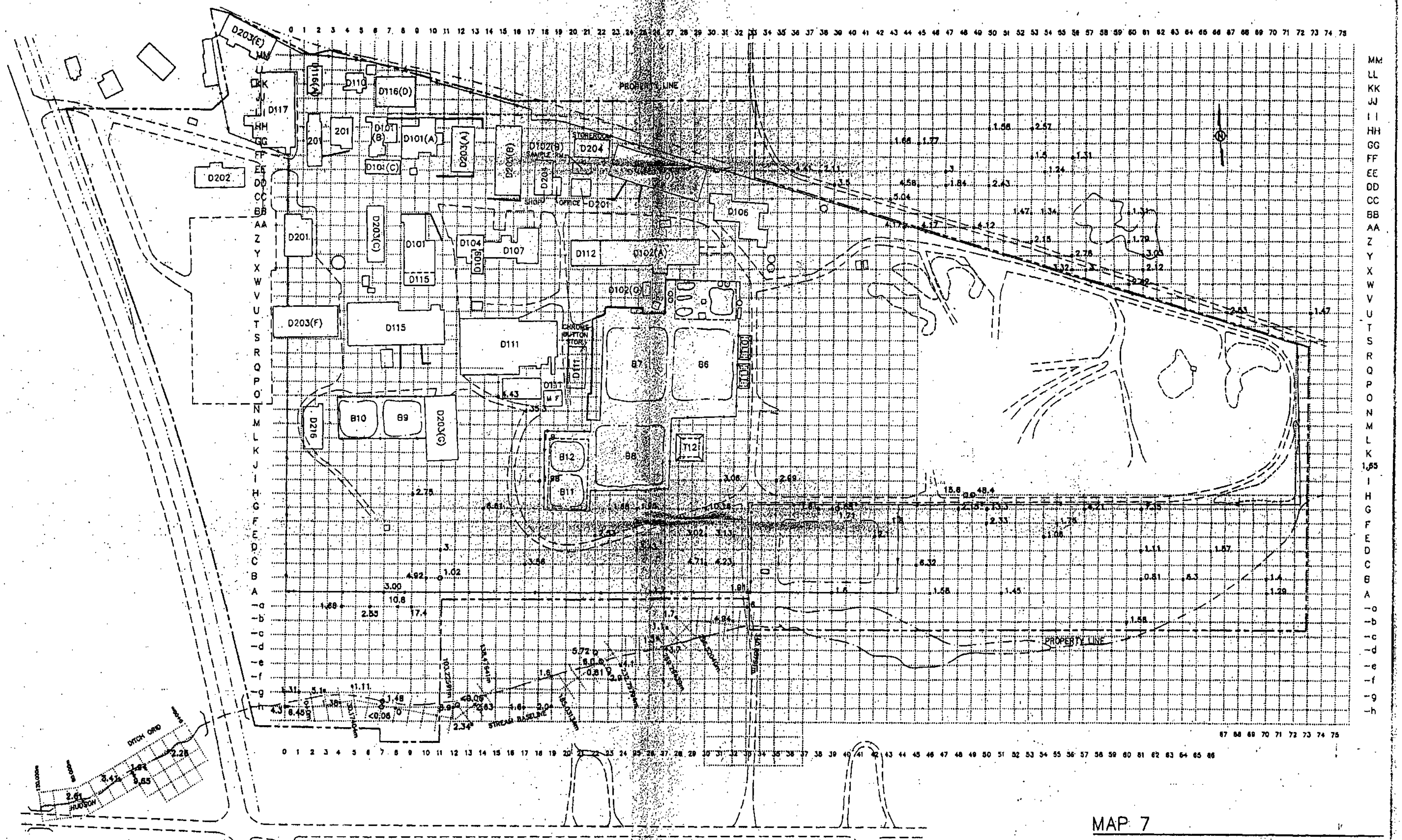
MAP 6

URANIUM-238 CONCENTRATIONS IN SOIL, SEDIMENT AND WATER SAMPLES

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD TOWNSHIP, NEW JERSEY

IT INTERNATIONAL TECHNOLOGY CORPORATION

DRAWING NO.: 464409-D-03
PROJECT NO.: 464409
INITIATOR: H. PRICHARD
PROJECT MGR.: C. BERGER
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 03/06/92
DRAWN BY: S. CARDWELL



GRID SPACING ON 10 METER CENTERS
SEMI PERMANENT POINTS SET ON
20 METER CENTERS
(HUB, IRON PIN, RR SPIKE OR DRILL HOLE)

SCALE:
0 100 200 FEET

LEGEND:
- ● SOIL AND SEDIMENT (pCi/g)
- ● WATER (pCi/l)

MAP 7

THORIUM-232 CONCENTRATIONS IN SOIL AND WATER SAMPLES

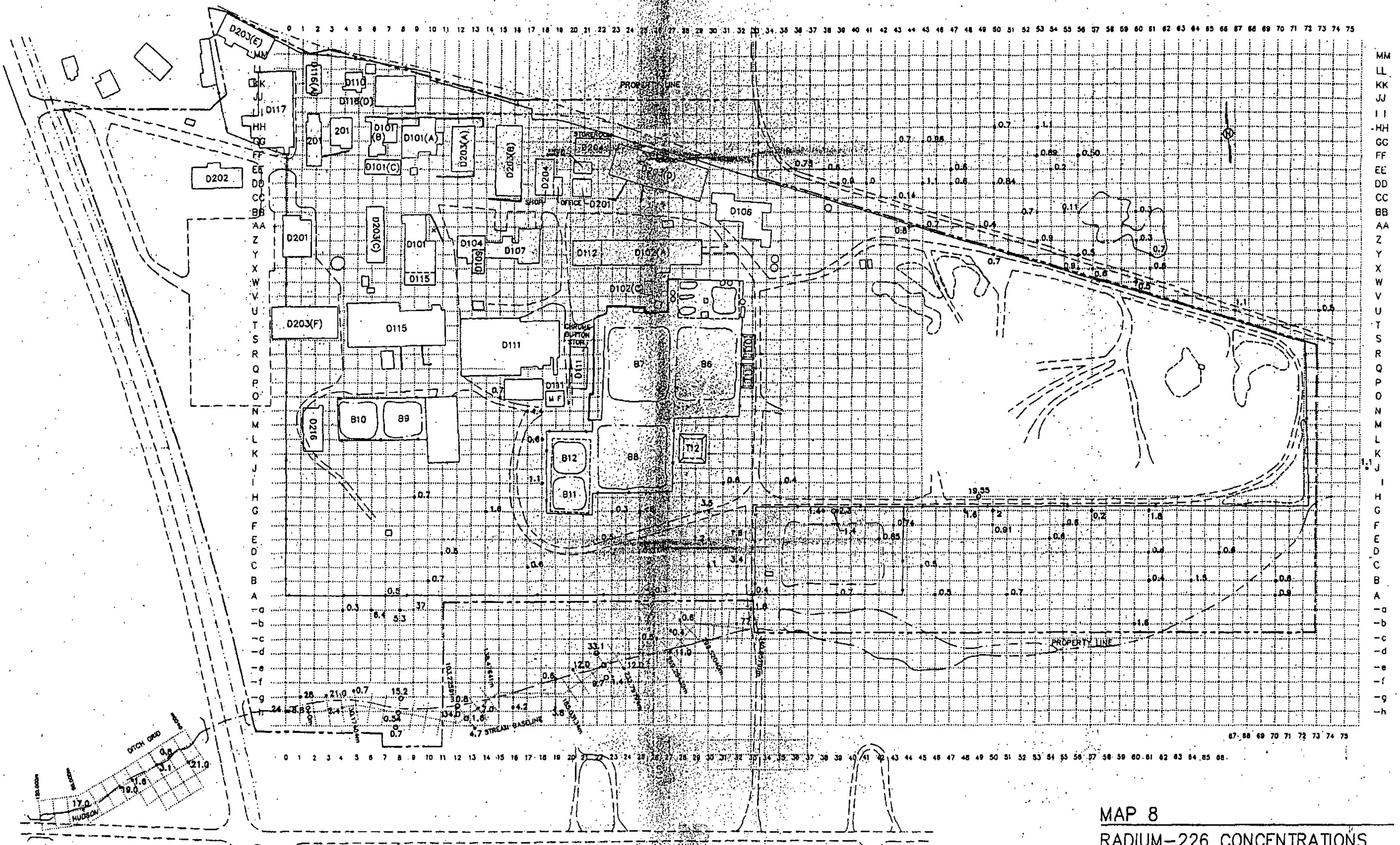
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD TOWNSHIP, NEW JERSEY

IT INTERNATIONAL TECHNOLOGY CORPORATION

NOTE: THIS MAP IS BASED ON DATA TRANSMITTED ELECTRONICALLY FROM SMC TO IT CORPORATION IN FEBRUARY, 1992

46440903 03/28/92 1:24pm DJH

DRAWING NO.: 464409-0-07
PROJECT NO.: 464409
INITIATOR: H. PRICHARD
PROJECT MGR.: C. BERGER
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 03/17/92
DRAWN BY: BILL SMITH



GRID SPACING ON 10 METER CENTERS
SEMI PERMANENT POINTS SET ON
20 METER CENTERS
(HUB, IRON PIN, RR SPIKE OR DRILL HOLE)

SCALE:
0 100 200 FEET

LEGEND:
■ SOIL AND SEDIMENT (pCi/g)
○ WATER (pCi/l)

MAP 8

RADIUM-226 CONCENTRATIONS IN SOIL, SEDIMENT, AND WATER SAMPLES

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD TOWNSHIP, NEW JERSEY

INTERNATIONAL TECHNOLOGY CORPORATION

NOTE: THIS MAP IS BASED ON DATA TRANSMITTED ELECTRONICALLY FROM SMC TO IT CORPORATION IN FEBRUARY, 1992

46440907 03/26/92 1:53pm GWP

TABLE 23a
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES

SAMPLE IDENTIFICATION:	RA34–01	RA58–01	RA72–01	RA58–02	RA59–01	RA59–02	RA60–01	RA60–02
SAMPLE DEPTH BELOW GRADE (INCHES):	0–6	6–12	DUPE	18–24	6–12	18–24	6–12	18–24
			RA58–01					
VOLATILE ORGANICS (PPB)								
CHLOROETHANE	–	–	–	–	–	–	–	–
BROMOMETHANE	–	–	–	–	–	–	–	–
VINLY CHLORIDE	–	–	–	–	–	–	–	–
CHLOROETHANE	–	–	–	–	–	–	–	–
METHYLENE CHLORIDE	71 R*	120 BJ*	96 R*	83 BJ*	76 BJ*	88 BJ*	74 BJ*	67 BJ*
ACETONE	31 BJ*	32 BJ*	23 N*	23 N*	20 N*	24 BJ*	19 N*	21 N*
CARBON DISULFIDE	–	–	–	–	–	–	–	–
1,1–DICHLORETHENE	–	–	–	–	–	–	–	–
1,1–DICHLORETHANE	–	–	–	–	–	–	–	–
1,2–DICHLORETHENE (total)	–	–	–	–	–	–	–	–
CHLOROFORM	–	–	–	–	–	–	–	–
1,2–DICHLORETHANE	–	–	–	–	–	–	–	–
2–BUTANONE	–	–	–	–	–	–	–	–
1,1,1–TRICHLOROETHANE	–	–	–	–	–	–	–	–
CARBON TETRACHLORIDE	–	–	–	–	–	–	–	–
VINYL ACETATE	–	–	–	–	–	–	–	–
BROMODICHLOROMETHANE	–	–	–	–	–	–	–	–
1,2–DICHLOROPROPANE	–	–	–	–	–	–	–	–
cis–1,3–DICHLOROPROPENE	–	–	–	–	–	–	–	–
TRICHLOROETHENE	4 J	3 J	1 J	1 J	3 J	–	5 J	–
DIBROMOCHLOROMETHANE	–	–	–	–	–	–	–	–
1,1,2–TRICHLOROETHANE	–	–	–	–	–	–	–	–
BENZENE	–	–	–	–	–	–	–	–
trans–1,3–DICHLOROPROPENE	–	–	–	–	–	–	–	–
BROMOFORM	–	–	–	–	–	–	–	–
4–METHYL1–2–PENTANONE	–	–	–	–	–	–	–	–
2–HEXANONE	–	–	–	–	–	–	–	–
TETRACHLOROETHENE	–	3 J	–	1 J	4 J	–	4 J	–
1,1,2,2–TETRACHLOROETHANE	–	–	–	–	–	–	–	–
TOLUENE	–	2 J	–	1 J	–	–	–	–
CHLOROBENZENE	–	–	–	–	–	–	–	–
ETHYLBENZENE	–	–	–	–	–	–	–	–
STYRENE	–	–	–	–	–	–	–	–
XYLENE (total)	–	–	–	–	–	–	–	–
Total VOCs	35	160	1	86	83	112	83	67

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE/PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC–ECI.

N/A – NOT ANALYZED FOR THIS COMPOUND.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 23b
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI–VOLATILE CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 1 of 2

SAMPLE IDENTIFICATION:	RA34–01	RA58–01	RA72–01	RA58–02	RA59–01	RA59–02	RA60–01	RA60–02
SAMPLE DEPTH BELOW GRADE (INCHES):	0–6	6–12	DUPE RA58–01	18–24	6–12	18–24	6–12	18–24
BASE NEUTRAL / ACIDS (PPB)								
PHENOL	–	–	–	–	–	–	–	–
bis(2–CHLOROETHYL)ETHER	–	–	–	–	–	–	–	–
2–CHLOROPHENOL	–	–	–	–	–	–	–	–
1,3–DICHLOROBENZENE	–	–	–	–	–	–	–	–
1,4–DICHLORBENZENE	–	–	–	–	–	–	–	–
BENZYL ALCOHOL	–	–	–	–	–	–	–	–
1,2–DICHLOROBENZENE	–	–	–	–	–	–	–	–
2–METHYLPHENOL	–	–	–	–	–	–	–	–
bis(2–CHLOROISOPROPYL)ETHER	–	–	–	–	–	–	–	–
4–METHYLPHENOL	–	–	–	–	–	–	–	–
N–NITROSO–DI–N–PROPYLAMINE	–	–	–	–	–	–	–	–
HEXACHLOROETHANE	–	–	–	–	–	–	–	–
NITROBENZENE	–	–	–	–	–	–	–	–
ISOPHORONE	–	–	–	–	–	–	–	–
2–NITROPHENOL	–	–	–	–	–	–	–	–
2,4–DIMETHYLPHENOL	–	–	–	–	–	–	–	–
BENZOIC ACID	–	–	–	–	–	–	–	–
bis(2–CHLOROETHOXY)METHANE	–	–	–	–	–	–	–	–
2,4–DICHLOROPHENOL	–	–	–	–	–	–	–	–
1,2,4–TRICHLOROBENZENE	–	–	–	–	–	–	–	–
NAPHTHALENE	–	–	–	–	–	–	–	–
4–CHLOROANILINE	–	–	–	–	–	–	–	–
HEXACHLOROBUTADIENE	–	–	–	–	–	–	–	–
4–CHLORO–3–METHYLPHENOL	–	–	–	–	–	–	–	–
2–METHYLNAPHTHALENE	–	–	–	–	–	–	–	–
HEXACHLOROCYCLOPENTADIENE	–	–	–	–	–	–	–	–
2,4,6–TRICHLOROPHENOL	–	–	–	–	–	–	–	–
2,4,5–TRICHLOROPHENOL	–	–	–	–	–	–	–	–
2–CHLORONAPHTHALENE	–	–	–	–	–	–	–	–
2–NITROANILINE	–	–	–	–	–	–	–	–
DIMETHYLPHTHALATE	–	–	–	–	–	–	–	–
ACENAPHTHYLENE	–	–	–	–	–	–	–	–
2,6–DINITROTOLUENE	–	–	–	–	–	–	–	–

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE/PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC–ECI.

N/A – NOT ANALYZED FOR THIS COMPOUND.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 23b
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI–VOLATILE CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 2 of 2

SAMPLE IDENTIFICATION:	RA34–01	RA58–01	RA72–01	RA58–02	RA59–01	RA59–02	RA60–01	RA60–02
SAMPLE DEPTH BELOW GRADE (INCHES):	0–6	6–12	DUPE RA58–01	18–24	6–12	18–24	6–12	18–24
BASE NEUTRAL / ACIDS (PPB) (continued)								
ACENAPHTHENE	–	–	–	–	–	–	–	–
1,4–DINITROPHENOL	–	–	–	–	–	–	–	–
4–NITROPHENOL	–	–	–	–	–	–	–	–
DIBENZOFURAN	–	–	–	–	–	–	–	–
2,4–DINITROTOLUENE	–	–	–	–	–	–	–	–
DIETHYLPHTHALATE	–	–	–	–	–	–	–	–
4–CHLOROPHENYL–PHENYLETHER	–	–	–	–	–	–	–	–
FLUORENE	–	–	–	–	–	–	–	–
4–NITROANILINE	–	–	–	–	–	–	–	–
4,6–DINITRO–2–METHYLPHENOL	–	–	–	–	–	–	–	–
N–NITROSODIPHENYLAMINE	–	–	–	–	–	–	–	–
4–BROMOPHENYL–PHENYLETHER	–	–	–	–	–	–	–	–
HEXACHLOROBENZENE	–	–	–	–	–	–	–	–
PENTACHLOROPHENOL	–	66 J	40 J	74 J	43 J	71 J	–	–
PHENANTHRENE	–	–	–	–	–	–	–	–
ANTHRACENE	–	–	–	–	–	–	–	–
DI–n–BUTYLPHALATE	210 JB	220 N*	430 N*	170 N*	220 N*	230 N*	240 N*	110 N*
FLUORANTHENE	–	–	–	–	–	–	–	–
PYRENE	–	52 J	57 J	–	–	–	–	–
BUTYLBENZYLPHTHALATE	–	–	–	–	–	–	–	–
3,3'–DICHLOROBENZIDINE	–	–	–	–	–	–	–	–
BENZO(a)ANTHRACENE	–	–	–	–	–	–	–	–
CHRYSENE	–	52 J	52 J	–	–	–	–	–
bis(2–ETHYLHEXYL)PHTHALATE	85 J	87 N*	84 N*	150 N*	100 N*	290 N*	51 N*	40 N*
DI–n–OCTYL PHTHALATE	–	–	–	–	–	–	–	–
BENZO(b)FLUORANTHENE	–	40 J	–	–	–	–	–	–
BENZO(k)FLUORANTHENE	–	–	–	–	–	–	–	–
BENZO(a)PYRENE	–	–	–	–	–	–	–	–
INDENO(1,2,3–cd)PYRENE	–	–	–	–	–	–	–	–
DIBENZO(A,H)ANTHRACENE	–	–	–	–	–	–	–	–
BENZO(g,h,i)PERYLENE	–	–	–	–	–	–	–	–
TOTAL caPAHs	0	92	52	0	0	0	0	0

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE/PROBABLE CONTAMINATION.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC–ECI.
N/A – NOT ANALYZED FOR THIS COMPOUND.
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 23c
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF PESTICIDE/PCB CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES

SAMPLE IDENTIFICATION:	RA34–01	RA58–01	RA72–01	RA58–02	RA59–01	RA59–02	RA60–01	RA60–02
SAMPLE DEPTH BELOW GRADE (INCHES):	0–6	6–12	DUPE RA58–01	18–24	6–12	18–24	6–12	18–24
PESTICIDES/PCB'S (PPB)								
ALPHA–BHC	–	–	–	–	–	–	–	–
BETA–BHC	–	–	–	–	–	–	–	–
DELTA–BHC	–	–	–	–	–	–	–	–
GAMMA–BHC(LINDANE)	–	–	–	–	–	–	–	–
HEPTACHLOR	–	–	–	–	–	–	–	–
ALDRIN	–	–	–	–	–	–	–	–
HEPTACHLOR EPOXIDE	–	–	–	–	–	–	–	–
ENDOSULFAN I	–	–	–	–	–	–	–	–
DIELDRIN	–	–	–	–	–	–	–	–
4,4–DDE	–	–	–	–	–	–	–	–
ENDRIN	–	–	–	–	–	–	–	–
ENDOSULFAN II	–	–	–	–	–	–	–	–
4,4–DDD	–	–	–	–	–	–	–	–
ENDOSULFAN SULFATE	–	–	–	–	–	–	–	–
4,4–DDT	–	–	–	–	–	–	–	–
METHOXYCHLOR	–	–	–	–	–	–	–	–
ENDRIN KETONE	–	–	–	–	–	–	–	
ALPHA–CHLORDANE	–	–	–	–	–	–	–	
GAMMA–CHLORDANE	–	–	–	–	–	–	–	–
TOXAPHENE	–	–	–	–	–	–	–	–
AROCLOR–1016	–	–	–	–	–	–	–	–
AROCLOR–1221	–	–	–	–	–	–	–	–
AROCLOR–1232	–	–	–	–	–	–	–	–
AROCLOR–1242	–	–	–	–	–	–	–	–
AROCLOR–1248	1900	–	–	–	–	–	–	–
AROCLOR–1254	1500 J	–	–	–	–	–	–	–
AROCLOR–1260	–	–	–	–	–	–	–	–

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 23d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 1 OF 8

SAMPLE IDENTIFICATION:	RA01-01	RA02-01	RA03-01	RA04-01	RA05-01	RA06-01	RA07-01	RA08-01	RA09-01
SAMPLE DEPTH BELOW GRADE (Inches)	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6
INORGANICS (PPM)									
ALUMINUM	3080	3120	3760	3920	7260	1500	4130	3140	3230
ANTIMONY	–	–	–	–	–	–	–	–	–
ARSENIC	1.8 B	1.6 B	3.1	2.7	4.5	1 B	1.7 B	1.8	1.6 B
BARIUM	16.6 B	12.4 B	19.9 B	24.3 B	57.8	15.2 B	14.6 B	15.1 B	11.9 B
BERYLLIUM	–	–	–	–	1.4	–	–	0.27 B	0.72 B
CADMIUM	–	–	–	–	–	–	–	–	–
CALCIUM	121 B	66.2 B	210 B	186 B	750 B	431 B	166 B	826 B	394 B
CHROMIUM	2.1 B	2.6 B	5.1	12.2	29.7	36.2	54.7	11.6	5.7
CHROMIUM VI	–	–	–	–	–	–	–	–	–
COBALT	–	–	–	–	1.7 B	–	–	–	1.8 B
COPPER	17.2	6.1	39.5	19.7	8.6	5.5 B	2.8 B	4.0 B	5.1 B
IRON	5340	4080	7290	8010	10300	1790	3630	4050	6160
LEAD	15.1	11.3	49.2	93	76.4	49.4	8.7	20.3	10.4
MAGNESIUM	135 B	115 B	114 B	221 B	572 B	202 B	188 B	392 B	251 B
MANGANESE	68.4	41.3	24.1	37	26.6	102	54.8	214	49.3
MERCURY	–	0.52	0.24	0.23	0.27	0.52	0.29	0.45	0.11
NICKEL	–	–	3.9 B	7.5 B	26.9	9.0 B	2.4 B	5.9 B	6.7 B
POTASSIUM	–	–	–	–	516 B	–	294 B	218 B	262 B
SELENIUM	–	–	–	0.44 B	–	–	–	–	–
SILVER	–	–	–	–	–	–	–	–	–
SODIUM	29.8 B	43.4 B	42.4 B	50.6 B	171 B	36.9 B	42.9 B	73.8 B	82.1 B
THALLIUM	–	–	–	–	–	–	–	–	–
VANADIUM	6.2 B	5.4 B	12.7	38.8	203	36.4	20	34.5	124
ZINC	13.7	24.9	20.4	27.8	31.1	22.5	13.5	28.1	17.1
CYANIDE	–	–	–	–	–	–	–	–	–
BORON	–	–	–	–	–	–	–	–	–
NIOBIUM	–	–	–	–	–	–	–	–	–
STRONTIUM	–	–	–	–	–	–	–	–	–
TITANIUM	79.3	73.9	106	127	159	78.1	88.6	99.6	112
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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'I' – CHROMIUM +6 VALUE IS THE RESULT OF WATER LEACH METHOD

N/A – NOT ANALYZED FOR THIS COMPOUND

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CRDL – CONTRACT REQUIRED DETECTION LIMIT

IDL – INSTRUMENT DETECTION LIMIT

TABLE 23d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 2 OF 8

SAMPLE IDENTIFICATION:	RA10–01	RA11–01	RA12–01	RA13–01	RA14–01	RA15–01	RA16–01	RA17–01	RA18–01
SAMPLE DEPTH BELOW GRADE (Inches)	0–6	0–6	0–6	0–6	0–6	0–6	0–6	0–6	0–6
INORGANICS (PPM)									
ALUMINUM	2410	2300	37400	7120	8720	1550	4940	4340	4950
ANTIMONY	–	–	–	–	–	–	–	–	–
ARSENIC	1.7 B	3.1	4	6.2	4.2 B	0.67 B	1.1 B	2.1	3.1 B
BARIUM	9.6 B	44.2 B	739	56.3 B	182	6.3 B	15.1 B	8.6 B	11.5 B
BERYLLIUM	0.17 B	2.1	60.1	6.8	12.8	–	0.89 B	0.40 B	0.39 B
CADMIUM	–	–	5.3	–	1.6	–	–	–	–
CALCIUM	164 B	1400 B	7320	3130	3670	90.7 B	923 B	127 B	106 B
CHROMIUM	38	45.1	5870	123	218	6.1	8.2	18.7	3.1
CHROMIUM VI	–	–	– !*	0.38 !*	– !*	–	–	0.12	0.33
COBALT	–	–	87.1	3.1 B	19.5	–	2.1 B	1.3 B	2.1 B
COPPER	2.0 B	5.5 B	887	17.6	33.6	1.1 B	3.0 B	1.4 B	1.5 B
IRON	2530	5750	32300	12000	9050	1890	7790	9230	13900
LEAD	11.3	40.8	760	319	257	3.5 B	9.8	6.4	8
MAGNESIUM	155 B	1720	4380	2980	3680	111 B	454 B	168 B	139 B
MANGANESE	62	71	1680	354	1110	36.8	106	21.7	19
MERCURY	0.26	–	0.51	0.44	0.17	–	–	–	–
NICKEL	3.7 B	17.8	3360	90.4	1290	3.8 B	15.7	5.1 B	6 B
POTASSIUM	208 B	480 B	1040 B	845 B	257 B	–	305 B	–	245 B
SELENIUM	–	–	–	–	0.51 B	–	–	–	–
SILVER	–	–	–	–	–	–	–	–	–
SODIUM	29.3 B	184 B	349 B	218 B	163 B	17.8 B	33.1 B	34.8 B	24.6 B
THALLIUM	–	–	–	–	–	–	–	–	–
VANADIUM	21.6	403	12100	1360	2560	24.2	131	34.4	20.8
ZINC	9.9	56.5	1310	87	355	4.3	14.3	18.4	6.1
CYANIDE	–	–	–	–	–	–	–	–	–
BORON	–	–	N/A	–	–	N/A	–	–	–
NIOBIUM	–	–	N/A	–	81.2	N/A	–	–	–
STRONTIUM	–	–	N/A	–	30.2	N/A	–	–	–
TITANIUM	70.3	51.5	N/A	197	197	N/A	103	57.8	61.8
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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TABLE 23d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 3 OF 8

SAMPLE IDENTIFICATION:	RA19–01	RA20–01	RA21–01	RA22–01	RA23–01	RA24–01	RA25–01	RA26–01	RA27–01
SAMPLE DEPTH BELOW GRADE (Inches)	0–6	0–6	0–6	0–6	0–6	0–6	0–6	0–6	0–6
INORGANICS (PPM)									
ALUMINUM	2430	1970	3430	3740	7950	2260	2710	4170	5360
ANTIMONY	–	–	–	–	–	–	–	–	–
ARSENIC	1.9 B	1.2 B	1.5 B	1.3 B	4.4	1.1 B	1.1 B	5	1.3
BARIUM	10.2 B	11.2 B	11.7 B	26.8 B	24.4 B	9.6 B	18.5 B	25.5 B	26.5 B
BERYLLIUM	–	–	0.95	3.3	8.9	–	0.46 B	1.8	2.3
CADMIUM	–	–	–	–	–	–	–	–	–
CALCIUM	594 B	996 B	616 B	1440	8650	402 B	828 B	563 B	574 B
CHROMIUM, TOTAL	6.6	3.8	8.9	51.4	102	7.6	8.1	16.3	57.6
CHROMIUM VI	–	–	–	0.30	0.96 !*	–	–	–	–
COBALT	–	–	1.3 B	2.1 B	2.9 B	–	–	3.6 B	3.4 B
COPPER	3.9 B	6.2	4.1 B	10.9	9.1	3 B	2.5 B	5.3	12.2
IRON	2860	2150	4400	4650	3890	2620	3570	12300	6620
LEAD	26.5 B	9.8	8.7	12	98.9	10.3	26.1	15 B	19.3 B
MAGNESIUM	111 B	150 B	1890	1090	14900	171 B	361 B	484 B	454 B
MANGANESE	42.9	47.4	39.3	408	100	77.9	123	164	591
MERCURY	0.09	0.41	–	–	–	0.12	0.14	–	–
NICKEL	–	–	8.3	91.5	189	3.5 B	9.1	29.9	42.1
POTASSIUM	–	–	316 B	180 B	388 B	–	–	223 B	577 B
SELENIUM	–	–	–	–	–	–	–	–	–
SILVER	–	–	–	–	–	–	–	2.2	–
SODIUM	37.4 B	36.6 B	150 B	434 B	264 B	23.6 B	23.8 B	189 B	59.6 B
THALLIUM	–	–	–	–	–	–	–	–	–
VANADIUM	14.4	11.5	175	654	1810	21.1	61.8	280	453
ZINC	24.3	26.9	25.9	28	96	21.4	18.8	79.4	30.5
CYANIDE	–	–	–	–	–	–	–	–	–
BORON	–	–	–	–	–	–	–	–	–
NIOBIUM	–	–	–	–	–	–	–	N/A	–
STRONTIUM	–	–	–	–	29.4	–	–	–	–
TITANIUM	65.3	51.9	96.6	128	101	61.5	94.4	121	142
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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TABLE 23d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 4 OF 8

SAMPLE IDENTIFICATION:	RA28-01	RA29-01	RA30-01	RA31-01	RA32-01	RA33-01	RA34-01	RA35-01	RA36-01
SAMPLE DEPTH BELOW GRADE (Inches)	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6
INORGANICS (PPM)									
ALUMINUM	42900	7940	3710	4060	11000	13100	28700	3700	1660
ANTIMONY	–	–	–	5.9 B	13.8	–	–	–	6.2 B
ARSENIC	2.7	1.2 B	4.2	1.6 B	1.6 B	1.1 B	3.1	6.1	0.74 B
BARIUM	166	77.2	26.1 B	23.3 B	149	650	400	53.7	6.5 B
BERYLLIUM	22.5	6.3	2.1	0.68 B	1.9	7.1	11.9	1.8	0.30 B
CADMIUM	0.91	2.8	–	–	–	–	–	–	–
CALCIUM	49500	4960	639 B	231 B	8410	7050	71900	840 B	107 B
CHROMIUM	368	130	421	67.2	469	113	148	24.0	3.0
CHROMIUM VI	0.46 I*	0.82 I*	1.6 I*	–	2.7 I*	0.19 I*	–	–	–
COBALT	19	8.0 B	3.9 B	2.2 B	3.5 B	12.2	6.1 B	2.9 B	–
COPPER	47.5	21.9	6.4	2.8 B	10.8	8.5	16.3	4.5 B	1.2 B
IRON	27100	16500	8400	6060	9070	2460	5100	8530	2540
LEAD	43.2	80	25.6	11.4	46.0	34.4	142	91.7	2.9 B
MAGNESIUM	26000	4620	477 B	–	50500	8290	33800	1150	190 B
MANGANESE	2830	1540	701	332	241	269	543	242	37.5
MERCURY	–	–	–	–	–	–	–	–	–
NICKEL	1110	239	78	10.0	356	534	299	39.9	4.1 B
POTASSIUM	342 B	169 B	–	–	1110	305 B	741 B	–	–
SELENIUM	–	–	–	–	–	–	–	–	–
SILVER	–	–	–	–	–	–	–	–	–
SODIUM	217 B	171 B	69.1 B	159 B	629 B	618 B	1520	219 B	160 B
THALLIUM	–	–	–	–	–	–	–	–	–
VANADIUM	4750	1270	390	102	436	1510	2450	302	35.9
ZINC	110	148	29	110	41.6	28.9	209	476	10.0
CYANIDE	–	–	–	–	–	–	N/A	–	–
BORON	102	37.9	–	–	146	64.1	59.5	–	–
NIOBIUM	–	–	–	–	–	81.5	–	–	–
STRONTIUM	117	–	–	–	22.8	127	171	–	–
TITANIUM	941	416	151	119	154	204	256	158	55.2
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	N/A	101	N/A	N/A

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TABLE 23d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 5 OF 8

SAMPLE IDENTIFICATION:	RA37-01	RA38-01	RA39-01	RA71-01	RA40-01	RA41-01	RA42-01	RA43-01	RA44-01
SAMPLE DEPTH BELOW GRADE (Inches)	0-6	0-6	0-6	DUPE RA39-01	0-6	0-6	0-6	0-6	0-6
INORGANICS (PPM)									
ALUMINUM	1180	2350	3510	4530	2020	1820	17900	66900	6480
ANTIMONY	7.0 B	–	7.3 B	–	–	–	–	–	8.8 B
ARSENIC	0.95 B	0.68 B	1.5 B	1.6 B	1.7 B	1.0 B	2.0 B	2.9 B	1.3 B
BARIUM	8.0 B	9.1 B	18.4 B	22.8 B	11.6 B	15.9 B	121	394	455
BERYLLIUM	0.36 B	0.37 B	0.38 B	0.39 B	0.34 B	5.5	13.0	26.6	4.3
CADMIUM	–	–	–	–	–	–	–	–	–
CALCIUM	111 B	198 B	257 B	243 B	219 B	612 B	13300	81800	8680
CHROMIUM	16.3	3.6	5.6	5.8	10.7	147	295	121	144
CHROMIUM VI	–	–	–	–	–	0.14 !*	0.34 !*	– I*	0.70 !*
COBALT	–	–	–	–	–	–	8.0 B	4.9 B	–
COPPER	2.8 B	1.3 B	1.5 B	2.9 B	3.3 B	5.1	73.7	21.9	36.5
IRON	1530	2260	4260	5300	2400	1760	25400	3120	3850
LEAD	11.2	4.4	4.9	5.7	16.8	11.2	41.4	203	556
MAGNESIUM	146 B	212 B	367 B	412 B	193 B	239 B	6650	42000	27600
MANGANESE	47.9	36.8	53.5	52.6	101	137	1060	370	890
MERCURY	–	–	–	–	–	–	–	0.11	–
NICKEL	4.2 B	3.9 B	5.5 B	4.8 B	5.6 B	32.7	326	306	65.5
POTASSIUM	–	–	–	–	–	–	–	–	2830
SELENIUM	–	–	–	0.52 B	–	–	–	–	–
SILVER	–	–	–	1.5 B	–	–	–	–	–
SODIUM	250 B	166 B	162 B	156 B	222 B	354 B	253 B	473 B	31300
THALLIUM	–	–	–	–	–	–	–	–	–
VANADIUM	65.3	43.6	39.7	36.2	47.7	715	1770	3780	551
ZINC	10.4	13.3	9.2	8.6	21.4	13.0	72.0	192	288
CYANIDE	–	–	–	–	–	–	–	0.52R*	–
BORON	–	–	–	–	–	–	–	69.5	65.3
NIOBIUM	–	–	–	–	–	–	69.7	104	845
STRONTIUM	–	–	–	–	–	–	26.5	139	68.5
TITANIUM	53.6	60.6	110	142	66.2	89.7	246	216	305
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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TABLE 23d
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PAGE 6 OF 8

SAMPLE IDENTIFICATION:	RA45–01	RA46–01	RA47–01	RA48–01	RA49–01	RA70–01	RA50–01	RA51–01	RA52–01
SAMPLE DEPTH BELOW GRADE (Inches)	0–6	0–6	0–6	0–6	0–6	DUPE RA49–01	0–6	0–6	0–6
INORGANICS (PPM)									
ALUMINUM	1420	1710	2220	1230	74300	60100	91300	1580	952
ANTIMONY	–	–	7.3 B	–	–	–	–	–	–
ARSENIC	1.5 B	2.1 B	1.8 B	0.93 B	3.1	2.6	3.1 B	1.5 B	0.79 B
BARIUM	11.3	7.1 B	7.7 B	4.3 B	248	177	683	10.9 B	9.3 B
BERYLLIUM	0.31 B	0.34 B	0.32 B	–	29.3	41.7	18.8	0.28 B	–
CADMIUM	–	–	–	–	–	–	–	–	–
CALCIUM	43.9 B	43.3 B	31.8 B	40.6 B	87100	70500	103000	73.0 B	58.3 B
CHROMIUM	7.3	9.1	6.1	5.4	114	201	176	12.5	2.4
CHROMIUM VI	–	–	–	–	– I*	–	– I*	–	–
COBALT	–	–	–	–	6.7 B	7.9 B	4.3 B	–	–
COPPER	2.0 B	2.5 B	1.8 B	2.4 B	14.7	49.5	14.3	2.6 B	1.7 B
IRON	3030	3610	3690	1430	3740	9480	4280	3480	1610
LEAD	10.4	19.8	52.0	7.2	74.2	66.0	96.7	8.2 B	4.6
MAGNESIUM	–	–	131 B	117 B	36400	26000	45800	181 B	107 B
MANGANESE	7.3	7.0	5.6	4.3	562	255	337	10	6.3
MERCURY	–	–	–	–	–	–	–	–	–
NICKEL	–	–	–	–	530	660	144	3.3 B	2.2 B
POTASSIUM	–	–	–	–	–	–	–	–	–
SELENIUM	–	–	–	0.47 B	–	–	–	0.42 B	–
SILVER	–	–	–	1.5 B	–	–	–	–	–
SODIUM	173 B	195 B	180 B	174 B	521 B	393 B	546 B	116 B	122 B
THALLIUM	–	–	–	–	–	–	–	–	–
VANADIUM	34.3	40.5	29.6	31.0	3990	5760	2660	36.0	15.0
ZINC	8.9	10.6	7.6	6.3	59.4	41.3	89.0	6.9	6.0
CYANIDE	–R*	–R*	–R*	–R*	0.615R*	–	–	–	–
BORON	–	–	–	–	104	239	208	–	–
NIOBIUM	–	–	–	–	52.1	–	52	–	–
STRONTIUM	–	–	–	–	118	101	228	–	–
TITANIUM	66.9	76.7	70.3	42.5	165	135	190	78.3	52.2
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE, THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC–ECI.

'I' – CHROMIUM +6 VALUE IS THE RESULT OF WATER LEACH METHOD

N/A – NOT ANALYZED FOR THIS COMPOUND

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

CRDL – CONTRACT REQUIRED DETECTION LIMIT

IDL – INSTRUMENT DETECTION LIMIT

TABLE 23d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 7 OF 8

SAMPLE IDENTIFICATION:	RA53-01	RA54-01	RA55-01	RA56-01	RA57-01	RA58-01	RA72-01	RA58-02	RA59-01
SAMPLE DEPTH BELOW GRADE (Inches)	0-6	0-6	0-6	0-6	0-6	6-12	DUPE RA58-01	42-48	6-12
INORGANICS (PPM)									
ALUMINUM	1500	1060	4770	6120	4350	4090	4720	4070	2820
ANTIMONY	6.5 B	5.9 B	5.2 B	–	–	–	6.1 B	–	4.7 B
ARSENIC	1.3 B	1.1 B	1.5 B	1.3 B	–	1.6 B	1.7 B	1.4 B	1.2 B
BARIUM	11.7 B	5.6 B	19.8 B	51.2	–	26.0 B	22 B	22 B	21.2 B
BERYLLIUM	0.27 B	0.33 B	0.60 B	1.8	–	0.5 B	.4 B	.23 B	–
CADMIUM	–	–	–	–	–	–	–	–	–
CALCIUM	38.4 B	39.1 B	556 B	1960	–	247 B	186 B	92.6 B	133 B
CHROMIUM	9.1	4.6	9.0	39.2	11.3	18.2	11.8	6.1	2.1 B
CHROMIUM VI	–	–	–	–	–	–	–	–	–
COBALT	–	–	2.3 B	4.0 B	–	2.7 B	1.9 B	1.9 B	–
COPPER	3.8 B	2.3 B	3.9 B	7.4	7.5	20.7	12.5	4.3 B	3.2 B
IRON	2830	2380	7680	7410	7500	8230	6560	4820	3630
LEAD	41.6	9.7 B	13.4	58.4	21.5	17.9 B	19.2	6.6	8.6
MAGNESIUM	136 B	111 B	411 B	989 B	148	251 B	238 B	151 B	164 B
MANGANESE	5.8	5.3	69.1	222	–	103	62.8	38.4	19.2
MERCURY	–	–	–	–	–	–	–	–	–
NICKEL	2.3 B	–	7.1 B	28.1	–	8.3	4.7 B	4.5 B	3.4 B
POTASSIUM	–	–	227 B	208 B	–	241 B	–	–	–
SELENIUM	0.51 B	–	–	–	–	–	–	–	0.49 B
SILVER	1.4 B	1.4 B	–	–	–	–	–	–	0.37 B
SODIUM	188 B	180 B	132 B	152 B	–	130 B	122 B	114 B	112 B
THALLIUM	–	–	–	–	–	–	–	–	–
VANADIUM	31.6	36.5	59.9	208	49.4	53.8	38.6	19.5	8.1 B
ZINC	10.7	6.2	155	335	112	18.1	7.4	7.6	16.7
CYANIDE	–R*	–R*	–	–	N/A	–	–	–	–
BORON	–	–	–	–	–	–	–	–	–
NIOBIUM	–	–	–	–	–	–	–	–	–
STRONTIUM	–	–	–	–	–	–	–	–	–
TITANIUM	70.9	61.9	125	150	142	123	116	91.6	59.1
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	–	–	–	–

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE, THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC-ECI.
'I' – CHROMIUM +6 VALUE IS THE RESULT OF WATER LEACH METHOD
N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT
CRDL – CONTRACT REQUIRED DETECTION LIMIT
IDL – INSTRUMENT DETECTION LIMIT

TABLE 23d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC CONSTITUENTS DETECTED IN SURFACE SOIL SAMPLES
PAGE 8 OF 8

SAMPLE IDENTIFICATION:	RA59-02	RA60-01	RA60-02	RA64-01
SAMPLE DEPTH BELOW GRADE (Inches)	42-48	0-6	42-48	0-6
INORGANICS (PPM)				
ALUMINUM	2890	1840	2520	4660
ANTIMONY	–	–	–	11.2 B
ARSENIC	1.1 B	1.2 B	1.9 B	69.8
BARIUM	8.9 B	17.7 B	17.5 B	370
BERYLLIUM	0.29 B	–	–	0.57 B
CADMIUM	–	–	–	1 B
CALCIUM	49.9 B	220 B	127 B	49300
CHROMIUM	–	1.6 B	1.5 B	801
CHROMIUM VI	–	–	–	201 !*
COBALT	1.6 B	–	1.5 B	4 B
COPPER	3.2 B	2.7 B	3.2 B	21.4
IRON	10700	3220	6620	10300
LEAD	3.8 B	6.7	7.8	101
MAGNESIUM	96.9 B	170 B	190 B	2250
MANGANESE	22.6	35.7	31.8	110
MERCURY	–	–	–	0.05
NICKEL	2.4 B	2.5 B	2.2 B	6.3 B
POTASSIUM	–	–	–	678 B
SELENIUM	–	–	–	4
SILVER	–	–	–	4.4
SODIUM	102 B	113 B	112 B	353 B
THALLIUM	–	–	–	–
VANADIUM	12.3	8.0 B	9.0 B	67
ZINC	12.3	15.2	10.4	248
CYANIDE	–	–	–	N/A
BORON	–	–	–	N/A
NIOBIUM	–	–	–	N/A
STRONTIUM	–	–	–	N/A
TITANIUM	62.3	49.3	78.6	N/A
ZIRCONIUM	–	–	–	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE, THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC-ECI.
'!' – CHROMIUM +6 VALUE IS THE RESULT OF WATER LEACH METHOD
N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT
CRDL – CONTRACT REQUIRED DETECTION LIMIT
IDL – INSTRUMENT DETECTION LIMIT

TABLE 24a
SHIELD ALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN TEST PIT SOIL SAMPLES

SAMPLE IDENTIFICATION:	TP01–01	TP02–01	TP03–01	TP04–01	TP05–01
SAMPLE DEPTH BELOW GRADE (FT):	12 ft	11 ft	8 ft	7 ft	5 ft
VOLATILE ORGANICS (PPB)					
CHLOROMETHANE	–	–	–	–	–
BROMOMETHANE	–	–	–	–	–
VINLY CHLORIDE	–	–	–	–	–
CHLOROETHANE	–	–	–	–	–
METHYLENE CHLORIDE	66 BJ*	68 BJ*	150 BJ*	150 BJ*	150 BJ*
ACETONE	17 BJ*	18 N*	110 BJ*	93 BJ*	120 BJ*
CARBON DISULFIDE	–	–	–	–	–
1,1–DICHLORETHENE	–	–	–	–	–
1,1–DICHLORETHANE	–	–	–	–	–
1,2–DICHLORETHENE (total)	–	–	–	–	–
CHLOROFORM	–	–	–	–	–
1,2–DICHLORETHANE	–	–	–	–	–
2–BUTANONE	–	–	–	–	–
1,1,1–TRICHLOROETHANE	–	–	–	–	–
CARBON TETRACHLORIDE	–	–	–	–	–
VINYL ACETATE	–	–	–	–	–
BROMODICHLOROMETHANE	–	–	–	–	–
1,2–DICHLOROPROPANE	–	–	–	–	–
cis–1,3–DICHLOROPROPENE	–	–	–	–	–
TRICHLOROETHENE	–	–	–	–	–
DIBROMOCHLOROMETHANE	–	–	–	–	–
1,1,2–TRICHLOROETHANE	–	–	–	–	–
BENZENE	–	–	–	–	–
trans–1,3–DICHLOROPROPENE	–	–	–	–	–
BROMOFORM	–	–	–	–	–
4–METHYL1–2–PENTANONE	–	–	–	–	–
2–HEXANONE	–	–	–	–	–
TETRACHLOROETHENE	–	–	–	–	–
1,1,2,2–TETRACHLOROETHANE	–	–	–	–	–
TOLUENE	–	–	–	–	–
CHLOROBENZENE	–	–	–	–	–
ETHYLBENZENE	–	–	–	–	–
STYRENE	–	–	–	–	–
XYLENE (total)	–	–	–	–	–
TOTAL VOCs	83	68	260	243	270

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE INDICATES POSSIBLE/PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC–ECI.

NA – PARAMETER NOT ANALYZED FOR THIS COMPOUND.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 24b
SHIELD ALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN TEST PIT SOIL SAMPLES
PAGE 1 OF 2

SAMPLE IDENTIFICATION:	TP01-01	TP02-01	TP03-01	TP04-01	TP05-01
SAMPLE DEPTH BELOW GRADE (FT):	12 ft	11 ft	8 ft	7 ft	5 ft
BASE NEUTRAL / ACIDS (PPB)					
PHENOL	NA	–	NA	NA	NA
bis(2-CHLOROETHYL)ETHER	NA	–	NA	NA	NA
2-CHLOROPHENOL	NA	–	NA	NA	NA
1,3-DICHLOROBENZENE	NA	–	NA	NA	NA
1,4-DICHLORBENZENE	NA	–	NA	NA	NA
BENZYL ALCOHOL	NA	–	NA	NA	NA
1,2-DICHLOROBENZENE	NA	–	NA	NA	NA
2-METHYLPHENOL	NA	–	NA	NA	NA
bis(2-CHLOROISOPROPYL)ETHER	NA	–	NA	NA	NA
4-METHYLPHENOL	NA	–	NA	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	NA	–	NA	NA	NA
HEXACHLOROETHANE	NA	–	NA	NA	NA
NITROBENZENE	NA	–	NA	NA	NA
ISOPHORONE	NA	–	NA	NA	NA
2-NITROPHENOL	NA	–	NA	NA	NA
2,4-DIMETHYLPHENOL	NA	–	NA	NA	NA
BENZOIC ACID	NA	–	NA	NA	NA
bis(2-CHLOROETHOXY)METHANE	NA	–	NA	NA	NA
2,4-DICHLOROPHENOL	NA	–	NA	NA	NA
1,2,4-TRICHLOROBENZENE	NA	–	NA	NA	NA
NAPHTHALENE	NA	–	NA	NA	NA
4-CHLOROANILINE	NA	–	NA	NA	NA
HEXACHLOROBUTADIENE	NA	–	NA	NA	NA
2,4,6-TRICHLOROPHENOL	NA	–	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	–	NA	NA	NA
2-CHLORONAPHTHALENE	NA	–	NA	NA	NA
2-NITROANILINE	NA	–	NA	NA	NA
DIMETHYLPHTHALATE	NA	–	NA	NA	NA
ACENAPHTHYLENE	NA	–	NA	NA	NA
2,6-DINITROTOLUENE	NA	–	NA	NA	NA
3-NITROANILINE	NA	–	NA	NA	NA

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE INDICATES POSSIBLE/PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC-ECI.

NA – PARAMETER NOT ANALYZED FOR THIS COMPOUND.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 24b
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN TEST PIT SOIL SAMPLES
PAGE 2 OF 2

SAMPLE IDENTIFICATION: SAMPLE DEPTH BELOW GRADE (FT):	TP01-01 12 ft	TP02-01 11 ft	TP03-01 8 ft	TP04-01 7 ft	TP05-01 5 ft
BASE NEUTRAL / ACIDS (PPB) (continued)					
ACENAPHTHENE	NA	–	NA	NA	NA
2,4-DINITROPHENOL	NA	–	NA	NA	NA
4-NITROPHENOL	NA	–	NA	NA	NA
DIBENZOFURAN	NA	–	NA	NA	NA
2,4-DINITROTOLUENE	NA	–	NA	NA	NA
DIETHYLPHTHALATE	NA	–	NA	NA	NA
4-CHLOROPHENYL-PHENYLETHER	NA	–	NA	NA	NA
FLUORENE	NA	–	NA	NA	NA
4-NITROANILINE	NA	–	NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	NA	–	NA	NA	NA
N-NITROSODIPHENYLAMINE (1)	NA	–	NA	NA	NA
4-BROMOPHENYL-PHENYLETHER	NA	–	NA	NA	NA
HEXACHLOROBENZENE	NA	–	NA	NA	NA
PENTACHLOROPHENOL	NA	–	NA	NA	NA
PHENANTHRENE	NA	–	NA	NA	NA
ANTHRACENE	NA	–	NA	NA	NA
DI-N-BUTYLPHTHALATE	NA	210 N*	NA	NA	NA
FLUORANTHENE	NA	43 J	NA	NA	NA
PYRENE	NA	58 J	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	–	NA	NA	NA
3,3-DICHLOROBENZIDINE	NA	–	NA	NA	NA
BENZO(A)ANTHRACENE	NA	–	NA	NA	NA
CHRYSENE	NA	–	NA	NA	NA
BIS(2-ETHYLHEZYL)PHTHALATE	NA	130 N*	NA	NA	NA
DI-N-OCTYL PHTHALATE	NA	–	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	–	NA	NA	NA
BENZO (K) FLUORANTHENE	NA	–	NA	NA	NA
BENZO (A) PYRENE	NA	–	NA	NA	NA
INDENO (1,2,3-CD) PYRENE	NA	–	NA	NA	NA
DIBENZO (A,H) ANTHRACENE	NA	–	NA	NA	NA
BENZO (G,H,I) PERYLENE	NA	–	NA	NA	NA
TOTAL caPAH	NA	0	NA	NA	NA

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE INDICATES POSSIBLE/PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC-ECI.

NA – PARAMETER NOT ANALYZED FOR THIS COMPOUND.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 24c
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF PESTICIDE/PCB COMPOUNDS DETECTED IN TEST PIT SOIL SAMPLES

SAMPLE IDENTIFICATION:	TP01-01	TP02-01	TP03-01	TP04-01	TP05-01
SAMPLE DEPTH BELOW GRADE (FT):	12 ft	11 ft	8 ft	7 ft	5 ft
PESTICIDES/PCB'S (PPB)					
ALPHA-BHC	NA	–	NA	NA	NA
BETA-BHC	NA	–	NA	NA	NA
DELTA-BHC	NA	–	NA	NA	NA
GAMMA-BHC(LINDANE)	NA	–	NA	NA	NA
HEPTACHLOR	NA	–	NA	NA	NA
ALDRIN	NA	–	NA	NA	NA
HEPTACHLOR EPOXIDE	NA	–	NA	NA	NA
ENDOSULFAN I	NA	–	NA	NA	NA
DIELDRIN	NA	–	NA	NA	NA
4,4-DDE	NA	–	NA	NA	NA
ENDRIN	NA	–	NA	NA	NA
ENDOSULFAN II	NA	–	NA	NA	NA
4,4-DDD	NA	–	NA	NA	NA
ENDOSULFAN SULFATE	NA	–	NA	NA	NA
4,4-DDT	NA	–	NA	NA	NA
METHOXYCHLOR	NA	–	NA	NA	NA
ENDRIN KETONE	NA	–	NA	NA	NA
ALPHA-CHLORDANE	NA	–	NA	NA	NA
GAMMA-CHLORDANE	NA	–	NA	NA	NA
TOXAPHENE	NA	–	NA	NA	NA
AROCLOR-1016	NA	–	NA	NA	NA
AROCLOR-1221	NA	–	NA	NA	NA
AROCLOR-1232	NA	–	NA	NA	NA
AROCLOR-1242	NA	–	NA	NA	NA
AROCLOR-1248	NA	–	NA	NA	NA
AROCLOR-1254	NA	–	NA	NA	NA
AROCLOR-1260	NA	–	NA	NA	NA

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE INDICATES POSSIBLE/PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC-ECI.

NA – PARAMETER NOT ANALYZED FOR THIS COMPOUND.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 24d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN TEST PIT SOIL SAMPLES

SAMPLE IDENTIFICATION:	TP01–01	TP02–01	TP03–01	TP04–01	TP05–01
SAMPLE DEPTH BELOW GRADE (FT):	12 ft	11 ft	8 ft	7 ft	5 ft
INORGANICS (PPM)					
ALUMINUM	4440	6720	6330	2090	4540
ANTIMONY	–	15.7	–	–	–
ARSENIC	2.4	2.8	–	3.5	4.1
BARIUM	30.8 B	17.0 B	–	9.3 B	19.7 B
BERYLLIUM	3.4	1.5	2.0	0.21 B	0.25 B
CADMIUM	–	–	–	–	–
CALCIUM	2770	109 B	–	144 B	112 B
CHROMIUM	92.5	44.9	69.5	17.1	6.6
CHROMIUM VI	0.31	0.34	1.6	1.0	–
COBALT	7.5 B	5.9 B	15.8	1.5 B	2.5 B
COPPER	14.6	4.3 B	6.6	2.2 B	2.0 B
CYANIDE, TOTAL	–	–R*	–	–	–
IRON	10600	15700	18300	3900	6530
LEAD	–	12.4	13	4.2	3.0
MAGNESIUM	11600	351 B	–	118 B	218 B
MANGANESE	3950	487	659	42.4	30.1
MERCURY	–	–	–	–	N/A
NICKEL	84.0	11.3	17.7	4.6 B	–
POTASSIUM	314 B	417 B	–	157 B	217 B
SELENIUM	–	–	–	–	–
SILVER	–	–	–	–	–
SODIUM	352 B	215 B	–	41.9 B	57.3 B
THALLIUM	–	–	–	–	–
VANADIUM	736	298	335	37.3	7.8 B
ZINC	67.7	29.6	18.1	3.5	2.2
BORON	47.3	–	–	–	–
NIOBIUM	–	–	–	–	–
STRONTIUM	–	–	–	–	–
TITANIUM	398	129	155	85.3	115

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE INDICATES POSSIBLE/PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC–ECI.

NA – PARAMETER NOT ANALYZED FOR THIS COMPOUND.

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT.

TABLE 25a

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 1 OF 6

SAMPLE IDENTIFICATION:	SB01–02	SB02–02	SB03–02	SB04–03	SB05–02	SB06–02	SB07–03	SB13–03	SB20–04	SB22–05	SB24–03	SB27–02	SB29–01	SB29–01	SB29–04
SAMPLE DEPTH BELOW GRADE (FT)	2–4	2–4	2–4	4–6	2–4	2–4	4–6	4–6	6–8	8–10	4–6	2–4	0–2	DUPE	6–8
VOLATILE ORGANICS (PPB)															
CHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BROMOMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VINLY CHLORIDE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
METHYLENE CHLORIDE	54 BJ*	31 N*	38 BJ*	46 BJ*	48 BJ*	43 BJ*	36 BJ*	48 BJ*	32 N*	36 BJ*	40 BJ*	41 N*	43 BJ*	36 R*	65 BJ*
ACETONE	31 N*	50 BJ*	70 BJ*	57 BJ*	79 BJ*	62 R*	160 BJ*	37 BJ*	56 BJ*	65 BJ*	45 BJ*	37 BJ*	82 BJ*	73 BJ*	61 BJ*
CARBON DISULFIDE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,1–DICHLOROETHENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,1–DICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,2–DICHLOROETHENE (total)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CHLOROFORM	–	–	–	–	–	–	–	–	–	–	–	1 J	–	–	–
1,2–DICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2–BUTANONE	–	–	–	–	–	–	–	–	–	–	–	–	8 J	9 JB	–
1,1,1–TRICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CARBON TETRACHLORIDE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VINYL ACETATE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BROMODICHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,2–DICHLOROPROPANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
cis–1,3–DICHLOROPROPENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TRICHLOROETHENE	24	–	–	–	–	–	1 J*	8	–	–	3 J	6	2 J	1 J	–
DIBROMOCHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,1,2–TRICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIMES EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC–ECI.

N/A – NOT ANALYZED FOR THIS COMPOUND

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25a

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 2 OF 6

SAMPLE IDENTIFICATION:	SB01–02	SB02–02	SB03–02	SB04–03	SB05–02	SB06–02	SB07–03	SB13–03	SB20–04	SB22–05	SB24–03	SB27–02	SB29–01	SB29–01	SB29–04
SAMPLE DEPTH BELOW GRADE (FT)	2–4	2–4	2–4	4–6	2–4	2–4	4–6	4–6	6–8	8–10	4–6	2–4	0–2	DUPE	6–8
VOLATILE ORGANICS (PPB) (CONTINUED)															
trans–1,3–DICHLOROPROPENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BROMOFORM	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4–METHYL1–2–PENTANONE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2–HEXANONE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TETRACHLOROETHENE	4 J	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,1,2,2–TETRACHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOLUENE	2 J	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CHLOROBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ETHYLBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
STYRENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
XYLENE (total)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DIETHYL ETHER	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TPH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL VOCs	84	50	108	103	127	43	197	93	56	101	88	44	135	83	126

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

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R – DATA IS REJECTED DUE TO HOLDING TIMES EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

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N/A – NOT ANALYZED FOR THIS COMPOUND

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TPH – TOTAL PETROLEUM HYDROCARBONS

TABLE 25a

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 3 OF 6

SAMPLE IDENTIFICATION:	SB32-04	SB39-04	SB40-02	SB40-05	SB41-02	SB42-01	SB42-04	SB42-05	SB44-01	SB44-02	SB45-02	SB45-03	SB46-01	SB46-04	SB47-04
SAMPLE DEPTH BELOW GRADE (FT)	6-8	6-8	2-4	8-10	2-4	0-2	6-8	8-10	0-2	2-4	2-4	4-6	0-2	6-8	6-8
VOLATILE ORGANICS (PPB)															
CHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BROMOMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VINLY CHLORIDE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
METHYLENE CHLORIDE	37 R*	30 N*	31 R*	34 R*	51 R*	34 BJ*	25 B	18 N*	47 R*	44 R*	42 BJ*	32 R*	30 R*	34 R*	40 BJ*
ACETONE	160 BJ*	150 BJ*	43 BJ*	26 BJ*	45 BJ*	98 BJ*	140 B	42 N*	3900 R*	4200 R*	180 BJ*	56 N*	23 BJ*	72 BJ*	65 BJ*
CARBON DISULFIDE	–	–	–	–	–	–	–	–	3 J	16	–	–	–	–	–
1,1-DICHLOROETHENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,1-DICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,2-DICHLOROETHENE (total)	–	–	3 J	–	–	–	–	–	2 J	–	–	–	–	–	–
CHLOROFORM	–	–	–	–	–	–	–	–	–	–	1 J	–	–	–	–
1,2-DICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2-BUTANONE	–	–	–	–	–	–	–	9 N*	–	–	7 J	–	–	–	–
1,1,1-TRICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CARBON TETRACHLORIDE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VINYL ACETATE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BROMODICHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,2-DICHLOROPROPANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
cis-1,3-DICHLOROPROPENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TRICHLOROETHENE	–	3 J	2 J	–	–	3 J	2 J	–	2 J	–	2 J	–	–	–	–
DIBROMOCHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,1,2-TRICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BENZENE	–	–	–	–	–	–	–	–	150	–	–	–	–	–	–

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.

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N/A – NOT ANALYZED FOR THIS COMPOUND

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TABLE 25a

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 4 OF 6

SAMPLE IDENTIFICATION:	SB32-04	SB39-04	SB40-02	SB40-05	SB41-02	SB42-01	SB42-04	SB42-05	SB44-01	SB44-02	SB45-02	SB45-03	SB46-01	SB46-04	SB47-04
SAMPLE DEPTH BELOW GRADE (FT)	6-8	6-8	2-4	8-10	2-4	0-2	6-8	8-10	0-2	2-4	2-4	4-6	0-2	6-8	6-8
(CONTINUED)															
trans-1,3-DICHLOROPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BROMOFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-METHYL1-2-PENTANONE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-HEXANONE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHENE	-	-	-	-	-	3 J	-	-	3 J	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	-	-	-	-	-	2 J	-	-	7	-	-	-	-	-	-
CHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	-	-	-	-	-	-	-	-	58	-	-	-	-	-	-
STYRENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XYLENE (total)	-	-	-	-	-	-	-	-	360	-	-	-	-	-	-
DIETHYL ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH	N/A	N/A	N/A	N/A	35000	4500	8000	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL VOCs	160	153	48	26	45	140	167	0	585	16	232	0	23	72	105

B - QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.
J - QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.
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N/A - NOT ANALYZED FOR THIS COMPOUND
'-' - NOT DETECTED TO THE REPORTED DETECTION LIMIT
TPH - TOTAL PETROLEUM HYDROCARBONS

TABLE 25a

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 5 OF 6

SAMPLE IDENTIFICATION:	SB55–04	SB60–02	SB72–01	SB72–04	SB73–02	SB73–04	SB73–04	SB77–03	SB84–05	SB91–01	SB91–04
SAMPLE DEPTH BELOW GRADE (FT)	6–8	2–4	0–2	6–8	2–4	6–8	DUPE	4–6	8–10	DUPE	DUPE
VOLATILE ORGANICS (PPB)											
CHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–
BROMOMETHANE	–	–	–	–	–	–	–	–	–	–	–
VINLY CHLORIDE	–	–	–	–	–	–	–	–	–	–	–
CHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–
METHYLENE CHLORIDE	26 BJ*	32 R*	44 B	38 BJ*	30 R*	40 R*	28 R*	38 N*	60 BJ*	25 BJ*	21 N*
ACETONE	58 BJ*	30 BJ*	57 R*	160 EB*	70 BJ*	82 BJ*	62 BJ*	16 N*	70 BJ*	140 BJ*	130 BJ*
CARBON DISULFIDE	–	–	–	–	–	–	–	–	–	–	–
1,1–DICHLOROETHENE	–	–	–	–	–	–	–	–	–	–	–
1,1–DICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–
1,2–DICHLOROETHENE (total)	–	–	–	–	–	–	–	–	–	–	–
CHLOROFORM	–	–	–	–	–	–	–	–	–	–	–
1,2–DICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–
2–BUTANONE	–	–	–	–	–	–	–	–	–	–	–
1,1,1–TRICHLOROETHANE	–	–	–	–	–	4 J	–	–	–	–	–
CARBON TETRACHLORIDE	–	–	–	–	–	–	–	–	–	–	–
VINYL ACETATE	–	–	–	–	–	–	–	–	–	–	–
BROMODICHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–
1,2–DICHLOROPROPANE	–	–	–	–	–	–	–	–	–	–	–
cis–1,3–DICHLOROPROPENE	–	–	–	–	–	–	–	–	–	–	–
TRICHLOROETHENE	–	–	2 J	–	–	–	–	–	–	2 J	–
DIBROMOCHLOROMETHANE	–	–	–	–	–	–	–	–	–	–	–
1,1,2–TRICHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–
BENZENE	–	–	–	–	–	–	–	–	–	–	–

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

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N/A – NOT ANALYZED FOR THIS COMPOUND

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25a

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 6 OF 6

SAMPLE IDENTIFICATION:	SB55-04	SB60-02	SB72-01	SB72-04	SB73-02	SB73-04	SB73-04	SB77-03	SB84-05	SB91-01	SB91-04
SAMPLE DEPTH BELOW GRADE (FT)	6-8	2-4	0-2	6-8	2-4	6-8	DUPE	4-6	8-10	DUPE	DUPE
VOLATILE ORGANICS (PPB) (CONTINUED)											
trans-1,3-DICHLOROPROPENE	-	-	-	-	-	-	-	-	-	-	-
BROMOFORM	-	-	-	-	-	-	-	-	-	-	-
4-METHYL1-2-PENTANONE	-	-	-	-	-	-	-	-	-	-	-
2-HEXANONE	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHENE	-	-	3 J	4 J	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	-	-	2 J	2 J	-	-	-	-	-	-	-
CHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	-	-	-	-	-	-	-	-	-	-	-
STYRENE	-	-	-	-	-	-	-	-	-	-	-
XYLENE (total)	-	-	-	-	-	-	-	-	-	-	-
DIETHYL ETHER	-	-	-	-	-	-	-	-	-	-	-
TPH	N/A	N/A	18000	69000	N/A	3400J	4000	N/A	3300J	-	-
TOTAL VOCs	84	30	51	204	70	86	62	0	130	167	130

B - QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.

J - QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N - QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R - DATA IS REJECTED DUE TO HOLDING TIMES EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* - INDICATES QUALIFIER PLACED BY TRC-ECI.

N/A - NOT ANALYZED FOR THIS COMPOUND

'-' - NOT DETECTED TO THE REPORTED DETECTION LIMIT

TPH - TOTAL PETROLEUM HYDROCARBONS

TABLE 25b

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 1 OF 6

SAMPLE IDENTIFICATION:	SB01-02	SB02-02	SB03-02	SB04-03	SB05-02	SB06-02	SB07-03	SB13-03	SB20-04	SB22-05	SB24-03	SB27-02	SB29-01	SB29-01	SB29-04
SAMPLE DEPTH BELOW GRADE (FT):	2-4	2-4	2-4	4-6	2-4	2-4	4-6	4-6	6-8	8-10	4-6	2-4	0-2	DUPE	6-8
BASE NEUTRAL / ACIDS (PPB)															
PHENOL	–	–	–	–	–	–	–	160 J	120 J	–	–	–	–	190 JB	–
bis(2-CHLOROETHYL)ETHER	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2-CHLOROPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,3-DICHLOROBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,4-DICHLORBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BENZYL ALCOHOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,2-DICHLOROBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2-METHYLPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
bis(2-CHLOROISOPROPYL)ETHER	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-METHYLPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N-NITROSO-DI-N-PROPYLAMINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
HEXACHLOROETHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NITROBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ISOPHORONE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2-NITROPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4-DIMETHYLPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BENZOIC ACID	360 JB	–	–	–	–	–	–	380 JB	–	–	–	240 BJ*	–	59 J	–
bis(2-CHLOROETHOXY)METHANE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4-DICHLOROPHENOL	–	–	–	–	–	–	–	–	–	–	87 J	49 J	–	–	–
1,2,4-TRICHLOROBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NAPHTHALENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-CHLOROANILINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
HEXACHLOROBUTADIENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-CHLORO-3-METHYLPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4,6-TRICHLOROPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4,5-TRICHLOROPHENOL	–	–	–	–	–	–	–	–	–	–	130 J	–	–	–	–
2-CHLORONAPHTHALENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2-NITROANILINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DIMETHYLPHTHALATE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ACENAPHTHYLENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,6-DINITROTOLUENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3-NITROANILINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

– QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATESPOSSIBLE / PROBABLE CONTAMINATION.
– QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
– QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
– DATA IS REJECTED DUE TO HOLDING TIMES EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
– INDICATES QUALIFIER PLACED BY TRC-ECI.
/A – NOT ANALYZED FOR THIS COMPOUND
-' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25b

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI–VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 2 OF 6

SAMPLE IDENTIFICATION:	SB01–02	SB02–02	SB03–02	SB04–03	SB05–02	SB06–02	SB07–03	SB13–03	SB20–04	SB22–05	SB24–03	SB27–02	SB29–01	SB29–01	SB29–04
SAMPLE DEPTH BELOW GRADE (FT):	2–4	2–4	2–4	4–6	2–4	2–4	4–6	4–6	6–8	8–10	4–6	2–4	0–2	DUPE	6–8
BASE NEUTRAL / ACIDS (PPB) (CONTINUED)															
ACENAPHTHENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4–DINITROPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4–NITROPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DIBENZOFURAN	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4–DINITROTOLUENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DIETHYLPHTHALATE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4–CHLOROPHENYL–PHENYLETHER	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
FLUORENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4–NITROANILINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4,6–DINITRO–2–METHYLPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N–NITROSODIPHENYLAMINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4–BROMOPHENYL–PHENYLETHER	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
HEXACHLOROBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
PENTACHLOROPHENOL	–	–	–	–	–	–	–	85 J	–	–	–	180 JB	130 J	140 J	–
PHENANTHRENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ANTHRACENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DI–N–BUTYLPHTHALATE	1000 R*	–	–	52 N*	49 R*	–	890 R*	280 R*	410 R*	52 R*	1600 R*	730 B	110 J	130 J	50 J
FLUORANTHENE	–	–	–	–	–	–	–	–	–	–	–	–	44 J	40 J	–
PYRENE	–	–	–	–	–	–	–	–	–	–	–	81 J	50 J	42 J	–
BUTYLBENZYLPHTHALATE	–	–	–	–	–	–	–	–	–	–	–	100 J	–	–	–
BENZO(a)ANTHRACENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CHRYSENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
bis(2–ETHYLHEXYL)PHTHALATE	170 JB	–	–	160 J	–	–	260 JB	270 JB	–	–	–	240 JB	62 J	110 J	180 J
BENZO(b)FLUORANTHENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BENZO(k)FLUORANTHENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BENZO(a)PYRENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
INDENO(1,2,3–cd)PYRENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
BENZO(g,h,i)PERYLENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL caPAH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATESPOSSIBLE / PROBABLE CONTAMINATION.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
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N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25b

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 3 OF 6

SAMPLE IDENTIFICATION:	SB32-04	SB39-04	SB40-02	SB40-05	SB41-02	SB42-01	SB42-04	SB42-05	SB44-01	SB44-02	SB45-02	SB45-03	SB46-01	SB46-04	SB47-04
SAMPLE DEPTH BELOW GRADE (FT)	6-8	6-8	2-4	8-10	2-4	0-2	6-8	8-10	0-2	2-4	2-4	6-8	0-2	6-8	6-8
BASE NEUTRAL / ACIDS (PPB)															
PHENOL	-	-	65 J	-	-	-	-	-	46 J	-	44 N*	43 N*	-	-	-
bis(2-CHLOROETHYL)ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	-	-	47 J	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLORBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL ALCOHOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLPHENOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-CHLOROISOPROPYL)ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-METHYLPHENOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-NITROSO-DI-N-PROPYLAMINE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ISOPHORONE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-NITROPHENOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZOIC ACID	-	-	95 J	-	-	150 J	-	-	88 J	-	-	-	-	-	-
bis(2-CHLOROETHOXY)METHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DICHLOROPHENOL	-	78 J	-	-	-	-	-	-	-	-	-	-	-	-	110 J
1,2,4-TRICHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	-	-	-	-	-	-	-	-	130 J	-	-	-	-	-	-
4-CHLOROANILINE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXACHLOROBUTADIENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-CHLORO-3-METHYLPHENOL	-	-	-	-	-	-	-	-	-	39 J	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	-	160 J	40 J	-	-	-	-	-	-	36 J	-	-	-	-	200 J
2-CHLORONAPHTHALENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-NITROANILINE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYLPHTHALATE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACENAPHTHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,6-DINITROTOLUENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-NITROANILINE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B - QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATESPOSSIBLE / PROBABLE CONTAMINATION.

J - QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.

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N/A - NOT ANALYZED FOR THIS COMPOUND

'-' - NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25b

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 4 OF 6

SAMPLE IDENTIFICATION:	SB32-04	SB39-04	SB40-02	SB40-05	SB41-02	SB42-01	SB42-04	SB42-05	SB44-01	SB44-02	SB45-02	SB45-03	SB46-01	SB46-04	SB47-04
SAMPLE DEPTH BELOW GRADE (FT)	6-8	6-8	2-4	8-10	2-4	0-2	6-8	8-10	0-2	2-4	2-4	6-8	0-2	6-8	6-8
BASE NEUTRAL / ACIDS (PPB) (CONTINUED)															
ACENAPHTHENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4-DINITROPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-NITROPHENOL	–	–	99 J	–	–	–	–	–	1000 J	–	–	–	–	–	–
DIBENZOFURAN	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2,4-DINITROTOLUENE	–	–	–	–	–	–	–	–	110 J	–	–	–	–	–	–
DIETHYLPHTHALATE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-CHLOROPHENYL-PHENYLETHEF	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
FLUORENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-NITROANILINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4,6-DINITRO-2-METHYLPHENOL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N-NITROSODIPHENYLAMINE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-BROMOPHENYL-PHENYLETHER	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
HEXACHLOROBENZENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
PENTACHLOROPHENOL	–	–	250 J	160 J	150 J	–	130 J	–	790 J	300 J	120 J	110 J	110 J	160 J	–
PHENANTHRENE	–	–	–	–	59 J	–	42 J	–	130 J	49 J	–	–	45 J	39 J	–
ANTHRACENE	–	–	–	–	–	–	–	–	84 J	–	–	–	–	–	–
DI-N-BUTYLPHTHALATE	1200	71 R*	300 JB*	76 JB	67 JB	200 JB	59 JB	880	300 JB	140 JB	72 J	58 J	120 JB	58 JB	85 N*
FLUORANTHENE	–	–	–	50 J	78 J	–	62 J	–	290 J	78 J	37 J	–	71 J	52 J	–
PYRENE	–	39 J	59 JB*	100 JB	120 JB	–	110 JB	–	350 JB	140 JB	42 J	–	100 JB	95 JB	–
BUTYLBENZYLPHTHALATE	–	–	–	–	–	–	–	–	120 J	–	–	–	–	–	–
BENZO(a)ANTHRACENE	–	–	36 J	39 J	53 J	–	46 J	–	420	52 J	–	–	–	46 J	–
CHRYSENE	–	–	–	–	39 J	–	38 J	–	580	46 J	–	–	–	40 J	–
bis(2-ETHYLHEXYL)PHTHALATE	–	–	48 J	–	100 J	–	–	–	250 J	–	–	37 J	71 J	–	–
BENZO(b)FLUORANTHENE	240 JB	–	40 J	–	–	–	–	–	350 J	–	–	–	–	–	–
BENZO(k)FLUORANTHENE	–	–	51 J	–	–	–	–	–	160 J	–	–	–	–	–	–
BENZO(a)PYRENE	–	–	44 J	–	–	–	–	–	740	–	–	–	–	–	–
INDENO(1,2,3-cd)PYRENE	–	–	37 J	–	–	–	–	–	380 J	–	–	–	–	–	–
BENZO(g,h,i)PERYLENE	–	–	59 J	–	–	–	–	–	1100	–	–	–	–	–	–
TOTAL caPAH	240	0	208	39	92	0	84	0	2630	98	0	0	0	86	0

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATESPOSSIBLE / PROBABLE CONTAMINATION.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIMES EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC-ECI.
N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25b

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI–VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 5 OF 6

SAMPLE IDENTIFICATION:	SB55–04	SB60–02	SB72–01	SB72–04	SB73–02	SB73–04	SB73–04	SB77–03	SB84–05
SAMPLE DEPTH BELOW GRADE (FT):	6–8	2–4	0–2	6–8	2–4	6–8	DUPE	4–6	8–10
** BASE NEUTRAL / ACIDS (PPB) **									
PHENOL	–	–	–	–	–	–	–	–	–
bis(2–CHLOROETHYL)ETHER	–	–	–	–	–	–	–	–	–
2–CHLOROPHENOL	–	–	–	–	–	–	–	–	–
1,3–DICHLOROBENZENE	–	–	–	–	–	–	–	–	–
1,4–DICHLORBENZENE	–	–	–	–	–	–	–	–	–
BENZYL ALCOHOL	–	–	–	–	–	–	–	–	–
1,2–DICHLOROBENZENE	–	–	–	–	–	–	–	–	–
2–METHYLPHENOL	–	–	–	–	–	–	–	–	–
bis(2–CHLOROISOPROPYL)ETHER	–	–	–	–	–	–	–	–	–
4–METHYLPHENOL	–	–	–	–	–	–	–	–	–
N–NITROSO–DI–N–PROPYLAMINE	–	–	–	–	–	–	–	–	–
HEXACHLOROETHANE	–	–	–	–	–	–	–	–	–
NITROBENZENE	–	–	–	–	–	–	–	–	–
ISOPHORONE	–	–	–	–	–	–	–	–	–
2–NITROPHENOL	–	–	–	–	–	–	–	–	–
2,4–DIMETHYLPHENOL	–	–	–	–	–	–	–	–	–
BENZOIC ACID	180 JB*	–	–	–	–	–	–	–	–
bis(2–CHLOROETHOXY)METHANE	–	–	–	–	–	–	–	–	–
2,4–DICHLOROPHENOL	–	–	–	–	–	–	–	–	–
1,2,4–TRICHLOROBENZENE	–	–	–	–	–	–	–	–	–
NAPHTHALENE	–	–	–	–	–	–	–	–	–
4–CHLOROANILINE	–	–	–	–	–	–	–	–	–
HEXACHLOROBUTADIENE	–	–	–	–	–	–	–	–	–
4–CHLORO–3–METHYLPHENOL	–	–	–	–	–	–	–	–	–
2,4,6–TRICHLOROPHENOL	–	–	–	–	–	–	–	–	–
2,4,5–TRICHLOROPHENOL	–	–	–	–	–	–	–	–	–
2–CHLORONAPHTHALENE	–	–	–	–	–	–	–	–	–
2–NITROANILINE	–	–	–	–	–	–	–	–	–
DIMETHYLPHTHALATE	–	–	–	–	–	–	–	–	–
ACENAPHTHYLENE	–	–	–	–	–	–	–	–	–
2,6–DINITROTOLUENE	–	–	–	–	–	–	–	–	–
3–NITROANILINE	–	–	–	–	–	–	–	–	–

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATESPOSSIBLE / PROBABLE CONTAMINATION.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIMES EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDE
* – INDICATES QUALIFIER PLACED BY TRC–ECI.
N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25b

SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF SEMI–VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 6 OF 6

SAMPLE IDENTIFICATION:	SB55–04	SB60–02	SB72–01	SB72–04	SB73–02	SB73–04	SB73–04	SB77–03	SB84–05
SAMPLE DEPTH BELOW GRADE (FT):	6–8	2–4	0–2	6–8	2–4	6–8	DUPE	4–6	8–10
** BASE NEUTRAL / ACIDS (PPB) ** (CONTINUED)									
ACENAPHTHENE	–	–	–	–	–	–	–	–	–
2,4–DINITROPHENOL	–	–	–	–	–	–	–	–	–
4–NITROPHENOL	–	–	–	–	–	–	–	–	–
DIBENZOFURAN	–	–	–	–	–	–	–	–	–
2,4–DINITROTOLUENE	–	–	–	–	–	–	–	–	–
DIETHYLPHTHALATE	–	–	–	–	–	–	–	–	–
4–CHLOROPHENYL–PHENYLETHER	–	–	–	–	–	–	–	–	–
FLUORENE	–	–	–	–	–	–	–	–	–
4–NITROANILINE	–	–	–	–	–	–	–	–	–
4,6–DINITRO–2–METHYLPHENOL	–	–	–	–	–	–	–	–	–
N–NITROSODIPHENYLAMINE	–	–	–	–	–	–	–	–	–
4–BROMOPHENYL–PHENYLETHER	–	–	–	–	–	–	–	–	–
HEXACHLOROBENZENE	–	–	–	–	–	–	–	–	–
PENTACHLOROPHENOL	370 JB	–	–	170 J	–	–	–	–	–
PHENANTHRENE	–	–	77 J	160 J	–	–	–	–	46 J
ANTHRACENE	–	–	–	55 J	–	–	–	–	–
DI–N–BUTYLPHTHALATE	870 B	830	–	120 JB	100 JB	57 JB	200 JB	–	–
FLUORANTHENE	–	–	110 J	240 J	–	–	–	–	56 J
PYRENE	73 J	–	140 JB	250 JB	–	–	–	–	60 J
BUTYLBENZYLPHTHALATE	77 J	–	–	–	–	–	–	–	–
BENZO(a)ANTHRACENE	–	–	–	130 J	–	–	–	–	–
CHRYSENE	–	–	73 J	130 J	–	–	–	–	–
bis(2–ETHYLHEXYL)PHTHALATE	950 B	–	–	88 J	–	–	–	–	–
BENZO(b)FLUORANTHENE	–	–	47 J	61 J	–	–	–	–	–
BENZO(k)FLUORANTHENE	–	–	–	75 J	–	–	–	–	–
BENZO(a)PYRENE	–	–	–	66 J	–	–	–	–	–
INDENO(1,2,3–cd)PYRENE	–	–	–	–	–	–	–	–	–
BENZO(g,h,l)PERYLENE	–	–	–	–	–	–	–	–	–
TOTAL caPAH	0	0	120	332	0	0	0	0	0

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIMES EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC–ECI.
N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25c
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF PESTICIDE/PCBs DETECTED IN SOIL BORING SAMPLES
PAGE 1 OF 2

SAMPLE IDENTIFICATION:	SB01-02	SB05-02	SB07-03	SB13-03	SB20-01	SB20-04	SB22-05	SB24-03	SB27-02	SB30-01	SB30-04	SB31-01	SB31-04	SB32-01	SB32-04
SAMPLE DEPTH BELOW GRADE	2-4	2-4	4-6	4-6	0-2	6-8	8-10	4-6	2-4	0-2	6-8	0-2	6-8	0-2	6-8
PESTICIDES/PCB'S (PPB)															
ALPHA-BHC	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
BETA-BHC	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
DELTA-BHC	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
GAMMA-BHC(LINDANE)	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
HEPTACHLOR	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
ALDRIN	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
HEPTACHLOR EPOXIDE	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
ENDOSULFAN I	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
DIELDRIN	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
4,4-DDE	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
ENDRIN	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
ENDOSULFAN II	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
4,4-DDD	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
ENDOSULFAN SULFATE	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
4,4-DDT	-	-	9.3 J	9.8 J	NA	26000	31000	-	-	NA	NA	NA	NA	NA	-
METHOXYCHLOR	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
ENDRIN KETONE	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
ALPHA-CHLORDANE	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
GAMMA-CHLORDANE	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
TOXAPHENE	-	-	-	-	NA	-	-	-	-	NA	NA	NA	NA	NA	-
AROCLOR-1016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1221	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1232	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1248	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1254	-	-	-	-	-	-	-	-	-	-	-	13 J	-	130	-
AROCLOR-1260	-	-	-	-	22 J	-	-	-	-	-	-	-	-	-	-

J - QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
NA - NOT ANALYZED
'-' - NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25c
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF PESTICIDE/PCBs DETECTED IN SOIL BORING SAMPLES
PAGE 2 OF 2

SAMPLE IDENTIFICATION:	SB33-01	SB33-04	SB34-01	SB34-04	SB94-04	SB35-01	SB35-04	SB39-04	SB42-05	SB47-04	SB55-04	SB60-02	SB73-04	SB77-03	SB84-05
SAMPLE DEPTH BELOW GRADE	0-2	6-8	0-2	6-8	DUP SB34	0-2	6-8	6-8	8-10	6-8	6-8	2-4	6-8	4-6	8-10
PESTICIDES/PCB'S (PPB)															
ALPHA-BHC	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
BETA-BHC	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
DELTA-BHC	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
GAMMA-BHC(LINDANE)	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
HEPTACHLOR	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
ALDRIN	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
HEPTACHLOR EPOXIDE	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
ENDOSULFAN I	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
DIELDRIN	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
4,4-DDE	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
ENDRIN	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
ENDOSULFAN II	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
4,4-DDD	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
ENDOSULFAN SULFATE	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
4,4-DDT	NA	NA	NA	NA	NA	NA	NA	20	-	-	-	-	37000	-	-
METHOXYCHLOR	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
ENDRIN KETONE	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
TOXAPHENE	NA	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-
AROCLOR-1016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1221	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1232	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1248	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1254	16 J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AROCLOR-1260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28 J

J - QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS AN ESTIMATE.
NA - NOT ANALYZED
'-' - NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 1 OF 10

SAMPLE IDENTIFICATION:	SB01-02	SB05-02	SB07-01	SB07-03	SB08-01	SB08-01	SB08-02	SB09-01	SB09-02	SB10-01	SB10-03	SB11-01	SB11-02	SB12-03
SAMPLE DEPTH BELOW GRADE (FT)	2-4	2-4	0-2	4-6	0-2	DUPE	2-4	0-2	2-4	0-2	4-6	0-2	2-4	4-6
INORGANICS (PPM)														
SILVER, TOTAL	–	–	–	–	–	–	–	–	–	2 B	–	–	–	–
ALUMINUM, TOTAL	459	927	2090	1590	5360	3220	3510	4550	3980	4360	1070	6400	1690	3330
ARSENIC, TOTAL	–	0.78 B	–	–	1.4 B	0.87 B	0.81 B	0.7 B	1.6 B	0.78 B	0.96 B	0.71 B	–	1.2 B
BARIUM, TOTAL	3.9 B	8.3 B	9.1 B	6.3 B	13 B	18.4 B	12.7 B	19.4 B	20.7 B	14.7 B	4.9 B	27.9 B	8.8 B	15.9 B
BERYLLIUM, TOTAL	–	0.47 B	0.66 B	0.76 B	2.1	3.2	1 B	1.6	7.2	–	–	–	–	4.5
CALCIUM, TOTAL	284 B	237 B	65.7 B	113 B	4950	1270	274 B	95.5 B	1150	84.8 B	35.1 B	129 B	–	1520
CADMIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
COBALT, TOTAL	–	–	–	–	–	1.7 B	–	1.7 B	4.7 B	1.5 B	–	–	–	3 B
CHROMIUM, TOTAL	1.1 B	16.2	3.3	3.8	30.8	27.7	6.5	178	375	3.9	1.7 B	5.2	4.9	18.1
CHROMIUM VI	–	–	0.15	–	–	–	–	22.8 +	41.7 +	–	–	–	–	0.25
COPPER, TOTAL	–	2.2 B	1.7 B	1.8 B	2.3 B	5.2	2.1 B	3.1 B	8.8	2.1 B	1.9 B	–	1.5 B	7.3
CYANIDE, TOTAL	–R*	–R*	–R*	–R*	–	–	–	–	–	–	–	–	–	–
IRON, TOTAL	405	1240	2460	2400	2200	5180	4300	4440	8860	4330	2480	6000	2840	5800
MERCURY, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
POTASSIUM, TOTAL	–	–	235 B	–	–	–	391 B	655 B	539 B	291 B	–	–	–	319 B
MAGNESIUM, TOTAL	82.2 B	154 B	305 B	316 B	2440	1440	410 B	554 B	2160	178 B	79.5 B	421 B	105 B	594 B
MANGANESE, TOTAL	2.6 B	40.5	11	15.6	92.9	142	32.3	36.8	441	22.7	17.6	20.2	15.9	65.6
SODIUM, TOTAL	46.1 B	53.7	44.5	41.4 B	103 B	142 B	101 B	188 B	216 B	185 B	112 B	–	–	55.8 B
NICKEL, TOTAL	–	10.9	–	3.9 B	11.6	73.7	3.9 B	11	245	–	–	2.8 B	2.9 B	81.9
LEAD, TOTAL	3.5	4	3.5	2.5	9.3	14.9	3.2	3.4	33.9	4.5	2.2	5.8	1.2	20.1
ANTIMONY, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SELENIUM, TOTAL	–	–	–	–	–	–	–	–	0.47 B	–	–	0.55 B	–	–
THALLIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	4.9 B	105	128	145	435	472	182	324	1630	10.2 B	6.5 B	7.4 B	2.7 B	903
ZINC, TOTAL	25.3	6.3	7.7	9.4	9.2	20.2	8.1	8.7	40	8.8	3.3	5.4	2.3 B	29.9
BORON	–	–	–	–	–	–	–	–	29.1	N/A	N/A	N/A	N/A	N/A
NIOBIUM	–	–	–	–	–	–	–	–	–	N/A	N/A	N/A	N/A	N/A
STRONTIUM	–	–	–	–	–	–	–	–	–	N/A	N/A	N/A	N/A	N/A
TITANIUM	32.5	35.9	85.2	85.8	85.2	94.5	168	121	98.1	N/A	N/A	N/A	N/A	N/A
ZIRCONIUM	–	–	N/A	–	–	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	51.7	–	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.
J – QUALIFIER INDICATES THE SAMPLE WAS ANALYZED DURING THE TEN DAY HOLDING TIME BUFFER PERIOD.
R – QUALIFIER INDICATES THAT THE HOLDING TIME WAS EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC-ECI.
+ – INDICATES Cr+6 DATA BY LEACH METHOD
N/A – NOT ANALYZED
'–' – INDICATES THE PARAMETER WAS NOT DETECTED TO THE REPORTED DETECTION LIMIT
CRDL – CONTRACT REQUIRED DETECTION LIMITS.
IDL – INSTRUMENT DETECTION LIMIT.

TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 2 OF 10

SAMPLE IDENTIFICATION:	SB13-01	SB13-03	SB14-01	SB14-01	SB14-02	SB15-01	SB15-02	SB16-03	SB17-01	SB17-02	SB18-01	SB18-01	SB18-02	SB19-03	SB20-01
SAMPLE DEPTH BELOW GRADE (FT):	0-2	4-6	0-2	DUPE	2-4	0-2	2-4	4-6	0-2	2-4	0-2	DUPE	2-4	4-6	0-2
INORGANICS (PPM)															
SILVER, TOTAL	–	–	–	2.1	1.3 B	–	2.1	–	1.3 B	1.5 B	2.2	1.9 B	2 B	–	–
ALUMINUM, TOTAL	9000	2140	2290	3140	749	5190	1920	1410	1720	1620	7440	6750	4940	3830	7950
ARSENIC, TOTAL	1.5 B	1 B	1.1 B	0.75 B	–	1.7 B	0.79 B	0.5 B	1.6 B	0.48 B	1.3 B	1.5 B	1.7 B	1 B	4.7
BARIUM, TOTAL	110	21.7 B	6.9 B	6.4 B	2.9 B	39.6 B	5.8 B	3.7 B	8.1 B	7.4 B	37.3 B	113	24.1 B	26.4 B	152
BERYLLIUM, TOTAL	2	1.2	0.25 B	0.25 B	–	1 B	–	–	1	0.26 B	0.38 B	3.5	0.21 B	1.1	5.7
CALCIUM, TOTAL	2560	364 B	80.2 B	55.9 B	37.3 B	706 B	61.5 B	–	297 B	32.3 B	81.6 B	4350	80.2 B	327 B	13100
CADMIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.7
COBALT, TOTAL	4.7 B	2.7 B	–	–	–	2.5 B	–	–	–	–	1.9 B	2.4 B	3.4 B	2.5 B	9.7 B
CHROMIUM, TOTAL	32.4	98.6	2.3	1.1 B	3.2	29.7	3.8	1.6 B	11.5	2.6	7.2	29.3	4.7	31.8	143
CHROMIUM VI	–	–	–	–	–	–	–	–	–	–	0.27	–	–	–	0.15 +
COPPER, TOTAL	12.2	17.8	2.4 B	2.9 B	1.3 B	7.5	1.6 B	–	4.8 B	1.5 B	4.2 B	11.1	2.8 B	5.3	342
CYANIDE, TOTAL	–R*	–R*	–	–	–	–	–	–	–	–	–	–	–	–	–R*
IRON, TOTAL	8170	3480	7400	10800	1110	7030	2580	2700	2200	2300	7620	8580	5240	5970	18900
MERCURY, TOTAL	–	–	–	–	–	–	–	–	0.08	–	–	–	–	–	–
POTASSIUM, TOTAL	230 B	–	–	–	–	325 B	–	–	220 B	190 B	1180	382 B	778 B	–	556 B
MAGNESIUM, TOTAL	1090	182 B	134 B	134 B	58.9 B	654 B	121 B	65.6 B	1200	165 B	533 B	4210	378 B	342 B	4070
MANGANESE, TOTAL	547	135	24.5	20.3	5.6	56.5	9.9	7	62.3	6.3	24.2	342	43.9	458	1510
SODIUM, TOTAL	76.1 B	65.1 B	86.2 B	101 B	87.5 B	159 B	115 B	39.4 B	223 B	164 B	479 B	264 B	329 B	38.7 B	206 B
NICKEL, TOTAL	94.4	44.2	3 B	–	–	13.6	–	–	13.4	–	3.8 B	64.2	3 B	17.6	322
LEAD, TOTAL	2.04	2.31	4.8	3.2	1.7	14.8	2.2	0.78 B	25.9	0.58	4.6	55.8	3.4	3.5	3.62
ANTIMONY, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SELENIUM, TOTAL	–	–	–	–	–	0.51 B	–	–	–	–	–	–	–	–	–
THALLIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	417	229	19.2	9.1 B	8.9 B	139	16.2	2.9 B	153	21.7	24.8	517	14.8	245	1160
ZINC, TOTAL	75	35.5	3.8 B	3.7 B	4.2	49.6	1.8 B	2.3 B	25.5	1.7 B	5.7	53.7	4 B	20.4	59.8
BORON	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
NIOBIUM	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
STRONTIUM	22.5	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	110
TITANIUM	200	125	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	341
ZIRCONIUM	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL
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N/A – NOT ANALYZED
'–' – INDICATES THE PARAMETER WAS NOT DETECTED TO THE REPORTED DETECTION LIMIT
CRDL – CONTRACT REQUIRED DETECTION LIMITS.
IDL – INSTRUMENT DETECTION LIMIT.

TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 3 OF 10

SAMPLE IDENTIFICATION:	SB20-04	SB21-01	SB21-04	SB22-01	SB22-04	SB22-05	SB23-01	SB23-01	SB23-05	SB24-03	SB25-01	SB25-01	SB25-04	SB26-01
SAMPLE DEPTH BELOW GRADE (FT):	6-8	0-2	6-8	0-2	6-8	8-10	0-2	DUPE	8-10	4-6	0-2	DUPE	6-8	0-2
INORGANICS (PPM)											P		P	
SILVER, TOTAL	–	–	–	–	–	N/A	–	–	–	–	–	–	–	–
ALUMINUM, TOTAL	3030	10400	6700	6030	2800	N/A	3050	6000	2770	3000	24400	2000	86300	6040
ARSENIC, TOTAL	–	1.2 B	–	1.1 B	–	N/A	0.57 B	0.65 B	1.8 B	0.8 B	–	0.51 B	–	1.1 B
BARIUM, TOTAL	10.4 B	71.8	15.5 B	44.4	8 B	N/A	21.5 B	18.5 B	21.0 B	8.5 B	88.7	4.7 B	452	28.4 B
BERYLLIUM, TOTAL	0.23 B	7.7	–	0.59 B	–	N/A	0.68 B	0.29 B	4.1	0.24 B	14	0.11 B	18.3	0.25 B
CALCIUM, TOTAL	50.4 B	7690	46.6 B	269 B	–	N/A	268 B	145 B	908 B	70.1 B	25000	37.6 B	106000	1930
CADMIUM, TOTAL	–	–	–	–	–	N/A	–	–	–	–	–	–	–	–
COBALT, TOTAL	2.8 B	10 B	3.3 B	2.6 B	1.8 B	N/A	–	1.45	3.7 B	5 B	–	–	–	–
CHROMIUM, TOTAL	–	162	4	32.7	3.6	N/A	31.4	51	834	3.5	46.9	1.2 B	83.1	10.1
CHROMIUM VI	–	0.84 +	–	0.66	–	N/A	3	–	0.28 +	–	–	–	–	–
COPPER, TOTAL	3.8 B	49.4	3.9 B	3.6 B	2.9 B	N/A	3 B	3.4 B	4.8 B	3.3 B	12.2	–	12.9	1.5 B
CYANIDE, TOTAL	–R*	–	–	–R*	R*	N/A	–	–	–	–R*	–	–	–	–
IRON, TOTAL	12900	15000	12100	7610	5520	N/A	7390	8700	9090	7510	3340	4520	2600	5410
MERCURY, TOTAL	–	–	–	–	–	N/A	0.09	–	0.07	–	0.12	0.1	0.1	–
POTASSIUM, TOTAL	–	389 B	216 B	375 B	–	N/A	320 B	499 B	652 B	–	–	–	–	206 B
MAGNESIUM, TOTAL	70 B	6330	296 B	640 B	33 B	N/A	547 B	672 B	503 B	131 B	10600	32.2 B	50900	754 B
MANGANESE, TOTAL	24.8	3150	37.6	85.7	10.8	N/A	62.4	31.2	348	203	49.1	6.8	217	25.3
SODIUM, TOTAL	34 B	195 B	80 B	332 B	40.8 B	N/A	284 B	295 B	321 B	81.7 B	–	–	1540	505 B
NICKEL, TOTAL	2.5 B	463	5 B	11.4	–	N/A	12.5	6.3 B	3.8 B	–	210	–	214	2.0 B
LEAD, TOTAL	–	68.3	3.9	4.1	5.8	N/A	8.4 B	12.9	54.2	5	68.7	2.7	110	6
ANTIMONY, TOTAL	–	–	–	–	–	N/A	–	6.7 B	8.4 B	4.7 B	–	–	–	–
SELENIUM, TOTAL	–	–	–	–	–	N/A	–	–	–	–	–	–	–	–
THALLIUM, TOTAL	–	–	–	–	–	N/A	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	2.4 B	1810	11.1	82.9	5.1 B	N/A	93.8	27.2	732	8.6 B	2780	–	3660	14.1
ZINC, TOTAL	8.5	286	5.7	23.7	34.3	N/A	9	5	79.6	10.3	20.4	3.9 B	92.7	9.7
BORON	–	N/A	N/A	–	–	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A
NIOBIUM	–	N/A	N/A	–	–	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A
STRONTIUI	–	N/A	N/A	–	–	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A
TITANIUM	74.6	N/A	N/A	133	82.1	N/A	N/A	N/A	N/A	103	N/A	N/A	N/A	N/A
ZIRCONIUM	–	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A
SULFATE	N/A	N/A	N/A	55.7	–	N/A	N/A	N/A	N/A	83.9	N/A	N/A	N/A	N/A

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TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 4 OF 10

SAMPLE IDENTIFICATION:	SB26-04	SB27-02	SB27-04	SB28-01	SB28-04	SB29-01	SB29-01	SB29-04	SB30-01	SB30-04	SB31-01	SB31-04	SB32-01	SB32-04
SAMPLE DEPTH BELOW GRADE (FT):	6-8	2-4	6-8	0-2	6-8	0-2	DUPE	6-8	0-2	6-8	0-2	6-8	0-2	6-8
INORGANICS (PPM)														
SILVER, TOTAL	–	–	–	–	–	–	1.5 B	–	–	1.4 B	–	–	–	2.1
ALUMINUM, TOTAL	2180	12000	2290	104000	1750	8980	6390	7810	6900	12500	6620	687	3890	3080
ARSENIC, TOTAL	0.49 B	0.93 B	0.58 B	2.6 B	0.69 B	0.58 B	0.92 B	0.55 B	1 B	–	0.86 B	–	1.1 B	–
BARIUM, TOTAL	8.3 B	26.8 B	12.8 B	228	4.6 B	12.4 B	10.9 B	20.6 B	39.9 B	13.3 B	26.1 B	2.6 B	30.8 B	12.3 B
BERYLLIUM, TOTAL	0.16 B	0.51 B	0.28 B	19.2	0.19 B	0.59 B	0.41 B	0.3 B	1.4	0.41 B	0.68 B	–	7.8	–
CALCIUM, TOTAL	36.5 B	76 B	66.5 B	115000	427 B	680 B	1370	157 B	1690	135 B	1670	26.1 B	1010 B	63.2 B
CADMIUM, TOTAL	–	–	–	–	–	–	–	–	0.92 B	–	–	–	–	–
COBALT, TOTAL	1.5 B	4.9 B	–	3.3 B	1.6 B	5.2 B	2 B	2.8 B	5.7 B	10.9 B	3.2 B	2.5 B	3.3 B	4 B
CHROMIUM, TOTAL	1.6 B	7.5 B	2.6	127	5.9	13	7.2	3.5	2280	–	783	11.3	1100	–
CHROMIUM VI	–	–	–	– +	0.13	N/A	N/A	N/A	1.3 +	–	0.64 +	0.22	0.79 +	–
COPPER, TOTAL	1.5 B	3.7 B	1.5 B	33.6	1.5 B	7.5	6.9	6.9	10.8	11.7	6.7	–	13.1	2.6 B
CYANIDE, TOTAL	–	–R*	–R*	–	–	–	–	–	–	–	–	–	–	–
IRON, TOTAL	4290	21600	2990	1670	4770	26400	11600	18400	13400	46800	10900	2580	8210	6290
MERCURY, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
POTASSIUM, TOTAL	–	450 B	189 B	–	–	773 B	561 B	679 B	426 B	–	653 B	–	285 B	–
MAGNESIUM, TOTAL	35.7 B	525 B	111 B	43000	195 B	296 B	360 B	149 B	720 B	233 B	572 B	22.6 B	707 B	98 B
MANGANESE, TOTAL	28.3	49.9	11	113	15.1	120	107	36.1	1240	70.6	163	21.9	565	25.2
SODIUM, TOTAL	211 B	161 B	119 B	1020	271 B	26.3 B	102 B	65.5 B	96.1 B	101 B	101 B	38 B	268 B	120 B
NICKEL, TOTAL	–	7 B	2.9 B	469	1.5 B	5.1 B	4.5 B	3.5 B	24	3.7 B	7.4 B	–	108	–
LEAD, TOTAL	1.2	4.9 B	2.8	70.4	1.8	11.3	8.6	5.9	43	4.3 B	57.2	0.95 B	331	2.8
ANTIMONY, TOTAL	–	–	5.8 B	–	–	–	–	–	39.5	–	16.8	–	–	–
SELENIUM, TOTAL	–	–	–	5.1	–	–	–	–	–	–	–	–	–	–
THALLIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	–	21.2	35.9	3630	16.7	48.9	28.7	15.9	262	13.8	109	12.6	1190	8.4 B
ZINC, TOTAL	6.8	12.5	2.7 B	49.1	5.5	10.8	5.8	5.4	75	7.5	30.5	4.4	243	1.6 B
BORON	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
NIOBIUM	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
STRONTIUM	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
TITANIUM	N/A	241	N/A	N/A	N/A	160	113	140	N/A	N/A	N/A	N/A	N/A	78.6
ZIRCONIUM	N/A	1120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
SULFATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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N/A – NOT ANALYZED
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TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 5 OF 10

SAMPLE IDENTIFICATION:	SB33-01	SB33-04	SB34-01	SB34-04	SB34-04	SB35-01	SB35-04	SB36-01	SB36-04	SB37-01	SB37-04	SB38-01	SB38-04	SB39-01
SAMPLE DEPTH BELOW GRADE (FT):	0-2	6-8	0-2	6-8	DUPE	0-2	6-8	0-2	6-8	0-2	6-8	0-2	6-8	0-2
INORGANICS (PPM)														
SILVER, TOTAL	2.3	2.1 B	–	–	–	–	–	–	–	–	–	–	–	–
ALUMINUM, TOTAL	4910	4080	4470	5210	5510	3040	2470	5290	3720	5660	2040	3550	1610	1990
ARSENIC, TOTAL	1.1 B	–	1.2 B	–	–	0.6 B	–	1.2 B	0.77 B	0.76 B	0.63 B	0.65 B	–	0.53 B
BARIUM, TOTAL	26.3 B	12.8 B	33.7 B	9.9 B	8.1 B	7.5 B	5.4 B	99.6	21.4 B	8.3 B	2.8 B	9.2 B	4.3 B	16.7 B
BERYLLIUM, TOTAL	1.1	–	–	–	0.27 B	0.24 B	–	6.3	0.37 B	2.7	–	–	0.34 B	1.6
CALCIUM, TOTAL	891 B	–	1250	40.5 B	58.8 B	1610	45.2 B	4790	121 B	1310	59 B	222 B	56.1 B	341 B
CADMIUM, TOTAL	–	–	–	–	–	–	–	0.92 B	–	–	–	–	–	–
COBALT, TOTAL	3.3 B	1.7 B	1.7 B	5.7 B	7.4 B	3.1 B	1.6 B	3.7 B	2.7 B	2.5 B	–	1.7 B	–	2.2 B
CHROMIUM, TOTAL	180	313	14.8	56.8	77.5	762	0.89 B	1630	57.5	32.7	21.6	17.4	3.9	101
CHROMIUM VI	– +	– +	–	9.1	7.7	0.19 +	–	5.6 +	8	0.18	–	–	–	0.22 +
COPPER, TOTAL	5.1 B	3.2 B	3.1 B	3.5 B	5.1 B	2.6 B	2.5 B	10.6	2.3	4.1 B	2.2 B	2.5 B	1.2 B	3.4 B
CYANIDE, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–R*
IRON, TOTAL	8480	6820	6770	18800	36100	7490	7790	5010	5320	8020	3450	5250	1730	3840
MERCURY, TOTAL	–	–	0.1	–	–	–	–	0.1	–	–	–	–	–	–
POTASSIUM, TOTAL	191 B	–	464 B	–	–	322 B	275 B	422 B	491 B	301 B	–	–	–	–
MAGNESIUM, TOTAL	683 B	69.1 B	201 B	105 B	111 B	219 B	47.2 B	2180	217 B	548 B	112 B	275 B	116 B	254 B
MANGANESE, TOTAL	236	21.6	44.6	44.3	48.1	56.3	13.3	158	33.8	33.7	10.5	37.5	9.7	192
SODIUM, TOTAL	187 B	524 B	152 B	90.1 B	34 B	56.1 B	45 B	137 B	90.3 B	66.5 B	49.8 B	32.2 B	–	30.2 B
NICKEL, TOTAL	36.4	–	–	–	–	–	–	116	2.9 B	–	–	–	–	25.4
LEAD, TOTAL	15.4	4.2	9.4	2.5	2.3	2.5	2	20.6	7	12.4 B	7.9 B	4.8	1.2	5.5
ANTIMONY, TOTAL	–	6.8 B	–	6.5 B	–	17.9	4.6 B	19.8	–	–	–	–	–	–
SELENIUM, TOTAL	–	–	–	–	–	–	–	2	–	0.47 B	–	–	0.47 B	–
THALLIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	145	9.7 B	8.2 B	5.6 B	–	28.2	–	1250	47.8	594	22.7	13.4	76.7	328
ZINC, TOTAL	14.2	1.8 B	11.4	4.5	5.3	6.7	3 B	117	7.4	7.8	3.3 B	4.9	7.8	40.1
BORON	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
NIOBIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
STRONTIUI	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
TITANIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	102
ZIRCONIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
SULFATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.
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TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 6 OF 10

SAMPLE IDENTIFICATION:	SB39-04	SB40-02	SB40-05	SB42-04	SB42-04	SB42-05	SB43-01	SB43-04	SB44-01	SB44-02	SB45-02	SB45-03	SB46-01	SB46-04	SB47-01
SAMPLE DEPTH BELOW GRADE (FT):	6-8	2-4	8-10	6-8	DUPE	8-10	0-2	6-8	0-2	2-4	2-4	4-6	0-2	6-8	0-2
INORGANICS (PPM)															
SILVER, TOTAL	–	–	–	N/A	–	2.7	3.3	–	–	–	–	–	–	–	–
ALUMINUM, TOTAL	1090	3960	257	N/A	3260	2110	4010	2130	6760	5760	3780	2270	1770	3160	7060
ARSENIC, TOTAL	–	1.2 B	–	N/A	0.55 B	–	43.1	0.71 B	1.7 B	1.9 B	1.1 B	0.62 B	1 B	0.85 B	4
BARIUM, TOTAL	4.2 B	30.2 B	–	N/A	6.2 B	3.7 B	123	9.5 B	15.8 B	26.9 B	7.8 B	4.9 B	8.7 B	11 B	59.9
BERYLLIUM, TOTAL	0.44 B	–	–	N/A	0.25 B	0.26 B	0.91 B	–	6.6	0.26 B	0.47 B	–	1.6	0.38 B	20
CALCIUM, TOTAL	61.9 B	553 B	27.8 B	N/A	76 B	112 B	1740	143 B	2340	240 B	466 B	95.7 B	1710	131 B	8460
CADMIUM, TOTAL	–	–	–	N/A	–	–	1.6	–	–	–	–	–	–	–	1.5
COBALT, TOTAL	–	–	0.95 B	N/A	2.5 B	1.6 B	32.8	2.4 B	5 B	1.8 B	–	–	–	10.2	9.5 B
CHROMIUM, TOTAL	8	3.5	–	N/A	–	1.2 B	260	4.5	97.5	5.1	57.8	5.1	6.6	–	87.3
CHROMIUM VI	0.37	N/A	–	N/A	–	–	N/A +	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER, TOTAL	–	1.7 B	–	N/A	2.1 B	1.2 B	121	6	4.4 B	2.5 B	4.7 B	1.2 B	2.3 B	1.3 B	32.2
CYANIDE, TOTAL	-R*	-R*	-R*	N/A	–	–	0.7	–	-R*	-R*	–	–	-R*	-R*	-R*
IRON, TOTAL	2440	4110	760	N/A	11200	8780	31100	4170	21000	7480	4910	3040	2610	11200	9810
MERCURY, TOTAL	–	–	–	N/A	–	0.06	0.11	–	–	–	–	–	–	–	–
POTASSIUM, TOTAL	–	279 B	–	N/A	–	–	248 B	–	467 B	389 B	266 B	219 B	213 B	362 B	–
MAGNESIUM, TOTAL	70.7 B	319 B	–	N/A	63.2 B	–	639 B	151 B	1130	891 B	369 B	191 B	844 B	142 B	3510
MANGANESE, TOTAL	16.5	85.9	3.8	N/A	26.4	11	2380	56.1	612	54.6	46.7	50.4	22	69.8	1810
SODIUM, TOTAL	42.5 B	52.2 B	–	N/A	31.6 B	21 B	192 B	–	66.3 B	179 B	97.4 B	65.5 B	35.4 B	71.9 B	410 B
NICKEL, TOTAL	–	–	28.2 B	N/A	–	–	41.9	–	5.9 B	–	2.3 B	–	19	–	339
LEAD, TOTAL	2.2	8.8	1.4	N/A	2.6	1.9	105	5.2 B	9 B	4.6 B	52.6	1.9	2.3	3.2	7.2
ANTIMONY, TOTAL	4.4 B	–	–	N/A	–	–	–	–	–	–	–	–	–	–	–
SELENIUM, TOTAL	–	–	–	N/A	–	–	0.75 B	–	–	–	0.48 B	–	–	–	0.42 B
THALLIUM, TOTAL	–	–	–	N/A	–	–	–	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	82.6	7.3 B	–	N/A	6.4 B	8.3 B	176	5.5 B	1280	12.4	86.8	23.6	308	44	4110
ZINC, TOTAL	9.8	8.7	4.2	N/A	4.3	4.1 B	159	38.6	13.7	8.5	13.8	3.2 B	6	5.7	266
BORON	–	N/A	–	N/A	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
NIOBIUM	–	N/A	–	N/A	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–
STRONTIUI	–	N/A	–	N/A	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	46.4
TITANIUM	40.4	120	29.4	N/A	93.5	44.2	N/A	N/A	156	205	99.4	82	81.8	98.5	219
ZIRCONIUM	–	N/A	N/A	N/A	–	43.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	N/A	N/A	–	N/A	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL
J – QUALIFIER INDICATES THE SAMPLE WAS ANALYZED DURING THE TEN DAY HOLDING TIME BUFFER PERIOD.
R – QUALIFIER INDICATES THAT THE HOLDING TIME WAS EXCEEDED.
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+ – INDICATES Cr+6 DATA BY LEACH METHOD
N/A – NOT ANALYZED
'–' – INDICATES THE PARAMETER WAS NOT DETECTED TO THE REPORTED DETECTION LIMIT
CRDL – CONTRACT REQUIRED DETECTION LIMITS.
IDL – INSTRUMENT DETECTION LIMIT.

TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 7 OF 10

SAMPLE IDENTIFICATION:	SB47-04	SB48-01	SB48-04	SB49-01	SB49-04	SB50-01	SB50-04	SB51-01	SB51-02	SB52-01	SB52-04	SB53-01	SB53-04	SB54-01
SAMPLE DEPTH BELOW GRADE (FT):	6-8	0-2	6-8	0-2	6-8	0-2	6-8	0-2	2-4	0-2	6-8	0-2	6-8	0-2
INORGANICS (PPM)														
SILVER, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ALUMINUM, TOTAL	867	10900	2020	3140	2770	4480	1290	4010	3270	19600	2250	3570	1620	15000
ARSENIC, TOTAL	–	2.5	–	0.97 B	–	1.2 B	0.49 B	1.2 B	1.2 B	1.5 B	0.42 B	0.88 B	–	0.6 B
BARIUM, TOTAL	5.3 B	39.6 B	4.8 B	44.2	9 B	15.5 B	3.1 B	14.9 B	9.2 B	119	7.2 B	160	6.1 B	178
BERYLLIUM, TOTAL	0.5 B	0.46 B	–	3.8	0.73 B	4.2	1.2	2.1	–	3.8	0.08 B	7.6	0.08 B	2.2
CALCIUM, TOTAL	198 B	384 B	45.3 B	266 B	114 B	372 B	94.1 B	149 B	197 B	21500	44.8 B	1160	69.5 B	11700
CADMIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
COBALT, TOTAL	–	4.5 B	–	3 B	–	6.1 B	–	2.4 B	1.4 B	1.4 B	1.5 B	10.3	1.5 B	6.3 B
CHROMIUM, TOTAL	1.7 B	7.6	4.1	7.1	108	6.4	10.2	5.8	5	206	2.2	473	2.9	334
CHROMIUM VI	–	N/A	N/A	0.32	– +	0.58	0.45	0.35	–	0.38 +	0.12	1.3 +	0.1	4.8 +
COPPER, TOTAL	–	5.3 B	3.1 B	3.6 B	3.1 B	3.3 B	1.2 B	3 B	3.5 B	6.1	0.88 B	9.9	–	7.1
CYANIDE, TOTAL	–R*	–	–	–	–	–	–	–	–	–	–	–	–	–
IRON, TOTAL	899	13800	3710	8320	2320	6610	1640	5570	4440	3380	3400	4140	2680	2300
MERCURY, TOTAL	–	–	–	–	–	–	–	–	–	–	0.08	–	–	–
POTASSIUM, TOTAL	–	493 B	–	235 B	203 B	253 B	–	839 B	443 B	–	–	–	–	–
MAGNESIUM, TOTAL	153 B	1010 B	68.3 B	496 B	288 B	528 B	202 B	504 B	361 B	9260	54.2 B	2060	84.2 B	5580
MANGANESE, TOTAL	53.2	72	9.8	70.6	21.2	26.1	7.3	55	19.1	128	7.7	233	14.9	150
SODIUM, TOTAL	61 B	64.2 B	32.5 B	214 B	126 B	110 B	136 B	59.3 B	143 B	892 B	87.4 B	557 B	98.7 B	1030 B
NICKEL, TOTAL	3 B	4.2 B	–	11.3	11.3	221	7.3 B	3.8 B	2.6 B	43.3	–	275	–	677
LEAD, TOTAL	1.5	4.2	2	6.6	17.8	4.4 B	2.5	21 B	7	30.8	4.5	34.8	4.2	40.5
ANTIMONY, TOTAL	5 B	–	–	–	–	–	–	–	–	–	–	–	–	–
SELENIUM, TOTAL	–	0.65 B	–	–	0.43 B	0.53 B	–	–	–	–	–	–	–	–
THALLIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	121	35.5	3.4 B	826	154	928	265	466	7.9 B	742	3.1 B	1510	6.1 B	433
ZINC, TOTAL	13.2	18.7	2.9 B	8.5	6	16.3	2.4 B	7.4	6.4	28.9	3.0 B	30.6	10.5	48.3
BORON	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NIOBIUM	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STRONTIUM	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TITANIUM	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZIRCONIUM	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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N/A – NOT ANALYZED
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CRDL – CONTRACT REQUIRED DETECTION LIMITS.
IDL – INSTRUMENT DETECTION LIMIT.

TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 8 OF 10

SAMPLE IDENTIFICATION:	SB54-04	SB55-01	SB55-04	SB56-01	SB56-04	SB57-01	SB57-03	SB60-02	SB60-04	SB61-01	SB61-04	SB62-01	SB62-04	SB63-01
SAMPLE DEPTH BELOW GRADE (FT):	6-8	0-2	6-8	0-2	6-8	0-2	4-6	2-4	6-8	0-2	6-8	0-2	6-8	0-2
INORGANICS (PPM)														
SILVER, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ALUMINUM, TOTAL	5190	8610	9440	3650	3010	8420	2340	4370	5570	5250	3190	3940	2290	2440
ARSENIC, TOTAL	0.63 B	0.74 B	–	1.4 B	0.81 B	1.1 B	0.83 B	–	0.48 B	0.83 B	–	0.42 B	–	0.66 B
BARIUM, TOTAL	35.7 B	36.2 B	23 B	53.2	15.6 B	128	12.9 B	13.4 B	16.1 B	22.9 B	6.3 B	12.9 B	9.9 B	17.5 B
BERYLLIUM, TOTAL	3.8	3.5	0.51 B	19.4	0.25 B	4.1	0.83 B	0.38 B	0.45 B	0.31 B	–	0.42 B	0.23 B	0.3 B
CALCIUM, TOTAL	2070	1890	74.4 B	1050 B	78 B	5430	121 B	96.3 B	73.4 B	84.3 B	40.2 B	94.9 B	50.9 B	597 B
CADMIUM, TOTAL	–	1.2	–	–	–	–	–	–	–	–	–	–	–	–
COBALT, TOTAL	2.1 B	8.2 B	11.3	12.4	1.5 B	3.4 B	–	4.4 B	4.3 B	3.3 B	2.1 B	1.5 B	–	–
CHROMIUM, TOTAL	145	158	6.4	67.6	3.6	61.8	378	28.4	17.4	33	12.5	50.7	9.2	17
CHROMIUM VI	– +	0.89 +	0.28	0.34	–	0.43	– +	–	–	–	–	–	0.26	–
COPPER, TOTAL	3.4 B	91.3	2.2 B	15.1	–	9.9	1.1 B	3.7 B	4.6 B	4.9 B	3.4 B	1.9 B	1.3 B	3.8 B
CYANIDE, TOTAL	–	–R*	–R*	–	–	–	–	–	–	–	–	–	–	–
IRON, TOTAL	6340	23200	31500	6960	4140	6210	2500	17800	20000	12000	8750	7270	3210	2780
MERCURY, TOTAL	–	–	–	0.09	–	–	–	–	–	–	–	–	–	–
POTASSIUM, TOTAL	928 B	–	511 B	–	–	–	–	–	254 B	405 B	–	–	245 B	318 B
MAGNESIUM, TOTAL	1410	1460	464 B	3320	352 B	3260	188 B	223 B	231 B	271 B	99.9 B	155 B	106 B	252 B
MANGANESE, TOTAL	60.6	371	68.5	627	28	129	123	93	91.4	78.9	23.7	48.4	37.9	133
SODIUM, TOTAL	646 B	188 B	77 B	174 B	65.4 B	153 B	115 B	67.8 B	60.7 B	210 B	147 B	–	35.1 B	38.6
NICKEL, TOTAL	30.8	176	3.7 B	912	3.0 B	345	–	11.2	14.4	10.9	3.5 B	–	5.2 B	6.2 B
LEAD, TOTAL	4.3	9 B	14.7	46.1	3.4	49.1	9.1	8.3	13.2	10.7	2	6.4	2.2	12.8
ANTIMONY, TOTAL	–	–	–	–	–	–	7.0 B	–	–	–	–	–	–	–
SELENIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
THALLIUM, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VANADIUM, TOTAL	721	671	16.6	3950	25.8	802	146	46	53.9	29.4	8.8 B	55.4	30.4	54.1
ZINC, TOTAL	7.1	48.9	7.5	50.9	5.3	33.3	16.6	11.4	13.4	17.3	7.7	11.2	22.2	17.2
BORON	N/A	N/A	–	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A
NIOBIUM	N/A	N/A	–	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A
STRONTIUM	N/A	N/A	–	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A
TITANIUM	N/A	N/A	193	N/A	N/A	N/A	N/A	103	N/A	N/A	N/A	N/A	N/A	N/A
ZIRCONIUM	N/A	N/A	44.1	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A

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N/A – NOT ANALYZED
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CRDL – CONTRACT REQUIRED DETECTION LIMITS.
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TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 9 OF 10

SAMPLE IDENTIFICATION:	SB63-04	SB64-01	SB64-04	SB77-01	SB77-03	SB78-01	SB78-03	SB79-01	SB79-02	SB80-01	SB80-03	SB81-01	SB81-03	SB82-01
SAMPLE DEPTH BELOW GRADE (FT):	6-8	0-2	6-8	0-2	4-6	0-2	4-6	0-2	2-4	0-2	4-6	0-2	4-6	0-2
INORGANICS (PPM)														
SILVER, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ALUMINUM, TOTAL	4640	5070	5670	17100	9160	4080	5050	6320	5420	6970	1830	4580	4520	3320
ARSENIC, TOTAL	1.2 B	–	0.89 B	0.96 B	0.61 B	1.3 B	1.0 B	–	–	0.66 B	0.76 B	1.3 B	0.81 B	1.5 B
BARIUM, TOTAL	18.8 B	15.5 B	23.7 B	138	33.2 B	74.5	17.3 B	29.0 B	10.9 B	102	7.0 B	216	118	15.4 B
BERYLLIUM, TOTAL	0.77 B	0.35 B	0.43 B	8.3	0.65 B	0.38 B	0.2 B	1.4	0.23 B	6	0.11 B	2.8	2.4	0.32 B
CALCIUM, TOTAL	677 B	86.6 B	152 B	10300	2020	295	45.8 B	315 B	27.6 B	785 B	47.0 B	1190	1100	235 B
CADMIUM, TOTAL	–	–	–	–	–	–	–	0.62	–	–	–	–	–	–
COBALT, TOTAL	–	2.2 B	2.2 B	5 B	2.6 B	–	2.6 B	2.7 B	1.9 B	9.3 B	1.1 B	4.5 B	4 B	–
CHROMIUM, TOTAL	27.4	2.3	6	135	3.9	16.1	2.4	49.3	12.1	66.2	2.8	211	95.5	10.9
CHROMIUM VI	0.12	–	–	0.46 +	–	0.37	–	0.48	0.45	–	0.15	0.17 +	–	–
COPPER, TOTAL	5.1	1.8 B	2.3 B	14.1	3.6 B	3.7 B	2.7 B	3.4 B	3.5 B	8.7	–	13	10.8	2.5 B
CYANIDE, TOTAL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
IRON, TOTAL	6760	11500	8120	14400	12700	4540	8750	8160	9960	10300	3040	7590	7010	3720
MERCURY, TOTAL	–	–	–	–	–	0.14	0.1	0.04	0.1	0.07	0.06	–	–	–
POTASSIUM, TOTAL	206 B	–	248 B	1240	–	620 B	294 B	1000	737 B	283 B	–	335 B	425 B	349 B
MAGNESIUM, TOTAL	4070	226 B	629 B	9590	957 B	2060	148 B	399 B	105 B	3210	119 B	1180	1010 B	311 B
MANGANESE, TOTAL	87.6	30.3	43.7	1480	45.2	47.9	34.1	26.2	13.6	299	10.3	557	573	51.1
SODIUM, TOTAL	190 B	–	71 B	5400	540 B	315 B	490 B	772 B	809 B	129 B	73.6 B	292 B	193 B	75.3 B
NICKEL, TOTAL	16.4	3.7 B	6.7 B	115	5.7 B	7.7 B	2.3 B	4.0 B	3.5 B	617	–	176	131	5.4 B
LEAD, TOTAL	18.6	4.3	6.4	124	5.8	63.2	6	23.6	66.2	102	2.5	165	17.4	13
ANTIMONY, TOTAL	–	–	–	–	–	5.7 B	4.6 B	–	–	–	–	–	–	6.5 B
SELENIUM, TOTAL	–	0.42 B	0.65 B	1.1	–	–	–	–	–	–	–	–	0.52 B	–
THALLIUM, TOTAL	–	–	–	–	–	–	–	–	1.1 B	–	–	–	–	–
VANADIUM, TOTAL	125	29.5	36.9	1760	75.8	52.8	6.2 B	209	15.1	1120	10.2 B	612	532	68.3
ZINC, TOTAL	65.2	3.8 B	14	72.8	3.1 B	37.5	7	9.3	8.8	95.2	5.5	48	53.1	9.6
BORON	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NIOBIUM	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STRONTIUM	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TITANIUM	N/A	N/A	N/A	N/A	198	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZIRCONIUM	N/A	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.
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TABLE 25d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SOIL BORING SAMPLES
PAGE 10 OF 10

SAMPLE IDENTIFICATION:	SB82–03	SB83–01	SB83–03
SAMPLE DEPTH BELOW GRADE (FT):	4–6	0–2	4–6
INORGANICS (PPM)			
SILVER, TOTAL	–	–	–
ALUMINUM, TOTAL	4010	4660	5090
ARSENIC, TOTAL	0.65 B	1.4 B	0.88 B
BARIUM, TOTAL	11.2 B	29.9 B	27.1 B
BERYLLIUM, TOTAL	–	0.51 B	0.23 B
CALCIUM, TOTAL	–	618 B	94.1 B
CADMIUM, TOTAL	–	–	–
COBALT, TOTAL	2 B	2 B	2.5 B
CHROMIUM, TOTAL	4.8	35.5	7.4
CHROMIUM VI	–	–	–
COPPER, TOTAL	3.4 B	5.4	3.8 B
CYANIDE, TOTAL	–	–	–
IRON, TOTAL	7470	8300	7540
MERCURY, TOTAL	–	–	–
POTASSIUM, TOTAL	202 B	307 B	234 B
MAGNESIUM, TOTAL	127 B	415 B	360 B
MANGANESE, TOTAL	21.5	118	40.9
SODIUM, TOTAL	35.7 B	59.8 B	52.3 B
NICKEL, TOTAL	–	11.7	4.4 B
LEAD, TOTAL	2.4	14.7	5.1
ANTIMONY, TOTAL	–	–	–
SELENIUM, TOTAL	–	–	–
THALLIUM, TOTAL	–	–	–
VANADIUM, TOTAL	6 B	91.2	16.9
ZINC, TOTAL	8.6	21	8.9
BORON	N/A	N/A	N/A
NIOBIUM	N/A	N/A	N/A
STRONTIUM	N/A	N/A	N/A
TITANIUM	N/A	N/A	N/A
ZIRCONIUM	N/A	N/A	N/A
SULFATE	N/A	N/A	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.
J – QUALIFIER INDICATES THE SAMPLE WAS ANALYZED DURING THE TEN DAY HOLDING TIME BUFFER PERIOD.
R – QUALIFIER INDICATES THAT THE HOLDING TIME WAS EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC–ECI.
+ – INDICATES Cr+6 DATA BY LEACH METHOD
N/A – NOT ANALYZED
'–' – INDICATES THE PARAMETER WAS NOT DETECTED TO THE REPORTED DETECTION LIMIT
CRDL – CONTRACT REQUIRED DETECTION LIMITS.
IDL – INSTRUMENT DETECTION LIMIT.

TABLE 1-7a
SURFACE SOIL SUMMARY TABLE
BY-PRODUCT STORAGE AREA
SUPPLEMENTAL SAMPLING INVESTIGATION
SHIELDALLOY METALLURGICAL CORPORATION
Page 1 of 5

SAMPLE ID:	SS-13	SS-14	SS-15	SS-40 Dup of SS-15
SAMPLE INTERVAL (FT):	0-1	0-1	0-1	0-1
PCBS (µg/kg)				
Aroclor-1016	35 u	36 u	43 u	41 u
Aroclor-1221	71 u	71 u	87 u	82 u
Aroclor-1232	35 u	36 u	43 u	41 u
Aroclor-1242	35 u	36 u	43 u	41 u
Aroclor-1248	35 u	36 u	43 u	41 u
Aroclor-1254	35 u	64	100	78
Aroclor-1260	35 u	NR	43 u	NR

ug/kg=micrograms per kilogram (ppb)

u=Analyzed, Not detected

NR=Not Reported; A combination of Aroclor - 1254 and Aroclor - 1260 was present in samples SS-14 and SS-40. The Aroclor quantified and reported was, in the analyst's opinion, the predominant PCB in the sample extract. However, the reported value was based on peaks common to both Aroclors to give the most accurate PCB result.

TABLE 1-7b
SURFACE SOIL SUMMARY TABLE
DEPARTMENT 106
SUPPLEMENTAL SAMPLING INVESTIGATION
SHIELDALLOY METALLURGICAL CORPORATION
Page 2 of 5

SAMPLE ID:	SS-9	SS-10	SS-11	SS-12
SAMPLE INTERVAL (FT):	0-1	0-1	0-1	0-1
INORGANICS (mg/kg)				
Aluminum	--	--	--	--
Antimony	--	--	--	--
Arsenic	--	--	--	--
Barium	--	--	--	--
Beryllium	--	--	1.8	1.9
Cadmium	--	--	--	--
Calcium	--	--	--	--
Chromium	67.9	146	335	463
Chromium VI	0.95	4.2	1.4	0.27
Cobalt	--	--	--	--
Copper	--	--	--	--
Iron	--	--	--	--
Lead	--	--	--	--
Magnesium	--	--	--	--
Manganese	--	--	--	--
Mercury	--	--	--	--
Nickel	--	--	--	--
Potassium	--	--	--	--
Selenium	--	--	--	--
Silver	--	--	--	--
Sodium	--	--	--	--
Vanadium	--	--	292	317
Zinc	--	--	--	--
Thallium	--	--	--	--

mg/kg=milligrams per kilogram (ppm)
-- = Not Analyzed
U=Analyzed, Not detected

TABL[illegible]c
SURFACE SOIL SUMMARY TABLE
HUDSON BRANCH FLOODPLAIN
SUPPLEMENTAL SAMPLING INVESTIGATION
SHIELDALLOY METALLURGICAL CORPORATION
Page 3 of 5

SAMPLE ID:	SS-16	SS-17	SS-18	SS-19	SS-41 Dup of SS-19	SS-20	SS-25	SS-28
SAMPLE INTERVAL (FT):	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1
INORGANICS (mg/kg)								
Aluminum	724	979	1230	5480	1200	782	--	1090
Antimony	3.8 u	4.7	3.9 u	3.6 u	3.6 u	3.9 u	--	2.8 u
Arsenic	0.25 u	1.3	3.7	1.4	1.3	0.7	--	2.1
Barium	21	4.1	10.3	75.1	5.7	6.8	--	4.3
Beryllium	0.43	0.16	0.51	6.1	0.11	0.67	0.24	0.1
Cadmium	0.44 u	0.42 u	0.44 u	0.41 u	0.41	0.44 u	--	0.3 u
Calcium	981	60.6	110	2760	106	228	--	35.9
Chromium	8.3	3.7	11.1	86.9	4.6	18.8	--	7.7
Chromium VI	1.1	5.3	1.1 u	2.5	1.1 u	1.4 u	--	0.52 u
Cobalt	0.41 u	0.39 u	0.61	3.8	0.85	0.41 u	--	0.4
Copper	7.7	4.2	4.8	11.9	6	1.8	--	1.7
Iron	773	2010	2450	9010	2620	669	--	23509
Lead	18.6	13.4	39.9	114	15	14.9	--	14.3
Magnesium	177	67.3	91	1710	84.8	106	--	46.1
Manganese	89	4.2	37	329	3.9	22.9	--	6.3
Mercury	0.07	0.16	0.21	0.08	0.09	0.1	--	0.09
Nickel	7.3	0.92 u	4.9	166	1.7	5.3	--	1.9
Potassium	140	153	341	243	241	81 u	--	59.4 u
Selenium	0.16	0.4	0.62	0.27	0.24	0.31	--	0.13 u
Silver	0.35 u	0.43	0.36 u	0.33 u	0.33 u	0.36 u	--	0.26 u
Sodium	109	598	84.1	129	685	158	--	44.5
Vanadium	44.4	17.3	62.6	1120	21.4	83.9	--	12.7
Zinc	23.4	6	9.6	77.1	15.1	8.2	--	4.8
Thallium	0.28 u	0.27 u	0.37	0.27 u	0.26 u	0.28 u	--	0.21 u

mg/kg=milligrams per kilogram (ppm)
u=Analyzed, Not detected
-- = Not Analyzed

TABLE 1-7d
SURFACE SOIL SUMMARY TABLE
NORTHERN OFF-SITE SURFACE SOIL SAMPLES
SUPPLEMENTAL SAMPLING INVESTIGATION
SHIELDALLOY METALLURGICAL CORPORATION

SAMPLE ID:	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
SAMPLE INTERVAL (FT):	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1
INORGANICS (mg/kg)								
Aluminum	--	--	--	--	--	--	--	--
Antimony	--	--	--	--	--	--	--	--
Arsenic	--	--	--	--	--	--	--	--
Barium	--	--	--	--	--	--	--	--
Beryllium	0.52	0.55	0.68	0.84	4.1	1.7	0.8	0.38
Cadmium	--	--	--	--	--	--	--	--
Calcium	--	--	--	--	--	--	--	--
Chromium	--	--	--	--	360	283	38.3	8.9
Chromium VI	--	--	--	--	5.9	0.41	0.23 u	0.23 u
Cobalt	--	--	--	--	--	--	--	--
Copper	--	--	--	--	--	--	--	--
Iron	--	--	--	--	--	--	--	--
Lead	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--
Manganese	--	--	--	--	--	--	--	--
Mercury	--	--	--	--	--	--	--	--
Nickel	--	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--	--
Selenium	--	--	--	--	--	--	--	--
Silver	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--
Vanadium	--	--	--	--	739	275	101	17.8
Zinc	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--

mg/kg=milligrams per kilogram (ppm)

-- =Not Analyzed

U=Analyzed, Not detected

TABLE 1-7e
SURFACE SOIL SUMMARY TABLE
SOUTHERN OFF-SITE SURFACE SOIL SAMPLES
SUPPLEMENTAL SAMPLING INVESTIGATION
SHIELDALLOY METALLURGICAL CORPORATION

SAMPLE ID:	SS-21	SS-22	SS-23	SS-24	SS-26	SS-27
SAMPLE INTERVAL (FT):	0-1	0-1	0-1	0-1	0-1	0-1
INORGANICS (mg/kg)						
Aluminum	2760	1390	2670	2140	–	–
Antimony	3 u	3 u	3.4 u	3.3 u	–	–
Arsenic	2.3	1.5	2.3	1.6	–	–
Barium	18.5	12.3	12.8	14.5	–	–
Beryllium	0.13	0.13	0.28	0.19	4.3	0.35
Cadmium	0.35 u	0.34 u	0.39 u	0.37 u	–	–
Calcium	1750	785	1090	845	–	–
Chromium	11.6	8	8.6	9.5	–	–
Chromium VI	0.23 u	0.22 u	0.25 u	0.24 u	–	–
Cobalt	0.43	0.34	0.39	1	–	–
Copper	8	3.7	4.4	3.8	–	–
Iron	3030	1850	5050	2380	–	–
Lead	20.4	15.5	17.3	14.4	–	–
Magnesium	222	87.2	103	83.2	–	–
Manganese	123	69.7	78.3	100	–	–
Mercury	0.31	0.21	0.38	0.19	–	–
Nickel	4	2.2	2.4	3.4	–	–
Potassium	147	130	76.4	147	–	–
Selenium	0.16	0.11 u	0.3	0.22	–	–
Silver	0.28 u	0.27 u	0.31 u	0.3 u	–	–
Sodium	61.3	65.6	331	155	–	–
Vanadium	19.7	14.1	22.4	22.4	–	–
Zinc	30.7	45.8	23.6	22.3	–	–
Thallium	0.23 u	0.22 u	0.25 u	0.24 u	–	–

mg/kg=milligram per kilogram (ppm)
– = Not Analyzed
u=Analyzed, Not detected

APPENDIX K
Analytical Results For Soil, Sediment and Water Sampling

	Sample Type											
Grid Location	Soil/Sediment or Water	U-238 (pCi/g)*	Th-232 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Pb-214 (pCi/g)	Bi-214 (pCi/g)	Th-228/A (pCi/g)	Pb-212 (pCi/g)	Tl-208 (pCi/g)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
-h0	S	5.79	4.3	24	31	26	24					
-h2	S	3.36	6.45	8.8	8.9	9.9	8.8					
-g1	S	11.2	1.31	28	28							
-b32	S	3.92	4.94	77	83							
-b60	S	1.80	2.35	2.2		0.93	0.79	1.7	1.8	1.5		
-b60 (DUP 1)	S	1.58	1.48	1.4		0.67	0.53	0.85	0.80	0.64		
-b60 (DUP 2)	S	1.58	2.00	1.6		0.69	0.74	1.1	0.99	0.97		
-a4	S	0.84	1.66	0.3	0.4	0.4	0.3					
-a6	S	1.17	2.58	6.4	9.7	4.0	<3.9					
-a6 (DUP)	S	0.94	2.55	0.3	<0.6	0.5	<0.3					
-a8	S	8.00	10.8	5.3	10	6.5	5.3					
-a9	S	10.4	1.74	37	47	40	37					
-a33	S	2.29	6.0	1.8	6.7	2.7	1.8					
A-33	W										4.2	6.0
A7	S	1.14	2.39	0.5	<0.7	1.0	<0.4					
A11	W	0.61	1.02	1.04	<3.6	<7	<7.3				15	15
A26	S	0.87	1.70	0.3	<1.0	0.6	< 0.4					
A33 (QC)	S	1.37	1.91	0.4	0.3	0.4	<0.3					
A39	S	1.19	1.6	0.7	0.7	0.6	<0.4					
A46	S	0.75	1.58	0.5	<0.6	0.5	0.5					
A51	S	0.87	1.45	0.7	0.6	0.8	<0.4					
A70	S	0.79	1.29	0.9	0.8	1.0	0.9					
B10	S	1.41	4.92	0.7	1.1	0.6	0.7					

APPENDIX K
(Continued)

	Sample Type											
Grid Location	Soil/Sediment or Water	U-238 (pCi/g)[a]	Th-232 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Pb-214 (pCi/g)	Bi-214 (pCi/g)	Th-228/A (pCi/g)	Pb-212 (pCi/g)	TI-208 (pCi/g)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
B61	S	0.79	0.81	0.4	0.3	0.4	0.4					
B64	S	1.71	.63	1.5	4.1	2.2	1.5					
B70	S	0.81	1.40	0.6	0.3	0.5	0.6					
C17	S	1.30	3.56	0.6	1.4	1.1	0.6					
C30	S	1.69	4.71	1.0	1.5	1.4	1.0					
C32	S	1.18	4.23	3.4	1.5	3.5	3.4					
C45	S	1.77	6.32	0.5	<0.5	0.7	0.5	1.8	1.7	1.7		
D11	S	1.20	3.00	0.5	1.0	0.7	<0.4					
D25	S	1.26	3.43	<0.3	<0.5	<0.2	<0.3					
D61	S	0.76	1.11	0.6	0.2	0.5	<0.3					
D66	S	0.82	1.57	0.6	0.3	0.5	<0.3					
E22	S	1.26	2.53	0.5	<0.5	0.4	0.5					
E30 (QC)	S	1.32	3.02	1.2	1.0	1.4	1.2					
E32	S	1.26	3.13	1.6	1.9	1.8	1.6					
E42	S	1.18	2.1	0.85			0.51	0.56	0.58	0.41		
E54	S	0.51	1.06	<0.6		0.43	0.38	0.60	0.47	0.42		
F43	S	1.15	1.80	0.74		0.44	0.40	0.56	0.46	.043		
F50	S	0.94	2.33	0.91		0.44	0.35	0.68	0.50	0.47		
F55	S	0.95	1.75	0.6	<0.8	1.0	0.6	0.47	0.50	0.32		
G14	S	3.31	8.61	1.6	2.9	1.4	<0.6					
G23	S	0.95	1.68	<0.3	<0.5	<0.2	<0.3					
G25	S	0.92	1.95	0.5	<0.5	0.4	0.5					

APPENDIX K
(Continued)

	Sample Type											
Grid Location	Soil/Sediment or Water	U-238 (pCi/g)^a	Th-232 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Pb-214 (pCi/g)	Bi-214 (pCi/g)	Th-228/A (pCi/g)	Pb-212 (pCi/g)	TI-208 (pCi/g)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
G30	S	3.49	10.16	3.5	9.0	3.3	3.5					
G38	S	1.12	1.81	1.1		0.81	0.66	0.52	0.55	0.47		
G38 (DUP)	S	1.52	2.43	1.4		0.72	0.59	0.60	0.53	0.67		
G39	W	0.48	1.71	1.38	<3.8	<8	<9.8				16	16
G39	S	1.77	1.85	2.3		1.5	1.3	0.93	0.97	0.10		
G48	S	0.81	2.15	1.6	<0.6	0.7	0.5	0.64	0.56	0.54		
G50	S			2.0		1.3	1.2	4.9	4.0	4.0		
G50	S	2.17	13.3	1.9	5.2	1.7	1.9					
G57	S	1.1	4.21	<0.2	<0.6	<0.3	<0.2	2.4	2.0	2.0		
G61	S	0.63	1.35	1.8		0.58	0.43	0.54	0.45	0.46		
H49	W	17.4	48.4	19.55	66	44	34				1220	888
H49 (QC)	W	8.1	15.6	10.07	21.1	15	14				488	353
H9	S	1.73	2.75	0.7	1.1	0.8	0.7					
I18	S	0.95	1.98	1.1	<1.7	0.9	1.1					
I31	S	0.83	3.06	0.6	<0.6	0.6	0.6					
I35 (QC)	S	1.02	2.99	0.4	0.7	0.6	0.4					
I35	S	1.02	2.99									
J76.5	S		1.38	<0.5		0.40	0.31	0.36	0.36	0.33		
J76.5 (DUP 1)	S			1.3		0.52	0.40	0.46	0.36	0.39		
J76.5 (DUP 2)	S			1.1		0.64	0.52	0.61	0.64	0.68		
L18	S	1.03	1.90	0.6	0.8	0.5	0.6					
N17	S	1.60	35.3	4.4	12	5.2	4.4					

APPENDIX K
(Continued)

Grid Location	Sample Type Soil/Sediment or Water	U-238 (pCi/g)[a]	Th-232 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Pb-214 (pCi/g)	Bi-214 (pCi/g)	Th-228/A (pCi/g)	Pb-212 (pCi/g)	Tl-208 (pCi/g)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
O15	S	2.36	4.43	0.7	1.5	1.0	0.7					
U67	S	1.43	2.53	1.1		0.61	0.48	0.74	0.77	0.54		
U73	S	1.21	1.47	0.5	0.6	0.4	0.5					
W60	S	1.23	2.42	<0.5		0.55	0.48	0.72	0.62	0.54		
X56	S	1.68	3.32	0.6	0.7	0.6	0.9					
X57	S	1.47	3.00	0.6	0.9	0.8	0.6					
X61	S	1.15	2.12	<.6		0.55	0.49	0.53	0.52	0.50		
Y50	S	1.66		0.7	1.0	0.6	0.7					
Y56	S	1.38	2.76	0.5	0.5	0.5	0.5					
Z53	S	1.78	2.15	1.1	0.9	1.0	0.9					
Z60	S	1.14	1.79	0.4	0.3	0.3	<0.2					
AA44	S	1.62	4.17	0.8	0.9	1.0	0.8					
AA45	S	1.44	4.17	0.7	1.4	1.0	0.7					
AA49	S	1.3	41.2	0.4	0.9	0.6	0.4					
BB53	S	1.03	1.47	0.70		0.46	0.46	0.53	0.43	0.39		
BB55	S	0.58	1.34	0.11		0.53	0.44	0.56	0.59	0.46		
BB60	S	0.93	1.31	0.3	0.3	0.3	0.3					
CC43	S	1.1	5.04	0.14		0.70	0.65	0.12	1.1	0.93		
DD39	S	1.28	3.50	<0.9		0.70	.064	1.1	.094	.093		
DD41	S											
DD45 (QC)	S	1.21	4.58	.090	3.6	0.90	<0.39					
DD45	S	1.43	7.54	1.1		0.73	0.63	2.6	2.1	2.2		

APPENDIX K
(Continued)

	Sample Type											
Grid Location	Soil/Sediment or Water	U-238 (pCi/g)[a]	Th-232 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Pb-214 (pCi/g)	Bi-214 (pCi/g)	Th-228/A (pCi/g)	Pb-212 (pCi/g)	Tl-208 (pCi/g)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
DD47	S	1.01	1.84	<0.6		0.50	0.44	0.54	0.47	0.48		
DD50	S	1.00	2.43	0.84		0.49	0.47	0.50	0.44	0.54		
EE36	S	1.51	4.41	0.75		0.87	0.77	0.99	0.86	0.80		
EE38	S	1.38	2.11	0.6	0.3	0.6						
EE47	S	1.03	3.00	<0.6		0.69	0.62	1.0	0.99	0.81		
EE47 (DUP)	S					0.92	0.82	3.2	2.5	2.6		
EE54	S	0.86	1.24	0.2	0.2	0.2	0.2					
FF53	S	0.90	1.50	0.89		0.44	0.42	0.56	0.53	0.47		
FF56	S	1.14	1.31	0.94	0.5	0.5	0.5					
FF56 (QC)	S	1.11	1.47	0.5	0.4	0.5	0.4					
GG43	S	0.76	1.66	<0.7		0.54	0.45	0.46	0.47	0.45		
GG45	S	0.95	1.77	0.98		0.52	0.45	0.70	0.62	0.59		
HH50	S	1.13	1.58	<0.7		0.51	0.44	0.56		.04		
HH53	S	1.06	2.57	1.1		0.57	0.616	0.69	0.65	0.72		
Settling Pond, SE	S	1.26	2.19	1.3	0.7	1.1	1.3					
Settling Pond, E	S	2.77	2.59	4.4	4.0	4.9	4.4					
Settling Pond, SW	S	5.15	1.67	1.4	1.0	1.7	1.4					
Settling Pond, W	S	1.93	4.03	2.2	0.6	2.2	2.2					
Settling Pond, N	S	3.06	2.89	0.6	<0.6	0.5	0.6					
0+10, 10L	S	5.65	5.1	21	22	24	21					
-0+10, 10L	S	5.65		21	22	24	21					
-0+20	S	1.75	3.17	0.8	1	0.8	0.8					

APPENDIX K
(Continued)

	Sample Type											
Grid Location	Soil/Sediment or Water	U-238 (pCi/g)[a]	Th-232 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Pb-214 (pCi/g)	Bi-214 (pCi/g)	Th-228/A (pCi/g)	Pb-212 (pCi/g)	TI-208 (pCi/g)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
-0+30	S	4.20		3.1	8.2	4.2	3.1					
-0+50	S	1.36	1.94	1.6	<1.1	1.3	1.6					
-0+50 (QC)	S	1.63	9.56	14	<11	14	<7.6					
-0+60	S	3.14	3.41	19	18	21	19					
-0+90	S	2.10	2.61	17	14	18	17					
-3+50 (QC)	S	1.63		14	<11	14	14					
0+20	S	2.57	1.38	2.4	1.6	2.6	2.4					
0+60, R	W	0.17	<0.079	0.71	<3.9	<9.2	<11				1.3	2.6
0+30, 10L	S	0.96	1.11	0.7	<0.7	0.8	<0.8					
0+60, L	W	1.98	1.48	15.2	9.9	10.4	9.0				86	65
0+100, 10L	S	5.71	8.86	34	30	36	34					
1+10	W	0.47	0.53	1.63	<3.9	9.0	10.0				9.9	10
1+10R	W										0	1.7
1+10L	W	0.42	<0.06	0.8	3.3	6.0	<5.6				1.5	1.8
1+10, 10R	S	1.92	2.34	4.7	.54	6.4	4.7					
1+20	S		2.63	7.0	4.2	7.4	7.0					
1+50, 10R	S	1.27	1.56	2.1	4.2	4.3	4.2					
1+60	W	0.18	0	0.69	0						7800	3600
1+80, 10R	S	0.89	1.62	1.9	2.8	4.4	3.8					
1+80, 10L	S	1.18	1.97	0.6	1.0	0.9	1.0					
1+100, 10L	S	2.55		12	8.1	13	12					
2+20	W	6.3	6.0	10.32	30.9	<2.1	<3.2				323	221

APPENDIX K
(Continued)

	Sample Type											
Grid Location	Soil/Sediment or Water	U-238 (pCi/g)[a]	Th-232 (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Pb-214 (pCi/g)	Bi-214 (pCi/g)	Th-228/A (pCi/g)	Pb-212 (pCi/g)	TI-208 (pCi/g)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)
2+20R	W	1.52	0.81	9.67	7.8	<8.8	<8.7				23	22
2+20L	W	6.1	5.72	33.11	36.3	59.9	46.0				247	239
2+20, 10R	S	2.67	2.93	<1.4	<1.0	<0.8	<1.0					
2+30, 10R	S	2.37	4.11	12	6.2	14	12					
2+60, 10L	S	1.10	1.31	0.5	0.3	20.7	0.5					
2+70	S	2.25	3.73	11	4.6	12	11					
2+80, 10L	S	1.03	1.11	0.4	0.3	0.5	<0.3					
2+90, 10L	S	0.77	1.68	0.6	0.8	0.8	0.6					
3+80, 10R,(QC)	S	1.38	1.51	8.1	3.8	8.2	8.1					
LOC-6	S			1.2		0.53	0.47	0.50	0.65	0.47		
BACKGROUND 1	S	0.83	1.48	^0.6	0.5	0.7	0.0					
BACKGROUND 2	S	1.38	0.28	1.0		0.51	0.47	0.55	0.47	0.44		
BACKGROUND 3	S	1.37	1.91	0.82		0.20	0.19	0.21	0.33	0.29		
BACKGROUND 4	S	0.92	1.68	<0.5		0.30	0.28	0.44	0.34	0.32		
BACKGROUND 5	S	1.04	1.19	0.85		0.32	0.31	0.43	0.42	0.27		
BACKGROUND 6	S	0.42	1.35	0.81		0.38	0.31	0.37	0.37	0.26		
J76.5 (BACKGROUND)	S	0.86	1.71									
J76.5 (BACKGROUND)	S	0.99	1.87									

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[a] pCi/L for water samples

APPENDIX E – GROUND WATER IMPACTS ANALYSIS REPORT

GROUND WATER IMPACTS ANALYSIS

BASED ON SUBSURFACE SOIL SAMPLING AND GROUND WATER MONITORING

DECOMMISSIONING PLAN
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

Prepared for

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Revised: August 2009

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ATTACHMENTS

EXECUTIVE SUMMARY

Shieldalloy Metallurgical Corporation (SMC) is seeking to decommission its Newfield, New Jersey facility (SMC facility) so that most of the property may be released for unrestricted use. In a small portion of the property which is referred to as the Storage Yard, there exist several piles of legacy residual radioactive materials. SMC proposes to consolidate those materials into a single pile ("the consolidated material") and cover the pile with an engineered barrier to provide for their long term isolation. Access to the Storage Yard is and will remain restricted, and the area will be maintained in accordance with the terms and conditions of a Long Term Control (LTC) License to be issued by the U. S. Nuclear Regulatory Commission (NRC), with the NRC providing long term oversight and control over the restricted area.

As part of the preparation of a decommissioning plan ("DP") for the facility, SMC has undertaken a comprehensive testing and measurement program to determine the release rate of radioactivity from the various materials that are currently present in the Storage Yard. An important aspect of that program is to determine the potential for future leaching of radioactivity into the ground water. The results of an ongoing test of leachability potential are reported in a separate document.

In its DP, SMC is addressing whether licensed activities conducted in the past at the SMC facility and the presence of these materials in the Storage Yard in an uncovered state for between 10 and 40+ years have resulted in the migration of radioactivity from the materials to the local ground water. To answer that question, the following activities have been conducted:

- A detailed review of the radioactivity measured in the local ground water through sampling and analysis campaigns that have taken place between 1988 and the present day was performed;
- An evaluation of the potential for agriculturally-induced leaching of natural radioactivity in soil within the general Newfield area was researched; and
- The potential presence of leached radioactivity in the soil immediately below the materials in the Storage Yard was investigated.

The findings from these activities are described in this Report. Briefly summarized, there is no credible evidence of radioactivity above drinking water standards in the shallow ground water under the SMC facility. In contrast, multiple rounds of samples collected from deep wells, including wells upgradient and sidegradient of the Storage Yard, indicate radioactivity above or approaching the drinking water standard, as well as elevated nitrate levels. Because agriculturally-induced leaching of natural radioactivity into the ground water is a common occurrence in southern New Jersey, particularly when associated with elevated nitrate levels, the few instances of radioactivity in the ground water above drinking water standards beneath the facility are attributable to agricultural activities that are on-going in the vicinity of the facility.

Other indicators of agricultural activities that are commonly associated with the naturally elevated radioactivity levels in southern New Jersey (e.g., low pH and elevated calcium) were also found in ground water samples collected from the deep wells, further confirming this interpretation. Furthermore, no leached radioactivity was found in the soil directly below the Storage Yard stockpiles. This lack of leached radioisotopes directly below the stockpiles further supports the conclusion that there is no link between the deep well results and the materials present in the Storage Yard. From these findings it is reasonable to conclude that the presence of licensed radioactive materials at the SMC facility for the past 40+ years has had no impact on the local ground water.

1.0 INTRODUCTION

In 1988, Oak Ridge Associated Universities (ORAU), under contract to the NRC, performed a radiological assessment of the SMC facility.[1] One of the issues evaluated was whether licensed radioactivity from the Storage Yard had moved into the ground water. The following was stated in the report prepared by ORAU:

> Soil around the slag piles is contaminated on the surface, but the contaminants appear to be limited to the upper 30-60 cm of soil. At other locations little evidence of subsurface soil contamination was noted. Water samples from boreholes and wells have contamination levels well below the NRC guideline for water in unrestricted areas. With only a few exceptions, the concentrations are below the EPA screening levels of 15 pCi/l gross alpha and 50 pCi/l gross beta for community drinking water systems. These low concentrations in subsurface soil and water are evidence that contamination from the site operations is not migrating into the soil and ground water. (Berger and Luck, 1988)

As part of its site-wide decommissioning effort, and in response to NRC inquiries, SMC has re-assessed the likelihood that its former operations at its SMC facility and the storage of radioactive materials in the Storage Yard may have had a radiological impact on the local ground water. A determination as to whether radioactivity may have migrated from the Storage Yard into the ground water over the last 40 years[2] was made from the following:

- Research into the potential for agriculturally-induced leaching into the ground water of radioactivity that is naturally present in soil;
- A characterization of the local ground water quality from routine sampling/analysis campaigns that took place from 1988 to the present day; and
- A 2008 investigation into whether radioactivity can be found within the soils immediately below the stockpiled material in the Storage Yard.

Included in this report is background information about the SMC facility and its operations, a description of the geologic and hydrologic character of the area, a summary of

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[1] Berger, J. D. and A. D. Luck, Oak Ridge Associated Universities Report No. ORAU 88/G-79, "Radiological Survey of the Shieldalloy Corporation; Newfield, New Jersey", Final Report, prepared for U. S. Nuclear Regulatory Commission (Division of Industrial and Medical Nuclear Safety), Region I Office, July, 1988.

[2] Aerial photographs from 1951, 1962, 1965, 1974 and 1986 show that licensable materials were first placed in the Storage Yard between 1951 and 1962, with the storage volume growing through the 1986 aerial photo. This is consistent with known production.

agricultural land use patterns that may impact the leaching of natural radioactivity within this geologic setting, the findings of the June 2008 subsurface soil investigation, and a ground water quality assessment based on sampling and analysis campaigns that have taken place over several years. From this information, SMC has concluded that licensed operations at Newfield and the storage of radioactive materials in the Storage Yard have not resulted in the release of radioactivity to the local ground water.

1.1 Background

Processing of naturally radioactive ores at the SMC facility was performed for a number of years pursuant to a source material license issued by the NRC. The facility's operations resulted in the presence at the site of ferrocolumbium slag, baghouse dust, and other materials containing naturally occurring radioactive elements. Those materials have been stored since their generation in the eastern portion of the plant property, in an area referred to as the Storage Yard. They have been placed on the surface of the ground, with no underlying barrier and no cover. They have been subjected to the effects of precipitation, heat and sunlight, wind, freezing and thawing, and other natural climatic forces for more than 40 years. Figure 1-1 shows the Storage Yard area and identifies the various stockpiles of materials. Materials characterization activities conducted within the Storage Yard demonstrate the greatest quantities of radioactive materials are located in Areas 3, 4, and 6 with 80% of the total amount of uranium and thorium being present in slag located in Area 4.

United States Geological Survey (USGS) studies (Kozinski, et al., 1995) have shown that a combination of the geology, geochemistry, and land use in southern New Jersey has an impact on the distribution of naturally occurring radionuclides in the ground water. Therefore, the results of the characterization of the soils at the SMC facility and the ground water in the facility's vicinity must be interpreted in the context of the important factors of local geology, geochemistry and land use.

Elevated concentrations of Radium-224 (Ra-224), Radium-226 (Ra-226), and Radium-228 (Ra-228), as well as gross alpha activity in excess of 15 pCi/l, are common in ground water in the aquifer system in the New Jersey Coastal Plain (Kozinski, et al., 1995; Szabo et al., 2005). These studies demonstrated that the sum of dissolved Ra-226 and Ra-228 in 26 of 81 ground water samples was greater than the U.S. Environmental Protection Agency's (EPA's) Maximum Contaminant Level (MCL) for drinking water of 5 pCi/l. Concentrations were greatest in ground water samples in the vicinity of outcrop areas of the Bridgeton Formation, where agricultural land use is prevalent within a 500-meter (1,640-foot) radius of the sampling locations. Natural leaching of uranium and radium from mineralogically immature sediments of the Bridgeton Formation, and the chemical processes associated with agricultural land use in the area, may enhance the release of some of the radionuclides to the ground water. A positive correlation was established between dissolved Ra-226 and Ra-228 concentrations and the concentrations of other dissolved chemical constituents, including nitrate plus nitrite (as nitrogen), chloride, magnesium, barium, and potassium. A rank regression model shows ground water that contains nitrate plus nitrite (as nitrogen) at levels greater than five (5) mg/l also has total radium concentrations in excess of five (5) pCi/l to 99 percent confidence.

As part of its Source Water Assessment Program, the New Jersey Department of Environmental Protection (NJDEP) has also evaluated each public water system's susceptibility to contamination, specifically pathogens, nutrients, pesticides, volatile organic compounds (VOCs), inorganics, radionuclides, radon, and disinfection byproduct precursors (DBPs). Because the communities of Newfield and Vineland both obtain their potable water supplies entirely from ground water, the associated Source Water Assessment evaluations focused on the potential for the production wells to be impacted. NJDEP's analyses, based on sensitivity[3] and intensity of use factors, provide susceptibility ratings (high, medium, or low) for each contaminant category for each well and intake. A more detailed discussion of the basis for these ratings is presented in Section 3.4.2.6 of the Environmental Report (ER). The two Borough of Newfield wells, which are located north/northeast and upgradient of the SMC facility, rate high in terms of susceptibility for radionuclides. Specifically, Newfield Well 5 has a high susceptibility rating for nutrients and radionuclides, and Well 3 has a high susceptibility rating for nutrients, radionuclides, and VOCs. Similarly, all of the Vineland public water supply wells, including wells which are not downgradient of the SMC facility, have a high susceptibility rating for radionuclides (NJDEP, 2004a; 2004b). These NJDEP assessments are consistent with the results of USGS studies of ground water in the Cohansey Sand of southern New Jersey.

In 2005, 2006, and 2007, the City of Vineland Water Utility reported exceedances of the MCLs for radium and alpha emitters, indicating in their annual water reports that the source was erosion of natural deposits (City of Vineland Water Utility, 2005; 2006; and 2007). The highest levels were reported in 2007, with gross alpha activity concentrations from 6.3 to 31.0 pCi/l, and combined Ra-226/228 concentrations ranging from 2.39 to 12.11 pCi/l. As a result, radium removal treatment systems were installed on the three wells that exhibited the highest gross alpha and combined Ra-226/228 activities, and additional permanent radium removal systems are in the design/construction phase for other wells.

There is agricultural land use within a 500-meter radius of the Storage Yard. Moreover, the Bridgeton Formation crops out in the vicinity of the SMC facility. These circumstances

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[3] Sensitivity factors consider the sensitivity of a water source to contamination. For example, a shallow well or surface water source like a reservoir is more sensitive to contamination from the surface or above ground than a deep well would be.

suggest a potential for increased concentrations of radionuclides in the local ground water in the vicinity of the facility from agriculturally-induced leaching of natural radioactivity in the soils.

1.2 Geologic and Hydrogeologic Setting

The SMC facility is located in the Atlantic Coastal Plain physiographic province, which extends from the Delaware Bay in the southwest to the Raritan Bay in the northeast, and from the Fall Line in the west to the Atlantic Ocean in the east. The Coastal Plain is a seaward (southeast)-dipping wedge of unconsolidated sediments that range in age from Cretaceous to Holocene. The formations comprising the Coastal Plain typically crop out in sequential bands striking northeast-southwest, becoming older in outcrop to the northwest.

The Upper Cretaceous and most Tertiary sediments were deposited in beach and shelf environments. Interbedded fine-grained sediments are transgressive marine deposits that formed during major incursions of the sea. The Tertiary Kirkwood and Cohansey Sand Formations are part of the Kirkwood-Cohansey aquifer system, which underlies the SMC facility and crops out in more than half of Gloucester County. Local public water supply wells are generally screened within the Kirkwood-Cohansey aquifer.

The Tertiary and Quaternary Kirkwood-Cohansey aquifer system is composed predominantly of quartz sand and gravel of the Miocene Kirkwood Formation, the Miocene-Pliocene Cohansey Sand, and locally, from oldest to youngest, the Pleistocene Bridgeton, Pensauken, and Cape May Formations. Unconformities separate each of these Formations (Hardt and Hilton, 1969; Rhodehamel, 1973). The Pensauken and Cape May Formations are not present in the area of the SMC facility. The following are descriptions of the Kirkwood Formation, the Cohansey Sand, and the Bridgeton Formation:

- The Kirkwood Formation consists of clay, silt, and very fine to coarse quartzose micaceous sand, and is only a minor aquifer in the Newfield area. The Kirkwood Formation ranges in thickness from 15 to 49 meters (50 to 160 feet).

- The Cohansey Sand is composed of fine to coarse quartz sand, lenses of clay, and lenses of gravel. This formation dips southeast about 2 meters per kilometer (11 feet per mile) and is approximately 40 meters (130 feet) thick in the Newfield area. Grain size varies both vertically and laterally, which is consistent with deposition within a coastal environment. The Cohansey Sand is a productive aquifer.

- The Bridgeton Formation is composed of fine to very coarse quartz sand and gravel, possibly of glacial or interglacial origins. Clast composition and paleocurrent indicators suggest that the sediments of the Bridgeton Formation were derived from crystalline and sedimentary rocks of the Hudson River Valley, the Reading Prong, and the Newark Basin. Because the source is uraniferous, the sands and gravels of the Bridgeton Formation have the potential to be richer in minerals containing uranium and thorium than the relatively pure quartz sands of the Cohansey Sand (Kozinski, et al., 1995).

1.2.1 Site-Specific Geology

Erosion, deposition, cutting, and filling have altered the landscape in and around the area of the SMC facility. These processes expose the Cohansey Sand at the ground surface at locations where the Bridgeton Formation has been removed. Reworked sediments of the Bridgeton Formation and the Cohansey Sand are present in stream valleys and floodplains. The Geologic Map of New Jersey (Lewis and Kummel, 1950) indicates that the surficial sediments at the facility and in the general Newfield area comprise the Bridgeton Formation.

The geology at the SMC facility was characterized during Superfund site investigations that included the completion of soil borings and monitoring wells. Surficial materials are characterized as brown sand of the Bridgeton Formation. The thickness of the Bridgeton Formation, measured during the Remedial Investigation (TRC, 1992), ranges from 0 meters in the vicinity of well SC-17D (located off-site and to the west of the SMC facility) to 8.5 meters (28 feet) in the vicinity of well SC-12D, just west of the Storage Yard (see Figure 1-2 for well locations). Four shallow soil borings located to the east of the Storage Yard (i.e., borings SB-25 through SB-28) indicated the presence of Bridgeton Formation sand to at least the total borehole depths of 2.5 meters (8 feet).

The Cohansey Sand underlies the Bridgeton Formation at the SMC facility. The Cohansey Sand is composed of coarse sands and little-to-trace silt in the upper 12 meters (40 feet), and generally finer sand and some silt, with some clay and silt stringers in the lower 18 to 24 meters (60 to 80 feet). Discontinuous silt and clay lenses up to 1.8 meters (6 feet) thick were encountered in some portions of the facility. The Kirkwood Formation, described as a gray silt and clay layer, was encountered at depths ranging from 37 meters (121 feet) below grade (on-site well SC-22D) to 46.6 meters (153 feet) below grade (off-site well SC-17D).

1.2.2 Site-Specific Hydrogeology

The shallow aquifer beneath the SMC facility is comprised of two main hydrogeologic units, based on grain size differences: the upper Cohansey Sand and the lower Cohansey Sand. The upper Cohansey Sand is approximately 12 to 15 meters (40 to 50 feet) thick. The lower Cohansey Sand varies in thickness between 18 and 24 meters (60 and 80 feet) and is characterized by generally finer-grained sand and a larger percentage of silt and clay than the upper Cohansey Sand. Shallow wells (screened above 15 meters or 50 feet) and deep wells (screened below 15 meters) confirm the characterization of the two units.

Around the vicinity of the Storage Yard, the two hydrogeologic units are separated by a low conductivity clay "wedge" ranging from 1.8 meters (6 feet) to 10.6 centimeters (4 inches) thick. There is a vertical hydraulic gradient of approximately 0.5% between the two Cohansey Sand units.

The ground water data for shallow wells are typically evaluated separately from the data for deep wells. A tabular summary of the SMC monitoring wells located at and surrounding the facility is provided in Table 1-1. Figure 1-2 depicts the ground water monitoring well locations in the immediate vicinity of the SMC facility.

The ground water flow direction at the facility generally corresponds to surface topography, which slopes gently to the southwest. Ground water contours for the upper and lower Cohansey Sand for the July 2005 ground water monitoring event were presented in Figures F-3 and F-4 in Appendix F of Rev. 1 of the Decommissioning Plan (IEM/TRC, 2005).

Typically, depths to ground water range from 0 at the Hudson Branch to approximately 5.2 meters (17 feet) below grade in the northwest portion of the facility. Depths to ground water in the on-site wells have not changed significantly over the past ten years of monitoring (i.e., since 1998).

The Bridgeton Formation is hydraulically connected to the underlying Cohansey Sand. Ground water is unconfined, and the water table occurs locally within the Bridgeton Formation. Depths to ground water in the vicinity of the Storage Yard have historically averaged 1.8 to 4.3

meters (6.1 to 14.2 feet) below ground surface, depending on the well location, based on quarterly water level data collected at wells SC-11S, SC-12S and SC-13S between 2001 and 2008. The saturated zone in this area encompasses the lower portion of the Bridgeton Formation.

2.0 SUBSURFACE SOIL INVESTIGATION AND RESULTS

2.1 Sampling Protocol and Sample Locations

On June 19 and June 20, 2008, TRC field team members used a combination of test pit and bucket auger methods to collect subsurface soil samples beneath and immediately next to the stockpiled materials within the Storage Yard area. Sample locations were selected to characterize soils beneath the stockpiles that contain most of the radioactivity in the Storage Yard, namely the electric arc furnace slag contained in Area 4 (sample location HA-6) and the CANAL slag (crushed electric arc furnace slag) contained in Area 3 (sample location HA-3). Samples were also collected beneath the aluminothermic slag in Area 6 (sample location HA-5) and the baghouse dust stockpile in Area 8 (sample location HA-4). In all cases, samples were collected as far beneath the outer edge of the stockpiles as possible. In addition, two background samples (HA-1 and HA-2) were collected that are representative of Bridgeton Formation conditions. The locations of all subsurface samples, including the background samples, are shown in Figure 2-1.

Samples were collected over consecutive 15-centimeter (6-inch) intervals, from the ground surface to depths as great as seven feet. In some sampling locations, slag was observed within the matrix of the near-surface soils. This appears to be the result of the intermingling of surface soils with smaller pieces of slag. Photographs of the test pits that demonstrate this phenomenon are included in Attachment A.

After collection, the samples were placed into coolers, removed from the Storage Yard, and transferred to Building 117 for field screening of gross radioactivity, as described further in Section 2.2. The GPS coordinates were determined for each sample location using a Trimble Asset Surveyor, Version 5.22.

2.1.1 Background Sample Collection

A bucket auger method was used for sample collection at the two background sample locations, HA-1 and HA-2. A thoroughly cleaned and decontaminated bucket auger was advanced into the soil, with samples collected over consecutive 15-centimeter (6-inch) intervals to the maximum depth. At background sample location HA-1, samples were collected to a depth of 1.4 meters (4.5 feet), and at background sample location HA-2, samples were collected to a depth of 1.2 meters (4 feet). Soil logs are provided in Attachment B.

For each 15-centimeter (6-inch) sample interval, the auger was emptied into a stainless steel bowl and the sample was thoroughly mixed using a decontaminated stainless steel spoon. Approximately one liter of the mixed solids was then placed into a ziploc bag. Each bag was marked with a sample ID designating the sample location and depth, the date and time of sample collection, and the initials of the person collecting the sample.

The bucket auger was decontaminated between sample locations. Sample bowls were decontaminated between the collection of samples while sample spoons were dedicated to a given sample interval.

2.1.2 Test Pit Sample Collection

At sample locations HA-3 through HA-6 within the Storage Yard, a backhoe was used to excavate beneath the edges of the stockpiled material and collect subsurface soil samples. A John Deere 310G backhoe with a 24-inch bucket, operated by KB Construction, was used for the test pit excavations. Sample collection is described below for each of the sample locations, and the soil logs are provided in Attachment B.

HA-3 – HA-3, which was located southwest of the CANAL slag (Area 3), intersected the slag/soil interface and extended to a depth of 1.7 meters (5.5 feet) below the ground surface (bgs), with some slag noted to a depth of 0.8 meters (2.5 feet) bgs. Samples were collected at every six-inch interval from the ground surface to a depth of 1.7 meters (5.5 feet).

HA-4 – HA-4 was located southwest of the baghouse dust area (Area 8), beneath an edge of the pile covered with slag, lime, and metal debris. Slag intermixed with sand was observed to a depth of 0.5 meters (1.5 feet) bgs. The test pit ended at a depth of five feet bgs. Samples were collected at 15-centimeter (six-inch) intervals from the ground surface to a depth of 1.4 meters (4.5 feet).

HA-5 – HA-5 was located to the south of the aluminothermic slag in Area 6, between Areas 6 and 7. Slag was incorporated in the soil matrix to a depth of 1.2 meters (4 feet) bgs. Wet soil was encountered at a depth of 1.4 meters (4.5 feet) bgs. Due to the thickness of intermixed soil/slag at this location, sampling continued to a depth of 2.1 meters (7 feet) bgs using a bucket auger from 1.4 to 2.1 meters (4.5 to 7 feet) bgs.

Samples were collected at every 15-centimeter (six-inch) interval from the surface to a depth of 2.1 meters (7 feet). To determine if the wet soil encountered at a depth of 1.4 meters (4.5 feet) was due to perched water, nearby well SC-11S (see Figure 1-2 for location) was gauged immediately after completion of the test pit. The depth to ground water at SC-11S was four meters (13 feet) bgs, supporting the conclusion that the wet soil encountered at location HA-5 was due to localized perched ground water and not the true water table.

HA-6 - HA-6 was located to the west of the northwest portion of the electric arc furnace slag contained in Area 4. Little or no slag was observed as being intermixed with the soil below the ground surface at this location. The test pit ended at a depth of 1.4 meters (4.5 feet) bgs, with samples collected at 15-centimeter (six-inch) intervals from the ground surface to that depth.

A standard round-point shovel, decontaminated between sample intervals, was utilized to collect samples for each 15 centimeter (six-inch) interval of the test pit sidewalls for the sample locations described above. Each sample was transferred to a decontaminated stainless-steel bowl, homogenized using a dedicated stainless steel spoon, and then transferred into a ziploc bag. Each bag was marked as described in Section 2.1.1 above.

2.2 Field Screening of Samples

After collection, the samples were transferred from the Storage Yard to Building D-117 where they were field-screened for the presence of radioactivity. The results were recorded on the sample collection log. Field screening was conducted by IEM personnel pursuant to IEM Procedure No. RSP-106, "Radionuclide Screening of Slag and Baghouse Dust at Newfield", Rev. 0, June 12, 2008, a copy of which is included in Attachment G. The qualifications of the IEM employee conducting the screening are presented in Attachment C. Attachment D contains a copy of the Field Activity Daily Logs that were maintained during the on-site effort.

The instruments used for the field screening included the following:

- Ludlum Model 19 microRem Meter for ambient gamma measurements;
- Ludlum Model 12 ratemeter with a Ludlum 44-9 pancake GM probe for surface contamination measurements; and
- Ludlum Model 2241 ratemeter with a Model 44-10 sodium iodide detector for the field screening of the samples.

Each instrument was checked prior to use to ensure proper functioning, response checked to a reference radiation source, and inspected for physical damage.

Background measurements were made in the parking lot of the facility, near the south-west access gate. Average background for the Model 19 was six microRem/hr. For the Model 2241/44-10, the background averaged approximately 4,000 counts per minute (cpm). Background for the Ludlum Model 12/44-9 varied from 50 to 60 cpm in Building D-117 and in the facility parking lot, and up to 200-300 cpm near the Storage Yard access point. A separate background for the Model 2241/44-10 was obtained in Building D117 where the samples were field screened. These results were approximately 5000 to 6000 cpm. Attachment E contains the instrument records for this project.

In Building D-117, two processing areas were designated: the first area for sample storage and the second area for sample handling and screening. A baseline contamination survey was performed in each area in order to characterize the pre-work radiological conditions (see Attachment F). After the survey was complete, the floors were covered with plastic sheeting.

On June 20, 2008, the samples in the ziploc bags were subject to gross radioactivity scanning using the Model 2241/44-10. Those with count rates above background had a portion of their contents transferred into a one-liter Marinelli beaker, which was subsequently field-screened pursuant to RSP-106 (see Attachment G). Ambient exposure rates in the work area were monitored at least hourly throughout the screening process.

Upon completion of the screening, each sample aliquot in the Marinelli beaker was returned to its respective ziploc bag, and the bag was placed into a sample cooler. Those bags that exhibited background levels of radioactivity during the gross radioactivity scans were also placed into sample coolers for subsequent storage.

A chain-of-custody form was prepared for the filled coolers (see Attachment H). Custody of each cooler was then relinquished to the SMC Radiation Safety Officer, who moved the coolers into a locked room adjacent to the Building D-117. A post-operational contamination survey of the work areas in Building D-117 was performed and documented. The results of the survey demonstrated no radiological contamination due to the field screening (see Attachment F).

2.3 Interpretation of Screening Results

Aliquots from ten of the field-screened samples were sent to an off-site laboratory for radionuclide analyses for use in generating a calibration curve for the gross radioactivity screening results, pursuant to RSP-106. The aliquots were selected to represent a range of count rates, from low to high. At the laboratory, the moisture content of each sample was measured, and the samples were then prepared (by drying, grinding, sieving, sealing into a counting container, etc.), stored for at least 21 days from the date of sample preparation, and then analyzed by the methodology of gamma spectroscopy. Attachment I contains the Certificates of Analysis.

For the 10 aliquots, a regression analysis between the analytical results for thorium, uranium, and radium and the corresponding radioactivity screening values produced the following results:

- Thorium (Ac-228): X-coefficient = 0.0010; intercept = 1.579; and R^2= 83%.
- Uranium (Th-234): X-coefficient = 0.0008; intercept = 0.959; and R^2 = 22%.[4]
- Radium (Bi-214): X-coefficient = 0.0006; intercept = 1.427; and R^2 = 99%.

These results translate into the following equations that model the correlation between the analyzed isotopic concentrations and the screening values:

- Th-232 (pCi/g) = cpm (net) x 0.0010 + 1.579
- U-238 (pCi/g) = cpm (net) x 0.0008 + 0.959
- Ra-226 (pCi/g) = cpm (net) x 0.0006 + 1.427

A table showing the calculated and measured radionuclide concentrations, along with the recorded visual observations (see Attachment J), demonstrates that radioactivity levels clearly above background were present only in those samples that contained visible amounts of slag or

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[4] Two of the analytical results for Th-234 were atypical of those that expected from a natural distribution of thorium and uranium isotopes: Lab ID 20080583-03 (Client ID HA-1/0.0-0.5) and Lab ID 20080585-05 (Client ID HA-3/1.0-1.5). Nonetheless, these results, although likely attributable to an analytical anomaly, were included in the regression analysis, and the goodness of fit reflects the variation.

baghouse dust. Soil samples collected from below the depth where slag or baghouse dust was identified exhibited radionuclide concentrations that were undistinguishable from background (i.e., less than about 2 pCi/g) and isotopic distributions that are typical for both SMC facility materials and for natural soil (i.e., approximately equal concentrations of uranium, thorium and radium).[5]

For example, samples collected at location HA-3 exhibit thorium, uranium or radium concentrations in excess of a nominal 2 pCi/g background concentration to a depth of about 2.5 feet bgs. The field notes for that test pit show slag was present to a depth of 2.5 feet bgs. However, below 2.5 feet, the radionuclide concentrations are within the range of background, the isotopic ratios are approximately equal, and the field notes indicate that slag is not present. Similarly, samples collected at location HA-4 exhibit radionuclide concentrations above 2 pCi/g and the visual presence of slag and sand (likely baghouse dust) to a depth of about 1 foot. At greater depths, the radionuclide concentrations are indistinguishable from background, the isotopic ratios approximately equal and no slag is identified.

It is also important to note that for all of the test pits, radionuclide concentrations above background levels were only observed to a maximum depth of one meter (three feet) bgs (i.e., sample locations HA-3 and HA-5), which is well-above the depth to ground water under the Storage Yard (i.e., from 6 feet in the northeast corner to 4.3 meters (14 feet) in the northwest corner). This provides additional evidence that no radioactivity from the SMC facility has migrated to the water table, and thus it is reasonable to conclude, from the screening and analysis of soil under the various stockpiles in the Storage Yard, that radioactivity has not come in contact with the ground water and that no leaching of the more environmentally mobile isotopes (i.e., those of radium) has taken place. The absence of elevated radioactivity levels in the soil between the base of the stockpiles of slag (HA-3, HA-5 and HA-6) or baghouse dust (HA-4) and the water table further demonstrates that migration has not occurred since the time of initial placement of the slag in the Storage Yard over 40 years ago.

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[5] Because all testing performed to date on SMC's slag and baghouse dust demonstrates the uranium and thorium therein are tightly bound and that surface radium is mobilized only under highly basic conditions, if leaching contributed to the radionuclide concentrations in the subsurface soil layers, one would expect results that were enriched in radium.

3.0 GROUND WATER QUALITY CHARACTERIZATION AND INTERPRETATION

The radiological content of the ground water at the SMC facility and in the adjacent areas has been assessed frequently over the course of recent years through the performance of radioactivity analyses in connection with ground water monitoring events, including those in connection with regularly scheduled CERCLA chemical ground water monitoring. These events have included the characterization of ground water both at the SMC facility and at off-site (including upgradient) locations.

3.1 Summary of Ground Water Sampling Events and Results

Several rounds of ground water sampling for radioactivity were conducted from the late 1980s through 1990, in 1995, and then again in 2004, 2005, 2007, and 2008. Measured radionuclide concentrations obtained in those sampling rounds were compared to drinking water standards set by the EPA.

Drinking water standards have been established by EPA for combined Ra-226/228 (5 picocuries per liter or pCi/l standard), uranium (30 ug/l standard), for gross alpha activity (15 pCi/l) and for gross beta/photon emitter activity (four mrem/yr dose potential). For beta-photon emitter activity, the screening level of 50 pCi/l defined at 40 CFR 141 was used in the evaluation of ground water quality.

The wells that were included in the radiologic ground water monitoring events and the years in which they were sampled are indicated on Figure 3-1. Monitoring included on-site monitoring wells and USGS observation well OBS-2A (representative of background conditions), as well as select off-site well locations, which are indicated in Figure 3-2. The purpose of these analyses was to determine if licensed radioactivity has impacted ground water beneath the facility. During some events, both filtered and unfiltered ground water samples were analyzed to determine the effects of suspended solids on ground water quality data.

The results of the radiological ground water analyses are summarized by well location in Table 3-1. For the ground water samples collected in the late 1980s through 1990 by Dan Raviv Associates (DRAI, 1990), when isotopic analyses were conducted, all results were less than 5 pCi/l. Gross alpha activities were also below the 15 pCi/l drinking water standard. The highest detected level of gross beta activity was 530 pCi/l in an unfiltered sample collected at well SC-13S. Exceedances of the gross beta screening level of 50 pCi/l were also detected in a filtered sample collected from well SC11S and in filtered and unfiltered samples from well SC-12S. Wells W2, W3, and A, however, were consistently below the standards/screening levels for both gross alpha and beta activity.

In July 1995, ground water samples were collected from wells A, W2(R), SC-11S(R), SC-12S, SC-13S, and SC-14S and analyzed for Actinium-228, Bismuth-214, Lead-212, Lead-214, and Thallium-208. No exceedances of standards or screening criteria were identified.

The annual Superfund-related ground water sampling event conducted in April 2004 included the collection of additional sample volumes to undergo radiochemical analysis (TRC, 2004). At the request of the NJDEP, ground water from select well locations surrounding the Storage Yard was analyzed for gross alpha activity, gross beta activity, Ra-226, Ra-228, and Uranium-238 (U-238). In addition, samples from USGS observation well OBS-2A (an off-site upgradient well) were submitted for radiochemical analysis. Samples were collected for both filtered and unfiltered analyses. For the filtered samples, the sediment removed by the filter was also analyzed for U-238.

None of the wells, including USGS observation well OBS-2A, exhibited gross alpha, Ra-226, Ra-228 or U-238 concentrations in excess of applicable drinking water standards. One of the monitoring wells (SC-12S) exhibited gross beta levels (in the unfiltered sample) that exceeded the 50 pCi/l screening level. The unfiltered sample from monitoring well SC-12S exhibited 128 pCi/l gross beta, which was confirmed by the duplicate sample (SC-32S at 115 pCi/l). Another set of samples was collected from SMC wells SC-25S, SC-11S, SC-12S, and SC-13S on April 13, 2005. A Borough of Newfield well was also sampled at that time to obtain representative background levels. The samples (both filtered and unfiltered fractions) were analyzed for gross alpha/beta, isotopic thorium, isotopic uranium, and isotopic radium. The results of this sampling round are included in Table 3-1. The non-radium isotopes met the EPA's drinking water standard for non-radium nuclides. The combined Ra-226 and Ra-228 results for two on-site wells (SC-11S and SC-13S) and for the background Borough well were slightly higher than 5 pCi/l, the MCL for combined Ra-226 and Ra-228. The results of the single sample collected from the Borough well did not indicate non-compliance with the drinking water standards because compliance with those standards for public water supplies is assessed based on annual average radionuclide concentrations (i.e., average of quarterly monitoring results, not a single measurement).

Additional radiological ground water sampling and analyses were conducted in July 2007, March 2008, and July 2008. In July 2007, samples were collected from wells A, W2(R), SC-11S(R), SC-12S, SC-12D, SC-14S, SC-20S, SC-20D, SC-22S, SC-25S, SC-26D, IWC-2, IWC-3, and SC-32D as well as Newfield wells #3 and 5. The July 2007 samples were subjected to gross alpha/beta analysis (including 48-hour assessments), Potassium-40 (by gamma spectroscopy), isotopic thorium, isotopic uranium, and isotopic radium analyses. Sampling of wells SC-20S and SC-20D was also conducted in March 2008, with the samples analyzed only for isotopic radium. For the July 2007 sampling event, gross beta activities in filtered and unfiltered samples collected from well SC-12S exceeded the 50 pCi/l screening level, and the gross alpha activities in the unfiltered samples from wells SC-12S, SC-20D, and Newfield Well #5 exceeded the 15 pCi/l standard. The 5 pCi/l standard for combined radium was not exceeded in wells SC-12S or Newfield Well #5, but was exceeded in well SC-20D (where Ra-226 was detected at 3.34 +/- 0.360 pCi/L and Ra-228 was detected at 3.46 +/- 0.065 pCi/L). This measurement for well SC-20D, which was thought to be attributable to seasonal variations, was repeated in the March 2008 sampling round, at which time the total radium concentrations were only slightly above the standard (Ra-226 was detected at 3.02 +/- 0.344 and Ra-228 was detected at 3.09 +/- 0.76).

In July 2008, samples were collected from wells A, W2(R), SC-11S(R), SC-12S, SC-12D, SC-13S(R), SC-14S, SC-20S, SC-20D, and SC-25S, as well as Newfield wells #3 and 5 and USGS observation well OBS-2A. The July 2008 samples were analyzed for isotopic radium and the presence of other, non-radiological, parameters of interest (barium, magnesium, calcium, aluminum, alkalinity, chloride, and nitrate), as identified by the USGS studies discussed in Section 1.1. Field measurements of pH and oxidation/reduction potential were also made. In the July 2008 sampling event, the combined radium concentration in well SC-20D again slightly exceeded the 5 pCi/l standard (Ra-226 was detected at 4.59 +/- 0.485 pCi/L and Ra-228 was detected at 2.20 +/- 0.527 pCi/L), and the combined radium concentration in Newfield Well #5, which is screened within the deep Cohansey Sand, was below the 5 pCi/l standard (Ra-226 was detected at 1.25 +/- 0.259 pCi/L and Ra-228 was detected at 1.34 +/- 0.058 pCi/L).

3.2 Evaluation of Ground Water Results

Based on all the ground water characterization data, exceedances of the 5 pCi/l standard for combined radium isotopes have occurred only in isolated locations and sampling events (i.e., well SC-11S -- April 2005 filtered sample only; well SC-13S -- April 2005 unfiltered sample only) or have been limited to deep wells (i.e., SC-20D -- July 2007 and March and July 2008 samples, and a Newfield well sample from April 2005. Similarly, exceedances of the gross alpha standard have also been limited to wells SC-12S, SC-20D and Newfield Well #5 in 2007.

With respect to the beta-photon emitter activity limit of 50 pCi/l, that level was exceeded in shallow wells SC-11S and SC-13S in the late 1980s/1990 and in shallow well SC-12S in the late 1980s/1990, 2004 and 2007. However, based on the results of the July 2007 sampling round, where K-40 analyses were a part of the analytical protocol, the levels of gross beta activity in these wells are attributable to elevated potassium concentrations and not to releases of radioactivity from the SMC facility. The isotope K-40 is a naturally-occurring radionuclide that is found wherever potassium is found.[6,7]

As indicated in Section 1.1, the USGS has documented a correlation between certain constituents and combined radium levels, including a correlation between elevated combined radium levels of greater than five pCi/l and nitrate plus nitrite (as nitrogen) levels greater than five mg/l. Therefore, the 2008 ground water samples were analyzed for additional constituents and properties (barium, magnesium, calcium, aluminum, alkalinity, chloride, nitrate, pH, and oxidation reduction potential (ORP)) to determine if any correlations exist between their presence for ground water in the vicinity of the facility and the radium levels measured at some locations. A summary of the 2008 analytical results for the key constituents identified by the

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[6] The human body maintains relatively tight homeostatic control over potassium levels, meaning the consumption of food or water that contains potassium will not increase the body's potassium content. As such, eating foods like bananas or drinking water with elevated K-40 concentrations does not increase the individual's radiation dose.

[7] It is unclear what the origin of the K-40 is. K occurs naturally, KNO_3 is used agriculturally, and $KClO_4$ was historically used at the SMC facility. Potassium perchlorate was used at the SMC facility, giving potassium chloride as a reaction product appearing as a component of the slag and baghouse dust. In addition, potassium was present as a "tramp" (i.e., extraneous) element in a number of the raw materials in use at the SMC facility.

USGS as having clear correlations with radium levels is provided in Table 3-2 for shallow and deep wells.

The radium/nitrate correlation was identified in the July 2008 data for well SC-20D and Newfield Well #5; the samples from these two wells contained combined radium at levels approaching or greater than 5 pCi/l and also contained nitrate plus nitrite (as nitrogen) levels exceeding 10 mg/l. This relationship is shown graphically in Figure 3-3. Table 3-2 and Figure 3-3 also show that the combined radium concentrations of the other deep wells are all significantly higher than the combined radium concentrations of the shallow wells. Furthermore, the nitrate plus nitrite concentrations of at least four of the six deep wells are significantly higher than the shallow well nitrate plus nitrite concentrations.

The USGS also found that radium levels are inversely correlated with pH levels. Figure 3-4 graphically shows combined radium concentrations relative to pH levels for shallow and deep wells. As indicated there and in Table 3-2, three wells screened within the deep Cohansey Sand have pH less than 5.0, whereas pH is greater than 5.0 in all of the shallow wells. It is also significant that total alkalinity is low to non-detectable in the deep ground water, in contrast to much higher alkalinity in most of the shallow wells (see Table 3-2). Only the two deep wells (wells A and OBS-2A) with the highest pH have some (low) alkalinity. The nearly complete lack of buffering capacity of the deep ground water reflects the generally acidic water migrating through this section of the aquifer.

The USGS also found a positive correlation between concentrations of combined radium and concentrations of calcium. As indicated in Table 3-2 and Figure 3-5, the deep wells (SC-20D and Newfield Well #5), which exhibited the highest combined radium levels, also exhibited the highest calcium levels among the wells screened in the deep Cohansey Sand.

3.3 Regional Context for Radium in Ground Water

Elevated concentrations of Ra-224, Ra-226, and Ra-228, as well as gross alpha activity concentrations in excess of 15 pCi/l, are common in ground water in the Kirkwood-Cohansey aquifer system in the New Jersey Coastal Plain (Kozinski, et al., 1995; Szabo et al., 2005). Some of this radioactivity is attributed to leaching of uranium and radium from naturally occurring, mineralogically immature sediments of the Bridgeton Formation, and this leaching is enhanced by agricultural chemicals. The relationship between the level of radioactivity in ground water and geology and land use is statistically significant and nonrandom (Kozinski, et al., 1995).

The Cohansey Sand dips on average southeast about 1.9 to 2.0 meters per kilometer (10 to 11 feet per mile) and ranges in thickness from about a meter in the updip limit area of the Cohansey Sand in the northwest to 39.6 meters (130 feet) at Newfield. The Cohansey Sand is in angular unconformable contact with the relatively flat-lying Bridgeton Formation over an extensive area of Gloucester County (see Figure 1 of Attachment K; Hardt and Hilton, 1969). This angular contact provides the means for the radioactive constituents leached from the Bridgeton Formation to directly enter the Cohansey Sand at all stratigraphic levels.

Figures 3-6 and 3-7 indicate the concentrations of combined radium (226 and 228) and nitrate plus nitrite (as nitrogen), as well as pH, in the shallow and deep wells based on the July 2008 ground water data. The figures show that the higher combined radium levels and nitrate levels are detected in the wells screened within the deeper Cohansey Sands, including an upgradient deep well. In contrast, lower concentrations of these constituents are detected in shallow wells. The paired wells SC-12S/SC-12D and SC-20S/SC-20D also show lower pH in the deeper screened wells. Table 3-2 also shows that the chemistry of the shallow ground water is very different from that of the deep ground water.

The Cohansey Sand contains many extensive clay lenses up to 25 feet thick and, at least locally, has more than one water-bearing zone. Low pressure confined conditions exist over relatively large areas, especially in the lower sections of the aquifer (Hardt and Hilton, 1969; Rhodehamel, 1973). This stratification of the aquifer, combined with the angular contact with the Bridgeton Formation, provides an explanation for the different levels of radioactivity observed in shallow and deep ground water beneath the facility. This stratification is reflected in the very different chemistry of shallow and deep ground water.

The Kirkwood Formation and the Cohansey Sand are hydraulically connected, and the potentiometry of the Kirkwood Formation (see Figure 2, Attachment K) indicates generally smooth radial southwest-south-eastward regional ground water migration from about the center of Gloucester County (Rhodehamel, 1973). Although the water table in the Cohansey Sand is highly irregular (see Figure 3, Attachment K), following local surface topography (Hardt and

Hilton, 1969), deeper regional potentiometry and ground water migration in the stratified aquifer should be broadly similar to the Kirkwood Formation.

The differences in chemistry of the shallow and deep ground water at the SMC facility support different flow paths and recharge areas of each section of the Cohansey Sand. The broad south-to-southeastward component of ground water migration in the lower Cohansey Sand from the updip areas where it subcrops the Bridgeton Formation, in contrast to the irregular potentiometry and local flow paths of shallow ground water, is an important factor in the interpretation of differences in radium, nitrate, and pH in the shallow and deep ground water at the facility. The lower Cohansey Sand is in direct contact with the Bridgeton Formation updip to the northwest of the facility over a large area (Figure 1, Attachment K). Numerous large tracts of farmland are present in this area (Figure 4, Attachment K). These farms and the underlying Bridgeton Formation are the likely source of the radioactivity and nitrate levels in the deep ground water beneath the facility. The Bridgeton Formation is missing over large areas of southern Gloucester County, where the upper Cohansey Sand is exposed at the ground surface (Figure 1, Attachment K). Moreover, the hydraulically upgradient (local gradient) area of Cohansey Sand overlain by Bridgeton Formation is limited in the vicinity of the facility (compare Figures 1 and 3, Attachment K). This limitation, combined with relatively sparse agricultural activity to the northeast (up-gradient) of the facility (Figure 4, Attachment K), explains the comparatively low radionuclide content of the shallow ground water.

There is some agricultural activity in the immediate vicinity and upgradient of the facility (Figure 5, Attachment K), where the Cohansey Sand is overlain by the Bridgeton Formation (Figure 1, Attachment K). This may, at least partially, account for the levels of radioactivity in the shallow ground water beneath the facility, which are nonetheless low. Furthermore, natural leaching of the Bridgeton Formation from infiltration of precipitation where it overlies the Cohansey Sand probably contributes to the radioactivity in shallow ground water beneath the facility.

The increasing truncation of the Cohansey Sand in the updip direction also limits the potential sources and load of radioactive constituents to the upper Cohansey Sand. Natural contributions to radioactivity of the ground water in the upper Cohansey Sand are limited by the limited area of Bridgeton Formation overlying the upper Cohansey Sand. Only farms relatively near the facility, within an area of Bridgeton Formation at the surface, and directly up the local upgradient can augment the natural contributions to the radioactivity in the shallow ground water that migrates beneath the facility. In contrast, the deeper ground water migrating beneath the facility can receive natural and agricultural-induced loads from a very broad area up-dip and up-gradient. These loads can be introduced directly to the lower Cohansey Sand, where the lower section subcrops the Bridgeton Formation over a broad area. Additionally, loads to the stratigraphically higher section (within shallow ground water) over a much broader area can migrate downward into deeper ground water under vertical hydraulic gradients associated with infiltration of precipitation.

The lower radium concentrations in the shallow ground water relative to the higher radium concentrations in the deeper ground water beneath the facility lead to the conclusion that leachate from the slag piles could not have caused or contributed to the radium levels in the deep ground water. Such levels are the result of natural processes and agricultural activities upgradient of the SMC facility. Likewise, natural and agriculturally-induced leaching of the Bridgeton Formation also occurs in the vicinity of the facility, thus the radium levels, albeit low, in shallow ground water beneath the facility do not result from leaching of the slag.

4.0 CONCLUSIONS

A 1998 subsurface soil and ground water assessment performed by an NRC contractor (ORAU) demonstrated that radionuclides were not migrating from the Storage Yard and into the ground water at the Newfield site. A 2008 subsurface soil sampling campaign within the Storage Yard also demonstrated that no radioactivity has migrated to the ground water from the materials that have been stockpiled there for over 40 years. Likewise, the many ground water sampling/analysis events that have taken place since 1988 show radionuclide concentrations have been, with few exceptions, well below the MCLs set by the EPA. Those exceptions that were verified by more than one round of sampling were in samples collected from deep wells, including wells upgradient and sidegradient of the Storage Yard, that exhibit elevated nitrate and low pH levels indicative of agriculturally-induced leaching of natural radium. Thus, the materials present in the Storage Yard have not resulted in the migration of radionuclides into the ground water in the vicinity of the Newfield site.

5.0 REFERENCES

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TABLES

TABLE 1-1
EXISTING AND HISTORIC MONITORING/EXTRACTION WELL CONSTRUCTION DETAILS
SHIELDALLOY METALLURGICAL CORPORATION

WELL #	LOCATION REF.	PERMIT #	INSTALLATION DATE	CASING TYPE / DIAMETER	GROUND ELEVATION (msl) (2)	TOP OF INNER CASING ELEV. (msl) (2)	WELL DEPTH (ft) (3)	SCREENED INTERVAL (ft) (3)	SCREENED INTERVAL ELEVATION (msl) (1) (2)
EXISTING MONITORING WELLS SCREENED IN THE LOWER COHANSEY SAND:									
A	Fig. 3-14	51-142	1970	STEEL/2"	-	94.82	124	114 to 124	-21.18 to -31.18
IWC3	Fig. 3-14	51-222	1/74	STEEL/2"	-	97.83	60	55 to 60	40.83 to 35.83
IWC4	Fig. 3-14	51-223	1/74	STEEL/2"	-	98.61	80	75 to 80	21.61 to 16.61
IWC5	Fig. 3-14	51-224	1/74	STEEL/2"	-	98.03	100	95 to 100	1.03 to -3.97
W3D	Fig. 3-14	31-25759	12/5/86	PVC/4"	-	108.37	108	88 to 108	18.37 to -1.63
W-4	Fig. 3-14	51-219	5/8/74	PVC/4"	-	104.58	75	55 to 75	47.58 to 27.58
SC-12D	Fig. 3-14	31-35226-0	11/28/90	PVC/4"	102.16	103.19	140	126 to 136	-23.84 to -33.84
SC-13D	Fig. 3-14	31-35227-8	11/29/90	PVC/4"	99.67	101.99	140.5	127 to 137	-27.33 to -37.33
SC-20D	Fig. 3-14	31-38187	1/10/92	PVC/4"	101.55	104.53	139	129 to 139	-27.45 to -37.45
SC-22D	Fig. 3-14	31-35222-7	11/21/90	PVC/4"	96.18	98.72	125	111 to 121	-14.82 to -24.82
SC-1D	Fig. 3-14	31-21619-6	5/30/84	PVC/2"	88.00	90.90	115	85-95/100-115	3 to -7 / -12 to -27
SC-2D(R)	Fig. 3-14	31-38194	1/3/92	PVC/4"	90.62	92.70	-	106 to 116	-15.38 to -25.38
SC-3D(R)	Fig. 3-14	31-38195	1/7/92	PVC/4"	88.75	91.06	-	102 to 112	-13.25 to -23.25
SC-4D	Fig. 3-14	31-21690-1	6/8/84	PVC/2"	-	92.64	120	110 to 120	-19.36 to -29.36
SC-5D	Fig. 3-14	31-21876-8	6/12/84	PVC/2"	-	97.00	120	90 to 120	5.00 to -25.00
SC-6D	Fig. 3-14	31-21878-4	6/26/84	PVC/2"	-	94.38	125	110 to 120	-17.62 to -27.62
SC-10D	Fig. 3-14	31-23370	11/12/85	PVC/4"	-	95.72	125	105 to 125	-11.28 to -31.28
SC-17D	Fig. 3-14	31-35223-5	11/27/90	PVC/4"	106.48	108.07	153	143 to 153	-36.52 to -46.52
SC-18D	Fig. 3-14	31-35228-6	11/20/90	PVC/4"	93.56	96.01	130	119 to 129	-25.44 to -35.44
SC-19D	Fig. 3-14	31-35221-9	11/26/90	PVC/4"	89.65	92.03	133	120 to 130	-30.35 to -40.35
SC-21D	Fig. 3-14	31-35220-1	11/27/90	PVC/4"	90.44	91.65	140	125 to 135	-34.56 to -44.56
SC-24D	Fig. 3-14	3142083	8/24/93	PVC/4"	-	93.52	115	105 to 115	-13.48 to -23.48
SC-26D	Fig. 3-14	31-39500	7/9/1992	PVC/4"	100.68	100.45	143	127 to 137	-26.32 to -36.32
IW-2	Fig. 3-14	-	11/12/85	PVC/6"	-	91.05	70	40 to 70	49.05 to 19.05
SC-28D	Fig. 3-14	31-47408	8/16/95	PVC/4"	107.41	106.87	153	133 to 153	-25.59 to -45.59
SC-29D	Fig. 3-14	31-47409	2/20/97	PVC/4"	106.50	106.23	148	128 to 148	-21.50 to -41.50
SC-30D	Fig. 3-14	31-63686	6/14/02	PVC/2"	114.59	115.58	157	147 to 157	-32.41 to -42.41
SC-31D	Fig. 3-14	31-66758	6/25/02	PVC/2"	99.78	102.61	130	120 to 130	-20.22 to -30.22
SC-32D	Fig. 3-14A	3500027314	12/16/06	PVC/2"	-	-	102	92 to 102	- - -
OBS-2A**	Fig. 3-14	31-06092	-	-	-	122.80	154	129 to 149	-8.20 to -28.20
EXISTING GROUND WATER TREATMENT SYSTEM EXTRACTION WELLS SCREENED IN THE LOWER COHANSEY SAND:									
W-9	Fig. 3-14	31-19648	10/17/82	PVC/6"	-	94.43	130	110 to 130	-17.57 to -35.57
RW6D	Fig. 3-14	31-28711	08/05/88	PVC/8"	-	93.08	125	90 to 125	1.08 to -33.92
HISTORIC MONITORING WELLS SCREENED IN THE LOWER COHANSEY SAND: (4)									
W2	Fig. 3-14	51-218	5/21/1974	PVC/4"	-	-	120	55 to 60	- - -
							and	116 to 120	- - -
EXISTING MONITORING WELLS SCREENED IN THE UPPER COHANSEY SAND:									
B	Fig. 3-14	51-143	1970	STEEL/2"	-	94.33	46	36 to 46	56.33 to 46.33
K	Fig. 3-14	51-152	1971	STEEL/2"	-	99.18	46	36 to 46	61.18 to 51.18
L	Fig. 3-14	51-153	1971	STEEL/2"	-	103.51	52	42 to 52	59.51 to 49.51
IWC1	Fig. 3-14	51-220	1/74	STEEL/2"	-	98.13	20	15 to 20	81.13 to 76.13
IWC2	Fig. 3-14	51-221	1/74	STEEL/2"	-	98.51	40	35 to 40	61.51 to 56.51
W2(R)	Fig. 3-14	31-38189	12/20/91	PVC/4"	95.88	97.96	17	2 to 17	93.88 to 78.88
SC-9S	Fig. 3-14	31-23368-6	8/1/85	PVC/4"	-	96.23	30	15 to 30	79.23 to 64.23
SC-11S(R)	Fig. 3-14	31-39512	7/1/92	PVC/4"	106.91	108.12	24	9 to 24	97.91 to 82.91
SC-12S	Fig. 3-14	31-29140-6	9/2/88	PVC/2"	-	104.76	25	15 to 25	87.76 to 77.76
SC-13S(R)	adj to SC-13S	Replacement well installed in June 2008; not yet surveyed							
SC-14S	Fig. 3-14	31-35215-4	11/15/90	PVC/4"	105.83	108.38	27	12 to 27	93.83 to 78.83
SC-15S	Fig. 3-14	31-35216-2	11/13/90	PVC/4"	106.06	108.32	27.5	12.5 to 27.5	93.56 to 78.56
SC-16S	Fig. 3-14	31-35217-5	11/14/90	PVC/4"	105.32	108.05	27	12 to 27	93.32 to 78.32
SC-20S	Fig. 3-14	31-35218-3	11/13/90	PVC/4"	101.74	104.45	22	7 to 22	94.74 to 79.74
SC-22S	Fig. 3-14	31-35219-7	11/14/90	PVC/4"	96.17	99.65	18	3 to 18	93.17 to 78.17
SC-23S	Fig. 3-14	31-35437-8	11/16/90	PVC/4"	102.83	102.21	24	9 to 24	93.83 to 78.83
SC-25S	Fig. 3-14	31-38188	12/23/91	PVC/4"	-	102.27	21	6 to 21	94.27 to 79.27
SC-27S	Fig. 3-14	31-41031	12/15/92	PVC/4"	-	100.54	22	7 to 22	91.54 to 76.54
SC-1S	Fig. 3-14	31-28825-1	6/22/88	PVC/4"	-	87.26	55	35 to 55	50.26 to 30.26
SC-3S	Fig. 3-14	31-28914-2	6/8/88	PVC/4"	-	90.32	55	35 to 55	53.32 to 33.32
SC-4S	Fig. 3-14	31-21689-7	6/7/84	PVC/2"	-	93.65	45	35 to 45	56.65 to 46.65
SC-5S	Fig. 3-14	31-35434-1	11/28/90	PVC/4"	94.18	96.55	20	5 to 20	89.18 to 74.18
SC-6S	Fig. 3-14	31-21691-5	6/21/84	PVC/2"	-	94.62	75	45 to 75	47.62 to 17.62
SC-10S	Fig. 3-14	31-23369	11/11/85	PVC/4"	-	95.38	55	35 to 55	58.38 to 38.38
SC-17S	Fig. 3-14	31-35229-4	11/19/90	PVC/4"	106.53	109.26	28	13 to 28	93.53 to 78.53
SC-18S	Fig. 3-14	31-35230-8	11/15/90	PVC/4"	93.43	95.72	19	4 to 19	89.43 to 74.43
SC-19S	Fig. 3-14	31-35224-3	11/15/90	PVC/4"	90.14	92.98	17	2 to 17	88.14 to 73.14
SC-21S	Fig. 3-14	31-35225-1	11/15/90	PVC/4"	90.57	92.64	18	3 to 18	87.57 to 72.57
SC-24S	Fig. 3-14	31-35435-1	11/28/90	PVC/4"	91.57	93.57	20	5 to 20	86.57 to 71.57
IW-1	Fig. 3-14	-	4/5/83	PVC/6"	89.06	90.33	62	32 to 62	57.06 to 27.06
EXISTING GROUND WATER TREATMENT SYSTEM EXTRACTION WELLS SCREENED IN THE UPPER COHANSEY SAND:									
Layne	Fig. 3-14	51-154	1971	STEEL/6"	-	94.11	47	42 to 47	50.11 to 45.11
RW6S	Fig. 3-14	31-28710	06/16/88	PVC/8"	-	92.70	75	55 to 75	35.70 to 15.70
RIW2	Fig. 3-14	31-28712	08/02/88	PVC/8"	-	91.52	75	30 to 55	59.52 to 34.52
HISTORIC MONITORING WELLS SCREENING IN THE UPPER COHANSEY SAND: (4)									
W3S	Fig. 3-14	31-25760	12/05/86	PVC/4"	-	-	62	42 to 62	- - -
SC11S	Fig. 3-14	31-29139-2	09/01/88	PVC/2"	-	-	27	20 to 27	- - -
SC-13S	Fig. 3-14	31-29570-3	9/9/88	PVC/2"	-	101.41	24.7	14.7 to 24.7	84.71 to 74.71

Note:

(1) - Screened interval elevations for well locations without surveyed ground elevations calculated assuming a ground elevation of 2 feet below the surveyed well elevation (i.e., top of inner casing elevation)..

(2) - All elevations based on vertical datum NGVD 1929

(3) - Feet Below Grade

(4) - Only historic wells which were used for radiological ground water characterization are listed.

* - Monitoring well not surveyed, casing elevation is approximate.

* *- USGS observation well (NJ-WRD Well Number 15-0372) land surface is 120 feet above NGVD 1929, with the measuring point 2.80 ft above the land surface. The total well depth is 154 feet, with a screened interval of 129-149 feet below grade. (USGS Water Resources Data, New Jersey Water Year 2002 Vol. 2: Water Data Report NJ-02-2)

All wells are owned by SMC, except for well OBS-2A which, as indicated above, is a USGS observation well and all wells are "active" (i.e., not damaged or abandoned).

All wells are either monitoring wells or extraction wells used for CERCLA ground water remediation, as noted in the table.

msl - Feet Above Mean Sea Level ft - Feet

TABLE 3-1
GROUND WATER RADIOLOGICAL SUMMARY TABLE
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ

WELL NUMBER	A				A			A				A		
DATE SAMPLED	12/17/1988				4/25/1989			8/1/1989				9/28/1989		
LABORATORY ID NUMBER	MT24072	MT24073	MT24074	SMC	MT28511	MT28512	SMC	Teledyne74140	Teledyne74139	Teledyne74141	Teledyne74142	Teledyne79778	Teledyne79778	Teledyne79778
SAMPLE TYPE	Filtered	Unfiltered	Unfiltered	Unfiltered	Filtered	Unfiltered	Unfiltered	Filtered	Unfiltered	Filter Paper	Filter Paper	Filtered	Unfiltered	Filter Paper
PARAMETERS (pCi/L)														
Gross Alpha	<2	<2	NA	NA	<2	<2	NA	<4.0	<5.0	<0.5	<0.4	<3.0	<3.0	<0.4
Gross Beta	4.7 +/- 2.2	9.1 +/- 2.4	NA	NA	<3	3.2 +/- 1.7	NA	<5.0	<6.0	<0.7	<0.8	<5.0	<5.0	<0.7
pH	NA	NA	NA	10.70	NA	NA	10.32	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	49	82	NA	NA	57	NA	NA	NA	NA	NA	NA	NA

WELL NUMBER	A	A			A	A
DATE SAMPLED	7/18/1995	Apr-04			7/25/2007	7/10/08
LABORATORY ID NUMBER	L5069-7	F4D100111-014	F4D100111-006	F4D100111-022	20070721-04	20080595-14
SAMPLE TYPE	N/A	Filtered	Unfiltered	Filter Paper	Unfiltered	Unfiltered
PARAMETERS						
Radiological (pCi/L)						
Gross Alpha (48 hour)	NA	NA	NA	NA	0.53 +/- 1.69	NA
Gross Beta (48 hour)	NA	NA	NA	NA	0 +/- 7.83	NA
Gross Alpha	NA	0.55U +/- 0.9	0.7U +/- 1.1	NA	NA	NA
Gross Beta	NA	13.0 +/- 2.0	1.9J +/- 1.2	NA	NA	NA
Actinium 228	0 +/- 7.6	NA	NA	NA	NA	NA
Bismuth 214	-2.5 +/- 4.4	NA	NA	NA	NA	NA
Potassium 40	48 +/- 32	NA	NA	NA	2.46 +/- 2.14	NA
Lead 212	-0.1 +/- 4.9	NA	NA	NA	NA	NA
Lead 214	3.2 +/- 4.9	NA	NA	NA	NA	NA
Thallium 208	1.4 +/- 2.7	NA	NA	NA	NA	NA
Radium 226	NA	0.11U +/- 0.12	0.1U +/- 0.1	NA	0.407 +/- 0.199	0.485 +/- 0.217
Radium 228	NA	0.38U +/- 0.38	-0.11U +/- 0.3	NA	0.173 +/- 0.048	0.752 +/- 0.454
Thorium 232	NA	NA	NA	NA	0.139 +/- 0.068	NA
Thorium 230	NA	NA	NA	NA	0.441 +/- 0.140	NA
Thorium 228	NA	NA	NA	NA	0.026 +/- 0.051	NA
Uranium 235	NA	NA	NA	NA	0.144 +/- 0.120	NA
Uranium 234	NA	NA	NA	NA	0.77 +/- 0.261	NA
Uranium 238	NA	NA	NA	0.31J +/- 0.12	0.106 +/- 0.160	NA
Other Constituents						
Barium (ug/L)	NA	NA	NA	NA	NA	ND
Magnesium (ug/L)	NA	NA	NA	NA	NA	ND
Calcium (ug/L)	NA	NA	NA	NA	NA	5600
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Alkalinity, Bicarbonate (mg/L)	NA	NA	NA	NA	NA	237
Alkalinity, Carbonate (mg/L)	NA	NA	NA	NA	NA	ND
Alkalinity, Total as CaCO3 (mg/L)	NA	NA	NA	NA	NA	22
Chloride (mg/L)	NA	NA	NA	NA	NA	10.7
Chromium, Hexavalent (mg/L)	NA	NA	NA	NA	NA	ND
Nitrogen, Nitrate (mg/L)	NA	NA	0.079B	NA	NA	4.3
Nitrogen, Nitrate + Nitrite (mg/L)	NA	NA	NA	NA	NA	4.3
Nitrogen, Nitrite (mg/L)	NA	NA	NA	NA	NA	0.021
Sulfate (mg/L)	NA	NA	42.2	NA	17.7	ND
Field pH	NA	NA	6.67	NA	6.65	8.23
Oxidation/reduction	NA	NA	NA	NA	NA	-284

Notes:
pCi/L - Picocuries per liter; April 2004 isotopic uranium analyses of filter paper samples are reported in picocuries/sample
NA - Not Analyzed
N/A - Not Available
J - Result is greater than sample detection limit but less than stated reporting limit
U - result is less than the sample detection limit

TABLE 3-1
GROUND WATER RADIOLOGICAL SUMMARY TABLE
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ

WELL NUMBER	W2				W2			W2			W2		
DATE SAMPLED	12/17/1988				4/25/1989			8/1/1989			9/28/1989		
LABORATORY ID NUMBER	MT24069	MT24070	MT24071	SMC	MT28509	MT28510	SMC	Teledyne74132	Teledyne74133	Teledyne74134	Teledyne79767	Teledyne79768	Teledyne79769
SAMPLE TYPE	Filtered	Unfiltered	Unfiltered	Unfiltered	Filtered	Unfiltered	Unfiltered	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filter Paper
PARAMETERS (pCi/L)													
Gross Alpha	<2	<2	NA	NA	1 (<1)	1.9 +/- 1.0	NA	<3.0	<4.0	<0.4	<2.0	<2.0	<0.4
Gross Beta	40+/- 4	39+/-4	NA	NA	12+/-2 (14+/-2)	14 +/- 2	NA	20 +/- 0.4	24 +/- 0.5	<0.8	14 +/- 0.4	12 +/- 0.4	<0.7
pH	NA	NA	NA	6.34	NA	NA	6.09	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	220	253	NA	NA	90	NA	NA	NA	NA	NA	NA

WELL NUMBER	W2 (R)	W2 (R)			W2 (R)		W2 (R)
DATE SAMPLED	7/17/1995	Apr-04			7/24/07		7/9/2008
LABORATORY ID NUMBER	L5069-5	F4D100111-013	F4D100111-005	F4D100111-021	20070717-07	20070717-07	20080595-02
SAMPLE TYPE	N/A	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Unfiltered
PARAMETERS							
Radiological (pCi/L)							
Gross Alpha (48 hour)	NA	NA	NA	NA	0.594 +/- 1.07	4.59 +/- 1.52	NA
Gross Beta (48 hour)	NA	NA	NA	NA	8.93 +/- 3.14	7.96 +/- 3.2	NA
Gross Alpha	NA	0.32U +/- 0.57	1.75J +/- 0.98	NA	NA	NA	NA
Gross Beta	NA	1.6U +/- 1.1	3.4J +/- 1.2	NA	NA	NA	NA
Actinium 228	-6 +/- 5.8	NA	NA	NA	NA	NA	NA
Bismuth 214	-1.3 +/- 5.0	NA	NA	NA	NA	NA	NA
Potassium 40	1 +/- 27	NA	NA	NA	9.31 +/- 8.09	8.32 +/- 7.23	NA
Lead 212	2.3 +/- 5.3	NA	NA	NA	NA	NA	NA
Lead 214	1.4 +/- 4.7	NA	NA	NA	NA	NA	NA
Thallium 208	1.0 +/- 2.8	NA	NA	NA	NA	NA	NA
Radium 226	NA	0.13U +/- 0.11	0.05U +/- 0.13	NA	0.119 +/- 0.122	0.813 +/- 0.431	0.082 +/- 0.100
Radium 228	NA	0.22U +/- 0.34	0.16U +/- 0.34	NA	0 +/- 0.092	1.05 +/- 0.098	0 +/- 0.602
Thorium 232	NA	NA	NA	NA	0.239 +/- 0.110	0.539 +/- 0.210	NA
Thorium 230	NA	NA	NA	NA	0.125 +/- 0.146	0.994 +/- 0.389	NA
Thorium 228	NA	NA	NA	NA	0.122 +/- 0.087	0.265 +/- 0.213	NA
Uranium 235	NA	NA	NA	NA	0.322 +/- 0.413	0.711 +/- 0.526	NA
Uranium 234	NA	NA	NA	NA	1.05 +/- 0.717	1.26 +/- 0.621	NA
Uranium 238	NA	NA	NA	0.38 +/- 0.13	0.445 +/- 0.553	0.905 +/- 0.571	NA
Other Constituents							
Barium (ug/L)	NA	NA	NA	NA	NA	NA	ND
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA	9500
Calcium (ug/L)	NA	NA	NA	NA	NA	NA	5270
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA	757
Alkalinity, Bicarbonate (mg/L)	NA	NA	NA	NA	NA	NA	48.5
Alkalinity, Carbonate (mg/L)	NA	NA	NA	NA	NA	NA	ND
Alkalinity, Total as CaCO3 (mg/L)	NA	NA	NA	NA	NA	NA	50.3
Chloride (mg/L)	NA	NA	NA	NA	NA	NA	3.3
Chromium, Hexavalent (mg/L)	NA	NA	NA	NA	NA	NA	ND
Nitrogen, Nitrate (mg/L)	NA	NA	NA	NA	NA	NA	0.74
Nitrogen, Nitrate + Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	0.74
Nitrogen, Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	ND
Sulfate (mg/L)	NA	NA	7.53	NA	NA	20.7	ND
Field pH	NA	NA	8.13	NA	NA	6.72	7.09
Oxidation/reduction	NA	NA	NA	NA	NA	NA	197.3

Notes:
pCi/L - Picocuries per liter; April 2004 isotopic uranium analyses of filter paper samples are reported in picocuries/sample
NA - Not Analyzed
Field duplicate data are in brackets.
J - Result is greater than sample detection limit but less than stated reporting limit
U - result is less than the sample detection limit
Field duplicate data are in brackets.

TABLE 3-1
GROUND WATER RADIOLOGICAL SUMMARY TABLE
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ

WELL NUMBER	W-3S				W-3S				W-3S		
DATE SAMPLED	12/17/1988				4/25/1989				8/1/1989		
LABORATORY ID NUMBER	MT24056	MT24057	MT24058	SMC	MT28500	MT28501	SMC	MT28501	Teledyne74125	Teledyne74126	Teledyne74127
SAMPLE TYPE	Filtered	Unfiltered	Unfiltered	Unfiltered	Filtered	Unfiltered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filter Paper
PARAMETERS (pCi/L)											
Gross Alpha	<5	<5	NA	NA	3.7 +/- 1.1	4.4 +/- 1.2	NA	<1	<2.0	1.2 +/- 0.8	<0.4
Gross Beta	<6	<6	NA	NA	6.9 +/- 1.8	7.6 +/- 1.9	NA	<3	6.6 +/- 1.7	7.5 +/- 1.8	<0.8
Thorium 232	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thorium 230	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Uranium	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	5.48	NA	NA	4.79	NA	NA	NA	NA
Sulfate	NA	NA	5.3	12	NA	NA	<10	NA	NA	NA	NA

WELL NUMBER	W-3S			W-3S					W-3S				
DATE SAMPLED	9/28/1989			1/10/1990					4/16/1990				
LABORATORY ID NUMBER	Teledyne79770	Teledyne79771	Teledyne79772	Teledyne90127	Teledyne90126	Teledyne90128	Teledyne90129	SMC	Teledyne99504	Teledyne99503	Teledyne99505	Teledyne99506	SMC
SAMPLE TYPE	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filter Paper	Filter Paper	Unfiltered	Filtered	Unfiltered	Filter Paper	Filter Paper	Unfiltered
PARAMETERS (pCi/L)													
Gross Alpha	<2.0	<2.0	<0.4	<3.0	<3.0	<0.6	<0.5	NA	2.7 +/- 0.9	4.6 +/- 1.1	<0.6	<0.5	NA
Gross Beta	6.2 +/- 3.3	7.6 +/- 3.4	<0.7	13.0 +/- 7.0	10.0 +/- 7.0	<0.7	<0.7	NA	9.7 +/- 2.8	6.5 +/- 2.5	<0.7	<0.7	NA
Thorium 232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thorium 230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Uranium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA	NA	5.24	NA	NA	NA	NA	4.77
Sulfate	NA	NA	NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	<10

Notes:
pCi/L - Picocuries per liter
NA - Not Analyzed

TABLE 3-1
GROUND WATER / SUSPENDED SOLIDS RADIOLOGICAL SUMMARY TABLE
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ

WELL NUMBER	SC-11S				SC-11S			SC-11S				SC-11S					
DATE SAMPLED	12/17/1988				4/26/1989			8/1/1989				1/10/1990					
LABORATORY ID NUMBER	MT24059	MT24060	MT24061	SMC	MT28502	MT28503	SMC	Teledyne74121	Teledyne74122	Teledyne74123	Teledyne74124	Teledyne90131	Teledyne90130	Teledyne90132	Teledyne90133	SMC
SAMPLE TYPE	Filtered	Unfiltered	Unfiltered	Unfiltered	Filtered	Filtered	Unfiltered	Filtered	Unfiltered	Filter Paper	Filter Paper	Filtered	Unfiltered	Filter Paper	Filter Paper	Unfiltered
PARAMETERS (pCi/L)																
Gross Alpha	<2	4.0 +/- 2.6	NA	NA	<1	5.5 +/- 1.3	NA	<5.0	5.4 +/- 3.7	<0.5	<0.4	<3.0	<5.0	3.0 +/- 1.5	1.1 +/- 0.8	NA
Gross Beta	3.8 +/- 2.0	28 +/- 8	NA	NA	<3	75 +/- 1.9	NA	<8.0	16.0 +/- 0.7	<0.7	<0.8	<10.0	6.5 +/- 3.2	4.4 +/- 0.9	1.4 +/- 0.6	NA
Radium 226	NA	NA	NA	NA	NA	1.2 +/- 0.2	NA	NA	1.4 +/- 0.8	NA	NA	NA	NA	NA	NA	NA
Thorium 232	<1	<1	NA	NA	NA	<1	NA	NA	<3.0	NA	NA	NA	NA	NA	NA	NA
Thorium 230	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thorium 228	NA	NA	NA	NA	NA	<1	NA	NA	<10.0	NA	NA	NA	NA	NA	NA	NA
Uranium 235	NA	NA	NA	NA	NA	<1	NA	NA	<0.1	NA	NA	NA	NA	NA	NA	NA
Uranium 234	NA	NA	NA	NA	NA	2.6 +/- 1.1	NA	NA	0.33 +/- 1.8	NA	NA	NA	NA	NA	NA	NA
Uranium 238	NA	NA	NA	NA	NA	2.8 +/- 1.1	NA	NA	0.33 +/- 2.0	NA	NA	NA	NA	NA	NA	NA
Total Uranium	<1	3.9 +/- 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	6.52	NA	NA	6.62	NA	NA	NA	NA	NA	NA	NA	NA	6.78
Sulfate	NA	NA	60	81	NA	NA	42	NA	NA	NA	NA	NA	NA	NA	NA	26

WELL NUMBER	SC-11S					SC-11S (R)	SC-11S (R)			SC-11S (R)		SC-11S (R)		SC-11S (R)
DATE SAMPLED	4/16/1990					7/17/1995	Apr-04			4/13/2005		7/27/2007		7/9/2008
LABORATORY ID NUMBER	Teledyne99508	Teledyne99507	Teledyne99509	Teledyne99510	SMC	L5069-2	F4D100111-010	F4D100111-002	F4D100111-018	20050277-02	20050277-02	20070717-03	20070717-03	20080595-04
SAMPLE TYPE	Filtered	Unfiltered	Filter Paper	Filter Paper	Unfiltered	N/A	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filtered	Unfiltered	Unfiltered
PARAMETERS														
Radiological (pCi/L)														
Gross Alpha (48 hour)	<0.9	2.1 +/- 1.0	<0.6	<0.5	NA	NA	NA	NA	NA	NA	NA	0.894 +/- 1.03	2.62 +/- 1.46	NA
Gross Beta (48 hour)	4.2 +/- 2.3	4.7 +/- 2.9	<0.7	<0.7	NA	NA	NA	NA	NA	NA	NA	4.20 +/- 2.84	0 +/- 3.62	NA
Gross Alpha	NA	NA	NA	NA	NA	NA	0.52U +/- 0.56	0.59U +/- 0.87	NA	NA	NA	NA	NA	NA
Gross Beta	NA	NA	NA	NA	NA	NA	2.5J +/- 0.94	2.7J +/- 1.2	NA	NA	NA	NA	NA	NA
Actinium 228	NA	NA	NA	NA	NA	0 +/- 7.4	NA	NA	NA	NA	NA	NA	NA	NA
Bismuth 214	NA	NA	NA	NA	NA	-1 +/- 5.5	NA	NA	NA	NA	NA	NA	NA	NA
Potassium 40	NA	NA	NA	NA	NA	-10 +/- 27	NA	NA	NA	NA	NA	2.2 +/- 1.91	2.15 +/- 1.87	NA
Lead 212	NA	NA	NA	NA	NA	2.8 +/- 5.0	NA	NA	NA	NA	NA	NA	NA	NA
Lead 214	NA	NA	NA	NA	NA	0.4 +/- 4.8	NA	NA	NA	NA	NA	NA	NA	NA
Thallium 208	NA	NA	NA	NA	NA	2.1 +/- 2.8	NA	NA	NA	NA	NA	NA	NA	NA
Radium 226	NA	NA	NA	NA	NA	NA	0.17U +/- 0.13	0.14U +/- 0.13	NA	<0.431	<0.293	-0.182 +/- 0.177	0.189 +/- 0.208	0.379 +/- 0.140
Radium 228	NA	NA	NA	NA	NA	NA	0.24U +/- 0.36	-0.14 +/- 0.27	NA	5.50	1.79	0.250 +/- 0.048	0.394 +/- 0.093	0 +/- 0.690
Thorium 232	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.256	<0.336	0.143 +/- 0.154	0.223 +/- 0.137	NA
Thorium 230	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.696	<0.636	0.255 +/- 0.148	0.315 +/- 0.160	NA
Thorium 228	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.373	<0.366	0.157 +/- 0.121	0.202 +/- 0.114	NA
Uranium 235	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.942	<1.29	0.181 +/- 0.160	0.456 +/- 0.330	NA
Uranium 234	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.91	2.89	1.36 +/- 0.367	1.23 +/- 0.471	NA
Uranium 238	NA	NA	NA	NA	NA	NA	NA	NA	0.29 +/- 0.12	<1.77	3.03	0.110 +/- 0.143	0.309 +/- 0.301	NA
Other Constituents														
Barium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Calcium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	357
Alkalinity, Bicarbonate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	22.6
Alkalinity, Carbonate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Alkalinity, Total as CaCO3 (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	22.6
Chloride (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.5
Chromium, Hexavalent (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Nitrogen, Nitrate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.78
Nitrogen, Nitrate + Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.78
Nitrogen, Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Sulfate (mg/L)	NA	NA	NA	NA	24	NA	NA	25.8	NA	NA	30.7	NA	14.2	19.1
Field pH	NA	NA	NA	NA	6.40	NA	NA	6.93	NA	NA	5.79	NA	5.81	5.29
Oxidation/reduction	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	252.9

Notes:
pCi/L - Picocuries per liter; April 2004 isotopic uranium analyses of filter paper samples are reported in picocuries/sample
NA - Not Analyzed
N/A - Not Available
J - Result is greater than sample detection limit but less than stated reporting limit
U - result is less than the sample detection limit

TABLE 3-1
GROUND WATER RADIOLOGICAL SUMMARY TABLE
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ

WELL NUMBER	SC-12S	SC-12S				SC-12S				SC-12S				SC-12S			SC-12S				
DATE SAMPLED	10/26/1988	12/17/1988				4/25/1989				8/1/1989				9/28/1989			1/10/1990				
LAB. ID NUMBER	AKEMP0103719	MT24062	MT24063 [24064]	MT24065	SMC	MT28504	MT28505	SMC	MT28505	Teledyne74128	Teledyne74129	Teledyne74130	Teledyne74131	Teledyne77993	Teledyne79774	Teledyne79775	Teledyne90131	Teledyne90130	Teledyne90132	Teledyne90133	SMC
SAMPLE TYPE	Unfiltered	Filtered	Unfiltered	Unfiltered	Unfiltered	Filtered	Unfiltered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filter Paper	Filter Paper	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filter Paper	Filter Paper	Unfiltered
PARAMETERS (pCi/L)																					
Gross Alpha	5.6 +/- 3.1	4.5 +/- 2.0	<3 [<3]	NA	NA	4.0 +/- 1.6	4.4 +/- 1.4	NA	<2	<5.0	<9.0	<0.5	<0.4	<9.0	<9.0	<0.4	<6.0	<7.0	<0.9	<0.9	NA
Gross Beta	83 +/- 9	59 +/- 6	100+/- 10 [130 +/- 20]	NA	NA	71 +/- 8	38 +/-4	NA	<3	39 +/- 0.9	73 +/- 1.7	<0.7	<0.8	69 +/- 1.5	70 +/- 1.5	<0.7	84+/-16	130 +/- 20	1.4 +/- 0.6	1.4 +/- 0.6	NA
Thorium 232	NA	<1	<1 [<1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	NA	NA	NA
Thorium 230	NA	<1	<1 [2.8 +/- 0.6]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thorium 228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.3	<0.3	NA	NA	NA
Total Uranium	NA	<1	<2 [<2]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Uranium 234	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.7 +/- 1.3	3.2 +/- 1.1	NA	NA	NA
Uranium 235	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6 +/- 0.48	<0.1	NA	NA	NA
Uranium 238	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 +/- 0.74	<0.3	NA	NA	NA
Radium 226	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA	NA	NA
pH	NA	NA	NA	NA	7.55	NA	NA	6.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.04
Sulfate	NA	NA	NA	46	81	NA	NA	79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99

WELL NUMBER	SC-12S						SC-12S	SC-12S			SC-32S (Blind duplicate of SC-12S)			SC-12S		SC-12S		SC-12S	SC-32S (dup)
DATE SAMPLED	4/16/1990						7/17/1995	Apr-04			Apr-04			4/13/2005		7/24/2007		7/9/2008	7/9/2008
LAB. ID NUMBER	Teledyne99513	Teledyne99511	Teledyne99512	Teledyne90132	Teledyne90133	SMC	L5069-3	F4D100111-011	F4D100111-003	F4D100111-019	F4D100111-012	F4D100111-004	F4D100111-020	20050277-03	20050277-03	20070717-04	20070717-04	20080595-05	20080595-07
SAMPLE TYPE	Filtered	Unfiltered	Unfiltered Duplicate	Filter Paper	Filter Paper	Unfiltered	N/A	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Filtered	Unfiltered	Unfiltered	Unfiltered
PARAMETERS																			
Radiological (pCi/L)																			
Gross Alpha (48 hour)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.11 +/- 3.81	13.1 +/- 4.88	NA	NA
Gross Beta (48 hour)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	115 +/- 12.6	112 +/- 11.1	NA	NA
Gross Alpha	<9	10 +/- 7	<9	<0.6	<0.5	NA	NA	0.91U +/- 0.97	8.8U +/- 9.8	NA	0.29U +/- 0.85	14.0U +/- 10.0	NA	NA	NA	2.0 +/- 3.11	11.0 +/- 3.85	NA	NA
Gross Beta	180 +/- 30	200 +/- 30	220 +/- 30	1.1 +/- 0.5	<0.7	NA	NA	14.0 +/- 2.1	128 +/- 16.0	NA	15.3 +/- 2.3	115 +/-15.0	NA	NA	NA	113 +/- 10.5	95 +/- 10.0	NA	NA
Actinium 228	NA	NA	NA	NA	NA	NA	1.6 +/- 7.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bismuth 214	NA	NA	NA	NA	NA	NA	3.6 +/- 5.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium 40	NA	NA	NA	NA	NA	NA	42 +/- 34	NA	NA	NA	NA	NA	NA	NA	NA	85 +/- 73.8	78.8 +/- 68.5	NA	NA
Lead 212	NA	NA	NA	NA	NA	NA	0.6 +/- 4.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead 214	NA	NA	NA	NA	NA	NA	1.6 +/- 4.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium 208	NA	NA	NA	NA	NA	NA	0.5 +/- 2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Radium 226	<1	NA	<1	NA	NA	NA	NA	0.82J +/- 0.24	0.52J +/- 0.18	NA	1.09 +/- 0.26	0.98J +/- 0.24	NA	0.598	<0.325	0.537 +/- 0.231	1.53 +/- 0.256	0.154 +/- 0.077	0.401 +/- 0.207
Radium 228	NA	NA	NA	NA	NA	NA	NA	0.58U +/- 0.41	0.42U +/- 0.31	NA	1.24 +/- 0.43	0.61J +/- 0.37	NA	2.28	4.47	1.04 +/- 0.051	2.62 +/- 0.120	0.211 +/- 0.668	0.069 +/- 0.410
Thorium 232	<0.04	NA	2.9 +/- 0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.312	<0.246	0.701 +/- 0.192	0.666 +/- 0.140	NA	NA
Thorium 230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.648	<0.674	0.563 +/- 0.202	0.358 +/- 0.133	NA	NA
Thorium 228	0.29 +/- 0.14	NA	4.3 +/- 0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.222	<0.227	0.113 +/- 0.105	0.743 +/- 0.148	NA	NA
Uranium 235	0.034 +/- 0.029	NA	0.087 +/- 0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.281	<0.154	0.107 +/- 0.344	0.239 +/- 0.233	NA	NA
Uranium 234	.96 +/- 1.3	NA	1.3 +/- 0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.666	0.427	1.04 +/- 0.602	1.78 +/- 0.522	NA	NA
Uranium 238	0.99 +/- 0.13	NA	0.99 +/- 0.15	NA	NA	NA	NA	NA	NA	0.43J +/- 0.14	NA	NA	0.48J +/- 0.15	<0.483	<0.272	0.489 +/- 0.401	0.796 +/- 0.356	NA	NA
																		NA	NA
Other Constituents																			
Barium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	40700	39200
Calcium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6080	6390
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3250	3510
Alkalinity, Bicarbonate (mg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	503	501
Alkalinity, Carbonate (mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
Alkalinity, Total as CaCO3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	505	502
Chloride (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14.5	14.5
Chromium, Hexavalent (m	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.16	0.16
Nitrogen, Nitrate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	4.69	NA	NA	4.46	NA	NA	NA	NA	NA	1.9	1.9
Nitrogen, Nitrate + Nitrite (	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9	1.9
Nitrogen, Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
Sulfate (mg/L)	NA	NA	NA	NA	NA	118	NA	NA	68.6	NA	NA	68.2	NA	NA	40.7	NA	51.6	32.3	32.6
Field pH	NA	NA	NA	NA	NA	7.60	NA	NA	7.44	NA	NA	7.44	NA	NA	5.85	NA	6.76	6.25	6.25
Oxidation/reduction	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	253.5	253.5

Notes:
pCi/L - Picocuries per liter; April 2004 isotopic uranium analyses of filter paper samples are reported in picocuries/sample
NA - Not Analyzed
N/A - Not Available
J - Result is greater than sample detection limit but less than stated reporting limit
U - result is less than the sample detection limit
Field duplicate data are in brackets.

TABLE 3-1
GROUND WATER RADIOLOGICAL SUMMARY TABLE
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ

WELL NUMBER	SC-13S	SC-13S				SC-13S			SC-13S					SC-13S		
DATE SAMPLED	10/26/1988	12/17/1988				4/25/1989			8/1/1989					9/28/1989		
LABORATORY ID NUMBER	AKEMP0102740	MT24066	MT24067	MT24068	SMC	MT28506 [28508]	MT28507	SMC	Teledyne74136	Teledyne79779	Teledyne74135	Teledyne74137	Teledyne74138	Teledyne79780	Teledyne74781	Teledyne74766
SAMPLE TYPE	Unfiltered	Filtered	Unfiltered	Unfiltered	Unfiltered	Filtered	Filtered	Unfiltered	Filtered	Filtered	Unfiltered	Filter Paper	Filter Paper	Unfiltered	Filter Paper	Filter Paper
PARAMETERS (pCi/L)																
Gross Alpha	7.1 +/- 3.4	<2	<2	NA	NA	10 +/- 2 [7.2 +/- 1.8]	<2	NA	<1.0	<10.0	<20.0	<0.5	<0.4	<10.0	<0.6	<0.4
Gross Beta	19 +/- 4	12 +/- 3	14+/- 3	NA	NA	25 +/- 3 [31 +/- 4]	18 +/- 2	NA	30 +/- 1.4	<20.0	<40.0	<0.7	<0.8	<20.0	0.85 +/- 5.3	<0.7
Radium 226	NA	NA	NA	NA	NA	<1 [1.0 +/- 0.1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thorium 232	NA	<1	<1	NA	NA	<1 [<1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thorium 230	NA	<1	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thorium 228	NA	NA	NA	NA	NA	<1 [<1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Uranium 235	NA	NA	NA	NA	NA	<1 [<1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Uranium 234	NA	NA	NA	NA	NA	6.5 +/- 1.4 [4.4 +/- 1.0]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Uranium 238	NA	NA	NA	NA	NA	5.5 +/- 1.2 [5.1 +/- 1.1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Uranium	NA	<2	2.1 +/- 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	6.56	NA	NA	6.47	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	310	409	NA	NA	259	NA	NA	NA	NA	NA	NA	NA	NA

WELL NUMBER	SC-13S						SC-13S					SC-13S	SC-13S			SC-13S		SC-13S (R)
DATE SAMPLED	1/10/1990						4/16/1990					7/17/1995	Apr-04			4/13/2005		7/9/2008
LABORATORY ID NUMBER	Teledyne90140	Teledyne90138	Teledyne99512	Teledyne90141	Teledyne90142	SMC	Teledyne99517	Teledyne99516	Teledyne99518	Teledyne99519	SMC	L5069-6	F4D100111-015	F4D100111-007	F4D100111-023	20050277-04	20050277-04	20080595-10
SAMPLE TYPE	Filtered	Unfiltered	Unfiltered Duplicate	Filter Paper	Filter Paper	Unfiltered	Filtered	Unfiltered	Filter Paper	Filter Paper	Unfiltered	N/A	Filtered	Unfiltered	Filter Paper	Filtered	Unfiltered	Unfiltered
PARAMETERS																		
Radiological (pCi/L)																		
Gross Alpha	<60	<80.0	<80.0	<0.7	<0.5	NA	<200	<200	<0.7	<0.5	NA	NA	-0.3U +/- 1.5	2.6U +/- 2.4	NA	NA	NA	NA
Gross Beta	430 +/- 130	530 +/- 160	480 +/- 160	<0.7	<0.7	NA	<800	<800	0.86 +/- 0.54	<0.7	NA	NA	2.3J +/- 1.2	17.6 +/- 2.5	NA	NA	NA	NA
Actinium 228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-2.5 +/- 5.7	NA	NA	NA	NA	NA	NA
Bismuth 214	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-4.5 +/- 5.2	NA	NA	NA	NA	NA	NA
Potassium 40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11+/- 29	NA	NA	NA	NA	NA	NA
Lead 212	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 +/- 5.0	NA	NA	NA	NA	NA	NA
Lead 214	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-2.6 +/- 4.6	NA	NA	NA	NA	NA	NA
Thallium 208	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6 +/- 2.7	NA	NA	NA	NA	NA	NA
Radium 226	<0.2	<0.2	<0.2	NA	NA	NA	<1	<1	NA	NA	NA	NA	0.41J +/- 0.17	0.3J +/- 0.17	NA	<0.715	<0.418	0.351 +/- .211
Radium 228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1U +/- 0.38	0.39U +/- 0.27	NA	<0.532	7.64	0 +/- 0.747
Thorium 232	<0.06	<0.06	<0.03	NA	NA	NA	<0.2	<0.2	NA	NA	NA	NA	NA	NA	NA	<0.207	<0.219	NA
Thorium 230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.587	<0.606	NA
Thorium 228	<0.3	<0.3	<0.2	NA	NA	NA	<0.4	<0.4	NA	NA	NA	NA	NA	NA	NA	<0.232	<0.267	NA
Uranium 235	<1.0	<2.0	<2.0	NA	NA	NA	0.23 +/- 0.1	0.094 +/- 0.085	NA	NA	NA	NA	NA	NA	NA	<0.220	<0.498	NA
Uranium 234	6.0 +/- 2.3	<60	6.6 +/- 2.2	NA	NA	NA	4.3 +/- 0.4	4.5 +/- 0.5	NA	NA	NA	NA	NA	NA	NA	1.14	2.57	NA
Uranium 238	3.4 +/- 2.0	<4.0	4.2 +/- 1.8	NA	NA	NA	3.4 +/- 0.4	3.7 +/- 0.4	NA	NA	NA	NA	NA	NA	0.24J +/- 0.11	1.25	1.86	NA
Other Constituents																		
Barium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	23400
Calcium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5230
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19700
Alkalinity, Bicarbonate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	466
Alkalinity, Carbonate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
Alkalinity, Total as CaCO3 (mg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	469
Chloride (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.1
Chromium, Hexavalent (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.064
Nitrogen, Nitrate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.076B	NA	NA	NA	ND
Nitrogen, Nitrate + Nitrite (mg/	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28
Nitrogen, Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.38
Sulfate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1768	NA	NA	63.4	NA	NA	305	89.3
Field pH	NA	NA	NA	NA	NA	11.94	NA	NA	NA	NA	9.84	NA	NA	7.22	NA	NA	9.19	9.64
Oxidation/reduction	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	145.7

Notes:
pCi/L - Picocuries per liter; April 2004 isotopic uranium analyses of filter paper samples are reported in picocuries/sample
NA - Not Analyzed
N/A - Not Available
J - Result is greater than sample detection limit but less than stated reporting limit
U - result is less than the sample detection limit

TABLE 3-1
GROUND WATER RADIOLOGICAL SUMMARY TABLE
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ

WELL NUMBER	SC-12D		SC-12D	SC-14S	SC-14S			SC-14S	SC-14S	SC-20S	SC-20S	SC-20S	SC-20D	SC-20D	SC-20D	SC22S	SC-25S		SC-25S	SC-25S	SC-26D
DATE SAMPLED	7/25/2007		7/9/2008	7/17/1995	Apr-04			7/25/2007	7/9/2008	7/25/2007	3/18/2008	7/9/2008	7/25/2007	3/18/2008	7/9/2008	7/25/2007	4/13/2005		7/24/2007	7/9/2008	7/25/2007
LABORATORY ID NUMBER	20070717-05	20070717-05	20080595-06	L5069-1	F4D100111-009	F4D100111-001	F4D100111-017	20070717-02	20080595-03	20070717-12	20080245-01	20080595-12	20070717-13	20080245-02	20080595-13	20070717-08	20050277-01	20050277-01	20070717-01	20080595-01	20070721-03
SAMPLE TYPE	Filtered	Unfiltered	Unfiltered	N/A	Filtered	Unfiltered	Filter Paper	Unfiltered	Unfiltered	Unfiltered	Unfiltered	Unfiltered	Unfiltered	Unfiltered	Unfiltered	Unfiltered	Filtered	Unfiltered	Unfiltered	Unfiltered	Unfiltered
PARAMETERS																					
Radiological (pCi/L)																					
Gross Alpha (48 hour)	4.69 +/- 1.57	7.39 +/- 1.76	NA	NA	NA	NA	NA	3.56 +/- 1.23	NA	1.23+/-1.39	NA	NA	24.8+/-3.05	NA	NA	1.00+/-1.28	NA	NA	6.52 +/- 1.75	NA	1.89 +/- 1.30
Gross Beta (48 hour)	1.06 +/- 3.71	8.33 +/- 3.05	NA	NA	NA	NA	NA	6.17 +/- 2.93	NA	7.33+/-3.42	NA	NA	18.9+/-3.71	NA	NA	1.56+/-3.83	NA	NA	8.81 +/- 4.28	NA	4.88 +/- 2.96
Gross Alpha	NA	3.06 +/- 1.41	NA	NA	0.41U +/- 0.84	1.1U +/- 1.0	NA	NA	NA	NA	NA	NA	11.5 +/- 2.21	NA	NA	NA	NA	NA	2.15 +/- 1.22	NA	NA
Gross Beta	NA	1.13 +/- 3.71	NA	NA	7.3 +/- 1.4	5.3 +/- 1 5	NA	NA	NA	NA	NA	NA	11.7 +/- 3.46	NA	NA	NA	NA	NA	4.77 +/- 4.16	NA	NA
Actinium 228	NA	NA	NA	15 +/- 16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bismuth 214	NA	NA	NA	-7.4 +/- 8.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium 40	1.36 +/- 1.18	1.2 +/- 1.04	NA	-1 +/- 68	NA	NA	NA	3.5 +/- 3.04	NA	11 +/- 9.56	NA	NA	1.97 +/- 1.71	NA	NA	12.4 +/- 10.8	NA	NA	2.28 +/- 1.98	NA	8.31 +/- 7.22
Lead 212	NA	NA	NA	4 +/- 8.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead 214	NA	NA	NA	6 +/- 9.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium 208	NA	NA	NA	-2 +/- 6.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Radium 226	2.74 +/- 0.306	2.09 +/- 0.278	2.24 +/- 0.408	NA	0.33J +/- 0.15	0.11U +/- 0.1	NA	0.202 +/- 0.157	0.208 +/- 0.102	-0.030+/-0.223	0.225+/-0.133	0.204 +/- 0.097	3.34+/-0.360	3.02+/-0.344	4.59 +/- 0.485	0.494+/-0.169	<0.352	<0.454	0.164 +/- 0.147	0.023 +/- 0.132	0.186 +/- 0.15
Radium 228	0.127 +/- 0.048	0.668 +/- 0.049	0.09 +/- 0.469	NA	0.89J +/- 0.32	0.91J +/- 0.36	NA	0.569 +/- 0.050	0 +/- 0.461	0.292+/-0.047	0.524+/-2.29	0.539 +/- 0.427	3.46+/-0.065	3.09+/-0.76	2.20 +/- 0.527	0.220+/-0.048	1.18	16.9	0.439 +/- 0.049	0 +/- 0.729	0.094 +/- 0.048
Thorium 232	0.213 +/- 0.115	0.197 +/- 0.106	NA	NA	NA	NA	NA	0.531 +/- 0.184	NA	0.311+/-0.129	NA	NA	0.167+/-0.118	NA	NA	0.715+/-0.187	<0.301	<0.335	0.340 +/- 0.187	NA	0.473 +/- 0.148
Thorium 230	0.169 +/- 0.124	0.300 +/- 0.143	NA	NA	NA	NA	NA	0.660 +/- 0.208	NA	0.056+/-0.168	NA	NA	0.323+/-0.160	NA	NA	0.739+/-0.214	<0.811	<0.751	0.198 +/- 0.258	NA	0.125 +/- 0.187
Thorium 228	0.137 +/- 0.090	0.032 +/- 0.077	NA	NA	NA	NA	NA	0 +/- 0.117	NA	0.272+/-0.123	NA	NA	0.063+/-0.078	NA	NA	0.150+/-0.101	<0.455	<0.455	0.071 +/- 0.143	NA	0.103 +/- 0.118
Uranium 235	0.331 +/- 0.264	0.112 +/- 0.154	NA	NA	NA	NA	NA	0.026 +/- 0.173	NA	0.289+/-0.231	NA	NA	0.114+/-0.171	NA	NA	0.165+/-0.131	0.628	0.628	0.088 +/- 0.198	NA	0.933 +/- 0.456
Uranium 234	1.18 +/- 0.451	0.393 +/- 0.248	NA	NA	NA	NA	NA	0.361 +/- 0.309	NA	0.967 +/- 0.394	NA	NA	0.994+/-0.342	NA	NA	0.637+/-0.271	3.65	3.65	1.06 +/- 0.492	NA	3.18 +/- 0.731
Uranium 238	0.839 +/- 0.367	0.126 +/- 0.175	NA	NA	NA	NA	0.31J +/- 0.12	0.079 +/- 0.285	NA	0.197+/-0.280	NA	NA	0.110+/-0.273	NA	NA	0.310+/-0.181	0.725	0.725	0.117 +/- 0.294	NA	0.988 +/- 0.451
Other Constituents																					
Barium (ug/L)	NA	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA
Magnesium (ug/L)	NA	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	10500	NA	NA	ND	NA	NA	NA	NA	NA	NA
Calcium (ug/L)	NA	NA	ND	NA	NA	NA	NA	NA	9150	NA	NA	19100	NA	NA	10100	NA	NA	NA	NA	NA	NA
Aluminum (ug/L)	NA	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity, Bicarbonate (mg/L)	NA	NA	ND	NA	NA	NA	NA	NA	13.6	NA	NA	122	NA	NA	ND	NA	NA	NA	NA	NA	NA
Alkalinity, Carbonate (mg/L)	NA	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA
Alkalinity, Total as CaCO3 (mg/L)	NA	NA	ND	NA	NA	NA	NA	NA	13.6	NA	NA	122	NA	NA	ND	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	NA	NA	2.5	NA	NA	NA	NA	NA	17.7	NA	NA	34.4	NA	NA	14.9	NA	NA	NA	NA	NA	NA
Chromium, Hexavalent (mg/L)	NA	NA	ND	NA	NA	NA	NA	NA	0.088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrate (mg/L)	NA	NA	0.22	NA	NA	NA	NA	NA	1.9	NA	NA	0.68	NA	NA	11.8	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrate + Nitrite (mg/L)	NA	NA	0.22	NA	NA	NA	NA	NA	1.9	NA	NA	0.71	NA	NA	11.8	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrite (mg/L)	NA	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	0.028	NA	NA	ND	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	NA	10.4	13.4	NA	NA	19.9	NA	21.7	23.4	NA	NA	NA	NA	NA	NA	22.6	NA	10.3	10	NA	29.2
Field pH	NA	5.38	4.58	NA	NA	6.13	NA	6.00	5.48	NA	NA	6.67	NA	NA	6.02	6.77	NA	7.23	7.6	NA	7.76
Oxidation/reduction	NA	NA	281.6	NA	NA	NA	NA	NA	227.4	NA	NA	-127.2	NA	NA	94.2	NA	NA	NA	NA	NA	NA

WELL NUMBER	SC-30S	SC-32D		IWC-2	IWC-3	OBS-2A			OBS-2A	Newfield Well (BN4-05)		NW-3	Newfield #3	NW-5	Newfield #5
DATE SAMPLED	7/17/1995	7/25/2007		7/25/2007	7/25/2007	4/4/2004			7/9/2008	4/13/2005		7/25/2007	7/9/2008	7/25/2007	7/9/2008
LABORATORY ID NUMBER	L5069-4	20070717-06	20070717-06	20071717-10	20070717-11	F4D100111-016	F4D100111-008	F4D100111-024	20080595-11	20050277-05	20050277-05	20070721-01	20080595-09	20070721-02	20080595-08
SAMPLE TYPE	N/A	Filtered	Unfiltered	Unfiltered	Unfiltered	Filtered	Unfiltered	Filter Paper	Unfiltered	Filtered	Unfiltered	Unfiltered	Unfiltered	Unfiltered	Unfiltered
PARAMETERS															
Radiological (pCi/L)															
Gross Alpha (48 hour)	NA	4.85+/-1.56	7.01 +/-1.68	1.46+/-2.25	9.33+/-1.98	NA	NA	NA	NA	NA	NA	5.81 +/- 1.67	NA	16.6 +/- 2.42	NA
Gross Beta (48 hour)	NA	1.58+/-3.07	0.259+/-3.94	13.3+/-4.31	11.7+/-3.20	NA	NA	NA	NA	NA	NA	5.55 +/- 3.23	NA	11.5 +/- 3.16	NA
Gross Alpha	NA	NA	5.52 +/- 1.63	NA	3.16 +/- 1.36	2.08J +/- 0.83	4.0 +/- 1.2	NA	NA	NA	NA	2.40 +/- 1.03	NA	3.17 +/- 1.46	NA
Gross Beta	NA	NA	5.87 +/- 3.24	NA	7.8 +/- 3.04	3.0J +/- 1.2	3.4J +/- 1.2	NA	NA	NA	NA	4.82 +/- 2.86	NA	2.19 +/- 3.76	NA
Actinium 228	7 +/- 7.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bismuth 214	6.5 +/- 5.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium 40	31 +/- 31	1.14 +/- 0.99	1.09 +/- 0.95	20.8 +/- 18.1	4.4 +/- 3.82	NA	NA	NA	NA	NA	NA	1.12 +/- 0.097	NA	2.1 +/- 1.82	NA
Lead 212	1.7 +/- 5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead 214	6.5 +/- 5.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium 208	2.1 +/- 2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Radium 226	NA	2.17+/-0.277	3.36+/-0.461	1.27+/-0.223	0.205+/-0.112	1.23 +/- 0.28	0.95J +/- 0.26	NA	0.646 +/- 0.144	<0.459	<1.00	0.439 +/- 0.157	0.431 +/- 0.127	1.25 +/- 0.259	0.967 +/- 0.236
Radium 228	NA	0.86+/-0.096	0.843+/-0.054	0.026+/-0.048	1.86+/-0.056	0.68J +/- 0.39	0.58J +/- 0.33	NA	1.46 +/- 0.632	6.39	5.54	0.551 +/- 0.049	1.30 +/- 0.650	1.34 +/- 0.058	3.55 +/- 0.503
Thorium 232	NA	0.080+/-0.075	0.061+/-0.146	0.521+/-0.151	0.350+/-0.140	NA	NA	NA	NA	0.310	0.144	0.443 +/- 0.171	NA	0.444 +/- 0.196	NA
Thorium 230	NA	-0.110+/-0.089	-0.038+/-0.192	0.300+/-0.157	0.575+/-0.199	NA	NA	NA	NA	<0.616	<0.653	0.454 +/- 0.230	NA	0.581 +/- 0.266	NA
Thorium 228	NA	0.196+/-0.155	0.186+/-0.097	0.299+/-0.127	0.299+/-0.127	NA		NA	NA	0.177	<0.405	0.011 +/- 0.093	NA	0.257 +/- 0.159	NA
Uranium 235	NA	0.187+/-0.178	0.120+/-0.101	0.131+/-0.124	0.131+/-0.124	NA		NA	NA	0.331	0.532	0.123 +/- 0.359	NA	0 +/- 0.105	NA
Uranium 234	NA	0.344+/-0.264	1.37+/-0.340	0.628+/-0.244	0.628+/-0.244	NA		NA	NA	1.23	0.645	1.13 +/- 0.660	NA	0.302 +/- 0.215	NA
Uranium 238	NA	0.139+/-0.179	0.162+/-0.142	0.269+/-0.173	0.269+/-0.173	NA		0.32J +/- 0.13	NA	0.527	<0.271	0.265 +/- 0.436	NA	0.009 +/- 0.177	NA
Other Constituents															
Barium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	ND
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	ND
Calcium (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	14000
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity, Bicarbonate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	21.0	NA	NA	NA	ND	NA	ND
Alkalinity, Carbonate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	ND
Alkalinity, Total as CaCO3 (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	21.5	NA	NA	NA	ND	NA	ND
Chloride (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	5.5	NA	NA	NA	9.7	NA	21.8
Chromium, Hexavalent (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	0.23	NA	NA	NA	3.7	NA	10.1
Nitrogen, Nitrate + Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	0.23	NA	NA	NA	3.7	NA	10.1
Nitrogen, Nitrite (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	ND	NA	ND
Sulfate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field pH	NA	NA	5.11	7.55	NA	NA	NA	NA	6.25	NA	NA	NA	3.60	NA	4.90
Oxidation/reduction	NA	NA	0.348	35.2	NA	NA	NA	NA	-131.8	NA	NA	NA	339.2	NA	940

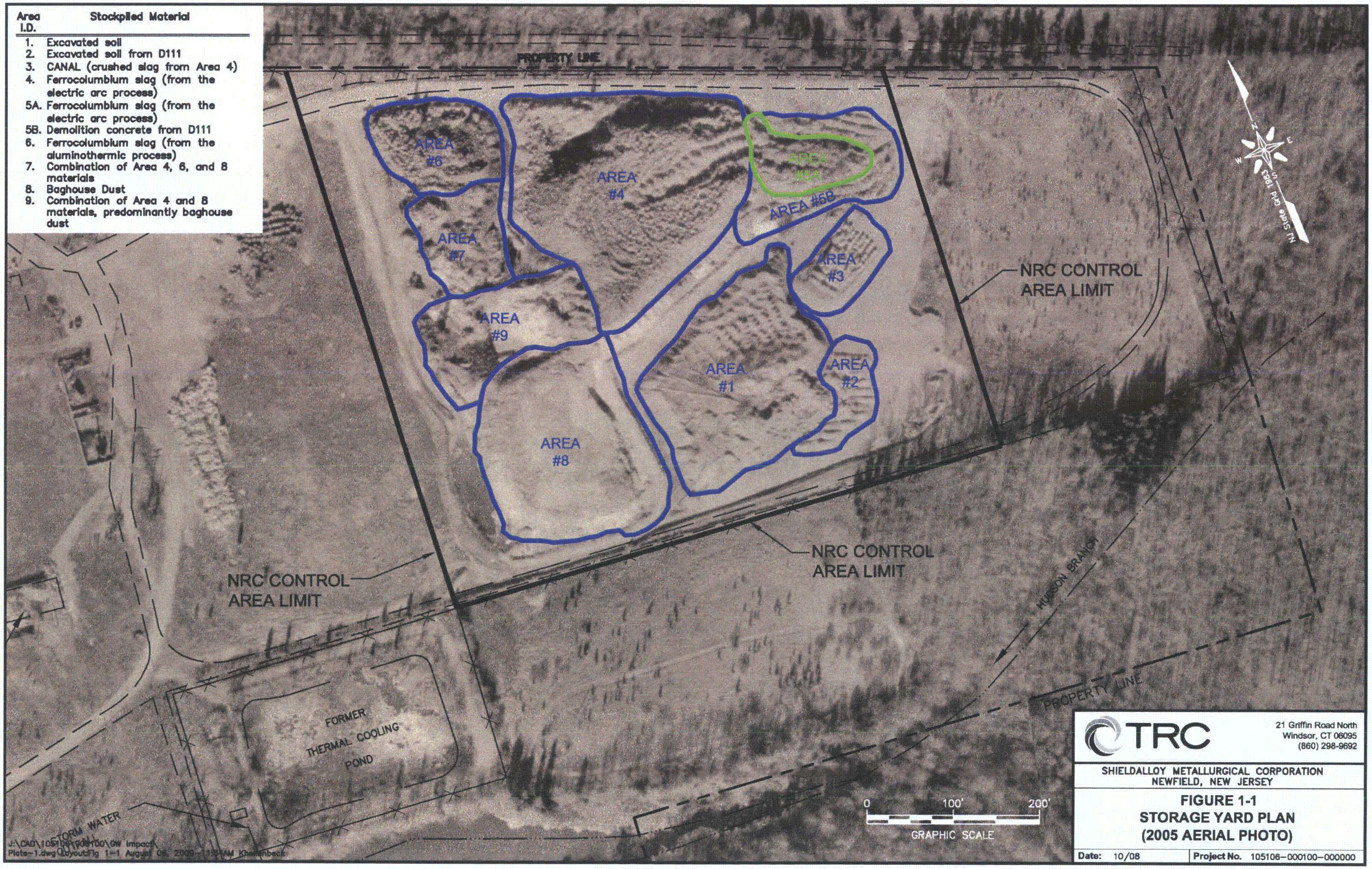
Notes:
pCi/L - Picocuries per liter; April 2004 isotopic uranium analyses of filter paper samples are reported in picocuries/sample
NA - Not Analyzed
N/A - Not Available
J - Result is greater than sample detection limit but less than stated reporting limit
U - result is less than the sample detection limit
The specific source of the 2005 Newfield well sample (BN4-05) is unidentified; NW-3 is Newfield Well 3; NW-5 is Newfield Well 5

TABLE 3-2
SUMMARY OF CONCENTRATIONS OF KEY CONSTITUENTS IN 2008 GROUND WATER SAMPLES
Shieldalloy Metallurgical Corporation, Newfield, New Jersey

	Shallow wells							Deep wells					
Analyte **Well:**	**W2(R)**	**SC-11S**	**SC-12S**	**SC-12S (DUP)**	**SC-13S**	**SC-14S**	**SC-20S**	**A**	**SC-12D**	**SC-20D**	**OBS-2A**	**NW-3**	**NW-5**
Combined Radium (pCi/l)	0.082	0.379	0.365	0.47	0.351	0.208	0.743	1.237	2.33	6.79	2.106	1.731	4.517
Barium (ug/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium (ug/L)	9500	ND	40700	39200	23400	ND	10500	ND	ND	ND	ND	ND	ND
Calcium (ug/L)	5270	ND	6080	6390	5230	9150	19100	5600	ND	10100	ND	ND	14000
Aluminum (ug/L)	757	357	3250	3510	19700	ND	NA	NA	ND	NA	NA	NA	NA
Alkalinity, Bicarbonate (mg/L)	48.5	22.6	503	501	466	13.6	122	237	ND	ND	21.0	ND	ND
Alkalinity, Carbonate (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alkalinity, Total as CaCO3 (mg/L)	50.3	22.6	505	502	469	13.6	122	22	ND	ND	21.5	ND	ND
Chloride (mg/L)	3.3	4.5	14.5	14.5	7.1	17.7	34.4	10.7	2.5	14.9	5.5	9.7	21.8
Chromium, Hexavalent (mg/L)	ND	ND	0.16	0.16	0.064	0.088	NA	ND	ND	NA	NA	NA	NA
Nitrogen, Nitrate (mg/L)	0.74	0.78	1.9	1.9	ND	1.9	0.68	4.3	0.22	11.8	0.23	3.7	10.1
Nitrogen, Nitrate + Nitrite (mg/L)	0.74	0.78	1.9	1.9	0.28	1.9	0.71	4.3	0.22	11.8	0.23	3.7	10.1
Nitrogen, Nitrite (mg/L)	ND	ND	ND	ND	0.38	ND	0.028	0.021	ND	ND	ND	ND	ND
Sulfate (mg/L)	ND	19.1	32.3	32.6	89.3	23.4	NA	ND	13.4	NA	NA	NA	NA
Field pH	7.09	5.29	6.25	6.25	9.64	5.48	6.67	8.23	4.58	6.02	6.25	3.60	4.90
Oxidation/reduction	197.3	252.9	253.5	253.5	145.7	227.4	-127.2	-284	281.6	94.2	-131.8	339.2	940

Combined Radium = Ra-226 plus Ra-228

FIGURES



Area I.D.	Stockpiled Material
1.	Excavated soil
2.	Excavated soil from D111
3.	CANAL (crushed slag from Area 4)
4.	Ferrocolumbium slag (from the electric arc process)
5A.	Ferrocolumbium slag (from the electric arc process)
5B.	Demolition concrete from D111
6.	Ferrocolumbium slag (from the aluminothermic process)
7.	Combination of Area 4, 6, and 8 materials
8.	Baghouse Dust
9.	Combination of Area 4 and 8 materials, predominantly baghouse dust

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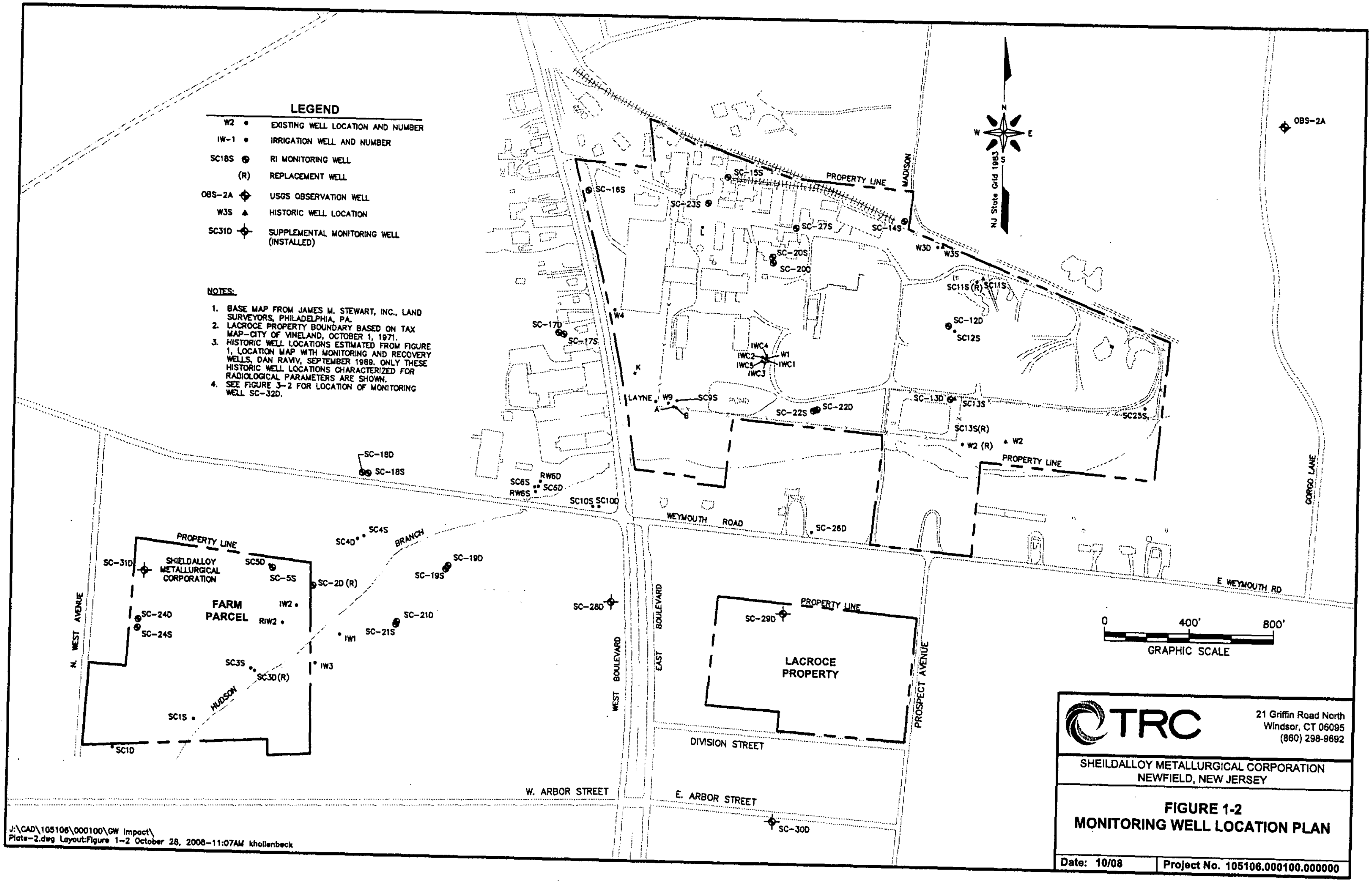
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 1-1
STORAGE YARD PLAN
(2005 AERIAL PHOTO)

Date: 10/08 Project No. 105106-000100-000000

J:\CAD\105106\000100\GW Impact\
Plate-1.dwg Layout:Fig 1-1 August 06, 2008 - 11:34AM Khallenbeck



NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. HISTORIC WELL LOCATIONS ESTIMATED FROM FIGURE 1, LOCATION MAP WITH MONITORING AND RECOVERY WELLS, DAN RAVIV, SEPTEMBER 1989. ONLY THESE HISTORIC WELL LOCATIONS CHARACTERIZED FOR RADIOLOGICAL PARAMETERS ARE SHOWN.
4. SEE FIGURE 3-2 FOR LOCATION OF MONITORING WELL SC-32D.

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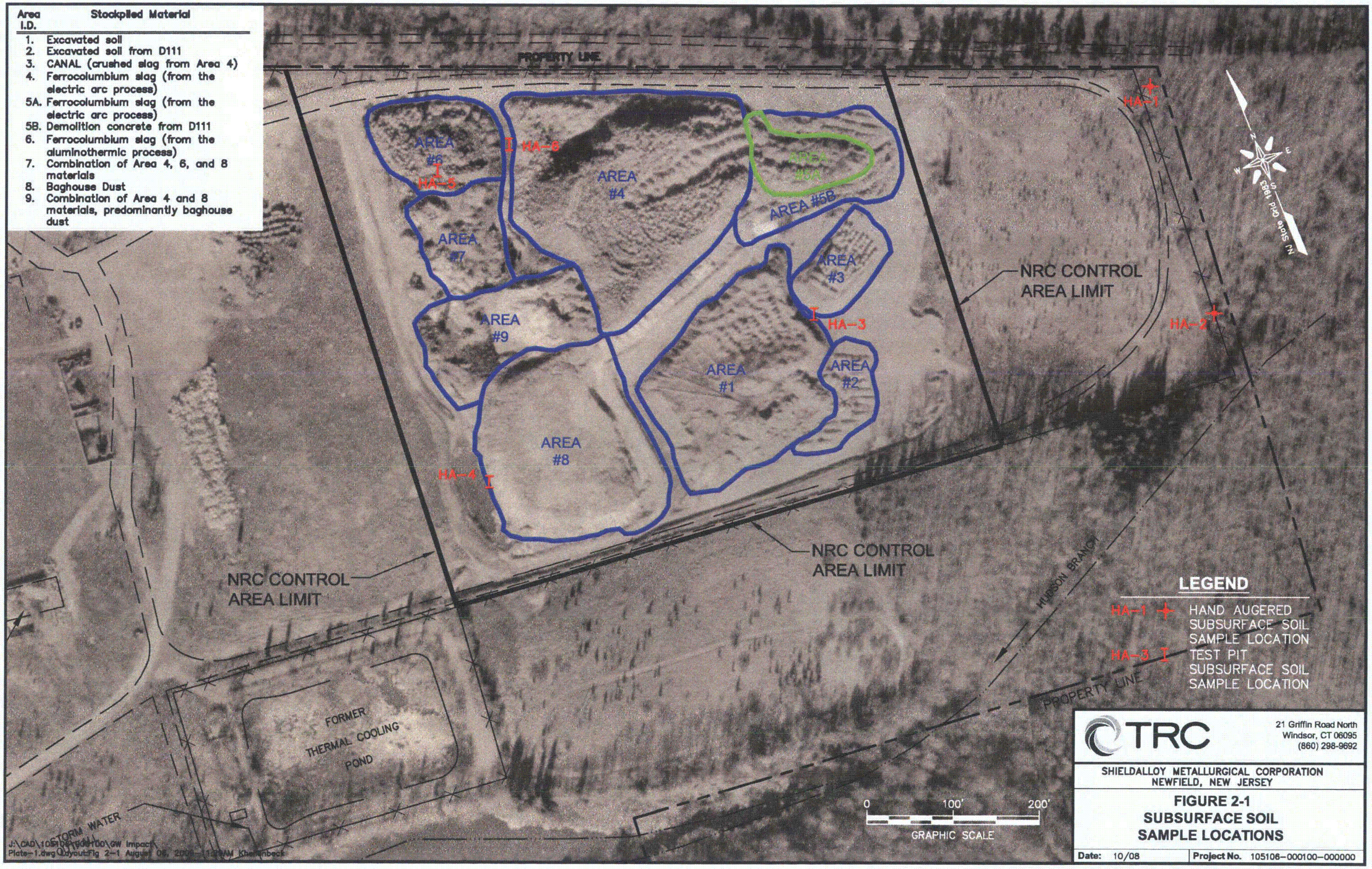
SHEILDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 1-2
MONITORING WELL LOCATION PLAN

Date: 10/08 | Project No. 105106.000100.000000

J:\CAD\105106\000100\GW Impact\
Plate-2.dwg Layout:Figure 1-2 October 28, 2008-11:07AM khollenbeck



Area I.D.	Stockpiled Material
1.	Excavated soil
2.	Excavated soil from D111
3.	CANAL (crushed slag from Area 4)
4.	Ferrocolumbium slag (from the electric arc process)
5A.	Ferrocolumbium slag (from the electric arc process)
5B.	Demolition concrete from D111
6.	Ferrocolumbium slag (from the aluminothermic process)
7.	Combination of Area 4, 6, and 8 materials
8.	Baghouse Dust
9.	Combination of Area 4 and 8 materials, predominantly baghouse dust

LEGEND

HA-1 ✛	HAND AUGERED SUBSURFACE SOIL SAMPLE LOCATION
HA-3 I	TEST PIT SUBSURFACE SOIL SAMPLE LOCATION

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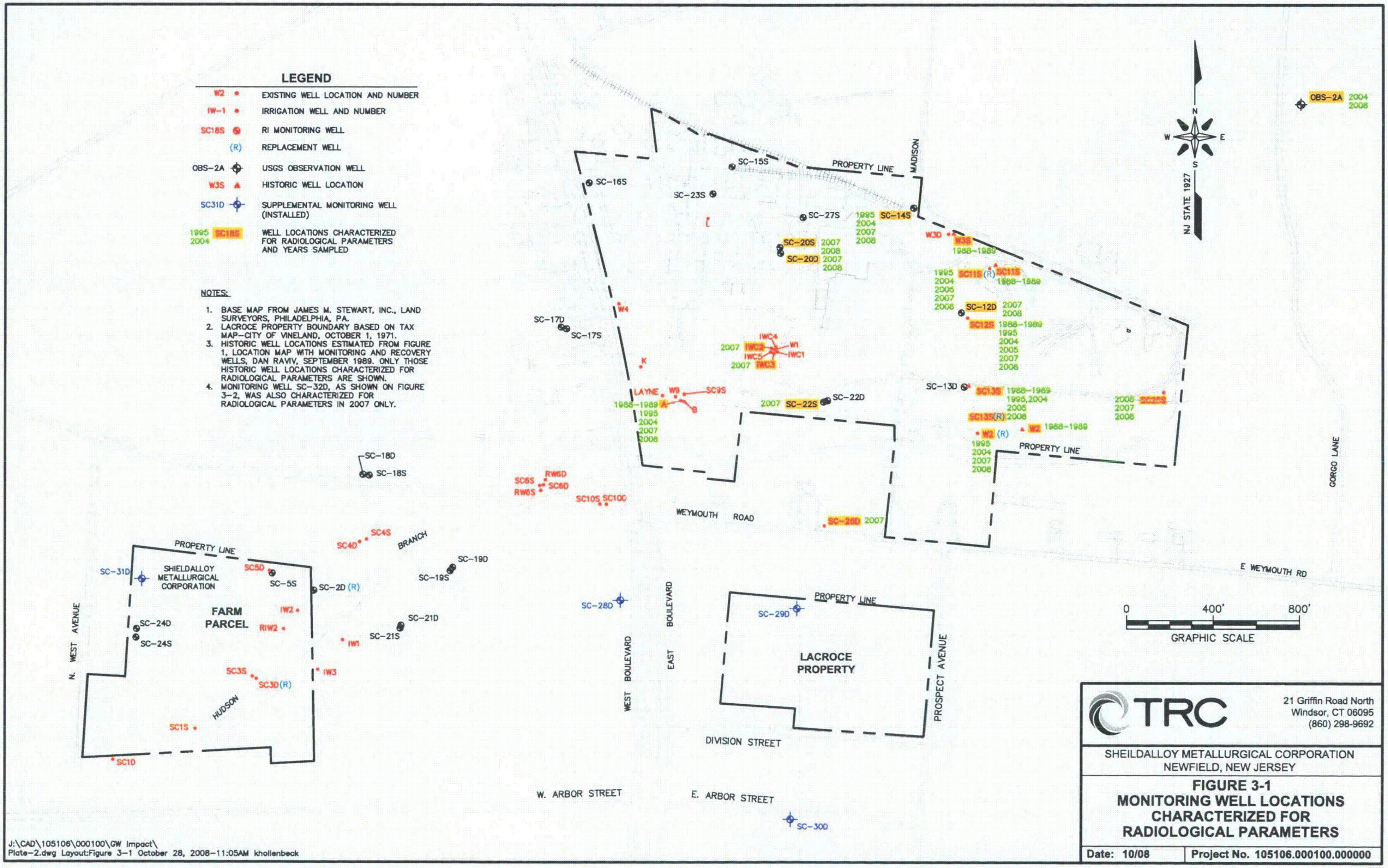
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 2-1
SUBSURFACE SOIL
SAMPLE LOCATIONS

Date: 10/08 Project No. 105106-000100-000000



LEGEND

W2	●	EXISTING WELL LOCATION AND NUMBER
IW-1	●	IRRIGATION WELL AND NUMBER
SC18S	●	RI MONITORING WELL
	(R)	REPLACEMENT WELL
OBS-2A	⊕	USGS OBSERVATION WELL
W3S	▲	HISTORIC WELL LOCATION
SC31D	⊕	SUPPLEMENTAL MONITORING WELL (INSTALLED)
1995 2004	SC18S	WELL LOCATIONS CHARACTERIZED FOR RADIOLOGICAL PARAMETERS AND YEARS SAMPLED

NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. HISTORIC WELL LOCATIONS ESTIMATED FROM FIGURE 1, LOCATION MAP WITH MONITORING AND RECOVERY WELLS, DAN RAVIV, SEPTEMBER 1989. ONLY THOSE HISTORIC WELL LOCATIONS CHARACTERIZED FOR RADIOLOGICAL PARAMETERS ARE SHOWN.
4. MONITORING WELL SC-32D, AS SHOWN ON FIGURE 3-2, WAS ALSO CHARACTERIZED FOR RADIOLOGICAL PARAMETERS IN 2007 ONLY.

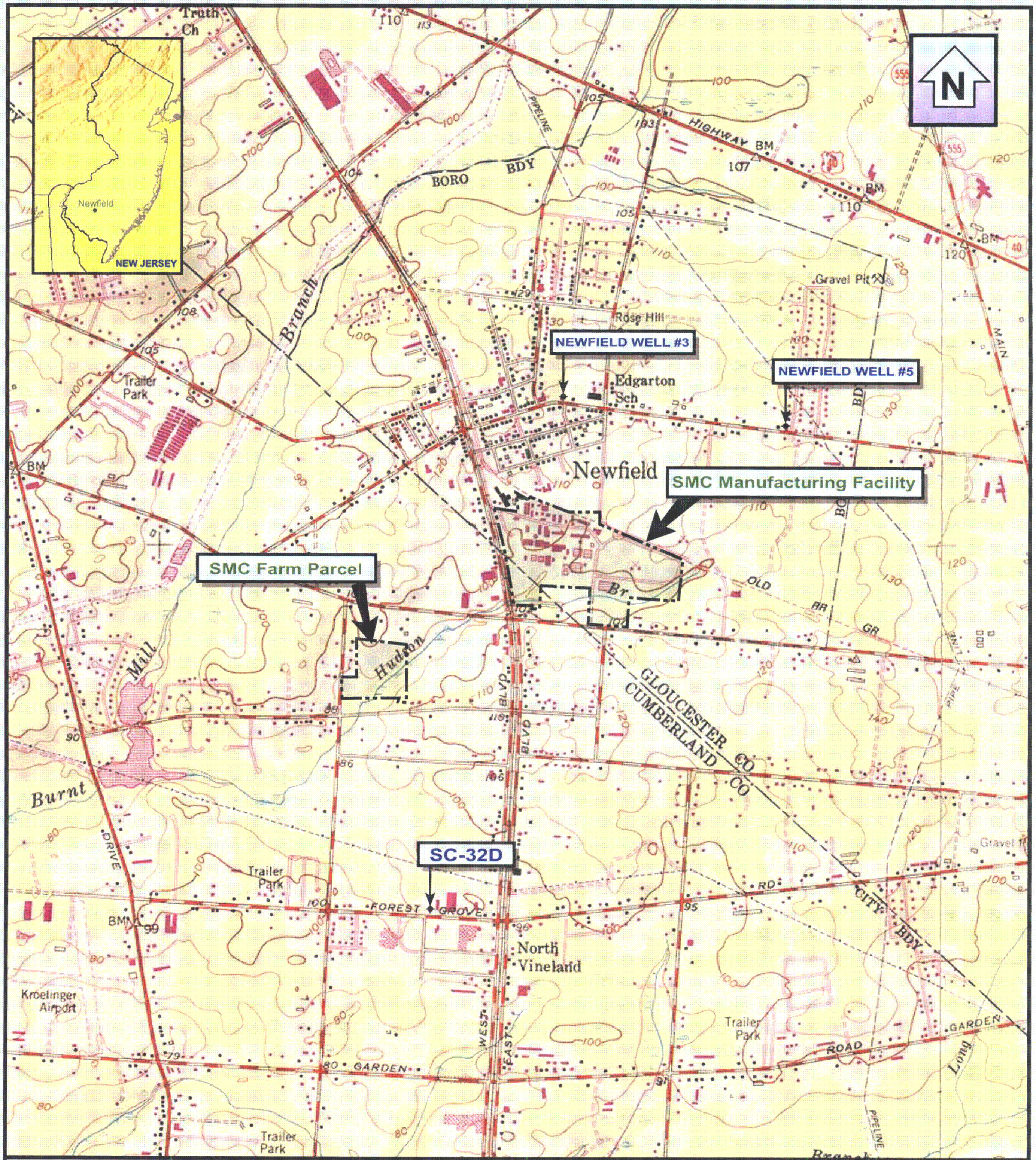
J:\CAD\105106\000100\GW Impact\
Plate-2.dwg Layout:Figure 3-1 October 28, 2008-11:05AM khollenbeck

TRC
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHEILDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 3-1
MONITORING WELL LOCATIONS CHARACTERIZED FOR RADIOLOGICAL PARAMETERS

Date: 10/08 | Project No. 105106.000100.000000



0 2000
SCALE FEET

0 1
SCALE MILE

1:24000

BASE CREATED WITH TOPO™ © 1996 WILDFLOWERS PRODUCTIONS, www.topo.com
7.5' NEWFIELD, NJ USGS TOPOGRAPHIC MAP

TOPO WITH WELLS.fh10

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Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 3-2
MONITORING WELL SC-32D AND NEWFIELD WELLS 3 & 5 LOCATION MAP

Date: 11/07 **Project No.** 105106.000100.000000

Figure 3-3
Combined Radium and Nitrate + Nitrite in Ground Water (July 2008)
Shieldalloy Metallurgical Corporation

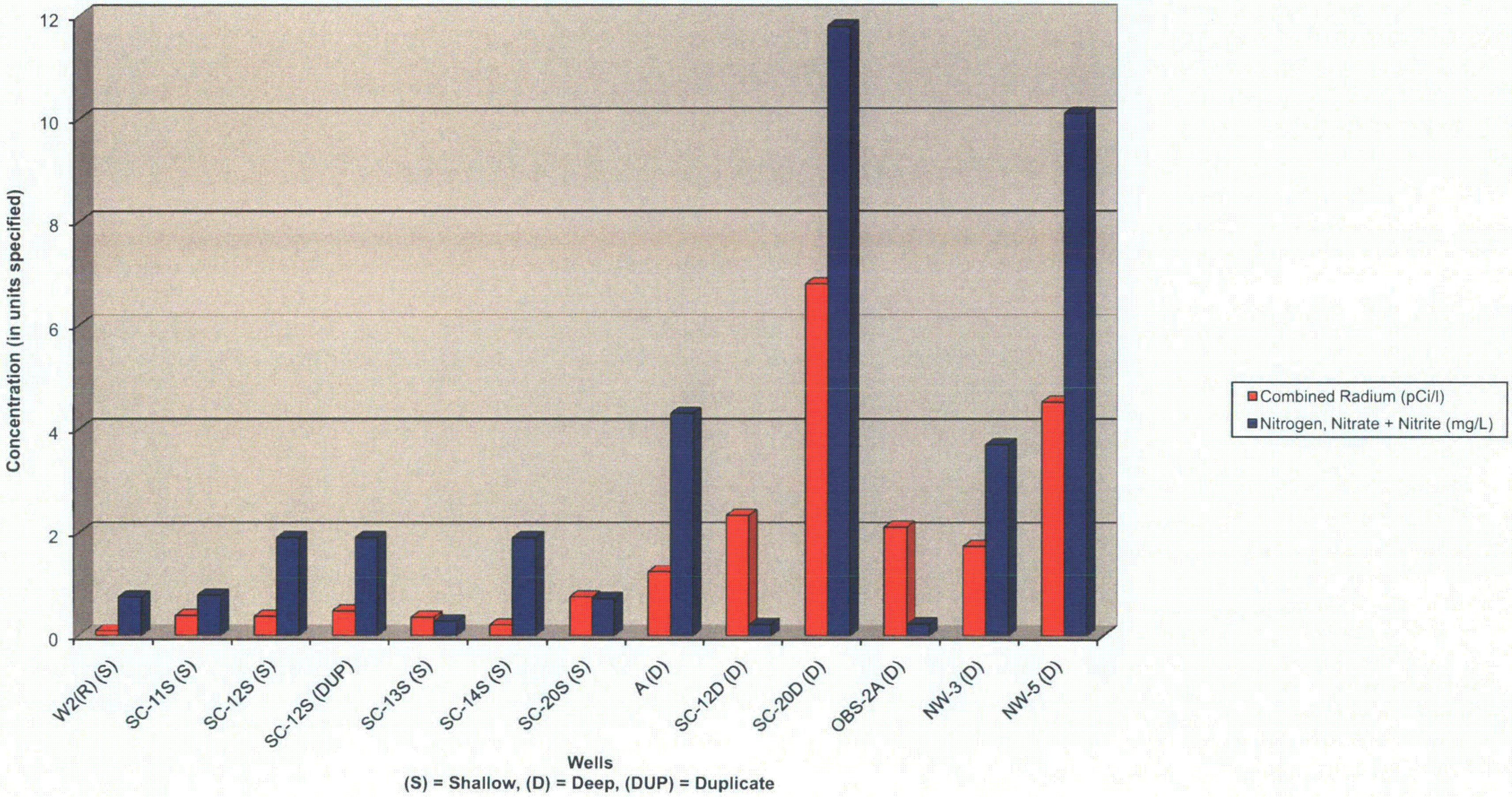


Figure 3-4
Combined Radium and pH in Ground Water (July 2008)
Shieldalloy Metallurgical Corporation

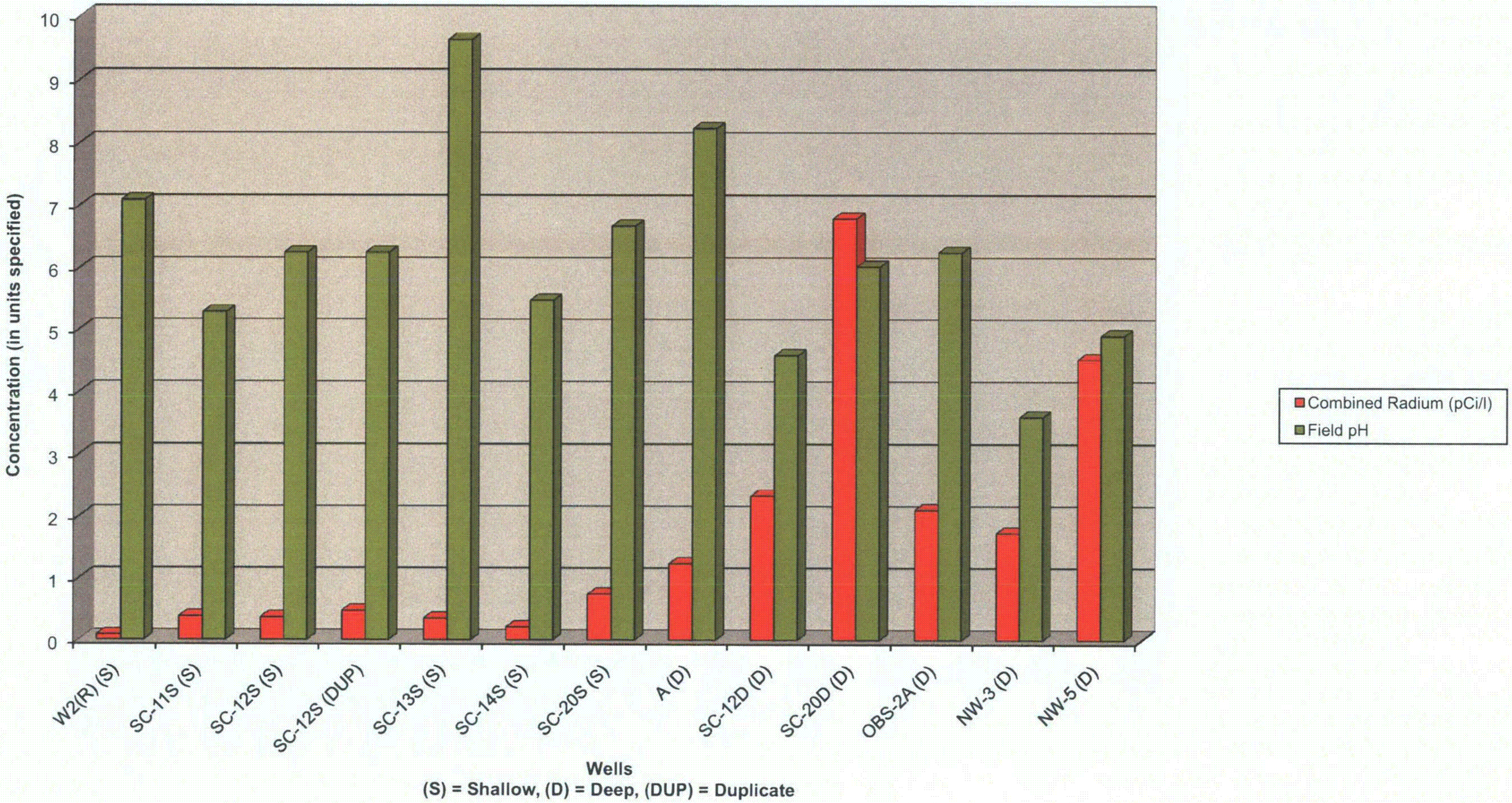
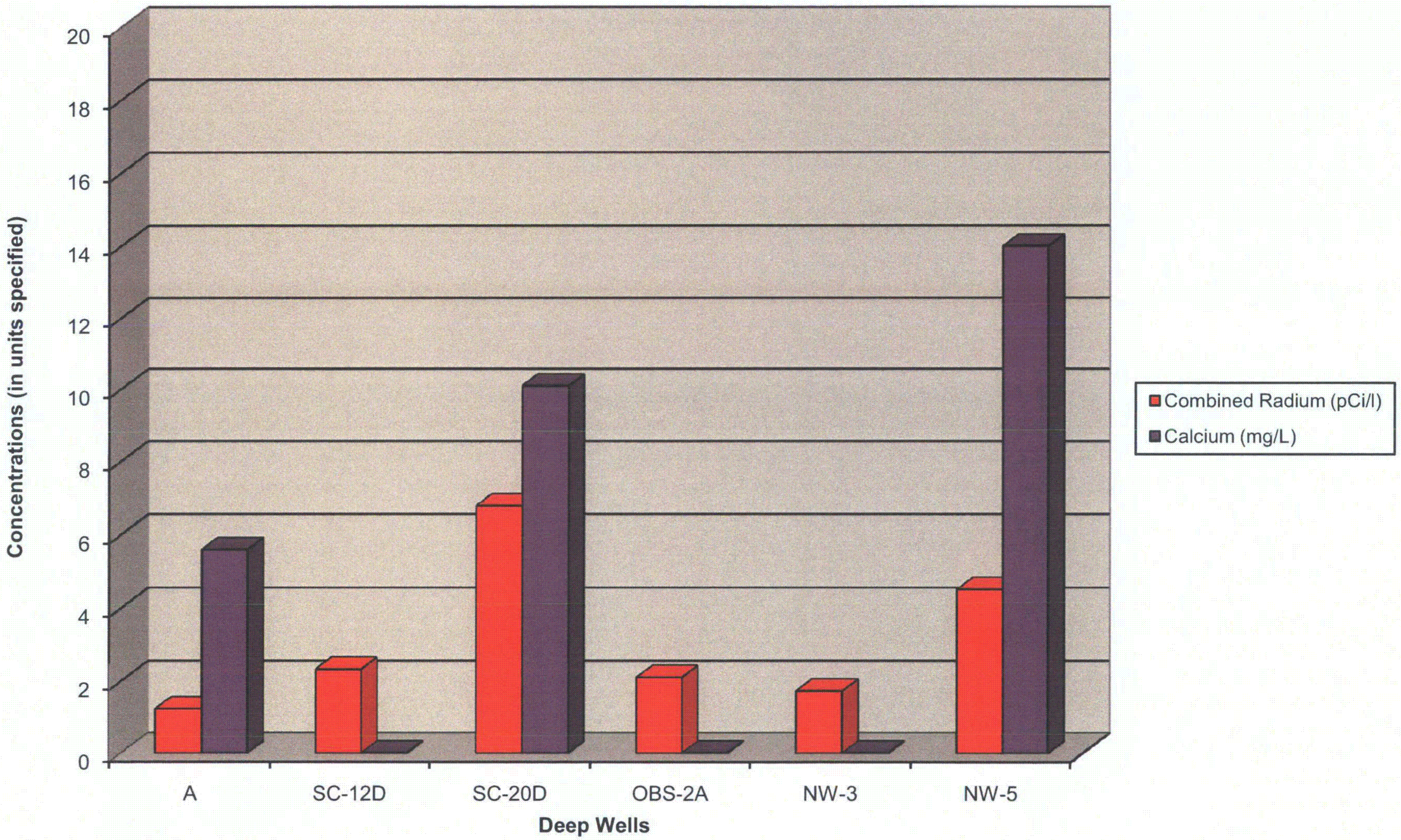
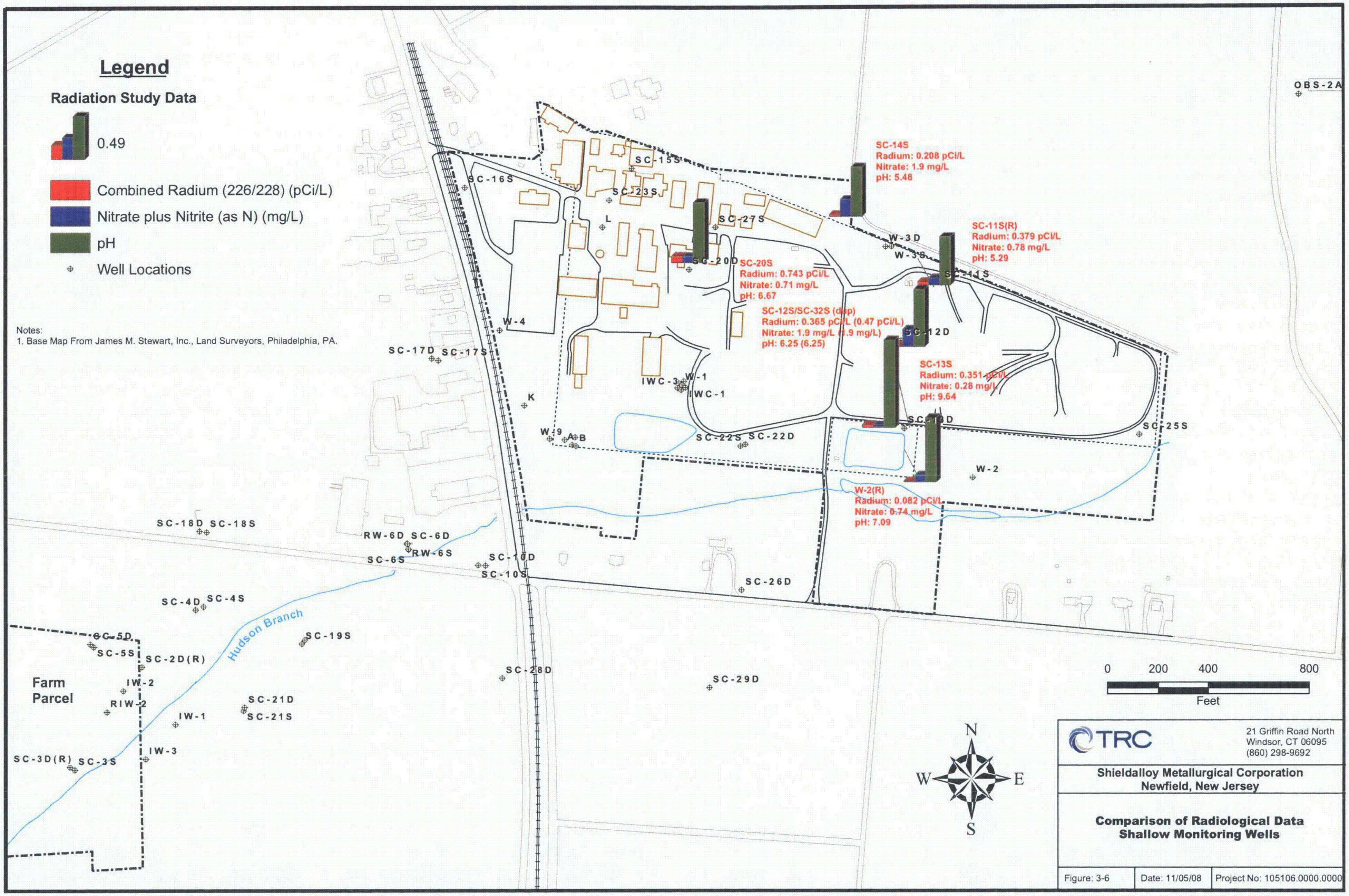


Figure 3-5
Combined Radium and Calcium in Deep Wells (July 2008)
Shieldalloy Metallurgical Corporation





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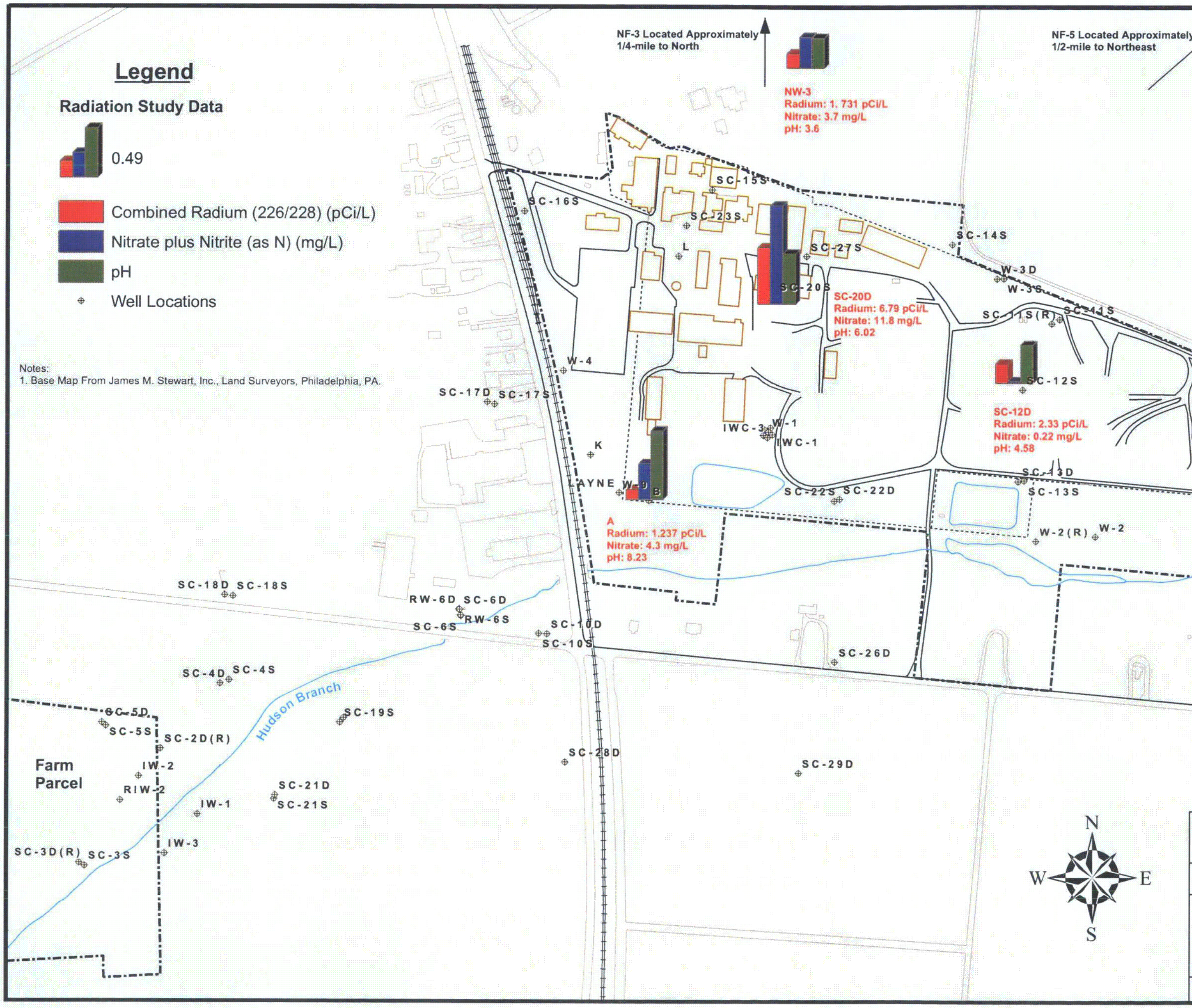
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Comparison of Radiological Data
Shallow Monitoring Wells

Figure: 3-6	Date: 11/05/08	Project No: 105106.0000.0000



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Windsor, CT 06095
(860) 298-9692

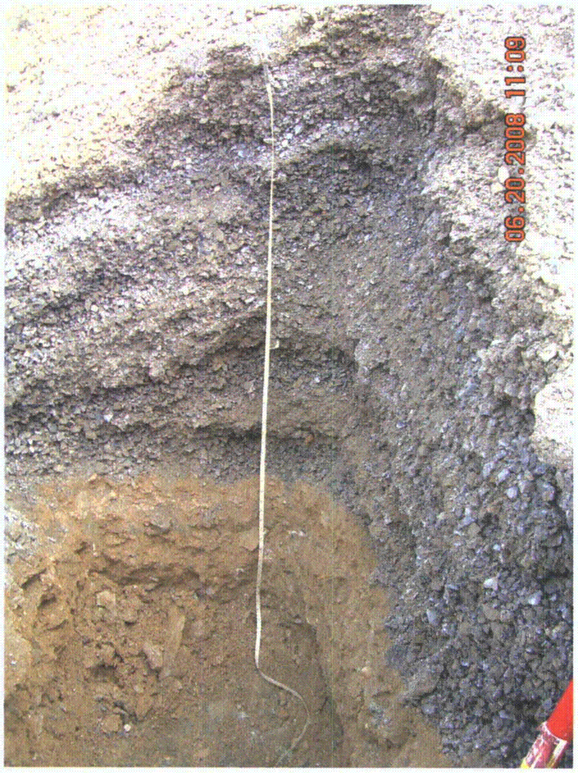
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Comparison of Radiological Data
Deep Monitoring Wells

Figure: 3-7	Date: 11/05/08	Project No: 105106.0000.0000

ATTACHMENT A

PHOTOGRAPHS


06.20.2008 11:09

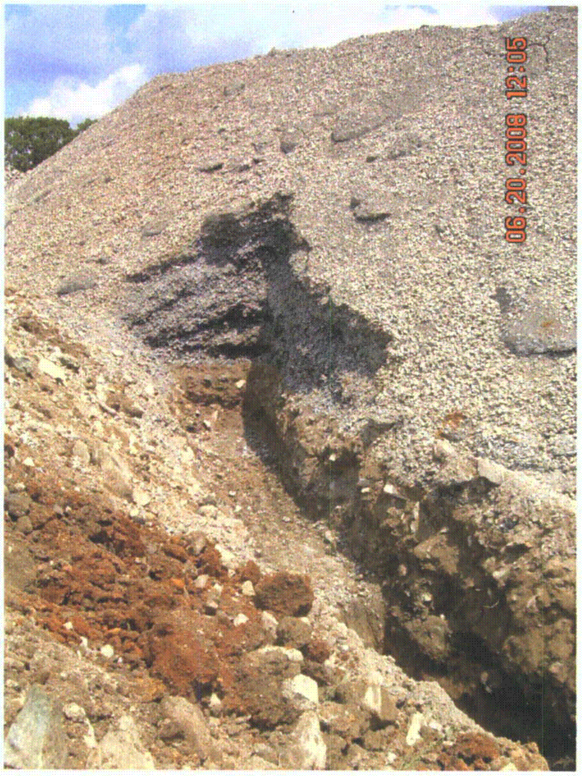
Test Pit HA-3 – Northern end


06.20.2008 11:10

Test Pit HA-3 – Northern End

Test Pit HA-3 – Southern End

Test Pit HA-3 – From South Looking North



Test Pit HA-3 –Northern End

Test Pit HA-4

Test Pit HA-4

Test Pit HA-5

Test Pit HA-5 - Close Up

Test Pit HA-5 – Transition to Saturated Material

Test Pit HA-6

Test Pit HA-6 (two photos combined)

Test Pit HA-6 Location

ATTACHMENT B

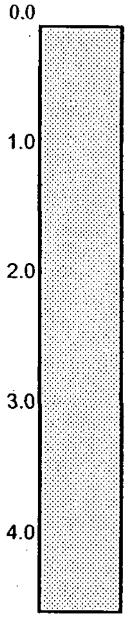
SOIL LOGS

SOIL BORING LOG
SMC
STORAGE YARD

SOIL PROBE LOCATION: HA 1
PROJECT NO: 105106 .000100.000000
PROJECT: SMC STORAGE YARD SOIL SAMPLING
LOCATION: NEWFIELD, NJ

TRC INSPECTOR: CARLSON, CHRIS
DRILLING RIG: HAND AUGER

DATE STARTED: 6/19/2008
DATE COMPLETED: 6/19/2008
LOCATION: N

DEPTH (FT)	SAMPLE	PID / FID (ppm)	SOIL DESCRIPTION	LITHOLOGY
0-0.5	X	NA	0-0.5' Light brown F-SAND, some silt, loose, dry, no odor, no stain	
0.5-1	X	NA	0.5-1' Light red-brown. F-SAND some silt, loose, dry, no odor, no stain	
1-1.5	X	NA	1-1.5' Light red-brown. F-SAND some silt, medium dense, dry, no odor, no stain	
1.5-2	X	NA	1.5-2' Light red-brown. F-SAND some silt, medium dense, dry, no odor, no stain	
2-2.5	X	NA	2-2.5' Light red-brown. F-SAND, little silt, trace f-gravel, medium dense, dry, no odor, no stain	
2.5-3	X	NA	2.5-3' Light. red-brown F-SAND, trace silt, little f-gravel, trace c gravel, medium dense, dry, no odor, no stain	
3-3.5	X	NA	3-3.5' Light. red-brown F/C SAND, little f-gravel, trace c-gravel. medium dense, dry, no odor, no stain	
3.5-4	X	NA	3.5-4' Light red-brown. F/C SAND, little f-gravel, trace c-gravel, medium dense, dry, no odor, no stain	
4-4.5	X	NA	4-4.5' Light red-brown. F/M SAND, little f-gravel, medium dense, dry, no odor, no stain	
			* Refusual @ 4.5'	

Notes: Samples retained onsite for radiological screening on a Ludlum Model 2241 scaler/ratemeter

▓ - silt

░ - Sand

▒ - silt & Sand

▨ - Clay

SOIL BORING LOG
SMC
STORAGE YARD

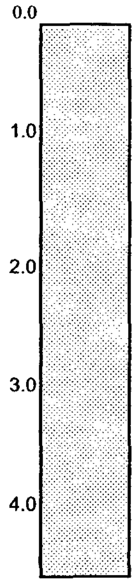
SOIL PROBE LOCATION: HA2
PROJECT NO: 105106.000100.000000
PROJECT: SMC STORAGE YARD SOIL
LOCATION: NEWFIELD, NJ

TRC INSPECTOR: CARLSON, CHRIS
DRILLING RIG: HAND AUGER

DATE STARTED:6/19/2008
DATE COMPLETED:6/19/2008
LOCATION: N

DEPTH (FT)	SAMPLE	PID / FID (ppm)	SOIL DESCRIPTION
0-0.5	X	NA	0-0.5' Brown F-SAND, trace silt, loose, dry, no odor, no stain
0.5-1	X	NA	0.5-1' Brown F-SAND, trace silt, loose, dry, no odor, no stain
1-1.5	X	NA	1-1.5' Light yellow-brown, F-SAND, trace silt, trace, m-sand, trace f-gravel, loose, dry, no odor, no stain
1.5-2	X	NA	1.5-2' Light yellow-brown, F-SAND, trace silt, trace, m-c sand, trace fine-gravel, loose, dry, no odor, no stain
2-2.5	X	NA	2-2.5' Light red-brown. F/C SAND, little f-gravel, damp, medium dense, no odor, no stain
2.5-3	X	NA	2.5-3' Light red-brown. F/C SAND some f-gravel, damp, medium dense, no odor, no stain
3-3.5	X	NA	3-3.5' Light red-brown F/C SAND and f-gravel, damp to wet, medium dense, no odor, no stain
3.5-4	X	NA	3.5-4' Light red-brown F/C SAND and f-gravel, wet, dense, no odor, no stain
			*Refusal at 4.0ft

LITHOLOGY



Notes: Samples retained onsite for radiological screening on a Ludlum Model 2241 scaler/ratemeter

▓ - silt
░ - Sand
▒ - silt & Sand
▨ - Clay

SOIL BORING LOG
SMC
STORAGE YARD

TEST PIT LOG

PROJECT NO. 105106.000100.000000	CLIENT SMC	TEST PIT NO. HA 3
LOCATION STORAGE YARD ARE		ELEVATION & DATUM N/A
CONTRACTOR KB Construction		TRC INSPECTOR Carlson, Chris
EQUIPMENT John Deere 310G Backhoe with 24" bucket		DATE START/COMPLETION 6/20/2008 STATUS Backfilled
SAMPLER TYPE N/A		TOTAL DEPTH 5.5' WATER LEVEL OBS. NA STAB. NA

DEPTH (ftbg)	WATER (ftbg)	SAMPLE DESCRIPTION	SAMPLE $^{(1)}$ (ftbg)	PID/FID (ppm/ppm)
0-2		Light brown F-C SAND, some silt, some f-c gravel, some slag	X*	NA
2-2.5		Light brown F-C SAND + SILT, some f-c gravel, some slag (highly cemented)	X*	NA
2.5-4		Dark brown F-SAND + SILT, some f-gravel, very dense	X*	NA
4.5-5		Light red-brown F-C SAND, little silt, trace clay, some f-gravel, dense to medium dense	X*	NA
		Notes: 1) x*= 0-5 ft. samples were collected at 6" intervals 2) Radioactive screening performed on-site on Ludlum Model 2241 scaler/ratemeter		

SOIL BORING LOG
SMC
STORAGE YARD

TRC

TEST PIT LOG

PROJECT NO. 105106.000100.000000	CLIENT SMC	TEST PIT NO. HA4
LOCATION STORAGE YARD AREA		ELEVATION & DATUM N/A
CONTRACTOR KB CONSTRUCTION		TRC INSPECTOR CARLSON, CHRIS
EQUIPMENT John Deere 310G Backhoe with 24" bucket		DATE START/COMPLETION 6/20/2008 STATUS Backfilled
SAMPLER TYPE N/A		TOTAL DEPTH 5 WATER LEVEL OBS. NA STAB. NA

DEPTH (ftbg)	WATER (ftbg)	SAMPLE DESCRIPTION	SAMPLE [1] (ftbg)	PID/FID (ppm/ppm)
0-2'		Black F-M SAND + SILT, some slag, no odor, no stain	X*	NA
2'-3'		Brown F-M SAND, some silt, trace f-gravel, no odor, no stain	X*	NA
2'-5'		Light orange-brown F-C SAND + SILT, little clay, little f-gravel, damp, no odor, no stain , very sticky	X*	NA

Notes:
1) x*= 0-5 ft. samples were collected at .6" intervals
2) Radioactive screening performed on-site on Ludlum Model 2241 scaler/ratemeter

SOIL BORING LOG
SMC
STORAGE YARD

TRC TEST PIT LOG

PROJECT NO. 105106.000100.000000	CLIENT SMC	TEST PIT NO. HA5
LOCATION STORAGE YARD AREA		ELEVATION & DATUM N/A
CONTRACTOR KB CONSTRUCTION		TRC INSPECTOR CARLSON, CHRIS
EQUIPMENT John Deere 310G Backhoe with 24" bucket		DATE START/COMPLETION 6/20/2008 — STATUS Backfilled
SAMPLER TYPE N/A		TOTAL DEPTH 7.0' — WATER LEVEL OBS. 4' — STAB. NA

DEPTH (ftbg)	WATER (ftbg)	SAMPLE DESCRIPTION	SAMPLE (1) (ftbg)	PID/FID (ppm/ppm)
0-4		Dark grey-brown SAND, some slag, damp, no odor, no stain	X*	NA
4-4.5	4.5	Light red-brown, F-M SAND some f-gravel, medium dense, damp, no odor, no stain	X*	NA
4.5-5		Light red-brown, F-M SAND some f-gravel, medium dense, wet, no odor, no stain	X*	NA
5-5.5		Light red-brown, F-M SAND some f-gravel, medium dense, wet, no odor, no stain	X*	NA
5.5-6		Light red-brown, F-C SAND, little silt, some f-gravel, medium dense, no odor, no stain	X*	NA
6-6.5		Light red-brown, F-C SAND, some silt, some f-gravel, medium dense, wet, no odor, no stain	X*	NA
6.5-7		Light red-brown, F-C SAND, some silt, some f-gravel, medium dense, wet, no odor, no stain	X*	NA
		Notes: 1) x*= 0-4 ft. samples were collected at .6" intervals 2) Radioactive screening performed on-site on Ludlum Model 2241 scaler/ratemeter.		

SOIL BORING LOG
SMC
STORAGE YARD

TRC TEST PIT LOG

PROJECT NO. 105106.000100.000000	CLIENT SMC	TEST PIT NO. HA 6
LOCATION STORAGE YARD AREA		ELEVATION & DATUM N/A
CONTRACTOR KB CONSTRUCTION		TRC INSPECTOR CARLSON, CHRIS
EQUIPMENT John Deere 310G Backhoe with 24" bucket		DATE START/COMPLETION 6/20/2008 STATUS Backfilled
SAMPLER TYPE N/A		TOTAL DEPTH 4.5' WATER LEVEL OBS. NA STAB. NA

DEPTH (ftbg)	WATER (ftbg)	SAMPLE DESCRIPTION	SAMPLE $^{(1)}$ (ftbg)	PID/FID (ppm/ppm)
0-1.3		Red brown F-C SAND, some f-gravel, little silt (lightly cemented)	X*	NA
1.5-3		Dark brown F-SAND + SILT, little clay, trace roots, very dense, damp, no odor, no stain	X*	NA
3-4.5		Light orange-brown F-SAND, little f-gravel, no odor, no stain	X*	NA
		Notes: 1) x*= 0-5 ft. samples were collected at .6" intervals 2) Radioactive screening performed on-site on Ludlum Model 2241 scaler/ratemeter		

ATTACHMENT C

QUALIFICATIONS

R. Alan Duff

Professional Qualifications

Mr. Duff has over 30 years of experience in nuclear and hazardous materials project management, design support, surveillance, operational health physics, training, and decommissioning activities. He has prepared numerous plans, procedures, and license documents for U. S. Department of Energy facilities, U. S. Department of Defense facilities, U. S. Nuclear Regulatory Commission licensees, and commercial client facilities that are regulated by agreement states. Mr. Duff is well versed in the area of civilian and government radioactive and mixed waste transport and disposal requirements. He is registered by the National Registry of Radiation Protection Technologists (NRRPT).

Education

Advanced Radioactive Material Transportation and Disposal Classes, 1989, 1993, 2003, and 2007.

GPS/GIS Backpack Survey Training Classes, 2007.

IT Corporation Project Management Course (40 hours), 1992.

40-Hour OSHA HAZWOPER (29 CFR 1910.120) Training, 1987.

Eight-hour Supervisor Training, 1990

Eight-hour OSHA Annual Refresher (29 CFR 1910.120), 2008.

Operational Water Chemistry and Radiological Controls, U.S. Navy, 1982

Engineering Laboratory Technician School, U.S. Navy, 1980.

Nuclear Power Training Unit (prototype), U.S. Navy, 1980.

Naval Nuclear Power School, U.S. Navy, 1978.

Registrations/Certifications

Registered Radiation Protection Technologist (RRPT), National Registry of Radiation Protection Technologists

Radiation Safety Officer - MDE Radioactive Materials License No. MD-31-281-01.

Authorized User - MDE Radioactive Materials License No. MD-31-281-01.

Experience and Background

2002-Present	*Vice President of Nuclear Services, Integrated Environmental Management, Inc., Knoxville, Tennessee* - As the director of IEM's Nuclear Services Division, which operates as a compliment to our consulting capability by providing support services and on-site project management for major client initiatives, Mr. Duff is responsible for turn-key decontamination and decommissioning of nuclear facilities - including the preparation of all planning documentation, characterization surveys and sampling, facility and equipment decontamination, final status survey performance, waste packaging/transport/disposal coordination, routine facility surveillance services, emergency response, leak testing of sealed sources, instrument rental, employee monitoring services for internal and/or external exposures, training, and a host of other applied health physics operations. Mr. Duff also serves as the Radiation Safety Officer (RSO) for IEM operations pursuant to Maryland Department of the Environment Radioactive Materials License No. MD-31-281-01.
1995-2002	*Program/Project Manager, Integrated Environmental Management, Inc., Knoxville, Tennessee* - Provided high-quality project management and remediation services to commercial and government clients. As a member of the client's response team, worked with clients to: Develop scopes-of-work and bid packages for specialty subcontractors handling highly focused assignments; identify those subcontractors who will provide the greatest value to the client; manage teams of specialty subcontractors to ensure that the client's goals and expectations (technical, regulatory, and financial) are met from the beginning until project completion; provide insights into future regulatory issues and their impact as input to the client's long-range business planning and cost forecasting process; provide site remediation/decommissioning services for radioactive and hazardous materials; advise and train clients on waste transportation and disposal issues; and develop project specific plans and procedures to conduct on site activities.
1994-1995	*Senior Environmental Specialist, AWK Consulting Engineers, Inc., Pittsburgh, Pennsylvania* While assigned to the Oak Ridge, Tennessee office, was responsible for performing technical and administrative duties required to satisfy customer needs on site characterization and pre-remedial design support projects and for all aspects of D&D projects. Responsible for preparing project plans, project work plans, task specific Health & Safety Plans, and budgets/schedules for these projects. Also responsible for identifying and implementing decommissioning and decontamination methods for these projects.
1987-1994	*Project Manager, Health Physics Supervisor, Nuclear/Mixed Waste Engineering Services, IT Corporation, Knoxville, Tennessee.* Provided project management and health physics support services for nuclear and mixed waste projects throughout the United States.
1978-1987	*Engineering Laboratory Technician (ELT), Leading Petty Officer, Radiological Controls Shift Supervisor*, United States Navy Supervised a division of 40 personnel, provided support for nuclear powered submarines, and performed over

250 error-free shipments of radioactive materials. Served as Leading ELT and Engine Room Supervisor on the USS Grayling, SSN 646.

Professional Society Memberships

Health Physics Society (Plenary Member)

American Nuclear Society

Conference of Radiation Control Program Directors (Advisor to the Radioactive Waste Management Committee E-5 and to the D&D Committee E-24)

Awards

Navy Achievement Medal for conducting the first Trident Class submarine ion exchange resin discharge and solidification.

IT Corporation Project Management Associate

Example Project Descriptions

Project Manager for health physics field activities during characterization, remediation and survey of several oil production sites with soil contaminated with Naturally-Occurring Radioactive Materials (NORM) for multiple clients in support of litigation defense.

Project Manager for the first contaminated soil remediation project conducted in Venezuela. Soil was contaminated with cesium-137 from a sealed source that was suspected to be improperly disposed of and had exposure rates up to 10 mr/hr on contact with the soil.

Project Manager for the radiological characterization (MARSSIM surveys) of a facility that manufactured thorium fluoride for use as an optical surfacing product. Conducted radiation and contamination surveys and obtained analytical samples of building materials. Returned to the facility to conduct surveys in support of property ownership transfer. Supervised radiological remediation of facility including floor and wall contamination, underground tank removal, drain line removal, roof decontamination, and equipment demolition including ventilation systems, fume hoods, and scrubber systems. Responsible for coordination for treatment and disposal of radioactive and mixed wastes generated during the project and conducted final status surveys at the facility upon completion of work.

Project Manger for Phase 1 Environmental Assessments conducted at six radioactive waste processing and disposal facilities and investigative characterization activities at two of those facilities including coring through concrete floors to obtain soil samples under buildings.

Radioactive waste broker and DOT shipper for multiple client sites for shipping and disposal of client's sealed sources and radioactive process wastes.

Project Manager and Health Physicist for the remediation and final status surveys/sampling of a former oilfield pipe scale facility. Supervised the demolition of the site building, excavation and disposal of twelve truckloads of NORM- contaminated soil, and excavation and release of over 175 truckloads of clean soil. Interfaced with the client and state regulators on the planning and final release of the facility. Work performed under the terms/conditions of License No. MD-31-281.01.

Project Manager and Health Physicist for the remediation and final status survey of a pharmaceutical company's radiological laboratories contaminated with Hydrogen-3 and Carbon-14. Supervised the on site demolition of the labs including fume hoods, lab furniture and ventilation systems. Supervised the disposal of radioactive and mixed wastes from the site and the performance of the final status survey of the facility.

Project Manager for the decommissioning of an oven contaminated with mercury and thorium (mixed waste). Arranged for subcontractors to conduct decontamination and disposal activities, prepared project plans, supervised all field activities, and conducted all radiological surveys during the decommissioning. Responsible for coordination for treatment and disposal of mixed and hazardous wastes generated during the project. Later conducted removal of a central vacuum system that was contaminated with mercury and thorium at the same facility.

Conducted audits of a client's radiation protection program including tour of the site, interviews with employees to verify radiological and respirator training, review of shipping, waste disposal, sealed source, training, and survey records. Also conducted leak tests of client's radioactive sealed sources.

Project Manager for escalated decommissioning a State-licensed site that manufactured, tested, and distributed gauging devices in anticipation of the sale of the company and the possibility of its moving its operations to another location. Responsible for preparation of work plans, negotiations with regulatory agencies, decontamination of indoor and outdoor areas, performance and documentation of a final status survey, shipment of waste, and project-specific health and safety.

Project Manager and health physicist for the remediation of a building foundation drainage system and the processing of over 100,000 gallons of water contaminated with cobalt-60 up to levels of one (1) microcurie per liter for a commercial client. Responsible for coordination of a water processing subcontractor, an excavation subcontractor, and off-site analytical laboratory activities. Also interfaced with on-site U. S. Nuclear Regulatory Commission, U. S. Environmental Protection Agency, and a variety of state and local agencies. Follow up work at the same facility included development of decommissioning funding plans and site decommissioning plans.

Technical writer for the development of a logic flow diagram for identifying radioactive and mixed wastes at the U. S. Department of Energy's Portsmouth (Ohio) Gaseous Diffusion Plant.

Technical writer for the Fernald Remedial Investigation/Feasibility Study (RI/FS). Provided technical guidance to engineering staff, generated reports on radioactive and mixed waste packaging, transport, and disposal.

Site Manager for the characterization survey of an EPA Superfund site three story warehouse that had been used in the past as a lantern mantle manufacturing facility and had been contaminated with thorium. Assisted in the development of project plans and final reports, supervised a crew of Health Physics technicians performing characterization surveys, interfaced with the facility owner and EPA personnel while on site.

Project Manager for the decommissioning and decontamination of three facilities at Sandia National Laboratory contaminated with radioactive and mixed waste. Responsible for the coordination of resources for the development of project plans, development of Project Work Plan, and maintaining project budget and schedule commitments.

Health Physics Supervisor for a transuranic (TRU) waste repackaging project. Supervised the characterization, repackaging and shipment of 130 containers of high-activity americium-241 and plutonium-238 hot cell waste. The waste was packaged to meet the WIPP waste acceptance criteria and was transported (highway route controlled quantity) to the Idaho National Engineering Laboratory (INEL) for storage.

Project Manager for the excavation and disposal of radium waste cells for the Corps of Engineers at Bergstrom Air Force Base in Austin, TX. Developed all project plans, supervised field efforts, and coordinated waste transport and disposal activities.

Project Manager for the decontamination and final release survey of a 70,000 ft^2 facility that manufactured cesium-137 level gauges. Decontamination efforts involved overhead areas, work area concrete floors, and removal of soil under the floor slab. Facility was released from their license following a verification survey by the state radiological licensing agency. Developed state approved decommissioning plan and final status survey report.

Project Manager for the packaging and disposal of 55,000 Curies of cobalt-60 teletherapy sources. Sources were loaded into cask liners in the facility hot cell and loaded into Type B casks for shipment for disposal. Also supported the packaging and disposal of several low level waste drums and HEPA filters that required the use of shielded Type A and B shipping containers.

Project Manager for the decommissioning and decontamination of IT Corporation's Oak Ridge Mixed Waste Analytical Laboratory. Developed the decommissioning and decontamination plan that was approved by the State of Tennessee. Also supervised the field crew during final surveys of facility.

Project Manager for the decommissioning and decontamination of a magnesium-thorium waterfall grinding booth at Tinker Air Force Base in Oklahoma. Responsible for the development of project plans, schedule and budget management, and disposal of radioactive and mixed wastes.

Project Manager for the decommissioning of a commercial facility which had previously processed ores containing uranium and thorium. Generated the decommissioning plan submitted to and approved by the U. S. Nuclear Regulatory Commission, and was responsible for schedule, budget, and on site activities.

Project Manager for the removal of a 22 MeV particle accelerator from a major university medical center. Developed State-approved decommissioning and decontamination plans, arranged for waste disposal and transfer of the accelerator to a university in Beijing, China, and was responsible for budget, schedule and all on site activities.

Project Manager for the decommissioning and decontamination of two radioactive source manufacturing laboratories at Chevron Research and Technology. The laboratories housed a neutron generator and were contaminated with tritium, carbon-14, cesium-134, and cobalt-60. Negotiated plan approvals with the State agency, and was responsible for budget, schedule, and all on site activities including waste transport and disposal.

Project Manager for the routine quarterly surveillance and special radiological projects at a metallurgical facility licensed by the NRC. Conducted radiation, contamination, and airborne radioactivity surveys as well as personnel bioassay and dosimetry program and environmental monitoring program each quarter. Provided health physics coverage for non-routine activities such as baghouse and stack testing, heats of specialty materials, final release surveys of an excavated road area, storage yard, and a warehouse formerly used for storage of radioactive materials, and recovery of radioactively contaminated equipment improperly released from site. Responsible for the generation of quarterly surveillance reports.

Project Manager for the development of a conceptual decommissioning plan for a maintenance facility located in South Carolina. The plan was generated to provide support for the facility's decommissioning funding plan.

Health and Safety Manager/Project Manager at the U. S. Department of Energy's Fernald site thorium silo and bins decommissioning and decontamination project. Developed the project-specific health and safety plan, and interfaced with the client on health physics and health/safety issues. This project received safety and quality awards from the client.

Health Physics Supervisor responsible for the sampling of underground storage tanks with radioactive and mixed wastes at Brookhaven National Laboratory.

Health and Safety Manager for the U. S. Department of Energy's Fernald Plant K-65 Silo sampling project. Developed the health/safety and sampling plans. The silos contained up to 0.5 microcurie of Radium-226 per gram and were the largest single source of radon gas in the U.S.

D&D Technical Manager for the decommissioning of the U. S. Department of Energy's LEHR facility at the University of California at Davis. Developed project decommissioning and decontamination plans and field procedures.

Health Physics Supervisor for the excavation of waste materials which included mixtures of uranium and explosives.

Project Manager for the MARSSIM type final status survey of a potentially contaminated 10 acre property on Staten Island, New York. Developed site characterization/survey plans, supervised the on site characterization survey and soil sampling at the site, and developed the project report for submittal to regulators.

Developed numerous business proposals for nuclear decommissioning and decontamination projects including job walk downs, cost estimation, scheduling, and technical content of proposals.

While in the US Navy, acted as radioactive materials shipper for the Trident Submarine Refit Facility. Performed over 250 error-free shipments of radioactive materials including Type B quantity radiography source shipments and radioactive waste shipments to the naval shipyard.

ATTACHMENT D

FIELD ACTIVITY DAILY LOGS

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

FIELD ACTIVITY DAILY LOG

Page 1 of 1

Facility: Shieldalloy Metallurgical Corp.

Date: 6/20/08 Job/Task Number: 94005.2901

Client Name: Shieldalloy

Address of Work Site: West Blvd., Newfield, NJ

Description of Work: counting samples

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS

Arrived on site at (insert date and time): 6/20/08

1400 Received samples from TRC personnel for counting. There is not sufficient time to prepare all samples for counting n Marinelli beakers ⇒ screened all 64 samples on the outside of their ziploc bags. All that exhibited detectable counts > bkgd. were weighed, photographed, & counted in a Marinelli beaker for 2 minutes in D117, The Cave.

- Completed on site work, samples were labeled, placed into coolers and a chain of custody was completed for each cooler. The sample coolers were taken to an adjacent, locked room & custody was transferred to Dave Smith of TRC until it is determined what analyses are to be performed.

No Further Entries This DATE RD

Departed site at (insert date and time): 6/20/08

Changes from Plans and Specifications, and Other Special Orders and Important Decisions: Not sufficient amount of time to perform detailed 2 min. counts on all samples, just screened some samples in bag in ratemeter mode

Weather Conditions:

Important Telephone Calls and Interactions: None

Personnel on Site: Duff (IEM)

Name (print): R. Alan Duff

Signature:

ATTACHMENT E

INSTRUMENT RECORDS

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

EXPOSURE RATE SURVEY INSTRUMENT DATA SHEET

Project No. 94005.2901	Detector		Meter		
Site Location/Background Location: SMC Newfield / Parking lot at site entrance	Type: N/A	Serial No. N/A	Type: Ludlum 19	Serial No: 182648	Operating Voltage: SAT

Check Source Number	Radionuclide:	Calibration Activity and Date:
#3347	Cs-137	11/97 1uC:

Date	Units	Start of Shift Background				End of Shift Background				Daily Response (μR/hr)	Initials
		1	2	3	Avg.	1	2	3	Ave.		
6/16/08	uR/hr	6	6	5	6	6	6	7	6	180	
6/17/08	uR/hr	6	5	6	6	6	6	6	6	180	
6/18/08	uR/hr	6	6	6	6	6	6	6	6	180	
6/19/08	uR/hr	6	6	6	6	6	6	6	6	180	
6/20/08	uR/hr	6	6	6	6	6	6	6	6	180	

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
CONTAMINATION SURVEY INSTRUMENT DATA SHEET

Project No: 94005.2901			Detector			Meter		
Site Location/Background Location: SMC Newfield / Parking lot at site entrance			Type: Ludlum 44-9	Serial No. 131864	Probe Area (cm²) 15	Type: Ludlum 12	Serial No: 121268	Operating Voltage: SAT
Check Source No: 2398-98			Check Source No:			Check Source No:		
Radionuclide: Tc-99	Activity: 19,200 dpm	Date: 8/6/96	Radionuclide:	Activity:	Date:	Radionuclide:	Activity:	Date:

Date	Start of Shift Background (cpm for a N/A minute count)								End of Shift Background (cpm for a N/A minute count)								Daily Source Check (α)		Daily Source Check (β)		MDA** - Scaler Mode (dpm)		Bat OK	HV OK	Initials
	Alpha				Beta				Alpha				Beta				Source (cpm)	Eff	Source (cpm)	Eff	α	β			
	1	2	3	Av.	1	2	3	Av.	1	2	3	Av.	1	2	3	Av.									
6/16	←	N/A		→	50	40	30	40	←	N/A		→	50	50	40	47	N/A	N/A	2800	66	N/A	N/A	✓	✓	
6/17					50	50	40	47					60	80	40	60			2800				✓	✓	
6/18					50	60	40	50					60	70	60	63			2800				✓	✓	
6/19					60	70	80	70					50	60	80	63			2800				✓	✓	
6/20		↓			60	80	60	68		↓			60	60	60	60	↓	↓	2800	↓	↓	↓	✓	✓	

** $MDA = \frac{2.71 + 4.65\sqrt{BKG_{avg} \times t}}{t \times E \times \frac{A}{100}}$, where MDA = the activity level (dpm/100 cm²), BKG_{avg} = the background count rate for this measurement type (cpm), t = the sample measurement duration (min), E = the 4-π instrument efficiency, and A = the physical probe area (cm²).

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
EXPOSURE RATE SURVEY INSTRUMENT DATA SHEET

Project No. 94005.2901	Detector		Meter		
Site Location/Background Location: SMC Newfield / Parking lot at site entrance	Type: Ludlum 44-10	Serial No. 151704	Type: Ludlum 2241	Serial No: 143562	Operating Voltage: SAT

Check Source Number	Radionuclide:	Calibration Activity and Date:
#3347	Cs-137	11/97 1 uCi

Date	Units	Start of Shift Background				End of Shift Background				Daily Response ~~(µR/hr)~~ cpm	Initials
		1	2	3	Avg.	1	2	3	Ave.		
6/16/08	cpm	4K	4K	5K	4K	4K	4K	4K	4K	210	
6/17/08	↓	4K	4K	4K	4K	4K	4K	4K	4K	205	
6/18/08	↓	4K	4K	4K	4K	4K	4K	4K	4K	208	
* 6/19/08	↓	11,523	11,481	11,289	11,431				*	208	
* 6/20/08	↓	11,230	11,315	11,262	11,269				*	209	

* Performed 3 2-min counts to determine bkgd. prior to counting samples in Marinelli beakers. Several 2-min. counts were performed throughout the day to ensure there was not a significant change in the bkgd. Samples & bkgd. were counted in D117, "the cave".

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2241 SERIAL# 143562

ner: IEM

DATE: 02/07/08 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES: 03/27/08

Reason For Calibration: ● Due For Calibration ○ Repair (See Remarks) ○ Other (See Remarks) ○ Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 114512 CAL. DUE: 12/20/08

MODEL: SERIAL #: CAL DUE:

☑ Fast/Slow Switch working properly ☑ Audio Response ☐ Geotropism CABLE LENGTH 39"

CONDITION: Sat

NEW BATTERIES: ○ Yes ● No BATTERY CHECK: Sat

HV TEST ○ N/A ● Sat ○ Unsat

AF INPUT SENSITIVITY (mV) #1: 35 AL INPUT SENSITIVITY (mV) #1: A.F.

AF INPUT SENSITIVITY (mV) #2: N/A AL INPUT SENSITIVITY (mV) #2 : N/A

AF INPUT SENSITIVITY (mV) #3: N/A AL INPUT SENSITIVITY (mV) #3: N/A

AF INPUT SENSITIVITY (mV) #4: N/A AL INPUT SENSITIVITY (mV) #4: N/A

RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
250	250	0.0%	A.F.	
2500	2502	0.1%	A.F.	
25K	25.021 K	0.1%	A.F.	
250K	250.254 K	0.1%	A.F.	

Is the As Found Data Within 2% of the Set Point?: ● Yes ○ No

DETECTOR 1:		DETECTOR 2:		DETECTOR 3:		DETECTOR 4:	
AF 1-6	AL 1-6	AF 1-6	AL 1-6	AF 1-6	AL 1-6	AF 1-6	AL 1-6
0006 S-6	A.F.	N/A	N/A	N/A	N/A	N/A	N/A
0100 -2	A.F.	N/A	N/A	N/A	N/A	N/A	N/A
c/	A.F.	N/A	N/A	N/A	N/A	N/A	N/A
m	A.F.	N/A	N/A	N/A	N/A	N/A	N/A
1	A.F.	N/A	N/A	N/A	N/A	N/A	N/A
000 s	A.F.	N/A	N/A	N/A	N/A	N/A	N/A

REMARKS: Calibrated w/44-10 #PR151704.

Does Instrument Meet Final Acceptance Criteria?: ● Yes ○ No

Calibration Sticker Attached?: ● Yes ○ No

Date Instrument is Due For Next Calibration: 02/07/09

rformed/Reviewed by: Joanne Glenn Date: 2/7/2008 Entered by: ____Initials

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 44-10 PROBE # PR151704

Owner: IEM

DATE: 02/07/08
TECH: Joanne Glenn
LOCATION: Griffin Inst
DATE LAST CAL EXPIRES: 03/22/08

○ Due For Calibration
○ Other (See Remarks)
○ Repair (See Remarks)
● Due and Repair

Cable Length: 39"
I.S.: 10 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2241 SERIAL #: 143562 CAL. DUE: 02/07/09
MODEL: SERIAL #: CAL. DUE:

SOURCE #: Other ISOTOPE: ACTIVITY: ASSAY DATE:
SOURCE #: 99-1816 ISOTOPE: Cs137 ACTIVITY: 1.23 uCi ASSAY DATE: 08/12/99

GEOMETRY: Jig upside down with source underneath, activity side up.

Physical Condition: ● Sat ○ Unsat

Efficiency From Last Calibration: 5.7%
Previous HV Set Point: 1000 V

Counts (CPM)	Background (CPM)	Net CPM:
0	0	0

Decay (yrs): 8.50
AF Efficiency: 0.00%

Is the AF efficiency within 20% of the efficiency from the last calibration? ○ Yes ● No

Reproducibility: 139650 140910 138420 Average: 139660.00

Are the individual counts within 10% of the average? ● Yes ○ No

High Voltage:	Source Response (CPM):	Background (CPM):	Net CPM:
750	112030	5020	107010
800	121860	7800	114060
850	130130	7880	122250
900	134570	8340	126230
950	139070	8620	130450
1000	141900	8610	133290
1050	138930	9260	129670

HV	RESPONSE	BACKGROUND	NET CPM
1000 V	139650	8770	130880

Decay (yrs): 8.50
Efficiency: 5.83%

REMARKS: Replaced broken PM Tube. Calibrated w/2241 #143562.

Does Instrument Meet Final Acceptance Criteria?: ● Yes ○ No

Calibration Sticker Attached?: ● Yes ○ No

Date Instrument is Due For Next Calibration: **02/07/09**

Performed/Reviewed by: Joanne Glenn **Date:** 2/7/2008 **Entered by:**______**Initials**

GRIFFIN INSTRUMENTS
Calibration Certificate

Serial #	182648	Model	19	Owner	IEM
Probe #	N/A	Model	N/A	PO #	IEM
Source Used	10250	Model	28-6A	Cert Date	6/25/04
Pulser Serial	114512	Model	500	Cal Due	12/11/07
Temperature	71.6 F	Pressure	30.06"	Humidity	57%

Batteries: Sat (√) Unsat ( ) Desiccant: Sat ( ) Unsat ( ) N/A (√)

Saturation: Sat (√) Unsat ( ) Geotropism: Sat (√) Unsat ( )

Mechanical Zero: As Found: 0 As Left: 0 HV = A.F.=800V A.L.=800V

Scale	Units		As Found	As Left
5000	mR/hr	4.0	3.5	3.75
5000	mR/hr	2.5	2.3	2.5
5000	mR/hr	1.0	1.0	1.1
500	uR/hr	400*	360	395
500	uR/hr	250*	230	250
500	uR/hr	100*	90	100
250	uR/hr	200*	185	200
250	uR/hr	125*	115	125
250	uR/hr	50*	45	50
50	uR/hr	40*	36	39.5
50	uR/hr	25*	23	25
50	uR/hr	10*	9	10
25	uR/hr	20*	18.5	20
25	uR/hr	12.5*	12	12.5
25	uR/hr	5*	4.5	5

*Pulsed

Are As Left readings w/in 10% of the Set Point? [✓ Yes] No

Remarks: 142 cpm/uR/hr.

Performed/Reviewed By: Date: 7/12/07.

Calibration Due Date: 7/12/08.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 12 NS SERIAL# 121268

er: IEM

DATE: 02/07/08 **LOCATION:** Griffin Inst

TECH: Joanne Glenn **DATE LAST CAL EXPIRES:** 04/05/08

Reason For Calibration: ○ Due For Calibration ○ Repair (See Remarks)
○ Other (See Remarks) ● Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 **SERIAL #:** 114512 **CAL. DUE:** 12/20/08
MODEL: **SERIAL #:** **CAL DUE:**

☑ Fast/Slow Switch working properly ☑ Audio Response ☑ Geotropism **CABLE LENGTH** 39"

CONDITION: Sat **AF MECHANICAL ZERO:** 0 **AL MECHANICAL ZERO:** 0

NEW BATTERIES: ○ Yes ● No **BATTERY CHECK:** Sat

HV RANGE 400 - 1500 VOLTS ● N/A ○ Sat ○ Unsat

HV		AS FOUND HV	AS LEFT HV
500 V:		500	A.F.
1250 V:	1000 V for 177s	1250	A.F.
2000 V:	1500 V for 177s	1950	A.F.

AF INPUT SENSITIVITY (mV): 33 **AL INPUT SENSITIVITY (mV) :** 35

RATE METER						SCALER			
SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.0%	A.F.					
	250	250	0.0%	A.F.					
	400	400	0.0%	A.F.					
x1 or x10	1000	1000	0.0%	A.F.					
	2500	2500	0.0%	A.F.					
	4000	4000	0.0%	A.F.					
x10 or x100	10K	10 K	0.0%	A.F.					
	25K	25 K	0.0%	A.F.					
	40K	40 K	0.0%	A.F.					
x100 or x1000	100K	100 K	0.0%	A.F.					
	250K	250 K	0.0%	A.F.					
	400K	400 K	0.0%	A.F.					

Is the As Found Data Within 20% of the Set Point?: ● Yes ○ No

REMARKS: Replaced broken reset switch. Married w/44-9 #PR131864.

Does Instrument Meet Final Acceptance Criteria?: ● Yes ○ No

Calibration Sticker Attached?: ● Yes ○ No

Date Instrument is Due For Next Calibration: **02/07/09**

rformed/Reviewed by: Joanne Glenn **Date:** 2/7/2008 **Entered by:**____**Initials**

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 44-9 PROBE # PR131864

Owner: IEM

DATE:	02/07/08	LOCATION:	Griffin Inst
TECH:	Joanne Glenn	DATE LAST CAL EXPIRES:	04/05/08

REASON FOR CALIBRATION:

● Due For Calibration ○ Repair (See Remarks) ○ Other (See Remarks) ○ Due and Repair

CABLE LENGTH: 39" INPUT SENSITIVITY: 35 mV

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL:	12	SERIAL #:	178479	CAL. DUE:	12/31/08
MODEL:		SERIAL #:		CAL. DUE:	

NIST TRACEABLE SOURCES

SOURCE #:	99TC470-1814	SOURCE #:	
ISOTOPE:	Tc99	ISOTOPE:	
ACTIVITY (dpm):	37300	ACTIVITY:	
ASSAY DATE:	08/03/99	ASSAY DATE:	

PHYSICAL CONDITION: Sat EFF. FROM LAST CAL.: 13.05% AF BKG: 67 HV 900V

3 ONE MINUTE COUNTS: 4319 4251 4227 AVERAGE: 4265.7

TC-99 EFFICIENCY: 11.26% *18.02%* SR-90 COUNT: SR-90 EFF:

AS LEFT ONE MINUTE COUNTS: AVERAGE:

TC-99 EFFICIENCY: SR-90 COUNT: SR-90 EFF:

Is the as found efficiency within 20% of eff. from last cal.?	● Yes	○ No *See Remarks
Saturation Test Satisfactory	● Yes	○ No
Reproducibility: Are the individual counts within 10% of the average?	● Yes	○ No
Does the probe meet final acceptance criteria?	● Yes	○ No
Calibration sticker attached?	● Yes	○ No

Remarks: Married w/12 #121268.

DATE PROBE IS DUE FOR NEXT CALIBRATION: 02/07/09

Performed/Reviewed by: Joanne Glenn Date: 2/7/2008 Entered by:______Initials

Geometry: Flat surface unless otherwise noted. 2 pi efficiencies italicized.

Calibrations performed to ANSI N323A-1997 standards

ATTACHMENT F

SURVEY RECORDS

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

RADIOLOGICAL SURVEY FORM

Survey Number Storage Yard Access/Exit

Page 1 of 1

Instrument/SN:	Calibration Due:	Site Name: SMC Newfield	Date: 6/16-6/20/08 Time:
Instrument/SN	Calibration Due:	Location: SMC Storage Yard	
Instrument/SN	Calibration Due:	Purpose: Daily Exit from area, Survey of vehicles/equipment.	
Survey Performed By (Print): R. Alan Duff		Survey Performed By (Signature):	
☒ Battery OK	☒ HV OK	☒ Source Check OK	Grid Dimensions: N/A x ☐ meters ☐ feet ☐ inches ☐ centimeters

6/16/08 - Performed direct frisk of vehicle tires, sampling equipment used, personnel hands + feet upon exit at the end of the work day, no counts > bkgd. noted.

6/17/08 - Performed direct frisk of vehicle tires, used sampling equipment, personnel hands + feet upon exit of the storage yard at lunch and at end of the work day, no counts > bkgd. noted.

6/18/08 - Performed direct frisk of vehicle tires, used sampling equipment, personnel hands + feet upon exit of the storage yard at lunch + at end of the work day, no counts > bkgd. noted.

6/19/08 - Performed direct frisk of vehicle tires, used sampling equipment, personnel hands + feet upon exit of the storage yard at lunch + at the end of the work day, no counts > bkgd. noted.

6/20/08 - Performed direct frisk of vehicle tires, used sampling equipment, personnel hands + feet upon exit of the storage yard, no counts > bkgd. noted.

Notes:

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

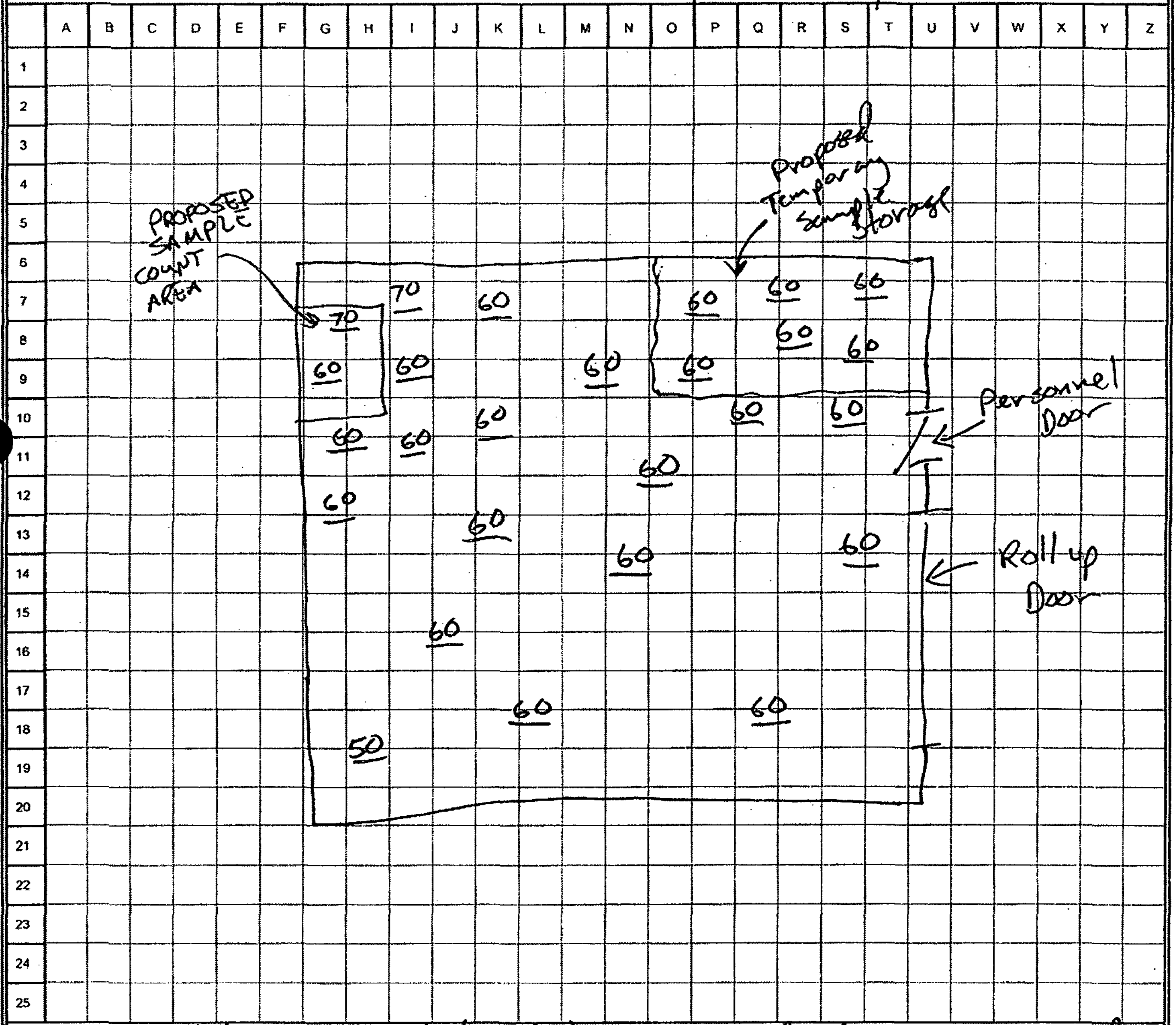
RADIOLOGICAL SURVEY FORM

Survey Number D117/The Cave-Pre

Page 1 of 1

Instrument/SN:	Calibration Due:	Site Name: SMC Newfield / Date: 6/19/08 / Time: 1200
Instrument/SN	Calibration Due:	Location: D117/The Cave
Instrument/SN Ludlum Model 12/ 44-9 121268/131864	Calibration Due: 2/7/09	Purpose: Pre-work survey
Survey Performed By (Print): R. Alan Duff		Survey Performed By (Signature):
☒ Battery OK	☒ HV OK	☒ Source Check OK

Grid Dimensions: N/A x
☐ meters ☐ inches
☐ feet ☐ centimeters



Notes: # – total βγ in counts/min (cpm) Gross, bkgd = 60cpm, surveyed floor surfaces holding probe w/in 1/2" of floor moving 1"-2"/sec.
Covered areas where samples will be handled with plastic sheeting.

Radiation Safety Procedure No. RSP-018, "Surveillance", Rev. 3 (Attachment 1)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.

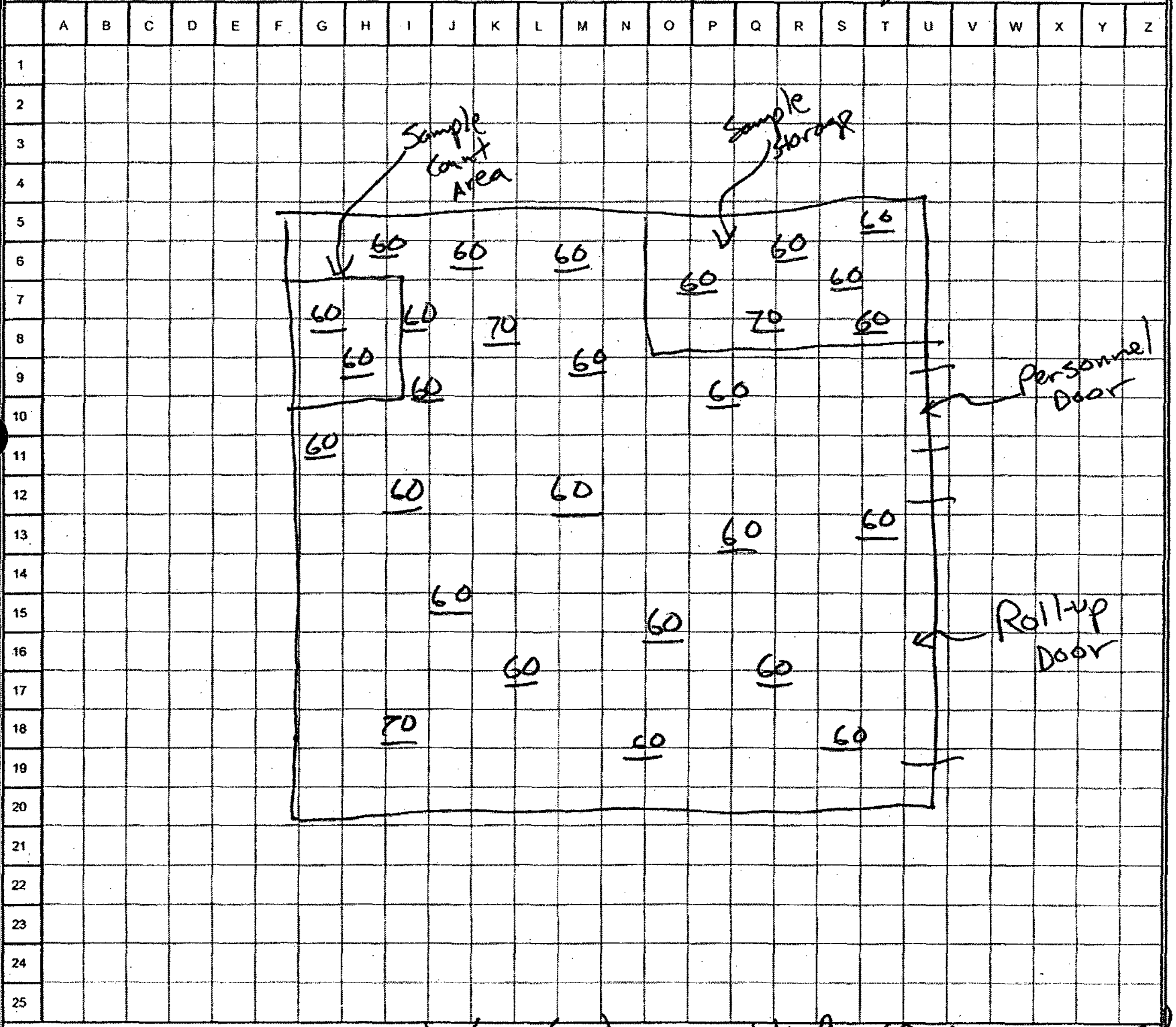
RADIOLOGICAL SURVEY FORM

Survey Number: D117/The Cave-Post

Page 1 of 1

Instrument/SN:	Calibration Due:	Site Name: SMC Newfield Date: 6/20/08 Time: 1830
Instrument/SN	Calibration Due:	Location: D117/The Cave
Instrument/SN Ludlum Model 12/ 44-9 121268/131864	Calibration Due: 2/7/09	Purpose: Post-Work Survey
Survey Performed By (Print): R. Alan Duff		Survey Performed By (Signature): RAD
☒ Battery OK	☒ HV OK	☒ Source Check OK

Grid Dimensions: N/A ×
☐ meters ☐ inches
☐ feet ☐ centimeters



Notes: # - total βγ in counts/min (cpm) Gross, bkgd. = 60 cpm, surveyed released & disposed of plastic sheeting, surveyed floor surfaces, scanned with probe w/in 1/2" of floor surface moving 1"-2"/sec.

Radiation Safety Procedure No. RSP-018, "Surveillance", Rev. 3 (Attachment 1)

ATTACHMENT G

SCREENING RESULTS

ATTACHMENT 8.1
SCREENING LOG

Counted 6/20/08

[illegible]ple No.	Collection Date	Collection Location	Sample Description	Measured Exposure Rate ~~(cpm)~~ Counts/2min	Analytical Result (pCi/g)		
					Ac-228	Bi-214	Th-234
P-8 x cut 1'-1.5'	6/20/08 1040	SEE TRC TRIP REPORT	Baghouse Dust/Soil	19,704			
P-8 x cut 4'-4.5'	6/20/08 1044		↓	15,497			
HA-3, 0'-0.5'	1135		Soil	71,761			
HA-3 0.5'-1'	1137			51,366			
HA-3 1'-1.5'	1139			25,274			
HA-3 1.5'-2'	1141			24,982			
HA-3, 2'-2.5'	1143			18,652			
HA-3, 2.5'-3'	1145			14,302			
HA-3, 3'-3.5'	1147			11,977			
HA-3 3.5'-4'	1149			11,945			
HA-3, 4'-4.5'	1150			11,872			
HA-4, 0'-0.5'	0955			16,691			
HA-4, 0.5'-1'	0957			16,919			
[illegible]4, 1'-1.5'	0959			12,276			
HA-4, 1.5'-2'	1000			11,844			
HA-5, 0'-0.5'	0845			37,347			
HA-5, 0.5'-1'	0848			70,990			
HA-5, 1'-1.5'	0850			100,530			
HA-5, 1.5'-2'	0853			33,477			
HA-5, 2'-2.5'	0855			14,920			
HA-5, 2.5'-3'	0858			14,634			
HA-5, 3'-3.5'	0900			12,423			
HA-6, 0'-0.5'	1245			16,267			
HA-6, 0.5'-1'	1247			14,463			
HA-6, 1'-1.5'	6/20/08 1249	↓	↓	12,072			

ATTACHMENT H

CHAIN-OF-CUSTODY FORMS

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 1 of 2

Reference No 94005.290)

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
HA-3	0'-0.5'	6/20/08 11:35	Ziploc Bag	~1kg	None	
	0.5'-1.0'	11:37				
	1.0'-1.5'	11:39				
	1.5'-2.0'	11:41				
	2.0'-2.5'	11:43				
	2.5'-3.0'	11:45				
	3.0'-3.5'	11:47				
	3.5'-4.0'	11:49				
	4.0'-4.5'	11:50				

(23) Special Instructions Potential U & Th Contamination

(24) Possible Hazard Identification
Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ______ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ______

(28) Relinquished by: (signature, date, time): 6/20/08 1800

Received by: (signature, date, time)

Relinquished by: (signature, date, time):

Received by: (signature, date, time)

Relinquished by: (signature, date, time):

Received by: (signature, date, time)

(See Reverse for Instructions)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 2 of 2

Reference No 94005.2901

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
HA-3	4.5'-5.0'	6/20/08 11:52	Ziploc Bag	~1kg	None	
HA-3	5.0'-5.5'	6/20/08 11:54	↓	↓	↓	
HA-4	0'-0.5'	↓ 09:55				
↓	0.5'-1.0'	09:57				
	1.0'-1.5'	09:59				
	1.5'-2.0'	10:00				
	2.0'-2.5'	10:01				
	2.5'-3.0'	10:03				
	3.0'-3.5'	10:05				

(23) Special Instructions Potential U & Th Contamination

(24) Possible Hazard Identification
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ______ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ______

(28) Relinquished by: (signature, date, time): 6/20/08 1400

Received by: (signature, date, time)

Relinquished by: (signature, date, time):

Received by: (signature, date, time)

Relinquished by: (signature, date, time):

Received by: (signature, date, time)

(See Reverse for Instructions)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 1 of 2

Reference No 94005.290)

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
HA-4	3.5'-4.0'	6/20/08 10:07	Ziploc Bag	~1kg	None	
HA-4	4.0'-4.5'	↓ 10:10	↓	↓	↓	
HA-4	4.5'-5.0'	↓ 10:13	↓	↓	↓	
HA-5	0.0'-0.5'	↓ 08:45	↓	↓	↓	
↓	0.5'-1.0'	↓ 08:48	↓	↓	↓	
↓	1.0'-1.5'	↓ 08:50	↓	↓	↓	
↓	1.5'-2.0'	↓ 08:53	↓	↓	↓	
↓	2.0'-2.5'	↓ 08:55	↓	↓	↓	
↓	2.5'-3.0'	↓ 08:58	↓	↓	↓	

(23) Special Instructions Potential U+Th Contamination

(24) Possible Hazard Identification
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ______ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ______

(28) Relinquished by: (signature, date, time): 6/20/08 1800	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)

(See Reverse for Instructions)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 2 of 2

Reference No

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
HA-5	3.0'-3.5'	6/20/08 09:00	Ziploc Bag	~1kg	None	
↓	3.5'-4.0'	↓ 09:02	↓	↓	↓	
↓	4.0'-4.5'	↓ 08:10	↓	↓	↓	
↓	4.5'-5.0'	↓ 08:05	↓	↓	↓	
↓	5.0'-5.5'	↓ 08:15	↓	↓	↓	
↓	5.5'-6.0'	↓ 08:20	↓	↓	↓	
↓	6.0'-6.5'	↓ 08:25	↓	↓	↓	
↓	6.5'-7.0'	↓ 08:30	↓	↓	↓	
HA-6	0.0'-0.5'	↓ 12:45	↓	↓	↓	

(23) Special Instructions Potential U & Th Contamination

(24) Possible Hazard Identification
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ______ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ______

(28) Relinquished by: (signature, date, time): 6/20/08 1800
Received by: (signature, date, time)

Relinquished by: (signature, date, time):
Received by: (signature, date, time)

Relinquished by: (signature, date, time):
Received by: (signature, date, time)

(See Reverse for Instructions)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 1 of 1

Reference No 94005.2901

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
HA-1	0'-0.5'	6/19/08 13:40	Ziploc Bag	~1 kg	None	
	0.5'-1.0'	13:45				
	1.0'-1.5'	13:50				
	1.5'-2.0'	13:55				
	2.0'-2.5'	14:00				
	2.5'-3.0'	14:05				
	3.0'-3.5'	14:08				
	3.5'-4.0'	14:10				
↓	4.0'-4.5'	↓ 14:15	↓	↓	↓	

(23) Special Instructions

(24) Possible Hazard Identification
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ______ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ______

(28)	Relinquished by: (signature, date, time): 6/20/08 1800	Received by: (signature, date, time)
	Relinquished by: (signature, date, time):	Received by: (signature, date, time)
	Relinquished by: (signature, date, time):	Received by: (signature, date, time)

(See Reverse for Instructions)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 1 of 1

Reference No 94605.2901

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
HA-2	0'-0.5'	6/19/08 14:30	Ziploc Bag	~1 kg	None	
	0.5'-1.0'	14:32				
	1.0'-1.5'	14:35				
	1.5'-2.0'	14:38				
	2.0'-2.5'	14:40				
	2.5'-3.0'	14:43				
	3.0'-3.5'	14:48				
	3.5'-4.0'	14:52				

(23) Special Instructions

(24) Possible Hazard Identification
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ________ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ________

(28) Relinquished by: (signature, date, time): 6/20/08 1800	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)

(See Reverse for Instructions)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 1 of 2

Reference No 94005.2961

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
HA-6	0.5'-1.0'	6/20/08 12:47	Ziploc Bag	~1kg	None	
↓	1.0'-1.5'	↓ 12:49	↓	↓	↓	
↓	1.5'-2.0'	↓ 12:51	↓	↓	↓	
↓	2.0'-2.5'	↓ 12:53	↓	↓	↓	
↓	2.5'-3.0'	↓ 12:55	↓	↓	↓	
↓	3.0'-3.5'	↓ 12:57	↓	↓	↓	
↓	3.5'-4.0'	↓ 12:59	↓	↓	↓	
↓	4.0'-4.5'	↓ 13:01	↓	↓	↓	
P8 XCUT	1.0'-1.5'	↓ 10:40	↓	↓	↓	

(23) Special Instructions Potential U & Th Contamination

(24) Possible Hazard Identification
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ______ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ______

(28) Relinquished by: (signature, date, time): 6/20/08 1400	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)

(See Reverse for Instructions)

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.
ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Page 2 of 2

Reference No 94005.2901

(1) Client Name	(7) Samples Shipment Date	(5) Bill to:
(2)Collected By:	(8) Lab Destination	
(3) Job/Task No:	(9) Lab Contact	
(4) Project Manager:	(12) IEM Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE CONTAINER PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program
P8XCUT	2.2'-2.5'	6/20/08 10:42	Ziploc Bag	~ 1kg	None	
P8XCUT	4.0'-4.5'	6/20/08 10:44	Ziploc Bag	~ 1kg	None	

(23) Special Instructions Potential U & Th Contamination

(24) Possible Hazard Identification
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive ______ months

(26) Turnaround Time Required: Normal ☐ Rush ☐

(27) QC Level: I ☐ II ☐ III ☐ Project Specific ______

(28) Relinquished by: (signature, date, time): 6/20/08 1400

Received by: (signature, date, time)

Relinquished by: (signature, date, time):

Received by: (signature, date, time)

Relinquished by: (signature, date, time):

Received by: (signature, date, time)

(See Reverse for Instructions)

ATTACHMENT I

CERTIFICATES OF ANALYSIS

Outreach
[illegible]oratory
311 North Aspen
Broken Arrow, OK 74012
(918) 251-2515
FAX (918) 251-0008

September 11, 2008

Carol Berger
Integrated Environmental Management, Inc.
8 Brooks Ave #205
Gaithersburg, MD 20877

CLIENT PROJECT NAME: 94005.29.05
OUTREACH LAB ID: 20080585

Dear Ms. Berger:

Please find enclosed the analytical report for your samples received in our laboratory on July 08, 2008 for the above captioned project. Ten samples were received in good condition. These samples were dried, ground and sealed for 21 days prior to analyzing for naturally occurring radionuclides by gamma spectroscopy, per your instructions. At your request, sample #5 was recounted and the original results were confirmed.

All Quality Control for the requested analysis is reported on the analytical report and is within control limits with the exception for the DUP RPD for Tl-208, Pb-212, and Bi-214.

Per your instructions, these samples will be disposed 30 days after the report date with the exception of samples #3, #4,and #5. These samples exceed our disposal limits and will be returned to you. Please provide a return address.

Thank you for choosing Outreach Laboratory and if you have any questions, please call us at 918-251-2515.

Laboratory Director

ODEQ ID #9517
NRC ODEQ LIC. #27522-01

ACCREDITED IN ACCORDANCE WITH
nelac

CERT. ID #OK001
See Certified
Parameter List

311 North Aspen
Broken Arrow, OK 74012
(918) 251-2515
FAX (918) 251-0008

Client:	IEM
Client Project:	94005.29.05
Lab Number:	20080585
Date Reported:	9/11/2008
Date Received:	7/8/08
Page Number:	1 of 5

Analytical Report

Lab ID: 20080585-01
Client ID: HA-1/ 1.0 - 1.5
Date Sampled: 6/19/2008 1:50:00 PM
Matrix: Solid

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
		Radiochemical Analyses					
K-40	HASL 300	6.39 +/- 1.30	pCi/g	0.597		8/1/2008	SD
Tl-208	HASL 300	0.264 +/- 0.072	pCi/g	0.074		8/1/2008	SD
Bi-212	HASL 300	0.513 +/- 0.229	pCi/g	0.348		8/1/2008	SD
Pb-212	HASL 300	0 +/- 0.108	pCi/g	0.215		8/1/2008	SD
Bi-214	HASL 300	0.684 +/- 0.134	pCi/g	0.115		8/1/2008	SD
Pb-214	HASL 300	6.55 +/- 0.119	pCi/g	0.237		8/1/2008	SD
Ac-228	HASL 300	0.625 +/- 0.210	pCi/g	0.420		8/1/2008	SD
Th-234	HASL 300	0.548 +/- 0.178	pCi/g	0.356		8/1/2008	SD
		Inorganics Analyses					
Percent Moisture	ASTM D2216-98	53.3	%		7/8/2008	7/10/2008	RP

Lab ID: 20080585-02
Client ID: HA-2/ 2.0 - 2.5
Date Sampled: 6/19/2008 2:40:00 PM
Matrix: Solid

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
		Radiochemical Analyses					
K-40	HASL 300	1.48 +/- 1.07	pCi/g	1.12		8/1/2008	SD
Tl-208	HASL 300	0.210 +/- 0.074	pCi/g	0.073		8/1/2008	SD
Bi-212	HASL 300	0.362 +/- 0.329	pCi/g	0.523		8/1/2008	SD
Pb-212	HASL 300	0.612 +/- 0.132	pCi/g	0.114		8/1/2008	SD
Bi-214	HASL 300	0.429 +/- 0.140	pCi/g	0.147		8/1/2008	SD
Pb-214	HASL 300	0.436 +/- 0.103	pCi/g	0.133		8/1/2008	SD
Ac-228	HASL 300	0.724 +/- 0.248	pCi/g	0.294		8/1/2008	SD
Th-234	HASL 300	0.528 +/- 0.955	pCi/g	1.12		8/1/2008	SD
		Inorganics Analyses					
Percent Moisture	ASTM D2216-98	66.7	%		7/8/2008	7/10/2008	RP

Lab ID: 20080585-03
Client ID: HA-3/ 0.0 - 0.5
Date Sampled: 6/20/2008 11:35:00 AM
Matrix: Solid

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
		Radiochemical Analyses					
[illegible]	HASL 300	4.01 +/- 2.23	pCi/g	2.52		8/1/2008	SD
Tl-208	HASL 300	9.89 +/- 0.795	pCi/g	0.546		8/1/2008	SD
Bi-212	HASL 300	17.6 +/- 2.99	pCi/g	3.11		8/1/2008	SD
Pb-212	HASL 300	27.0 +/- 2.47	pCi/g	0.447		8/1/2008	SD

BDL = Below Detection Limit

Analytical Report

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
Bi-214	HASL 300	18.3 +/- 1.34	pCi/g	0.683		8/1/2008	SD
Pb-214	HASL 300	19.1 +/- 1.26	pCi/g	0.655		8/1/2008	SD
Ac-228	HASL 300	26.9 +/- 1.79	pCi/g	1.24		8/1/2008	SD
Th-234	HASL 300	1.19 +/- 1.49	pCi/g	2.84		8/1/2008	SD
		Inorganics Analyses					
Percent Moisture	ASTM D2216-98	67.3	%		7/8/2008	7/10/2008	RP

Lab ID: **20080585-04**
Client ID: **HA-3/ 0.5 - 1.0**
Date Sampled: **6/20/2008 11:37:00 AM**
Matrix: **Solid**

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
		Radiochemical Analyses					
K-40	HASL 300	8.90 +/- 2.23	pCi/g	2.14		8/1/2008	SD
Tl-208	HASL 300	11.1 +/- 0.641	pCi/g	0.541		8/1/2008	SD
Bi-212	HASL 300	19.0 +/- 2.49	pCi/g	2.65		8/1/2008	SD
P[illegible]	HASL 300	58.4 +/- 5.96	pCi/g	2.27		8/1/2008	SD
Bi-214	HASL 300	13.6 +/- 0.986	pCi/g	0.556		8/1/2008	SD
Pb-214	HASL 300	20.1 +/- 2.31	pCi/g	1.33		8/1/2008	SD
Ac-228	HASL 300	29.1 +/- 1.28	pCi/g	0.647		8/1/2008	SD
Th-234	HASL 300	10.2 +/- 4.99	pCi/g	3.60		8/13/2008	SD
		Inorganics Analyses					
Percent Moisture	ASTM D2216-98	73.0	%		7/8/2008	7/10/2008	RP

Lab ID: **20080585-05**
Client ID: **HA-3/ 1.0 - 1.5**
Date Sampled: **6/20/2008 11:39:00 AM**
Matrix: **Solid**

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
		Radiochemical Analyses					
K-40	HASL 300	3.87 +/- 1.58	pCi/g	1.74		8/1/2008	SD
Tl-208	HASL 300	6.62 +/- 0.450	pCi/g	0.288		8/1/2008	SD
Bi-212	HASL 300	14.5 +/- 2.00	pCi/g	2.06		8/1/2008	SD
Pb-212	HASL 300	18.5 +/- 2.13	pCi/g	0.721		8/1/2008	SD
Bi-214	HASL 300	6.26 +/- 0.501	pCi/g	0.371		8/1/2008	SD
Pb-214	HASL 300	6.58 +/- 0.571	pCi/g	0.593		8/1/2008	SD
Ac-228	HASL 300	18.7 +/- 1.03	pCi/g	0.447		8/1/2008	SD
Th-234	HASL 300	3.30 +/- 0.840	pCi/g	1.18		8/1/2008	SD
		Inorganics Analyses					
P[illegible] Moisture	ASTM D2216-98	57.8	%		7/8/2008	7/10/2008	RP

BDL = Below Detection Limit

utreach
boratory
311 North Aspen
Broken Arrow, OK 74012
(918) 251-2515
FAX (918) 251-0008

Client:	IEM
Client Project:	94005.29.05
Lab Number:	20080585
Date Reported:	9/11/2008
Date Received:	7/8/08
Page Number:	3 of 5

Analytical Report

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
ab ID:	**20080585-06**						
lient ID:	**HA-3/ 1.5 - 2.0**						
ate Sampled:	**6/20/2008 11:41:00 AM**						
latrix:	**Solid**						
		Radiochemical Analyses					
-40	HASL 300	9.13 +/- 4.88	pCi/g	5.26		8/1/2008	SD
l-208	HASL 300	9.80 +/- 0.917	pCi/g	0.468		8/1/2008	SD
i-212	HASL 300	15.1 +/- 2.99	pCi/g	4.97		8/1/2008	SD
b-212	HASL 300	3.60 +/- 0.529	pCi/g	0.551		8/1/2008	SD
i-214	HASL 300	10.9 +/- 1.16	pCi/g	0.899		8/1/2008	SD
b-214	HASL 300	5.96 +/- 0.542	pCi/g	0.653		8/1/2008	SD
c-228	HASL 300	4.84 +/- 1.02	pCi/g	1.25		8/1/2008	SD
h-234	HASL 300	0 +/- 2.65	pCi/g	5.30		8/1/2008	SD
		Inorganics Analyses					
er[illegible]t Moisture	ASTM D2216-98	86.1	%		7/8/2008	7/10/2008	RP
ab ID:	**20080585-07**						
lient ID:	**HA-3/ 3.0 - 3.5**						
ate Sampled:	**6/20/2008 11:47:00 AM**						
latrix:	**Solid**						
		Radiochemical Analyses					
-40	HASL 300	4.35 +/- 1.17	pCi/g	0.680		8/1/2008	SD
l-208	HASL 300	0.383 +/- 0.089	pCi/g	0.077		8/1/2008	SD
i-212	HASL 300	0.518 +/- 0.451	pCi/g	0.539		8/1/2008	SD
b-212	HASL 300	1.09 +/- 0.165	pCi/g	0.086		8/1/2008	SD
i-214	HASL 300	0.726 +/- 0.158	pCi/g	0.122		8/1/2008	SD
b-214	HASL 300	0.859 +/- 0.134	pCi/g	0.105		8/1/2008	SD
c-228)	HASL 300	0.787 +/- 0.172	pCi/g	0.222		8/1/2008	SD
h-234	HASL 300	0 +/- 2.08	pCi/g	0.778		8/1/2008	SD
		Inorganics Analyses					
ercent Moisture	ASTM D2216-98	59.1	%		7/8/2008	7/10/2008	RP
ab ID:	**20080585-08**						
lient ID:	**HA-3/ 3.5 - 4.0**						
ate Sampled:	**6/20/2008 11:49:00 AM**						
latrix:	**Solid**						
		Radiochemical Analyses					
[illegible]	HASL 300	5.93 +/- 1.08	pCi/g	0.625		8/1/2008	SD
l-208	HASL 300	0.408 +/- 0.067	pCi/g	0.057		8/1/2008	SD
i-212	HASL 300	0.479 +/- 0.456	pCi/g	0.564		8/1/2008	SD
b-212	HASL 300	0.356 +/- 0.366	pCi/g	0.109		8/1/2008	SD

BDL = Below Detection Limit

[illegible]treach
[illegible]oratory
311 North Aspen
Broken Arrow, OK 74012
(918) 251-2515
FAX (918) 251-0008

Client: IEM
Client Project: 94005.29.05
Lab Number: 20080585
Date Reported: 9/11/2008
Date Received: 7/8/08
Page Number: 4 of 5

Analytical Report

	Method	Result	Units	DL	Prep Date	Analysis Date	Analyst
Bi-214	HASL 300	1.01 +/- 0.156	pCi/g	0.137		8/1/2008	SD
Pb-214	HASL 300	1.18 +/- 0.126	pCi/g	0.187		8/1/2008	SD
Ac-228	HASL 300	0.861 +/- 0.188	pCi/g	0.214		8/1/2008	SD
Th-234	HASL 300	2.61 +/- 1.16	pCi/g	1.72		8/1/2008	SD
		Inorganics Analyses					
Percent Moisture	ASTM D2216-98	60.1	%		7/8/2008	7/10/2008	RP
Lab ID:	**20080585-09**						
Client ID:	**HA-4/ 0.0 - 0.5**						
Date Sampled:	**6/20/2008 9:55:00 AM**						
Matrix:	**Solid**						
		Radiochemical Analyses					
K-40	HASL 300	3.87 +/- 0.870	pCi/g	1.74		8/1/2008	SD
Tl-208	HASL 300	1.11 +/- 0.159	pCi/g	0.157		8/1/2008	SD
Bi-212	HASL 300	2.74 +/- 0.915	pCi/g	1.17		8/1/2008	SD
[illegible]	HASL 300	2.34 +/- 0.750	pCi/g	0.335		8/1/2008	SD
Bi-214	HASL 300	2.57 +/- 0.267	pCi/g	0.202		8/1/2008	SD
Pb-214	HASL 300	2.52 +/- 0.207	pCi/g	0.168		8/1/2008	SD
Ac-228	HASL 300	3.36 +/- 0.385	pCi/g	0.433		8/1/2008	SD
Th-234	HASL 300	0.053 +/- 0.070	pCi/g	0.323		8/1/2008	SD
		Inorganics Analyses					
Percent Moisture	ASTM D2216-98	64.1	%		7/8/2008	7/10/2008	RP
Lab ID:	**20080585-10**						
Client ID:	**HA-4/ 0.5 - 1.0**						
Date Sampled:	**6/20/2008 9:57:00 AM**						
Matrix:	**Solid**						
		Radiochemical Analyses					
K-40	HASL 300	2.65 +/- 1.02	pCi/g	0.876		8/1/2008	SD
Tl-208	HASL 300	0.748 +/- 0.134	pCi/g	0.122		8/1/2008	SD
Bi-212	HASL 300	1.29 +/- 0.840	pCi/g	1.04		8/1/2008	SD
Pb-212	HASL 300	2.24 +/- 0.300	pCi/g	0.138		8/1/2008	SD
Bi-214	HASL 300	2.57 +/- 0.299	pCi/g	0.200		8/1/2008	SD
Pb-214	HASL 300	2.92 +/- 0.280	pCi/g	0.155		8/1/2008	SD
Ac-228	HASL 300	2.04 +/- 0.297	pCi/g	0.301		8/1/2008	SD
Th-234	HASL 300	0 +/- 0.565	pCi/g	1.13		8/1/2008	SD
		Inorganics Analyses					
[illegible] Moisture	ASTM D2216-98	58.4	%		7/8/2008	7/10/2008	RP

BDL = Below Detection Limit

[illegible]utreach
[illegible]boratory
311 North Aspen
Broken Arrow, OK 74012
(918) 251-2515
FAX (918) 251-0008

Client:	IEM
Client Project:	94005.29.05
Lab Number:	20080585
Date Reported:	9/11/2008
Date Received:	7/8/08
Page Number:	5 of 5

Lab Approval: ______________________

BDL = Below Detection Limit

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SHIELDALLOY METALLURGICAL CORPORATION
P.O. BOX 768, 12 WEST BOULEVARD
NEWFIELD, NJ 08344 • (609) 692-4200

Project No: IEM Project No. 94005.29.05

Chain of Custody Tape No:

Sampler: *(Print Name)*

Purchase Order:

ANALYSES

	Sample No./ Identification	Collection Date	Collection Time	Preserv.	Lab Sample Number	Sample Matrix	IEM Project #94005.29.05	IEM Specifications 07/07/08					pH*	Number of Containers/ REMARKS
1	HA-1/1.0-1.5	6/19/08	13:50	none	Ziploc Bag	Soil		X						
2	HA-2/2.0-2.5	↓	14:40					X						
3	HA-3/0.0-0.5	6/20/08	11:35					X						
4	HA-3/0.5-1.0		11:37					X						
5	HA-3/1.0-1.5		11:39					X						
6	HA-3/1.5-2.0		11:41					X						
7	HA-3/3.0-3.5		11:47					X						
8	HA-3/3.5-4.0		11:49					X						
9	HA-4/0.0-0.5		09:55					X						
10	HA-4/0.5-1.0		09:57					X				(918)	251-	2515

Send to Outreach Laboratory
Attn Sample Receiving
311 North Aspen
Broken Arrow, OK 74012

Relinquished By: *(Signature)*	Date	Time	Received By: *(Signature)*	Date	Time
1. Dan P. Smith	7/7/08		1. Lou Phillips	070808	1440
2.			2.		
3.			3.		

Sample Disposal Method:

Disposed By: *(Signature)*

SAMPLE COLLECTOR/WITNESS: *(Signature)*

ANALYTICAL LABORATORY AND CONTACT:

* If required pH should be taken within 15 minutes of sample collection time. Record result in the corresponding row.

L=Liquid S=Sludge
S=Solid O=Other (Specify)

Page _____ of _____

ATTACHMENT J

SUBSURFACE SOIL CONCENTRATIONS

STORAGE YARD SUBSURFACE SOIL SAMPLING SUMMARY

Shieldalloy Metallurgical Corporation

									Measured			Calculated					
Sample ID	Location	Sampling Method	Notes	Depth (ft)	Gross Screening Result (cpm)	Error (95%)	Net Screening Result (cpm)	Error (95%)	Th-232 (pCi/g)	U-238 (pCi/g)	Ra-226 (pCi/g)	Th-232 (pCi/g)	Error (95%)	U-238 (pCi/g)	Error (95%)	Ra-226 (pCi/g)	Error (95%)
HA-1	Background	Hand Auger	Sampled every 0.5 ft from surface to 4.5 feet below ground surface (bgs)	0 to 0.5	5835	153	0					2		1		1	
			Generally light red-brown fine to coarse sands	0.5 to 1	5835	153	0					2		1		1	
			Refusal at 4.5 feet bgs	1 to 1.5	5835	153	0		0.625	0.548	0.684	2		1		1	
				1.5 to 2	5835	153	0					2		1		1	
				2 to 2.5	5835	153	0					2		1		1	
				2.5 to 3	5835	153	0					2		1		1	
				3 to 3.5	5835	153	0					2		1		1	
				3.5 to 4	5835	153	0					2		1		1	
				4 to 4.5	5835	153	0					2		1		1	
HA-2	Background	Hand Auger	Sampled every 0.5 ft from surface to 4 feet bgs	0 to 0.5	5835	153	0					2		1		1	
			Generally brown to yellow-brown trending to red-brown fine to coarse sands	0.5 to 1	5835	153	0					2		1		1	
			Refusal at 4 feet bgs	1 to 1.5	5835	153	0					2		1		1	
				1.5 to 2	5835	153	0					2		1		1	
				2 to 2.5	5835	153	0		0.724	0.528	0.429	2		1		1	
				2.5 to 3	5835	153	0					2		1		1	
				3 to 3.5	5835	153	0					2		1		1	
				3.5 to 4	5835	153	0					2		1		1	
				4 to 4.5	5835	153	0					2		1		1	
HA-5	Between Areas 6 & 7	Test Pit	Dark gray/brown sand with slag to 4 ft bgs	0 to 0.5	18674	273	12839	313				15	2	12	1	9	1
		Hand Auger	Red brown sand & gravel, trace silt, medium dense 4 ft to 7 ft bgs	0.5 to 1	35495	377	29660	407				32	2	25	1	19	1
			Perched water at 4.5 ft bgs	1 to 1.5	50265	448	44430	474				48	2	38	1	28	1
			Sampled every 0.5 ft from surface to 7 ft bgs	1.5 to 2	16739	259	10904	301				13	2	10	1	8	1
				2 to 2.5	7460	173	1625	231				3	2	2	1	2	1
			Gauged adjacent well SC11S(R) - water at 13 ft bgs; supports perched ground water at 4.5 ft at HA-5	2.5 to 3	7317	171	1482	230				3	2	2	1	2	1
				3 to 3.5	6212	158	377	220				2	2	1	1	2	1
				3.5 to 4	5835	153	0	216				2	2	1	1	1	1
				4 to 4.5	5835	153	0	216				2	2	1	1	1	1
				4.5 to 5	5835	153	0	216				2	2	1	1	1	1
				5 to 5.5	5835	153	0	216				2	2	1	1	1	1
				5.5 to 6	5835	153	0	216				2	2	1	1	1	1
				6 to 6.5	5835	153	0	216				2	2	1	1	1	1
				6.5 to 7	5835	153	0	216				2	2	1	1	1	1
HA-4	West Side of Area 8	Test Pit	Sampled every 0.5 ft from surface to 4.5 ft bgs	0 to 0.5	8346	183	2511	238	3.360	0.053	2.570	4	2	3	1	3	1
			Slag intermixed with sand 0 - 1.5 ft bgs	0.5 to 1	8460	184	2625	239	2.040	0.000	2.570	4	2	3	1	3	1
			Black fine/med sand & silt from 0.5 to 2 ft bgs	1 to 1.5	6138	157	303	219				2	2	1	1	2	1
			Brown f/m sand, some silt, trace gravel 2.0 to 3.0 ft bgs	1.5 to 2	5922	154	87	217				2	2	1	1	1	1
				2 to 2.5	5835	153	0	216				2	2	1	1	1	1
				2.5 to 3	5835	153	0	216				2	2	1	1	1	1
				3 to 3.5	5835	153	0	216				2	2	1	1	1	1
				3.5 to 4	5835	153	0	216				2	2	1	1	1	1
				4 to 4.5	5835	153	0	216				2	2	1	1	1	1
			lt orange brown f/c sand & silt; little clay; damp little f gravel 3.0 to 5.0 ft bgs	4.5 to 5	5835	153	0	216				2	2	1	1	1	1

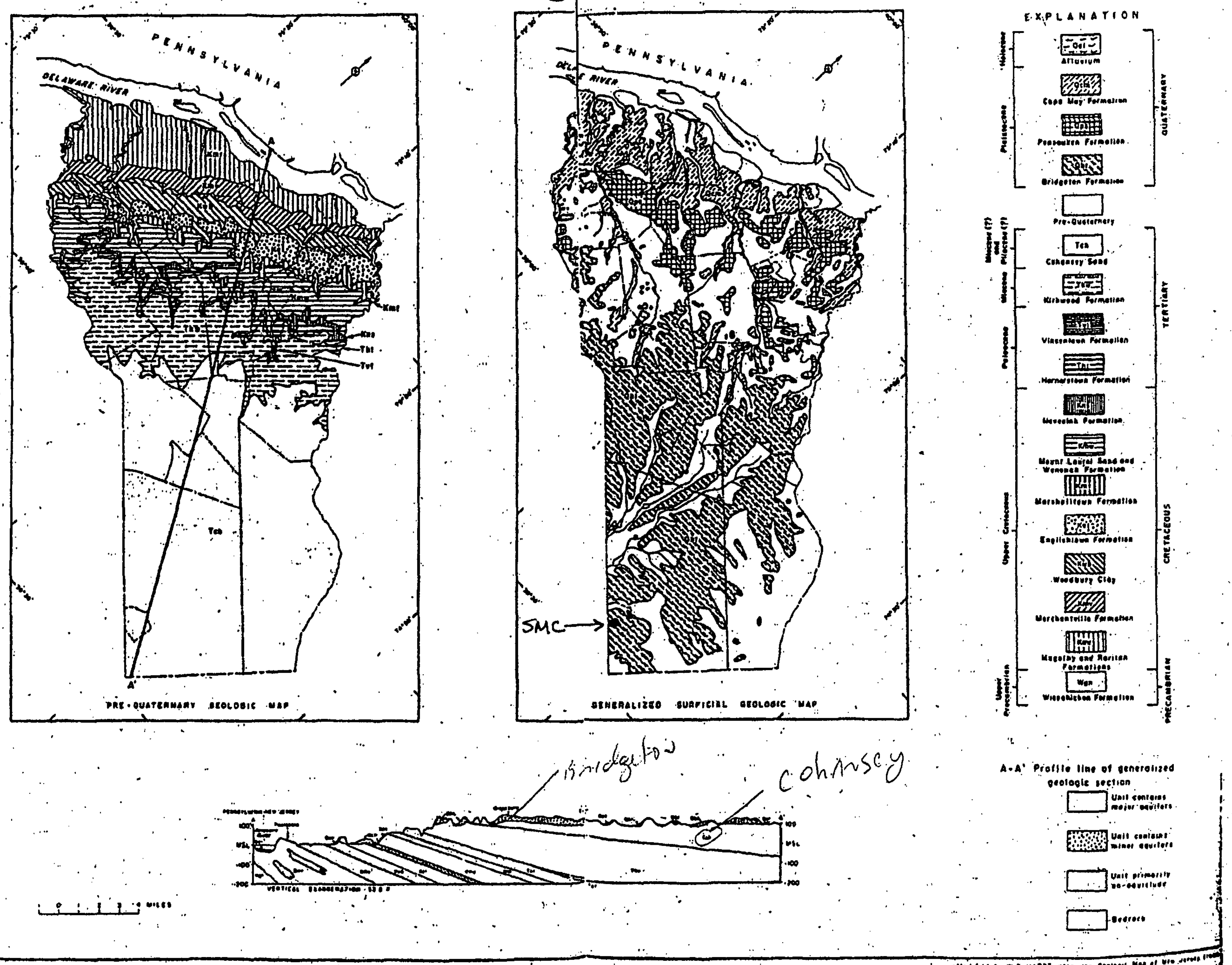
Sample ID	Location	Sampling Method	Notes	Depth (ft)	Gross Screening Result (cpm)	Error (95%)	Net Screening Result (cpm)	Error (95%)	Th-232 (pCi/g)	U-238 (pCi/g)	Ra-226 (pCi/g)	Th-232 (pCi/g)	Error (95%)	U-238 (pCi/g)	Error (95%)	Ra-226 (pCi/g)	Error (95%)
HA-3	Southwest Side of Area 3, between Areas 3 & 4	Test Pit	Sampled every 0.5 ft from surface to 5.5 ft bgs	0 to 0.5	35881	379	30046	409	26.900	1.190	18.300	33	2	26	1	20	1
			Intermixed sand & slag from 0 to 2.5 ft bgs	0.5 to 1	25683	321	19848	355	29.100	58.500	13.600	22	2	17	1	13	1
			Lt brown F/C sand, some silt, some F/C gravel, some slag, cobbles, boulders 0 to 2 ft bgs	1 to 1.5	12637	225	6802	272	18.700	3.300	6.260	9	2	7	1	6	1
				1.5 to 2	12492	224	6657	271	4.840	0.000	10.900	8	2	6	1	5	1
				2 to 2.5	9326	193	3491	246				5	2	4	1	4	1
			Lt brown F/C sand & silt, F/C gravel, slag, highly cemented 2 to 2.5 ft bgs	2.5 to 3	7151	169	1316	228				3	2	2	1	2	1
			Dk brown F sand & silt, some F gravel, very dense 2.5 to 4 ft bgs	3 to 3.5	5988	155	153	218	0.787	0.000	0.726	2	2	1	1	2	1
				3.5 to 4	6022	155	187	218	0.861	2.610	1.010	2	2	1	1	2	1
			Lt red brown F/C sand, lt silt, trace clay, some F gravel, dense to medium dense 4 to 5.5 ft bgs	4 to 4.5	5936	154	101	217				2	2	1	1	1	1
				4.5 to 5	5835	153	0	216				2	2	1	1	1	1
				5 to 5.5	5835	153	0	216				2	2	1	1	1	1
HA-6	Between Areas 4 and 6	Test Pit	Sampled every 0.5 ft from surface to 4.5 ft bgs	0 to 0.5	8134	180	2299	237				4	2	3	1	3	1
			Red brown F/C sand, some F gravel, little silt, lightly cemented 0 to 1.3 ft bgs	0.5 to 1	7232	170	1397	229				3	2	2	1	2	1
			Dark brown F sand & silt, little clay, trace roots, very dense 1.3 to 3 ft bgs	1 to 1.5	6036	155	201	218				2	2	1	1	2	1
			Lt orange brown fine sand, little fine gravel 3 to 4.5 ft bgs	1.5 to 2	5835	153	0	216				2	2	1	1	1	1
				2 to 2.5	5835	153	0	216				2	2	1	1	1	1
				2.5 to 3	5835	153	0	216				2	2	1	1	1	1
				3 to 3.5	5835	153	0	216				2	2	1	1	1	1
				3.5 to 4	5835	153	0	216				2	2	1	1	1	1
				4 to 4.5	5835	153	0	216				2	2	1	1	1	1

ATTACHMENT K

SELECT SUPPORTING FIGURES

ATTACHMENT K

Figure 1



SMC→

Bridgeton

cohansey

Modified by W F HARDT after the Geologic Map of New Jersey

Figure 2.–Generalized geologic maps & cross-section of Gloucester County, N. J.

ATTACHMENT K

Figure 2

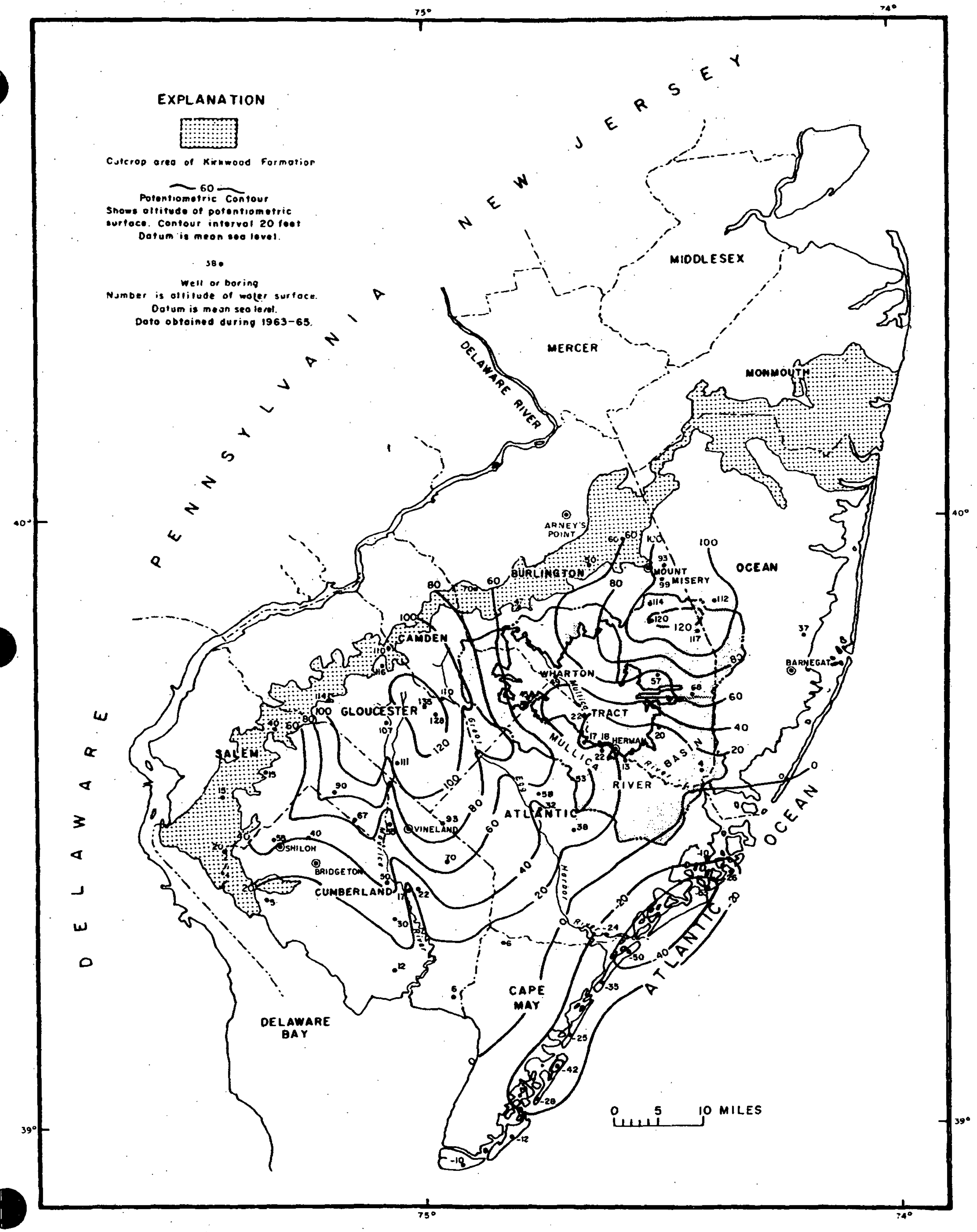


Figure 11. – Map showing the generalized potentiometric surface of the Kirkwood Formation in southern New Jersey.

ATTACHMENT K

Figure 3

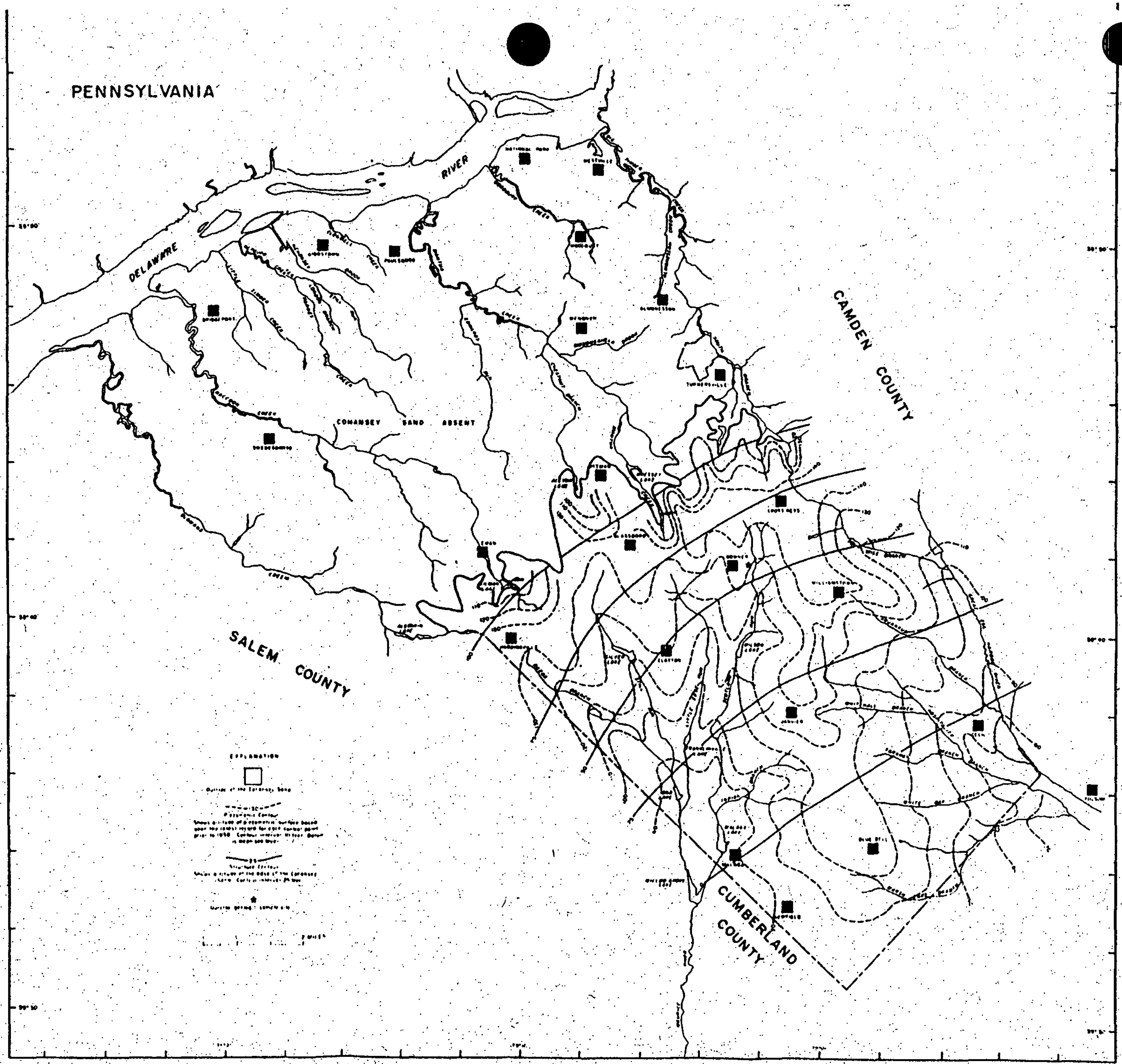


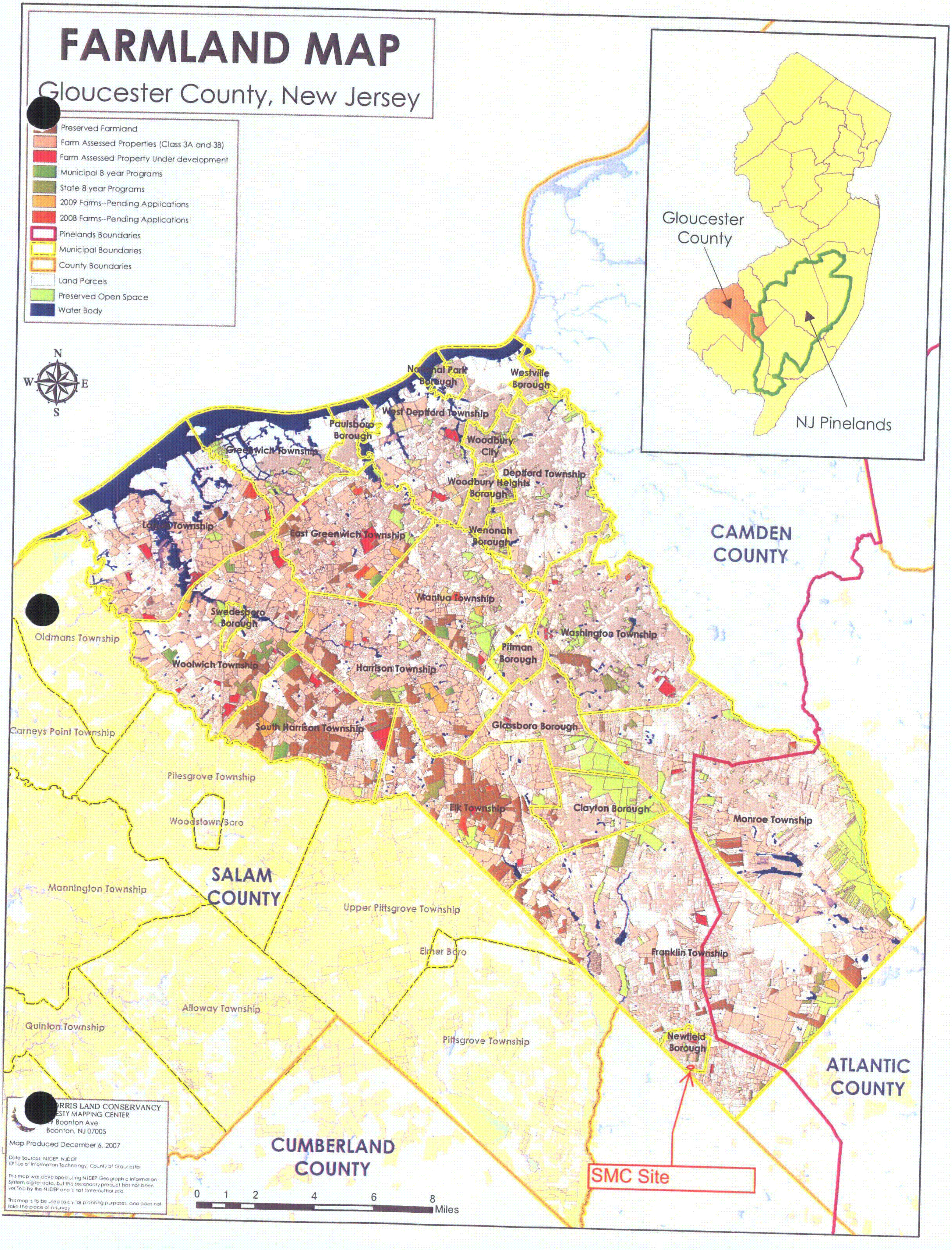
Figure 9.—Map showing generalized contours on the water table and generalized structure contours on the base of the Cohansey Sand.

ATTACHMENT K

Figure 4

FARMLAND MAP

Gloucester County, New Jersey



ORRIS LAND CONSERVANCY
ESTY MAPPING CENTER
9 Boonton Ave
Boonton, NJ 07005

Map Produced December 6, 2007

Data Sources: NJDEP, NJDOT
Office of Information Technology, County of Gloucester

This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.

This map is to be used solely for planning purposes, and does not take the place of a survey.

ATTACHMENT K

Figure 5

pers/jwaleszczyk/haz/smc/105106 agricultural.fh10

TRC
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE 1
AGRICULTURAL OBSERVATIONS IN AREAS SURROUNDING SMC JULY 24-25, 2007

Date: 08/07
Project No. 105106.000100.000000

APPENDIX F –
HYDROLOGIC DATA FOR THE MAURICE RIVER BASIN

APPENDIX F - HYDROLOGIC DATA FOR THE MAURICE RIVER BASIN

Surface Water Records – Maurice River at Norma
Surface Water Records – Various Hudson Branch Locations
Low-Flow Characteristics and Flow Duration of New Jersey Streams – Maurice River Data
Table F-1 – Summary of NJPDES Discharge Flow Data 2000 - Present

Water-Data Report 2008

01411500 MAURICE RIVER AT NORMA, NJ

MAURICE RIVER BASIN

LOCATION.--Lat 39°29'44", long 75°04'37" referenced to North American Datum of 1983, Pittsgrove Township, Salem County, NJ, Hydrologic Unit 02040206, on right bank just upstream from bridge on Almond Road (County Route 540) at Norma, 0.8 mi downstream from Blackwater Branch, and 2.9 mi west of Vineland.

DRAINAGE AREA.–112 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--July 1932 to current year. Monthly discharge only for December 1933, published in WSP 1302.

REVISED RECORDS.--WSP 1382: 1933. WDR NJ-79-1: 1967(P). WDR NJ-82-2: Drainage area. WDR US-2007: 2000, 2003.

GAGE.--Water-stage recorder and crest-stage gage. Concrete control since Dec 27, 1937. Datum of gage is 46.94 ft above NGVD of 1929.

REMARKS.--Records fair. Occasional regulation by lakes and ponds above station. Several measurements of water temperature were made during the year. Satellite gage-height telemetry at station.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 380 ft³/s and (or) maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar 9	0430	*227	*3.05

01411500 MAURICE RIVER AT NORMA, NJ—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	48	105	78	182	143	146	135	152	126	90	54	43
2	48	96	80	173	185	145	148	144	119	86	53	43
3	48	89	123	159	192	138	145	137	115	68	53	41
4	48	86	126	142	191	135	157	133	142	62	50	41
5	48	83	119	132	187	156	163	127	180	71	48	41
6	49	87	113	130	179	166	172	124	173	94	47	55
7	51	88	105	127	176	168	176	121	180	108	46	88
8	50	85	106	123	163	209	169	119	167	95	42	90
9	51	82	107	125	151	227	161	178	145	81	41	96
10	72	80	108	124	148	227	153	221	128	75	49	98
11	83	78	107	141	142	226	147	204	112	71	75	87
12	89	76	103	152	136	219	155	210	104	67	91	81
13	79	79	102	148	166	207	168	226	98	64	91	81
14	73	82	109	156	208	191	152	215	94	63	92	76
15	68	82	107	153	210	180	141	205	91	65	91	72
16	65	85	140	147	209	172	135	200	86	61	94	68
17	63	81	154	140	198	165	130	202	85	59	96	64
18	61	79	150	175	188	150	128	187	87	54	90	61
19	64	79	141	181	180	148	125	186	91	54	80	58
20	73	80	133	177	169	162	122	183	83	54	70	55
21	70	80	125	162	161	160	121	192	81	52	63	54
22	69	80	118	155	158	152	119	186	80	51	59	53
23	67	82	121	149	163	149	118	180	80	50	54	52
24	76	88	136	143	161	145	116	170	79	61	53	51
25	105	85	132	142	159	142	112	158	82	59	52	50
26	101	88	129	139	157	138	111	146	80	57	50	59
27	140	91	129	136	162	134	111	134	76	56	48	55
28	156	87	124	131	158	133	123	128	80	60	43	61
29	155	83	159	115	150	133	163	131	78	61	44	69
30	132	81	171	115	---	130	158	128	83	58	46	67
31	116	---	185	124	---	130	---	124	---	56	43	---
Total	2,418	2,527	3,840	4,498	4,950	5,083	4,234	5,151	3,205	2,063	1,908	1,910
Mean	78.0	84.2	124	145	171	164	141	166	107	66.5	61.5	63.7
Max	156	105	185	182	210	227	176	226	180	108	96	98
Min	48	76	78	115	136	130	111	119	76	50	41	41
Cfsm	0.70	0.75	1.11	1.30	1.52	1.46	1.26	1.48	0.95	0.59	0.55	0.57
In.	0.80	0.84	1.28	1.49	1.64	1.69	1.41	1.71	1.06	0.69	0.63	0.63

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1933 - 2008, BY WATER YEAR (WY)

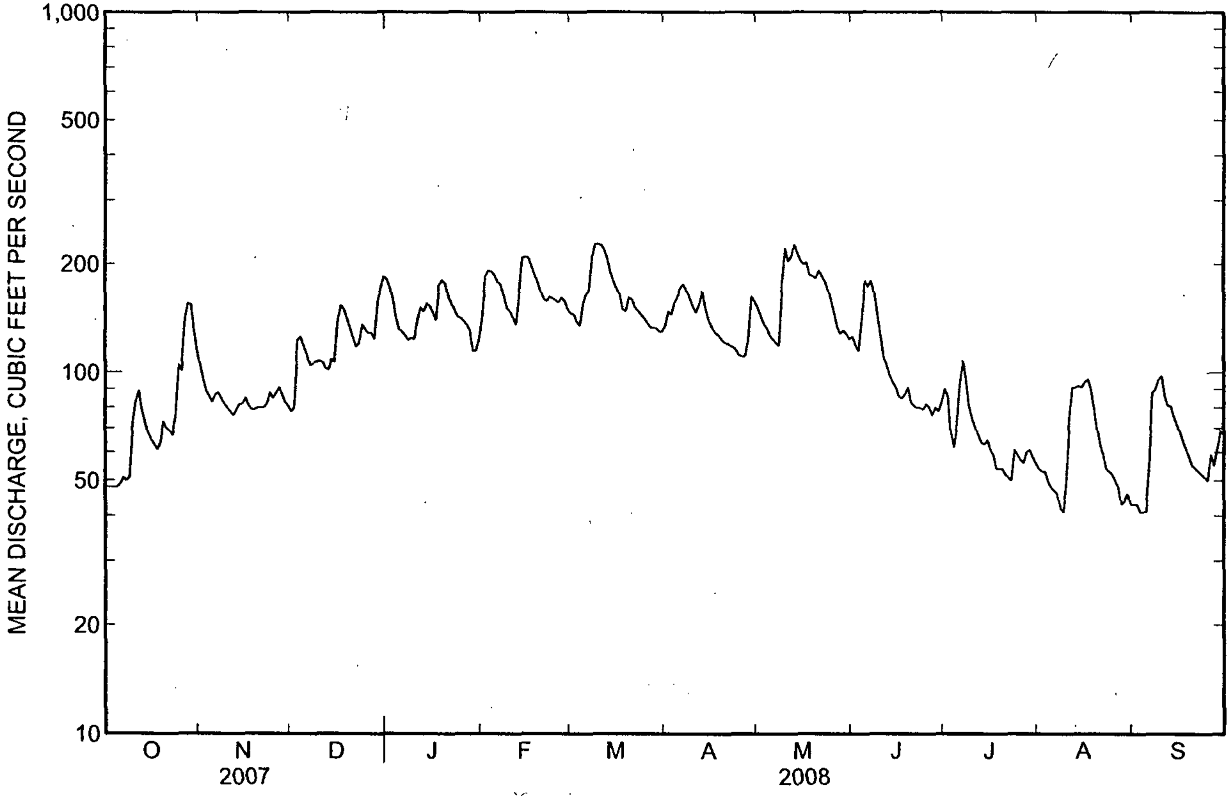
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	112	139	168	189	199	228	227	187	146	122	120	118
Max	266	330	385	380	418	427	437	387	325	333	327	591
(WY)	(1990)	(1973)	(1973)	(1936)	(1939)	(1979)	(1984)	(1958)	(2003)	(1975)	(1958)	(1940)
Min	48.6	46.7	57.1	64.7	69.4	89.9	90.9	79.5	57.7	35.6	32.1	40.6
(WY)	(1966)	(1966)	(1966)	(1966)	(2002)	(2002)	(1966)	(1977)	(1966)	(1966)	(2002)	(1965)

01411500 MAURICE RIVER AT NORMA, NJ—Continued

SUMMARY STATISTICS

	Calendar Year 2007		Water Year 2008		Water Years 1933 - 2008	
Annual total	61,535		41,787			
Annual mean	169		114		163	
Highest annual mean					253	1973
Lowest annual mean					67.4	1966
Highest daily mean	1,520	Apr 17	227	Mar 9,10	5,260	Sep 2, 1940
Lowest daily mean	48	Sep 30	41	Many days	20	Aug 16, 2002
Annual seven-day minimum	48	Sep 29	43	Aug 30	20	Aug 16, 2002
Maximum peak flow			227	Mar 9-11	[a]7,360	Sep 2, 1940
Maximum peak stage			3.05	Mar 9-11	8.72	Sep 2, 1940
Instantaneous low flow			39	Aug 8, Sep 5	20	Aug 15, 2002
Annual runoff (cfsm)	1.51		1.02		1.45	
Annual runoff (inches)	20.44		13.88		19.75	
10 percent exceeds	296		180		278	
50 percent exceeds	126		114		143	
90 percent exceeds	61		53		67	

[a] From rating curve extended above 3,000 ft³/s by logarithmic plotting, peak was highest since at least 1867, when Union Lake Dam was built in Millville.



WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1953, 1962-63, 1965 to September 1997, December 1998 to current year.

PERIOD OF DAILY RECORD.--
DISSOLVED OXYGEN: August and September 2007.
DISSOLVED OXYGEN PERCENT OF SATURATION: August and September 2007.
PH: November 1992 to April 1994, August and September 2007.
SPECIFIC CONDUCTANCE: January 1980 to November 1986, November 1992 to September 1994, August and September 2007.
WATER TEMPERATURE: January 1980 to November 1986, November 1992 to September 1994, August and September 2007.

REMARKS.--Cooperative Network Site Descriptor: Watershed Integrator, New Jersey Department of Environmental Protection Watershed Management Area 17. The samples on Jul 29 and Sep 16 were for the National Monitoring Network. The sample on Aug 27 was for both networks.

COOPERATION.--Physical measurements and samples for laboratory analyses on Nov 20, Feb 26, May 14, and Aug 27 were provided by personnel of the NJ Department of Environmental Protection. Determinations of dissolved ammonia, dissolved orthophosphate, and suspended residue on those dates were performed by the NJ Department of Health and Senior Services, Environmental and Chemical Laboratory.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 1 of 5

[Remark codes: <, less than; E, estimated.]

Date	Time	Instantaneous discharge, ft3/s (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	UV absorbance, 254 nm, wat flt units /cm (50624)	UV absorbance, 280 nm, wat flt units /cm (61726)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unf µS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)
Nov													
20...	0830	80	1.1	.128	.102	765	9.5	83	6.6	118	7.5	9.3	24
Feb													
26...	0800	157	1.7	.198	.151	756	10.2	81	6.5	137	4.0	6.8	26
May													
14...	0800	217	2.8	.602	.471	765	7.0	68	6.3	98	13.5	14.0	20
Jul													
29...	1020	62	2.5	.144	.114	761	8.2	94	6.6	110	27.5	22.2	22
Aug													
27...	0900	49	1.4	.163	.127	764	7.5	80	6.6	117	19.0	19.1	23
Sep													
16...	1100	68	1.8	.171	.133	765	8.2	92	6.5	113	19.0	21.1	22

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 2 of 5

[Remark codes: <, less than; E, estimated.]

Date	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium, water, fltrd, mg/L (00930)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Alkalinity, wat flt inf tit field, mg/L as CaCO3 (39086)	Bicarbonate, wat flt infl pt titr., field, mg/L (00453)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)
Nov													
20...	5.02	2.79	2.32	10.2	9	--	--	--	15.7	<.12	7.8	10.6	69
Feb													
26...	5.47	2.91	2.05	12.8	7	--	--	--	20.8	<.12	7.1	12.1	76
May													
14...	4.12	2.29	1.82	8.64	9	--	--	--	14.8	<.12	5.8	8.14	55
Jul													
29...	4.49	2.49	2.34	9.48	--	12	10	12	15.5	<.12	5.51	6.70	E60
Aug													
27...	4.73	2.69	2.27	11.3	12	12	--	--	15.9	<.12	5.67	8.36	E66
Sep													
16...	4.63	2.60	2.23	9.85	--	12	E9	E10	15.8	<.12	5.53	8.64	E61

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 3 of 5

[Remark codes: <, less than; E, estimated.]

Date	Residue on evap. at 180degC wat flt mg/L (70300)	Residue total non-filterable, mg/L (00530)	Ammonia + org-N, water, fltrd, mg/L as N (00623)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Nitrate water, fltrd, mg/L as N (00618)	Nitrite water, fltrd, mg/L as N (00613)	Particulate nitrogen, susp, water, mg/L (49570)	Total nitrogen, water, fltrd, mg/L (00602)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L as P (00666)
Nov													
20...	82	3	.31	--	.034	2.03	--	--	E.04	2.3	E2.4	<.010	E.006
Feb													
26...	91	4	.27	--	.019	1.97	--	--	.05	2.2	2.3	<.010	E.007
May													
14...	88	2	.51	--	.016	.85	--	--	.07	1.4	1.4	<.010	.013
Jul													
29...	76	--	.29	.29	<.020	1.60	1.60	.003	E.02	1.9	E1.9	E.005	.006
Aug													
27...	73	3	.38	.32	.029	1.72	1.72	.003	E.04	2.1	E2.1	E.004	.008
Sep													
16...	70	--	.31	.31	.022	1.43	1.43	.003	.04	1.7	1.7	<.006	.008

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 4 of 5

[Remark codes: <, less than; E, estimated.]

Date	Phos-phorus, water, unfltrd mg/L as P (00665)	Total carbon, suspnd sedimnt total, mg/L (00694)	Inor-ganic carbon, suspnd sedimnt total, mg/L (00688)	Organic carbon, suspnd sedimnt total, mg/L (00689)	Organic carbon, water, fltrd, mg/L (00681)	Organic carbon, water, unfltrd mg/L (00680)	Arsenic water, fltrd, µg/L (01000)	Boron, water, fltrd, µg/L (01020)	Iron, water, fltrd, µg/L (01046)	Lithium water, fltrd, µg/L (01130)	Selen-ium, water, fltrd, µg/L (01145)	Stront-ium, water, fltrd, µg/L (01080)	Vana-dium, water, fltrd, µg/L (01085)
Nov													
20...	.009	.4	<.04	.4	3.1	--	--	36	--	--	--	--	--
Feb													
26...	.011	.4	<.04	.4	4.7	--	--	34	--	--	--	--	--
May													
14...	.022	.9	<.04	.9	11.1	--	--	39	--	--	--	--	--
Jul													
29...	.014	.2	<.04	.2	3.0	3.5	1.6	37	270	E.7	.09	27.8	.57
Aug													
27...	.013	.4	<.04	.4	3.8	4.7	1.5	42	318	E.8	.10	30.2	.59
Sep													
16...	.014	.5	<.04	.5	3.9	4.7	1.3	37	244	E.7	.07	30.6	.41

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 5 of 5

[Remark codes: <, less than; E, estimated.]

Date	Sus-pended sedi-ment concen-tration mg/L (80154)
Nov	
20...	--
Feb	
26...	--
May	
14...	--
Jul	
29...	2
Aug	
27...	3
Sep	
16...	3

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 1 of 7

[Remark codes: <, less than; E, estimated.]

Date	1-Naphthol, water, fltrd 0.7u GF µg/L (49295)	2,6-Diethylaniline water, fltrd 0.7u GF µg/L (82660)	2Chloro-2',6'-diethyl acetanilide wat flt µg/L (61618)	CIAT, water, fltrd, µg/L (04040)	2-Ethyl-6-methylaniline water, fltrd, µg/L (61620)	3,4-Dichloroaniline water, fltrd, µg/L (61625)	3,5-Dichloroaniline water, fltrd, µg/L (61627)	4-Chloro-2methyl phenol, water, fltrd, µg/L (61633)	Acetochlor, water, fltrd, µg/L (49260)	Alachlor, water, fltrd, µg/L (46342)	alpha-Endosulfan, water, fltrd, µg/L (34362)	Atrazine, water, fltrd, µg/L (39632)	Azinphos-methyl oxon, water, fltrd, µg/L (61635)
Jul													
29...	<.04	<.006	<.010	E.006	<.010	<.006	<.008	<.005	<.006	<.006	<.006	E.005	<.04
Aug													
27...	<.04	<.006	<.010	E.008	<.010	<.006	<.008	<.005	<.006	<.006	<.006	E.006	<.04
Sep													
16...	<.04	<.006	<.010	E.008	<.010	<.006	<.008	<.005	<.006	<.006	<.006	<.007	<.04

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 2 of 7

[Remark codes: <, less than; E, estimated.]

Date	Azinphos-methyl, water, fltrd 0.7u GF µg/L (82686)	Benfluralin, water, fltrd 0.7u GF µg/L (82673)	Carbaryl, water, fltrd 0.7u GF µg/L (82680)	Carbofuran, water, fltrd 0.7u GF µg/L (82674)	Chlorpyrifos oxon, water, fltrd, µg/L (61636)	Chlorpyrifos water, fltrd, µg/L (38933)	cis-Permethrin water fltrd 0.7u GF µg/L (82687)	cis-Propiconazole, water, fltrd, µg/L (79846)	Cyanazine, water, fltrd, µg/L (04041)	Cyfluthrin, water, fltrd, µg/L (61585)	lambda-Cyhalothrin, water, fltrd, µg/L (61595)	Cypermethrin water, fltrd, µg/L (61586)	DCPA, water, fltrd 0.7u GF µg/L (82682)
Jul													
29...	<.120	<.010	<.060	<.020	<.06	<.005	<.010	<.006	<.020	<.016	<.004	<.014	E.002
Aug													
27...	<.120	<.010	<.060	<.020	<.06	<.005	<.010	<.006	<.020	<.016	<.004	<.014	E.004
Sep													
16...	<.120	<.010	<.060	<.020	<.06	<.005	<.010	<.006	<.020	<.016	<.004	<.014	E.003

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 3 of 7

[Remark codes: <, less than; E, estimated.]

Date	Desulf-inyl-fipro-nil, water, fltrd, µg/L (62170)	Diazi-non, water, fltrd, µg/L (39572)	Dicro-tophos, water, fltrd, µg/L (38454)	Diel-drin, water, fltrd, µg/L (39381)	Dimeth-oate, water, fltrd 0.7u GF µg/L (82662)	Disulf-oton sulfone water, fltrd, µg/L (61640)	Disul-foton, water, fltrd 0.7u GF µg/L (82677)	Endo-sulfan sulfate water, fltrd, µg/L (61590)	EPTC, water, fltrd 0.7u GF µg/L (82668)	Ethion monoxon water, fltrd, µg/L (61644)	Ethion, water, fltrd, µg/L (82346)	Etho-prop, water, fltrd 0.7u GF µg/L (82672)	Fenami-phos sulfone water, fltrd, µg/L (61645)
Jul													
29...	<.012	<.005	<.08	<.009	<.006	<.01	<.04	<.022	<.002	<.02	<.006	<.012	<.053
Aug													
27...	<.012	<.005	<.08	<.009	<.006	<.01	<.04	<.022	<.002	<.02	<.006	<.012	<.053
Sep													
16...	<.012	<.005	<.08	<.009	<.006	<.01	<.04	<.022	<.002	<.02	<.006	<.012	<.053

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 4 of 7

[Remark codes: <, less than; E, estimated.]

Date	Fenami-phos sulf-oxide, water, fltrd, µg/L (61646)	Fenami-phos, water, fltrd, µg/L (61591)	Desulf-inyl-fipro-nil amide, wat flt µg/L (62169)	Fipro-nil sulfide water, fltrd, µg/L (62167)	Fipro-nil sulfone water, fltrd, µg/L (62168)	Fipro-nil, water, fltrd, µg/L (62166)	Fonofos water, fltrd, µg/L (04095)	Hexa-zinone, water, fltrd, µg/L (04025)	Ipro-dione, water, fltrd, µg/L (61593)	Isofen-phos, water, fltrd, µg/L (61594)	Mala-oxon, water, fltrd, µg/L (61652)	Mala-thion, water, fltrd, µg/L (39532)	Meta-laxyl, water, fltrd, µg/L (61596)
Jul													
29...	<.20	<.03	<.029	<.013	<.024	<.020	<.010	<.008	<.01	<.006	<.020	<.016	.013
Aug													
27...	<.20	<.03	<.029	<.013	<.024	<.020	<.010	<.008	<.01	<.006	<.020	<.016	.015
Sep													
16...	<.20	<.03	<.029	<.013	<.024	<.020	<.010	<.008	<.01	<.006	<.020	<.016	E.015

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 5 of 7

[Remark codes: <, less than; E, estimated.]

Date	Methidathion, water, fltrd, µg/L (61598)	Methyl paraoxon, water, fltrd, µg/L (61664)	Methyl parathion, water, fltrd 0.7u GF µg/L (82667)	Metolachlor, water, fltrd, µg/L (39415)	Metribuzin, water, fltrd, µg/L (82630)	Molinate, water, fltrd 0.7u GF µg/L (82671)	Myclobutanil water, fltrd, µg/L (61599)	Oxyfluorfen, water, fltrd, µg/L (61600)	Pendimethalin, water, fltrd 0.7u GF µg/L (82683)	Phorate oxon, water, fltrd, µg/L (61666)	Phorate water, fltrd 0.7u GF µg/L (82664)	Phosmet oxon, water, fltrd, µg/L (61668)	Phosmet water, fltrd, µg/L (61601)
Jul													
29...	<.004	<.01	<.008	.013	E.007	<.003	<.010	<.006	<.012	<.03	<.040	<.05	<.008
Aug													
27...	<.004	<.01	<.008	.036	<.012	<.003	<.010	<.006	<.012	<.03	<.040	<.05	<.008
Sep													
16...	<.004	<.01	<.008	.021	<.012	<.003	<.010	<.006	<.012	<.03	<.040	<.05	<.008

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 6 of 7

[Remark codes: <, less than; E, estimated.]

Date	Prometon, water, fltrd, µg/L (04037)	Prometryn, water, fltrd, µg/L (04036)	Propyzamide, water, fltrd 0.7u GF µg/L (82676)	Propanil, water, fltrd 0.7u GF µg/L (82679)	Propargite, water, fltrd 0.7u GF µg/L (82685)	Simazine, water, fltrd, µg/L (04035)	Tebuthiuron water, fltrd 0.7u GF µg/L (82670)	Tefluthrin, water, fltrd, µg/L (61606)	Terbufos oxon sulfone water, fltrd, µg/L (61674)	Terbufos, water, fltrd 0.7u GF µg/L (82675)	Terbuthylazine, water, fltrd, µg/L (04022)	Thiobencarb water, fltrd 0.7u GF µg/L (82681)	trans-Propiconazole, water, fltrd, µg/L (79847)
Jul													
29...	E.01	<.006	<.004	<.006	<.04	E.007	E.01	<.003	<.04	<.02	<.01	<.010	<.02
Aug													
27...	E.01	<.006	<.004	<.006	<.04	.027	<.02	<.004	<.04	<.02	<.01	<.010	<.02
Sep													
16...	E.01	<.006	<.004	<.006	<.04	.021	.02	<.003	<.04	<.02	<.01	<.010	<.02

01411500 MAURICE RIVER AT NORMA, NJ—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 7 of 7

[Remark codes: <, less than; E, estimated.]

Date	Tribuphos, water, fltrd, µg/L (61610)	Trifluralin, water, fltrd 0.7u GF µg/L (82661)	Dichlorvos, water, fltrd, µg/L (38775)
Jul			
29...	<.035	<.009	<.01
Aug			
27...	<.035	<.009	<.01
Sep			
16...	<.035	<.009	<.01

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01411483 HUDSON BRANCH AT NEWFIELD, NJ

MAURICE RIVER BASIN

LOCATION.--Lat 39°32'05", long 75°01'50" referenced to North American Datum of 1983, Vineland City, Cumberland County, NJ, Hydrologic Unit 02040206, at bridge on West Arbor Avenue, 0.7 mi northwest of North Vineland, 1.0 mi southwest of Newfield, and 0.8 mi upstream of mouth.

DRAINAGE AREA.--1.41 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Occasional low-flow measurements, water years 2000, 2008.

GAGE.--None.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Date	Discharge, in ft^3/s
Jul 17, 2008	0.45
Sep 2, 2008	0.30

U.S. Department of the Interior
U.S. Geological Survey

01411483 HUDSON BRANCH AT NEWFIELD, NJ—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2004, 2007-08.

REMARKS.--Cooperative Network Site Descriptor: Trace Element Assessment (303d) special study site.

COOPERATION.--Physical measurements and samples for laboratory analyses were provided by personnel of the NJ Department of Environmental Protection.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 1 of 2

[QC, quality control sample. Remark codes: <, less than.]

Date	Time	Sample medium and type	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Baro-metric pres-sure, mm Hg (00025)	Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	Specif-ic conduc-tance, wat unf µS/cm 25 degC (00095)	Temper-ature, air, deg C (00020)
Jan									
08...	*0920*	*QC - Artificial, field blank*	--	--	--	--	--	--	--
08...	1000	Surface water, regular	4.1	766	9.6	83	8.2	630	13.0
Apr									
03...	*0910*	*QC - Artificial, field blank*	--	--	--	--	--	--	--
03...	0930	Surface water, regular	3.7	773	10.8	93	8.3	656	5.5
Jun									
17...	*0905*	*QC - Artificial, field blank*	--	--	--	--	--	--	--
17...	0930	Surface water, regular	24	755	5.6	64	7.9	663	25.0

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 2 of 2

[QC, quality control sample. Remark codes: <, less than.]

Date	Temper-ature, water, deg C (00010)	Mercury water, fltrd, µg/L (71890)	Mercury water, unfltrd recover-able, µg/L (71900)
Jan			
08...	--	*<.010*	--
08...	8.7	.015	.028
Apr			
03...	--	*<.010*	--
03...	8.7	.016	.027
Jun			
17...	--	*<.010*	--
17...	20.4	.012	.064

Water-Data Report 2008

01411481 HUDSON BRANCH 250 FT DOWNSTREAM OF WEST WEYMOUTH ROAD, AT NEWFIELD, NJ

MAURICE RIVER BASIN

LOCATION.--Lat 39°32'18", long 75°01'32" referenced to North American Datum of 1983, Vineland City, Cumberland County, NJ, Hydrologic Unit 02040206, 250 ft downstream of West Weymouth Road, 0.6 mi south of Newfield, 0.8 mi north of North Vineland, and 1.4 mi upstream of mouth.

DRAINAGE AREA.--1.20 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Occasional low-flow measurements, water year 2008.

GAGE.--None.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Date	Discharge, in ft^3/s
Jul 17, 2008	0.44
Sep 2, 2008	0.42

Water-Data Report 2008

01411479 HUDSON BRANCH 300 FT UPSTREAM OF WEST BOULEVARD, AT NEWFIELD, NJ

MAURICE RIVER BASIN

LOCATION.--Lat 39°32'22", long 75°01'18" referenced to North American Datum of 1983, Vineland City, Cumberland County, NJ, Hydrologic Unit 02040206, 300 ft upstream of West Boulevard (County Route 614), 0.5 mi south of Newfield, 0.9 mi north of North Vineland, and 1.6 mi upstream of mouth.

DRAINAGE AREA.--1.07 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Occasional low-flow measurements, water year 2008.

GAGE.--None.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Date	Discharge, in ft³/s
Jul 17, 2008	0.52
Sep 2, 2008	0.55

Water-Data Report 2008

01411480 HUDSON BRANCH 200 FT UPSTREAM OF WEST WEYMOUTH ROAD, AT NEWFIELD, NJ

MAURICE RIVER BASIN

LOCATION.--Lat 39°32'20", long 75°01'25" referenced to North American Datum of 1983, Vineland City, Cumberland County, NJ, Hydrologic Unit 02040206, 200 ft upstream of West Weymouth Road, 0.5 mi south of Newfield, 0.9 mi north of North Vineland, and 1.5 mi upstream of mouth.

DRAINAGE AREA.--1.14 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Occasional low-flow measurements, water year 2008.

GAGE.--Reference point only.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Date	Discharge, in ft³/s
Jul 17, 2008	0.51
Sep 2, 2008	0.37

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Water-Data Report 2008

01411482 HUDSON BRANCH 200 FT UPSTREAM OF WEST ARBOR AVENUE, AT NEWFIELD, NJ

MAURICE RIVER BASIN

LOCATION.--Lat 39°32'07", long 75°01'49" referenced to North American Datum of 1983, Vineland City, Cumberland County, NJ, Hydrologic Unit 02040206, 200 ft upstream of West Arbor Avenue, 0.7 mi northwest of North Vineland, 0.9 mi southwest of Newfield, and 1.1 mi upstream of mouth.

DRAINAGE AREA.--1.40 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Occasional low-flow measurements, water year 2008.

GAGE.--None.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Date	Discharge, in ft³/s
Jul 17, 2008	0.36
Sep 2, 2008	0.28

Water-Data Report 2008

01411484 HUDSON BRANCH 1,400 FT DOWNSTREAM OF NORTH WEST AVENUE, NEAR VINELAND, NJ

MAURICE RIVER BASIN

LOCATION.--Lat 39°31'54", long 75°02'04" referenced to North American Datum of 1983, Vineland City, Cumberland County, NJ, Hydrologic Unit 02040206, 1,400 ft downstream of North West Avenue, 0.6 mi upstream of mouth, 1.2 mi southwest of Newfield, and 3.2 mi north of Vineland.

DRAINAGE AREA.--1.90 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Occasional low-flow measurements, water year 2008.

GAGE.--None.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Date	Discharge, in ft^3/s
Jul 17, 2008	0.40
Sep 2, 2008	0.20

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

LOW-FLOW CHARACTERISTICS AND FLOW DURATION OF NEW JERSEY STREAMS

By Brian D. Gillespie and Robert D. Schopp

Open-File Report 81-1110

Prepared in cooperation with the
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION,
DIVISION OF WATER RESOURCES

Trenton, New Jersey
January 1982

UNITED STATES DEPARTMENT OF THE INTERIOR

JAMES G. WATT, Secretary

GEOLOGICAL SURVEY

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DELAWARE BAY BASINS

MAP NO.	STATION NUMBER	STATION NAME	QUADRANGLE MAP 7.5 MINUTE SERIES	PAGE
		DELAWARE BAY BASINS		
		FISHING CREEK BASIN		
1	01411400	FISHING CREEK AT RIO GRANDE	RIO GRANDE	116
		GREEN CREEK BASIN		
2	01411404	GREEN CREEK AT GREEN CREEK	RIO GRANDE	116
		DIAS CREEK BASIN		
3	01411408	DIAS CREEK NEAR CAPE MAY COURT HOUSE	STONE HARBOR	116
		BIDWELL DITCH BASIN		
		BIDWELL DITCH:		
4	01411410	BIDWELL DITCH TRIBUTARY NEAR CAPE MAY COURT HOUSE	STONE HARBOR	116
5	01411412	BIDWELL DITCH TRIBUTARY NO. 2 NEAR CAPE MAY COURT HOUSE	STONE HARBOR	117
		GOSHEN CREEK BASIN		
6	01411418	GOSHEN CREEK AT GOSHEN	WOODBINE	117
		DENNIS CREEK BASIN		
		DENNIS CREEK:		
7	01411430	SLUICE CREEK AT CLERMONT	WOODBINE	117
		MAURICE RIVER BASIN		
8	01411500	MAURICE RIVER AT NORMA	MILLVILLE	117
9	01411800	MAURICE RIVER NEAR MILLVILLE	MILLVILLE	118
10	01411850	MILL CREEK NEAR MILLVILLE	MILLVILLE	118
11	01412000	MENANTICO CREEK NEAR MILLVILLE	FIVE POINTS	118
12	01412100	MANUMUSKIN RIVER NEAR MANUMUSKIN	PORT ELIZABETH	118
13	01412500	WEST BRANCH COHANSEY RIVER AT SEELEY	SHILOH	119
		STOW CREEK BASIN		
14	01413050	STOW CREEK AT JERICHO	SHILOH	119
15	01413060	CANTON DRAIN NEAR CANTON	SALEM	119

01411412 BIDWELL DITCH TRIBUTARY NO. 2 NEAR CAPE MAY COURT HOUSE, NJ

LOCATION -- LAT 39 06 25, LONG 074 50 12, CAPE MAY COUNTY, AT CULVERT PIPE ON GOSHEN ROAD, 1.8 MI (2.9 KM) NORTHWEST OF CAPE MAY COURT HOUSE, 2.3 MI (3.7 KM) SOUTHEAST OF GOSHEN, AND 3.6 MI (5.8 KM) UPSTREAM FROM MOUTH.
DRAINAGE AREA -- 0.19 SQ-MI (0.49 SQ-KM)
TRIBUTARY TO -- BIDWELL DITCH
STATION TYPE -- LOW-FLOW PARTIAL-RECORD STATION
REMARKS -- LOW-FLOW FREQUENCY ESTIMATES BASED ON CORRELATIONS WITH GAGING STATIONS 01409500, 01410000, 01411000 AND 01411500. CORRELATIONS RATED GOOD.

LOW-FLOW FREQUENCY -- PERIOD 1967-72

PERIOD OF CONSECUTIVE DAYS	AVERAGE ANNUAL MINIMUM DISCHARGE IN CU FT/S (CU M/S) FOR INDICATED RECURRENCE INTERVALS	
	2 YEARS	10 YEARS
7	0.0 (0.00)	0.0 (0.00)

01411418 GOSHEN CREEK AT GOSHEN, NJ

LOCATION -- LAT 39 07 39, LONG 074 50 45, CAPE MAY COUNTY, AT CULVERT PIPE ON GOSHEN ROAD, 1.0 MI (1.6 KM) SOUTHEAST OF GOSHEN, 3.3 MI (5.3 KM) NORTHWEST OF CAPE MAY COURT HOUSE, AND 3.3 MI (5.3 KM) UPSTREAM FROM MOUTH.
DRAINAGE AREA -- 0.33 SQ-MI (0.85 SQ-KM)
TRIBUTARY TO -- DELAWARE BAY
STATION TYPE -- LOW-FLOW PARTIAL-RECORD STATION
REMARKS -- LOW-FLOW FREQUENCY ESTIMATES BASED ON CORRELATIONS WITH GAGING STATIONS 01409500, 01411000 AND 01411500. CORRELATIONS RATED GOOD.

LOW-FLOW FREQUENCY -- PERIOD 1967-72

PERIOD OF CONSECUTIVE DAYS	AVERAGE ANNUAL MINIMUM DISCHARGE IN CU FT/S (CU M/S) FOR INDICATED RECURRENCE INTERVALS	
	2 YEARS	10 YEARS
7	0.0 (0.00)	0.0 (0.00)

01411430 SLUICE CREEK AT CLERMONT, NJ

LOCATION -- LAT 39 09 26, LONG 074 46 18, CAPE MAY COUNTY, AT CULVERT PIPE ON STATE ROUTE 83, 0.6 MI (1.0 KM) NORTHWEST OF CLERMONT, 3.7 MI (6.0 KM) SOUTHEAST OF DENNISVILLE, AND 5.6 MI (9.0 KM) UPSTREAM FROM MOUTH.
DRAINAGE AREA -- 0.67 SQ-MI (1.74 SQ-KM)
TRIBUTARY TO -- DENNIS CREEK
STATION TYPE -- LOW-FLOW PARTIAL-RECORD STATION
REMARKS -- LOW-FLOW FREQUENCY ESTIMATES BASED ON CORRELATIONS WITH GAGING STATIONS 01409500, 01411000 AND 01411500. CORRELATIONS RATED GOOD.

LOW-FLOW FREQUENCY -- PERIOD 1967-72

PERIOD OF CONSECUTIVE DAYS	AVERAGE ANNUAL MINIMUM DISCHARGE IN CU FT/S (CU M/S) FOR INDICATED RECURRENCE INTERVALS	
	2 YEARS	10 YEARS
7	0.0 (0.00)	0.0 (0.00)

01411500 MAURICE RIVER AT NORMA, NJ

LOCATION -- LAT 39 29 42, LONG 075 04 38, SALEM COUNTY, ON RIGHT BANK JUST UPSTREAM FROM ALMOND ROAD BRIDGE IN NORMA, AND 0.8 MI (1.3 KM) DOWNSTREAM FROM BLACKWATER BRANCH.
DRAINAGE AREA -- 113 SQ-MI (293 SQ-KM)
TRIBUTARY TO -- DELAWARE BAY
STATION TYPE -- CONTINUOUS RECORD GAGING STATION
AVERAGE DISCHARGE -- 168 CU FT/S (4.76 CU M/S)
DAILY DISCHARGE EXTREMES -- MAXIMUM 5260 CU FT/S (149 CU M/S)
MINIMUM 23 CU FT/S (0.65 CU M/S)
REMARKS -- OCCASIONAL REGULATION; PROBABLY NOT SIGNIFICANT.

DURATION TABLE OF DAILY FLOW -- PERIOD 1933-75

DISCHARGE WHICH WAS EXCEEDED FOR INDICATED PERCENT OF TIME

	2.0%	5.0%	10.0%	20.0%	30.0%	40.0%	50.0%	60.0%	70.0%	80.0%	90.0%	95.0%	98.0%	99.0%	99.5%
CU FT/S	430	345	287	233	198	173	150	129	108	90.0	68.8	55.3	44.1	37.7	33.5
CU M/S	12.2	9.77	8.13	6.60	5.61	4.90	4.25	3.65	3.06	2.55	1.95	1.57	1.25	1.07	0.949

LOW-FLOW FREQUENCY -- PERIOD 1934-75

PERIOD OF CONSECUTIVE DAYS	AVERAGE ANNUAL MINIMUM DISCHARGE IN CU FT/S (CU M/S) FOR INDICATED RECURRENCE INTERVALS			
	2 YEARS	5 YEARS	10 YEARS	20 YEARS
3	53 (1.5)	39 (1.1)	33 (0.93)	28 (0.79)
7	59 (1.7)	44 (1.2)	37 (1.0)	32 (0.91)
30	70 (2.0)	51 (1.4)	43 (1.2)	38 (1.1)
90	90 (2.5)	66 (1.9)	55 (1.6)	47 (1.3)

TABLE F-1
SUMMARY OF NJPDES DISCHARGE FLOW DATA 2000 - PRESENT
DSN001B AND DSN004A
Shieldalloy Metallurgical Corporation, Newfield, New Jersey

Outfall DSN 001B Remediated Ground Water & Storm Water	
Month	**Ave. Flow (MGD)**
Jan 00	0.326
Feb	0.348
Mar	0.344
Apr	0.332
May	0.324
Jun	0.235
Jul	0.26
Aug	0.23
Sep	0.116
Oct	0.381
Nov	0.492
Dec	0.433
Jan 01	0.346
Feb	0.379
Mar	0.443
Apr	0.368
May	0.473
Jun	0.441
Jul	0.464
Aug	0.424
Sep	0.446
Oct	0.43
Nov	0.372
Dec	0.372
Jan 02	0.401
Feb	0.362
Mar	0.342
Apr	0.351
May	0.361
Jun	0.306
Jul	0.39
Aug	0.393
Sep	0.35
Oct	0.385
Nov	0.244
Dec	0.281
Min. Mo. Ave.	0.116
Max. Mo. Ave	0.492
Mon. Ave:	0.360

Outfall DSN 004A Remediated Ground Water & Storm Water	
Month	**Ave. Flow (MGD)**
Jan 03	0.364
Feb	0.461
Mar	0.439
Apr	0.447
May	0.45
Jun	0.504
Jul	0.425
Aug	0.46
Sep	0.473
Oct	0.384
Nov	0.451
Dec	0.448
Jan 04	0.326
Feb	0.418
Mar	0.42
Apr	0.42
May	0.4
Jun	0.38
Jul	0.404
Aug	0.396
Sep	0.369
Oct	0.398
Nov	0.4
Dec	0.399
Jan 05	0.387
Feb	0.68
Mar	0.398
Apr	0.4
May	0.37
Jun	0.37
Jul	0.33
Aug	0.376
Sep	0.36
Oct	0.43
Nov	0.387
Dec	0.35
Jan 06	0.34
Feb	0.34
Mar	0.33
Apr	0.339

Data source: NJDEP, 2009b

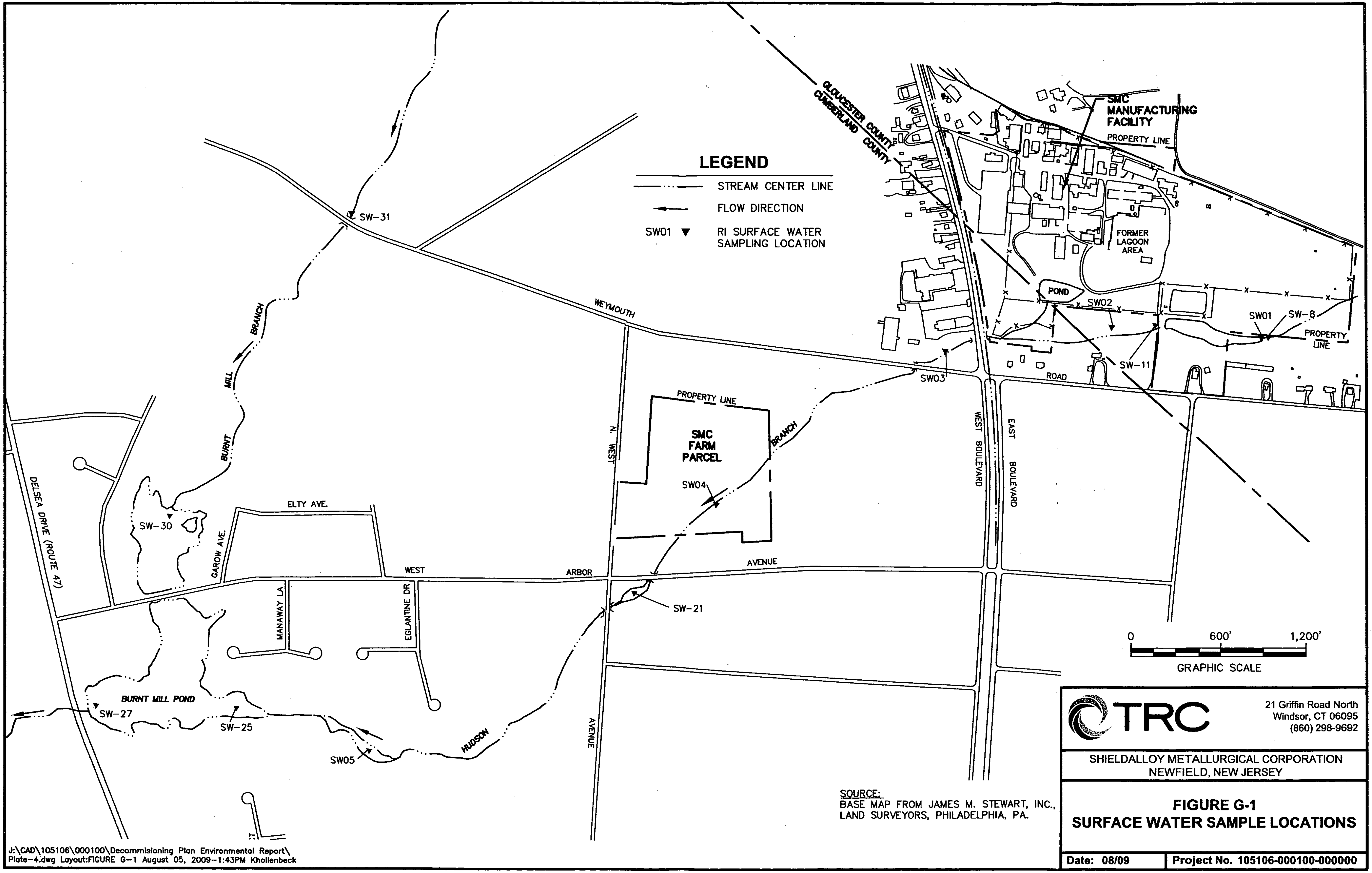
TABLE F-1
SUMMARY OF NJPDES DISCHARGE FLOW DATA 2000 - PRESENT
DSN001B AND DSN004A
Shieldalloy Metallurgical Corporation, Newfield, New Jersey

Outfall DSN 004A Remediated Ground Water & Storm Water	
Month	Ave. Flow (MGD)
May	0.315
Jun	0.36
Jul	0.33
Aug	0.34
Sep	0.419
Oct	0.388
Nov	0.42
Dec	0.365
Jan 07	0.337
Feb	0.32
Mar	0.32
Apr	0.36
May	0.38
Jun	0.25
Jul	0.29
Aug	0.276
Sep	0.3
Oct	0.3
Nov	0.22
Dec	0.25
Jan 08	0.29
Feb	0.3
Mar	0.247
Apr	0.319
May	0.298
Jun	0.312
Jul	0.25
Aug	0.34
Sep	0.31
Oct	0.3
Nov	0.31
Dec	0.35
Jan 09	0.26
Feb	0.28
Mar	0.26
Apr	0.319
May	0.321
Min. Mo. Ave.	0.22
Max. Mo. Ave	0.68
Mon. Ave:	0.361

Data source: NJDEP, 2009b

APPENDIX G - SURFACE WATER SAMPLING RESULTS

APPENDIX G - SURFACE WATER SAMPLING RESULTS



SOURCE:
BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.

TRC
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE G-1
SURFACE WATER SAMPLE LOCATIONS

Date: 08/09

Project No. 105106-000100-000000

J:\CAD\105106\000100\Decommisioning Plan Environmental Report\Plate-4.dwg Layout:FIGURE G-1 August 05, 2009-1:43PM Khollenbeck

TABLE 7

SHIELDALLOY METALLURGY CORPORATION
SURFACE WATER
FIELD MEASUREMENTS

SAMPLE ID NUMBER	TEMPERATURE (degree C)	pH	SPECIFIC CONDUCTIVITY (micromhos)
SMC-SW01-01	3.8	6.98	273
SMC-SW02-01	5.4	6.99	275
SMC-SW03-01	4.3	7.76	270
SMC-SW04-01	4.9	7.28	265
SMC-SW05-01	5.8	7.60	250

TABLE 31a
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE WATER SAMPLES

SAMPLE IDENTIFICATION:	SW1-01	SW2-01	SW3-01	SW10-01	SW4-01	SW5-01	SW6-01	SW7-01	SW8-01	SW9-01
VOLATILE ORGANICS (ppb)										
CHLOROMETHANE	–	–	–	–	9 J	–	–	–	–	–
BROMOMETHANE	–	–	–	–	–	–	–	–	–	–
VINLY CHLORIDE	–	–	–	–	–	–	–	–	–	–
CHLOROETHANE	–	–	–	–	–	–	–	–	–	–
METHYLENE CHLORIDE	19 R*	17 R*	18 R*	18 R*	10 BJ*	10 BJ*	41 R*	36 R*	35 R*	19 R*
ACETONE	12 BJ*	6 JB	6 JB	5 JB	7 JB	7 JB	6 N*	10 N*	9 N*	4 N*
CARBON DISULFIDE	–	–	–	–	–	–	2 N*	2 N*	2 N*	2 N*
1,1-DICHLORETHENE	–	–	–	–	–	–	–	–	–	–
1,1-DICHLORETHANE	–	–	–	–	–	–	–	–	–	–
1,2-DICHLORETHENE (total)	–	–	–	–	2 J	–	–	–	–	–
CHLOROFORM	–	–	–	–	–	–	–	–	–	–
1,2-DICHLORETHANE	–	–	–	–	–	–	–	–	–	–
2-BUTANONE	–	–	–	–	–	–	–	–	–	–
1,1,1-TRICHLOROETHANE	–	–	–	–	–	–	–	–	–	–
CARBON TETRACHLORIDE	–	–	–	–	–	–	–	–	–	–
VINYL ACETATE	–	–	–	–	–	–	–	–	–	–
BROMODICHLOROMETHANE	–	–	–	–	–	–	–	–	–	–
1,2-DICHLOROPROPANE	–	–	–	–	–	–	–	–	–	–
cis-1,3-DICHLOROPROPENE	–	–	–	–	–	–	–	–	–	–
TRICHLOROETHENE	–	–	–	–	3 J	–	–	–	–	–
DIBROMOCHLOROMETHANE	–	–	–	–	–	–	–	–	–	–
1,1,2-TRICHLOROETHANE	–	–	–	–	–	–	–	–	–	–
BENZENE	–	–	–	–	–	–	–	–	–	–
trans-1,3-DICHLOROPROPENE	–	–	–	–	–	–	–	–	–	–
BROMOFORM	–	–	–	–	–	–	–	–	–	–
4-METHYL1-2-PENTANONE	–	–	–	–	–	–	–	–	–	–
2-HEXANONE	–	–	–	–	–	–	–	–	–	–
TETRACHLOROETHENE	–	–	–	–	–	–	–	–	–	–
1,1,2,2-TETRACHLOROETHANE	–	–	–	–	–	–	–	–	–	–
TOLUENE	–	–	–	–	–	–	–	–	–	–
CHLOROBENZENE	–	–	–	–	–	–	–	–	–	–
ETHYLBENZENE	–	–	–	–	–	–	–	–	–	–
STYRENE	–	–	–	–	–	–	–	–	–	–
XYLENE (total)	–	–	–	–	–	–	–	–	–	–
TOTAL VOCs	12	6	6	5	31	17	8	0	0	0

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC-ECI.

N/A – NOT ANALYZED FOR THIS COMPOUND

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 31b
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE WATER SAMPLES
PAGE 1 OF 2

SAMPLE IDENTIFICATION:	SW1-01	SW2-01	SW3-01	SW10-01	SW4-01	SW5-01	SW6-01	SW7-01	SW8-01	SW9-01
BASE NEUTRAL / ACIDS (ppb)										
PHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
bis(2-CHLOROETHYL)ETHER	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2-CHLOROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
1,3-DICHLOROBENZENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
1,4-DICHLORBENZENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BENZYL ALCOHOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
1,2-DICHLOROBENZENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2-METHYLPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
bis(2-CHLOROISOPROPYL)ETHI	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4-METHYLPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
N-NITROSO-DI-N-PROPYLAM	–	N/A	N/A	N/A	–	N/A	–	–	–	–
HEXACHLOROETHANE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
NITROBENZENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ISOPHORONE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2-NITROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2,4-DIMETHYLPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BENZOIC ACID	–	N/A	N/A	N/A	–	N/A	–	–	–	–
bis(2-CHLOROETHOXY)METHAN	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2,4-DICHLOROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
1,2,4-TRICHLOROBENZENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
NAPHTHALENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4-CHLOROANILINE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
HEXACHLOROBUTADIENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4-CHLORO-3-METHYLPHENOI	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2-METHYLNAPHTHALENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
HEXACHLOROCYCLOPENTADIEN	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2,4,6-TRICHLOROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2,4,5-TRICHLOROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2-CHLORONAPHTHALENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2-NITROANILINE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
DIMETHYLPHTHALATE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ACENAPHTHYLENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2,6-DINITROTOLUENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC-ECI.
N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 31b
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE WATER SAMPLES
PAGE 2 OF 2

SAMPLE IDENTIFICATION:	SW1-01	SW2-01	SW3-01	SW10-01	SW4-01	SW5-01	SW6-01	SW7-01	SW8-01	SW9-01
BASE NEUTRAL / ACIDS (ppb) (continued)										
3-NITROANILINE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ACENAPHTHENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
1,4-DINITROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4-NITROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
DIBENZOFURAN	–	N/A	N/A	N/A	–	N/A	–	–	–	–
2,4-DINITROTOLUENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
DIETHYLPHTHALATE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4-CHLOROPHENYL-PHENYLET	–	N/A	N/A	N/A	–	N/A	–	–	–	–
FLUORENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4-NITROANILINE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4,6-DINITRO-2-METHYLPHEN	–	N/A	N/A	N/A	–	N/A	–	–	–	–
N-NITROSODIPHENYLAMINE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4-BROMOPHENYL-PHENYLET	–	N/A	N/A	N/A	–	N/A	–	–	–	–
HEXACHLOROBENZENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
PENTACHLOROPHENOL	–	N/A	N/A	N/A	–	N/A	–	–	–	–
PHENANTHRENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ANTHRACENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
DI-n-BUTYLPHALATE	1 J	N/A	N/A	N/A	1 J	N/A	–	2 J	2 J	1 J
FLUORANTHENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
PYRENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BUTYLBENZYLPHTHALATE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
3,3'-DICHLOROBENZIDINE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BENZO(a)ANTHRACENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
CHRYSENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
bis(2-ETHYLHEXYL)PHTHALATE	–	N/A	N/A	N/A	2 J	N/A	–	–	–	–
DI-n-OCTYL PHTHALATE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BENZO(b)FLUORANTHENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BENZO(k)FLUORANTHENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BENZO(a)PYRENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
INDENO(1,2,3-cd)PYRENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
DIBENZO(A,H)ANTHRACENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BENZO(g,h,I)PERYLENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
TOTAL caPAH	0	N/A	N/A	N/A	0	N/A	0	0	0	0

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.

R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.

* – INDICATES QUALIFIER PLACED BY TRC-ECI.

N/A – NOT ANALYZED FOR THIS COMPOUND

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 31c
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF PESTICIDES/PCB COMPOUNDS DETECTED IN SURFACE WATER SAMPLES

SAMPLE IDENTIFICATION:	SW1-01	SW2-01	SW3-01	SW10-01	SW4-01	SW5-01	SW6-01	SW7-01	SW8-01	SW9-01
PESTICIDES/PCB'S (ppb)										
ALPHA-BHC	–	N/A	N/A	N/A	–	N/A	–	–	–	–
BETA-BHC	–	N/A	N/A	N/A	–	N/A	–	–	–	–
DELTA-BHC	–	N/A	N/A	N/A	–	N/A	–	–	–	–
GAMMA-BHC(LINDANE)	–	N/A	N/A	N/A	–	N/A	–	–	–	–
HEPTACHLOR	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ALDRIN	–	N/A	N/A	N/A	–	N/A	–	–	–	–
HEPTACHLOR EPOXIDE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ENDOSULFAN I	–	N/A	N/A	N/A	–	N/A	–	–	–	–
DIELDRIN	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4,4-DDE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ENDRIN	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ENDOSULFAN II	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4,4-DDD	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ENDOSULFAN SULFATE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
4,4-DDT	–	N/A	N/A	N/A	–	N/A	–	–	–	–
METHOXYCHLOR	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ENDRIN KETONE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
ALPHA-CHLORDANE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
GAMMA-CHLORDANE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
TOXAPHENE	–	N/A	N/A	N/A	–	N/A	–	–	–	–
AROCLOR-1016	–	N/A	N/A	N/A	–	N/A	–	–	–	–
AROCLOR-1221	–	N/A	N/A	N/A	–	N/A	–	–	–	–
AROCLOR-1232	–	N/A	N/A	N/A	–	N/A	–	–	–	–
AROCLOR-1242	–	N/A	N/A	N/A	–	N/A	–	–	–	–
AROCLOR-1248	–	N/A	N/A	N/A	–	N/A	–	–	–	–
AROCLOR-1254	–	N/A	N/A	N/A	–	N/A	–	–	–	–
AROCLOR-1260	–	N/A	N/A	N/A	–	N/A	–	–	–	–

B – QUALIFIER USED WHEN THE ANALYTE IS FOUND IN THE ASSOCIATED METHOD BLANK AS WELL AS IN THE SAMPLE. IT INDICATES POSSIBLE / PROBABLE CONTAMINATION.
J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.
N – QUALIFIER INDICATES THE CONCENTRATION FOUND IN THE SAMPLE IS LESS THAN THREE TIMES THE CONCENTRATION FOUND IN THE ASSOCIATED BLANKS. THE PRESENCE OF THE ANALYTE IS NEGATED DUE TO LABORATORY CONTAMINATION.
R – DATA IS REJECTED DUE TO HOLDING TIME EXCEEDED, BLANK CONTAMINATION, INSTRUMENT CALIBRATION ERROR, OR OTHER MAJOR CONTROLLING LIMITS ARE EXCEEDED.
* – INDICATES QUALIFIER PLACED BY TRC-ECI.
N/A – NOT ANALYZED FOR THIS COMPOUND
'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

TABLE 31d
SHIELDALLOY METALLURGICAL CORPORATION
SUMMARY OF INORGANIC COMPOUNDS DETECTED IN SURFACE WATER SAMPLES

SAMPLE IDENTIFICATION:	SW1-01	SW2-01	SW3-01	SW10-01	SW4-01	SW5-01	SW6-01	SW7-01	SW8-01	SW9-01
INORGANICS (ppb)										
ALUMINUM	4610	44800	544	442	319	224	3450	48100	12800	9300
ANTIMONY	44.2 B	151	–	–	–	–	–	–	–	–
ARSENIC	2.0 B	34.6	–	–	2.4 B	–	–	116	2.4 B	2.2 B
BARIUM	78.2 B	962	44.4 B	43.6 B	40.8 B	24.5 B	205	400	65.1 B	160 B
BERYLLIUM	1.3 B	25.1	1.0 B	1.0 B	1.0 B	–	–	468	15.4	37.2
CADMIUM	–	9.0	–	–	–	–	–	5.2	–	–
CALCIUM	5480	18100	4040 B	3960 B	4600 B	4940 B	9200	30300	13300	11000
CHROMIUM	43.3	8520	120	106	208	99.0	29.8	313	91.4	283
CHROMIUM VI	–	–	–	–	0.054	–	0.031	0.057	0.028	0.14
COBALT	–	62.2	–	–	–	–	–	13.1 B	–	–
COPPER	8.0 B	432	13.7 B	11.8 B	7.7 B	7.3 B	6.3 B	64.2	16.3 B	23.2 B
CYANIDE, TOTAL (UG/L)	–	11.0J*	–	–	–	–	–	94.4	–	12.3
IRON	4660	71000	1210	1020	933	697	128	13900	14200	6820
LEAD	28.0	–	7.6	9.3	3.8 B	5.5 B	8	1240	1050	170
MAGNESIUM	9250	5670	1700 B	1690 B	2060 B	2400 B	16500	63200	12000	27800
MANGANESE	622	2590	220	219	342	131	10.7 B	1160	223	500
MERCURY	–	21.4	–	–	–	–	–	–	–	–
NICKEL	20.8 B	618	29.6 B	34.5 B	17.7 B	17.1 B	–	415	49.2	242
POTASSIUM	8670	4670 B	1610 B	1890 B	4310 B	4490 B	9300	171000	6890	14400
SELENIUM	–	–	–	–	–	–	–	29 B	–	2.1 B
SILVER	–	–	–	–	–	–	–	–	–	–
SODIUM	25900	20300	24400	23900	107000	65200	64900	90100	23800	80700
THALLIUM	–	–	–	–	–	–	–	–	–	–
VANADIUM	272	5700	310	307	246	286	1410	8650	3380	8350
ZINC	56.4	1070	41.8	32.4	25.4	20.8	58.6	942	108	234
BORON	828	N/A	N/A	N/A	585	N/A	14100	4960	286	320
NIOBIUM	–	N/A	N/A	N/A	–	N/A	–	527	–	–
STRONTIUM	–	N/A	N/A	N/A	–	N/A	221	–	–	–
TITANIUM	–	N/A	N/A	N/A	–	N/A	–	443	193	143
ZIRCONIUM	–	N/A	N/A	N/A	–	N/A	N/A	N/A	N/A	N/A
FLUORIDE	0.87	0.92	1.1	1.1	0.84	0.97	N/A	N/A	N/A	N/A
SULPHATE	68.7	25.8	12.2	11.7	139	80.2	N/A	N/A	N/A	N/A

B – INDICATES THAT THE REPORTED VALUE IS LESS THAN THE CRDL BUT GREATER THAN THE IDL.

J – QUALIFIER USED TO INDICATE AN ESTIMATED VALUE. THE CONCENTRATION IS QUANTITATIVELY QUALIFIED AND THE FINAL RESULT REPORTED IS ESTIMATED.

* – INDICATES QUALIFIER PLACED BY TRC–ECI.

N/A – NOT ANALYZED FOR THIS COMPOUND

'–' – NOT DETECTED TO THE REPORTED DETECTION LIMIT

CRDL – CONTRACT REQUIRED DETECTION LIMITS.

IDL – INSTRUMENT DETECTION LIMITS.

TABLE 1-9
SURFACE WATER SUMMARY TABLE
INORGANICS
SUPPLEMENTAL SAMPLING INVESTIGATION
SHIELDALLOY METALLURGICAL CORPORATION

SAMPLE ID:	SW-8	SW-11	SW-32 Dup of SW-11	SW-21	SW-25	SW-27	SW-30	SW-31
INORGANICS (µg/L)								
Aluminum	979	1,770	227	169	2310	286	163	127
Antimony	27.2 u	27.2 u	27.2 u	27.2 u	27.2 u	27.2 u	27.2 u	27.2 u
Arsenic	3.2	1.8 u	1.8 u	1.8 u	2.8	1.8 u	1.8 u	1.8 u
Barium	34	53.3	21.1	40.4	87.1	119	174	162
Beryllium	0.7 u	0.7 u	0.7 u	1	2.6	1	0.7 u	0.7 u
Cadmium	2.9 u	2.9 u	2.9 u	2.9 u	3.1 u	3.1 u	3.1 u	3.1 u
Calcium	3,650	4,250	4,200	5,189	4660	5220	8960	8330
Chromium	101	47.6	23	19.6	46.8	38.7	2.7 u	2.7 u
Chromium VI (mg/L)	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u	0.02 u
Cobalt	2.9 u	4.9	2.9 u	2.9 u	10.1	7.4	6.3	7.9
Copper	23.2	17.6	13.5	6.2	7.9	6	2.7	3.3
Iron	655	1,710	143	150	3080	374	301	259
Lead	2.9	0.7 u	0.7 u	0.7 u	2.7	3.4	0.9 u	0.9 u
Magnesium	3,210	7,770	3,620	3,860	8670	2620	4440	4160
Manganese	42.3	42.3	28.2	9.4	88	194	180	271
Mercury	0.1 u	0.1 u	0.1 u	0.1 u	0.1 u	0.1 u	0.1 u	0.1 u
Nickel	10.2	12.3	6.8 u	6.8 u	19.2	8.1	6.9 u	10.5
Potassium	18,600	21,000	22,700	15,800	8960	4890	3080	2600
Selenium	4.4	1.2 u	1.2 u	1.2 u	1.7	1.5 u	1.5 u	1.5 u
Silver	2.5 u	2.5 u	2.5 u	2.5 u	2.5 u	2.5 u	2.5 u	2.5 u
Sodium	177,000	196,000	215,000	150,000	44,600	15,000	6390	5970
Vanadium	64.3	33	33.9	257	413	144	3.5 u	3.5 u
Zinc	287	54.1	54.4	47.5	24.6	55.1	77.6	85.9
Thallium	2 u	2 u	2 u	2 u	2 u	2 u	2 u	2 u
Cyanide	5 u	5 u	5 u	5 u	5 u	5 u	5 u	5 u
Hardness (mg/L)	21.6	22.5	22.5	20.6	23.5	29.4	38.3	37.4

µg/L=micrograms per liter
mg/L=milligrams per liter
u=Analyzed, Not Detected

APPENDIX H - REGIONAL HYDROGEOLOGIC INFORMATION

APPENDIX H - REGIONAL HYDROGEOLOGIC INFORMATION

Qualitative Description of the New Jersey Coastal Plain Aquifer System
New Jersey Coastal Plain Aquifer System Sole Source Aquifer Designation
Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey;
    USGS Well MW-24
Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey;
    USGS Well OU02

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New Jersey Coastal Plain Aquifer

Support Document

Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Middlesex, Monmouth, Ocean, and Salem Counties New Jersey
May 1988

I. Introduction

A. Statement of Section 1424 (e)

The Safe Drinking Water Act (SDWA), Public Law 93-523, of December 16, 1974 contains a provision in Section 1424(e), which states that:

> If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create significant hazard to public health, he shall publish notice of that determination in the Federal Register. After the publication of any such notice, no commitment for Federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health, but a commitment for Federal financial assistance may, if authorized under another provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer.

This section allows for the specific designation of areas which are dependent upon ground water supplies. Following designation, the review process will ensure that federal agencies will not commit funds toward projects which may contaminate these ground water supplies.

B. Receipt of Petition

On December 4, 1978 the Environmental Defense Fund, Inc. and Sierra Club New Jersey Chapter petitioned the U.S. Environmental Protection Agency (EPA) Administrator to determine that the Counties of Monmouth, Burlington, Ocean, Camden, Gloucester, Atlantic, Salem, Cumberland, Cape May and portions of Mercer and Middlesex Counties, New Jersey, constitute an area whose aquifer system is "the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health".

C. Area of Consideration

The area of the New Jersey Coastal Plain Aquifer System includes the area for the Counties of Monmouth, Burlington, Ocean, Camden, Gloucester, Atlantic, Salem, Cumberland, Cape May and portions of Mercer and Middlesex Counties, New Jersey. Pursuant to section 1424(e), Federally assisted projects proposed for construction in the New Jersey Coastal Plain Area and the project review area within portions of its streamflow source zone will be subject to EPA review.

The streamflow source zone for the New Jersey Coastal Plain Aquifer System includes upstream portions of the Delaware River Basin in the States of Delaware (New Castle County), New Jersey (Mercer-part, Hunterdon-part, Sussex-part, and Warren Counties), New York (Delaware, Orange, Sullivan and Ulster Counties), and Pennsylvania (Berks-part, Bucks, Carbon-part, Chester-part, Delaware, Lackawanna-part, Lancaster, Lehigh, Luzerne-part, Monroe, Montgomery, Northampton, Philadelphia, Pike, Schuykill and Wayne Counties).

The project review area includes that portion of the streamflow source zone which lies within two miles of the Delaware River in the States of New Jersey (in Mercer, Hunterdon, Sussex and Warren Counties), Delaware (in New Castle County), Pennsylvania (in Delaware, Philadelphia, Bucks, Monroe, Northampton, Pike and Wayne Counties) and New York (in Delaware, Orange and Sullivan Counties).

D. Topography

The New Jersey Coastal Plain is part of the Atlantic Plain physiographic province. The Coastal Plain physiographic province lies along the Atlantic and Gulf Coasts from Long Island to Mexico and contains one of the most prolific system of aquifers in the country. The area petitioned by the Environmental Defense Fund, Inc. and the Sierra Club New Jersey Chapter is the New Jersey Coastal Plain Aquifer System, which is located between the Delaware River and Bay, the Atlantic Coast, Staten Island and a belt of more rugged, generally higher terrain called the Piedmont province. A Fall Line, extending northeast along the Delaware River and through Mercer and Middlesex counties, separates the Coastal Plain from the Appalachian Highlands. The Fall Line separates areas with major differences in topography, geology, and hydrology.

The New Jersey Coastal Plain Aquifer System, lying southeast of the Fall Line, covers about 4,200 square miles. More than half of the land area is below an altitude of fifty feet (50') above sea level (NGVD). The area is largely surrounded by salty or brackish water and is bounded by the Delaware River on the west, Delaware Bay on the south, the Atlantic Ocean on the east, and Raritan Bay on the north.

The land surface is divided into drainage basins. A drainage basin is an area that contributes runoff to a stream and its tributaries. A drainage divide marks the topographic boundary between adjacent drainage basins. A major stream divide in the Coastal Plain of New Jersey separates streams flowing to the Delaware River and the Atlantic Ocean.

II. Hydrogeology

A. Geologic Framework

The following physiographic and hydrogeologic descriptions are excerpted from the United States Geological Survey (USGS) Report on the New Jersey Coastal Plain Area (Vowinkel and Foster, 1981). The New Jersey Coastal Plain is underlain by a wedge shaped mass of unconsolidated sediments composed of clay, silt, sand and gravel. The wedge thins to a featheredge along the Fall Line and attains a thickness of over six-thousand feet (6,000') at the tip of Cape May County, New Jersey. These sediments range in age from Cretaceous to Holocene and can be classified as continental, coastal or marine deposits. The Cretaceous and Tertiary age sediments generally strike on a northeast-southwest direction and dip gently to the southeast from ten to sixty feet (10 - 60') per mile. The overlying Quaternary deposits, where present, are basically flat lying. The unconsolidated Coastal Plain deposits, are unconformably underlain by a Pre-Cretaceous basement bedrock complex, which consists primarily of Precambrian and early Paleozoic age rocks. Locally, along the Fall Line in Mercer and Middlesex Counties, Triassic age rocks underlie the unconsolidated sediments.

Potomac Raritan Magothy aquifer system is divided into two aquifers. They are the Farrington aquifer and the Old Bridge aquifer. These aquifers are both upper Cretaceous in age and would be stratigraphically equivalent to the Raritan and Magothy formations, respectively.

B. Geologic Setting (Major Aquifers and Confining Units)

The wedge of sediment comprises one interrelated aquifer system that includes several aquifers and confining units. These sediments range in age from Cretaceous to Holocene and can be classified as continental, coastal or marine

[redacted]

deposits. In general, aquifers and confining units in the Coastal Plain Aquifer System correspond to the geologic formations presented in Table 1. However, the boundaries of the aquifers and confining beds may not be the same as the geologic formations for the following reasons: (1) the formations may change in physical character from place to place and may act as an aquifer in one area or a confining bed in another; (2) some formations are divided into several aquifers and confining beds; and (3) adjacent formations may form a single aquifer or confining bed.

There are five major aquifers in the New Jersey Coastal Plain Aquifer System. They are the Potomac-Raritan-Magothy aquifer system, Englishtown aquifer, Wenonah-Mount Laurel aquifer, lower "800 foot" sand aquifer of the Kirkwood Formation and the Kirkwood-Cohansey aquifer. The major aquifers and their respective confining units are described in ascending order from the bedrock surface.

Overlying the consolidated rocks of the bedrock is the Potomac-Raritan-Magothy aquifer system. This wedgeshaped mass of sediments of Cretaceous age is composed of alternating layers of clay, silt, sand, and gravel. These deposits range in thickness from a featheredge along the Fall Line to more than 4,100 feet beneath Cape May County. The Potomac-Raritan-Magothy aquifer system is exposed in a narrow outcrop along the Fall Line and the Delaware River. The aquifer is confined except in outcrop areas by the underlying crystalline rocks and the overlying Merchantville-Woodbury confining unit. In the northern part of the Coastal Plain, the Potomac-Raritan-Magothy aquifer system is divided into two aquifers. They are the Farrington aquifer (mainly Raritan age) and the Old Bridge aquifer (Magothy age).

The Merchantville Formation and Woodbury Clay form a major confining unit throughout most of the Coastal Plain of New Jersey. Although their permeability is very low, the Merchantville-Woodbury confining unit can transmit significant quantities of water when sizeable differences in potentiometric head exist between overlying and underlying aquifers.

The Englishtown aquifer overlies the Merchantville and Woodbury confining unit in the central and northern parts of the Coastal Plain. The aquifer is a significant source of water for Ocean and Monmouth Counties. In northern and eastern Ocean County, the Englishtown aquifer can be subdivided into two waterbearing sands. Upper and lower units of quartz sand with thin interbeds of dark sandy silt are separated by a thick sequence of sandy and clayey lignitic silt (Nichols, 1977).

The Marshalltown Formation overlies the Englishtown sand in most of the Coastal Plain but overlies the Woodbury Clay in much of Salem County. The formation has a maximum thickness of thirty feet (30'). Because the Marshalltown Formation is thin and contains some slightly to moderately permeable beds, it acts as a leaky confining bed.

Although the Wenonah Formation and Mount Laurel Sand are distinct lithologic units, they are hydraulically connected and together form the Wenonah-Mount Laurel aquifer. The Mount Laurel Sand, a coarser sandunit than the Wenonah Formation, is the major component of the aquifer. The combined thickness of the Wenonah Formation and Mount Laurel Sand in outcrop is as much as one hundred feet (100'). In the subsurface they range in thickness from forty feet (40') to slightly more than two hundred feet (200') (Nemickas, 1976). The Wenonah-Mount Laurel aquifer is an important water producing aquifer in the northern and western parts of the Coastal Plain.

Overlying the Wenonah-Mount Laurel aquifer is a confining unit that comprises several geologic units. The confining unit consists of the Navesink Formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Marl, Piney Point Formation and the basal clay of the

Kirkwood Formation. Some of these geologic units may act as aquifers on a local basis.

The Kirkwood Formation includes several waterbearing units. The major Kirkwood aquifer is the principal artesian aquifer within the Kirkwood Formation, also known as the Atlantic City "800 foot" sand (Barksdale and others, 1936). The Kirkwood "800 foot" sand aquifer extends along the Atlantic Coast from Cape May to Barnegat Light and some distance inland. In Cape May and Cumberland Counties, the upper artesian aquifer of the Kirkwood Formation is defined as the Rio Grande waterbearing zone (Gill, 1962). This aquifer is productive only locally in Cape May County. Along the coast north of Barnegat Light and inland from the coast in Ocean, Burlington, Atlantic, and the western part of Cumberland Counties, the sands of the upper part of the Kirkwood Formation are hydraulically connected to the overlying Cohansey Sand.

The Cohansey Sand is typically a lightcolored quartzose sand with lenses of silt and clay. The Cohansey Sand is exposed throughout most of the outer part of the Coastal Plain and attains a maximum thickness of about two hundred fifty feet (250'). Ground water in the Cohansey aquifer occurs generally under watertable conditions except Cape May County, where the aquifer is confined. Inland from the coast and in the northern part of Ocean County, the upper part of the Kirkwood Formation is in hydraulic connection with the Cohansey Sand and they act as a single aquifer.

C. Ground Water Hydrology

Man has modified the natural equilibrium of the New Jersey Coastal Plain Aquifer System by increasing the rate of outflow from the system to the ocean. One major effect of the increased outflow of water is a regional decline in ground water levels. This decline in potentiometric head (the level to which water will rise under a given pressure with respect to aknown datum) within the aquifers may change the direction of ground water flow and cause induced recharge and/or saltwater encroachment into the system. Significant regional waterlevel declines have occurred in the Potomac-Raritan-Magothy aquifer system, Englishtown aquifer, Wenonah-Mount Laurel aquifer and the "800 foot" sand aquifer of the Kirkwood Formation. Ground water withdrawals from the Potomac-Raritan-Magothy aquifer system have resulted in ground water level declines of 1.5 to 2.5 feet per year from 1966 to 1976 (Luzier, 1980). These declines in head are causing a reversal in the direction of ground water flow near pumping centers. Model studies have indicated that about forty three percent (43%) of the total inflow to the Potomac-Raritan-Magothy aquifer system in 1973 was induced recharge from the Delaware River (Luzier, 1980). Saline water in the Delaware River Estuary threatens water quality in the aquifers along Salem and Gloucester Counties. sustained increases in the rate of withdrawal from the Potomac-Raritan-Magothy and in the consumptive uses of Delaware River water portends continued and increased movement of inferior quality water into the aquifer.

The head reductions in the Potomac-Raritan-Magothy aquifer system have also increased leakage from the overlying Englishtown and Wenonah-Mount Laurel aquifers through the Merchantville Formation Woodbury Clay confining unit. In model simulation, approximately thirty percent (30%) of the recharge to the Potomac-Raritan-Magothy aquifer system in 1973 was due to leakage from overlying aquifers (Luzier, 1980).

Withdrawal of water from the Englishtown aquifer has had a marked effect on the water level in the overlying Wenonah-Mount Laurel aquifer. Decline in head in the Englishtown aquifer from 1959 to 1970 was 8 to 12 ft/yr over a large area. As a consequence of this change in head, increased quantities of water apparently leak from the Wenonah-Mount Laurel aquifer, through the confining layers, and into the

Englishtown aquifer (Nichols, 1977).

Since the recharge from precipitation and induced infiltration is insufficient to replace ground water in heavily pumped areas close to the saltwater-freshwater interface, the interface can advance toward pumping centers.

1. Recharge

The Delaware River and Estuary, Sandy Hook Bay, the Atlantic Coast and the older, harder rocks of the Piedmont province constitute the recharge boundaries of the New Jersey Coastal Plain aquifers. These hydrographicfeatures represent the interfaces across which water either moves into or out of the ground water reservoir. Natural recharge occurs primarily through direct precipitation on the outcrop area of the geologic formations. A smaller component of natural recharge to the deeper layers of the system occurs by vertical leakage from the upper layers. This accounts for a small percentage of the total amount of recharge; however, over a large area and a long period of time the amount of water transmitted can be significant.

Natural recharge to the New Jersey Coastal Plain Area occurs primarily through direct precipitation on the outcrop area of the geologic formations. Based primarily on estimates of ground water contributing to streamflow and basin runoff, several estimates of ground water recharge in the Coastal Plain have been made. In the outcrop areas of the Potomac - Raritan - Magothy aquifer system, where it is unconfined, recharge to the aquifer is about twelve (12) inches per year (in/yr). In the outcrop area of the Farrington aquifer, the recharge to ground water is twelve (12) in/yr. Recharge ranges from twelve to twenty (12 - 20) in/yr in the outcrop of the Old Bridge aquifer.

Another component of natural recharge to deep, confined aquifers is primarily by vertical leakage from the upper layers. Only a small percentage of the water within the unconfined ground water system leaks to the confined aquifers; but over a large area and a long period of time, the amount of water transmitted can be significant (Vowinkel & Foster, 1981).

2. Discharge

The New Jersey Coastal Plain Aquifer discharges to the surface through streams, springs and evapotranspiration. Many streams ultimately flow into bays or directly into the ocean. Development of the ground water reservoir as a water supply source constitutes another discharge component which today accounts for a significant portion of discharge from the overall system. In certain areas (e.g., along the Delaware River) heavy pumping has caused a reversal in the normal discharge from the aquifer (Raritan-Magothy) such that the surface stream (Delaware River) now recharges the aquifer. This phenomenon implies that, in addition to the New Jersey Coastal Plain Area, the Delaware River Basin within Delaware, New Jersey, Pennsylvania and New York must be regarded as a streamflow source zone (an upstream headwaters area which drains into a recharge zone), which flows into the Coastal Plain Area.

3. Streamflow Source Zone

The New Jersey Coastal Plain Aquifer System discharge to the surface through streams, springs and evapotranspiration. Many streams ultimately flow into bays or directly into the ocean. Development of the ground water reservoir as a water supply source constitutes another discharge component which today accounts for a significant portion of discharge from the overall system. In certain areas (e.g. along the Delaware River) heavy pumping has caused a reversal in the normal discharge from the aquifer (Raritan-Magothy) such that the surface stream (Delaware River) now recharges the aquifer. This phenomena implies that, in addition to the New Jersey Coastal Plain Area, a major portion of the Delaware River Basin must be regarded as a streamflow source zone (an upstream headwaters area which drains into a recharge zone), which flows into the designated area.

D. Ground Water Quality

Fresh, uncontaminated ground water in the New Jersey Coastal Plain is low in dissolved solids (generally less than 150 milligrams per liter (mg/l). Calcium and bicarbonate are usually dominant ions in solution with smaller amounts of sodium, potassium, magnesium sulfate and chloride. Locally, concentrations of iron and manganese present a problem near the water table because the ground water tends to have a low pH. These waters are treated to make them palatable. Historically, no significant quantities of heavy metals, pesticides, organics or coliform bacteria have been found in the artesian aquifers. Except for specific parameters (e.g. iron) and contamination incidents, water quality in the artesian ground water system meets or exceeds Federal and State drinking water standards. The quality of ground water in the outcrop area, on the other hand, is variable, being largely determined by local conditions at the land surface.

A large part of the Potomac-Raritan-Magothy aquifer system in the southern Coastal Plain of New Jersey contains salty ground water with chloride concentrations ranging from less than 250 to as high as 27,000 mg/L (Luzier, 1980). The concentrations of chloride increase with depth as well as toward the ocean.

E. Designated Areas

The proposed Sole Source Aquifer designation areas for the New Jersey Coastal Plain Aquifer System are defined within the Counties of Monmouth, Burlington, Ocean, Cumberland and Cape May, and portions of Mercer and Middlesex Counties, New Jersey, and that portion of the streamflow source zonewhich lies within two miles of the Delaware River in the States of New Jersey (in Mercer, Hunterdon, Sussex and Warren Counties), Delaware (in New Castle County), Pennsylvania (in Delaware, Philadelphia, Bucks, Monroe, Northampton, Pike and Wayne Counties) and New York (in Delaware, Orange and Sullivan Counties). Outside the New Jersey Coastal Plain Area and further than two miles from the Delaware River in the streamflow source zone, only those Federally assisted proposed projects requiring the preparation of an Environmental Impact Statement will be reviewed. The two-mile limit for the project review area along the Delaware River is based on the climate and hydrologic setting of the area.

F. Ground Water Use

Ground water use for public supply in the Coastal Plain area, was about 250 million gallons per day (MGD) in 1978. Use of surface water for public supply in this same area amounts to 79 MGD. Of the estimated 400 MGD withdrawn from the Coastal Plain aquifer system in 1978, approximately seventy-five percent (75%) was used for drinking water purposes to serve 2.3 million people.

Estimates for industrial and commercial consumption of ground water range from 75 MGD (USGS, 1978) to 97 MGD (NJ Water Supply Master Plan, WSMP, 1976). Agriculture is also a major consumer of ground water, pumping anywhere from 11 MGD (USGS, 1978) to 50 MGD (NJWSMP, 1976).

No accurate tally of domestic consumption in the Coastal Plain Area is available; however, the New Jersey Water Supply Master Plan estimates that as much as 40 MGD of ground water was pumped to private households.

The PotomacRaritanMagothy aquifer system is the most widely used aquifer in the Coastal Plain, but it is not the primary source of drinking water for every county. The Cohansey and Kirkwood aquifers are the primary sources of ground water in Atlantic, Cape May and Cumberland County. In these counties, the Potomac-Raritan-Magothy aquifer contains saltwater. The Englishtown and Wenonah-Mount Laurel aquifers are productive mainly in the northern and central counties of the Coastal Plain.

III. Susceptibility to Contamination

The New Jersey Coastal Plain Aquifer System is susceptible to contamination across several interfaces. In the outcrop areas, the water table conditions and the highly permeable nature of the soil, with its low attenuation capability, facilitate the movement of contaminants from the land surface into the system. Significant pollution sources include septic tanks, landfills, chemical spills and dumping, chemical storage leaks, industrial waste lagoons, highway deicing and agricultural chemicals. These sources have immediate local impacts as well as long term cumulative impacts as they progress through to the lower system.

EPA has identified roughly 150 hazardous waste disposal sites within the New Jersey Coastal Plain area which have the potential for contaminating the environment.

Municipal Land Disposal

Municipal land disposal sites frequently are discovered to contain other than municipal wastes. One example is Jackson Township, Ocean County. The Township disposal site has been found to be leaching chlorinated industrial solvents and other toxic organic chemicals into the aquifer that serves private drinking water wells of more than 100 homes in a nearby development. A second site is the Price Landfill in Pleasantville, New Jersey. The contamination emanating from this site does threaten the Atlantic City water supply.

Pipelines and Storage Tanks

Pipelines and tanks which carry and store petroleum products and other chemicals are subject to accidental rupture, external corrosion, and structural failure from a wide variety of causes. In the Pinelands, there are fourteen (14) storage tanks which are required to have Federal and/or State permits because of their size. Approximately 13.9 million gallons are stored in these facilities, and additional amounts are transferred through them.

Industrial Waste Lagoons

Industrial waste lagoons are constructed for the primary purpose of providing temporary storage of waste materials. Seven industrial lagoons have been identified in the Pinelands, and three have been linked to contaminated wells (New Jersey Pinelands Comprehensive Management Plan, 1980).

Hazardous Waste Sites

The lower Delaware along the TriCounty and Salem County area is highly industrialized, densely populated and contains a concentration of hazardous waste sites as well as an assortment of treatment, storage and disposal facilities. The potential for pointsource contamination of ground andsurface water quality is therefore greater in this area.

Fertilizer

In the Pinelands, there is increasing evidence to support an association between fertilizer use and nitrate in ground water. For example, high ground water nitrate levels possibly stemming from agricultural fertilization has been noted in Winslow Township. (New Jersey Pinelands Comprehensive Management Plan)

Hydraulic Gradient Variability Across Confining Units

Contamination across the confining units is another mechanism through which the Coastal Plain aquifer system is susceptible to contamination. Significant hydraulic gradients and variabilities in the integrity of these units has facilitated the migration of pollutants from one formation into another in South Brunswick (Geraghty and Miller, 1979)

Salt Water Encroachment

The Coastal Plain aquifers are also susceptible to contamination by saltwater encroachment. A large part of the Potomac-Raritan-Magothy aquifer system in the southern Coastal Plain of New Jersey contains saline ground water. m e concentrations of chloride increase with depth as well as distance toward the ocean. According to Luzier (1980), head reductions caused by withdrawal of ground water near the saltwater interface are more than sufficient to cause the slow migration of the saltwater toward pumping centers.

Lateral Salt Water Intrusion

Lateral saltwater intrusion is occurring in a part of the Old Bridge aquifer in the vicinity of Keyport and Union Beach Boroughs in Monmouth County, NJ. The reduction in water levels has caused a reversal in the direction of ground water flow in the Old Bridge aquifer. Prior to development, water in the aquifer flowed into Raritan Bay; however, saltwater is now flowing inland from the submerged (exposed) outcrop of the aquifer beneath Raritan Bay. As previously discussed, saltwater contamination is a threat to the Potomac-Raritan-Magothy Aquifer along the Delaware River.

In summary, problems in the New Jersey Coastal Plain Aquifer System revolve around rapid migration of contaminants as a result of the predominantly permeable hydrogeology. This poses an immediate threat to existing water supplies, as in the case of the Price Landfill, or may result in a more chronic contamination of the large interrelated aquifers.

IV. Alternative Sources of Drinking Water

The New Jersey Coastal Plain Aquifer System area is heavily dependent upon the ground water system for its drinking water supply. The many streams throughout the area might be considered alternative supplies; however, the streams are not as readily accessible to everyone as is ground water. Since the ground water has historically been the primary source of supply, considerable cost would be associated with tapping, treating and distributing this surface resource as an alternative supply. Most importantly, the close interrelationship between the ground water system and quality and baseflow of the streams precludes stream resource as a viable longterm alternative in the event of ground water contamination. The Delaware River may be considered an alternative source of supply for portions of the area; however, existing competitive uses severely limit the availability of additional water for drinking purposes.

In the event of contamination, it is possible to relocate drinking water wells to different depths and, in some portions of the Coastal Plain, to different formations. Deeper wells inevitably incur higher costs for drilling, piping and pumping. As evidenced in the discussions on ground water movement and susceptibility to contamination, the practical lifetime of this alternative can be limited and very costly.

Desalinization is also an alternative source of drinking water for the Coastal and Bay areas; however, conversion of saltwater requires considerable energy and the economic constraints make desalinization an impractical alternative.

Since the ground water resources of the New Jersey Coastal Plain Aquifer System are vast in magnitude and distribution, no alternative sources of water supply are considered viable.

V. Summary

Based upon the information presented, the New Jersey Coastal Plain Aquifer System, as defined in this document, meet the technical requirements for Sole Source Aquifer designation. More than fifty percent (50%) of the drinking water for the aquifer service areas is supplied by the aquifer system. In addition, there are no economically feasible alternative drinking water sources which could replace the aquifer systems. Therefore, it is recommended that the New Jersey Coastal Plain Aquifer System be designated a Sole Source Aquifer. This will provide an additional review of ground water protection measures, incorporating state and local measures whenever possible, for only those projects which request Federal financial assistance.

The Coastal Plain Aquifer System of New Jersey is an interrelated hydrologic system which responds to natural and manmade stresses. The wedge of unconsolidated sediments underlying the Coastal Plain Aquifer System of New Jersey is comprised of a series of hydrologic units that have varying thickness, lateral extent, and waterbearing characteristics. Some of the units act as aquifers, while others act as confining beds. Previous to development by wells, the groundwater system is in a state of dynamic equilibrium.

Withdrawal of ground water by wells is a stress superimposed on a previously balanced groundwater system. The response of an aquifer to pumping stresses may result in an increase in recharge to the aquifer, a decrease in the natural discharge, a loss of storage within the aquifer, or a combination of these effects. Also, the response of an aquifer to stress may extend beyond the limits of the aquifer being evaluated.

The following findings, which are the basis for the determination:

(1.) The New Jersey Coastal Plain Area depends upon the under-lying Coastal Plain Aquifer System for seventy-five percent (75%) or more of its drinking water to serve 3 million people.

(2.) Data show that the formations of the New Jersey Coastal Plain Area are hydrologically inter-connected such that they respond collectively as an interrelated aquifer system.

(3.) If the aquifer were to become contaminated, exposure of the persons served by the system would constitute a significant hazard to public health.

(4.) Alternative supplies capable of providing fifty (50) percent or more of the drinking water to the designated area are not available at similar economic costs.

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21. U.S. Army Corps of Engineers, Philadelphia District, April 1980, Camden Metropolitan Urban Study, Volumes I, II, and III.

22. U.S. Department of Interior, Northeast Regional Office, Heritage Conservation and Recreation Service, September 1980, Draft Environmental Impact Statement, Proposed Comprehensive Management Plan for the Pinelands National Reserve.

23. Vowinkel, Eric F. and W. Rendall Foster, April 1981, Hydrogeologic Conditions in the Coastal Plain of New Jersey, Open File Report 81405.

24. WAPORA, Inc., December 26, 1979, Analysis of Sole Source Designations Pursuant to Section 1424(e) of the Safe Drinking Water Act and the Proposed Coastal New Jersey Designation, prepared for the Homebuilders League of South Jersey and submitted to EPA for inclusion in the public record.

VII. Tables

Table 1. Characteristics of the New Jersey Coastal Plain Aquifer System

System	Formation	Thickness	Lithology
Quaternary	Alluvial & Cape May Formation	80'	Sand, silt, black mud
	Pennsauken &		Sand, quartz, light-colored

[redacted]

Tertiary	Bridgeton Formation	200'	clayey, pebbly, glauconite
	Beacon Hill Formation	40'	Gravel, quartz, light-colored sandy
	Cohansey Sand	250'	Sand, quartz, light-colored, medium to coarse-grained, pebbly; local clay beds
	Kirkwood Formation	780'	Sand, quartz, gray to tan, very fine- to medium-grained, micaceous
	Piney Point Formation	220'	Sand, quartz and glauconite, fine- to coarse-grained
	Shark River Marl	140' ?	Sand, quartz and glauconite, gray, brown, and green, fine- to coarse-grained, clayey and green silty and sandy clay
	Manasquan Formation	180'	Sand, quartz and glauconite, gray, brown, and green, fine- to coarse-grained, clayey and green silty and sandy clay
	Vincentown Formation	100'	Sand, quartz, gray and green, fine- to coarse-grained, glauconitic, and brown clayey, very fossiliferous, glauconite and quartz calcarenite
	Hornerstown Sand	35'	Sand, glauconite, green, medium- to coarse-grained, clayey
Cretaceous	Tinton Sand	25'	Sand, quartz, and glauconite, brown and gray, fine- to coarse grained, clayey, micaceous
	Red Band Sand	150'	Sand, quartz, and glauconite, brown and gray, fine- to coarse grained, clayey, micaceous
	Navesink Formation	50'	Sand, glauconite, and quartz, green, black and brown, medium- to coarse grained, clayey
	Mount Laurel Sand / Wenonah Formation	220'	Sand, quartz, brown and gray, fine- to coarse-grained, glauconitic
	Marshalltown Formation	30'	Sand, quartz, and glauconite, gray and black, very fine- to medium-grained, very clayey
	Englishtown Formation	220'	Sand, quartz, tan and gray, fine- to medium-grained; local clay beds
	Woodbury Clay / Merchantville Formation	325'	Clay, gray and black, micaceous, glauconitic, silty
	Magothy - Rariton - Potomac Formations	4100'	Sand, quartz, light-gray, fine- to coarse-grained, pebbly, arkosic, dark-gray lignitic clay/red, white and varigated clay/alternating clay, silt, sand and gravel

Pre-Cretaceous	Pre-Cretaceous Unconsolidated rocks and Wissahickon Formation	?	Precambrian and lower Paleozoic crystalline rocks, metamorphic schist and gneiss; locally Triassic basalt, sandstone, and shale

Table 2. Total Drinking Water Pumped from the New Jersey Coastal Plain Area

	(Million Gallons per day)			
County	**USGS (a)**	**208 Plan (b)**	**NJWSMP ©**	**Est. Private Use ©**
Atlantic	20.1	28.5	17.7	4.4
Burlington	30.5	25.5	32.4	4.7
Camden	67.5	66.7	70.3	2.4
Cape May	10.9	9.0	11.3	2.5
Cumberland	14.2	13.5	13.5	4.2
Gloucester	16.6	15.0	16.0	4.0
Mercer	7.2	6.5	4.5	1.5
Middlesex	24.7	25.8	24.1	1.5
Monmouth	26.0	28.6	28.6	4.2
Ocean	29.6	28.5	29.5	3.1
Salem	2.8	3.0	3.0	2.2
TOTAL	**251.0**	**251.0**	**251.0**	**39.6**

Sources of information:
(a) USGS Report on the NJ Coastal Plain Area; Database: 1978.
(b) Respective Water Quality Management Plans; database: 1970-75.
© New Jersey Water Supply Master Plan; database: 1976.

Table 3. Major Ground Water Withdrawals from the Coastal Plain Area

	(Million Gallons per day)					
County	**PRM**	**E**	**W-M**	**K**	**K-C**	**Other**
Atlantic	---	---	---	9.12	16.75	0.30
Burlington	38.96	0.49	1.14	---	0.36	---
Camden	69.57	0.76	0.88	---	0.04	0.98
Cape May	---	---	---	5.36	0.38	0.56
Cumberland	---	---	---	0.80	20.12	0.45
Gloucester	25.19	---	0.02	---	1.76	---
Mercer	8.12	---	---	---	---	---
Middlesex	49.38	---	---	---	---	---
Monmouth	21.60	6.25	1.31	---	1.14	0.31
Ocean	11.53	4.59	0.03	4.22	12.50	4.84

Salem	6.10	---	1.32	---	1.86	0.82
TOTAL	**230.45**	**12.09**	**4.70**	**19.50**	**60.92**	**8.26**

PRM = Potomac-Raritan-Magothy
W = Englishtown
WM = Wenonah-Mount Laurel
K = Kirkwood
KC = Kirkwood-Cohansey
Source: Vonwinkle and Foster, 1981.

Table 4. Population within Coastal Plain Aquifer System

County	**1985**	**2000**	**Change**
Atlantic	226,800	277,400	50,600
Burlington	372,900	471,900	99,000
Camden	482,600	555,900	73,300
Cape May	85,500	91,600	6,100
Cumberland	135,100	142,600	7,500
Gloucester	206,300	269,100	62,800
Mercer	100,330	111,602	11,272
Middlesex	256,440	302,840	46,400
Monmouth	515,700	588,200	72,500
Ocean	370,100	447,300	77,200
Salem	66,500	6,100	2,600
TOTAL	**2,818,270**	**3,327,542**	**509,272**

VIII. Figures

Coastal Plain Figures

For information on this page, contact: Rinaldo.Lawrence@epamail.epa.gov

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Last updated on Wednesday, June 25th, 2003
URL: http://www.epa.gov/region02/water/aquifer/coast/coastpln.htm

U.S. Environmental Protection Agency

Region 2 Water

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New Jersey Coastal Plain Aquifer

Federal Register Notice

Volume 53, No. 122, Page 23791
Friday, June 24, 1988
Sole Source Aquifer Determination
for the New Jersey Coastal Plain Aquifer System

AGENCY

Environmental Protection Agency

ACTION

Notice.

SUMMARY

Notice is hereby given that, pursuant to section 1424(e) of the Safe Drinking Water Act, the Administrator of the U.S. Environmental Protection Agency (EPA) has determined that the New Jersey Coastal Plain Aquifer System, underlying the New Jersey Coastal Plain Area, is the sole or principal source of drinking water for the Counties of Monmouth, Burlington, Ocean, Camden, Gloucester, Atlantic, Salem, Cumberland, Cap May and portions of Mercer and Middlesex Counties, New Jersey, and that the aquifer, if contaminated, would create a significant hazard to public health.

As a result of this action EPA will review Federally assisted projects (projects which receive Federal financial assistance through a grant, contract, loan guarantee, or otherwise) proposed for constructed in a project review area which includes the New Jersey Coastal Plain Area and a portion of the aquifer streamflow source zone.

The streamflow source zone includes upstream portions of the Delaware River Basin in the States of Delaware, New Jersey, New York and Pennsylvania. Federally assisted projects will be reviewed to ensure that they are designed and constructed so that they do not

create a significant hazard to public health. Projects outside of the project review area but within the streamflow source zone will be reviewed if they require an Environmental Impact Statement (EIS).

DATES

This determination shall be promulgated for purposes of judicial review at 1:00 P.M., Eastern Time on July 7, 1988. This determination shall become effective on August 8, 1988.

ADDRESS: The data on which these findings are based, detailed maps of the New Jersey Coastal Plain Area and the project review area, a compilation of public comments and the Agency's response to those comments, are available to the public and may be inspected during normal business hours at the U.S. Environmental Protection Agency, Water Management Division, 26 Federal Plaza, New York, New York 10278. In addition, copies of a map showing the designated area and a responsiveness summary to public comment are available upon request.

FOR FURTHER INFORMATION CONTACT: John S. Malleck, Chief, Office of Ground Water Management, U.S. Environmental Protection Agency, 26 Federal Plaza, New York, NY 10278, (212) 264-5635.

SUPPLEMENTARY INFORMATION

Notice is hereby given that pursuant to section 1424(e) of the Safe Drinking Water Act (42 U.S.C., 300f, 300h-3(e), Pub. L. 93-523), the Administrator of the U.S. Environmental Protection Agency (EPA) has determined that the New Jersey Coastal Plain Aquifer System, underlying the New Jersey Coastal Plain Area, is the sole or principal source of drinking water for the Counties of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Monmouth, Ocean, Salem, and portions of Mercer and Middlesex Counties, New Jersey.

Pursuant to section 1424(e), Federally assisted projects proposed for construction in the New Jersey Coastal Plain Area and the project review area within portions of its streamflow source zone will be subject to EPA review.

The streamflow source zone for the New Jersey Coastal Plain Aquifer System includes upstream portions of the Delaware River Basin in the States of Delaware (New Castle County), New Jersey (Mercer-part, Hunterdon-part, Sussex-part, and Warren Counties), New York (Delaware, Orange, Sullivan and Ulster Counties), and Pennsylvania (Berks-part, Bucks, Carbon-part, Chester-part, Delaware, Lackawanna-part, Lancaster, Lehigh, Luzerne-part, Monroe, Montgomery, Northampton, Philadelphia, Pike, Schuykill and Wayne Counties).

The project review area includes that portion of the streamflow source zone which lies within two miles of the Delaware River in the States of New Jersey (in Mercer, Hunterdon, Sussex and Warren Counties), Delaware (in New Castle County), Pennsylvania (in Delaware, Philadelphia, Bucks, Monroe, Northampton, Pike and Wayne Counties) and New York (in Delaware, Orange and Sullivan Counties).

I. Background

Section 1424(e) of the Safe Drinking Water Act states: (e) If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health, he shall publish a notice of the determination in the Federal Register. After the publication of any such notice, no commitment for Federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health, but a commitment for Federal financial as-sistance may, if authorized under another provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer.

On December 4, 1978 the Environmental Defense Fund, Inc., and Sierra Club New Jersey Chapter petitioned the EPA Administrator to determine that the Counties of Monmouth, Burlington, Ocean, Camden, Gloucester, Atlantic, Salem, Cumberland, Cap May and portions of Mercer and Middlesex Counties, New Jersey, constitute an area whose aquifer system is "the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health." On March 21, 1979, EPA published the petition in the Federal Register. Public hearings on the petition request were heal May 1, 15 and 17, 1979 in Lindenwold, Trenton, Freehold and Pomona, New Jersey. A May 19, 1983 Federal Register notice announced the availability of additional technical information and the extension of public comment period to July 15, 1983.

II. Basis for the Determination

Among the factors to be considered by the Administrator in con-nection with the designating an area under section 1424(e) are:

(1) Whether the aquifer is the area's sole or principal source of drinking water and (2) whether contamination of the aquifer would create a significant hazard to public health.

On the basis of information available to this Agency, the Administrator has made the following findings, which are the basis for the determination noted above:

(1.) The New Jersey Coastal Plain Area depends upon the under-lying Coastal Plain Aquifer System for seventy-five (75) percent or more of its drinking water to serve 3 million people.

(2.) Data show that the formations of the New Jersey Coastal Plain Area are hydrologically inter-connected such that they respond collectively as an interrelated aquifer system.

(3.) If the aquifer were to become contaminated, exposure of the persons served by the system would constitute a significant hazard to public health.

(4.) Alternative supplies capable of providing fifty (50) percent or more of the drinking water to the designated area are not available at similar economic costs.

The New Jersey Coastal Plain Aquifer System is highly susceptible to contamination through its recharge zone from a number of sources, including but not limited to, chemical spills, leachate from landfills, stormwater runoff, highway deicing, faulty septic systems, wastewater treatment systems and waste disposal lagoons. The aquifer is also susceptible to contamination to a lesser degree fro the same sources through its streamflow source zone. Since ground water contamination can be difficult or impossible to reverse completely and since the aquifer in this area is solely or principally relied upon for drinking water purposes by the population of the New Jersey Coastal Plain Area, contamination of the aquifer could pose a significant hazard to public health.

III. Description of the New Jersey Coastal Plain Area Aquifer Systems, its Recharge Zone and its Streamflow Source Zone

The New Jersey Coastal Plain Aquifer System consists of a wedge-shaped mass of unconsolidated sediments composed of clay, silt, sand and gravel. The wedge thins to a feathered edge along the Fall Line and attains a thickness of 6,000 feet at the tip of Cape May County, New Jersey.

These sediments range in age from Cretaceous to Holocene and can be classified as continental, coastal or marine deposits. There are five major aquifers within the Coastal Plain Aquifer System. They are the Potomac-Raritan-Magothy Aquifer System, Englishtown

Aquifer, Wenonah-Mount Laurel Aquifer, Kirkwood Aquifer and the Cohansey Aquifer. Natural recharge to the New Jersey Coastal Plain Aquifer System occurs primarily through direct precipitation on the outcrop area of the geologic formations. A smaller component of natural recharge to the deeper layers of the system occurs by vertical leakage from the upper layers. This accounts for a small percentage of the total amount of recharge; however, over a large area and a long period of time the amount of water transmitted can be significant.

The New Jersey Coastal Plain Aquifer discharges to the surface through streams, springs and evapotranspiration. Many streams ultimately flow into bays or directly into the ocean. Development of the ground water reservoir as a water supply source constitutes another discharge component which today accounts for a significant portion of discharge from the overall system. In certain areas (e.g., along the Delaware River) heavy pumping has caused a reversal in the normal discharge from the aquifer (Raritan-Magothy) such that the surface stream (Delaware River) now recharges the aquifer. This phenomenon implies that, in addition to the New Jersey Coastal Plain Area, the Delaware River Basin within Delaware, New Jersey, Pennsylvania and New York must be regarded as a streamflow source zone (an upstream headwaters area which drains into a recharge zone), which flows into the Coastal Plain Area.

IV. Information Utilized in Determination

The information utilized in this determination includes the petition, written and verbal comments submitted by the public, and various technical publications. The above data are available to the public and may be inspected during normal business hours at the U.S. Environmental Protection Agency, Region II, Water Management Division, 26 Federal Plaza, New York, New York 10278.

V. Project Review

When the EPA Administrator publishes his determination for a sole or principal drinking water source, no commitment for Federal financial assistance may be committed if the Administrator finds that the Federally assisted project may contaminate the aquifer through a recharge zone so as to create a significant hazard to public health...Safe Drinking Water Act section 1424(e), 42 U.S.C. 300h-3(e). In many cases, these Federally assisted projects would also be analyzed in an "Environmental Impact Statement" (EIS) under the National Environ-mental Policy Act (NEPA), 42 U.S.C. 4332(2)(C). All EIS's, as well as any other proposed Federal actions affecting an EPA program or responsibility, are required by Federal law (under the so-called "NEPA/309" process) to be reviewed and commented upon by the EPA Administrator. Therefore, in order to streamline EPA's review of the possible environmental impacts on designated aquifers, when an action is analyzed in an EIS, the two reviews will be consolidated and both authorities cited. The EPA review (under the Safe Drinking Water Act) of Federally assisted projects potentially affecting sole or principal source aquifers, will be included in the EPA review (under the "NEPA/309" process) of any EIS accompanying the same Federally assisted project. The letter transmitting EPA's comments on the final EIS to the lead agency will be the vehicle for informing the lead agency of EPA's actions under Section 1424(e).

All Federally assisted proposed projects will be reviewed, within the New Jersey Coastal Plain Area (Counties of Monmouth, Burlington, Ocean, Cumberland and Cape May, and portions of Mercer and Middlesex Counties, New Jersey (as delineated on maps included in the petition), and that portion of the streamflow source zone which lies within two miles of the Delaware River in the States of New Jersey (in Mercer, Hunterdon, Sussex and Warren Counties), Delaware (in New Castle County), Pennsylvania (in Delaware, Philadelphia, Bucks, Monroe, Northampton, Pike and Wayne Counties) and New York (in Delaware, Orange and Sullivan Counties) (asdelineated on maps included in the public record).

Outside the New Jersey Coastal Plain Area and further than two miles from the Delaware River in the streamflow source zone, only those Federally assisted proposed projects requiring the preparation of an EIS will be reviewed. The Agency has chosen a two-mile limit for the project review area along the Delaware River based on the climate and hydrologic setting of the area. The two-mile distance is consistent with the two-mile review radius included in the EPA guidelines for Ground Water Classification and is protective of human health.

VI. Summary and Discussion of Public Comments

There has been much controversy over the possible designation of this aquifer system. The majority of the public comments from the original 1979 public hearings were in direct opposition to such a designation. More than half of all responses received were against designation. Several commenters felt constrained by the original comment period and thereby requested an extension. EPA complied with this request on two occasions, once by announcing at the four public hearings it held throughout the area under consideration that the agency had extended the formal comment period from May 14, 1979, to December 31, 1979, and again in a May 19, 1983 Federal Register Notice that announced the availability of additional information and extension of the public comment period to July 15, 1983. Although a number of ground water protection measures are available at the Federal, State and local level, none of these, either individually or collectively, permit EPA to act as directly as would a sole source aquifer designation in the review and approval of Federally assisted projects. In addition, EPA feels that the sole source project review process will foster integration rather than duplication of environmental review efforts. Memoranda of Understanding have been negotiated with various Federal agencies with the purpose of streamlining the review process and minimizing project delays. Most of the commenters expressed concern that a designation would be a duplication of efforts already existing on the state and local levels. Some commenters felt that a sole source aquifer designation would give EPA the power to reject any applications for Federally funded projects indiscriminately and to delay any project underway. Another main concern of many commenters was that a designation would cause a strong negative impact on the area in question and curtail needed development, thus eliminating jobs. EPA is sympathetic to the concerns of the commenters; however, the Agency feels that a sole source aquifer designation would not interfere with economic development. Federal financial assistance will be withheld only in those instances where it is determined that a proposed project may contaminate the aquifer so as to create a significant hazard to public health and no acceptable remedial measures are available to prevent the potential hazard.

Dated: June 16, 1988.
Lee M. Thomas, Administrator

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URL: http://www.epa.gov/region02/water/aquifer/coast/fr_coast.htm

Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey
(Source: USGS Water Quality Database)

USGS Well MW-24, Station Number 394014075060001, Camden, NJ - Gloucester County			
Parameter	Units	Concentration	Concentration
		8/22/2000	7/18/2005
Temperature	deg C	16	13.5
Barometric pressure	mm Hg	765	760
Specific conductance	ms/cm	245	200
Dissolved oxygen mg/L	mg/L	10.5	10.8
pH		4.5	5
Ammonia (filtered)	mg/L	<0.02	<0.04
Nitrite (filtered)	mg/L	<0.01	<0.008
Ammonia + Org. Nitrogen	mg/L	0.09	0.09
Nitrate + Nitrite	mg/L	10.9	8.74
Orthophosphate	mg/L	<0.01	<0.02
Organic carbon	mg/L	3.2	0.8
Hardness	mg/L as CaCO3	78	68
Calcium	mg/L	20.1	18.0
Magnesium	mg/L	6.56	5.59
Sodium	mg/L	1.85	1.75
Potassium	mg/L	3.01	2.90
Chloride	mg/L	16.2	11.2
Sulfate	mg/L	29.1	32.8
Fluoride	mg/L	<0.10	0.05
Silica	mg/L	8.2	7.3
Arsenic	mg/L	<0.9	0.2
Barium	mg/L	331	241
Boron	mg/L	12	13
Cadmium	mg/L	<1.00	0.36
Chromium	mg/L	0.8	1.0
Copper	mg/L	1.2	2.0
Iron	mg/L	7	5
Lead	mg/L	1.73	1.36
Manganese	mg/L	93.5	55.2
Nickel	mg/L	NA	2.83
Silver	mg/L	<1.0	<0.2
Thallium	mg/L	NA	0.04
Zinc	mg/L	1.4	1.0
Antimony	mg/L	NA	<0.20
Aluminum	mg/L	383	256
Selenium	mg/L	2.5	2.0
Gross beta radioactivity	pci/L	<4.0	NA
Propachlor	ug/L	<0.007	<0.025
Butylate	ug/L	<0.002	<0.004
Simazine	ug/L	<0.005	<0.005
Prometon	ug/L	<0.02	<0.01
2-Chloro-4-isopropylamino-6-amino-s-triazine	ug/L	0.093	0.030
Cyanazine	ug/L	<0.004	<0.018
Fonofos	ug/L	<0.003	<0.003
Alpha radioactivity	ug/L	6.2	NA
Bromodichloromethane	ug/L	<0.1	<0.1
Tetrachloromethane	ug/L	<0.2	<0.2
1,2-Dichloroethane	ug/L	<0.2	<0.2
Tribromomethane	ug/L	<0.2	<0.2
Dibromochloromethane	ug/L	<0.2	<0.2
Trichloromethane	ug/L	<0.1	<0.1
Toluene	ug/L	<0.1	<0.1
Benzene	ug/L	<0.1	<0.1
alpha-HCH	ug/L	<0.002	<0.005
Chlorobenzene	ug/L	<0.1	<0.1

Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey
(Source: USGS Water Quality Database)

USGS Well MW-24, Station Number 394014075060001, Camden, NJ - Gloucester County			
Parameter	Units	Concentration	Concentration
		8/22/2000	7/18/2005
Ethylbenzene	ug/L	<0.1	<0.1
Dichloromethane	ug/L	<0.2	<0.2
Tetrachloroethene	ug/L	<0.1	<0.1
Trichlorofluoromethane	ug/L	<0.2	<0.2
1,1-Dichloroethane	ug/L	<0.1	<0.1
1,1-Dichloroethene	ug/L	<0.1	<0.1
1,1,1-Trichloroethane	ug/L	<0.1	<0.1
1,2-Dichlorobenzene	ug/L	<0.1	<0.1
1,2-Dichloropropane	ug/L	<0.1	<0.1
trans-1,2-Dichloroethene	ug/L	<0.1	<0.1
1,3-Dichlorobenzene	ug/L	<0.1	<0.1
1,4-Dichlorobenzene	ug/L	<0.1	<0.1
p,p'-DDE	ug/L	<0.006	<0.003
Dichlorodifluoromethane	ug/L	<0.2	<0.2
Chlorpyrifos	ug/L	<0.004	<0.005
Vinyl chloride	ug/L	<0.2	<0.2
Trichloroethene	ug/L	<0.1	<0.1
Lindane	ug/L	<0.004	<0.004
Dieldrin	ug/L	0.013	<0.009
Metolachlor	ug/L	<0.002	<0.006
Malathion	ug/L	<0.005	<0.027
Parathion	ug/L	<0.004	<0.010
Diazinon	ug/L	<0.002	<0.005
Atrazine	ug/L	0.177	0.022
Alachlor	ug/L	0.013	<0.005
Acetochlor	ug/L	<0.002	<0.006
tert-Butyl ethyl ether	ug/L	<0.1	<0.1
Methyl tert-pentyl ether	ug/L	<0.2	<0.2
Turbidity	NTU	4.2	NA
Alpha radiactivity 72-hr, wat flt Th-230	pci/L	NA	4.6
Alpha radiactivity 30-d, wat flt Th-230	pci/L	NA	2.2
Beta radiactivity 72-hr, wat flt Cs-137	pci/L	NA	3.4
Beta radiactivity 30-d, wat flt Cs-137	pci/L	NA	3.7
Mercury	ug/L	<0.2	<0.010
Alpha radioactivity 2-sigma	ug/L	3.2	NA
Beta radioactivity 2-sigma	ug/L	4.1	NA
cis-1,2-Dichloroethene	ug/L	<0.1	<0.1
Styrene	ug/L	<0.1	<0.1
o-Xylene	ug/L	<0.1	<0.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	<0.1	<0.1
Methyl tert-butyl ether	ug/L	<0.2	<0.2
Diethyl ether	ug/L	<0.2	<0.2
Diisopropyl ether	ug/L	<0.2	<0.2
Sampling method	ug/L	4040	4040
Metribuzin	ug/L	<,0.004	,0.006
2,6-Diethylaniline	ug/L	<0.003	<0.006
Trifluralin	ug/L	<0.002	<0.009
Ethalfluralin	ug/L	<0.004	<0.009
Phorate	ug/L	<0.002	<0.011
Terbacil	ug/L	<0.007	<0.034
Linuron	ug/L	<0.002	<0.035
Methyl parathion	ug/L	<0.006	<0.015
EPTC	ug/L	<0.002	<0.004
Pebulate	ug/L	<0.004	<0.004
Tebuthiuron	ug/L	<0.01	<0.02

Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey
(Source: USGS Water Quality Database)

USGS Well MW-24, Station Number 394014075060001, Camden, NJ - Gloucester County			
Parameter	Units	Concentration	Concentration
		8/22/2000	7/18/2005
Molinate	ug/L	<0.004	<0.003
Ethoprop	ug/L	<0.003	<0.005
Benfluralin	ug/L	<0.002	<0.010
Carbofuran	ug/L	<0.003	<0.020
Terbufos	ug/L	<0.01	<0.02
Propyzamide	ug/L	<0.003	<0.004
Disulfoton	ug/L	<0.02	<0.02
Triallate	ug/L	<0.001	<0.006
Propanil	ug/L	<0.004	<0.011
Carbaryl	ug/L	<0.003	<0.041
Thiobencarb	ug/L	<0.002	<0.010
DCPA	ug/L	<0.002	<0.003
Pendimethalin	ug/L	<0.004	<0.022
Napropamide	ug/L	<0.003	<0.007
Propargite	ug/L	<0.01	<0.02
Azinphos-methyl	ug/L	<0.001	<0.050
cis-Permethrin	ug/L	<0.005	<0.006
m-Xylene plus p-xylene	ug/L	<0.2	<0.2
Specific conductance	ug/L	227	194
Acid neutralizing capacity	ug/L	<1	<5
Diazinon-d10	ug/L	104	101
alpha-HCH-d6	ug/L	85.5	97.8
1,2-Dichloroethane-d4, surrogate	ug/L	106	127
Toluene-d8, surrogate	ug/L	103	102
1-Bromo-4-fluorobenzene	ug/L	87.8	66.1

Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey
(Source: USGS Water Quality Database)

USGS Well QU02, Station Number 392920075011901, Vineland, NJ - Cumberland County										
Parameter	Units	Concentration								
		9/24/1996	9/24/1996	9/24/1996	9/24/1996	12/18/1996	12/18/1996	12/18/1996	9/13/1999	7/26/2004
Temperature	dec C						15.8	15.9	20	15.9
Barometric Pressure	mm Hg						756		763	765
Specific conductance	ms/cm						232	236	250	345
Dissolved Oxygen	mg/L						6.3	5.7	6	6.7
pH							4.4	4.5	4.4	4.3
Bicarbonate	mg/L						0			<1
Ammonia	mg/L						<0.01	<0.01	≤0.02	<0.04
Nitrite	mg/L						<0.010	0.01	≤.010	<0.008
Ammonia	mg/L						0.04	<0.20	0.10	0.06
Nitrate	mg/L						4.3	4.3	2.77	4.83
Phosphorus	mg/L						<0.01			
Orthophosphate	mg/L						<0.01	<0.01	<0.01	<0.02
Organic Carbon	mg/L						0.9	0.9	0.9	1.0
Calcium	mg/L						8.5	8.6	10.1	5.86
Magnesium	mg/L						3.4	3.6	4.21	4.83
Sodium	mg/L						25	23	23.5	38.8
Potassium	mg/L						3	2.9	3.89	2.77
Chloride	mg/L						26		43.2	76.5
Sulfate	mg/L						38		27.0	8.36
Fluoride	mg/L						<0.1		<0.010	<0.17
Silica	mg/L						4.9	5.00	6.0	7.2
Arsenic	ug/L							<1	<1	<0.2
Barium,	ug/L							82	116	372
Beryllium	ug/L							<1.00		0.23
Boron	ug/L							44		29
Cadmium	ug/L							<1.00	<1.0	0.31
Chromium	ug/L							2	<1.0	<0.8
Cobalt	ug/L							4		
Copper	ug/L							<1.0	1.5	1.3
Iron	ug/L						23	4	<10	<6
Lead	ug/L							<1.00	<1	0.46
Manganese	ug/L						30	30	36.8	47.1
Molybdenum	ug/L							<1.0		
Nickel	ug/L							3.0		5.43
Silver	ug/L							<1.0	<1.0	<0.2
Strontium	ug/L							23		
Zinc	ug/L							6	23	9.3
Antimony	ug/L							<1.00		<0.2
Aluminum	ug/L							315	470	446
Selenium	ug/L								1	1.3
Gross beta	pCi/L								25.6	
Propachlor	ug/L						<0.007		<0.007	<0.025
Butylate	ug/L						<0.002		<0.002	<0.004
Bromacil	ug/L						<0.04			
Simazine	ug/L						Est.<0.004		<0.005	<0.005
Prometon	ug/L						<0.02		<0.02	<0.01
CIAT	ug/L						<0.002		<0.002	<0.006
Cyanazine	ug/L						<0.004		<0.004	<0.018
Fonofos	ug/L						<0.003		<0.003	<0.003
Gross Alpha	pCi/L								35.4	
Ra-226,	pCi/L							0.42		
Uranium	ug/L							<1.00		
Dibromomethane	ug/L					<0.10				
Bromodichloromethane	ug/L					<0.10			<0.1	<0.1
Tetrachloromethane	ug/L					<0.05			<0.2	<0.2
1,2-Dichloroethane	ug/L					<1			<0.2	<0.2
Tribromomethane	ug/L					<0.20			<0.2	<0.2

Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey
(Source: USGS Water Quality Database)

USGS Well OU02, Station Number 392920075011901, Vineland, NJ - Cumberland County

Parameter	Units	Concentration								
		9/24/1996	9/24/1996	9/24/1996	9/24/1996	12/18/1996	12/18/1996	12/18/1996	9/13/1999	7/26/2004
Dibromochlormethane	ug/L					<0.1			<0.2	<0.2
Trichloromethane	ug/L					Est.<).04			<0.1	0.1
Toluene	ug/L					<0.05			<0.1	<0.1
Benzene	ug/L					<0.05			<0.1	<0.1
Acrolien	ug/L					<2				
Acrylonitrile	ug/L					<2				
Alpha-HCH	ug/L						<0.002		<0.002	<0.005
Chlorobenzene	ug/L					<0.05			<0.1	<0.1
Chloroethane	ug/L					<0.1				
Ethylbenzene	ug/L					<0.05			<0.1	<0.1
Hexachloroethane	ug/L					<0.1				
Bromomethane	ug/L					<0.1				
Chloromethane	ug/L					<0.2				
Dichloromethane	ug/L					<0.1			<0.2	<0.2
Tetrachloroethene	ug/L					<0.1			<0.1	<0.1
Trichlorofluoromethane	ug/L					<0.10			<0.2	<0.2
1,1-Dichloroethane	ug/L					<0.05			<0.1	<0.1
1,1-Dichloroethene	ug/L					<0.10			<0.1	<0.1
1,1,1-Trichloroethane	ug/L					<0.05			<0.1	<0.1
1,1,2-Tetrachloroethane	ug/L					<0.10				
1,1,2,2-Tetrachloroethane	ug/L					<0.10				
1,2-Dichlorobenzene	ug/L					<0.05			<0.1	<0.1
1,2-Dichloropropane	ug/L					<0.05			<0.1	<0.1
1,2-Dichloroethene	ug/L					<0.05			<0.1	<0.1
1,2,4-Trichlorobenzene	ug/L					<0.2				
1,3-Dichlorobenzene	ug/L					<0.05			<0.1	<0.1
1,4-Dichlorobenzene	ug/L					<0.05			<0.1	<0.1
p,p'-DDE,	ug/L						<0.006		<0.006	<0.003
Dichlorodofluoromethane	ug/L					<0.2			<0.2	<0.2
Naphthalene,	ug/L					<0.2				
trans-1,3-Dichloropropene	ug/L					<0.10				
cis-1,3-Dichloropropene	ug/L					<0.10				
Dicamba	ug/L						<0.04			
Linuron	ug/L						<0.02			
MCPA	ug/L						<0.05			
MCPB	ug/L						<0.04			
Methiocarb	ug/L						<0.03			
Propoxur	ug/L						<0.04			
Bentazon	ug/L						<0.01			
2,4-DB	ug/L						<0.04			
Fluometuron	ug/L						<0.04			
Oxamyl	ug/L						<0.02			
Chlorpyrifos	ug/L						<0.004		<0.004	<0.005
Vinyl Chloride	ug/L					<0.1			<0.2	<0.2
Trichloroethene	ug/L					<0.05			<0.1	<0.1
Aldrin	ug/L						<0.01			
Lindane	ug/L						<0.004		<0.004	<0.004
Chlordane	ug/L						<0.1			
p,p'-DDD	ug/L						<0.01			
p,p'-DDE	ug/L						<0.01			
p,p'-DDT	ug/L						<0.01			
Dieldrin	ug/L						0.06		0.108	<0.009
Endrin	ug/L						<0.01			
Toxaphene	ug/L						<1			
Heptachlor	ug/L						<0.01			
Metolachlor	ug/L						<0.002		<0.002	0.012
Heptachlorepoxide	ug/L						<0.01			

Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey
(Source: USGS Water Quality Database)

USGS Well OU02, Station Number 392920075011901, Vineland, NJ - Cumberland County										
Parameter	Units	Concentration								
		9/24/1996	9/24/1996	9/24/1996	9/24/1996	12/18/1996	12/18/1996	12/18/1996	9/13/1999	7/26/2004
PCBs	ug/L						<0.1			
Malathion	ug/L						<0.005		<0.005	<0.027
Parathion	ug/L						<0.004		<0.004	<0.010
Diazinon	ug/L						<0.002		<0.002	<0.005
Atrazine	ug/L						<0.001		<0.004	<0.007
Hexachlorobutadiene	ug/L					<0.2				
Picloram	ug/L						<0.01			
2,4-D	ug/L						<0.01			
2,4-D	ug/L						<0.04			
2,4,5-T	ug/L						<0.01			
2,4,5-T	ug/L						<0.04			
Mirex	ug/L						<0.01			
Silvex	ug/L						<0.01			
Silvex	ug/L						<0.02			
Alachlor	ug/L						<0.002		<0.002	<0.005
Triclopyr	ug/L						<0.05			
Propham	ug/L						<0.04			
Acetochlor	ug/L						<0.002		<0.002	<0.006
Picloram	ug/L						<0.05			
Oryzalin	ug/L						<0.02			
Norflurazon	ug/L						<0.02			
Neburon	ug/L						<0.02			
1-Naphthol	ug/L						<0.01			
Methomyl	ug/L						<0.02			
Fenuron	ug/L						<0.01			
Esfenvalerate	ug/L						<0.02			
2Methyl4,6dinitrophenol	ug/L						<0.04			
Diuron	ug/L						<0.02			
Dinoseb	ug/L						<0.04			
Dichlorprop	ug/L						<0.03			
Dichlobenil	ug/L						<0.02			
Dacthalmonoacid	ug/L						<0.02			
Clopyralid	ug/L						<0.05			
Chlorothalonil	ug/L						<0.04			
Hydroxycarbofuran	ug/L						<0.01			
Carbofuron	ug/L						<0.03			
Carbaryl	ug/L						≤.008			
Bromoxynil	ug/L						<0.04			
Aldicarb	ug/L						<0.02			
Aldicarb sulfone	ug/L						<0.02			
Aldicarbsulfoxide	ug/L						<0.02			
Acifluorfen	ug/L						<0.04			
Methylacrylate	ug/L					<2				
Tetramethylbenzene	ug/L					<0.1				
1,2,3,5-Tetramethylbenzene	ug/L					<0.1				
Bromoethene	ug/L					<0.1				
t-Butylethylether	ug/L					<0.10			<0.1	<0.1
Methyltertpentylether	ug/L					<0.1			<0.2	0.7
Turbidity	NTU							0.2	4.1	0.3
Chlorambenmethylester	ug/L						<0.01			
Alpha radiactivity 72-hr,Th-230	pCi/L									49
Alpha radiactivity 30-d,Th-230	pCi/L									7.5
Beta radiactivity 72-hr,Cs-137	pCi/L									26
Beta radiactivity 30-d,Cs-137	pCi/L									18
Solids	mm	0.6	0.5	0.4	0.4					
Solids	mm	1.4	1.5	1.1	0.9					
Solids,	mm	2.4	3.1	2	1.4					
Bromide	mg/L						0.08			
Mercury	ug/L							0.2	<0.1	0.632
trans-1,4-Dichlorobutene	ug/L					<5.0				
Ethylmethacrylate	ug/L					<1.0				

Regional Ground Water Quality: Gloucester and Cumberland Counties, New Jersey
(Source: USGS Water Quality Database)

USGS Well OU02 Station Number 392920075011901 Vineland, NJ - Cumberland County										
Parameter	Units	Concentration								
		9/24/1996	9/24/1996	9/24/1996	9/24/1996	12/18/1996	12/18/1996	12/18/1996	9/13/1999	7/26/2004
Alpha radioactivity	pCi/L								6.8	
Beta radioactivity	pCi/L								5.3	
Ra-228	pCi/L							1.4		
Ra-226	pCi/L							0.07		
Rn-222	pCi/L							36		
Carbon disulfide	ug/L					<0.05				
Vinyl acetate	ug/L					<5				
cis-1,2-Dichloroethene	ug/L					<0.05			<0.1	<0.1
Methyl n-butylketone	ug/L					<5.0				
Styrene	ug/L					<0.05			<0.1	<0.1
Xylene	ug/L					<0.05			<0.1	<0.1
1,1-Dichloropropene	ug/L					<0.05				
2,2-Dichloropropane	ug/L					<0.05				
1,3-Dichloropropane	ug/L					<0.1				
Ethyltoluene	ug/L					<0.05				
1,2,3-Trimethylbenzene	ug/L					<0.1				
1,2,4-Trimethylbenzene	ug/L					<0.05				
Isopropylbenzene	ug/L					<0.05				
n-propylbenzene	ug/L					<0.05				
1,3,5-Trimethylbenzene	ug/L					<0.05				
2-Clorotoluene	ug/L					<0.05				
4-Chlorotoluene	ug/L					<0.05				
Bromochloromethane	ug/L					<0.10				
n-Butylbenzene	ug/L					<0.1				
sec-Butylbenzene	ug/L					<0.05				
tert-Butylbenzene	ug/L					<0.05				
4-Isopropyltoluene	ug/L					<0.05				
1,2,3-Trichloropropane	ug/L					<0.2				
1,1,1,2-Tetrachloroethane	ug/L					<0.05				
1,2,3-Trichlorobenzene	ug/L					<0.2				
1,2-Dibromoethane	ug/L					<0.1				
CFC-113	ug/L					<0.05			<0.1	<0.1
Methyl-t-butylether	ug/L					0.3			0.4	30.5
Chloropropene	ug/L					<0.1				
Isobutylmethylketone	ug/L					<5.0				
Ra-228	pCi/L							6		
Acetone	ug/L					<5				
Bromobenzene	ug/L					<0.05				
Di-ethylether	ug/L					<0.1			<0.2	<0.2
Diisopropylether	ug/L								<0.2	<0.2
Methylacrylonitrile	ug/L					<2.0				
Ethylmethylketone	ug/L					<5				
Methylmethacrylate	ug/L					<1.0				
Tetrahydrofuran	ug/L					<5				
Dicamba	ug/L						<0.01			
Dichlorprop	ug/L						<0.01			
Rn-222	pCi/L							300		
p,p'-Ethyl-DDD	ug/L						<0.1			
p,p'-Methoxychlor	ug/L						<0.01			
alpha-Endosulfan	ug/L						<0.01			
PCNs	ug/L						<0.1			
Dibromochloropropane	ug/L					<0.5				
Metribuzin	ug/L						<0.004		<0.004	<0.006
2,6-Di-ethylaniline	ug/L						<0.003		<0.003	<0.006
Trifluralin	ug/L						<0.002		<0.002	<0.009

APPENDIX I - LOCAL HYDROGEOLOGIC DATA

APPENDIX I - LOCAL HYDROGEOLOGIC DATA

Table I-1

Summary of Large Capacity Well Search Results

Shieldalloy Metallurgical Corporation

Number	Owner's Name	Permit Number	Local Identification	Latitude	Longitude	Distance / Direction (miles) / (Compass)	Well Depth (feet)	Pump Capacity (gpm)	Withdrawal Rate (gpd)
2237P	Shieldalloy Metalurgical Corp.	3119648	W9	393224	750120	0.30/SW	130	100	70000
2237P	Shieldalloy Metalurgical Corp.	3105842	Layne	393224	750123	0.33/SW	47	100	30000
2237P	Shieldalloy Metalurgical Corp.	3128710	RW6S	393220	750128	0.43/SW	75	100	135000
2237P	Shieldalloy Metalurgical Corp.	3128711	RW6D	393220	750128	0.43/SW	125	100	130000
2237P	Shieldalloy Metalurgical Corp.	3128712	RIW2	393213	750143	0.69/SW	75	200	220000
5147	Newfield Borough Water Dept	3104559	3	393254	750121	0.54/NW	162	400	265000
5147	Newfield Borough Water Dept	5100046	5	393246	750031	0.59/NE	140	500	335000
CU0029	Sepers Nursery	5500158	Well 5	393232	750157	0.84/W	85	300	108000
CU0129	Petronglo Farms, Inc.	3121627	Well 6	393213	750146	0.73/SW	100	350	126000
CU105R	Lopergolo, Mike	3500032	Well 1	393147	750143	0.89/SW	129	90	21,600*
GL0048	Pine Grove Camp, Inc.	3503230	Well 1	393148	750145	0.91/SW	100	500	180000
GL0182	Leshay Farms, Samuel	3104823	Well 2	393243	750132	0.59/NW	130	1000	360000
GL0182	Leshay Farms, Samuel	5100392	Well 1	393253	750045	0.49/N	104	1000	360000
	Leshay Farms, Samuel**	3122330	Well 3	393241	750035	0.43/NE	130		
	Leshay Farms, Samuel**	3158063	Well 4	393233	750128	0.45/NW	100		
	Leshay Farms, Samuel**	3163314	Well 5	393238	750059	0.20/N	109		
	Leshay Farms, Samuel**	3106890	Well 6	393239	750102	0.22/NW	100		

Notes:

Source: NJDEP - Water Supply Element, Bureau of Water Allocation; Large Capacity (100,000 GPD) Well Search Within 5 Miles of Site Focus; Performed on 3/17/00

Number field indicates either a Water Allocation Permit, Agricultural Certification, or Registration Number

Distance field indicates the distance in miles between the well current slag pile.

Direction field indicates compass direction from the search focus.

Withdrawal rate for Shieldallow Metalurgical Corp. wells based on ground water remediation system operation records

Withdrawal rates for Newfield Borough Water Dept wells based on reports by Mr. Jack Harris, Water Department Superintendant, Borough of Newfield

* Maximum pumping rate from well permit

** Information provided to TRC by NJDEP July 26, 2004

Table I-2

Summary of Well Search Results - Lower Capacity Wells[1]

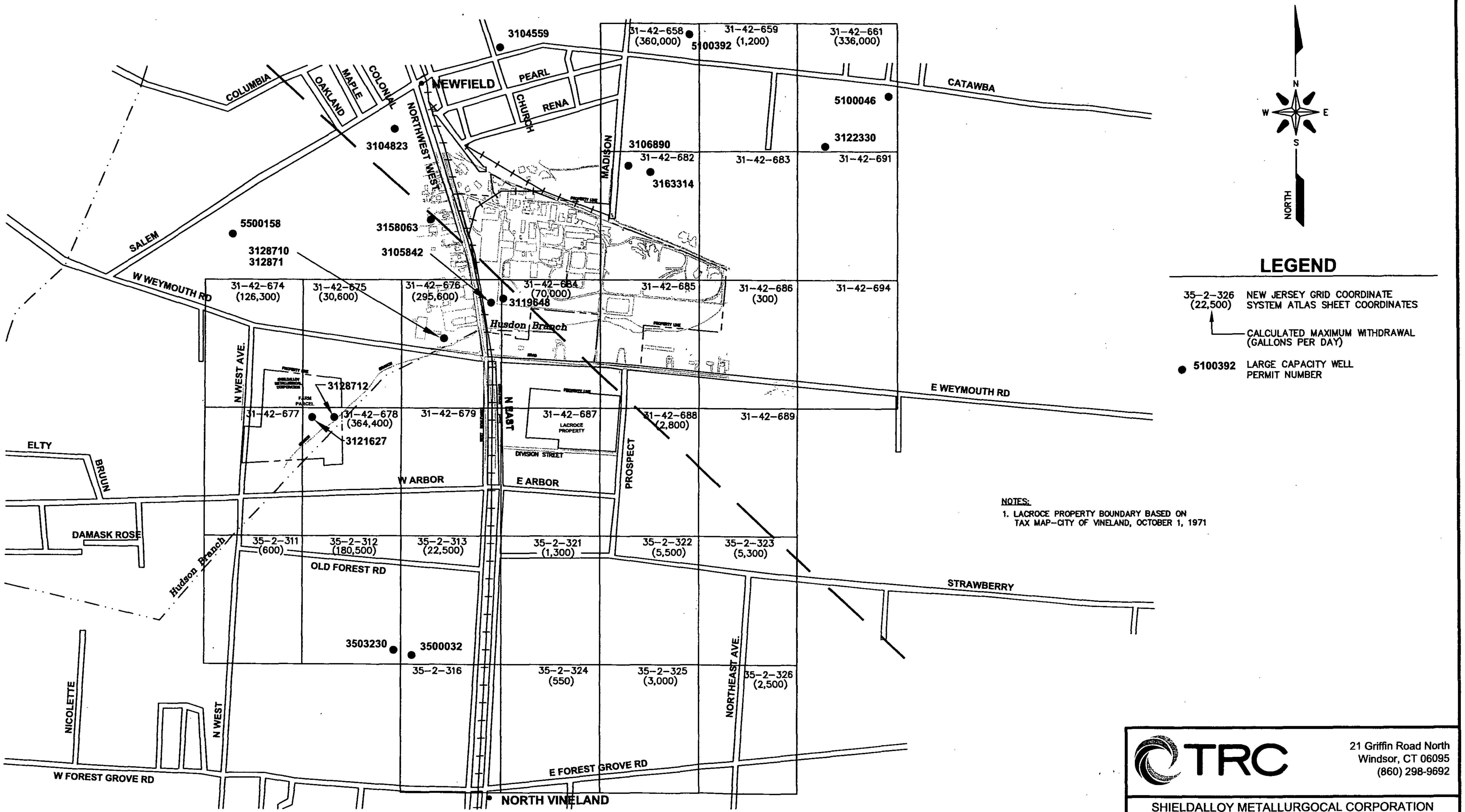
Shieldalloy Metallurgical Corporation

Permit Number	Install Date	Well Owner	Owner's Address	Well Location Address	Atlas Sheet Coordinates	Well Location Lot/Block	Screen Diameter	Screened Interval (FBG)	Average Withdrawal (GPD)	Maximum Pumping Rate (GPD)	Specific Capacity (GPM/FT)	Pump Capacity (GPM)	Well Usage
Sheet 31													
31-6890	4/18/1973	Leshay Bros.	Newfield	Catawba Ave	31 42 658		6	70-100			50		Irrigation
31-31860	8/29/1989	Sam Le Shay	Catawba Ave., Newfield	Same	31 42 659	17/24	4	75-85			1.58		Domestic
31-31859	8/29/1989	Sam Le Shay	Catawba Ave., Newfield	Same	31 42 659	18a/24	4	80-90			1.58		Domestic
31-20606	3/20/1984	D&M Builders	596 Clayton Rd., Franklin Twp.		31 42 661	3c/519	2	55-59	500	500		9	Domestic
31-20755	7/20/1984	D&M Builders	596 Clayton Rd., Franklin Twp.		31 42 661	3d/519	2	54-58	500	500		9	Domestic
31-21627	6/12/1984	Carman Petronglo	5014 N. Delsea Drive, Vineland		31 42 674	13/83	5	40-60				350*	Irrigation
31-28468	5/20/1989	Sol Finkelstein	882 S. Spring Rd, Vineland		31 42 674	1.05/43	2	145-150	150	300		10	Domestic
31-19465	9/18/1982	James Bringer	555 E. Elm Rd., Vineland		31 42 675	3/968	4	75-85				15	Domestic
31-143	5/15/1950	Gus Hauser	Weymouth Rd., Newfield		31 42 675		4	140-150		30,000	2.5	NI	Irrigation
31-49153	4/27/1996	Eugene Magliocco	756 Strawberry Ave., Vineland	Same	31 42 676	4/6901	4	90-100				12	Domestic
31-19723	4/5/1983	Petronglo Farms	5014 N. Delsea Drive, Newfield		31 42 678	10/83	6	42-62					Irrigation
31-9125	8/14/1975	J. Ruberto	605 W. Arbor Ave., Vineland	Arbor Ave/West Ave	31 42 678		2	51-61	300	400		50	Domestic
31-23513	9/12/1985	Bruce Wean	R.D. 1 Box 511 W. Garden Rd.	Pottsgrove Twp.	31 42 678	46/67	3	62-72				50	Irrigation
31-6092	11/3/1969	Borough of Newfield	Borough Hall, Newfield	Main St., Newfield	31 42 685		10	129-149			21.91	500	Public Supply
31-13812	6/13/1978	Krykory Torgover	Weymouth Rd., Vineland	Same	31 42 686	6b/581	2	53-58	200	300			Domestic
31-21871	9/1/1984	Newlin Caudill	Aura Willow Grove Rd.	Weymouth Rd.	31 42 688		4	90-100	500	600		12	Domestic
31-21871	9/26/1984	Newlin Caudill	Aura Willow Grove Rd.	Weymouth Rd.	31 42 688	6c/581	4	80-90	500	600		16	Domestic
31-19468	9/27/1982	Richard Krason	3151 North East Ave., Vineland	East Avenue	31 42 688		3	70-80				15	Domestic
31-1066	7/10//53	Louis Pelts	Prospect Ave., Vineland	Same	31 42 688		4	45-51	500	600		10	Domestic and Poultry
31-1133	9/12/1953	Alfred Osterman	Arbor Ave., Vineland	Same	31 42 688		4	65-71	300	400	5.5	10	Domestic
Sheet 35													
35-12130	7/15/1991	Frank Marchisella	3183 N. East Blvd, Vineland	Same	35 02 311	12/114	4	90-100				11	Domestic
35-2734	1/1982	Gene Brenner	Arbor Ave, Vineland	Same	35 02 312		2	65-70	200	500		12	Domestic
35-3230	4/12/1982	Joseph Petronglo Jr.	4724 N. Delsea Dr.	West Ave	35 02 312		3	34-64				500*	Irrigation
35-32	7/12/1950	Frank Russo	West Blvd, N. Vineland	Same	35 02 313		4	99-129		21600	8.25	90	Irrigation
35-4248	7/1/1984	Bob Carpenter	168 Arbor Ave., Vineland	Same	35 02 313	8/83	2	90-95				10	Domestic
35-75	3/5/1952	Joseph Girardi	E. Blvd & Strawberry Ave., Vineland	Same	35 02 313		4	25.5-31.5	300	300		8	Domestic
35-14281	8/16/1993	John Ruggiano	311 Baylor Ave., Vineland	Strawberry Ave.	35 02 321	24.03/114	4	80-90					Return
35-1653	5/10/1978	Ronald Jacobson	181 Strawberry Ave		35 02 321		3	84-94	200	400			Domestic
35-18262	12/14/1997	W. Serad	745 Strawberry Ave.	Same	35 02 321	67/7004	4	90-100				12	Domestic
35-5352	2/24/1986	Leo Palmonai	3127 N.E. Blvd		35 02 321	10/114	4	80-90	150	300			Domestic
35-11946	5/16/1991	Richard Bruno	3120 N. East Ave., Vineland	Same	35 02 322	28/114	4	95-105	400	600		25	Domestic
35-12625	1/7/1992	Richard Lorenzini	3181 N. East Ave., Vineland	Same	35 02 322	20/121	4	90-100	400	600		10	Domestic
35-13775	8/16/1993	John & Margaret Ruggiano	311 Baylor Ave., Vineland	Strawberry Ave.	35 02 322	24.03/114	4	85-95				25	Domestic
35-14414	9/27/94	Richard Linn	1069 Linda Lane, Vineland	Strawberry Ave.	35 02 322	24.02/114	4	108-118	500	750		20	Domestic
35-14783	4/11/1995	Wells Cornell	1022 Holmes Ave, Vineland	Strawberry Ave.	35 02 322	24.03/114	4	73-83	500	1800	2.08		Domestic
35-15257	9/27/1994	Richard Linn	1019 Linda Lane, Vineland	Strawberry Ave.	35 02 322	24.02/114	4	100-110					Heat Pump Discharge
35-3132	2/2/1982	Daniel S. Falasca	Box 127 Morris Ave.	Strawberry Ave.	35 02 322		3	69-79				15	Domestic
35-3133	2/2/1982	Daniel S. Falasca	Box 127 Morris Ave.	Strawberry Ave.	35 02 322		3	69-79				15	Domestic
35-06267	5/15/1987	KDR Contractors	PO Box 2370, Vineland		35 02 323	32.01/114	2	84-90	500	600		10	Domestic
35-10153	1/24/1990	James Schrier	560 E. Forest Grove Rd.	Same	35 02 323	11/121	4	115-130				15	Domestic
35-12597	11/13/1992	Phil Schreiber	935 Magnolia Rd	N. E. Ave	35 02 323	32/114	4	80-90				25	Domestic
35-12842	3/21/1992	Louis Dalesandro	3005 N. East Ave., Vineland	Same	35 02 323	15/121	4	58-68	500	1800		12	Domestic
35-13276	8/28/1992	Charles Schaser	3176 N. East Ave., Vineland	Same	35 02 323		4	110-120	400	600		20	Domestic
35-3611	3/17/1983	Charles R. Johnson	741 Strawberry Ave.		35 02 323	1B/583	2	120-127					Domestic
35-4916	9/14/1985	Robert Petronglo	2060 Weymouth Rd.		35 02 323	1/46	4	125-135	200	500		25	Domestic
35-08272	2/16/1989	Garden Homes	N. Delsea Dr. / Garden Rd.	Forest Grove Rd.	35 02 324	32.02/114	4	73-83	150	150	1.1	11	Domestic
35-13626	12/23/1992	Mary H. Gamba	3095 North East Blvd. Vineland	Same	35 02 324	9/114	2	88-98	300	400	7.8	10	Domestic
35-05892	5/20/1987	Daniel McDermott	2668 Division St, Vineland	Same	35 02 325	34/114	2	78-85					Domestic
35-14509	12/17/1993	Philo & Maxine Chapman	2388 N. East Ave	Same	35 02 325	5/127	4	80-90	400	600		15	Domestic
35-15381	10/31/1994	Mary C. Meyer-Bowen	855 E. Forest Grove Rd., Vineland	Same	35 02 325	4/128	4	86-96	400	600		10	Domestic
35-17000	6/21/1996	Audrey McDermott	330 Grove Road, Vineland	Same	35 02 325	35/114	4	73-83				20	Domestic
35-17367	1/20/1997	Edward & Bridget Conrow	311 Central Ave, Vineland	Forest Grove Rd.	35 02 325	1/124	4	90-100				25	Domestic
35-15575	1/20/1995	Steven Gatier	267 E. Forest Grove Rd.	Same	35 02 326	6/123	4	75-85	300	400		8	Domestic
35-02260	4/1/1981	Richard McDermott	Division Street		35 02 326		2	71-76	200	500		18	Domestic
35-3929	11/15/1984	William Sirawatka			35 02 326	9.10/121	2	72-79				NI	Domestic
35-07901	7/2/1988	Lottie Reed Jones	304 E. Forest Grove Rd.	Same	35 02 326	36/114	4	90-100	500	750		11	Domestic

[1] Source: NJDEP - Water Supply Element, Bureau of Water Allocation; Well Permit Search Within 1 Mile of Site Focus; Performed March 2000

NI - Pump not installed

* - Pump capacity reported in Large Capacity Well Search



LEGEND

35-2-326 (22,500) NEW JERSEY GRID COORDINATE SYSTEM ATLAS SHEET COORDINATES

CALCULATED MAXIMUM WITHDRAWAL (GALLONS PER DAY)

● 5100392 LARGE CAPACITY WELL PERMIT NUMBER

NOTES:

1. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971

0 1,000' 2,000'

GRAPHIC SCALE

TRC

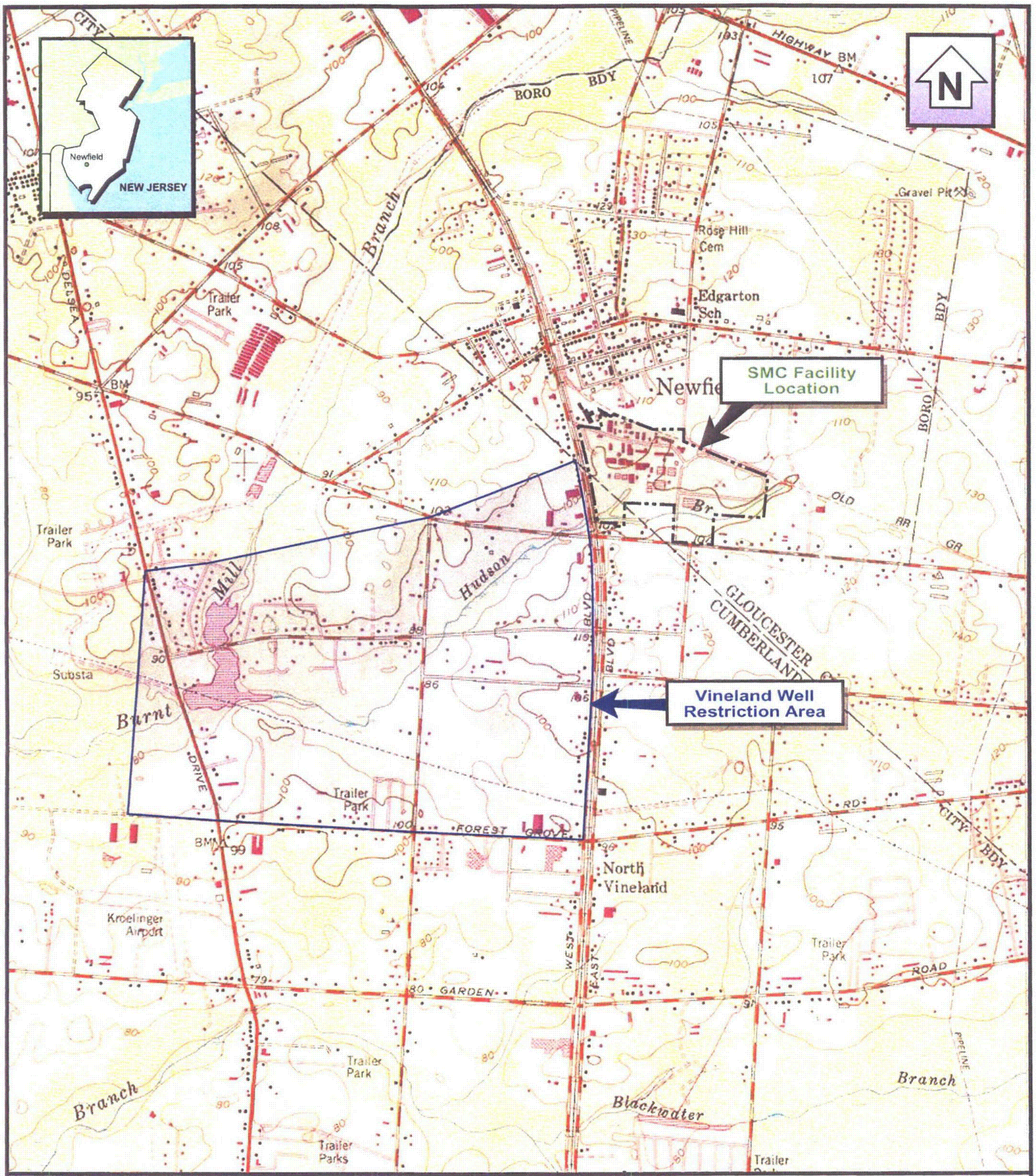
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGOCAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-1
LOCATION OF HIGH-CAPACITY WATER SUPPLY WELLS

Date: 06/09 | Project No. 105106.000100.000000

J:\CAD\105106\000100\Decommisioning Plan Environmental Report\
Figure I-1.dwg Layout:FIGURE I-1 July 13, 2009-2:12PM khollenbeck



0 2000
SCALE FEET

0 1
SCALE 1:24000 MILE

BASE CREATED WITH TOPO™ © 1996 WILDFLOWERS PRODUCTIONS, www.topo.com
7.5' USGS TOPOGRAPHIC MAP

PERS/JW/HAZ/105106 SMC/Fig I-2 WELL RESTRICTION.fh10

TRC

21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-2
LOCATION OF VINELAND WELL RESTRICTION AREA

Date: 07/09 **Project No.** 105106.000100.0000

CITY OF VINELAND
WATER-SEWER UTILITY

FACSIMILE COVER SHEET

DATE: 6-3-91 FAX NO: 697-9025

TO: Shield Alloy

ATTENTION: Mr. Jim Valente

FROM: Paul Horner

TOTAL NUMBER OF SHEETS INCLUDING COVER SHEET: 02

COMMENTS: Description of Well Restrictions
Area in North Vineland

FAX # 609-794-6181

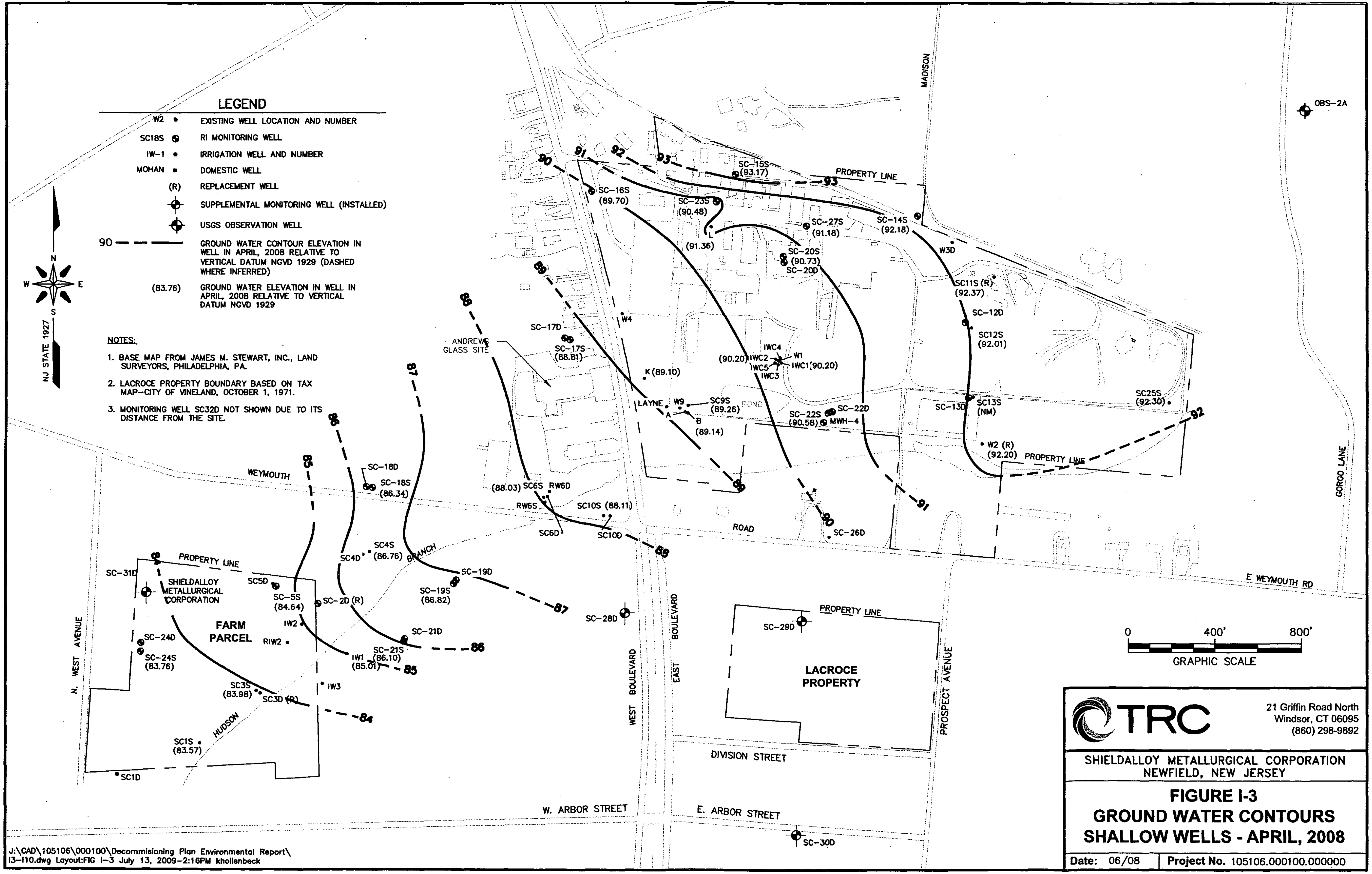
TEL # 609-794-4056

WHEREAS, the State legislature has provided, in N.J.S. 40:63-52, et seq., for local ordinances requiring mandatory connection with water systems, and the State of New Jersey, Department of Environmental Protection, has ordered mandatory sealing of wells in accordance with N.J.S.A. 58:4A-4.1 et seq., and N.J.S.A. 58:12A-1 et seq.;

NOW, THEREFORE, BE IT ORDAINED by the City Council of the City of Vineland, County of Cumberland, and State of New Jersey, as follows:

1. All buildings located upon a street in which the public water supply main is constructed in the area designated by the State of New Jersey, Department of Environmental Protection, identified in Section 2 of this Ordinance, shall be connected with the public water supply main, and the private water supply well shall be permanently sealed.

2. All private water supply wells in the following area shall be sealed pursuant to mandatory order issued by the State Department of Environmental Protection, and the City of Vineland shall contract therefor upon connection of all properties to the Municipal Water Utility's distribution mains in said area: N. West Avenue, from Weymouth Road to Forest Grove Road; W. Arbor Avenue, from N.J. Route No. 47 (Delsea Drive) to N. West Boulevard; Old Forest Road, from N. West Avenue to N. West Boulevard; W. Forest Grove Road, from 1,225 feet west of N.J. Route No. 47 (Delsea Drive) to N. West Boulevard; N.J. Route No. 47, from W. Forest Grove Road to 1,200 feet north of W. Arbor Avenue; N. West Boulevard, from W. Forest Grove Road to City Limit; W. Weymouth Road, from 210 feet west of N. West Avenue to N. West Boulevard; Gerow Avenue, from W. Arbor Avenue to Elty Avenue; Elty Avenue, from Gerow Avenue to Braun Avenue; Braun Avenue, from Elty Avenue to W. Arbor Avenue; Burnt Mill Road, from W. Arbor Avenue to Regina Elena Avenue; Temm Court, from Burnt Mill Drive to cul-de-sac; Regina Elena Avenue, from Burnt Mill Drive to easterly terminus.



LEGEND

W2 ●	EXISTING WELL LOCATION AND NUMBER
SC18S ⊛	RI MONITORING WELL
IW-1 ●	IRRIGATION WELL AND NUMBER
MOHAN ▪	DOMESTIC WELL
(R)	REPLACEMENT WELL
⊕	SUPPLEMENTAL MONITORING WELL (INSTALLED)
⊕	USGS OBSERVATION WELL
90 — — —	GROUND WATER CONTOUR ELEVATION IN WELL IN APRIL, 2008 RELATIVE TO VERTICAL DATUM NGVD 1929 (DASHED WHERE INFERRED)
(83.76)	GROUND WATER ELEVATION IN WELL IN APRIL, 2008 RELATIVE TO VERTICAL DATUM NGVD 1929

NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

TRC
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-3
GROUND WATER CONTOURS
SHALLOW WELLS - APRIL, 2008

Date: 06/08 **Project No.** 105106.000100.000000

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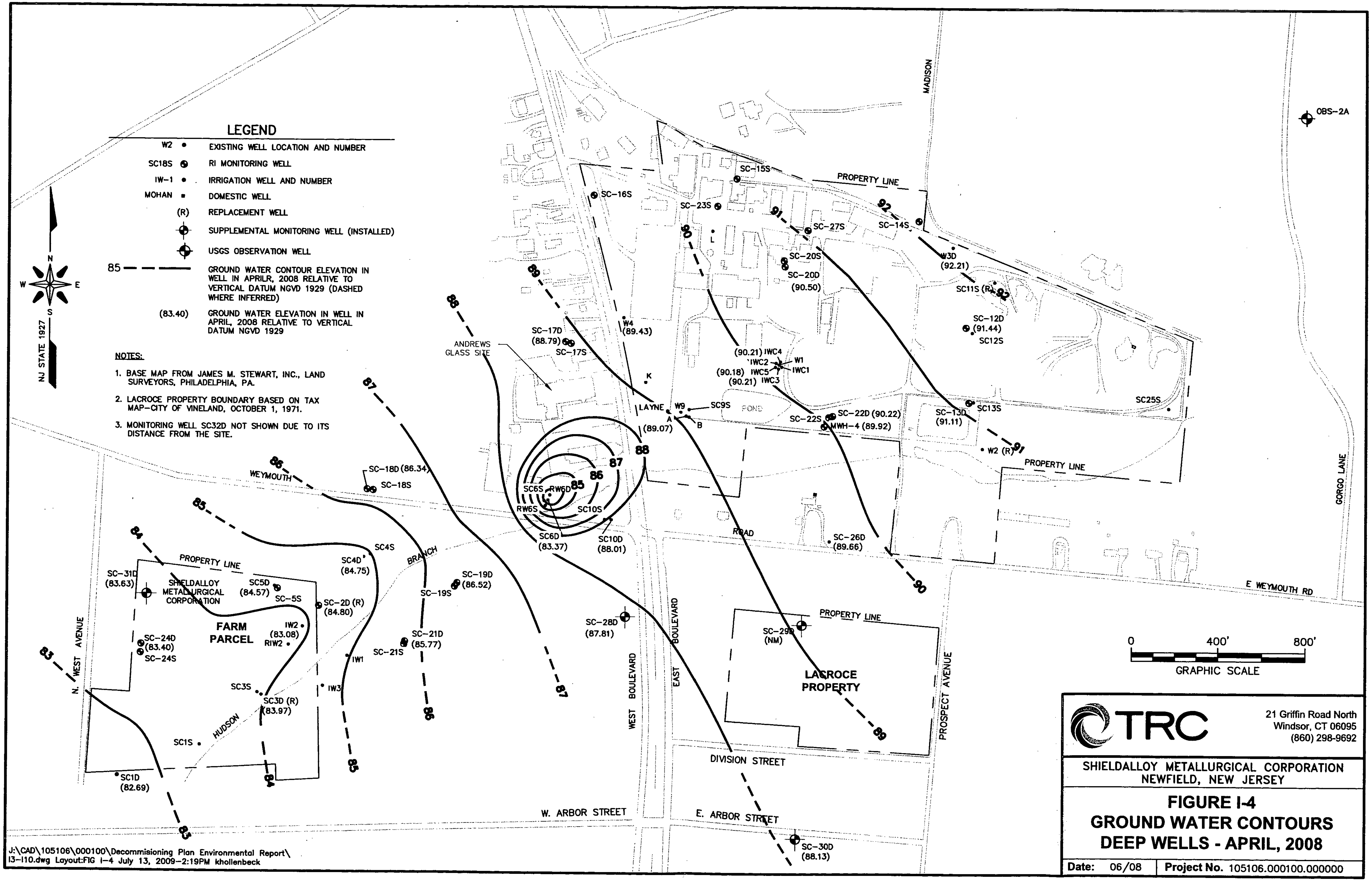
I3-I10.dwg Layout:FIG I-3 July 13, 2009-2:16PM khollenbeck



NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

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21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-4
GROUND WATER CONTOURS DEEP WELLS - APRIL, 2008

Date: 06/08 | Project No. 105106.000100.000000

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13-I10.dwg Layout:FIG I-4 July 13, 2009-2:19PM khollenbeck

TABLE I-3
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ
GROUND WATER ANALYTICAL RESULTS
ON-SITE WELLS
OCTOBER 2008

WELL NUMBER	A	B	K	L	IWC2	IWC5	SC9S	SC11S(R)	SC12S	SC32S$^{(1)}$	SC12D	SC13S [R]	SC13D	SC14S	SC22S	MWH-4	MWH-10$^{(2)}$	SC-23S	SC25S	W2(R)	W3(D)	SC20D	SC20S	LAYNE	W9	INFLUENT	EFFLUENT	TB102308A	TB102208	TB102308	FB102208
LAB ID	J51820-1	J51604-3	J51831-3	J51831-2	J51573-11	J51604-1	J51604-2	J51573-3	J51573-4	J51573-5	J51573-6	J51573-8	J51573-9	J51573-2	J51573-10	J51693-1	J51693-2	J51831-1	J51573-1	J51573-7				J51820-3	J51820-2	J51820-4	J51820-5				
SAMPLE DATE	07/10/08	07/10/08	07/10/08	07/10/08	07/10/08	07/10/08	07/09/08	07/09/08	07/09/08	07/09/08	07/09/08	07/09/08	07/09/08	07/09/08	07/10/08	07/10/08	07/10/08	07/10/08	01/16/07	07/09/08	07/09/08	07/09/08	07/09/08	07/10/08	01/17/07	07/10/08	07/10/08	10/23/08	10/22/08	10/23/08	10/22/08
SCREENED INTERVAL (FT)	114-124	36-46	36-46	42-52	35-40	95-100	15-30	9-24	15-25	15-25	126-136	14.7-24.7	127-137	12-27	3-18	119-129	119-129	9-24	7-22	2-17				42-47	110-130						
PARAMETER																															
VOCs (ug/L)																															
Acrolein	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Acrylonitrile	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Benzene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Bromodichloromethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Bromoform	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Bromomethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Carbon tetrachloride	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Chlorobenzene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Chloroethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
2-Chloroethyl vinyl ether	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Chloroform	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Chloromethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Dibromochloromethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,2-Dichlorobenzene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,3-Dichlorobenzene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,4-Dichlorobenzene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,1-Dichloroethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,2-Dichloroethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,1-Dichloroethene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	0.23 J	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,2-Dichloropropane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Ethylbenzene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	2.5	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Methylene chloride	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Tetrachloroethene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Toluene	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,1,1-Trichloroethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
1,1,2-Trichloroethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Trichloroethene	U	U	2.3	NA	0.56 J	U	U	NA	NA	NA	NA	NA	NA	NA	U	10.7	11.8	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Trichlorofluoromethane	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Vinyl chloride	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	U	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Xylenes (total)	U	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	8.7	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
Volatile TICs	11 J	U	U	NA	U	U	U	NA	NA	NA	NA	NA	NA	NA	U	U	U	36.91 J	NA	NA	U	NA	NA	NA	NA	NA	NA	U	U	U	U
INORGANICS (ug/L)																															
Aluminum	NA	NA	NA	NA	NA	NA	NA	U	346	U	U	46900	426	U	NA	NA	NA	NA	611	5080	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Boron	NA	NA	NA	NA	NA	NA	NA	274	6430	6540	U	7950	U	1260	NA	NA	NA	NA	2190	755	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (Total)	105	1310	184	291	886	219	20.9	12.1	239	235	U	U	U	167	104	1960	2040	826	21.0	44.4	U	NA	NA	919	NA	NA	NA	NA	NA	NA	U
Hexavalent Chromium	U	U	41	U	780	200	13	U	220	240	U	300	U	220	U	740	700	830	13	U	U	NA	NA	770	NA	NA	NA	NA	NA	NA	U
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	96400	15600	33500	16000	110000	79300	91500	7830	111000	115000	1970	605000	3620	14800	33300	65900	67500	63100	20500	22000	3950	NA	NA	105000	NA	NA	NA	NA	NA	NA	U
Vanadium	NA	NA	NA	NA	NA	NA	NA	U	1590	1390	U	118000	U	U	NA	NA	NA	NA	U	1340	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER PARAMETERS (mg/L)																															
pH	7.72	7.75	7.41	7.21	7.48	11.11	7.06	6.96	7.08	7.08	7.56	10.52	7.43	5.90	6.87	8.84	8.84	5.67	7.20	7.34	5.31	NA	NA	8.18	NA	NA	NA	NA	NA	NA	NA
Sulfate	71.2	26.4	5.3	4.3	63.6	U	68.4	16.0	51.3	53.9	17.6	225	13.6	38.3	30.7	22.5	22.4	172	U	14.10	U	NA	NA	62.1	NA	NA	NA	NA	NA	NA	U

VOC Analysis performed via Method 624
Total metals performed via Method 6010B; Hexavalent Chromium via Method 7196A; and Sulfate via Method 300.0.
FT - Feet below ground surface.
U - Indicates compound analyzed for but not detected (organics and inorganics).
J - Indicates an estimated value (organics).
B - The analyte is found in the associated blank as well as in the sample (organics) or the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but not greater than or equal to the Instrument Detection Limit (IDL) (inorganics).
NA - Not analyzed
(1) - Duplicate sample of well SC12S
(2) - Duplicate sample of well MWH-4

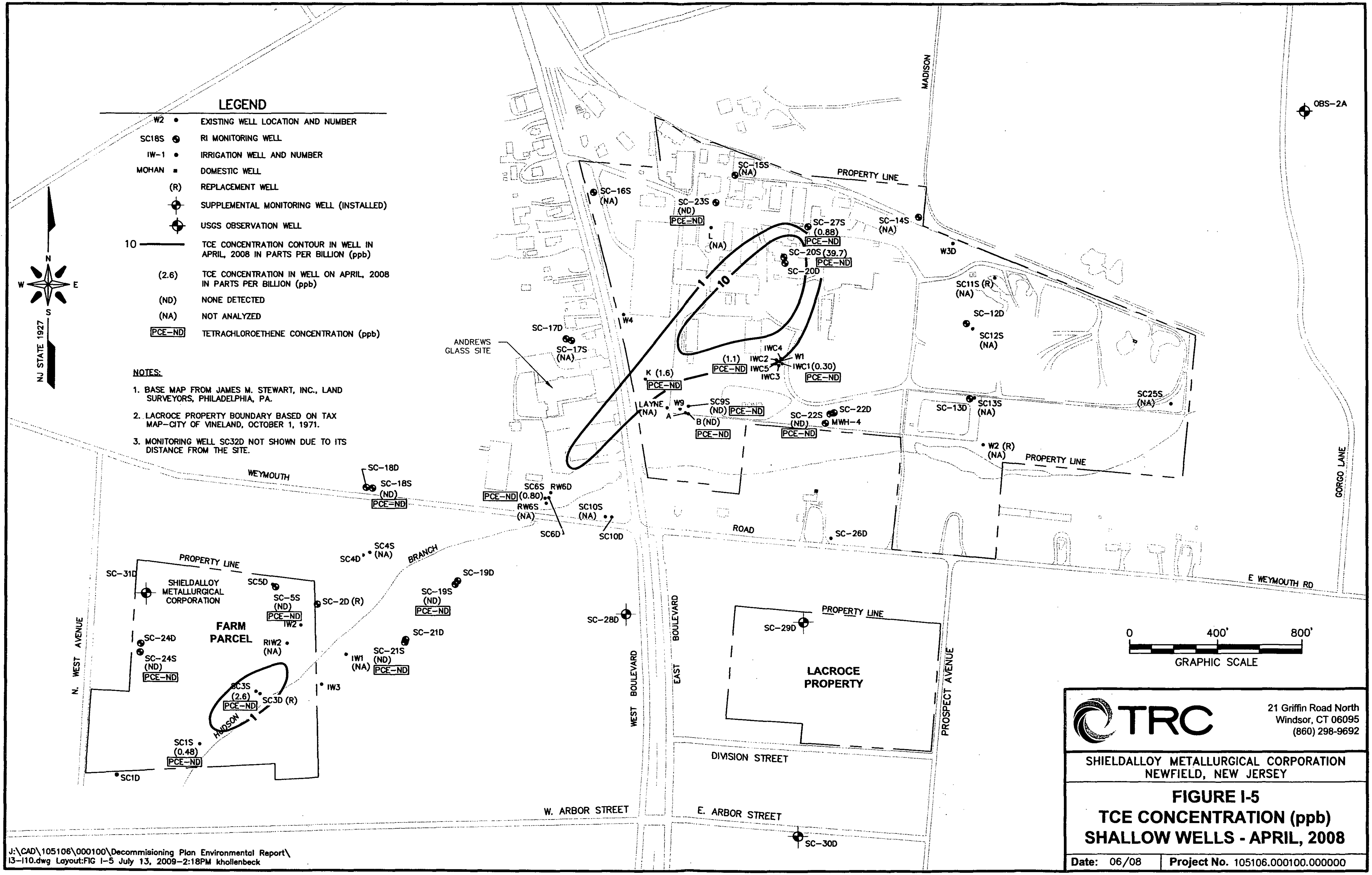
TABLE I-4
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ
GROUND WATER ANALYTICAL RESULTS
OFFSITE WELLS
OCTOBER 2008

WELL NUMBER	SC1S	SC1D	SC2D(R)	SC3S	SC3D(R)	SC33D (1)	SC5S	SC5D	SC6S	SC6D	SC10S	SC10D
LAB ID	J51574-5	J51574-4	J51603-4	J51574-6	J51574-7	J51574-8	J51603-2	J51603-3	J51702-4	J51702-5	J51819-1	J51819-2
SAMPLE DATE	07/08/08	07/08/08	07/09/08	07/09/08		07/09/08	07/10/08	07/10/08	07/10/08	07/10/08	07/09/08	07/09/08
SCREENED INTERVAL (FT)	35-55	85-95 / 100-115	106-116	35-55	102-112	102-112	5-20	90-120	45-75	110-120	35-55	105-125
PARAMETER												
VOCs (ug/L)												
Acrolein	U	U	U	U	U	U	U	U	U	U	NA	NA
Acrylonitrile	U	U	U	U	U	U	U	U	U	U	NA	NA
Benzene	U	U	U	U	U	U	U	U	U	U	NA	NA
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	NA	NA
Bromoform	U	U	U	U	U	U	U	U	U	U	NA	NA
Bromomethane	U	U	U	U	U	U	U	U	U	U	NA	NA
Carbon tetrachloride	U	U	U	U	U	U	U	U	U	U	NA	NA
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	NA	NA
Chloroethane	U	U	U	U	U	U	U	U	U	U	NA	NA
2-Chloroethyl vinyl ether	U	U	U	U	U	U	U	U	U	U	NA	NA
Chloroform	U	U	U	U	U	U	U	U	U	U	NA	NA
Chloromethane	U	U	U	U	U	U	U	U	U	U	NA	NA
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	NA	NA
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	NA	NA
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	NA	NA
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	NA	NA
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	NA	NA
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	NA	NA
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	NA	NA
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	NA	NA
cis-1,2-Dichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	NA	NA
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	NA	NA
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	NA	NA
Ethylbenzene	U	U	U	U	U	U	U	U	U	U	NA	NA
Methylene chloride	U	U	U	U	U	U	U	U	U	U	NA	NA
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	NA	NA
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	NA	NA
Toluene	U	U	U	U	U	U	U	U	U	U	NA	NA
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	NA	NA
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	NA	NA
Trichloroethene	0.63 J	8.3	4.3	1.9	14.7	14.4	U	2.4	U	9.8	NA	NA
Trichlorofluoromethane	U	U	U	U	U	U	U	U	U	U	NA	NA
Vinyl chloride	U	U	U	U	U	U	U	U	U	U	NA	NA
Xylenes (total)	U	U	U	U	U	U	U	U	U	U	NA	NA
Volatile TICs	0.79 J	0.81 J	U	U	U	U	U	U	U	U	NA	NA
INORGANICS (ug/L)												
Chromium (Total)	U	U	12000	U	U	U	U	1610	36.9	2550	U	557
Hexavalent Chromium	U	U	10200	U	U	U	U	1600	35	2700	U	460
Trivalent Chromium	U	U	NA	U	U	U	U	U	NA	NA	NA	
Sodium	64200	61100	54500	101000	75400	75400	5590	35900	129000	169000	103000	236000
OTHER PARAMETERS (mg/L)												
pH	5.22	5.25	5.73	5.12	4.36	4.36	4.41	5.40	6.25	6.07	6.60	8.88
Ferrous Iron (Fe^{+2})	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	90.2	76.4	26.3	178	120	119	16.7	42.3	137	322	111	117

WELL NUMBER	SC19S	SC19D	SC21S	SC21D	SC24S	SC24D	SC26D	SC28D	SC30D	SC31D	SC32D	IW1
LAB ID	J51702-9	J51702-10	J51702-11	J51702-12	J51702-2	J51702-3	J51574-1	J51574-2	J51574-3	J51702-1	J51702-8	J51603-1
SAMPLE DATE	07/10/08	07/10/08	07/10/08	07/10/08	07/10/08	07/10/08	07/09/08	07/09/08	07/09/08	07/10/08	07/10/08	07/10/08
SCREENED INTERVAL (FT)	2-17	120-130	3-18	125-135	5-20	105-115	127-137	133-153	147-157	120-130	92-102	32-62
PARAMETER												
VOCs (ug/L)												
Acrolein	U	U	U	U	U	U	U	U	U	U	U	NA
Acrylonitrile	U	U	U	U	U	U	U	U	U	U	U	NA
Benzene	U	U	U	U	U	U	U	U	U	U	U	NA
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	NA
Bromoform	U	U	U	U	U	U	U	U	U	U	U	NA
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	NA
Carbon tetrachloride	U	U	U	U	U	U	U	U	U	U	U	NA
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	NA
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	NA
2-Chloroethyl vinyl ether	U	U	U	U	U	U	U	U	U	U	U	NA
Chloroform	U	U	U	U	U	U	U	U	U	U	U	NA
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	NA
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	NA
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	NA
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	NA
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	NA
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	NA
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	NA
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	NA
1,2-Dichloroethene (total)	U	U	U	U	U	U	0.73 J	4.4	U	U	U	NA
cis-1,2-Dichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	NA
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	NA
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	NA
Ethylbenzene	U	U	U	U	U	U	U	U	U	U	U	NA
Methylene chloride	U	U	U	U	U	U	U	U	U	U	U	NA
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	NA
Tetrachloroethene	U	U	U	U	U	U	U	U	U	1.3	U	NA
Toluene	U	U	U	U	U	U	U	U	U	U	U	NA
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	NA
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	NA
Trichloroethene	U	U	U	1.1	U	4.5	2.8	16.1	U	13.6	U	NA
Trichlorofluoromethane	U	U	U	U	U	U	U	U	U	U	U	NA
Vinyl chloride	U	U	U	U	U	U	U	U	U	U	U	NA
Xylenes (total)	U	U	U	U	U	U	U	U	U	U	U	NA
Volatile TICs	U	U	U	U	U	U	U	U	U	U	U	NA
INORGANICS (ug/L)												
Chromium (Total)	U	U	U	U	U	U	196	154	U	U	U	U
Hexavalent Chromium	U	U	U	U	U	U	180	120	U	U	U	U
Trivalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	U	NA	NA
Sodium	25000	21900	8510	28300	7060	33500	130000	233000	4690	36700	5210	93000
OTHER PARAMETERS (mg/L)												
pH	5.10	3.89	5.45	4.28	3.97	5.03	8.70	6.46	9.02	5.20	7.79	5.81
Ferrous Iron (Fe^{+2})	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	33.7	20.1	24.3	27.2	72.2	46.4	65.3	220	U	28.1	U	113

WELL NUMBER	IW2	RIW2	RW6S	OBS-2A	RW6D	TB102308A	TB102208	TB102308	FB102208	NEWFIELD NO.3	NEWFIELD NO. 5
LAB ID	J51574-10	J51574-9	J51702-6		J51702-7						
SAMPLE DATE	07/09/08	07/09/08		07/09/08		10/23/08	10/22/08	10/23/08	10/22/08	7/9/2008	7/9/2008
SCREENED INTERVAL (FT)	40-70	30-55	55-75		90-125						
PARAMETER											
VOCs (ug/L)											
Acrolein	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Acrylonitrile	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Benzene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Bromodichloromethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Bromoform	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Bromomethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Carbon tetrachloride	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Chlorobenzene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Chloroethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
2-Chloroethyl vinyl ether	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Chloroform	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Chloromethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Dibromochloromethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,2-Dichlorobenzene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,3-Dichlorobenzene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,4-Dichlorobenzene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,1-Dichloroethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,2-Dichloroethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,1-Dichloroethene	2.7	NA	NA	NA	NA	U	U	U	U	NA	NA
1,2-Dichloroethene (total)	3.4	NA	NA	NA	NA	U	U	U	U	NA	NA
cis-1,2-Dichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
cis-1,3-Dichloropropene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
trans-1,3-Dichloropropene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Ethylbenzene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Methylene chloride	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,1,2,2-Tetrachloroethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Tetrachloroethene	0.71 J	NA	NA	NA	NA	U	U	U	U	NA	NA
Toluene	U	NA	NA	NA	NA	U	U	U	U	NA	NA
1,1,1-Trichloroethane	2.1	NA	NA	NA	NA	U	U	U	U	NA	NA
1,1,2-Trichloroethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Trichloroethene	22.0	NA	NA	NA	NA	U	U	U	U	NA	NA
Trichlorofluoromethane	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Vinyl chloride	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Xylenes (total)	U	NA	NA	NA	NA	U	U	U	U	NA	NA
Volatile TICs	4 J	NA	NA	NA	NA	U	U	U	U	NA	NA
INORGANICS (ug/L)											
Chromium (Total)	2430	1360	NA	NA	1510	NA	NA	NA	U	NA	NA
Hexavalent Chromium	2500	1400	NA	NA	1500	NA	NA	NA	U	NA	NA
Trivalent Chromium	U	U							NA		
Sodium	56600	65100	NA	NA	101000	NA	NA	NA	U	NA	NA
OTHER PARAMETERS (mg/L)											
pH	5.79	5.82	NA	NA	6.36	NA	NA	NA	NA	NA	NA
Ferrous Iron (Fe^{+2})	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	53.3	95.8	NA	NA	113	NA	NA	NA	U	NA	NA

VOC Analysis performed via Method 624 (Monitoring well SC28D via Method 524.2).
Total metals performed via Method 6010B; Hexavalent Chromium via Method 7196A; and Sulfate via Method 300.0.
FT - Feet below ground surface.
U - Indicates compound analyzed for but not detected (organics and inorganics).
J - Indicates an estimated value (organics).
B - The analyte is found in the associated blank as well as in the sample (organics) or the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but not greater than or equal to the Instrument Detection Limit (IDL) (inorganics).
NA - Not analyzed
(1) - Duplicate sample of well SC3D(R)



LEGEND

W2 •	EXISTING WELL LOCATION AND NUMBER
SC18S ⊕	RI MONITORING WELL
IW-1 •	IRRIGATION WELL AND NUMBER
MOHAN ▪	DOMESTIC WELL
(R)	REPLACEMENT WELL
⊕	SUPPLEMENTAL MONITORING WELL (INSTALLED)
⊕	USGS OBSERVATION WELL
10 ――	TCE CONCENTRATION CONTOUR IN WELL IN APRIL, 2008 IN PARTS PER BILLION (ppb)
(2.6)	TCE CONCENTRATION IN WELL ON APRIL, 2008 IN PARTS PER BILLION (ppb)
(ND)	NONE DETECTED
(NA)	NOT ANALYZED
PCE-ND	TETRACHLOROETHENE CONCENTRATION (ppb)

NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-5
TCE CONCENTRATION (ppb)
SHALLOW WELLS - APRIL, 2008

Date: 06/08 Project No. 105106.000100.000000

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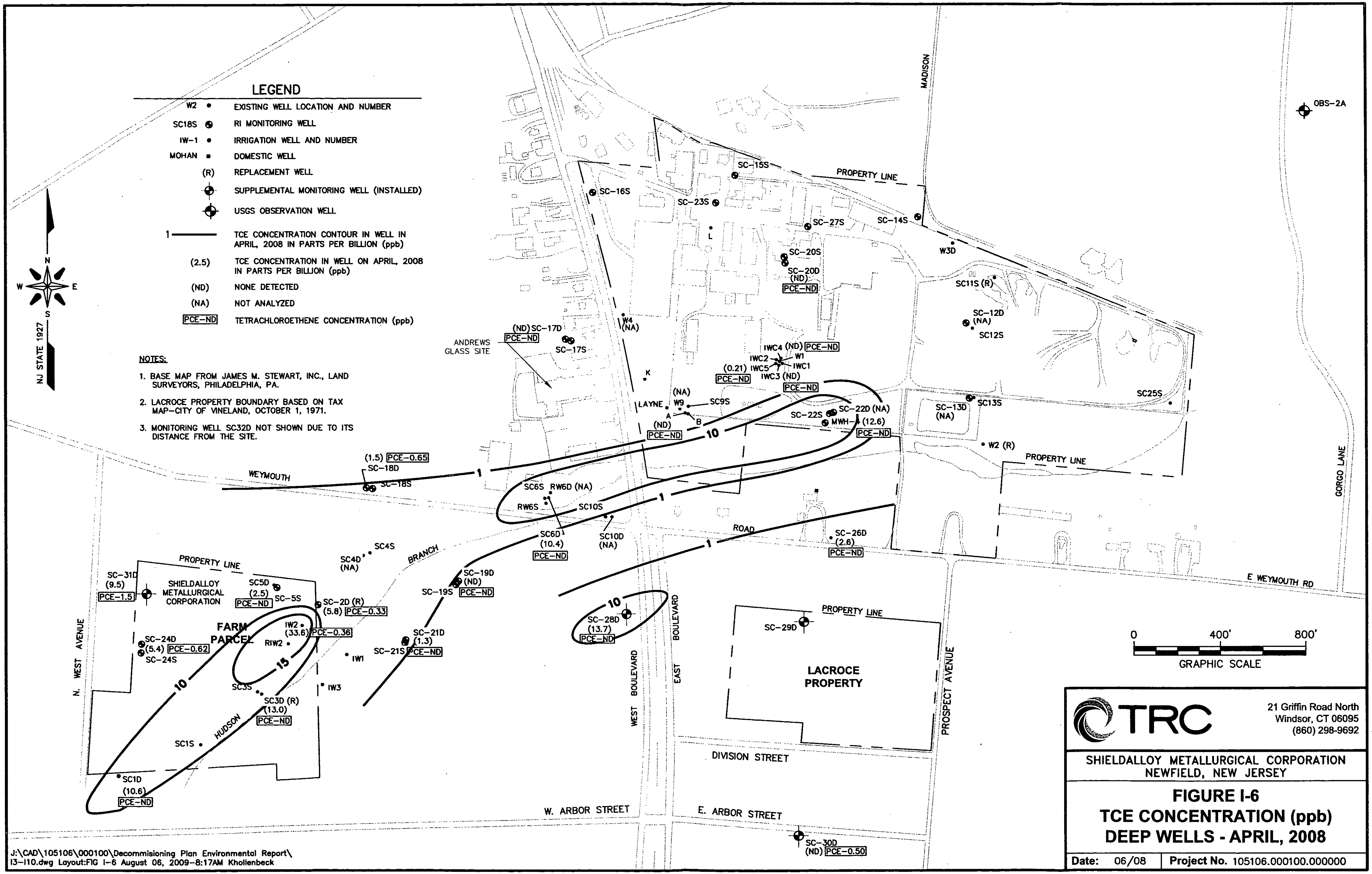
13-I10.dwg Layout:FIG I-5 July 13, 2009-2:18PM khollenbeck



LEGEND

W2 ●	EXISTING WELL LOCATION AND NUMBER
SC18S ⊗	RI MONITORING WELL
IW-1 ●	IRRIGATION WELL AND NUMBER
MOHAN ■	DOMESTIC WELL
(R)	REPLACEMENT WELL
⊕	SUPPLEMENTAL MONITORING WELL (INSTALLED)
⊕	USGS OBSERVATION WELL
1 ——	TCE CONCENTRATION CONTOUR IN WELL IN APRIL, 2008 IN PARTS PER BILLION (ppb)
(2.5)	TCE CONCENTRATION IN WELL ON APRIL, 2008 IN PARTS PER BILLION (ppb)
(ND)	NONE DETECTED
(NA)	NOT ANALYZED
PCE-ND	TETRACHLOROETHENE CONCENTRATION (ppb)

NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

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I3-I10.dwg Layout:FIG I-6 August 06, 2009-8:17AM Khollenbeck

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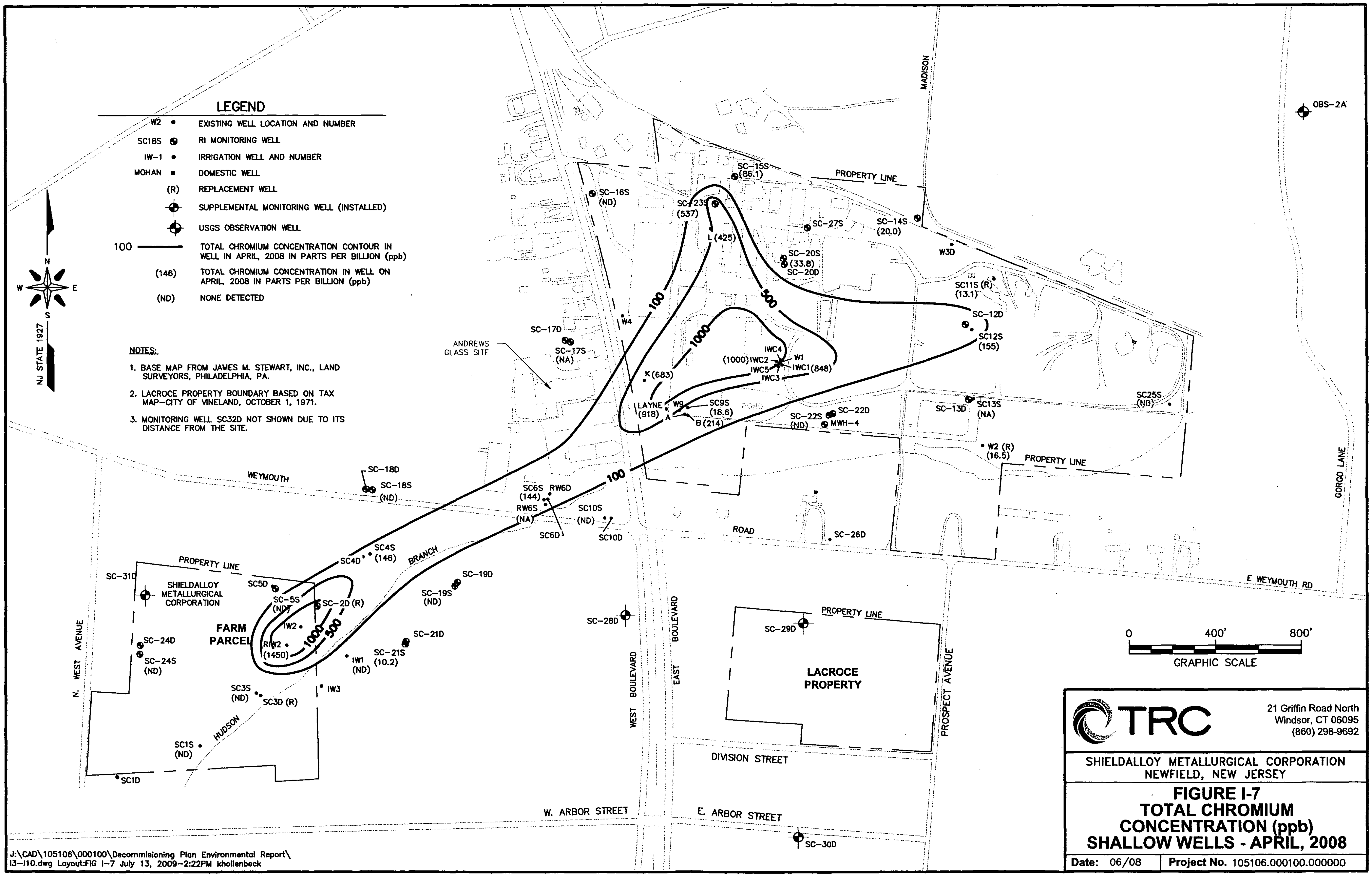
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-6
TCE CONCENTRATION (ppb)
DEEP WELLS - APRIL, 2008

Date: 06/08 **Project No.** 105106.000100.000000



LEGEND

W2 •	EXISTING WELL LOCATION AND NUMBER
SC18S ⊛	RI MONITORING WELL
IW-1 •	IRRIGATION WELL AND NUMBER
MOHAN ▪	DOMESTIC WELL
(R)	REPLACEMENT WELL
⊕	SUPPLEMENTAL MONITORING WELL (INSTALLED)
⊕	USGS OBSERVATION WELL
100 ——	TOTAL CHROMIUM CONCENTRATION CONTOUR IN WELL IN APRIL, 2008 IN PARTS PER BILLION (ppb)
(146)	TOTAL CHROMIUM CONCENTRATION IN WELL ON APRIL, 2008 IN PARTS PER BILLION (ppb)
(ND)	NONE DETECTED

NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-7
TOTAL CHROMIUM CONCENTRATION (ppb) SHALLOW WELLS - APRIL, 2008

Date: 06/08 Project No. 105106.000100.000000

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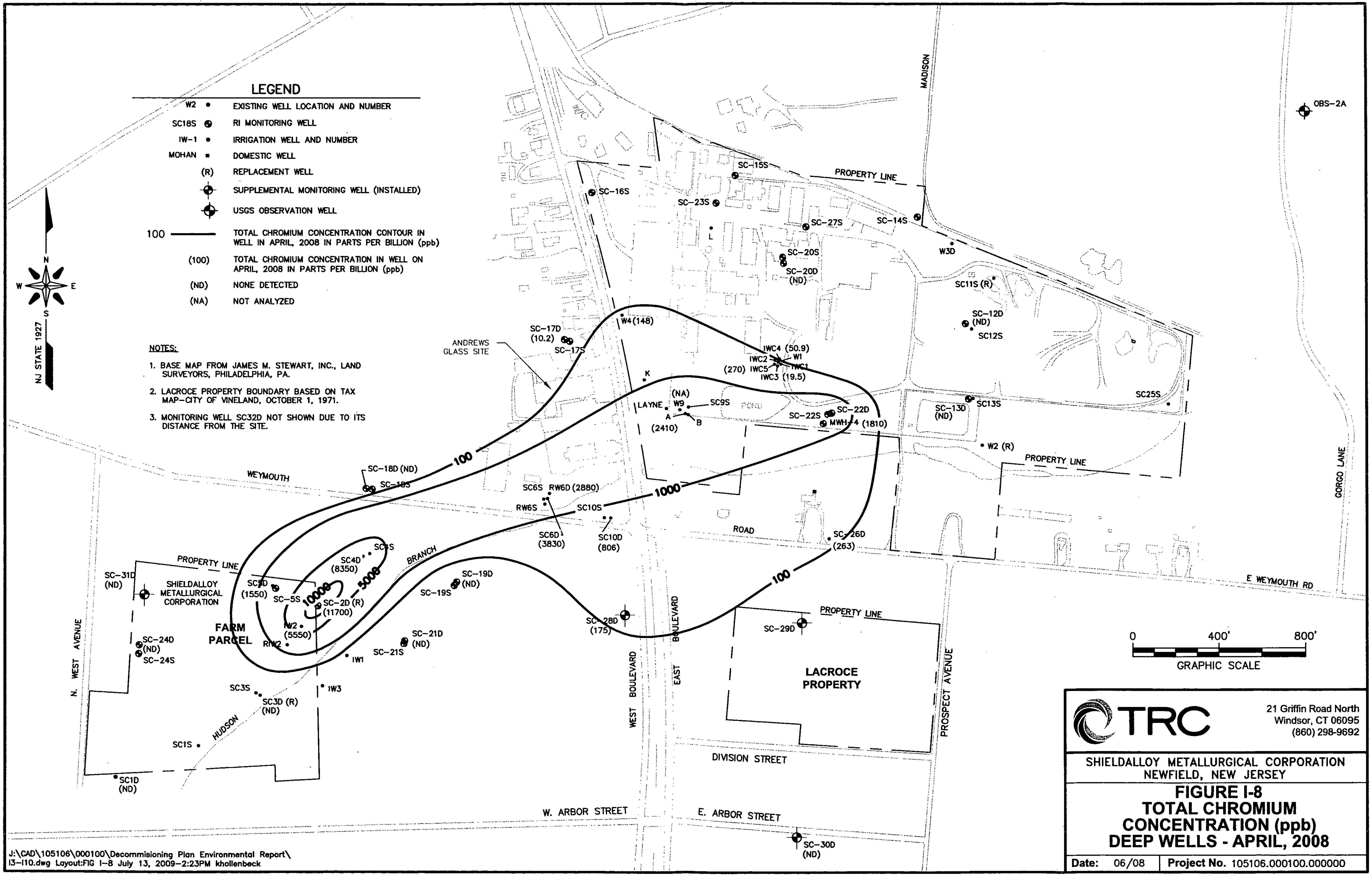
I3-I10.dwg Layout:FIG I-7 July 13, 2009-2:22PM khollenbeck



NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-8
TOTAL CHROMIUM CONCENTRATION (ppb)
DEEP WELLS - APRIL, 2008

Date: 06/08 **Project No.** 105106.000100.000000

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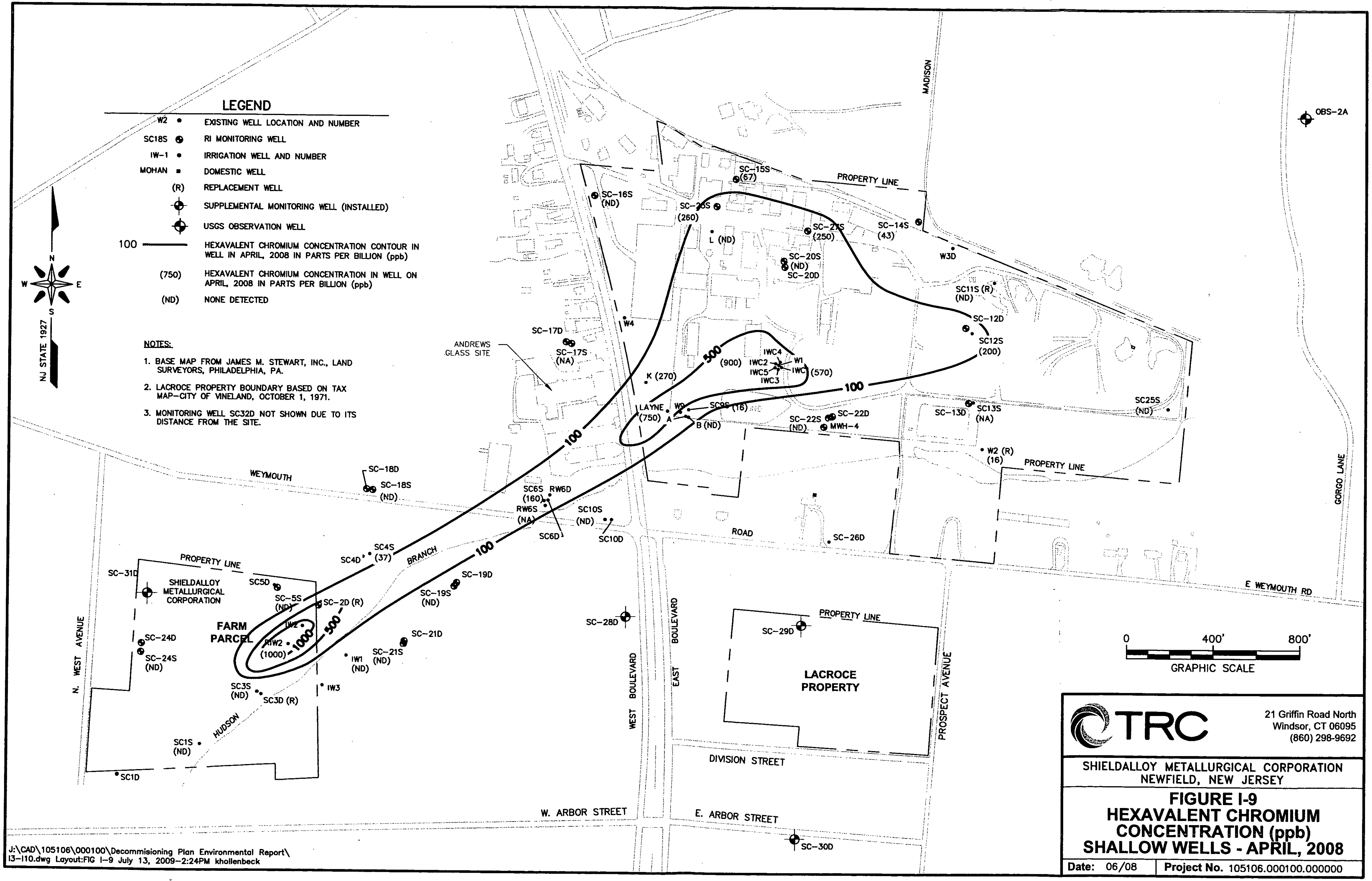
I3-I10.dwg Layout:FIG I-8 July 13, 2009-2:23PM khollenbeck



NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP-CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-9
HEXAVALENT CHROMIUM CONCENTRATION (ppb) SHALLOW WELLS - APRIL, 2008

Date: 06/08 | Project No. 105106.000100.000000

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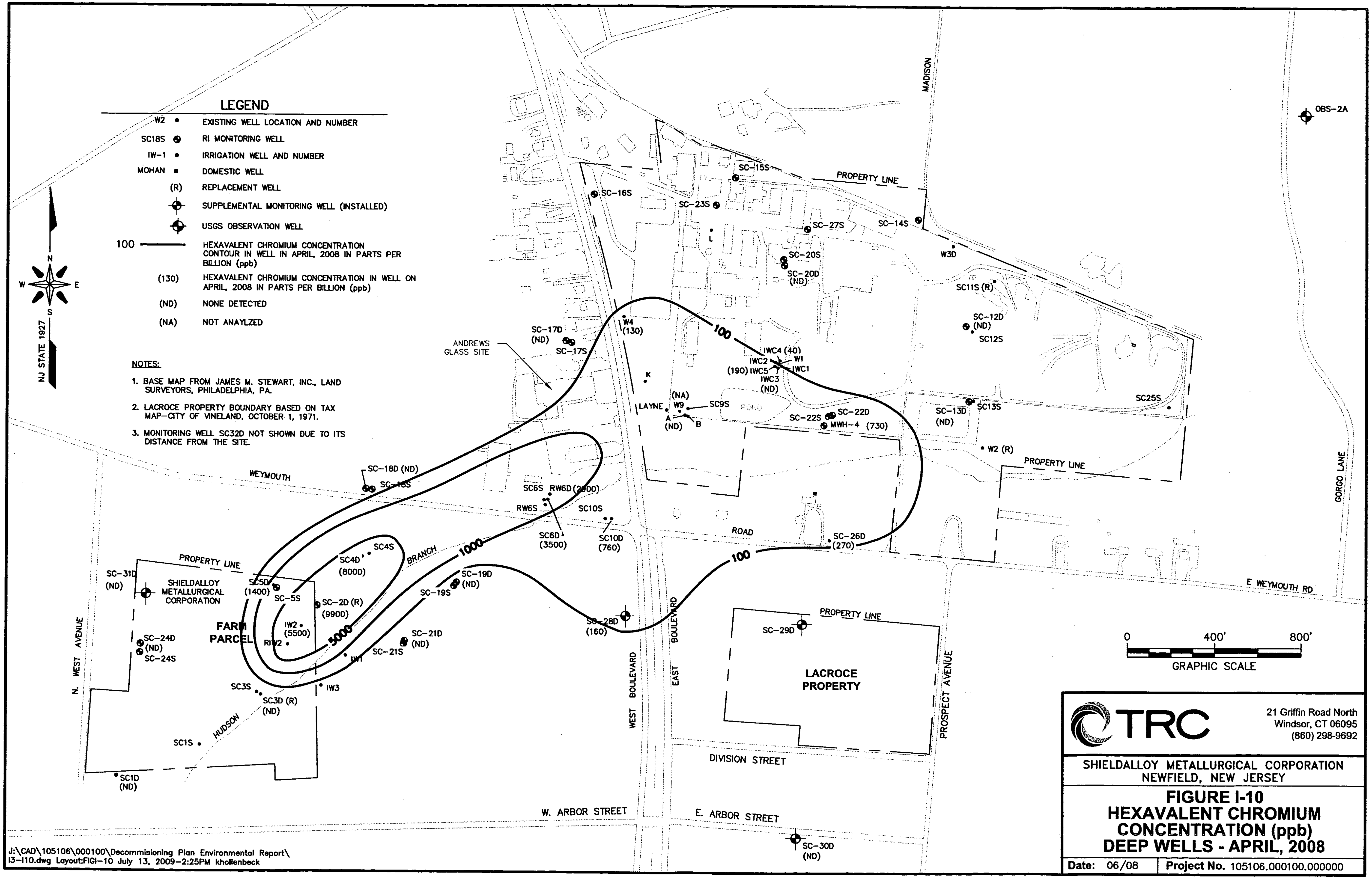
I3-I10.dwg Layout:FIG I-9 July 13, 2009-2:24PM khollenbeck



LEGEND

W2 •	EXISTING WELL LOCATION AND NUMBER
SC18S ●	RI MONITORING WELL
IW-1 •	IRRIGATION WELL AND NUMBER
MOHAN ▪	DOMESTIC WELL
(R)	REPLACEMENT WELL
⊕	SUPPLEMENTAL MONITORING WELL (INSTALLED)
⊕	USGS OBSERVATION WELL
100 ———	HEXAVALENT CHROMIUM CONCENTRATION CONTOUR IN WELL IN APRIL, 2008 IN PARTS PER BILLION (ppb)
(130)	HEXAVALENT CHROMIUM CONCENTRATION IN WELL ON APRIL, 2008 IN PARTS PER BILLION (ppb)
(ND)	NONE DETECTED
(NA)	NOT ANAYLZED

NOTES:

1. BASE MAP FROM JAMES M. STEWART, INC., LAND SURVEYORS, PHILADELPHIA, PA.
2. LACROCE PROPERTY BOUNDARY BASED ON TAX MAP–CITY OF VINELAND, OCTOBER 1, 1971.
3. MONITORING WELL SC32D NOT SHOWN DUE TO ITS DISTANCE FROM THE SITE.

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SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

FIGURE I-10
HEXAVALENT CHROMIUM
CONCENTRATION (ppb)
DEEP WELLS - APRIL, 2008

Date: 06/08 **Project No.** 105106.000100.000000

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I3-I10.dwg Layout:FIGI-10 July 13, 2009-2:25PM khollenbeck

TABLE I-5

GROUND WATER / SUSPENDED SOLIDS RADIOLOGICAL RESULTS
SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NJ
APRIL 2004

WELL NUMBER	A			W2(R)			OBS-2A (1)			SC11S(R)		
SCREENED INTERVAL (FT)	114-124			2-17			129-149			9-24		
LABORATORY ID NUMBER	F4D100111-006	F4D100111-014	F4D100111-022	F4D100111-005	F4D100111-013	F4D100111-021	F4D100111-008	F4D100111-016	F4D100111-024	F4D100111-002	F4D100111-010	F4D100111-018
UNFILTERED/FILTERED/FILTER PAPER	Unfiltered	Filtered	Filter Paper	Unfiltered	Filtered	Filter Paper	Unfiltered	Filtered	Filter Paper	Unfiltered	Filtered	Filter Paper
PARAMETERS												
Radiochemical Parameter (pCi/L)												
Gross Alpha	0.7U +/- 1.1	0.55U +/- 0.9	NA	1.75J +/- 0.98	0.32U +/- 0.57	NA	4.0 +/- 1.2	2.08J +/- 0.83	NA	0.59U +/- 0.87	0.52U +/- 0.56	NA
Gross Beta	1.9J +/- 1.2	13.0 +/- 2.0	NA	3.4J +/- 1.2	1.6U +/- 1.1	NA	3.4J +/- 1.2	3.0J +/- 1.2	NA	2.7J +/- 1.2	2.5J +/- 0.94	NA
Radium 226	0.1U +/- 0.1	0.11U +/- 0.12	NA	0.05U +/- 0.13	0.13U +/- 0.11	NA	0.95J +/- 0.26	1.23 +/- 0.28	NA	0.14U +/- 0.13	0.17U +/- 0.13	NA
Radium 228	-0.11U +/- 0.3	0.38U +/- 0.38	NA	0.16U +/- 0.34	0.22U +/- 0.34	NA	0.58J +/- 0.33	0.68J +/- 0.39	NA	-0.14U +/- 0.27	0.24U +/- 0.36	NA
Uranium 238 (pCi/sample) (4)	NA	NA	0.31J +/- 0.12	NA	NA	0.38J +/- 0.13	NA	NA	0.32J +/- 0.13	NA	NA	0.29J +/- 0.12

WELL NUMBER	SC12S			SC32S (2)			SC13S			SC14S		
SCREENED INTERVAL (FT)	15-25			15-25			14.7-24.7			12-27		
LABORATORY ID NUMBER	F4D100111-003	F4D100111-011	F4D100111-019	F4D100111-004	F4D100111-012	F4D100111-020	F4D100111-007	F4D100111-015	F4D100111-023	F4D100111-001	F4D100111-009	F4D100111-017
UNFILTERED/FILTERED/FILTER PAPER	Unfiltered (3)	Filtered	Filter Paper	Unfiltered (3)	Filtered	Filter Paper	Unfiltered	Filtered	Filter Paper	Unfiltered	Filtered	Filter Paper
PARAMETERS												
Radiochemical Parameter (pCi/L)												
Gross Alpha	8.8U +/- 9.8	0.91U +/- 0.97	NA	14.0U +/- 10.0	0.29U +/- 0.85	NA	2.6U +/- 2.4	-0.3U +/- 1.5	NA	1.1U +/- 1.0	0.41U +/- 0.84	NA
Gross Beta	128 +/- 16.0	14.0 +/- 2.1	NA	115 +/- 15.0	15.3 +/- 2.3	NA	17.6 +/- 2.5	2.3J +/- 1.2	NA	5.3 +/- 1.5	7.3 +/- 1.4	NA
Radium 226	0.52J +/- 0.18	0.82J +/- 0.24	NA	0.98J +/- 0.24	1.09 +/- 0.26	NA	0.3J +/- 0.17	0.41J +/- 0.17	NA	0.11U +/- 0.1	0.33J +/- 0.15	NA
Radium 228	0.42U +/- 0.31	0.58U +/- 0.41	NA	0.61J +/- 0.37	1.24 +/- 0.43	NA	0.39U +/- 0.27	0.1U +/- 0.36	NA	0.91J +/- 0.36	0.89J +/- 0.32	NA
Uranium 238 (pCi/sample) (4)	NA	NA	0.43J +/- 0.14	NA	NA	0.48J +/- 0.15	NA	NA	0.24J +/- 0.11	NA	NA	0.31J +/- 0.12

Notes:

FT - Feet below ground surface.
pCi/L - Picocuries per liter
NA - Not analyzed
J - Result is greater than sample detection limit but less than stated reporting limit
U - Result is less than the sample detection limit.
(1) - USGS observation well (NJ-WRD Well Number 15-0372) located northeast of the SMC site.
(2) - Duplicate sample of well SC12S.
(3) - The standard reporting limit was exceeded due to a reduction of sample size attributed to the sample's high residual mass. The analytical results are reported with the MDA achieved.
(4) - Isotopic uranium (U-238) analysis was conducted on the sediment retained on the filter.

Sample Analyses:

Gross Alpha/Beta by GFPC (EPA 900.0 MOD).
Radium-226 by EPA 903.0 MOD.
Radium-228 by GFPC (EPA 904 MOD).
Isotopic Uranium by Alpha Spectroscopy (DOE A-01-R MOD).

TABLE I-6
AVERAGE DEPTHS TO GROUND WATER - MONITORING WELLS MW-11S, MW-12S AND MW-13S
JANUARY 2001 - JANUARY 2009
Shieldalloy Metallurgical Corporation, Newfield, New Jersey

	SC11S			SC12S			SC13S		
Sample Date	Ground Elevation	Ground Water Elevation	Depth to Ground Water from Ground Surface	Ground Elevation	Ground Water Elevation	Depth to Ground Water from Ground Surface	Ground Elevation	Ground Water Elevation	Depth to Ground Water from Ground Surface
Jan-09	106.91	91.96	14.95	102.41	91.62	10.79	NA	92.04	NA
Oct-08	106.91	90.16	16.75	102.41	89.75	12.66	NA	90.04	NA
Jul-08	106.91	92.13	14.78	102.41	91.83	10.58	NA	92.33	NA
Apr-08	106.91	92.37	14.54	102.41	92.01	10.40	NA	NM	NA
Jan-08	106.91	91.5	15.41	102.41	91.2	11.21	NA	NM	NA
Oct-07	106.91	90.99	15.92	102.41	90.6	11.81	NA	NM	NA
Jul-07	106.91	93.42	13.49	102.41	92.99	9.42	NA	NM	NA
Apr-07	106.91	96.37	10.54	102.41	95.71	6.70	99.31	96.64	2.67
Jan-07	106.91	94.51	12.40	102.41	94.15	8.26	99.31	94.77	4.54
Oct-06	106.91	90.65	16.26	102.41	91.31	11.10	99.31	91.80	7.51
Jul-06	106.91	92.81	14.10	102.41	92.56	9.85	99.31	93.57	5.74
Apr-06	106.91	93.10	13.81	102.41	92.69	9.72	99.31	93.15	6.16
Jan-06	106.91	93.26	13.65	102.41	92.99	9.42	99.31	93.66	5.65
Oct-05	106.91	92.79	14.12	102.41	92.76	9.65	99.31	94.07	5.24
Jul-05	106.91	93.47	13.44	102.41	93.14	9.27	99.31	93.55	5.76
Apr-05	106.91	94.61	12.30	102.41	94.34	8.07	99.31	95.05	4.26
Jan-05	106.91	92.70	14.21	102.41	92.50	9.91	99.31	93.30	6.01
Oct-04	106.91	91.99	14.92	102.41	91.73	10.68	99.31	92.36	6.95
Jul-04	106.91	93.67	13.24	102.41	93.35	9.06	99.31	93.80	5.51
Apr-04	106.91	94.37	12.54	102.41	94.04	8.37	99.31	94.65	4.66
Jan-04	106.91	94.79	12.12	102.41	94.40	8.01	99.31	94.99	4.32
Oct-03	106.91	93.53	13.38	102.41	93.15	9.26	99.31	93.47	5.84
Jul-03	106.91	95.13	11.78	102.41	94.67	7.74	99.31	95.01	4.30
Apr-03	106.91	94.42	12.49	102.41	94.03	8.38	99.31	94.46	4.85
Jan-03	106.91	91.98	14.93	102.41	91.74	10.67	99.31	92.31	7.00
Oct-02	106.91	89.63	17.28	102.41	89.49	12.92	99.31	90.34	8.97
Jul-02	106.91	90.40	16.51	102.41	90.16	12.25	99.31	90.92	8.39
Apr-02	106.91	89.61	17.30	102.41	89.40	13.01	99.31	90.29	9.02
Jan-02	106.91	89.60	17.31	102.41	89.34	13.07	99.31	90.10	9.21
Oct-01	106.91	90.76	16.15	102.41	90.43	11.98	99.31	91.08	8.23
Jul-01	106.91	92.61	14.30	102.41	92.26	10.15	99.31	92.76	6.55
Apr-01	106.91	94.05	12.86	102.41	93.69	8.72	99.31	94.19	5.12
Jan-01	106.91	91.20	15.71	102.41	91.96	10.45	99.31	92.80	6.51
	Ave. depth to ground water:		14.35			10.11			6.11

Note: Well MW-13S was destroyed in 2007 and replaced in 2008. A new ground surface elevation has not been surveyed for the replacement well.

APPENDIX I
DESCRIPTION OF RADIOLOGICAL GROUND WATER SAMPLING PROCEDURES

For the 1988-1989 radiological analyses of ground water samples conducted by Dan Raviv, the report in which the data summary tables were provided did not specifically describe sampling procedures. Other Dan Raviv ground water sampling reports from the same period indicate that ground water samples were collected in accordance with Dan Raviv sampling protocols, which were based on NJDEP requirements. Samples were analyzed for gross alpha and gross beta, with isotopic analyses (specific analyses varied with the sampling date) performed if gross alpha or beta exceeded specific screening criteria. The summary tables presented in the DP, Rev. 1, Appendix 19.2 (Table VII, "Summary of Analytical Results - Radiological Parameters, Quarterly Sampling of 'Slag Area' Wells") provide detection limits for those samples where relevant isotopes were not detected, along with the analytical uncertainty.

For the 1995 ground water sampling and radiological analyses, the ground water samples were collected by TRC in accordance with CERCLA ground water sampling procedures. The samples were analyzed by gamma spectroscopy with the concentration of all positively identified radionuclides reported. (If not positively identified, the detection limits for Ac-228, Bi-214, K-40, Pb-212, Pb-214 and Tl-208 were reported). A September 8, 1995 letter summarizing the results, with the laboratory report attached, is included herein.

For the April 2004 ground water sampling and radiological analyses, the ground water samples were collected by TRC followed CERCLA ground water sampling procedures. Gross alpha, gross beta, Radium 226 and Radium 228 analyses were performed on filtered and unfiltered samples. Summary Table I-5 presents detection limits for those samples where radioisotopes were not detected (indicated by a "U" qualifier) and the uncertainties associated with the analyses. The data package is also provided herein.

For the April 2005 ground water sampling and radiological analyses, the ground water samples were collected by TRC following CERCLA ground water sampling procedures. Isotopic analyses (Ra-226, Ra-228, Th-232, Th-230, Th-228, U-238, U-235 and U-234) were performed on filtered and unfiltered samples. The summary tables within the June 9, 2005 letter report presented herein include detection limits for those samples where radioisotopes were not detected. The data package is also provided herein.

For the July 2007 ground water sampling and radiological analyses, the ground water samples were collected by TRC following CERCLA ground water sampling procedures. Gross alpha, gross beta and isotopic analyses (isotopic Uranium, isotopic Thorium, K-40, Ra-226 and Ra-228) were performed on filtered and unfiltered samples. Laboratory data packages are presented herein that include detection limits and uncertainties associated with the analyses. This data was provided to Region I NRC on October 30, 2007.

For the March and July 2008 ground water sampling and radiological analyses, the ground water samples were collected by TRC following CERCLA ground water sampling procedures. In March 2008, two wells (SC-20S and SC-20D) were sampled and analyzed for isotopic radium. The July 2008 ground water samples were analyzed for isotopic radium and the presence of other, non-radiological, parameters of interest (barium, magnesium, calcium, aluminum, alkalinity, chloride, and nitrate). Laboratory data packages are included herein.

IEM
Integrated Environmental Management, Inc.

9040 Executive Park Drive, Suite 205
Knoxville, TN 37923
Phone: (615) 531-9140
Fax: (615) 531-9130

1680 East Gude Drive, Suite 305
Rockville, MD 20850
Phone: (301) 762-0502
Fax: (301) 762-0638

September 8, 1995

Lee Harp, Esq.
Archer & Greiner
One Central Square
Post Office Box 3000
Haddonfield, New Jersey 08033-0968

Re: Analytical Results from Water Sampling at Shieldalloy Metallurgical Corporation's Newfield, New Jersey Plant

Dear Mr. Harp:

Pursuant to the request of Mr. Robert Smith of TRC Environmental Corporation, I arranged to have seven (7) samples of groundwater that were collected from Shieldalloy Metallurgical Corporation's Newfield, New Jersey site analyzed for their radiological constituents. Enclosed are the certificates of analysis, quality assurance data, and the chain of custody record from this effort. Enclosed also are the specifications provided to the analytical laboratory for the work that they performed.

As you can see from review of these data, none of the radionuclides in the licensable inventory at the Newfield plant are present in statistically-significant concentrations. The only concentrations of note are for an isotope of potassium (^{40}K), which is a common constituent in groundwater. For your information, rocks and soils contain between eight (8) and 20 pCi/g of ^{40}K.[1] Therefore, groundwater that runs through rocks and soil contains measurable ^{40}K. Surface water and rain water typically contain lesser concentrations of this naturally-occurring radionuclide.

Similar to the results of previous analyses of Newfield groundwater, this ^{40}K concentration, in concert with the beta emissions from the series radionuclides, would reflect elevated gross beta

---

[1] National Council on Radiation Protection and Measurements, NCRP Report No. 94, "Exposure of the Population in the United States and Canada from Natural Background Radiation", December 30, 1987.

activity if this analysis was performed.[2] However, ^{40}K and stable potassium are essential elements and under close metabolic (homeostatic) control. Therefore, variations in dietary composition have little effect on the body content or on the radiation dose received. Thus knowledge of ^{40}K concentrations in groundwater is of no practical value in assessing human radiation exposures.

To summarize, there are no radionuclides present in these groundwater samples that would cause a member of the general public, if that individual consumed only water from these wells, to exceed the U. S. Environmental Protection Agency's dose standard for radionuclides in drinking (40 CFR 141). In addition, these data confirm that operations with licensable radioactive materials at the Newfield plant have not negatively impacted the groundwater.

If I can answer any questions or provide you with additional information, please do not hesitate to call me at (301) 762-0502. I am looking forward to speaking with you again soon.

Sincerely,

Carol D Berger

Carol D. Berger, C.H.P.

cc: C. S. Eves

---

[2] While "gross beta analysis" is frequently used as a screening mechanism for radioactivity in water, positive results are only indicative of the presence of beta-emitting radioactivity. Any numerical concentrations that are reported should be used with caution since transforming the measurement results (e.g., counts per minute per liter of water) into activity (e.g., picocuries per liter of water) is heavily influenced by counting geometry, instrument energy response, and the problems associated with applying a single counts-to-activity conversion factor to samples that contain a mixture of radionuclides.

SPECIFICATIONS SUBMITTED TO LOCKHEED ANALYTICAL SERVICES FOR ANALYSIS OF GROUNDWATER SAMPLES

1. Once authorization to ship has been given, IEM will forward up to six samples of water to your Las Vegas laboratory by overnight mail (Federal Express or equivalent) for priority delivery.

2. The sample sizes will be approximately one liter each.

3. Upon receipt, the samples shall be analyzed by gamma spectroscopy (Method HASL 300 or equivalent).

4. Count times should be sufficient to achieve a nominal detection limit of 50 picocuries of ^{40}K per liter of water, and 10 picocuries (each) of those beta/gamma-emitting daughters that are typically found in the natural decay series per liter of water. If it is not possible to achieve these detection limits within a three-hour count time, an explanation should be provided.

5. The concentration (pCi/l) of all gamma-emitting radionuclides that are positively identified in the sample shall be reported.

6. If not positively identified, the detection limit for ^{214}Pb, ^{212}Pb, ^{40}K, ^{214}Bi, ^{228}Ac, and ^{208}Tl shall be reported.

7. Preliminary results, stamped or marked as "draft" or "preliminary" shall be sent by facsimile to me at IEM's Rockville, Maryland office. For initial reporting purposes, Lockheed may fax reports generated directly by the instrumentation.

8. Once the preliminary results are approved, the final report may be issued. All paper or electronic copies in your possession that are marked "draft" or "preliminary" shall be destroyed.

9. After authorization is given by IEM, the samples may be disposed of by Lockheed.

10. Lockheed shall commit to delivery of the preliminary results within 21 days after sample receipt. The final report may be issued within 10 business days after approval of the draft report. The final report should be sent to me at IEM's Rockville, Maryland office.

11. Invoices for this work should reference Job Number 95008.01.

LOCKHEED MARTIN

Lockheed Analytical Services

IEM, INC.

ANALYTICAL DATA REPORT
FOR
RADIOCHEMISTRY

LOG-IN NUMBER: L5069

QUOTATION NUMBER: Q521450

DOCUMENT FILE NUMBER: 0808574

Lockheed Environmental Systems & Technologies Co.
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

September 5, 1995

Ms. Carol Berger
IEM, Inc.
1680 East Gude Dr., Suite 305
Rockville, MD 20850

RE: Log-in No.: L5069
Quotation No.: Q521450
Document File No.: 0808574

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on August 8, 1995. The temperature of the cooler upon receipt was 22°C. Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Karen Germann at (702) 361-3955, ext. 289.

Release of this data report has been authorized by the Laboratory Director or the Director's designee as evidenced by the following signature.

Sincerely,

Karen Germann

Karen Germann
Client Services Representative

cc: Client Services
Document Control

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, duplicate samples.

Holding Time Requirements

All holding time requirements were met.

Analytical Method Gamma Spectrometry

The gamma spectrometry was performed using standard operating procedure, LAL-91-SOP-0063. The samples were analyzed in workgroup 26262. No problems were encountered during preparation or analysis. No re-analyses were performed.

Andrea Tippett	September 5, 1995
Prepared By	Date

Lockheed Analytical Services

DATA QUALIFIERS FOR RADIOCHEMICAL ANALYSES

[Revised 08/28/92]

For Use on the Analytical Data Reporting Forms	
B	Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL) and/or minimum detectable activity (MDA).
C	Presence of high TDS in sample required reduction of sample size which increased the MDA.
D	Constituent detected in the diluted sample.
E	Constituent concentration exceeded the calibration or attenuation curve range.
F	*For Alpha Spectrometry Only*– FWHM exceeded acceptance limits.
H	Sample analysis performed outside of method-specified maximum holding time requirement.
Y	Chemical yield exceeded acceptance limits.
For Use on the QC Data Reporting Forms	
*****	QC data (i.e., percent recovery data for laboratory control standard and matrix spike; and RPD for replicate analyses) exceeded acceptance limits.
a[1]	The spike recovery and/or RPD for matrix spike and duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b[1]	The RPD cannot be computed because the sample and/or duplicate concentration was below the MDA.

[1] Used as foot note designations on the QC summary form.

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
IEM, Inc.

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
A	L5069-7		Water	GAMMA SPEC LAL-00
REPORT TYPE	L5069-8		Water	RAD RPT TYPE 2
SC11SR	L5069-2		Water	GAMMA SPEC LAL-00
SC12S	L5069-3		Water	GAMMA SPEC LAL-00
SC13S	L5069-6		Water	GAMMA SPEC LAL-00
SC14S	L5069-1		Water	GAMMA SPEC LAL-00
SC30S	L5069-4		Water	GAMMA SPEC LAL-00
WR2	L5069-5		Water	GAMMA SPEC LAL-00

0808574

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 08 1995, 05:18 pm

ok
MBK 8/11/95

Login Number: L5069
Account: 574 IEM, Inc.
Project: IEM GAMMA WATERS Waters for gamma spec

```
Laboratory         Client                    Collect   Receive        Due
Sample Number      Sample Number             Date      Date      PR   Date

L5069-1            SC14S ✓                   17-JUL-95 08-AUG-95      29-AUG-95
TEMP 22
Location: 157
Water       1  S GAMMA SPEC LAL-0063   Hold:13-JAN-96

L5069-2            SC11SR ✓                  17-JUL-95 08-AUG-95      29-AUG-95
TEMP 22
Location: 157
Water       1  S GAMMA SPEC LAL-0063   Hold:13-JAN-96

L5069-3            SC12S ✓                   17-JUL-95 08-AUG-95      29-AUG-95
TEMP 22
Location: 157
Water       1  S GAMMA SPEC LAL-0063   Hold:13-JAN-96

L5069-4            SC30S ✓                   17-JUL-95 08-AUG-95      29-AUG-95
TEMP 22
Location: 157
Water       1  S GAMMA SPEC LAL-0063   Hold:13-JAN-96

L5069-5            WR2 ✓                     17-JUL-95 08-AUG-95      29-AUG-95
TEMP 22
Location: 157
Water       1  S GAMMA SPEC LAL-0063   Hold:13-JAN-96

L5069-6            SC13S ✓                   17-JUL-95 08-AUG-95      29-AUG-95
TEMP 22
Location: 157
Water       1  S GAMMA SPEC LAL-0063   Hold:13-JAN-96

L5069-7            A ✓                       18-JUL-95 08-AUG-95      29-AUG-95
TEMP 22
Location: 157
Water       1  S GAMMA SPEC LAL-0063   Hold:14-JAN-96

L5069-8            REPORT TYPE               08-AUG-95 08-AUG-95      29-AUG-95
Location:
Water       1  S RAD RPT TYPE 2
```

Signature: Paula Davis

Date: 8-08-95

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SHIELDALLOY METALLURGICAL CORPORATION
P.O. BOX 768, 12 WEST BOULEVARD
NEWFIELD, N.J. 08344 (609)692-4200

L5069

Project No. 95008.01	Purchase Order Q521450
Sampler: (Print Name) Bob Bowden	Chain of Custody Tape No.

ANALYSES

Sample No./ Identification	Collection Date	Collection Time	Preserv.	Lab Sample Number	Sample Matrix (Liquid, Sludge, etc.)	Gamma Spectroscopy Method HASL 300						Number of Containers/ REMARKS
SC14S	7/17/95	13:45			Water	1						
SC11SR		14:05				1						
SC12S		14:30				1						
SC30S		14:45				1						
W2R		15:35				1						
SC13S		16:00				1						
A	7/18/95	11:00				1						

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
1. Melanie Loiacono	7/18/95	15:00	Lidia Stasiuk	7/18/95	15:00
2. Lidia Stasiuk	8/7/95	16:30	Paul C Davis	8.08.95	12:00
3.					
4.					
5.					

Sample Disposal Method	Disposed of by: *(Signature)*	Date	Time

SAMPLE COLLECTOR/WITNESS *(Signature)*	ANALYTICAL LABOARATORY AND CONTACT
Melanie Loiacono	Lockheed Ms. Karen Germann

Page 1 of 1

L5069

№ 001624

LOCKHEED MARTIN

Sample Login
Login Review Checklist

Lot Number 5C69

The login review should be conducted by that person logging in the samples as well as a peer. Please use this checklist to ensure that such reviews occur in a uniform basis. Please sign and date below to verify that a login review has occurred. This checklist should be affixed to each login package prior to distribution.

For effective login review, at a minimum, five reports form the login process are required. These are the COC (or equivalent), the login COC report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning review, ensure that these five components are available. Jobs with single component samples, the sample summary report may be omitted.

SAMPLE SUMMARY REPORT	YES	NO	N/A	Comment
1. Are all sample ID's correct?	X			
2. Are all samples present?	X			
3. Are all matrices indicated correctly?	X			
4. Are all analyses on the COC logged in for the appropriate samples?	X			
5. Are all analyses logged in for the correct container?	X			
6. Are samples logged in according to LAS batching procedures?	X			

LOGIN CHAIN OF CUSTODY	YES	NO	N/A	Comment
1. Are the collect, receive, and due dates correct for every sample?	X			
2. Have all appropriate comments been indicated in the comment section?			X	

SAMPLE RECEIVING CHECKLIST	YES	NO	N/A	Comment
1. Are all discrepancies between the COC and the login noted (if applicable)?			X	

Also reviewed by MBF 8Jul95

primary review signature 	date 5-05-95 	secondary review signature 	date 5-05-95

0808574

Lockh‿ed Analytical Services
Sample Receiving Checklist

Page 1 of

Client Name: I. E. M **Job No.** L5067 **Cooler ID:** n/a

COOLER CONDITION UPON RECEIPT			
Temperature of cooler upon receipt: 2.2°			
temperature of temp. blank upon receipt:			
	Yes	**No**	*** Comments/Discrepancies**
custody seals intact	X		
chain of custody present	X		
blue ice (or equiv.) present/frozen		X	[illegible] ice melted
rad survey completed	X		
SAMPLE CONDITION UPON RECEIPT			
	Yes	**No**	*** Comments/Discrepancies**
all bottles labeled	X		
samples intact	X		
proper container used for sample type	X		
sample volume sufficient for analysis	X		
proper pres. indicated on the COC	X		
VOA's contain headspace		n/a	
are samples bi-phasic (if so, indicate sample ID'S):		n/a	
MISCELLANEOUS ITEMS			
	Yes	**No**	*** Comments/Discrepancies**
samples with short holding times		X	
samples to subcontract		n/a	
ADDITIONAL COMMENTS/DISCREPANCIES			
Completed by / date: 5-8-95			
Sent to the client (date/initials): 8/11/95 MBK		**** Client's signature upon receipt:**	

Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt.

***** = please review this information and return via facsimile to the appropriate CSR (702) 361-8146***

0082574

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

IEM, Inc.

Waters for gamma spec (Project IEM GAMMA WATERS)

Client Sample ID: SC14S

Date Collected: 17-JUL-95

Matrix: Water

LAL Sample ID: L5069-1

Date Received: 08-AUG-95

Login Number: L5069

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228	26-AUG-95	GAMMA SPEC LAL-0063_26262	15.	16.	30.		pCi/L
Bi-214	26-AUG-95	GAMMA SPEC LAL-0063_26262	-7.4	8.8	15.		pCi/L
K-40	26-AUG-95	GAMMA SPEC LAL-0063_26262	-1	68.	99.		pCi/L
Pb-212	26-AUG-95	GAMMA SPEC LAL-0063_26262	4.0	8.5	11.		pCi/L
Pb-214	26-AUG-95	GAMMA SPEC LAL-0063_26262	6.0	9.3	14.		pCi/L
Tl-208	26-AUG-95	GAMMA SPEC LAL-0063_26262	-2.0	6.1	8.8		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

IEM, Inc.

Waters for gamma spec (Project IEM GAMMA WATERS)

Client Sample ID: SC11SR

Date Collected: 17-JUL-95

Matrix: Water

LAL Sample ID: L5069-2

Date Received: 08-AUG-95

Login Number: L5069

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228	26-AUG-95	GAMMA SPEC LAL-0063_26262	0	7.4	14.		pCi/L
Bi-214	26-AUG-95	GAMMA SPEC LAL-0063_26262	-1.	5.5	8.9		pCi/L
K-40	26-AUG-95	GAMMA SPEC LAL-0063_26262	-10.	27.	47.		pCi/L
Pb-212	26-AUG-95	GAMMA SPEC LAL-0063_26262	2.8	5.0	7.3		pCi/L
Pb-214	26-AUG-95	GAMMA SPEC LAL-0063_26262	0.4	4.8	8.1		pCi/L
Tl-208	26-AUG-95	GAMMA SPEC LAL-0063_26262	2.1	2.8	4.0		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

IEM, Inc.

Waters for gamma spec (Project IEM GAMMA WATERS)

Client Sample ID: SC12S LAL Sample ID: L5069-3

Date Collected: 17-JUL-95 Date Received: 08-AUG-95

Matrix: Water Login Number: L5069

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228	27-AUG-95	GAMMA SPEC LAL-0063_26262	1.6	7.5	14.		pCi/L
Bi-214	27-AUG-95	GAMMA SPEC LAL-0063_26262	3.6	5.3	8.0		pCi/L
K-40	27-AUG-95	GAMMA SPEC LAL-0063_26262	42.	34.	47.		pCi/L
Pb-212	27-AUG-95	GAMMA SPEC LAL-0063_26262	0.6	4.9	7.3		pCi/L
Pb-214	27-AUG-95	GAMMA SPEC LAL-0063_26262	1.6	4.9	8.2		pCi/L
Tl-208	27-AUG-95	GAMMA SPEC LAL-0063_26262	0.5	2.7	4.0		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

IEM, Inc.

Waters for gamma spec (Project IEM GAMMA WATERS)

Client Sample ID: SC30S

Date Collected: 17-JUL-95

Matrix: Water

LAL Sample ID: L5069-4

Date Received: 08-AUG-95

Login Number: L5069

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228	28-AUG-95	GAMMA SPEC LAL-0063_26262	7.0	7.3	13.		pCi/L
Bi-214	28-AUG-95	GAMMA SPEC LAL-0063_26262	6.5	5.7	8.2		pCi/L
K-40	28-AUG-95	GAMMA SPEC LAL-0063_26262	31.	31.	44.		pCi/L
Pb-212	28-AUG-95	GAMMA SPEC LAL-0063_26262	1.7	5.1	7.5		pCi/L
Pb-214	28-AUG-95	GAMMA SPEC LAL-0063_26262	6.5	5.2	7.9		pCi/L
Tl-208	28-AUG-95	GAMMA SPEC LAL-0063_26262	2.1	2.9	4.1		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

IEM, Inc.

Waters for gamma spec (Project IEM GAMMA WATERS)

Client Sample ID: WR2
LAL Sample ID: L5069-5
Date Collected: 17-JUL-95
Date Received: 08-AUG-95
Matrix: Water
Login Number: L5069

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228	28-AUG-95	GAMMA SPEC LAL-0063_26262	-6.0	5.8	14.		pCi/L
Bi-214	28-AUG-95	GAMMA SPEC LAL-0063_26262	-1.3	5.0	8.3		pCi/L
K-40	28-AUG-95	GAMMA SPEC LAL-0063_26262	1.	27.	44.		pCi/L
Pb-212	28-AUG-95	GAMMA SPEC LAL-0063_26262	2.3	5.3	7.9		pCi/L
Pb-214	28-AUG-95	GAMMA SPEC LAL-0063_26262	1.4	4.7	7.9		pCi/L
Tl-208	28-AUG-95	GAMMA SPEC LAL-0063_26262	1.0	2.8	4.2		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

IEM, Inc.

Waters for gamma spec (Project IEM GAMMA WATERS)

Client Sample ID: SC13S

LAL Sample ID: L5069-6

Date Collected: 17-JUL-95

Date Received: 08-AUG-95

Matrix: Water

Login Number: L5069

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228	25-AUG-95	GAMMA SPEC LAL-0063_26262	-2.5	5.7	14.		pCi/L
Bi-214	25-AUG-95	GAMMA SPEC LAL-0063_26262	-4.5	5.2	9.0		pCi/L
K-40	25-AUG-95	GAMMA SPEC LAL-0063_26262	11.	29.	46.		pCi/L
Pb-212	25-AUG-95	GAMMA SPEC LAL-0063_26262	0.5	5.0	7.5		pCi/L
Pb-214	25-AUG-95	GAMMA SPEC LAL-0063_26262	-2.6	4.6	8.0		pCi/L
Tl-208	25-AUG-95	GAMMA SPEC LAL-0063_26262	0.6	2.7	4.1		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

IEM, Inc.

Waters for gamma spec (Project IEM GAMMA WATERS)

Client Sample ID: A
LAL Sample ID: L5069-7
Date Collected: 18-JUL-95
Date Received: 08-AUG-95
Matrix: Water
Login Number: L5069

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228	25-AUG-95	GAMMA SPEC LAL-0063_26262	0	7.6	14.		pCi/L
Bi-214	25-AUG-95	GAMMA SPEC LAL-0063_26262	-2.5	4.4	7.5		pCi/L
K-40	25-AUG-95	GAMMA SPEC LAL-0063_26262	48.	32.	42.		pCi/L
Pb-212	25-AUG-95	GAMMA SPEC LAL-0063_26262	-0.1	4.9	7.5		pCi/L
Pb-214	25-AUG-95	GAMMA SPEC LAL-0063_26262	3.2	4.9	8.2		pCi/L
Tl-208	25-AUG-95	GAMMA SPEC LAL-0063_26262	1.4	2.7	4.0		pCi/L

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY ANALYTES

QC Data Summary For Reagent Blank Analysis

Login Number: L5069

Analyte	Batch ID	MDA	Acceptance Limit	Date Analyzed	Reagent Blank Result	Data Qualifier
Ac-228	26262	29.8	29.8	08/27/95	5.65	
Bi-214	26262	16	16	08/27/95	-2.2	
Co-60	26262	7.59	7.59	08/27/95	-0.122	
Cs-137	26262	6.98	6.98	08/27/95	0.783	
K-40	26262	81.8	81.8	08/27/95	-10.6	
Pb-212	26262	12.2	12.2	08/27/95	-2.62	
Pb-214	26262	12.7	12.7	08/27/95	0.47	
Tl-208	26262	8.56	8.56	08/27/95	-0.64	

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY ANALYTES

QC Data Summary For Laboratory Control Sample Analysis

Login Number: L5069

Analyte	Batch ID	Date Analyzed	LCS Result	Error 2 Sigma	True Value	(%) Recovery	Data Qualifiers
Co-60	26262	08/27/95	199	23.5	218	91	
Cs-137	26262	08/27/95	182	23.4	197	93	

LOCKHEED ANALYTICAL SERVICES

RADIOCHEMISTRY ANALYTES

QC Data Summary For Duplicate Sample Analysis

Login Number: L5069

Analyte	Batch ID	Client ID	LAL ID	Date Analyzed	Sample Result	Error 2 Sigma	Duplicate Result	Error 2 Sigma	RER	RPD	Q
Co-60	26262	SC14S	L5069-1	08/26/95	1.23	3.71	0.25	3.6	0.13	132	
K-40	26262	SC14S	L5069-1	08/26/95	-0.902	67.7	47.7	60.3	0.38	208	
Pb-214	26262	SC14S	L5069-1	08/26/95	6.01	9.32	-8.09	4.31	1	1360	