Appendix B
Boring Logs and Well Completion Diagrams

Boring Logs

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** MW16-D2a
Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 727.66 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 95, 4.25 HSA and 5ft CME sampler
START: 08 January 2004 **FINISH:** 29 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
5						Blind drill to 12' bgs with till confirmation. See MW 16-I for complete description of deposits.
10						
15	12.0 15.0	CT-1	31.2 / 36		SILT (ML), orange (oxidized), moist, stiff-hard, Sand in partings, some Clay, trace subangular Gravel. (TILL)	Install 20-inch steel isolation casting to 12 feet bgs.
	15.0 17.0	CT-2	20.4 / 24		As above, gray.	BZ=0ppm HS=0 ppm
20	17.0 20.0	CT-3	33.6 / 36		4.6-inch gray, wet, loose, medium sand with gravel seam at 16.3' bgs SILT (ML), gray, moist, stiff-hard, Sand in partings, some Clay, trace Gravel. (TILL)	BZ=0ppm HS=0 ppm
	20.0 25.0	CT-4	52.8 / 60		As above.	BZ=0ppm HS=0 ppm
25	25.0 30.0	CT-5	60 / 60		SILT (ML), gray, moist to dry, hard to very hard. Some Sand and Clay, trace fine to coarse subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
30	30.0 35.0	CT-6	43.2 / 60		As above.	BZ=0 ppm, HS=0 ppm
					SILTY SAND (SM), Very, very fine, moist, loose, slightly cohesive	HS=0 ppm
35	35.0 38.0	CT-7	36 / 36		SILT (ML), Gray, moist to dry, very hard, some sand, little clay, approximately 10-% gravel subangular, fine to coarse (till).	BZ=0 ppm, HS=0 ppm
40	39.0 44.0	CT-8	57.6 / 60		SILT (ML), grayish brown, moist, hard, Clayey with Sand in partings and trace subangular Gravel. (TILL)	Install 14-inch steel isolation casing to 38 feet bgs. BZ=0 ppm, HS=4.0 ppm
45	44.0 49.0	CT-9	60 / 60		As above.	BZ=0 ppm, HS=0 ppm
50					6-inch, wet, medium to fine, sand seam at 48.0'. As above	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW16-D2a Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 727.66 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95, 4.25 HSA and 5ft CME sampler

START: 08 January 2004 **FINISH:** 29 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	49.0 54.0	CT-10	57.6 / 60		As above.	
					As above.	BZ=0 ppm, HS=0 ppm
55	54.0 56.0	CT-11	24 / 24		As above.	
	56.0 60.0	CT-12	0 / 60			Large cobble in lodged in sampler cause of poor recovery.
60	60.0 62.0	CT-13	24 / 24		As above.	BZ=0 ppm, HS=0 ppm
	62.0 64.0	CT-14	24 / 24		As above.	BZ=0 ppm, HS=0 ppm
65	64.0 69.0	CT-15	22.8 / 60			Cobble lodged in sampler cause of poor recovery
					SILT (ML), Brownish gray, moist, very stiff, with very fine Sand, some fine to coarse Gravel (TILL)	BZ=0 ppm, HS=0 ppm
70	69.0 74.0	CT-16	54 / 60		As above, more sand	BZ=0 ppm, HS=0 ppm
75	74.0 76.0	SPT-1	24 / 24	22-27-29-33	As above	Switch to split spoon sampler because driller is concerned about sand lock
	76.0 78.0	SPT-2	24 / 24	20-21-29-29	SILTY SAND (SM), Brown gray, moist, dense, fine to mediuam sand, some gravel.	BZ=0 ppm, HS=0 ppm
	78.0 80.0	SPT-3	24 / 24	20-20-29-40	SAND (SP), Brownish yellow, saturated dense, fine to medium sand..	BZ=0 ppm, HS=0 ppm
80	80.0 82.0	SPT-4	24 / 24	29-29-38-61	4-inch silty sand brownish gray, moist, dense, fine to medium sand at 77.6' bgs	BZ=0 ppm, HS=0 ppm
	82.0 84.0	SPT-5	18 / 24	41-49-57-68	As above.	BZ=0 ppm, HS=0 ppm
					As above, some fine angular gravel.	
85	84.0 86.0	SPT-6	18 / 24	10-27-31-36	SAND (SW), Brownish yellow, saturated, dense, medium to coarse Sand, angular to subangular, trace fine Gravel.	BZ=0 ppm, HS=0 ppm
	86.0 88.0	SPT-7	16 / 24	22-29-37-60		BZ=0 ppm, HS=0 ppm
	88.0 90.0	SPT-8	17 / 24	40-55-61-70		Collect soil sample for grain size analysis 86-91' bgs
90	90.0 91.0	SPT-9	12 / 12	32-47		
					End of Boring	End boring at 91' bgs
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW16-I Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 727.99 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 03 Nov 04 **FINISH:** 19 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	12 / 24	4-5-7-8	SAND (SP),moist, brown to yellow brown, medium dense, fine Sand.	Begin sampling with split spoon sampler at 2' bgs
5	4.0 6.0	SPT-2	24 / 24	5-5-5-9	CLAY (CL), silty, moist, brown to reddish brown, stiff, low plasticity	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	24 / 24	6-9-17-18	(CAP)	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	24 / 24	9-15-18-18	As above,gray, hard, more silt	BZ=0 ppm, HS=0 ppm
10	10.0 15.0	CT-1	46.8 / 60		SILT (ML), gray with iron staining, moist-dry, hard, some Sand and Clay, trace Gravel. (TILL)	Install 10-inch isolation casing at 10 feet bgs. End split spoon sampling begin sampling with CME sampler
15	15.0 17.0	CT-2	22.8 / 24		As above. 1-inch coarse sand seam @ 15.3, yellowish brown, wet, coarse	BZ=0 ppm, HS=0 ppm
	17.0 20.0	CT-3	36 / 36		SILT (ML), gray, moist to dry, hard, Clayey, some Sand, trace Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
20	20.0 22.5	CT-4	24 / 30			BZ=0 ppm, HS=0 ppm
	22.5 25.0	CT-5	33.6 / 36		SILT (ML), gray, moist, hard, Clayey and trace subangular Gravel. (TILL).	BZ=0 ppm, HS=0 ppm
25	25.0 27.0	CT-6	24 / 24		SILT (ML), Gray, moist, soft, approximately 40% very fine sand.	BZ=0 ppm, HS=0 ppm
	27.0 30.0	CT-7	36 / 36		SILT (ML), gray, moist to dry, hard to very hard. Some Sand and Clay, trace fine to coarse subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
30	30.0 33.5	CT-8	36.5 / 36.5		1-inch wet, subround to round, coarse gravel at 26.8' bgs.	BZ=0 ppm, HS=0 ppm
	33.5 35.0	CT-9	18 / 18		SILT (ML), gray, moist to dry, hard to very hard. Some Sand and Clay, trace fine to coarse subangular Gravel. (TILL)	Collect soil sample for grain size analysis 33.75-34.75' bgs
35					SILTY SAND (SM), Gray, moist to wet, 1.0', fine to very fine Sand at 33.75' bgs	End boring at 35' bgs
					SILT (ML), gray, moist to dry, hard to very hard. Some Sand and Clay, trace fine to coarse subangular Gravel. (TILL)	
40					End of Boring	
45						
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW16-I Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 727.99 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 03 November 2004 **FINISH:** 19 November 2004 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	12 / 24	4-5-7-8	SAND (SP),moist, brown to yellow brown, medium dense, fine Sand.	Begin sampling with split spoon sampler at 2' bgs
5	4.0 6.0	SPT-2	24 / 24	5-5-5-9	CLAY (CL), silty, moist, brown to reddish brown, stiff, low plasticity	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	24 / 24	6-9-17-18	(CAP)	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	24 / 24	9-15-18-18	As above,gray, hard, more silt	BZ=0 ppm, HS=0 ppm
10	10.0 15.0	CT-1	46.8 / 60	N/A	SILT (ML), gray with iron staining, moist-dry, hard, some Sand and Clay, trace Gravel. (TILL)	Install 10-inch isolation casing at 10 feet bgs. End split spoon sampling begin sampling with CME sampler
15	15.0 17.0	CT-2	22.8 / 24	N/A	As above. 1-inch coarse sand seam at 15.3, yellowish brown, wet, coarse	BZ=0 ppm, HS=0 ppm
	17.0 20.0	CT-3	36 / 36	N/A	SILT (ML), gray, moist to dry, hard, Clayey, some Sand, trace Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
20	20.0 22.5	CT-4	24 / 30	N/A		BZ=0 ppm, HS=0 ppm
	22.5 25.0	CT-5	33.6 / 36	N/A	SILT (ML), gray, moist, hard, Clayey and trace subangular Gravel. (TILL).	BZ=0 ppm, HS=0 ppm
25	25.0 27.0	CT-6	24 / 24	N/A	SILT (ML), Gray, moist, soft, approximately 40% very fine sand.	BZ=0 ppm, HS=0 ppm
	27.0 30.0	CT-7	36 / 36	N/A	SILT (ML), gray, moist to dry, hard to very hard. Some Sand and Clay, trace fine to coarse subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
30	30.0 35.0	CT-8	60 / 60	N/A	1-inch wet, subround to round, coarse gravel at 26.8' bgs. SILT (ML), gray, moist to dry, hard to very hard. Some Sand and Clay, trace fine to coarse subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm Collect soil sample for grain size analysis 33.75-34.75' bgs
35					SILTY SAND (SM), Gray, moist to wet, 1.0', fine to very fine Sand at 33.75' bgs SILT (ML), gray, moist to dry, hard to very hard. Some Sand and Clay, trace fine to coarse subangular Gravel. (TILL)	End boring at 35' bgs
40					End of Boring	
45						
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW17-D2 Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 732.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25HSA; 2ft split spoon and 5ft CME samplers

START: 02 November 2004 **FINISH:** 19 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	18 / 24	8-28-30-30	CLAY (CL), gray, very stiff, compacted, Silty and Sandy with Gravel. (CAP)	Begin sampling with split spoon sampler at 2' bgs
5	4.0 6.0	SPT-2	24 / 24	4-7-9-10	GRAVEL (GP), black, some Sand.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	8 / 24	11-8-9-9	As above, more sand	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	18 / 24	9-5-4-4	SAND (SP), brown, loose, medium Sand	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	24 / 24	2-2-2-2	As above, wet, with shell fragments SILTY SAND (SM), brown, fine Sand.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	24 / 24	2-2-6-8	SAND (SP), brown, wet, loose, coarse Sand, with shell fragments.	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-7	18 / 24	5-7-8-8	SILTY SAND (SM), Brown, wet, fine.	BZ=0 ppm, HS=0 ppm
	16.0 20.0	CT-1	48 / 48		SAND (SP), Brown, wet, medium, with shell fragments. As above with gravel. SILT (ML) gray, stiff, Clayey, with trace Gravel	Install 20-inch steel isolation casing at 18 feet bgs. Begin sampling with CME sampler.
20	20.0 25.0	CT-2	14.4 / 60		SILT (ML), brownish-gray, moist, stiff, Clayey, with Sand, and trace, grave.l (TILL) As above	Cobble wedged in sampler cause of poor recovery
25	25.0 30.0	CT-3	26.4 / 60		SILT (ML), gray, moist, hard to very hard, clayey, some sand in partings, trace fine subangular gravel. (TILL) GRAVEL (GP) wet, with Sand and fines.	Per driller's notes, 27-30 sand and gravel, residue in sampler of sand and gravel. Collect groundwater grab MW-17D2-30.
30	30.0 35.0	CT-4	60 / 60		SILT (ML), brownish gray, moist to dry, hard, massive non- plastic, Clayey, Sandy, trace subangular Gravel (TILL)	Install 14-inch steel isolation casing at 30 feet bgs. BZ=0 ppm, HS=0 ppm
35	35.0 39.0	CT-5	48 / 48		As above As above, possible laminations	BZ=0 ppm, HS=0 ppm
40	39.0 44.0	CT-6	51.6 / 60		1-inch gravel layer at 29.8' bgs. As above. As above.	BZ=0 ppm, HS=0 ppm
45	44.0 49.0	CT-7	60 / 60		As above. As above.	BZ=0 ppm, HS=0 ppm Per driller's notes, large cobble at 47 feet bgs.
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW17-D2 Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 732.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25HSA; 2ft split spoon and 5ft CME samplers

START: 02 November 2004 **FINISH:** 19 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	49.0 54.0	CT-8	60 / 60		As above.	BZ=0 ppm, HS=0 ppm
55	54.0 59.0	CT-9	60 / 60		As above, more sand	BZ=0 ppm, HS=0 ppm
60	59.0 64.0	CT-10	60 / 60		As above. SILTY SAND (SM), grayish-brown, moist, medium dense, very very fine Sand. SILT (ML), grayish-brown, moist, firm, laminated.	BZ=0 ppm, HS=0 ppm
65	64.0 69.0	CT-11	21.6 / 60		SAND (SP), yellowish-gray, brown, wet, loose, fine.	BZ=0 ppm, HS=0 ppm
70	69.0 71.0	SPT-8	22.8 / 24	12-12-16-20	SAND (SP), grayish-yellow, moist, medium dense, fine Sand.	Switch to split spoon because of sand and poor recovery
	71.0 73.0	SPT-9	21.6 / 24	10-12-12-18	As above.	BZ=0 ppm, HS=0 ppm
75	73.0 75.0	SPT-10	20.4 / 24	12-15-15-21	SILT (ML), grayish-brown, stiff, Clayey, low plasticity, laminated	BZ=0 ppm, HS=0 ppm
	75.0 80.0	CT-12	60 / 60		SAND (SP),gray yellow, moist, medium dense, medium to fine Sand.	BZ=0 ppm, HS=0 ppm
80						End boring at 80 feet bgs.
					End of Boring	
85						
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW21-I Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.74 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25HSA; 2ft split spoon and 5ft CME samplers

START: 01 November 2004 **FINISH:** 16 November 2004 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0						
	3.0 5.0	SPT-1	18 / 24	10-12-15-15	SILTY SAND (SM) light brow, moist, loose, with pebbles.	Begin split spoon sampling at 3 feet bgs.
5	5.0 7.0	SPT-2	8 / 24	5-7-9-12	As above, less silt.	BZ=0 ppm, HS=0 ppm
	7.0 9.0	SPT-3	18 / 24	4-4-4-4	SANDY GRAVEL (GP), black, high sheen, crude oil odor.	BZ=0 ppm, HS=2 ppm
10	9.0 11.0	SPT-4	18 / 24	3-4-5-5	As above.	BZ=0ppm, HS=20ppm
	11.0 13.0	SPT-5	15 / 24	12-15-30-30	As above, wet.	BZ=0 ppm, HS=0 ppm
	13.0 15.0	SPT-6	3 / 24	5-6-7-7	As above, saturated, with shell fragments.	BZ=0 ppm, HS=0 ppm
15	15.0 17.0	SPT-7	2 / 24	5-8-9-9	CLAY (CL), gray, stiff, with Sand and Silt, trace subangular Gravel.	BZ=0 ppm, HS=0 ppm
	17.0 19.0	SPT-8	18 / 24	4-5-7-10	As above, hard	BZ=0 ppm, HS=0 ppm
20	19.0 21.0	SPT-9	24 / 24	7-10-10-20	As above	BZ=0 ppm, HS=0 ppm
	21.0 23.0	SPT-10	24 / 24	7-10-15-15	As above	BZ=0 ppm, HS=0 ppm
	23.0 25.0	CT-1	21.6 / 24		CLAY (ML), gray, hard, with silt, trace gravel.	Install 10-inch steel isolation casing at 23 feet bgs.
25						BZ=0 ppm, HS=0 ppm
	25.0 29.5	CT-2	38.4 / 30		As above. SAND (SW), gray, wet, loose, medium Sand CLAY (CL), gray, moist, hard, with Silt. GRAVEL (GP), Gray, wet, with fines, fine to coarse, no odor.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
30					CLAY (CL), gray, moist, hard with Silt and trace Gravel.	End Boring at 29.5 feet bgs
					End of Boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** MW22-I **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 728.11 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers
START: 02 November 2004 **FINISH:** 16 November 2004 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0						
	2.0 4.0	SPT-1	24 / 24	6-7-9-10	SAND (SW), brown, moist, coarse, with Gravel. CLAY (CL), gray, hard, dry compacted, Sandy. (CAP)	Begin split spoon sampling at 2 feet bgs.
5	4.0 6.0	SPT-2	18 / 24	2-2-2-2	SAND (SW), Brown, moist, medium to coarse Sand with Gravel.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	24 / 24	2-2-2-2	GRAVEL (GW), Brown, fine.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	24 / 24	4-4-4-4	SAND (SW), brown, wet, medium to coarse Sand with Gravel.	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	18 / 24	4-4-8-10	As above.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	20 / 24	4-4-6-10	As above.	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-7	12 / 24	7-12-13-20	SILT (ML), gray, stiff, with clay and sand, trace subangular gravel.	BZ=0 ppm, HS=0 ppm
	16.0 20.0	CT-1	48 / 48		SILT (ML), Gray, moist to dry, low plasticity, with clay and sand trace subangular gravel. (TILL)	BZ=0 ppm, HS=0 ppm Install 10-inch steel isolation casing at 18 feet bgs. Begin sampling with CME sampler.
20	20.0 23.0	CT-2	32.4 / 36		As above.	BZ=0 ppm, HS=0 ppm
	23.0 26.0	CT-3	36 / 36		GRAVEL (GM), gray, moist, fine to coarse, cemented with fines and sand. SAND (SP) gray, wet, loose, fine to coarse Sand.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
25	26.0 28.5	CT-4	0 / 30		SILT (ML), gray, moist to dry, hard, low plasticity, Clayey, some Gravel. SAND (SP), gray to brown wet, loose, medium Sand.	Per driller's notes sand 26-28.5' bgs. Sampler wet and contained small amount of sand. Switch to split spoon because of poor recovery
	28.5 30.5	SPT-8	24 / 24	54-71-71-80	CLAY WITH SILT (CL), Gray, dry, low plasticity, some gravel.	End boring at 30.5 feet bgs
30					End of Boring	
35						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** MW23-I **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 733.04 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45 and 95 with 4.25 HSA with 2ft split spoon & 5ft CME samplers

START: 04 November 2004 **FINISH:** 23 November 2004 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24	7-7-8-9	CLAY (CL), gray, dry, compacted hard, some sand, trace gravel. (CAP)	Begin split spoon sampling at 2 feet bgs.
5	4.0 6.0	SPT-2	24 / 24	10-9-7-7	SAND (SP), brown to black with orange mottles, moist, medium to fine.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	24 / 24	5-5-9-10	SAND (SP), Yellowish-brown, moist, medium.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	24 / 24	5-8-10-11	As above.	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	24 / 24	5-5-5-10	As above, wet, coarse.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	6 / 24	4-4-4-10	SILT (ML), gray, moist, stiff, massive, non-plastic	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-7	14 / 24	4-6-10-10		BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
	16.0 20.0	CT-1	32/ 48		As above.	
20					As above.	Install 10-inch steel isolation casing at 18 feet bgs.
	20.0 24.0	CT-2	48 / 48		SILT (ML), gray, moist, hard, massive, non-plastic with medium sand, trace fine to coarse gravel. (TILL)	Collect soil sample for chemical analysis (VMP-MW23I-22-24)
25	24.0 27.0	CT-4	32.4 / 36		SAND (SW), gray with oxidation stains, moist, loose, medium Sand with some Gravel.	
	27.0 30.0	CT-5	36 / 36		SILT (ML), gray, moist to dry, hard massive, non-plastic, slight hydrocarbon odor,some clay, trace angular gravel. (TILL)	
30					As above, sand in partings, no odor	
	30.0 35	CT-6	58.8 / 60		As above, no odor	
					As above, sandy, no odor	
35					As above, no odor, less sand.	
	35.0 40.0	CT-8	60 / 60		SILT (ML), gray, moist to wet, stiff, wth clay, laminated.	
40					1-inch seam of wet medium sand at 40 feet bgs.	
	40.0 45.0	CT-10	54 / 60		SILT(ML) grayish brown stiff, with clay, varves.	Collect soil sample for grain size analysis (42-45 feet bgs.). Per driller's notes sand approximately 1.5 feet thick.
45					SILT(ML)gray with oxidation stains, with Clay and Gravel. (TILL)	
					SAND (SP), grayish-light brown, wet, coarse Sand, with fine to coarse subangular Gravel.	End boring at 44.7' bgs
50					SILT (ML), gray, moist, hard, with Clay and Sand, trace subangulare Gravel. (TILL)	
					End of Boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW27-I Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 735.64 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 03 November 2004 **FINISH:** 18 November 2004 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24		SILTY SAND (SM), brown, medium dense, fine Sand.	Begin split spoon sampling at 2 ft bgs.
5	4.0 6.0	SPT-2	24 / 24		CLAY (CL), brown, moist, stiff, Silty with some Sand.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	24 / 24		As above.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	24 / 24		SILT (ML), brown, stiff, Clayey with some Sand. As above	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	24 / 24		SAND (SP), brown, medium dense, fine Sand.	BZ=0 ppm, HS=0 ppm
	12.0 16.0	CT-1	21.6 / 48		SILT (ML), brown, stiff, Clayey with Some sand SILT (ML), grayish brown, moist, very stiff, trace Gravel, Sand partings. (TILL)	BZ=0 ppm, HS=0 ppm Install 10-inch steel isolation casing at 14 feet bgs.
15	16.0 20.0	CT-2	45.6 / 48		As above As above, less sand, more dry.	BZ=0 ppm, HS=0 ppm
20	20.0 22.0	CT-3	24 / 24		As above.	BZ=0 ppm, HS=0 ppm
	22.0 25.0	CT-4	34.8 / 36		As above. As above, oxidation staining.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
25	25.0 27.5	CT-5	26.4 / 30		SILTY SAND (SM) grayish-brown, moist, medium dense, very fine Sand.	BZ=0 ppm, HS=0 ppm
	27.5. 30.0	CT-6	30 / 30		SILT (ML), moist to dry, very stiff, Clayey, trace Gravel, fine to medium Sand in partings.	BZ=0 ppm, HS=0 ppm
30	30.0 31.7	CT-7	12 / 20.4		3-inch layer wet coarse sand and gravel at 24.8 SILT (ML), moist, hard, Clayey, trace Gravel. (TILL)	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm End boring 31.7 feet bgs
35					SILT (ML), gray, moist to dry, very stiff, Trace Gravel. (TILL) SAND (SP), gray, wet, loose, fine to medium Sand.	
					SILT (ML), gray, moist, hard, Clayey.	
40					SAND (SP), gray, wet, loose fine to fine to medium Sand.	
					SILT (ML), gray, moist, hard, clayey. (TILL)	
45					End of Boring	
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** MW30-I **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 722.78 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 03 November 2004 **FINISH:** 20 November 2004 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24		SILT (ML), brown, medium soft, some clay.	Begin split spoon sampling at 2 feet bgs.
5	4.0 6.0	SPT-2	12 / 24	3-3-4-6	SAND (SM), brown,moist, fine sand with fines.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	12 / 24	2-2-2-2	As above.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	12 / 24	2-1-1-1	As above, black with sheen, wet, strong grease trap type odor, odor and sheen 6.5-7.5 feet bgs..	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	8 / 24	1-4-6-10	SILT (ML), brown, moist, stiff.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	12 / 24	12-15-18-20	As above.	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-7	18 / 24	10-12-18-18	SILT (ML), gray, moist, stiff, Clayey with Sand and trace Gravel.	BZ=0 ppm, HS=0 ppm
	18.0 21.0	CT-1	60 / 60	8-14-19-20	As above	Install 10-inch Isolation casing at 18 feet bgs
20					SILT (ML), gray, moist, very stiff, massive, non-plastic, Clayey with Sand and trace subangular to subround Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
	21.0 25.0	CT-2	45.6 / 48		As above, sand in partings, sand is fine to medium, approximately 5%, higher clay content.	
25	25.0 28.0	CT-3	34.8 / 36		As above	BZ=0 ppm, HS=0 ppm
	28.0 30.0	CT-4	24 /24		SAND (SP), brown, angular medium sand	
30	30.0 32.0	CT-5	12 / 24		As above, wet at 30' bgs	BZ=0 ppm, HS=0 ppm
					SILT (ML), gray, moist, hard, Clayey with sand and trace subangular Gravel. (TILL)	End boring at 32.2 feet bgs
35					End of Boring	
40						
45						
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW31-Da Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 06 December 2004 **FINISH:** 30 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0						
5						
10						Blind drill to 12 feet bgs. Till confirmed. See MW31-I for complete description of deposits.
15	12.0 16.0	CT-1	46.8 / 48		SILT (ML), gray, moist, stiff, Clayey with Sand. (TILL)	Install 20-inch steel isolation casing at 12 feet bgs. BZ=0 ppm, HS=0 ppm
	16.0 18.0	CT-2	15.6 / 24		SAND (SM), gray, moist to wet, loose, very fine sand with fines.	BZ=0 ppm, HS=0 ppm
20	18.0 22.0	CT-3	0 / 48		SILT (ML), gray, moist, very hard, Clayey, some Sand and trace subangular Gravel. (TILL)	Per driller's notes, very hard drilling, possible rock in shoe.
	22.0 25.0	CT-4	0 / 36			
25	25.0 27.0	SPT-1	24 / 24	16-29-33-40	SILT (ML) gray, moist, very hard, Clayey with Sand and trace subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
	27.0 30.0	CT-5	0 / 36			Driller believes that rock is being pushed down in advance of the auger causing continous poor recovery.
30	30.0 35.0	CT-6	12 / 60			
35	35.0 37.0	CT-7	30 / 60		SILT(ML), gray, moist, very hard, Clayey, with Sand and trace subangular Gravel. (TILL).	BZ=0 ppm, HS=0 ppm Pieces of boulder in tip of sampler 30-35, driller thinks he's finally broken up the obstruction.
	37.0 39.0	SPT-	24 / 24		SILT (ML), gray, wet to moist, dense, with very fine Sand laminated.	BZ=0 ppm, HS=0 ppm
40	39.0 41.0	SPT-	24 / 24		As above, sandy	BZ=0 ppm, HS=0 ppm
	41.0 44.0	CT-8	0 / 36		SILT (ML), gray moist to wet, firm, laminated, cohesive Clayey. As above, drier.	Install 14-inch steel isolation casing at 41 feet bgs.
45	44.0 49.0	CT-9	14.4 / 60		CLAY (CL), grayish brown, moist, stiff, medium to high plasticity, Silty. SAND (SP), brownish yellow, wet, loose.	BZ=0 ppm, HS=0 ppm
50	49.0 51.0	SPT-1	24 / 24		As above.	BZ=0 ppm, HS=0 ppm

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW31-Da Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 06 December 2004 **FINISH:** 30 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
55	51.0 53.0	SPT-2	21.6 / 24		GRAVEL (GM), Wet, loose, fine subangular Silty Gravel, with Sand.	BZ=0 ppm, HS=0 ppm
	53.0 55.0	SPT-3	15.6 / 24		As above, silty.	BZ=0 ppm, HS=0 ppm
	55.0 57.0	SPT-4	21.6 / 24		SILT (ML), gray, wet, soft,Clayey, approximately 40% fine subangular Gravel , medium plasticity, no odor.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
					SAND (SP), yellow ish brown, moist, very dense, fine to medium sand.	End boring at 57 feet bgs
60					End of Boring	
65						
70						
75						
80						
85						
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW31-Da Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 06 December 2004 **FINISH:** 30 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
5						
10						Blind drill to 12 feet bgs. Till confirmed. See MW31-I for complete description of deposits.
15	12.0 16.0	CT-1	46.8 / 48	N/A	SILT (ML), gray, moist, stiff, Clayey with Sand. (TILL)	Install 20-inch steel isolation casing at 12 feet bgs. BZ=0 ppm, HS=0 ppm
	16.0 18.0	CT-2	15.6 / 24	N/A	SAND (SM), gray, moist to wet, loose, very fine sand with fines.	BZ=0 ppm, HS=0 ppm
20	18.0 22.0	CT-3	0 / 48	N/A	SILT (ML), gray, moist, very hard, Clayey, some Sand and trace subangular Gravel. (TILL)	Per driller's notes, very hard drilling, possible rock in shoe.
	22.0 25.0	CT-4	0 / 36	N/A		
25	25.0 27.0	SPT-1	24 / 24	16-29-33-40	SILT (ML) gray, moist, very hard, Clayey with Sand and trace subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
	27.0 30.0	CT-5	0 / 36	N/A		Driller believes that rock is being pushed down in advance of the auger causing continous poor recovery.
30	30.0 35.0	CT-6	12 / 60	N/A		
35	35.0 37.0	CT-7	30 / 60	N/A	SILT(ML), gray, moist, very hard, Clayey, with Sand and trace subangular Gravel. (TILL).	BZ=0 ppm, HS=0 ppm Pieces of boulder in tip of sampler 30-35, driller thinks he's finally broken up the obstruction.
	37.0 39.0	SPT-2	24 / 24	6-9-11-18	SILT (ML), gray, wet to moist, dense, with very fine Sand laminated.	BZ=0 ppm, HS=0 ppm
40	39.0 41.0	SPT-3	24 / 24	9-12-19-19	As above, sandy SILT (ML), gray moist to wet, firm, laminated, cohesive Clayey.	BZ=0 ppm, HS=0 ppm
	41.0 44.0	CT-8	0 / 36	N/A	As above, drier.	Install 14-inch steel isolation casing at 41 feet bgs.
45	44.0 49.0	CT-9	14.4 / 60	N/A	CLAY (CL), grayish brown, moist, stiff, medium to high plasticity, Silty. SAND (SP), brownish yellow, wet, loose.	BZ=0 ppm, HS=0 ppm
50	49.0 51.0	SPT-4	24 / 24	10-18-29-32	As above.	BZ=0 ppm, HS=0 ppm

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW31-Da Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 06 December 2004 **FINISH:** 30 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	51.0 53.0	SPT-5	21.6 / 24	48-51-67-70	GRAVEL (GM), Wet, loose, fine subangular Silty Gravel, with Sand.	BZ=0 ppm, HS=0 ppm
	53.0 55.0	SPT-6	15.6 / 24	10-14-20-21	As above, silty.	BZ=0 ppm, HS=0 ppm
55	55.0 57.0	SPT-7	21.6 / 24	4-20-48-60	SILT (ML), gray, wet, soft,Clayey, approximately 40% fine subangular Gravel , medium plasticity, no odor.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
					SAND (SP), yellow ish brown, moist, very dense, fine to medium sand.	End boring at 57 feet bgs
60					End of Boring	
65						
70						
75						
80						
85						
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** MW31-I **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 729.64 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers
START: 03 November 2004 **FINISH:** 17 November 2004 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24	4-5-6-7	SAND (SW), brownish-gray, moist, loose, fine to medium sand.	Begin split spoon sampling at 2 feet bgs.
5	4.0 6.0	SPT-2	24 / 24	5-7-7-9	As above.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	12 /24	4-6-8-12	SILT (ML), gray, moist, dense, cohesive, sand, trace gravel.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	20 / 24	4-5-5-6	As above.	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	24 / 24	5-7-7-9	As above, stiff	BZ=0 ppm, HS=0 ppm
	12.0 15.0	CT-1	36 / 36		Silty (ML) gray, moist, massive, stiff, Clayey, some sand.	Install 10-inch steel isolation casing at 14 feet bgs.
15					As above.	BZ=0 ppm, HS=0 ppm
	15.0 20.0	CT-2	42 / 60		As above, wet 16.5-16.75 feet bgs.	BZ=0 ppm, HS=0 ppm
					SAND (SP), gray, wet, coarse with fines and fine Gravel.	BZ=0 ppm, HS=0 ppm
20	20.0 22.0	CT-3	24 / 24		SANDY SILT (SM), gray, moist, massive.	BZ=0 ppm, HS=0 ppm
	22.0 25.0	CT-4	36 / 36		SILT (ML), gray, moist, hard, Clayey, trace subangular gravel. (TILL)	BZ=0 ppm, HS=0 ppm
25					As above.	
	25.0 27.0	CT-5	24 / 24		As above.	BZ=0 ppm, HS=0 ppm
	27.0 29.0	CT-6	24 / 24		As above.	BZ=0 ppm, HS=0 ppm
					As above.	
30	29.0 32.0	CT-7	33.6 / 36		As above.	BZ=0 ppm, HS=0 ppm
	32.0 34.0	CT-8	24 / 24		As above.	BZ=0 ppm, HS=0 ppm
35	34.0 37.0	CT-9	36 / 36		SILT (ML), grayish-brown, moist, soft, sandy (fine), laminated.	BZ=0 ppm, HS=0 ppm
	37.0 40.0	CT-10	36 / 36		SILTY SAND (SM), gray, saturated very very fine sand with silt, gradational laminations	BZ=0 ppm, HS=0 ppm
40					SILT (ML), gray, moist, massive	
	40.0 43.0	CT-11	33.6 / 36			BZ=0 ppm, HS=0 ppm
	43.0 45.0	CT-12	24 / 24		SILT (ML), grayish-brown, moist, hard, Clayey with trace subangular Gravel. (TILL)	End boring at 45.0 feet bgs
45					End of Boring	
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW34-D Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.87 **DRILLING CONTRACTOR:** Matecto

DRILLING METHOD AND EQUIPMENT: CME 95 HSA with 5' CME continous sampler

START: 08 March 2005 **FINISH:** 15 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
5						Blind drill to 24 feet bgs. Till confirmation at 17 feet. See MW34-I for description of these deposits.
10						
15						
20						Install 20-inch steel isolation casing at 19 feet bgs.
25	24.0 29.0	CT-1	51.6 / 60		SILT (ML) gray, moist, stiff, some Clay, trace subangular Gravel. (TILL) As above, drier	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
30	29.0 34.0	CT-2	60 / 60		SAND (SP), brown, saturated, loose, medium Sand. SILT (ML), brwon, moist, hard, some Sand, trace subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
35	34.0 37.0	CT-3	36 / 36		SAND (SP), brown, wet, dense, fine Sand. SILT (ML), brownish-gray, moist, hard, Clayey, some Sand, trace subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
40	39.0 44.0	CT-4	43.2 / 48		SILT (ML), brownish-gray, moist, stiff, Clayey, some Sand in partings, trace subangular Gravel. (TILL) As above.	Install 14-inch steel isolation casing at 37 feet bgs. BZ=0 ppm, HS=0 ppm Cobble in tip of sampler caused poor recovery.
45	44.0 49.0	CT-5	60 / 60		As above As above.	BZ=0 ppm, HS=0 ppm
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW34-D Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.87 **DRILLING CONTRACTOR:** Matecto

DRILLING METHOD AND EQUIPMENT: CME 95 HSA with 5' CME continous sampler

START: 08 March 2005 **FINISH:** 15 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	49.0 54.0	CT-6	60 / 60		As above. As above, less sand.	BZ=0 ppm, HS=0 ppm
55	54.0 59.0	CT-7	57.6 / 60		As above. As above. As above.	BZ=0 ppm, HS=0 ppm
60	59.0 64.0	CT-8	60 / 60		As above. As above As above	BZ=0 ppm, HS=0 ppm
65	64.0 69.0	CT-9	33.6 / 60		Sand (SW) brown, saturated loose, medium angular Sand, some Gravel	BZ=0 ppm, HS=0 ppm
70	69.0 71.0	SPT-1	24 / 24		SILT (ML), brown, moist, firm, laminated, some Clay. End of Boring	End boring at 71 feet bgs.
75						
80						
85						
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW34-I Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.86 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45/95 HSA with 2' split spoon and 5' CME continous samplers

START: 5 November 2004 **FINISH:** 9 February 2005 **LOGGER:** J. Myers & J. Mallison

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24	11-4-4-7	CLAY (CL) gray, dessicated, hard, Sandy. (CAP)	Begin split spoon sampling at 2 feet bgs.
5	4.0 6.0	SPT-2	12 / 24	5-5-5-5		BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-4	24 / 24	5-7-7-10	GRAVEL (GW) moist, gravel with glass, concrete,and wood fragemnts, hydrocarbon ordor	BZ=0 ppm, HS=40 ppm
	8.0 10.0	SPT-5	0 / 24	5-5-5-7-9	Sand (SP), black, moist, medium dens, hydrocarbon odor, medium sand with fines.	Driller thinks aguger is pushing a rock which is causing poor recovery
10	10.0 12.0	SPT-6	8 / 24	7-7-7-7	SILT (ML) gray, wet, medium soft, Clayey.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-7	3 / 24	7-9-10-10	As above, stiff	BZ=0 ppm, HS=0 ppm
15	14.0 17.0	CT-1	18 / 36		SILT (ML), gray, moist, stiff, some clay, trace subangular gravel.	Install 20-inch steel isolation casing at 16 feet bgs.
	17.0 19.0	CT-2	22.8 / 24			
20	19.0 21.0	CT-3	24 / 24			BZ=0 ppm, HS=0 ppm
	21.0 24.0	CT-4	36 / 36			BZ=0 ppm, HS=0 ppm
25	24.0 27.0	CT-5	36 / 36		SILT (ML), brown, saturated, stiff, trace Sand and fine Gravel.	
	27.0 29.0	CT-6	24 / 24		SAND (SP), brown, saturated, loose, medium sand, trace Gravel, Silt, and Clay.	BZ=0 ppm, HS=0 ppm
30	29.0 33.0	CT-7	48 / 48		SILT (ML), brown, saturated, stiff, some fine Sand, some Clay, trace fine Gravel	Install 14-inch steel isolation casing at 28 feet.
					SAND(SP), brown, saturated, loose, medium Sand, trace Gravel, Clay, and Silt.	BZ=0 ppm, HS=0 ppm
35	33.0 35.8	CT-8	33.6/ 33.6		SILT(ML), gray, moist-wet, cohesive, some subangular Gravel.	BZ=0 ppm, HS=0 ppm End boring 35.8 feet bgs
40					End of Boring	
45						
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: MW35-I Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 721.69 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 HSA with 2 ft split spoon and 5' CME continous samplers

START: 30 March 2005 **FINISH:** 04 April 2005 **LOGGER:** R. Schuth

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0.0 2.0	SPT-1	21.6/24	1-1-2-2	SILT (ML) reddish-brown, mottled	BZ=0 ppm, HS=0 ppm
	2.0 4.0	SPT-2	24 / 24	3-7-9-12	SILT (ML) reddish-brown, mottled, medium soft, Clayey, some coarse Sand.	BZ=0 ppm, HS=0 ppm
5	4.0 6.0	SPT-3	24 / 24	3-6-7-7		BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-4	21.6/24	3-12-18-21	SILT (ML) Reddish-brown, moist, very stiff, trace subangular Gravel.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-5	24 / 24	16-40-40-48	As above, hard	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-6	24 / 24	16-29-33-46	SILT (ML) gray, moist-dry, hard, some Sand, trace fine Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
	12.0 14.0	CT-1	19.2 / 36	N / A		Install 10-inch steel isolation casing at 12 feet bgs
15	15.0 20.0	CT-2	24 / 60	N / A	SILT (ML), gray, moist-dry, hard, Clayey, some Sand, trace Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
20					As above.	BZ=0 ppm, HS=0 ppm
	20.0 25.0	CT-3	60 / 60	N / A	As above	
25					SILT (ML), gray, medium soft, Sandy, some Clay, trace Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
	25.0 28.0	CT-4	31.2 / 36	N / A	SAND (SP), gray, wet, loose, fine Sand.	BZ=0 ppm, HS=0 ppm
					SILT (ML), gray, medium soft, Sandy, some Clay, trace Gravel. (TILL)	End boring 28 feet bgs.
30					End of Boring	
35						
40						
45						
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-01 **Sheet:** 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 731.60 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler

START: 04 November 2004 **FINISH:** 28 February 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24	10-12-13-15	CLAY (CL),Gray, dessicated hard, some Silt and Sand. (CAP)	Begin split spoon sampling at 2 feet bgs. BZ=0 ppm, HS=0 ppm
5	4.0 6.0	SPT-2	24 / 24	8-10-11-12	As above.	
	6.0 8.0	SPT-3	6 / 24	10-10-6-6	SAND (SP), Black, dry to moist, peppery hydrocarbon odor, sheen.	BZ=0 ppm, HS=223 ppm Encounter pipe at 7 feet bgs, hole abandoned, and rig repostioned.
	8.0 10.0	SPT-4	24 / 24	4-4-5-6	As above, no sheen, no odor.	
10	12.0 14.0	CT-1	22.8 / 48	N/A	SILT (ML), Brown, soft, becoming dense, very stiff and grey with depth. (TILL)	BZ=0 ppm, HS=0 ppm
					SILT (ML), Gray, moist, hard, massive, non-plastic, Clayey, some Sand, trace angular Gravel. (TILL)	Install 20-inch steel isolation casing at 12 feet bgs.
15	14.0 18.5	CT-2	42 / 42	N/A	As above	BZ=0 ppm, HS=0 ppm
	17.5 20.0	CT-3	30 / 30	N/A	2-inch layer loose, wet, medium sand at 16.5 feet bgs.	
20	20.0 24	CT-4	48 / 48	N/A	4-inch layer of moist, loose, silty sand at 17.5 feet bgs. As above	BZ=0 ppm, HS=0 ppm
					2-inch layer wet, coarse sand and gravel at 22.7 feet bgs.	
25	24.0 27.0	CT-5	36 / 36	N/A	As above.	BZ=0 ppm, HS=0 ppm
	27.0 30.0	CT-6	34 / 36	N/A	As above.	
30	30.0 34.0	CT-7	48 / 48	N/A	2-inch wet, loose, fine sand at 29.5 feet bgs. As above, low plasticity.	BZ=0 ppm, HS=0 ppm
35	34.0 39.0	CT-8	60 / 60	N/A	As above, stiff.	BZ=0 ppm, HS=0 ppm
40	39.0 43.0	CT-9	15.6 / 48	N/A	Sand (SP), Brown, wet, loose, coarse subangular Sand and fine subangular Gravel.	Collect groundwater grab sample SBI-01-39 (39-43). Collect soil sample for grain size analysis (39-42).
					SILT (ML), Gray, moist, hard, massive, non-plastic, Clayey, some Sand, trace subangular fine Gravel. (TILL)	Install 14-inch steel isolation casing at 43 feet bgs.
45	43.0 47.0	CT-10	48 / 48	N/A	SILT (ML), Brownish-gray, moist to dry, stiff, massive, non-plastic, some gravel, angular. (TILL)	BZ=0 ppm, HS=0 ppm
	47.0 49.5	CT-11	27.6 / 30	N/A	As above, sand in partings.	
50					As above, fine wet sand in partings.	BZ=0 ppm, HS=0 ppm

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-01 **Sheet:** 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 731.60 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler
START: 04 November 2004 **FINISH:** 28 February 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	49.5 52.0	CT-12	33.6 / 30	N/A	As above, hard	
	52.0 54.5	CT-13	27.6 / 30	N/A	SILTY SAND (SM), Gray, wet, medium density, very fine Sand with Silt, trace subangular Gravel.	
55	54.5 59.5	CT-14	55.2 / 60	N/A	4-inch layer gray, wet, loose, medium sand at 55 feet bgs.	BZ=0 ppm, HS=0 ppm
60	59.5 63.5	CT-15	56.3 / 60	N/A	SILT (ML), Gray, moist, hard, massive, non-plastic, Clayey, some Sand, trace subangular fine Gravel. (TILL) As above.	BZ=0 ppm, HS=0 ppm
65	63.5 69.5	CT-16	50 /54	N/A	As above. As above.	BZ=0 ppm, HS=0 ppm
70	69.0 74.0	CT-17	60 / 60	N/A	As above. CLAYEY SILT (ML), Gray-brown, moist, stiff, Clayey, with laminations.	BZ=0 ppm, HS=0 ppm
75	74.0 79.0	CT-18	60 / 60	N/A	As above. As above.	BZ=0 ppm, HS=0 ppm
80	79.0 84.0	CT-19	60 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm End boring at 84 feet bgs.
85					End of Boring	
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-02 **Sheet:** 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 732.14 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SPT Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler
START: 04 November 2004 **FINISH:** 03 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24	8-9-11-12	CLAY (CL) Gray, dessicated, hard, Sandy. (CAP)	Begin split spoon sampling at 2 feet bgs. BZ=0 ppm, HS=0 ppm
5	4.0 6.0	SPT-2	24 / 24	4-5-7-9	SAND (SP), Brownish red to yellow, medium.	BZ=0 ppm, HS=5 ppm
	6.0 8.0	SPT-3	24 / 24	2-2-4-5	SILTY SAND (SM), Black, moist, odor trace, gravel.	BZ=0 ppm, HS=4 ppm
	8.0 10.0	SPT-4	24 / 24	3-3-3-3	As above, peppery NAPL smell and sheen.	BZ=0 ppm, HS=587 ppm
10	10.0 12.0	SPT-5	24 / 24	4-6-8-16	SAND (SP), Light brown, meidum coarsing down to gravelly coarse Sand.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
	14.0 17.0	CT-1	36 / 60	N/A	SILT (ML), Brown, wet, soft, low plasticity. As above, gray, stiff, with some sand. SILT (ML), Gray, moist, stiff, Clayey, Sand in partings, trace subangular Gravel. (TILL).	BZ=0 ppm, HS=0 ppm Install 20-inch steel isolation casing at 14 feet bgs.
15	17.0 19.0	CT-2	24 / 24	N/A	As above.	BZ=0 ppm, HS=0ppm
20	19.0 22.0	CT-3	36 / 36	N/A	As above.	BZ=0 ppm, HS=0 ppm
	22.0 25.0	CT-4	34.8 / 36	N/A	As above, drier, more sand.	
25	25.0 29.0	CT-5	60 / 60	N/A	As above, more plastic.	BZ=0 ppm, HS=0 ppm
30	30.0 34.0	CT-6	48 / 48	N/A	As above. SILT (ML), Gray, moist, stiff, slight plasticity, Clayey, some Sand, trace angular Gravel. (TILL).	BZ=0 ppm, HS=0 ppm
35	34.0 39.0	CT-7	60 / 60	N/A	As above. As above, wet, 35- 36.5 feet bgs. As above.	BZ=0 ppm, HS=0 ppm
40	39.0 44.0	CT-8	60 / 60	N/A	As above. As above, non-plastic. As above, no gravel, possible lamination.	BZ=0 ppm, HS=0 ppm
45	44.5 49.0	CT-9	45.6 / 60	N/A	1-inch coarse sand, wet at 43.80 feet bgs SAND (SP), Gray, wet, coarse, loose. SILT (ML), Gray, moist, medium plastic, Clayey, some subangular Gravel and Sand. (TILL)	Collect soil sample for grain size analysis and groundwater grab sample 45-50 feet bgs.
50	49.0 51.0	CT-10	6 / 24	N/A	GRAVEL (GP), Brown, wet, fine gravel.	

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-02 **Sheet:** 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 732.14 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SPT Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler

START: 04 November 2004 **FINISH:** 03 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					SAND (SP), Brown, wet, loose, medium sand.	
	51.0 55.0	CT-11	25.2 / 48	N/A	SILT (ML), Gray, moist, hard, low plasticity, massive. (TILL) As above, trace subangular gravel.	Install 14-inch steel isolation casing at 51 feet bgs.
55	55.0 58.0	CT-12	36 / 36	N/A	SAND (SM), Brown/gray, wet, medium dense, silt matrix, fine sand. SILT (ML), Gray, moist, hard, low plasticity, massive, some sand and gravel. (TILL)	BZ=0 ppm, HS=0 ppm
60	58.0 62.0	CT-13	46.8 / 48	N/A	As above. As above, sand in partings.	BZ=0 ppm, HS=0 ppm
65	62.0 64.0	CT-14	31.2 / 3	N/A	As above.	BZ=0 ppm, HS=0 ppm
70	67.0 72.0	CT-15	32.4 / 60	N/A	As above. As above, more sand.	BZ=0 ppm, HS=0 ppm
75	72.0 76.0	CT-16	0	N/A	BOULDER (GW) from 72-75 feet bgs.	Rotary drill 72-75 feet bgs.
	76.0 78.0	SPT-7	15.6 / 24	18-18-20-27	SILT (ML), Gray brown, moist, stiff, Clayey, laminated.	BZ=0 ppm, HS=0 ppm
80	78.0 80.0	SPT-8	20.4 / 24	18-19-21-29	As above. End of Boring	End boring at 80 feet bgs.
85						
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-03 **Sheet:** 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.09 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler

START: 04 November 2004 **FINISH:** 17 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24	4-7-10-11	SILTY SAND (SM), Dark brown, wet, loose.	
5	4.0 6.0	SPT-2	24 / 24	4-9-10-10	CLAY (CL), Gray, dessicated, hard, some gravel. (CAP)	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	24 / 24	5-8-7-9	SILT (ML), Moist, soft, non-cohesive, Clayey with coarse gravel.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	24 / 24	4-4-9-11	SAND (SP), Black, moist, organic odor, no sheen, medium density, medium sand.	BZ=0 ppm, HS=2 ppm
10	10.0 12.0	SPT-5	24 / 24	4-4-17-20	SILT (ML), Brown, moist, stiff, cohesive.	BZ=0 ppm, HS=0 ppm
	14.0 17.0	CT-1	32.4 /36	N/A	SILT (ML), Gray with orange oxidation stains, very stiff, cohesive, massive, non-plastic,some Sand, trace subangular Gravel. (TILL).	
15	17.0 19.0	CT-2	24 / 24	N/A	As above, gray, staining ends at 17.5 feet bgs.	BZ=0 ppm, HS=0 ppm
	19.0 21.5	CT-3	30 / 30	N/A	As above.	
20	21.5 24.0	CT-4	30 / 30	N/A	4-inches wet, very fine silty sand at 21.2 feet bgs. As above.	BZ=0 ppm, HS=0 ppm
	24.0 27.0	CT-5	36 / 36	N/A	As above, drier, more sand. As above.	
25	27.0 29.5	CT-6	30 / 30	N/A	SILT (ML), Gray, moist to dry, hard, massive, non-plastice, Clayey some Sand, trace subangular Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
30	29.5 33.0	CT-7	42 /42	N/A	As above.	BZ=0 ppm, HS=0 ppm
	33.0 36.0	CT-8	36 / 36	N/A	SAND (SP), Gray, wet, loose, fine to medium.	BZ=0 ppm, HS=0 ppm Collect groundwater grab sample SBI-03-33 (33-36 feet bgs).
35	36.0 39.0	CT-9	36 / 36	N/A	SILT (ML), Gray, moist to dry, hard, massive, non-plastice, Clayey some Sand, trace subangular Gravel. (TILL)	Install 14-inch steel isolation casing at 36 feet bgs.
	39.0 42.0	CT-10	34.8 / 36	N/A	As above. As above.	BZ=0 ppm, HS=0 ppm
40	42.0 45.0	CT-11	34.8 /36	N/A	As above.	
45	45.0 48.0	CT-12	36 / 36	N/A	As above.	BZ=0 ppm, HS=0 ppm
	48.0 50.0	CT-13	24 /24	N/A	As above. As above.	BZ=0 ppm, HS=0 ppm
50						

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-03 Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.09 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler

START: 04 November 2004 **FINISH:** 17 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
55	50.0 55.0	CT-14	58.0 / 60	N/A	As above. GRAVEL (GW), Wet, subangular to subrounded.	Collect groundwater grab sample (51.3-56.3 feet bgs).
	55.0 60.0	CT-15	60 / 60	N/A	SILT (ML), Gray brown, moist, hard, approximately 25% angular gravel, Clayey, some Sand. (TILL) 4-inches loose, wet, medium sand at 55.5 As above, very stiff.	Install 8-inch steel isolation casing at 58 feet bgs.
60	60.0 65.0	CT-16	54 / 60	N/A		BZ=0 ppm, HS=0 ppm
65	65.0 70.0	CT-17	60 / 60	N/A	As above. As above.	BZ=0 ppm, HS=0 ppm
70	70.0 75.0	CT-18	51.6 / 60	N/A	As above. As above, stiff.	BZ=0 ppm, HS=0 ppm
75	75.0 80.0	CT-19	55.2 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm
80	80.0 85.0	CT-20	60 / 60	N/A	As above, stiff.	BZ=0 ppm, HS=0 ppm End boring at 85 feet bgs.
85					End of Boring	
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-04 **Sheet:** 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 730.71 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler
START: 04 November 2004 **FINISH:** 16 February 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	24 / 24	4-7-9-9	CLAY (CL) Gray, dessicated, hard, some Sand. (CAP)	Begin split spoon sampling at 2 feet bgs.
5	4.0 6.0	SPT-2	18 / 24	4-5-9-10	As above.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	24 / 24	4-5-7-9	SAND (SP), Brown, moist, loose, fine to medium Sand, some fines.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	18 / 24	2-2-4-6	SAND (SP), Black, some fines, "sticky", organic odor.	BZ=0 ppm, HS=4.5 ppm
10	10.0 12.0	SPT-5	24 / 24	1-1-12-17	As above, gray, no odor	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	24 / 24	9-9-17-19	SILT (ML), Brownish yellow, moist, stiff, Clayey.	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	CT-1	24 / 24	N/A	SILT (ML), Yellowish brown and gray, moist, some oxidation staining, hard,Clayey, some Sand, trace subangular Gravel. (TILL).	Install 20-inch steel isolation casing at 14 fee bgs.
	16.0 18.0	CT-2	60 / 60	N/A	As above, less staining	BZ=0 ppm, HS=2 ppm
20					4-inch layer of gray, wet, loose angular medium sand with styrene 17.3-17.6 feet bgs.	
	21.0 26.0	CT-4	60 / 60	N/A	As above, no oxidation staining, hard	BZ=0 ppm, HS=0 ppm
25					SAND (SP), Yellowish gray, wet, loose, angled grains, medium Sand becoming fine with depth.	BZ=0 ppm, HS=0 ppm
	26.0 29.0	CT-6	36 / 36	N/A	SILT (ML), Gray, some orange oxidation stains, moist, hard, low plasticity, massive, Clayey, some sand, trace subangular gravel. (TILL).	Collect groundwater grab sample SBI-04-24 (24-29 ft bgs)
30	29.0 32.0	CT-7	6 / 36	N/A	As above, end oxidation stains	Install 14-inch steel isolation casing at 29 feet bgs. Large cobble lodged in sampler, cause of poor recovery.
	32.0 35.0	CT-8	30 / 36	N/A	As above.	
35	35.0 38.0	CT-10	36 / 36	N/A	As above.	BZ=0 ppm, HS=0 ppm
	38.0 41.0	CT-11	34.8 / 36	N/A	As above.	BZ=0 ppm, HS=0 ppm
40	41.0 44.0	CT-12	22.8 / 36	N/A	As above, more gravel	
45	44.0 49.0	CT-13	60 / 60	N/A	As above.	BZ=0 ppm, HS=1 ppm
					As above.	
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-04 Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.71 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler

START: 04 November 2004 **FINISH:** 16 February 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	49.0 54.0	CT-15	60 / 60	N/A	As above. SAND (SP), Dark brown, wet, loose, coarse, angular sand.	BZ=0 ppm, HS=0 ppm
55	54.0 56.0	CT-17	60 / 60	N/A	SILT (ML), Gray, moist, hard, low plasticity, massive, Clayey, some sand, trace subangular gravel. (TILL). 3-inch layer gray, saturated, loose, clayey, fine sand at 52.8	BZ=0 ppm, HS=0 ppm
60	59.0 64.0	CT-19	60 / 60	N/A	As above.	
65	64.0 68.0	CT-21	48 / 48	N/A	As above, very stiff.	BZ=0 ppm, HS=0 ppm
70	68.0 71.5	CT-22	42/ 42	N/A	CLAYEY SAND (SC), Gray, wet, plastic, trace subangular Gravel. SILT (ML), Gray, moist, trace Gravel, laminated.	End boring at 71.5 feet bgs.
75					End of Boring	
80						
85						
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-06 **Sheet:** 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 734.85 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler

START: 05 November 2004 **FINISH:** 05 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0						
	2.0 4.0	SPT-1	24	8-8-9-9		Begin split spoon sampling at 2 feet bgs.
	4.0 6.0	SPT-2	24	5-5-9-9	CLAY (CL), Gray, dessicated, hard, some Sand. (CAP)	BZ=0 ppm, HS=0 ppm
5	6.0 8.0	SPT-3	0 / 24	4-3-3-4	SAND (SP), Brown, moist, loose, medium sand.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	24 / 24	1-1-3-6	GRAVEL (GP), Wet, fine gravel, organic odor.	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	24 / 24	2-2-2-2	SILT (ML), Dark brown, soft, low plasticity, Clayey.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	24 / 24	2-2-2-2	GRAVEL (GP), Black, wet, coarse. SAND (SP), Brown, wet, medium loose.	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-7	24 / 24	4-4-9-10		BZ=0 ppm, HS=0 ppm
	16.0 18.0	SPT-8	24 / 24	8-12-29-27		BZ=0 ppm, HS=0 ppm
20	20.0 25.0	CT-1	60 / 60	N/A	SILT (ML), Gray, moist, very stiff, some Gravel, some fine Sand. (TILL) SILT (ML), Dark gray, moist to dry, hard, some Sand, trace subangular Gravel. (TILL). As above.	Install 20-inch steel isolation casing at 20 feet bgs.
25	25.0 30.0	CT-2	42 / 60	N/A	As above. As above, possible laminations. As above, wet	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
30	30.0 35.0	CT-3	46.8 / 60	N/A	GRAVEL (GP), Wet, subangular, Sand/Silt matrix. SILT (ML), Moist, hard, non-plastic, massive, Clayey, some Sand, trace Gravel. (TILL)	Attempt groundwater grab at 31.5 feet bgs, but recharge insufficient.
35	35.0 37.0	SPT-9	24 / 24	17-19-19-32	As above.	Switch to split spoon because driller reports rock.
	37.0 39.0	SPT-10	21.6 / 24	51-54-74-74	As above.	
40	39.0 41.0	SPT-11	24 / 24	67-82-89-107		BZ=0 ppm, HS=0 ppm
	41.0 43.0	SPT-12	24 /24	74-96-111-121	As above, gray to brown.	
	43.0 45.0	SPT-13	24 / 24	88-94-108-136	As above, reddish brown, more sand.	
45	45.0 49.0	CT-4	48 / 48	N/A	As above.	Install 14-inch steel isolation casing at 44 feet bgs.
50					As above.	

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBI-06 **Sheet:** 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 734.85 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45' with 2' SS Sampler/CME 95 4 1/4 HSA - 5' Continuous Sampler

START: 05 November 2004 **FINISH:** 05 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	49.0 54.0	CT-5	60 / 60	N/A		
55	54.0 59.0	CT-6	60 / 60	N/A	As above, drier more sand.	BZ=0 ppm, HS=0 ppm
60	59.0 64.0	CT-7	60 / 60	N/A	SAND (SP), Brown, saturated, loose, fine to medium sand. SILT (ML), Moist, hard, some Gravel. (TILL) SAND (SP), Brown, wet, loose, fine to medium Sand, some Gravel.	BZ=0 ppm, HS=0 ppm Collect soil sample for grain size analysis and groundwater grab (SBI06-60.5) 60.5-65.5 feet bgs.
65	64.0 66.0	CT-8	24 / 24	N/A		End boring at 66 feet bgs.
70					End of Boring	
75						
80						
85						
90						
95						
100						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-07 Sheet: 1 of 3

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.93 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: 4.25 HSA with 2 foot split spoon and 5 foot CME continuous samplers

START: 05 November 2004 **FINISH:** 22 March 2005 **LOGGER:** J. Myers & T. Vonwallmenich

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
0					Ground Surface	
						begin split spoon sampling at 2 feet bgs.
	2.0 4.0	SPT-1	24 / 24	4-7-10-10	SANDY CLAY (CL), Gray, dessicated, hard. (CAP)	BZ=0 ppm, HS=0 ppm
5	4.0 6.0	SPT-2	24 / 24	8-12-16-16		
	6.0 8.0	SPT-3	24 / 24	8-10-10-18	SILT (ML) Brown, moist, Sandy with glass and gravel. (FILL)	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	6 / 24	3-4-5-5	SAND, Black, moist, soft, medium sand with magnesium oxide. (FILL) As above, less sand, wet.	BZ=0 ppm, HS=1 ppm
10	10.0 12.0	SPT-5	24 / 24	2-2-2-2	As above, gray, little sand.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	8 / 24	2-2-4-9	As above, firmer.	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-7	24 /24	5-5-5-5	SAND (SP), Black, wet, coarse, no odor.	
					CLAY (CL), Dark brown-gray, moist, stiff.	BZ=0 ppm, HS=0 ppm
	16.0 18.0	SPT-8	24 / 24	8-10-10-12	SAND (SP), Black, coarse, no odor. As above.	BZ=0 ppm, HS=1 ppm
	18.0 20.0	SPT-9	24 / 24	4-9-10-16	SILT(ML), Dark brown to gray, moist, stiff, Clayey. As above, very stiff.	BZ=0 ppm, HS=0 ppm
20	21.0 25.0	CT-1	49.2 / 48	N/A	CLAYEY SILT (ML), Gray, moist, hard, occasional fine Sand and fine Gravel. (TILL). As above. As above. As above.	Install 20-inch steel isolation casing at 21 feet bgs. BZ=0 ppm, HS=0 ppm
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-07 Sheet: 2 of 3

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.93 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: 4.25 HSA with 2 foot split spoon and 5 foot CME continuous samplers

START: 05 November 2004 **FINISH:** 22 March 2005 **LOGGER:** J. Myers & T. Vonwallmenich

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	25.0 30	CT-2	60 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm
					GRAVEL (GW), Wet, medium Sand and Gravel, angular to sub angular material.	BZ=0 ppm, HS=0 ppm
30	30.0 33.0	CT-4	33.6 / 36	N/A	SILT (ML), Gray, moist, hard, Clayey, some Sand, trace Gravel. (TILL). SILT (ML), Brown-grayish brown, moist to dry, hard, massive, sandy and clayey, trace fine to coarse rounded gravel. (TILL)	Install 14-inch steel isolation casing at 30 feet bgs. BZ=0 ppm, HS=0 ppm
35	33.0 38.0	CC #2	60 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm
40	38.0 43.0	CT-5	21.6 / 60	N/A	SAND (SP), Yellow brown, wet, loose, medium sand, trace fine gravel.	BZ=0 ppm, HS=0 ppm
	43.0 45.0	CT-6	24 / 24	N/A		Collect groundwater grab and grain size samples
45	45.0 50.0	CT-7	36 / 60	N/A	CLAYEY SILT (ML), Gray moist hard, trace fine sand and fine gravel, grades in and out with very fine Silty Sand/Sandy Silt. (TILL) As above	Install 8-inch stell isolation casing at 45 feet bgs.
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-07 Sheet: 3 of 3

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.93 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: 4.25 HSA with 2 foot split spoon and 5 foot CME continuous samplers

START: 05 November 2004 **FINISH:** 22 March 2005 **LOGGER:** J. Myers & T. Vonwallmenich

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	50.0 55.0	CT-8	36 / 60	N/A	SILTY SAND (SM), Grayish brown, moist, very dense, fine to medium with occasional fine gravel.	BZ=0 ppm, HS=0 ppm
55					As above,with coarse gravel and cobbles, gravel fragments are dolomite.	
	55.0 56.5	CT-9	18 / 18	N/A	CLAY WITH SAND AND GRAVEL (CL), Grayish brown with coarse gravel (1"), moist, very hard, sand is very fine in the laminae and medium angular in matrix.	Difficult drilling at 56'
	57.5 58.5	STP-10	9 / 12	64-100/3"	SILTY CLAY WITH SAND (CL), Grayish brown, sand is very fine medium coarse in matrix, hard becoming wet (TILL).	BZ=0 ppm, HS=0 ppm
	58.5 60.0	CT-10	36 / 36	N/A		Chatter
60					SILTY SAND (SM), Gray, wet, sand is coarse, angular, occasional coarse gravel, cobble, dense, silt approximaterly 50%.	Install temporary well 56-61 feet bgs. Grab sample SBI07-56-61-GW obtained 23 March 2005
					FINE SAND WITH SILT (SP-SM), Gray with fine to coarse gravel (up to 2"), wet, dense.	
					End of Boring	
65						
70						
75						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-08 Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.40 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: HSA with 2-foot split spoon and 5 foot CME samplers

START: 03 November 2004 **FINISH:** 16 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	2.0 4.0	SPT-1	6 /24	8-12-16-20	CLAY (CL), Gray, dessicated, hard, occasional fine Gravel. (CAP)	Begin split spoon sampling at 2 feet bgs.
5	4.0 6.0	SPT-2	24 / 24	7-12-15-17		BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-3	18 / 24	15-31-30-20	CLAYEY SILT(ML), Dark brown, moist, some medium Sand and occasional Gravel	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-4	18 / 24	5-7-10-10	SAND (SP), Yellow -brown, coarse.	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-5	24 / 24	7-10-10-8	SAND (SP), Black, moist, medium Sand with yellow sulpher-like globblular material.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-6	18 / 24	3-4-5-5	SAND (SP), Brown, moist, medium to fine. As above, wet, coarsinging to fine Gravel	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-7	18 /24	4-4-4-4	CLAY (CL), Black, wet, very soft, cohesive, no odor, some Sand.	BZ=0 ppm, HS=0 ppm
	16.0 18.0	SPT-8	24 / 24	5-7-9-10	SAND (SP), Gray brown, moist, fine to medium.	BZ=0 ppm, HS=0 ppm
	18.0 20.0	SPT-9	24 /24	9-9-15-17	CLAY (CL), Dark brown, wet, low plasticity, stiff	BZ=0 ppm, HS=0 ppm
20					CLAYEY SILT(ML), Gray, moist, very stiff, non-plastic, massive.	
	22.0 25.0	CT-1	60 / 60	N/A	CLAYEY SILT (ML), Gray, moist to dry, very stiff, massive, non-plastic, trace fine Gravel. (TILL)	Install 20-inch steel isolation casing at 22 feet bgs.
25					1-inch wet, fine to medium subangular gravel seam at 23.4.	
	25.0 30.0	CT-2	58.8 / 60	N/A		BZ=0 ppm, HS=0 ppm
30					1-inch wet, fine to medium subangular gravel seam at 28.7	
	30.0 35.0	CT-3	60 / 60	N/A	1-inch very fine wet sand at 30.45 feet bgs 5-inch gray, fine sand at 31.5 feet bgs.	BZ=0 ppm, HS=0 ppm
35					CLAYEY SILT (ML), Gray, moist to dry, very stiff trace fine Gravel. (TILL).	
	35.0 40.0	CT-4	60 / 60	N/A	As above, more gravel	BZ=0 ppm, HS=0 ppm
40					3-inches coarse, wet sand at 39.7 feet bgs.	BZ=0 ppm, HS=1.9 ppm
	40.0 44.0	CT-4	48 / 48	N/A	CLAYEY SILT (ML), Gray brown, moist, stiff, approximately 20% gravel, clayey, some sand (TILL).	Install 14-inch steel isolation casing at 41 feet bgs.
45					As above.	
	44.0 49.0	CT-5	60 / 60	N/A		
50					As above, more sand.	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-08 Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.40 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: HSA with 2-foot split spoon and 5 foot CME samplers

START: 03 November 2004 **FINISH:** 16 March 2005 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
	49.0 54.0	CT-6	60 / 60	N/A	As above.	
55	54.0 59.0	CT-7	60 /60	N/A	CLAYEY SILT (ML), Brown with oxidation stains, stiff, some Sand, trace fine Gravel. bottom 3 inches of sample are green in color. (TILL) CLAYEY SILT (ML), Gray brown, moist to dry, stiff, some fine Sand, trace fine Gravel. (TILL)	BZ=0 ppm, HS=0 ppm
60	59.0 64.0	CT-8	60 / 60	N/A		BZ=0 ppm, HS=0 ppm
					SAND (SP), Brownish yellow, saturated, medium sand.	BZ=0 ppm, HS=0 ppm
65	64.0 67.0	CT-9	36 / 36	N/A	SILTY CLAY (ML), Gray brown, moist, stiff, laminated.	BZ=0 ppm, HS=0 ppm
					SAND (SP), Brownish yellow, saturated, medium sand.	End boring at 67 feet bgs.
70					SILTY CLAY (ML), Gray brown, moist, stiff, laminated.	
					End of Boring	
75						
80						
85						
90						
95						
100						

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBI-09 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 731.83 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 Track Rig with 2' SS HSA

START: 29 March 2005 **FINISH:** 29 March 2005 **LOGGER:** R. Schuth

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	16.8 / 24	7-8-8-7	2.4 inches asphalt	
	2.0 4.0	SPT-2	19.2 / 24	1-2-2-3	0.2 - 0.8' - SAND WITH GRAVEL, Brown, moist, medium, loose.	BZ=0 ppm, HS=0 ppm
5	4.0 6.0	SPT-3	16.8 / 24	3-3-3-4	SILT (ML), Brown, moist, firm, with fine Sand.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-4	18 / 24	3-4-7-10	As above.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-5	24 / 24	3-4-6-9	SILT (ML), Brown with yellow brown and gray mottling, moist, stiff, some Clay and coarse Sand.	BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-6	20.4 / 24	5-5-8-11	CLAYEY SILT (ML), Gray, moist, stiff.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-7	20.4 / 24	7-12-12-25	CLAYEY SILT(ML) Brown with dark brown mottling, moist, stiff, some fine Sand, trace fine Gravel.	BZ=0 ppm, HS=0 ppm
15	14.0 16.0	SPT-8	6 /24	7-9-14-16	SILT (ML), Gray, moist to dry, stiff, some fine gravel.	BZ=0 ppm, HS=0 ppm
	16.0 18.0	SPT-9	15.6 / 24	9-29-50-51		
20	18.0 23.0	CT-1	52.8 / 60	N/A	3-inches wet loose silty sand at 12 feet bgs. SILTY CLAY (CL), Gray, moist to dry, hard, angular fine Gravel.	Install 10-inch steel isolation casing at 18 feet bgs.
					CLAYEY SILT (ML), Reddish brown, moist to wet, stiff, some fine Sand.	BZ=0 ppm, HS=0 ppm
25	23.0 27.0	CT-2	30 / 60	N/A	SILTY CLAY (CL), Gray, moist to dry, hard, angular fine Gravel.	BZ=0 ppm, HS=0 ppm
30	28.0 33.0	CT-3	60 / 60	N/A	CLAYEY SILT (ML), Gray, moist to dry, hard, some fine Sand, trace fine to coarse Gravel. (TILL).	BZ=0 ppm, HS=0 ppm
35	33.0 38.0	CT-4	60 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm
40	38.0 43.0	CT-5	54 / 60	N/A	As above.	
45	43.0 48.0	CT-6	60 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm
50	48.0 52.5	CT-7	54 / 60	N/A	As above.	End boring at 52.5 feet bgs.
55					End of Boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01

BORING NUMBER: SBI-10
Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 733.11 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 55 Track Rig, 4.25 HSA, 2 ft split spoon and 5 ft CME samplers
START: 30 March 2005 **FINISH:** 30 March 2005 **LOGGER:** R. Schuth

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0.0 2.0	SPT-1	21.6 / 24	4-4-4-4	Asphalt	BZ=0 ppm, HS=0 ppm
	2.0 4.0	SPT-2	0 / 24	2-2-2-2	SAND (SP), Brown, moist, loose, trace Gravel, coarse Sand, asphalt. (ROAD FILL)	BZ=0 ppm, HS=0 ppm
5	4.0 6.0	SPT-3	16.8 / 24	1-2-2-5	SAND (SP), Brown, moist, loose, coarse Sand, trace Gravel.	BZ=0 ppm, HS=0 ppm
	6.0 8.0	SPT-4	16.8 / 24	8-9-9-12	SILT (ML), Brown with red brown mottling, moist to wet, stiff, Sandy, trace Gravel.	BZ=0 ppm, HS=0 ppm
	8.0 10.0	SPT-5	21.6 / 24	7-10-10-10		BZ=0 ppm, HS=0 ppm
10	10.0 12.0	SPT-6	8.4 / 24	5-5-5-7	SILT (ML), Gray, moist, stiff, some Sand, trace Gravel.	BZ=0 ppm, HS=0 ppm
	12.0 14.0	SPT-7	14.4 / 24	6-6-11-13	As above, very stiff.	BZ=0 ppm, HS=0 ppm
	14.0 16.0	SPT-8	24 / 24	6-6-13-21	SILTY SAND (SM), Gray, wet, loose, coarse Sand with Silt.	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
15	16.0 18.0	SPT-9	21.6 / 24	8-13-16-23	SILT (ML), Gray-brown, moist, very stiff, trace Gravel.	BZ=0 ppm, HS=0 ppm
	19.0 24.0	CT-1	27.6 / 60	N/A	SILT (ML), Gray, moist to dry very stiff to hard, some fine Sand and Gravel. (TILL). SILT (ML), Gray, moist to dry, hard, Clayey, some fine Sand, trace Gravel. (TILL).	BZ=0 ppm, HS=0 ppm BZ=0 ppm, HS=0 ppm
20						
25	24.0 29.0	CT-2	60 / 60	N/A		BZ=0 ppm, HS=0 ppm
30	29.0 34.0	CT-3	57.6 / 60	N/A	As above, sand in partings.	BZ=0 ppm, HS=0 ppm
35	34.0 39.0	CT-4	57.6 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm
40	39.0 44.0	CT-5	60 / 60	N/A	As above.	BZ=0 ppm, HS=0 ppm
45	44.0 49.0	CT-6	54	N/A	As above.	BZ=0 ppm, HS=0 ppm End boring at 49 feet bgs.
50					End of Boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01

BORING NUMBER: SBS-01
Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 731.16 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 12/14/05 **FINISH:** 12/14/05 **LOGGER:** T. Vonwallmenich

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	24 / 24	32-45-23-27	WELL GRADED SAND WITH SILT (SW-SM), Brown, moist with fines and gravel, very dense.	
	2.0 4.0	SPT-2	24 / 24	27-22-23-26	CLAY (CL), Brown, moist, sandy with occasional fines and gravel, hard.	
5	4.0 6.0	SPT-3	8.4 / 24	20-37-23-28	Clay for approximately 3" then drove rock.	
	6.0 8.0	SPT-4	19.2 / 24	4-4-3-2	CLAY (CL), Brown, moist, sand, occasional fine to coarse gravel, stiff.	HS=1.3 ppm
	8.0 10.0	SPT-5	18 / 24	2-2-7-10	Becomes gray. WELL GRADED SAND WITH SILT (SW-SM), Moist, black, medium dense.	
10	10.0 12.0	SPT-6	16.8 / 24	4-7-8-7	Becomes wet.	HS=1.5 ppm Collect groundwater grab sample 10-15 feet bgs.
	12.0 14.0	SPT-7	24 / 24	2-2-3-4	PEAT (PT), Brown and black. FINE SAND (SP), Greenish gray, wet, very fine, loose.	HS= 1.5 ppm HS=0.7 ppm
15	14.0 16.0	SPT-8	24 / 24	3-4-6-7	SILT/CLAY (ML/CL), Brown to gray, grades from very fine silt at top to clay at bottom with orange-brown mottles, medium stiff to stiff.	
	16.0 18.0	SPT-9	24 / 24	3-4-5-6	SANDY CLAY/CLAYEY SAND (CL/SM), Brown-gray, moist, sand is in pockets of fine and coarse, medium stiff to stiff, loose.	
	18.0 20.0	SPT-10	24 / 24	4-7-13-20	SANDY CLAY (CL), Gray, moist, sand is fine to meium, occasional coarse gravel, very stiff (till).	0.7 ppm
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-02 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.94 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 12/14/05 **FINISH:** 12/15/05 **LOGGER:** T. Vonwallmenich

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	21.6 / 24	18-40-60-38	SANDY CLAY (CL), Brown, dry, fine to coarse with occasional fines and gravels, hard.	
	2.0 4.0	SPT-2	22.8 / 24	21-28-28-34	WELL GRADED SAND (SW), Light brown, moist, loose, occasional fine gravel. SAND CLAY (CL), Brown, dry, fine to coarse with occasional fines and gravels, hard.	HS=1.3 ppm
5	4.0 6.0	SPT-3	0 / 24	40-40-38-36	Drove rock.	
	6.0 8.0	SPT-4	22.8 / 24	8-12-17-20	SAND WITH SILT (SW-SM), Black to brown, moist, with wood, medium dense.	HS=0.5 ppm
	8.0 10.0	SPT-5	24 /24	7-6-5-4	As above, magnesium oxide, loose.	
10						HS=0.2 ppm
	10.0 12.0	SPT-6	14.4 / 24	3-6-6-5	As above, Black becoming wet, medium dense.	HS=0.2 ppm
	12.0 14.0	SPT-7	24 / 24	3-3-4-4		Collect groundwater grab sample 9-14 feet bgs.
					PEAT (PT), Black, wet, woody.	HS=0.2 ppm, odor
15	14.0 16.0	SPT-8	24 / 24	2-3-4-6	FINE SAND (SP), Light brown mottled with orange, wet, loose, occasional black peat and coarse sand.	
					CLAYEY SAND (SC), Brown (mottled with orange),moist, top is mottled with black to approximately 15.0', sand is very fine to fine, occasional coarse, medium dense (clayey sections stiff).	End boring at 16 feet bgs.
					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBS-03 **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** ST. Louis, MI

ELEVATION: 730.04 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 2/15/05 **FINISH:** 2/15/05 **LOGGER:** T. Vonwallmenich

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
0					Ground Surface	
	0 2.0	SPT-1	20.4 / 24	9-12-19-28	SANDY CLAY (CL), Brown, moist,very stiff to hard, with fine gravel, occasional coarse gravel.	
	2.0 4.0	SPT-2	24 / 24	27-25-20-18	Same as above.	HS=0 ppm
5	4.0 6.0	SPT-3	14.4 / 24	14-21-29-20	Shoe broke off downhole, brick fragments in cuttings, wood pieces (possible roots).	
	6.0 8.0	SPT-4	14.4 / 24	5-5-2-9	SILTY SAND (SM), Brown, moist, loose, fine to coarse with coarse gravel.	HS=0.6 ppm, driller reports odor
	8.0 10.0	SPT-5	8.4 / 24	5-4-1-2	As above, wet. As above, becomes blackwith medium sheen, petroleum odor	HS=3 ppm Collect ground water grab sample 9-14 feet bgs
10	10.0 12.0	SPT-6	21.6 / 24	1-2-3-3	FINE SAND (SP), Brown/black, wet, loose. As above, gray (11. -11.5 feet bgs)	DNAPL Spray Test positive. HS=0 ppm
	12.0 14.0	SPT-7	24 / 24	2-2-2-4	As above, black (11.5-12 feet bgs) Grades to very fine sand/silt greenish gray with black streaks, medium to high sheen.	DNAPL Spray Test positive. HS=0 ppm
15					Grades to fine-medium silty sand, brown with orange. CLAY (CL), Brown with orange, moist, very stiff. End of Boring	Driller reports just touched into harder clay at 14.0'
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBS-04 **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 730.23 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 12/17/05 **FINISH:** 2/17/05 **LOGGER:** S. Saxena

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	16.8 / 24	6-4-2-2	CLAY WITH SAND (CL), Brown, moist.	
	2.0 4.0	SPT-2	19.2 / 24	6-22-10-11	CLAY WITH SAND (CL), Brown, dry, some gravel, hard.	
5	4.0 6.0	SPT-3	18 / 24	6-8-12-19	CLAY WITH POORLY GRADED SAND (CL), Some peat, dry, gravel present.	DNAPL Spray Test positive.
	6.0 8.0	SPT-4	12 / 24	12-22-25-26	SAND (SP), Black to brown, moist, medium sand, odor	
	8.0 10.0	SPT-5	6 / 24	4-4-6-5	SAND (SP), Black wet, sheen, medium sand, odor.	
10	10.0 12.0	SPT-6	18 / 24	4-3-6-6	As above.	HS=5 ppm
	12.0 14.0	SPT-7	18 / 24	15-26-10-11	As above, saturated.	HS=20 ppm Collect soil sample 10-12 feet bgs. Collect possible product sample 12-14 feet bgs.
					SILTY CLAY (CL), Brown, moist, stiff, some sand.	
15					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-05 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 732.71 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 2/16/05 **FINISH:** 2/16/05 **LOGGER:** S. Saxena

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	20.4 / 24	8-6-5-5	SANDY CLAY (CL), Brown, moist.	
	2.0 4.0	SPT-2	24 / 24	5-13-15-13	SANDY CLAY (CL), Brown, dry.	
5	4.0 6.0	SPT-3	18 / 24	7-9-9-9	CLAY (CL), Brown, dry, some medium to fine sand.	
	6.0 8.0	SPT-4	21.6 / 24	5-13-11-12	CLAY WITH SAND (CL), Brown, dry, lower 6 inches crushed brick.	
	8.0 10.0	SPT-5	21.6 / 24	6-8-9-9	CLAY WITH SAND (CL), Brown, moist, gray medium sand in bottom 2 inches	
10	10.0 12.0	SPT-6	15.6 / 24	5-5-5-10	POORLY GRADED SAND WITH CLAY (SC), Grayish moist, medium sand, with pieces of brick.	DNAPL spray test positive
	12.0 14.0	SPT-7	18 / 24	6-8-5-11	SAND (SP), Black, wet, medium sand, pieces of brick and wood, odor.	DNAPL Spray test positive
15	14.0 16.0	SPT-8	18 / 24	19-13-14-17	Clay (CL), Black to gray, moist, stiff. (TILL)	DNAPLE Spray test positive Sample collected 1400
					End of Boring at 16.0'	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-06 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 734.85 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 2/17/05 **FINISH:** 2/17/05 **LOGGER:** S. Saxena

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	18 / 24	7-9-13-12	SANDY CLAY (CL), Brown, dry, some gravel.	
	2.0 4.0	SPT-2	21.6 / 24	18-16-24-27	SANDY CLAY (CL), Brown, dry, poorly sorted sand, some gravel.	
5	4.0 6.0	SPT-3	24 / 24	7-11-12-10	As above.	
	6.0 8.0	SPT-4	13.2 /24	2-3-3-3	As above.	
	8.0 10.0	SPT-5	13.2 /24	4-6-21-27	SAND (SP), Brown, dry, sand with rock and concrete fragments.	HS=0 ppm Suspect PID is not working properly do to extreme cold.
10	10.0 12.0	SPT-6	18 / 24	17-15-10-8	SAND (SP), Gray to black, moist, loose, concrete fragments.	HS=0 ppm
	12.0 14.0	SPT-7	8.4 / 24	3-8-6-4	SAND (SP), Gray, wet, some fine gravel.	HS=0 ppm
15	14.0 16.0	SPT-8	18 / 24	4-6-8-18	SAND (SW), Gray, wet.	Ground water grab sample 12-17 feet bgs. Soil sample collected 14-15 feet bgs.
	16.0 18.0	SPT-9	16.8 / 24	9-10-13-14	SAND (SW), Gray, wet, loose, medium sand. CLAY (CL) Gray, moist, stiff.	
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-07 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 735.73 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 2/16/05 **FINISH:** 2/17/05 **LOGGER:** S. Sexana

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	2 / 24	7-16-12-8	SANDY CLAY (CL), Brown, moist, becoming dry with depth.	
	2.0 4.0	SPT-2	21.6 / 24	16-22-14-12	SANDY CLAY (CL), Brown, dry, consolidated.	
5	4.0 6.0	SPT-3	19.2 / 24	13-11-11-13	SANDY CLAY (CL), consolidated, dry.	
	6.0 8.0	SPT-4	6 / 24	4-9-12-7	CLAY WITH SAND (CL), Brown, moist.	DNAPL Spray Test negative
	8.0 10.0	SPT-5	0 / 24	9-10-12-50 for 3"	brick fragments.	
10	10.0 12.0	SPT-6	0 / 24	50 for 5"	brick fragments	
	12.0 14.0	SPT-7	24 / 24	14-22-22-27	SAND (SP), Black, moist, loose, medium, odor.	HS=1.8 ppm
15	14.0 16.0	SPT-8	24 / 24	6-3-3-6	As above.	
	16.0 18.0	SPT-9	24 / 24	5-6-10 -10	As above.	Groundwater grab sample collected 14-19 feet bgs. Soil sample collected 16-18 feet bgs.
	18.0 20.0	SPT-10	24 / 24	5-9-11-16	As above.	
20					CLAY (CL) Gray, mosit, stiff.	
					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-08 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 735.57 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 2/16/05 **FINISH:** 2/16/05 **LOGGER:** S. Saxena

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-2	24 / 24	15-20-18 (38)	SANDY CLAY (CL), Brown, dry, fine to coarse sand, fine gravel.	
	2.0 4.0	SPT-5	16 / 24	8-6-6 (12)	As above.	
5	4.0 6.0	SPT-3	24 / 24	11-13-13 (26)	SAND WITH CLAY (SC), Gray, black, moist, loose, medium sand.	HS=14 ppm
	6.0 8.0	SPT-4	12 / 24	8-50/3"	As above.	HS=3 ppm
	8.0 10.0	SPT-9	1.5	8-4-3 (7)	SAND WITH CLAY (SC), Light to dark brown, moist loose, medium sand.	HS=0 ppm
10					Concrete	
	10.0 12.0	SPT-6	6 /24	8-54-14 (68)	SAND (SW) Brown, moist, loose, medium sand. As above.	HS=2 ppm
	12.0 14.0	SPT-1	0 / 24	100/4"	Concrete	
15	14.0 16.0	SPT-7	12 / 24	9-11-4 (15)	As above.	DNAPL Spray test negative Groundwater grab sample collected 13-18 feet bgs. Soil sample collected 16-18 feet bgs.
	16.0 18.0	SPT-8	1 / 24	7-10-7 (17)	SAND (SW), Black, moist, loose,medium, odor, CLAY (CL) Gray, moist, stiff.	HS=39 ppm
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-09 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 733.55 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 ATV rig - 2" and 2 1/2" SS with Autohammer - 4 1/4 ID HSA

START: 2/23/05 **FINISH:** 2/23/05 **LOGGER:** R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	20.4 / 24	6-4-7-7	Topsoil, frozen SILTY SAND (SM), Brown, moist.	HS FID=3 ppm
	2.0 4.0	SPT-2	12 / 24	5-45-50 for 1"	Concrete slab.	HS FID=3 ppm
5						
	6.0 8.0	SPT-3	24 / 24	6-11-12-14	SILTY SAND (SM) Brown, moist, loose, medium sand with fine gravel and wood fragments.	HS FID=25 ppm
	8.0 10.0	SPT-4	6 / 24	14-19-20-18	As above, red staining 7-8 feet bgs. Concrete	HS FID=5 ppm
10						
	10.0 12.0	SPT-5	12 / 24	7-11-6-11	SAND (SP),Black, moist, loose, medium, some fine gravel, strong crude oil odor.	HS FID=129 ppm
	12.0 14.0	SPT-6	14.4 / 24	8-5-8-20	As above.	HS FID=160 ppm Collect groundwater grab sample 12-17 feet bgs. Collect soil sample 12-14 feet bgs.
15	14.0 16.0	SPT-7	14.4 / 24	12-16-18-8	As above, gray, wet.	HS FID=373 ppm
	16.0 18.0	SPT-8	18 / 24	8-10-9-14	CLAYEY SILT (CL-ML), Gray, moist trace fine gravel.	HS FID=18 ppm
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-10 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.96 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 2/17/05 **FINISH:** 2/18/05 **LOGGER:** S. Saxena

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	20.4 / 24	6-6-12-14	CLAY (CL), Brown, dry,with some medium sand and fine gravel.	
	2.0 4.0	SPT-2	22.8 / 24	6-12-8-10	As above, pieces of brick.	
5	4.0 6.0	SPT-3	18 / 24	6-7-8-8	SAND (SW), Brown, moist, loose, some brick framents.	
	6.0 8.0	SPT-4	3.6 / 12	5-3-3-7	As above, with fine gravel, wet.	
	8.0 10.0	SPT-5	22.8 / 24	5-6-8-9	SAND (SP) Gray, wet, loose, medium sand with fine gravel.	Collect groundwater grab sample 8.5-13.5 feet bgs. Collect soil sample 8 feet bgs.
10	10.0 12.0	SPT-6	24 / 24	10-10-15-17	SAND (SP), Gray, wet, loose, medium sand.	
	12.0 14.0	SPT-7	24 / 24	13-13-8-11	As above.	
					SANDY CLAY (CL), Gray, mosit, firm, very fine sand.	
15					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBS-11 **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 732.00 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 22 Feb 05 **FINISH:** 22 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	24 / 24	4-3-3-6	SANDY SILT(ML), Brown, moist, medium density, medium sand. (TOPSOIL)	
	2.0 4.0	SPT-2	20.4 / 24	9-27-12-13	SANDY CLAY (CL), Gray, dessicated, hard. (CAP)	HS FID=1.9 ppm
5	4.0 6.0	SPT-3	0 / 24	12-9-50 for 1"	As above.	Crushed tip of spoon can not open concrete in shoe
	6.0 8.0	SPT-4	21.6 / 24	10-13-9-13	SAND (SP), Black, dry to moist, medium, loose, no odor.	
	8.0 10.0	SPT-5	20.4 / 24	4-4-3-4	SAND (SP), Brown/yellow, moist to wet, medium, some oxidation in bands.	HS FID=133 ppm
10	10.0 12.0	SPT-6	24 / 24	6-8-7-10	SAND (SP), Black, wet, loose, medium, saturated, light sheen, low odor.	HS FID=207 ppm Collect groundwater grab sample 8.6 -13.6 feet bgs. Collect soil sample 10-12 feet bgs.
	12.0 14.0	SPT-7	15.6 / 24	5-8-12-26	As above, wet.	HS FID=69 ppm
15	14.0 16.0	SPT-8	24 / 24	6-12-9-11	As above, wet	HS FID=86 ppm
					SANDY SILT (ML), Gray, moist, stiff, occassional fine gravel.	
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-12 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.81 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 2/18/05 **FINISH:** 2/18/05 **LOGGER:** S. Saxena

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	24 / 24	13-8-7-11	SILT (ML), Brown, moist, medium dense. (TOPSOIL) CLAY (CL), Gray, dessicted, hard, occasional gravel.	
	2.0 4.0	SPT-2	24 / 24	14-21-20-27	As above.	
5	4.0 6.0	SPT-3	13.2 / 24	15-21-25-20	As above. SILT (SM), Brown, moist, stiff, wood fragments.	
	6.0 8.0	SPT-4	12 / 24	5-12-12-9	SAND (SP), Brown, wet, loose, mediumsand with trace gravel and white granular material.	HS=54 ppm
	8.0 10.0	SPT-5	18 / 24	4-9-1-15	SAND (SW), Dark gray, wet, loose, medium sand, odor.	HS=60 ppm
10	10.0 12.0	SPT-6	9.6 / 24	7-5-5-7	As above.	HS=55 ppm
	12.0 14.0	SPT-7	24 / 24	7-11-11-13	SAND (SP), Gray, wet, loose, medium sand.	HS=102 ppm Collect groundwater grab sample 11-16 feet bgs. Collect soil sample 12-14 feet bgs.
15	14.0 16.0	SPT-8	24 / 24	9-10-10-16	As above. CLAY (CL) Gray, moist, stiff.	HS=40 ppm
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-13 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 731.82 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 2" Split Spoon
START: 19 Feb 05 **FINISH:** 19 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0					Topsoil	
	0 2.0	SPT-1	22.8 / 24	12-5-3-3	SANDY CLAY (CL), Gray, dessicated, hard.	
	2.0 4.0	SPT-2	24 / 24	12-13-17-13	As above.	
					As above.	
5	4.0 6.0	SPT-3	21.6 / 24	14-19-12-10	SAND (SW), Brown, moist, loose, medium sand, some wood fragments.	HS FID=29 ppm
	6.0 8.0	SPT-4	18 / 24	11-13-14-50	SILTY SAND (SM), Dark brown, moist, loose, some wood fragments.	HS FID=30.4 ppm Bits of glass and washers in cuttings
					Concrete slab	Per Driller concrete slab 7.5-8.5, with cobbles 6.5-9.5. Cuttings contain rebar and concrete. Collect groundwater grab sample 8.6-13.6 feet bgs.
10	10.0 12.0	SPT-7	0 / 24	12-16-18-31		Concrete in shoe cause of poor recovery 10-12 feet bgs.
	12.0 14.0	SPT-8	24 / 24	14-21-30-34	SILTY SAND (SM), Brown, wet, medium density, medium to fine sand.	HS FID=107 ppm Collect soil sample 12-14 feet bgs.
					SILTY CLAY (CL), Gray, moist, firm, trace gravel, angular, medium plasticity. (TILL).	
15					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-14 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.61 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 2' Split Spoon

START: 19 Feb 05 **FINISH:** 19 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
0					Ground Surface	
	0 2.0	SPT-1	24 /24	21-24-25-31	SANDY SILT (ML), Brown, moist, loose, fine sand. (TOPSOIL) SANDY CLAY (CL), Gray, dessicated, hard. (CAP	
	2.0 4.0	SPT-2	24 / 24	13-12-21-27		
5	4.0 6.0	SPT-3	21.6 / 24	11-6-6-8	SAND (GW), Yellow brown, dry, medium, loose. SILT (ML), Gray brown, moist, medium firm, white chalky substance (magnesium oxide?) As above, more white chalky substance, wet.	
	6.0 8.0	SPT-4	0 / 24	2-2-2-2		Rock in shoe cause of poor recovery
	8.0 10.0	SPT-5	24 / 24	4-5-6-9	SANDY SILT (ML), Brown, wet, loose, fine sand. SAND (SW), Brown, saturated, very coarse, angular, odor.	Collect soil sample 9-10 feet bgs. DNAPL Spray Test - Positive HS FID=512 ppm
10	10.0 12.0	SPT-6	24 /24	10-10-13-18	SAND (SW), Gray, saturated, medium sand, odor, sheen.	HS FID=225 ppm DNAPL Spray Test - Negative
	12.0 14.0	SPT-7	18 / 24	100+ for 1 inch	SAND (SW), Brown, saturated, very coarse, angular, odor.	HS FID=337 ppm DNAPL Spray Test - Negative
15	14.0 16.0	SPT-8	24 / 24	26-24-27-32	SAND (SW), Black, saturated, loose, medium, odor and sheen. SAND (SW), Brown, saturated, coarse, loose, odor, sheen.	DNAPL Spray Test - Positive HS FID=169 ppm HS FID=150 ppm DNAPL Spray Test - negative
	16.0 18.0	SPT-9	24 / 24	18-13-11-21	SAND (SW), Black, saturated, loose, odor and sheen.	Collect groundwater grab sample 15-18 feet bgs. HS FID=386 ppm
	18.0 19.0	SPT-10	12 / 12	9-50	SAND (SW), Brown, moist, loose, odor, no sheen, coarse. SANDY CLAY (CL), Gray, moist, hard, some fine sand, trace angular gravel. (TILL)	HS FID=380 ppm
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-15 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 731.19 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 Tire Mount 4 1/4" HSA - 2' Split Spoon

START: 18 Feb 05 **FINISH:** 18 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	18 / 24	9-5-2-3	SANDY SILT (ML), Brown, moist, loose, fine sand. (TOPSOIL) SANDY CLAY (CL), Gray, dessicted, hard. (CAP)	
	2.0 4.0	SPT-2	20.4 / 24	9-18-21-15	As above.	
5	4.0 6.0	SPT-3	24 / 24	15-16-21-21	As above.	
	6.0 8.0	SPT-4	22.8 / 24	11-13-7-5	SAND (SP), Yellow brown, moist, dense, medium sand. SILT (ML), Gray, moist, firm.	
	8.0 10.0	SPT-5	0 / 24	3-1 for 12 inches-7	Brick fill.	HS FID=.03 ppm Possible void space 8.5-9.5 bgs.
10	10.0 12.0	SPT-6	6 / 24	7-2-2-3	SILT (ML), Gray, wet.	HS FID= 0.7 ppm Large cobble in shoe cause of poor recovery
	12.0 14.0	SPT-7	24 / 24	3-5-7-8	As above, chemical odor	HS FID=23 ppm
15	14.0 16.0	SPT-8	24 / 24	6-8-11-17	SAND (SP), Yellow brown, wet, angular, loose, chemical odor, medium sand.	HS FID=42 ppm
	16.0 18.0	SPT-9	22.8 / 24	6-23-24-24	SAND (SP), Yellow Brown, wet, angular, loose chemical odor, medium sand.	HS FID=33 ppm
	18.0 20.0	SPT-10	24 / 24	15-26-28-30	As above.	HS FID=202 ppm Collect groundwater grab sample 21.4-26.4 feet bgs. Collect soil sample 18-20 feet bgs.
20	20.0 22.0	SPT-11	24 / 24	7-13-20 (33)		HS FID=187 ppm
					SILTY CLAY (CL), Reddish brown, moist, hard to stiff, trace angular gravel. (TILL).	
					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-16 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 734.36 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 4 1/4" HSA - 2' Split Spoon
START: 19 Feb 05 **FINISH:** 19 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	24 / 24	9-5-4-7	SANDY SILT (ML), Brown, moist, loose, fine sand, roots. (TOPSOIL) CLAY (CL), Gray, dessicated, hard. (CAP)	
	2.0 4.0	SPT-2	14.4 / 24	6-10-30-15	As above.	
5	4.0 6.0	SPT-3	24 / 24	12-14-12-26	SANDY SILT (ML), Brown, moist, firm, hydrocarbon odor.	HS FID=59.8 ppm DNAPL Spray Test - Negative
	6.0 8.0	SPT-4	16.8 / 24	9-28-29-21	SAND (SW), Brown, moist, loose, medium sand, some fine gravel.	HS FID=9.2 ppm Concrete in tip of sampler cause of poor recovery
	8.0 10.0	SPT-5	18 / 24	9-10-15-20	As above.	HS FID=5.4 ppm
10	10.0 12.0	SPT-6	19.2 / 24	12-11-13-8	SAND (SP), Yellow-brown, wet, loose, mediumsand.	HS FID=2.48 ppm
	12.0 14.0	SPT-7	21.6 / 24	2-3-34	As above.	HS FID=23.75 ppm
15	14.0 16.0	SPT-8	24 / 24	8-12-6-10	As above. SILTY CLAY (CL), Gray, moist, firm, some angular gravel (TILL).	HS FID=4.2 ppm
					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-17 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 732.76 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 4 1/4" HSA - 2" Split Spoon
START: 19 Feb 05 **FINISH:** 19 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	24 / 24	10-5-7-10	Topsoil SAND (SP), Yellow brown, dry, medium, loose.	
	2.0 4.0	SPT-2	24 / 24	8-10-27-25	SANDY CLAY (CL), Gray, dessicted, hard. (CAP) As above.	HS FID=0 ppm HS PID=0 ppm
5	4.0 6.0	SPT-3	24 / 24	13-15-17-18	As above.	HS FID=1 ppm HS PID=1 ppm
	6.0 8.0	SPT-4	18 / 24	5-5-6-3	As above.	
	8.0 10.0	SPT-5	12 / 24	2-3-9-5	SILT (ML) Gray, moist, firm, white chalky material present (magnesium oxide?).	HS FID=1 ppm HS PID=1 ppm Wood in shoe
10	10.0 12.0	SPT-6	16.8 / 24	4-2-3-4	SAND (SW), Black with yellow layers, moist, loos, fine sand.	HS FID=105 ppm HS PID=2.11 ppm
	12.0 14.0	SPT-7	24 /24	3-6-9-13	SANDY SILT (ML), Brown, saturaturated, soft. SAND (SW), Black, wet, loose, fine.	HS FID=38 ppm HS PID=2 ppm HS FID=306 ppm HS PID=5 ppm
15	14.0 16.0	SPT-8	24 /24	6-6-16-17	SAND (SW), Black, moist, medium density, odor. SILTY CLAY (CL), Orangeish, hard, trace angular fine gravel. (TILL).	HS FID=284 ppm HS PID=8 ppm Collect groundwater grab sample 11-16 feet bgs. Collect soil sample 13-15 feet bgs.
					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-18 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 734.31 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 2/20/05 **FINISH:** 2/20/05 **LOGGER:** S. Saxena

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	24/ 24	13-17-18-21	SANDY SILT (ML), Brown, moist, loose, fine sand. (TOPSOIL) SAND (SP), Brown, moist, loose, medium sand.	
	2.0 4.0	SPT-2	18 / 24	17-18-13-14	SANDY CLAY (CL),Gray, dessicated, hard. (CAP As above.	
5	4.0 6.0	SPT-3	13.2 / 24	10-14-50 for 4 inches		
	6.0 8.0	SPT-4	24 /24	8-19-25-27	As above SAND (SP), Brown, moist, loose, medium sand.	
	8.0 10.0	SPT-5	24 /24	21-15-21-21	SILTY SAND (SM), Black, moist, medium sand.	
10	10.0 12.0	SPT-6	13.2 / 14	8-12-7-10	SAND (SP), Brown, moist,loose, medium sand with pieces of rock.	
	12.0 14.0	SPT-7	21.6 / 14	8-6-4-5	SAND (SW) Brown, wet, loose, medium sand.	Collect groundwater grab sample 12-15 feet bgs. Collect soil sample 8-10 feet bgs.
15	14.0 16.0	SPT-8	18 / 24	6-5-11-9	As above.	
	16.0 18.0	SPT-9	21.6 / 24	4-6-13-19	As above. CLAY (CL), Gray, moist, stiff.	
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-19 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 736.79 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 20 Feb 05 **FINISH:** 20 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	22.8 / 24	15-22-5-7	SANDY SILT (ML), Brown, moist, soft, fine sand. (TOPSOIL)	
					SANDY (CL), Gray, dessicated, hard, trace fine gravel. (CAP)	
	2.0 4.0	SPT-2	6 / 24	8-6-10-12	As above.	
5	4.0 6.0	SPT-3	24 / 24	6-7-5-4	SILTY SAND (SM), Brown, moist, medium dense, medium sand.	HS FID=1.98 ppm
	6.0 8.0	SPT-4	24 / 24	8-8-15 (23)	SILT/CLAY (CL/ML), Brown/Gray, moist, firm, bits of concrete, brick, grass, no odor, no sheen.	HS FID=8.3 ppm DNAPL Spray Test - Negative
	8.0 10.0	SPT-5	6 / 24	5-50 for 1 inch	As above.	Cobble in sampler tip cause of poor recovery.
10	10.0 12.0	SPT-6	6 / 24	11-24-34-36	SILT (ML), Brown, moist, firm.	DNAPL Spray Test - Negative Cobble in sampler tip cause of poor recovery.
	12.0 14.0	SPT-7	6 / 24	11-12-16-16	SANDY SILT (ML), Brown, moist, medium sand.	HS FID=34 ppm Cobble in sampler tip cause of poor recovery.
15	14.0 16.0	SPT-8	12 / 24	7-7-15-12	SILT (ML), Brown, moist, firm, odor, sheen.	HS FID=7.3 ppm DNAPL Spray Test - negative
	16.0 18.0	SPT-9	6 / 24	7-11-14-15	SANDY SILT (ML), Brown, wet, firm, odor, sheen.	HS FID=161 ppm DNAPL Spray Test - negative
					CLAY (CL), Gray, moist, firm, some gravel (TILL).	Collect groundwater grab sample 13-18 feet bgs and soil sample 16-18 feet bgs.
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-20 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 734.97 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 02/21/05 **FINISH:** 02/21/05 **LOGGER:** R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	24 / 24	11-15-9-9	SANDY SILT (ML), Brown, moist, soft, fine sand. (TOPSOIL)	
					SAND (SP), Yellow, moist, loose, medium sand.	HS FID=3 ppm
	2.0 4.0	SPT-2	19.2 / 24	16-17-15-11	SILTY SAND (SM), Light brown, loose, moist, fine sand..	
					SILTY SAND (SM), Brown, moist, medium dense, fine sand, trace fine gravel.	HS FID=4 ppm
5	4.0 6.0	SPT-3	24 / 24	10-12-13-13		HS FID=32 ppm
	6.0 8.0	SPT-4	0 / 24	6-11-13-15		
	8.0 10.0	SPT-5	18 / 24	6-7-11-11	As above.	HS FID=8 ppm
					SAND (SP), Gray, moist, medium, some fine gravel.	Collect soil sample 4-6 feet bgs. Groundwater insufficient to obtain sample.
10	10.0 12.0	SPT-6	18 / 24	11-15-19-21	SAND (SP), Golden brown, moist, loose, medium sand, trace fine gravel.	HS FID=5 ppm
	12.0 14.0	SPT-7	20.4 / 24	4-6-13-19	CLAYEY SILT (CL-ML), Gray, moist, stiff, some fine sand.	HS FID=8 ppm
15	14.0 16.0	SPT-8	13.2 / 24	9-10-12-14		HS FID=5 ppm
					SANDY SILT (ML), Gray, moist, stiff, trace fine angular gravel. (TILL)	
					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-21 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 736.58 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 02/21/2005 **FINISH:** 02/21/2005 **LOGGER:** R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
					Ground Surface	
0	0 2.0	SPT-1	24 / 24	12-14-14-14	SILTY SAND (SM), Brown, moist, loose, fine sand. (TOPSOIL)	HS FID= 3 ppm
	2.0 4.0	SPT-2	24 / 24	8-11-12-9	SANDY CLAY (CL), Gray, dessicated, hard. (CAP) SILTY SAND (SM), Brown, moist, odor.	HS FID= 209 ppm
5	4.0 6.0	SPT-3	9.6 / 24	7-9-6-8	SILTY SAND (SM), Brown, moist, medium density, fine sand, some fine gravel.	HS FID= 989 ppm
	6.0 8.0	SPT-4	0 / 24	13-8-7-6		
	8.0 10.0	SPT-5	19.2 / 24	3-4-6-12	SAND WITH SILT (SM), Brown, moist, medium density, fine sand.	HS FID= 843 ppm
10	10.0 12.0	SPT-6	4.8 / 24	4-5-4-3	SILTY SAND (SM), Gray, moist, medium density, fine sand.	HS FID= 413 ppm
	12.0 14.0	SPT-7	21.6 / 24	5-4-3-6	SILTY SAND (SM), Gray, moist, medium density, fine sand.	HS FID= 182 ppm
15	14.0 16.0	SPT-8	24 / 24	9-10-9-9	SAND (SP), Gray, wet, loose, medium grain.	HS FID= 28 ppm Collect groundwater grab sample (16-21 feet bgs) and soil sample (4-10 feet bgs.)
	16.0 18.0	SPT-9	14.4 / 24	3-3-3-4	SILT (ML), Gray, wet, soft.	HS FID= 7 ppm
	18.0 20.0	SPT-10	24 / 24	5-8-7-10	As above.	
20	20.0 22.0	STP-11	18 / 24	5-13-21-29	SANDY SILT (ML), Gray, moist, hard, trace fine gravel. (TILL)	HS FID= 4 ppm HS FID= 4 ppm
					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-22 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 731.59 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 21 Feb 05 **FINISH:** 21 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	16.8 / 24	8-6-5-5	SILT (ML), Brown, moist, firm, some fine gravel.	
	2.0 4.0	SPT-2	24 / 24	12-18-30-50	SANDY CLAY (CL), Gray, dessicated, hard.	Cobble in sampler causing poor recovery
					As above.	
5	4.0 6.0	SPT-3	9.6 / 24	8-12-18-11	SAND (SW), Yellow -brown, angular, loose, medium sand, some fine gravel.	HS FID=12 ppm HS PID=1.9 ppm
	6.0 8.0	SPT-4	15.6 / 24	8-15-24-34	As above. As above.	HS FID=21.6 ppm
	8.0 10.0	SPT-5	19.2 / 24	4-6-19-24	As above, wet. CLAY (CL), Gray with black staining, stiff, hydrocarbon odor.	HS FID=41 ppm
10	10.0 12.0	SPT-6	24 / 24	7-11-18-18	SILT (ML), Brown, wet, stiff, approximately 30% very fine sand, hydrocarbon odor. As above.	HS FID=41 ppm
	12.0 14.0	SPT-7	24 / 24	4-6-14-016	SILT (ML), Gray, moist, very stiff, some fine gravel and clay (TILL).	Collect groundwater grab sample 8.3-13.3 feet bgs and soil sample 10-12 feet bgs.
15					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-23 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** 6' N. of Weston F12

ELEVATION: 734.39 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 2/15/05 **FINISH:** 2/15/05 **LOGGER:** T. Von Wallmerich, S. Saxena, R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	21.6 / 24	4-7-8-12	SANDY CLAY (CL), Brown to dark brown, pocket (4") of SW at 0.7 - 1.1',moist, stiff.	
	2.0 4.0	SPT-2	24 / 24	10-11-11-12	As, above, pocket (4") of fine to very fine sand at 3.5', very stiff.	
5	4.0 6.0	SPT-3	24 / 24	5-11-13-15	SAND WITH CLAY (SW-SC), Brown/yellowish, moist, fine to coarse, occasional fine gravel, medium dense.	HS PID=0 ppm DNAPL Spray Test - Negative
	6.0 8.0	SPT-4	15.6 / 24	6-3-3-4	SANDY CLAY (CL), Brown/yellowish, moist. SANDY CLAY (CL), Brown/grayish, occasional gravel, green and yellow mottling	1 inch pipe fragments in cuttings from 6.5 feet bgs.
	8.0 10.0	SPT-5	0 / 24	100/3"	Concrete	Driller reports slight odor, BZ PID=0 ppm Concrete slab 8.5 feet bgs, abandon hole and reposition 2 feet north.
10						
	12.0 14.0	SPT-7	2.4 / 24	12-9-6-7	SILTY SAND (SM), Brown, moist, medium density, fine sand, some fine gravel	Drill through concrete 8.5-12.5 feet bgs.
15	14.0 16.0	SPT-10	0 / 24	19-20-19-22		HS FID=9 ppm Sampler became unthreaded and lost down hole, abandon hole and repositon 4 feet south.
	16.0 18.0	SPT-12	12 / 24	9-15-8-8	SAND (SP), Gray to brown, wet, loose, medium sand, some fine gravel, pungent odor. SILTY CLAY (CL-ML), Gray, wet, some fine gravel, odor. (TILL)	HS FID=108 ppm Collect groundwater grab sample (14-19 feet bgs) and soil sample (16-18 feet bgs.)
	18.0 20.0	SPT-13	12 / 24	8-9-13-18		HS FID=31 ppm
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-24 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.70 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 2 Feb 05 **FINISH:** 2 Feb 05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	24 / 24	8-5-6-9	SANDY SILT (ML), Brown, moist, fine sand, roots. (TOPSOIL)	
					SANDY CLAY (CL), Gray, dessicated, hard, trace gravel. (CAP)	
	2.0 4.0	SPT-2	24 / 24	14-13-9-27	As above.	HS FID=6.2 ppm HS PID=0 ppm
5	4.0 6.0	SPT-3	24 / 24	18-30-22-34	BRICK WITH WOOD, crushed loose brick and wood fragments.	
	6.0 8.0	SPT-4	0 / 24	6-12-8-8		Concrete in tip of sampler.
	8.0 10.0	SPT-5	20.4 / 24	4-5-7-8	SAND (SP), Brown, wet, loose, angular, coarse sand, some black staining in bands..	HS FID=78 ppm HS PID=.8 ppm
10	10.0 12.0	SPT-6	24 / 24	5-8-10-13	As above.	HS FID=107 ppm HS PID=5.8 ppm
	12.0 14.0	SPT-7	21.6 / 24	10-8-8-13		Collect groundwater grab sample 8.4-13.4 feet bgs and soil sample 10-13 feet bgs.
					CLAY (ML), Gray, moist, firm to hard, low plasticity, trace gravel. (TILL)	HS FID=108 ppm
15					End of Boring	
20						
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-25 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 743.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55, 3/4 HSA - Split Spoon Sampler (2 1/2" diameter)

START: 3/18/05 **FINISH:** 3/18/05 **LOGGER:** R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	24 / 24	15-15-12-14	SILT (ML), Brown, moist, soft, roots. (TOPSOIL)	
					SILTY SAND (SM), Brown, moist, loose, fine sand.	
	2.0 4.0	SPT-2	9.6 / 24	2-2-5-2	CLAYEY SILT (ML), Brownish gray, moist, soft, some fine sand.	HS PID=0.5 ppm HS PID=1.1 ppm
5	4.0 6.0	SPT-3	12 / 24	5-5-5-5	As above.	HS PID=1.1 ppm
	6.0 8.0	SPT-4	24 / 24	4-5-5-5	CLAYEY SILT (ML), Brown, moist, some fine sand and gravel.	HS PID=0.6 ppm
	8.0 10.0	SPT-5	10.8 / 24	2-3-3-3	SANDY SILT (ML), Brownish gray, moist, some fine gravel.	HS PID=0.5 ppm
10	10.0 12.0	SPT-6	14.4 / 24	2-2-3-3	As above	HS PID=1.1 ppm
	12.0 14.0	SPT-7	21.6 / 24	2-2-5-9	SANDY SILT (ML), Brownish gray, moist, some fine sand and gravel, strong brine odor.	HS PID=48 ppm
15	14.0 16.0	SPT-8	21.6 / 24	3-5-9-10	As above.	HS PID=28 ppm
	16.0 18.0	SPT-9	18 / 24	16-16-14-15	SAND(SP), Brown, dry, loose, medium sand with fine gravel.	HS PID=6 ppm
	18.0 20.0	SPT-10	10.8 / 24	7-8-10-10	As above.	HS PID=4 ppm
20	20.0 22.0	SPT-11	4.8 / 24	2-4-5-8	As above.	HS PID=2 ppm
	22.0 24.0	SPT-12	18 / 24	4-7-10-14	SILT (ML), Light brown, moist, soft, trace fine sand.	HS PID=2 ppm
25	24.0 26.0	SPT-13	9.6 / 24	4-10-10-14	As above.	HS PID=0.9 ppm
	26.0 28.0	SPT-14	24 / 24	10-16-16-21	As above.	HS PID=0.5 ppm
	28.0 30.0	SPT-15	13.2 / 24	8-12-26-21	SAND(SP), Grayish brown, moist, loose, coarse sand with fine gravel.	HS PID=0.2 ppm
30					SANDY SILT (ML), Grayish brown, moist, stiff, fine sand, trace fine gravel. (TILL)	
					End of Boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-26 Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 747.08 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 3/18/05 **FINISH:** 3/18/05 **LOGGER:** R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	18 / 24	5-5-5-7	SANDY SILT (ML), Brown, moist, soft, fine sand. (TOPSOIL) SILTY SAND (SM) Brown, moist, fine sand, some fine gravel and organic matter.	
	2.0 4.0	SPT-2	18 / 24	1-13-13-13	SILTY SAND (SM), Gray, dry, trace fine gravel.	HS PID=0.5 ppm HS PID=0.8 ppm
5	4.0 6.0	SPT-3	13.2 / 24	3-4-9-11	SILTY SAND (SM), Brown, dry some fine gravel.	HS PID=0.3 ppm HS PID=0.5 ppm
	6.0 8.0	SPT-4	15.6 / 24	6-12-15-15	As above.	HS PID=1.1 ppm
	8.0 10.0	SPT-5	20.4 / 24	6-8-12-15	As above, dark brown	HS PID=0.6 ppm
10	10.0 12.0	SPT-6	21.6 / 24	6-6-12-13	As above with brine odor.	HS PID=1.2 ppm
	12.0 14.0	SPT-7	21.6 / 24	3-3-3-5	SANDY SILT (ML), Black staining, petro (cyanide) odor.	HS PID=33 ppm Collect soil sample 12-14 feet bgs.
15	14.0 16.0	SPT-8	24 / 24	2-2-2-2	SILT (ML), Light gray, very soft.	HS PID=4 ppm
	16.0 18.0	SPT-9	18 / 24	2-2-1-1	SILT (ML), Dark gray and brown mottle, very soft.	HS PID=6 ppm
	18.0 20.0	SPT-10	24 / 24	1-1-1-3	As above.	HS FID=3 ppm HS FID=1.2 ppm
20	20.0 22.0	SPT-11	9.6 / 24	2-2-2-3	SILTY SAND (SM), Grayish brown, dry, medium density, fine sand, some fiine gravel.	HS FID=1.8 ppm
	22.0 24.0	SPT-12	10.8 / 24	11-16-31-27	SAND (SW), Gray, moist, loose, medium sand, some fine gravel.	
25	24.0 26.0	SPT-13	15.6 / 24	6-7-10-15	As above	HS FID=2.0 ppm

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBS-26 **Sheet:** 2 of 2

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 747.08 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 3/18/05 **FINISH:** 3/18/05 **LOGGER:** R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
					SILT (ML), Brown, moist, firm, some fine gravel.	
	26.0 28.0	SPT-14	18 /24	3-6-10-16	SILT (ML), Brown gray, moist, firm, some fine sand.	HS FID=1.7 ppm
	28.0 30.0	SPT-15	18 / 24	7-15-19-30	SAND (SP), Gray, wet, loose, medium sand.	HS FID=1.1 ppm Collect groundwater grab sample 28-33 feet bgs.
30	30.0 32.0	SPT-16	14.4 / 24	3-5-5-12	As above.	HS FID=1.5 ppm
	32.0 34.0	SPT-17	21.6 / 24	7-15-38-50 for 5 inches	CLAYEY SILT (ML), Gray, moist, stiff, trace fine gravel.	HS FID=0.6 ppm
35					End of Boring	
40						
45						
50						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-27 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 731.16 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 HSA 4 1/4" ID - 140 lb Autohammer SPT

START: 3/23/05 **FINISH:** 3/23/05 **LOGGER:** R. Stryker

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	COMMENTS (DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID)
					Ground Surface	
0	0 2.0	SPT-1	21.6 / 24	7-15-10-8	SANDY SILT (ML), Brown, moist, soft, fine sand. (TOPSOIL)	
					SANDY SILT (ML), Brown, dry, some fine gravel. (CAP)	
	2.0 4.0	SPT-2	6 / 24	9-16-21-21	As above.	HS PID=0.2 ppm HS PID=0.4 ppm Collect soil sample 4-6 feet bgs.
5	4.0 6.0	SPT-3	21.6 / 24	4-10-12-15	SILTY SAND (SM), Brown, moist, fine sand, some fine gravel, brine odor.	HS PID=9 ppm
	6.0 8.0	SPT-4	19.2 / 24	4-5-8-14	CLAYEY SILT (ML), Brown and gray mottle, most, soft, some fine sand. As above, magnesium oxide present.	HS FID=0.6 ppm HS PID=3 ppm
	8.0 10.0	SPT-5	2.4 / 24	2-2-2-1	As above, wet, magnesium oxide present.	HS FID=0.8 ppm Encounter obstuction at 8.6 feet bgs. Reposition, blind drill to 8 feet bgs.
10	10.0 1.0	SPT-6	21.6 /24	1-1-1-1	As above, wet, magnesium oxide present.	HS PID=0 ppm
	12.0 14.0	SPT-7	0 / 24	WHO-1-1		
15	14.0 16.0	SPT-8	21.6 /24	1-3-3-12	As above, wet, magnesium oxide present.	HS PID=0 ppm
					SAND (SP), Black, moist, medium sand, some fine gravel, stained.	HS PID=0 ppm
	16.0 18.0	SPT-9	14.4 /24	4-4-9-10	SANDY SILT (ML), Dark brown, moist, soft. SAND (SP), Brown, wet, loose, medium.	Collect groundwater grab sample 15-20 feet bgs.
20	18.0 20.0	SPT-10	13.2 /24	6-6-10-14	CLAYEY SILT (ML), Brownish gray, moist, stiff, some fine sand, trace fine gravel. (TILL).	HS PID=0 ppm
	20.0 22.0	SPT-11	12 / 24	4-8-14-14	As above.	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01	BORING NUMBER: SBS-28 Sheet: 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 732.64 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 4/6/05 **FINISH:** 4/6/05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
0					Ground Surface	
	0 2.0	SPT-1	19.2 / 24	4-6-6-12	SANDY SILT (ML), Brown, moist, soft, fine sand. (TOPSOIL) SAND (SW), Brown, moist, loose, coarse sand.	
	2.0 4.0	SPT-2	12 / 24	12-17-17-14	SILT (ML), Brown-gray, dessicated, hard. (CAP) As above.	BZ=0 ppm, HS=0 ppm
5	4.0 6.0	SPT-3	14.4 / 24	17-16-15-14	As above.	Refusal at 6 feet bgs, repositon 10 feet north, blind drill to 6 feet bgs.
	6.0 8.0	SPT-4	20.4 / 24	3-4-4-6	As above SILTY SAND (SP), Moist, loose, medium sand, some fine gravel.	HS PID=20.4 ppm Rock in shoe
	8.0 10.0	SPT-5	16.8 / 24	3-4-5-7	SAND (SW), Brown with black mottles, moist to wet, loose, medium sand.	HS PID=23.4 ppm HS PID=87 ppm
10	10.0 12.0	SPT-6	20.4 / 24	2-2-2-2	As above, strong solvent odor As above ,wet, strong solvent odor	BZ=0 ppm HS PID=167 ppm Collect groundwater grab sample 11-16 feet bgs.
	12.0 14.0	SPT-7	24 / 24	1-4-7-10	As above, wet, strong solvent odor	BZ=0 ppm Collect soil sample 12-16 feet bgs. HS PID=185 ppm
15	14.0 16.0	SPT-8	24 / 24	1-5-8-8	As above, wet, strong solvent odor. SILT (ML), Gray, moist, hard, firm, some gravel.	HS PID=193 ppm
20					End of Boring	
25						

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **BORING NUMBER:** SBS-29 **Sheet:** 1 of 1

SOIL BORING LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 732.85 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 750 HSA 4 1/4" ID - 140 lb Autohammer SPT
START: 4/7/05 **FINISH:** 4/7/05 **LOGGER:** J. Myers

DEPTH BELOW	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (IN)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6"	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, TESTS, INSTRUMENTATION AND AIR MONITORING BZ=Breathing zone PID HS=Headspace PID
					Ground Surface	
0	0 2.0	SPT-1	22.8 / 24	6-7-10-10	SANDY SILT (ML), brown, moist, fine sand. (TOPOSIL) SAND (SP), Brown, loose, medium sand.	HS PID=0 ppm
	2.0 4.0	SPT-2	20.4 / 24	5-6-7-10	SANDY CLAY (CL), Gray,dessicated, hard ,fine sand, trace fine gravel. (CAP). As above.	
5	4.0 6.0	SPT-3	19.2 / 24	4-8-12-20	As above. SILTY SAND (SM), Brown, dry, loose, medium sand.	HS PID=3 ppm
	6.0 8.0	SPT-4	16.8 / 24	2-2-3-3	As above. SAND (SW), Brown, wet to moist, fine to coarse, no odor, trace fine gravel.	HS PID=5.2 ppm HS PID=4.5 ppm
	8.0 10.0	SPT-5	19.2 / 24	2-2-3-4		
10	10.0 12.0	SPT-6	20.4 / 24	2-2-5-5	As above, wet.	
	12.0 14.0	SPT-7	19.2 / 24	3-5-9-9	As above, saturated.	HS PID=6 ppm HS PID=15.2 ppm
15	14.0 16.0	SPT-8	21.6 / 24	4-9-7-10	As above, saturated.	Collect groundwater grab sample (12.87-17.87 feet bgs.) and soil sample (15-17 feet bgs.).
	16.0 18.0	SPT-9	21.6 / 24	5-7-12-18	SILT (ML), Gray, moist, stiff, trace, angular gravel.	
20					End of Boring	
25						

Well Completion Diagrams

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **WELL NUMBER:** MW16-D2a | **Sheet:** 1 of 3

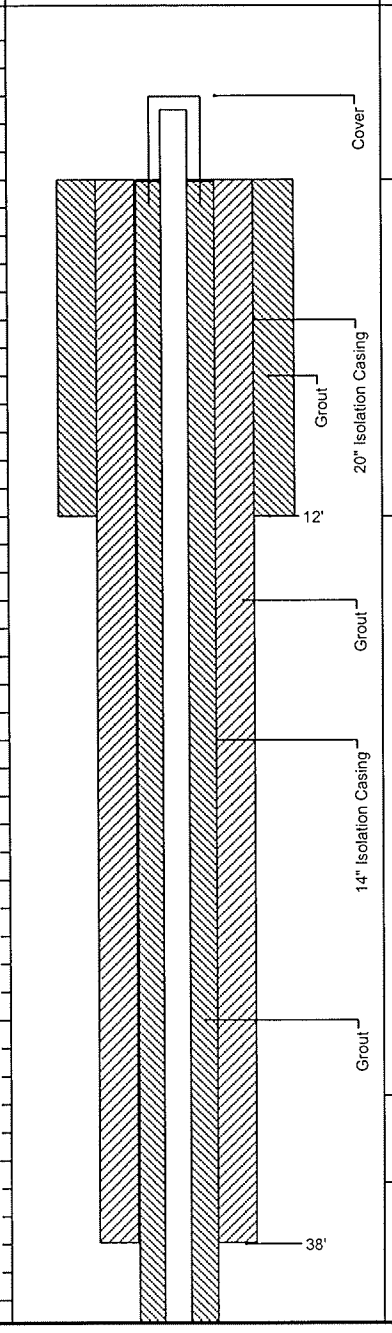
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 727.66 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA and 5ft CME sampler

START: 08 Jan 04 **FINISH:** 29 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5			ISOLATION CASING #1 Material: Type 316 Steel Diameter: 20 inches Type of Joints: None
0		Ground Surface	
5			ISOLATION CASING #2 Material: Type 316 Steel Diameter: 14 inches Type of Joints: Welded
10			WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded
15		SILT (ML),Orange (oxidized), moist, stiff-hard, fine sand in partings, some clay, trace subangular gravel. (TILL) As above, gray. 4.6-inches gray, wet, loose, medium sand with gravel at 16.3 feet bgs.	WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches
20		SILT (ML), Gray, moist, stiff-hard, sand in partings, some clay, trace fine gravel. (TILL) As above.	DEVELOPMENT Development Method: Pump Time: 1.5 hrs 03-31-05 plus 1/2 hour w/surge block prior to grout
25		SILT (ML), Gray, moist to dry, hard, some fine sand and clay, trace fine to coarse subangular gravel. (TILL)	
30		As above.	COMMENTS Filter Pack: Well Gravel (K&I Well gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad
35		SILTY SAND (SM), Gray, moist, loose, slightly cohesive, very fine sand.	
40		SILT (ML), Gray, moist to dry, very hard, some sand, little clay, trace gravel subangular, fine to coarse. (TILL)	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW16-D2a Sheet: 2 of 3

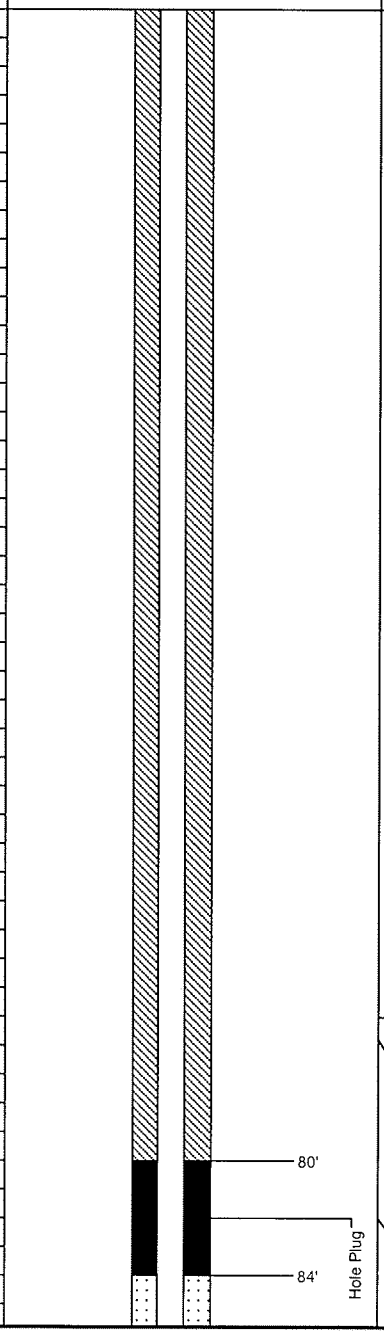
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 727.66 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA and 5ft CME sampler

START: 08 Jan 04 **FINISH:** 29 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
45		CLAYEY SILT (ML), Grayish brown, moist, hard, fine sand in partings and trace subangular gravel. (TILL)	
50		As above. 6-inch, wet, medium to fine, sand seam at 48.0 feet bgs. As above As above.	
55		As above. As above.	
60		As above. As above.	
65		SILT (ML), Brownish gray, moist, very stiff, with very fine sand, some fine to coarse gravel. (TILL)	
70		As above, more sand	
75		As above SILTY SAND (SM), Brown gray, moist, dense, fine to mediuam sand, some gravel.	
80		SAND (SP), Brownish yellow, saturated, dense, fine to medium sand. 4-inch silty sand brownish gray, moist, dense, fine to medium sand at 77.6 feet bgs. As above.	
85		As above, some fine angular gravel. SAND (SW), Brownish yellow, saturated, dense, medium to coarse sand, trace fine gravel.	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW16-D2a Sheet: 3 of 3

WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 727.66 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA and 5ft CME sampler

START: 08 Jan 04 **FINISH:** 29 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
90 95 100 105 110 115 120 125 130	86' Sand Screen 91'	End boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **WELL NUMBER:** MW17-D2 | **Sheet:** 1 of 2

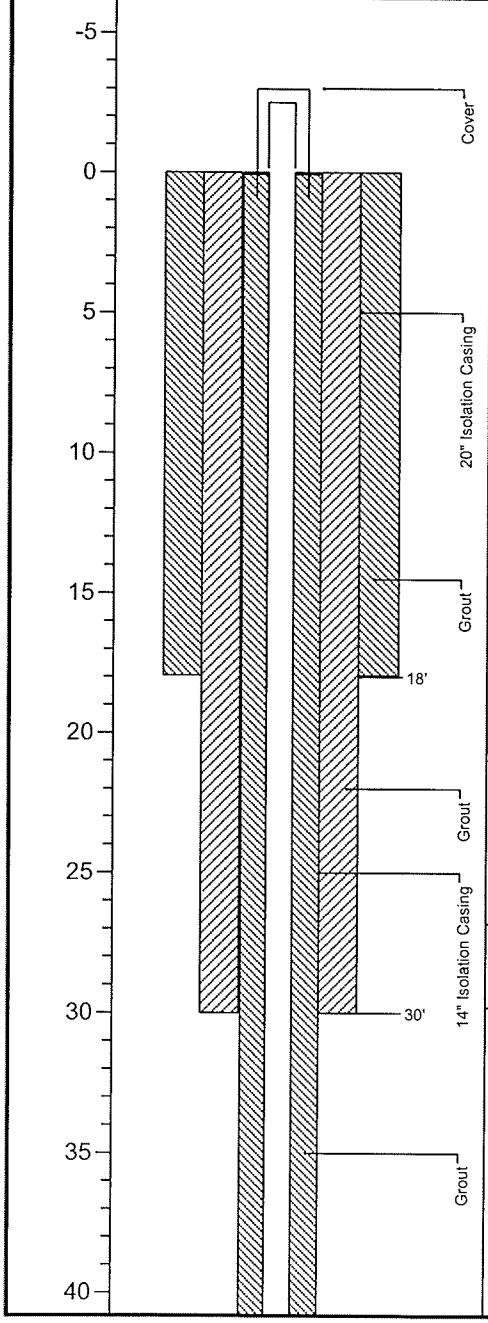
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 731.87 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25HSA; 2ft split spoon and 5ft CME samplers

START: 02 Nov 04 **FINISH:** 19 Mar 05 **LOGGER:** J. Myers



SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
Ground Surface	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 20 inches Type of Joints: None
SILTY SANDY CLAY (CL), Gray, very stiff, compacted, some with gravel. (CAP)	ISOLATION CASING #2 Material: Type 316 Steel Diameter: 14 inches Type of Joints: Welded
GRAVEL (GP), Black, some sand.	
SAND (SP), Brown, loose, medium sand, shell fragments.	WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded
6-inches brown silty fine sand at 9 feet bgs.	
SAND (SP), Brown, wet, loose, coarse sand, with shell fragments.	
SILTY SAND (SM), Brown, wet, fine.	
SAND (SP), Brown, wet, medium, with shell fragments.	WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches
As above with gravel.	
CLAYEY SILT (ML) Gray, stiff, trace fine gravel.	
CLAYEY SILT (ML), Brownish-gray, moist, stiff, some fine sand, trace gravel. (TILL)	DEVELOPMENT Development Method: Pump Time: 1 hr 11-19-04 plus 1/2 hour w/surge block prior to grout
As above.	
CLAYEY SILT (ML), Gray, moist, hard, fine sand in partings, trace fine gravel. (TILL)	
GRAVEL (GP) Browm,wet, some medium sand and fines.	
CLAYEY SANDY SILT (ML), Brownish gray, moist to dry, hard, massive non-plastic, trace subangular gravel. (TILL)	COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad
As above.	
As above, possible laminations.	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW17-D2 Sheet: 2 of 2

WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 731.87 **DRILLING CONTRACTOR:** Mateco
DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25HSA; 2ft split spoon and 5ft CME samplers
START: 02 Nov 04 **FINISH:** 19 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
45		1-inch wet, brown, fine, gravel at 29.8 feet bgs. As above. As above. As above. As above.	
50		As above.	
55		As above, more sand.	
60		As above.	
65		SILTY SAND (SM), Grayish-brown, moist, medium dense, very fine sand. SILT (ML), Grayish-brown, moist, firm, laminated. SAND (SP), Yellowish-gray brown, wet, loose, fine.	
70	68' Hole Plug 72'	SAND (SP), grayish-yellow, moist, medium dense, fine sand. As above.	
75	Sand 75'	CLAYEY SILT (ML), Grayish-brown, moist, stiff, low plasticity, laminated.	
80	Screen 80'	SAND (SP), Gray yellow, moist, medium dense, medium to fine sand. End boring	
85			

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-22I Sheet: 1 of 1

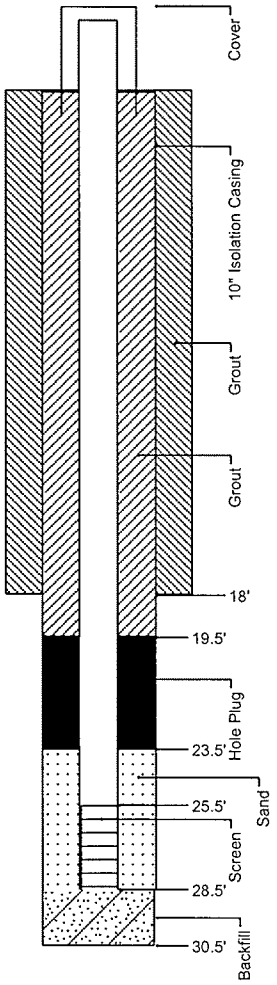
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 728.11 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 02 Nov 04 **FINISH:** 16 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface SAND (SW), Brown, moist, coarse, with gravel. SANDY CLAY (CL), Gray, desiccated hard. (CAP) SAND (SW), Brown, moist, medium to coarse sand with gravel. GRAVEL (GW), Brown, fine. SAND (SW), Brown, wet, medium to coarse sand with gravel. As above. As above. SILT (ML), gray, stiff, some clay and fine sand, trace subangular gravel. SILT (ML), Gray, moist to dry, low plasticity, some clay and fine sand, trace subangular gravel. (TILL) As above. GRAVEL (GM), gray, moist, fine to coarse, cemented with fines and sand. SAND (SP) Gray, wet, loose, fine to coarse sand. CLAYEY SILT (ML), Gray, moist to dry, hard, low plasticity, some fine gravel. (TILL) SAND (SP), Gray to brown wet, loose, medium sand. CLAY WITH SILT (CL), Gray, dry, low plasticity, some fine gravel. (TILL) End boring	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 3 hrs 11-16-04 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Grout Method: Tremie pipe Backfill: Hole plug bentonite chips (Baroid Drilling Fluids) and Well gravel (K&I Well Gravel) Backfill Method: Gravity filled Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW23-I Sheet: 1 of 2

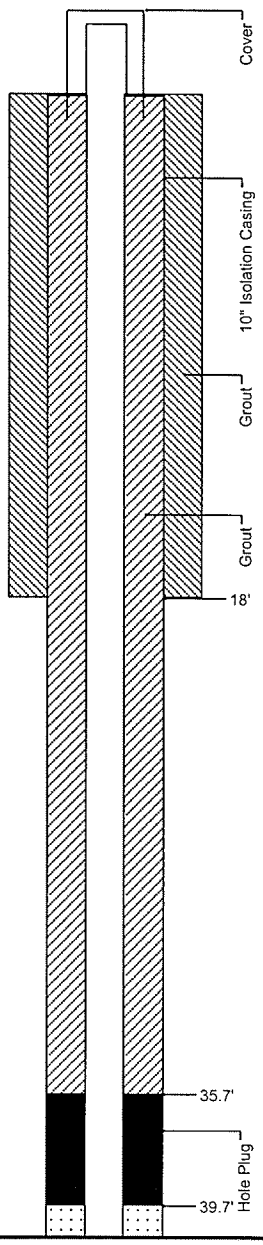
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 733.04 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45 and 95 with 4.25 HSA with 2ft split spoon & 5ft CME samplers

START: 04 Nov 04 **FINISH:** 23 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface CLAY (CL), Gray, desiccated, hard, some fine sand, trace gravel. (CAP) SAND (SP), Brown to black with orange mottles, moist, medium to fine. SAND (SP), Yellowish-brown, moist, medium. As above. As above, wet, coarse. SILT (ML), gray, moist, stiff, massive, non-plastic As above. As above. SILT (ML), Gray, moist, hard, massive, non-plastic, some medium sand, trace fine to coarse gravel. (TILL) SAND (SW), Gray with oxidation stains, moist, loose, medium sand with some gravel. SILT (ML), Gray, moist to dry, hard massive, non-plastic, slight hydrocarbon odor, some clay, trace angular gravel. (TILL) As above, sand in partings, no odor. As above, no odor. As above, sandy, no odor. As above, no odor, less sand. SILT (ML), Gray, moist to wet, stiff, wth clay, laminated.	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 1.5 hrs 11-23-04 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW23-I Sheet: 2 of 2

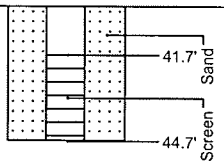
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 733.04 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45 and 95 with 4.25 HSA with 2ft split spoon & 5ft CME samplers

START: 04 Nov 04 **FINISH:** 23 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
45 50 55 60 65 70 75 80 85		1-inch wet, medium sand at 40 feet bgs. SILT (ML) Grayish brown stiff, some clay, varves. SILT (ML), Gray with oxidation stains, with clay and gravel. (TILL) SAND (SP), Grayish-light brown, wet, coarse sand, with fine to coarse subangular gravel. SILT (ML), Gray, moist, hard, with clay and sand, trace subangular gravel. (TILL) End boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-31I Sheet: 1 of 2

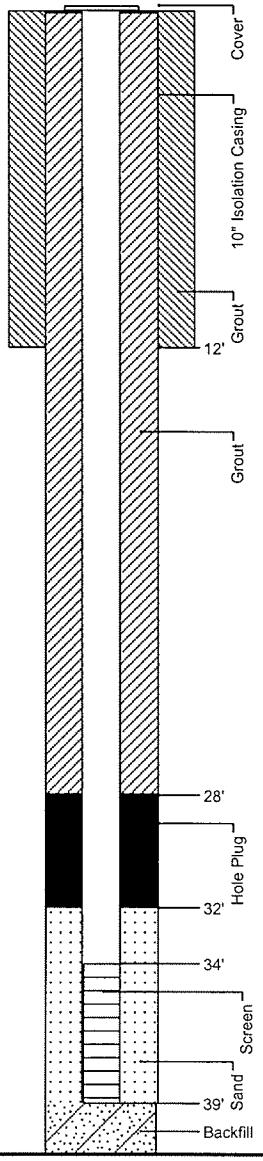
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.10 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 3 Nov 04 **FINISH:** 17 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface SAND (SW), Brownish-gray, moist, loose, fine to medium sand. As above. SILT (ML), Gray, moist, dense, cohesive, some fine sand, trace gravel. As above. As above, stiff CLAYEY SILT (ML) Gray, moist, massive, stiff, some fine sand. As above, wet SAND (SP), Gray, wet, coarse with fines and fine gravel. SANDY SILT (SM), Gray, moist, massive. CLAYEY SILT (ML), Gray, moist, hard, trace subangular gravel. (TILL) As above. As above. As above. As above. As above. As above. SANDY SILT (ML), Grayish-brown, moist, soft, fine sand, laminated. SILTY SAND (SM), Gray, saturated very fine sand, gradational, laminations. SILT (ML), Gray, moist, massive.	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 3 hrs 11-20-04 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Grout Method: Tremie pipe Backfill: Hole plug bentonite chips (Baroid Drilling Fluids) and Well gravel (K&I Well Gravel) Backfill Method: Gravity fill Flushmount, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-31I Sheet: 2 of 2

WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.10 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 3 Nov 04 **FINISH:** 17 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
45	Backfill 45'	CLAYEY SILT (ML), Grayish-brown, moist, hard, trace subangular gravel. (TILL) End boring	
50			
55			
60			
65			
70			
75			
80			
85			

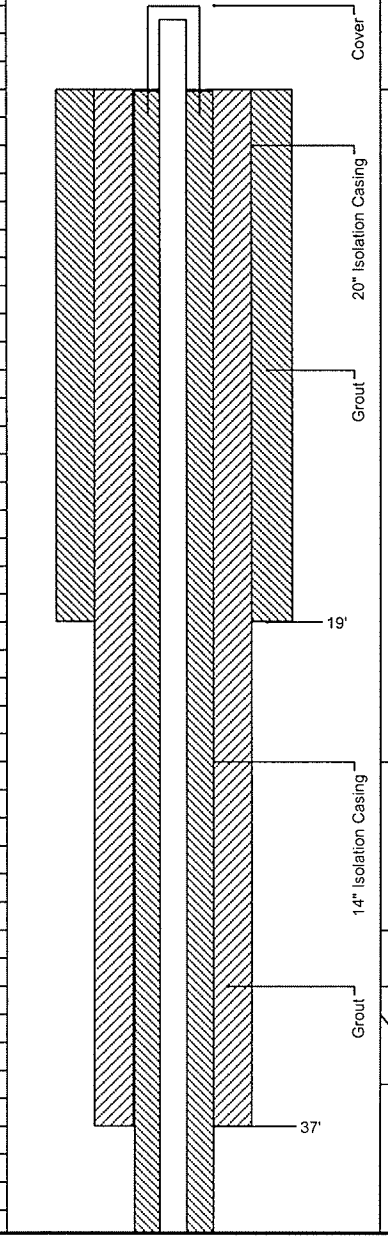
CH2MHILL

PROJECT NUMBER: 321099.EN.01

WELL NUMBER: MW34-D
Sheet: 1 of 2

WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI
ELEVATION: 729.87 **DRILLING CONTRACTOR:** Matecto
DRILLING METHOD AND EQUIPMENT: CME 95 HSA with 5' CME continous sampler
START: 8 Mar 05 **FINISH:** 15 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 to 40		Ground Surface SILT (ML) gray, moist, stiff, some Clay, trace subangular Gravel. (TILL) As above, drier SAND (SP), brown, saturated, loose, medium Sand. SILT (ML), brwon, moist, hard, some Sand, trace subangular Gravel. (TILL) SAND (SP), brown, wet, dense, fine Sand. SILT (ML), brownish-gray, moist, hard, Clayey, some Sand, trace subangular Gravel. (TILL)	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 20 inches Type of Joints: None ISOLATION CASING #2 Material: Type 316 Steel Diameter: 14 inches Type of Joints: Welded WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 1 hr 3-15-05 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW34-D Sheet: 2 of 2

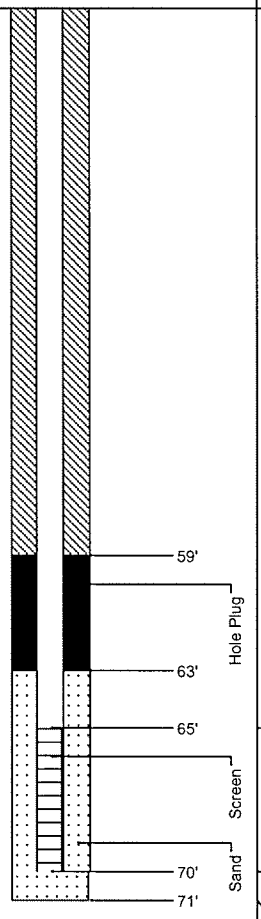
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.87 **DRILLING CONTRACTOR:** Matecto

DRILLING METHOD AND EQUIPMENT: CME 95 HSA with 5' CME continous sampler

START: 8 Mar 05 **FINISH:** 15 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
45 50 55 60 65 70 75 80 85		SILT (ML), brownish-gray, moist, stiff, Clayey, some Sand in partings, trace subangular Gravel. (TILL) As above. As above As above. As above. As above, less sand. As above. As above. As above. As above. As above As above Sand (SW) brown, saturated loose, medium angular Sand, some Gravel SILT (ML), brown, moist, firm, laminated, some Clay. End boring	

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-34I Sheet: 1 of 1

WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.86 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 45/95 HSA with 2' split spoon and 5' CME continous samplers

START: 5 Nov 2005 **FINISH:** 9 Feb 2005 **LOGGER:** J. Myers & J. Mallison

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40	Cover 20" Isolation Casing Grout 14" Isolation Casing 16' Grout Grout 22' Hole Plug 26' 28' Sand Screen 31' Backfill 35.8'	Ground Surface SANDY CLAY (CL) Gray, desiccated, hard. (CAP) GRAVEL (GW) Brown, moist, gravel with glass, concrete, and wood fragments, hydrocarbon odor. SAND (SP), Black, moist, medium dense, hydrocarbon odor, medium sand, some fines.. CLAYEY SILT (ML) Gray, wet, medium soft. As above, stiff. SILT (ML), Gray, moist, stiff, some clay, trace subangular gravel. (TILL) SILT (ML), Brown, saturated, stiff, trace sand and fine gravel. (TILL) SAND (SP), Brown, saturated, loose, medium sand, trace gravel and fines. SILT (ML), Brown, saturated, stiff, some fine sand, some clay, trace fine gravel. (TILL) SAND (SP), Brown, saturated, loose, medium sand, some fines, trace fine gravel. SILT(ML), Gray, moist-wet, cohesive, some subangular gravel. (TILL) End boring	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 20 inches Type of Joints: None ISOLATION CASING #2 Material: Type 316 Steel Diameter: 14 inches Type of Joints: Welded WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 2 hrs 2-09-05 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids)

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **WELL NUMBER:** MW-35I | **Sheet:** 1 of 1

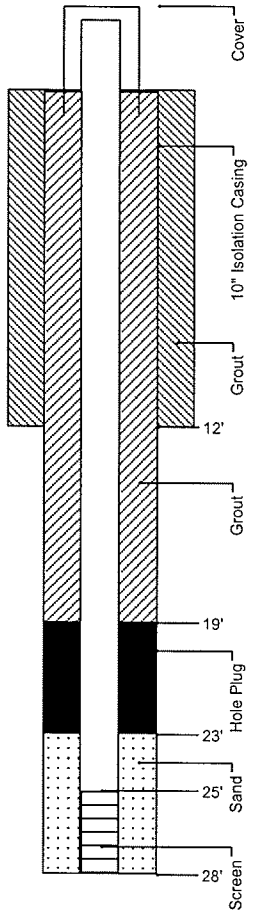
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 721.69 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 55 HSA with 2 ft split spoon and 5' CME continous samplers

START: 30 Mar 05 **FINISH:** 1 Apr 05 **LOGGER:** R. Schuth

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface SILT (ML) Reddish-brown, mottled. CLAYEY SILT (ML) Reddish-brown, mottled, medium soft, some coarse sand. SILT (ML) Reddish-brown, moist, very stiff, trace subangular gravel. As above, hard. SILT (ML) Gray, moist-dry, hard, some fine sand, trace fine gravel. (TILL) CLAYEY SILT (ML), Gray, moist-dry, hard, some fine sand, trace fine gravel. (TILL) As above. As above. SANDY SILT (ML), Gray, medium soft, some clay, trace fine gravel. (TILL) SAND (SP), Gray, wet, loose, fine sand. SANDY SILT (ML), Gray, medium soft, some clay, trace fine gravel. (TILL) End boring	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Whale Pump Time: 1 hr 4-06-05 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01 | **WELL NUMBER:** MW-16I

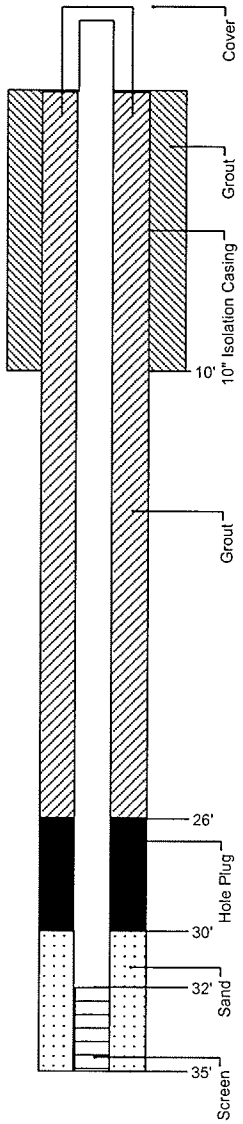
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.99 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 03 Nov 04 **FINISH:** 19 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface SAND (SP), Brown to yellow-brown, moist, medium dense, fine sand. SILTY CLAY (CL), Brown to reddish brown, moist, stiff, low plasticity. As above ,gray, hard, more silt. SILT (ML), Gray with iron staining, moist-dry, hard, some fine sand and clay, trace gravel. (TILL) As above. 1-inch yellowish brown, wet, coarse sand at 15.3 feet bgs. CLAYEY SILT (ML), Gray, moist to dry, hard, some fine sand , trace gravel. (TILL) CLAYEY SILT (ML), Gray, moist, hard, trace subangular gravel. (TILL) SANDY SILT (ML), Gray, moist, soft, very fine sand. SILT (ML), Gray, moist to dry, hard to very hard, some fine sand and clay, trace fine to coarse subangular gravel. (TILL) 1-inch wet, subround to round, coarse gravel at 26.8 feet bgs. SILT (ML), Gray, moist to dry, hard to very hard, some fine sand and clay, trace fine to coarse subangular gravel. (TILL) SILTY SAND (SM), Gray, moist to wet, fine to very fine sand. SILT (ML), Gray, moist to dry, hard to very hard, some fine sand and clay, trace fine to coarse subangular gravel. (TILL)	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 3.5 hrs 11-21-04 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-21I Sheet: 1 of 1

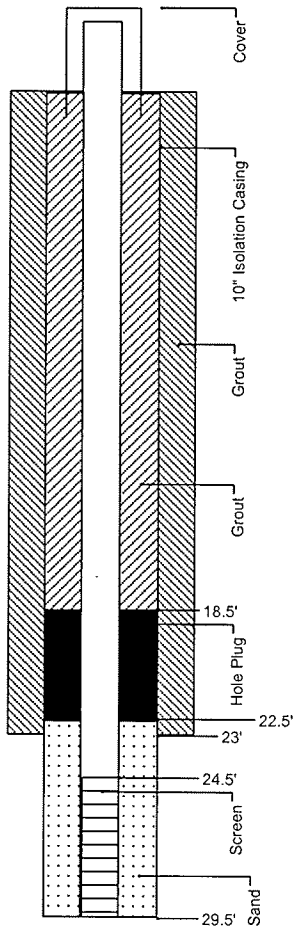
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 730.74 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25HSA; 2ft split spoon and 5ft CME samplers

START: 01 Nov 04 **FINISH:** 16 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface SILTY SAND (SM), Light brown, moist, loose, with pebbles. As above, less silt. SANDY GRAVEL (GP), black, high sheen, crude oil odor. As above. As above, wet. As above, saturated, with shell fragments. CLAY (CL), Gray, stiff, some fine sand and silt, trace subangular gravel. As above, hard. As above. As above. CLAY (ML), Gray, hard, some silt, trace gravel. As above. SAND (SW), Gray, wet, loose, medium sand. CLAY (CL), Gray, moist, hard, with silt. GRAVEL (GP), Gray, wet, fine to coarse, some fines. CLAY (CL), Gray, moist, hard with silt and trace fine gravel. End boring	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 1.5 hrs 11-22-04 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-27I Sheet: 1 of 1

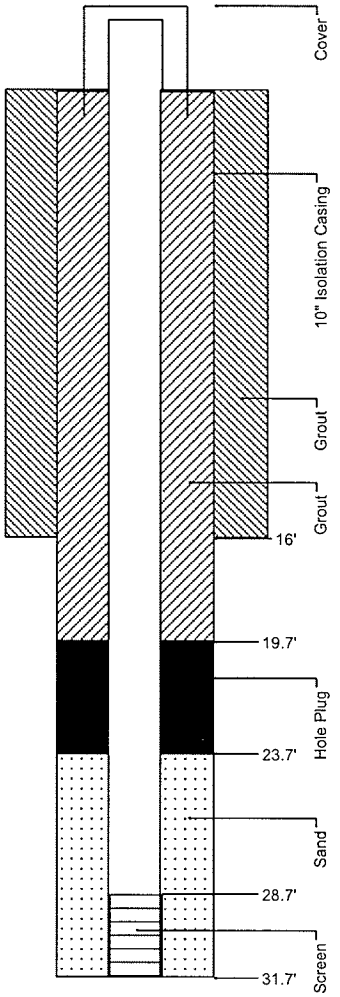
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 735.64 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 03 Nov 04 **FINISH:** 18 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface SILTY SAND (SM), Brown, medium dense, fine sand. SILTY CLAY (CL), Brown, moist, stiff, some fine sand. As above. CLAYEY SILT (ML), Brown, stiff, some fine sand. As above SAND (SP), Brown, medium dense, fine sand. CLAYEY SILT (ML), Brown, stiff, some fine sand. SILT (ML), Grayish brown, moist, very stiff, trace gravel, sand partings. (TILL) As above As above, less sand, more dry. As above. As above, oxidation staining. SILTY SAND (SM) Grayish-brown, moist, medium dense, very fine sand. CLAYEY SILT (ML), moist to dry, very stiff, trace gravel, fine to medium sand in partings. 3 inches wet, coarse sand and fine gravel at 24.8 feet bgs. CLAYEY SILT (ML), moist, hard, trace gravel. (TILL) SILT (ML), Gray, moist to dry, very stiff, trace gravel. (TILL) SAND (SP), Gray, wet, loose, fine to medium sand. CLAYEY SILT (ML), Gray, moist, hard. (TILL) SAND (SP), Gray, wet, loose fine to fine to medium sand. CLAYEY SILT (ML), Gray, moist, hard. (TILL) End boring	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 2 hrs 11-21-04 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-30I Sheet: 1 of 1

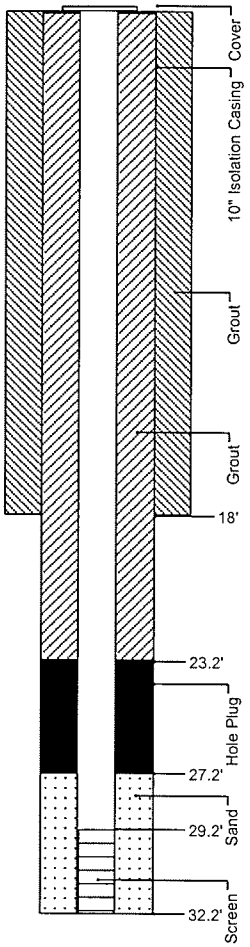
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 722.78 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 03 Nov 04 **FINISH:** 20 Nov 04 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface SILT (ML), Brown, medium soft, some clay. SAND (SM), Brown,moist, fine sand with fines. As above. As above, black with sheen, wet, strong grease trap type odor. SILT (ML), Brown, moist, stiff. As above. CLAYEY SILT (ML), Gray, moist, stiff, some fine sand, trace gravel. As above. CLAYEY SILT (ML), Gray, moist, very stiff, massive, non-plastic, some fine sand, trace subangular to subround gravel. (TILL) As above, fine to medium sand in partings, more clay As above. SAND (SP), Brown, angular medium sand. As above, wet at 30 feet bgs CLAYEY SILT (ML), Gray, moist, hard, some fine sand, trace subangular gravel. (TILL) End boring	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 10 inches Type of Joints: None WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 0.5 hrs 11-20-04 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Well Grout Method: Tremie pipe Steel locking cover with 3 protective bollards, 2' round pad

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-31Da Sheet: 1 of 2

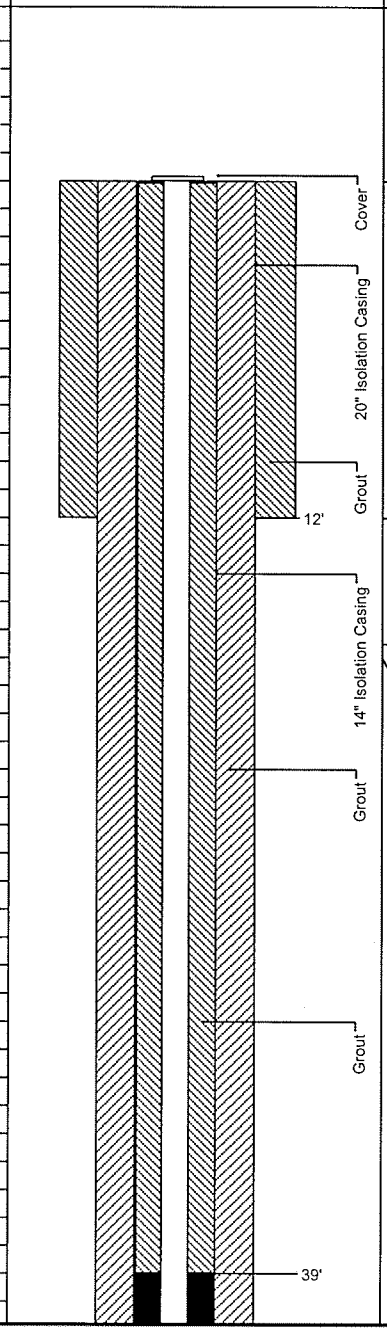
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.57 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 06 Dec 04 **FINISH:** 30 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
-5 0 5 10 15 20 25 30 35 40		Ground Surface CLAYEY SILT (ML), Gray, moist, stiff, some fine sand. (TILL) SAND (SM), Gray, moist to wet, loose, very fine sand with fines. CLAYEY SILT (ML), Gray, moist, hard, some fine sand, trace subangular gravel. (TILL) CLAYEY SILT (ML), Gray, moist, hard, some fine sand, trace subangular gravel. (TILL) CLAYEY SILT (ML), Gray, moist, hard, some fine sand, trace subangular gravel. (TILL) SILT (ML), Gray, wet to moist, stiff, very fine sand laminated. As above, sandy.	ISOLATION CASING #1 Material: Type 316 Steel Diameter: 20 inches Type of Joints: None ISOLATION CASING #2 Material: Type 316 Steel Diameter: 14 inches Type of Joints: Welded WELL CASING Material: Type 316 Stainless Steel Diameter: 2 inches Type of Joints: Threaded WELL SCREEN Type of Screen: Type 316 Stainless Steel Size: 0.010-inch wire wrap Diameter: 2 inches DEVELOPMENT Development Method: Pump Time: 1 hr 03-31-05 plus 1/2 hour w/surge block prior to grout COMMENTS Filter Pack: Well Gravel (K&I Well Gravel) Seal: Holeplug bentonite chips (Baroid Drilling Fluids) Isolation Casing Grout: LeFarge Type 1 Portland and QuickGel bentonite powder (Baroid Drilling Fluids) Well Grout: AquaGuard (Baroid Drilling Fluids) Grout Method: Tremie pipe Backfill: Hole plug bentonite chips (Baroid Drilling Fluids) and Well gravel (K&I Well Gravel)

CH2MHILL

PROJECT NUMBER: 321099.EN.01	WELL NUMBER: MW-31Da Sheet: 2 of 2

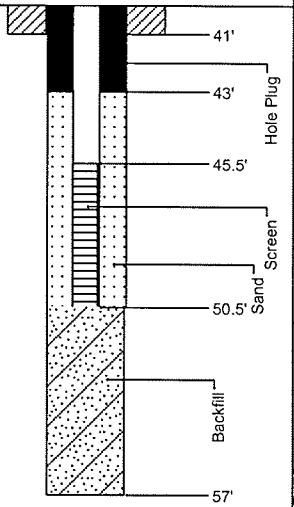
WELL CONSTRUCTION LOG

PROJECT: Velsicol Main Plant Site **LOCATION:** St. Louis, MI

ELEVATION: 729.57 **DRILLING CONTRACTOR:** Mateco

DRILLING METHOD AND EQUIPMENT: CME 95 with 4.25 HSA; 2ft split spoon and 5ft CME samplers

START: 06 Dec 04 **FINISH:** 30 Mar 05 **LOGGER:** J. Myers

DEPTH BELOW GROUND SURFACE (FT)	WELL	SOIL DESCRIPTION	WELL CONSTRUCTION INFORMATION
45 50 55 60 65 70 75 80 85		CLAYEY SILT (ML), Gray moist to wet, firm, laminated, cohesive. As above, drier. SAND (SP), Brownish yellow, wet, loose. As above. SILTY GRAVEL (GM), Wet, loose, fine subangular gravel, some fine sand. As above, silty. CLAYEY SILT (ML), Gray, wet, soft, some subangular gravel, medium plasticity, no odor. SAND (SP), Yellowish brown, moist, very dense, fine to medium sand. End boring	