Site: Sullivan's Ledge
Break: 4.6
Other:

EPA WORK ASSIGNMENT NUMBER: 115-1L54

EPA CONTRACT NUMBER: 68-01-7250

EBASCO SERVICES INCORPORATED

VOLUME II (vol. I is the RI, in 3.6)
DRAFT FINAL

FEASIBILITY STUDY REPORT
APPENDICES

SULLIVAN'S LEDGE
NEW BEDFORD, MASSACHUSETTS

JANUARY 1989

6447

LIST OF APPENDICES
SULLIVAN'S LEDGE SITE
FEASIBILITY STUDY

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APPENDIX B	PHASE II DATA VALIDATION TABLES
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APPENDIX E	INTERIM SEDIMENT CRITERIA EVALUATION
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APPENDIX A
PHASE II FIELD DATA
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

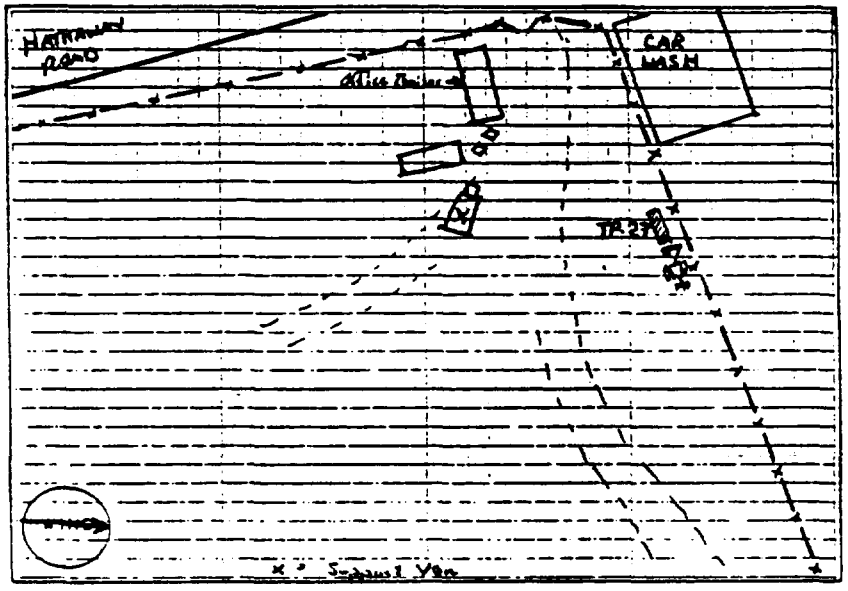
TEST PIT RECORD

SITE Sullivan's Ledge

TEST PIT TP-~~28~~27 DATE 1-5-88 TIME ST. 1430 END 1510

COORDINATES _____ GRID ELEMENT _____

SKETCH MAP OF TEST PIT SITE
(SHOW SURFACE MONITORING RESULTS)



SCALE 1" = 50 FT

CREW MEMBERS

1. Gerry Fordham ECJ
2. Hans-Peter Kraus ECJ
3. Guy Vaillencourt ECJ
4. William Grover Grover Enf.
5.
6.

MONITOR EQUIPMENT

PI METER Tip	(Y)	N
EXPLOSIVE GAS	(Y)	N
AVAIL. OXYGEN	(Y)	N
OVA	Y	(N)

OTHER _____

PHOTOGRAPHS, ROLL 1
EXPOSURE #13

NOTES TP-27 is located approximately 120 feet south/south east of the wash gate alongside the eastern fence boundary of the site, oriented N/NW by S/SE

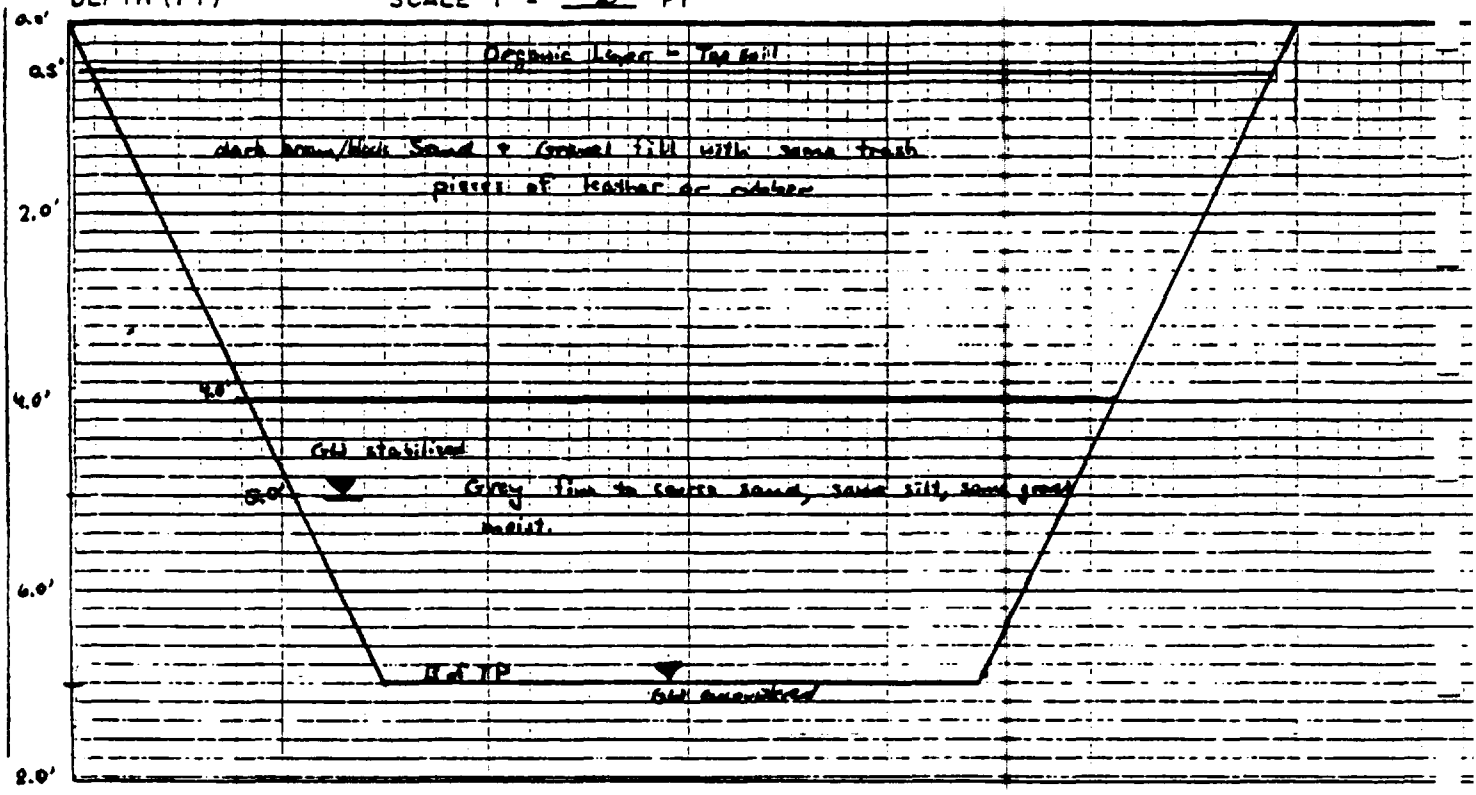
The level B operation had Gerry Fordham monitoring the excavation and then collecting the analytical samples. Hans-Peter Kraus, also at level B, was logging the hole. Guy Vaillencourt was providing support for this operation at level C dermal / level B respiratory prepared. William Grover operated the backhoe at level B. Lewis Mills stayed back at decon at level C dermal protection.

Weather: clear, cold ≈ 10°F, wind at 10-15 mph.

TEST PIT RECORD
PROFILE ALONG TEST PIT- 27

SITE Sullivan's Ledge

DEPTH (FT) SCALE 1" = 2 FT



NOTES:

Sample TP-27-01 collected at 1500 for VOA, Semi, Metals, CN⁻, PCB/Pest, TOC, % Silica, and Grain Size by G.F. Sample TP-27-02 collected at 1455 for VOA, Semi, Metals, CN⁻, PCB/Pest by G.F. A duplicate SS-Dup 1 was collected at the same time, also from center of bucket. Sample TP-27-03 was collected at 1445 for VOA, Semi, Metals, CN⁻, PCB/Pest by G.F. from the center of the bucket.

SAMPLES OBTAINED

NO.	DEPTH (FT)	INIT. SER. NO.	HD. SP VOA PPM
S-1	1-3.0'	27-01	
S-2	4.0-5.0'	27-02	
S-3	7.0'	27-03	
S-4			
S-5			
S-6			
S-7			
S-8			
S-2 dup	4.0-5.0'	27-02 SS-Dup 1	

REFERENCE: FIELD BOOK, PG. 8, 9

ATTACHMENTS

SIGNATURE

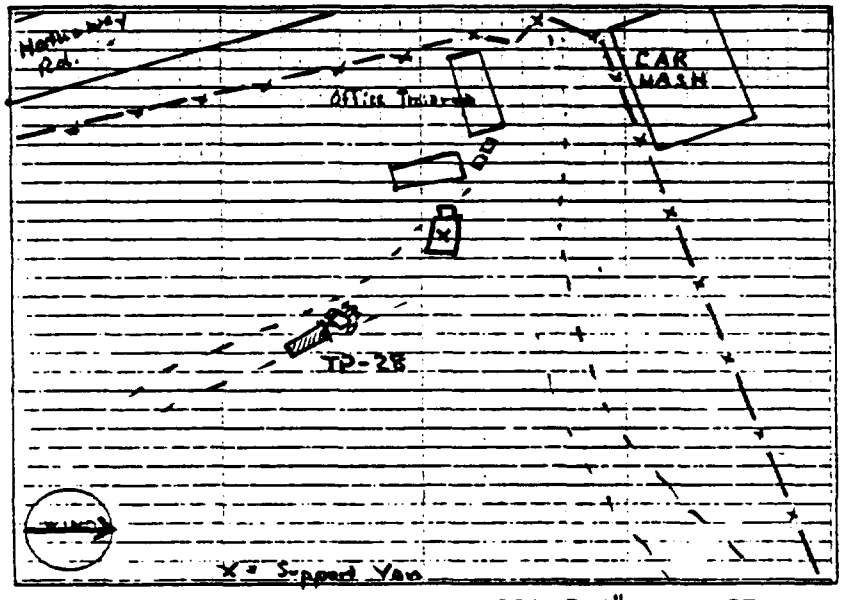
TEST PIT RECORD

SITE SULLIVAN'S LEDGE

TEST PIT TP-28 DATE 1-5-88 TIME ST. 1300 END 1400

COORDINATES _____ GRID ELEMENT _____

SKETCH MAP OF TEST PIT SITE
(SHOW SURFACE MONITORING RESULTS)



SCALE 1" = 50 FT

CREW MEMBERS

1. Gerry Fordham ECJ
2. Hans-Peter Krahn ECJ
3. Guy Vaillencourt ECJ
4. William Grover Grover Ent.
5.
6.

MONITOR EQUIPMENT

PI METER Tip	(Y)	N
EXPLOSIVE GAS	(Y)	N
AVAIL. OXYGEN	(Y)	N
OVA	Y	(N)

OTHER _____

PHOTOGRAPHS, ROLL 1
EXPOSURE # 5-10

NOTES TP-28 is located approx. 280 ft. Southeast of the main entrance gate to the site on the access road to the back southwestern section of the site. The pit was located on a slight slope. The backhoe began on the SW side of the pit facing down, then moved to the NE side facing uphill due to slipping.

The level B operation had Gerry Fordham monitoring the excavation and then collecting the analytical samples at level B. Hans-Peter Krahn, also at level B, was logging the hole. Guy Vaillencourt was providing support for this operation at level C demand / level B prepared respiratory protection. William Grover operated the backhoe and Lewis Mills stayed back for the decon operation. William Grover was at level B protection and Lewis Mills at D/C.

Weather: clear, cold ~10°F, consistent wind at 10-15 mph

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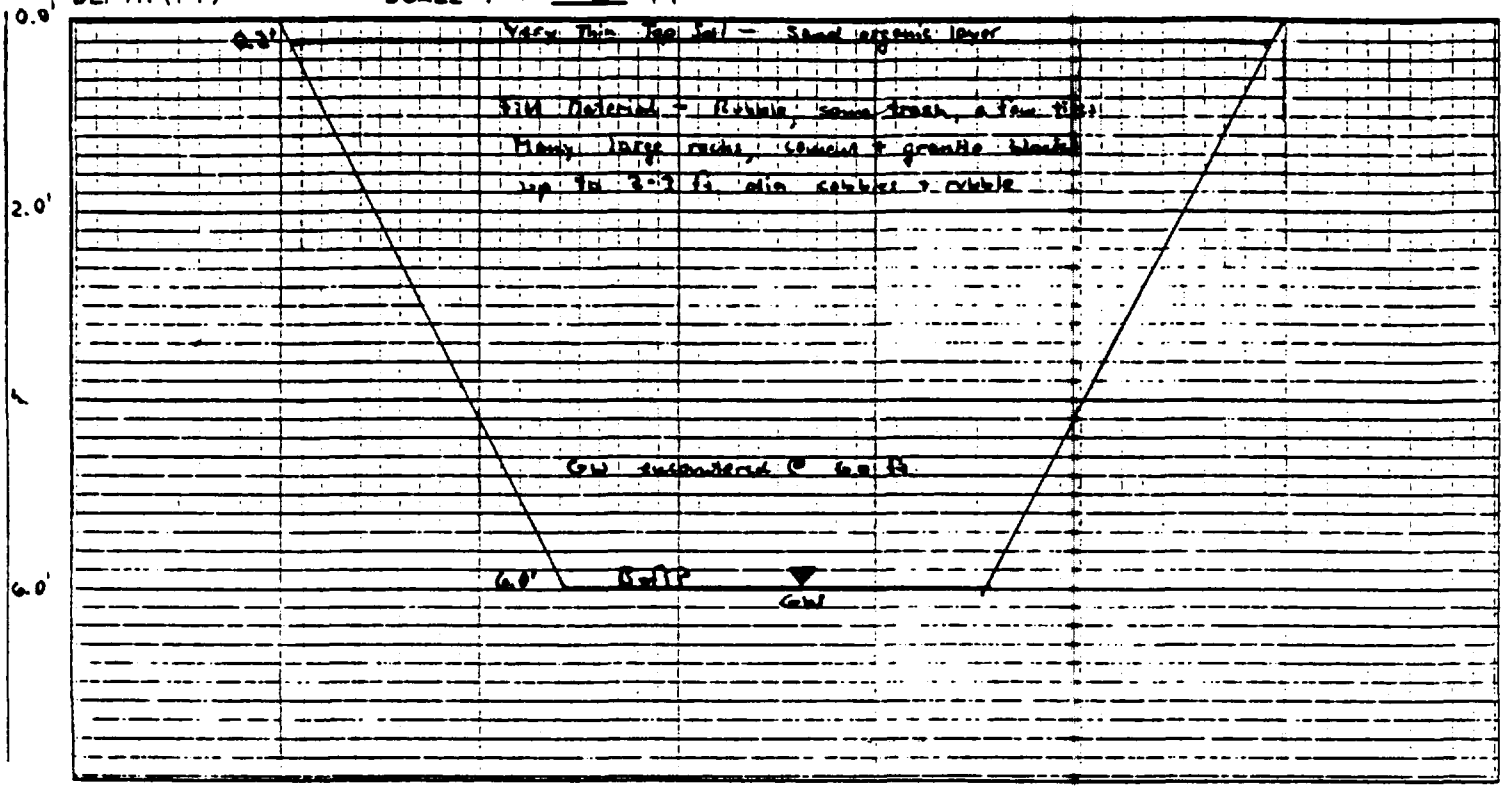
TEST PIT RECORD
PROFILE ALONG TEST PIT- 28

SITE: SULLIVAN'S LEDGE

DEPTH (FT) SCALE 1" = 2 FT



NOTES:

Samples 28-01 and 28-02 and a duplicate were collected at 1345 for VOA, Semi, Metals/CN⁻, PCB/Pest, Sample 28-02 ~~duplicate~~ was also sampled for TOC, % Silica, and Grain Size. All samples were collected from the center of the bucket. Sample 28-03 was collected at 1330 for VOA, Semi, Metals/CN⁻, PCB/Pest. from the center of the bucket by G.F.

SAMPLES OBTAINED

NO.	DEPTH (FT)	INIT. SER. NO.	HD. SP. VOA PPM
S-1	3.0-4.0'	28-01	
S-2	3.0-4.0'	28-02	
S-3	6.0-6.2'	28-03	1.5 ppm
S-4			
S-5			
S-6			
S-7			
S-8			
S-1 dup2	3.0-4.0	28-01 dup2	

REFERENCE: FIELD BOOK, PG. 6-7
ATTACHMENTS

SIGNATURE

ECJORDANCO

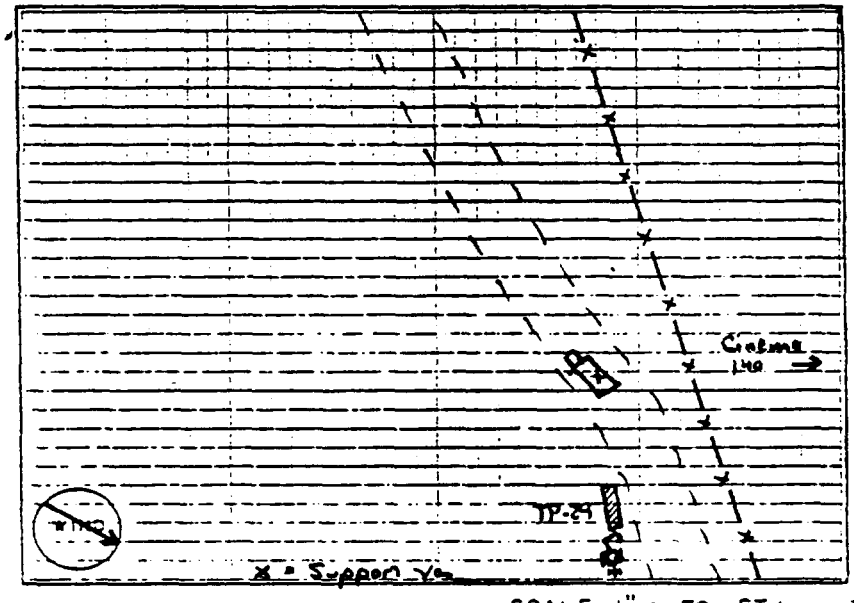
TEST PIT RECORD

SITE Sullivan's Ledge

TEST PIT TP-29 DATE 1-5-88 TIME ST. 11:15 END 12:15

COORDINATES _____ GRID ELEMENT _____

SKETCH MAP OF TEST PIT SITE
(SHOW SURFACE MONITORING RESULTS)



SCALE 1" = 50 FT (approx.)

CREW MEMBERS

1. Guy Vaillencourt ECJ
2. Hans-Peter Krahn ECJ
3. Gerry Fordham ECJ
4. William Grover Grove
5.
6.

MONITOR EQUIPMENT

PI METER Tip	Y	N
EXPLOSIVE GAS	Y	N
AVAIL. OXYGEN	Y	N
OVA	Y	N
OTHER		

PHOTOGRAPHS, ROLL 1
EXPOSURE #3, 4

NOTES TP-29 is located approx. 150 ft. north of TP-30 and ≈ 100 ft north of the treeline along the access road 40-50 ft west of the fence. The backhoe was situated south of the pit and the support van approximately 50-60' north of the pit. Wind came from north/north west.

The level B operation had Guy Vaillencourt monitoring the excavation and then collecting the analytical samples at level B protection. Hans-Peter Krahn, also at level B, was logging the hole. Gerry Fordham was providing support for this operation at level C dermal/level B prepared. William Grover operated the backhoe and Lewis Mills stayed back for bucket decon. William Grover was at level B and Lewis Mills had level D protection/level C dermal.

Weather: clear, cold ≈ 15° F, consistent wind at ≈ 10-15 mph.

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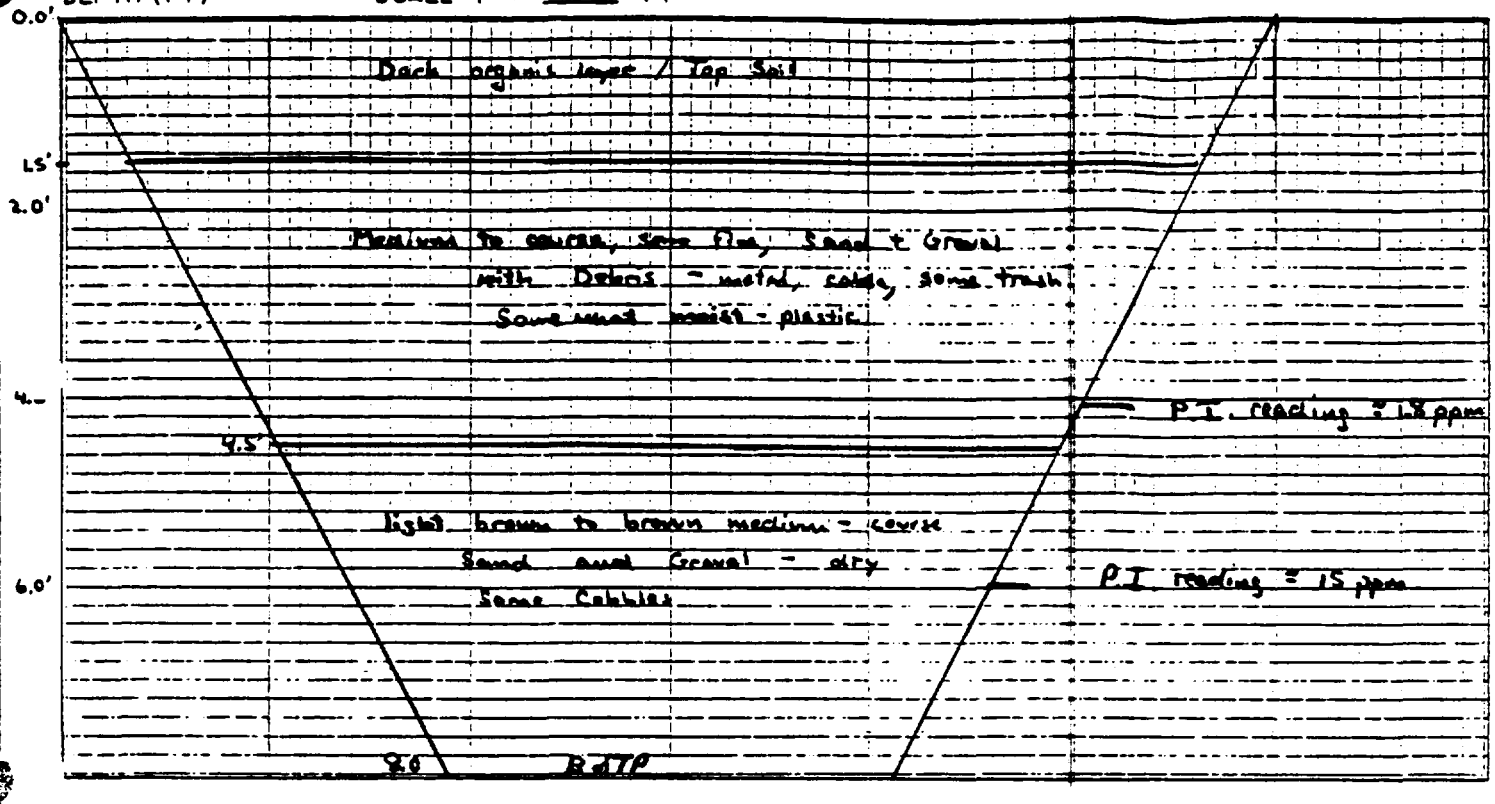
23 of 41 30 of dow 1-14-2

TEST PIT RECORD
PROFILE ALONG TEST PIT- 29

SITE SULLIVAN'S LEDGE

2 OF 2

DEPTH (FT) SCALE 1" = 2 FT



NOTES:

Sample 29-01 collected @ 1205 for VOA, Semi, Metals/CN⁻, PCB/Pest from the center of the bucket by G.V.

Sample 29-02 was collected @ 1155 for VOA, Semi, Metals/CN⁻, PCB/Pest. from the center of the bucket by G.V.

Sample 29-03 was collected @ 1145 for VOA, Semi, Metals/CN⁻, PCB/Pest. TOC, BOD, % Silica, COD, and Grain Size by GV from the center of the backhoe bucket.

SAMPLES OBTAINED

NO.	DEPTH (FT)	INIT. SER. NO.	HD. SP. VOA PPM
S-1	2.0-2.0'	29-01	
S-2	4.0-5.0'	29-02	
S-3	8.0'	29-03	
S-4			
S-5			
S-6			
S-7			
S-8			

REFERENCE: FIELD BOOK, PG. 4-5
ATTACHMENTS

Hans-Peter [signature]
SIGNATURE

E.C.JORDAN CO.

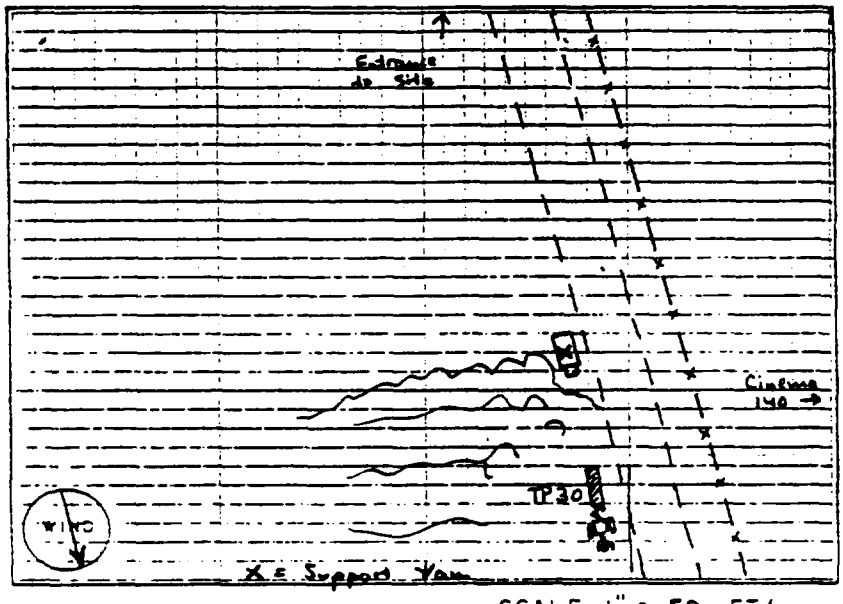
TEST PIT RECORD

SITE Sullivan's Ledge

TEST PIT TP-30 DATE 1-5-88 TIME ST. 0800 END 0900

COORDINATES _____ GRID ELEMENT _____

SKETCH MAP OF TEST PIT SITE
(SHOW SURFACE MONITORING RESULTS)



SCALE 1" = 50 FT (approx.)

CREW MEMBERS

1. Guy Vaillencourt ECJ
2. Hans-Peter Krahn ECJ
3. Gerry Fordham ECJ
4. Lewis Mills Grover
5. William Grover Grover
6.

MONITOR EQUIPMENT

PI METER Tip Y N
EXPLOSIVE GAS Y N
AVAIL. OXYGEN Y N
OVA Y N
OTHER _____

PHOTOGRAPHS, ROLL 1
EXPOSURE #1, 2

NOTES TP-30 is located approximately 500 ft. south/southeast of the entry gate to the site on the west side of the access road and west roughly 30-40 feet from the chain link fence. The backhoe was situated south/southeast of the pit (downwind) and the support van approximately 60-70' upwind of the pit.

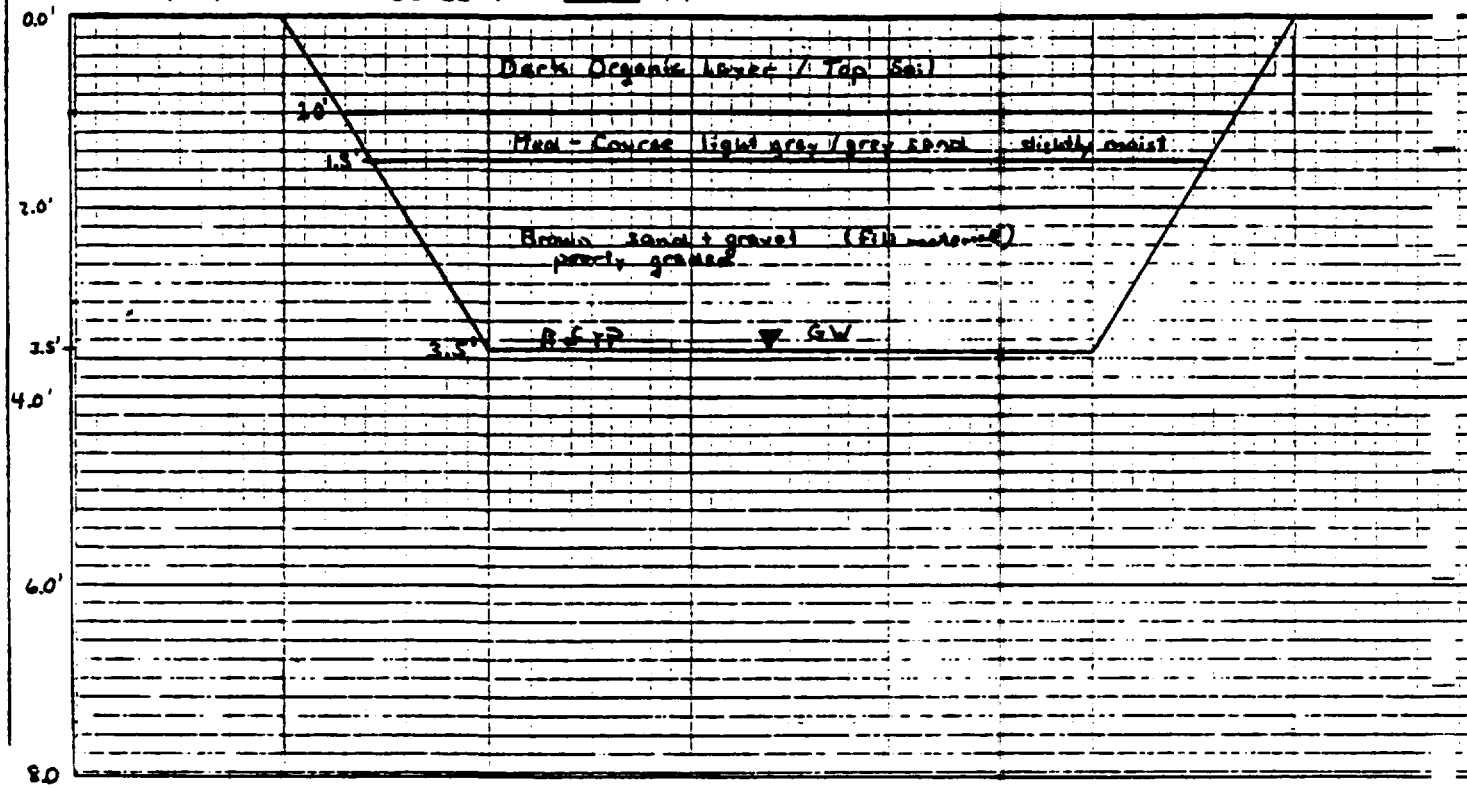
The level B operation had Guy Vaillencourt monitoring the excavation and then collecting the analytical samples at level B. Hans-Peter Krahn, also at level B, was logging the hole. Gerry Fordham was providing support for this operation at level C donned / level B prepared. William Grover operated the backhoe and Lewis Mills provided support at the excavation. Both were in level B.

Weather: clear, cold ≈ 10° F, light wind ≈ 0-10 mph.

TEST PIT RECORD
PROFILE ALONG TEST PIT-30

SITE Sullivan's Ledge

DEPTH (FT) SCALE 1" = 2 FT



NOTES:

Sample 30-01 collected @ 0820 for VOA, Semi, Metals, PCB/Pest, CN⁻, TOC, BOD, COD, % Silica + Grain Size from the edge of the pit by G.V.

Sample 30-02 collected @ 0830 for VOA, Semi, Metals, PCB/Pest, CN⁻ from the edge of the pit by G.V.

Sample 30-03 collected @ 0840 for VOA, Semi, Metals, PCB/Pest, CN⁻ from the center of the backhoe bucket by GV.

SAMPLES OBTAINED

NO.	DEPTH (FT)	INIT. SER. NO.	HD. SP VOA PPM
S-1	1.0'	30-01	
S-2	1.5'	30-02	≃ 1.5 ppm
S-3	2.5'	30-03	
S-4			
S-5			
S-6			
S-7			
S-8			

REFERENCE: FIELD BOOK, PG. 1-3
ATTACHMENTS

Hans-Peter Kuehl
SIGNATURE

ECJORDANC 2

FIELD BORING LOG

Boring No. ECT-1

Project: No 5180-03	Project Name SULLIVAN'S LEDGE		Page 1 of 2
Contractor O.E. DUBE & SON	Driller DAVE DUBE	Date started 2-1-88	completed 2-3-88
Method AIR ROTARY	Casing Size 4"	HNU 11.7/10.2	Protection Level C - RESPIRATORY
Ground El 84.1'	Soil Drilled 11'	∇ below ground	Total Depth 300'
Logged by T. LONGLEY	Checked by	Date	

BK = BACKGROUND

Sample No	Depth in Feet	Blows per 6 inches	Pen/Rec	Description	HNU Jar	Comments on Advance of Boring	Monitoring HNU	Monitoring LEL
				START HOLE WITH 8 3/4" ROLLER BIT TO 32'. SOIL TO 11'. SET CASING TO 32'. SAND & ROCKS W/ BOULDERS TO 11'. DRILLED W/ 4" AIR ROTARY FROM 32' AFTER PRESSURE GROUTED CASING		12'-13' - SEVERE CHATTER	BK	BK
S-1	31'-31.5'			PINK GRANITE MED. GRAINED W/ HIGH K-SPAR CONTENT GIVING SALMON COLOR TO ROCK CHIPS. SAMPLES ARE FOR REFERENCE ONLY - GRABBED ROCK CHIPS		32' - DEEP OXI. COLOR TO WATER RETURN 39' - 6" YELLOW WATER RETURN		
						58'-59' - DRILLER SAID SOFT ZONE. YELLOW OXIDIZED TO RETURN WATER		
S-2	60'-61'			GRANITE - PINK WITH FEW OXIDIZED ROCK CHIPS & TRACE GREEN CHLORITE		60.5'-63' - DRILLER SAID SOFT - RUSTY WATER RETURN 69' - TRACE GARNETS 72'-72.5' - RUSTY WATER RETURN W/ DROP OF RODS		
						118'-118.5' - DRILLER SAID SOFT W/ RUSTY RETURN		

FIELD BORING LOG

Boring No. ECJ-1

Project: No 5180-03	Project: Name SULLIVAN'S LEDGE		Page 2 of 2
Contractor D.E. DUBE & SON	Driller DALE DUBE	Date started 2-1-88	completed 2-3-88
Method AIR ROTARY	Casing Size 4"	HNU 11.7 (10.2)	Protection Level C - RESPIRATOR
Ground El 94.1'	Soil Drilled 11'	∇ below ground	Total Depth 300'
Logged by T LONGLEY	Checked by	Date	

Sample No	Depth in Feet	Blows per 6 inches	Pen/Rec	Description	HNU jar	Comments on Advance of Boring	Monitor: HNU	[illegible]
				PINK GRANITE		124'-125' - DRILLER SAID SOFT	BK	[illegible]
S-3	152'			PINK GRANITE W/ HIGH % OF GREEN CHLORITE		147'-152' - VUGGY, FRACTURE ZONE, HAMMER ADVANCED IN QUICK JUMPS - LARGE ROCK FRAGS. IN RETURN		
S-4	272'			269' - VERY HIGH % OF GREEN CHLORITE WITH PINK GRANITE - ROCK IS GREEN IN OVERALL COLOR		ROCK CUTS VERY QUICKLY AT 269' TO 272' AT 50 SEC./ft.		
				282' - ROCK BECOMES LESS CHLORITIC & MORE K-SPAR RICH - BRIGHT PINK GRANITE				
				B.O.B. @ 300'		WATER PRODUCTION FROM HOLE IS ~ 4.5 GAL/MIN.	▽	

DRILL RATES
41'-61' = 19 MINUTES
61-81 = 19
81-101 = 22
101-121 = 22
121-141 = 23
161-181 = 28
181-201 = 28
201-221 = 29
221-241 = 28
241-261 = 33
261-281 = 26
281'-300' = 27 MIN.

FIELD BORING LOG

Boring No. ECJ-2

Project: No 5180-03	Project: Name SULLIVAN'S LEDGE		Page 1 of 1
Contractor O.E. DUBE & SON	Driller DAVE DUBE	Date started 1-28-88	completed 1-30-88
Method AIR ROTARY	Casing Size 4"	HNU 11.7/10.2	Protection Level C-DERMAL
Ground El. 70.4	Soil Drilled 10'	∇ below ground	Total Depth 300'
Logged by T. LONGLEY	Checked by	Date	

BK = BACKGROUND

Sample No	Depth in Feet	Blows per 6 inches	Pen/Rec	Description	HNU jar	Comments on Advance of Boring	Monitoring HNU	Monitoring LEL
		N/A		SAND AND GRAVEL WITH BOULDERS DOWN TO 10'		CASING DOWN TO 30.5' BELOW GROUND	BK	BK
S-1	21'-22'			BIOTITE/MUSCOVITE RICH SCHIST-GNEISS (SAMPLES FOR REFERENCE ONLY - GRABBED ROCK CHIPS)		SOME CHATTER AT 19'		
				SCHIST/GNEISS		SOFT AT 40'		
S-2	53'-54'			GREENISH GRAY, CHLORITIZED MICACEOUS, TRACE OF PLAGIOCLASE & QUARTZ & K-SPAR		OXIDATION STAINING OBSERVED TO 93'		
						82'-82.5' INCREASED FEED RATE		
S-3	93'-94'			AS ABOVE - W/ QTZ. SEAMS & GREEN CHLORITE		85' - JUMPED AHEAD		
						89' - SOME CHATTER		
						NO OBSERVED WATER LOSS/GAIN		
S-4	146'-148'			SCHIST - BLACK TO GREENISH BLACK, MED. GRAINED, W/ BIOTITE & CHLORITE; TRACE RED GARNET		106'-107' - SOFT/CHATTER		
						111'-111.5' - 6" DROP		
						116'-118' - SOFT		
						AT 141' MAY BE MAKING 1 GAL. WATER/MIN.		
				164' TO BOTTOM - PINK GRANITE		127'-127.5' - CHATTER		
						184'-184.5' - SUDDEN JUMP OF RODS		
S-5	205'-206'			PINK GRANITE - MED. GRAINED		DRILL RATES:		
				228'-228.5' - BIOTITE RICH ZONE - LARGE CRYSTALS		44'-61' = 11 MINUTES		
						61'-81' = 14 MIN.		
						81-101 = 21		
				B.O.B. = 300'		101-141 = 49		
						141-161 = 20		
						161'-181' = 21		
						181'-201' = 23		
						201'-221' = 29		
						221-241 = 31		
						241-261 = 31		
						261-281 = 33		
						281'-300' = 33 MIN.		

FIELD BORING LOG

Boring No. ECJ-3

Project No 5180-03	Project Name SULLIVAN'S LEDGE		Page 1 of 2
Contractor O.E. DUBE & SON	Driller DAVE DUBE	Date started 1-11-88	completed 1-15-88
Method AIR ROTARY	Casing Size 4"	HNU 11.7 / 10.2	Protection Level C - DERMAL
Ground El 107.1	Soil Drilled 8'	▽ below ground	Total Depth 303'
Logged by T. LONGLEY	Checked by	Date	

BK = BACKGROUND

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	HNU jar	Comments on Advance of Boring	Monitoring HNU	
				USED 6" AIR HAMMER TO OPEN HOLE TO 28'. HAVE 8' OF SOIL OVER BEDROCK. GROUTED CASING TO 28'			BK	BK
						35'-36' - POSSIBLE FRACTURE - RUSTY WATER RETURN		
S-1	44'			PINK GRANITE ~45% K-SPAR 45% QTZ & PLAG. 10% ACCESSORIES		50'-52' FRACTURE ZONE - RUSTY WATER RETURN @ ≈ 3 GAL./MIN.		
S-2	84'			PINK GRANITE AS ABOVE FRESH UNWEATHERED		89' - SLIGHTLY RUSTY WATER		
S-3	124'			~ 50% K-SPAR 47% PLAG & QTZ. 3% ACCESSORIES (V. ROUGH ESTIMATES)		127' - DRILL RATE CHANGED - SLIGHT AMOUNT OF RUSTY WATER		
						130' - 6" ZONE OF V. RUSTY WATER RETURN - NOTHING APPARENT ON CUTTINGS		
S-4	141'-143'			134' - BIOTITE RICH ZONE - BIOTITE GNEISS(?) BLUISH BLACK W/ QTZ & K-SPAR		143' CHANGE FROM DARK COLORED RETURN TO MILKY GRAYISH BROWN		
						145' - RUSTY WATER RETURN		
						146' - RUSTY RETURN	▽	▽

FIELD BORING LOG

Boring No. ECJ-3

Project: No 5183-03	Project: Name SULLIVAN'S LEDGE		Page 2 of 2
Contractor O. E. DUBE & SON	Driller DAVE DUBE	Date started 1-11-88	completed 1-15-88
Method AIR ROTARY	Casing Size 4"	HNU 11.7/10.2	Protection Level C - DERMAL
Ground El 107.1'	Soil Drilled 8'	∇ below ground	Total Depth 303'
Logged by T. LONGLEY	Checked by	Date	

Sample No	Depth in Feet	Blows per 6 inches	Pen/Rec	Description	HNU jar	Comments on Advance of Boring	Monitoring HNU	Monitoring LEL
				153'- PINK GRANITE W/ BIOTITE FRAGMENTS		152'- RUSTY RETURN & OXIDIZED FRAGS.	BK	BK
				SINCE 134' HAVE GONE IN AND OUT OF GRAY GRANITE (RICH IN K-SPAR) AND BIOTITE GNEISS/SCHIST		167'-172'- DRILLER SAID SOFTER		
						174.5'- SOFT W/ SOME CHATTER		
				187'-197'- CUTTINGS SHOW BIOTITE SCHIST/GNEISS W/ K-SPAR.		(SINCE AROUND 50', THE FIRST 1/2 MIN. ON EACH NEW SECTION OF ROD PRODUCES RUSTY WATER RETURN)		
				198' PINK GRANITE		198'- DRILLER SAYS SOFT		
						209'- RUSTY WATER RETURN		
				243'-246' GNEISSIC ZONE. LIGHT & DARK MINERALS VARY IN % AS GO FROM ZONE TO ZONE		240'-240.5'- DRILL SPEEDS UP & RUSTY RETURN		
S-5	243'-246'					270'- RETURN WATER LIGHT MUDDY BRN.		
S-6	270'-271'			BIOT. SCHIST/GNEISS TO 263'		DRILL RATES		
S-7	287'-288'			284'- HIT COARSE GRAINED MICA RICH ZONE TO 290'		43'-63' = 26 MIN		
				290'-303' PINK GRANITE		63'-83' = 23		
						83-103 = 24		
				B.O.B. @ 303'		103-123 = 28		
						123-143 = 26		
						143-163 = 27		
						163-183 = 24		
						183-203 = 26		
						203-223 = 36		
						223-243 = 28		
						243-263 = 37		
						263-283 = 36		
						283'-303' = 38 MIN		

FIELD BORING LOG

Boring No. ECJ-4

Project: No 5180-03	Project: Name SULLIVAN'S LEDGE		Page 1 of 2
Contractor O.E. DUBE & SON	Driller DAVE DUBE	Date started 1-18-88	completed 1-26-88
Method AIR ROTARY	Casing Size 4"	HNU 11.7 (10.2)	Protection Level C - DERMAL
Ground El 68.1'	Soil Drilled 16'	∇ below ground	Total Depth 300'
Logged by T. LONGLEY / L. FITZGERALD	Checked by	Date	

BK = BACKGROUND

Sample No	Depth in Feet	Blows per 6 inches	Pen/Rec	Description	HNU jar	Comments on Advance of Boring	Monitor: HNU	
				0'-16' OVERBURDEN OF GRAVEL, ROCKS, SOIL, PEAT (8'-9.5')			BK	BK
				TOP OF ROCK IS FRAGMENTED AND WEATHERED				
				GNEISSIC TO GRANITIC W/ PINK K-SPAR, QTZ., PLAG. BIOT., AMPHIBOLE		21'-22' DRILLER SAID SOFT GETS HARDER AT 36'		
						50' SOFT		
S-1	51'			BIOTITE GNEISS; 90% DARK MINERALS, 10% LIGHT PLAG. & QTZ., PINK K-SPAR GREEN CHLORITE				
						59' - FAULT - PRODUCES WATER, MUDDY & DIRTY WATER RETURN - STAINING APPARENT ON FREE FACES - YIELDS APPROX. 30GAL/MIN		
				NEAR 55' START GETTING MORE K-SPAR, COARSE GRAINED MUSC. & QTZ MIXED W/ BIOT. GNEISS				
				67' - ALTERNATING BETWEEN DARK BIOT. GNEISS TO PINK GRANITE		76' - DRILL RATE INCREASED OVER 6" ZONE		
						87' - DRILL JUMPED AHEAD BY 1'		
S-2	88'			AS ABOVE - MIXED GNEISS/GRANITE				
						115' - DRILLER NOTES CHANGE - FRAC.?		
				125' - HIGH K-SPAR GRANITE				

FIELD BORING LOG

Boring No. ECJ-4

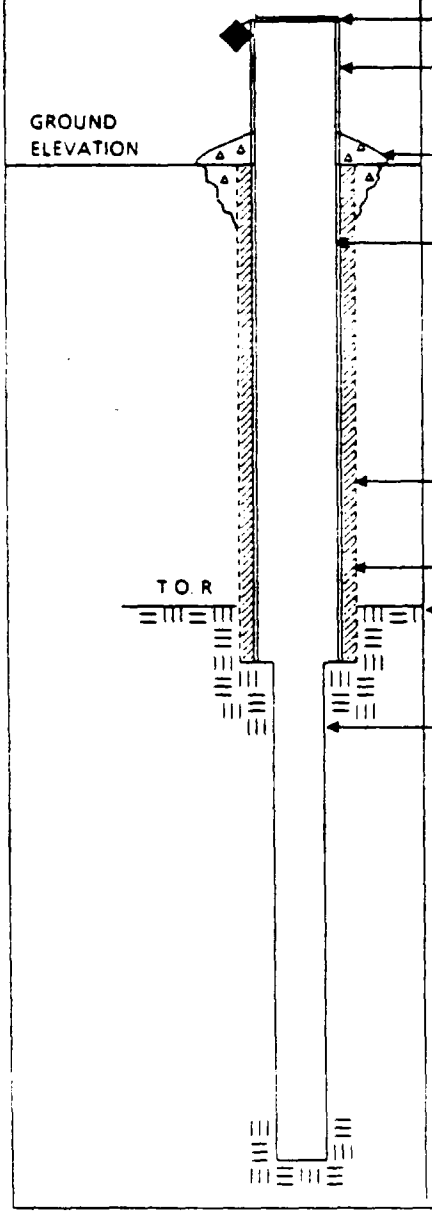
Project No 5180-03	Project Name SULLIVAN'S LEDGE		Page 2 of 2
Contractor D. E. DUBE & Son	Driller DAVE DUBE	Date started 1-18-88	completed 1-26-88
Method AIR ROTARY	Casing Size 4"	HNU 11.7 (10.2)	Protection Level C-DERMAL
Ground El 68.1'	Soil Drilled 16'	∇ below ground	Total Depth 300'
Logged by T. LONGLEY L. FITZGERALD	Checked by	Date	

Sample No	Depth in Feet	Blows per 6 inches	Pen Rec	Description	HNU Jar	Comments on Advance of Boring	Monitoring HNU	Monitoring [illegible]
				DARK SCHIST -128'		128'-129' - INCREASE PENETRATION RATE		
S-3	146'			GNEISS - MED. GRAINED W/ BIOTITE, QTZ., PLAG., MINOR K-SPAR, CHLORITE IN-AND-OUT OF LIGHT & DARK ZONES				
				DRILL RATES 42'-62' = 22 MINUTES 62-82 = 27 82-102 = 32 102-122 = 23 122-142 = 31 161-181 = 39 241-261 = 44 261-281 = 50 281'-300' = 53 MINUTES INCREASE IN TIMES DUE TO WEIGHT OF WATER ON HAMMER		161' - RODS JUMP AHEAD BY 1' - HAMMER BREAKS OFF IN HOLE - POSSIBLY FRACTURE OR JUST EQUIP. BREAK 174' - DRILLER SAID SOFT		
				184' BIOT. GNEISS		179' - BROWN WATER RETURN 189'-193' - DRILLER SAID SOFT 197'-200' SOFT W/ CHATTER		
				BIOT. SCHIST/GNEISS ALT. W/ GRANITE		200'-202' - CHATTER W/ BROWN RETURN 219' CHATTER		
S-4	225'-227'			225'-227' 80% BIOT. + CHLORITE 20% LIGHTER QTZ., PLAG., K-SPAR - REPRESENTATIVE OF HOLE SINCE 161'		225'-227' CHATTER 244'-246' - INCREASE FEED & SLIGHT CHATTER - AGAIN AT 273'-275' 286'-289' - SOFT, INCR. PENETRATION, CHATTER		
				B.O.B. 300'				

BORING NO. ECJ-1

BEDROCK
MONITORING WELL SHEET
OPEN HOLE WELL

PROJECT: SULLIVAN'S LEDGE
PROJECT NO: 5180-03
ELEVATION: 84.1'
FIELD GEOLOGIST: J. LONGLEY
LOCATION: NEW BEDFORD, MA
BORING: ECJ-1
DATE: 2-21-88
DRILLER: DAVE DUBE
DRILLING METHOD: AIR ROTARY
DEVELOPMENT METHOD: AIR SURGE



ELEVATION OF TOP OF CASING: 86.71

STICK UP OF CASING ABOVE GROUND SURFACE: 2.61

TYPE OF SURFACE SEAL: CEMENT GROUT

I.D. OF CASING: 4"

TYPE OF CASING: BLACK STEEL

TEMP / PERM:

DEPTH TO BOTTOM CASING: 32'

DIAMETER OF HOLE: 8 3/4"

TYPE OF CASING SEAL: CEMENT/BENT.

DEPTH TO TOP OF ROCK: 11'

DIAMETER OF HOLE IN BEDROCK: 3.9" NOMINAL

DESCRIBE IF CORE / REAMED WITH BIT:
AIR HAMMER ROCK CHIPS
- PINK GRANITE WITH
GREEN CHLORITE ZONE

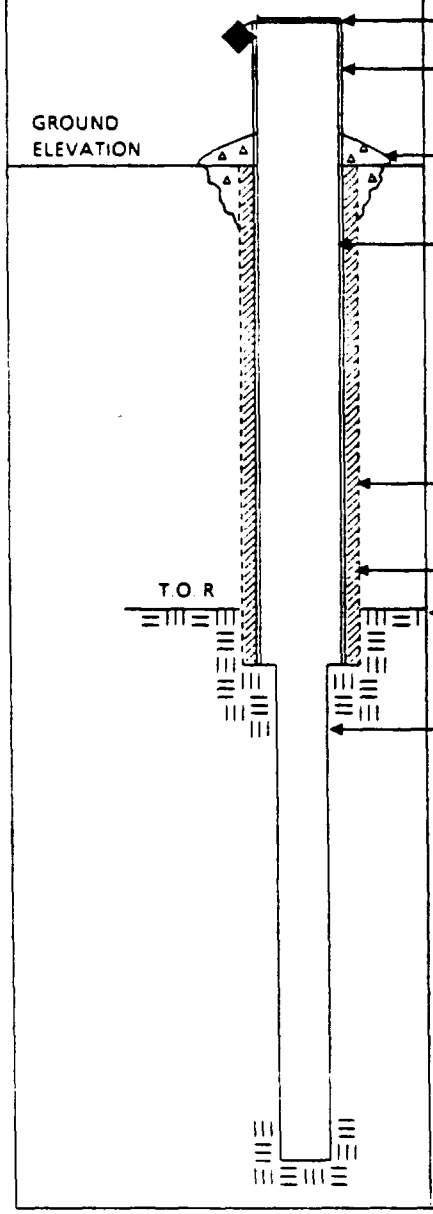
DESCRIBE JOINTS IN BEDROCK AND DEPTH:
12'-13'; 32'; 39'-39.5'; 58'-59';
60.5'-63'; 72'-72.5'; 118'-118.5';
147'-152'; BASED ON CHATTER,
RUSTY WATER RETURN, DROP OF
RODS, ETC.

ELEVATION / DEPTH OF HOLE: -215.9' / 300'

BORING NO. ECJ-2

BEDROCK
MONITORING WELL SHEET
OPEN HOLE WELL

PROJECT: SULLIVAN'S LEDGE
PROJECT NO.: 5180-03
ELEVATION: 70.4'
FIELD GEOLOGIST: T. LANGLEY
LOCATION: NEW BEDFORD, MA
BORING: ECJ-2
DATE:
DRILLER: DAVE DUBE
DRILLING METHOD: AIR ROTARY
DEVELOPMENT METHOD: AIR SURGE



ELEVATION OF TOP OF CASING: 72.62'

STICK UP OF CASING ABOVE GROUND SURFACE: 2.22'

TYPE OF SURFACE SEAL: CEMENT GROUT

I.D. OF CASING: 4"

TYPE OF CASING: BLACK STEEL

TEMP / PERM:

DEPTH TO BOTTOM CASING: 30.5'

DIAMETER OF HOLE: 8.75'

TYPE OF CASING SEAL: CEMENT/BENT. GROUT

DEPTH TO TOP OF ROCK: 19'

DIAMETER OF HOLE IN BEDROCK: 3.9" NOMINAL

DESCRIBE IF CORE / REAMED WITH BIT:
AIR HAMMER ROCK CHIPS

DESCRIBE JOINTS IN BEDROCK AND DEPTH:
82'-82.5'; 106'-107'; 111'-111.5'; 127'-127.5'; 184'-184.5'; POSSIBLE — BASED ON INCREASED DRILL FEED, CHATTER, ETC. INFERRED DUE TO DRILLING METHOD

ELEVATION / DEPTH OF HOLE: -229.6'/300'

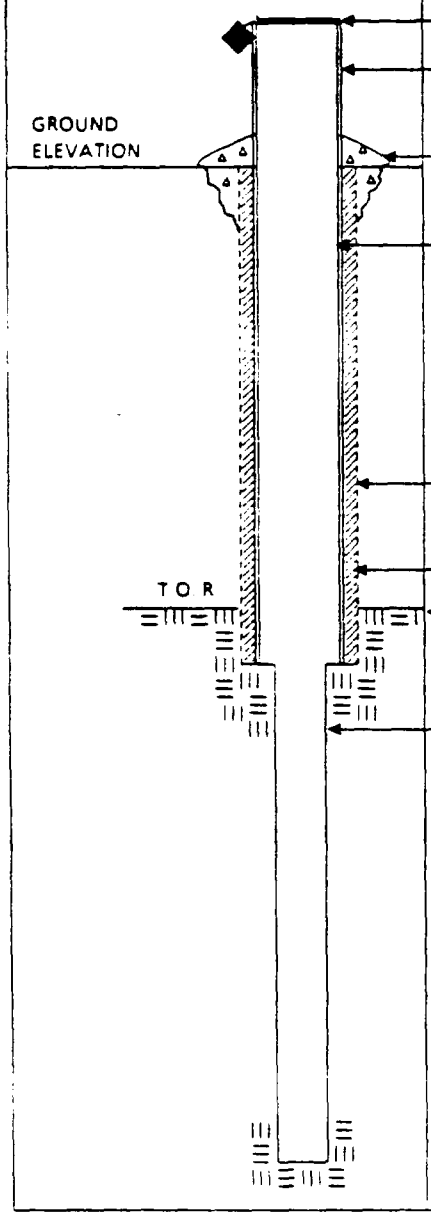
BORING NO. ECJ-3

BEDROCK
MONITORING WELL SHEET
OPEN HOLE WELL

PROJECT SULLIVAN'S LEDGE
PROJECT NO. 5180-03
ELEVATION 107.1'
FIELD GEOLOGIST T. LONGLEY

LOCATION NEW BEDFORD, MA
BORING ECJ-3
DATE 1-15-88

DRILLER DAVE DUGE
DRILLING METHOD AIR ROTARY
DEVELOPMENT METHOD AIR SURGE



ELEVATION OF TOP OF CASING: 109.48'

STICK UP OF CASING ABOVE GROUND SURFACE: 2.38'

TYPE OF SURFACE SEAL: CEMENT GROUT

I.D. OF CASING: 4"
TYPE OF CASING: BLACK STEEL

TEMP / PERM:

DEPTH TO BOTTOM CASING: 28'

DIAMETER OF HOLE: 6" NOMINAL

TYPE OF CASING SEAL: CEMENT/BENT.

DEPTH TO TOP OF ROCK: 8'

DIAMETER OF HOLE IN BEDROCK: 3.9" NOMINAL

DESCRIBE IF CORE / REAMED WITH BIT:
AIR HAMMER ROCK CHIPS - PINK GRANITE W/ BIOTITE RICH GNEISSIC ZONES

DESCRIBE JOINTS IN BEDROCK AND DEPTH:
36'-36'; 50'-52'; 89'; 127'; 130'; 145'-146'; 152'; 174.5'; 209'; 240'-240.5'; 270'
ALL BASED ON OBSERVATIONS OF DRILL SPEED, CHATTER, RUSTY WATER RETURN

ELEVATION / DEPTH OF HOLE: -195.9'/303'

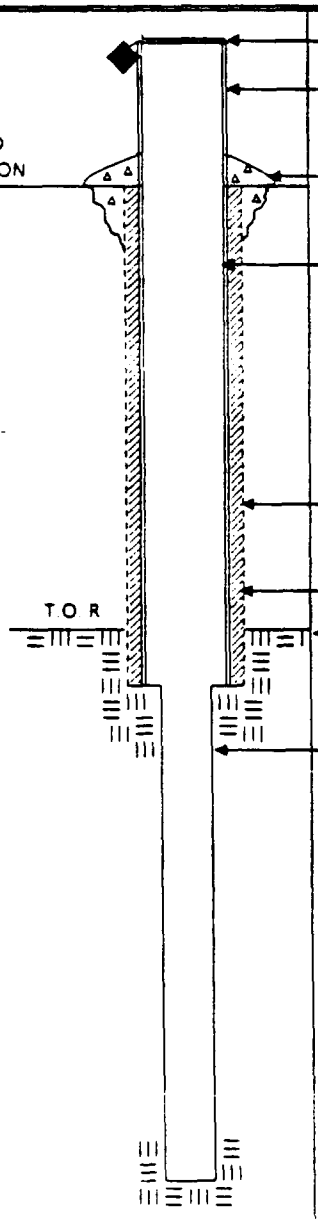
BORING NO. ECJ-4

BEDROCK
MONITORING WELL SHEET
OPEN HOLE WELL

PROJECT: SULLIVAN'S LEDGE
PROJECT NO.: 5180-03
ELEVATION: 68.1'
FIELD GEOLOGIST: T. LONGLEY - L. FITZGERALD

LOCATION: NEW BEDFORD, MA
BORING: ECJ-4
DATE:

DRILLER: DAVE DUBÉ
DRILLING METHOD: AIR ROTARY
DEVELOPMENT METHOD: AIR SURGE



ELEVATION OF TOP OF CASING: 70.66'

STICK UP OF CASING ABOVE GROUND SURFACE: 2.56'

TYPE OF SURFACE SEAL: CEMENT

I.D. OF CASING: 4"

TYPE OF CASING: BLACK STEEL

TEMP / PERM:

DEPTH TO BOTTOM CASING: 40'

DIAMETER OF HOLE: 6" NOMINAL

TYPE OF CASING SEAL: CEMENT/BENT.

DEPTH TO TOP OF ROCK: 16'

DIAMETER OF HOLE IN BEDROCK: 3.8" NOMINAL

DESCRIBE IF CORE / REAMED WITH BIT:
AIR HAMMER ROCK CHIPS;
ROCK IS BIOTITE SCHIST/GNEISS
W/ ZONES OF PINK GRANITE

DESCRIBE JOINTS IN BEDROCK AND DEPTH:
59'; 76'; 87'; 115'; 128'-129';
161'(?); 174'; 179'; 197'; 200'-202';
219'; 225'; 244'; 273'; 286'.
ALL BASED ON CHATTER, RUSTY WATER RETURN, DROP OF RODS, ETC.

ELEVATION / DEPTH OF HOLE: -231.9'/300'

Sheet 1 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

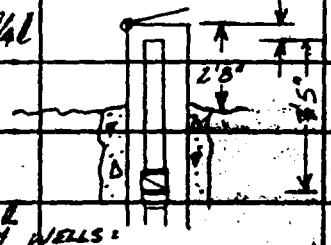
Project: SULLIVANS LEDGE - E.C. JORDAN WB Ref: WB 54B

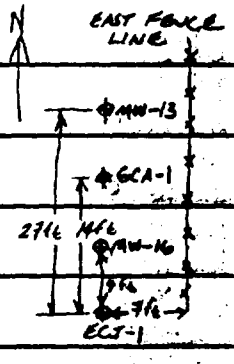
Location: NEW BEDFORD, MASS. Hole No: ECJ-1 Installed by: DL/KS/GF

Hole Depth: 300 ft MP Depth: 295 ft Hole Diameter: NOM. 3.9" Date Installed: FEB 18/88

Measurement Datum: GROUND SURFACE Datum Elevation: TOP OF PROTECTIVE STEEL 86.71 ft Date Drawn: FEB 23/88

Depth (ft)	Geological Description (AFTER ECJ LOG)	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
0	OVERBURDEN					- STICK-UP OF PROTECTIVE CASING W/LOCKING CAP OPEN ABOVE	✓	✓
	-SAND, ROCKS		37			G.S. = - CUT MP CASING BELOW PROTECTIVE		
10						CASING = - DRILLED BY	✓	✓
		MW13A	36			AIR ROTARY - 4" STEEL CASING		
20	GRANITE	MW13				GROUTED IN PLACE TO 32 ft. - DTW ~ 3 ft.	✓	✓
	-PINK		35	1113	100psi/4 3/4 l		✓	✓
30	DEEP RED RETURN WATER		34				✓	✓
			33	3352			✓	✓
	YELLOW/RED RETURN WATER						✓	✓
40			32	1841	95psi/4 9/16 l	NEARBY WELLS:		
				1114		- MW13 -13.63-20.65'	✓	✓
		GCA-1	31	3355		- MW13A -5.25-12.25'		
50			30			- GCA-1 -9.2-101.7'	✓	✓
				1158	100psi/4 5/16 l		✓	✓
			29					
	SOFT, RUSTY WATER RETURN						✓	✓
60	SOFT ROCK, RUSTY WATER RETURN		28	3350			✓	✓
			27	1850				
				1111	90psi/4 5/16 l		✓	✓
70	RUSTY WATER RETURN RODS DROP		26	3361				
80			25	1847			✓	✓
90			24				✓	✓
				1118	100psi/3 7/8 l		✓	✓
			23					
100		101.7						





Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Sheet 2 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVANS LEDGE - E.C. JORDAN WB Ref: WB 548

Location: NEW BEDFORD, MASS. Hole No: ECJ-1 Installed by: DL/KS/GF

Hole Depth: 300 ft MP Depth: 295 ft. Hole Diameter: NOM. 3.9" Date Installed: FEB 18/88

Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn: FEB 23/88

Depth (ft)	Geological Description (AFTER ECJ LOG)	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
100		✓					✓	✓
	GRANITE - PINK		22	1112	110psi/4¼l		✓	✓
110		✓	21					
	SOFT SPOT W/ RUSTY RETURN WATER	✓					✓	✓
120		✓	20	3371				
	SAND, SOFT ROCK						✓	✓
130		✓	19	1852 1117	90psi/4 3/16 l		✓	✓
		✓	18					
140		✓					✓	✓
	VUGGY FRACTURE ZONE - DRILL JUMPS AHEAD IN SPURTS		17	3351				
150							✓	✓
		✓ ✓	16	1116	100psi/3 5/8 l		✓	✓
160			15					
	GRANITE - PINK	✓					✓	✓
170		✓	14	3354				
		✓					✓	✓
180		✓	13	1856 1110	100psi/4 3/16 l		✓	✓
		✓	12					
190		✓					✓	✓
		✓	11	3357				
200		✓						

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

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Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE – E.C. JORDAN WB Ref: WB 54B

Location: NEW BEDFORD, MASS. Hole No: ECJ-1 Installed by: DL/KS/GF

Hole Depth: 300 Ft MP Depth: 295 Ft Hole Diameter: Nom. 3.9" Date Installed: FEB 18/88

Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn: FEB 23/88

Depth (ft)	Geological Description (AFTER ECJ LOG)	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
200								
		✓	10				✓	✓
	GRANITE							
210		✓						
	– PINK w/ GREEN CHLORITE						✓	✓
		✓	9	1115	100psi/3⅜ℓ		✓	✓
220		✓	8					
230		✓ ✓	7	3358			✓	✓
240		✓ ✓	6	1845			✓	✓
250			5				✓	✓
		✓			100psi/4.0ℓ		✓	✓
		✓	4					
260								
		✓	3	3356			✓	✓
270	HIGH % GREEN CHLORITE							
	SLIGHTLY FASTER RATE OF DRILLING	✓	2				✓	✓
280		✓						
		✓	1				✓	✓
290		✓						
300		✓						

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Westbay Instruments Ltd.

CASING COMPLETION SUMMARY

Site Location: SULLIVANS LEDGE, NEW BEDFORD, MASS.
Drillhole No.: ECJ-1
Weather/Temperature: CLEAR, COOL

Installation Date: FEB 18/88
Technician(s): DL/KS/GF
Job No./Client: WB 548 / E.C. JORDAN

Completion Zone	DEPTH Interval (Ft)	Length (Ft)	Piezometer #	Piezometer Depth (Ft)	Pumping Port #	Pumping Port Depth (Ft)	Volume Pumped	Apparent "T"	Comments (Geology, etc.)
1	254-300	46	3	265	2	275			
2	219-251	32	7	230	6	240			
3	184-216	32	11	195					
4	159-181	22	14	170	13	180			
5	134-156	22	17	145	16	155			
6	109-131	22	20	120	19	130			
7	94-106	12	23	95					
8	69-91	22	26	70	25	80			
9	54-66	12	28	60	27	65			
10	44-51	7	31	45					
11	32-41	9	33	35	32	40			

Sheet 1 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE WB Ref: WB548

Location: NEW BEDFORD MA Hole No: ECJ-2 Installed by: DL/KS/ER/LF

Hole Depth: 300 ft MP Depth: 290 ft Hole Diameter: Nom 3.9" Date Installed: FEB 11, 1988

Measurement Datum: GROUND LEVEL Datum Elevation: TOP OF PROTECTIVE STEEL 72.62 ft Date Drawn: FEB 11, 1988

Depth (ft)	Geological Description (after ECJ field log)	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
	SAND AND GRAVEL - with boulders		37			- STICK UP OF PROTECTIVE CASING W/ LOCKING CAP OPEN ABOVE G.S. = 2'2½"	✓	✓
						- CUT MP CASING BELOW PROTECTIVE CASING = 4½"	✓	✓
10			36			- DRILLED BY AIR ROTARY - 4" STEEL CASING GROUTED IN PLACE TO 30.5 ft. - DTW ~1.5 ft		
	GRANITE - biotite/muscovite rich - green/grey - chloritized - trace oxidation stain observed down to 93 ft.	MW-6 MW-6A					✓	✓
20			35					
30		30.5'	34				✓	✓
				1126	75psi/4½ ℓ		✓	✓
			33					
40	DRILLING FRACTURE, 40 ft						✓	✓
			32	3372				
50			31	1858		NEARBY WELLS: - MW-6: 20-100' - MW-6A: 6-17'	✓	✓
60			30			- JOINT TESTS t = 1 minute	✓	✓
				1132	80psi/4½ ℓ	P = 100psi	✓	✓
			29					
70				1131	75psi/3½ ℓ	N FAIRWAY STREAM	✓	✓
			28			10 ft MW6 ECJ-2 8 ft MW6A		
80	POSSIBLE FRACTURE		27	3374		ACCESS HATHAWAY ROAD	✓	✓
	DRILL BIT JUMPED AHEAD							
90	POSSIBLE FRACTURE		26	1860			✓	✓
100							✓	✓

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Sheet 2 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE WB Ref: WB.548

Location: NEW BEDFORD, MASS. Hole No: PCT-2 Installed by: [illegible]

Hole Depth: 300 ft MP Depth: 290 ft Hole Diameter: Nom. 3.9" Date Installed: FEB [illegible]

Measurement Datum: GROUND LEVEL Datum Elevation: Date Drawn: FEB 11/88

Depth (ft)	Geological Description	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
	GRANITE (CONTINUED)		25	1133	80psi/4.0l		✓	✓
	SOFT							
110			24					
	DRILL BIT DROPPED 0.5ft							
				3367			✓	✓
	SOFT							
120			23					
				1859			✓	✓
	SOFT							
130			22					
			21				✓	✓
140				1134	80psi/4.0l		✓	✓
				20 1130	80psi/3.8l		✓	✓
			19					
150	SCHIST			3366			✓	✓
	- BLACK TO GREEN/BLACK		18					
	- TRACE RED GARNET			1849			✓	✓
			17					
160							✓	✓
				16 1136	80psi/3.8l		✓	✓
	GRANITE		15					
170	- PINK						✓	✓
				14 1135	75psi/3.75l		✓	✓
			13					
180								
	DRILL BIT DROPPED 0.5 ft.			3375			✓	✓
			12					
190								
			11	1848			✓	✓
200								

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

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Sheet 3 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE WB Ref: WB 548

Location: NEW BEDFORD, MASS. Hole No: ECJ-2 Installed by: DL/KS/ER/LE/TR

Hole Depth: 300 ft MP Depth: 290 ft Hole Diameter: NOM. 3.9" Date Installed: FEB 11/88

Measurement Datum: GROUND LEVEL Datum Elevation: Date Drawn: FEB 11/88

Depth (ft)	Geological Description	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
	GRANITE (CONT'D.)							
		✓	10				✓	✓
210				1137	75psi/3.75l		✓	✓
		✓	9					
		✓						
220			8	3376			✓	✓
		✓						
230			7				✓	✓
		✓		1138	80psi/2¾l		✓	✓
			6					
240		✓						
			5	3368			✓	✓
		✓						
250								
		✓	4				✓	✓
				1139	80psi/3¼l			
260							✓	✓
			3					
		✓						
270							✓	✓
			2	3373				
		✓						
		✓						
280			1	1857			✓	✓
		✓						
290								
		✓						
		✓						
300								

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Westbay Instruments Ltd

CASING COMPLETION SUMMARY

Site Location: SULLIVAN'S LEDGE, NEW BEDFORD, MASS

Drillhole No.: ECJ-2

Weather/Temperature: CLEAR, ~ FREEZING

Installation Date: FEBRUARY 11, 1988

Technician(s): DL/ER/KS/LF/TDL

Job No./Client: WB 548 / E.C. JORDAN

Completion Zone	DEPTH Interval (ft)	Length (ft)	Piezometer #	Piezometer Depth (ft)	Pumping Port #	Pumping Port Depth (ft)	Volume Pumped (l)	Apparent "T"	Comments (Geology, etc.)
1 ✓	259-300	41	2	270	1	280	5.0		
2 ✓	234-256	22	5	245					
3 ✓	209-231	22	8	220					
4 ✓	174-206	32	12	185	11	195	23.8		
5 ✓	144-161	17	18	150	17	155	37.2		
6 ✓	104-136	32	23	115	22	125	5		
7 ✓	69-101	32	27	80	26	90	247		
8 ✓	34-61	27	32	45	31	50	365		

Sheet 1 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

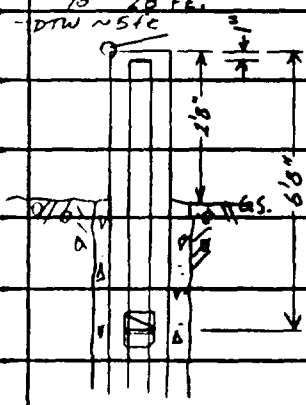
Project: SULLIVAN'S LEDGE WB Ref: WB 548

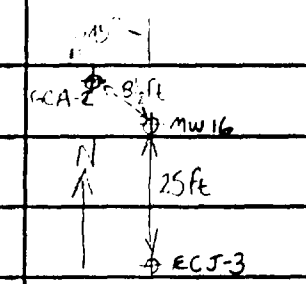
Location: NEW BEDFORD, MASS. Hole No: ECJ-3 Installed by: DL/KS/ER/LF/TI

Hole Depth: 303 ft MP Depth: 289 ft Hole Diameter: NOM. 3.9" Date Installed: FEB 14/88

Measurement Datum: GROUND SURFACE TOP OF PROTECTIVE STEEL Datum Elevation: 109.48 ft Date Drawn: FEB 17/88

Depth (ft)	Geological Description (AFTER ECJ LOG)	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
0	OVERBURDEN/FILL		4 / 37			- STICK-UP OF PROTECTIVE CASING W/ LOCKING CAP OPEN ABOVE G.S. = 2'8"	✓	✓
						- CUT MP CASING BELOW PROTECTIVE CASING = 1"		
10	GRANITE - PINK	GCA-2, MW-16	14 / 36			- DRILLED BY AIR ROTARY	✓	✓
						- 4" STEEL CASING GROUTED IN PLACE TO 28 ft.		
20			24 / 35			- DTW ~5 ft	✓	✓
							✓	✓
30			29 / 34	1155	80psi/3.9 l		✓	✓
	FRACTURE		34 / 33	3364			✓	✓
40			39 / 32	1153	80psi/3.9 l		✓	✓
			44 / 31				✓	✓
50	FRACTURE ~3gpm		49 / 30	3378			✓	✓
			54 / 29	1832		- GCA-2 : 11.5'-74.6' - MW-16 : 3.25'-21.75'	✓	✓
60						- JOINT TESTS t=1 minute P=80psi		
			64 / 28	1127	90psi/3.9 l		✓	✓
70			69 / 27				✓	✓
80			79 / 26				✓	✓
90	FRACTURE		89 / 25	3379			✓	✓
100			99 / 24	1833			✓	✓





Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

21187

Sheet 2 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE WB Ref: WB 548

Location: NEW BEDFORD, MASS. Hole No: ECJ-3 Installed by: DL/KS/ER/LE/TZ

Hole Depth: 303 ft MP Depth: 289 ft Hole Diameter: NOM. 3.9" Date Installed: FEB 14/88

Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn: FEB 17/88

Depth (ft)	Geological Description	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
100	GRANITE (CONT'D)	V	99 – 24					
			109 – 23				✓	✓
110		V	114 – 22	1152	105psi/4.0 l		✓	✓
120		V	124 – 21	3370			✓	✓
	SMALL FRACTURE							
130	6" FRACTURE VERY RED RETURN WATER	V	134 – 20	1834			✓	✓
	BIOTITE SCHIST/GNEISS		139 – 19	1156	110psi/4.1 l		✓	✓
140	– WITH STRINGERS OR LENSES OF GRANITE	V	144 – 18	3360			✓	✓
	RUSTY RETURN WATER							
150	RUSTY RETURN WATER	V	154 – 17	1831			✓	✓
			159 – 16	1157	100psi/4.1 l		✓	✓
160		V	164 – 15	1154	90psi/3.1 l		✓	✓
170			169 – 14				✓	✓
	SMALL FRACTURE	V						
180			179 – 13	3377			✓	✓
190		V	189 – 12				✓	✓
200			199 – 11				✓	✓

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Sheet 3 of 3

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE WB Ref: WB 548

Location: NEW BEDFORD, MASS. Hole No: ELJ-3 Installed by: DL/KS/ER/LF/T.

Hole Depth: 303 ft MP Depth: 289 ft Hole Diameter: Nom. 3.9" Date Installed: FEB 14/88

Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn: FEB 17/88

Depth (ft)	Geological Description	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
200	SCHIST/GNEISS		199–11	1151	90psi/3.5 l		✓	✓
			204–10					
	-WITH GRANITE							
	SMALL FRACTURE		209	3369			✓	✓
210	RUSTY RETURN WATER							
			219–8				✓	✓
220				1150	90psi/4.0 l			
			224–7				✓	✓
230								
			234	3363			✓	✓
240	BROWN TO RUSTY RETURN WATER							
			244–5	1844			✓	✓
				1125	120psi/4.0 l			
250			249–4				✓	✓
260			259–3				✓	✓
270	GRANITE -PINK		269–2	3365			✓	✓
280			279–1	1846			✓	✓
290	SCHIST/GNEISS WITH GRANITE		289			PACKER PRESSURE = LINE PRESSURE - TOOL PRESSURE	✓	✓
						TOOL PRESSURE = 180psi		
300								

300'10" (SOUNDED 12:18 p.m., FEB 14, 1988)

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Westbay Instruments Ltd

CASING COMPLETION SUMMARY

Page ____ of ____

Site Location: SULLIVANS LEDGE, NEW BEDFORD, MASS.

Drillhole No.: ECJ-3

Weather/Temperature: CLEAR, ~ FREEZING

Installation Date: FEB 14/88

Technician(s): DL/KS/ER/LF/TL

Job No./Client: WB 548 / E.C. JORDAN

Completion Zone	DEPTH Interval (ft)	Length (ft)	Piezometer #	Piezometer Depth (ft)	Pumping Port #	Pumping Port Depth (ft)	Volume Pumped (l)	Apparent "T"	Comments (Geology, etc.)
1	248-303	55	2	269	1	279	102		
2	223-245	22	6	234	5	244	98		
3	203-220	17	9	209					
4	163-200	37	13	179					
5	138-155	17	18	144	17	154	110		
6	113-135	22	21	124	20	134	237		
7	68-110	42	25	89	24	99	241.5		
8	43-65	22	30	49	29	54	279.5		
9	33-40	7	33	34					

Sheet 1 of 3

Westbay Instruments Ltd.

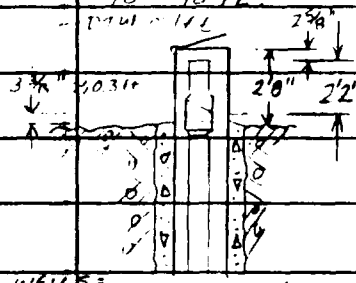
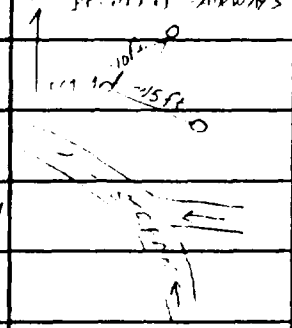
MP System Casing Installation Log

Project: SULLIVANS LEDGE - E.C. JORDAN WB Ref: WB 548

Location: NEW BEDFORD, MASS. Hole No: ECJ-4 Installed by: ER/KS/GV/GF

Hole Depth: 300 ft MP Depth: 290 ft Hole Diameter: Nom. 3.9" Date Installed: FEB 20/88

Measurement Datum: GROUND SURFACE Datum Elevation: TOP OF PROTECTIVE CASING 70.66 ft Date Drawn: FEB 23

Depth (ft)	Geological Description (AFTER ECJ LOG)	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
0	OVERBURDEN - GRAVEL, PEAT, TILL	MWB, MWB-A	39			STICK-UP OF PROTECTIVE CASING W/LOCKING CAP OPEN ABOVE	✓	✓
						G.S. = 2'8" CUT MP CASING BELOW PROTECTIVE CASING - DRILLED BY AIR ROTARY	✓	✓
10			7.7 38			4" STEEL CASING GROUTED IN PLACE TO 40 ft.	✓	✓
20			19.7 37				✓	✓
30	GNEISS - WITH PINK FELDSPAR		29.7 36				✓	✓
40			39.7 35		NEARBY WELLS: - MWB = 18-70' - MWBA = 4-16'		✓	✓
50			49.7 34	3430		JOINT TESTS t=1 minute, p=80psi	✓	✓
			54.7 33	1145	110psi/4 1/16 l		✓	✓
60	MAJOR FRACTURE - HIGH WATER YIELD - 30 gpm		59.7 32	3421			✓	✓
70			69.7 31	1839			✓	✓
			74.7 30	1143	100psi/4 1/16 l		✓	✓
	POSSIBLE FRACTURE							
80			84.7 29	3422			✓	✓
	BIT JUMPED AHEAD 1 ft						✓	✓
90			89.7 28	1837				
			94.7 27	1144	100psi/3 11/16 l		✓	✓
				3362				
100								

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE – E.C. JORDAN WB Ref: WB 548

Location: NEW BEDFORD, MASS. Hole No: ECJ-4 Installed by: ER/KS/GV/GF

Hole Depth: 300 ft MP Depth: 290 ft Hole Diameter: Nom. 3.9" Date Installed: FEB 20/88

Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn: FEB 23

Depth (ft)	Geological Description	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
100	GNEISS		104.7 26				✓	✓
				1148	107psi/3 13/16 0			
110			109.7 25				✓	✓
	POSSIBLE FRACTURE							
120			119.7 24				✓	✓
130	GRANITE FRACTURE - WITH BANDS OF SCHIST	✓	129.7 23	3429			✓	✓
			134.7 22	1835			✓	✓
		✓		1147	105psi/4 1/16 0			
140			139.3 21	3425			✓	✓
		✓						
150		✓	149.7 20				✓	✓
				1142	95psi/3 13/16 0			
		✓	154.7 19				✓	✓
160			159.7 18	3428			✓	✓
	MAJOR FRACTURE - WATER BEARING - DRILL RODS DROPPED 1ft.	✓	164.7 17	1854			✓	✓
	GRANITE	✓		1149	107psi/3 1/16 0			
170			169.7 16				✓	✓
		✓						
		✓						
180	BROWN RETURN WATER	✓	179.7 15	3380			✓	✓
	GNEISS							
190			189.7 14	1843			✓	✓
				1140	100psi/2 15/16 0			
			194.7 13				✓	✓
200			199.7 12				✓	✓

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Westbay Instruments Ltd.

MP System Casing Installation Log

Project: SULLIVAN'S LEDGE - E.C. JORDAN WB Ref: WB 548

Location: NEW BEDFORD, MASS. Hole No: ECJ-4 Installed by: ER/KS/GV/GF

Hole Depth: 300 ft MP Depth: 290 ft Hole Diameter: NOM. 3.9" Date Installed: FEB 20/88

Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn: FEB 23

Depth (ft)	Geological Description	Geologic Log	MP Casing Log	Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
200			12	3426			✓	✓
	GNEISS							
210			11				✓	✓
				1146	105 psi / 3 5/16		✓	✓
			10					
220								
	POSSIBLE FRACTURE		9	3424			✓	✓
230								
			8	1836			✓	✓
				1141	90 psi / 3 5/16			
240			7				✓	✓
	FRACTURE - WATER LOSS		6	3423			✓	✓
250			5	1838			✓	✓
		✓		1159	120 psi / 3 3/4		✓	✓
			4					
260			3				✓	✓
	PINK GRANITE	✓						
270			2	3427			✓	✓
		✓						
280			1	1853			✓	✓
		✓						
290							✓	✓
		✓						
300								

Regular MP Casing | MP Packer | Settlement Casing | Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

221187

Westbay Instruments Ltd

CASING COMPLETION SUMMARY

Page ____ of ____

Site Location: SULLIVANS LEDGE NEW BEDFORD MASS.

Drillhole No.: ECJ-4

Weather/Temperature: CLEAR, ABOVE FREEZING

Installation Date: FEB 20/88

Technician(s): ER/KS/GV/GF

Job No./Client: WB 548/E.C. JORDAN

Completion Zone	DEPTH Interval (ft)	Length (ft)	Piezometer #	Piezometer Depth (ft)	Pumping Port #	Pumping Port Depth (ft)	Volume Pumped	Apparent "T"	Comments (Geology, etc.)
1	255.7-300	46.3	2	270	1	280			
2 ✓	238.7-250.7	12	6	245	5	250			
3 ✓	213.7-235.7	22	9	225	8	235			
4 ✓	193.7-210.7	17	12	200					
5 ✓	168.7-190.7	22	15	180	14	190			
6 ✓	153.7-165.7	12	18	160	17	165			
7 ✓	138.7-150.7	12	21	140					
8 ✓	108.7-135.7	27	23	130	22	135			
9 ✓	93.7-105.7	12	27	95					
10 ✓	73.7-90.7	17	29	85	28	90			
11 ✓	53.7-70.7	17	32	60	31	70			
12 ✓	40-50.7	10.7	34	50					

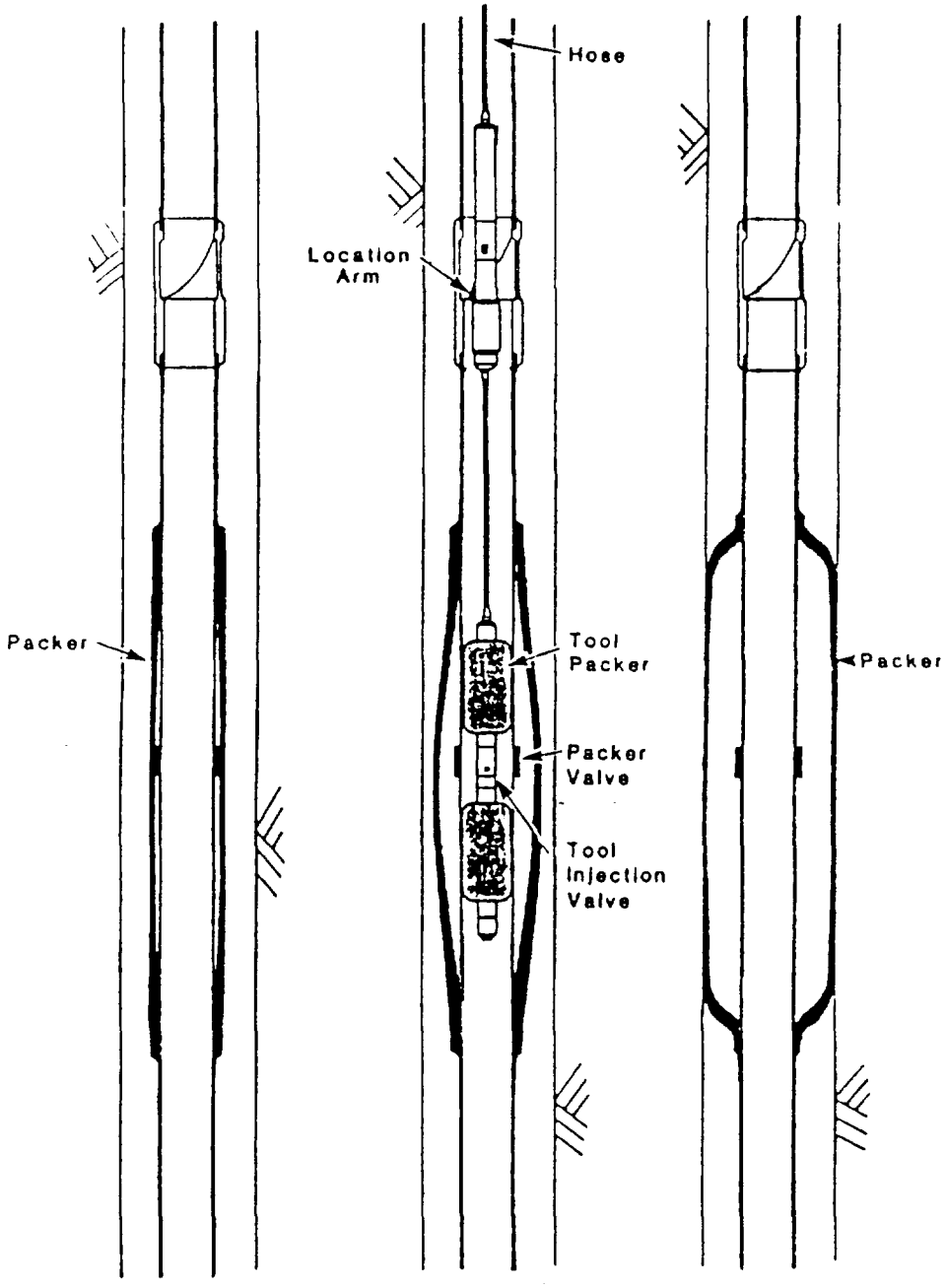
Technical Guideline for Westbay Sampling Procedures

The four ECJ wells installed during the Phase II Field Investigation required special sampling methods. The nature of the system eliminates the need for the purging of three to five well volumes prior to sampling. These well systems are a modular multiple-level groundwater monitoring device employing a single, closed access tube with valved ports. The valved ports are used to provide access to several different levels of a drill hole in a single well casing. These leaf spring valves are normally closed and are only opened for purposes of obtaining aquifer pressure readings and water quality samples. The annular space between each monitoring zone is sealed off from the next zone to prevent fluid migration by means of permanent hydraulically inflated packers (Figure 1).

Once the casing and annular seals have been installed, the development of the monitoring zones can proceed. This is done by opening the pumping port that is paired with a sampling port in each of the packered zones. With the pumping port opened, fluid from the inside of the casing is pumped or airlifted out in the same fashion as with a typical standpipe well. Once developed, and with the pumping port still opened, hydrogeologic testing of this zone and its adjacent casing seals can be performed (e.g., tests).

To operate the pumping port valve, an open/close tool is used, as illustrated in Figure 2. This tool has spring-loaded "jaws" that can be mechanically activated from the surface. The pumping port is shown closed in Figure 2a. To open the valve, the tool is lowered on a wireline with the jaws extended and pointing upward (i.e., so that they will catch on shoulders when the tool is raised.). In this condition, the jaws will spring through the couplings as the tool is lowered to just below the desired pumping port coupling. The tool is then pulled up so that the jaws engage the bottom shoulder of the sliding valve. By continuing to pull up on the wireline, the valve can be opened, as shown in Figure 2b. Once the valve is opened, the jaws can be collapsed into the housing and the tool recovered. With this one valve opened, fluids can be added to or removed from the monitoring interval by injecting or pumping from the MP casing. Other zones may still be monitored in the normal manner using a pressure probe or sampling probe because they will not be hydraulically connected to the interior of the casing.

To close the pumping port coupling, the open/close tool is brought to the surface and the housing is reversed so that the jaws point downward (i.e., the tool will stop on exposed shoulders when the tool is lowered). The tool is lowered to the open pumping port with the jaws collapsed into the housing. Once the tool is located near the pumping port, the jaws are



a) PACKER AS INSTALLED.

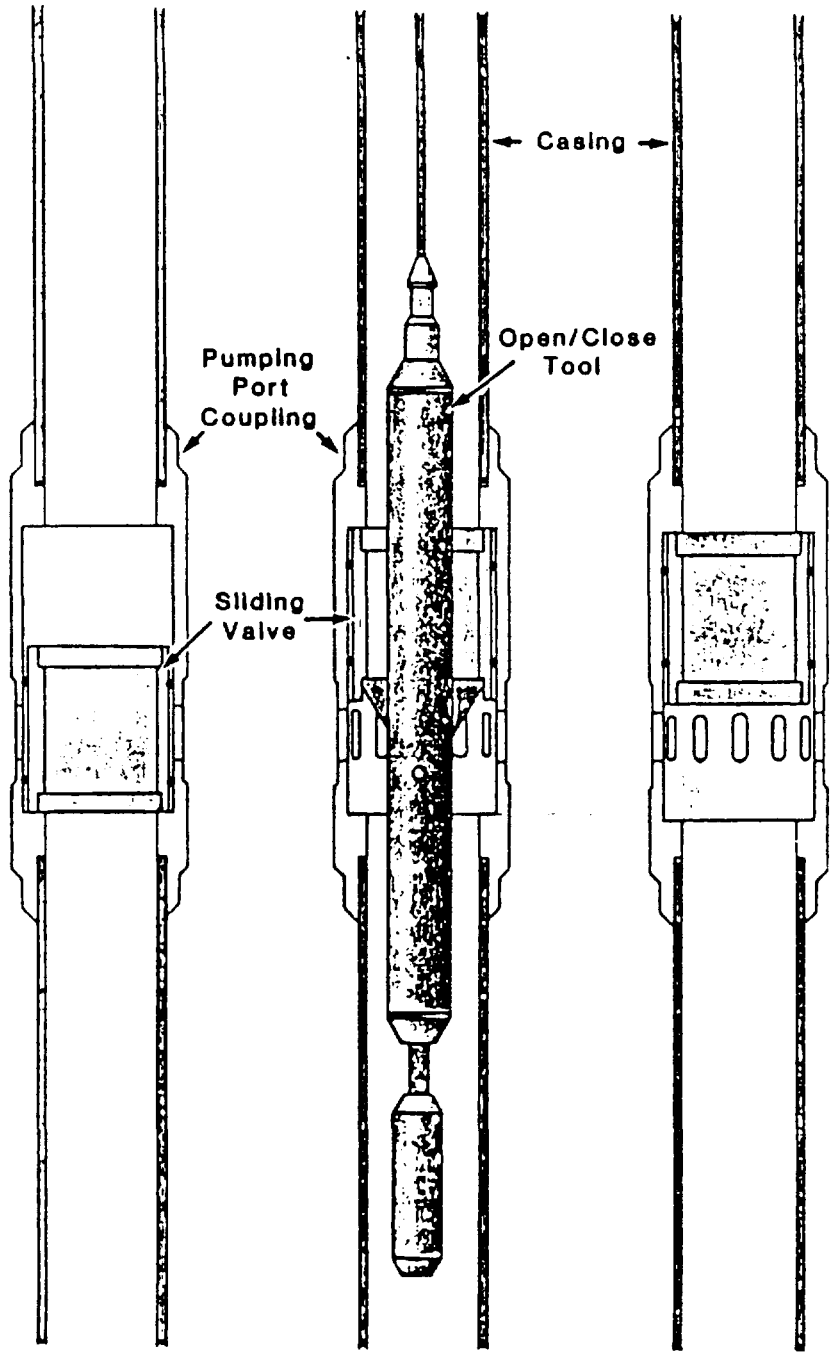
b) INFLATION TOOL INFLATING PACKER.

c) FULLY INFLATED PACKER.

FIGURE 1
STEPS IN THE INFLATION OF SYSTEM PACKER
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

5180-11

0401269A



a) PUMPING PORT CLOSED.

b) OPEN/CLOSE TOO PULLED UP TO OPEN SLIDE VALVE.

c) PUMPING PORT OPEN.

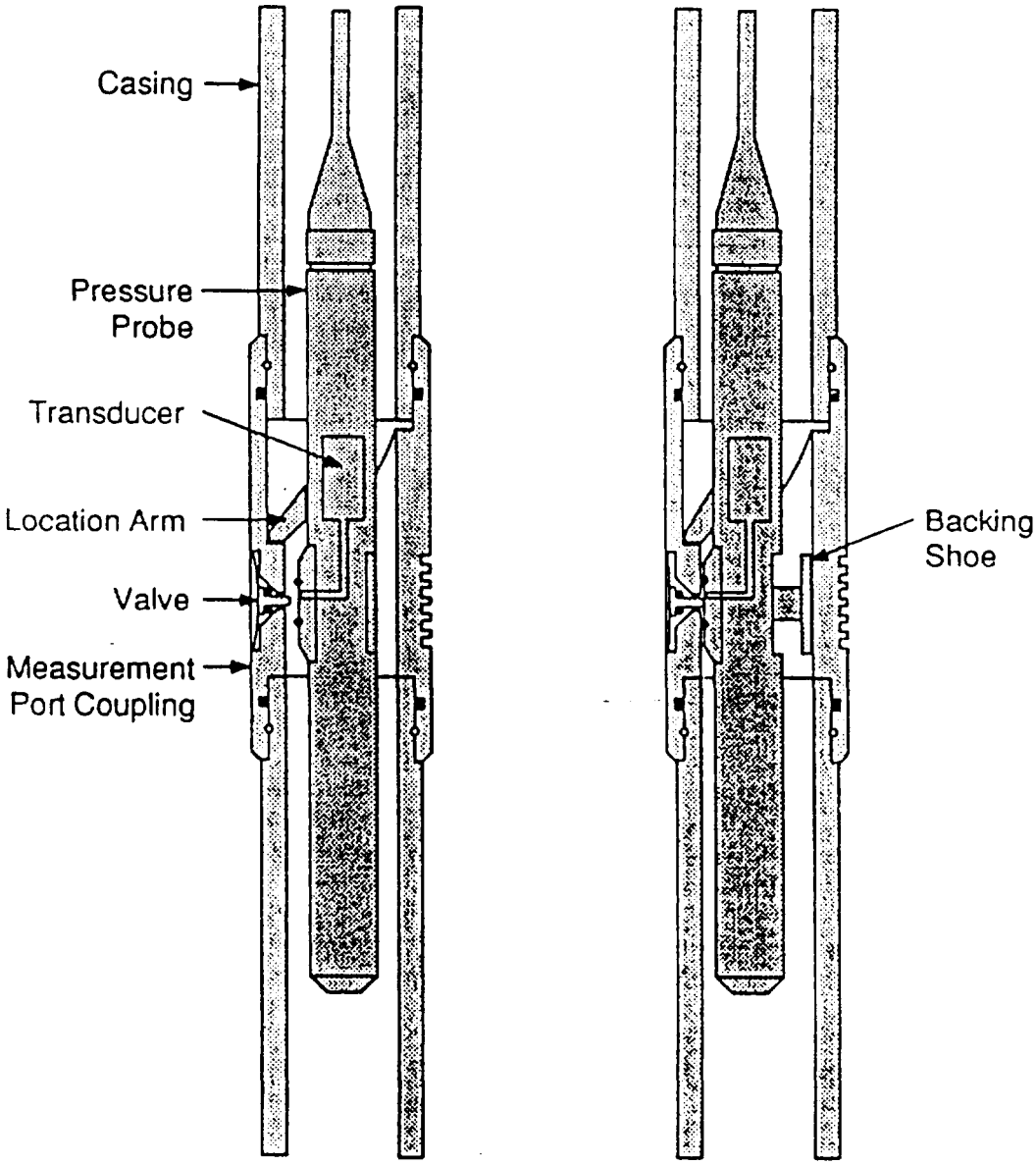
FIGURE 2
STEPS IN OPENING PUMPING PORT
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

5180-11

released and the valve is closed by tapping on the top shoulder of the sliding valve with the tool.

Fluid pressure measurements can be made (with a pressure transducer probe) within each of the packered sections through the valved ports, or measurement port couplings. Each one of these ports is part of a coupling that has a helical landing ring that accepts a pressure probe. This probe incorporates a location arm, a backing shoe, a face seal, and a fluid pressure transducer (Figure 3). Once the probe is in proper location, the backing shoe is activated, forcing the probe to the wall of the coupling so that the face seal on the probe seals around the measurement port valve at the same time as the face of the probe pushes the valve open. The transducer is now hydraulically connected to the fluid outside the coupling and isolated from the fluid inside the casing. A reading is then displayed on a surface data unit; this reading is the fluid pressure in the formation outside the measurement port relative to the water pressure reading for the top of the plastic casing. After the reading has been recorded, the probe backing shoe is retracted and the valve in the coupling reseals.

The probe is then moved up to the next measurement port and the procedure is repeated.



a) PROBE LOCATED AT MEASUREMENT PORT COUPLING.

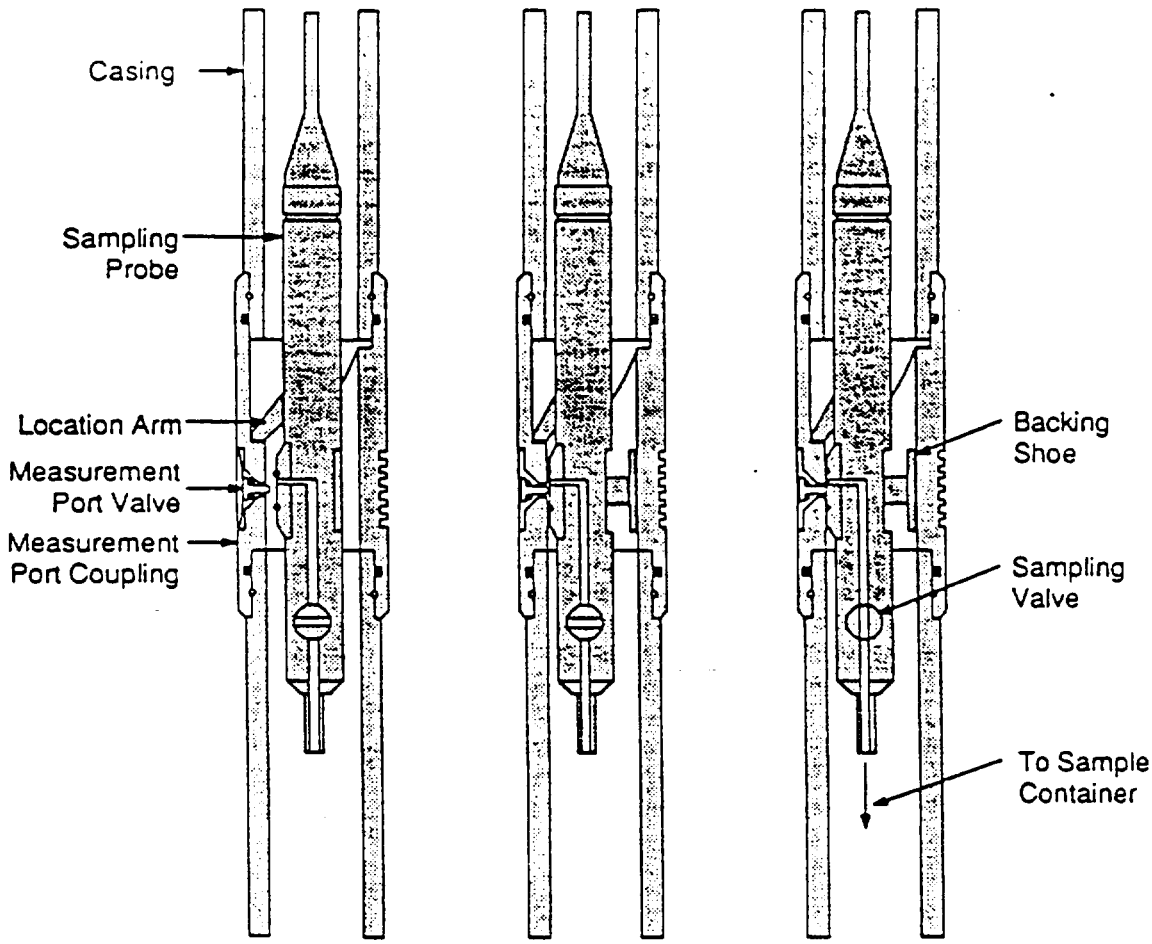
b) PROBE MEASURING FLUID PRESSURE OUTSIDE COUPLING.

FIGURE 3
OPERATION OF PRESSURE PROBE
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

5180-11

Fluid samples are obtained by lowering a sampling probe and sample container to the desired measurement port coupling. The sampling probe operates in similar fashion to the pressure probe except that a groundwater sample is drawn through the measurement port coupling (Figure 4). A clean, empty sample container is attached to the sampling probe. The sampling valve on the probe is closed to prevent water inside of the casing from entering the sample container. By means of the extended location arm, the sampling unit is positioned in the measurement port coupling. As with the pressure probe instrument, a backing shoe is activated from the surface and this pushes the probe to the wall of the coupling so that the face seal on the probe seals around the measurement port valve at the same time as the face of the probe pushes the valve open. The interior passage of the probe is now hydraulically connected to formational water outside the coupling.

The sampling valve in the probe is opened by surface controls allowing fluid from outside the measurement port to enter the sample bottle. Once the bottle is full, the sampling valve is closed, the backing shoe is retracted, and the sampling probe and sample bottle are pulled to the surface. The sampling probe can then be cleaned, a clean bottle attached, and the procedure repeated.



a) PROBE LOCATED AT MEASUREMENT PORT COUPLING. SAMPLING VALVE CLOSED.

b) PROBE ACTIVATED. SAMPLING VALVE CLOSED.

c) PROBE ACTIVATED. SAMPLING VALVE OPEN.

FIGURE 4
OPERATION OF SAMPLING PROBE
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

seals around the measurement port valve at the same time as the face of the probe pushes the valve open. The interior passage of the probe is now hydraulically connected to formational water outside the coupling.

The sampling valve in the probe is opened by surface controls allowing fluid from outside the measurement port to enter the sample bottle. Once the bottle is full, the sampling valve is closed, the backing shoe is retracted, and the sampling probe and sample bottle are pulled to the surface. The sampling probe can then be cleaned, a clean bottle attached, and the procedure repeated.

Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: Ground Level Pressure Probe Type: Electric Date: Feb 19, 1988 Job No.: WB 548

Elev. Ground Sfc: Serial No.: EE166 Drillhole No.: ECJ-1

Height MP Casing above Ground Sfc: 31.5" / 80cm Range: 0 to 200 psi Project: Sullivans Ledge

Elev. top of MP Casing: Weather: Cloudy Casing Size/Type: 1.5" MP

Reference Elev. Steel Casing: Barometric Pressure: Operator: K Seedhouse D Larssen

Ambient Reading (Pressure/Temperature/Time): Start 13.71 / 290.2 / 1627 Finish

Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	ΔP Press. Head Outside Port, m (ft)	Piez. Level Outside Port, m	Comments
From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
~~265~~			129.73			288.6	4:35			Bottom Port
265'						287.9	4:37			
			129.75			287.6	4:38			
			129.74			287.4	4:39			
			129.73			287.2				
				129.62			16:40			
				129.59		287.1	16:41			
				129.59	129.72	287.1	16:42	-0.30		
230			114.59	112.32			16:43			
				112.22			16:44			
				112.10			16:45			
				112.01		287.2	16:46			
				111.95		287.1	16:48			
				111.90		287.1	16:49			
				111.85		287.1	16:50			
				111.78	114.56	287.1	16:52	-6.42		
195'				~~99.40~~	~~96.19~~	~~287.2~~	~~16:55~~			
					~~96.19~~		~~16:56~~	KS Feb 19/88		
			99.40	96.19		287.2	16:55			
				96.19	99.40		16:56	-7.41		

Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVEL

FIELD DATA AND CALCULATION SHE

Datum: _____ Pressure Probe Type: _____ Date: Feb 19 1988 Job No.: _____

Elev. Ground Sfc: _____ Serial No.: _____ Drillhole No.: ECJ-1

Height MP Casing above Ground Sfc: _____ Range: 0 to _____ psi Project: _____

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: K Seedhouse

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish _____

Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	(ΔP) Press. Head Outside Port, m ft.	Piez. Level Outside Port, m	Comments
From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
170'			88.56	85.18		287.2	17:03			
				85.01			17:04			
				84.88			17:05			
				84.80		287.2	17:06			
				84.76			17:07			
				84.74	88.55		17:08	-8.79		
145'			77.71	73.85			17:10:16			
				73.84	77.69	287.2	17:11	-8.93		
120'			66.85	62.96			17:14			
				~~62.95~~			17:15			
				62.95	66.84	287.2	17:16	-8.89		
			55.98	52.49			17:17			
				52.18			17:18			
95'				52.04			17:19			
				52.01	55.98	287.2	17:20	-9.16		
70'			45.12	41.09			17:23:20			
				41.06			17:23.40			
				41.06	45.12	287.2	17:24	-9.37		
60'			40.78	~~36.01~~			17:27:15			
				36.01			17:27:30			
				36.00	40.77	287.2	17:28	-11.01		

220886

Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: ___ Pressure Probe Type: ___ Date: Feb 19, 1988 Job No.: ___

Elev. Ground Sfc: ___ Serial No.: ___ Drillhole No.: ECJ-1

Height MP Casing above Ground Sfc: ___ Range: 0 to ___ psi Project: Sullivans Ledge

Elev. top of MP Casing: ___ Weather: ___ Casing Size/Type: ___

Reference Elev. Steel Casing: ___ Barometric Pressure: ___ Operator: K Seedhouse D Larssen

Ambient Reading (Pressure/Temperature/Time): Start ___ Finish 13.65 / 287.0

Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	ΔP Press. Head Outside Port, m (ft)	Piez. Level Outside Port, m	Comments
From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
45'			34.27	29.48			17:31:00			
				29.47	34.26		7:32	-11.05		
35'			29.92	25.14			17:33:40			
				25.12	29.92	287.1	17:34:00	-11.08		

220884

Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Page 1 of

Datum: _____ Pressure Probe Type: ELECTRIC Date: FEB 25/88 Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: EE166/DEE146/EEP095 Drillhole No.: ECJ-1

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVANS LEDGE/EC JORDAN

Elev. top of MP Casing: _____ Weather: CLOUDY, COOL Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: E. REHTANE/T. LONGLEY

Ambient Reading (Pressure/Temperature/Time): Start 13.25/279.3/2:06 Finish _____

Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, m Δp, psi	Piez. Level Outside Port, m ft	Comments
From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#4 265	266'7"		129.50			285.3	2:23			
			129.53			285.8	2:26			
			129.55			286.2	2:29			
			129.55			286.3	2:31			
				129.31			2:31:30			
				129.32			2:32			
				129.32	129.55	286.4	2:34	0.23	0.53	
#8 230	231'11"		114.45				2:39			
				113.27			2:39:30			
				113.13			2:40:30			
				113.11			2:41:30			
				113.11	114.44	286.7	2:42:30	1.34	3.09	
#12 195	197'2"		99.26	96.36		286.8	2:47			
				96.35			2:47:30			
				96.35		286.9	2:48	2.91	6.71	
#15 170	172'5"		88.42	85.20		286.9	2:52			
				85.14			2:52:30			
				85.10			2:53			
				85.04			2:54			
				84.99			2:55			
				84.95			2:56			

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Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: ___ Pressure Probe Type: ELECTRIC Date: Feb 25/88 Job No.: WB-548

Elev. Ground Sfc: ___ Serial No.: EE166/~~DEE146~~/~~EER~~ 095 Drillhole No.: ECJ-1

Height MP Casing above Ground Sfc: ___ Range: 0 to 200 psi Project: SULLIVAN'S LODGE

Elev. top of MP Casing: ___ Weather: CLOUDY, COLD Casing Size/Type: E. REHZMANE / T. LOWLEY

Reference Elev. Steel Casing: ___ Barometric Pressure: ___ Operator: ___

Ambient Reading (Pressure/Temperature/Time): Start ___ Finish ___

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, m Δp, psi	Piez. Level Outside Port, m ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
					84.92/3			2:57			
					84.90			2:58			
					84.88			2:59			
					84.86		286.9	3:00	3.56	8.21	
#18	145	147'8"		77.57/8	73.97/3			3:02:30			
					73.92			3:03			
					73.92		286.9	3:03:15	3.66	8.44	
#21	120	122'9"		66.73				3:05			
				~~63.03~~	63.03			3:05:30			
				~~63.03~~	63.03		286.9	3:06			
				~~63.03~~	63.03	66.72		3:06:30	3.70	8.54	
#24	95	97'11"		55.86	52.34		286.9	3:09:30			
					52.14			3:10			
					52.11			3:10:30			
					52.10			3:11			
					52.10		286.9	3:11:30	3.76	8.67	
#27	70'	73'		45.00	41.11		286.9	3:15			
					41.10			3:15:30			
					41.10		286.9	3:16	3.90	9.00	

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Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: _____ Job No.: _____

Elev. Ground Sfc: _____ Serial No.: _____ Drillhole No.: ECJ-1

Height MP Casing above Ground Sfc: _____ Range: 0 to _____ psi Project: _____

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: _____

Ambient Reading (Pressure/Temperature/Time): Start 13.56/286.9/3:31 Finish _____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, psi Δp, psi	Piez. Level Outside Port, ft ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#29	60	63		40.66	35.84		286.9	3:19:30			
					35.84			3:20			
					35.84	40.65	286.9	3:20:30	4.82	11.12	
#32	45	48'2"		34.16	29.31		286.9	325:45			
					29.30			3:26			
					29.29			3:26:30			
					29.29	34.15	286.9	3:27	4.87	11.23	
#34	35	38'2"		29.81	24.94		286.9	3:28:45			
					24.94			3:29			
					24.94/3	29.81		3:30	4.87	11.23	

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SUMMARY OF PURGE DATA

WB 548.

SULLIVAN'S LEDGE PROJECT

MONITORING WELL No. ECS-1

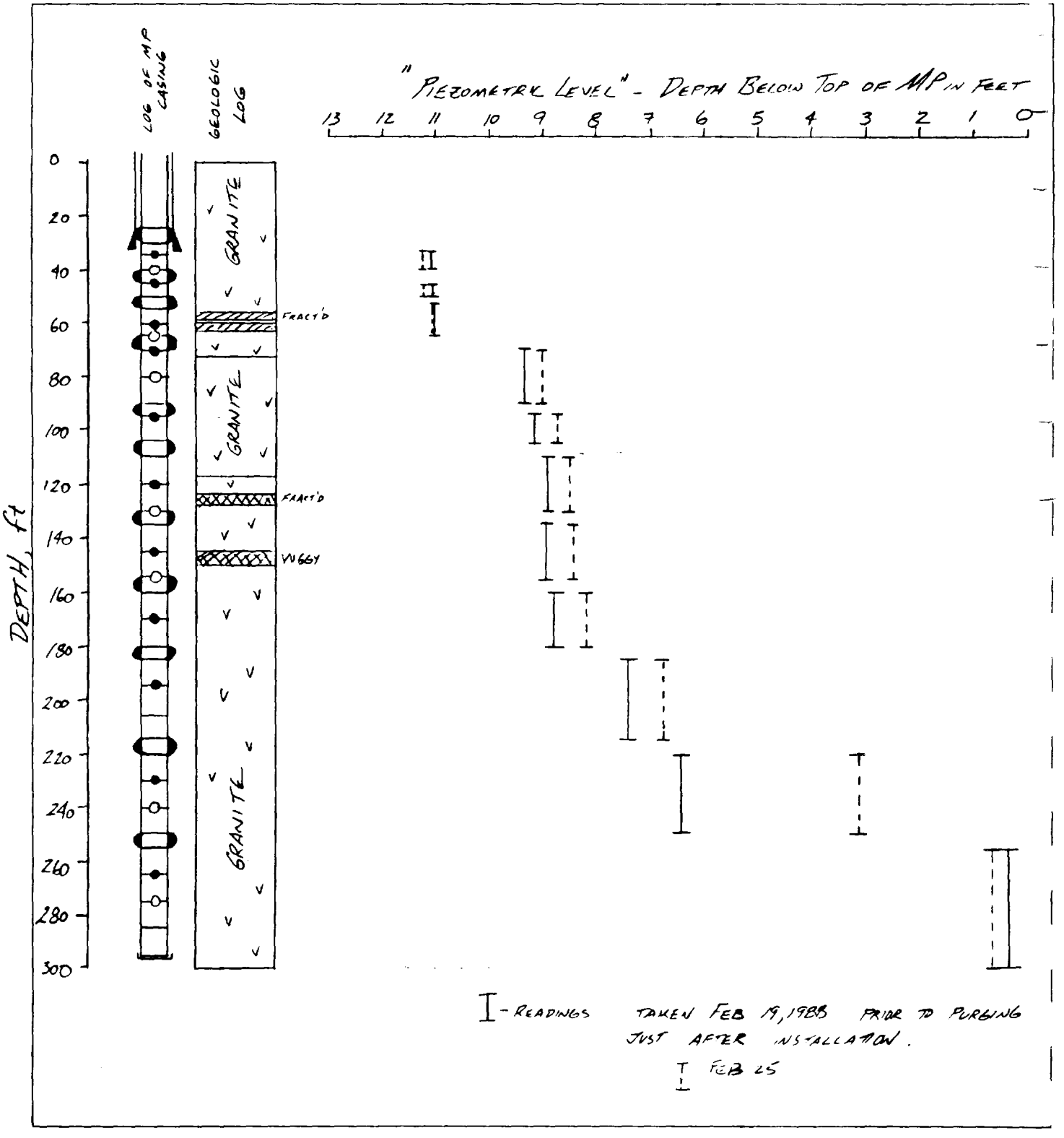
PUMPING PORT.	ZONE L (ft)	ZONE VOL (l)	PUMPING TIME START	PUMPING TIME STOP	PUMPING TIME Δt	PUMP RATE	VOL PUMPED	COMMENTS.
2	46 ft	87.4 l	Feb 20/88 1100 hr	Feb 21 0810	1250 min	—	96.3 l	- discharge slightly cloudy
6	32 ft	42 l	Feb 21/88 1540 1730	1655 Feb 22/88 0925	75 955	—	0.46 l 2.2 l	VERY SLOW RECOVERY OF PUMPED DOWN WATER LEVEL. SHUT OFF PURGING BECAUSE OF VERY SLOW RECOVERY
13	22 ft	42 l	Feb 21/88 0820 1145 1330	1145 1330 Feb 22/88 1515	205 min 105 min 1575 min	— — —	0.8 l 0.5 l 4.0 l	Very slow recovery of pumped down WATER LEVEL SHUT OFF PURGING TOO SLOW
16	22 ft	42 l	Feb 23/88 0950	1010	20 min.	11.5 lpm	230 l	DISCHARGE cloudy BROWN, CLEARS. HNU: AT PURGE DISCHARGE = 50/90.
19	22 ft.	42 l	Feb 23/88 1030	1420	230 min	—	43.5 l	Discharge slightly cloudy
25	22 ft	42 l	Feb 23/88 1430 1630	~~Feb~~ ~~1630~~ Feb 24/88 1430	120 min —	— —	29 l 13.4 l 42.4 l	DISCHARGE Brown colored, clears slightly HNU AT PURGE DISCHARGE = 40-5[illegible] - recovery of MP well.
27	10 ft	22 l	Feb 24/88 1400	1440	40	3.8 lpm	152 l	HNU: 80-90 peak 150 DISCHG BROWN [illegible]
32	10 ft	22 l	Feb 24/88 1645	1725	40	1.7 lpm	66.7 l	HNU: 8-10 ; PEAK 150 DISCHARGE BROWN FROTHY

Westbay Instruments Ltd.

Subject: PIEZOMETRIC LEVEL PLOT – ECJ-1 Date: FEB. 24/88

Project: SULLIVAN'S LEDGE, NEW BEDFORD / EC JORDAN Ref. No.: WB 548

Prepared by: E. REHTLANE Sheet: of



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Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: FEB 22/88 Job No.: WB548

Elev. Ground Sfc: _____ Serial No.: EE 166/DEE 146 Drillhole No.: ELJ-2

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVANS LEDGE/NEW BEDFORD, MA.

Elev. top of MP Casing: _____ Weather: COLD, SUNNY Casing Size/Type: MP

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: E. REHTLANE

Ambient Reading (Pressure/Temperature/Time): Start 13.39/279.2/10:44 Finish 13.63/286.3/11:47

0.4335 psi/ft H_2O TO TOP OF MP

Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	~~Press. Head Outside Port, m~~ ΔP (psi)	Piez. Level Outside Port, ~~m~~ ft	Comments
From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
						285.1	10:54			
						286.7	11:05			
#2 270'	269'		124.93							
				127.11			11:06			
				127.17			11:06:30			
				127.20			11:07			
				127.24			11:08			
				127.29			11:10			
				127.30/1	124.94		11:11	-2.37	-5.47	
#5 245'	244'0"		115.47				11:13			
				116.88			11:13:30			
				116.93			11:14			
				117.01		287.0	11:15			
				117.06			11:16			
				117.11		287.0	11:17			
				117.14			11:18			
				117.17/8			11:19			
				117.20/1		287.0	11:20			
				117.23	115.48		11:21	-1.75	-4.04	

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Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: FEB 22/88 Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: EE 166/DEE 146 Drillhole No.: ECJ-2

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVANS LEDGE, NEW BEDFORD, MA.

Elev. top of MP Casing: _____ Weather: COLD, SUNNY Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: ERIK REHTLANE

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish _____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	~~Press. Head Outside Port, m~~ Δp, psi	Piez. Level Outside Port, ~~m~~ ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#8	220'	219'5"		105.91				11:23			
					107.22			11:23:30			
					107.25		287.1	11:24			
					107.27			11:25			
					107.28/9	105.91	287.2	11:26	-1.38	-3.18	
#12	185'	184'9"		92.30				11:29			
					93.65			11:29:30			
					93.65			11:30			
					93.65/6	92.30		11:30:30	-1.36	-3.14	
#18	150	150'0"		78.47/8			287.2	11:32			
					79.19			11:32:30			
					79.20/1			11:33			
					79.22		287.1/.2	11:34			
					79.22/3	78.48		11:35	-0.75	-1.73	
#23	115'	115'0"		64.03				11:37			
					64.31		287.1	11:37:30			
					64.32		287.1	11:38			
					64.33	64.03		11:39	-0.30	-0.69	
#27	80'	80'4"		49.12/3				11:41			
					48.16/7			11:41:30			
					48.16/7	49.12		11:42	0.95	2.19	

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: FEB-22/88 Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: EE 166/DEE 146 Drillhole No.: ECJ-2

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVANS LEDGE/NEW BEDFORD, MA

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: E. REHTLANE

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish 13.63/286.3/11:47

Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, ~~m~~ Δp, psi	Piez. Level Outside Port, ~~m~~ ft	Comments
From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#32 45'	45'10"		33.96				11:45			
				32.50		286.6	11:45:30			
				32.50	33.95		11:46	1.45	3.34	

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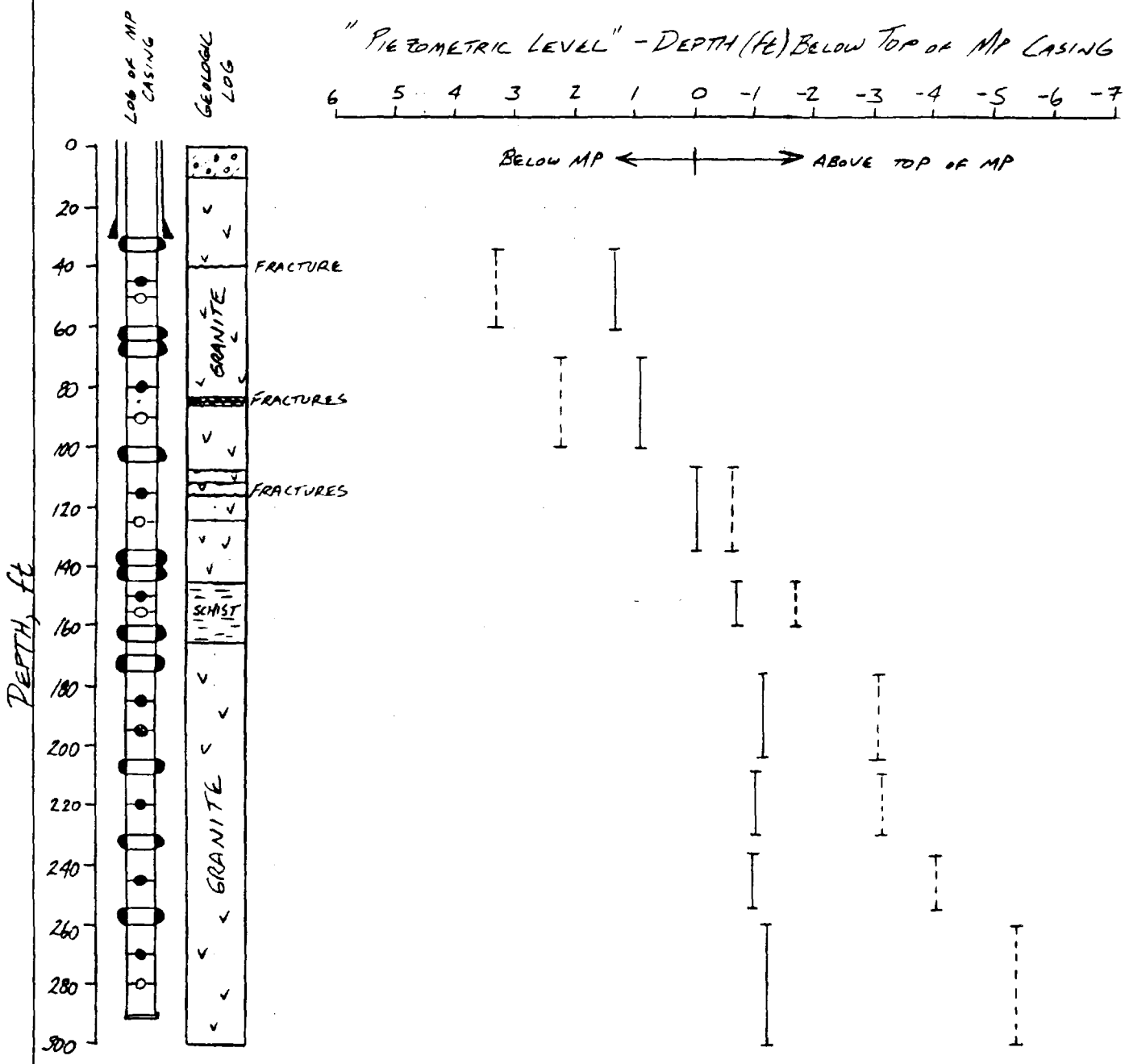
Subject: PIEZOMETRIC LEVEL PLOT - ECJ-2 Date: FEB 24/88

Project: SULLIVAN'S LEDGE, NEW BEDFORD / EC JORDAN Ref. No.: WB 548

Prepared by: E. REHTLANE Sheet: of



I - READINGS TAKEN FEB 12/88 PRIOR TO PURGING. SUSPECT READINGS DUE TO FLASHING DISPLAY

I - READINGS TAKEN FEB 22/88 FOLLOWING PURGING

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Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: G.L. Pressure Probe Type: EE Date: Feb 15/88 Job No.: WB548

Elev. Ground Sfc: Serial No.: EE-166 Drillhole No.: ECJ-3

Height MP Casing above Ground Sfc: Range: 0 to 200 psi Project: SULLIVAN'S LEDGE

Elev. top of MP Casing: Weather: Sunny Casing Size/Type: MP PLASTIC 1.5"

Reference Elev. Steel Casing: Barometric Pressure: ? Operator: LF/TA/JF/DL

Ambient Reading (Pressure/Temperature/Time): Start 13.65 / 289°K / 0945 Finish 13.60 / 287.4 / 1130

Reference - H_2O to top of MP

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M	Press. Head Outside Port, m ΔP (psi)	Piez. Level Outside Port, m ΔP (ft)	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
2	~~270'~~			✓	✓	✓	✓	✓	OUTSIDE MINUS INSIDE	@ 0.433 psi/ft.	
	269						287.4	1004			
		269'1"		131.47	125.98		287.4	1008			
					125.97	131.45	287.3	1010	5.49	-12.7	
6	234'	234'3"		116.31	110.79		287.4	1027			
					110.77	116.29		10:28	5.5	-12.7	
9	209'	209'3"		105.48	100.42		287.4	10:37	5.5		
					100.16						
					100.06						
					100.01						
					99.99						
					99.96	105.46	287.5	10:42	5.5	12.7	
13	179'	179'-4"		92.49	88.08		287.5	10:48:30			
					87.23			10:49:00			
					87.07			10:49:15			
					87.01			10:49:30			
					86.98			10:49:45			
					86.96			10:50:00			
					86.96			10:50:30			
						92.48	287.5	10:51	-5.54	-12.8	

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: Ground Level Pressure Probe Type: EE Date: 2-15-88 Job No.: WB 548

Elev. Ground Sfc: ____ Serial No.: EE-166 Drillhole No.: ECJ-3

Height MP Casing above Ground Sfc: ____ Range: 0 to 200 psi Project: Sullivan's Ledge

Elev. top of MP Casing: ____ Weather: Sunny/cloudy Casing Size/Type: MP Flexible 1.5

Reference Elev. Steel Casing: ____ Barometric Pressure: ____ Operator: DL, TL, JF, LF

Ambient Reading (Pressure/Temperature/Time): Start ____ Finish ____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, ΔP (psi)	Piez. Level Outside Port, m	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
18	144	144'5"		77.28			287.6	11:00			
					71.02			1101			
					71.02			110130	-6.24	14.41	
						77.26	287.6	11:03			
21	124	124'6"		68.59			287.7	11:07			
					62.44			11:07			
					62.44	68.57	287.7	11:10	-6.15	14.20	
25	89'	89'7"		53.39			287.8	11:15			
					47.59			11:16			
						53.37	287.8	11:17	-5.8	13.4	
30	49'	49'8"		36.01			287.7	11:21			
					30.44			11:22			
					30.43			11:23			
						35.98	287.7	11:24	-5.6	12.93	
33	34'	34'8"		29.48			287.6	11:25			
					25.12			112630			
					25.54			112645			
					25.37			112700			
					25.27			112715			
					25.15			1128			
					25.14	29.46	287.5	112830	-4.34	~~12.8~~ 10.02'	
				13.60			287.4	11:30			

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Westbay Instruments Ltd.

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: FEB. 22/88 Job No.: WB548

Elev. Ground Sfc: _____ Serial No.: EE166/DEE146 Drillhole No.: ECJ-3

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVAN'S LEDGE, NEW BEDFORD MASS.

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: ERIK RENTLANE

Ambient Reading (Pressure/Temperature/Time): Start 13.60/284.8/8:20 Finish _____

H_2O TO TOP OF MP

Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Δp÷.433 = Press. Head Outside Port, m Δp, psi	Piez. Level Outside Port, m ft	Comments
From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#2 269	266'5"					287.1	8:40			GET H_2O FOR FILLING MP.
						287.4	8:58			
#2 269	266'5"		131.50			287.3	9:07			
				125.63			9:07:30			
				125.63			9:08			
				125.63	131.48			5.87	13.54	
#6 231'	231'10"		116.38				9:13			
				110.55		287.6	9:13:30			
				110.55/4		287.6	9:14			
				110.54	116.36		9:15	5.84	13.47	
#9 209'	207'0"		105.56				9:17			
				100.20			9:17:30			
				99.99		287.5	9:18			
				99.85			9:19			
				99.80			9:20			
				99.79	105.54		9:21	5.77	13.31	
#13 179'	177'2"		92.48							H_2O NOT TO TOP OF MP
				86.83			9:26			
				86.78		287.5	9:27			
				86.78	92.57		9:28	5.79	13.36	H_2O TO TOP OF MP.

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: FEB 22/88 Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: FE 166/DEE 146 Drillhole No.: ECT-3

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVANS LEDGE, NEW BEDFORD, MASS

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: ERIK RENTANE

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish _____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, m ΔP, PSI	Piez. Level Outside Port, m ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#18	144	142'8"		77.37				9:32:30			
					71.03		287.5	9:33			
					71.03	77.36		9:33:30	6.34	14.63'	
#21	124	122'10"		68.69							
					62.40			9:35			
					62.40	68.69	287.5	9:36	6.29	14.51'	
#25	89'	88'2"		53.49	47.51			9:38			
					47.51	53.48	287.6	9:38:30	5.98	13.79'	
#30	49'	48'6"		36.10				9:40			GCA-2
					30.34		287.5	9:40:30			PUMPING
					30.32			9:41			
					30.29			9:41:30			
					30.22		287.3	9:43			
					30.17	36.06		9:44	5.93	13.68↓	
#33	34'	33'5"		29.57				9:49			
					25.60			9:49:30			
					25.31		286.3	9:50			
					25.22			9:50:30			
					25.16		286.3	9:51			
					25.13	29.54		9:51:30	4.44	10.74↓	

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: FEB 22/88 Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: EE 166/DEE 146 Drillhole No.: ECJ-3

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVAN'S LEDGE, NEW BEDFORD MASS.

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: E. REHFLANE

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish 13.69 | 287.2 | 10:16

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, m Dp, psi	Piez. Level Outside Port, m ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#18	144'	142'5"		77.34				9:57			GCA-2
					70.98		286.5	9:57:30			PUMPING
					70.98	77.33		9:59	6.36	14.67	KECK Pump
#21	124'	122'7"		68.67				9:59			1 1/2 gal/min
					62.34			9:59:30			
					62.34			10:00			
					62.34	68.66	287.1	10:00:30	6.33	14.60	
#25	89'	87'10"		53.48				10:03			
					47.23			10:03:30			
					47.23			10:04			
					47.23	53.45	287.4	10:04:30	6.25	14.42	
#30	49	48'3"		36.09				10:08			
					29.89			10:08:30			
					29.89		287.4	10:09			
					29.88	36.07	287.5	10:09:30	6.21	14.33	
#33	34'	33'4"		29.58				10:10:30			
					25.50		287.4	10:11			
					25.28			10:11:30			
					25.18			10:12			
					25.12			10:13			
					25.06	29.57		10:14	4.52	10.43	

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PAGE____of____

MP PACKER INFLATION RECORD

PROJECT: WS 578 - SULLIVANS LEDGE

COMPLETED BY: KURT SEEDHOUSE

LOCATION: NEW BEDFORD, MASS

DATE COMPLETED: FEBRUARY 14, 1988

HOLE NO.: [illegible]

DATE INFLATED: Feb 14 1988

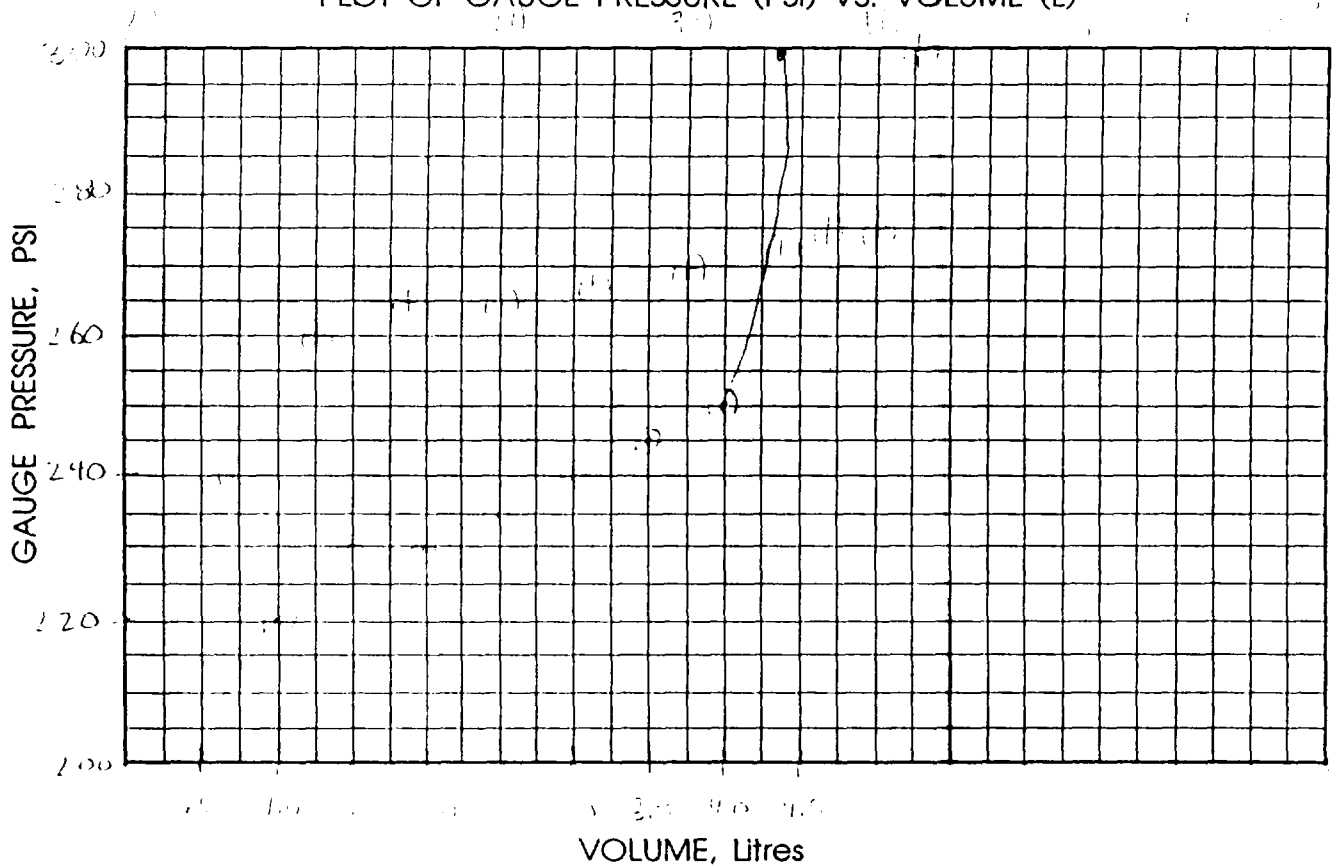
PACKER NO.: [illegible]

DEPTH (M): 244' - 249'

INFLATION TOOL SETTING (PSI): 180

VOLUME (L)	[illegible]	[illegible]	[illegible]	2.0	2.5	3.0	3.5	3¾	4.0	4 3/16
PRESSURE (PSI)	[illegible]	[illegible]	[illegible]	230	235	240	245	250	[illegible]	300

PLOT OF GAUGE PRESSURE (PSI) VS. VOLUME (L)



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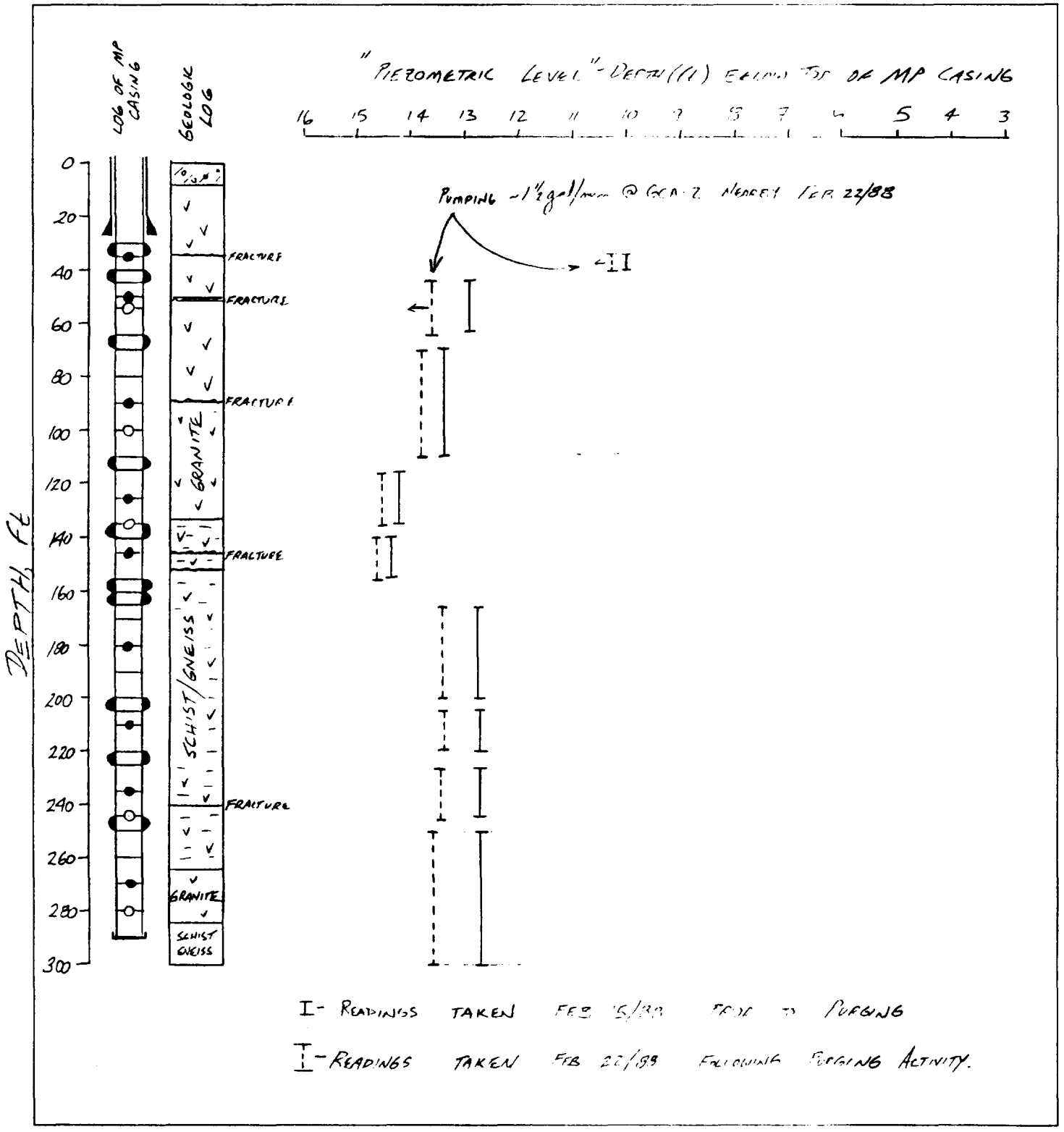
Subject: PIEZOMETRIC LEVEL PLOT - ECJ-3 Date: FEB. 24/88

Project: SULLIVANS LEDGE, NEW BEDFORD/EL JORDAN Ref. No.: WB 548

Prepared by: E. REHTLANE Sheet: of



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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: GROUND SURFACE Pressure Probe Type: ELECTRIC Date: FEB 21, 1988 Job No.: WB 548

Elev. Ground Sfc: Serial No.: EE 166 / EER 097 DEE 146 Drillhole No.: ECJ-4

Height MP Casing above Ground Sfc: Range: 0 to 200 psi Project: SULLIVANS LEDGE / NEW BEDFORD, MA

Elev. top of MP Casing: Weather: COLD, BREEZY Casing Size/Type: MP CASING

Reference Elev. Steel Casing: Barometric Pressure: Operator: E. REHTLANE

Ambient Reading (Pressure/Temperature/Time): Start 13.43 / 287.5 / 8:44 Finish 13.41 / 286.5 / 10:31

0.435 psi/ft 13.39 / 286.0 / 8.57 H_2O in top of MP on Air Press.

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	~~Press. Head Outside Port, m~~ Δp, psi	Piez. Level Outside Port, m ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
				13.43			287.5	8:44			[illegible]
											[illegible]
#3	270'			130.91			286.2	9:00			To stabilize
				130.96			286.4	9:04			top up H_2O
				130.97			286.5	9:12			
					129.86		286.5	9:13			[illegible]
					129.86			9:14			
					129.84/3	130.76		9:15	1.11	[illegible]	
#6	245	245		120.36				9:19			
					119.42			9:19.5			
					119.37		286.6	9:20			
					119.27		286.6	9:22			
					119.25/4		286.6	9:24			
					119.24	120.35	286.6	9:26	1.12	[illegible]	
#9	225	225'7"		111.84	110.75			9:29			
					110.71/0		286.7	9:31			
					110.70	111.83	286.6	9:33	1.14	[illegible]	
#12	200	200'9"		101.13	100.33			9:36			
					100.10		286.7	9:38			
					100.01			9:40			

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: GROUND SURFACE Pressure Probe Type: ELECTRIC Date: FEBRUARY 21, 1988 Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: EE 166/DEE 146/EER097 Drillhole No.: ECJ-4

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVAN'S LEDGE, NEW BEDFORD, MA.

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: MP CASING

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: E. REHTLANE

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish _____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	~~Press. Head Outside Port, m~~ Δp, PSI	Piez. Level Outside Port, m ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#12 CONT.					99.96			9:42			
					99.94	101.13	286.7	9:44	1.19	2.15	
#15	180	181'0"		92.53				9:46			
					91.61			9:46:[illegible]			
					91.38			9:48			
					91.31			9:50			
					91.28			9:52			
					91.27	92.52	286.7	9:54	1.26	2.91	
#18	160	161'2"		83.89	82.63			9:57			
					82.62	83.88		9:59	1.27	2.13	
#21	140	141.5"		75.22	73.95/6		286.6	10:01			
					73.95/4	75.22		10:03	1.28	2.95	
#23	130	131'6"		70.87	69.61/60			10:07			
					69.61	70.87	286.6	10:09	1.26	2.91	
#27	95	96'6"		55.66	54.85			10:13			
					54.41			10:14			
					54.32			10:15			
					54.30			10:16			
					54.29	55.65	286.5	10:17	1.37	3.16	
#29	85	86'7"		51.31	49.93			10:20			
					49.92			10:20.30			

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: GROUND SURFACE Pressure Probe Type: ELECTRIC Date: FEBRUARY 21 Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: EE 166/DEE 146/EER 097 Drillhole No.: ECJ-4

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVANS LEDGE, NEW BEDFORD, MA

Elev. top of MP Casing: _____ Weather: _____ Casing Size/Type: MP CASING

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: E. REHTLANE

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish _____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	~~Press. Head Outside Port, m~~ Δp, psi	Piez. Level Outside Port, m ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
#29 cont					49.72/93	51.31	286.5	10:22	1.39	3.21	
#32	60	61'10"		40.45	39.02		286.5	10:24			
					39.02	40.44	286.5	10:25	1.43	3.30	
#34	50'	52'0"		36.09				10:28			
					34.66		286.5	10:28:30			
					34.66	36.08	286.5	10:29:30	1.43	3.30	
									13.41	10:31	286.5

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: ELECTRIC Date: [illegible] Job No.: WB 54B

Elev. Ground Sfc: _____ Serial No.: [illegible] 166/DEE 146 Drillhole No.: [illegible]

Height MP Casing above Ground Sfc: _____ Range: 0 to 200 psi Project: SULLIVAN'S LODGE

Elev. top of MP Casing: _____ Weather: SUNNY/COLD Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: E. REHRANE / TOM LONGLEY

Ambient Reading (Pressure/Temperature/Time): Start 13.45/283.1/8.12 Finish _____

CONVERSION = 0.4335 psi/ft [illegible]

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, m	Piez. Level Outside Port, m	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing			ΔP, psi	ft	
		[illegible]					[illegible]	15			
#4	267.7			131.12			286.3	8:32			
				131.12			286.[illegible]	[illegible]			
					129.88			8:40			
					129.88			8:40:[illegible]			
					129.88	131.11/12	[illegible]	[illegible]	1.24	2.86	
#6	244.7			120.52/3				[illegible]			
					119.51			[illegible]			
					119.[illegible]			[illegible]			
					119.31			8:18			
					119.[illegible]			[illegible]			
					119.27			[illegible]			
					119.26		286.5	8:[illegible]	1.27	2.93	1
#9	224.7			112.90			286.6	[illegible]			
					110.78			[illegible]			
					110.74			[illegible]			
				[illegible]	110.73	111.99	[illegible]	[illegible]	1.2[illegible]	2.93	1
#12	[illegible]			101.30	100.44			[illegible]			
					100.34			1:00			
					100.28/9			[illegible]			
					100.[illegible]			[illegible]			

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: [illegible] Date: [illegible] Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: [illegible] Drillhole No.: [illegible]

Height MP Casing above Ground Sfc: _____ Range: 0 to [illegible] psi Project: [illegible]

Elev. top of MP Casing: _____ Weather: [illegible] Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: [illegible]

Ambient Reading (Pressure/Temperature/Time): Start _____ Finish _____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, m	Piez. Level Outside Port, m	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]	[illegible]	[illegible]	[illegible]	1.23	2.84	1
415	[illegible]			[illegible]				[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]	[illegible]	[illegible]	[illegible]	1.51	3.02	1
418	[illegible]			[illegible]				[illegible]			
					[illegible]			[illegible]			
					[illegible]			[illegible]			
					[illegible]	[illegible]	[illegible]	[illegible]	1.44	3.32	1
421	[illegible]			[illegible]	[illegible]			[illegible]			
					[illegible]			[illegible]			

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PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA AND CALCULATION SHEET

Datum: _____ Pressure Probe Type: [illegible] Date: [illegible] Job No.: WB 548

Elev. Ground Sfc: _____ Serial No.: [illegible] Drillhole No.: [illegible]

Height MP Casing above Ground Sfc: _____ Range: 0 to 2m psi Project: [illegible]

Elev. top of MP Casing: _____ Weather: [illegible] Casing Size/Type: _____

Reference Elev. Steel Casing: _____ Barometric Pressure: _____ Operator: [illegible]

Ambient Reading (Pressure/Temperature/Time): Start [illegible] Finish _____

	Depth to Meas. Port Valve, m		Elev. Meas. Port, m	Fluid Pressure Readings psi			Trans. Temp., K	Time, H:M:S	Press. Head Outside Port, m Δp psi	Piez. Level Outside Port, m ft	Comments
	From Log	From Cable		Inside Casing	Outside Casing	Inside Casing					
					13.71/13	15.34	[illegible]	[illegible]	1.45	3.34	1
#23	[illegible]			[illegible]	69.61			[illegible]			
					69.61			[illegible]			
					69.61	11.03	[illegible]	[illegible]	1.45	3.30	1
#27	94.7			55.85/3	54.44			[illegible]			
					54.30			[illegible]			
					54.29			[illegible]			
					54.29	55.82	[illegible]	[illegible]	1.54	3.55	1
#29	84.7			51.48/3	49.73/3			[illegible]			
					49.73/3	51.48/3	[illegible]	[illegible]	1.56	3.60	1
#32	[illegible]			40.62	39.02			[illegible]			
					39.03			[illegible]			
					39.03	40.61	[illegible]	[illegible]	1.59	3.67	1
#34	42.7			[illegible]	34.68			[illegible]			
					34.68			[illegible]			
					34.68	36.27	[illegible]	[illegible]	1.59	3.67	1

220686

SULLIVAN'S [illegible]

MONITORING WELL No. EC[illegible]

PUMPING PORT.	ZONE L (ft)	ZONE VOL (l)	PUMPING TIME START	STOP	[illegible]	PUMP RATE	VOL PUMPED	COMMENTS
1	47'	89 l	Feb 21/88 1600 N			—	[illegible] l	- surge pumping
			Feb 22/88			—	[illegible] l	- surge pumpi
			0800	0850	—			
			0850	0910	20 min ~~1.25 lpm~~	1.25 lpm	25.0 l ~~[illegible]~~ 131.8 l	- suction lift pumping.
5	12'	23 l	Feb 23/88 0840	1115	115		7.3 l	
			1145	1645	330		21.6 l	
							28.9 l	
8	22'	42 l	Feb 24/88 0840 -	0923	43 min	—	12.60 l	- w.l. recovery inside MP.
			0930	1010	45 min	0.25 lpm	10 l	
			1015	1140	85 min	—	22.5 l	- w.l. recovery inside MP
							45.10 l	
14	22'	42 l	Feb 22/88 1415	Feb 23/88 0830	1095 min	—	25.45	- w.l. Recovery inside mp Csg
			Feb 23/88 1710	Feb 24 0810	905 min	—	20.25 l	- w.l. Recov inside mp Casing
							45.7 l	
18	12'	23 l	Feb 22/88 1130	1330	120 min	0.8 lpm	96 l	
22	27'	51.3 l	Feb 22/88 1100	1110	10 min	20 lpm	200 l	
28	17'	32.3 l	Feb 22/88 1025	1035	10 min	22 lpm	220 l	
31	17'	32.3 l	Feb 22/88 0955	1005	11 min	[illegible] lpm	345 l	

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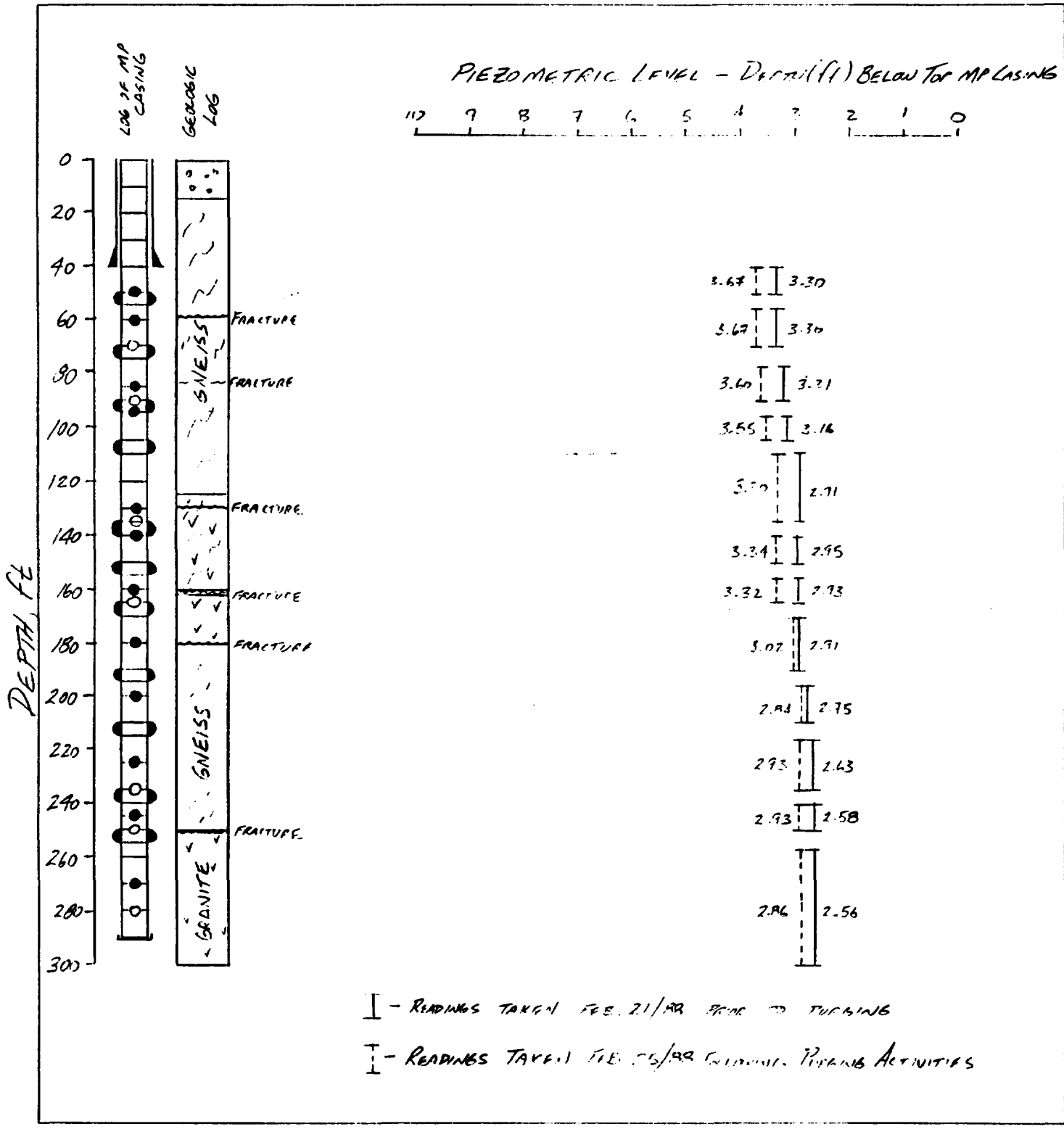
Subject: PIEZOMETRIC LEVEL PLOT - FCJ-4 Date: FEB 24/88

Project: SULLIVAN'S LEDGE, NEW [illegible] Ref. No.: WB 548

Prepared by: E. RENTLANE Sheet: of



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APPENDIX B
PHASE II DATA VALIDATION TABLES
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
(207) 775-5401 Telex 94-4329

5180-04

June 1, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8970/3635A, Sullivan's Ledge Inorganic Data; Samples MAH213 through MAH231, MAH251 through MAH259, and MAH150

We have completed our review of the inorganic data generated by Chemtech Consulting Group for the 29 low level water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating Inorganic analysis and included the following:

- data completeness
- matrix spikes
- blank analysis
- furnace atomic absorption QC
- holding times
- instrument calibrations (initial and continuing)
- instrument detection limits
- interference checks
- serial dilutions
- laboratory control samples

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

DATA COMPLETENESS

Analytical results for all required analysis were received along with documentation for all required QA/QC. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

Boston, Massachusetts Detroit, Michigan Tallahassee, Florida Washington, DC

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HOLDING TIMES
All samples met the contract required holding time for all parameters.

INSTRUMENT CALIBRATION (INITIAL AND CONTINUING)
Calibrations were performed at the required frequency. The recovery of selenium from one continuing calibration verification sample was greater than 110%. We have flagged the associated positive results for this parameter as estimated.

BLANK ANALYSIS
No method blank contamination was noted.

INTERFERENCE CHECKS
An ICP interference check sample analysis was performed and results for all parameters met criteria.

MATRIX SPIKE
Zinc, iron, manganese, and selenium recoveries for the matrix spike were greater than 125%. We have flagged all positive results for these parameters as estimated to reflect the indication of a potential positive bias. Lead had a recovery less than 75%, an indication of potential negative bias in quantitative results. All results for lead were flagged as estimated.

DUPLICATE ANALYSIS
Laboratory duplicates for lead and cadmium had non-compliant relative percent differences. We have qualified results for these parameters as estimated to indicate potential sample heterogeneity.

LABORATORY CONTROL SAMPLE
The laboratory control sample analysis was performed as required and results met the required criteria.

INSTRUMENT DETECTION LIMITS
The reported instrument detection limits were all less than the CRDL.

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FURNACE ATOMIC ABSORPTION QC
Replicate injections and one-point analytical spikes were performed as required and results for selenium on sample MAH221 and lead on sample MAH223 were found to be non-compliant even after a third injection. We have flagged these data points as estimated. The method of standard additions was employed when necessary and all results were compliant.

SERIAL DILUTION
An ICP serial dilution was performed and the results for calcium, iron, and manganese did not agree within 10% of the original sample. We have qualified the results for these parameters as estimated to indicate a potential for physical or chemical interference.

OVERALL ASSESSMENT
We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Tatarka
G. Vaillancourt
L. Dixon
L. Pitts

Boston, Massachusetts Detroit, Michigan Tallahassee, Florida Washington, DC

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-MW-16	GW-GCA-2A	GW-MW-20	GW-MW-8	GW-MW-8A	GW-MW-4A	GW-MW-4	GW-MW-10B
SAMPLE LOCATION:			GW-MW-16	GW-GCA-2A	GW-MW-20	GW-MW-8	GW-MW-8A	GW-MW-4A	GW-MW-4	GW-MW-10B
SMO NUMBER:			MAH213	MAH214	MAH215	MAH216	MAH217	MAH218	MAH219	MAH220
UNITS:			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	P	200	100 U	100 U	100 U	100 U	100 U	139 []	100 U	100 U
Antimony	P	60	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Arsenic	F	10	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Barium	P	200	69 []	235	45 U	45 U	45 U	45 U	152 []	45 U
Beryllium	P	5	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	P	5	5 UJ	5 UJ	7 J	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Calcium	P	5000	29000 J	25700 J	62100 J	59300 J	56200 J	11300 J	49600 J	19900 J
Chromium	P	10	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Cobalt	P	50	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Copper	P	25	16 []	14 []	20 []	12 U	16 []	20 []	15 []	12 U
Iron	P	100	192 J	122 J	19100 J	662 J	473 J	891 J	16200 J	751 J
Lead	P/F	5	5 UJ	6.1 J	32 J	6.0 J	5.9 J	5.7 J	6.8 J	6.0 J
Magnesium	P	5000	7180	6810	24600	27600	28000	2010 []	9670	10700
Manganese	P	15	176 J	30 J	1100 J	32 J	29 J	428 J	2240 J	12 []J
Mercury	CV	0.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	P	40	8 []	7 U	34 []	11 []	13 []	7 U	11 []	16 []
Potassium	P	5000	7200	6700	5900	3500 []	3200	8400	2000 []	1900 []
Selenium	F	5	3 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Silver	P	10	8 U	8 U	8 U	8 U	8 U	8 U	8 U	13
Sodium	P	5000	73500	75600	16300	29400	27000	8300	35300	13200
Thallium	F	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vandium	P	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Zinc	P	20	264 J	218 J	67 J	23 J	20 U	20 U	20 U	24 J
Cyanide		10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Other										
%SOLID			NR	NR	NR	NR	NR	NR	NR	NR

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-MW-5A	GW-MW-1A	GW-MW-6	GW-MW-10	GW-MW-10A	GW-SB-1	GW-MW-2	GW-MW-1
SAMPLE LOCATION:			GW-MW-5A	GW-MW-1A	GW-MW-6	GW-MW-10	GW-MW-10A	GW-SB-1	GW-MW-2	GW-MW-1
SMO NUMBER:			MAH221	MAH251	MAH252	MAH253	MAH254	MAH255	MAH256	MAH222
UNITS:			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	P	200	100 U	100 U	100 U	100 U	100 U	100 U	120 []	100 U
Antimony	P	60	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Arsenic	F	10	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Barium	P	200	171 []	45 U	45 U	45 U	45 U	45 U	82 []	45 U
Beryllium	P	5	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	P	5	5 UJ	5 UJ	7 J	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Calcium	P	5000	34100 J	39300 J	48100 J	23500 J	44800 J	792 []J	54200 J	21900 J
Chromium	P	10	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Cobalt	P	50	9 U	9 U	9 U	9 U	9 U	9 U	10 []	9 U
Copper	P	25	20 []	31	18 []	17 []	18	23 []	12 U	12 U
Iron	P	100	215 J	3890 J	17800 J	161 J	10600 J	385 J	12400 J	396 J
Lead	P/F	5	5 UJ	5.2 J	5 J	5.5 J	17 J	16 J	53 J	16 J
Magnesium	P	5000	8240	13200	14200	12200	17800	377 U	18900	3300 []
Manganese	P	15	23 J	1840 J	4480 J	27 J	1620 J	8 UJ	2820 J	449 J
Mercury	CV	0.2	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40
Nickel	P	40	16 []	13 []	12 []	7 U	13 []	7 U	31 []	7 U
Potassium	P	5000	10900	6200	8700	2100 []	2500 []	500 U	10000	1600 []
Selenium	F	5	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Silver	P	10	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Sodium	P	5000	214000	51000	72500	13000	16200	11660	75600	11800
Thallium	F	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vandium	P	50	10 U	10 U	10 U	10 U	10 U	10 U	12 []	10 U
Zinc	P	20	27 J	22 J	20 UJ	20 U	20 U	23 J	23 J	20 U
Cyanide		10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Other										
%SOLID			NR	NR	NR	NR	NR	NR	NR	NR

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-DUP-2	GW-MW-6A	GW-DUP-1	GW-FB-1	GW-MW-12A	GW-MW-13	GW-MW-5	GW-MW-17
SAMPLE LOCATION:			GW-DUP-2	GW-MW-6A	GW-DUP-1	GW-FB-1	GW-MW-12A	GW-MW-13	GW-MW-5	GW-MW-17
SMO NUMBER:			MAH223	MAH224	MAH225	MAH226	MAH227	MAH228	MAH229	MAH230
UNITS:			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	P	200	100 U	100 U	100 U	100 U	100 U	100 U	118 []	381
Antimony	P	60	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Arsenic	F	10	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Barium	P	200	119 []	45 U	45 U	45 U	1140	591	75 []	58 []
Beryllium	P	5	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	P	5	7 J	5 UJ	5 UJ	5 UJ	17 J	10 J	5 UJ	5 UJ
Calcium	P	5000	38200 J	40700 J	41600 J	718 UJ	85900 J	57800 J	112000 J	16400 J
Chromium	P	10	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Cobalt	P	50	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Copper	P	25	20 []	15 []	20 []	26	13 []	12 U	16 []	26
Iron	P	100	25800 J	11000 J	11000 J	100 J	50500 J	47000 J	1220 J	4640 J
Lead	P/F	5	7.6 J	17 J	15 J	13 J	16 J	15 J	15 J	6.6 J
Magnesium	P	5000	11900	11900	12200	377 U	16700	15600	19500	2220 []
Manganese	P	15	5410 J	3700 J	3810 J	8 UJ	536 J	2120 J	48 J	625 J
Mercury	CV	0.2	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	P	40	37 []	8 []	14 []	7 U	14 []	15 []	7 U	7 U
Potassium	P	5000	6100	10500	10300	500 U	10500	8500	6500	3000 []
Selenium	F	5	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Silver	P	10	24	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Sodium	P	5000	85900	71800	72400	1166 U	53800	36700	78500	13900
Thallium	F	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vandium	P	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Zinc	P	20	24 J	20 U	20 U	20 U	24 J	20 U	22 J	23 J
Cyanide		10	10 U	16	10 U	NR	10 U	10 U	10 U	10 U
Other										
%SOLID			NR	NR	NR	NR	NR	NR	NR	NR

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-MW-22A	GW-MW-1A	GW-MW-25	GW-MW-24	GW-MW-B3
SAMPLE LOCATION:			GW-MW-22A	GW-MW-1A	GW-MW-25	GW-MW-24	GW-MW-B3
SMO NUMBER:			MAH231	MAH257	MAH258	MAH259	MAH150
UNITS:			ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	P	200	100 U	100 U	100 U	100 U	100 U
Antimony	P	60	25 U	25 U	25 U	25 U	25 U
Arsenic	F	10	3 U	3 U	3 U	3 U	3 U
Barium	P	200	913	55 []	64 []	112 []	132 []
Beryllium	P	5	4 U	4 U	4 U	4 U	4 U
Cadmium	P	5	18 J	5 UJ	5 UJ	10 J	6 J
Calcium	P	5000	80100 J	103000 J	41100 J	41500 J	37700 J
Chromium	P	10	9 U	9 U	9 U	11	9 U
Cobalt	P	50	9 U	9 U	9 U	9 U	9 U
Copper	P	25	14 []	15 []	27	19 []	18 []
Iron	P	100	75100 J	21400 J	3160 J	14600 J	26200 J
Lead	P/F	5	14 J	23 J	15 J	10 J	5 UJ
Magnesium	P	5000	27400	14900	8130	12200	12200
Manganese	P	15	1070 J	2360 J	122 J	6010 J	5380 J
Mercury	CV	0.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	P	40	19 []	7 U	7 U	8 []	7 U
Potassium	P	5000	9400	14100	11600	6200	6000
Selenium	F	5	3 U	3 U	3 U	3 U	3 U
Silver	P	10	8 U	8 U	8 U	8 U	8 U
Sodium	P	5000	41600	85900	62700	52400	88800
Thallium	F	10	5 U	5 U	5 U	5 U	5 U
Vandium	P	50	16 []	10 U	10 U	10 U	10 U
Zinc	P	20	24 J	20 U	127 J	109 J	22 J
Cyanide		10	10 U	10 U	10 U	10 U	10 U
Other							
%SOLID			NR	NR	NR	NR	NR

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
(207) 775-5401 Telex 94-4329

5180-04

June 1, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #9026/3643 Sullivan's Ledge Inorganic Data;
Samples MAH242 through MAH247

We have completed our review of the inorganic data generated by Northern Labs & Engineering Inc. for six water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating Inorganic analysis and included the following:

- data completeness
- matrix spikes
- blank analysis
- furnace atomic absorption QC
- holding times
- instrument calibrations (initial and continuing)
- instrument detection limits
- interference checks
- serial dilutions
- laboratory control samples

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

DATA COMPLETENESS

Results for all analyses were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

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HOLDING TIMES
All samples met the contract required holding time for all parameters.

INSTRUMENT CALIBRATION (INITIAL AND CONTINUING)
All calibrations were performed as required and contract specifications were met.

BLANK ANALYSIS
The method blank contained calcium, iron, manganese and magnesium at levels greater than two times the IDL. Revised detection limits were set at five times the concentration detected in the blank per protocol guidelines.

INTERFERENCE CHECKS
An ICP interference check sample analysis was performed and results for all parameters met criteria.

MATRIX SPIKE
Selenium and mercury recoveries for the matrix spike analysis were greater than 125%. We have flagged all positive results for these parameters as estimated to indicate a possible positive bias in reported results. Thallium had a recovery less than 75%. We have flagged all results for this parameter as estimated to indicate a negative bias.

DUPLICATE ANALYSIS
The laboratory matrix duplicate results were compliant.

LABORATORY CONTROL SAMPLE
The laboratory control sample analysis was performed as required and results met the required criteria.

INSTRUMENT DETECTION LIMITS
The reported instrument detection limits were all less than the CRDL.

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FURNACE ATOMIC ABSORPTION QC
Duplicate injections and one-point analytical spikes were performed as required and results met the contractual criteria.

SERIAL DILUTION
An ICP serial dilution was performed and the results were in criteria.

OVERALL ASSESSMENT
We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Tatarka
G. Vaillancourt
L. Dixon
L. Pitts

PROJECT: SULLIVAN'S LEDGE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-ECJ-2-05	GW-ECJ-2-04	GW-ECJ-2-03	GW-ECJ-2-02	GW-DUP-3	GW-ECJ-2-01
SAMPLE LOCATION:			GW-ECJ-2-05	GW-ECJ-2-04	GW-ECJ-2-03	GW-ECJ-2-02	GW-DUP-3	GW-ECJ-2-01
SMO NUMBER:			MAH242	MAH243	MAH244	MAH245	MAH246	MAH247
UNITS:			UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Aluminum	P	200	22 U	22 U	22 U	22 U	22 U	22 U
Antimony	P	60	22 U	22 U	22 U	22 U	22 U	22 U
Arsenic	F	10	10 U	10 U	10 U	10 U	10 U	10 U
Barium	P	200	33 []	12 []	12 []	16 []	16 []	17 []
Beryllium	P	5	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	P	5	3 U	3 U	3 U	3 U	3 U	3 U
Calcium	P	5000	24700	29300	33300	57300	58400	61500
Chromium	P	10	7 U	7 U	7 U	7 U	7 U	7 U
Cobalt	P	50	4 U	4 U	4 U	4 U	4 U	4 U
Copper	P	25	3 U	3 U	3 U	3 U	3 U	3 U
Cyanide		10	10 U	10 U	10 U	10 U	10 U	10 U
Iron	P	100	130 UJB	130 UJB	142	914	905	1200
Lead	P/F	5	5 U	5 U	5 U	5 U	5 U	5 U
Magnesium	P	5000	4060 []	5390	6130	11800	12100	13400
Manganese	P	15	138	174	158	561	574	1030
Mercury	CV	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.29 J	0.2 U
Nickel	P	40	5 U	5.5 []	6 []	5 U	5 U	5 U
Potassium	P	5000	1070 []	2460 []	1380 []	1540	1520	3280
Selenium	F	5	5 U	5 U	5 U	5 U	5 U	5 U
Silver	P	10	3 U	3 U	3 U	3 U	3 U	3 U
Sodium	P	5000	35300	33800	33800	41100	42100	43200
Thallium	F	10	10 U	10 U	10 U	10 U	10 U	10 U
Vandium	P	50	3 U	3 U	3 U	3 U	3 U	3 U
Zinc	P	20	26	43	37	45	37	128
%SOLID			NA					

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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5180-04

June 6, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #9026/3643A Sullivan's Ledge Organic Data;
Samples AK184 through AK190

We have completed our review of the organic data generated by Gulf South Research Inc. for seven water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

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DATA COMPLETENESS
Results for all analyses were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB and DFTPP tuning criteria were reviewed and found to be within contract specifications.

SURROGATE SPIKE RESULTS
The initial analysis of samples AK185 through AK188 yielded recoveries of volatile surrogates outside the acceptable criteria. These samples were re-analyzed after dilution and the surrogate recoveries were compliant. Although not contractually required, results of the non-compliant runs were provided.

MATRIX SPIKE RESULTS
Benzene, 2,4-dinitrotoluene, 4-nitrophenol, and endrin had non-compliant recoveries for the matrix spike or the matrix spike duplicate. Since recoveries were compliant in at least one spike sample for each of the above compounds, results were not qualified. Endrin and lindane had non-compliant relative percent differences between the matrix spike and the matrix spike duplicate. We have flagged the results for these compounds on the spike sample (AK188) as estimated to indicate possible sample heterogeneity.

BLANK ANALYSIS
The method blanks contained methylene chloride, acetone, and trichloroethene. The revised detection limits calculated for these compounds in accordance with the functional guidelines are reported on the summary sheet.

INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound.

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Vinyl acetate, phenol, 4-nitroaniline, and benzyl alcohol had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. For these compounds, we have flagged all associated quantitative results as estimated.

PESTICIDES/PCBs QC

All pesticides/PCB quality control results were found to be compliant.

GAS CHROMATOGRAMS AND MASS SPECTRA

Gas chromatograms and mass spectra were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT

All compound identifications met the essential criteria. We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

B. K. Wallin

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Vaillancourt
G. Tatarka
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-TB-4	GW-ECJ-2-05	GW-ECJ-2-04	GW-ECJ-2-03	GW-ECJ-2-02	GW-DUP-3	GW-ECJ-2-01
SMO NUMBER:		AK184	AK185	AK186	AK187	AK188	AK189	AK190
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l							
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	380 J	660	670	560	1000	490 J
Chloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	40 UJB	40 UJB	52 JB	44 JB	40 UJB	40 UJB	40 UJB
Acetone	10	60 UJB	9 JB	60 UJB	60 UJB	60 UJB	60 UJB	60 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	30	55	55	42	53	34
1,1 - Dichloroethane	5	5 U	5	7	6	4 JJ	5	4 JJ
1,2 - Dichloroethene (Total)	5	5 U	6000	11000 J	9300	10000 J	13000 J	8400
Chloroform	5	5 U	3 JJ	5 U	5 U	3 JJ	3 JJ	5 U
1,2 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	8	5 U
2-Butanone	10	10 UR	33 J	98 J	260 J	10 UR	10 UR	19 J
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethane	5	5 U	14000 J	22000 J	21000 J	9500	14000 J	9600
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	47	68	63	60	77	60
Trans - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	2600	2200 J	2000	1000	3200	1200
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	26	36	42	14	16	12
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	850	1300	1200 J	580	900	540
Chlorobenzene	5	5 U	2 JJ	3 JJ	4 JJ	17	22	19
Ethylbenzene	5	5 U	190 J	370	210 J	270	410	150
Styrene	5	5 U	200 J	380	560	220	320	200
Total Xylenes	5	5 U	9	17	20	12	14	8
%SOLID		NR	NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1	1
DRYWT/DIL FACTOR		1	1	1	1	1	1	1

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-ECJ-2-05	GW-ECJ-2-04	GW-ECJ-2-03	GW-ECJ-2-02	GW-DUP-3	GW-ECJ-2-01
SMO NUMBER:		AK185	AK186	AK187	AK188	AK189	AK190
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l						
Phenol	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	10 U	10 U	10 U	3 JJ	4 JJ	10 U
Benzyl Alcohol	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	23	60	56	21	23	21
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50	50 U	50 U	50 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-ECJ-2-05	GW-ECJ-2-04	GW-ECJ-2-03	GW-ECJ-2-02	GW-DUP-3	GW-ECJ-2-01
SMO NUMBER:		AK185	AK186	AK187	AK188	AK189	AK190
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l						
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 U	10 U	11	5 JJ	8 JJ
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U	10 U	10 U
%SOLIDS:		NR	NR	NR	NR	NR	NR
DILUTION FACTOR:		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-TB-4	GW-ECJ-2-05	GW-ECJ-2-04	GW-ECJ-2-03	GW-ECJ-2-02	GW-DUP-3	GW-ECJ-2-01
SMO NUMBER:		AK184	AK185	AK186	AK187	AK188	AK189	AK190
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l							
Alpha-BHC	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beta-BHC	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
Heptachlor	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	NR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 UJ	0.10 U	0.10 U
Endosulfan II	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	NR	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	NR	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	NR	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	NR	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1260	1.00	NR	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS			NR	NR	NR	NR	NR	NR
DILUTION FACTOR			1.00	1.00	1.00	1.00	1.00	1.00
DRYWT/DILUTION FACTOR			1.00	1.00	1.00	1.00	1.00	1.00

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
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5180-04

June 6, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8815 Sullivan's Ledge Inorganic Data;
Samples MAH127 through MAH140

We have completed our review of the inorganic data generated by Versar for the 14 low sediment samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating Inorganic analysis and included the following:

- data completeness
- matrix spikes
- blank analysis
- furnace atomic absorption QC
- holding times
- instrument calibrations (initial and continuing)
- instrument detection limits
- interference checks
- serial dilutions
- laboratory control samples

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

DATA COMPLETENESS

Analytical results for all required analysis were received along with documentation for all required QA/QC. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

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HOLDING TIMES
The reanalysis of cyanide on sample MAH139 exceeded the contract required holding time. The result has been flagged as estimated. All other contract required holding times were met.

INSTRUMENT CALIBRATION (INITIAL AND CONTINUING)
All calibrations were performed as required and all contract specifications were met.

BLANK ANALYSIS
The levels of aluminum and magnesium in the preparation blank were greater than two times the IDL. Revised detection limits were calculated for these species, according to protocol guidelines ad are reported on the summary sheet.

INTERFERENCE CHECKS
An ICP interference check sample analysis was performed and results for all parameters met criteria.

MATRIX SPIKE
Lead, manganese, zinc, and cyanide recoveries for the soil matrix spike analysis were greater than 125%. Due to the possibility of false positives and biased results, we have flagged positive results for these parameters as estimated. The arsenic, copper, antimony and mercury recoveries were less than 75%. We have flagged all results for these parameters as estimated to indicate possible false negatives and a negative bias of positive results.

DUPLICATE ANALYSIS
The duplicate results for lead and cyanide were outside contract criteria. We have flagged the results for these parameters as estimated to indicate possible sample heterogeneity.

LABORATORY CONTROL SAMPLE
The laboratory control sample analysis was performed as required and results for aluminum, arsenic, silver, and selenium did not meet contract specifications. We have flagged results for these analytes as estimated.

INSTRUMENT DETECTION LIMITS
The reported instrument detection limits were all less than the CRDL.

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FURNACE ATOMIC ABSORPTION QC
Duplicate injections and one-point analytical spikes were performed as required. The method of standard additions was used to quantitate results as required.

SERIAL DILUTION
An ICP serial dilution was performed and the results for chromium and iron did not agree within 10% of the original sample after dilution. We have flagged results for these parameters as estimated to indicate a possible chemical or physical interference.

OVERALL ASSESSMENT
We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Greg A Tatarka For

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Tatarka
G. Vaillancourt
L. Dixon
L. Pitts

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL mg/kg	SS-27-01 MAH127 mg/kg	SS-27-02 MAH128 mg/kg	SS-27-03 MAH129 mg/kg	SS-28-01 MAH130 mg/kg	SS-28-02 MAH131 mg/kg	SS-28-03 MAH132 mg/kg	SS-29-01 MAH133 mg/kg	SS-29-02 MAH134 mg/kg
Aluminum	P	40	4760	3200	4610	8090	5450	7590	10300	6310
Antimony	P	12	3.7 UJ	6.2 []J	3.8 UJ	3.9 UJ	4.0 UJ	4.2 UJ	18 J	4.1 UJ
Arsenic	F	2	9.3 J	9.3 J	2.2 UJ	11 J	5 J	5.9 J	14 J	6.3 J
Barium	P	40	51	53	17 []	85	47	55	787	153
Beryllium	P	1	0.44 U	0.45 U	0.45 U	0.46 U	0.47 U	0.5 U	2.1	0.48 U
Cadmium	P	1	0.88 U	3	0.90 U	10	0.94 U	0.99 U	3.6	2.4
Calcium	P	1000	1080 []	1420	1240	4350	4570	2680	5100	7030
Chromium	P	2	19	17	15	14	12	14	31	16
Cobalt	P	10	4.8 []	4.7 []	4 []	3.2 []	2.4 []	3 []	10 []	3.6 []
Copper	P	5	78 J	52 J	8.7 J	32 J	26 J	40 J	578 J	64 J
Cyanide		2	6.4 J	15 J	0.56 UJ	0.58 UJ	0.58 UJ	0.62 UJ	0.84 J	0.59 UJ
Iron	P	20	21200 J	25900 J	7800 J	12300 J	8280 J	10100 J	26200 J	15600 J
Lead	P/F	1	75 J	169 J	5.9 J	351 J	215 J	142 J	209 J	174 J
Magnesium	P	1000	2270	1150	2400	1810	1570	1560	1760	1460
Manganese	P	3	197 J	191 J	128 J	147 J	99 J	102 J	121 J	177 J
Mercury	CV	0.04	0.11 UJ	0.16 J	0.11 UJ	0.20 J	0.2 J	0.16 J	0.44 J	0.34 J
Nickel	P	8	21	22	9.6	9.4	9.5	13	39	12
Potassium	P	1000	972 []	860 []	1250	527 []	255 U	339 []	750 []	590 []
Selenium	F	1	1.2	1.1 UJ	1.1 UJ	1.2 UJ	1.2 UJ	1.2 UJ	4.1	1.2 UJ
Silver	P	2	0.44 UJ	0.45 UJ	0.45 UJ	0.46 UJ	0.47 UJ	0.5 UJ	0.52 UJ	0.48 UJ
Sodium	P	1000	73 []	99 []	83 []	90 []	69 []	169 []	244 []	209 []
Thallium	F	2	2.2 U	2.2 U	2.2 U	2.3 U	2.3 U	2.5 U	2.6 U	2.4 U
Vandium	P	10	48	28	15	46	38	58	142	26
Zinc	P	4	115 J	295 J	97 J	188 J	115 J	188 J	470 J	152 J
Other										
%SOLID			91	89.2	89.2	86.2	85.5	80.7	76.2	84

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL mg/kg	SS-29-03	SS-30-01	SS-30-02	SS-30-03	SS-DUP-1	SS-DUP-2
SAMPLE LOCATION:			SS-29-03	SS-30-01	SS-30-02	SS-30-03	SS-DUP-1	SS-DUP-2
SMO NUMBER:			MAH135	MAH136	MAH137	MAH138	MAH139	MAH140
UNITS:			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	P	40	6130	1610	2200	6240	3270	5450
Antimony	P	12	3.7 UJ	3.6 UJ	3.6 UJ	3.9 UJ	4 UJ	3.9 UJ
Arsenic	F	2	2.2 UJ	2.1 UJ	2.2 J	2.3 UJ	8.1 J	9.8 J
Barium	P	40	21 []	16 []	11 []	22 []	62	45 []
Beryllium	P	1	0.43 U	0.43 U	0.43 U	0.46 U	0.47 U	0.46 U
Cadmium	P	1	0.87 U	0.85 U	0.85 U	0.92 U	0.94 U	0.92 U
Calcium	P	1000	684 []	537 []	492 []	1150	1440	3420
Chromium	P	2	13	2.5	3.2	12	16	10
Cobalt	P	10	4.3 []	1.1 U	1.1 U	2 []	4.3 []	1.6 []
Copper	P	5	9.7 J	11 J	4.1 []J	6.2 J	68 J	31 J
Cyanide		2	0.54 UJ	0.53 UJ	0.53 UJ	0.57 UJ	3.1 J	0.58 UJ
Iron	P	20	10200 J	4850 J	4620 J	8340 J	20600 J	8180 J
Lead	P/F	1	11 J	26 J	230 J	9.5 J	114 J	166 J
Magnesium	P	1000	2740	470 []	494 []	1520	1010 []	1630
Manganese	P	3	194 J	171 J	149 J	223 J	220 J	121 J
Mercury	CV	0.04	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.14 J	0.12 J
Nickel	P	8	9.4	4.3 []	4.3 []	5.8 []	31	6.4 []
Potassium	P	1000	716 []	470 []	465 []	657 []	735 []	592 []
Selenium	F	1	1.1 UJ	1.1 UJ	1.1 UJ	1.1 UJ	1.2 UJ	1.2 UJ
Silver	P	2	0.43 UJ	0.43 UJ	0.43 UJ	0.46 UJ	0.47 UJ	0.46 UJ
Sodium	P	1000	118 []	66 []	64 []	59 []	122 []	71 []
Thallium	F	2	2.2 U	2.1 U	2.1 U	2.3 U	2.4 U	2.3 U
Vandium	P	10	17	113	179	72	34	37
Zinc	P	4	40 J	65 J	40 J	42 J	218 J	124 J
Other								
%SOLID			92.1	93.8	93.7	87.3	85.1	86.8

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5180-04

June 6, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8970/3635A Sullivan's Ledge Organic Data;
Samples AK167, AK173 through AK183, and AK197

We have completed our review of the organic data generated by Gulf South Research Institute for the 13 low water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

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DATA COMPLETENESS
Results for all analysis were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB and DFTPP tuning criteria were reviewed and found to be within contract specifications.

SURROGATE SPIKE RESULTS
The initial analysis of sample AK174 yielded non-compliant surrogate recoveries on the acid fraction. A re-analysis was performed and results were compliant. Therefore, we have provided the results of the second analysis on the summary table with no qualification of results in accordance with the functional guidelines. Sample Ak176 had non-compliant surrogate recoveries in both the initial analysis and the re-analysis. Since the recoveries were less than 10% in both runs, we have qualified all non-detect values as estimated and detected results as estimated to indicate a possible negative bias due to sample interference. The dilution of sample AK175 raised the detection limit for the volatiles above the surrogate concentration. Therefore, we were unable to asses the surrogate results for this sample.

MATRIX SPIKE RESULTS
Phenol had a non-compliant recovery for the matrix spike sample Since the recovery was compliant in the matrix spike duplicate, the result was not qualified. Pentachlorophenol and endrin had non-compliant recoveries in both the matrix spike and matrix spike duplicate. We have qualified the results for these compounds on the original sample (AK167).

BLANK ANALYSIS
The method blanks contained methylene chloride, acetone, toluene, and diethylphthalate. Revised detection limits were calculated for these compounds, in accordance with the functional guidelines, and were reported on the summary sheet.

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INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound. acetone, benzoic acid, 2,4-dinitrophenol, 4-nitroaniline, pentachlorophenol, and phenol had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. We have flagged all associated quantitative results as estimated for these compounds.

PESTICIDES/PCBs QC
The percent difference in retention time for DBC between the initial calibration and sample AK175 were non-compliant. We have qualified all pesticide/PCB results for this sample as unusable in accordance with the functional guidelines. All other pesticide/PCB QC were compliant.

GAS CHROMATOGRAMS AND MASS SPECTRA
Gas chromatograms and mass spectra data were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT
All compound identifications met the essential criteria. We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Greg A Tatarka For

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Vaillancourt
G. Tatarka
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-MW-11	GW-GCA-1	GW-GCA-1A	GW-GCA-2	GW-TB-3	GW-SB-2	GW-MW-22B
SMO NUMBER:		AK174	AK175	AK178	AK180	AK182	AK183	AK197
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l							
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	5600 JJ	92	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	18
Methylene Chloride	5	70 UJB	70 UJB	70 UJB	100 UJB	100 UJB	70 UJB	100 UJB
Acetone	10	10 UJ	10 UJ	15 J	140 UJB	140 UJB	10 J	140 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	140	20	5 U	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	9	5 U	5 U	5 U	5 U	5 U
Trans - 1,2 - Dichloroethene	5	5 U	51000	4000	13	5 U	5 U	28
Chloroform	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloroethane	5	5 U	11	5 U	5 U	5 U	5 U	5 U
2 - Butanone	10	10 UR	30 J	10 UR	10 UR	10 UR	84 J	130 J
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	1200 J	1800	72	5 U	5 U	2 JJ
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	10	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	400 J	100	5 U	5 U	5 U	88
Trans - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4 - Methyl - 2 - Pentanone	10	10 U	10 U	4 JJ	10 U	10 U	10 U	10 U
2 - Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	3 JJ	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	20 UJB	500 BJ	130 B	5 U	5 U	20 UJB	5 U
Chlorobenzene	5	5 U	240 J	53	5 U	5 U	5 U	32
Ethylbenzene	5	5 U	640 J	160	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	23	5 U	5 U	5 U	5 U
Total Xylenes	5	5 U	75	6	5 U	5 U	5 U	11
%SOLID		NR	NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1	1
DRYWT/DIL FACTOR		1	1	1	1	1	1	1

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-SNF	GW-MW-14F	GW-MW-11	GW-GCA-1	GW-GCA-1F	GW-MW-22AF	GW-GCA-1A	GW-GCA-1AF
SMO NUMBER:		AK167	AK173	AK174RE	AK175	AK176	AK177	AK178	AK179
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	20 UJ	3 JJ	10 UR	10 UJ	10 UR	5 JJ	4 JJ	10 UJ
bis(2-Chloroethyl)Ether	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	20 U	10 U	10 U	11	6 JJ	6 JJ	3 JJ	10 U
1,4 - Dichlorobenzene	10	20 U	3 JJ	10 U	38	20	9 JJ	8 JJ	6 JJ
Benzyl Alcohol	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2 - Dichlorobenzene	10	20 U	10 U	10 U	4 JJ	10 U	10 U	10 U	10 U
2-Methylphenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	20 U	10 U	10 U	12	9 JJ	10 U	10 U	10 U
2-Nitrophenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4 - Dimethylphenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
Benzoic Acid	50	100 UJ	50 UJ	50 UR	50 UJ	50 UR	50 UJ	50 UJ	50 UJ
bis(2-Chloroethoxy)Methane	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	20 U	10 U	10 U	23	4 JJ	10 U	18	10
Naphthalene	10	20 U	10 U	10 U	89	35	19	5 JJ	4 JJ
4-Chloroaniline	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2-Methylnaphthalene	10	20 U	10 U	10 U	4 JJ	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	20 U	10 U	10 UR	10 U	10 UR	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	100 U	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
2-Chloronaphthalene	10	20 U	10 U	10 U	11	10 U	10 U	10 U	10 U
2-Nitroaniline	50	100 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	100 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	100 UJ	50 UJ	50 UR	50 UJ	50 UR	50 UJ	50 UJ	50 UJ
4-Nitrophenol	50	100 U	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
Dibenzofuran	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	90 UJB	90 UJB	10 U	90 UJB	90 UJB	90 UJB	90 UJB	90 UJB
4-Chlorophenyl-Phenylether	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	100 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-SNF	GW-MW-14F	GW-MW-11	GW-GCA-1	GW-GCA-1F	GW-MW-22AF	GW-GCA-1A	GW-GCA-1AF
SMO NUMBER:		AK167	AK173	AK174RE	AK175	AK176	AK177	AK178	AK179
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
4,6 - Dinitro-2-Methylphenol	50	100 U	50 U	50 UR	50 U	50 UR	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	20 U	10 U	10 U	17	10 U	10 U	8 JJ	10 U
4-Bromophenyl-Phenylether	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	100 UJ	50 UJ	50 UR	50 UJ	50 UR	50 UJ	50 UJ	50 UJ
Phenanthrene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	40 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	20 U	10 U	5 JJ	3 JJ	10 U	10 U	3 JJ	10 U
Di-n-Octyl Phthalate	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
%SOLIDS:									
DILUTION FACTOR:									
DRYWT/DILUTION FACTOR		2	1	1	1	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-GCA-2	GW-MW-22BF	GW-SB-2	GW-MW-22B
SMO NUMBER:		AK180	AK181	AK183	AK197
UNITS:		ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l				
Phenol	10	10 UJ	2 JJ	10 UJ	4 JJ
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	2 JJ	10 U	10 U
1,4 - Dichlorobenzene	10	10 U	9 JJ	10 U	9 JJ
Benzyl Alcohol	10	10 U	10 U	10 U	10 U
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 U
Benzoic Acid	50	50 UJ	50 UJ	50 UJ	50 UJ
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	4 JJ	10 U	7 JJ
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	3 JJ	10 U	5 JJ
2,4 - Dinitrophenol	50	50 UJ	50 UJ	50 UJ	50 UJ
4-Nitrophenol	50	50 U	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U
Diethylphthalate	10	90 UJB	90 UJB	90 UJB	90 UJB
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	3 JJ
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ	50 UJ

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-GCA-2	GW-MW-22BF	GW-SB-2	GW-MW-22B
SMO NUMBER:		AK180	AK181	AK183	AK197
UNITS:		ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l				
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	5 J	10 U	12
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 UJ	50 UJ	50 UJ	50 UJ
Phenanthrene	10	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	5 JJ	10 U	10 U	12
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U
%SOLIDS:					
DILUTION FACTOR:					
DRYWT/DILUTION FACTOR		1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-SNF	GW-MW-14F	GW-MW-11	GW-GCA-1	GW-GCA-1F	GW-MW-22AF	GW-GCA-1A	GW-GCA-1AF
SMO NUMBER:		AK167	AK173	AK174	AK175	AK176	AK177	AK178	AK179
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l								
Alpha-BHC	0.05	0.10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beta-BHC	0.05	0.10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	0.10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05	0.10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05	0.10 UR	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	0.10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	0.20 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	2.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	1.00 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	9.00	1.00 U	6.90	34.00 J	1.00 U	1.00 U	3.70	1.00 U
Aroclor-1260	1.00	2.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS									
DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DRYWT/DILUTION FACTOR		2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

VALIDATION
TABLE

SAMPLE LOCATION:		GW-GCA-2	GW-MW-22BF	GW-SB-2	GW-MW-22B
SMO NUMBER:		AK180	AK181	AK183	AK197
UNITS:		ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l				
Alpha-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Beta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	0.39 JJ	1.00 U	0.23 JJ	3.30
Aroclor-1260	1.00	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS					
DILUTION FACTOR		1.00	1.00	1.00	1.00
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	1.00

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
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5180-04

June 6, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #9026 Sullivan's Ledge Inorganic Data;
Samples MAH270 through MAH279

We have completed our review of the inorganic data generated by Northern Labs & Engineering inc. for ten water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating Inorganic analysis and included the following:

- data completeness
- matrix spikes
- blank analysis
- furnace atomic absorption QC
- holding times
- instrument calibrations (initial and continuing)
- instrument detection limits
- interference checks
- serial dilutions
- laboratory control samples

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

DATA COMPLETENESS

Results for all analyses were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
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HOLDING TIMES
All contract required holding times were met.

INSTRUMENT CALIBRATION (INITIAL AND CONTINUING)
All calibrations were performed as required and all contract specifications were met.

BLANK ANALYSIS
The levels of calcium, manganese, and zinc in the method blanks were greater than twice the IDL. Revised detection limits were calculated for these species, according to protocol guidelines and are reported on the summary sheet.

INTERFERENCE CHECKS
An ICP interference check sample analysis was performed and results for all parameters met criteria.

MATRIX SPIKE
Silver and thallium recoveries for the matrix spike analysis were less than 75%. Due to the possibility of false negatives and biased results, we have flagged all results for these parameters as estimated.

DUPLICATE ANALYSIS
The laboratory matrix duplicate met criteria for all parameters.

LABORATORY CONTROL SAMPLE
The laboratory control sample analysis was performed as required and results for all parameters were found to be compliant.

INSTRUMENT DETECTION LIMITS
The reported instrument detection limits were all less than the CRDL.

FURNACE ATOMIC ABSORPTION QC
Duplicate injections and one-point analytical spikes were performed as required and the results were compliant. The method of standard additions was used to quantitate results when contractually required.

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SERIAL DILUTION
An ICP serial dilution was performed and the results for sodium did not agree within 10% of the original sample after dilution. We have flagged all results for this parameter as estimated to indicate a possible chemical or physical interference.

OVERALL ASSESSMENT
We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Tatarka
G. Vaillancourt
L. Dixon
L. Pitts

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-ECJ-1-04	GW-ECJ-1-03	GW-ECJ-4-06	GW-ECJ-4-05	GW-ECJ-4-04	GW-ECJ-4-03	GW-ECJ-4-02	GW-ECJ-4-01
SAMPLE LOCATION:			GW-ECJ-1-04	GW-ECJ-1-03	GW-ECJ-4-06	GW-ECJ-4-05	GW-ECJ-4-04	GW-ECJ-4-03	GW-ECJ-4-02	GW-ECJ-4-01
SMO NUMBER:			MAH 270	MAH 271	MAH 272	MAH 273	MAH 274	MAH 275	MAH 276	MAH 277
UNITS:			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	P	200	27 []	22 U	22 U	52 []	29 []	22 U	22 U	22 U
Antimony	P	60	22 U	22 U	22 U	22 U	22 U	22 U	22 U	22 U
Arsenic	F	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	P	200	39 []	18 []	2 U	2 U	2 U	4.3 []	3.8 []	4.3 []
Beryllium	P	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	P	5	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Calcium	P	5000	31800	28000	22400	19600	21600	97800	99400	89400
Chromium	P	10	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U
Cobalt	P	50	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Copper	P	25	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Cyanide		10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Iron	P	100	2310	876	75 []	21 []	16 []	13 U	13 U	13 U
Lead	F	5	5 U	11	5 U	5 U	5 U	5 U	5 U	5.5
Magnesium	P	5000	6410	5510	4610 []	3410 []	4660 []	27700	25500	24300
Manganese	P	15	1020	575	33 UJB	33 UJB	33 UJB	69	33 UJB	55
Mercury	CV	0.2	0.23	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	P	40	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	P	5000	1880 []	880	1330 []	861 []	1550 []	3210 []	2950 []	3170 []
Selenium	F	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Silver	P	10	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ
Sodium	P	5000	18800 J	13400 J	24300 J	2400 J	17200 J	23000 J	21900 J	21800 J
Thallium	F	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Vandium	P	50	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Zinc	P	20	12 UJB	12 UJB	12 UJB	14 JB	12 UJB	12 UJB	12 UJB	26
OTHER										
%SOLID			NR	NR	NR	NR	NR	NR	NR	NR

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-SB-4	GW-FB-4
SAMPLE LOCATION:			GW-SB-4	GW-FB-4
SMO NUMBER:			MAH 278	MAH 279
UNITS:			ug/l	ug/l
Aluminum	P	200	22 U	22 U
Antimony	P	60	22 U	22 U
Arsenic	F	10	10 U	10 U
Barium	P	200	2 U	2 U
Beryllium	P	5	1 U	1 U
Cadmium	P	5	3 U	3 U
Calcium	P	5000	8 U	8 U
Chromium	P	10	7 U	7 U
Cobalt	P	50	4 U	4 U
Copper	P	25	3 U	3 U
Cyanide		10	10 U	10 U
Iron	P	100	13 U	13 U
Lead	F	5	5 U	5 U
Magnesium	P	5000	21 U	21 U
Manganese	P	15	33 UJB	33 UJB
Mercury	CV	0.2	0.2 U	0.2 U
Nickel	P	40	5 U	5 U
Potassium	P	5000	121 U	121 U
Selenium	F	5	5 U	5 U
Silver	P	10	3 UJ	3 UJ
Sodium	P	5000	58 []J	40 []J
Thallium	F	10	10 UJ	10 UJ
Vandium	P	50	3 U	3 U
Zinc	P	20	12 UJB	12 UJB
OTHER				
%SOLID			NR	NR

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5180-04

June 6, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8730 Sullivan's Ledge Inorganic Data;
Samples MAF243 through MAF247, MAF266 through MAF275

We have completed our review of the inorganic data generated by Century Laboratories for 15 water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating Inorganic analysis and included the following:

- data completeness
- matrix spikes
- blank analysis
- furnace atomic absorption QC
- holding times
- instrument calibrations (initial and continuing)
- instrument detection limits
- interference checks
- serial dilutions
- laboratory control samples

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

DATA COMPLETENESS

Results for all analyses were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

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HOLDING TIMES
All contract required holding times were met.

INSTRUMENT CALIBRATION (INITIAL AND CONTINUING)
All calibrations were performed as required and all contract specifications were met.

BLANK ANALYSIS
The levels of aluminum and vanadium in the method blanks were greater than twice the IDL. Revised detection limits were calculated for these species, according to protocol guidelines ad are reported on the summary sheet.

INTERFERENCE CHECKS
An ICP interference check sample analysis was performed and results for all parameters met criteria.

MATRIX SPIKE
Arsenic, silver, and cyanide recoveries for the matrix spike analysis were less than 75%. Due to the possibility of false negatives and biased results, we have flagged all results for these parameters as estimated.

DUPLICATE ANALYSIS
The laboratory matrix duplicate met criteria for all parameters.

LABORATORY CONTROL SAMPLE
The laboratory control sample analysis was performed as required and results for all parameters were compliant.

INSTRUMENT DETECTION LIMITS
The reported instrument detection limits were all less than the CRDL.

FURNACE ATOMIC ABSORPTION QC
Duplicate injections and one-point analytical spikes were performed as required. Duplicate results agreed within 20% as contractually required. The method of standard additions was used to quantitate results as required.

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SERIAL DILUTION
An ICP serial dilution was performed and the results for aluminum, iron, magnesium, potassium, and sodium did not agree within 10% of the original sample after dilution. We have flagged the results for these parameters as estimated to indicate a possible chemical or physical interference.

OVERALL ASSESSMENT
We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Tatarka
G. Vaillancourt
L. Dixon
L. Pitts

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8
SAMPLE LOCATION:			SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8
SMO NUMBER:			MAF266	MAF267	MAF268	MAF269	MAF270	MAF271	MAF272	MAF273
UNITS:			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	P	200	433	165 UJB	165 UJB	165 UJB	165 UJB	376	165 UJB	166 []
Antimony	P	60	55 U	55 U	55 U	55 U	55 U	55 U	55 U	55 U
Arsenic	F	10	4 UJ	4 UJ	4 UJ	4 UJ	4 UJ	4 UJ	4 UJ	4 UJ
Barium	P	200	139 []	44 []	36 []	47 []	37 []	964	54 []	873
Beryllium	P	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	P	5	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U
Calcium	P	5000	63200 J	16100 J	16200 J	19200 J	19700 J	64300 J	20400 J	70200 J
Chromium	P	10	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cobalt	P	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	P	25	13 []	17 []	10 []	9 []	10 []	6 []	13 []	10 []
Cyanide	CM	10	NR	NR	10 UJ	NR	10 UJ	10 UJ	NR	200 J
Iron	P	100	624 J	661 J	107 J	1110 J	264 J	66400 J	1890 J	76900 J
Lead	P/F	5	2 U	18	2 U	2 U	2 U	5 []	5 U	3 []
Magnesium	P	5000	20900 J	5420 J	4260 []J	6500 J	4030 []J	17700 J	6860 J	13600 J
Manganese	P	15	143	264	40	595	464	2410	706	1030
Mercury	CV	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	P	40	12 []	20 []	11 U	11 U	11 U	11 U	11 U	11 U
Potassium	P	5000	4810 []J	3460 []J	3750 []J	3680 []J	2650 []J	8960 J	3840 []J	9010 J
Selenium	F	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	20 U
Silver	P	10	8.7 UJ	8.7 UJ	23 J	8.7 UJ	8.7 UJ	8.7 UJ	8.7 UJ	8.7 UJ
Sodium	P	5000	104600 J	52500 J	42300 J	62400 J	51100 J	46000 J	63400 J	54000 J
Thallium	F	10	20 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Vandium	P	50	40 UJB	40 UJB	40 UJB	40 UJB	40 UJB	40 UJB	40 UJB	40 []
Zinc	P	20	29	84	17 []	29	69	48	34	44
Other										
%SOLID										

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	SW-9	SW-10	SW-11	SW-12	SW-13	SW-DUP-1	SW-DUP-2
SAMPLE LOCATION:			SW-9	SW-10	SW-11	SW-12	SW-13	SW-DUP-1	SW-DUP-2
SMO NUMBER:			MAF275	MAF243	MAF244	MAF246	MAF247	MAF274	MAF245
UNITS:			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Aluminum	P	200	415	165 UJB	339	174 []	239	194 []	165 UJB
Antimony	P	60	55 U	55 U	55 U	55 U	55 U	55 U	55 U
Arsenic	F	10	4 UJ	4 UJ	4 UJ	4 UJ	4 UJ	4 UJ	4 UJ
Barium	P	200	41 []	30 []	99 []	95 []	85 []	884	34 []
Beryllium	P	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	P	5	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U
Calcium	P	5000	27300 J	21700 J	19000 J	21900 J	19600 J	70700 J	22100 J
Chromium	P	10	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cobalt	P	50	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	P	25	9 []	6 []	19 []	13 []	13 []	8 []	6 []
Cyanide	CM	10	26 J	NR	NR	NR	NR	48 J	NR
Iron	P	100	5230 J	1970 J	6160 J	4980 J	4850 J	78800 J	2450 J
Lead	P/F	5	71	2 U	14	7	13	5 U	2 U
Magnesium	P	5000	6720 J	6880 J	5740 J	6830 J	6360 J	13700 J	6960 J
Manganese	P	15	776	545	537	544	466	1040	548
Mercury	CV	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	P	40	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Potassium	P	5000	5070 J	3560 []J	3500 []J	3760 []J	3280 []J	9010 J	3630 []J
Selenium	F	5	2 U	2 U	2 U	2 U	2 U	20 U	2 U
Silver	P	10	8.7 UJ	8.7 UJ	8.7 UJ	8.7 UJ	8.7 UJ	8.7 UJ	8.7 UJ
Sodium	P	5000	82900 J	47500 J	48000 J	57700 J	46100 J	54800 J	48100 J
Thallium	F	10	2 U	2 U	20 U	2 U	2 U	2 U	2 U
Vandium	P	50	40 UJB	40 UJB	40 UJB	40 UJB	40 UJB	44 []	40 UJB
Zinc	P	20	16 []	15 []	83	64	60	39	10 []
Other									
%SOLID									

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

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5180-04

June 6, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #9026 Sullivan's Ledge Inorganic Data;
Samples MAH248 through MAH250, MAH268 through MAH269

We have completed our review of the inorganic data generated by Northern Labs & Engineering inc. for 15 water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating Inorganic analysis and included the following:

- data completeness
- matrix spikes
- blank analysis
- furnace atomic absorption QC
- holding times
- instrument calibrations (initial and continuing)
- instrument detection limits
- interference checks
- serial dilutions
- laboratory control samples

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

DATA COMPLETENESS

Results for all analyses were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

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HOLDING TIMES
All contract required holding times were met.

INSTRUMENT CALIBRATION (INITIAL AND CONTINUING)
All calibrations were performed as required and contract specifications were met.

BLANK ANALYSIS
The levels of beryllium, calcium, copper, and manganese in the method blanks were greater than 2 times the IDL. Revised detection limits were calculated for these species, according to protocol guidelines and are reported on the summary sheet.

INTERFERENCE CHECKS
An ICP interference check sample analysis was performed and results for all parameters met criteria.

MATRIX SPIKE
Selenium recovery for the matrix spike analysis was greater than 125%. Due to the possibility of false positives and biased results, we have flagged positive results for this parameter as estimated.

DUPLICATE ANALYSIS
The laboratory duplicate met criteria for all parameters.

LABORATORY CONTROL SAMPLE
The laboratory control sample analysis was performed as required and results for all parameters were compliant.

INSTRUMENT DETECTION LIMITS
The reported instrument detection limits were all less than the CRDL.

FURNACE ATOMIC ABSORPTION QC
Duplicate injections and one-point analytical spikes were performed as required. Duplicate results agreed within 20% as contractually required. The method of standard additions was used to quantitate results as required.

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SERIAL DILUTION
An ICP serial dilution was performed and the results for all parameters were compliant.

OVERALL ASSESSMENT
We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Tatarka
G. Vaillancourt
L. Dixon
L. Pitts

VALIDATION TABLE

PROJECT: Sullivan's Ledge

		SAMPLE LOCATION:	GW-ECJ-3-06	GW-ECJ-3-05	GW-DOM-1	GW-ECJ-3-04	GW-ECJ-3-03	GW-ECJ-3-02	GW-ECJ-3-01	GW-ECJ-1-06
		SMO NUMBER:	MAH-248	MAH-249	MAH-250	MAH-260	MAH-261	MAH-262	MAH-263	MAH-264
		UNITS:	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l								
Aluminum	P	200	22 U	22 U	22 U	44 []	22 U	65 []	22 U	36 []
Antimony	P	60	22 U	22 U	22 U	22 U	22 U	22 U	22 U	22 U
Arsenic	F	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	P	200	24 []	19 []	12 []	38 []	41 []	22 []	49 []	32 []
Beryllium	P	5	15 UJB	15 UJB	15 UJB	15 UJB	15 UJB	15 UJB	15 UJB	15 UJB
Cadmium	P	5	3 U	3 U	3 U	4.1 []	4.1 []	4.1 []	3.1 []	3.7 []
Calcium	P	5000	23100	23700	14600	32600	37700	27200	26300	25200
Chromium	P	10	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U
Cobalt	P	50	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Copper	P	25	25 UJB	25 UJB	25 UJB	25 UJB	25 UJB	25 UJB	25 UJB	25 UJB
Cyanide		10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	25
Iron	P	100	182	62 []	22 []	67 []	26 []	66 []	25 []	48 []
Lead	P/F	5	5 U	5 U	14	5 U	5 U	5 U	5 U	5 U
Magnesium	P	5000	5890	5200	5290	8040	8180	12300	8500	3370 []
Manganese	P	15	336	313	36 UJB	302	390	36 UJB	60 JB	282
Mercury	CV	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.78
Nickel	P	40	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	P	5000	706 []	865 []	3490 []	5500	5420	5500	6960	4010 []
Selenium	F	5	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Silver	P	10	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Sodium	P	5000	10700	10900	24600	65300	63300	64700	82400	13800
Thallium	F	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vandium	P	50	3 U	3 U	3 U	3 U	3 U	3.2 []	3 U	3 U
Zinc	P	20	6.9 []	4.6 []	2 U	151	251	32	57	18 []
Other										
%SOLID										

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	SAMPLE LOG SMO	GW-ECJ-1-05 MAH-265 ug/l	GW-ECJ-1-02 MAH-266 ug/l	GW-SB-3 MAH-267 ug/l	GW-CB-1 MAH-268 ug/l	GW-ECJ-1-01 MAH-269 ug/l	GW-FB-3 MAH-333 ug/l	GW-DUP-4 MAH-334 ug/l
Aluminum	P		22 U	22 U	22 U	22 U	22 U	22 U	22 U
Antimony	P		22 U	22 U	22 U	22 U	22 U	22 U	22 U
Arsenic	F		10 U	10 U	10 U	10 U	10 U	10 U	10 U
Barium	P		25 []	179 []	2 U	2 U	1860	2 U	208
Beryllium	P		15 UJB	15 UJB	15 UJB	15 UJB	15 UJB	15 UJB	15 UJB
Cadmium	P		3 U	7.5	3 U	4.1 []	8.4	3 U	8.4
Calcium	P		26800	54000	8 U	2520 []	64400	8 U	57000
Chromium	P		7 U	7 U	7 U	7 U	7 U	7 U	7 U
Cobalt	P		4 U	4 U	4 U	4 U	30 []	4 U	4 U
Copper	P		25 UJB	25 UJB	25 UJB	17 []	5 []	3 U	3 U
Cyanide			10 U	22	10 U	10 U	43	NR	18
Iron	P		361	20200	13 U	41 []	29400	66 []	22200
Lead	P/F		5 U	5 U	5 U	5 U	5 U	6.5	5 U
Magnesium	P		4690 []	12900	21 U	190 []	20300	21 U	13800
Manganese	P		395	4990	36 UJB	36 UJB	26000	36 UJB	5550
Mercury	CV		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	P		5 U	5 U	5 U	7 []	5 U	5 U	5 U
Potassium	P		1120 []	4010	121 U	121 U	9560	121 U	4470 []
Selenium	F		5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Silver	P		3 U	3 U	3 U	3 U	3 U	3 U	3 U
Sodium	P		13800	28700	187 []	8630	50800	233 []	31200
Thallium	F		10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vandium	P		3 U	3 U	3 U	3.9 []	3 U	3 U	3 U
Zinc	P		7.2 []	54	2 U	140	95	3.6 []	54
Other									
%SOLID									

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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5180-04

June 6, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #9870/3635A Sullivan's Ledge Inorganic Data;
Samples MAH232 through MAH241

We have completed our review of the inorganic data generated by Chemtech Consulting Group for ten water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating Inorganic analysis and included the following:

- data completeness
- matrix spikes
- blank analysis
- furnace atomic absorption QC
- holding times
- instrument calibrations (initial and continuing)
- instrument detection limits
- interference checks
- serial dilutions
- laboratory control samples

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

DATA COMPLETENESS

Results for all analyses were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

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HOLDING TIMES
All samples met the contract required holding time for all parameters.

INSTRUMENT CALIBRATION (INITIAL AND CONTINUING)
All calibrations were performed as required and all contract specifications were met.

BLANK ANALYSIS
No method blank contamination was noted.

INTERFERENCE CHECKS
An ICP interference check sample analysis was performed and results for all parameters met criteria.

MATRIX SPIKE
Lead and selenium recoveries for the matrix spike analysis were less than 30%. We have flagged all positive results as estimated and all non-detected results as unusable for these parameters per protocol guidelines.

DUPLICATE ANALYSIS
The laboratory matrix duplicate results for cadmium and cyanide were outside contract criteria. We have flagged the results for these parameters as estimated to indicate possible sample heterogeneity.

LABORATORY CONTROL SAMPLE
The laboratory control sample analysis was performed as required and results met the required criteria.

INSTRUMENT DETECTION LIMITS
The reported instrument detection limits were all less than the CRDL.

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FURNACE ATOMIC ABSORPTION QC

Duplicate injections and one-point analytical spikes were performed as required and the results for thallium on sample MAH234 and lead on sample MAH238 were non-compliant. We have flagged these results as estimated. The method of standard additions was used to quatitate results when necessary.

SERIAL DILUTION

An ICP serial dilution was performed and the results for calcium, iron, and manganese did not agree within 10% of the original sample after dilution. We have flagged results for these parameters as estimated to indicate a possible chemical or physical interference.

OVERALL ASSESSMENT

We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Tatarka
G. Vaillancourt
L. Dixon
L. Pitts

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-MW-12 MAH232 ug/l	GW-MW-13A MAH233 ug/l	GW-MW-14 MAH 234 ug/l	GW-MW-11 MAH235 ug/l	GW-GCA-1 MAH 236 ug/l	GW-GCA-1A MAH237 ug/l	GW-GCA-2 MAH238 ug/l	GW-MW-22B MAH239 ug/l
Aluminum	P	200	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Antimony	P	60	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Arsenic	F	10	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Barium	P	200	1490	664	45 U	56 []	2050	889	67 []	423
Beryllium	P	5	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	P	5	17 J	9.8 J	5 UJ	5 UJ	20 J	14 J	5 UJ	16 J
Calcium	P	5000	98500 J	57100 J	43300 J	26000 J	123000 J	61100 J	22700 J	65400 J
Chromium	P	10	33	9 U	9 U	9 U	9.9 []	9 U	9 U	9 U
Cobalt	P	50	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Copper	P	25	25	12 U	15 []	22 []	18 []	18 []	14 []	35
Iron	P	100	57400 J	37000 J	5690 J	703 J	65100 J	49600 J	204 J	56700 J
Lead	P/F	5	0.3 []J	17 J	6.8 J	5.4 J	17 J	4.8 []J	6.3 J	5.5 J
Magnesium	P	5000	21500	15300	13900	4280 []	35600	16700	6680	11800
Manganese	P	15	3090 J	1730 J	1520 J	1110 J	20900 J	2170 J	15 J	1270 J
Mercury	CV	0.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40	0.30	0.20 U
Nickel	P	40	36 []	20 []	7.4 []	7 U	29 []	26 []	93	78
Potassium	P	5000	11500	9100	8200	1800 []	12600	8100	6400	9500
Selenium	F	5	2 UR	2 UR	2 UR	2 UR	2 UR	2 UR	2 UR	2 UR
Silver	P	10	8 U	8 U	8 U	8 U	8 U	8 U	8 U	21
Sodium	P	5000	62500	41400	63800	11700	88000	42900	58900	48900
Thallium	F	10	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U
Vandium	P	50	16 []	10 U	10 U	10 U	26 []	11 []	10 U	12 []
Zinc	P	20	27	78	20 U	23	37	20 U	36	30
Cyanide		10	37 J	10 UJ	10 UJ	10 UJ	124 J	70 J	10 UJ	62 J
%SOLID			NR	NR	NR	NR	NR	NR	NR	NR

VALIDATION TABLE

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l	GW-SB-2 MAH240 ug/l	GW-FB-2 MAH241 ug/l
Aluminum	P	200	100 U	100 U
Antimony	P	60	25 U	25 U
Arsenic	F	10	4 U	4 U
Barium	P	200	45 U	45 U
Beryllium	P	5	4 U	4 U
Cadmium	P	5	5 UJ	5 UJ
Calcium	P	5000	7180 UJ	718 UJ
Chromium	P	10	9 U	9 U
Cobalt	P	50	9 U	9 U
Copper	P	25	12 U	12 U
Iron	P	100	101 J	103 J
Lead	P/F	5	5 J	5.2 J
Magnesium	P	5000	377 U	377 U
Manganese	P	15	8 UJ	8 UJ
Mercury	CV	0.2	0.60	1.65
Nickel	P	40	12 []	24 []
Potassium	P	5000	500 U	500 U
Selenium	F	5	2 UR	2 UR
Silver	P	10	8 U	8 U
Sodium	P	5000	1166 U	1166 U
Thallium	F	10	5 U	5 U
Vandium	P	50	10 U	10 U
Zinc	P	20	27	20 U
Cyanide		10	10 UJ	NR
%SOLID			NR	NR

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5180-04

June 24, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8815 Sullivan's Ledge Organic Data;
Samples AK002 through AK020

We have completed our review of the organic data generated by Radian Corporation for 19 soil samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table. In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

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DATA COMPLETENESS
Results for all analysis were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB tuning for mass 177 was reported at 4.9% of mass 176. The required abundance is 5-9% of mass 176. The DFTPP tuning for mass 442 was reported at 39.9% of mass 198. The required abundance is greater than 40% of mass 198. We feel these deficiencies do not effect data quality. DFTPP tuning for mass 275 was reported at 2.8% of mass 198. The required abundance was 10-30% of mass 198. Associated BNA results may be subject to incorrect interpretation.

SURROGATE SPIKE RESULTS
The initial analysis of volatiles on sample AK007 yielded non-compliant surrogate recoveries. A re-analysis was performed and results remained non-compliant. Therefore, we have provided the results of the first analysis on the summary table with positive results qualified as estimated and non-detected results unusable in accordance with the functional guidelines.

MATRIX SPIKE RESULTS
All pesticides had non-compliant recoveries in both the matrix spike and matrix spike duplicate. We have qualified the results for these compounds on the original sample (AK004). The relative percent differences between the matrix spike and the matrix spike duplicate for pyrene was non-compliant. We have flagged the results for this compound as estimated on the spiked sample (AK010) to indicate possible sample heterogeneity.

BLANK ANALYSIS
The method blanks contained methylene chloride, acetone, di-n-butylphthalate and bis(2-Ethylhexyl)Phthalate. Revised detection limits were calculated for these compounds, in accordance with the functional guidelines, and were reported on the summary sheet.

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INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound. Vinyl chloride, bromomethane, and benzyl alcohol had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. We have flagged all associated quantitative results as estimated for these compounds.

PESTICIDES/PCBs QC
Retention times were not within the established windows for several compounds on the 1/26/88 and 1/27/88 calibrations. Positive values for these compounds on the samples analyzed on the above days should be considered tentatively identified and are flagged on the summary tables. The %RSD for the column used for quantitive determinations was greater than 10%. All associated quantative results are qualified as estimated. The percent difference in retention time for DBC was greater than 2% for most samples. Results for these samples are qualified as unusable. Several compounds had non-compliant percent differences between calibration factors. associated results are flagged as estimated.

GAS CHROMATOGRAMS AND MASS SPECTRA
Gas chromatograms and mass spectra data were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT
Due to severe quality control problems on the Pesticides/PCB fraction, we consider all results for this fraction questionable. We estimate that all other reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Greg A Tetuka For

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat
Enclosure
cc: D. Szaro (w/ enclosure)
G. Vaillancourt
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		SS-27-01	SS-27-02	SS-27-03	SS-28-01	SS-28-02	SS-28-03	SS-29-01	SS-29-02
SMO NUMBER:		AK002	AK003	AK004	AK005	AK006	AK007	AK008	AK009
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	11 U	11 U	12 U	11 U	12 U	12 UJ	13 U	12 U
Bromomethane	10	11 UJ	11 UJ	12 UJ	11 UJ	12 UJ	12 UJ	13 UJ	12 UJ
Vinyl Chloride	10	11 UJ	11 UJ	12 UJ	11 UJ	12 UJ	12 UJ	13 UJ	12 UJ
Chloroethane	10	11 U	11 U	12 U	11 U	12 U	12 UJ	13 U	12 U
Methylene Chloride	5	22 UJB	22 UJB	24 UJB	23 UJB	23 UJB	24 UJB	26 UJB	23 UJB
Acetone	10	150 B	180 B	48 UJB	45 UJB	46 UJB	48 UJB	92 UJB	47 UJB
Carbon Disulfide	5	6 U	14	6 U	6 U	6 U	6 UJ	7 U	6 U
1,1 - Dichloroethene	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
1,1 - Dichloroethane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Trans - 1,2 - Dichloroethene	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Chloroform	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
1,2 - Dichloroethane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
2 - Butanone	10	11 UR	70 J	12 UR	11 UR	12 UR	12 UR	13 UR	12 UR
1,1,1 - Trichloroethane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Carbon Tetrachloride	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Vinyl Acetate	10	11 U	11 U	12 U	11 U	12 U	12 UJ	13 U	12 U
Bromodichloromethane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
1,2 - Dichloropropane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Trans - 1,3 - Dichloropropen	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Trichloroethane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	2 JJ	6 U
Dibromochloromethane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
1,1,2 - Trichloroethane	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Benzene	5	1 JJ	3 JJ	6 U	6 U	6 U	23 J	7 U	6 U
Cis - 1,3 - Dichloropropene	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Bromoform	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
4 - Methyl - 2 - Pentanone	10	11 U	11 U	12 U	11 U	12 U	12 UJ	13 U	12 U
2 - Hexanone	10	11 U	11 U	12 U	11 U	12 U	12 UJ	13 U	12 U
Tetrachloroethene	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
1,1,2,2 - Tetrachloroethane	5	11 U	11 U	12 U	11 U	12 U	12 UJ	13 U	12 U
Toluene	5	12	31	6 U	6 U	6 U	35 J	7 U	1 JJ
Chlorobenzene	5	6 U	6 U	6 U	6 U	6 U	6 UJ	7 U	6 U
Ethylbenzene	5	30	110	6 U	6 U	6 U	43 J	7 U	6 U
Styrene	5	1 JJ	5 JJ	6 U	6 U	6 U	7 J	7 U	6 U
Total Xylenes	5	66	180	6 U	6 U	6 U	10 J	7 U	6 U
%SOLID		90	89	83	88	86	84	76	86
DILUTION FACTOR		1	1	1	1	1	1	1	1
DRYWT/DIL FACTOR		1.00	0.00	0.00	0.00	0.00	0.00	1.32	1.16

VALIDATION TABLE

SAMPLE LOCATION:		SS-29-03	SS-30-01	SS-30-02	SS-30-03	SS-DUP-1	SS-DUP-2	SS-6	SS-7
SMO NUMBER:		AK010	AK011	AK012	AK013	AK014	AK015	AK016	AK017
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	11 U	11 U	11 U	12 U	11 U	11 U	21 U	40 U
Bromomethane	10	11 UJ	11 UJ	11 UJ	12 UJ	11 UJ	11 UJ	21 UJ	40 UJ
Vinyl Chloride	10	11 UJ	11 UJ	11 UJ	12 UJ	11 UJ	11 UJ	21 UJ	40 UJ
Chloroethane	10	11 U	11 U	11 U	12 U	11 U	11 U	21 U	40 U
Methylene Chloride	5	60 UJB	60 UJB	60 UJB	58 UJB	55 UJB	57 UJB	106 UJB	200 UJB
Acetone	10	96 UJB	95 UJB	96 UJB	93 UJB	210 B	92 UJB	170 UJB	320 UJB
Carbon Disulfide	5	5 U	5 U	5 U	6 U	7	6 U	11 U	20 U
1,1 - Dichloroethene	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
1,1 - Dichloroethane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Trans - 1,2 - Dichloroethene	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Chloroform	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
1,2 - Dichloroethane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
2 - Butanone	10	11 UR	11 UR	11 UR	12 UR	84 J	11 UR	21 UR	60 J
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Carbon Tetrachloride	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Vinyl Acetate	10	11 U	11 U	11 U	12 U	11 U	11 U	21 U	40 U
Bromodichloromethane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Trans - 1,3 - Dichloropropen	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Trichloroethane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Dibromochloromethane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Benzene	5	5 U	5 U	5 U	6 U	1 JJ	6 U	11 U	20 U
Cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Bromoform	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
4 - Methyl - 2 - Pentanone	10	11 U	11 U	11 U	12 U	11 U	11 U	21 U	40 U
2 - Hexanone	10	11 U	11 U	11 U	12 U	11 U	11 U	21 U	40 U
Tetrachloroethene	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
1,1,2,2 - Tetrachloroethane	5	11 U	11 U	11 U	12 U	11 U	11 U	21 U	40 U
~~Toluene~~	~~5~~	~~5 U~~	~~1 JJ~~	~~2 JJ~~	~~6 U~~	~~15~~	~~6 U~~	~~11 U~~	~~20 U~~
Chlorobenzene	5	5 U	5 U	5 U	6 U	6 U	6 U	11 U	20 U
Ethylbenzene	5	5 U	5 U	5 U	6 U	75	6 U	11 U	20 U
Styrene	5	5 U	5 U	5 U	6 U	3 JJ	6 U	11 U	20 U
Total Xylenes	5	5 U	5 U	5 U	6 U	130	6 U	11 U	20 U
%SOLID		83	84	83	86	90	87	47	25
DILUTION FACTOR		1	1	1	1	1	1	1	1
DRYWT/DIL FACTOR		1.20	1.19	1.20	1.16	1.11	1.15	2.13	4.00

VALIDATION
TABLE

SAMPLE LOCATION:	SS-8	SS-9	SS-SB
SMO NUMBER:	AK018	AK019	AK020
UNITS:	ug/kg	ug/kg	ug/kg
VOLATILE COMPOUNDS (CRDL ug/l)			
Chloromethane (10)	83 U	110 U	10 U
Bromomethane (10)	83 UJ	110 UJ	10 UJ
Vinyl Chloride (10)	83 UJ	110 UJ	10 UJ
Chloroethane (10)	83 U	110 U	10 U
Methylene Chloride (5)	167 UJB	222 UJB	20 UJB
Acetone (10)	580 UJB	900 UJB	70 UJB
Carbon Disulfide (5)	42 U	56 U	5 U
1,1 - Dichloroethene (5)	42 U	56 U	5 U
1,1 - Dichloroethane (5)	42 U	56 U	5 U
Trans - 1,2 - Dichloroethene (5)	42 U	56 U	5 U
Chloroform (5)	42 U	56 U	5 U
1,2 - Dichloroethane (5)	42 U	56 U	5 U
2 - Butanone (10)	83 UR	110 UR	70 J
1,1,1 - Trichloroethane (5)	42 U	56 U	5 U
Carbon Tetrachloride (5)	42 U	56 U	5 U
Vinyl Acetate (10)	83 U	110 U	10 U
Bromodichloromethane (5)	42 U	56 U	5 U
1,2 - Dichloropropane (5)	42 U	56 U	5 U
Trans - 1,3 - Dichloropropen (5)	42 U	56 U	5 U
Trichloroethane (5)	42 U	56 U	5 U
Dibromochloromethane (5)	42 U	56 U	5 U
1,1,2 - Trichloroethane (5)	42 U	56 U	5 U
Benzene (5)	42 U	56 U	5 U
Cis - 1,3 - Dichloropropene (5)	42 U	56 U	5 U
Bromoform (5)	42 U	56 U	5 U
4 - Methyl - 2 - Pentanone (10)	83 U	110 U	10 U
2 - Hexanone (10)	83 U	110 U	10 U
Tetrachloroethene (5)	42 U	56 U	5 U
1,1,2,2 - Tetrachloroethane (5)	83 U	110 U	10 U
Toluene (5)	42 U	56 U	5 U
Chlorobenzene (5)	42 U	56 U	5 U
Ethylbenzene (5)	42 U	56 U	5 U
Styrene (5)	42 U	56 U	5 U
Total Xylenes (5)	42 U	56 U	5 U
%SOLID	12	9	100
DILUTION FACTOR	1	1	1
DRYWT/DIL FACTOR	8.33	11.11	1.00

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		SS-27-01	SS-27-02	SS-28-01	SS-28-01	SS-28-03	SS-28-03	SS-29-01	SS-29-02
SMO NUMBER:		AK002	AK003	AK004	AK005	AK006	AK007	AK008	AK009
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
bis(2-Chloroethyl)Ether	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2-Chlorophenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
1,3 - Dichlorobenzene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
1,4 - Dichlorobenzene	10	200 JJ	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Benzyl Alcohol	10	730 UJ	720 UJ	800 UJ	740 UJ	760 UJ	3900 UJ	4300 UJ	770 UJ
1,2 - Dichlorobenzene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2-Methylphenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
bis(2-Chloroisopropyl)Ether	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
4-Methylphenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	190 JJ
N-Nitroso-Di-n-Propylamine	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Hexachloroethane	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Nitrobenzene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Isophorone	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2-Nitrophenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2,4 - Dimethylphenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Benzoic Acid	50	3500 U	3500 U	3900 U	3500 U	3700 U	19000 U	21000 U	3700 U
bis(2-Chloroethoxy)Methane	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2,4 - Dichlorophenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
1,2,4 - Trichlorobenzene	10	350 JJ	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Naphthalene	10	6800	26000 J	570 JJ	9600	550 JJ	19000	3300 JJ	4600
4-Chloroaniline	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Hexacholorobutadiene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
4-Chloro-3-Methylphenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2-Methylnaphthalene	10	810	1200	800 U	6700	400 JJ	13000	1500 JJ	2300
Hexachlorocyclopentadiene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2,4,6 - Trichlorophenol	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2,4,5 - Trichlorophenol	50	3500 U	3500 U	3900 U	3600 U	3700 U	19000 U	21000 U	3700 U
2-Chloronaphthalene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
2-Nitroaniline	50	3500 U	3500 U	390 U	3600 U	3700 U	19000 U	21000 U	3700 U
Dimethyl Phthalate	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Acenaphthylene	10	3700	970	86 JJ	8200	710 JJ	10000	4300 U	190 JJ
2,6 - Dinitrotoluene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
3-Nitroaniline	50	3500 U	3500 U	3900 U	3600 U	3700 U	19000 U	21000 U	3700 U
Acenaphthene	10	1800	540 JJ	800 U	1500	210 JJ	17000	6200	7400
2,4 - Dinitrophenol	50	3500 U	3500 U	3900 U	3600 U	3700 U	19000 U	21000 U	3700 U
4-Nitrophenol	50	3500 U	3500 U	3900 U	3600 U	3700 U	19000 U	21000 U	3700 U
Dibenzofuran	10	690 JJ	280 JJ	800 U	450 JJ	760 U	1300 JJ	4900	6200
2,4 - Dinitrotoluene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Diethylphthalate	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
4-Chlorophenyl-Phenylether	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Fluorene	10	4600	820	800 U	7200	680 JJ	16000	6000	770 U
4-Nitroaniline	50	3500 U	3500 U	3900 U	3600 U	3700 U	19000 U	21000 U	3700 U

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		SS-27-01	SS-27-02	SS-28-01	SS-28-01	SS-28-03	SS-28-03	SS-29-01	SS-29-02
SMO NUMBER:		AK002	AK003	AK004	AK005	AK006	AK007	AK008	AK009
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
4,6 - Dinitro-2-Methylphenol	50	3500 U	3500 U	3900 U	3600 U	3700 U	19000 U	21000 U	3700 U
N-Nitrosodiphenylamine (1)	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	460 U
4-Bromophenyl-Phenylether	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Hexachlorobenzene	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Pentachlorophenol	50	3500 U	3500 U	3900 U	3600 U	3700 U	19000 U	21000 U	3700 U
Phenanthrene	10	27000	3500	290 JJ	36000	4300	61000	56000	53000
Anthracene	10	5500	1000	800 U	8300	1100	22000	15000	12000
Di-n-Butylphthalate	10	8100 B	3150 UJB	3400 UJB	3200 UJB	3300 UJB	16000 UJB	18000 UJB	33000 UJB
Fluoranthene	10	12000	3500	280 JJ	15000	2900	23000	56000	51000
Pyrene	10	12000	4400	470 JJ	7700	4800	59000	47000	40000
Butylbenzylphthalate	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
3,3' - Dichlorobenzidine	20	1500 U	1400 U	1600 U	1500 U	1500 U	7700 U	8700 U	1500 U
Benzo (a) Anthracene	10	2600	2000	200 JJ	1200	1700	3900 U	23000	2400
Chrysene	10	17000	2100	230 J	12000	1700	17000	20000	17000
bis (2-Ethylhexyl) Phthalate	10	2000 UJB	2000 UJB	2200 UJB	2000 UJB	2000 UJB	11000 UJB	2400 UJB	2200 UJB
Di-n-Octyl Phthalate	10	730 U	720 U	800 U	740 U	760 U	3900 U	4300 U	770 U
Benzo (b) Fluoranthene	10	12000	2500	190 JJ	9900	1200	16000	28000	770 U
Benzo (k) Fluoranthene	10	730 U	720 U	260 JJ	740 U	760 U	3900 U	4300 U	16000
Benzo (a) Pyrene	10	20000	2500	310 JJ	13000	2400	25000	28000	24000
Indeno (1,2,3-cd) Pyrene	10	2800	990	120 JJ	740 U	920	6100	12000	8300
Dibenz (a,h) Anthracene	10	4300	710 JJ	800 U	740 U	830	2100 JJ	5500	6100
Benzo (g,h,i,) Perylene	10	4700	910	140 JJ	740 U	1000	6900	14000	5100
%SOLIDS:		90	89	83	88	86	84	76	86
DILUTION FACTOR:		2	2	2	2	2	10	10	2
DRYWT/DILUTION FACTOR		73	74	80	75	77	393	434	77

VALIDATION TABLE

SAMPLE LOCATION:		SS-29-03	SS-30-01	SS-30-02	SS-30-03	SS-DUP-1	SS-DUP-2	SS-6	SS-7
SMO NUMBER:		AK010	AK011	AK012	AK013	AK014	AK015	AK016	AK017
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
bis(2-Chloroethyl)Ether	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2-Chlorophenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
1,3 - Dichlorobenzene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
1,4 - Dichlorobenzene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Benzyl Alcohol	10	730 UJ	680 UJ	710 UJ	760 UJ	2900 UJ	1500 UJ	1400 UJ	2700 UJ
1,2 - Dichlorobenzene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2-Methylphenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
bis(2-Chloroisopropyl)Ether	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
4-Methylphenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
N-Nitroso-Di-n-Propylamine	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Hexachloroethane	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Nitrobenzene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Isophorone	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2-Nitrophenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2,4 - Dimethylphenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Benzoic Acid	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	6700 U	13000 U
bis(2-Chloroethoxy)Methane	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2,4 - Dichlorophenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
1,2,4 - Trichlorobenzene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Naphthalene	10	180 JJ	680 U	710 U	760 U	26000	1800	1400 U	2700 U
4-Chloroaniline	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Hexacholorobutadiene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
4-Chloro-3-Methylphenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2-Methylnaphthalene	10	79 JJ	680 U	710 U	760 U	1200 JJ	1200 JJ	1400 U	2700 U
Hexachlorocyclopentadiene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2,4,6 - Trichlorophenol	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2,4,5 - Trichlorophenol	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	6700 U	13000 U
2-Chloronaphthalene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
~~2-Nitroaniline~~	~~50~~	~~3500 U~~	~~3300 U~~	~~3400 U~~	~~3700 U~~	~~14000 U~~	~~7400 U~~	6700 U	13000 U
Dimethyl Phthalate	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Acenaphthylene	10	730 U	680 U	710 U	760 U	960 JJ	1900	1400 U	2700 U
2,6 - Dinitrotoluene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
3-Nitroaniline	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	6700 U	13000 U
Acenaphthene	10	280 JJ	680 U	710 U	760 U	570 JJ	400 JJ	1400 U	2700 U
2,4 - Dinitrophenol	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	6700 U	13000 U
4-Nitrophenol	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	6700 U	13000 U
Dibenzofuran	10	220 JJ	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
2,4 - Dinitrotoluene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Diethylphthalate	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
4-Chlorophenyl-Phenylether	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Fluorene	10	290 JJ	680 U	710 U	760 U	860 JJ	1700	1400 U	2700 U
4-Nitroaniline	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	6700 U	13000 U

VALIDATION TABLE

SAMPLE LOCATION:		SS-29-03	SS-30-01	SS-30-02	SS-30-03	SS-DUP-1	SS-DUP-2	SS-6	SS-7
SMO NUMBER:		AK010	AK011	AK012	AK013	AK014	AK015	AK016	AK017
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
4,6 - Dinitro-2-Methylphenol	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	6700 U	13000 U
N-Nitrosodiphenylamine (1)	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
4-Bromophenyl-Phenylether	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Hexachlorobenzene	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Pentachlorophenol	50	3500 U	3300 U	3400 U	3700 U	14000 U	7400 U	750 U	13000 U
Phenanthrene	10	2300	140 JJ	710 U	760 U	4600	10000	200 JJ	2700 U
Anthracene	10	720 JJ	680 U	710 U	760 U	1500 JJ	3000	1400 U	2700 U
Di-n-Butylphthalate	10	3000 UJB	3000 UJB	3000 UJB	33000 UJB	15000 UJB	6500 UJB	6000 UJB	11200 UJB
Fluoranthene	10	2100	130 JJ	710 U	760 U	4800	6300	300 JJ	2700 U
Pyrene	10	1800 J	140 JJ	710 U	760 U	5100	11000	300 U	2700 U
Butylbenzylphthalate	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
3,3' - Dichlorobenzidine	20	1500 U	1400 U	1400 U	1500 U	5900 U	3000 U	2800 U	5300 U
Benzo (a) Anthracene	10	850	680 U	710 U	760 U	2400 JJ	3600	150 JJ	2700 U
Chrysene	10	840	82 JJ	710 U	760 U	2200 JJ	3600	190 JJ	2700 U
bis (2-Ethylhexyl) Phthalate	10	2000 UJB	1900 UJB	1900 UJB	2100 UJB	10000 UJB	4000 UJB	3900 UJB	7200 UJB
Di-n-Octyl Phthalate	10	730 U	680 U	710 U	760 U	2900 U	1500 U	1400 U	2700 U
Benzo (b) Fluoranthene	10	1300	75 JJ	710 U	760 U	2700 JJ	2300	280 JJ	2700 U
Benzo (k) Fluoranthene	10	730 U	680 U	710 U	760 U	1500 JJ	2700	1400 U	2700 U
Benzo (a) Pyrene	10	1100	680 U	710 U	760 U	2600 JJ	5600	230 JJ	1900 JJ
Indeno (1,2,3-cd) Pyrene	10	530 JJ	680 U	710 U	760 U	950 JJ	2200	1400 U	2700 U
Dibenz (a,h) Anthracene	10	290 JJ	680 U	710 U	760 U	380 JJ	800 JJ	1400 U	2700 U
Benzo (g,h,i,) Perylene	10	530 JJ	680 U	710 U	760 U	1000 JJ	2800	1400 U	2700 U
%SOLIDS:		93	94	93	86	90	87	47	25
DILUTION FACTOR:		2	2	2	2	10	4	2	2
DRYWT/DILUTION FACTOR		71	70	71	77	11	5	4	8

VALIDATION TABLE

SAMPLE LOCATION:		SS-8	SS-9	WATER SS-SB
SMO NUMBER:		AK018	AK019	AK020
UNITS:		ug/kg	ug/kg	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l			
Phenol	10	5500 U	7300 U	10 U
bis(2-Chloroethyl)Ether	10	5500 U	7300 U	10 U
2-Chlorophenol	10	5500 U	7300 U	10 U
1,3 - Dichlorobenzene	10	5500 U	7300 U	10 U
1,4 - Dichlorobenzene	10	5500 U	7300 U	10 U
Benzyl Alcohol	10	5500 UJ	7300 UJ	10 UJ
1,2 - Dichlorobenzene	10	5500 U	7300 U	10 U
2-Methylphenol	10	5500 U	7300 U	10 U
bis(2-Chloroisopropyl)Ether	10	5500 U	7300 U	10 U
4-Methylphenol	10	5500 U	7300 U	10 U
N-Nitroso-Di-n-Propylamine	10	5500 U	7300 U	10 U
Hexachloroethane	10	5500 U	7300 U	10 U
Nitrobenzene	10	5500 U	7300 U	10 U
Isophorone	10	5500 U	7300 U	10 U
2-Nitrophenol	10	5500 U	7300 U	10 U
2,4 - Dimethylphenol	10	5500 U	7300 U	10 U
Benzoic Acid	50	27000 U	35000 U	50 U
bis(2-Chloroethoxy)Methane	10	5500 U	7300 U	10 U
2,4 - Dichlorophenol	10	5500 U	7300 U	10 U
1,2,4 - Trichlorobenzene	10	5500 U	7300 U	10 U
Naphthalene	10	5500 U	7300 U	10 U
4-Chloroaniline	10	5500 U	7300 U	10 U
Hexacholorobutadiene	10	5500 U	7300 U	10 U
4-Chloro-3-Methylphenol	10	5500 U	7300 U	10 U
2-Methylnaphthalene	10	5500 U	7300 U	10 U
Hexachlorocyclopentadiene	10	5500 U	7300 U	10 U
2,4,6 - Trichlorophenol	10	5500 U	7300 U	10 U
2,4,5 - Trichlorophenol	50	27500 U	35000 U	50 U
2-Chloronaphthalene	10	5500 U	7300 U	10 U
2-Nitroaniline	50	27500 U	35000 U	50 U
Dimethyl Phthalate	10	5500 U	7300 U	10 U
Acenaphthylene	10	5500 U	7300 U	10 U
2,6 - Dinitrotoluene	10	5500 U	7300 U	10 U
3-Nitroaniline	50	27000 U	35000 U	50 U
Acenaphthene	10	5500 U	7300 U	10 U
2,4 - Dinitrophenol	50	27000 U	35000 U	50 U
4-Nitrophenol	50	27000 U	35000 U	50 U
Dibenzofuran	10	5500 U	7300 U	10 U
2,4 - Dinitrotoluene	10	5500 U	7300 U	10 U
Diethylphthalate	10	5500 U	7300 U	10 U
4-Chlorophenyl-Phenylether	10	5500 U	7300 U	10 U
Fluorene	10	5500 U	7300 U	10 U
4-Nitroaniline	50	27000 U	35000 U	50 U

VALIDATION TABLE

SAMPLE LOCATION:		SS-8	SS-9	WATER SS-SB
SMO NUMBER:		AK018	AK019	AK020
UNITS:		ug/kg	ug/kg	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l			
4,6 - Dinitro-2-Methylphenol	50	27000 U	35000 U	50 U
N-Nitrosodiphenylamine (1)	10	5500 U	7300 U	10 U
4-Bromophenyl-Phenylether	10	5500 U	7300 U	10 U
Hexachlorobenzene	10	5500 U	7300 U	10 U
Pentachlorophenol	50	27000 U	35000 U	50 U
Phenanthrene	10	5500 U	7300 U	10 U
Anthracene	10	5500 U	7300 U	10 U
Di-n-Butylphthalate	10	5500 U	7300 U	50 UJB
Fluoranthene	10	5500 U	7300 U	10 U
Pyrene	10	5500 U	7300 U	10 U
Butylbenzylphthalate	10	5500 U	7300 U	10 U
3,3' - Dichlorobenzidine	20	11000 U	15000 U	20 U
Benzo (a) Anthracene	10	5500 U	7300 U	10 U
Chrysene	10	5500 U	7300 U	10 U
bis (2-Ethylhexyl) Phthalate	10	7200 UJB	20000 UJB	20 UJB
Di-n-Octyl Phthalate	10	5500 U	7300 U	10 U
Benzo (b) Fluoranthene	10	5500 U	7300 U	10 U
Benzo (k) Fluoranthene	10	5500 U	7300 U	10 U
Benzo (a) Pyrene	10	4100 JJ	5400 U	10 U
Indeno (1,2,3-cd) Pyrene	10	5500 U	7300 U	10 U
Dibenz (a,h) Anthracene	10	5500 U	7300 U	10 U
Benzo (g,h,i,) Perylene	10	5500 U	7300 U	10 U
%SOLIDS:		12	9	NR
DILUTION FACTOR:		2	2	1
DRYWT/DILUTION FACTOR		17	22	1

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		SS-27-01	SS-27-02	SS-28-01	SS-28-02	SS-28-03	SS-28-03	SS-29-01	SS-29-02
SMO NUMBER:		AK002	AK003	AK004	AK005	AK006	AK007	AK008	AK009
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
PESTICIDES/PCB	CRDL ug/kg								
Alpha-BHC	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Beta-BHC	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Delta-BHC	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Gamma-BHC (Lindane)	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Heptachlor	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Aldrin	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Heptachlor Epoxide	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Endosulfan I	8	44 U	88 U	48 U	18 U	18 U	230 U	210 U	19 U
Dieldrin	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
4,4' - DDE	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
Endrin	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
Endosulfan II	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
4,4' - DDD	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
Endrin Aldehyde	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
4,4' - DDT	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
Methoxychlor	80	440 U	880 U	480 U	180 U	180 U	2300 U	2100 U	190 U
Endrin Ketone	16	88 U	180 U	97 U	36 U	37 U	470 U	420 U	37 U
Alpha-Chlordane	80	440 U	880 U	480 U	180 U	180 U	2300 U	2100 U	190 U
Gamma-Chlordane	80	440 U	880 U	480 U	180 U	180 U	2300 U	2100 U	190 U
Toxaphene	160	880 U	1800 U	970 U	360 U	370 U	2300 U	4200 U	370 U
Aroclor-1016	80	440 U	880 U	480 U	180 U	180 U	2300 U	2100 U	190 U
Aroclor-1221	80	440 U	880 U	480 U	180 U	180 U	2300 U	2100 U	190 U
Aroclor-1232	80	440 U	880 U	480 U	180 U	180 U	2300 U	2100 U	190 U
Aroclor-1242	80	440 U	880 U	480 U	180 U	180 U	2300 U	2100 U	190 U
Aroclor-1248	80	440 U	880 U	480 U	180 U	180 U	110000 J	2100 U	190 U
Aroclor-1254	160	21000 CJ	29000 CJ	18000 CJ	5100 CJ	4300 CJ	77000 CJ	81000 J	11000 CJ
Aroclor-1260	160	880 U	1800 U	970 U	360 U	370 U	4700 U	4200 U	370 U
%SOLIDS		90	89	83	88	86	84	76	86
DILUTION FACTOR		5	10	5	2	2	25	20	2
DRYWT/DILUTION FACTOR		889	1798	964	364	372	4762	4211	372

VALIDATION TABLE

SAMPLE LOCATION:		SS-29-03	SS-30-1	SS-30-02	SS-30-03	SS-DUP-1	SS-DUP-2	SS-6	SS-7
SMO NUMBER:		AK010	AK011	AK012	AK013	AK014	AK015	AK016	AK017
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
PESTICIDES/PCB	CRDL ug/kg								
Alpha-BHC	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Beta-BHC	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Delta-BHC	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Gamma-BHC (Lindane)	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Heptachlor	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Aldrin	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Heptachlor Epoxide	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Endosulfan I	8	18 UJ	8.3 U	34 U	18 U	44 U	46 U	17 U	32 U
Dieldrin	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
4,4' - DDE	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
Endrin	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
Endosulfan II	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
4,4' - DDD	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
Endrin Aldehyde	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
4,4' - DDT	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
Methoxychlor	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Endrin Ketone	16	36 UJ	17 U	69 U	37 U	89 U	92 U	34 U	64 U
Alpha-Chlordane	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Gamma-Chlordane	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Toxaphene	160	360 UJ	170 U	690 U	370 U	890 U	920 U	340 U	640 U
Aroclor-1016	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Aroclor-1221	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Aroclor-1232	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Aroclor-1242	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Aroclor-1248	80	180 UJ	83 U	340 U	180 U	440 U	460 U	170 U	320 U
Aroclor-1254	160	380 J	3400 CJ	690 U	3300 CJ	11000 CJ	14000 CJ	1500 J	460 CJJ
Aroclor-1260	160	360 UJ	170 U	690 U	370 U	890 U	920 U	340 U	640 U
%SOLIDS		93	94	93	86	90	87	47	25
DILUTION FACTOR		2	1	4	2	5	5	1	1
DRYWT/DILUTION FACTOR		344	170	688	372	889	920	340	640

VALIDATION
TABLE

SAMPLE LOCATION:		SS-8	SS-9	SS-SB
SMO NUMBER:		AK018	AK019	AK020
UNITS:		ug/kg	ug/kg	ug/l
PESTICIDES/PCB	CRDL ug/kg			
Alpha-BHC	8	330 U	88 U	0.050 U
Beta-BHC	8	330 U	88 U	0.050 U
Delta-BHC	8	330 U	88 U	0.050 U
Gamma-BHC (Lindane)	8	330 U	88 U	0.050 U
Heptachlor	8	330 U	88 U	0.050 U
Aldrin	8	330 U	88 U	0.050 U
Heptachlor Epoxide	8	330 U	88 U	0.050 U
Endosulfan I	8	330 U	88 U	0.050 U
Dieldrin	16	670 U	180 U	0.10 U
4,4' - DDE	16	670 U	180 U	0.10 U
Endrin	16	670 U	180 U	0.10 U
Endosulfan II	16	670 U	180 U	0.10 U
4,4' - DDD	16	670 U	180 U	0.10 U
Endrin Aldehyde	16	670 U	180 U	0.10 U
4,4' - DDT	16	670 U	180 U	0.10 U
Methoxychlor	80	3300 U	880 U	0.50 U
Endrin Ketone	16	670 U	180 U	0.10 U
Alpha-Chlordane	80	3300 U	880 U	0.50 U
Gamma-Chlordane	80	3300 U	880 U	0.50 U
Toxaphene	160	6700 U	1800 U	1.0 U
Aroclor-1016	80	3300 U	880 U	0.50 U
Aroclor-1221	80	3300 U	880 U	0.50 U
Aroclor-1232	80	3300 U	880 U	0.50 U
Aroclor-1242	80	3300 U	880 U	0.50 U
Aroclor-1248	80	3300 U	880 U	0.50 U
Aroclor-1254	160	6700 U	3200 CJ	1.0 U
Aroclor-1260	160	6700 U	1800 U	1.0 U
%SOLIDS		12	9	NR
DILUTION FACTOR		5	1	1
DRYWT/DILUTION FACTOR		6667	1778	1

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
(207) 775-5401 Telex 94-4329

5180-04

June 24, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8730 Sullivan's Ledge Organic Data;
Samples AK028 through AK047

We have completed our review of the organic data generated by Nanco Laboratories for 20 soil samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

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DATA COMPLETENESS
Results for all analysis were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB and DFTPP tuning met the contractual criteria.

SURROGATE SPIKE RESULTS
One pesticide surrogate recovery did not meet the contractual criteria. No action was necessary in accordance with the functional guidelines.

MATRIX SPIKE RESULTS
2,4-dinitrotoluene, aldrin, and endrin had non-compliant recoveries in both the matrix spike and matrix spike duplicate. We have qualified the results for these compounds on the original sample (AK028). The relative percent differences between the matrix spike and the matrix spike duplicate for trichloroethene, phenol, pentachlorophenol, 4,4'DDT, lindane, heptachlor, aldrin, dieldrin and endrin were non-compliant. We have flagged the results for these compound as estimated on the spiked samples to indicate possible sample heterogeneity.

BLANK ANALYSIS
The method blanks contained methylene chloride, acetone, di-n-butylphthalate and bis(2-Ethylhexyl)Phthalate. Revised detection limits were calculated for these compounds, in accordance with the functional guidelines, and were reported on the summary sheet.

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INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone, 4-chloroaniline, 4-nitroaniline, 3,3'-dichlorobenzidine, and tetrachloroethene had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound. Methylene chloride, acetone, 1,1,2,2 tetrachloroethane and hexachlorocyclopentadiene had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. We have flagged all associated quantitative results as estimated for these compounds.

PESTICIDES/PCBs QC
Several compounds had percent differences between the calibration factors outside the acceptable limit. We have qualified the results for these compounds as estimated.

GAS CHROMATOGRAMS AND MASS SPECTRA
Gas chromatograms and mass spectra data were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT
Due to severe differences between the original sample results and the duplicate results, we consider all results for the Pesticide/PCB fraction questionable. We estimate that all other reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Greg A Tatuka for

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat
Enclosure
cc: D. Szaro (w/ enclosure)
G. Vaillancourt
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		SD-11	SD-2	SD-SB-1	SD-6	SW-9	SW-DUP-1	SW-8	SW-6
SMO NUMBER:		AI-028	AI-033	AI-036	AI-038	AI-041	AI-042	AI-043	AI-044
UNITS:		ug/kg	ug/kg	ug/l	ug/kg	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	660 U	660 U	10 UJ	660 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	660 UJ	660 U	10 U	660 U	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
1,2 - Dichlorobenzene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
N-Nitrosodipropylamine	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Isophorone	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Benzoic Acid	50	3200 U	3200 U	50 U	3200 U	50 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Naphthalene	10	660 U	660 U	10 U	660 U	10 U	13	16	10 U
4-Chloroaniline	10	660 UJ	660 UJ	10 UJ	660 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Hexacholorobutadiene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	660 U	660 U	10 U	660 U	10 U	4.2 JJ	6.4	10 U
Hexachlorocyclopentadiene	10	660 U	660 U	10 U	660 U	10 UJ	10 U	10 U	10 UJ
2,4,6 - Trichlorophenol	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	3200 U	3200 U	50 U	3200 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50	3200 U	3200 U	50 U	3200 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	3200 UR	3200 UR	10 UR	3200 UR	10 UR	10 UR	10 UR	10 UR
Acenaphthene	10	660 U	660 U	10 U	660 U	10 U	3.1 JJ	3.1 JJ	10 U
2,4 - Dinitrophenol	50	3200 U	3200 U	10 U	3200 U	10 U	10 U	10 U	10 U
4-Nitrophenol	50	3200 U	3200 U	10 U	3200 U	10 U	10 U	10 U	10 U
Dibenzofuran	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	660 UR	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Fluorene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	3200 UR	3200 UR	10 UR	3200 UR	10 UR	10 UR	10 UR	10 UR
4,6 - Dinitro-2-Methylphenol	50	3200 U	3200 U	10 U	3200 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine (1)	10	660 U	660 U	10 U	660 U	10 U	16	16	10 U
4-Bromophenyl-Phenylether	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	3200 U	3200 U	10 UJ	3200 U	10 U	10 U	10 U	10 U
Phenanthrene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Anthracene	10	660 U	660 U	50 U	660 U	50 U	50 U	50 U	50 U

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		SD-11	SD-2	SD-SB-1	SD-6	SW-9	SW-DUP-1	SW-8	SW-6
SMO NUMBER:		AI-028	AI-033	AI-036	AI-038	AI-041	AI-042	AI-043	AI-044
UNITS:		ug/kg	ug/kg	ug/l	ug/kg	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Di-n-Butylphthalate	10	660 U	660 U	320 UJB	660 U	320 UJB	320 UJB	320 UJB	320 UJB
Fluoranthene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Pyrene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
3,3 - Dichlorobenzidine	20	1320 UR	1320 UR	10 UR	1320 UR	10 UR	10 UR	10 UR	10 UR
Benzo (a) Anthracene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Chrysene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	660 U	660 U	3400 B	660 U	560 B	190 UJB	680 B	190 UJB
Di-n-Octyl Phthalate	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	660 U	660 U	50 U	660 U	50 U	50 U	50 U	50 U
Benzo (a) Pyrene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	660 U	660 U	50 U	660 U	50 U	50 U	50 U	50 U
Dibenz (a,h) Anthracene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	660 U	660 U	10 U	660 U	10 U	10 U	10 U	10 U
%SOLIDS:		78	78	NR	78	NR	NR	NR	NR
DILUTION FACTOR:		2	2	1	2	1	1	1	1
DRYWT/DILUTION FACTOR		66	66	1	66	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION
TABLE

SAMPLE LOCATION:		SW-5	SW-3
SMO NUMBER:		AI-045	AI-046
UNITS:		ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l		
Phenol	10	10 U	10 U
bis(2-Chloroethyl)Ether	10	10 U	10 U
2-Chlorophenol	10	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U
1,4 - Dichlorobenzene	10	10 U	10 U
Benzyl Alcohol	10	10 U	10 U
1,2 - Dichlorobenzene	10	10 U	10 U
2-Methylphenol	10	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U
4-Methylphenol	10	10 U	10 U
N-Nitrosodipropylamine	10	10 U	10 U
Hexachloroethane	10	10 U	10 U
Nitrobenzene	10	10 U	10 U
Isophorone	10	10 U	10 U
2-Nitrophenol	10	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U
Benzoic Acid	50	50 U	50 U
bis(2-Chloroethoxy)Methane	10	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U
Naphthalene	10	10 U	10 U
4-Chloroaniline	10	10 UJ	10 UJ
Hexacholorobutadiene	10	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U
2-Methylnaphthalene	10	10 U	4.3 J
Hexachlorocyclopentadiene	10	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U
2-Nitroaniline	50	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U
Acenaphthylene	10	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U
3-Nitroaniline	50	10 UR	10 UR
~~Acenaphthene~~	~~10~~	~~10 U~~	~~10 U~~
2,4 - Dinitrophenol	50	10 U	10 U
4-Nitrophenol	50	10 U	10 U
Dibenzofuran	10	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U
Diethylphthalate	10	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U
Fluorene	10	10 U	10 U
4-Nitroaniline	50	10 UR	10 UR
4,6 - Dinitro-2-Methylphenol	50	10 U	10 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U
4-Bromophenyl-Phenylether	10	10 U	10 U
Hexachlorobenzene	10	10 U	10 U
Pentachlorophenol	50	10 U	10 U
Phenanthrene	10	10 U	10 U
Anthracene	10	50 U	50 U

(1) Cannot be separated from Diphenylamine.

VALIDATION
TABLE

SAMPLE LOCATION:	SW-5	SW-3
SMO NUMBER:	AI-045	AI-046
UNITS:	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l	
Di-n-Butylphthalate	10	320 UJB	320 UJB
Fluoranthene	10	10 U	10 U
Pyrene	10	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U
3,3 - Dichlorobenzidine	20	10 UR	10 UR
Benzo (a) Anthracene	10	10 U	10 U
Chrysene	10	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	190 UJB	190 UJB
Di-n-Octyl Phthalate	10	10 U	9 JJ
Benzo (b) Fluoranthene	10	10 U	10 U
Benzo (k) Fluoranthene	10	50 U	50 U
Benzo (a) Pyrene	10	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	50 U	50 U
Dibenz (a,h) Anthracene	10	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U
%SOLIDS:		NR	NR
DILUTION FACTOR:		1	1
DRYWT/DILUTION FACTOR		1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVAN'S LEDGE

PESTICIDES/PCB	CRDL ug/kg	SD-11 A1028 ug/kg	SD-5 A1029 ug/kg	SD-4 A1030 ug/kg	SD-3 A1031 ug/kg	SD-DUP-1 A1032 ug/kg	SD-2 A1033 ug/kg	SD-1 A1034 ug/kg	SD-SB-1 A1036 ug/kg
Alpha-BHC	8	20.51 UR	29.63 U	88.89 U	23.53 U	38.10 U	22.22 U	38.10 U	0.05 U
Beta-BHC	8	20.51 UR	29.63 UJ	88.89 UJ	23.53 UJ	38.10 UJ	22.22 UJ	38.10 UJ	0.05 UJ
Delta-BHC	8	20.51 UR	29.63 U	88.89 U	23.53 U	38.10 U	22.22 U	38.10 U	0.05 U
Gamma-BHC (Lindane)	8	20.51 UR	29.63 U	88.89 U	23.53 U	38.10 U	22.22 U	38.10 U	0.05 U
Heptachlor	8	59.00 J	29.63 U	88.89 U	23.53 U	38.10 U	22.22 U	38.10 U	0.05 U
Aldrin	8	73.00 J	29.63 UJ	88.89 UJ	23.53 UJ	38.10 UJ	22.22 UJ	38.10 UJ	0.01 JJ
Heptachlor Epoxide	8	20.51 UR	29.63 UJ	88.89 UJ	23.53 UJ	38.10 UJ	22.22 UJ	38.10 UJ	0.05 UJ
Endosulfan I	8	20.51 UR	29.63 UJ	88.89 UJ	23.53 UJ	38.10 UJ	22.22 UJ	38.10 UJ	0.05 UJ
Dieldrin	16	41.03 UR	59.26 UJ	177.78 UJ	47.06 UJ	76.19 UJ	44.44 UJ	76.19 UJ	0.02 JJ
4,4-DDE	16	41.03 UR	59.26 U	177.78 U	47.06 U	76.19 U	44.44 U	76.19 U	0.10 U
Endrin	16	41.03 UR	59.26 U	177.78 U	47.06 U	76.19 U	44.44 U	76.19 U	0.10 UR
Endosulfan II	16	41.03 UR	59.26 U	177.78 U	47.06 U	76.19 U	44.44 U	76.19 U	0.10 U
4,4-DDD	16	41.03 UR	59.26 U	177.78 U	47.06 U	76.19 U	44.44 U	76.19 U	0.10 U
Endosulfan Sulfate	16	41.03 UR	59.26 UJ	119.00 JJ	47.06 UJ	755.00 J	50.00 J	76.19 UJ	0.10 UJ
4,4'-DDT	16	41.03 UR	59.26 U	177.78 U	47.06 U	76.19 U	44.44 U	76.19 U	0.10 UJ
Endrin Ketone	16	41.03 UR	59.26 U	177.78 U	47.06 U	76.19 U	44.44 U	76.19 U	0.10 U
Methoxychlor	80	205.13 UR	296.30 UJ	888.89 UJ	235.29 UJ	380.95 UJ	222.22 UJ	380.95 UJ	0.50 UJ
Alpha-Chlordane	80	205.13 UR	296.30 U	888.89 U	235.29 U	380.95 U	222.22 U	380.95 U	0.50 U
Gamma-Chlordane	80	205.13 UR	296.30 UJ	888.89 UJ	235.29 UJ	380.95 UJ	222.22 UJ	380.95 UJ	0.50 UJ
Toxaphene	160	410.26 UR	592.59 U	1777.78 U	470.59 U	761.90 U	444.44 U	761.90 U	1.00 U
Aroclor-1016	80	205.13 UR	296.30 U	888.89 U	235.29 U	380.95 U	222.22 U	380.95 U	0.50 U
Aroclor-1221	80	205.13 UR	296.30 U	888.89 U	235.29 U	380.95 U	222.22 U	380.95 U	0.50 U
Aroclor-1232	80	205.13 UR	296.30 U	888.89 U	235.29 U	380.95 U	222.22 U	380.95 U	0.50 U
Aroclor-1242	80	205.13 UR	296.30 U	888.89 U	235.29 U	380.95 U	222.22 U	380.95 U	0.50 U
Aroclor-1248	80	205.13 UR	296.30 U	888.89 U	235.29 U	380.95 U	222.22 U	380.95 U	0.50 U
Aroclor-1254	160	5259.00 J	1718.00	1777.78 U	1450.00	761.90 U		11007.00	1.00 U
Aroclor-1260	160	410.26 UR	592.59 U	1777.78 U	470.59 U	761.90 U	444.44 U	761.90 U	1.00 U
%SOLIDS		78	54	18	68	42	72	42	NR
DILUTION FACTOR		2	2	2	2	2	2	2	2
DRYWT/DILUTION FACTOR		410	593	1778	471	762	444	762	1

VALIDATION TABLE

SAMPLE LOCATION:		SD-10	SD-6	SD-9	SD-8	SW-9	SW-DUP-1	SW-8	SW-6
SMO NUMBER:		AI037	AI038	AI039	AI040	AI041	AI042	AI043	AI044
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/kg								
Alpha-BHC	8	88.89 U	20.51 U	66.67 U	133.33 U	0.05 U	0.05 U	0.05 U	0.05 U
Beta-BHC	8	88.89 UJ	20.51 UJ	66.67 UJ	133.33 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Delta-BHC	8	88.89 U	20.51 U	66.67 U	133.33 U	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	8	88.89 U	20.51 U	66.67 U	133.33 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	8	88.89 U	20.51 U	66.67 U	133.33 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	8	10583.00 UJ	20.51 UJ	66.67 UJ	133.33 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Heptachlor Epoxide	8	88.89 UJ	20.51 UJ	66.67 UJ	133.33 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Endosulfan I	8	88.89 UJ	20.51 UJ	66.67 UJ	133.33 UJ	0.05 UJ	0.05 UJ	0.67 J	0.05 UJ
Dieldrin	16	177.78 UJ	41.03 UJ	18.00 JJ	266.67 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4-DDE	16	177.78 U	41.03 U	51.00 JJ	266.67 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	16	177.78 U	41.03 U	133.33 U	266.67 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	16	177.78 U	41.03 U	133.33 U	266.67 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	16	177.78 U	41.03 U	133.33 U	266.67 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	16	177.78 UJ	41.03 UJ	27.00 JJ	27.00 JJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
4,4'-DDT	16	177.78 U	41.03 U	133.33 U	266.67 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin Ketone	16	177.78 U	41.03 U	133.33 U	266.67 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	80	888.89 UJ	205.13 UJ	666.67 UJ	1333.33 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Alpha-Chlordane	80	888.89 U	205.13 U	666.67 U	1333.33 U	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	80	888.89 UJ	205.13 UJ	666.67 UJ	1333.33 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Toxaphene	160	1777.78 U	410.26 U	1333.33 U	2666.67 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	80	888.89 U	205.13 U	666.67 U	1333.33 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	80	888.89 U	205.13 U	666.67 U	1333.33 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	80	888.89 U	205.13 U	666.67 U	1333.33 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	80	888.89 U	205.13 U	666.67 U	1333.33 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	80	888.89 U	205.13 U	666.67 U	1333.33 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	160	341481.00	3104.00	341481.00	387407.00	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1260	160	1777.78 U	410.26 U	1333.33 U	2666.67 U	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS		18	78	24	12	NR	NR	NR	NR
DILUTION FACTOR		2	2	2	2	1	1	1	1
DRYWT/DILUTION FACTOR		1778	410	1333	2667	1	1	1	1

VALIDATION
TABLE

SAMPLE LOCATION:		SW-5	SW-3	SD-7
SMO NUMBER:		A1045	A1046	A1047
UNITS:		ug/l	ug/l	ug/kg
PESTICIDES/PCB	CRDL ug/kg			
Alpha-BHC	8	0.05 U	0.05 U	200.00 U
Beta-BHC	8	0.05 UJ	0.05 UJ	200.00 UJ
Delta-BHC	8	0.05 U	0.05 U	200.00 U
Gamma-BHC (Lindane)	8	0.05 U	0.05 U	200.00 U
Heptachlor	8	0.05 U	0.05 U	200.00 U
Aldrin	8	0.05 UJ	0.05 UJ	200.00 UJ
Heptachlor Epoxide	8	0.05 UJ	0.05 UJ	200.00 UJ
Endosulfan I	8	0.05 UJ	0.05 UJ	200.00 UJ
Dieldrin	16	0.10 UJ	0.10 UJ	400.00 UJ
4,4-DDE	16	0.10 U	0.10 U	400.00 U
Endrin	16	0.10 U	0.10 U	400.00 U
Endosulfan II	16	0.10 U	0.10 U	400.00 U
4,4-DDD	16	0.10 U	0.10 U	400.00 U
Endosulfan Sulfate	16	0.10 UJ	0.10 UJ	400.00 UJ
4,4'-DDT	16	0.10 U	0.10 U	400.00 U
Endrin Ketone	16	0.10 U	0.10 U	400.00 U
Methoxychlor	80	0.50 UJ	0.50 UJ	2000.00 UJ
Alpha-Chlordane	80	0.50 U	0.50 U	2000.00 U
Gamma-Chlordane	80	0.50 UJ	0.50 UJ	2000.00 UJ
Toxaphene	160	1.00 U	1.00 U	4000.00 U
Aroclor-1016	80	0.50 U	0.50 U	2000.00 U
Aroclor-1221	80	0.50 U	0.50 U	2000.00 U
Aroclor-1232	80	0.50 U	0.50 U	2000.00 U
Aroclor-1242	80	0.50 U	0.50 U	2000.00 U
Aroclor-1248	80	0.50 U	0.50 U	2000.00 U
Aroclor-1254	160	1.00 U	1.00 U	4000.00 U
Aroclor-1260	160	1.00 U	1.00 U	4000.00 U
%SOLIDS		NR	NR	8
DILUTION FACTOR		1	1	2
DRYWT/DILUTION FACTOR		1	1	4000

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
(207) 775-5401 Telex 94-4329

5180-04

June 24, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #9026/3643A Sullivan's Ledge Organic Data;
Samples AK191 through AK196, AK285 through AK294, and AK342

We have completed our review of the organic data generated by Gulf South Research Institute for 17 water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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DATA COMPLETENESS
Results for all analysis were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB and DFTPP tuning criteria were reviewed and found to be within contract specifications.

SURROGATE SPIKE RESULTS
The initial analysis of acids on samples AK291, AK294, and Ak342 yielded non-compliant surrogate recoveries. A re-analysis was performed and results for all samples were once again non-compliant. Therefore, we have provided the results of the first analysis on the summary table with positive results qualified as estimated and non-detects as rejected.

MATRIX SPIKE RESULTS
4-nitrophenol and pentachlorophenol had non-compliant relative percent differences between the matrix spike and the matrix spike duplicate. We have qualified the results for these compounds on the spiked sample as estimated to indicate possible sample heteroginiety

BLANK ANALYSIS
The method blanks contained methylene chloride, acetone trichloroethane, bis(2-Ethylhexyl)Phthalate, and n-nitrosodiphenylamine. Revised detection limits were calculated for these compounds, in accordance with the functional guidelines, and were reported on the summary sheet.

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound. Vinyl chloride, 4-nitroaniline, benzoic acid, benzyl alcohol, phenol, and di-n-octyl phthalate had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. We have flagged all associated quantitative results as estimated for these compounds.

PESTICIDES/PCBs QC
All pesticide/PCB QC were compliant.

GAS CHROMATOGRAMS AND MASS SPECTRA
Gas chromatograms and mass spectra data were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT
All compound identifications met the essential criteria. We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Greg A Tatarka For

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Vaillancourt
G. Tatarka
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GWECJ-3-06	GW-TB-5	GWECJ-3-05	GWECJ-3-04	GW-ECJ-3-03	GW-TB-7	GWECJ-3-02	GWECJ-3-01
SMO NUMBER:		AK191	AK192	AK193	AK195	AK196	AK285	AK286	AK287
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Chloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	40 UJB	40 UJB	40 UJB	80 UJB	80 UJB	80 UJB	80 UJB	60 UJB
Acetone	10	60 UJB	60 UJB	60 UJB	80 UJB	80 UJB	80 UJB	80 UJB	80 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloroethene (Total)	5	4 JJ	5 U	4 JJ	4 JJ	5 U	5 U	5 U	5 U
Chloroform	5	10	5 U	4 JJ	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2 - Butanone	10	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	17 J	10 UR
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	13	6	8	11	5	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trans - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4 - Methyl - 2 - Pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2 - Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
~~Toluene~~	~~5~~	~~5 U~~	~~5 U~~	~~5 U~~	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Xylenes	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
%SOLID									
DILUTION FACTOR									
DRYWT/DIL FACTOR		1	1	1	1	1	1	1	1

VALIDATION TABLE

SAMPLE LOCATION:		GWECJ-1-06	GWECJ-1-05	GW-TB-8	GWECJ-1-02	GW-SB-3	GW-CB-1	GWECJ-1-01	GW-DUP-4
SMO NUMBER:		AK288	AK289DL	AK290	AK291DL	AK292	AK293	AK294DL	AK342DL
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	10 U	500 U	10 U	2500 U	10 U	10 U	500 U	500 U
Bromomethane	10	10 U	500 U	10 U	2500 U	10 U	10 U	500 U	500 U
Vinyl Chloride	10	36 J	220 JJ	10 U	2500 UJ	10 U	9 JJ	120 JJ	460 JJ
Chloroethane	10	10 U	500 U	10 U	2500 U	10 U	10 U	500 U	500 U
Methylene Chloride	5	60 UJB	2500 UJB	40 UJB	12500 UJB	40 UJB	50 UJB	2500 UJB	2500 UJB
Acetone	10	80 UJB	3000 UJB	60 UJB	15000 UJB	60 UJB	60 UJB	3000 UJB	3000 UJB
Carbon Disulfide	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
1,1 - Dichloroethene	5	4 JJ	250 U	5 U	1300 U	5 U	5 U	250 U	110 JJ
1,1 - Dichloroethane	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
1,2 - Dichloroethene (Total)	5	1500	5500	5 U	21000	2 JJ	190	2600	16000
Chloroform	5	5 U	250 U	5 U	1300 U	5 U	39	250 U	250 U
1,2 - Dichloroethane	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
2 - Butanone	10	34 J	500 UR	10 UR	2500 UR	14 J	63 J	500 UR	500 UR
1,1,1 - Trichloroethane	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
Carbon Tetrachloride	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
Vinyl Acetate	10	10 U	500 U	10 U	2500 U	10 U	10 U	500 U	500 U
Bromodichloromethane	5	5 U	250 U	5 U	1300 U	5 U	7	250 U	250 U
1,2 - Dichloropropane	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
cis - 1,3 - Dichloropropene	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
Trichloroethene	5	3700 J	37000	15 UJB	34000	15 UJB	360	5500	24000
Dibromochloromethane	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
1,1,2 - Trichloroethane	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
Benzene	5	12	250 U	5 U	1300 U	5 U	5 U	250 U	100 JJ
Trans - 1,3 - Dichloropropene	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
Bromoform	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
4 - Methyl - 2 - Pentanone	10	300 J	750	10 U	2500 U	10 U	10 U	500 U	550
2 - Hexanone	10	10 U	500 U	10 U	2500 U	10 U	10 U	500 U	500 U
Tetrachloroethene	5	10	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
1,1,2,2 - Tetrachloroethane	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
Toluene	5	600	2000	5 U	1400	5 U	17	210 JJ	1100
Chlorobenzene	5	5 U	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
Ethylbenzene	5	36	340	5 U	720 JJ	5 U	6	250 U	630
Styrene	5	410	1600	5 U	560 JJ	5 U	9	150 JJ	450
Total Xylenes	5	14	250 U	5 U	1300 U	5 U	5 U	250 U	250 U
%SOLID									
DILUTION FACTOR									
DRYWT/DIL FACTOR		1	50	1	250	1	1	50	50

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GWECJ-3-06	GWECJ-3-05	GW-DOM-1	GWECJ-3-04	GWECJ-3-03	GWECJ-3-02	GW-ECJ-3-01	GWECJ-1-06	GWECJ-1-05
SMO NUMBER:		AK191	AK193	AK194	AK195	AK196	AK286	AK287	AK288	AK289
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l									
Phenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	4 JJ
Benzyl Alcohol	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	4 JJ
2-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	22	33
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 UJ	50 UJ
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20	57
Naphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	7 JJ
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50	50 U	50 U	50 U	50 UJ	50 U	50 U	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GWECJ-3-06	GWECJ-3-05	GW-DOM-1	GWECJ-3-04	GWECJ-3-03	GWECJ-3-02	GW-ECJ-3-01	GWECJ-1-06	GWECJ-1-05
SMO NUMBER:		AK191	AK193	AK194	AK195	AK196	AK286	AK287	AK288	AK289
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l									
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U	50 UJ	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	13	3 JJ	10 U	30 UJB	30 UJB	30 UJB	30 UJB	3 JJ	11
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
%SOLIDS:										
DILUTION FACTOR:										
DRYWT/DILUTION FACTOR		1	1	1	1	1	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GWECJ-1-02	GW-SB-3	GW-CB-1	GWECJ-1-01	GW-DUP-4
SMO NUMBER:		AK291	AK292	AK293	AK294	AK342
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l					
Phenol	10	10 UR	10 UJ	10 UJ	10 UR	10 UR
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 UR	10 U	10 U	10 UR	10 UR
1,3 - Dichlorobenzene	10	4 JJ	10 U	10 U	3 JJ	4 JJ
1,4 - Dichlorobenzene	10	5 JJ	10 U	10 U	11	5 JJ
Benzyl Alcohol	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,2 - Dichlorobenzene	10	3 JJ	10 U	10 U	10 U	3 JJ
2-Methylphenol	10	10 UR	10 U	10 U	10 UR	10 UR
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 UR	10 U	10 U	10 UR	10 UR
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U
Isophorone	10	32	10 U	10 U	5 JJ	22
2-Nitrophenol	10	10 UR	10 U	10 U	10 UR	10 UR
2,4 - Dimethylphenol	10	10 UR	10 U	10 U	10 UR	10 UR
Benzoic Acid	50	21 JJ	50 UJ	50 UJ	50 UR	12 JJ
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 UR	10 U	10 U	10 UR	10 UR
1,2,4 - Trichlorobenzene	10	36	10 U	10 U	12	31
Naphthalene	10	9 JJ	10 U	10 U	10 U	7 JJ
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 UR	10 U	10 U	10 UR	10 UR
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 UR	10 U	10 U	10 UR	10 UR
2,4,5 - Trichlorophenol	50	50 UR	50 U	50 U	50 UR	50 UR
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 UR	50 U	50 U	50 UR	50 UR
4-Nitrophenol	50	50 UR	50 U	50 U	50 UR	50 UR
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GWECJ-1-02	GW-SB-3	GW-CB-1	GWECJ-1-01	GW-DUP-4
SMO NUMBER:		AK291	AK292	AK293	AK294	AK342
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l					
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
4,6 - Dinitro-2-Methylphenol	50	50 UR	50 U	50 U	50 UR	50 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U	10 U	7 JJ	3 J
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 UR	50 U	50 U	50 UR	50 UR
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	10 U	16	10 U	240
Di-n-Octyl Phthalate	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U	10 U
%SOLIDS:						
DILUTION FACTOR:						
DRYWT/DILUTION FACTOR		1	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GWECJ-3-06	GW-ECJ-3-05	GW-DOM-1	GWECJ-3-04	GWECJ-3-03	GWECJ-3-02	GWECJ-3-01	GWECJ-1-06
SMO NUMBER:		AK191	AK193	AK194	AK195	AK196	AK286	AK287	AK288
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l								
Alpha-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1260	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS									
DILUTION FACTOR									
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

VALIDATION
TABLE

SAMPLE LOCATION:		GWECJ-1-05	GWECJ-1-02	GW-SB-3	GW-CB-1	GW-ECJ-1-01	GW-DUP-4
SMO NUMBER:		AK289	AK291	AK292	AK293	AK294	AK342
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.13	0.05 U
Beta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05	0.10	0.04 JJ	0.05 U	0.05 U	0.34	0.04 JJ
Heptachlor Epoxide	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	0.07	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.11	0.10 U
4,4-DDE	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1260	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS							
DILUTION FACTOR							
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
(207) 775-5401 Telex 94-4329

5180-04

June 24, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #9026/3643A Sullivan's Ledge Organic Data;
Samples AK295 through AK305

We have completed our review of the organic data generated by Gulf South Research Institute for eleven water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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DATA COMPLETENESS
Results for all analysis were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB and DFTPP tuning criteria were reviewed and found to be within contract specifications.

SURROGATE SPIKE RESULTS
The initial analysis of sample AK298 yielded a non-compliant base/neutral surrogate recovery. A re-analysis was not required in accordance with the functional guidelines. Therefore, we have reported the results for this sample unqualified.

MATRIX SPIKE RESULTS
4,4'-DDT had non-compliant recoveries in both the matrix spike and matrix spike duplicate. We have qualified the results for these compounds on the original sample (AK301). All relative percent differences between the matrix spike and the matrix spike duplicate were compliant.

BLANK ANALYSIS
The method blanks contained methylene chloride, acetone and tricloroethene. Revised detection limits were calculated for these compounds, in accordance with the functional guidelines, and were reported on the summary sheet.

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound. Vinyl chloride, 4-nitroaniline, phenol, and bis(2-chloroethyl)ether had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. We have flagged all associated quantitative results as estimated for these compounds.

PESTICIDES/PCBs QC
The percent difference between calibration factors was greater than the specified criteria for 4,4"-DDT. We have qualified all associated results for this compound as estimated in accordance with the functional guidelines. All other pesticide/PCB QC were compliant.

GAS CHROMATOGRAMS AND MASS SPECTRA
Gas chromatograms and mass spectra data were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT
All compound identifications met the essential criteria. We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Gary A Tatarka For

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Vaillancourt
G. Tatarka
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GWECJ-1-04	GWECJ-1-03	GW-TB-9	GWECJ-4-06	GWECJ-4-05	GWECJ-4-04	GWECJ-4-03	GWECJ-4-02
SMO NUMBER:		AK295DL	AK296DL	AK297	AK298	AK299DL	AK300	AK301	AK302
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	10000 U	10000 U	10 U	10 U	10000 U	10 U	10 U	10 U
Bromomethane	10	10000 U	10000 U	10 U	10 U	10000 U	10 U	10 U	10 U
Vinyl Chloride	10	10000 UJ	10000 U	10 UJ	10 U	10000 U	10 U	10 U	10 U
Chloroethane	10	10000 U	10000 U	10 U	10 U	10000 U	10 U	10 U	10 U
Methylene Chloride	5	80000 UJB	60000 UJB	80 UJB	60 UJB	120000 UJB	120 UJB	60 UJB	60 UJB
Acetone	10	70000 UJB	20000 UJB	70 UJB	20 UJB	60000 UJB	60 UJB	20 UJB	20 UJB
Carbon Disulfide	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
1,1 - Dichloroethane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
1,2 - Dichloroethene (total)	5	12000	6900 D	5 U	5 U	6300	5 U	5 U	5 U
Chloroform	5	5000 U	5000 U	5 U	8	5000 U	6	3 JJ	2 JJ
1,2 - Dichloroethane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
2 - Butanone	10	10000 UR	10000 UR	10 UR	10 UR	10000 UR	10 UR	13 J	10 UR
1,1,1 - Trichloroethane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Vinyl Acetate	10	10000 U	10000 U	10 U	10 U	10000 U	10 U	10 U	10 U
Bromodichloromethane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Trichloroethene	5	74000 B	57000	25 UJB	4 JJ	270000 J	3 JJ	3 JJ	2 JJ
Dibromochloromethane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Benzene	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Trans - 1,3 - Dichloropropene	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Bromoform	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
4 - Methyl - 2 - Pentanone	10	10000 U	10000 U	10 U	10 U	10000 U	10 U	10 U	10 U
2 - Hexanone	10	10000 U	10000 U	10 U	10 U	10000 U	10 U	10 U	10 U
Tetrachloroethene	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Toluene	5	3900 JJ	2800 JJ	5 U	5 U	14000	5 U	5 U	5 U
Chlorobenzene	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
Ethylbenzene	5	2200 JJ	5000 U	5 U	5 U	7500	5 U	5 U	5 U
Styrene	5	5000 U	5000 U	5 U	5 U	10000	5 U	5 U	5 U
Total Xylenes	5	5000 U	5000 U	5 U	5 U	5000 U	5 U	5 U	5 U
%SOLID				1					
DILUTION FACTOR									
DRYWT/DIL FACTOR		1000.00	1000.00	1.00	1.00	1000.00	1.00	1.00	1.00

VALIDATION
TABLE

SAMPLE LOCATION:		GWECJ-4-01	GW-TB-10	GW-SB-4
SMO NUMBER:		AK303	AK304	AK305
UNITS:		ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l			
Chloromethane	10	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U
Methylene Chloride	5	60 UJB	120 UJB	60 UJB
Acetone	10	20 UJB	60 UJB	20 UJB
Carbon Disulfide	5	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	5 U	5 U
1,2 - Dichloroethene (total)	5	5 U	3 JJ	5 U
Chloroform	5	5 U	5 U	5 U
1,2 - Dichloroethane	5	5 U	5 U	5 U
2 - Butanone	10	10 UR	10 UR	15 J
1,1,1 - Trichloroethane	5	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U
Vinyl Acetate	10	10 U	10 U	10 U
Bromodichloromethane	5	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U
Trichloroethene	5	3 JJ	30	6
Dibromochloromethane	5	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U
Trans - 1,3 - Dichloropropene	5	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U
4 - Methyl - 2 - Pentanone	10	10 U	10 U	10 U
2 - Hexanone	10	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U
Total Xylenes	5	5 U	5 U	5 U
%SOLID				
DILUTION FACTOR				
DRYWT/DIL FACTOR		1.00	1.00	1.00

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-ECJ-1-04	GW-ECJ-1-03	GW-ECJ-4-06	GW-ECJ-4-05	GW-ECJ-4-04	GW-ECJ-4-03	GW-ECJ-4-02	GW-ECJ-4-01	GW-SB-4
SMO NUMBER:		AK295	AK296	AK298	AK299	AK300	AK301	AK302	AK303	AK305
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l									
Phenol	10	4 JJ	2 JJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
2-Chlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	7 JJ	11	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2 - Dichlorobenzene	10	7 JJ	12	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	7 JJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	81	120	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50	37 JJ	30 JJ	17 JJ	50 U	50 U	50 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	73	140	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	13	22	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-ECJ-1-04	GW-ECJ-1-03	GW-ECJ-4-06	GW-ECJ-4-05	GW-ECJ-4-04	GW-ECJ-4-03	GW-ECJ-4-02	GW-ECJ-4-01	GW-SB-4
SMO NUMBER:		AK295	AK296	AK298	AK299	AK300	AK301	AK302	AK303	AK305
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l									
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	50 U	50 U	50 U	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	57	4 JJ	4 JJ	13	3 JJ	10 U	36	70
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
%SOLIDS:										
DILUTION FACTOR:										
DRYWT/DILUTION FACTOR		1	1	1	1	1	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-ECJ-1-04	GW-ECJ-1-03	GW-ECJ-4-06	GW-ECJ-4-05	GW-ECJ-4-04	GW-ECJ-4-03	GW-ECJ-4-02	GW-ECJ-4-01	GW-SB-4
SMO NUMBER:		AK295	AK296	AK298	AK299	AK300	AK301	AK302	AK303	AK305
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l									
Alpha-BHC	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Beta-BHC	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Delta-BHC	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Gamma-BHC (Lindane)	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Heptachlor	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Aldrin	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Heptachlor Epoxide	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Endosulfan I	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dieldrin	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
4,4-DDE	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endrin	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endosulfan II	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
4,4-DDD	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Endosulfan Sulfate	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
4,4'-DDT	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 UR	0.010 U	0.010 U	0.010 U
Methoxychlor	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Endrin Ketone	0.10	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Alpha-Chlordane	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Gamma-Chlordane	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Toxaphene	1.00	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Aroclor-1016	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Aroclor-1221	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Aroclor-1232	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Aroclor-1242	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Aroclor-1248	0.50	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Aroclor-1254	1.00	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Aroclor-1260	1.00	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
%SOLIDS										
DILUTION FACTOR										
DRYWT/DILUTION FACTOR		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
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(207) 775-5401 Telex 94-4329

5180-04

June 24, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8970/3635A Sullivan's Ledge Organic Data; Samples AK154 through AK166, AK168 through AK172, AK198 and AK199

We have completed our review of the organic data generated by Gulf South Research Institute for 20 water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

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DATA COMPLETENESS
Results for all analysis were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB and DFTPP tuning criteria were reviewed and found to be within contract specifications.

SURROGATE SPIKE RESULTS
The initial analysis of volatiles on samples AK157, AK168, and AK169; and acids on samples AK157, AK159, AK161, and Ak170 yielded non-compliant surrogate recoveries. A re-analysis was performed and results for all samples were compliant. Therefore, we have provided the results of the second analysis on the summary table with no qualification of results in accordance with the functional guidelines.

MATRIX SPIKE RESULTS
4-nitrophenol had non-compliant recoveries in both the matrix spike and matrix spike duplicate. We have qualified the results for these compounds on the original sample (AK166). All relative percent differences between the matrix spike and the matrix spike duplicate were compliant.

BLANK ANALYSIS
The method blanks contained methylene chloride, acetone and bis(2-Ethylhexyl)Phthalate. Revised detection limits were calculated for these compounds, in accordance with the functional guidelines, and were reported on the summary sheet.

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound. Vinyl acetate, chloroform, 4-nitroaniline, benzoic acid and 2,4-dinitrophenol had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. We have flagged all associated quantitative results as estimated for these compounds.

PESTICIDES/PCBs QC
The percent difference in retention time for DBC between the initial calibration and samples AK155, AK156, AK160, AK168, AK170, and AK172 were non-compliant. We have qualified all pesticide/PCB results for this sample as unusable in accordance with the functional guidelines. All other pesticide/PCB QC were compliant.

GAS CHROMATOGRAMS AND MASS SPECTRA
Gas chromatograms and mass spectra data were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT
All compound identifications met the essential criteria. We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Gary F. Tatarka For

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Vaillancourt
G. Tatarka
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-MW-B3	GW-DUP-2	GW-MW-6A	GW-TB-2	GW-DUP-1	GW-MW-12A	GW-MW-13	GW-MW-5
SMO NUMBER:		AK155	AK156	AK157	AK158	AK160	AK162	AK163	AK164
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	200	10 U	87	10 U	36	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	7 J	11	10 U	10 U
Methylene Chloride	5	80 UJB	140 UJB	140 UJB	90 UJB	90 UJB	40 UJB	80 UJB	90 UJB
Acetone	10	80 UJB	100 UJB	100 UJB	110 UJB	110 UJB	80 UJB	110 UJB	110 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trans - 1,2 - Dichloroethene	5	5 U	5 U	490	5 U	470	5 U	200	5 U
Chloroform	5	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
1,2 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2 - Butanone	10	10 UR	10 UR	10 UR	10 UR	34 J	5 JJ	130 J	10 UR
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	9	5 U	29	5 U	32	5 U	110	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	4 JJ	5 U	36	5 U	36	3 JJ	52	5 U
Trans - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4 - Methyl - 2 - Pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U	6 JJ	10 U
2 - Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	3 JJ	5 U	3 JJ	5 U	8	5 U
Chlorobenzene	5	5 U	5 U	28	5 U	28	13	24	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	8	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Xylenes	5	5 U	5 U	5 U	5 U	2 JJ	5 U	5 U	5 U
%SOLID		NR	NR	NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1	1	1
DRYWT/DIL FACTOR		1	1	1	1	1	1	1	1

VALIDATION TABLE

SAMPLE LOCATION:		GW-MW-17	GW-MW-22A	GW-MW-12	GW-MW-8A	GW-MW-14	GW-MW-25
SMO NUMBER:		AK165	AK168	AK169	AK171	AK172	AK199
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l						
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	190	6400	8 JJ	10 U	10 U
Chloroethane	10	10 U	10 U	3 JJ	2 JJ	10 U	10 U
Methylene Chloride	5	80 UJB	80 UJB	80 UJB	80 UJB	80 UJB	80 UJB
Acetone	10	110 UJB	110 UJB	110 UJB	110 UJB	110 UJB	110 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	5 U	87	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	5 U	7	5 U	5 U	5 U
Trans - 1,2 - Dichloroethene	5	5 U	84	30000	90	5 U	5 U
Chloroform	5	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
1,2 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
2 - Butanone	10	10 UR	10 UR	10 UR	230 J	110 J	370 J
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U
Cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	25	5 U	150	5 U	5 U	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	87	340 J	76	51	5 U
Trans - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U
4 - Methyl - 2 - Pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U
2 - Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	8	280 J	3 JJ	5 U	5 U
Chlorobenzene	5	5 U	340	220 J	54	4 JJ	4 JJ
Ethylbenzene	5	5 U	3200	290 J	8	6	43
Styrene	5	5 U	5 U	5 U	5 U	5 U	5 U
Total Xylenes	5	5 U	32	67	3 JJ	5 U	5 U
%SOLID		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DIL FACTOR		1	1	1	1	1	1

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-MW-24F	GW-MW-B3	GW-DUP-2	GW-MW-6A	GW-MW-6AF	GW-DUP-1	GW-DUP-1F	GW-MW-12A
SMO NUMBER:		AK154	AK155	AK156	AK157	AK159	AK160	AK161	AK162
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	4 JJ	10 U	10 U	10 U	10 U	10 U	10 U	16
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	6 JJ	10 U	10 U	6 JJ	10 U	6 JJ	5 JJ	9 JJ
Benzyl Alcohol	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	16	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	28
2-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	2 JJ	10 U	10 U	10 U	3 JJ
2,4 - Dinitrophenol	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
4-Nitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-MW-24F	GW-MW-B3	GW-DUP-2	GW-MW-6A	GW-MW-6AF	GW-DUP-1	GW-DUP-1F	GW-MW-12A
SMO NUMBER:		AK154	AK155	AK156	AK157	AK159	AK160	AK161	AK162
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	8 JJ	10 U	10 U	10 U	10 U	10 U	10 U	9 JJ
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	8 JJ	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
%SOLIDS:									
DILUTION FACTOR:									
DRYWT/DILUTION FACTOR		1	1	1	1	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-MW-13	GW-MW-5	GW-MW-17	GW-SF	GW-MW-22A	GW-MW-12	GW-MW-12F	GW-MW-13A
SMO NUMBER:		AK163	AK164	AK165	AK166	AK168	AK169	AK170	AK171
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	10 U	10 U	10 U	20 U	8 JJ	10 U	10 UR	10 U
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	20 U	7 JJ	10 U	10 UR	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U	20 U	21	8 JJ	4 JJ	10 U
1,4 - Dichlorobenzene	10	4 JJ	10 U	10 U	20 U	35	32	16	10
Benzyl Alcohol	10	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	20 U	10 U	10 U	10 UR	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	20 U	10 U	10 U	10 UR	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	20 U	10 U	5 JJ	6 JJ	10 U
2-Nitrophenol	10	10 U	10 U	10 U	20 U	10 U	10 U	10 UR	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	20 U	10 U	10 U	10 UR	10 U
Benzoic Acid	50	50 UJ	50 UJ	50 UJ	100 UJ	50 UJ	50 UJ	50 UR	50 UJ
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	20 U	10 U	10 U	10 UR	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U	20 U	8 JJ	5 JJ	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	20 U	76	46	16	10 U
4-Chloroaniline	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	20 U	10 U	10 U	10 UR	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	20 U	16	5 JJ	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	20 U	10 U	10 U	10 UR	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	100 U	50 U	50 U	50 UR	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	20 U	3 JJ	20	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	100 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	100 U	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	20 U	8 JJ	4 JJ	10 U	10 U
2,4 - Dinitrophenol	50	50 UJ	50 UJ	50 UJ	100 UJ	50 UJ	50 UJ	50 UR	50 UJ
4-Nitrophenol	50	50 U	50 U	50 U	100 U	50 U	50 U	50 UR	50 U
Dibenzofuran	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	20 U	4 JJ	3 JJ	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ	100 UJ	50 UJ	50 UJ	50 UJ	50 UJ

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-MW-13	GW-MW-5	GW-MW-17	GW-SF	GW-MW-22A	GW-MW-12	GW-MW-12F	GW-MW-13A
SMO NUMBER:		AK163	AK164	AK165	AK166	AK168	AK169	AK170	AK171
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	100 U	50 U	50 U	50 UR	50 U
N-Nitrosodiphenylamine (1)	10	4 JJ	10 U	10 U	20 U	10 U	16	10 U	9 JJ
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U	100 U	50 U	50 U	50 UR	50 U
Phenanthrene	10	10 U	10 U	10 U	20 U	9 JJ	7 JJ	10 U	10 U
Anthracene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	20 U	4 JJ	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	40 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB	30 UJB
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U
%SOLIDS:									
DILUTION FACTOR:									
DRYWT/DILUTION FACTOR		1	1	1	2	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION
TABLE

SAMPLE LOCATION:		GW-MW-14	GW-FB-1F	GW-MW-25
SMO NUMBER:		AK172	AK198	AK199
UNITS:		ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l			
Phenol	10	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	4 JJ	10 U	10 U
Benzyl Alcohol	10	10 UJ	10 UJ	10 UJ
1,2 - Dichlorobenzene	10	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U
Benzoic Acid	50	50 UJ	50 UJ	50 UJ
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 UJ	50 UJ	50 UJ
4-Nitrophenol	50	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ

(1) Cannot be separated from Diphenylamine.

VALIDATION
TABLE

SAMPLE LOCATION:		GW-MW-14	GW-FB-1F	GW-MW-25
SMO NUMBER:		AK172	AK198	AK199
UNITS:		ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l			
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U	10 U
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	30 UJB	30 UJB	30 UJB
Di-n-Octyl Phthalate	10	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U
%SOLIDS:				
DILUTION FACTOR:				
DRYWT/DILUTION FACTOR		1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-MW-24F	GW-MW-B3	GW-DUP-2	GW-MW-6A	GW-MW-6AF	GW-DUP-1	GW-DUP-1F	GW-MW-12A
SMO NUMBER:		AK154	AK155	AK156	AK157	AK159	AK160	AK161	AK162
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l								
Alpha-BHC	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Beta-BHC	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 UR	0.05 UR	0.05 U	0.05 U	0.05 UR	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
4,4-DDE	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 UR	0.10 UR	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 UR	1.00 UR	1.00 U	1.00 U	1.00 UR	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 UR	0.50 UR	0.50 U	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1254	1.00	1.00 U	1.00 UR	1.00 UR	1.00 U	1.00 U	1.00 UR	1.00 U	4.30
Aroclor-1260	1.00	1.00 U	1.00 UR	1.00 UR	1.00 U	1.00 U	1.00 UR	1.00 U	1.00 U
%SOLIDS									
DILUTION FACTOR									
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

VALIDATION TABLE

SAMPLE LOCATION:		GW-MW-13	GW-MW-5	GW-MW-17	GW-SF	GW-MW-22A	GW-MW-22A	GW-MW-12	GW-MW-12F
SMO NUMBER:		AK163	AK164	AK165	AK166	AK168	AK168DL	AK169	AK170
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l								
Alpha-BHC	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Beta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Delta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Heptachlor	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Aldrin	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Heptachlor Epoxide	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Endosulfan I	0.05	0.05 U	0.05 U	0.05 U	0.10 U	0.05 UR	0.05 UR	0.05 U	0.05 UR
Dieldrin	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
4,4-DDE	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
Endrin	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
Endosulfan II	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
4,4-DDD	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
Endosulfan Sulfate	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
Methoxychlor	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	0.50 UR	0.50 U	0.50 UR
Endrin Ketone	0.10	0.10 U	0.10 U	0.10 U	0.20 U	0.10 UR	0.10 UR	0.10 U	0.10 UR
Alpha-Chlordane	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	0.50 UR	0.50 U	0.50 UR
Gamma-Chlordane	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	0.50 UR	0.50 U	0.50 UR
Toxaphene	1.00	1.00 U	1.00 U	1.00 U	2.00 U	1.00 UR	1.00 UR	1.00 U	1.00 UR
Aroclor-1016	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	0.50 UR	0.50 U	0.50 UR
Aroclor-1221	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	0.50 UR	0.50 U	0.50 UR
Aroclor-1232	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	0.50 UR	0.50 U	0.50 UR
Aroclor-1242	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	0.50 UR	0.50 U	0.50 UR
Aroclor-1248	0.50	0.50 U	0.50 U	0.50 U	1.00 U	0.50 UR	65.00 J	0.50 U	0.50 UR
Aroclor-1254	1.00	0.98 JJ	1.00 U	1.00 U	0.69 JJ	1.00 UR	93.00 J	15.00	1.00 UR
Aroclor-1260	1.00	1.00 U	1.00 U	1.00 U	2.00 U	1.00 UR	1.00 UR	1.00 U	1.00 UR
%SOLIDS									
DILUTION FACTOR									
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00

VALIDATION
TABLE

SAMPLE LOCATION:		GW-MW-13A	GW-MW-14	GW-FB-1F	GW-MW-25
SMO NUMBER:		AK171	AK172	AK198	AK199
UNITS:		ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l				
Alpha-BHC	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Beta-BHC	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 UR	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
4,4-DDE	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 UR	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 UR	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 UR	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 UR	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 UR	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 UR	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 UR	0.50 U	1.30
Aroclor-1254	1.00	1.00 U	1.00 UR	0.19 JJ	2.60
Aroclor-1260	1.00	1.00 U	1.00 UR	1.00 U	1.00 U
%SOLIDS					
DILUTION FACTOR					
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	1.00

E.C.JORDAN CO. ENGINEERS & SCIENTISTS

261 Commercial Street/P.O. Box 7050
Portland, Maine 04112
(207) 775-5401 Telex 94-4329

5180-04

June 24, 1988

Ms. Nancy Barmakian
Environmental Scientist
Waste Management Division
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203

Dear Ms. Barmakian:

Subject: Case #8970/3635A Sullivan's Ledge Organic Data;
Samples AK097 through AK100, AK138 through AK153

We have completed our review of the organic data generated by Gulf South Research Institute for 20 water samples from the Sullivan's Ledge site with the above SMO sample designations. Our review, summarized below, was based on the criteria outlined in the Functional Guidelines for Evaluating organic analysis and the Functional guidelines for Evaluating Pesticides/PCBs and included the following:

- data completeness
- surrogate spikes
- matrix spikes/matrix spike duplicates
- blank analysis
- BFB and DFTPP tuning
- holding times
- instrument calibrations (initial and continuing)
- pesticide/PCB QA/QC
- gas chromatograms and mass spectra

Data were flagged in accordance with the criteria outlined in the above guidelines and the December 1987 USEPA Region I revisions. We have attached completed data review worksheets, including a data summary table.In instances where more than one flag was required by the guidelines, we have included only the most disqualifying flag in the summary table. All flags are reported on the worksheet.

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DATA COMPLETENESS
Results for all analysis were received along with all required documentation. Approximately two percent of calculations and transcriptions were reviewed and were found to be correct.

HOLDING TIMES
All contract required holding times were met.

BFB & DFTPP TUNING
The BFB and DFTPP tuning criteria were reviewed and found to be within contract specifications.

SURROGATE SPIKE RESULTS
The initial analysis of acids on sample AK146 yielded non-compliant surrogate recoveries. A re-analysis was performed and results for all samples were compliant. Therefore, we have provided the results of the second analysis on the summary table with no qualification of results in accordance with the functional guidelines.

MATRIX SPIKE RESULTS
4-nitrophenol, phenol, 2,4-dinitrotoluenne, and endrin had non-compliant recoveries in both the matrix spike and matrix spike duplicate. We have qualified the results for these compounds on the original sample (AK140). Aldrin had a non-compliant relative percent difference between the matrix spike and the matrix spike duplicate. We have flagged the results for this compound on the spiked sample only (AK138) as estimated to indicate possible sample heterogeneity.

BLANK ANALYSIS
The method blanks contained methylene chloride and acetone. Revised detection limits were calculated for these compounds, in accordance with the functional guidelines, and were reported on the summary sheet.

E.C. JORDAN CO. ENGINEERS & SCIENTISTS

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INSTRUMENT CALIBRATIONS (INITIAL AND CONTINUING)
2-Butanone had a response factor on the initial calibration less than 0.05. Since this relates directly to the instrument sensitivity, we have flagged all non-detect results as unusable and detected results as estimated for this compound. Vinyl acetate, chloroform, and 4-nitroaniline had relative standard deviations or percent differences on the initial or continuing calibrations outside contract specifications. We have flagged all associated quantitative results as estimated for these compounds.

PESTICIDES/PCBs QC
The percent difference in retention time for DBC between the initial calibration and sample AK099 was non-compliant. We have qualified all pesticide/PCB results for this sample as unusable in accordance with the functional guidelines. All other pesticide/PCB QC were compliant.

GAS CHROMATOGRAMS AND MASS SPECTRA
Gas chromatograms and mass spectra data were reviewed and found to be of acceptable quality.

OVERALL ASSESSMENT
All compound identifications met the essential criteria. We estimate that the reported results for this case require no additional qualification beyond that dictated by the constraints of the methods employed.

Should you have any questions or require any additional information, please give me a call.

Sincerely,

E.C. JORDAN CO.

Gregory A. Tatarka For

B. K. Wallin, Ph.D.
Manager, Engineering Chemistry

BKW/gat

Enclosure

cc: D. Szaro (w/ enclosure)
G. Vaillancourt
G. Tatarka
L. Pitts
L. Dixon

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-GCA-2A	GW-TB-1	GW-MW-20	GW-MW-16	GW-MW-8	GW-MW-8A	GW-MW-4A	GW-MW-4
SMO NUMBER:		AK097	AK098	AK099	AK100	AK138	AK139	AK140	AK141
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 J
Chloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	30 UJB	80 UJB	40 UJB	60 UJB	60 UJB	60 UJB	40 UJB	40 UJB
Acetone	10	100 UJB	80 UJB	110 UJB	80 UJB	80 UJB	80 UJB	110 UJB	110 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloroethene (Total)	5	5 U	5 U	5 U	2 J	5 U	5 U	5 U	49
Chloroform	5	5 U	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 U	5 U
1,2 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	10	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	2 J	5 U	5 U	5 U	120
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	2 J	5 U	5 U	5 U	5 U	5 U
Trans- 1,3 -Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Xylenes	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
%SOLID									
DILUTION FACTOR		1	1	1	1	1	1	1	1
DRYWT/DIL FACTOR		1	1	1	1	1	1	1	1

VALIDATION
TABLE

SAMPLE LOCATION:		GW-MW-10B	GW-MW-5A	GW-MW-1	GW-MW-1A	GW-MW-6	GW-MW-10	GW-MW-10A	GW-SB-1
SMO NUMBER:		AK142	AK143	AK144	AK145	AK146	AK147	AK148	AK150
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l								
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	5 J	10 U	540	10 U	4 J	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	14	10 U	10 U	10 U
Methylene Chloride	5	40 UJB	40 UJB	80 UJB	60 UJB	60 UJB	60 UJB	80 UJB	80 UJB
Acetone	10	110 UJB	110 UJB	80 UJB	80 UJB	80 UJB	80 UJB	80 UJB	80 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	5 U	5 U	5 U	13	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloroethene (Total)	5	4 J	5 U	15	5 U	3800	3 J	28	5 U
Chloroform	5	5 U	5 U	5 UJ	5 U	5 U	5 U	5 UJ	5 UJ
1,2 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	10	13 J	10 UR	10 UR	30 J	10 UR	10 UR	10 UR	10 UR
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	8	5 U	6	5 U	2200	5	4 J	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5	5 U	33	5 U	5 U	5 U
Trans- 1,3 -Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	42	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U	30	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	2 J	37	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	9	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	3 J	5 U	5 U	5 U
Total Xylenes	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
%SOLID									
DILUTION FACTOR		1	1	1	1	1	1	1	1
DRYWT/DIL FACTOR		1	1	1	1	1	1	1	1

VALIDATION
TABLE

SAMPLE LOCATION:		GW-MW-2	GW-MW-15	GW-MW-24
SMO NUMBER:		AK151	AK152	AK153
UNITS:		ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	CRDL ug/l			
Chloromethane	10	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U
Vinyl Chloride	10	180	10 U	100
Chloroethane	10	17	10 U	32
Methylene Chloride	5	80 UJB	140 UJB	80 UJB
Acetone	10	80 UJB	100 UJB	80 UJB
Carbon Disulfide	5	5 U	5 U	5 U
1,1 - Dichloroethene	5	4 J	5 U	5 U
1,1 - Dichloroethane	5	3 J	5 U	5
1,2 - Dichloroethene (Total)	5	600	5 U	310
Chloroform	5	5 UJ	5 UJ	5 UJ
1,2 - Dichloroethane	5	5 U	5 U	5 U
2-Butanone	10	10 UR	10 UR	10 UR
1,1,1 - Trichloroethane	5	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U
Vinyl Acetate	10	10 UJ	10 UJ	10 UJ
Bromodichloromethane	5	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U
cis - 1,3 - Dichloropropene	5	5 U	5 U	5 U
Trichloroethene	5	200	5 U	1400
Dibromochloromethane	5	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U
Benzene	5	510	5 U	710
Trans- 1,3 -Dichloropropene	5	5 U	5 U	5 U
Bromoform	5	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U
Toluene	5	3 J	5 U	17
Chlorobenzene	5	54	5 U	5
Ethylbenzene	5	5 U	5 U	14
Styrene	5	5 U	5 U	5 U
Total Xylenes	5	4 J	5 U	65
%SOLID				
DILUTION FACTOR		1	1	1
DRYWT/DIL FACTOR		1	1	1

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-GCA-2A	GW-MW-20	GW-MW-16	GW-MW-8	GW-MW-8A	GW-MW-4A	GW-MW-4	GW-MW-10B
SMO NUMBER:		AK097	AK099	AK100	AK138	AK139	AK140	AK141	AK142
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	10 U	10 U	10 U	10 U	4 J	10 UR	10 U	10 U
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50	50 U	50 U	50 U	50 U	50 U	50 UR	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U	10 U	10 UR	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-GCA-2A	GW-MW-20	GW-MW-16	GW-MW-8	GW-MW-8A	GW-MW-4A	GW-MW-4	GW-MW-10B
SMO NUMBER:		AK097	AK099	AK100	AK138	AK139	AK140	AK141	AK142
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	210 E	27	10 U	10 U	13	6 J	5 J
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
%SOLIDS:									
DILUTION FACTOR:		1	1	1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-MW-5A	GW-MW-1	GW-MW-1A	GW-MW-6	GW-MW-6	GW-MW-10	GW-MW-10A	GW-SB-1F
SMO NUMBER:		AK143	AK144	AK145	AK146	AK146RE	AK147	AK148	AK149
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
Phenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
1,4 - Dichlorobenzene	10	10 U	10 U	10 U	5 JJ	5 J	10 U	10 U	10 U
Benzyl Alcohol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Benzoic Acid	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
4-Nitrophenol	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 UJ	50 UR	100 UJ	50 UJ	50 UJ	50 UJ

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-MW-5A	GW-MW-1	GW-MW-1A	GW-MW-6	GW-MW-6	GW-MW-10	GW-MW-10A	GW-SB-1F
SMO NUMBER:		AK143	AK144	AK145	AK146	AK146RE	AK147	AK148	AK149
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l								
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U	50 UR	100 U	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 UR	40 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	7 J	28	8 J	9 JJ	14 J	10 U	4 J	10 U
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 UR	20 U	10 U	10 U	10 U
%SOLIDS:									
DILUTION FACTOR:		1	1	1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	2	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-SB-1	GW-MW-2	GW-MW-15	GW-MW-24
SMO NUMBER:		AK150	AK151	AK152	AK153
UNITS:		ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l				
Phenol	10	10 U	19	6 J	3 J
bis(2-Chloroethyl)Ether	10	10 U	10 U	10 U	10 U
2-Chlorophenol	10	10 U	10 U	10 U	10 U
1,3 - Dichlorobenzene	10	10 U	8 J	10 U	10 U
1,4 - Dichlorobenzene	10	10 U	27	10 U	6 J
Benzyl Alcohol	10	10 U	10 U	10 U	10 U
1,2 - Dichlorobenzene	10	10 U	10 U	10 U	10 U
2-Methylphenol	10	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether	10	10 U	10 U	10 U	10 U
4-Methylphenol	10	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10	10 U	10 U	10 U	10 U
Hexachloroethane	10	10 U	10 U	10 U	10 U
Nitrobenzene	10	10 U	10 U	10 U	10 U
Isophorone	10	10 U	10 U	10 U	10 U
2-Nitrophenol	10	10 U	10 U	10 U	10 U
2,4 - Dimethylphenol	10	10 U	10 U	10 U	10 U
Benzoic Acid	50	50 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane	10	10 U	10 U	10 U	10 U
2,4 - Dichlorophenol	10	10 U	10 U	10 U	10 U
1,2,4 - Trichlorobenzene	10	10 U	15	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U
4-Chloroaniline	10	10 U	10 U	10 U	10 U
Hexacholorobutadiene	10	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10	10 U	10 U	10 U	10 U
2,4,6 - Trichlorophenol	10	10 U	10 U	10 U	10 U
2,4,5 - Trichlorophenol	50	50 U	50 U	50 U	50 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U
2-Nitroaniline	50	50 U	50 U	50 U	50 U
Dimethyl Phthalate	10	10 U	10 U	10 U	10 U
Acenaphthylene	10	10 U	10 U	10 U	10 U
2,6 - Dinitrotoluene	10	10 U	10 U	10 U	10 U
3-Nitroaniline	50	50 U	50 U	50 U	50 U
Acenaphthene	10	10 U	10 U	10 U	10 U
2,4 - Dinitrophenol	50	50 U	50 U	50 U	50 U
4-Nitrophenol	50	50 U	50 U	50 U	50 U
Dibenzofuran	10	10 U	10 U	10 U	10 U
2,4 - Dinitrotoluene	10	10 U	10 U	10 U	10 U
Diethylphthalate	10	10 U	10 U	10 U	10 U
4-Chlorophenyl-Phenylether	10	10 U	10 U	10 U	10 U
Fluorene	10	10 U	10 U	10 U	10 U
4-Nitroaniline	50	50 UJ	50 UJ	50 U	50 U

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

SAMPLE LOCATION:		GW-SB-1	GW-MW-2	GW-MW-15	GW-MW-24
SMO NUMBER:		AK150	AK151	AK152	AK153
UNITS:		ug/l	ug/l	ug/l	ug/l
SEMI-VOLATILE COMPOUNDS	CRDL ug/l				
4,6 - Dinitro-2-Methylphenol	50	50 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	10	10 U	5 J	8 J	22
4-Bromophenyl-Phenylether	10	10 U	10 U	10 U	10 U
Hexachlorobenzene	10	10 U	10 U	10 U	10 U
Pentachlorophenol	50	50 U	50 U	50 U	50 U
Phenanthrene	10	10 U	10 U	10 U	10 U
Anthracene	10	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10	10 U	10 U	10 U	10 U
Fluoranthene	10	10 U	10 U	10 U	10 U
Pyrene	10	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10	10 U	10 U	10 U	10 U
3,3' - Dichlorobenzidine	20	20 U	20 U	20 U	20 U
Benzo (a) Anthracene	10	10 U	10 U	10 U	10 U
Chrysene	10	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	10	10 U	17	7 J	10
Di-n-Octyl Phthalate	10	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10	10 U	10 U	10 U	10 U
Benzo (g,h,i,) Perylene	10	10 U	10 U	10 U	10 U
%SOLIDS:					
DILUTION FACTOR:		1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1

(1) Cannot be separated from Diphenylamine.

VALIDATION TABLE

PROJECT: SULLIVANS LEDGE

SAMPLE LOCATION:		GW-GCA-2A	GW-MW-20	GW-MW-16	GW-MW-8	GW-MW-8A	GW-MW-4A	GW-MW-4	GW-MW-10B
SMO NUMBER:		AK097	AK099	AK100	AK138	AK139	AK140	AK141	AK142
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l								
Alpha-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	1.00 U	1.00 U	1.90	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1260	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS									
DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

VALIDATION TABLE

SAMPLE LOCATION:		GW-MW-5A	GW-MW-1	GW-MW-1A	GW-MW-6	GW-MW-10	GW-MW-10A	GW-SB-1F	GW-SB-1
SMO NUMBER:		AK143	AK144	AK145	AK146	AK147	AK148	AK149	AK150
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l								
Alpha-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	1.00 U	0.46 J	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Aroclor-1260	1.00	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
%SOLIDS									
DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DRYWT/DILUTION FACTOR		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

VALIDATION
TABLE

SAMPLE LOCATION:		GW-MW-2	GW-MW-15	GW-MW-24
SMO NUMBER:		AK151	AK152	AK153
UNITS:		ug/l	ug/l	ug/l
PESTICIDES/PCB	CRDL ug/l			
Alpha-BHC	0.05	0.05 U	0.81	0.05 U
Beta-BHC	0.05	0.05 U	0.05 U	0.05 U
Delta-BHC	0.05	0.05 U	0.05 U	0.05 U
Gamma-BHC (Lindane)	0.05	0.05 U	0.05 U	0.05 U
Heptachlor	0.05	0.05 U	0.05 U	0.05 U
Aldrin	0.05	0.05 U	0.05 U	0.05 U
Heptachlor Epoxide	0.05	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05	0.05 U	0.05 U	0.05 U
Dieldrin	0.10	0.10 U	0.10 U	0.10 U
4,4-DDE	0.10	0.10 U	0.10 U	0.10 U
Endrin	0.10	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10	0.10 U	0.10 U	0.10 U
4,4-DDD	0.10	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.50	0.50 U	0.50 U	0.50 U
Gamma-Chlordane	0.50	0.50 U	0.50 U	0.50 U
Toxaphene	1.00	1.00 U	1.00 U	1.00 U
Aroclor-1016	0.50	0.50 U	0.50 U	0.50 U
Aroclor-1221	0.50	0.50 U	0.50 U	0.50 U
Aroclor-1232	0.50	0.50 U	0.50 U	0.50 U
Aroclor-1242	0.50	0.50 U	0.50 U	0.50 U
Aroclor-1248	0.50	0.50 U	0.50 U	0.50 U
Aroclor-1254	1.00	1.00 U	1.00 U	1.00 U
Aroclor-1260	1.00	1.00 U	1.00 U	1.00 U
%SOLIDS				
DILUTION FACTOR		1.00	1.00	1.00
DRYWT/DILUTION FACTOR		1.00	1.00	1.00

VALIDATION TABLE PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-TB-11	GW-ECJ-1-18	GW-ECJ-1-17	GW-ECJ-1-16	GW-ECJ-1-15	GW-ECJ-1-14	GW-ECJ-1-13	GW-ECJ-1-12
SMO NUMBER:		AN 051	AN 052	AN 053	AN 054	AN 055	AN 056	AN 057	AN 058
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l								
Chloromethane	10	10 U	500 U	2500 U	3000 U	300 U	5000 U	8000 U	1500 U
Bromomethane	10	10 U	500 U	2500 U	3000 U	300 U	5000 U	8000 U	1500 U
Vinyl Chloride	10	10 U	500 U	2500 U	3000 U	300 U	5000 U	8000 U	1500 U
Chloroethane	10	10 U	500 U	2500 U	3000 U	300 U	5000 U	8000 U	1500 U
Methylene Chloride	5	70 UJB	2500 UJB	17500 UJB	21000 UJB	2100 UJB	35000 UJB	56000 UJB	7500 UJB
Acetone	10	240 UJB	12500 UJB	60000 UJB	72000 UJB	7200 UJB	120000 UJB	192000 UJB	37500 UJB
Carbon Disulfide	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
1,1 - Dichloroethene	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
1,1 - Dichloroethane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
1,2 - Dichloroethene (Total)	5	5 U	1600	4000	14000	3900	15000	11000	24000
Chloroform	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
1,2 - Dichloroethane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
2-Butanone	10	35 UJB	2000 UJBR	8750 UJB	105000 UJB	1050 UJB	17500 UJB	28000 UJB	60000 UJBR
1,1,1 - Trichloroethane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Carbon Tetrachloride	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Vinyl Acetate	10	10 U	500 U	2500 U	3000 U	300 U	5000 U	8000 U	1500 U
Bromodichloromethane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
1,2 - Dichloropropane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Trans- 1,3 -Dichloropropene	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Trichloroethene	5	5 U	9500	34000	47000	3200	76000	110000	20000
Dibromochloromethane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
1,1,2 - Trichloroethane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Benzene	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Cis- 1,3 -Dichloropropene	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
2-Chloroethylvinylether	10	10 U	500 U	2500 U	3000 U	300 U	5000 U	8000 U	1500 U
Bromoform	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
4-Methyl-2-Pentanone	10	10 U	500 U	2500 U	3000 U	300 U	2200 JJ	8000 U	1500 U
2-Hexanone	10	10 U	500 U	2500 U	3000 U	300 U	5000 U	8000 U	1500 U
Tetrachloroethene	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
1,1,2,2 - Tetrachloroethane	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Toluene	5	5 U	480	1700	2100	220	3200	4400	750 U
Ethylbenzene	5	5 U	250 U	1300 U	1600	160	1800 JJ	2600 JJ	310 JJ
Chlorobenzene	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
Styrene	5	5 U	310	1100 JJ	1500 U	150 U	2500 U	4000 U	750 U
Total Xylenes	5	5 U	250 U	1300 U	1500 U	150 U	2500 U	4000 U	750 U
DILUTION FACTOR		1	50	250	300	30	500	800	150

VALIDATION TABLE

SAMPLE LOCATION:		GW-ECJ-1-11	GW-DUP-6	GW-DUP-7	GW-ECJ-2-16	GW-ECJ-2-15	GW-ECJ-2-14	GW-ECJ-2-13	GW-ECJ-2-12
SMO NUMBER:		AN 059	AN 060	AN 061	AN 062	AN 063	AN 064	AN 065	AN 066
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l								
Chloromethane	10	500 U	5000 U	7000 U	200 U	1000 U	500 U	2000 U	1000 U
Bromomethane	10	500 U	5000 U	7000 U	200 U	1000 U	500 U	2000 U	1000 U
Vinyl Chloride	10	230 JJ	5000 U	7000 U	360	600 JJ	350 JJ	800 JJ	1400
Chloroethane	10	500 U	5000 U	7000 U	200 U	1000 U	500 U	2000 U	1000 U
Methylene Chloride	5	2500 UJB	10000 UJB	35000 UJB	1000 UJB	5000 UJB	2500 UJB	4000 UJB	5000 UJB
Acetone	10	12500 UJB	70000 UJB	175000 UJB	5000 UJB	25000 UJB	12500 UJB	28000 UJB	25000 UJB
Carbon Disulfide	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
1,1 - Dichloroethene	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
1,1 - Dichloroethane	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
1,2 - Dichloroethene (Total)	5	3900	12000	11000	2900	9200	7100	8800	19000
Chloroform	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
1,2 - Dichloroethane	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
2-Butanone	10	2000 UJBR	27500 UJB	28000 UJBR	800 UJBR	4000 UJBR	200 UJBR	11000 UJB	4000 UJBR
1,1,1 - Trichloroethane	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
Carbon Tetrachloride	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
Vinyl Acetate	10	500 U	5000 U	7000 U	200 U	1000 U	500 U	2000 U	1000 U
Bromodichloromethane	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
1,2 - Dichloropropane	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
Trans- 1,3 -Dichloropropene	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
Trichloroethene	5	6800	68000	110000	2500	18000	230 JJ	29000	16000
Dibromochloromethane	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
1,1,2 - Trichloroethane	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
Benzene	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
Cis- 1,3 -Dichloropropene	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
2-Chloroethylvinylether	10	500 U	5000 U	7000 U	200 U	1000 U	500 U	2000 U	1000 U
Bromoform	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
4-Methyl-2-Pentanone	10	500 U	2300 JJ	7000 U	170 JJ	1900	1300	2800	1500
2-Hexanone	10	500 U	5000 U	7000 U	200 U	1000 U	500 U	2000 U	1000 U
Tetrachloroethene	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
~~1,1,2,2 - Tetrachloroethane~~	~~5~~	~~250 U~~	~~2500 U~~	~~3500 U~~	~~100 U~~	~~500 U~~	~~250 U~~	~~1000 U~~	~~500 U~~
Toluene	5	250 U	3200	4000	73 JJ	1000	180 JJ	1600	1000
Ethylbenzene	5	250 U	2500	2600 JJ	100 U	500 U	250 U	450 JJ	460 JJ
Chlorobenzene	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
Styrene	5	250 U	2500 U	3500 U	100 U	500 U	250 U	630 JJ	240 JJ
Total Xylenes	5	250 U	2500 U	3500 U	100 U	500 U	250 U	1000 U	500 U
DILUTION FACTOR		50	500	700	20	100	50	200	100

VALIDATION TABLE

SAMPLE LOCATION:		GW-ECJ-2-11	GW-DUP-8	GW-DUP-9	GW-SB-5	GW-ECJ-4-18	GW-ECJ-4-17	GW-ECJ-4-16	GW-ECJ-4-15
SMO NUMBER:		AN 067	AN 068	AN 069	AN 070	AN 071	AN 072	AN 073	AN 074
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l								
Chloromethane	10	800 U	200 U	300 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	800 U	200 U	300 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	820	300	280 J	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	800 U	200 U	300 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	1600 UJB	400 UJB	600 UJB	70 UJB	60 UJB	60 UJB	60 UJB	60 UJB
Acetone	10	11200 UJB	2800 UJB	4200 UJB	240 UJB	240 UJB	240 UJB	240 UJB	240 UJB
Carbon Disulfide	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloroethene (Total)	5	9900	2200	5200	5 U	5 U	5 U	5 U	5 U
Chloroform	5	400 U	100 U	150 U	5 U	5 U	4 JJ	2 JJ	3 JJ
1,2 - Dichloroethane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	10	4400 UJB	1100 UJB	1650 UJB	35 UJB	65 UJB	65 UJB	65 UJB	65 UJB
1,1,1 - Trichloroethane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	800 U	200 U	300 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Trans- 1,3 -Dichloropropene	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	10000	2400	150 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Cis- 1,3 -Dichloropropene	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
2-Chloroethylvinylether	10	800 U	200 U	300 U	10 U	10 U	10 U	10 U	10 U
Bromoform	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	1100	190 JJ	950	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	800 U	200 U	300 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	760	78 JJ	170	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	380 JJ	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
Styrene	5	200 JJ	100 U	150 U	5 U	5 U	3 JJ	5 U	5 U
Total Xylenes	5	400 U	100 U	150 U	5 U	5 U	5 U	5 U	5 U
DILUTION FACTOR		80	20	30	1	1	1	1	1

VALIDATION TABLE

SAMPLE LOCATION:		GW-ECJ-4-14	GW-ECJ-4-13	GW-ECJ-4-12	GW-ECJ-4-11	GW-DUP-10	GW-DUP-11
SMO NUMBER:		AN 075	AN 076	AN 077	AN 078	AN 079	AN 080
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Chloromethane	10	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5	60 UJB	60 UJB	60 UJB	60 UJB	60 UJB	60 UJB
Acetone	10	240 UJB	240 UJB	240 UJB	240 UJB	240 UJB	240 UJB
Carbon Disulfide	5	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U
1,1 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloroethene (Total)	5	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	5	3 JJ	3 JJ	5 U	2 JJ	2 JJ	3 JJ
1,2 - Dichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	10	65 UJB	65 UJB	65 UJBR	65 UJB	65 UJB	65 UJB
1,1,1 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U
1,2 - Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U
Trans- 1,3 -Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U	3 JJ	5 U
Dibromochloromethane	5	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2 - Trichloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5	5 U	5 U	5 U	5 U	5 U	5 U
Cis- 1,3 -Dichloropropene	5	5 U	5 U	5 U	5 U	5 U	5 U
2-Chloroethylvinylether	10	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	5	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2 - Tetrachloroethane	5	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5	5 U	5 U	5 U	5 U	5 U	5 U
Total Xylenes	5	5 U	5 U	5 U	5 U	5 U	5 U
DILUTION FACTOR		1	1	1	1	1	1

APPENDIX C
PHASE II LABORATORY DATA
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

COMBINED SUMMARY TABLE — PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		TP-27-01	TP-27-02	TP-27-02-DUP	TP-27-03	TP-28-01	TP-28-01-DUP
SMO NUMBER:		AK002/MAH127	AK003/MAH128	AK014/MAH139	AK004/MAH129	AK005/MAH130	AK015/MAH140
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS	**CRDL ug/kg**						
Acetone	10	150 B	180 B	210 B	-	-	-
Carbon Disulfide	5	-	14	7	-	-	-
2-Butanone	10	-	70 J	84 J	-	-	-
Benzene	5	-	-	-	-	-	-
Toluene	5	12	31	15	-	-	-
Ethylbenzene	5	30	110	75	-	-	-
Styrene	5	-	-	-	-	-	-
Total Xylenes	5	66	180	130	-	-	-
TOTAL VOLATILES:		258	585	521	-	-	-
SEMI-VOLATILE ORGANIC COMPOUNDS	**CRDL ug/kg**						
Naphthalene	330	6800	26000 J	26000	-	9600	1800
2-Methylnaphthalene	330	810	1200	-	-	6700	-
Acenaphthylene	330	3700	970	-	-	8200	1900
Acenaphthene	330	1800	-	-	-	1500	-
Dibenzofuran	330	-	-	-	-	-	-
Fluorene	330	4600	820	-	-	7200	1700
Phenanthrene	330	27000	3500	4600	-	36000	10000
Anthracene	330	5500	1000	-	-	8300	3000
Di-n-Butylphthalate	330	8100 B	-	-	-	-	-
Fluoranthene	330	12000	3500	4800	-	15000	6300
Pyrene	330	12000	4400	5100	-	7700	11000
Benzo (a) Anthracene	330	2600	2000	-	-	1200	3600
Chrysene	330	17000	2100	-	-	12000	3600
Benzo (b) Fluoranthene	330	12000	2500	-	-	9900	2300
Benzo (k) Fluoranthene	330	-	-	-	-	-	2700
Benzo (a) Pyrene	330	20000	2500	-	-	13000	5600
Indeno (1,2,3-cd) Pyrene	330	2800	990	-	-	-	2200
Dibenz (a,h) Anthracene	330	4300	-	-	-	-	-
Benzo (g,h,i,) Perylene	330	4700	910	-	-	-	2800
TOTAL SEMI-VOLATILES:		145710	52390	40500	-	136300	58500
PESTICIDES/PCB	**CRDL ug/kg**						
Aroclor-1248	80	-	-	-	-	-	-
Aroclor-1254	160	21000 CJ	29000 CJ	11000 CJ	18000 CJ	5100 CJ	14000 CJ
TOTAL PESTICIDES/PCB:		21000	29000	11000	18000	5100	14000
INORGANIC COMPOUNDS / **ANALYTICAL METHOD**	**CRDL mg/kg**						
Aluminum P	40	4760	3200	3270	4610	8090	5450
Antimony P	12	-	-	-	-	-	-
Arsenic F	2	9.3 J	9.3 J	8.1 J	-	11 J	9.8 J
Barium P	40	51	53	62	-	85	-
Beryllium P	1	-	-	-	-	-	-
Cadmium P	1	-	3	-	-	10	-
Calcium P	1000	-	1420	1440	1240	4350	3420
Chromium P	2	19	17	16	15	14	10
Copper P	5	78 J	52 J	68 J	8.7 J	32 J	31 J
Cyanide	2	6.4 J	15 J	3.1 J	-	-	-
Iron P	20	21200 J	25900 J	20600 J	7800 J	12300 J	8180 J
Lead P/F	1	75 J	169 J	114 J	5.9 J	351 J	166 J
Magnesium P	1000	2270	1150	-	2400	1810	1630
Manganese P	3	197 J	191 J	220 J	128 J	147 J	121 J
Mercury CV	0.04	-	0.16 J	0.14 J	-	0.20 J	0.12 J
Nickel P	8	21	22	31	9.6	9.4	-
Potassium P	1000	-	-	-	1250	-	-
Selenium F	1	1.2	-	-	-	-	-
Vandium P	10	48	28	34	15	46	37
Zinc P	4	115 J	295 J	218 J	97 J	188 J	124 J
OTHER PARAMETERS	**CRDL mg/kg**						
Silicon		250000	NA	NA	NA	NA	NA
TOC		0.099	NA	NA	NA	NA	NA
%SOLIDS		90	89	90	83	88	87
Grain Size (No. 10)		100	NA	NA	NA	NA	NA
Hydrometer (Particle Size)		% PASS	NA	NA	NA	NA	NA
0.023		11.4					
0.007		6.4					
0.001		1.4					

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		TP-28-02	TP-28-03	TP-29-01	TP-29-02	TP-29-03	TP-30-01
SMO NUMBER:		AK006/MAH131	AK007/MAH132	AK008/MAH133	AK009/MAH134	AK010/MAH135	AK011/MAH136
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
Acetone	10	-	-	-	-	-	-
Carbon Disulfide	5	-	-	-	-	-	-
2-Butanone	10	-	-	-	-	-	-
Benzene	5	-	23 J	-	-	-	-
Toluene	5	-	35 J	-	-	-	-
Ethylbenzene	5	-	43 J	-	-	-	-
Styrene	5	-	7 J	-	-	-	-
Total Xylenes	5	-	110 J	-	-	-	-
TOTAL VOLATILES:		-	218	-	-	-	-
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
Naphthalene	330	-	19000	-	4600	-	-
2-Methylnaphthalene	330	-	13000	-	2300	-	-
Acenaphthylene	330	-	10000	-	-	-	-
Acenaphthene	330	-	17000	6200	7400	-	-
Dibenzofuran	330	-	-	4900	6200	-	-
Fluorene	330	-	16000	6000	-	-	-
Phenanthrene	330	4300	61000	56000	53000	2300	-
Anthracene	330	1100	22000	15000	12000	-	-
Di-n-Butylphthalate	330	-	-	-	-	-	-
Fluoranthene	330	2900	23000	56000	51000	2100	-
Pyrene	330	4800	59000	47000	40000	1800 J	-
Benzo (a) Anthracene	330	1700	-	23000	2400	850	-
Chrysene	330	1700	17000	20000	17000	840	-
Benzo (b) Fluoranthene	330	1200	16000	28000	-	1300	-
Benzo (k) Fluoranthene	330	-	-	-	16000	-	-
Benzo (a) Pyrene	330	2400	25000	28000	24000	1100	-
Indeno (1,2,3-cd) Pyrene	330	920	6100	12000	8300	-	-
Dibenz (a,h) Anthracene	330	830	-	5500	6100	-	-
Benzo (g,h,i,) Perylene	330	1000	6900	14000	5100	-	-
TOTAL SEMI-VOLATILES:		22850	311000	321600	255400	10290	-
PESTICIDES/PCB	CRDL ug/kg						
Aroclor-1248	80	-	110000 J	-	-	-	-
Aroclor-1254	160	4300 CJ	77000 CJ	81000 J	11000 CJ	380 J	3400 CJ
TOTAL PESTICIDES/PCB:		4300	187000	81000	11000	380	3400
INORGANIC COMPOUNDS / ANALYTICAL METHOD	CRD mg/k						
Aluminum P	40	5450	7590	10300	6310	6130	1610
Antimony P	12	-	-	18 J	-	-	-
Arsenic F	2	5 J	5.9 J	14 J	6.3 J	-	-
Barium P	40	47	55	787	153	-	-
Beryllium P	1	-	-	2.1	-	-	-
Cadmium P	1	-	-	3.6	2.4	-	-
Calcium P	1000	4570	2680	5100	7030	-	-
Chromium P	2	12	14	31	16	13	2.5
Copper P	5	26 J	40 J	578 J	64 J	9.7 J	11 J
Cyanide	2	-	-	0.84 J	-	-	-
Iron P	20	8280 J	10100 J	26200 J	15600 J	10200 J	4850 J
Lead P/F	1	215 J	142 J	209 J	174 J	11 J	26 J
Magnesium P	1000	1570	1560	1760	1440	2740	-
Manganese P	3	99 J	102 J	121 J	177 J	194 J	171 J
Mercury CV	0.04	0.2 J	0.16 J	0.44 J	0.34 J	-	-
Nickel P	8	9.5	13	39	12	9.4	-
Potassium P	1000	-	-	-	-	-	-
Selenium F	1	-	-	4.1	-	-	-
Vandium P	10	38	58	142	26	17	113
Zinc P	4	115 J	188 J	470 J	152 J	40 J	65 J
OTHER PARAMETERS	CRDL mg/kg						
Silicon		360000	NA	NA	NA	370000	370000
TOC		0.011	NA	NA	NA	0.009	0.012
%SOLIDS		86	84	76	86	93	94
Grain Size (No. 10)		100	NA	NA	NA	100	100
Hydrometer (Particle Size)		% PASS	NA	NA	NA	% PASS	% PASS
	0.023	15.4				7.4	10.4
	0.007	9.4				4.4	4.4
	0.001	3.4				1.4	0.4

COMBINED SUMMARY TABLE

SAMPLE LOCATION:	TP-30-02	TP-30-03
SMO NUMBER:	AK012/MAH137	AK013/MAH138
UNITS:	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS	**CRDL ug/kg**	
Acetone	10	-	-
Carbon Disulfide	5	-	-
2-Butanone	10	-	-
Benzene	5	-	-
Toluene	5	-	-
Ethylbenzene	5	-	-
Styrene	5	-	-
Total Xylenes	5	-	-
TOTAL VOLATILES:		-	-
SEMI-VOLATILE ORGANIC COMPOUNDS	**CRDL ug/kg**		
Naphthalene	330	-	-
2-Methylnaphthalene	330	-	-
Acenaphthylene	330	-	-
Acenaphthene	330	-	-
Dibenzofuran	330	-	-
Fluorene	330	-	-
Phenanthrene	330	-	-
Anthracene	330	-	-
Di-n-Butylphthalate	330	-	-
Fluoranthene	330	-	-
Pyrene	330	-	-
Benzo (a) Anthracene	330	-	-
Chrysene	330	-	-
Benzo (b) Fluoranthene	330	-	-
Benzo (k) Fluoranthene	330	-	-
Benzo (a) Pyrene	330	-	-
Indeno (1,2,3-cd) Pyrene	330	-	-
Dibenz (a,h) Anthracene	330	-	-
Benzo (g,h,i,) Perylene	330	-	-
TOTAL SEMI-VOLATILES:		-	-
PESTICIDES/PCB	**CRDL ug/kg**		
Aroclor-1248	80	-	-
Aroclor-1254	160	-	3300 CJ
TOTAL PESTICIDES/PCB:		-	3300

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRD mg/k		
Aluminum	P	40	2200	6240
Antimony	P	12	-	-
Arsenic	F	2	2.2 J	-
Barium	P	40	-	-
Beryllium	P	1	-	-
Cadmium	P	1	-	-
Calcium	P	1000	-	1150
Chromium	P	2	3.2	12
Copper	P	5	-	6.2 J
Cyanide		2	-	-
Iron	P	20	4620 J	8340 J
Lead	P/F	1	230 J	9.5 J
Magnesium	P	1000	-	1520
Manganese	P	3	149 J	223 J
Mercury	CV	0.04	-	-
Nickel	P	8	-	-
Potassium	P	1000	-	-
Selenium	F	1	-	-
Vandium	P	10	179	72
Zinc	P	4	40 J	42 J

OTHER PARAMETERS	CRDL mg/kg		
Silicon		NA	NA
TOC		NA	NA
%SOLIDS		93	86
Grain Size (No. 10)		NA	NA
Hydrometer (Particle Size)		NA	NA
	0.023		
	0.007		
	0.001		

SUMMARY STATISTICS TABLE

PROJECT: SULLIVAN'S LEDGE
SITE: TEST PITS (TP)

	STANDARD DEVIATION	MEAN	RANGE	FREQUENCY
VOLATILE ORGANIC COMPOUNDS (ug/kg)				
Acetone	59.94	31.67	5 - 180	2 of 12
Carbon Disulfide	3.18	3.46	2.5 - 14	1 of 12
2-Butanone	17.97	10.42	5 - 70	1 of 12
Benzene	5.67	4.21	2.5 - 23	1 of 12
Toluene	11.35	8.38	2.5 - 35	3 of 12
Ethylbenzene	30.80	17.13	2.5 - 110	3 of 12
Styrene	1.24	2.88	2.5 - 7	1 of 12
Total Xylenes	55.51	31.54	2.5 - 180	3 of 12
TOTAL VOLATILES:	167.26	109.67	25 - 590	3 of 12
SEMI-VOLATILE ORGANIC COMPOUNDS (ug/kg)				
Naphthalene	8271.11	5596.25	165 - 26000	5 of 12
2-Methylnaphthalene	3749.37	2097.08	165 - 13000	5 of 12
Acenaphthylene	3333.24	2015.83	165 - 10000	4 of 12
Acenaphthene	4877.47	2921.25	165 - 17000	5 of 12
Dibenzofuran	2024.34	1062.50	165 - 6200	2 of 12
Fluorene	4647.66	2981.25	165 - 16000	5 of 12
Phenanthrene	23761.95	20313.33	165 - 61000	8 of 12
Anthracene	7038.61	5477.08	165 - 22000	7 of 12
Di-n-Butylphthalate	2193.12	826.25	165 - 8100	1 of 12
Fluoranthene	19060.03	13846.67	165 - 56000	8 of 12
Pyrene	20243.64	14780.00	165 - 59000	8 of 12
Benzo (a) Anthracene	6131.13	2881.25	165 - 23000	7 of 12
Chrysene	8007.15	7358.33	165 - 20000	8 of 12
Benzo (b) Fluoranthene	8479.48	5977.08	165 - 28000	7 of 12
Benzo (k) Fluoranthene	4376.56	1484.58	165 - 16000	1 of 12
Benzo (a) Pyrene	10928.55	9721.67	165 - 28000	8 of 12
Indeno (1,2,3-cd) Pyrene	3808.57	2675.00	165 - 12000	6 of 12
Dibenz (a,h) Anthracene	2230.59	1504.17	165 - 6100	4 of 12
Benzo (g,h,i,) Perylene	4078.62	2800.00	165 - 14000	6 of 12
TOTAL SEMI-VOLATILES:	120725.34	106319.58	3135 - 322425	8 of 12
PESTICIDES/PCB (ug/kg)				
Aroclor-1248	30391.34	9203.33	40 - 110000	1 of 12
Aroclor-1254	27273.89	21130.00	80 - 81000	11 of 12
TOTAL PESTICIDES/PCB:	51878.79	30333.33	120 - 187000	11 of 12
INORGANIC COMPOUNDS (mg/kg)				
Aluminum	2386.61	5540.83	1610 - 10300	12 of 12
Antimony	3.32	7.00	6 - 18	1 of 12
Arsenic	4.32	5.58	1 - 14	8 of 12
Barium	207.17	110.92	20 - 787	7 of 12
Beryllium	0.44	0.63	0.5 - 2.1	1 of 12
Cadmium	2.67	1.92	0.5 - 10	4 of 12
Calcium	2152.12	2461.67	500 - 7030	8 of 12
Chromium	6.99	14.06	2.5 - 31	12 of 12
Copper	153.27	75.68	2.5 - 578	11 of 12
Cyanide	4.02	2.60	0.84 - 15	3 of 12
Iron	7297.49	12949.17	4620 - 26200	12 of 12
Lead	105.50	134.78	5.9 - 351	12 of 12
Magnesium	652.50	1603.33	500 - 2740	10 of 12
Manganese	38.46	158.25	99 - 223	12 of 12
Mercury	0.14	0.14	0.02 - 0.44	6 of 12
Nickel	9.64	13.08	4 - 39	9 of 12
Potassium	207.29	562.50	500 - 1250	1 of 12
Selenium	1.00	0.86	0.5 - 4.1	2 of 12
Vandium	50.33	65.17	15 - 179	12 of 12
Zinc	120.64	150.58	40 - 470	12 of 12
OTHER PARAMETERS (mg/kg)				
Silicon	50682.84	337500.00	250000 - 370000	4 of 4
TOC	0.04	0.03	0.009 - 0.099	4 of 4

APPENDIX C-3

SEDIMENT SAMPLING RESULTS
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Sample Location	Depth (in.)	Date Sampled	Level III PCB Arochlor 1254 (ppm)	Level III Results TOC (mg/kg)	Level IV CLP SVOA	Level IV CLP PCBs(ppm)	Grain Size
AS-1	0-4	12/15/87	1.0	NA	NA	NA	NA
AS-2	0-6	12/15/87	4.2	NA	NA	NA	NA
AS-3	4	12/15/87	14.0	0.373	NA	ND	NA
AS-4	0-12	12/15/87	5.7	NA	NA	NA	NA
AS-5	0-6	12/15/87	12.0	NA	NA	NA	NA
AS-6	0-6	12/15/87	19.0	NA	NA	NA	NA
AS-7	0-6	12/15/87	16.0	NA	NA	NA	NA
AS-8	0-8	12/15/87	<1.0	NA	NA	NA	NA
AS-9	0-8	12/15/87	3.6	NA	NA	NA	NA
AS-10	0-6	12/15/87	<1.0	NA	NA	NA	NA
AS-11	0-6	12/15/87	11.0/22.0	NA	NA	NA	NA
AS-12	0-6	12/15/87	5.1	0.278	NA	NA	NA
AS-13	0-6	12/15/87	3.5	NA	NA	NA	NA
AS-14	0-6	12/15/87	7.4	NA	NA	NA	NA
AS-15	0-12	12/15/87	1.7	NA	NA	NA	NA
AS-16	0-6	12/15/87	13.0	0.179	NA	NA	NA
AS-17	0-12	12/15/87	10.0	NA	NA	NA	NA
AS-18	0-12	12/15/87	11.0	NA	NA	NA	NA
AS-19	0.6	3/8/88	NA	NA	14.0J	NA	NA
AS-20	0.6	3/8/88	NA	0.146	18.0/17	NA	NA
AS-21	0.6	3/8/88	NA	NA	4.7	NA	NA
AS-22	0.6	3/8/88	NA	NA	7.3	NA	NA
AS-23	0.6	3/8/88	NA	0.056	15.0J	NA	NA
MM-1	0-6	12/16/87	<1.0	NA	NA	NA	NA
MM-2	4	12/16/87	1.0	0.114	NA	ND	NA
MM-3	0-4	12/16/87	6.3	NA	NA	NA	NA
MM-4	0-12	12/16/87	4.4	NA	NA	NA	NA
MM-5	0-6	12/16/87	60.0	NA	NA	NA	NA
MM-6	0-12	12/16/87	4.2	0.056	NA	ND	NA
MM-7	0-12	12/16/87	<1.0	NA	NA	NA	NA
MM-8	0-6	12/16/87	3.0	NA	NA	NA	NA
MM-9	0-12	12/16/87	16.0/18.0	NA	NA	NA	NA
MM-10	0-6	12/16/87	11.0	NA	NA	NA	NA
MM-11	0-12	12/16/87	9.1	NA	NA	NA	NA
MM-12	0-6	12/16/87	23.0	NA	NA	NA	NA
MM-13	0-8	12/16/87	8.2	NA	NA	NA	NA
MM-14	0-6	12/16/87	9.3	NA	NA	NA	NA
MM-15	0-6	12/16/87	8.1	NA	NA	NA	NA
MM-16	0-6	12/16/87	4.0	0.008	B	3.1	C
MM-17	0-12	12/16/87	5.6/10.0	0.460	NA	NA	NA
MM-18	0-6	12/16/87	2.1	NA	NA	NA	NA
MM-19	0-6	12/16/87	<1.0	NA	NA	NA	NA
MM-20	0-6	12/16/87	28.0	0.130	NA	15.0	NA

5.88.84
0012.0.0

APPENDIX C-3 (continued)

SEDIMENT SAMPLING RESULTS
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Sample Location	Depth (in.)	Date Sampled	Level III PCB Arochlor 1254 (ppm)	Level III Results TOC (mg/kg)	Level IV CLP SVOA	Level IV CLP PCBs(ppm)	Grain Size
MM-21	0-6	12/16/87	9.2	NA	NA	NA	NA
MM-22	0-4	12/16/87	2.2	NA	NA	NA	NA
MM-23	0-6	12/16/87	<1.0	NA	NA	NA	NA
MM-24	0-12	12/16/87	4.6	NA	NA	NA	NA
MM-25	0-12	12/16/87	10.0	NA	NA	NA	NA
MM-26	0-6	12/16/87	8.5	NA	NA	NA	NA
SD-1	2-3	12/16/87	NA	0.022	A/A	NA	NA
SD-2	2-3	12/16/87	NA	0.010	A	NA	NA
SD-3	1-2	12/16/87	NA	NA	A	NA	NA
SD-4	0-6	12/16/87	NA	NA	A	NA	NA
SD-5	0-6	12/16/87	NA	NA	A	NA	NA
SD-6	0-12	1/6/88	NA	0.087	A	A	B
SD-7	0-12	1/6/88	NA	0.025	A	A	B
SD-8	0-12	1/6/88	NA	0.105	A	A	B
SD-9	0-12	1/6/88	NA	0.110	A	A	B
SD-10	2-3	12/16/87	NA	0.002	A	NA	NA

NOTES:

AS = Apponagansett Swamp Sediment Sampling Stations
MM = Middle Marsh Sediment Sampling Stations
NA = Not Analyzed
/ = Duplicate (Reported Second)
A = Sample was analyzed for CLP VOCs; results are shown in Appendix C-4.
B = Sample was analyzed for CLP SVOCs; results are shown in Appendix C-4.
C = Grain-size analyses were completed and are shown in Appendix C-4.

5.88.84
0013.0.0

COMBINED SUMMARY TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		SD-1	SD-1-DUP	SD-2	SD-3	SD-4	SD-5
SMO NUMBER:		AI034	AI032	AI033	AI031	AI030	AI029
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
2-Butanone	10	NA	NA	NA	NA	NA	NA
TOTAL VOLATILES:		NA	NA	NA	NA	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
bis (2-Ethylhexyl) Phthalate	330	NA	NA	-	NA	NA	NA
TOTAL SEMI-VOLATILES:		NA	NA	-	NA	NA	NA
PESTICIDES/PCB	CRDL ug/kg						
Heptachlor	8	-	-	-	-	-	-
Aldrin	8	-	-	-	-	-	-
Endosulfan Sulfate	16	-	755 J	50 J	-	-	-
4,4-DDD	16	-	-	-	-	-	-
4,4'-DDT	16	-	-	-	-	-	-
Aroclor-1254	160	870	-	-	1450	-	1718
TOTAL PESTICIDES/PCB:		870	755	50	1450	-	1718
OTHER PARAMETERS	mg/kg						
Silicon		NA	NA	NA	NA	NA	NA
TOC		0.022	NA	0.010	NA	NA	NA
%SOLIDS		42	42	72	68	18	54

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		SD-6	SD-7	SD-8	SD-9	SD-10	SD-SB-1
SMO NUMBER:		AK016	AI047	AK018	AK019	AI028	AI036
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
2-Butanone	10	-	NA	-	-	NA	NA
TOTAL VOLATILES:		-	NA	-	-	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
bis (2-Ethylhexyl) Phthalate	330	-	NA	-	-	-	3400 B
TOTAL SEMI-VOLATILES:		-	NA	-	-	-	3400
PESTICIDES/PCB	CRDL ug/kg						
Heptachlor	8	-	-	-	-	59.00 J	-
Aldrin	8	-	-	-	-	73 J	-
Endosulfan Sulfate	16	-	-	-	-	-	-
4,4-DDD	16	-	-	-	-	-	-
4,4'-DDT	16	-	-	-	-	-	-
Aroclor-1254	160	1500 J	-	-	3200 CJ	5259 J	-
TOTAL PESTICIDES/PCB:		1500	-	-	3200	5391	-
OTHER PARAMETERS	mg/kg						
Silicon		NA	NA	NA	NA	NA	NA
TOC		0.087	0.025	0.105	0.110	0.002	NA
%SOLIDS		78	8	12	24	78	NR

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		SD-AS-3	SD-AS-12	SD-AS-16	SD-AS-19	SD-AS-20	SD-AS-20-DUP
SMO NUMBER:		AK017	NA	NA	AK344	AK345	AK346
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
2-Butanone	10	60 J	NA	NA	NA	NA	NA
TOTAL VOLATILES:		60	NA	NA	NA	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg						
bis (2-Ethylhexyl) Phthalate	330	-	NA	NA	NA	NA	NA
TOTAL SEMI-VOLATILES:		-	NA	NA	NA	NA	NA
PESTICIDES/PCB	CRDL ug/kg						
Heptachlor	8	-	NA	NA	-	-	-
Aldrin	8	-	NA	NA	-	-	-
Endosulfan Sulfate	16	-	NA	NA	-	-	-
4,4-DDD	16	1400	NA	NA	-	-	-
4,4'-DDT	16	100 J	NA	NA	-	-	-
Aroclor-1254	160	10000	NA	NA	14000 J	18000	17000
TOTAL PESTICIDES/PCB:		11500	NA	NA	14000	18000	17000
OTHER PARAMETERS	mg/kg						
Silicon		NA	NA	NA	NA	NA	NA
TOC		0.373	0.278	0.179	NA	0.146	NA
%SOLIDS		25	10.3	10.9	13	14.1	14.1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:	SD-AS-21	SD-AS-22	SD-AS-23
SMO NUMBER:	AK347	AK348	AK349
UNITS:	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS — CRDL ug/kg			
2-Butanone — 10	NA	NA	NA
TOTAL VOLATILES:	NA	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS — CRDL ug/kg			
bis (2-Ethylhexyl) Phthalate — 330	NA	NA	NA
TOTAL SEMI-VOLATILES:	NA	NA	NA
PESTICIDES/PCB — CRDL ug/kg			
Heptachlor — 8	-	-	-
Aldrin — 8	-	-	-
Endosulfan Sulfate — 16	-	-	-
4,4-DDD — 16	-	-	-
4,4'-DDT — 16	-	-	-
Aroclor-1254 — 160	4700	7300	15000 J
TOTAL PESTICIDES/PCB:	4700	7300	15000
OTHER PARAMETERS — mg/kg			
Silicon	NA	NA	NA
TOC	NA	NA	0.056
%SOLIDS	10	17	76.4

COMBINED SUMMARY TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		MM-2	MM-6	MM-16	MM-17	MM-20
SMO NUMBER:		AI040	AI039	AI038	NA	AI037
UNITS:		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg					
2-Butanone	10	NA	NA	NA	NA	NA
TOTAL VOLATILES:		NA	NA	NA	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/kg					
bis (2-Ethylhexyl) Phthalate	330	NA	NA	NA	NA	NA
TOTAL SEMI-VOLATILES:		NA	NA	NA	NA	NA
PESTICIDES/PCB	CRDL ug/kg					
Heptachlor	8	-	-	-	NA	R
Aldrin	8	-	110	-	NA	R
Endosulfan Sulfate	16	-	-	-	NA	-
4,4'-DDT	16	-	70 J	-	NA	160
Aroclor-1254	160	-	-	3104	NA	15000
TOTAL PESTICIDES/PCB:		-	180	3104	NA	15160
OTHER PARAMETERS	mg/kg					
Silicon		NA	NA	NA	NA	NA
TOC		0.114	0.056	0.008	0.460	0.130
%SOLIDS		12	24	78	11	18

SUMMARY STATISTICS TABLE

PROJECT: SULLIVAN'S LEDGE
SITE: ECJ WELLS

	STANDARD DEVIATION	MEAN	RANGE	FREQUENCY
VOLATILE ORGANIC COMPOUNDS (ug/kg)				
2-Butanone	23.82	18.75	5 - 60	1 of 4
TOTAL VOLATILES:	23.82	18.75	5 - 60	1 of 4
SEMI-VOLATILE ORGANIC COMPOUNDS (ug/kg)				
bis (2-Ethylhexyl) Phthalate	1132.01	627.14	165 - 3400	1 of 7
TOTAL SEMI-VOLATILES:	1132.01	627.14	165 - 3400	1 of 7
PESTICIDES/PCB (ug/kg)				
Heptachlor	11.22	6.39	4 - 59	1 of 23
Aldrin	2156.79	466.96	4 - 10583	2 of 23
Endosulfan Sulfate	152.19	42.30	8 - 755	2 of 23
4,4-DDD	0.00	1400.00	1400 - 1400	1 of 23
4,4'-DDT	0.00	100.00	100 - 100	1 of 23
Aroclor-1254	68922.11	19357.48	80 - 341481	14 of 23
TOTAL PESTICIDES/PCB:	83915.11	27905.63	138 - 352076	14 of 16
OTHER PARAMETERS (mg/kg)				
TOC	0.13	0.13	0.00 - 0.46	17 of 17

COMBINED SUMMARY TABLE PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-GCA-1	(Filtered) GW-GCA-1F	GW-GCA-1A	(Filtered) GW-GCA-1AF	GW-GCA-2	GW-GCA-2A
SMO NUMBER:		AK175/MAH236	AK176/	AK178/MAH237	AK179/	AK180/MAH238	AK097/MAH214
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	NA	92	NA	-	-
Chloroethane	10	-	NA	-	NA	-	-
Acetone	10	-	NA	15 J	NA	-	-
1,1 - Dichloroethene	5	140	NA	20	NA	-	-
1,1 - Dichloroethane	5	9	NA	-	NA	-	-
1,2 - Dichloroethene (Total)	5	51000	NA	4000	NA	13	-
Chloroform	5	-	NA	-	NA	-	-
1,2 - Dichloroethane	5	11	NA	-	NA	-	-
2-Butanone	10	30 J	NA	-	NA	-	-
Bromodichloromethane	5	-	NA	-	NA	-	-
Trichloroethene	5	1200 J	NA	1800	NA	72	-
1,1,2 - Trichloroethane	5	10	NA	-	NA	-	-
Benzene	5	400 J	NA	100	NA	-	-
4-Methyl-2-Pentanone	10	-	NA	-	NA	-	-
Toluene	5	500 JB	NA	130 B	NA	-	-
Chlorobenzene	5	240 J	NA	53	NA	-	-
Ethylbenzene	5	640 J	NA	160	NA	-	-
Styrene	5	-	NA	23	NA	-	-
Total Xylenes	5	75	NA	6	NA	-	-
TOTAL VOLATILES:		54255	NA	6399	NA	85	-
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	-	-	-	-	-
1,3 - Dichlorobenzene	10	11	-	-	-	-	-
1,4 - Dichlorobenzene	10	38	20	-	-	-	-
Isophorone	10	12	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	23	-	18	10	-	-
Naphthalene	10	89	35	-	-	-	-
2-Methylnaphthalene	10	-	-	-	-	-	-
2-Chloronaphthalene	10	11	-	-	-	-	-
N-Nitrosodiphenylamine	10	17	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	-	-	-	-	-	-
TOTAL SEMI-VOLATILES:		201	55	18	10	-	-
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aroclor-1248	0.50	-	-	-	-	-	-
Aroclor-1254	1.00	-	-	3.7	-	-	-
TOTAL PESTICIDES:		-	-	3.7	-	-	-
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l						
Aluminum	P 200	-	NA	-	NA	-	-
Barium	P 200	2050	NA	889	NA	-	235
Cadmium	P 5	20 J	NA	14 J	NA	-	-
Calcium	P 5000	123000 J	NA	61100 J	NA	22700 J	25700 J
Chromium	P 10	-	NA	-	NA	-	-
Copper	P 25	-	NA	-	NA	-	-
Cyanide	10	124 J	NA	70 J	NA	-	-
Iron	P 100	65100 J	NA	49600 J	NA	204 J	122 J
Lead	P/F 5	17 J	NA	-	NA	6.3 J	6.1 J
Magnesium	P 5000	35600	NA	16700	NA	6680	6810
Manganese	P 15	20900 J	NA	2170 J	NA	15 J	30 J
Mercury	CV 0.2	-	NA	0.40	NA	0.30	-
Nickel	P 40	-	NA	-	NA	93	-
Potassium	P 5000	12600	NA	8100	NA	6400	6700
Silver	P 10	-	NA	-	NA	-	-
Sodium	P 5000	88000	NA	42900	NA	58900	75600
Zinc	P 20	37	NA	-	NA	36	218 J
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (02)		20	NA	15	NA	NA	NA
TOC		34	NA	10	NA	NA	NA
COD (02)		150	NA	54	NA	NA	NA
Chloride		23	NA	61	NA	NA	NA
Nitrate		0.5	NA	0.2	NA	NA	NA
TDS		1020	NA	410	NA	NA	NA
TSS		57	NA	83	NA	NA	NA
Sulfate		2.6	NA	21	NA	NA	NA
Oil & Grease		11	NA	3	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		GW-MW-1	GW-MW-1A	GW-MW-2	GW-MW-4	GW-MW-4A	GW-MW-5
SMO NUMBER:		AK144/MAH222	AK145/MAH251	AK151/MAH256	AK141/MAH219	AK140/MAH218	AK164/MAH229
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	-	180	-	-	-
Chloroethane	10	-	-	17	-	-	-
Acetone	10	-	-	-	-	-	-
1,1 - Dichloroethene	5	-	-	-	-	-	-
1,1 - Dichloroethane	5	-	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	15	-	600	49	-	-
Chloroform	5	-	-	-	-	-	-
1,2 - Dichloroethane	5	-	-	-	-	-	-
2-Butanone	10	-	30 J	-	-	-	-
Bromodichloromethane	5	-	-	-	-	-	-
Trichloroethene	5	6	-	200	120	-	-
1,1,2 - Trichloroethane	5	-	-	-	-	-	-
Benzene	5	5	-	510	-	-	-
4-Methyl-2-Pentanone	10	-	-	-	-	-	-
Toluene	5	-	-	-	-	-	-
Chlorobenzene	5	-	-	54	-	-	-
Ethylbenzene	5	-	-	-	-	-	-
Styrene	5	-	-	-	-	-	-
Total Xylenes	5	-	-	-	-	-	-
TOTAL VOLATILES:		26	30	1561	169	-	-
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	-	19	-	-	-
1,3 - Dichlorobenzene	10	-	-	-	-	-	-
1,4 - Dichlorobenzene	10	-	-	27	-	-	-
Isophorone	10	-	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	-	-	15	-	-	-
Naphthalene	10	-	-	-	-	-	-
2-Methylnaphthalene	10	-	-	-	-	-	-
2-Chloronaphthalene	10	-	-	-	-	-	-
N-Nitrosodiphenylamine	10	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	28	-	17	-	13	-
TOTAL SEMI-VOLATILES:		28	-	78	-	13	-
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aroclor-1248	0.50	-	-	-	-	-	-
Aroclor-1254	1.00	-	-	-	-	-	-
TOTAL PESTICIDES:		-	-	-	-	-	-
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l						
Aluminum	P 200	-	-	-	-	-	-
Barium	P 200	-	-	-	-	-	-
Cadmium	P 5	-	-	-	-	-	-
Calcium	P 5000	21900 J	39300 J	54200 J	49600 J	11300 J	112000 J
Chromium	P 10	-	-	-	-	-	-
Copper	P 25	-	31	-	-	-	-
Cyanide	10	-	-	-	-	-	-
Iron	P 100	396 J	3890 J	12400 J	16200 J	891 J	1220 J
Lead	P/F 5	16 J	5.2 J	53 J	6.8 J	5.7 J	15 J
Magnesium	P 5000	-	13200	18900	9670	-	19500
Manganese	P 15	449 J	1840 J	2820 J	2240 J	428 J	48 J
Mercury	CV 0.2	0.40	-	-	-	-	-
Nickel	P 40	-	-	-	-	-	-
Potassium	P 5000	-	6200	10000	-	8400	6500
Silver	P 10	-	-	-	-	-	-
Sodium	P 5000	11800	51000	75600	35300	8300	78500
Zinc	P 20	-	22 J	23 J	-	-	22 J
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (O2)		-	19	31	NA	NA	NA
TOC		1.7	19	17	NA	NA	NA
COD (O2)		-	48	75	NA	NA	NA
Chloride		7	56	98	NA	NA	NA
Nitrate		-	0.1	-	NA	NA	NA
TDS		140	370	520	NA	NA	NA
TSS		4	72	24	NA	NA	NA
Sulfate		12	30	22	NA	NA	NA
Oil & Grease		-	-	-	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		GW-MW-5A	GW-MW-6	GW-MW-6A	MW-6A-DUP	(Filtered) GW-MW-6AF	MW-6AF-DUP
SMO NUMBER:		AK143/MAH221	AK146/MAH252	AK157/MAH224	AK160/MAH225	AK159/	AK161/
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	540	200	87	NA	NA
Chloroethane	10	-	14	-	-	NA	NA
Acetone	10	-	-	-	-	NA	NA
1,1 - Dichloroethene	5	-	13	-	-	NA	NA
1,1 - Dichloroethane	5	-	-	-	-	NA	NA
1,2 - Dichloroethene (Total)	5	-	3800	490	470	NA	NA
Chloroform	5	-	-	-	-	NA	NA
1,2 - Dichloroethane	5	-	-	-	-	NA	NA
2-Butanone	10	-	-	-	34 J	NA	NA
Bromodichloromethane	5	-	-	-	-	NA	NA
Trichloroethene	5	-	2200	29	32	NA	NA
1,1,2 - Trichloroethane	5	-	-	-	-	NA	NA
Benzene	5	-	33	36	36	NA	NA
4-Methyl-2-Pentanone	10	-	42	-	-	NA	NA
Toluene	5	-	30	-	-	NA	NA
Chlorobenzene	5	-	37	28	28	NA	NA
Ethylbenzene	5	-	9	-	-	NA	NA
Styrene	5	-	-	-	-	NA	NA
Total Xylenes	5	-	-	-	-	NA	NA
TOTAL VOLATILES:		-	6718	783	687	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	-	-	-	-	-
1,3 - Dichlorobenzene	10	-	-	-	-	-	-
1,4 - Dichlorobenzene	10	-	-	-	-	-	-
Isophorone	10	-	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	-	-	-	-	-	-
Naphthalene	10	-	-	-	-	-	-
2-Methylnaphthalene	10	-	-	-	-	-	-
2-Chloronaphthalene	10	-	-	-	-	-	-
N-Nitrosodiphenylamine	10	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	-	-	-	-	-	-
TOTAL SEMI-VOLATILES:		-	-	-	-	-	-
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aroclor-1248	0.50	-	-	-	-	-	-
Aroclor-1254	1.00	-	-	-	-	-	-
TOTAL PESTICIDES:		-	-	-	-	-	-
INORGANIC COMPOUNDS / ANALYTICAL METHOD	CRDL ug/l						
Aluminum P	200	-	-	-	-	NA	NA
Barium P	200	-	-	-	-	NA	NA
Cadmium P	5	-	7 J	-	-	NA	NA
Calcium P	5000	34100 J	48100 J	40700 J	41600 J	NA	NA
Chromium P	10	-	-	-	-	NA	NA
Copper P	25	-	-	-	-	NA	NA
Cyanide	10	-	-	16	-	NA	NA
Iron P	100	215 J	17800 J	11000 J	11000 J	NA	NA
Lead P/F	5	-	5 J	17 J	15 J	NA	NA
Magnesium P	5000	8240	14200	11900	12200	NA	NA
Manganese P	15	23 J	4480 J	3700 J	3810 J	NA	NA
Mercury CV	0.2	-	-	-	-	NA	NA
Nickel P	40	-	-	-	-	NA	NA
Potassium P	5000	10900	8700	10500	10300	NA	NA
Silver P	10	-	-	-	-	NA	NA
Sodium P	5000	214000	72500	71800	72400	NA	NA
Zinc P	20	27 J	-	-	-	NA	NA
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (02)		NA	12	8	9	NA	NA
TOC		NA	34	12	11	NA	NA
COD (02)		NA	48	28	28	NA	NA
Chloride		NA	120	130	160	NA	NA
Nitrate		NA	0.1	0.1	-	NA	NA
TDS		NA	460	420	450	NA	NA
TSS		NA	45	17	23	NA	NA
Sulfate		NA	3	6	5	NA	NA
Oil & Grease		NA	-	-	3	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY
TABLE

SAMPLE LOCATION:		GW-MW-8	GW-MW-8A	GW-MW-10	GW-MW-10A	GW-MW-10B	GW-MW-11
SMO NUMBER:		AK138/MAH216	AK139/MAH217	AK147/MAH253	AK148/MAH254	AK142/MAH220	AK174/MAH235
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	-	-	-	-	-
Chloroethane	10	-	-	-	-	-	-
Acetone	10	-	-	-	-	-	-
1,1 - Dichloroethene	5	-	-	-	-	-	-
1,1 - Dichloroethane	5	-	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	-	-	-	28	-	-
Chloroform	5	-	-	-	-	-	-
1,2 - Dichloroethane	5	-	-	-	-	-	-
2-Butanone	10	-	-	-	-	13 J	-
Bromodichloromethane	5	-	-	-	-	-	-
Trichloroethene	5	-	-	5	-	8	-
1,1,2 - Trichloroethane	5	-	-	-	-	-	-
Benzene	5	-	-	-	-	-	-
4-Methyl-2-Pentanone	10	-	-	-	-	-	-
Toluene	5	-	-	-	-	-	-
Chlorobenzene	5	-	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	-	-
Styrene	5	-	-	-	-	-	-
Total Xylenes	5	-	-	-	-	-	-
TOTAL VOLATILES:		-	-	5	28	21	-
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	-	-	-	-	-
1,3 - Dichlorobenzene	10	-	-	-	-	-	-
1,4 - Dichlorobenzene	10	-	-	-	-	-	-
Isophorone	10	-	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	-	-	-	-	-	-
Naphthalene	10	-	-	-	-	-	-
2-Methylnaphthalene	10	-	-	-	-	-	-
2-Chloronaphthalene	10	-	-	-	-	-	-
N-Nitrosodiphenylamine	10	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	-	-	-	-	-	-
TOTAL SEMI-VOLATILES:		-	-	-	-	-	-
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aroclor-1248	0.50	-	-	-	-	-	-
Aroclor-1254	1.00	-	-	-	-	-	6.9
TOTAL PESTICIDES:		-	-	-	-	-	6.9
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l						
Aluminum	P 200	-	-	-	-	-	-
Barium	P 200	-	-	-	-	-	-
Cadmium	P 5	-	-	-	-	-	-
Calcium	P 5000	59300 J	56200 J	23500 J	44800 J	19900 J	26000 J
Chromium	P 10	-	-	-	-	-	-
Copper	P 25	-	-	-	18	-	-
Cyanide	10	-	-	-	-	-	-
Iron	P 100	662 J	473 J	161 J	10600 J	751 J	703 J
Lead	P/F 5	6.0 J	5.9 J	5.5 J	17 J	6.0 J	5.4 J
Magnesium	P 5000	27600	28000	12200	17800	10700	-
Manganese	P 15	32 J	29 J	27 J	1620 J	-	1110 J
Mercury	CV 0.2	-	-	-	-	-	-
Nickel	P 40	-	-	-	-	-	-
Potassium	P 5000	-	3200	-	-	-	-
Silver	P 10	-	-	-	-	13	-
Sodium	P 5000	29400	27000	13000	16200	13200	11700
Zinc	P 20	23 J	-	-	-	24 J	23
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (O2)		NA	NA	NA	NA	NA	2
TOC		NA	NA	NA	NA	NA	15
COD (O2)		NA	NA	NA	NA	NA	6
Chloride		NA	NA	NA	NA	NA	20
Nitrate		NA	NA	NA	NA	NA	1
TDS		NA	NA	NA	NA	NA	240
TSS		NA	NA	NA	NA	NA	14
Sulfate		NA	NA	NA	NA	NA	22
Oil & Grease		NA	NA	NA	NA	NA	-
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		GW-MW-12	GW-MW-12A	(Filtered) GW-MW-12F	GW-MW-13	GW-MW-13A	GW-MW-14
SMO NUMBER:		AK169/MAH232	AK162/MAH227	AK170/	AK163/MAH228	AK171/MAH233	AK172/MAH234
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	6400	-	NA	36	-	-
Chloroethane	10	-	11	NA	-	-	-
Acetone	10	-	-	NA	-	-	-
1,1 - Dichloroethene	5	87	-	NA	-	-	-
1,1 - Dichloroethane	5	7	-	NA	-	-	-
1,2 - Dichloroethene (Total)	5	30000	-	NA	200	90	-
Chloroform	5	-	-	NA	-	-	-
1,2 - Dichloroethane	5	-	-	NA	-	-	-
2-Butanone	10	-	-	NA	130 J	230 J	110 J
Bromodichloromethane	5	-	-	NA	-	-	-
Trichloroethene	5	150	-	NA	110	-	-
1,1,2 - Trichloroethane	5	-	-	NA	-	-	-
Benzene	5	340 J	-	NA	52	76	51
4-Methyl-2-Pentanone	10	-	-	NA	-	-	-
Toluene	5	280 J	-	NA	8	-	-
Chlorobenzene	5	220 J	13	NA	24	54	-
Ethylbenzene	5	290 J	-	NA	8	8	6
Styrene	5	-	-	NA	-	-	-
Total Xylenes	5	67	-	NA	-	-	-
TOTAL VOLATILES:		37841	24	NA	568	458	167
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	16	-	-	-	-
1,3 - Dichlorobenzene	10	-	-	-	-	-	-
1,4 - Dichlorobenzene	10	32	-	16	-	10	-
Isophorone	10	-	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	-	-	-	-	-	-
Naphthalene	10	46	-	16	-	-	-
2-Methylnaphthalene	10	-	-	-	-	-	-
2-Chloronaphthalene	10	20	28	-	-	-	-
N-Nitrosodiphenylamine	10	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	-	-	-	-	-	-
TOTAL SEMI-VOLATILES:		98	44	32	-	10	-
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aroclor-1248	0.50	-	-	-	-	-	-
Aroclor-1254	1.00	15	4.3	-	-	-	-
TOTAL PESTICIDES:		15	4.3	-	-	-	-
INORGANIC COMPOUNDS / ANALYTICAL METHOD	CRDL ug/l						
Aluminum P	200	-	-	NA	-	-	-
Barium P	200	1490	1140	NA	591	664	-
Cadmium P	5	17 J	17 J	NA	10 J	9.8 J	-
Calcium P	5000	98500 J	85900 J	NA	57800 J	57100 J	43300 J
Chromium P	10	33	-	NA	-	-	-
Copper P	25	25	-	NA	-	-	-
Cyanide	10	37 J	-	NA	-	-	-
Iron P	100	57400 J	50500 J	NA	47000 J	37000 J	5690 J
Lead P/F	5	-	16 J	NA	15 J	17 J	6.8 J
Magnesium P	5000	21500	16700	NA	15600	15300	13900
Manganese P	15	3090 J	536 J	NA	2120 J	1730 J	1520 J
Mercury CV	0.2	-	-	NA	-	-	-
Nickel P	40	-	-	NA	-	-	-
Potassium P	5000	11500	10500	NA	8500	9100	8200
Silver P	10	-	-	NA	-	-	-
Sodium P	5000	62500	53800	NA	36700	41400	63800
Zinc P	20	27	24 J	NA	-	78	-
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (O2)		13	31	NA	12	21	6
TOC		90	16	NA	7.6	9.3	16
COD (O2)		81	62	NA	50	44	58
Chloride		21	84	NA	43	52	76
Nitrate		0.2	0.2	NA	0.2	0.3	0.1
TDS		650	520	NA	400	420	420
TSS		88	79	NA	66	34	-
Sulfate		4	8	NA	32	55	31
Oil & Grease		6	6	NA	-	3	-
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY
TABLE

SAMPLE LOCATION:	(Filtered) GW-MW-14F	GW-MW-15	GW-MW-16	GW-MW-17	GW-MW-20	GW-MW-22A
SMO NUMBER:	AK173/	AK152/MAH257	AK100/MAH213	AK165/MAH230	AK099/MAH215	AK168/MAH231
UNITS:	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS (CRDL ug/l)						
Vinyl Chloride (10)	NA	-	-	-	-	190
Chloroethane (10)	NA	-	-	-	-	-
Acetone (10)	NA	-	-	-	-	-
1,1 - Dichloroethene (5)	NA	-	-	-	-	-
1,1 - Dichloroethane (5)	NA	-	-	-	-	-
1,2 - Dichloroethene (Total) (5)	NA	-	-	-	-	84
Chloroform (5)	NA	-	-	-	-	-
1,2 - Dichloroethane (5)	NA	-	-	-	-	-
2-Butanone (10)	NA	-	-	-	-	-
Bromodichloromethane (5)	NA	-	-	-	-	-
Trichloroethene (5)	NA	-	-	25	-	-
1,1,2 - Trichloroethane (5)	NA	-	-	-	-	-
Benzene (5)	NA	-	-	-	-	87
4-Methyl-2-Pentanone (10)	NA	-	-	-	-	-
Toluene (5)	NA	-	-	-	-	8
Chlorobenzene (5)	NA	-	-	-	-	340
Ethylbenzene (5)	NA	-	-	-	-	3200
Styrene (5)	NA	-	-	-	-	-
Total Xylenes (5)	NA	-	-	-	-	32
TOTAL VOLATILES:	NA	-	-	25	-	3941
SEMI-VOLATILE ORGANIC COMPOUNDS (CRDL ug/l)						
Phenol (10)	-	-	-	-	-	-
1,3 - Dichlorobenzene (10)	-	-	-	-	-	21
1,4 - Dichlorobenzene (10)	-	-	-	-	-	35
Isophorone (10)	-	-	-	-	-	-
1,2,4 - Trichlorobenzene (10)	-	-	-	-	-	-
Naphthalene (10)	-	-	-	-	-	76
2-Methylnaphthalene (10)	-	-	-	-	-	16
2-Chloronaphthalene (10)	-	-	-	-	-	-
N-Nitrosodiphenylamine (10)	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate (10)	-	-	27	-	210 J	-
TOTAL SEMI-VOLATILES:	-	-	27	-	210	148
PESTICIDES/PCB (CRDL ug/l)						
Alpha-BHC (0.05)	-	0.81	-	-	-	-
Aroclor-1248 (0.50)	-	-	-	-	-	65 J
Aroclor-1254 (1.00)	-	-	1.9	-	-	93 J
TOTAL PESTICIDES:	-	0.81	1.9	-	-	158
INORGANIC COMPOUNDS (ANALYTICAL METHOD, CRDL ug/l)						
Aluminum (P, 200)	NA	-	-	381	-	-
Barium (P, 200)	NA	-	-	-	-	913
Cadmium (P, 5)	NA	-	-	-	7 J	18 J
Calcium (P, 5000)	NA	103000 J	29000 J	16400 J	62100 J	80100 J
Chromium (P, 10)	NA	-	-	-	-	-
Copper (P, 25)	NA	-	-	26	-	-
Cyanide (10)	NA	-	-	-	-	-
Iron (P, 100)	NA	21400 J	192 J	4640 J	19100 J	75100 J
Lead (P/F, 5)	NA	23 J	-	6.6 J	32 J	14 J
Magnesium (P, 5000)	NA	14900	7180	-	24600	27400
Manganese (P, 15)	NA	2360 J	176 J	625 J	1100 J	1070 J
Mercury (CV, 0.2)	NA	-	-	-	-	-
Nickel (P, 40)	NA	-	-	-	-	-
Potassium (P, 5000)	NA	14100	7200	-	5900	9400
Silver (P, 10)	NA	-	-	-	-	-
Sodium (P, 5000)	NA	85900	73500	13900	16300	41600
Zinc (P, 20)	NA	-	264 J	23 J	67 J	24 J
OTHER PARAMETERS (CRDL mg/l)						
BOD, 5-day (02)	NA	NA	NA	NA	NA	NA
TOC	NA	NA	NA	NA	NA	NA
COD (02)	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA
TDS	NA	NA	NA	NA	NA	NA
TSS	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA
Oil & Grease	NA	NA	NA	NA	NA	NA
%SOLIDS	NR	NR	NR	NR	NR	NR
DILUTION FACTOR	1	1	1	1	1	1
DRYWT/DILUTION FACTOR	1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		(Filtered) GW-MW-22AF	GW-MW-22B	(Filtered) GW-MW-22BF	GW-MW-24	(Filtered) GW-MW-24F	GW-MW-25
SMO NUMBER:		AK177/	AK197/MAH239	AK181/	AK153/MAH259	AK154/	AK199/MAH258
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	NA	-	NA	100	NA	-
Chloroethane	10	NA	18	NA	32	NA	-
Acetone	10	NA	-	NA	-	NA	-
1,1 - Dichloroethene	5	NA	-	NA	-	NA	-
1,1 - Dichloroethane	5	NA	-	NA	5	NA	-
1,2 - Dichloroethene (Total)	5	NA	28	NA	310	NA	-
Chloroform	5	NA	-	NA	-	NA	-
1,2 - Dichloroethane	5	NA	-	NA	-	NA	-
2-Butanone	10	NA	130 J	NA	-	NA	370 J
Bromodichloromethane	5	NA	-	NA	-	NA	-
Trichloroethene	5	NA	-	NA	1400	NA	-
1,1,2 - Trichloroethane	5	NA	-	NA	-	NA	-
Benzene	5	NA	88	NA	710	NA	-
4-Methyl-2-Pentanone	10	NA	-	NA	-	NA	-
Toluene	5	NA	-	NA	17	NA	-
Chlorobenzene	5	NA	32	NA	5	NA	-
Ethylbenzene	5	NA	-	NA	14	NA	43
Styrene	5	NA	-	NA	-	NA	-
Total Xylenes	5	NA	11	NA	65	NA	-
TOTAL VOLATILES:		NA	307	NA	2658	NA	413
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	-	-	-	-	-
1,3 - Dichlorobenzene	10	-	-	-	-	-	-
1,4 - Dichlorobenzene	10	-	-	-	-	-	-
Isophorone	10	-	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	-	-	-	-	-	-
Naphthalene	10	19	-	-	-	16	-
2-Methylnaphthalene	10	-	-	-	-	-	-
2-Chloronaphthalene	10	-	-	-	-	-	-
N-Nitrosodiphenylamine	10	-	12	-	22	-	-
bis (2-Ethylhexyl) Phthalate	10	-	12	-	10	-	-
TOTAL SEMI-VOLATILES:		19	24	-	32	16	-
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aroclor-1248	0.50	-	-	-	-	-	1.3
Aroclor-1254	1.00	-	3.3	-	-	-	2.6
TOTAL PESTICIDES:		-	3.3	-	-	-	3.9
INORGANIC COMPOUNDS / ANALYTICAL METHOD	CRDL ug/l						
Aluminum P	200	NA	-	NA	-	NA	-
Barium P	200	NA	423	NA	-	NA	-
Cadmium P	5	NA	16 J	NA	10 J	NA	-
Calcium P	5000	NA	65400 J	NA	41500 J	NA	41100 J
Chromium P	10	NA	-	NA	11	NA	-
Copper P	25	NA	35	NA	-	NA	27
Cyanide	10	NA	62 J	NA	-	NA	-
Iron P	100	NA	56700 J	NA	14600 J	NA	3160 J
Lead P/F	5	NA	5.5 J	NA	10 J	NA	15 J
Magnesium P	5000	NA	11800	NA	12200	NA	8130
Manganese P	15	NA	1270 J	NA	6010 J	NA	122 J
Mercury CV	0.2	NA	-	NA	-	NA	-
Nickel P	40	NA	78	NA	-	NA	-
Potassium P	5000	NA	9500	NA	6200	NA	11600
Silver P	10	NA	21	NA	-	NA	-
Sodium P	5000	NA	48900	NA	52400	NA	62700
Zinc P	20	NA	30	NA	109 J	NA	127 J
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (O2)		NA	NA	NA	NA	NA	NA
TOC		NA	NA	NA	NA	NA	NA
COD (O2)		NA	NA	NA	NA	NA	NA
Chloride		NA	NA	NA	NA	NA	NA
Nitrate		NA	NA	NA	NA	NA	NA
TDS		NA	NA	NA	NA	NA	NA
TSS		NA	NA	NA	NA	NA	NA
Sulfate		NA	NA	NA	NA	NA	NA
Oil & Grease		NA	NA	NA	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		GW-MW-B3	MW-B3-DUP	(Column Blank) GW-CB-1	(Blank) GW-FB-1F	(Blank) GW-FB-2	(Blank) GW-FB-3
SMO NUMBER:		AK155/MAH150	AK156/MAH223	AK293/MAH268	AK198/MAH226	/MAH241	/MAH333
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	-	-	NA	NA	NA
Chloroethane	10	-	-	-	NA	NA	NA
Acetone	10	-	-	-	NA	NA	NA
1,1 - Dichloroethene	5	-	-	-	NA	NA	NA
1,1 - Dichloroethane	5	-	-	-	NA	NA	NA
1,2 - Dichloroethene (Total)	5	-	-	190	NA	NA	NA
Chloroform	5	-	-	39	NA	NA	NA
1,2 - Dichloroethane	5	-	-	-	NA	NA	NA
2-Butanone	10	-	-	63 J	NA	NA	NA
Bromodichloromethane	5	-	-	7	NA	NA	NA
Trichloroethene	5	9	-	360	NA	NA	NA
1,1,2 - Trichloroethane	5	-	-	-	NA	NA	NA
Benzene	5	-	-	-	NA	NA	NA
4-Methyl-2-Pentanone	10	-	-	-	NA	NA	NA
Toluene	5	-	-	17	NA	NA	NA
Chlorobenzene	5	-	-	-	NA	NA	NA
Ethylbenzene	5	-	-	6	NA	NA	NA
Styrene	5	-	-	9	NA	NA	NA
Total Xylenes	5	-	-	-	NA	NA	NA
TOTAL VOLATILES:		9	-	691	NA	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	-	-	-	NA	NA
1,3 - Dichlorobenzene	10	-	-	-	-	NA	NA
1,4 - Dichlorobenzene	10	-	-	-	-	NA	NA
Isophorone	10	-	-	-	-	NA	NA
1,2,4 - Trichlorobenzene	10	-	-	-	-	NA	NA
Naphthalene	10	-	-	-	-	NA	NA
2-Methylnaphthalene	10	-	-	-	-	NA	NA
2-Chloronaphthalene	10	-	-	-	-	NA	NA
N-Nitrosodiphenylamine	10	-	-	-	-	NA	NA
bis (2-Ethylhexyl) Phthalate	10	-	-	16	-	NA	NA
TOTAL SEMI-VOLATILES:		-	-	16	-	NA	NA
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	NA	NA
Aroclor-1248	0.50	-	-	-	-	NA	NA
Aroclor-1254	1.00	-	-	-	-	NA	NA
TOTAL PESTICIDES:		-	-	-	-	NA	NA
INORGANIC COMPOUNDS / ANALYTICAL METHOD	CRDL ug/l						
Aluminum P	200	-	-	-	-	-	-
Barium P	200	-	-	-	-	-	-
Cadmium P	5	6 J	7 J	-	-	-	-
Calcium P	5000	37700 J	38200 J	-	-	-	-
Chromium P	10	-	-	-	-	-	-
Copper P	25	-	-	-	26	-	-
Cyanide	10	-	-	-	NR	NR	NR
Iron P	100	26200 J	25800 J	-	100 J	103 J	-
Lead P/F	5	-	7.6 J	-	13 J	5.2 J	6.5
Magnesium P	5000	12200	11900	-	-	-	-
Manganese P	15	5380 J	5410 J	-	-	-	-
Mercury CV	0.2	-	-	-	-	1.65	-
Nickel P	40	-	-	-	-	-	-
Potassium P	5000	6000	6100	-	-	-	-
Silver P	10	-	24	-	-	-	-
Sodium P	5000	88800	85900	8630	-	-	-
Zinc P	20	22 J	24 J	140	-	-	-
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (O2)		NA	NA	NA	NA	NA	NA
TOC		NA	NA	NA	NA	NA	NA
COD (O2)		NA	NA	NA	NA	NA	NA
Chloride		NA	NA	NA	NA	NA	NA
Nitrate		NA	NA	NA	NA	NA	NA
TDS		NA	NA	NA	NA	NA	NA
TSS		NA	NA	NA	NA	NA	NA
Sulfate		NA	NA	NA	NA	NA	NA
Oil & Grease		NA	NA	NA	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		(Blank) GW-FB-4	(Blank) GW-SB-1	(Blank) GW-SB-1F	(Blank) GW-SB-2	(Blank) GW-SB-3	(Blank) GW-SB-4
SMO NUMBER:		/MAH279	AK150/MAH255	AK149/·	AK183/MAH240	AK292/MAH267	AK305/MAH278
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	NA	-	NA	-	-	-
Chloroethane	10	NA	-	NA	-	-	-
Acetone	10	NA	-	NA	10 J	-	-
1,1 - Dichloroethene	5	NA	-	NA	-	-	-
1,1 - Dichloroethane	5	NA	-	NA	-	-	-
1,2 - Dichloroethene (Total)	5	NA	-	NA	-	-	-
Chloroform	5	NA	-	NA	-	-	-
1,2 - Dichloroethane	5	NA	-	NA	-	-	-
2-Butanone	10	NA	-	NA	84 J	14 J	15 J
Bromodichloromethane	5	NA	-	NA	-	-	-
Trichloroethene	5	NA	-	NA	-	-	6
1,1,2 - Trichloroethane	5	NA	-	NA	-	-	-
Benzene	5	NA	-	NA	-	-	-
4-Methyl-2-Pentanone	10	NA	-	NA	-	-	-
Toluene	5	NA	-	NA	-	-	-
Chlorobenzene	5	NA	-	NA	-	-	-
Ethylbenzene	5	NA	-	NA	-	-	-
Styrene	5	NA	-	NA	-	-	-
Total Xylenes	5	NA	-	NA	-	-	-
TOTAL VOLATILES:		NA	-	NA	94	14	21
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	NA	-	-	-	-	-
1,3 - Dichlorobenzene	10	NA	-	-	-	-	-
1,4 - Dichlorobenzene	10	NA	-	-	-	-	-
Isophorone	10	NA	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	NA	-	-	-	-	-
Naphthalene	10	NA	-	-	-	-	-
2-Methylnaphthalene	10	NA	-	-	-	-	-
2-Chloronaphthalene	10	NA	-	-	-	-	-
N-Nitrosodiphenylamine	10	NA	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	NA	-	-	-	-	70
TOTAL SEMI-VOLATILES:		NA	-	-	-	-	70
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	NA	-	-	-	-	-
Aroclor-1248	0.50	NA	-	-	-	-	-
Aroclor-1254	1.00	NA	-	-	-	-	-
TOTAL PESTICIDES:		NA	-	-	-	-	-
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l						
Aluminum	P 200	-	-	NA	-	-	-
Barium	P 200	-	-	NA	-	-	-
Cadmium	P 5	-	-	NA	-	-	-
Calcium	P 5000	-	-	NA	-	-	-
Chromium	P 10	-	-	NA	-	-	-
Copper	P 25	-	-	NA	-	-	-
Cyanide	10	-	-	NA	-	-	-
Iron	P 100	-	385 J	NA	101 J	-	-
Lead	P/F 5	-	16 J	NA	5 J	-	-
Magnesium	P 5000	-	-	NA	-	-	-
Manganese	P 15	-	-	NA	-	-	-
Mercury	CV 0.2	-	-	NA	0.60	-	-
Nickel	P 40	-	-	NA	-	-	-
Potassium	P 5000	-	-	NA	-	-	-
Silver	P 10	-	-	NA	-	-	-
Sodium	P 5000	-	11660	NA	-	-	-
Zinc	P 20	-	23 J	NA	27	-	-
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (O2)		NA	NA	NA	NA	NA	NA
TOC		NA	NA	NA	NA	NA	NA
COD (O2)		NA	NA	NA	NA	NA	NA
Chloride		NA	NA	NA	NA	NA	NA
Nitrate		NA	NA	NA	NA	NA	NA
TDS		NA	NA	NA	NA	NA	NA
TSS		NA	NA	NA	NA	NA	NA
Sulfate		NA	NA	NA	NA	NA	NA
Oil & Grease		NA	NA	NA	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	2	1
DRYWT/DILUTION FACTOR		1	1	1	1	2	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		Spike (Filtered) GW-SF	Spike (Non-Filtered) GW-SNF	(Trip Blank) GW-TB-1	(Trip Blank) GW-TB-2	(Trip Blank) GW-TB-3	(Trip Blank) GW-TB-4
SMO NUMBER:		AK166/	AK167/	AK098/	AK158/	AK182/	AK184/
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	NA	NA	-	-	-	-
Chloroethane	10	NA	NA	-	-	-	-
Acetone	10	NA	NA	-	-	-	-
1,1 - Dichloroethene	5	NA	NA	-	-	-	-
1,1 - Dichloroethane	5	NA	NA	-	-	-	-
1,2 - Dichloroethene (Total)	5	NA	NA	-	-	-	-
Chloroform	5	NA	NA	-	-	-	-
1,2 - Dichloroethane	5	NA	NA	-	-	-	-
2-Butanone	10	NA	NA	-	-	-	-
Bromodichloromethane	5	NA	NA	-	-	-	-
Trichloroethene	5	NA	NA	-	-	-	-
1,1,2 - Trichloroethane	5	NA	NA	-	-	-	-
Benzene	5	NA	NA	-	-	-	-
4-Methyl-2-Pentanone	10	NA	NA	-	-	-	-
Toluene	5	NA	NA	-	-	-	-
Chlorobenzene	5	NA	NA	-	-	-	-
Ethylbenzene	5	NA	NA	-	-	-	-
Styrene	5	NA	NA	-	-	-	-
Total Xylenes	5	NA	NA	-	-	-	-
TOTAL VOLATILES:		NA	NA	-	-	-	-
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Phenol	10	-	-	NA	NA	NA	NA
1,3 - Dichlorobenzene	10	-	-	NA	NA	NA	NA
1,4 - Dichlorobenzene	10	-	-	NA	NA	NA	NA
Isophorone	10	-	-	NA	NA	NA	NA
1,2,4 - Trichlorobenzene	10	-	-	NA	NA	NA	NA
Naphthalene	10	-	-	NA	NA	NA	NA
2-Methylnaphthalene	10	-	-	NA	NA	NA	NA
2-Chloronaphthalene	10	-	-	NA	NA	NA	NA
N-Nitrosodiphenylamine	10	-	-	NA	NA	NA	NA
bis (2-Ethylhexyl) Phthalate	10	-	-	NA	NA	NA	NA
TOTAL SEMI-VOLATILES:		-	-	NA	NA	NA	NA
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	NA	NA	NA	NA
Aroclor-1248	0.50	-	-	NA	NA	NA	NA
Aroclor-1254	1.00	-	9	NA	NA	NA	NA
TOTAL PESTICIDES:		-	9	NA	NA	NA	NA
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l						
Aluminum	P / 200	NA	NA	NA	NA	NA	NA
Barium	P / 200	NA	NA	NA	NA	NA	NA
Cadmium	P / 5	NA	NA	NA	NA	NA	NA
Calcium	P / 5000	NA	NA	NA	NA	NA	NA
Chromium	P / 10	NA	NA	NA	NA	NA	NA
Copper	P / 25	NA	NA	NA	NA	NA	NA
Cyanide	10	NA	NA	NA	NA	NA	NA
Iron	P / 100	NA	NA	NA	NA	NA	NA
Lead	P/F / 5	NA	NA	NA	NA	NA	NA
Magnesium	P / 5000	NA	NA	NA	NA	NA	NA
Manganese	P / 15	NA	NA	NA	NA	NA	NA
Mercury	CV / 0.2	NA	NA	NA	NA	NA	NA
Nickel	P / 40	NA	NA	NA	NA	NA	NA
Potassium	P / 5000	NA	NA	NA	NA	NA	NA
Silver	P / 10	NA	NA	NA	NA	NA	NA
Sodium	P / 5000	NA	NA	NA	NA	NA	NA
Zinc	P / 20	NA	NA	NA	NA	NA	NA
OTHER PARAMETERS	CRDL mg/l						
BOD, 5-day (O2)		NA	NA	NA	NA	NA	NA
TOC		NA	NA	NA	NA	NA	NA
COD (O2)		NA	NA	NA	NA	NA	NA
Chloride		NA	NA	NA	NA	NA	NA
Nitrate		NA	NA	NA	NA	NA	NA
TDS		NA	NA	NA	NA	NA	NA
TSS		NA	NA	NA	NA	NA	NA
Sulfate		NA	NA	NA	NA	NA	NA
Oil & Grease		NA	NA	NA	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		(Trip Blank) GW-TB-5	(Trip Blank) GW-TB-7	(Trip Blank) GW-TB-8	(Trip Blank) GW-TB-9	(Trip Blank) GW-TB-10
SMO NUMBER:		AK192/	AK285/	AK290/	AK297/	AK304/
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l					
Vinyl Chloride	10	-	-	-	-	-
Chloroethane	10	-	-	-	-	-
Acetone	10	-	-	-	-	-
1,1 - Dichloroethene	5	-	-	-	-	-
1,1 - Dichloroethane	5	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	-	-	-	-	-
Chloroform	5	-	-	-	-	-
1,2 - Dichloroethane	5	-	-	-	-	-
2-Butanone	10	-	-	-	-	-
Bromodichloromethane	5	-	-	-	-	-
Trichloroethene	5	6	-	-	-	30
1,1,2 - Trichloroethane	5	-	-	-	-	-
Benzene	5	-	-	-	-	-
4-Methyl-2-Pentanone	10	-	-	-	-	-
Toluene	5	-	-	-	-	-
Chlorobenzene	5	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	-
Styrene	5	-	-	-	-	-
Total Xylenes	5	-	-	-	-	-
TOTAL VOLATILES:		6	-	-	-	30
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l					
Phenol	10	NA	NA	NA	NA	NA
1,3 - Dichlorobenzene	10	NA	NA	NA	NA	NA
1,4 - Dichlorobenzene	10	NA	NA	NA	NA	NA
Isophorone	10	NA	NA	NA	NA	NA
1,2,4 - Trichlorobenzene	10	NA	NA	NA	NA	NA
Naphthalene	10	NA	NA	NA	NA	NA
2-Methylnaphthalene	10	NA	NA	NA	NA	NA
2-Chloronaphthalene	10	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	10	NA	NA	NA	NA	NA
bis (2-Ethylhexyl) Phthalate	10	NA	NA	NA	NA	NA
TOTAL SEMI-VOLATILES:		NA	NA	NA	NA	NA
PESTICIDES/PCB	CRDL ug/l					
Alpha-BHC	0.05	NA	NA	NA	NA	NA
Aroclor-1248	0.50	NA	NA	NA	NA	NA
Aroclor-1254	1.00	NA	NA	NA	NA	NA
TOTAL PESTICIDES:		NA	NA	NA	NA	NA
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l					
Aluminum	P / 200	NA	NA	NA	NA	NA
Barium	P / 200	NA	NA	NA	NA	NA
Cadmium	P / 5	NA	NA	NA	NA	NA
Calcium	P / 5000	NA	NA	NA	NA	NA
Chromium	P / 10	NA	NA	NA	NA	NA
Copper	P / 25	NA	NA	NA	NA	NA
Cyanide	/ 10	NA	NA	NA	NA	NA
Iron	P / 100	NA	NA	NA	NA	NA
Lead	P/F / 5	NA	NA	NA	NA	NA
Magnesium	P / 5000	NA	NA	NA	NA	NA
Manganese	P / 15	NA	NA	NA	NA	NA
Mercury	CV / 0.2	NA	NA	NA	NA	NA
Nickel	P / 40	NA	NA	NA	NA	NA
Potassium	P / 5000	NA	NA	NA	NA	NA
Silver	P / 10	NA	NA	NA	NA	NA
Sodium	P / 5000	NA	NA	NA	NA	NA
Zinc	P / 20	NA	NA	NA	NA	NA
OTHER PARAMETERS	CRDL mg/l					
BOD, 5-day (02)		NA	NA	NA	NA	NA
TOC		NA	NA	NA	NA	NA
COD (02)		NA	NA	NA	NA	NA
Chloride		NA	NA	NA	NA	NA
Nitrate		NA	NA	NA	NA	NA
TDS		NA	NA	NA	NA	NA
TSS		NA	NA	NA	NA	NA
Sulfate		NA	NA	NA	NA	NA
Oil & Grease		NA	NA	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1

SUMMARY STATISTICS TABLE

PROJECT: SULLIVAN'S LEDGE
SITE: OTHER WELLS (GW)

	STANDARD DEVIATION	MEAN	RANGE	FREQUENCY
VOLATILE ORGANIC COMPOUNDS (ug/l)				
Vinyl Chloride	1094.16	238.27	36 - 6400	8 of 33
Chloroethane	5.57	7.03	11 - 32	5 of 33
Acetone	1.71	5.30	15 - 15	1 of 33
1,1 - Dichloroethene	27.29	10.08	13 - 140	4 of 33
1,1 - Dichloroethane	1.38	2.91	5 - 9	3 of 33
1,2 - Dichloroethene (Total)	9973.64	2750.06	13 - 51000	15 of 33
1,2 - Dichloroethane	1.46	2.76	11 - 11	1 of 33
2-Butanone	77.25	35.39	13 - 370	8 of 33
Trichloroethene	548.44	223.61	5 - 2200	15 of 33
1,1,2 - Trichloroethane	1.29	2.73	10 - 10	1 of 33
Benzene	163.63	76.91	5 - 710	13 of 33
4-Methyl-2-Pentanone	6.34	6.12	42 - 42	1 of 33
Toluene	97.57	31.45	8 - 500	7 of 33
Chlorobenzene	76.69	34.92	5 - 340	12 of 33
Ethylbenzene	555.02	134.41	6 - 3200	10 of 33
Styrene	3.51	3.12	23 - 23	1 of 33
Total Xylenes	19.48	9.80	6 - 75	6 of 33
TOTAL VOLATILES:	11108.77	3574.88	5 - 54255	23 of 33
SEMI-VOLATILE ORGANIC COMPOUNDS (ug/l)				
Phenol	3.01	5.76	16 - 19	2 of 33
1,3 - Dichlorobenzene	2.90	5.67	11 - 21	2 of 33
1,4 - Dichlorobenzene	9.23	8.55	10 - 38	5 of 33
Isophorone	1.20	5.21	12 - 12	1 of 33
1,2,4 - Trichlorobenzene	4.05	6.24	15 - 23	3 of 33
Naphthalene	19.55	10.94	46 - 89	3 of 33
2-Methylnaphthalene	1.89	5.33	16 - 16	1 of 33
2-Chloronaphthalene	4.71	6.33	11 - 28	3 of 33
N-Nitrosodiphenylamine	3.66	6.09	12 - 22	3 of 33
bis (2-Ethylhexyl) Phthalate	35.21	13.55	10 - 210	7 of 33
TOTAL SEMI-VOLATILES:	49.49	73.67	10 - 210	13 of 33
PESTICIDES/PCB (ug/l)				
Alpha-BHC	0.13	0.05	0.81 - 0.81	1 of 33
Aroclor-1248	11.10	2.24	1.3 - 65	2 of 33
Aroclor-1254	15.92	4.34	1.9 - 93	8 of 33
TOTAL PESTICIDES:	26.91	6.63	0.81 - 158	9 of 33
INORGANIC COMPOUNDS (ug/l)				
Aluminum	48.17	108.52	381 - 381	1 of 33
Barium	463.16	327.12	235 - 2050	9 of 33
Cadmium	5.64	6.19	6 - 20	12 of 33
Calcium	27767.97	51281.82	11300 -123000	33 of 33
Chromium	4.88	6.03	11 - 33	2 of 33
Copper	6.03	15.14	18 - 35	6 of 33
Cyanide	24.82	13.61	16 - 124	5 of 33
Iron	22315.13	18517.27	122 - 75100	33 of 33
Lead	10.04	11.28	5 - 53	28 of 33
Magnesium	7939.59	14215.45	6680 - 35600	29 of 33
Manganese	3676.12	2093.26	15 - 20900	32 of 33
Mercury	0.08	0.12	0.3 - 0.4	3 of 33
Nickel	15.74	23.97	78 - 93	2 of 33
Potassium	3384.47	7148.48	3200 - 14100	25 of 33
Silver	3.03	5.73	13 - 21	2 of 33
Sodium	38012.20	52633.33	8300 -214000	33 of 33
Zinc	57.85	41.52	22 - 264	21 of 33
OTHER PARAMETERS (mg/l)				
BOD, 5-day (O2)	9.28	14.65	0.5 - 31	12 of 13
TOC	21.64	21.66	1.7 - 90	13 of 13
COD (O2)	35.39	54.35	2.5 - 150	12 of 13
Chloride	37.66	60.85	7 - 130	13 of 13
Nitrate	0.25	0.23	0.025 - 1	11 of 13
TDS	201.28	460.77	140 - 1020	13 of 13
TSS	29.55	45.23	4 - 88	12 of 13
Sulfate	14.78	19.12	2.6 - 55	13 of 13
Oil & Grease	2.77	3.15	1.5 - 11	5 of 13

COMBINED SUMMARY TABLE

PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		GW-ECJ-1-01	GW-ECJ-1-02	GW-ECJ-1-03	GW-ECJ-1-04	GW-ECJ-1-05	GW-ECJ-1-06
SMO NUMBER:		AK294/MAH269	AK291/MAH266	AK296/MAH271	AK295/MAH270	AK289/MAH265	AK288/MAH264
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	-	-	-	-	36 J
Methylene Chloride	5	-	-	-	-	-	-
1,1 - Dichloroethene	5	-	-	-	-	-	-
1,1 - Dichloroethane	5	-	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	2600	21000	6900	12000	5500	1500
Chloroform	5	-	-	-	-	-	-
1,2 - Dichloroethane	5	-	-	-	-	-	-
2-Butanone	10	-	-	-	-	-	34 J
Trichloroethene	5	5500	34000	57000	74000 B	37000	3700 J
Benzene	5	-	-	-	-	-	12
4-Methyl-2-Pentanone	10	-	-	-	-	750	300 J
Tetrachloroethene	5	-	-	-	-	-	10
Toluene	5	-	1400	-	-	2000	600
Chlorobenzene	5	-	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	340	36
Styrene	5	-	-	-	-	1600	410
Total Xylenes	5	-	-	-	-	-	14
TOTAL VOLATILES:		8100	56400	63900	86000	47190	6652
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
1,4 - Dichlorobenzene	10	11	-	11	-	-	-
1,2 - Dichlorobenzene	10	-	-	12	-	-	-
Isophorone	10	-	32	120	81	33	22
1,2,4 - Trichlorobenzene	10	12	36	140	73	57	20
Naphthalene	10	-	-	22	13	-	-
bis (2-Ethylhexyl) Phthalate	10	-	-	57	-	11	-
TOTAL SEMI-VOLATILES:		23	68	362	167	101	42
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	0.13	-	-	-	-	-
Aldrin	0.05	0.34	-	-	-	0.097	-
Endosulfan I	0.05	-	-	-	-	0.073	-
Dieldrin	0.10	0.11	-	-	-	-	-
TOTAL PESTICIDES:		0.58	-	-	-	0.17	-

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l					
Barium	P	200	1860	-	-	-	-
Cadmium	P	5	8.4	7.5	-	-	-
Calcium	P	5000	64400	54000	28000	31800	26800	25200
Cyanide	CM	10	43	22	-	-	-	25
Iron	P	100	29400	20200	876	-	361	-
Lead	P/F	5	-	-	11	-	-	-
Magnesium	P	5000	20300	12900	5510	6410	-	-
Manganese	P	15	26000	4990	575	1020	395	282
Mercury	CV	0.2	-	-	-	0.23	-	0.78
Potassium	P	5000	9560	4010	880	-	-	-
Sodium	P	5000	50800	28700	13400 J	18800 J	13800	13800
Zinc	P	20	95	54	-	-	-	-

OTHER PARAMETERS	CRDL mg/l						
TSS	10	500	300	NA	NA	140	NA
TDS	4	50	34	NA	NA	-	NA
Chloride	2	88	49	NA	NA	13	NA
Nitrate	0.05	-	-	NA	NA	-	NA
Sulfate	1	-	12	NA	NA	16	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		GW-ECJ-2-01	GW-ECJ-2-02	GW-ECJ-2-03	GW-ECJ-2-04	GW-ECJ-2-05
SMO NUMBER:		AK190/MAH247	AK188/MAH245	AK187/MAH244	AK186/MAH243	AK185/MAH 242
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l					
Vinyl Chloride	10	490 J	560	670	660	380 J
Methylene Chloride	5	-	-	44 JB	52 JB	-
1,1 - Dichloroethene	5	34	42	55	55	30
1,1 - Dichloroethane	5	-	-	6	7	5
1,2 - Dichloroethene (Total)	5	8400	10000 J	9300	11000 J	6000
Chloroform	5	-	-	-	-	-
1,2 - Dichloroethane	5	-	-	-	-	-
2-Butanone	10	19 J	-	260 J	98 J	33 J
Trichloroethene	5	9600	9500	21000 J	22000 J	14000 J
Benzene	5	60	60	63	68	47
4-Methyl-2-Pentanone	10	1200	1000	2000	2200 J	2600
Tetrachloroethene	5	12	14	42	36	26
Toluene	5	540	580	1200 J	1300	850
Chlorobenzene	5	19	17	-	-	-
Ethylbenzene	5	150	270	210 J	370	190 J
Styrene	5	200	220	560	380	200 J
Total Xylenes	5	8	12	20	17	9
TOTAL VOLATILES:		20732	22275	35430	38243	24370
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l					
1,4 - Dichlorobenzene	10	-	-	-	-	-
1,2 - Dichlorobenzene	10	-	-	-	-	-
Isophorone	10	21	21	56	60	23
1,2,4 - Trichlorobenzene	10	-	-	-	-	-
Naphthalene	10	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	-	11	-	-	-
TOTAL SEMI-VOLATILES:		21	32	56	60	23
PESTICIDES/PCB	CRDL ug/l					
Alpha-BHC	0.05	-	-	-	-	-
Aldrin	0.05	-	-	-	-	-
Endosulfan I	0.05	-	-	-	-	-
Dieldrin	0.10	-	-	-	-	-
TOTAL PESTICIDES:		-	-	-	-	-
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l					
Barium	P 200	-	-	-	-	-
Cadmium	P 5	-	-	-	-	-
Calcium	P 5000	61500	57300	33300	29300	24700
Cyanide	CM 10	-	-	-	-	-
Iron	P 100	1200	914	142	-	130
Lead	P/F 5	-	-	-	-	-
Magnesium	P 5000	13400	11800	6130	5390	-
Manganese	P 15	1030	561	158	174	138
Mercury	CV 0.2	-	-	-	-	-
Potassium	P 5000	3280	1540	-	-	-
Sodium	P 5000	43200	41100	33800	33800	35300
Zinc	P 20	128	45	37	43	26
OTHER PARAMETERS	CRDL mg/l					
TSS	10	NA	290	NA	190	NA
TDS	4	NA	-	NA	-	NA
Chloride	2	NA	44	NA	20	NA
Nitrate	0.05	NA	-	NA	-	NA
Sulfate	1	NA	10	NA	12	NA
%SOLIDS		NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		GW-ECJ-3-01	GW-ECJ-3-02	GW-ECJ-3-03	GW-ECJ-3-04	GW-ECJ-3-05	GW-ECJ-3-06
SMO NUMBER:		AK287/MAH263	AK286/MAH262	AK196/MAH261	AK195/MAH260	AK193/MAH249	AK191/MAH248
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	-	-	-	-	-
Methylene Chloride	5	-	-	-	-	-	-
1,1 - Dichloroethene	5	-	-	-	-	-	-
1,1 - Dichloroethane	5	-	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	-	-	-	-	-	-
Chloroform	5	-	-	-	-	-	10
1,2 - Dichloroethane	5	-	-	-	-	-	-
2-Butanone	10	-	17 J	-	-	-	-
Trichloroethene	5	-	-	5	11	8	13
Benzene	5	-	-	-	-	-	-
4-Methyl-2-Pentanone	10	-	-	-	-	-	-
Tetrachloroethene	5	-	-	-	-	-	-
Toluene	5	-	-	-	-	-	-
Chlorobenzene	5	-	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	-	-
Styrene	5	-	-	-	-	-	-
Total Xylenes	5	-	-	-	-	-	-
TOTAL VOLATILES:		-	17	5	11	8	23
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
1,4 - Dichlorobenzene	10	-	-	-	-	-	-
1,2 - Dichlorobenzene	10	-	-	-	-	-	-
Isophorone	10	-	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	-	-	-	-	-	-
Naphthalene	10	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	-	-	-	-	-	13
TOTAL SEMI-VOLATILES:		-	-	-	-	-	13
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aldrin	0.05	-	-	-	-	-	-
Endosulfan I	0.05	-	-	-	-	-	-
Dieldrin	0.10	-	-	-	-	-	-
TOTAL PESTICIDES:		-	-	-	-	-	-
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l						
Barium	P / 200	-	-	-	-	-	-
Cadmium	P / 5	-	-	-	-	-	-
Calcium	P / 5000	26300	27200	37700	32600	23700	23100
Cyanide	CM / 10	-	-	-	-	-	-
Iron	P / 100	-	-	-	-	-	182
Lead	P/F / 5	-	-	-	-	-	-
Magnesium	P / 5000	8500	12300	8180	8040	5200	5890
Manganese	P / 15	-	-	390	302	313	336
Mercury	CV / 0.2	-	-	-	-	-	-
Potassium	P / 5000	6960	5500	5420	5500	-	-
Sodium	P / 5000	82400	64700	63300	65300	10900	10700
Zinc	P / 20	57	32	251	151	-	-
OTHER PARAMETERS	CRDL mg/l						
TSS	10	NA	NA	NA	NA	NA	NA
TDS	4	NA	NA	NA	NA	NA	NA
Chloride	2	NA	NA	NA	NA	NA	NA
Nitrate	0.05	NA	NA	NA	NA	NA	NA
Sulfate	1	NA	NA	NA	NA	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		GW-ECJ-4-01	GW-ECJ-4-02	GW-ECJ-4-03	GW-ECJ-4-04	GW-ECJ-4-05	GW-ECJ-4-06
SMO NUMBER:		AK303/MAH277	AK302/MAH276	AK301/MAH275	AK300/MAH274	AK299/MAH273	AK298/MAH272
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Vinyl Chloride	10	-	-	-	-	-	-
Methylene Chloride	5	-	-	-	-	-	-
1,1 - Dichloroethene	5	-	-	-	-	-	-
1,1 - Dichloroethane	5	-	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	-	-	-	-	6300	-
Chloroform	5	-	-	-	6	-	8
1,2 - Dichloroethane	5	-	-	-	-	-	-
2-Butanone	10	-	-	13 J	-	-	-
Trichloroethene	5	-	-	-	-	270000 J	-
Benzene	5	-	-	-	-	-	-
4-Methyl-2-Pentanone	10	-	-	-	-	-	-
Tetrachloroethene	5	-	-	-	-	-	-
Toluene	5	-	-	-	-	14000	-
Chlorobenzene	5	-	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	7500	-
Styrene	5	-	-	-	-	10000	-
Total Xylenes	5	-	-	-	-	-	-
TOTAL VOLATILES:		-	-	13	6	307800	8
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
1,4 - Dichlorobenzene	10	-	-	-	-	-	-
1,2 - Dichlorobenzene	10	-	-	-	-	-	-
Isophorone	10	-	-	-	-	-	-
1,2,4 - Trichlorobenzene	10	-	-	-	-	-	-
Naphthalene	10	-	-	-	-	-	-
bis (2-Ethylhexyl) Phthalate	10	36	-	-	13	-	-
TOTAL SEMI-VOLATILES:		36	-	-	13	-	-
PESTICIDES/PCB	CRDL ug/l						
Alpha-BHC	0.05	-	-	-	-	-	-
Aldrin	0.05	-	-	-	-	-	-
Endosulfan I	0.05	-	-	-	-	-	-
Dieldrin	0.10	-	-	-	-	-	-
TOTAL PESTICIDES:		-	-	-	-	-	-
INORGANIC COMPOUNDS	ANALYTICAL METHOD / CRDL ug/l						
Barium	P / 200	-	-	-	-	-	-
Cadmium	P / 5	-	-	-	-	-	-
Calcium	P / 5000	89400	99400	97800	21600	19600	22400
Cyanide	CN / 10	-	-	-	-	-	-
Iron	P / 100	-	-	-	-	-	-
Lead	P/F / 5	5.5	-	-	-	-	-
Magnesium	P / 5000	24300	25500	27700	-	-	-
Manganese	P / 15	55	-	69	-	-	-
Mercury	CV / 0.2	-	-	-	-	-	-
Potassium	P / 5000	-	-	-	-	-	-
Sodium	P / 5000	21800 J	21900 J	23000 J	17200 J	2400 J	24300 J
Zinc	P / 20	26	-	-	-	14 JB	-
OTHER PARAMETERS	CRDL mg/l						
TSS	10	NA	360	NA	120	NA	NA
TDS	4	NA	-	NA	-	NA	NA
Chloride	2	NA	190	NA	18	NA	NA
Nitrate	0.05	NA	1.2	NA	1.4	NA	NA
Sulfate	1	NA	20	NA	19	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR
DILUTION FACTOR		1	1	1	1	1	1
DRYWT/DILUTION FACTOR		1	1	1	1	1	1

COMBINED SUMMARY TABLE

SAMPLE LOCATION: ECJ-2-02-DUP ECJ-1-02-DUP
SMO NUMBER: AK189/MAH246 AK/342/MAH334
UNITS: ug/l

VOLATILE ORGANIC COMPOUNDS	CRDL ug/l		
Vinyl Chloride	10	1000	-
Methylene Chloride	5	-	-
1,1 - Dichloroethene	5	53	-
1,1 - Dichloroethane	5	5	-
1,2 - Dichloroethene (Total)	5	13000 J	16000
Chloroform	5	-	-
1,2 - Dichloroethane	5	8	-
2-Butanone	10	-	-
Trichloroethene	5	14000 J	24000
Benzene	5	77	-
4-Methyl-2-Pentanone	10	3200	550
Tetrachloroethene	5	16	-
Toluene	5	900	1100
Chlorobenzene	5	22	-
Ethylbenzene	5	410	630
Styrene	5	320	450
Total Xylenes	5	14	-
TOTAL VOLATILES:		33025	42730

SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l		
1,4 - Dichlorobenzene	10	-	-
1,2 - Dichlorobenzene	10	-	-
Isophorone	10	23	22
1,2,4 - Trichlorobenzene	10	-	31
Naphthalene	10	-	-
bis (2-Ethylhexyl) Phthalate	10	-	240
TOTAL SEMI-VOLATILES:		23	293

PESTICIDES/PCB	CRDL ug/l		
Alpha-BHC	0.05	-	-
Aldrin	0.05	-	-
Endosulfan I	0.05	-	-
Dieldrin	0.10	-	-
TOTAL PESTICIDES:		-	-

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l		
Barium	P	200	-	208
Cadmium	P	5	-	8.4
Calcium	P	5000	58400	57000
Cyanide	CM	10	-	18
Iron	P	100	905	22200
Lead	P/F	5	-	-
Magnesium	P	5000	12100	13800
Manganese	P	15	574	5550
Mercury	CV	0.2	0.29 J	-
Potassium	P	5000	1520	-
Sodium	P	5000	42100	31200
Zinc	P	20	37	54

OTHER PARAMETERS	CRDL mg/l		
TSS	10	290	NA
TDS	4	-	NA
Chloride	2	43	NA
Nitrate	0.05	-	NA
Sulfate	1	11	NA
%SOLIDS		NR	NR
DILUTION FACTOR		1	1
DRYWT/DILUTION FACTOR		1	1

SUMMARY STATISTICS TABLE

PROJECT: SULLIVAN'S LEDGE
SITE: ECJ WELLS

	STANDARD DEVIATION	MEAN	RANGE	FREQUENCY
VOLATILE ORGANIC COMPOUNDS (ug/l)				
Vinyl Chloride	230.64	125.26	5 - 670	6 of 23
Methylene Chloride	12.87	6.46	2.5 - 52	2 of 23
1,1 - Dichloroethene	17.47	11.35	2.5 - 55	5 of 23
1,1 - Dichloroethane	1.22	2.96	2.5 - 7	3 of 23
1,2 - Dichloroethene (Total)	5462.24	4370.76	2.5 - 21000	12 of 23
Chloroform	1.94	3.22	2.5 - 10	3 of 23
1,2 - Dichloroethane	0.00	2.50	2.5 - 2.5	0 of 23
2-Butanone	54.10	24.09	5 - 260	7 of 23
Trichloroethene	55946.83	24232.80	2.5 -270000	16 of 23
Benzene	23.64	15.33	2.5 - 68	6 of 23
4-Methyl-2-Pentanone	786.61	440.43	5 - 2600	7 of 23
Tetrachloroethene	11.10	7.93	2.5 - 42	6 of 23
Toluene	2834.42	978.48	2.5 - 14000	9 of 23
Chlorobenzene	4.38	3.85	2.5 - 19	2 of 23
Ethylbenzene	1519.10	395.80	2.5 - 7500	8 of 23
Styrene	2035.17	591.63	2.5 - 10000	8 of 23
Total Xylenes	5.22	5.33	2.5 - 20	6 of 23
TOTAL VOLATILES:	63795.99	31218.17	50 -307837	20 of 23
SEMI-VOLATILE ORGANIC COMPOUNDS (ug/l)				
1,4 - Dichlorobenzene	1.69	5.52	5 - 11	2 of 23
1,2 - Dichlorobenzene	1.43	5.30	5 - 12	1 of 23
Isophorone	29.22	23.22	5 - 120	10 of 23
1,2,4 - Trichlorobenzene	31.39	18.39	5 - 140	6 of 23
Naphthalene	3.76	6.09	5 - 22	2 of 23
bis (2-Ethylhexyl) Phthalate	12.03	9.83	5 - 57	6 of 23
TOTAL SEMI-VOLATILES:	72.00	68.35	30 - 362	14 of 23
PESTICIDES/PCB (ug/l)				
Alpha-BHC	0.02	0.03	0.025 - 0.13	1 of 23
Aldrin	0.07	0.04	0.025 - 0.34	2 of 23
Endosulfan I	0.01	0.03	0.025 - 0.073	1 of 23
Dieldrin	0.01	0.05	0.05 - 0.11	1 of 23
TOTAL PESTICIDES:	0.18	0.43	0.245 - 0.605	2 of 23
INORGANIC COMPOUNDS (ug/l)				
Barium	358.92	176.52	100 - 1860	1 of 23
Cadmium	1.54	2.97	2.5 - 8.4	2 of 23
Calcium	24519.70	41613.04	19600 - 99400	23 of 23
Cyanide	9.06	8.26	5 - 43	3 of 23
Iron	7066.15	2352.39	50 - 29400	9 of 23
Lead	1.81	3.00	2.5 - 11	2 of 23
Magnesium	8036.13	9280.43	1000 - 27700	17 of 23
Manganese	5297.39	1681.43	7.5 - 26000	17 of 23
Mercury	0.14	0.14	0.1 - 0.78	2 of 23
Potassium	2415.21	2463.04	880 - 9560	9 of 23
Sodium	20653.44	31930.43	2400 - 82400	23 of 23
Zinc	58.02	46.04	10 - 251	13 of 23
OTHER PARAMETERS (mg/l)				
TSS	124.26	271.43	120 - 500	7 of 7
TDS	18.57	13.43	2 - 50	2 of 7
Chloride	58.11	60.29	13 - 190	7 of 7
Nitrate	0.59	0.37	0.002 - 1.4	2 of 7
Sulfate	6.11	12.79	0.5 - 20	6 of 7

SUMMARY TABLE PROJECT: SULLIVAN'S LEDGE

ZONE:			Number 6	Number 5B	Number 5A	Number 5	Number 4	Number 4	Number 3	Number 3
SAMPLE LOCATION:		GW-TB-11	GW-ECJ-1-18	GW-ECJ-1-17	GW-ECJ-1-16	GW-ECJ-1-15	GW-ECJ-1-14	GW-DUP-6 (ECJ-1-14)	GW-ECJ-1-13	GW-DUP-7 (ECJ-1-13)
SMO NUMBER:		AN 051	AN 052	AN 053	AN 054	AN 055	AN 056	AN 060	AN 057	AN 061
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l									
Vinyl Chloride	10	-	-	-	-	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	-	1600	4000	14000	3900	15000	12000	11000	11000
2-Butanone	10	-	R	-	-	-	-	-	-	R
Trichloroethene	5	-	9500	34000	47000	3200	76000	68000	110000	110000
4-Methyl-2-Pentanone	10	-	-	-	-	-	-	-	-	-
Toluene	5	-	480	1700	2100	220	3200	3200	4400	4000
Ethylbenzene	5	-	-	-	1600	160	-	2500	-	-
Styrene	5	-	310	-	-	-	-	-	-	-
DILUTION FACTOR		1	50	250	300	30	500	500	800	700

SUMMARY TABLE

ZONE:		Number 2	Number 1	Number 6	Number 6	Number 5	Number 4	Number 4	Number 3	Number 2
					GW-DUP-8			GW-DUP-9		
SAMPLE LOCATION:		GW-ECJ-1-12	GW-ECJ-1-11	GW-ECJ-2-16	(ECJ-2-16)	GW-ECJ-2-15	GW-ECJ-2-14	(ECJ-2-14)	GW-ECJ-2-13	GW-ECJ-2-12
SMO NUMBER:		AN 058	AN 059	AN 062	AN 068	AN 063	AN 064	AN 069	AN 065	AN 066
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l									
Vinyl Chloride	10	-	-	360	300	-	-	-	-	1400
1,2 - Dichloroethene (Total)	5	24000	3900	2900	2200	9200	7100	5200	8800	19000
2-Butanone	10	R	R	R	-	R	R	-	-	R
Trichloroethene	5	20000	6800	2500	2400	18000	-	-	29000	16000
4-Methyl-2-Pentanone	10	-	-	-	-	1900	1300	950	2800	1500
Toluene	5	-	-	-	-	1000	-	170	1600	1000
Ethylbenzene	5	-	-	-	-	-	-	-	-	-
Styrene	5	-	-	-	-	-	-	-	-	-
DILUTION FACTOR		150	50	20	20	100	50	30	200	100

SUMMARY TABLE

ZONE:		Number 1		Number 7	Number 7	Number 6	Number 5	Number 5	Number 4A	Number 4
					GW-DUP-10			GW-DUP-11		
SAMPLE LOCATION:		GW-ECJ-2-11	GW-SB-5	GW-ECJ-4-18	(ECJ-4-18)	GW-ECJ-4-17	GW-ECJ-4-16	(ECJ-4-16)	GW-ECJ-4-15	GW-ECJ-4-14
SMO NUMBER:		AN 067	AN 070	AN 071	AN 079	AN 072	AN 073	AN 080	AN 074	AN 075
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l									
Vinyl Chloride	10	820	-	-	-	-	-	-	-	-
1,2 - Dichloroethene (Total)	5	9900	-	-	-	-	-	-	-	-
2-Butanone	10	-	-	-	-	-	-	-	-	-
Trichloroethene	5	10000	-	-	-	-	-	-	-	-
4-Methyl-2-Pentanone	10	1100	-	-	-	-	-	-	-	-
Toluene	5	760	-	-	-	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	-	-	-	-	-
Styrene	5	-	-	-	-	-	-	-	-	-
DILUTION FACTOR		80	1	1	1	1	1	1	1	1

SUMMARY TABLE

	ZONE:	Number 3	Number 2	Number 1
	SAMPLE LOCATION:	GW-ECJ-4-13	GW-ECJ-4-12	GW-ECJ-4-11
	SMO NUMBER:	AN 076	AN 077	AN 078
	UNITS:	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l			
Vinyl Chloride	10	-	-	-
1,2 - Dichloroethene (Total)	5	-	-	-
2-Butanone	10	-	R	-
Trichloroethene	5	-	-	-
4-Methyl-2-Pentanone	10	-	-	-
Toluene	5	-	-	-
Ethylbenzene	5	-	-	-
Styrene	5	-	-	-
DILUTION FACTOR		1	1	1

COMBINED SUMMARY TABLE PROJECT: SULLIVAN'S LEDGE

SAMPLE LOCATION:		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
SMO NUMBER:		/MAF266	/MAF267	AI046/MAF268	/MAF269	AI045/MAF270	AI044/MAF271
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Chloromethane	10	NA	NA	-	NA	-	-
Methylene Chloride	5	NA	NA	-	NA	24 J	28 J
Acetone	10	NA	NA	-	NA	-	16 J
1,2 - Dichloroethene (Total)	5	NA	NA	-	NA	-	675
Trichloroethene	5	NA	NA	-	NA	-	8.8
Benzene	5	NA	NA	-	NA	-	-
Chlorobenzene	5	NA	NA	-	NA	-	43
Ethylbenzene	5	NA	NA	-	NA	-	25
Total Xylenes	5	NA	NA	-	NA	-	6.8
TOTAL VOLATILES:		NA	NA	-	NA	24	802.6
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Naphthalene	10	NA	NA	-	NA	-	-
N-Nitrosodiphenylamine	10	NA	NA	-	NA	-	-
bis (2-Ethylhexyl) Phthalate	10	NA	NA	-	NA	-	-
TOTAL SEMI-VOLATILES:		NA	NA	-	NA	-	-
PESTICIDES/PCB	CRDL ug/l						
Endosulfan I	0.05	NA	NA	-	NA	-	-
TOTAL PESTICIDES/PCB:		NA	NA	-	NA	-	-
INORGANIC COMPOUNDS / ANALYTICAL METHOD	CRDL ug/l						
Aluminum P	200	433	-	-	-	-	376
Barium P	200	-	-	-	-	-	964
Calcium P	5000	63200 J	16100 J	16200 J	19200 J	19700 J	64300 J
Cyanide CM	10	NR	NR	-	NR	-	-
Iron P	100	624 J	661 J	107 J	1110 J	264 J	66400 J
Lead P/F	5	-	18	-	-	-	-
Magnesium P	5000	20900 J	5420 J	-	6500 J	-	17700 J
Manganese P	15	143	264	40	595	464	2410
Potassium P	5000	-	-	-	-	-	8960 J
Silver P	10	-	-	23 J	-	-	-
Sodium P	5000	104600 J	52500 J	42300 J	62400 J	51100 J	46000 J
Zinc P	20	29	84	-	29	69	48
OTHER PARAMETERS	ug/l						
TOC		2.9	4.6	NA	4	NA	NA
Chloride		NA	NA	85	NA	100	86
Sulfate		NA	NA	34	NA	16	-
Nitrate + Nitrite		NA	NA	0.22	NA	2.1	-
%SOLIDS		NR	NR	NR	NR	NR	NR

COMBINED SUMMARY
TABLE

SAMPLE LOCATION:		SW-7	SW-8	SW-8-DUP	SW-9	SW-10	SW-10-DUP
SMO NUMBER:		/MAF272	AI043/MAF273	AI042/MAF274	AI041/MAF275	/MAF243	/MAF245
UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Chloromethane	10	NA	50	-	-	NA	NA
Methylene Chloride	5	NA	28 J	21 J	13 J	NA	NA
Acetone	10	NA	10 J	-	-	NA	NA
1,2 - Dichloroethene (Total)	5	NA	-	-	-	NA	NA
Trichloroethene	5	NA	-	-	-	NA	NA
Benzene	5	NA	45	-	-	NA	NA
Chlorobenzene	5	NA	34	-	-	NA	NA
Ethylbenzene	5	NA	-	-	-	NA	NA
Total Xylenes	5	NA	39	24	-	NA	NA
TOTAL VOLATILES:		NA	206	45	13	NA	NA
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l						
Naphthalene	10	NA	16	13	-	NA	NA
N-Nitrosodiphenylamine	10	NA	16	16	-	NA	NA
bis (2-Ethylhexyl) Phthalate	10	NA	680 B	-	560 B	NA	NA
TOTAL SEMI-VOLATILES:		NA	712	29	560	NA	NA
PESTICIDES/PCB	CRDL ug/l						
Endosulfan I	0.05	NA	0.67 J	-	-	NA	NA
TOTAL PESTICIDES/PCB:		NA	0.67	-	-	NA	NA
INORGANIC COMPOUNDS / ANALYTICAL METHOD	CRDL ug/l						
Aluminum P	200	-	-	-	415	-	-
Barium P	200	-	873	884	-	-	-
Calcium P	5000	20400 J	70200 J	70700 J	27300 J	21700 J	22100 J
Cyanide CM	10	NR	200 J	48 J	26 J	NR	NR
Iron P	100	1890 J	76900 J	78800 J	5230 J	1970 J	2450 J
Lead P/F	5	-	-	-	71	-	-
Magnesium P	5000	6860 J	13600 J	13700 J	6720 J	6880 J	6960 J
Manganese P	15	706	1030	1040	776	545	548
Potassium P	5000	-	9010 J	9010 J	5070 J	-	-
Silver P	10	-	-	-	-	-	-
Sodium P	5000	63400 J	54000 J	54800 J	82900 J	47500 J	48100 J
Zinc P	20	34	44	39	-	-	-
OTHER PARAMETERS	ug/l						
TOC		4.1	NA	NA	NA	5	5
Chloride		NA	100	100	220	NA	NA
Sulfate		NA	-	-	14	NA	NA
Nitrate + Nitrite		NA	-	-	0.23	NA	NA
%SOLIDS		NR	NR	NR	NR	NR	NR

COMBINED SUMMARY TABLE

SAMPLE LOCATION:		SW-11	SW-12	SW-13	SW-TB-1
SMO NUMBER:		/MAF244	/MAF246	/MAF247	AI035/
UNITS:		ug/l	ug/l	ug/l	ug/l
VOLATILE ORGANIC COMPOUNDS	CRDL ug/l				
Chloromethane	10	NA	NA	NA	-
Methylene Chloride	5	NA	NA	NA	-
Acetone	10	NA	NA	NA	-
1,2 - Dichloroethene (Total)	5	NA	NA	NA	-
Trichloroethene	5	NA	NA	NA	-
Benzene	5	NA	NA	NA	-
Chlorobenzene	5	NA	NA	NA	-
Ethylbenzene	5	NA	NA	NA	-
Total Xylenes	5	NA	NA	NA	-
TOTAL VOLATILES:		NA	NA	NA	-
SEMI-VOLATILE ORGANIC COMPOUNDS	CRDL ug/l				
Naphthalene	10	NA	NA	NA	NA
N-Nitrosodiphenylamine	10	NA	NA	NA	NA
bis (2-Ethylhexyl) Phthalate	10	NA	NA	NA	NA
TOTAL SEMI-VOLATILES:		NA	NA	NA	NA
PESTICIDES/PCB	CRDL ug/l				
Endosulfan I	0.05	NA	NA	NA	NA
TOTAL PESTICIDES/PCB:		NA	NA	NA	NA

INORGANIC COMPOUNDS	ANALYTICAL METHOD	CRDL ug/l				
Aluminum	P	200	339	-	239	NA
Barium	P	200	-	-	-	NA
Calcium	P	5000	19000 J	21900 J	19600 J	NA
Cyanide	CM	10	NR	NR	NR	NA
Iron	P	100	6160 J	4980 J	4850 J	NA
Lead	P/F	5	14	7	13	NA
Magnesium	P	5000	5740 J	6830 J	6360 J	NA
Manganese	P	15	537	544	466	NA
Potassium	P	5000	-	-	-	NA
Silver	P	10	-	-	-	NA
Sodium	P	5000	48000 J	57700 J	46100 J	NA
Zinc	P	20	83	64	60	NA

OTHER PARAMETERS	ug/l				
TOC		6.1	4.2	7.5	NA
Chloride		NA	NA	NA	NA
Sulfate		NA	NA	NA	NA
Nitrate + Nitrite		NA	NA	NA	NA
%SOLIDS		NR	NR	NR	NR

SUMMARY STATISTICS TABLE

PROJECT: SULLIVAN'S LEDGE
SITE: SURFACE WATER (SW)

	STANDARD DEVIATION	MEAN	RANGE	FREQUENCY
VOLATILE ORGANIC COMPOUNDS (ug/l)				
Chloromethane	18.00	14.00	5 - 50	1 of 5
Methylene Chloride	9.95	19.10	2.5 - 28	4 of 5
Acetone	4.35	8.20	5 - 16	2 of 5
1,2 - Dichloroethene (Total)	269.00	137.00	2.5 - 675	1 of 5
Trichloroethene	2.52	3.76	2.5 - 8.8	1 of 5
Benzene	17.00	11.00	2.5 - 45	1 of 5
Chlorobenzene	17.86	16.90	2.5 - 43	2 of 5
Ethylbenzene	9.00	7.00	2.5 - 25	1 of 5
Total Xylenes	14.27	10.66	2.5 - 39	2 of 5
TOTAL VOLATILES:	299.13	227.62	27.5 - 810.1	4 of 5
SEMI-VOLATILE ORGANIC COMPOUNDS (ug/l)				
Naphthalene	4.40	7.20	5 - 16	1 of 5
N-Nitrosodiphenylamine	4.40	7.20	5 - 16	1 of 5
bis (2-Ethylhexyl) Phthalate	303.67	251.00	5 - 680	2 of 5
TOTAL SEMI-VOLATILES:	309.95	265.40	15 - 712	2 of 5
PESTICIDES/PCB (ug/l)				
Endosulfan I	0.26	0.15	0.025 - 0.67	1 of 5
TOTAL PESTICIDES/PCB:	0.26	0.15	0.025 - 0.67	1 of 5
INORGANIC COMPOUNDS (ug/l)				
Aluminum	133.68	200.15	100 - 433	5 of 13
Barium	295.85	225.92	100 - 964	2 of 13
Calcium	19529.67	30676.92	16100 - 70200	13 of 13
Cyanide	76.33	48.20	5 - 200	2 of 5
Iron	25103.84	13165.08	107 - 76900	13 of 13
Lead	18.09	11.00	2.5 - 71	5 of 13
Magnesium	5356.95	8346.92	2500 - 20900	11 of 13
Manganese	564.68	655.38	40 - 2410	13 of 13
Potassium	2355.69	3695.38	2500 - 9010	3 of 13
Silver	4.80	6.38	5 - 23	1 of 13
Sodium	16813.07	58346.15	42300 - 104600	13 of 13
Zinc	25.47	44.15	10 - 84	10 of 13
OTHER PARAMETERS (ug/l)				
TOC	1.33	4.80	2.9 - 7.5	8 of 8
Chloride	51.31	118.20	85 - 220	5 of 5
Sulfate	12.36	13.00	0.5 - 34	3 of 5
Nitrate + Nitrite	0.80	0.52	0.025 - 2.1	3 of 5

APPENDIX D
PHASE II ECOTOXICITY ASSESSMENT
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

D.0 ECOTOXICITY ASSESSMENT

This appendix provides toxicological information for the contaminant of concern that poses the greatest actual or potential risk to the environment: PCBs. The Ecotoxicity Assessment is a two-step process consisting of an evaluation of available toxicological information and an assesssment of concentration/response information. The toxicological evaluation involves performing a qualitative evaluation of the toxicity data for PCBs to determine the nature and severity of actual or potential adverse effects associated with exposure. The concentration/response assessment is a quantitative estimation of the risk from contaminant exposure.

D.1 TOXICOLOGICAL EVALUATION

This subsection of the Ecotoxicological Assessment describes the potential acute and chronic toxic effects to aquatic and terrestrial organisms associated with exposure to PCBs. While extensive ecotoxicity reviews exist for PCBs, this profile concentrates on ecotoxicity data most appropriate to characterizing the potential toxic effects to aquatic and terrestrial organisms at the Sullivan's Ledge site.

PCBs are produced by direct chlorination of a biphenyl, resulting in 209 possible congeners, of which 50 to 100 are

frequently observed in the environment. PCBs, marketed in the U.S. under the tradename Aroclor, contain a known average percentage of chlorine by weight (e.g., Aroclor-1254 contains an average of 54 percent by weight chlorine). The primary Aroclor found in association with the Sullivan's Ledge site is Aroclor-1254, although Aroclor-1248 is also found. Toxicity information presented later will be specific to these Aroclors.

D.1.1 Toxicity to Aquatic Life

Exposure to PCBs can result in acute (lethal) or chronic (sublethal) adverse effects to aquatic organisms. Examples of sublethal effects are decreased growth and decreased reproductivity. In addition to resulting from direct contact with contaminated water or sediments, adverse effects can occur as a result of dietary exposure to PCBs and accumulation of PCBs in the tissues of the organism.

D.1.1.1 Aquatic Toxicity

Information concerning the acute effects of PCB exposure to aquatic organisms is characterized by use of LC50 values. LC50 values represent the PCB concentration that causes lethality in 50 percent of the organisms tested over a designated time interval. In general, the toxicity of PCBs increases with increasing periods of exposure. Younger developmental stages

and crustaceans are the most sensitive groups of organisms (Table D-1).

The cladoceran (microcrustacean) (Daphnia magna), exposed for 14 and 21 days to PCBs, experienced 50-percent mortality at 1.8 and 1.3 ug/l, respectively (EPA, 1980). The amphipod (Gammarus pseudolimnaeus) was more tolerant, with 50-percent mortality at 2,400 ug/l PCBs (NAS, 1979). The damselfly (Ischnura verticalis), the dragonfly (Macromia sp.), and the glass shrimp (Palaemonetes kadiakensis) exhibited intermediate tolerances, with LC50 values of 200, 800, and 3 ug/L, respectively, when exposed for 4, 5, and 7 days to PCBs (Johnson and Finley 1980; NAS, 1979).

Freshwater fish are more resistant than invertebrates to acute doses of PCBs in water. The rainbow trout (Salmo gairdneri) is the most sensitive fish species for which toxicity information is available. Trout exhibited LC50 values of 8 and 142 ug/l when exposed to PCBs for 10 and 8 days, respectively (Johnson and Finley, 1980; NAS, 1979).

D.1.1.2 Chronic Toxicity (Sublethal Effects)

PCBs are relatively inert and, therefore, are persistent compounds with low vapor pressures, low water solubility, and high log octanol/water partition coefficients. Because PCBs are

TABLE D-1

AROCLOR 1254 BIOCONCENTRATION FACTORS (BCF)
FOR SELECTED SPECIES OF WHOLE AQUATIC ORGANISMS
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

ORGANISM, GENUS/SPECIES	EXPOSURE DURATION IN DAYS (TISSUE)	BCF	REFERENCE
Invertebrates			
Daphnid Daphnia magna	4 (whole)	47,000	NAS, 1979
Phantom midge Chaoborus punctipennis	4 (whole) 14 (whole)	23,000 25,000	" "
Scud Gammarus pseudolimnaeus	4 (whole) 21 (whole)	24,000 27,000	" "
Mosquito larvae Culex tarsalis	4 (whole)	18,000	"
Crayfish Orconectes nais	4 (whole) 21 (whole)	1,700 5,100	" "
Glass shrimp Palaemonetes kodiakensis	4 (whole) 21 (whole)	12,000 17,000	" "
Protozoan Tetrahymena pyriformis	4 (whole)	60	EPA, 1980
Vertebrates			
Rainbow trout Salmo Gairdneri	30 (whole)	46,000	Bills & Marking, 1977
Channel catfish Icatalrus punctatus	77 (whole)	61,200	Mayer, et al., 1977
Fathead minnow (female) Pimephales promelas	240 (whole)	238,000	Nebeker, et al., 1974
Brook trout Salvelinus fontinalis	118 (whole)	47,000	Mauck, et al., 1978
Brook trout Salvelinus fontinalis	500 (whole)	3,000	Snarski and Puglisi, 1976
Brook trout Salvelinus fontinalis	500 (fillet)	42,000	Snarski and Puglisi, 1976

persistent and lipophilic, they are bioconcentrated in the fatty tissues of aquatic organisms. PCB bioaccumulation can directly result in sublethal effects to organisms.

The microcrustacean (Daphnia magna), phantom midge (Chaoborus punctipennis), scud (Gammarus pseudolimnaeus), mosquito larvae (Culex tarsalis), and glass shrimp (Palaemonetes kodiakensis) exhibited bioconcentration factors (BCFs) of 47,000, 23,000, 24,000, 18,000, 1,700, and 12,000, respectively, after being exposed to PCBs in solution for four days (NAS, 1979). BCFs for freshwater fish exposed to Aroclor-1254 range from 3,000 for brook trout (Salvelinus fontinalis) (fillets) to 238,000 for fathead minnow (Pimephales promelas).

PCB whole-body residues in freshwater fish are associated with reproductive impairment. Low survival and numerous fry deformities were observed in rainbow trout (Salmo gairdheri) eggs from adults with whole-body residues of 0.4-mg Aroclor-1242/kg fresh weight (EPA, 1980). Prehatch mortality (28 percent) and numerous posthatch deformities were also observed in rainbow trout eggs with 0.33-mg Aroclor-1254/kg fresh weight (Niimi, 1983). Brook trout (Salvelinus fontinalis) experienced complete reproductive failure during exposure to 200 ppm PCBs for 71 weeks; the no-effect level was 0.94 ug/l (EPA, 1980).

Dietary exposure to PCBs can result in pathological abnormalities in freshwater fish. Pathological changes were observed in the kidney of rainbow trout exposed to 1.0 mg of Aroclor-1254/kg fresh weight for 11 months. Dietary exposure of 1.2-mg Aroclor-1248/kg fresh weight for the lake trout (Salvelinus namaycusn) for nine months resulted in progressive degenerative changes in the liver (Roberts, et al., 1978).

Chronic PCB exposure can also result in decreased growth. Growth reduction was observed in the freshwater alga (Scenedesmus quadricauda) when exposed to PCB concentrations (Aroclor-1254) as low as 0.1 ug/l (EPA, 1980). Disruption of internal chloroplast membranes and failure of cytokinesis were the adverse changes observed in S. quadricauda treated with Aroclor-1252 (Mahanty, et al., 1983). Brook trout fry exposed for 48 days to 1.5 ug/L (Aroclor-1254) also showed decreased growth (Johnson and Finley, 1980).

PCB exposure over the entire life cycle of the test organism reflects a lower tolerance to PCBs than is represented by acute toxicity testing. Chronic values, as determined by EPA (EPA, 1980), represent PCB concentrations that cause significant adverse effects during long-term exposure to aquatic organisms. Chronic values for cladoceran (Daphinia magna) range from 2.1 to 15 ug/l for exposure to Aroclor-1254 and -1248. The amphipod (Gammarus pseudolimnaeus) and the midge (Tanytarsus dissimilis) exhibit chronic values of 3.3 and 0.8 ug/l, respectively.

Chronic values for freshwater fish are reported for the fathead minnow (Pimephales premelas) and range from 0.2 to 9.0 ug/l for Aroclor-1242 and -1248, respectively.

D.1.2 Mammalian Toxicity

Dietary exposure to PCBs is responsible for reproductive impairment and adverse physiological effects in mammals. The mink is one of the mammalian species most sensitive to PCBs (Aulerich and Ringer, 1977; Ringer, 1983; Hornshaw, et al., 1983; and Aulerich, et al., 1985). PCB poisoning in mink results in anorexia, weight loss, lethargy, gastrointestinal bleeding, reproductive impairment, and death. Mink diets supplemented with 2 ppm of Aroclor-1254 for eight months resulted in a high death rate among the young. A dietary exposure level of 1 ppm was not associated with any impairment.

Exposure to dietary doses of PCBs (Aroclor-1254) is also associated with behavioral changes in small mammals. Dietary levels of 25 to 100 ppm for three weeks significantly reduced sleeping times in animals such as the white-footed mouse (Peromyscus leucophus) (Sanders and Kirkpatrick, 1977) and the raccoon (Procyon lotor) (Montz, et al., 1982), which normally hibernate.

D.1.3 Avian Toxicity

PCBs disrupt normal patterns of reproduction, behavior, and metabolism in birds. PCBs are rapidly accumulated and slowly depurated by avian species. PCBs are primarily accumulated via the diet. PCB residue levels in bird liver were highest in those birds consuming fish (900 mg/kg) and lowest in herbivorous (i.e., plant-eating) species. Birds that consumed smaller birds and mammals, worms, and insects contained 50 and 0.65 mg/kg, respectively (NAS, 1979).

Reproductive impairment is often associated with dietary exposure to PCBs (Aroclor-1254) in birds. Ringed turtledoves exposed via diet to 10-ppm Aroclor-1254 for three months experienced reproductive impairment. The hatchability of the second clutch was reduced to 10 percent of the control group (Peakall, et al., 1972). Reduced hatchability was also observed in chicken eggs where adults were fed 20 ppm PCBs (Heinz, et al., 1984). A significant decline in sperm concentration was observed in American kestrels (*Falco sparverius*) fed 33-ppm Aroclor-1254 for 62 to 69 days (Bird, et al., 1983).

Dietary exposure to PCBs can disrupt mating behavior in bird species. Mourning doves (*Zanaida macroura carolinensis*) fed 10 ppm PCBs (Aroclor-1254) spent twice as long as controls in the courtship phase (billing, cooing, nest site selection). Only 50 percent of these pairs completed the courtship phase and

progressed into nest building and incubation. Of those doves that did nest, nest initiation was significantly delayed. Following dietary exposure to 40 ppm PCBs, mourning doves did not respond during courtship to the presence of a mate (Tori and Peterle, 1983). PCBs have also been associated with inducing abnormal behavior in European robins (Erithacus rubecula), pheasants, quail, and other avian species (Heinz, et al., 1984).

PCBs are associated with a variety of biochemical and histopathological responses in birds. PCB exposure disrupted vitamin A use in quail, and zinc and calcium metabolism in chickens (Roberts, et al., 1978). Ringed turtledoves fed dietary Aroclor-1254 (10 or 100 ppm) exhibited depressed levels of dopamine and norepinepherine (chemicals necessary for nervous transmission in the brain) in brain tissue (Heinz, et al., 1984). Liver histopathology was observed in pelicans (Pelecanus sp.) exposed to dietary Aroclor-1254 (100 ppm) for 10 weeks (NAS, 1979).

D.2 CONCENTRATION/RESPONSE EVALUATION

The purpose of this evaluation is to determine concentration/response relationships, including no-effect levels based on laboratory-derived ecotoxicity data for PCBs.

D.2.1 Concentration/Response Relationships

The first portion of the concentration/response evaluation establishes concentration/response relationships based on laboratory-derived ecotoxicity data for PCBs. Ecotoxicity data for fish and invertebrates exposed to PCBs discussed in the Toxicological Evaluation are summarized in Tables D-2 and D-3. Toxicological data discussed for avian species and mammals are provided in Table D-4. BCFs for aquatic species exposed to PCBs (Aroclor-1254) are presented in Table D-1. A discussion of PCB levels in water, diet, and tissue believed to be protective of adverse effects to aquatic life, mammals, and birds follows.

The best available data concerning long-term exposure of fish to PCBs indicate that concentrations below 0.7 ug/l in water produce no measurable effect on growth, reproduction, survival, or metabolic upset in the brook trout (*Salvelinus fontinalis*) (see Table D-3). Available data for invertebrates suggest that no adverse effects will occur to the insect midge (*Tanytarsus dissimilis*) at PCB concentrations below 0.5 ug/l (see Table D-3).

Whole body residues of 0.4-mg PCBs/kg fresh weight are associated with reproductive toxicity in rainbow trout (EPA, 1980). Rainbow trout eggs containing 0.22-mg PCBs/kg fresh weight exhibited reduced hatch and a significant increase in

TABLE D-2

ACUTE AND CHRONIC TOXICITIES OF PCBS TO SELECTED AQUATIC SPECIES
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Organism, Genus/Species	Exposure Period (days)	LC50 (μg/ℓ)	Reference
Acute Toxicity			
Invertebrates			
Crayfish			
Orconectes nais			
1254	7	80-100	NAS, 1979
1242	7	30	
Scud			
Gammarus pseudolimnaeus			
1254	4	2,400	
Glass shrimp			
Palaemonetes kadiakensis			
1254	7	3	
Damselfly			
Ischnura verticalis			
1254	4	200	Johnson and Finley, 1980
1242	4	400	
Dragonfly, macromia sp.			
1254	5	800	
Cladoceran			
Daphnia magna			
1254	14	1.8-24.0	EPA, 1980
1254	21	1.3	
Hydra			
Hydra oligactis			
1254	3	10,000	Adams and Haileselassie, 1984
Fish			
Rainbow trout, Salmo gairdneri			
1254	5	142	Johnson and Finley, 1980
1254	10	8	NAS, 1979
Bluegill, Lepomis macrochirus			
1254	25	54	NAS, 1979
Channel catfish, Ictalurus punctatus			
1254	15	740	NAS, 1979
Cutthroat trout, Salmo clarki			
1254	4	42,500	
Yellow perch, Perca flavescens			
1254	4	>150	

5.88.84
0060.0.0

TABLE D-2 (continued)

ACUTE AND CHRONIC TOXICITIES OF PCBS TO SELECTED AQUATIC SPECIES
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Organism, Genus/Species	Exposure Period (days)	LC50 (μg/ℓ)	Reference
Chronic Toxicity			
Invertebrates			
Cladoceran, Daphnia magna			
1254	15	10-24	Makl & Johnson, 1975
1248	4.3	2.5-7.5	Nebeker & Puglisi, 1974
1254	2.1	1.2-3.5	
Scud, Glammarus pseudolimnaeus			
1242	4.9	2.8-8.7	
1248	3.3	2.2-5.1	
Midge, Tanytarsus dissimills			
1254	0.8	0.5-1.2	
Fish			
Brook trout, Salvellnus fontinalls			
1254	1.0	0.7-1.5	Mauck, et al., 1978
Fathead minnow, Pimephales promeias			
1248	0.2	0.1-0.4	DeFoe, et al., 1978
1260	2.3	1.3-4.0	
1242	9.0	5.4-15.0	Nebeker, et al., 1974
1254	2.9	1.8-4.6	

TABLE D-3

MAXIMUM ACCEPTABLE TOXICANT CONCENTRATION (MATC) VALUES FOR AROCLOR PCBS AND SELECTED SPECIES OF FRESHWATER AQUATIC ORGANISMS*
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Organism, Aroclor PCB, Genus/Species	MATC[1] (μg/ℓ)
Cladoceran, Daphnia manga	
1248	1.2-3.5
1254	2.5-7.5
Amphipod, Gammarus pseudolimnaeus	
1242	2.8-8.7
1248	2.5-5.1
Insect (midge), Tanytarsus dissimilis	
1254	0.5-1.2
Brook trout, Salvelinus fontinalis	
1254	0.7-1.5
Fathead minnow, Pimephales promelas	
1254	1.8-4.6
1242	5.4-15.0
1248	0.1-0.4

[1] Lower value in each pair indicates highest concentration tested producing no measureable effect on growth, reproduction, survival, and metabolic upset during chronic exposure; higher value indicates lowest concentration tested producing a measureable effect.

Table taken from Eisler, 1986

* Based on exposure for life cycle, partial life cycle, or early life stage (EPA, 1980)

TABLE D-4

TOXICITIES OF PCBS TO SELECTED SPECIES OF BIRDS AND MAMMALS
ADMINISTERED VIA DIETARY, ORAL, DERMAL, OR INTRAPERITONEAL ROUTES
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Taxonomic Group, Route of Administration, Units, Organisms, and Compound	Exposure Period (days)	LD-50	Reference[1]
BIRDS			
Dietary (mg/kg diet)			
Northern bobwhite			
Colinus virginianus	5 days on treated diet	604	Heath, et al., 1972
1254	plus 3 days untreated	2,098	
1242		1,175	
1248			
Mallard			
Anas platyrhynchos			
1254	5 days on treated diet	2,699	
1242	plus 3 days untreated	3,182	
1248		2,798	
Ring-necked pheasant			
Phasianas colchicus			
1254	5 days on treated diet	1,091	
1242	plus 3 days untreated	2,078	
1248		1,312	
Japanese quail			
Coturnix coturnix	5 days on treated diet	2,898	
japonica	plus 3 days untreated		
European starling			
Sturnus vulgairs			
1254	4 days	1,500	Stickel, et al., 1984
Red-winged blackbird			
Agelaius phoeniceus			
1254	6 days	1,500	
Brown-headed cowbird,			
Molothrus ater			
1254	7 days	1,500	
Oral (grams/kg body weight)			

5.88.84
0062.0.0

TABLE D-4 (continued)

TOXICITIES OF PCBS TO SELECTED SPECIES OF BIRDS AND MAMMALS
ADMINISTERED VIA DIETARY, ORAL, DERMAL, OR INTRAPERITONEAL ROUTES
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Taxonomic Group, Route of Administration, Units Organisms, and Compound	Exposure Period (days)	LD-50	Reference[1]
BIRDS (cont'd)			
Mallard			
Anas platyrhynchos			
1254	Single dose	>2	NAS, 1979
1242		>2	
MAMMALS			
Dietary (mg/kg diet)			
Mink			
Mustela vison			
1242	9 months	8.6	Ringer, 1983
1254	9 months	6.7	
White-footed mice			
Peromyscus leucopus			
1254	3 weeks	>100	Sanders and Kirkpatrick, 1977
Rat			
Rattus norvegicus			
1254	6 days	>75	Hudson, et al., 1984
Raccoon			
Procyon lotor			
1254	8 days	>50	Montz, et al., 1982
Cottontail rabbit			
Sylvilagus floridanus			
1254	12 weeks	>10	Zepp and Kirkpatrick, 1976
Oral (grams/kg body weight)			
Rat			
Rattus norvegicus			
1254	Single dose	0.5-1.4	Hudson, et al., 1984
1242		0.8-8.7	
1248		0.8-11.0	

5.88.84
0063.0.0

TABLE D-4 (continued)

TOXICITIES OF PCBS TO SELECTED SPECIES OF BIRDS AND MAMMALS
ADMINISTERED VIA DIETARY, ORAL, DERMAL, OR INTRAPERITONEAL ROUTES
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

Taxonomic Group, Route of Administration, Units, Organisms, and Compound	Exposure Period (days)	LD-50	Reference[1]
Oral (grams/kg body weight) (cont'd)			
Mink			
Mustela vison			
1254	Single dose	4.0	Aulerich and Ringer, 1977; Ringer, 1983
1242		3.0	
Dermal (grams/kg body weight)			
Rat			
Rattus norvegicus			
Various	Single dose	0.8-3.2	Safe, 1984
Intraperitoneal (grams/kg body weight)			
Mink			
Mustela vison			
1254	Single dose	1.25-2.25	Aulerich and Ringer, 1977
1242		1.0	

[1] Each reference applies to data in the same row in the rows that immediately follow for which no reference is indicated.

larval deformities (Niimi, 1983). Fish diets containing 1.0 mg Aroclor-1254/kg fresh weight produced pathological changes in kidneys of rainbow trout after 11 months. Diets containing 11.2-ppm PCBs fresh weight produced progressive degenerative changes in livers of lake trout after nine months (Roberts, et al., 1978). No-effect levels of PCBs have not been determined for tissues and diets of freshwater fish, but would be at concentrations lower than those reported.

No adverse effects are believed to occur to the mink (Mustela vison) at PCB tissue concentrations less than 100 ppb (fresh weight) in the diet (Aulerich, et al., 1985), or less than 1.5 ug/kg of body weight ingested daily (Hornshaw, et al., 1983) (see Table D-4). The mink is believed to be the wildlife species most sensitive to PCB exposure.

No adverse effects were observed in screech owls fed 3.0 ppm PCBs (fresh weight) in their diet or in the progeny from eggs containing up to 17.8 ppm PCBs (McLane and Hughes, 1980). PCB concentrations below 54 ppm (fresh weight) in brain tissue of birds were not associated with the PCB poisoning (resulting in mortality). PCB poisoning is found in birds with PCB brain tissue concentrations exceeding 301 ppm (Stickel, et al., 1984).

APPENDIX E
INTERIM SEDIMENT CRITERIA EVALUATION
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

ERRATA SHEET

1.) Page 4

The document Application of Interim Sediment Criteria Values at Sullivan's Ledge Superfund Site states incorrectly that ". . . the PCB criteria is based on the FDA action level of 5 mg/kg . . ." This sentence should read ". . .the PCB criteria is based on the lowest maximum permissible tissue concentration in fish that will not cause reproductive impairment in mink."

INTERIM SEDIMENT CRITERIA VALUES FOR NONPOLAR HYDROPHOBIC ORGANIC COMPOUNDS

INTRODUCTION

Toxic contaminants in the bottom sediments of lakes, rivers and coastal waters can degrade the environment. Available data indicate many locations where existing sediment contaminant concentrations are now causing significant adverse environmental effects on aquatic life, even when water column contaminant concentrations comply with established water quality criteria (Malins et al. 1980, 1982). Since 1985, the Criteria and Standards Division of EPA has been pursuing the Equilibrium Partitioning (EP) approach for estimating sediment quality criteria for nonpolar and metal contaminants. In anticipation of favorable review of the approach by EPA's Science Advisory Board, interim sediment criteria values based on the EP approach for selected nonpolar, hydrophobic organic compounds were developed. These interim criteria values can be used to evaluate the appropriate applications of sediment criteria in existing regulatory programs. This report describes how the interim numbers were developed and briefly how the criteria values can be used to evaluate the extent of sediment contamination. Preparation of this report has resulted in a great deal of discussion regarding choice of partition coefficients and methods for determining the uncertainty in the interim criteria values. Therefore, it is very likely that the final values that EPA will recommend will differ from these values although not substantially. Any user of these numbers should be aware that these numbers are indeed interim and not final criteria values.

The main part of this report describes the development of interim criteria values for nonpolar organic contaminants for which chronic water quality

criteria have been generated. In Appendix E of the report, additional interim criteria for selected PAHs are given.

EQUILIBRIUM PARTITIONING APPROACH

Before describing how the interim criteria were estimated, the technical approach that forms the basis for the sediment criteria development effort will be discussed. The approach that is being pursued by the Criteria and Standards Division for establishing sediment quality criteria, on the recommendation of participants in the technical workshops and steering committees, is the EP approach (Neff 1985, Cowan 1986, Cowan 1987). The EP approach is based on two interrelated assumptions. First, that the interstitial water concentration of the contaminant is controlled by partitioning between the sediment and the water at contaminant concentrations well below saturation in both phases. Thus, the partitioning can be calculated from the quantity of the sorbent(s) on the sediment and the appropriate sorption coefficient(s). For nonpolar organic contaminants, the primary sorbent is the organic carbon on the sediment; therefore, the partition coefficient is called the organic carbon normalized partition coefficient, K_{oc}. Second, the toxicity and accumulation of the contaminant by benthic organisms is correlated to the interstitial, or pore water concentration and not directly to the total concentration of the contaminant on the sediment.

When the EP approach is used to estimate sediment quality criteria, chronic water quality criteria (WQC) are used to establish the "no-effect" concentration in the interstitial water. Chronic water quality criteria are used to protect benthic organisms from effects due to their long-term exposure to low ambient concentrations in the sediment. The use of WQC assumes that the sensitivities

of water column and benthic species to a compound are similar. This assumption is being evaluated. This interstitial water concentration (C_W) is then used with the partition coefficients (K_{oc}) and the following equation

$$C_{sed} = K_{oc} * C_W \tag{1}$$

to calculate the concentration of the contaminant on the sediment (C_{sed}) that at equilibrium will result in this interstitial water concentration. This concentration on the sediment will be the numerical criteria value (SQC). For compounds where chronic water quality criteria are not available, the EP approach can still be useful. For example, using upper-bounds effects concentrations will give comparable (i.e, upper-bounds effects) sediment concentrations. The interpretation of such sediment values is analogous to the interpretations of the comparable water column values used in their derivation.

DEVELOPMENT OF INTERIM NUMBERS

To estimate interim sediment criteria values, two sets of data are needed for each compound for which criteria values are required. These data are the water quality criteria and the partition coefficients.

WATER QUALITY CRITERIA VALUES

Water Quality Criteria (WQC) concentrations are available for 17 nonpolar organic chemicals (Hansen 1987). The criteria values are summarized in Table 1. The procedures for deriving these criteria are described in Appendix A. The WQC concentrations consist of the Criteria Maximum Concentration (CMC) and

the Criteria Continuous Concentration (CCC). The CMC is not applicable for derivation of SQC concentrations because it protects aquatic life from acutely lethal effects of a chemical. The CCC is the lower of the Final Chronic Value (FCV), the concentration protecting aquatic life from chronic toxicity, and the Final Residue Value (FRV), the concentration protecting uses of aquatic life. These uses include marketability of aquatic life based on FDA or other action levels or consumption of aquatic life by wildlife. The CCC is the appropriate value to use in deriving SQC because it protects aquatic life from effects due to long-term exposure to contaminated sediments. Both the FCV and FRV are presented in Table 1.

Important limitations of Table 1 should be mentioned. First, the WQC concentrations for acenaphthene, aniline, diethylhexylphthalate, methyl-parathion, phenanthrene, and 1,2,4-trichlorobenzene must be used with caution because they are preliminary values until criteria documents have been peer reviewed and accepted. Second, the PCB criteria is based on the FDA action level of 5 mg/kg and bioaccumulation factors measured in the laboratory. Since 1980 when this criteria was developed, the FDA action level has been changed to 2 mg/kg. Furthermore, the residue values do not account for bioconcentration in the food chain which results in bioaccumulation factors for fish at least 10 times higher than those measured in the laboratory. This bioconcentration has been shown to be important for DDT and PCB.

PARTITION COEFFICIENTS

For estimating the interim sediment quality criteria values presented here, it is assumed that the sediment organic carbon partition coefficient,

K_{oc}, can be accurately calculated from the octanol-water partition coefficient, K_{ow}, using the following equation (DiToro 1985):

$$Log_{10}(K_{oc}) = 0.00028 + 0.983*Log10(K_{ow}) \quad (2)$$

The K_{oc} values used in the regression analysis were carefully screened to remove data for experiments that were conducted at high particle concentrations and to ensure that only nonpolar organic compounds were included. This screening is important because particle interactions at high particle concentrations can result in errors in the K_{oc} values (DiToro 1985). This relationship is chosen to calculate K_{oc} values rather than using tabulated Koc values because K_{ow} values have been determined by more researchers and the procedure for determining K_{ow} values is simpler than that used for determining K_{oc} values because interferences caused by dissolved organic carbon and particle effects do not have to be considered or accounted for in the experimental design and data analysis.

Because K_{ow} is used to estimate K_{oc}, and ultimately the interim sediment quality criteria, it is important that both an estimate of the mean K_{ow} and a quantification of its uncertainty be determined. To provide a preliminary estimate of the K_{ow} values and their uncertainty, for each compound in Table 1, the following alternative methods were used.

- Review of all measured values and calculation of the geometric mean and standard deviation of the mean from the data
- Determine recommended value from Leo-Hanch database
- Estimate log K_{ow} from correlations with aqueous solubility
- Estimate log K_{ow} from structure-activity relationships.

The results of the four methods are presented in Table 2. The estimates derived from the four methods compared for overall consistency.

The review of all measured values was conducted using the database developed by Envirosphere for the report by Pavlou et al. (1987). Because this database has been updated since that report was prepared the values in Table 2 may differ slightly from those presented in that report. The recommended value for the log K_{ow} from the Leo and Hanch Log P Database (Leo 1984) was also tabulated for comparison.

The methods used for estimating the log K_{ow} values from the solubility and from the chemical structure of the compound are outlined in Appendices B and C, respectively. Estimates of K_{ow} based on aqueous solubility, which were corrected for solids melting point (Bowman and Sans 1983), were calculated from solubility and melting point data reported in the Arizona Database of Aqueous Solubility (Yalkowsky et al. 1987). The log mean K_{ow} for solubilities measured in the range of 15 to 25°C is reported in Table 2.

PCB Aroclor K_{ow} values reported in the "measured" column in Table 2 were calculated using the median of the log mean K_{ow} values for the homologs and the Aroclor homolog composition as illustrated in Appendix D. Log mean K_{ow} values for the homologs were compiled from six sources (Rapaport and Eisenrich 1984, Rapaport and Eisenrich 1985, Shiu and MacKay 1986, Woodburn et al. 1984, Miller et al. 1984, Chiou et al. 1977) and the median of the reported values determined. The Aroclor homolog composition was taken from Verschueren (1983).

The K_{ow} values in Table 2 for the four methods do in general agree; however, for some compounds the values range over several orders of magnitude. For these compounds, the wide range in uncertainty, the disagreement between the recommended value of Leo-Hanch and the geometric mean of all reported

values, or lack of confirmatory data makes it difficult to chose a definitive log K_{ow} value. Based on the review of all the data, log K_{ow} values for 11 of the 17 nonpolar compounds, for which there are WQC, are considered acceptable at this time and are used to calculate interim criteria values. Further review is ongoing to determine the most acceptable mean and uncertainty values to represent the K_{ow} values for these compounds. The accepted mean, standard deviation (S.D.), and the 95% confidence intervals for the log K_{ow} value; and the mean, S.D., and 95% confidence intervals for the log K_{oc} value for each of the 11 compounds are presented in Table 3. The 95% confidence intervals for the K_{ow} values were calculated assuming a t statistic of 1.96, which is the value for large sample size, rather than the statistic for the specific sample size used to estimate the mean and S.D. for the compound. The mean log K_{oc} values in this table were estimated using Equation (2) and the mean log K_{ow} value. The S.D. of the log K_{oc} value was estimated using the following equation:

$$\text{S.D.} = \sqrt{(\text{S.D. of log } K_{ow})^2 + (0.3)^2}$$

where 0.3 represents the standard error due to the regression relationship. This estimate of the standard error of the regression is large because the least squares regression method assumes that all uncertainty is in the log K_{oc} value. As part of the ongoing review, the most appropriate methods for estimating the mean and S.D. of the log K_{ow} values are being examined. Also, alternative regression methods will be used to determine the most appropriate value for the standard error due to the regression. As a result of this review, the final log K_{ow} values and the final criteria values may change slightly from those presented in this report.

INTERIM SEDIMENT QUALITY CRITERIA

Table 4 summarizes the interim sediment criteria values calculated using Equations (1) and (2) and the FCV and FRV criteria, respectively, for freshwater (Table 1) as the basis of the interim criteria. Table 5 summarizes the criteria values using FCV and FRV criteria, respectively, for saltwater (Table 1). When both FCV and FRV values are available for a compound, the FCV concentrations should only be used to calculate SQC when they are lower than the corresponding FRV concentrations. However, SQC values derived from both FCV and FRV values are presented to permit the user to determine what end use is being protected for.

Estimates of the SQCs are shown for the mean and 95% confidence interval of the log K_{oc} values. The confidence interval is reported to illustrate the uncertainty in the interim criteria values and to permit the user to estimate the likelihood that the sediment does or does not exceed the criteria value. The confidence interval represents the range within which with 95% certainty the sediment criteria value will fall. The lower value of the confidence interval represents the concentration which with 97.5% certainty will result in protection from chronic effects or of uses depending on the WQC value used in the SQC derivation. Any contaminant in a sediment at concentrations less than this value would not be of concern; however, the sediment can not be considered "safe" because the sediment may contain other contaminants above safe levels but for which criteria do not exist. The upper value of the confidence interval represents the concentration which with 97.5% certainty will result in hazardous long-term impacts on the benthic fauna. Thus, any sediments with concentrations above this level are considered hazardous. Concentrations within the confidence intervals can be considered either "safe"

or hazardous with respect to that compound with certainties between 2.5 and 97.5%.

APPLICATION OF INTERIM NUMBERS

To determine if the sediment concentration of a nonpolar contaminant exceeds the sediment criteria values, the concentration of the contaminant and the organic carbon content of the sediment must both be known. The analytical methodologies for measuring the concentration of nonpolar organic compounds and the organic carbon content in sediments are described in Cowan and Riley (1987). Because the sediment criteria values are presented as normalized to organic carbon content (i.e., presented on a per organic carbon weight basis), the normalized sediment concentrations of the contaminants must be calculated. These normalized concentrations can then be directly compared with the interim values in Tables 4 and 5. Alternatively, the sediment criteria values could be multiplied by the lowest organic carbon content and the total concentrations compared with these criteria values. To facilitate this second type of comparison, Tables 6 and 7 contain the sediment criteria values for specific organic carbon contents of 1 and 10% for fresh and saltwater, respectively. These organic carbon contents represent the average range over which the EP approach has been examined (Karickhoff 1984, DiToro 1985).

SAMPLE CALCULATION

To illustrate the use of the interim sediment criteria values, an example calculation is presented.

For example, consider a site where previous analyses have indicated that DDT is present in the freshwater sediments at a concentration of 0.1 mg/kg of sediment and that the organic carbon (f_{oc}) content is 2% or 0.02 kg of C/kg of sediment. To calculate the normalized sediment concentration in terms of organic carbon content, the formula is as follows:

$$\text{Normalized Concentration} = \text{Sediment Concentration}/f_{oc}$$

For this specific example,

$$\text{Concentration (mg/kg C)} = (0.1 \text{ mg/kg})/(0.02 \text{ kg C/kg})$$
$$= 5 \text{ mg/kg C}$$

Comparing this value to the values in Table 4, the normalized concentration exceeds the criteria values based on the FRV for freshwater.

Alternatively, the criteria value in Table 4 could be multiplied by the organic carbon content of the sediment to calculate the criteria value for a specific organic carbon content. The formula is as follows:

$$\text{Sediment Concentration} = (\text{SQC})(f_{oc})$$

The calculation for this same case (i.e., 2% organic carbon) using the lower confidence interval value would be

$$\text{SQC at 2\% O.C. (mg/kg)} = 0.183 \text{ mg/kg C} \times 0.02 \text{ kg C/kg}$$
$$= 3.66\text{E-3 mg/kg}$$

Comparison of this value with the measured concentration indicates that the criteria value is again exceeded. Using the upper confidence interval value also indicates that the criteria are exceeded.

The first calculation method would be most appropriately used when several contaminant concentrations are available across a site that varies in organic carbon content. In that case, the calculation of the organic carbon normalized values and contours of concentration could be used to indicate the approximate

area or sampling sites that are above the criteria value. The second calculation method would be most appropriate when several contaminant concentrations are available, but the organic carbon content of the sediment is constant.

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TABLE 1. Final Residue Values (FRV) and Final Chronic Values (FCV) for Nonpolar Organic Compounds

Compound (Pub. Date)	C.A.S. Number	Freshwater µg/L FCV	Freshwater µg/L FRV	Saltwater µg/L FCV	Saltwater µg/L FRV
Acenaphthene*	83-32-9	57	-	-	-
Aniline*	62-53-3	7.2	-	27	-
Chlordane (1980)	57-74-9	0.17	0.004	0.0064	0.004
Chlorpyrifos (1986)	2921-88-2	0.041	-	0.0056	-
DDT (1980)	50-29-3	-	0.0010	-	0.0010
Dieldrin (1980)	60-57-1	0.29	0.0019	0.084	0.0019
Diethylhexylphthalate*	117-81-7	360	-	360	-
Endosulfan(1980)	115-29-7	0.056	-	0.0087	
Endrin (1980)	72-20-8	0.045	0.0023	0.0093	0.0023
Ethyl Parathion (1986)	56-38-2	0.013	-	-	-
Hepatachlor (1980)	76-44-8	-	0.0038	-	0.0036
Hexachlorocyclohexane (1980)***	608-73-1	0.080	-	-	-
Methyl Parathion*	298-00-0	0.15	-	0.076	-
Phenanthrene*	85-01-8	6.3	-	4.6	-
Polychlorinated Biphenyls (1980)		-	0.014	-	0.030
Toxaphene (1986)	8001-35-2	<0.039	0.0002**	0.21	0.0002**
1,2,4-Trichlorobenzene*	120-82-1	23	-	-	-

* Draft criteria documents.
** See criteria document for explanation of this residue-based value.
*** Also known as Lindane

TABLE 2. K_{OW} Values for Compounds in Table 1

CHEMICAL (PUB. DATE)	C.A.S. No.	LOG K_{OW} LEO-HANCH MEASURED	LEO-HANCH FRAGMENT ANALYSIS	LEO-HANCH AQUEOUS SOLUBILITY	PAVLOU ET AL. (1987) GEOMETRIC MEAN	S.D.	95%CI
ACENAPHTHENE	83-32-9	3.92	4.07	3.72	4.18	0.0832	4.02 - 4.34
ANILINE	62-53-3	0.90	0.92	0.63	0.98	0.0350	0.91 - 1.05
CHLORDANE(1980)	57-74-9	-	5.54	4.76	4.01	0.487	3.05 - 4.97
CHLORPYRIFOS(1986)	2921-88-2	4.96	4.69	5.11	4.98	0.0141	4.95 - 5.01
DDT(1980)	50-29-3	6.37	6.91	6.16	6.02	0.1479	5.73 - 6.31
DIELDRIN(1980)	60-57-1	4.32	2.92	4.40	4.92	0.490	3.96 - 5.88
DIETHYLHEXYLPHTHALATE	117-81-7	-	8.66	5.78			
ENDOSULFAN(1980)	115-29-7	3.83	4.67	-			
ENDRIN(1980)	72-20-8	-	2.92	3.81	4.44	0.355	3.74 - 5.14
ETHYL PARATHION(1986)	56-38-2	3.83	3.47	3.94	3.88	0.196	3.47 - 4.25
HEPTACHLOR	76-44-8	-	4.61	5.18	4.54	0.329	3.89 - 5.19
HEXACHLOROCYCLOHEXANE(1980)*	608-73-1	3.72	3.75	3.41	3.35	0.063	3.23 - 3.47
METHYL PARATHION	298-00-0	2.86	2.79	3.34			
~~PHENANTHRENE~~	~~85-01-8~~	~~4.46~~	~~4.49~~	~~4.94~~	~~4.42~~	~~0.116~~	~~4.19 - 4.65~~
POLYCHLORINATED BIPHENYLS:							
AROCLOR 1242		6.10	-	-			
AROCLOR 1254		6.73	-	-	6.25	0.196	5.87 - 6.63
AROCLOR 1260		6.94	-	-			
TOXAPHENE(1986)	8001-35-2	-	-	4.77	3.26	0.0283	3.20 - 4.77
1,2,4-TRICHLOROBENZENE	120-82-1	4.02	4.28	3.38			

* Also known as Lindane

TABLE 3. K_{ow} and K_{oc} Values for Selected Nonpolar Organic Compounds

Compound	Log K_{ow} Mean(a)	S.D.	95%(b) Confidence Interval		Log K_{oc} Mean	S.D.(c)	95%(b) Confidence Interval	
Acenaphthene	4.18	0.0832	4.02	4.34	4.11	0.311	3.50	4.73
Aniline	0.98	0.0350	0.91	1.05	0.96	0.302	0.37	1.56
Chlorpyrifos	4.98	0.0141	4.95	5.01	4.90	0.300	4.31	5.49
DDT	6.02	0.148	5.73	6.31	5.92	0.334	5.26	6.58
Dieldrin	4.92	0.490	3.96	5.88	4.84	0.574	3.71	5.97
Endrin	4.44	0.355	3.74	5.14	4.36	0.465	3.45	5.29
Ethyl-parathion	3.86	0.197	3.47	4.25	3.79	0.359	3.09	4.51
Heptachlor	4.54	0.329	3.90	5.18	4.46	0.445	3.59	5.34
Lindane	3.35	0.063	3.23	3.47	3.29	0.306	2.69	3.90
Phenanthrene	4.42	0.116	4.19	4.65	4.35	0.322	3.71	4.98
PCB (1254)	6.25	0.196	5.87	6.63	6.14	0.358	5.44	6.85

(a) Geometric mean
(b) 95% confidence interval calculated assuming log normal distribution of K_{ow} values and 1.96 for t(@95%).
(c) Standard error of log K_{oc} calculated using following formula:

$$S.D. = \sqrt{(S.D. \text{ of } \log K_{ow})^2 + (0.3)^2}$$

where 0.3 is the standard error from regression relationship

TABLE 4. Sediment Quality Criteria Values for Selected Nonpolar Organic Compounds for Freshwater

Compound	Freshwater FCV	Sediment Quality Criteria (μg/gC) Mean	95% Confidence Interval		Freshwater FRV	Sediment Quality Criteria (μg/gC) Mean	95% Confidence Interval	
Acenaphthene	57	732	180	3,030				
Aniline	7.2	0.0662	0.0169	0.262				
Chlorpyrifos	0.041	3.22	0.831	12.7				
DDT					0.001	0.828	0.183	3.80
Dieldrin	0.29	19.9	1.49	273	0.0019	0.130	0.00976	1.79
Endrin	0.045	1.04	0.128	8.68	0.0023	0.0532	0.00654	0.443
Ethyl Parathion	0.013	0.0810	0.0160	0.416				
Heptachlor					0.0038	0.110	0.0148	0.840
Lindane	0.08	0.157	0.0394	0.636				
Phenanthrene	6.3	139	32.6	605				
PCB (1254)					0.014	19.5	3.87	99.9

TABLE 5. Sediment Quality Criteria Values for Selected Nonpolar Organic Compounds for Saltwater

Compound	Saltwater FCV	Sediment Quality Criteria (µg/gC) Mean	95% Confidence Interval		Saltwater FRV	Sediment Quality Criteria (µg/gC) Mean	95% Confidence Interval	
Acenaphthene								
Aniline	27	0.248	0.0635	0.984				
Chlorpyrifos	0.0056	0.440	0.114	1.73				
DDT					0.001	0.828	0.183	3.80
Dieldrin	0.084	5.77	0.431	79.2	0.0019	0.130	0.00976	1.79
Endrin	0.0093	0.215	0.0264	1.793	0.0023	0.0532	0.00654	0.443
Ethyl Parathion								
Heptachlor					0.0038	0.104	0.0140	0.796
Lindane								
Phenanthrene	4.6	102	23.8	442				
PCB (1254)					0.030	41.8	8.29	214

TABLE 6. Sediment Quality Criteria Values for Selected Nonpolar Organic Compounds for Freshwater at 1 and 10% Organic Carbon Content (all criteria with units of ppm or mg/kg)

Compound	FCV						FRV					
	1%			10%			1%			10%		
	Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI	
Acenaphthene	7.33	1.88	30.3	73.3	18.0	303						
Aniline	0.66E-3	0.169E-3	2.63E-3	6.61E-3	1.69E-3	0.0262						
Chlorpyrifos	0.0322	0.31E-3	0.127	0.322	0.083	1.27						
DDT							0.28E-3	1.83E-3	0.0380	0.0828	0.0182	0.380
Dieldrin	0.199	0.016	2.73	1.99	0.149	27.3	1.30E-3	0.0976E-3	0.0179	0.0130	0.976E-3	0.179
Endrin	0.010	1.28E-3	0.0867	0.0104	0.0128	0.868	0.533E-3	0.0654E-3	4.43E-3	5.328E-3	0.654E-3	0.0443
Ethyl Parathion	0.810E-3	0.160E-3	4.16E-3	8.10E-3	1.60E-3	0.0416						
Heptachlor							1.10E-3	0.148E-3	0.40E-3	0.0110E-3	1.480E-3	0.0840
Lindane	1.57E-3	0.394E-3	6.36E-3	0.157	3.94E-3	0.0636						
Phenanthrene	1.39	0.326	6.05	13.9	3.26	60.5						
PCB (1254)							0.195	0.0387	0.999	1.95	0.387	9.99

TABLE 7. Sediment Quality Criteria Values for Selected Nonpolar Organic Compounds for Saltwater at 1 and 10% Organic Carbon Content (all criteria with units of ppm or mg/kg)

Compound	FCV						FRV					
	1%			10%			1%			10%		
	Mean	95% CI		Mean	95% CI		Mean	95% CI		Mean	95% CI	
Acenaphthene												
Aniline	2.48E-3	0.635E-3	9.84E-3	0.0248	6.35E-3	0.0984						
Chlorpyrifos	4.40E-3	1.14E-3	0.0173	0.0440	0.0114	0.173						
DDT							0.28E-3	1.03E-3	0.0380	0.0028	0.0102	0.380
Dieldrin	0.0577	4.31E-3	0.792	0.577	0.0431	7.92	1.30E-3	0.0976E-3	0.0179	0.0130	0.975E-3	0.179
Endrin	2.15E-3	0.264E-3	0.0179	0.0215	2.64E-3	0.179	0.533E-3	0.0654E-3	4.43E-3	5.328E-3	0.654E-3	0.0443
Ethyl Parathion												
Heptachlor							1.04E-3	0.140E-3	7.96E-3	0.0104E-3	1.40E-3	0.0796
Lindane												
Phenanthrene	1.02	0.238	4.42	10.2	2.38	44.2						
PCB (1254)							0.418	0.0829	2.14	4.18	0.829	21.4

Appendix A. Water Quality Criteria Derivation Procedures

The water quality criteria listed in Table 1 were obtained from published or draft aquatic-life water quality criteria documents. These numerical water quality criteria concentrations were derived using the "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (Stephan et al. 1985). These "National Guidelines" specify minimum data requirements and data synthesis procedures which allow calculation of numerical criteria concentrations to protect the presence and uses of aquatic life.

Water quality criteria concentrations to protect the presence of aquatic life are derived using the following procedure. First, all available data on the toxicity of the chemical are collected, reviewed for acceptability, and sorted by test type. If minimum database requirements for acute and chronic toxicity as specified in the "National Guidelines" are met, Criteria Maximum Concentrations (CMC) and Criteria Continuous Concentrations (CCC) are calculated to protect important aquatic life from acute and chronic toxicity, respectively. If the toxicity of the chemical is dependent on a water quality characteristic, then the CMC or CCC values are derived as a function of the appropriate characteristic. Because aquatic ecosystems can tolerate some stress and occasional adverse additions, protection of all species at all times and places is not necessary. Therefore, criteria derivation procedures result in criteria concentrations intended to protect most species most of the time but not all of the species all of the time.

Water quality criteria concentrations to protect the uses of aquatic life are derived using the following procedure. A Criteria Continuous Concentration to limit residues in aquatic life can be derived if maximum permissible tissue concentrations and data on bioaccumulation or bioconcentration factors are available. Maximum permissible tissue concentrations are based on either (a) a FDA action level for fish oil or edible portions of fish or shellfish, (b) a maximum acceptable dietary intake based on a wildlife feeding study, or (c) residue-effects data for aquatic life. Either bioconcentration or bioaccumulation factors are required to calculate the water concentrations expected to limit chemical uptake by organisms to below the permissible tissue concentration. Bioconcentration factors, the concentration of the chemical in the organism divided by the concentration in the exposure water, are calculated from laboratory studies where steady-state conditions are achieved. Bioaccumulation factors, the concentration of chemical in the organism from all sources (e.g., food, water) divided by the concentration in the water, are calculated from data obtained in field studies. It is important to note that if food-chain transfer is an important uptake route, criteria concentrations derived using bioconcentration factors, such as those for DDT and PCBs, will probably be underprotective.

The water quality criteria statement contains a concentration limit, averaging period, and return frequency and is stated as follows: "The procedures described in the "Guidelines for Deriving National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" indicate that, except possibly where a locally important species is

very sensitive, (1) aquatic organisms and their uses should not be affected unacceptably if the four-day average concentration of (2) does not exceed (3) μg/L more than once every three years on the average and if the one-hour average concentration does not exceed (4) μg/L more than once every three years on the average." In this statement insert either "freshwater" or "saltwater" at (1), the name of the chemical at (2), the lower of the chronic-effect or residue-based concentrations as the Criteria Continuous Concentration at (3) and the acute effect-based Criteria Maximum Concentration at (4).

The Criteria Continuous Concentration based on either chronic effect or residue data can be used to derive sediment quality criteria for nonpolar organic chemicals using the equilibrium partitioning approach. Detailed knowledge of the National Guidelines and the water quality criteria document as a basis for understanding the water quality criteria that are used in the derivation of sediment quality criteria is highly recommended.

Appendix B. Aqueous Solubility and Octanol-Water Partition Coefficient

Estimates of K_{ow} from solubility are based on a thermodynamically inspired correlation developed for 61 organophosphorus and carbamate insecticides (Bowman and Sans 1983). The relationship includes a melting point (MP) correction for chemicals that are solids at room temperature. The regression analysis using K_{ow} and the estimated aqueous solubility of the liquid (or supercooled liquid for solids) yields the following relationship (Bowman and Sans 1983):

$$\text{Log } K_{ow} = 0.280 - 0.839 \log S_{scl}$$

where S_{scl} is the molar aqueous solubility of the supercooled liquid. The relationship between the molar solubility of the solid, S_{solid}, and the supercooled liquid, S_{scl}, is given by the following relationship (Bowman and Sans 1983, Miller et al. 1985):

$$\text{Log } S_{scl} = \log S_{solid} + \frac{\overline{\Delta H}_f}{2.303\ RT_m} \left(\frac{T_m}{T} - 1\right)$$

where $\Delta\overline{H}_f/T_m = \Delta S$, the entropy of fusion, is reported to be 13.5 cal/mole á á °K for most low melting point compounds and R = 1.987 cal/mole °K.

Appendix C. Estimating K_{ow} using CLOGP

The CLOGP program, based on Leo's Fragment Constant Method (Lyman et al. 1982), estimates log K_{ow} using fragment constants (f_i) and structural factors (F_i) that have been empirically derived for many molecular groups. The estimated K_{ow} is obtained from the sum of constants and factors for each of the molecular subgroups comprising the molecule as follows:

$$\log K_{ow} = \sum_{i=1}^{n} (f_i + F_i)$$

The method assumes that log K_{ow} is a linear additive function of the structure of the solute and its constitutive parts, and that the most important structural effects are described by available factors. The structure of the compound is specified using the Simplified Molecular Interactive Linear Entry System (SMILES) notation (Weininger and Weininger 1986). The notation uniquely describes the empirical formula and molecular structure of the compound of interest.

Appendix D. Example Calculation of Aroclor K_{ow}

Aroclor $K_{ow} = \Sigma K_{ow,i} f_i$

Homolog	Aroclor 1242 Homolog Fraction	Homolog log K_{ow}
mono	0.03	4.33
di	0.13	5.12
tri	0.28	5.57
tetra	0.30	5.84
penta	0.22	6.35
hexa	0.04	7.05

For Aroclor 1242:

$$\log K_{ow} = \log_{10} [0.03(10^{4.33}) + 0.13(10^{5.12}) + 0.28(10^{5.57}) + 0.30(10^{5.84}) + 0.22(10^{6.35}) + 0.04(10^{7.05})$$

$$= \log_{10} [1,270,684]$$

$$\log K_{ow} = 6.10$$

Appendix E. Interim Sediment Criteria Values for Polycyclic Aromatic Hydrocarbons

In the main part of this report, interim sediment criteria values are shown for 11 nonpolar organic compounds for which chronic water quality criteria have been generated. During visits to regional Superfund offices to discuss the application of these interim criteria values, the need for interim criteria for several of the polycyclic aromatic hydrocarbons (PAHs) was identified. The PAHs are Fluoranthene, Pyrene, Benzo(a)pyrene and Benzo(a)anthracene. This appendix describes how those interim criteria values were developed and provides all supporting data for their calculation.

The freshwater chronic water quality criteria values for the four PAHs given in Table E.1 were determined by Mr. Anthony (Ron) Carlson of EPA-Duluth using the computer automated method system developed by that laboratory. The calculated criteria values for Phenanthrene and Acenaphthene are given for comparison. Accepted chronic criteria for these compounds are 0.006 mg/L and 0.057 mg/L, respectively. The computerized method which uses the K_{ow} and solubility values for the compound to calculate both the acute and chronic water quality criteria is based on the work of Veith et al. (1983) and Call et al. (1985). The values given are based on toxicity to chronically exposed fathead minnows. This method is estimated to provide acute and chronic toxicity values that are within a factor of 3 and 5, respectively, of the actual values for approximately 80% of the known industrial compounds.

The log K_{ow} values for the four PAHs given in Table E.2 were developed as described in the main part of the report. The log K_{oc} values and

the 95% confidence interval for the log K_{oc} values given in Table E.3 were also estimated using the same methods and assumptions described previously.

The final criteria values are given in Table E.4 on an organic carbon normalized basis and for 1% and 10% organic carbon in Table E.5. These interim criteria values can be used in the same way as the interim values in the main part of the report to determine if a sediment sample exceeds or does not exceed the criteria values.

Table E.1. Predicted Fathead Minnow Toxicity Values

Compound Name	C.A.S. Number	Mode of Action(a)	Log K_{ow}	Solubility (mg/l)	Acute (mg/l)	Chronic (mg/l)
Phenanthrene	85018	NN	4.49	1.26	0.6	0.035
Acenaphthene	83329	NN	4.07	4.44	1.3	0.086
Fluoranthene	206440	NN	4.95	0.24	0.25	0.013
Pyrene	129000	NN	4.95	0.13	0.25	0.013
Benzo(a)pyrene	50328	NN(?)	6.12	0.004	0.025	0.0012
Benzo(a)anthracene	56553	NN(?)	5.66	0.014	0.061	0.0030

a) NN = Nonpolarnarcosis. The question mark indicates that the mode of action is not known with certainty.

Table E.2. Log K_{ow} values for the four PAHs in Table 1

Compound	Log Kow						
	Leo-Hanch Measured	Fragment Analysis	Aqueous Solubility	Geometric Mean	S.D.	95% Confidence Interval	
Fluoranthene	5.2	4.95	4.61	5.25	0.139	4.98	5.52
Pyrene	4.88	4.95	4.44	5.09	0.187	4.72	5.46
Benzo(a)pyrene	5.97	6.12	5.81	6.05	0.168	5.72	6.38
Benzo(a)anthracene	-	5.66	6.34	5.74	0.264	5.22	6.26

Table E.3. Log K_{ow} and log K_{oc} values for the for PAHs.

Compound	Log Kow				Log Koc			
	Geometric Mean	S.D.	95% Confidence Interval		Mean	S.D.	95% Confidence Interval	
Fluoranthene	5.25	0.139	4.98	5.52	5.16	0.33	4.51	5.81
Pyrene	5.09	0.187	4.72	5.46	5.00	0.35	4.31	5.70
Benzo(a)pyrene	6.05	0.168	5.72	6.38	5.95	0.34	5.27	6.62
Benzo(a)anthracene	5.74	0.264	5.22	6.26	5.64	0.40	4.86	6.43

Table E.4. Interim Sediment Quality Criteria values for four PAHs.

Compound	WQC	Sediment Quality Criteria (ug/g C) Mean	95% Confidence Interval	
Fluoranthene	13	1,883	423	8,375
Pyrene	13	1,311	265	6,465
Benzo(a)pyrene	1.2	1,063	225	5,018
Benzo(a)anthracene	3	1,317	217	7,999

Table E.5. Interim Sediment Quality Criteria values for four PAHs for 1 and 10% Organic Carbon Contents. (All criteria with units of ppm or mg/kg.)

	1%			10%		
Compound	Mean	95% Confidence Interval		Mean	95% Confidence Interval	
Fluoranthene	18.8	4.24	83.8	188	42.7	838
Pyrene	13.1	2.66	64.6	131	26.6	646
Benzo(a)pyrene	10.6	2.25	50.2	106	22.5	502
Benzo(a)anthracene	13.2	2.17	80.0	132	21.7	800

CONTRIBUTORS

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- Dr. Dom DiToro, Mr. Paul Paquin, and Mr. Benjamin Wu of HydroQual, Inc., tabulated K_{OW} and K_{OC} values for the nonpolar contaminants, with assistance from Dr. Spyros Pavlou and Mr. Roger Kadeg of Envirosphere Co, Inc.

- Mr. David Hansen of EPA's Narragansett Laboratory, and Mr. Nelson Thomas and Mr. Ron Carlson of EPA's Duluth Laboratory provided water quality criteria for nonpolar contaminants, the QSAR based criteria for PAHs, and the appendix on criteria development procedures.

- All of the above people as well as Dr. Herb Allen of Drexel University, Ms. Alexis Steen and Dr. James Fava of Battelle, and Mr. Chris Zarba, the EPA Work Assignment Manager, provided valuable comments on the draft of this report.

APPENDIX F
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
SULLIVAN'S LEDGE SITE
NEW BEDFORD, MASSACHUSETTS

TABLE 1

ALTERNATIVE SC-1 ARAR EVALUATION
NO ACTION
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
			-None-	

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	This ARAR will not be attained under the no-action source control alternative. PCB-contaminated soils will remain on-site and continue to impact the Middle Marsh and Apponagansett Swamp by erosion and subsequent deposition. In addition, PCB-contaminated sediments will remain in-place with the potential for adverse impacts to the aquatic biota.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	This ARAR will not be attained under the no-action source control alternative. PCB-contaminated soils will remain on-site and continue to impact the Middle Marsh and Apponagansett Swamp by erosion and subsequent deposition. In addition, PCB-contaminated sediments will remain in-place with the potential for adverse impacts to the aquatic biota.
Federal Nonregulatory Requirements to be Considered	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	This ARAR will not be attained under the no-action source control alternative. PCB-contaminated soils will remain on-site and continue to impact the Middle Marsh and Apponagansett Swamp by erosion and subsequent deposition. In addition, PCB-contaminated sediments will remain in-place with the potential for adverse impacts to the aquatic biota.

TABLE 1 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - Releases From Solid Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details requirements for a groundwater monitoring program to be installed on-site.	The no-action source control alternative does not include preparation of a post-closure plan and does not provide for protection or monitoring of groundwater.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This requirement details the general requirements for closure and post-closure of hazardous waste facilities, including the installation of a groundwater monitoring program.	Under the no-action source control alternative, these long-term monitoring and maintenance requirements will not be met.
FRR	RCRA - General Facility Standards (40 CFR 264.10 - 264.18)	Relevant and Appropriate	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	The site will be fenced, posted, and operated in accordance with this requirement. Any workers on the site will be properly trained.
FRR	TSCA - Storage and Disposal (40 CFR 761.60 - 761.79)	Relevant and Appropriate	These regulations specify the disposal/destruction requirements of PCB materials in excess of 50 ppm.	The requirements of this regulation would not be attained under the no-action scenario for PCB-contaminated soils in excess of 50 ppm.
FRR	OSHA - General Industry Standards (29 CFR 1910)	Applicable	This regulation specifies the 8-hour, time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below these concentrations.
FRR	OSHA - Safety and Health Standards (29 CFR 1926)	Applicable	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site and procedures will be followed during any site activities.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines the recordkeeping and reporting requirements for an employer under OSHA.	These regulations are applicable to the company contracted to install the site fence.
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste, Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations provide a comprehensive program for monitoring, storing, record-keeping, etc., at hazardous waste sites.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be appropriate.
SRR	DEQE - Massachusetts Contingency Plan (310 CMR 40.000)	Applicable	These regulations provide the procedures for regulating hazardous waste activities in the Commonwealth of Massachusetts.	During remedial design, these regulations will be compared to the corresponding federal CERCLA regulations and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.

TABLE 1 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality Engineering.	The requirements of this regulation will be attained during alternative implementation.

TABLE 2

ALTERNATIVE SC-2 ARAR EVALUATION
CONTAINMENT
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) - 40 CFR 40.0.	Relevant and Appropriate	The national primary and secondary ambient air quality standards for particulate material is stated in this regulation.	Fugitive dust generated from cap construction will be maintained below 150 $\mu g/m^3$ (primary standard) by water sprays and other dust suppressants.
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 - 8.00).	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Fugitive dust generated from cap construction will be maintained below 150 $\mu g/m^3$ (secondary standard) by water sprays and other dust suppressants.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains Federal Regulatory Requirements	RCRA Location Standards (40 CFR 264.18)	Relevant and Appropriate	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	The cap will be constructed outside of the 100-year floodplain of the unnamed stream to prevent washout of the cap or underlying contaminated soils.
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	This ARAR will be attained under the containment alternative. PCB-contaminated soils will be capped on-site and will not continue to impact the Middle Marsh and Apponagansett Swamp by erosion and subsequent deposition. PCB-contaminated sediments, however, will remain in-place with the potential for adverse impacts to the aquatic biota.
State Regulatory Requirements	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	A Notice of Intent will be filed with DEQE outlining the proposed location. No portion of the cap will be located within a wetland or bordering a vegetated wetland, or within a 100-year floodplain, unless approved by the State.

TABLE 2 (continued)

LOCATION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	This ARAR will be attained under the containment alternative. PCB-contaminated soils will be capped on-site and will not continue to impact the Middle Marsh and Apponagansett Swamp by erosion and subsequent deposition. PCB-contaminated sediments, however, will remain in-place with the potential for adverse impacts to the aquatic biota.
Federal Nonregulatory Requirements to be Considered	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	This ARAR will be attained under the containment alternative. PCB-contaminated soils will be capped on-site and will not continue to impact the Middle Marsh and Apponagansett Swamp by erosion and subsequent depositin. PCB-contaminated sediments, however, will remain in-place with the potential for adverse impacts to the aquatic biota.

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10 - 264.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	A cap will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Entry to site must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 264.30-264.37)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.
FRR	RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous constituents.	Plans will be developed during remedial design. Copies of the plans will be kept on-site.

TABLE 2 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	The facility must be closed in a manner that minimizes the need for further maintenance and controls, minimizes, or eliminates post-closure escape of hazardous waste, contaminated rainfall, or waste decomposition products. A 30-year post-closure program must include maintenance, monitoring, and reporting requirements. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.
FRR	RCRA - Waste Piles (40 CFR 264.250 - 264.269)	Relevant and Appropriate	Details procedures, operating requirements, closure and post-closure options for waste piles. If removal or decontamination of all contaminated subsoils is not possible, closure and post-closure requirements for landfills must be attained.	According to RCRA, waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste, may comply with either the waste pile or landfill requirements. The covering of solid waste on-site, therefore, must comply with either subpart.
FRR	RCRA - Landfills (40 CFR 264.300 - 364.339)	Relevant and Appropriate	These regulations detail design, operating, monitoring, inspection survey, recordkeeping, closure, and post-closure requirements.	Under this requirement, two liners must be installed to prevent contamination of groundwater. A leachate collection system must be placed above and between the liner systems. Monitoring inspection, surveying, and recordkeeping must be conducted in compliance with these requirements. This alternative would provide only the latter requirements.
FRR	TSCA - Storage and Disposal (40 CFR 761.60 - 761.79)	Relevant and Appropriate	These regulations specify the disposal/destruction requirements of PCB materials in excess of 50 ppm.	The requirements of this regulation would not be attained under the no-action scenario for PCB-contaminated soils in excess of 50 ppm.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour time-weighted average concentration for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.

TABLE 2 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	OSHA - Safety and Health Standards for Federal (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines the record-keeping and reporting regulations for an employer under OSHA.	This regulation will be applicable to the construction company(s) contracted to set up the facility and perform the decontamination process on-site.
FRR	DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1 - 172.558)	Applicable	This regulation outlines procedures for the packaging, labelling, manifesting, and transporting of hazardous materials.	Hazardous wastes are known to exist on-site. If encountered during decontamination of heavy equipment and personal protective gear, these materials shall be packaged, manifested, and transported to a licensed off-site disposal facility. Waste must have registration number with the letters "DOT".
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste, Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations provide a comprehensive program for monitoring, storing, and recordkeeping at hazardous waste sites.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be relevant.
SRR	DEQE - Massachusetts Contingency Plan (310 CMR 40.000)	Applicable	These regulations provide the framework for the Commonwealth of Massachusetts to regulate hazardous waste activities in the state.	During remedial design, these regulations will be compared to the corresponding federal CERCLA regulations, and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 3

ALTERNATIVE SC-3 ARAR EVALUATION
IN-SITU VITRIFICATION OF SOILS
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) - 40 CFR 40.	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Off-gas emissions from the in-situ vitrification process will be treated so that they are in compliance with this requirement. Fugitive dust will be controlled by water sprays or other dust suppressants.
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 - 8.00).	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Off-gas emissions from the in-situ vitrification process will be treated so that they are in compliance with this requirement. Fugitive dust will be controlled by water sprays or other dust suppressants.
Federal Criteria, Advisories, and Guidance	Threshold Limit Value (TLVs)	To be Considered	These standards were issued as consensus standards for controlling air quality in work place environments.	TLVs will be used for assessing site inhalation risks for the in-situ vitrification activities.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Erosion of site soils will be mitigated on-site by the construction of drainage ditches, culverts and a sedimentation pond. Therefore, increased sediment loading to the Middle Marsh and Apponagansett Swamp will not occur.
	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	Contaminated soils will be removed from the 100-year floodplain of the unnamed stream prior to vitrification. These soils will be spread on top of areas to be vitrified and treated with the other contaminated soils.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	Erosion of site soils will be mitigated on-site by the construction of drainage ditches, culverts, and a sedimentation pond. Therefore, increased sediment loading to the Middle Marsh and Apponagansett Swamp will not occur.

TABLE 3 (continued)

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	A Notice of Intent will be filed with DEQE outlining the proposed location. No portion of the in-situ vitrified mass will be located within a wetland or bordering a vegetated wetland, or within a 100-year floodplain.

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10-264.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	Facility will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Site entry must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 264.30 - 264.37)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.
FRR	RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous waste constituents.	Plans will be developed and implemented during remedial design. Copies of the plan will be kept on-site.
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	Hazardous materials will be treated by in-situ vitrification. A 30-year post-closure program will include groundwater monitoring. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.

TABLE 3 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA Regulations on Land Disposal Restrictions (40 CFR 268)	Relevant and Appropriate	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Contaminated soils would be treated to the Best Demonstrated Available Technology levels by in-situ treatment. Placement/disposal does not occur since contaminated soils in the unnamed stream would be consolidated into an area that is presently contaminated prior to in-situ treatment.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour, time-weighted average concentrations for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
FRR	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines the recordkeeping and reporting regulations for an employer under OSHA.	This regulation will be applicable to the construction company(s) contracted to set up the facility and perform the decontamination process on-site.
FRR	Protection of Archaeological Resources (32 CFR Part 229, 229.4)	Relevant and Appropriate	These regulations develop procedures for the protection of archaeological resources.	If archaeological resources are encountered during soil excavation, work will stop until the area has been reviewed by federal and state archaeologists.
FRR	CWA - 40 CFR, R5	Applicable	This regulation specifies that a Best Management Program (BMP) be developed to minimize pollutant release from the facility.	A BMP will be developed and will include sedimentation control on-site and for the vitrified areas, and fugitive dust control.
FRR	National Environmental Policy Act (40 CFR 6)	Applicable	This act sets forth the policy for carrying out the provisions of the Floodplain Management and the Protection of Wetlands Executive Orders.	The policies for management of floodplains and protection of wetlands should be considered during remedial alternative implementation.
FRR	DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1 - 172.558)	Applicable	This regulation outlines procedures for the packaging, labelling, manifesting, and transporting of hazardous materials.	Hazardous wastes are known to exist on-site. If encountered during decontamination of heavy equipment and personal protective gear, these materials shall be packaged, manifested, and transported to a licensed off-site disposal facility. Waste must have registration number with the letters "DOT".

TABLE 3 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	TSCA - Storage and Disposal (40 CFR 761.60 - 761.79)	Relevant and Appropriate	These regulations specify the disposal/ destruction requirements of PCB materials in excess of 50 ppm.	ISV is an innovative treatment technology. Compliance with TSCA by achieving level of performance equivalent to incineration would need to be determined during pilot testing.
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations specify the Massachusetts requirements for closure and post-closure of hazardous waste facilities.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be applicable.
SRR	DEQE - Massachusetts Contingency Plan	Applicable	These regulations provide the framework for the Commonwealth of Massachusetts to regulate hazardous waste activities in the state.	During remedial design these regulations will be compared to the corresponding CERCLA regulations, and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 4

ALTERNATIVE SC-4 ARAR EVALUATION
SOLIDIFICATION OF SOILS
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) - 40 CFR 40	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Fugitive dust from the solidification process, stockpiles, and work areas will be controlled by water sprays or other suppressants.
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 - 8.00)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Fugitive dust from the solidification process, stockpiles, and work areas will be controlled by water sprays or other suppressants.
Federal Criteria, Advisories, and Guidance	Threshold Limit Value (TLVs)	To be Considered	These standards were issued as consensus standards for controlling air quality in work place environments.	TLVs will be used for assessing site inhalation risks for the solidification activities.

LOCATION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Erosion of site soils will be mitigated on-site by the construction of drainage ditches, culverts, and a sedimentation pond. Therefore, increased sediment loading to the Middle Marsh and Apponagansett Swamp will not occur.
	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	Contaminated soils will be removed from the 100-year floodplain of the unnamed stream, solidified on-site, and landfilled on-site outside of the 100-year floodplain.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	Erosion of site soils will be mitigated on-site by the construction of drainage ditches, culverts, and a sedimentation pond. Therefore, increased sediment loading to the Middle Marsh and Apponagansett Swamp will not occur.
	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	A Notice of Intent will be filed with DEQE outlining the proposed location. No portion of the solidified soil will be located within a wetland or bordering a vegetated wetland, or within a 100-year floodplain.

TABLE 4 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10 - 264.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	Facility will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Site entry must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 264.30 - 264.37)	Relevant and Appropriate	This regulations outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.
FRR	RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous waste constituents.	Plans will be developed during remedial design. Copies of the plans will be kept on-site.
FRR	RCRA - Manifesting, Record-keeping, and Reporting (40 CFR 264.70 - 264.77)	Relevant and Appropriate	This regulation describes the details of the manifesting, recordkeeping, and reporting requirements for RCRA facilities.	Records of facility activities will be maintained during remedial action.
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.70 -	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	All hazardous materials should be contained by placing an impermeable cap over the landfill. The unit will be dewatered and wastes stabilized by solidification. A 30-year post-closure program must include monitoring and maintaining the cap, and groundwater monitoring. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.
FRR	RCRA - Landfills (40 CFR 264.300 - 364.339)	Applicable	These regulations detail design, operating monitoring, inspection survey, record-keeping, closure, and post-closure requirements.	If a RCRA landfill were constructed to house solidified wastes, two liners must be installed to prevent contamination of groundwater. A leachate collection system must be placed above and between the liner systems. Monitoring inspections, surveying, and recordkeeping must be conducted in compliance with these requirements. This alternative will place a cap over solidified wastes to reduce precipitation/infiltration. Thus, the RCRA landfill requirements are not appropriate.

TABLE 4 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA Regulations on Land Disposal Restrictions for Hazardous Wastes	Relevant and Appropriate	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Contaminated soils would be treated to the Best Demonstrated Available Technology levels before being placed in the disposal area under the impermeable cap. Hazardous waste cannot be stored except for accumulation for recovery, treatment, or disposal.
FRR	RCRA - Waste Piles (40 CFR 264.250 - 264.269)	Relevant and Appropriate	Details procedures, operating requirements, and closure and post-closure options for waste piles. If removal or decontamination of all contaminated subsoils is not possible, closure and post-closure requirements for landfills must be attained.	According to RCRA, waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste, may comply with either the waste pile or landfill requirements. The covering of solidified soils on-site, therefore, must comply with either subpart.
FRR	TSCA - Storage and Disposal (40 CFR 761.60 - 761.79)	Relevant and Appropriate	These regulations specify the disposal/destruction requirements of PCB materials in excess of 50 ppm.	Solidification is considered an alternative treatment method under TSCA. Bench-scale and treatability testing will be required to demonstrate that solidification achieves a level of performance equivalent to incineration prior to implementation.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour, time-weighted average concentrations for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
FRR	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines the recordkeeping and reporting regulations for an employer under OSHA.	This regulation will be applicable to the construction company(s) contracted to set up the facility and perform the solidification process on-site.
FRR	DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1 - 172.558)	Applicable	This regulation outlines procedures for the packaging, labelling, manifesting, and transporting of hazardous materials.	Hazardous wastes are known to exist on-site. If encountered during decontamination of heavy equipment and personal protective gear, these materials shall be packaged, manifested, and transported to a licensed off-site disposal facility. Waste must have registration number with the letters "DOT".

TABLE 4 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	CWA - 40 CFR, R5	Applicable	This regulation specifies that a Best Management Program (BMP) be developed to minimize pollutant release from the facility.	A BMP will be developed for the excavation and solidification area, and fugitive dust control.
FRR	National Environmental Policy Act (40 CFR 6)	Applicable	This act sets forth the policy for carrying out the provisions of the Floodplain Management and the Protection of Wetlands Executive Orders.	The policies for management of floodplains and protection of wetlands should be considered during remedial alternative implementation.
FRR	Protection of Archaeological Resources (32 CFR Part 229, 229.4)	Applicable	These regulations develop procedures for the protection of archaeological resources.	If archaeological resources are encountered during soil excavation, work will stop until the area has been reviewed by federal and state archaeologists.
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations provide a comprehensive program for the identification, handling, transportation, recordkeeping, reporting, storage, treatment, etc., of hazardous waste work conducted in Massachusetts.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be applicable.
SRR	DEQE - Massachusetts Contingency Plan	Applicable	The regulations specify the procedures the Commonwealth of Massachusetts must follow in regulating hazardous waste activities in the state.	During remedial design these regulations will be compared to the corresponding CERCLA regulations, and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 5

ALTERNATIVE SC-5 ARAR EVALUATION
ON-SITE INCINERATION OF SOILS
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) - 40 CFR 40	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Incineration emissions will be controlled by Best Available Control Technology such that the requirements of this regulation are met. In addition, fugitive dust from construction, stockpiles, and work areas will be controlled by water sprays or other dust suppressants.
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 - 8.00)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Incineration emissions will be controlled by Best Available Control Technology such that the requirements of this regulation are met. In addition, fugitive dust from construction, stockpiles, and work areas will be controlled by water sprays or other dust suppressants.
Federal Criteria, Advisories, and Guidance	Threshold Limit Value (TLVs)	To be Considered	These standards were issued as consensus standards for controlling air quality in work place environments.	TLVs will be used for assessing site inhalation risks for the incineration activities.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) (40 CFR Part 230)	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Erosion of site soils will be mitigated on-site by the construction of drainage ditches, culverts, and a sedimentation pond. Therefore, increased sediment loading to the Middle Marsh and Apponagansett swamp will not occur.
	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	Contaminated soils will be removed from the 100-year floodplain of the unnamed stream, incinerated on-site and landfilled outside of the 100-year floodplain.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws that regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	Erosion of site soils will be mitigated on-site by the construction of drainage ditches, culverts and a sedimentation pond. Therefore, increased sediment loading to the Middle Marsh and Apponagansett swamp will not occur.

TABLE 5 (continued)

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
State Regulatory Requirements (continued)				
	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	A Notice of Intent will be filed with DEQE outlining the proposed location. No portion of the incinerated soils will be disposed within a wetland or bordering a vegetated wetland, or within a 100-year floodplain.

ACTION-SPECIFIC ARARs

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10 - 264.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	Facility will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Site entry must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 264.30 - 264.37)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.
FRR	RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous waste constituents.	Plans will be developed during remedial design. Copies of the plans will be kept on-site.
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	The on-site contaminated soils will be treated by incineration. A 30-year post-closure program will include monitoring of the landfilled ash, and groundwater monitoring. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.

TABLE 5 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA - Incinerators (40 CFR 264.340 - 264.599)	Relevant and Appropriate	This regulation specifies the performance standards, operating requirements, monitoring, inspection, and closure guidelines of any incinerator burning hazardous waste.	At closure, all wastes, residues, ash, and effluents will be removed from the incinerator site if demonstrated to be hazardous. Performance standards for incinerating PCBs will be attained.
FRR	RCRA Regulations on Land Disposal Restrictions (40 CFR 268)	Relevant and Appropriate	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Contaminated soils would be treated to the Best Demonstrated Available Technology levels before being placed or replaced on the land. Hazardous waste cannot be stored except for accumulation for recovery, treatment, or disposal.
FRR	RCRA - Waste Piles (40 CFR 264.250 - 264.269)	Relevant and Appropriate	Details procedures, operating requirements, and closure and post-closure options for waste piles. If removal or decontamination of all contaminated subsoils is not possible, closure and post-closure requirements for landfills must be attained.	According to RCRA, waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste may comply with either the waste pile or landfill requirements. The covering of incinerator ash on-site, therefore, must comply with either subpart.
FRR	TSCA - Storage and Disposal (40 CFR 761.60 - 761.79)	Relevant and Appropriate	These regulations specify destruction requirements of PCB materials in excess of 50 ppm.	The requirements of this regulation will be attained during the remedial action. Test burns will be required to maximize PCB destruction efficiencies.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour, time-weighted average concentrations for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
FRR	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site, and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines OSHA recordkeeping and reporting regulations for an employer.	This regulation will be applicable to the construction company(s) contracted to set up the facility and perform the decontamination process on-site.
FRR	Protection of Archaeological Resources (32 CFR Part 229, 229.4)	Relevant and Appropriate	These regulations develop procedures for the protection of archaeological resources.	If archaeological resources are encountered during soil excavation, work will stop until the area has been reviewed by federal and state archaeologists.

TABLE 5 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	CWA - 40 CFR, R5	Applicable	This regulation specifies that a Best Management Program (BMP) be developed to minimize pollutant release from the Remedial Action.	A BMP will be developed and will include sedimentation control around the excavation areas, and fugitive dust control.
FRR	National Environmental Policy Act (40 CFR 6)	Applicable	This act sets the policy for carrying out the provisions of the Floodplain Management and the Protection of Wetlands Executive Orders.	The policies for management of floodplains and protection of wetlands should be considered during remedial alternative implementation.
FRR	DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1 - 172.558)	Applicable	This regulation outlines procedures for the packaging, labelling, manifesting, and transporting of hazardous materials.	Hazardous wastes are known to exist on-site. If encountered during decontamination of heavy equipment and personal protective gear, these materials shall be packaged, manifested, and transported to a licensed off-site disposal facility. Waste must have registration number with the letters "DOT".
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations specify the Massachusetts requirements for closure and post-closure of hazardous waste facilities.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be appropriate.
SRR	DEQE - Massachusetts Contingency Plan	Applicable	These regulations provide the framework for the Commonwealth of Massachusetts to regulate hazardous waste activities in the state.	During remedial design, these regulations will be compared to the corresponding CERCLA regulations, and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 6

ALTERNATIVE SC-6 ARAR EVALUATION
REMOVAL AND ON-SITE INCINERATION OF PCB-CONTAMINATED SEDIMENTS
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Surface Water				
State Regulatory Requirements	DEQE - Massachusetts Surface Water Quality Standards (310 CMR 4.00)	Applicable	DEQE Surface Water Quality Standards are given for dissolved oxygen, temperature increase, pH, and total coliform.	Erosion control measures such as check dams, silt curtains, and hay bales will be used to mitigate potential downstream violations of the DEQE Surface Water Quality Standards During sediment excavation.
Federal Criteria, Advisories, and Guidance	Federal Ambient Water Quality Criteria (AWQC)	Applicable	Federal AWQC are health-based criteria that have been developed for 95 carcinogenic and non-carcinogenic compounds.	AWQCs may be exceeded for certain compounds (e.g., lead, zinc, etc.) in the work area and immediately downstream due to excavation activities.
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) (40 CFR 40)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Incinerator emissions will be controlled by Best Available Control Technology such that the regulations are met. In addition, fugitive dust on haul roads, work areas, and stockpiles will be controlled by water sprays or other dust suppressants.
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 8.00)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Incinerator emissions will be controlled by Best Available Control Technology such that the regulations are met. In addition, fugitive dust on haul roads, work areas, and stockpiles will be controlled by water sprays or other dust suppressants.
Federal Criteria, Advisories, and Guidance	Threshold Limit Value (TLVs)	To be Considered	These standards were issued as consensus standards for controlling air quality in work place environments.	TLVs will be used for assessing site evaluation risks for the incineration activities.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely effects a wetland shall be permitted if a practicable alternative that has less effect is available.	Excavation and incineration of the PCB-contaminated sediments in the Middle Marsh and Apponagansett Swamp will significantly affect these wetlands. Road removal and wetlands revegetation will attempt to mitigate this impact.

TABLE 6 (continued)

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
	Fish and Wildlife Coordination Act (16 U.S.C 661)	Applicable	This regulation requires that any federal agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Services. This requirement is addressed under CWA Section 404 requirements.	Excavation and incineration of the PCB-contaminated sediments in the Middle Marsh and Apponagansett Swamp will significantly affect these wetlands. U.S. Fish and Wildlife Services must be contacted prior to remedial action.
	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	The incinerator and associated equipment will be located outside of the 100-year floodplain of the unnamed stream.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	This alternative involves removing, filling, dredging, and altering a wetland; a Notice of Intent will be filed with the DEQE. If work is conducted within 100 feet of a wetland, a request for a Determination Applicability must be filed. This alternative will significantly alter the Middle Marsh and Apponagansett Swamp. Removal of the PCB-contaminated sediment, however, will contribute to the long-term protection of the aquatic environment.
	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for any wetland area.	A Notice of Intent will be filed with DEQE outlining the proposed incinerator location. This facility will be located outside of the 100-year floodplain of the unnamed steam and any wetland area.
Federal Nonregulatory Requirements to be Considered	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	Since this remedial action excavates wetland areas, wetlands protection considerations are not possible unless wetland areas are reestablished after remedial activities are completed.
	Floodplains Executive Order (EO 11988)	To be Considered	Federal agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of floodplains.	The excavation of sediments in the unnamed stream, Middle Marsh, water hazards, and Apponagansett Swamp will have minimal impact on the floodplain of the unnamed stream.

TABLE 6 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10 - 264.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	Facility will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Site entry must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 264.30 - 264.37)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.
FRR	RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous waste constituents.	Plans will be developed during remedial design. Copies of the plans will be kept on-site.
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	Incinerated sediments, if deemed hazardous, should be contained with an impermeable cap. A 30-year post-closure program must include groundwater monitoring. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.
FRR	RCRA - Incinerators (40 CFR 264.340 - 264.599)	Relevant and Appropriate	This regulation specifies the performance standards, operating requirements, monitoring, inspection, and closure guidelines of any incinerator burning hazardous waste.	At closure, all wastes, residues, ash, and effluents will be placed in an on-site disposal area if demonstrated to be hazardous.
FRR	RCRA Regulations on Land Disposal Restrictions (40 CFR 268)	Relevant and Appropriate	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Contaminated sediments would be treated to the Best Demonstrated Available Technology levels before being placed or replaced on the land. Hazardous waste cannot be stored except for accumulation for recovery, treatment, or disposal.

TABLE 6 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA - Waste Piles (40 CFR 264.250 - 264.269)	Relevant and Appropriate	Details procedures, operating requirements, and closure and post-closure options for waste piles. If removal or decontamination of all contaminated soils is not possible, closure and post-closure requirements for landfills must be attained.	According to RCRA, waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste, may comply with either the waste pile or landfill requirements. The covering of the incinerator ash on-site, therefore, must comply with either subpart.
FRR	TSCA - Storage and Disposal (40 CFR 761.60 - 761.79)	Relevant and Appropriate	These regulations specify the disposal/destruction requirements of PCB materials in excess of 50 ppm.	The requirements of this regulation will be attained during remedial action. Test burns will be required to maximize PCB destruction efficiencies.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour, time-weighted average concentrations for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
FRR	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site, and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines OSHA recordkeeping and reporting regulations for an employer.	This regulation will be applicable to the construction company(s) contracted to set up the facility and perform the decontamination process on-site.
FRR	Protection of Archaeological Resources (32 CFR Part 229, 229.4)	Relevant and Appropriate	These regulations develop procedures for the protection of archaeological resources.	If archaeological resources are encountered during sediment excavation, work will stop until the area has been reviewed by federal and state archaeologists.
FRR	CWA - 40 CFR, R5	Applicable	This regulation specifies that a best management program (BMP) be developed to minimize pollutants release from the facility.	A BMP will be developed and will include sedimentation control around the excavation areas, and fugitive dust control.
FRR	CWA - Permits for Dredged and Fill Material (Section 404)	Applicable	This regulation states that no alternative that impacts a wetland shall be permitted if there is a practicable alternative that has less impact on the wetland. If there is no practicable alternative, impacts must be mitigated.	Following the excavation of contaminated sediments, a wetland will be recreated by placement of clean soils (if necessary) and grading, followed by revegetation. Potential impacts associated with erosion, sedimentation, and resuspension of sediments will be mitigated.
FRR	National Environmental Policy Act (40 CFR 6)	Applicable	This act sets for the policy for carrying out the provisions of the Floodplain Management and the Protection of Wetlands Executive Orders.	The policies for management of floodplains and protection of wetlands will be considered during remedial alternative implementation.

TABLE 6 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1 - 172.558)	Applicable	This regulation outlines procedures for packaging, labelling, manifesting, and transporting hazardous materials.	PCB-contaminated sediments are known to exist. If encountered during decontamination of heavy equipment and personal protective gear, these materials shall be packaged, manifested, and transported to a licensed off-site disposal facility. Waste must have registration number with the letters "DOT".
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations specify the Massachusetts requirements for closure and post-closure of hazardous waste facilities.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be relevant.
SRR	DEQE - Massachusetts Contingency Plan	Applicable	These regulations outline the State of Massachusetts procedures for regulating hazardous waste activities.	During remedial design, these regulations will be compared to the corresponding CERCLA regulations, and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 7

ALTERNATIVE SC-7 ARAR EVALUATION
REMOVAL AND ON-SITE SOLIDIFICATION OF PCB-CONTAMINATED SEDIMENTS
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Surface Water				
State Regulatory Requirements	DEQE - Massachusetts Surface Water Quality Standards (310 CMR 4.00)	Applicable	DEQE Surface Water Quality Standards are given for dissolved oxygen, temperature increase, pH, and total coliform.	Erosion control measures such as check dams, silt curtains, and hay bales will be used to mitigate potential downstream violations of the DEQE surface water quality standards.
Federal Criteria, Advisories, and Guidance	Federal Ambient Water Quality Criteria (AWQC)	Applicable	Federal AWQC are health-based criteria that have been developed for 95 carcinogenic and non-carcinogenic compounds.	AWQCs may be exceeded for certain compounds (e.g., lead, zinc, etc.) in the work area and immediately downstream of the excavation activities.
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) - 40 CFR 40	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Fugitive dust from the solidification process haul roads, work areas, and stockpiles will be controlled by water sprays or other dust suppressants.
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 - 8.00)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Fugitive dust from the solidification process haul roads, work areas, and stockpiles will be controlled by water sprays or other dust suppressants.
Federal Criteria, Advisories, and Guidance	Threshold Limit Values (TLVs)	To be Considered	These standards were issued as consensus standards for controlling air quality in work place environments.	TLVs will be used for assessing site evaluation risks for the solidification activities.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Excavation and solidification of the PCB-contaminated sediments in the Middle Marsh and Apponagansett Swamp will significantly affect these wetlands. Road removal and wetlands revegetation will attempt to mitigate this impact.
	Fish and Wildlife Coordination Act (16 U.S.C. 661)	Applicable	This regulation requires that any federal agency that proposes to modify a body of water must consult with the U.S. Fish and Wildlife Services. This requirement is addressed under CWA Section 404 requirement.	Excavation and solidification of the PCB-contaminated sediments in the Middle Marsh and Apponagansett Swamp will significantly affect these wetlands. Road removal and wetlands revegetation will attempt to mitigate this impact.

TABLE 7 (continued)

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	The solidification unit and associated equipment will be located outside of the 100-year floodplain of the unnamed stream.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws that regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	This alternative involves removing, filling, dredging, and altering a wetland; a Notice of Intent will be filed with the DEQE. If work is conducted within 100 feet of a wetland, a request for a Determination Applicability must be filed. This alternative will significantly alter the Middle Marsh and Apponagansett Swamp. Removal of the PCB-contaminated sediment, however, will contribute to the long-term projection of the aquatic environment.
	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	A Notice of Intent will be filed with DEQE outlining the proposed facility location. This facility will be located outside of the 100-year floodplain of the unnamed stream and any wetland area.
Federal Nonregulatory Requirements to be Considered	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	Since this alternative specifically excavates wetland areas, wetlands protection consideration is not possible unless wetland areas are reestablished after remedial activities are completed.
	Floodplains Executive Order (EO 11988)	To be Considered	Federal agencies are required to reduce the risk of flood loss, to minimize impact to floods, and to restore and preserve the natural and beneficial value of floodplains.	The excavation of sediments in the unnamed stream, Middle Marsh, water hazards, and Apponagansett Swamp will have minimal impact on the floodplain of the unnamed stream.

TABLE 7 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10 - 4.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	Facility will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Site entry must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 4.30 - 264.37)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.
FRR	RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous waste constituents.	Plans will be developed and implemented during remedial design. Copies of the plans will be kept on-site.
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 -264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	The solidified sediments should be contained by placing an impermeable cap over the landfill. Sediments will be dewatered and wastes stabilized. A 30-year post-closure program must include groundwater monitoring. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.
FRR	RCRA Regulations on Land Disposal Restrictions (40 CFR 268)	Relevant and Appropriate	This regulation outlines land disposal requirements and restrictions for hazardous wastes.	Contaminated sediments would be treated to the Best Demonstrated Available Technology levels before being placed or replaced on the land. Hazardous waste cannot be stored except for accumulation for recovery, treatment, or disposal.

TABLE 7 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA - Waste Piles (40 CFR 268)	Relevant and Appropriate	Details procedures, operating requirements, and closure and post-closure options for waste piles. If removal or decontamination of all contaminated subsoils is not possible, closure and post-closure requirements for landfills must be attained.	According to RCRA, waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste, may comply with either the waste pile or landfill requirements.
FRR	RCRA - Landfills (40 CFR 264.300 - 364.339)	Applicable	These regulations detail design, operating, monitoring, inspection survey, recordkeeping, and closure and post-closure requirements.	If an on-site landfill is constructed, two liners must be installed to prevent contamination of groundwater. A leachate collection system must be placed above and between the liner systems. Monitoring inspections, surveying, and recordkeeping must be conducted in compliance with these requirements. This alternative will not comply with the RCRA landfill requirements.
FRR	TSCA - Storage and Disposal (40 CFR 761.60 - 761.79)	Relevant and Appropriate	These regulations specify the disposal/destruction requirements of PCB materials in excess of 50 ppm.	Solidification is considered an alternative method under TSCA. Bench-scale and treatability testing will be required to demonstrate that solidification achieves a level of performance equivalent to incineration prior to implementation.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour, time-weighted average concentrations for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
FRR	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site, and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines OSHA recordkeeping and reporting regulations for an employer.	This regulation will be applicable to the construction company(s) contracted to set up the facility and perform the solidification process on-site.
FRR	Protection of Archaeological Resources (32 CFR Part 229, 229.4)	Relevant and Appropriate	These regulations develop procedures for the protection of archaeological resources.	If archaeological resources are encountered during sediment excavation, work will stop until the area has been reviewed by federal and state archaeologists.
FRR	CWA - 40 CFR, R5	Applicable	This regulation specifies that a best management program (BMP) be developed to minimize pollutant release from the facility.	A BMP will be developed and will include sedimentation control around the excavation area, and fugitive dust control.

TABLE 7 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	CWA - Permits for Dredged and Fill Material (Section 404)	Applicable	This regulation states that no alternative that impacts a wetland shall be permitted if there is a practicable alternative that has less impact on the wetland. If there is no practicable alternative, impacts must be mitigated.	Following the excavation of contaminated sediments, a wetland will be recreated by placement of clean soils (if necessary) and grading followed by revegetation. Potential impacts associated with erosion, sedimentation, and resuspension of of sediments will be mitigated.
FRR	National Environmental Policy Act (40 CFR 6)	Applicable	This act sets for the policy for carrying out the provisions of the Floodplain Management and the Protection of Wetlands Executive Orders.	The policies for management of floodplains and protection of wetlands will be considered during remedial alternative implementation.
FRR	DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1 - 172.558)	Applicable	This regulation outlines procedures for the packaging, labelling, manifesting, and transporting of hazardous materials.	PCB-contaminated sediments are known to exist. If encountered during decontamination of heavy equipment and personal protective gear, these materials shall be packaged, manifested, and transported to a licensed off-site disposal facility. Waste must have registration number with the letters "DOT".
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations specify the State of Massachusetts requirements for hazardous waste facilities.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be relevant.
SRR	DEQE - Massachusetts Contingency Plan	Applicable	These regulations outline the State of Massachusetts procedures for regulating hazardous waste activities.	During remedial design, these regulations will be compared to the corresponding CERCLA regulations, and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 8

ALTERNATIVE MM-1 ARAR EVALUATION
NO ACTION
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
Groundwater				
Federal Regulatory Requirements	SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	Relevant and Appropriate	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the concentration of contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	Under the No-action alternative, MCLs and MCLGs will be exceeded for several compounds including vinyl chloride, trichloroethene, and 1,2-dichloroethene. Institutional controls will be required to prevent private well installation within a one-mile radius of the site.
State Regulatory Requirements	DEQE - Massachusetts Groundwater Quality Standards (314 CMR 6.00)	Applicable	Massachusetts Groundwater Quality Standards have been promulgated for a number of contaminants. When the state levels are more stringent than federal levels, the state levels will be used.	DEQE Groundwater Standards for iron and manganese are more stringent than federal standards, and will be exceeded for the groundwater within the site boundaries.
	DEQE - Drinking Water Standards (310 CMR 22.00)	Relevant and Appropriate	The Massachusetts Drinking Water Guidelines and Standards include Massachusetts Maximum Contaminant Levels (MMCLs) that are the MCL values established by EPA and adopted by the state, and MCLs that have been established by EPA but not yet adopted by Massachusetts. MMCLs have not been established for any of the contaminants of concern in the groundwater at the Sullivan's Ledge site.	As noted under SDWA, the groundwater in and around the Sullivan's Ledge site will exceed MCLs for several compounds. Institutional controls will be required to prevent private well installation within a one-mile radius of the site.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Under a no-action alternative, the volatile organic compound contaminant plume will eventually reach and may contaminate the Middle Marsh area. A groundwater monitoring program will need to be implemented to determine the extent of impact on wetlands.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	Under a No-action alternative, the volatile organic compound contaminant plume will eventually reach and may contaminate the Middle Marsh area. A groundwater monitoring program will need to be implemented to determine the extent of wetlands impact.

TABLE 8 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10-264.18)	Relevant and Appropriate	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	The site will be fenced, posted, and operated in accordance with these requirements. Site workers will be properly trained.
FRR	RCRA - Release From Solid Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contaminant migration.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This requirement details the general requirements for closure and post-closure of hazardous waste facilities, including the installation of a groundwater monitoring program.	Under a No-action alternative, these long-term monitoring and maintenance requirements must be met.
FRR	OSHA - General Industry Standards (29 CFR 1910)	Applicable	This regulation specifies the 8-hour, time-weighted average concentration for various organic compounds.	Proper respiratory equipment will be worn during groundwater sampling if it is not possible to maintain the work atmosphere below these concentrations.
FRR	OSHA - Safety and Health Standards (29 CFR 1926)	Applicable	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be worn on-site and procedures will be followed during groundwater monitoring.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines OSHA recordkeeping and reporting requirements for an employer.	These regulations are applicable to the company contracted to monitor groundwater wells.
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste, Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations provide a comprehensive program for monitoring, storing, and recordkeeping at hazardous waste sites.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be applicable.
SRR	DEQE - Massachusetts Contingency Plan (310 CMR 40.000)	Applicable	These regulations provide the framework for the Commonwealth of Massachusetts to regulate hazardous waste activities in the state.	During remedial design, these regulations will be compared to the corresponding federal CERCLA regulations, and the more stringent requirements will be applicable.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 9

ALTERNATIVE MM-3 ARAR EVALUATION
PASSIVE COLLECTION
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Groundwater				
Federal Regulatory Requirements	SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	Relevant and Appropriate	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the concentration of contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	This alternative only addresses the overburden groundwater and the upper portion of the shallow bedrock groundwater. MCLs will be exceeded, however, in the deeper bedrock for several compounds including vinyl chloride and trichloroethene. Institutional controls will be required to prevent private well installation within a one-mile radius of the site.
State Regulatory Requirements Standards	DEQE - Massachusetts Groundwater Quality Standards (314 CMR 6.00)	Applicable	Massachusetts Groundwater Quality Standards have been promulgated for a number of contaminants. When the state levels are more stringent than federal levels, the state levels will be used.	DEQE Groundwater Standards for iron and manganese are more stringent than federal standards and will be exceeded for the bedrock groundwater within the site boundaries.
	DEQE - Drinking Water Standards (310 CMR 22.00)	Relevant and Appropriate	The Massachusetts Drinking Water Guidelines and Standards include Massachusetts Maximum Contaminant Levels (MMCLs) which are the MCL values established by EPA and adopted by the state, and MCLs that have been established by EPA but not yet adopted by Massachusetts. MCLs have not been established for any of the contaminants of concern in the groundwater at the Sullivan's Ledge site.	As noted under SDWA, the bedrock groundwater in and around the Sullivan's Ledge site will exceed MCLs for several compounds. Institutional controls will be required to prevent private well installation within a one-mile radius of the site.
Surface Water				
State Regulatory Requirements	DEQE - Massachusetts Surface Water Quality Standards (310 CMR 4.00)	Applicable	DEQE Surface Water Quality Standards are given for dissolved oxygen, temperature increase, pH, and total coliform.	Discharges from the leachate collection treatment system will meet the DEQE surface water quality standards.
Federal Criteria, Advisories, and Guidance	Federal Ambient Water Quality Criteria (AWQC)	Applicable	Federal AWQC are health-based criteria that have been developed for 95 carcinogenic and non-carcinogenic compounds.	Federal AWQC will be attained for the discharge from the leachate collection treatment system. AWQCs of concern are chlorobenzene, bis(2-ethyl hexyl) phthalate, cyanide, lead, silver, and zinc.
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) - 40 CFR 40.	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Standards for particulate matter will be used when assessing impacts of construction activities. Fugitive dust emissions will be controlled by water sprays or dust suppressants as required.

TABLE 9 (continued)

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 - 8.00)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Fugitive dust will be controlled by water sprays or dust suppressants as required. If an air stripper is reconsidered for groundwater treatment, then vapor phase carbon adsorption will be required.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	RCRA Location Standards (40 CFR 264.18)	Relevant and Appropriate	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	If the leachate collection treatment facility is constructed within the 100-year floodplain of the unnamed stream, it will be designed, operated, and maintained to prevent leachate release during a 100-year flood.
State Regulatory Requirements	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	A Notice of Intent will be filed with DEQE outlining the proposed location. No portion of the facility will be located within a wetland or bordering a vegetated wetland, or within a 100-year floodplain, unless approved by the State.

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10 - 4.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	Facility will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Site entry must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 264.30-264.37)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.

TABLE 9 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA - Contingency Plan and Emergency Procedures	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous waste constituents.	Plans will be developed during remedial design. Copies of the plans will be kept on-site.
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details the requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination.
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	A 30-year post-closure program must include monitoring and maintaining the cap; removing liquid in the leachate collection system; and groundwater monitoring. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour, time-weighted average concentrations for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
FRR	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines OSHA recordkeeping and reporting regulations for an employer.	This regulation will be applicable to the construction company(s) contracted to set up the facility and perform the decontamination process on-site.
FRR	CWA - National Pollutant Discharge Elimination System Regulations (40 CFR 122, 125)	Applicable	This requirement implements the NPDES program that specifies the applicable effluent standards, monitoring requirements, and standard and special conditions for direct discharge.	Both on-site and off-site dischargers from CERCLA sites to surface waters are required to meet the substantive CWA NPDES requirement including discharge limitations, monitoring requirements, and BMPs.

TABLE 9 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations provide a comprehensive program for monitoring, storing, and recordkeeping at hazardous waste sites.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be applicable.
SRR	DEQE - Massachusetts Contingency Plan (310 CMR 40.000)	Applicable	These regulations provide the procedures for the Commonwealth of Massachusetts to regulate hazardous waste activities in the state.	During remedial design, these regulations will be compared to the corresponding federal CERCLA regulations, and the more stringent requirements will be applicable.
SRR	MDWPC - Surface Water Discharge Permits; Surface Water Quality Standards; Groundwater Discharge Permit Program; and Groundwater Quality Standards	Applicable	This regulation outlines general requirements necessary to obtain an NPDES permit in Massachusetts.	Actions required to meet Massachusetts NPDES requirements will be similar to those discussed for CWA 40 CFR 122, 125. These actions will include compliance with water quality standards, implementation of a discharge monitoring system, completion of discharge monitoring records, and adherence to BMPs.
SRR	MDWPC - Supplemental Requirements for Hazardous Waste Management Facilities (314 CMR 8.00-29.00)	Applicable	This regulation outlines additional requirements that must be satisfied in order for a RCRA facility to comply with NPDES requirements.	Actions discussed for the CWA (40 CFR Parts 122, 125) should be sufficient to meet these additional requirements. During remedial design, both federal and state regulations will be compared, and the more stringent requirement will be adopted.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.

TABLE 10

ALTERNATIVE MM-5 ARAR EVALUATION
PUMP AND TREAT
SULLIVAN'S LEDGE SITE

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Groundwater				
Federal Regulatory Requirements	SDWA - Maximum Contaminant Levels (MCLs) (40 CFR 141.11 - 141.16)	Relevant and Appropriate	MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the concentration of contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers potentially used for drinking water.	This alternative addresses the off-site overburden groundwater plume and the off-site shallow bedrock groundwater plume. MCLs will be attained for these areas. This alternative also addresses the on-site bedrock groundwater. Attainment of MCLs in the deep bedrock groundwater both on- and off-site, is not known and may be technically infeasible due to the likely occurrence of DNAPLs in the quarry pits and adjacent bedrock fractures. Institutional controls will be required to prevent private well installation within a one-mile radius of the site.
State Regulatory Requirements	DEQE - Massachusetts Groundwater Quality Standards (314 CMR 6.00)	Applicable	Massachusetts Groundwater Quality Standards have been promulgated for a number of contaminants. When the state levels are more stringent than federal levels, the state levels will be used.	DEQE Groundwater Standards for iron and manganese are more stringent than federal standards and will be attained due to the large amount of metal disposed in the pits which will continue to rust for generations.
	DEQE - Drinking Water Standards (310 CMR 22.00)	Relevant and Appropriate	The Massachusetts Drinking Water Guidelines and Standards include Massachusetts Maximum Contaminant Levels (MMCLs) that are the MCL values established by EPA and adopted by the state, and MCLs that have been established by EPA but not yet adopted by Massachusetts. MCLs have not been established for any of the contaminants of concern in the groundwater; therefore, the MCLs were used to establish target levels.	As noted under SDWA, the bedrock groundwater off-site and potentially on-site will not attain MCLs for several compounds. Institutional controls will be required to prevent private well installation within a one-mile radius of the site.
Surface Water				
State Regulatory Requirements	DEQE - Massachusetts Surface Water Quality Standards (310 CMR 4.00)	Applicable	DEQE Surface Water Quality Standards are given for dissolved oxygen, temperature increase, pH, and total coliform.	Discharges from the groundwater treatment system will be into the unnamed stream and will meet the DEQE water quality standards.
Federal Criteria, Advisories, and Guidance	Federal Ambient Water Quality Criteria (AWQC)	Applicable	Federal AWQC are health-based criteria which have been developed for 95 carcinogenic and non-carcinogenic compounds.	Federal AWQCs will be attained for the discharge from the groundwater treatment system.

TABLE 10 (continued)

CHEMICAL-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Air				
Federal Regulatory Requirements	CAA - National Air Quality Standards (NAQS) - 40 CFR 40	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Standards for particulate matter will be used when assessing impacts of construction activities. Fugitive dust emissions will be controlled by water sprays or dust suppressants as required.
State Regulatory Requirements	DEQE - Air Quality, Air Pollution (310 CMR 6.00 - 8.00)	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Fugitive dust will be controlled or water sprays or dust suppressants as required. If an air stripper is reconsidered for groundwater treatment, then vapor phase carbon adsorption will be required.

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Wetlands/Floodplains				
Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 230	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	The pump and treat alternative is not expected to significantly affect the Middle Marsh area. Any drying of the wetland that may occur will be compensated by discharging the treated water into the unnamed stream and subsequently the Middle Marsh.
	RCRA Location Standards (40 CFR 264.18)	Relevant and Appropriate	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	If the groundwater treatment facility is constructed within the 100-year floodplain of the unnamed stream, it will be designed, operated, and maintained to prevent accidental discharge during a 100-year flood.
State Regulatory Requirements	DEQE - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	The pump and treat alternative is not expected to significantly affect the Middle Marsh area. Any drying of the wetland that may occur will be compensated by discharging the treated water into the unnamed stream and subsequently the Middle Marsh.
	Hazardous Waste Facility Siting Regulations (990 CMR 1.00)	Relevant and Appropriate	These regulations outline the criteria for the construction, operation, and maintenance of a new facility or increase in an existing facility for the storage, treatment, or disposal of hazardous waste.	A Notice of Intent will be filed with DEQE outlining the proposed location of the treatment facility. No portion the facility will be located within a wetland or within a 100-year floodplain, unless approved by the State.

TABLE 10 (continued)

LOCATION-SPECIFIC ARARS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Nonregulatory Requirements to be Considered	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	The pump and treat alternative is not expected to significantly affect the Middle Marsh area. Any drying of the wetland that may occur will be compensated by discharging the treated water into the unnamed stream and subsequently the Middle Marsh.
	Floodplains Executive Order (EO 11988)	To be Considered	Federal agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of floodplains.	The design of the groundwater treatment system will be outside the 100-year floodplain of the unnamed stream. If this is not possible, the design will incorporate measures to minimize the effects on the 100-year floodplain.

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
Federal Regulatory Requirements (FRR)	RCRA - General Facility Standards (40 CFR 264.10 - 264.18)	Relevant and Appropriate	General facility requirements outlining general waste analysis, security measures, inspections, training, and location standards.	Facility will be constructed, fenced, and operated in accordance with this requirement. All workers will be properly trained. A written waste analysis plan must be developed and maintained on-site. Site entry must be prevented by a 24-hour surveillance system and appropriate signs posted. A written inspection program must be developed, and all personnel must complete an on-the-job training program to ensure facility compliance.
FRR	RCRA - Preparedness and Prevention (40 CFR 264.30-264.37)	Relevant and Appropriate	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed on-site; local authorities will be familiarized with the site.
FRR	RCRA - Contingency Plan and Emergency Procedures	Relevant and Appropriate	Every hazardous waste facility must have a contingency plan that is implemented immediately upon fire, explosion, or release of harmful hazardous waste constituents.	Plans will be developed during remedial design. Copies of the plans will be kept on-site.
FRR	RCRA - Releases from Hazardous Waste Management Units (40 CFR 264.90 - 264.109)	Relevant and Appropriate	This regulation details requirements for a groundwater monitoring program to be installed on-site.	A groundwater monitoring program will be designed, installed, and operated to assess groundwater contamination movement with time.

TABLE 10 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
FRR	RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	Relevant and Appropriate	This regulation details the specific requirements for closure and post-closure of hazardous waste facilities.	A 30-year post-closure program must include monitoring and maintaining the cap, and monitoring groundwater. A notation on the deed to the property must be recorded that will notify any potential purchaser that the land has been used to manage hazardous waste.
FRR	OSHA - General Industry Standards (29 CFR Part 1910)	Applicable	These regulations specify the 8-hour, time-weighted average concentrations for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
FRR	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR 1926)	Applicable	This document contains instructions concerning worker safety at RCRA or Superfund hazardous waste facilities.	All appropriate safety equipment will be on-site, and appropriate procedures will be followed during remediation.
FRR	OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines OSHA recordkeeping and reporting regulations for an employer.	This regulation will be applicable to the construction company(s) contracted to set up the facility and operate the groundwater treatment system.
FRR	CWA - National Pollutant Discharge Elimination System Regulations (40 CFR 122, 125)	Applicable	This requirement implements the NPDES program that specifies the applicable effluent standards, monitoring requirements, and standard and special conditions for direct discharge.	Both on-site and off-site discharges from CERCLA sites to surface waters are required to meet the substantive CWA NPDES requirement including discharge limitations, monitoring requirements, and BMPs.
FRR	National Environmental Policy Act (40 CFR 6)	Applicable	This act sets forth the policy for carrying out the provisions of the Protection of Wetlands Executive Order.	The policies for management of floodplains and protection of wetlands should be considered during remedial alternative implementation.
State Regulatory Requirements (SRR)	DEQE - Hazardous Waste Phases I and II (310 CMR 30.00)	Relevant and Appropriate	These regulations provide a comprehensive program for monitoring, storing, and recordkeeping at hazardous waste sites.	During remedial design, these regulations will be compared to the corresponding federal RCRA regulations, and the more stringent requirements will be applicable.
SRR	DEQE - Massachusetts Contingency Plan (310 CMR 40.000)	Applicable	These regulations provide the framework for the Commonwealth of Massachusetts to regulate hazardous waste activities in the state.	During remedial design these regulations will be compared to the corresponding federal CERCLA regulations, and the more stringent requirements will be applicable.
SRR	MDWPC - Surface Water Discharge Permits; Surface Water Quality Standards; Groundwater Discharge Permit Program; and Groundwater Quality Standards	Applicable	This regulation outlines general requirements necessary to obtain an NPDES permit in Massachusetts.	Actions required to meet Massachusetts NPDES requirements will be similar to those discussed for CWA 40 CFR 122, 125. These actions will include compliance with water quality standards, implementation of a discharge monitoring system, completion of discharge monitoring records, and adherence to BMPs.

TABLE 10 (continued)

ACTION-SPECIFIC ARARS

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CORRESPONDING REMEDIAL ACTION(S)
SRR	MDWPC - Supplemental Requirements for Hazardous Waste Management Facilities (314 CMR 8.00-29.00)	Applicable	This regulation outlines additional requirements that must be satisfied in order for a RCRA facility to comply with NPDES requirements.	Actions discussed for the CWA (40 CFR Parts 122, 125) should be sufficient to meet these additional requirements. During remedial design, both federal and state regulations will be compared, and the more stringent requirement will be adopted.
SRR	DPW - Hazardous Substance Right-to-Know (105 CMR 67)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Public Works.	The requirements of this regulation will be attained during alternative implementation.
SRR	DOL - Hazardous Substance Right-to-Know (441 CMR 21)	Applicable	These regulations detail the informational requirements for hazardous substances used by the Massachusetts Dept. of Labor.	The requirements of this regulation will be attained during alternative implementation.
SRR	DEQE - Hazardous Substance Right-to-Know (310 CMR 33)	Applicable	These regulations outline the informational requirements for hazardous substances that may affect workers associated with the Department of Environmental Quality.	The requirements of this regulation will be attained during alternative implementation.