VOLUME 3

OPERABLE UNIT
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FOR
MONTGOMERY TOWNSHIP HOUSING DEVELOPMENT SITE

Prepared for:

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Hazardous Site Mitigation
Bureau of Site Management
Trenton, New Jersey 08625

DRAFT

July 1987

86C4290

Submitted by:

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Wayne, New Jersey 07470

MTH 001 1040

58271

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MTH 001 1041

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MTH 001 1042

Appendix A

APPENDIX A
PREVIOUS REMEDIAL RESPONSE ACTIVITIES

MTH 001 1044

APPENDIX A
PREVIOUS REMEDIAL RESPONSE ACTIVITIES

The following is a listing of the response actions to the ground water pollution problem at Montgomery Township Housing Development and Rocky Hill Municipal Wellfield. The list includes physical remedial actions and well, septic, and soil sampling.

Remedial Response Activities Within Montgomery Township Housing Development

Date	Event
11/19/79	Well samples from two homesites in the development were collected by NJDEP and analyzed for volatile organics (NJDOH, 12/7/79e).
12/4/79	Well samples from 21 residents were collected and analyzed for trichloroethylene (TCE) and 1,1,1-trichloroethane by Princeton Testing Laboratory (Dennison, 12/10/79).
12/19/79	Well samples from 36 residences were collected and analyzed for TCE by Princeton Testing Laboratory (Dennison, 12/28/79).
1/28/80	Princeton Testing Laboratory reported on TCE analysis of 41 well samples from residences (Dennison, 1/28/80d).
2/11/80	NJDEP analyzed 11 private well samples for chlorinated hydrocarbons (NJDOH, 2/19/80d).

MTH 001 1045

Remedial Response Activities
Within Montgomery Township Housing Development (Continued)

Date	Event
3/14/80	Princeton Testing Laboratory reported on TCE content of 21 housing development well samples (Dennison, 3/18/80).
5/12/80	TCE analysis on one resident's private well was done by Princeton Testing Laboratory (Dennison, 5/12/80).
11/18/80	Princeton Testing Laboratory reported on TCE content of 26 wells (Dennison 11/18/80).
1/2/81	NJDEP septic tank samples taken from five homes (Searfoss, 7/22/83).
2/10/81	NJDEP conducted volatile organic compound (VOC) scan of six private well samples (NJDOH, 2/23/81e).
3/16/81	Installation of Elizabethtown Water Company lines (Searfoss, 7/22/83).
7/14, 7/20, 8/4/81	NJDEP conducted VOC scan of six private well samples; nutrient, total dissolved solids (TDS), chloride analysis done on one (NJDOH, 8/5/81a, 9/17/81).
9/25/81	Princeton Testing Laboratory performed TCE analysis of one private well sample (Scaaf, 9/30/81).
10/15/81	Princeton Testing Lab performed TCE analysis of 34 private well samples (Schaaf, 10/11/81).

MTH 001 1046

Remedial Response Activities
Within Montgomery Township Housing Development (Continued)

Date	Event
3/16, 3/18, 5/25/82	NJDEP conducted VOC scan and polychlorinated biphenyl (PCB) analysis of six potable wells in development (NJDOH, 6/16/82).
6/14/82	TCE analysis was performed on 15 private well samples; VOC analysis of 9 private well samples (Schaaf, 6/14/83).
5/2/83	Princeton Testing Lab VOC analysis of two well samples (Searfoss, 7/22/83).
7/7/83	Somerset Clinical VOC analysis of one well sample (Searfoss, 7/22/83).
7/17/85	WCC enters into contract with NJDEP to conduct remedial investigation at MTHD.
11/7, 11/8, 12/3/85	WCC conducted electrical resistivity sounding and profiling survey of MTHD.
1/86	NJDEP Division of Water Resources placed a restriction on future well drilling for water supply wells in MTHD.
5/28/86-10/8/86	WCC performed inspection of drilling, installation, and development of 26 monitoring wells.

MTH 001 1047

Remedial Response Activities
Within Montgomery Township Housing Development (Continued)

Date	Event
6/5/86- 6/6/86	Well samples from 35 residents were collected by WCC and analyzed for VOC.
11/18/86- 12/4/86	Well samples from 20 monitoring wells were collected by WCC and analyzed for priority pollutants plus 40.
11/3, 12/1, 12/2/86	WCC conducted field permeability tests on 14 monitoring wells.
4/22/87	Second round well samples from 6 residences collected by WCC an analyzed for VOC.
4/22/87	Surface water and stream sediment from 5 locations in Rocky Hill vicinity were collected by WCC and analyzed for priority pollutants plus 40 and VOC, respectively.
4/22, 5/27/87	WCC conducted ambient air quality survey of MTHD site.
6/1/86- 6/16/87	Inspection of 33 soil borings were performed and soil samples were collected by WCC and analyzed for VOC. In addition, 11 soil samples were analyzed for priority pollutants plus 40.
6/13/87- 6/16/87	WCC performed inspection of drilling, installation, and development of 3 additional monitoring wells.

MTH 001 1048

Remedial Response Activities
Within Montgomery Township Housing Development (Continued)

Date	Event
6/23/87	Septic tank samples from 7 industries and residences were collected by WCC and analyzed for VOC.
6/23/87-7/14/87	Second round monitoring well samples from 29 monitoring wells were collected by WCC and analyzed for VOC.

MTH 001 1049

Remedial Response Activities Within Rocky Hill Municipal Wellfield

Date	Event
9/78-5/79	Rutgers University took samples of Rocky Hill Municipal well water (Rocky Hill Water Department, 1979).
11/9/78	Rocky Hill Municipal well water samples were taken by the NJDEP (NJDEP, 1980).
11/5/79-11/9/79	Potable water well samples were taken from residential and industrial wells in the Rocky Hill vicinity (Rocky Hill Water Department, 1980).
11/14/79	Rocky Hill Municipal Well Number 2 shut down (Post, 1979).
12/8/79-12/18/80	Quality Control Laboratory Division took samples of the Rocky Hill Municipal Water Supply (Quality Control Laboratory Division, 1980).
1/11/80-1/20/80	Water samples were taken from Rocky Hill Municipal Well #2 (Rocky Hill Water Department, 1980).
1/14/80	Water samples were collected along Van Horn Brook (NJDEP, 1980).
1/15/80	Water samples were taken in the Rocky Hill Borough Area (Rocky Hill Water Department, 1980).
1/17/80	A water sample was taken from the Rocky Hill Cemetery Well (NJDEP, 1980).

MTH 001 1050

Remedial Response Activities
Within Rocky Hill Municipal Wellfield (Continued)

Date	Event
3/17/80-3/19/80	Water level readings were taken at nine industrial and residential wells in the Rocky Hill Area (NJDEP, 1980).
5/14/80	Water samples were collected along Van Horn Brook (NJDEP, 1980).
1/81 (Circa)	Samples were taken from Borough residential water supplies (NJDEP, 1981).
2/20/81-12/11/81	International Hydronics Corporation took samples of the Rocky Hill Municipal Well water (International Hydronics Corporation, 1981).
7/5/81	The Rocky Hill Water Department reopened Municipal Well Number 2 (The Princeton Packet, 1981).
11/24/81-2/16/83	Accutest Laboratories took water samples from the Rocky Hill well system. (Accutest Laboratories, 1983).
1/25/82	The Borough of Rocky Hill closed Well Number 2 after it switched back to the Elizabethtown Water Supply (Geoghan, 1982).
2/23/82	Well Number 2 was returned to service for residential use.
3/17/82	Rocky Hill Municipal Wellwater samples were taken by NJDEP (NJDEP, 1982).

MTH 001 1051

Remedial Response Activities
Within Rocky Hill Municipal Wellfield (Continued)

Date	Event
1/6/83- 1/1/83	Random potable water well samples were taken in the Rocky Hill Borough Area (NJ Division of Water Resources, 1983).
7/27/83	Air-stripping pilot testing was conducted on Well Number 2 (Merk, 1983).
7/17/85	WCC enters into contract with NJDEP to conduct remedial investigation at RHMW.
12/13/86	WCC performed short duration pumping test at Rocky Hill municipal well.
4/22, 5/27/87	WCC conducted ambient air quality survey of RHMW vicinity.

MTH 001 1052

Remedial Response Activities
At Suspected Sources - Polycell Corp.

Date	Event
2/11/80	NJDEP sampled Polycell septic tank; VOC scan (NJDOH, 2/21/80).
2/21/80	NJDEP sampled Polycell well; VOC scan (NJDOH, 3/18/80).
2/10/81	NJDEP sampled Polycell well; VOC scan (NJDOH, 2/23/81a).
5/5/81	NJDEP sampled three pipelines; VOC scan (NJDOH, 6/10/81).
7/14/81	NJDEP sampled Polycell well; VOC scan, TDS (NJDOH, 8/5/81b).
7/14/81	NJDEP sampled Polycell #4 tank; VOC scan (NJDOH, 8/5/81b).
3/17/82	NJDEP sampled Polycell well; VOC scan (NJDOH, 4/6/82d).
4/12/82	NJDEP took shallow well and deep well samples, performed a VOC scan, and analyzed for TDS, chloride, sulfate, specific conductance, hexavalent chromium; additional shallow well sample for heavy metal analysis (NJDOH, 6/1/82b).
3/30/83	NJDEP took a shallow well sample and performed a VOC scan; and took a deep well sample and analyzed for PCB and also conducted a VOC scan (NJDOH, 4/19/83c).
5/17/83	NJDEP sampled Polycell bedrock well; PCB analysis (NJDOH 6/3/83b).

MTH 001 1053

Remedial Response Activities
At Suspected Sources - Polycell Corp. (Continued)

Date	Event
10/28/83	NJDEP sampled soil to be analyzed for PCB (Cunningham, 12/23/83).
5/27/87	WCC conducted ambient air quality survey.
6/8/87-6/15/87	WCC inspected 6 soil borings and collected 11 soil samples; priority pollutants plus 40 or VOC analysis.

MTH 001 1054

Remedial Response Activities
At Suspected Sources - 1377 Route 206 (PCR)

Date	Event
2/11/80	NJDEP sampled 1377 Route 206 (PCR) septic, VOC scan (NJDOH, 2/19/80b).
2/21/80	NJDEP sampled 1377 Route 206 (PCR) well, VOC scan (NJDOH, 3/18/80).
4/17/80	NJDEP sampled 1377 Route 206 (PCR) septic; VOC scan (NJDOH, 5/27/80).
2/10/81	NJDEP sampled 1377 Route 206 (PCR)-1 and (PCR)-2 wells; VOC scan (NJDOH, 2/23/81c).
2/13/81	NJDEP took soil sample at pipe end; VOC scan (NJDOH, 1/26/82).
7/14/81	NJDEP sampled 1377 Route 206 (PRC)-2 well; VOC scan, TDS, iron (NJDOH, 8/5/81c).
3/17/82	NJDEP sampled well water; VOC scan. Sample of black soil material; VOC scan. Sample of monitoring well near Village Shopper (NJDOH, 4/6/82, 5/5/82).
3/18/82	NJDEP sampled well water (top); PCB analysis, VOC scan (NJDOH, 5/5/82b).
4/12/82	NJDEP sampled 1377 Route 206 (PCR) well; VOC scan, TDS, chloride, sulfate, specific conductance, hexavalent chromium. Also sampled monitoring well at Village Shopper; VOC scan (NJDOH, 6/1/82a).

MTH 001 1055

Remedial Response Activities
At Suspected Sources - 1377 Route 206 (PCR) (Continued)

Date	Event
12/6/82	NJDEP took soil samples at holes #1, 2A, 2B, 3; VOC scan, PCB analysis (NJDOH, 1/7/83).
3/30/83	NJDEP sampled Village Shopper monitoring well; VOC scan. 1377 Route 206 (PCR) shallow well sample; PCB analysis (NJDOH, 4/19/83a).
3/31/83	NJDEP sampled 1377 Route 206 (PCR)-2 well; VOC scan (NJDOH, 4/19/83b).
5/17/83	NJDEP sampled 1377 Route 206 (PCR)-2 well; PCB analysis and Village Shopper background well; PCB analysis (NJDOH, 6/3/83c).
8/29/83	NJDEP and Princeton Testing Laboratory collected soil samples for PCB and volatile organics (see Appendix E) (NJDOH 9/30/83).
10/28/83	NJDEP collected soil samples on property immediately east of 1377 Route 206 (PCR) (Cunningham, 12/23/83).
9/16/86-9/30/86	WCC inspected drilling, installation and development of one deep and one shallow monitoring well.
11/21/86	WCC sampled monitoring wells; priority pollutants plus 40 analysis.

MTH 001 1056

Remedial Response Activities
At Suspected Sources - 1377 Route 206 (PCR) (Continued)

Date	Event
5/27/87	WCC conducted ambient air quality survey.
6/1/87- 6/5/87	WCC inspected 6 soil borings and collected 11 soil samples; priority pollutants plus 40 or VOC analysis.
6/23/87	WCC sampled septic tank; VOC analysis.
7/6/87	WCC sampled monitoring wells; VOC analysis.

MTH 001 1057

Remedial Response Activities
At Suspected Sources - Princeton Airport

Date	Event
11/19/79	NJDEP obtained well water sample; VOC scan (NJDOH, 12/7/79a).
12/17/82	NJDEP took soil samples at 1A, 1B, 2 sites; VOC scan (NJDOH, 1/4/83).
1/6/83	NJDEP obtained well sample; VOC scan (NJDOH, 2/18/83b).
1/11/83	NJDEP obtained well sample; PCB analysis (NJDOH, 1/31/83b).
1/20/83	NJDEP took 2', 4', 5', 6' depth composite trench sediment samples; VOC scan, Trench 2, 2' + 4' samples for PCB. Groundwater analysis from trench 2 at 2', 4', 5'; VOC scan, PCB analysis (NJDOH, 2/18/83c).
4/4/83	NJDEP took stream sample adjacent to airport; VOC scan (NJDOH, 4/19/83g).
5/4/83	Airport submitted hydrogeological plan to NJDEP (Cunningham, 5/26/83).
7/6/83	NJDEP and airport collected water samples from four monitoring wells; VOC scan (NJDOH, 7/26/83).
9/26/83	NJDEP collected soil samples at a location where a fuel tank had been removed (NJDOH, 9/26/83).

MTH 001 1058

Remedial Response Activities
At Suspected Sources - Princeton Airport (Continued)

Date	Event
10/17/83	NJDEP and Princeton Airport collected samples from 5 additional wells (Cunningham 12/23/83).
11/20, 12/4/86	WCC sampled 3 monitoring wells; priority pollutants plus 40 analysis.
4/22/87	WCC conducted ambient air quality survey.

MTH 001 1059

Remedial Response Activities
At Suspected Sources - Princeton Gamma Tech (PGT)

Date	Event
11/19/79	NJDEP sampled PGT septic tank; VOC scan (NJDOH, 12/7/79f).
1/17/80	NJDEP sampled PGT septic tank; VOC scan (NJDOH, 2/26/80).
1/8/80	Princeton Testing Lab sampled PGT well water (Dennison, 1/11/80).
2/11/80	NJDEP sampled PGT well; organic scan (NJDOH, 2/19/80a).
2/21/80	NJDE sampled PGT well; VOC scan (NJDOH, 3/18/80).
5/9/80	Princeton Testing Lab sampled ground water; TCE analysis (Dennison, 5/9/80).
5/16/80	Princeton Testing Lab sampled well; VOC scan (Dennison 6/2/80).
3/25/83	NJDEP sampled Elizabethtown Water Company water and aeration tank; VOC scan (NJDOH, 4/13/83).
3/25/83	NJDEP sampled soil at 1A, 1B, 1C, 1D sites; VOC scan (NJDOH, 4/15/83).
6/11/86-6/30/86	WCC inspected drilling, installation, and development of one deep and one shallow monitoring well.
11/18/86	WCC sampled monitoring wells; priority pollutants plus 40 analysis.

MTH 001 1060

Remedial Response Activities
At Suspected Sources - Princeton Gamma Tech (PGT) (Continued)

Date	Event
4/22/87	WCC conducted ambient air quality survey.
6/10, 6/11/87	WCC inspected 3 soil borings and collected 6 soil samples; priority pollutant plus 40 or VOC analysis.
6/23/87	WCC sampled aeration tank; VOC analysis.
7/9/87	WCC sampled monitoring wells; VOC analysis.

MTH 001 1061

Remedial Response Activities
At Suspected Sources - Compo Industries

Date	Event
11/5/79	NJDEP sampled raw well water; VOC scan (NJDOH, 12/7/79c).
11/14/79	NJDEP sampled raw well water; VOC scan (NJDOH, 12/12/79).
2/11/80	NJDEP sampled Compo septic; VOC scan (NJDOH, 2/21/80).
10/6/80	Chemical analysis of 10 storage drums was performed by Stablex-Reutter Inc. (Hartman, 10/6/80).
2/10/81	NJDEP sampled Compo well water: VOC scan (NJDOH, 2/23/81b).
3/26/81	Borough of Rocky Hill sampled Compo effluent; VOC scan (Bruns, 4/6/81).
4/7/81	Borough of Rocky Hill Sampled Compo effluent; VOC scan (Bruns, 4/13/81).
2/23/82	Princeton Testing Lab analyzed Compo effluent; VOC scan (Rodoti, 3/9/82).
3/30/83	NJDEP sampled monitoring well; VOC scan (NJDOH, 4/19/83d).
4/12/83	NJDEP sampled production well; VOC scan (NJDOH, 5/10/83).
5/17/83	NJDEP sampled monitoring well; VOC scan (NJDOH, 6/3/83d).
4/22/86	WCC conducted ambient air quality survey.

MTH 001 1062

Remedial Response Activities
At Suspected Sources - Compo Industries (Continued)

Date	Event
6/10, 6/11/87	WCC inspected 2 soil borings and collected 4 soil samples; priority pollutant plus 40 or VOC analysis.

MTH 001 1063

Remedial Response Activities
At Suspected Sources - Other Sources

Date	Event
11/19/79	NJDEP sampled Ingersoll-Rand well; VOC scan (NJDOH, 12/7/79b).
12/10/79	Princeton Testing Lab sampled Ingersoll-Rand well; TCE analysis (Dennison, 12/13/79).
12/19/79	Princeton Testing Lab sampled Ingersoll-Rand well; TCE analysis (Dennison, 12/28/79).
1/17/80	NJDEP sampled Rocky Hill Cemetery well; VOC scan (NJDOH, 2/26/80).
2/6/80	Ingersoll-Rand well sample; VOC scan (Author unknown, no date, circa 1980).
2/11/80	NJDEP sampled Montgomery Shopping Center Septic #1 and Septic #2 for organic scan (NJDOH, 4/9/80).
3/4/80	Ingersoll-Rand well sample; VOC scan (Author unknown, no date circa 1980).
8/27/80	Ingersoll-Rand well sample; VOC scan (Dennison, 8/27/80).
1/29/82	Stablex & Reutter sampled Town and Country Animal Hospital potable well water for organic scans (Hartman, 1/29/82).

MTH 001 1064

Remedial Response Activities
At Suspected Sources - Other Sources (Continued)

Date	Event
3/23/82	Stablex & Reutter sampled Town and Country Animal Hospital potable well water for volatile petroleum hydrocarbon analysis (Hartman, 4/16/82).
1/6/83	NJDEP took well samples from Town & Country; VOC scan, Thul's Auto; VOC Wm. Penn Gas; VOC scan (NJDOH, 2/18/83a, b).
1/11/83	NJDEP took well samples from Texaco Gas; VOC scan (NJDOH, 1/31/83).
4/1/83	NJDEP took well samples from Thul's; VOC scan, Texaco; VOC scan, Wm. Penn Gas; VOC scan (NJDOH, 4/19/83f).
10/28/83	NJDEP collected sediment samples for PCB analysis from a small stream near the PCR facility (Cunningham 12/23/83).
4/22, 5/27/87	WCC conducted ambient air quality survey at Ingersoll-Rand, Thul's, Texaco, Wm. Penn Gass, Town and Country, Montgomery Shopping Center, Village Shopper, and Princeton VW.
6/3/87-6/16/87	Inspection of soil borings and collecting of soil samples by WCC at Thul's, Texaco, Wm. Penn Gas, Town and Country, Montgomery Shopping Center, Village Shopper, Princeton VW, and Tigers Tale; VOC analysis.
6/13/87-6/23/87	WCC inspected installation of 3 monitoring wells at Montgomery Shopping Center.

MTH 001 1065

Remedial Response Activities
At Suspected Sources - Other Sources (Continued)

Date	Event
6/23/87	WCC sampled septic tanks at Wm. Penn Gas, Montgomery Shopping Center, and Village Shopper; VOC analysis.
7/8/87	WCC sampled 3 monitoring wells at Montgomery Shopping Center; VOC analysis.

MTH 001 1066

Appendix B

MTH 001 1067

APPENDIX B
SUMMARY OF ANALYTICAL DATA

MTH 001 1068

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS PPB	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 8	29003 13	29003 8	29002 7	29003 7
1,1-Dichloroethane	10/30/84		-	8.4	-	-	-	-	-	-	-	-	-	-	-	ND	-
	6/5/86		-	4.5-5.6	-	-	ND	-	-	4.0	2.6	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
	3/16-18/82		-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	10/30/84		-	ND	-	-	-	-	-	ND	-	-	-	-	-	ND	-
	6/14/82		-	-	-	-	-	-	2ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/10/79		-	-	2ND	-	-	-	-	-	2ND	2ND	-	2ND	7	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	6/5/86		-	40-44	-	-	3.8	-	-	32	24	3.9	18	-	ND	-	-
	10/30/84		-	41	-	-	-	-	-	-	-	-	-	-	-	9.9	-
	6/14/82		-	-	-	-	-	-	6	-	-	-	-	-	-	-	-
	3/16-18/82		-	40	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/15/81		ND	-	-	-	-	-	-	16	8	-	6	5	16	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/10-18/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/18/80		1ND	-	13	-	-	-	-	-	4	-	-	2	-	-	-
	5/12/80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/14/80		2ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-
	1/28/80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	3ND
	12/19/79		-	-	-	-	-	-	-	2ND	-	-	-	-	-	-	-
	12/10/79		-	-	4	-	-	-	-	-	2	2ND	-	2ND	2ND	-	-
	11/18-19/79		1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	6/5-6/86		-	2.4-1.8	-	-	7.1	-	-	ND	1.7	3.0	ND	-	ND	-	-
	10/30/84		-	ND	-	-	-	-	-	ND	-	-	-	-	-	ND	-
	6/14/82		-	-	-	-	-	-	5ND	-	-	-	-	-	-	-	-
Acetone	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
Diethyl phthalate	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
1,2-Dichloroethene	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS PPB	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 6	29003 13	29003 8	29002 7	29003 7
	3/16-18/82		-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	-	-	-	-	-	ND	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86		-	1.5	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	2ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	.76	ND	-	ND	-	-
Toluene	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	6/14/82		-	-	-	-	-	-	5ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS PPB	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 6	29003 13	29003 8	29002 7	29003 7
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	8/14/81		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
Bromodichloromethane	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	5ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Dichlorobenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3-Benzofuran	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyclopropylbenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	3/16-18/82		-	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	6/5-6/86		-	18-20	-	-	ND	-	-	8.7	8.5	ND	7.2	-	ND	-	-
Barium	6/5-6/86		-	142-144	-	-	151	-	-	165	118	105	62	-	58	-	-
Cadmium	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
Chromium	6/5-6/86		-	10-11	-	-	ND	-	-	10	12	ND	11	-	8.5	-	-
Copper	6/5-6/86		-	31	-	-	114	-	-	31	18	171	47	-	126	-	-
Iron	6/5-6/86		-	510-514	-	-	18	-	-	89	26	15	57	-	56	-	-
Lead	6/5-6/86		-	7.7	-	-	6.0	-	-	5	ND	4.7	91	-	ND	-	-
Manganese	6/5-6/86		-	6.2-6.1	-	-	ND	-	-	5.6	3.6	ND	44	-	6.2	-	-
Mercury	6/5-6/86		-	.18-.24	-	-	ND	-	-	.14	ND	ND	.14	-	.14	-	-
Nickel	6/5-6/86		-	12-14	-	-	ND	-	-	ND	14	ND	11	-	15	-	-
Silver	6/5-6/86		-	10	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS ppb	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 8	29003 13	29003 6	29002 7	29003 7
Sodium	6/5-6/86		-	14,700-14,100	-	-	5160	-	-	13,900	9,040	6,440	10,600	-	13,600	-	-
Zinc	6/5-6/86		-	138-148	-	-	178	-	-	44	38	26	43	-	47	-	-
Cyanide	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
Phenols	6/5-6/86		-	13	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 20ND: NOT DETECTED AT 1, 20, ETC. ppb

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 23
1,1-Dichloroethane	10/30/84	-	-	-	-	-	-	ND	ND	-	-	-	-	-	ND	-	-
	6/5/86	-	-	-	-	-	-	3.8	ND	-	-	-	-	1.5	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	1	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	ND	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	10/30/84	-	-	-	-	-	-	ND	ND	-	-	-	-	-	ND	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	5	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	7.3	-	-
	12/10/79	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Trichloroethene	6/5/86	-	-	-	-	-	-	35	2.5	-	-	-	-	140	60	-	72
	10/30/84	-	-	-	-	-	-	27	12	-	-	-	-	-	ND	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	5	-	ND	-
	10/15/81	-	13	ND	-	ND	-	-	-	120	-	-	2ND	46	55	94	140
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	-	-	-	-	-	-	-	-	-	-	-	95	-	52	-
	6/14/81	-	-	-	-	-	-	-	14	-	-	-	-	58	210	52	-
	3/10-18/81	-	-	-	-	-	-	-	-	-	-	-	-	318	-	120	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	45	45	59	-
	11/18/80	-	-	-	-	-	-	-	15	-	84	-	1	-	-	-	90
	5/12/80	-	-	-	1ND	1ND	1ND	-	-	-	-	-	-	63	-	-	-
	3/14/80	-	-	2ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	69	-	-	2ND	-	58	-	-
	1/28/80	-	-	-	-	-	3ND	-	-	-	-	-	-	63	79	130	78
	12/19/79	-	2ND	-	-	2ND	-	-	-	-	-	-	-	51	-	110	79
	12/10/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/16-19/79	-	-	-	-	-	-	-	-	-	17.2	-	-	50	-	-	-
Methylene Chloride	6/5-6/86	-	-	-	-	-	-	ND	16	-	-	-	-	ND	ND	-	4.0
	10/30/84	-	-	-	-	-	-	ND	ND	-	-	-	-	-	31	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5ND	-
Acetone	6/5-6/86	-	-	-	-	-	-	ND	12	-	-	-	-	3.5	ND	-	ND
Diethyl phthalate	6/5-6/86	-	-	-	-	-	-	ND	4.2	-	-	-	-	ND	ND	-	ND
1,2-Dichloroethene	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	5.6	4.4	-	5.3
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 33
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	8	-	18	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	32.3	-	-	-	-	7.6	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	2.1	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	12	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	ND	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	3.4	-	-	-	-	-	-
Ethylbenzene	6/5-6/86	-	-	-	-	-	-	ND	5.3	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	1ND	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Chloroform	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	8	-	1	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Chlordane	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
Toluene	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
Carbon Tetrachloride	6/14/82	-	-	-	-	-	-	-	-	-	-	-	5ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	3.1	-	-	-	-	1.9	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 25
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	7.8	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	17.1	-	-	-	-	-
1,2-Dichloroethane	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
Trichlorofluoromethane	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
Bromodichloromethane	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	5ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
o-Dichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	438	-
1,2,4-Trichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	42	-	ND	-
N-Butylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	691	-
2,3-Benzofuran	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	148	-
Cyclopropylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	24	-
PCBs	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	1ND	-	1ND	-
Arsenic	6/5-6/86	-	-	-	-	-	-	5.1	4.4	-	-	-	-	ND	ND	-	ND
Barium	6/5-6/86	-	-	-	-	-	-	121	135	-	-	-	-	125	106	-	107
Cadmium	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	5.7
Chromium	6/5-6/86	-	-	-	-	-	-	5.0	9.5	-	-	-	-	6.9	ND	-	13
Copper	6/5-6/86	-	-	-	-	-	-	26	31	-	-	-	-	41	45	-	31
Iron	6/5-6/86	-	-	-	-	-	-	66	124	-	-	-	-	44	ND	-	59
Lead	6/5-6/86	-	-	-	-	-	-	740	7.0	-	-	-	-	3.6	4.4	-	ND
Manganese	6/5-6/86	-	-	-	-	-	-	5.9	6.1	-	-	-	-	4.2	ND	-	5.6
Mercury	6/5-6/86	-	-	-	-	-	-	.18	.18	-	-	-	-	0.14	ND	-	ND
Nickel	6/5-6/86	-	-	-	-	-	-	12	16	-	-	-	-	14	ND	-	71
Silver	6/5-6/86	-	-	-	-	-	-	ND	10	-	-	-	-	10	ND	-	10

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 25
Sodium	6/5-6/86	-	-	-	-	-	-	8,035	15,400	-	-	-	-	10,000	5,660	-	14,100
Zinc	6/5-6/86	-	-	-	-	-	-	82	70	-	-	-	-	73	31	-	29
Cyanide	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
Phenols	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 20ND: NOT DETECTED AT 1, 20, ET

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	29001 51	23001 20	29001 2
1,1-Dichloroethane	10/30/84	-	-	ND	-	-	-	-	-	-	-	-	-	10	-	-	-
	6/5/86	-	1.5	ND	-	ND	-	-	-	-	-	ND	ND	7.1	ND	ND	ND
	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	1	-	ND	-	-	-	-	4	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	ND	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	3.7	ND	ND	ND
	10/30/84	-	-	ND	-	-	-	-	-	-	-	-	-	10	-	-	-
	6/14/82	2ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	5	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	7.3	-	-	-	-	-	-	-	-	-	5	-	-	-
	12/10/79	2ND	-	-	-	-	2ND	-	-	-	2ND	-	-	5	6	-	-
	11/19/79	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
Trichloroethene	6/5/86	-	140	60	-	72	-	-	-	-	-	220	64	72	ND	1.9	ND
	10/30/84	-	-	ND	-	-	-	-	-	-	-	-	-	45	-	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	5	-	ND	-	-	-	-	249	-	-	-	-	-	-	-
	10/15/81	2ND	46	55	94	140	ND	-	2	-	68	-	6	5	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	95	-	52	-	-	-	-	-	-	-	-	-	-	-	-
	6/14/81	-	58	210	52	-	-	-	-	-	54	-	-	14	-	-	-
	3/10-18/81	-	318	-	120	-	-	-	-	249	18	-	-	-	-	-	-
	2/10/81	-	45	45	59	-	-	-	-	28	-	-	-	-	-	-	-
	11/18/80	1	-	-	-	90	-	5	-	-	33	-	-	10	-	-	-
	5/12/80	-	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/14/80	-	-	-	-	-	2ND	-	2ND	-	-	-	-	11	-	-	-
	2/11/80	2ND	-	58	-	-	-	-	-	-	-	-	-	13	-	-	-
	1/26/80	-	63	79	130	78	-	6	-	58	-	68	-	-	-	-	-
	12/19/79	-	51	-	110	79	-	-	-	-	-	36	-	-	-	-	-
	12/10/79	-	-	-	-	-	2ND	-	-	-	21	-	-	15	2ND	-	-
	11/18-19/79	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	6/5-6/86	-	ND	ND	-	4.0	-	-	-	-	-	ND	1.8	ND	ND	ND	ND
	10/30/84	-	-	31	-	-	-	-	-	-	-	-	-	ND	-	-	-
	6/14/82	-	-	-	5ND	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	6/5-6/86	-	3.5	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
Diethyl phthalate	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	-	-	-
1,2-Dichloroethene	6/5-6/86	-	5.6	4.4	-	5.3	-	-	-	-	-	7.6	ND	3.4	ND	ND	ND
	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	29001 51	23001 20	29001 2
	3/16-18/82	-	8	-	18	-	-	-	-	5	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	7.6	-	-	-	-	-	-	-	-	-	4.6	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86	-	2.1	ND	-	ND	-	-	-	-	-	26	ND	1.9	ND	ND	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	5	-	-	-	-	5	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	ND	-	12	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	ND	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	ND	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	1ND	-	-	1ND	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	2ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	8	-	1	-	-	-	-	2	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
Toluene	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
Carbon Tetrachloride	6/14/82	5ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	1.9	-	-	-	-	-	-	-	-	-	1.1	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	29001 51	23001 20	29001 2
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	7.8	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	ND	-	ND	-	-	-	-	8	-	-	-	-	-	-	-
Trichlorofluoromethane	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
Bromodichloromethane	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	5ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
o-Dichlorobenzene	3/16-18/82	-	ND	-	438	-	-	-	-	ND	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	3/16-18/82	-	42	-	ND	-	-	-	-	8	-	-	-	-	-	-	-
N-Butylbenzene	3/16-18/82	-	ND	-	691	-	-	-	-	12	-	-	-	-	-	-	-
2,3-Benzofuran	3/16-18/82	-	ND	-	148	-	-	-	-	ND	-	-	-	-	-	-	-
Cyclopropylbenzene	3/16-18/82	-	ND	-	24	-	-	-	-	ND	-	-	-	-	-	-	-
PCBs	3/16-18/82	-	1ND	-	1ND	-	-	-	-	1ND	-	-	-	-	-	-	-
Arsenic	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	4.2	ND	ND	ND	39	7.5
Barium	6/5-6/86	-	125	106	-	107	-	-	-	-	-	135	85	72	295/306	106	6.7
Cadmium	6/5-6/86	-	ND	ND	-	5.7	-	-	-	-	-	5.3	ND	ND	4.1	ND	4.8
Chromium	6/5-6/86	-	6.9	ND	-	13	-	-	-	-	-	13	11	12	9.2-7.6	11	8.6
Copper	6/5-6/86	-	41	45	-	31	-	-	-	-	-	94	47	47	31-30	31	31
Iron	6/5-6/86	-	44	ND	-	59	-	-	-	-	-	30	125	97	70/75	69	156
Lead	6/5-6/86	-	3.6	4.4	-	ND	-	-	-	-	-	40	6.1	3.6	3.2	3.5	ND
Manganese	6/5-6/86	-	4.2	ND	-	5.6	-	-	-	-	-	5.3	18	13	5.4-5.2	5.9	255
Mercury	6/5-6/86	-	0.14	ND	-	ND	-	-	-	-	-	ND	0.16	ND	ND	ND	0.16
Nickel	6/5-6/86	-	14	ND	-	71	-	-	-	-	-	15	25	19	12-17	24	26
Silver	6/5-6/86	-	10	ND	-	10	-	-	-	-	-	10	ND	20	10	30	10

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	23001 5	23001 20	23001 2
Sodium	6/5-6/86	-	10,000	5,660	-	14,100	-	-	-	-	-	15,000	15,800	12,900	12,000-9,756	14,000	57,900
Zinc	6/5-6/86	-	73	31	-	29	-	-	-	-	-	54	148	39	36/47	45	32
Cyanide	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
Phenols	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	54	ND	ND	30	11	ND

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 2ND: NOT DETECTED AT 1, 2D, ET

MTH 001 1080

CONTAMINANTS PPB	DATE	29001 4	29002 4	29002 2	29002 2	29002 5	29003 1	23001 19	23001 29	29002 1	23001 17	29002 22	29002 28	29002 24	29002 33	29003 18	26001 37	29001 37	ELIMINATED FROM WATER
1,1-Dichloroethane	10/30/84	-	-	-	-	-	-	-	-	ND	-	9	-	5.8	-	-	-	-	-
	6/5/86	ND	ND	-	-	-	-	-	-	-	ND	8.6	ND	3.5	5.8	ND	ND	ND	ND
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	22	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10/30/84	-	-	-	-	-	-	-	-	ND	-	ND	-	ND	-	-	-	-	-
	6/14/82	-	-	-	-	2ND	-	-	-	2ND	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	3.2	-	ND	2ND	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-
	12/10/79	3	-	2ND	-	-	-	-	-	-	-	-	2ND	2ND	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	6/5/86	ND	58	-	-	-	-	-	-	-	ND	28	ND	46	340	ND	ND	ND	ND
	10/30/84	-	-	-	-	-	-	-	-	ND	-	20	-	34	-	-	-	-	-
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	950	-	257	-	-	-	-
	10/15/81	-	-	-	-	-	-	30	-	2ND	-	-	-	-	-	ND	-	ND	-
	8/14/81	-	-	-	-	1ND	-	-	-	1ND	-	-	322	-	-	-	-	-	-
	3/14-20/81	-	-	-	-	-	-	28	-	-	-	-	-	-	-	-	-	-	-
	6/14/81	-	-	-	-	1ND	-	30	-	-	-	-	-	-	-	-	-	-	-
	3/10-18/81	-	-	-	-	-	-	28	-	-	-	-	2	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	430	-	39	-	-	-	-
	11/18/80	-	-	-	-	-	-	29	1ND	1	-	-	-	-	-	-	-	-	-
	5/12/80	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-	-	-
	3/14/80	-	-	6	-	-	-	-	-	-	-	-	309/2	-	-	2ND	-	-	-
	2/11/80	-	-	-	-	-	-	20	-	2.2	-	-	111	-	-	-	-	-	-
	1/28/80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3ND	-
	12/19/79	-	-	-	-	-	-	-	2ND	-	-	-	-	-	39	2ND	-	-	-
	12/10/79	2ND	-	6	-	-	-	-	-	-	-	-	2	6	-	-	-	-	-
	11/18-19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	1.1	5.8	3.2	ND	2.1	ND	ND	24
	10/30/84	-	-	-	-	20ND	-	-	-	83	-	ND	-	ND	-	-	-	-	-
	6/14/82	-	-	-	-	5ND	-	-	-	5ND	-	-	-	-	-	5ND	-	-	-
Acetone	6/5-6/86	4.6	ND	-	-	-	-	-	-	-	ND	5.3	ND	7.3	ND	ND	ND	ND	ND
Diethyl phthalate	6/5-6/86	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	6/5-6/86	ND	4.0	-	-	-	-	-	-	-	ND	4.0	ND	3.5	17	ND	ND	ND	ND
	6/14/82	-	-	-	-	1ND	-	-	-	-	-	-	-	-	-	1ND	-	-	-

MTH 001 1081

CONTAMINANTS PPB	DATE	29001 4	29002 4	29002 2	29002 2	29002 5	29003 1	23001 19	23001 29	29002 1	23001 17	29002 22	29002 28	29002 24	29002 33	29003 18	23001 37	23001 37	ELIZABETH TOWN WATER
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	32	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86	ND	1.8	-	-	-	-	-	-	-	ND	ND	ND	ND	1.4	ND	ND	ND	ND
	6/14/82	-	-	-	-	2ND	-	-	-	2ND	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	51	-	24	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/14-20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	18	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	11
	6/14/82	-	-	-	-	1ND	-	-	-	2ND	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	560	-	1	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	2.0	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	4.7
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	8	-	ND	-	-	-	-
Carbon Tetrachloride	6/14/82	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	16.3	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	5ND	-	-	-

CONTAMINANTS PPB	DATE	29001 4	29002 4	29002 2	25002 2	29002 5	29003 1	23001 19	23001 29	29002 1	23001 17	29002 22	29002 28	29002 24	29002 33	29003 18	28001 37	29001 37	ELIZABETH TOWN WATER
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	6/14/82	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	ND	-	-	53	-	8	-	-	-	-
Trichlorofluoromethane	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	23.6	-	-	-	-	-	-
Bromodichloromethane	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	2.8
	6/14/82	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	5ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	40	-	ND	-	-	-	-
o-Dichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	70	-	ND	-	-	-	-
1,2,4-Trichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
n-Butylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
2,3-Benzofuran	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
Cyclopropylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-		-	ND	-	ND	-	-	-	-
PCBs	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	1ND	-	-	-	-
Arsenic	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	10	ND	10	10	ND	ND	ND	ND
Barium	6/5-6/86	8.4	82	-	-	-	-	-	-	-	199	120	70	114	88	131	102	233	39
Cadmium	6/5-6/86	4.7	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	9.8	4.1
Chromium	6/5-6/86	5.3	8.2	-	-	-	-	-	-	-	7.8	11	6.4	13	12	117	15	14	7.6
Copper	6/5-6/86	144	28	-	-	-	-	-	-	-	30	31	118	47	23	31	46	31	76
Iron	6/5-6/86	3840	23	-	-	-	-	-	-	-	25	116	30	163	656	56	40	107	74
Lead	6/5-6/86	ND	28	-	-	-	-	-	-	-	2.8	4.0	4.0	143	19	20	7.0	7.0	18
Manganese	6/5-6/86	222	ND	-	-	-	-	-	-	-	3.7	94	4.2	74	6.1	6.1	5.3	15	6.0
Mercury	6/5-6/86	0.14	0.14	-	-	-	-	-	-	-	ND	0.14	0.14	0.18	ND	ND	0.18	ND	ND
Nickel	6/5-6/86	37	20	-	-	-	-	-	-	-	23	33	18	27	21	14	10	19	16
Silver	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	10	10	ND	10	20	10	10	10

CONTAMINANTS PPB	DATE	29001 4	29002 4	29002 2	29002 2	29002 5	29003 1	23001 19	23001 23	29002 1	23001 17	29002 22	29002 28	29002 24	29002 33	29003 16	23001 37	29001 37	ELIZABETH TOWN WATER
Sodium	6/5-6/86	10	10,800	-	-	-	-	-	-	-	13,000	16,900	7,740	15,300	2,600	9,270	12,400	14,600	11,100
Zinc	6/5-6/86	15	36	-	-	-	-	-	-	-	69	123	77	48	205	95	42	48	32
Cyanide	6/5-6/86	99	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenols	6/5-6/86	20	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 20ND: NOT DETECTED AT 1, 20, ET

MTH 001 1084

GROUND WATER ANALYSES

Compound	Sampling Date	Inals Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
V.O. Scan	11/5/79	-	-	-	-	-	-	-	-	ND+	-	-
	11/14/79	-	-	-	-	-	-	-	-	25ND	-	-
	11/19/79	-	-	-	-	ND+	ND+	-	-	-	-	-
	2/6/80	-	-	-	-	ND+	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND+	-	ND+	-
	3/4/80	-	-	-	-	ND+	-	-	-	-	-	-
	5/16/80	-	-	-	-	-	-	-	-	-	ND+	-
	8/27/80	-	-	-	-	ND+	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	ND+	ND	ND+	-	-
	7/14/81	-	-	-	-	-	-	ND+	ND	-	-	-
	3/17/82	-	-	-	-	-	-	ND+	ND+	-	-	-
	3/18/82	-	-	-	-	-	-	ND+	-	-	-	-
	4/12/82	-	-	-	-	-	-	ND+	ND+	-	-	ND+
	1/6/83	ND+	ND+	-	ND	-	ND	-	-	-	-	-
	1/11/83	-	-	ND+	-	-	2ND	-	-	-	-	-
	1/20/83	-	-	-	-	-	19peaks	-	-	-	-	-
	3/30/83	-	-	-	-	-	-	-	ND+	ND	-	-
	3/31/83	-	-	-	-	-	-	-	-	-	-	-
	4/1/83	ND+	ND+	ND+	-	-	-	-	-	-	-	-
	5/17/83	-		-	-	-	-	-	-	-	-	-
	7/6/83	-	-	-	-	-	1peak	-	-	-	-	-
	9/26/83	-	-	-	-	-	ND	-	-	-	-	-
Trichloroethene	11/5/79	-	-	-	-	-	-	-	-	37.0	-	-
	11/19/79	-	-	-	ND	1.7	ND	-	-	-	-	-
	12/10/79	-	-	-	-	14	-	-	-	-	-	-
	12/19/79	-	-	-	-	12	-	-	-	-	-	-
	1/6/80	-	-	-	-	-	-	-	-	-	ND	-
	2/6/80	-	-	-	-	2ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	124.9	48.0	-	28.7	-
	3/4/80	-	-	-	-	74	-	-	-	-	-	-
	5/5/80	-	-	-	-	-	-	-	-	-	68-75	-
	5/16/80	-	-	-	-	-	-	-	-	-	91	-
	2/10/81	-	-	-	-	-	-	67	ND	25	-	-
	2/10/81	-	-	-	-	-	-	258	-	-	-	-
	7/14/81	-	-	-	-	-	-	482	ND	-	-	-
	3/17/82	-	-	-	-	-	-	210	98.0	-	-	-
	3/18/82	-	-	-	-	-	-	368	ND	-	-	-
	4/12/82	-	-	-	-	-	-	180	6.0	-	-	ND
	1/6/83	120	7.0	-	ND	-	ND	-	-	-	-	-
	1/11/83	-	-	3.0	-	-	-	-	-	-	-	-
	3/30/83	-	-	-	-	-	-	-	6.0	ND	-	-
	3/30/83	-	-	-	-	-	-	-	12.0	-	-	-
	3/31/83	-	-	-	-	-	-	160	-	-	-	-
	4/1/83	24	9.0	ND	-	-	-	-	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	46	-	-
1,1-dichloroethene	11/5/79	-	-	-	-	-	-	-	-	12.2	-	-

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GROUND WATER ANALYSES

Compound	Sampling Date	Louis Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/6/80	-	-	-	-	4ND	-	-	-	-	13.2	-
	2/21/80	-	-	-	-	-	-	5.5	7.4	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	2ND	-
	3/17/82	-	-	-	-	-	-	ND	5.0	-	-	-
	1/6/83	8.5	ND	-	ND	-	ND	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/31/83	-	-	-	-	-	-	ND	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	17	-	-
1,1,1-trichloroethane	11/5/79	-	-	-	-	-	-	-	-	34.8	-	-
	11/19/79	-	-	-	-	3.9	ND	-	-	-	-	-
	12/10/79	-	-	-	-	ND	-	-	-	-	-	-
	12/19/79	-	-	-	-	ND	-	-	-	-	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	10.7	4.2	-	32.6	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	6/27/80	-	-	-	-	ND	-	-	-	-	-	-
	3/18/82	-	-	-	-	-	-	2	-	-	-	-
	4/12/82	-	-	-	-	-	-	1	2	-	-	ND
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/31/83	-	-	-	-	-	-	2	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	44	-	-
	5/17/83	-	-	-	-	-	-	-	-	3	-	-
1,1,2,2-tetrachloroethene	1/6/83	ND	ND	ND	-	-	ND	-	-	-	-	-
	4/1/83	ND	ND	ND	-	-	-	-	-	-	-	-
Benzene	12/10/79	-	-	-	-	ND	-	-	-	-	-	-
	12/19/79	-	-	-	-	ND	-	-	-	-	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	1ND	-
	2/6/80	-	-	-	-	90	-	-	-	-	-	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
	1/20/83	-	-	-	-	-	8000	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
Toluene	11/5/79	-	-	-	-	-	-	-	-	52.4	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	17	-
	2/21/80	-	-	-	-	-	-	ND	1.8	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	ND	ND	-	-	ND
	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
	4/12/82	-	-	-	-	-	-	ND	ND	-	-	6
	1/20/83	-	-	-	-	-	18000	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	ND	ND	-	ND

GROUND WATER ANALYSES

Compound	Sampling Date	Thuls Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
Ethylbenzene	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	5/16/80	-	-	-	-	-	-	-	-	-	1	-
	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
	1/28/83	-	-	-	-	-	170D	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
1,1,2,2-tetrachloroethane	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	ND	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	7.0	ND	-	-
	3/30/83	-	-	-	-	-	-	-	9.0	-	-	-
	3/31/83	-	-	-	-	-	-	14	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	16	-	-
1,2-dichloroethane	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	ND	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	ND	2	-	-	-
	3/18/82	-	-	-	-	-	-	5	-	-	-	-
	4/12/82	-	-	-	-	-	-	5	ND	-	-	ND
	1/28/83	-	-	-	-	-	65	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	2.0	ND	-	-
1,2-dichloroethene	11/5/79	-	-	-	-	-	-	-	-	4.8	-	-
	2/21/80	-	-	-	-	-	-	16.3	2.4	-	ND	-
	3/31/83	-	-	-	-	-	-	ND	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	6	-	ND
1,1-dichloroethane	11/5/79	-	-	-	-	-	-	-	-	4	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	58.8	ND	-	2.3	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	ND	ND	-	-	ND
	3/18/82	-	-	-	-	-	-	17	-	-	-	-
	4/12/82	-	-	-	-	-	-	10	30	-	-	ND
	4/12/82	-	-	-	-	-	-	-	2	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	5	ND	-	3
	3/30/83	-	-	-	-	-	-	-	6	-	-	-
	3/31/83	-	-	-	-	-	-	9	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	4	-	-
Tetrachloroethene	11/5/79	-	-	-	-	-	-	-	-	6.1	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	14.5	16.5	-	3.6	-

GROUND WATER ANALYSES

Compound	Sampling Date	Thuis Auto	We. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	2/10/81	-	-	-	-	-	-	ND	-	-	-	-
	3/17/82	-	-	-	-	-	-	2	4	-	-	ND
	3/18/82	-	-	-	-	-	-	5	-	-	-	-
	4/12/82	-	-	-	-	-	-		3	-	-	ND
	4/12/82	-	-	-	-	-	-	5	3	-	-	2
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	ND	ND	-	ND
	4/12/83	-	-	-	-	-	-	ND	ND	ND	-	ND
Carbon Tetrachloride	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	1.4	-	ND	-
	2/10/80	-	-	-	-	-	-	ND	-	-	-	-
	7/14/81	-	-	-	-	-	-	163	-	-	-	-
	4/12/82	-	-	-	-	-	-	158	ND	-	-	ND
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
Hexachlorobutadiene	2/21/80	-	-	-	-	-	-	ND	-	-	-	-
	4/12/82	-	-	-	-	-	-	1200	-	-	-	ND
Trifluorotoluene	2/21/80	-	-	-	-	-	-	ND	-	-	-	-
	4/12/82	-	-	-	-	-	-	611	-	-	-	ND
N-pentane	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
N-hexane	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
N-heptane	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
Xylenes	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
33 purgeable organics	1/29/82	-	-	-	10ND	-	-	-	-	-	-	-
Chloroform	11/5/79	-	-	-		-	-	-	-	2.8	-	-
	11/19/79	-	-	-	-	ND	2.8	-	-	-	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	4	-	2	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	5/16/80	-	-	-	-	-	-	-	-	-	40	-
	3/17/82	-	-	-	-	-	-	ND	2	-	-	-
	3/18/82	-	-	-	-	-	-	1	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	25	-
PCB	3/18/82	-	-	-	-	-	-	56	-	-	-	-
	3/30/83	-	-	-	-	-	-	1.12	0.69	-	-	-
	5/17/83	-	-	-	-	-	-	19.8	0.80	-	-	ND
p-xylene	1/28/83	-	-	-	-	-	1200	-	-	-	-	-

MTH 001 1088

GROUND WATER ANALYSES

Compound	Sampling Date	Thuls Auto	Wa. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
o-xylene	1/28/83	-	-	-	-	-	2400	-	-	-	-	-
m-xylene	1/28/83	-	-	-	-	-	3900	-	-	-	-	-
Cumene	1/28/83	-	-	-	-	-	10	-	-	-	-	-
Styrene	1/28/83	-	-	-	-	-	79	-	-	-	-	-
n-propylbenzene	1/28/83	-	-	-	-	-	220	-	-	-	-	-
1,3,5 trimethylbenzene	1/28/83	-	-	-	-	-	520	-	-	-	-	-
1,2,4 trimethylbenzene	1/28/83	-	-	-	-	-	1900	-	-	-	-	-
p-dichlorobenzene	1/28/83	-	-	-	-	-	2200	-	-	-	-	-
o-dichlorobenzene	1/28/83	-	-	-	-	-	980	-	-	-	-	-
n-butylbenzene	1/28/83	-	-	-	-	-	340	-	-	-	-	-
Naphthalene	3/18/82	-	-	-	-	-	-	ND	-	-	-	-
	4/12/82	-	-	-	-	-	-	10	-	-	-	-
	1/28/83	-	-	-	-	-	2200	-	-	-	-	-
Petroleum hydrocarbons	1/28/83	-	-	-	-	-	324	-	-	-	-	-
	1/28/83	-	-	-	-	-	3.7	-	-	-	-	-
	1/28/83	-	-	-	-	-	209	-	-	-	-	-
	7/6/83	-	-	-	-	-	ND	-	-	-	-	-
	7/6/83	-	-	-	-	-	ND	-	-	-	-	-
	7/6/83	-	-	-	-	-	ND	-	-	-	-	-
	7/6/83	-	-	-	-	-	17.7	-	-	-	-	-
	3/6/84	-	-	-	-	-	19520	-	-	-	-	-
	7/16/84	-	-	-	-	-	3470*	-	-	-	-	-
	9/3/84	-	-	-	-	-	9400*	-	-	-	-	-
	10/31/84	-	-	-	-	-	1540*	-	-	-	-	-
Aromatic hydrocarbon	2/18/81	-	-	-	-	-	-	-	ND	-	-	-
	7/14/81	-	-	-	-	-	-	-	ND	-	-	-
	3/17/82	-	-	-	-	-	-	-	-	-	-	ND
	3/30/83	-	-	-	-	-	-	-	-	ND	-	-
	7/6/83	-	-	-	-	-	ND	-	-	-	-	-
	7/6/83	-	-	-	-	-	ND	-	-	-	-	-
	7/16/84	-	-	-	-	-	ND	-	-	-	-	-
	10/31/84	-	-	-	-	-	ND	-	-	-	-	-
Chlorinated hydrocarbon	2/18/81	-	-	-	-	-	-	-	5AD	-	-	-
	7/14/81	-	-	-	-	-	-	-	5AD	-	-	-
	3/17/82	-	-	-	-	-	-	-	-	-	-	ND
	3/30/83	-	-	-	-	-	-	-	-	ND	-	-

MTH 001 1089

GROUND WATER ANALYSES

Compound	Sampling Date	Inuls Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
	7/6/83	-	-	-	-	-	1ND	-	-	-	-	-
	7/6/83	-	-	-	-	-	1ND	-	-	-	-	-
Methylene Chloride	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	ND	-	ND	-	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	25	-	-	-	ND
	4/12/82	-	-	-	-	-	-	50	-	-	-	1
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	ND	ND	ND	-	ND
1,1,2,2-trichlorotri-fluoroethane	2/21/80	-	-	-	-	-	-	40	-	-	-	-
Total Dissolved Solids	7/14/81	-	-	-	-	-	-	228ppm	386ppm	-	-	-
	4/12/82	-	-	-	-	-	-	130ppm	306ppm	-	-	-
	4/12/82	-	-	-	-	-	-	-	120ppm	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	712ppm	-	-
Iron	7/14/81	-	-	-	-	-	-	230770ppm	-	-	-	-
Chloride	4/12/82	-	-	-	-	-	-	18ppm	78ppm	-	-	-
	4/12/82	-	-	-	-	-	-	-	8ppm	-	-	-
Sulfate	4/12/82	-	-	-	-	-	-	26ppm	46ppm	-	-	-
	4/12/82	-	-	-	-	-	-	-	10ppm	-	-	-
Specific Conductance	4/12/82	-	-	-	-	-	-	175.3	406.4	-	-	-
	4/12/82	-	-	-	-	-	-	-	149.9	-	-	-
Hexavalent Chromium	4/12/82	-	-	-	-	-	-	5ND	13	-	-	-
	4/12/82	-	-	-	-	-	-	-	5ND	-	-	-
Dibromochloromethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	2ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	3.2	ND	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	5ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Trans-1,1-dichloroethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
1,2-dichloropropane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	15ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-

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GROUND WATER ANALYSES

Compound	Sampling Date	Inuis Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte. 206	Polycell	Compo Industries	P.G.T.	Village Shopper
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Trans-1,3-dichloropropane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
cis-1,3-dichloropropane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
1,1,2-trichloroethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	3ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
2-chloroethylvinyl ether	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	5ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Bromoform	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	4ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	14	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Chlorobenzene	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	1ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Benzene	1/8/80	-	-	-	-	-	-	-	-	3	-	-
	2/21/80	-	-	-	-	-	-	-	ND	3.6	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-

1601 100 HIW

GROUND WATER ANALYSES

Compound	Sampling Date	Inuls Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Snopper
Bromodichloromethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	2ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/3/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	9.5	-	-
Acid Extractables	3/8/84	-	-	-	-	-	5ND	-	-	-	-	-
	3/14/84	-	-	-	-	-	ND	-	-	-	-	-
Base Neutrals	3/8/84	-	-	-	-	-	5ND	-	-	-	-	-
	3/14/84	-	-	-	-	-	ND	-	-	-	-	-

Note:

all concentrations in ppb except where noted
ND not detected
2ND not detected at 2ppb
ND+ not detected except for compounds listed below
* represents maximum concentration of several samples

SOIL ANALYSES

Compound	Sampling Date	1377 Route 206	Princeton Airport	Princeton Gamma Tech
V.O. Scan	5/9/80	-	-	2ND
	2/13/81	ND	-	-
	3/17/82	ND*	-	-
	12/6/82	ND	-	-
	12/17/82	-	4peaks	-
	12/17/82	-	4peaks	-
	1/20/83	-	1peak	-
	3/30/83	-	-	ND
	3/30/83	-	-	ND
	3/25/83	-	-	ND
	3/30/83	-	-	ND
	3/32/83	-	-	ND
	6/23/83	3peaks*	-	-
Tetrachloroethene	12/6/82	180	-	-
Methylene Chloride	3/17/82	735	-	-
	9/29/83	110*	-	-
1,2,3-Trichlorobenzene	12/6/82	900	-	-
Benzene	12/17/82	-	3215	-
	12/17/82	-	130	-
Toluene	12/17/82	-	13200	-
	1/20/83	-	12900	-
	9/29/83	33*	-	-
Ethyl Benzene	12/17/82	-	2330	-
	1/20/83	-	4281	-
p-xylene	12/17/82	-	1645	-
	1/20/83	-	3533	-
o-xylene	12/17/82	-	2615	-
	1/20/83	-	5930	-
	8/29/83	12400*	-	-
m-xylene	12/17/82	-	33413	-
	1/20/83	-	9020	-
p-bromofluorobenzene	12/17/82	-	920	-
	1/22/83	-	2330	-
o-chlorotoluene	12/17/82	-	1270	-
	1/20/83	-	3575	-

SOIL ANALYSES

Compound	Sampling Date	1377 Route 206	Princeton Airport	Princeton Gamma Tech
p-cymene	12/17/82	-	180	-
	1/20/83	-	465	-
1,2,3-trimethylbenzene	12/17/82	-	29756	-
	1/20/83	-	8175	-
o-dichlorobenzene	12/17/82	-	550	-
n-butylbenzene	12/17/82	-	195	-
	1/20/83	-	660	-
2,3-benzofuran	12/17/82	-	775	-
	1/20/83	-	1040	-
hexachlorobutadiene	12/17/82	-	4175	-
	1/20/83	-	6030	-
napthalene	12/17/82	-	1132	-
	1/20/83	-	1220	-
cumene	1/20/83	-	450	-
n-propylbenzene	1/20/83	-	1576	-
PCB	12/6/82	23.7	-	-
	12/6/82	.561	-	-
	1/20/83	-	ND	-
	9/29/83	16300*	-	-
	10/20/83	2102*	-	-
	2/20/84	492202*	-	-
Chloroform	9/29/83	32*	-	-

Note:

all concentrations in ppb

* represents maximum concentration of several samples collected on this date

- not analyzed for

ND not detected

ND+ not detected except for compounds indicated below

MTH 001 1094

SEPTIC TANK ANALYSES

Compound	Sampling Date	1377 Route 206	Princeton Gamma Tech	Polycell	Compo Industries	Montgomery Shop. Center
V.O. Scan	11/19/79	-	ND+	-	-	-
	1/17/80	-	ND+	-	-	-
	2/11/80	-	-	ND+	ND+	ND+
	4/17/80	ND+	-	-	-	-
	3/25/83	-	ND+	-	-	-
Trichloroethene	11/19/79	-	8900	-	-	-
	2/11/80	95	-	31.4	62	ND
	4/17/80	25ND	-	-	-	-
Chlorobenzene	2/11/80	ND	-	ND	ND	162
Trichloroethane	2/11/80	ND	-	ND	ND	15000
Methylene Chloride	2/11/80	ND	-	ND	ND	12500
M,p-xylene	2/11/80	ND	-	ND	ND	150
O-xylene	2/11/80	ND	-	ND	ND	220
1,1-dichloroethane	2/11/80	ND	-	6.0	3.9	8800
1,1 dichloroethylene	2/11/80	ND	-	-	47.0	290
Toluene	11/19/79	-	795	-	-	-
	2/11/80	ND	-	ND	ND	185
1,2-dichloroethylene	2/11/80	ND	-	3.6	9.5	ND
1,1,1-trichloroethane	2/11/80	ND	-	ND	52.7	ND
Tetrachloroethene	2/11/80	ND	-	15.8	14.6	ND
Ethyl Benzene	2/11/80	ND	-	2.3	ND	-
Chloroform	11/19/79	-	1280	-	-	-
	3/25/83	-	5	-	-	-
Benzene	11/19/79	-	1550	-	-	-
Nonane	11/19/79	-	162	-	-	-
Octane	11/19/79	-	28	-	-	-
1,3 dichloropropane	3/25/83	-	8	-	-	-

SEPTIC TANK ANALYSES

Note:
ND - not detected
ND+ - not detected except for compounds indicated below
- - not analyzed for
all concentrations in ppb

EFFLUENT ANALYSES

Parameter	Sampling Date	1377 Rte. 206 Discharge to Beden Brook	Combo Indust. Discharge to Millstone R.	Combo Indust. Discharge to Catch Basin	P'ton. Airport Discharge to adjacent stream
V.O. Scan	3/26/81	-	ND+	-	-
	4/7/81	-	ND+	-	-
	4/12/83	-	ND+	ND+	-
Turbidity	7/2/73	13	-	-	-
	6/19/74	430	-	-	-
pH	7/2/73	6.3	-	-	-
	6/19/74	6.4	-	-	-
Alkalinity to pH4	7/2/73	28	-	-	-
	6/19/74	95	-	-	-
Nitrate Nitrogen	7/2/73	54	-	-	-
Ammonia Nitrogen	7/2/73	1	-	-	-
Total Nitrogen	7/2/73	1	-	-	-
Chloride	7/2/73	40	-	-	-
	6/19/74	150	-	-	-
Suspended Solids	7/2/73	18	-	-	-
	6/19/74	45	-	-	-
Total Solids	6/19/74	3122	-	-	-
Ash	7/2/73	3	-	-	-
	6/19/74	32	-	-	-
Total Phosphate	7/2/73	3	-	-	-
	6/19/74	5	-	-	-
Detergents	7/2/73	2.34	-	-	-
COD	7/2/73	1300	-	-	-
	6/19/74	403	-	-	-
Ether Soluble Fraction	7/2/73	72	-	-	-
Initial D.O.	7/2/73	2.9	-	-	-
	6/19/74	0	-	-	-
BOD 2%	7/2/73	94	-	-	-
BOD 10%	7/2/73	70	-	-	-
	6/19/74	61	-	-	-

MTH 001 1097

EFFLUENT ANALYSES

Parameter	Sampling Date	1377 Rte. 286 Discharge to Becen Brook	Compo Indust. Discharge to Millstone R.	Compo Indust. Discharge to Catch Basin	P'ton. Airport Discharge to adjacent stream
Trichloroethene	11/14/79	-	ND	-	-
1,1,2,2-tetrachloroethane	11/14/79	-	ND	-	-
	4/4/83	-	-	-	ND
Methyl Ethyl Ketone	11/14/79	-	50,000ND	-	-
	3/26/81	-	3987	-	-
	4/4/83	-	-	-	7
m-xylene	11/14/79	-	350	-	-
	3/26/81	-	626	-	-
	4/4/83	-	-	-	ND
p-xylene	11/14/79	-	350	-	-
	3/26/81	-	626	-	-
	4/4/83	-	-	-	ND
o-xylene	11/14/79	-	225	-	-
	3/26/81	-	626	-	-
	4/4/83	-		-	ND
Dimethyl Formide	11/14/79	-	ND	-	-
	3/26/81	-	.225	-	-
	4/7/81	-	.487	-	-
	4/4/83	-	-	-	ND
Toluene	11/14/79	-	ND	-	-
	3/26/81	-	3790	-	-
	4/4/83	-	-	-	ND
	4/12/83	-	ND	2.0	-
Benzene	11/14/79	-	ND	-	-
	3/26/81	-	182	-	-
	4/4/83	-	-	-	ND
Chlorinated hydrocarbons	11/14/79	-	ND	-	-
	3/26/81	-	10ND	-	-
	4/7/81	-	5ND	-	-
	4/4/83	-	-	-	ND
Petroleum hydrocarbons	11/14/79	-	ND	-	-
	3/26/81	-	0.53	-	-
	4/4/83	-	-	-	ND
TOC	3/26/81	-	900	-	-
	4/7/81	-	55	-	-
	[illegible]	-	[illegible]	21.0	-

MTH 001 1098

EFFLUENT ANALYSES

Parameter	Sampling Date	1377 Rte. 286 Discharge to Beden Brook	Compo Indust. Discharge to Millstone R.	Compo Indust. Discharge to Catch Basin	P'ton. Airport Discharge to adjacent stream
Chloroform	4/12/83	-	ND	9.0	-
1,1,1 trichloroethane	4/12/83	-	ND	2.0	-
Bromodichloroethane	4/12/83	-	ND	1.0	-
TDS	4/12/83	-	-	446	-
Base Neutrals	4/12/83	-	-	5.0	-
Phenol	4/12/83	-	-	8.2	-

Note:

all concentrations in ppb
- not analyzed
ND not detected
ND+ not detected except for compounds indicated below

MIH 001 1099

Form WAQC.400
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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

WAQC 010

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APR 20 1987
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING W.

PUBLIC WATER SYSTEM NAME AND ADDRESS

ELIZABETHTOWN WATER COMPANY - MAIN SUPPLY
ONE ELIZABETHTOWN PLAZA
ELIZABETH, NEW JERSEY 07202

PWS ID (1-7): 2 0 0 4 0 0 2

TRANSACTION CODE (8-9): 0 3

1-9 ABOVE	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	REMARKS (21)	ANALYSIS DATE MO DAY YR (22-27)	28-46 BELOW	SAMPLE ANALYZED BY:
DUP	1022	Copper	903	<0010	2	031487	DUP	H.C.
DUP	1028	Iron	904	<0010	2	031287	DUP	H.C.
DUP	1032	Manganese	924	<0005	2	031187	DUP	H.C.
DUP	1052	Sodium	954	0137	1	031787	DUP	H.C.
DUP	1095	Zinc	906	<0010	2	031787	DUP	H.C.
DUP							DUP	
DUP							DUP	
DUP							DUP	
DUP							DUP	
DUP							DUP	

LOCATION CODE (38-39)	LOCATION NAME	SAMPLE DATE MO. DAY YR (31-36)	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY:
		030687	D	1335	18024	E'town Water Co.Lab	N.D.B.

PREPARED BY Glenn Johansen DATE 4/13/87

REVIEWED BY [illegible] DATE 1 1

MAY 06 1987

NO. 61

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

MTH 001 1100

Form WAQC.A09
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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
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PUBLIC WATER SYSTEM NAME AND ADDRESS

Elizabethtown Water Company - Main Supply
One Elizabethtown Plaza
Elizabeth, New Jersey 07202

PWS ID: 2 0 0 4 0 0 2 (1-7)

TRANSACTION CODE: 0 3 (8-9)

1-9 BELOW	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-30)	ANALYSIS REMARKS (31)	ANALYSIS DATE MO (32-33)	DAY (34-35)	YR (36-37)	38-46 BELOW	SAMPLE ANALYZED BY
DUP	1 0 4 5	Selenium	9 2 0	< 0 0 0 1	3	0 4	0 8	8 7	DUP	G.G.
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	

LOCATION CODE (38-39)	LOCATION NAME	SAMPLE DATE MO	DAY	YR (31-36)	SAMPLE TYPE (37)	SAMPLE TIME (38-44)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY
		0 3	0 6	8 7	D	1 3 3 5	1 2 1 2 9	Accutest Laboratories	N.D.B

PREPARED BY: Glenn Johansen DATE: 4/13/87

APPROVED BY: [signature] DATE: / /

MAY 06 1987

NO. 61

SAMPLE TYPE KEY
- C - CHECK SAMPLE
- D - REGULAR DISTRIBUTION SAMPLE
- P - PLANT TAP SAMPLE
- R - RAW WATER SAMPLE
- S - SPECIAL SAMPLE

JUL 8 '87 11:26

PAGE.08

MTH 001 1101

WAQC.400

WAQC 010

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

PUBLIC WATER SYSTEM NAME AND ADDRESS

ELIZABETHTOWN WATER COMPANY - MAIN SUPPLY
ONE ELIZABETHTOWN PLAZA
ELIZABETH, NEW JERSEY 07202

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BUREAU OF SAFE DRINKING WATER

87. 10/08 10:00 P07 *

PWS ID: 2 0 0 4 0 0 2 (1-7)

MANUFACTURER CODE: 0 3 (8-9)

CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	ANALYSIS REMARKS (21)	ANALYSIS DATE MO DAY YR (22-27)	28-46 BELOW	SAMPLE ANALYZED BY:
1005	ARSENIC	910	<0005	3	031987	DUP	H.C.
1010	BARIUM	915	0083	3	041087	DUP	H.C.
1015	CADMIUM	916	<0001	3	033087	DUP	H.C.
1020	CHROMIUM	917	<0010	3	032887	DUP	H.C.
1025	FLUORIDE	935	<0001	1	030687	DUP	R.A.
1030	LEAD	918	<0010	3	032687	DUP	H.C.
1035	MERCURY	912	<0005	4	031387	DUP	H.C.
1040	NITRATE	931	0136	2	030687	DUP	R.A.
~~1045~~	~~SELENIUM~~	~~911~~	~~<0005~~	~~3~~	~~031887~~	~~DUP~~	~~H.C.~~
1050	SILVER	921	<0002	3	032587	DUP	H.C.

LOCATION CODE (38-39)	LOCATION NAME	SAMPLE DATE MO DAY YR (31-36)	SAMPLE TYPE (37)	SAMPLE TIME (40-44)	LAB ID (45-48)	LAB NAME	SAMPLE COLLECTED BY:
		030687	D	1335	1824	E'town Water Co.Lab	N.D.B.

* not certified for Selenium analysis.
(see attached)

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

PREPARED BY Glenn Johansen DATE 4/13/87

APPROVED BY [signature] DATE

MAY 06 1987

NO. 61

MTH 001 1102

Form WAQC.460
1/79

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

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PUBLIC WATER SYSTEM NAME AND ADDRESS

Elizabethtown Water Company - Princeton Supply
One Elizabethtown Plaza
Elizabeth, New Jersey 07202

PWS ID: 2004002 (1-7)
TRANSACTION CODE: 03 (8-9)

1-8 ABOVE	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	ANALYSIS DIGITS (21)	ANALYSIS DATE MO DAY YR (22-27)	28-46 BELOW	SAMPLE ANALYZED BY:
DUP	2005	ENDRIN	941	<0001	4	090586	DUP	V.P.
DUP	2010	LINDANE	941	<0001	4	090586	DUP	V.P.
DUP	2015	METHOXYCHLOR	941	<0001	4	090586	DUP	V.P.
DUP	2020	TOXAPHENE	941	<0001	4	090586	DUP	V.P.
DUP	2105	2,4-D	942	<0002	4	090586	DUP	V.P.
DUP	2110	2,4,5-TP SILVEX	942	<0001	4	090586	DUP	V.P.
DUP							DUP	
DUP							DUP	
DUP							DUP	
DUP							DUP	

LOCATION CODE (28-30)	LOCATION NAME	SAMPLE DATE MO DAY YR (31-36)	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY:
001	Princeton	081886	D	1335	12129	Acutest Laboratories	A.A.

PREPARED BY Glenn Johansen DATE 9/8/86

APPROVED BY [illegible] DATE / /

MAR 0 2 1987

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

JUL 8 '87 11:23
PAGE.06
MTH 001 1103

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1/79

WAQC 010

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM

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PUBLIC WATER SYSTEM NAME AND ADDRESS

Elizabethtown Water Company - Main Supply
One Elizabethtown Plaza
Elizabeth, New Jersey Ø72Ø2

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BUREAU OF SAFE DRINKING WATER

PWS ID: 2ØØ4ØØ2 (1-7)

MONITORING CODE: Ø3 (8-9)

CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	ANALYSIS REMARKS (21)	ANALYSIS DATE MO DAY YR (22-27)	28-46 BELOW	SAMPLE ANALYZED BY:
2Ø5	ENDRIN	941	<ØØØ1	4	Ø9Ø586	DUP	V.P.
21Ø	LINDANE	941	<ØØØ1	4	Ø9Ø586	DUP	V.P.
215	METHOXYCHLOR	941	<ØØØ1	4	Ø9Ø586	DUP	V.P.
22Ø	TOXAPHENE	941	<ØØØ1	4	Ø9Ø586	DUP	V.P.
215	2,4-D	942	<ØØØ2	4	Ø9Ø586	DUP	V.P.
211Ø	2,4,5-TP SILVEX	942	<ØØØ1	4	Ø9Ø586	DUP	V.P.
						DUP	
						DUP	
						DUP	
						DUP	

1-9 ABOVE

LOCATION CODE (38-39)	LOCATION NAME	SAMPLE DATE MO DAY YR (34-36)	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY:
~~Ø112~~	Piscataway	Ø818Ø6	D	1236	12129	Accutest Laboratories	A.A.

PREPARED BY Glenn Johansen DATE 9/8/86

APPROVED BY [illegible] DATE / /

MAR 2 1987

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

MTH 001 1104

New Jersey Department of Environmental Protection
Division of Water Resources, Bureau of Potable Water
CN-029, Trenton, N.J. 08625
Hazardous Contaminant Analysis Input

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JUL 7 1986
NJ STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

OCT 21 1986

PS186

PWS ID: 2 0 0 4 0 0 2

TRANSACTION CODE: 0 3

PUBLIC WATER SYSTEM NAME AND ADDRESS:
Elizabethtown Water Company - Princeton Supply
One Elizabethtown Plaza
Elizabeth, New Jersey 07202

Enter "<" sign if appropriate.

CONTAMINANT ID	CONTAMINANT NAME	ANALYSIS METHOD	ANALYSIS PPM (Integers)	ANALYSIS PPM (Decimals)	ANALYSIS DATE (MO DAY YR)	20-44 BELOW	SAMPLE ANALYZED BY
2984	Trichloroethylene	217	<0001	3	052686		H.K.
2987	Tetrachloroethylene	217	<0001	3	052686		H.K.
2982	Carbon tetrachloride	217	<0001	3	052686		H.K.
2981	1,1,1 - Trichloroethane	217	<0001	3	052686		H.K.
2980	1,2 - Dichloroethane	217	<0001	3	052686		H.K.
2976	Vinyl chloride	217	<0001	3	052686		H.K.
2964	Methylene chloride	217	<0001	3	052686		H.K.
2990	Benzene	217	<0001	3	052686		H.K.
2989	Chlorobenzene	217	<0001	3	052686		H.K.
2406	1,2 - Dichlorobenzene	217	<0001	3	052686		H.K.
2402	1,3 - Dichlorobenzene	217	<0001	3	052686		H.K.
2404	1,4 - Dichlorobenzene	217	<0001	3	052686		H.K.
2378	1,2,4 - Trichlorobenzene	217	<0001	3	052686		H.K.
2977	1,1 - Dichloroethylene	217	<0001	3	052686		H.K.
2382	Trans - 1,2 - Dichloroethylene	217	<0001	3	052686		H.K.
2384	O-Xylene	217	<0001	3	052686		H.K.

MTH 001 1105

SAMPLE DATE: MO 05 DAY 15 YR 86

SAMPLE: D TIME 0920

LAB ID: 0744

LAB NAME: Garden State Labs.

Sample location (Street address and municipality):
Princeton Borough Hall
Monument Drive, Princeton (9-5-86A280)

SAMPLE COLLECTED BY: Walter Sawyer

DATE 5/15/86

I certify that this sample was collected by personnel authorized by the Department in a manner approved by the Department from the location described above.

6/27/86

Form WAQC-480
1/78

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

WA

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DEC 17 1986
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING W

PUBLIC WATER SYSTEM NAME AND ADDRESS

ELIZABETHTOWN WATER COMPANY - MAIN SUPPLY
ONE ELIZABETHTOWN PLAZA
ELIZABETH, NEW JERSEY 07202

PWS ID: 2 0 0 4 0 0 2 (1-7)

MONITORING CODE: 0 3 (8-9)

1-6	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	ANALYSIS DIGITS (21)	ANALYSIS DATE MO DAY YR (22-27)	28-48 BELOW	SAMPLE ANALYZ
	2 9 5 0	TOTAL TRIHALOMETHANES	9 4 3	0 0 1 8	3	1 1 1 8 8 6		R.K

LOCATION CODE (30-32)	LOCATION NAME	SAMPLE DATE MO DAY YR (33-38)	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLEC
	South Bound Brook	1 1 1 4 8 6	D	0 8 3 0	1 8 0 2 4	E'town Water Co.Lab	R.

PREPARED BY Glenn Johansen DATE 12/2/86

APPROVED BY _____ DATE / /

ENTERED
JAN 12 1987
NO. 30

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAM
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

JUL 8 '87 11:19

MTW 001 1106

F 23

(5)

87. 10/08 10:00 P02 *

MB

ELIZABETHTOWN WATER COMPANY

ORGANIC ANALYSIS

RECEIVED
JUN 4 1987
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

Date JANUARY - JUNE 1987

GENERAL SOURCE · RARITAN - MILLSTONE PLANT

Sample No. 1 Raritan-Millstone composite delivered water - 8:00 a.m., 1/14/87

Sample No. 2 Raritan-Millstone composite delivered water - 8:00 a.m., 2/13/87

Sample No. 3 Raritan-Millstone composite delivered water - 8:00 a.m., 3/20/87

Sample No. 4 Raritan-Millstone composite delivered water - 8:00 a.m., 4/22/87

Sample No. 5 Raritan-Millstone composite delivered water - 8:00 a.m., 5/22/87

Sample No. 6

PARAMETER	M.C.L. E.P.A. / DEP.	1	2	3	4	5	6
CHLORINATED HYDROCARBONS							
Lindane	0.004 mg/l						
Endrin	0.0002 mg/l						
Methoxychlor	0.100 mg/l						
Toxaphene	0.005 mg/l						
CHLOROPHENOXYS							
2, 4 - D	0.100 mg/l						
2, 4, 5 - TP Silvex	0.010 mg/l						
TRIHALOMETHANES							
Chloroform	—	0.008	0.005	0.011	0.018	0.018	
Bromodichloromethane	—	0.002	0.002	0.003	0.006	0.006	
Chlorodibromomethane	—	< 0.001	<0.001	< 0.001	< 0.001	<0.001	
Bromoform	—	< 0.001	<0.001	<0.001	<0.001	<0.001	
Total THM's	0.100 mg/l	0.010	0.007	0.014	0.024	0.024	
1,1,1-Trichloroethane	—	< 0.001	<0.001	<0.001	<0.001	<0.001	
Trichloroethylene	—	< 0.001	<0.001	< 0.001	< 0.001	<0.001	
Tetrachloroethylene	—	< 0.001	<0.001	<0.001	< 0.001	<0.001	
Sample ID Number	—	OV6987	OV 12787	OV-27387	OV38187	OV49387	
Chlorine Residual (mg/l)	—	<.05/0.80	0.05/0.75	<0.05/0.70	<.05/0.60	<.05/0.75	
Temperature, °F	—	38°	34°	46°	65°	62°	

MTH 001 1107

Appendix B

APPENDIX B
SUMMARY OF ANALYTICAL DATA

MTH 001 1109

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS ppb	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 8	29003 13	29003 8	29002 7	29003 7
1,1-Dichloroethane	10/30/84		-	8.4	-	-	-	-	-	-	-	-	-	-	-	ND	-
	6/5/86		-	4.5-5.6	-	-	ND	-	-	4.0	2.6	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
	3/16-18/82		-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	10/30/84		-	ND	-	-	-	-	-	ND	-	-	-	-	-	ND	-
	6/14/82		-	-	-	-	-	-	2ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/10/79		-	-	2ND	-	-	-	-	-	2ND	2ND	-	2ND	7	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	6/5/86		-	40-44	-	-	3.8	-	-	32	24	3.9	18	-	ND	-	-
	10/30/84		-	41	-	-	-	-	-	-	-	-	-	-	-	9.9	-
	6/14/82		-	-	-	-	-	-	6	-	-	-	-	-	-	-	-
	3/16-18/82		-	40	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/15/81		ND	-	-	-	-	-	-	16	8	-	6	5	16	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/10-18/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/18/80		1ND	-	13	-	-	-	-	-	4	-	-	2	-	-	-
	5/12/80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/14/80		2ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-
	1/28/80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	3ND
	12/19/79		-	-	-	-	-	-	-	2ND	-	-	-	-	-	-	-
	12/10/79		-	-	4	-	-	-	-	-	2	2ND	-	2ND	2ND	-	-
	11/18-19/79		1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	6/5-6/86		-	2.4-1.8	-	-	7.1	-	-	ND	1.7	3.0	ND	-	ND	-	-
	10/30/84		-	ND	-	-	-	-	-	ND	-	-	-	-	-	ND	-
	6/14/82		-	-	-	-	-	-	5ND	-	-	-	-	-	-	-	-
Acetone	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
Diethyl phthalate	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
1,2-Dichloroethene	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-

MTH 001 1110

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS ppb	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 8	29003 13	29003 8	29002 7	29003 7
	3/16-18/82		-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	-	-	-	-	-	ND	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86		-	1.5	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	2ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlordane	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	.76	ND	-	ND	-	-
Toluene	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	6/14/82		-	-	-	-	-	-	5ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-
	11/19/79		ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-

MTH 001 1111

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS PPB	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 8	29003 13	29003 8	29002 7	29003 7
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79		-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	6/14/82		-	-	-	-	-	-	1ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	8/14/81		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80		-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
Bromodichloromethane	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
	6/14/82		-	-	-	-	-	-	5ND	-	-	-	-	-	-	-	-
	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Dichlorobenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Butylbenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3-Benzofuran	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyclopropylbenzene	3/16-18/82		-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	3/16-18/82		-	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	6/5-6/86		-	18-20	-	-	ND	-	-	8.7	8.5	ND	7.2	-	ND	-	-
Barium	6/5-6/86		-	142-144	-	-	151	-	-	165	118	105	62	-	58	-	-
Cadmium	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
Chromium	6/5-6/86		-	10-11	-	-	ND	-	-	10	12	ND	11	-	8.5	-	-
Copper	6/5-6/86		-	31	-	-	114	-	-	31	18	171	47	-	126	-	-
Iron	6/5-6/86		-	510-514	-	-	18	-	-	89	26	15	57	-	56	-	-
Lead	6/5-6/86		-	7.7	-	-	6.0	-	-	5	ND	4.7	91	-	ND	-	-
Manganese	6/5-6/86		-	6.2-6.1	-	-	ND	-	-	5.6	3.6	ND	44	-	6.2	-	-
Mercury	6/5-6/86		-	.18-.24	-	-	ND	-	-	.14	ND	ND	.14	-	.14	-	-
Nickel	6/5-6/86		-	12-14	-	-	ND	-	-	ND	14	ND	11	-	15	-	-
Silver	6/5-6/86		-	10	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-

MTH 001 1112

MONTGOMERY TOWNSHIP RESIDENTIAL WELLS

CONTAMINANTS ppb	DATE	BLOCK LOT	29003 16	29002 40	29003 14	29003 3	29003 5	29002 18	29003 11	29003 12	29003 15	29002 17	29002 8	29003 13	29003 6	29002 7	29003 7
Sodium	6/5-6/86		-	14,700-14,100	-	-	5160	-	-	13,900	9,040	6,440	10,600	-	13,600	-	-
Zinc	6/5-6/86		-	138-148	-	-	178	-	-	44	38	26	43	-	47	-	-
Cyanide	6/5-6/86		-	ND	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-
Phenols	6/5-6/86		-	13	-	-	ND	-	-	ND	ND	ND	ND	-	ND	-	-

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 20ND: NOT DETECTED AT 1, 20, ETC. ppb

MTH 001 1113

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 23
1,1-Dichloroethane	10/30/84	-	-	-	-	-	-	ND	ND	-	-	-	-	-	ND	-	-
	6/5/86	-	-	-	-	-	-	3.8	ND	-	-	-	-	1.5	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	1	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	ND	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	10/30/84	-	-	-	-	-	-	ND	ND	-	-	-	-	-	ND	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	5	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	7.3	-	-
	12/10/79	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Trichloroethene	6/5/86	-	-	-	-	-	-	35	2.5	-	-	-	-	140	60	-	72
	10/30/84	-	-	-	-	-	-	27	12	-	-	-	-	-	ND	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	5	-	ND	-
	10/15/81	-	13	ND	-	ND	-	-	-	120	-	-	2ND	46	55	94	140
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	-	-	-	-	-	-	-	-	-	-	-	95	-	52	-
	6/14/81	-	-	-	-	-	-	-	14	-	-	-	-	58	210	52	-
	3/10-18/81	-	-	-	-	-	-	-	-	-	-	-	-	318	-	120	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	45	45	59	-
	11/18/80	-	-	-	-	-	-	-	15	-	84	-	1	-	-	-	90
	5/12/80	-	-	-	1ND	1ND	1ND	-	-	-	-	-	-	63	-	-	-
	3/14/80	-	-	2ND	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	69	-	-	2ND	-	58	-	-
	1/28/80	-	-	-	-	-	3ND	-	-	-	-	-	-	63	79	130	78
	12/19/79	-	2ND	-	-	2ND	-	-	-	-	-	-	-	51	-	110	79
	12/10/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/16-19/79	-	-	-	-	-	-	-	-	-	17.2	-	-	50	-	-	-
Methylene Chloride	6/5-6/86	-	-	-	-	-	-	ND	16	-	-	-	-	ND	ND	-	4.0
	10/30/84	-	-	-	-	-	-	ND	ND	-	-	-	-	-	31	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5ND	-
Acetone	6/5-6/86	-	-	-	-	-	-	ND	12	-	-	-	-	3.5	ND	-	ND
Diethyl phthalate	6/5-6/86	-	-	-	-	-	-	ND	4.2	-	-	-	-	ND	ND	-	ND
1,2-Dichloroethene	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	5.6	4.4	-	5.3
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 23
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	8	-	16	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	32.3	-	-	-	-	7.6	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	2.1	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	12	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	ND	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	3.4	-	-	-	-	-	-
Ethylbenzene	6/5-6/86	-	-	-	-	-	-	ND	5.3	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	1ND	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Chloroform	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	8	-	1	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Chlordane	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
Toluene	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
Carbon Tetrachloride	6/14/82	-	-	-	-	-	-	-	-	-	-	-	5ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
	2/11/80	-	-	-	-	-	-	-	-	3.1	-	-	-	-	1.9	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 25
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	7.8	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	17.1	-	-	-	-	-
1,2-Dichloroethane	6/14/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
Trichlorofluoromethane	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
Bromodichloromethane	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	5ND	-	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-
o-Dichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	438	-
1,2,4-Trichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	42	-	ND	-
N-Butylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	691	-
2,3-Benzofuran	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	148	-
Cyclopropylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	24	-
PCBs	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	1ND	-	1ND	-
Arsenic	6/5-6/86	-	-	-	-	-	-	5.1	4.4	-	-	-	-	ND	ND	-	ND
Barium	6/5-6/86	-	-	-	-	-	-	121	135	-	-	-	-	125	106	-	107
Cadmium	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	5.7
Chromium	6/5-6/86	-	-	-	-	-	-	5.0	9.5	-	-	-	-	6.9	ND	-	13
Copper	6/5-6/86	-	-	-	-	-	-	26	31	-	-	-	-	41	45	-	31
Iron	6/5-6/86	-	-	-	-	-	-	66	124	-	-	-	-	44	ND	-	59
Lead	6/5-6/86	-	-	-	-	-	-	740	7.0	-	-	-	-	3.6	4.4	-	ND
Manganese	6/5-6/86	-	-	-	-	-	-	5.9	6.1	-	-	-	-	4.2	ND	-	5.6
Mercury	6/5-6/86	-	-	-	-	-	-	.18	.18	-	-	-	-	0.14	ND	-	ND
Nickel	6/5-6/86	-	-	-	-	-	-	12	16	-	-	-	-	14	ND	-	71
[illegible]	6/5-6/86	-	-	-	-	-	-	ND	10	-	-	-	-	10	ND	-	10

MTH 001 1116

CONTAMINANTS PPB	DATE	29002 6	29003 10	29002 19	29003 2	29003 4	29003 6	29002 43	29002 14	23001 25	23001 24	23001 23	23001 21	23001 28	23001 27	23001 26	23001 25
Sodium	6/5-6/86	-	-	-	-	-	-	8,035	15,400	-	-	-	-	10,000	5,660	-	14,100
Zinc	6/5-6/86	-	-	-	-	-	-	82	70	-	-	-	-	73	31	-	29
Cyanide	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND
Phenols	6/5-6/86	-	-	-	-	-	-	ND	ND	-	-	-	-	ND	ND	-	ND

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 20ND: NOT DETECTED AT 1, 20, ET

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	29001 51	23001 20	29001 2
1,1-Dichloroethane	10/30/84	-	-	ND	-	-	-	-	-	-	-	-	-	10	-	-	-
	6/5/86	-	1.5	ND	-	ND	-	-	-	-	-	ND	ND	7.1	ND	ND	ND
	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	1	-	ND	-	-	-	-	4	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	ND	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	3.7	ND	ND	ND
	10/30/84	-	-	ND	-	-	-	-	-	-	-	-	-	10	-	-	-
	6/14/82	2ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	5	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	7.3	-	-	-	-	-	-	-	-	-	5	-	-	-
	12/10/79	2ND	-	-	-	-	2ND	-	-	-	2ND	-	-	5	6	-	-
	11/19/79	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
Trichloroethene	6/5/86	-	140	60	-	72	-	-	-	-	-	220	64	72	ND	1.9	ND
	10/30/84	-	-	ND	-	-	-	-	-	-	-	-	-	45	-	-	-
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	5	-	ND	-	-	-	-	249	-	-	-	-	-	-	-
	10/15/81	2ND	46	55	94	140	ND	-	2	-	68	-	6	5	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	95	-	52	-	-	-	-	-	-	-	-	-	-	-	-
	6/14/81	-	58	210	52	-	-	-	-	-	54	-	-	14	-	-	-
	3/10-18/81	-	318	-	120	-	-	-	-	249	18	-	-	-	-	-	-
	2/10/81	-	45	45	59	-	-	-	-	28	-	-	-	-	-	-	-
	11/18/80	1	-	-	-	90	-	5	-	-	33	-	-	10	-	-	-
	5/12/80	-	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/14/80	-	-	-	-	-	2ND	-	2ND	-	-	-	-	11	-	-	-
	2/11/80	2ND	-	58	-	-	-	-	-	-	-	-	-	13	-	-	-
	1/28/80	-	63	79	130	78	-	6	-	58	-	68	-	-	-	-	-
	12/19/79	-	51	-	110	79	-	-	-	-	-	36	-	-	-	-	-
	12/10/79	-	-	-	-	-	2ND	-	-	-	21	-	-	15	2ND	-	-
	11/18-19/79	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	6/5-6/86	-	ND	ND	-	4.0	-	-	-	-	-	ND	1.8	ND	ND	ND	ND
	10/30/84	-	-	31	-	-	-	-	-	-	-	-	-	ND	-	-	-
	6/14/82	-	-	-	5ND	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	6/5-6/86	-	3.5	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
Diethyl phthalate	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	-	-	-
1,2-Dichloroethene	6/5-6/86	-	5.6	4.4	-	5.3	-	-	-	-	-	7.6	ND	3.4	ND	ND	ND
	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MTH 001 1118

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	29001 51	23001 20	29001 2
	3/16-18/82	-	8	-	18	-	-	-	-	5	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	7.6	-	-	-	-	-	-	-	-	-	4.6	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86	-	2.1	ND	-	ND	-	-	-	-	-	26	ND	1.9	ND	ND	ND
	6/14/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	5	-	-	-	-	5	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/14-20/81	-	ND	-	12	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	ND	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	ND	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	1ND	-	-	1ND	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	2ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	8	-	1	-	-	-	-	2	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	ND	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
Toluene	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
Carbon Tetrachloride	6/14/82	5ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	-	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/10/81	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
	2/11/80	-	-	1.9	-	-	-	-	-	-	-	-	-	1.1	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	23001 51	23001 20	23001 2
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	7.8	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	6/14/82	1ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	ND	-	ND	-	-	-	-	8	-	-	-	-	-	-	-
Trichlorofluoromethane	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-
Bromodichloromethane	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
	6/14/82	5ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3/16-18/82	-	ND	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-
o-Dichlorobenzene	3/16-18/82	-	ND	-	438	-	-	-	-	ND	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	3/16-18/82	-	42	-	ND	-	-	-	-	8	-	-	-	-	-	-	-
n-Butylbenzene	3/16-18/82	-	ND	-	691	-	-	-	-	12	-	-	-	-	-	-	-
2,3-benzofuran	3/16-18/82	-	ND	-	148	-	-	-	-	ND	-	-	-	-	-	-	-
Cyclopropylbenzene	3/16-18/82	-	ND	-	24	-	-	-	-	ND	-	-	-	-	-	-	-
PCBs	3/16-18/82	-	1ND	-	1ND	-	-	-	-	1ND	-	-	-	-	-	-	-
Arsenic	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	4.2	ND	ND	ND	39	7.5
Barium	6/5-6/86	-	125	106	-	107	-	-	-	-	-	135	85	72	295/306	106	6.7
Cadmium	6/5-6/86	-	ND	ND	-	5.7	-	-	-	-	-	5.3	ND	ND	4.1	ND	4.8
Chromium	6/5-6/86	-	6.9	ND	-	13	-	-	-	-	-	13	11	12	9.2-7.6	11	8.6
Copper	6/5-6/86	-	41	45	-	31	-	-	-	-	-	94	47	47	31-30	31	31
Iron	6/5-6/86	-	44	ND	-	59	-	-	-	-	-	30	125	97	70/75	69	156
Lead	6/5-6/86	-	3.6	4.4	-	ND	-	-	-	-	-	40	6.1	3.6	3.2	3.5	ND
Manganese	6/5-6/86	-	4.2	ND	-	5.6	-	-	-	-	-	5.3	18	13	5.4-5.2	5.9	255
Mercury	6/5-6/86	-	0.14	ND	-	ND	-	-	-	-	-	ND	0.16	ND	ND	ND	0.16
Nickel	6/5-6/86	-	14	ND	-	71	-	-	-	-	-	15	25	19	12-17	24	26
Silver	6/5-6/86	-	10	ND	-	10	-	-	-	-	-	10	ND	20	10	30	10

MTH 001 1120

CONTAMINANTS PPB	DATE	23001 21	23001 28	23001 27	23001 26	23001 23	29002 16	29002 9	29002 15	29002 10	29002 13	29002 11	29002 12	29002 14	29001 5	23001 20	23001 2
Sodium	6/5-6/86	-	10,000	5,660	-	14,100	-	-	-	-	-	15,000	15,800	12,900	12,000-9,756	14,000	57,900
Zinc	6/5-6/86	-	73	31	-	29	-	-	-	-	-	54	148	39	36/47	45	32
Cyanide	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	ND	ND	ND	ND	ND	ND
Phenols	6/5-6/86	-	ND	ND	-	ND	-	-	-	-	-	54	ND	ND	30	11	ND

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 2UND: NOT DETECTED AT 1, 2U, ET

CONTAMINANTS PPB	DATE	29001 4	29002 4	29002 2	29002 2	29002 5	29003 1	23001 19	23001 29	29002 1	23001 17	29002 22	29002 28	29002 24	29002 33	29003 18	26001 37	23001 37	ELIMINEET-TOWN WATER
1,1-Dichloroethane	10/30/84	-	-	-	-	-	-	-	-	ND	-	9	-	5.8	-	-	-	-	-
	6/5/86	ND	ND	-	-	-	-	-	-	-	ND	8.6	ND	3.5	5.8	ND	ND	ND	ND
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	22	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	6/5/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	10/30/84	-	-	-	-	-	-	-	-	ND	-	ND	-	ND	-	-	-	-	-
	6/14/82	-	-	-	-	2ND	-	-	-	2ND	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	3.2	-	ND	2ND	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-
	12/10/79	3	-	2ND	-	-	-	-	-	-	-	-	2ND	2ND	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	6/5/86	ND	58	-	-	-	-	-	-	-	ND	28	ND	46	340	ND	ND	ND	ND
	10/30/84	-	-	-	-	-	-	-	-	ND	-	20	-	34	-	-	-	-	-
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	950	-	257	-	-	-	-
	10/15/81	-	-	-	-	-	-	30	-	2ND	-	-	-	-	-	ND	-	ND	-
	8/14/81	-	-	-	-	1ND	-	-	-	1ND	-	-	322	-	-	-	-	-	-
	7/14-20/81	-	-	-	-	-	-	28	-	-	-	-	-	-	-	-	-	-	-
	6/14/81	-	-	-	-	1ND	-	30	-	-	-	-	-	-	-	-	-	-	-
	3/10-18/81	-	-	-	-	-	-	28	-	-	-	-	2	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	430	-	39	-	-	-	-
	11/18/80	-	-	-	-	-	-	29	1ND	1	-	-	-	-	-	-	-	-	-
	5/12/80	-	-	-	-	-	-	-	-	-	-	-	2ND	-	-	-	-	-	-
	3/14/80	-	-	6	-	-	-	-	-	-	-	-	309/2	-	-	2ND	-	-	-
	2/11/80	-	-	-	-	-	-	20	-	2.2	-	-	111	-	-	-	-	-	-
	1/28/80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3ND	-
	12/19/79	-	-	-	-	-	-	-	2ND	-	-	-	-	-	39	2ND	-	-	-
	12/10/79	2ND	-	6	-	-	-	-	-	-	-	-	2	6	-	-	-	-	-
	11/18-19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	1.1	5.8	3.2	ND	2.1	ND	ND	24
	10/30/84	-	-	-	-	20ND	-	-	-	83	-	ND	-	ND	-	-	-	-	-
	6/14/82	-	-	-	-	5ND	-	-	-	5ND	-	-	-	-	-	5ND	-	-	-
Acetone	6/5-6/86	4.6	ND	-	-	-	-	-	-	-	ND	5.3	ND	7.3	ND	ND	ND	ND	ND
Diethyl phthalate	6/5-6/86	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene	6/5-6/86	ND	4.0	-	-	-	-	-	-	-	ND	4.0	ND	3.5	17	ND	ND	ND	ND
	6/14/82	-	-	-	-	1ND	-	-	-	-	-	-	-	-	-	1ND	-	-	-

MTH 001 1122

CONTAMINANTS ppb	DATE	29001 4	29002 4	29002 2	29002 2	29002 5	29003 1	23001 19	23001 29	29002 1	23001 17	29002 22	29002 28	29002 24	29002 33	29003 18	28001 37	23001 37	ELIZABETH TOWN WATER
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	32	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	6/5-6/86	ND	1.8	-	-	-	-	-	-	-	ND	ND	ND	ND	1.4	ND	ND	ND	ND
	6/14/82	-	-	-	-	2ND	-	-	-	2ND	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	51	-	24	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/14-20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	18	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ethylbenzene	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	11
	6/14/82	-	-	-	-	1ND	-	-	-	2ND	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	560	-	1	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	2.0	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroane	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	4.7
	6/14/82	-	-	-	-	1ND	-	-	-	1ND	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	8	-	ND	-	-	-	-
Carbon Tetrachloride	6/14/82	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	1ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	16.3	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	6/14/82		-	-	-	ND	-	-	-	-	-	-	-	-	-	5ND	-	-	-

MTH 001 1123

CONTAMINANTS PPB	DATE	29001 4	29002 4	29002 2	25002 2	29002 5	25003 1	23001 19	23001 29	29002 1	23001 17	29002 22	29002 28	25002 24	29002 33	25003 18	28001 37	29001 37	ELIZABETH TOWN WATER
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	7/20/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-
	11/19/79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	6/14/82	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	2ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	ND	-	-	53	-	8	-	-	-	-
Trichlorofluoromethane	8/14/81	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
	2/11/80	-	-	-	-	-	-	-	-	ND	-	-	23.6	-	-	-	-	-	-
Bromodichloromethane	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	2.8
	6/14/82	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	5ND	-	-	-
	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	40	-	ND	-	-	-	-
o-Dichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	70	-	ND	-	-	-	-
1,2,4-Trichlorobenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
n-Butylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
2,3-Benzofuran	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	ND	-	ND	-	-	-	-
Cyclododecylbenzene	3/16-18/82	-	-	-	-	-	-	-	-	-		-	ND	-	ND	-	-	-	-
PCBs	3/16-18/82	-	-	-	-	-	-	-	-	-	-	-	1ND	-	1ND	-	-	-	-
Arsenic	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	10	ND	10	10	ND	ND	ND	ND
Barium	6/5-6/86	8.4	82	-	-	-	-	-	-	-	199	120	70	114	88	131	102	233	39
Cadmium	6/5-6/86	4.7	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	9.8	4.1
Chromium	6/5-6/86	5.3	8.2	-	-	-	-	-	-	-	7.8	11	6.4	13	12	117	15	14	7.6
Copper	6/5-6/86	144	28	-	-	-	-	-	-	-	30	31	118	47	23	31	46	31	76
Iron	6/5-6/86	3840	23	-	-	-	-	-	-	-	25	116	30	163	656	56	40	107	74
Lead	6/5-6/86	ND	28	-	-	-	-	-	-	-	2.8	4.0	4.0	143	19	20	7.0	7.0	18
Manganese	6/5-6/86	222	ND	-	-	-	-	-	-	-	3.7	94	4.2	74	6.1	6.1	5.3	15	6.0
Mercury	6/5-6/86	0.14	0.14	-	-	-	-	-	-	-	ND	0.14	0.14	0.18	ND	ND	0.16	ND	ND
Nickel	6/5-6/86	37	20	-	-	-	-	-	-	-	23	33	16	27	21	14	10	19	16
Silver	6/5-6/86	ND	ND	-	-	-	-	-	-	-	ND	10	10	ND	10	20	10	10	10

CONTAMINANTS PPB	DATE	29001 4	29002 4	29002 2	29002 2	29002 5	29003 1	23001 19	23001 29	29002 1	23001 17	29002 22	29002 26	29002 24	29002 33	29003 16	28001 37	29001 37	ELIZABETH TOWN WATER
Sodium	6/5-6/86	10	10,800	-	-	-	-	-	-	-	13,000	16,900	7,740	15,300	2,600	9,270	12,400	14,600	11,100
Zinc	6/5-6/86	15	36	-	-	-	-	-	-	-	69	123	77	48	205	95	42	48	32
Cyanide	6/5-6/86	99	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenols	6/5-6/86	20	ND	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES: (-): NOT SAMPLED
ND: SAMPLED BUT NOT DETECTED
1ND, 20ND: NOT DETECTED AT 1, 20, ET

GROUND WATER ANALYSES

Compound	Sampling Date	Thule Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
V.O. Scan	11/5/79	-	-	-	-	-	-	-	-	ND+	-	-
	11/14/79	-	-	-	-	-	-	-	-	25ND	-	-
	11/19/79	-	-	-	-	ND+	ND+	-	-	-	-	-
	2/6/80	-	-	-	-	ND+	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND+	-	ND+	-
	3/4/80	-	-	-	-	ND+	-	-	-	-	-	-
	5/16/80	-	-	-	-	-	-	-	-	-	ND+	-
	8/27/80	-	-	-	-	ND+	-	-	-	-	-	-
	2/10/81	-	-	-	-	-	-	ND+	ND	ND+	-	-
	7/14/81	-	-	-	-	-	-	ND+	ND	-	-	-
	3/17/82	-	-	-	-	-	-	ND+	ND+	-	-	-
	3/18/82	-	-	-	-	-	-	ND+	-	-	-	-
	4/12/82	-	-	-	-	-	-	ND+	ND+	-	-	ND+
	1/6/83	ND+	ND+	-	ND	-	ND	-	-	-	-	-
	1/11/83	-	-	ND+	-	-	2ND	-	-	-	-	-
	1/28/83	-	-	-	-	-	19peaks	-	-	-	-	-
	3/30/83	-	-	-	-	-	-	-	ND+	ND	-	-
	3/31/63	-	-	-	-	-	-	-	-	-	-	-
	4/1/83	ND+	ND+	ND+	-	-	-	-	-	-	-	-
	5/17/83	-		-	-	-	-	-	-	-	-	-
	7/6/83	-	-	-	-	-	1peak	-	-	-	-	-
	9/26/83	-	-	-	-	-	ND	-	-	-	-	-
Trichloroethene	11/5/79	-	-	-	-	-	-	-	-	37.0	-	-
	11/19/79	-	-	-	ND	1.7	ND	-	-	-	-	-
	12/10/79	-	-	-	-	14	-	-	-	-	-	-
	12/19/79	-	-	-	-	12	-	-	-	-	-	-
	1/6/80	-	-	-	-	-	-	-	-	-	ND	-
	2/6/80	-	-	-	-	2ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	124.9	48.0	-	28.7	-
	3/4/80	-	-	-	-	74	-	-	-	-	-	-
	5/5/80	-	-	-	-	-	-	-	-	-	60-75	-
	5/16/60	-	-	-	-	-	-	-	-	-	91	-
	2/10/81	-	-	-	-	-	-	67	ND	25	-	-
	2/10/81	-	-	-	-	-	-	250	-	-	-	-
	7/14/81	-	-	-	-	-	-	402	ND	-	-	-
	3/17/82	-	-	-	-	-	-	210	90.0	-	-	-
	3/16/62	-	-	-	-	-	-	368	ND	-	-	-
	4/12/82	-	-	-	-	-	-	180	6.0	-	-	ND
	1/6/63	120	7.0	-	ND	-	ND	-	-	-	-	-
	1/11/83	-	-	3.0	-	-	-	-	-	-	-	-
	3/30/63	-	-	-	-	-	-	-	6.0	ND	-	-
	3/30/83	-	-	-	-	-	-	-	12.0	-	-	-
	3/31/83	-	-	-	-	-	-	160	-	-	-	-
	4/1/83	24	9.0	ND	-	-	-	-	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	46	-	-
1,1-cichloretnene	11/5/79	-	-	-	-	-	-	-	-	12.2	-	-

GROUND WATER ANALYSES

Compound	Sampling Date	Inuls Auto	Am. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/6/80	-	-	-	-	4ND	-	-	-	-	13.2	-
	2/21/80	-	-	-	-	-	-	5.5	7.4	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	2ND	-
	3/17/82	-	-	-	-	-	-	ND	5.0	-	-	-
	1/6/83	8.5	ND	-	ND	-	ND	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/31/83	-	-	-	-	-	-	ND	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	17	-	-
1,1,1-trichloroethane	11/5/79	-	-	-	-	-	-	-	-	34.8	-	-
	11/19/79	-	-	-	-	3.9	ND	-	-	-	-	-
	12/10/79	-	-	-	-	ND	-	-	-	-	-	-
	12/19/79	-	-	-	-	ND	-	-	-	-	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	10.7	4.2	-	32.6	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	6/27/80	-	-	-	-	ND	-	-	-	-	-	-
	3/18/82	-	-	-	-	-	-	2	-	-	-	-
	4/12/82	-	-	-	-	-	-	1	2	-	-	ND
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/31/83	-	-	-	-	-	-	2	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	44	-	-
	5/17/83	-	-	-	-	-	-	-	-	3	-	-
1,1,2,2-tetrachloroethene	1/6/83	ND	ND	ND	-	-	ND	-	-	-	-	-
	4/1/83	ND	ND	ND	-	-	-	-	-	-	-	-
Benzene	12/10/79	-	-	-	-	ND	-	-	-	-	-	-
	12/19/79	-	-	-	-	ND	-	-	-	-	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	1ND	-
	2/6/80	-	-	-	-	9ND	-	-	-	-	-	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
	1/20/83	-	-	-	-	-	8000	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
Toluene	11/5/79	-	-	-	-	-	-	-	-	52.4	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	17	-
	2/21/80	-	-	-	-	-	-	ND	1.8	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	ND	ND	-	-	ND
	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
	4/12/82	-	-	-	-	-	-	ND	ND	-	-	6
	1/20/83	-	-	-	-	-	10000	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	ND	ND	-	ND

MTH 001 1127

GROUND WATER ANALYSES

Compound	Sampling Date	Thuls Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
Ethylbenzene	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	5/16/80	-	-	-	-	-	-	-	-	-	1	-
	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
	1/28/83	-	-	-	-	-	1700	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
1,1,2,2-tetrachloroethane	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	ND	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	7.0	ND	-	-
	3/30/83	-	-	-	-	-	-	-	9.0	-	-	-
	3/31/83	-	-	-	-	-	-	14	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	16	-	-
1,2-dichloroethane	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	ND	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	ND	2	-	-	-
	3/18/82	-	-	-	-	-	-	5	-	-	-	-
	4/12/82	-	-	-	-	-	-	5	ND	-	-	ND
	1/28/83	-	-	-	-	-	65	-	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	2.0	ND	-	-
1,2-dichloroethene	11/5/79	-	-	-	-	-	-	-	-	4.0	-	-
	2/21/80	-	-	-	-	-	-	16.3	2.4	-	ND	-
	3/31/83	-	-	-	-	-	-	ND	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	6	-	ND
1,1-dichloroethane	11/5/79	-	-	-	-	-	-	-	-	4	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	58.0	ND	-	2.3	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	ND	ND	-	-	ND
	3/16/82	-	-	-	-	-	-	17	-	-	-	-
	4/12/82	-	-	-	-	-	-	10	30	-	-	ND
	4/12/82	-	-	-	-	-	-	-	2	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	5	ND	-	3
	3/30/83	-	-	-	-	-	-	-	6	-	-	-
	3/31/83	-	-	-	-	-	-	9	-	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	4	-	-
Tetrachloroethene	11/5/79	-	-	-	-	-	-	-	-	6.1	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	14.5	16.5	-	3.6	-

GROUND WATER ANALYSES

Compound	Sampling Date	Inuis Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	2/10/81	-	-	-	-	-	-	ND	-	-	-	-
	3/17/82	-	-	-	-	-	-	2	4	-	-	ND
	3/18/82	-	-	-	-	-	-	5	-	-	-	-
	4/12/82	-	-	-	-	-	-		3	-	-	ND
	4/12/82	-	-	-	-	-	-	5	3	-	-	2
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	-	ND	ND	-	ND
	4/12/83	-	-	-	-	-	-	ND	ND	ND	-	ND
Carbon Tetrachloride	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	1.4	-	ND	-
	2/10/80	-	-	-	-	-	-	ND	-	-	-	-
	7/14/81	-	-	-	-	-	-	163	-	-	-	-
	4/12/82	-	-	-	-	-	-	150	ND	-	-	ND
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
hexachlorobutadiene	2/21/80	-	-	-	-	-	-	ND	-	-	-	-
	4/12/82	-	-	-	-	-	-	1200	-	-	-	ND
Trifluorotoluene	2/21/80	-	-	-	-	-	-	ND	-	-	-	-
	4/12/82	-	-	-	-	-	-	611	-	-	-	ND
n-pentane	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
n-hexane	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
n-heptane	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
Xylenes	3/23/82	-	-	-	50ND	-	-	-	-	-	-	-
33 purgeable organics	1/29/82	-	-	-	10ND	-	-	-	-	-	-	-
Chloroform	11/5/79	-	-	-		-	-	-	-	2.8	-	-
	11/19/79	-	-	-	-	ND	2.8	-	-	-	-	-
	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	-	-	ND	4	-	2	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	5/16/80	-	-	-	-	-	-	-	-	-	40	-
	3/17/82	-	-	-	-	-	-	ND	2	-	-	-
	3/18/82	-	-	-	-	-	-	1	-	-	-	-
	3/25/83	-	-	-	-	-	-	-	-	-	25	-
PCB	3/18/82	-	-	-	-	-	-	56	-	-	-	-
	3/30/83	-	-	-	-	-	-	1.12	0.69	-	-	-
	5/17/83	-	-	-	-	-	-	19.8	0.80	-	-	ND
p-xylene	1/28/83	-	-	-	-	-	1200	-	-	-	-	-

MTH 001 1129

GROUND WATER ANALYSES

Compound	Sampling Date	Tauls Auto	Wa. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
o-xylene	1/28/83	-	-	-	-	-	2400	-	-	-	-	-
m-xylene	1/28/83	-	-	-	-	-	3300	-	-	-	-	-
Cumene	1/28/83	-	-	-	-	-	10	-	-	-	-	-
Styrene	1/28/83	-	-	-	-	-	79	-	-	-	-	-
n-propylbenzene	1/28/83	-	-	-	-	-	220	-	-	-	-	-
1,3,5 trimethylbenzene	1/28/83	-	-	-	-	-	520	-	-	-	-	-
1,2,4 trimethylbenzene	1/28/83	-	-	-	-	-	1930	-	-	-	-	-
p-dichlorobenzene	1/28/83	-	-	-	-	-	2200	-	-	-	-	-
o-dichlorobenzene	1/28/83	-	-	-	-	-	960	-	-	-	-	-
n-butylbenzene	1/28/83	-	-	-	-	-	340	-	-	-	-	-
Naphthalene	3/18/82	-	-	-	-	-	-	ND	-	-	-	-
	4/12/82	-	-	-	-	-	-	10	-	-	-	-
	1/28/83	-	-	-	-	-	2200	-	-	-	-	-
Petroleum hydrocarbons	1/28/83	-	-	-	-	-	324	-	-	-	-	-
	1/28/83	-	-	-	-	-	3.7	-	-	-	-	-
	1/28/83	-	-	-	-	-	209	-	-	-	-	-
	7/6/83	-	-	-	-	-	IND	-	-	-	-	-
	7/6/83	-	-	-	-	-	IND	-	-	-	-	-
	7/6/83	-	-	-	-	-	IND	-	-	-	-	-
	7/6/83	-	-	-	-	-	17.7	-	-	-	-	-
	3/6/84	-	-	-	-	-	19520	-	-	-	-	-
	7/16/84	-	-	-	-	-	3470*	-	-	-	-	-
	9/3/84	-	-	-	-	-	9400*	-	-	-	-	-
	10/31/84	-	-	-	-	-	1540*	-	-	-	-	-
Aromatic hydrocarbon	2/10/81	-	-	-	-	-	-	-	IND	-	-	-
	7/14/81	-	-	-	-	-	-	-	IND	-	-	-
	3/17/82	-	-	-	-	-	-	-	-	-	-	IND
	3/30/83	-	-	-	-	-	-	-	-	IND	-	-
	7/6/83	-	-	-	-	-	IND	-	-	-	-	-
	7/6/83	-	-	-	-	-	IND	-	-	-	-	-
	7/16/84	-	-	-	-	-	IND	-	-	-	-	-
	10/31/84	-	-	-	-	-	IND	-	-	-	-	-
Chlorinated hydrocarbon	2/10/81	-	-	-	-	-	-	-	SND	-	-	-
	7/14/81	-	-	-	-	-	-	-	SND	-	-	-
	3/17/82	-	-	-	-	-	-	-	-	-	-	IND
	3/30/83	-	-	-	-	-	-	-	-	IND	-	-

MTH 001 1130

GROUND WATER ANALYSES

Compound	Sampling Date	Inuls Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.286	Polycell	Compo Industries	P.G.T.	Village Shopper
	7/6/83	-	-	-	-	-	1ND	-	-	-	-	-
	7/6/83	-	-	-	-	-	1ND	-	-	-	-	-
Methylene Chloride	1/8/80	-	-	-	-	-	-	-	-	-	ND	-
	2/21/80	-	-	-	-	ND	-	ND	-	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	-	ND	-
	3/17/82	-	-	-	-	-	-	25	-	-	-	ND
	4/12/82	-	-	-	-	-	-	50	-	-	-	1
	3/25/83	-	-	-	-	-	-	-	-	-	ND	-
	3/30/83	-	-	-	-	-	-	ND	ND	ND	-	ND
1,1,2,2-trichlorotri-fluoroethane	2/21/80	-	-	-	-	-	-	40	-	-	-	-
Total Dissolved Solids	7/14/81	-	-	-	-	-	-	228ppm	386ppm	-	-	-
	4/12/82	-	-	-	-	-	-	130ppm	386ppm	-	-	-
	4/12/82	-	-	-	-	-	-	-	120ppm	-	-	-
	4/12/83	-	-	-	-	-	-	-	-	712ppm	-	-
Iron	7/14/81	-	-	-	-	-	-	230770ppm	-	-	-	-
Chloride	4/12/82	-	-	-	-	-	-	18ppm	78ppm	-	-	-
	4/12/82	-	-	-	-	-	-	-	8ppm	-	-	-
Sulfate	4/12/82	-	-	-	-	-	-	26ppm	46ppm	-	-	-
	4/12/82	-	-	-	-	-	-	-	10ppm	-	-	-
Specific Conductance	4/12/82	-	-	-	-	-	-	175.3	486.4	-	-	-
	4/12/82	-	-	-	-	-	-	-	149.9	-	-	-
Hexavalent Chromium	4/12/82	-	-	-	-	-	-	5ND	13	-	-	-
	4/12/82	-	-	-	-	-	-	-	5ND	-	-	-
Dibromochloromethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	2ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	3.2	ND	-	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	5ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Trans-1,1-dichloroethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
1,2-dichloropropane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	15ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-

GROUND WATER ANALYSES

Compound	Sampling Date	Inuis Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Trans-1,3-dichloropropane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
cis-1,3-dichloropropane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
1,1,2-trichloroethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	3ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
2-chloroethylvinyl ether	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	5ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Bromoform	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	4ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	14	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Chlorobenzene	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	1ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-
Benzene	1/8/80	-	-	-	-	-	-	-	-	3	-	-
	2/21/80	-	-	-	-	-	-	-	ND	3.6	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	3/25/83	-	-	-	-	-	-	-	-	ND	-	-

GROUND WATER ANALYSES

Compound	Sampling Date	Inuls Auto	Wm. Penn	Texaco	Town & Country	Ingersoll Rand	Princeton Airport	1377 Rte.206	Polycell	Compo Industries	P.G.T.	Village Shopper
Bromodichloromethane	1/8/80	-	-	-	-	-	-	-	-	ND	-	-
	2/6/80	-	-	-	-	2ND	-	-	-	-	-	-
	2/21/80	-	-	-	-	-	-	-	ND	ND	ND	-
	5/9/80	-	-	-	-	-	-	-	-	ND	-	-
	5/16/80	-	-	-	-	-	-	-	-	2ND	ND	-
	3/25/83	-	-	-	-	-	-	-	-	9.5	-	-
Acid Extractables	3/8/84	-	-	-	-	-	5ND	-	-	-	-	-
	3/14/84	-	-	-	-	-	ND	-	-	-	-	-
Base Neutrals	3/8/84	-	-	-	-	-	5ND	-	-	-	-	-
	3/14/84	-	-	-	-	-	ND	-	-	-	-	-

Note:

all concentrations in ppb except where noted
ND not detected
2ND not detected at 2ppb
ND+ not detected except for compounds listed below
* represents maximum concentration of several samples

SOIL ANALYSIS

Compound	Sampling Date	1377 Route 206	Princeton Airport	Princeton Gamma Tech
V.O. Scan	5/9/80	-	-	2ND
	2/13/81	ND	-	-
	3/17/82	ND*	-	-
	12/6/82	ND	-	-
	12/17/82	-	4peaks	-
	12/17/82	-	4peaks	-
	1/20/83	-	1peak	-
	3/30/83	-	-	ND
	3/30/83	-	-	ND
	3/25/83	-	-	ND
	3/30/83	-	-	ND
	3/32/83	-	-	ND
	6/23/83	3peaks*	-	-
Tetrachloroethene	12/6/82	180	-	-
Methylene Chloride	3/17/82	735	-	-
	9/29/83	110*	-	-
1,2,3-Trichlorobenzene	12/6/82	980	-	-
Benzene	12/17/82	-	3215	-
	12/17/82	-	130	-
Toluene	12/17/82	-	13200	-
	1/20/83	-	12900	-
	9/29/83	33*	-	-
Ethyl Benzene	12/17/82	-	2330	-
	1/20/83	-	4281	-
p-xylene	12/17/82	-	1645	-
	1/20/83	-	3533	-
o-xylene	12/17/82	-	2615	-
	1/20/83	-	5930	-
	8/29/83	12400*	-	-
m-xylene	12/17/82	-	39413	-
	1/20/83	-	9820	-
p-bromofluorobenzene	12/17/82	-	920	-
	1/22/83	-	2330	-
o-chlorotoluene	12/17/82	-	1270	-
	1/20/83	-	3575	-

MTH 001 1134

SOIL ANALYSES

Compound	Sampling Date	1377 Route 206	Princeton Airport	Princeton Gamma Tech
p-cymene	12/17/82	-	180	-
	1/20/83	-	465	-
1,2,3-trimethylbenzene	12/17/82	-	29756	-
	1/20/83	-	8175	-
o-dichlorobenzene	12/17/82	-	550	-
n-butylbenzene	12/17/82	-	195	-
	1/20/83	-	660	-
2,3-benzofuran	12/17/82	-	775	-
	1/20/83	-	1040	-
hexachlorobutadiene	12/17/82	-	4175	-
	1/20/83	-	6030	-
napthalene	12/17/82	-	1132	-
	1/20/83	-	1220	-
cumene	1/20/83	-	450	-
n-propylbenzene	1/20/83	-	1576	-
PCB	12/6/82	23.7	-	-
	12/6/82	.561	-	-
	1/20/83	-	ND	-
	9/29/83	16300*	-	-
	10/20/83	2102*	-	-
	2/20/84	492202*	-	-
Chloroform	9/29/83	32*	-	-

Note:

all concentrations in ppb

* represents maximum concentration of several samples collected on this date

- not analyzed for

ND not detected

ND+ not detected except for compounds indicated below

MTH 001 1135

SEPTIC TANK ANALYSIS

Compound	Sampling Date	1377 Route 206	Princeton Gamma Tech	Polycell	Compo Industries	Montgomery Shop. Center
V.O. Scan	11/19/79	-	ND+	-	-	-
	1/17/80	-	ND+	-	-	-
	2/11/80	-	-	ND+	ND+	ND+
	4/17/80	ND+	-	-	-	-
	3/25/83	-	ND+	-	-	-
Trichloroethene	11/19/79	-	8900	-	-	-
	2/11/80	95	-	31.4	62	ND
	4/17/80	2500	-	-	-	-
Chlorobenzene	2/11/80	ND	-	ND	ND	162
Trichloroethane	2/11/80	ND	-	ND	ND	15000
Methylene Chloride	2/11/80	ND	-	ND	ND	12500
M,p-xylene	2/11/80	ND	-	ND	ND	150
O-xylene	2/11/80	ND	-	ND	ND	220
1,1-dichloroethane	2/11/80	ND	-	6.0	3.9	8000
1,1 dichloroethylene	2/11/80	ND	-	-	47.0	290
Toluene	11/19/79	-	755	-	-	-
	2/11/80	ND	-	ND	ND	165
1,2-dichloroethylene	2/11/80	ND	-	3.6	9.5	ND
1,1,1-trichloroethane	2/11/80	ND	-	ND	52.7	ND
Tetrachloroethene	2/11/80	ND	-	15.8	14.6	ND
Ethyl Benzene	2/11/80	ND	-	2.3	ND	-
Chloroform	11/19/79	-	1260	-	-	-
	3/25/83	-	5	-	-	-
Benzene	11/19/79	-	1550	-	-	-
Nonane	11/19/79	-	162	-	-	-
Octane	11/19/79	-	28	-	-	-
1,3 dichloropropane	3/25/83	-	8	-	-	-

MTH 001 1136

SEPTIC TANK ANALYSES

Note:
ND - not detected
ND+ - not detected except for compounds indicated below
- - not analyzed for
all concentrations in ppb

EFFLUENT ANALYSES

Parameter	Sampling Date	1377 Rte. 286 Discharge to Beden Brook	Combo Indust. Discharge to Millstone R.	Combo Indust. Discharge to Catch Basin	P'ton. Airport Discharge to adjacent stream
V.O. Scan	3/26/81	-	ND+	-	-
	4/7/81	-	ND+	-	-
	4/12/83	-	ND+	ND+	-
Turbidity	7/2/73	13	-	-	-
	6/19/74	430	-	-	-
pH	7/2/73	6.3	-	-	-
	6/19/74	6.4	-	-	-
Alkalinity to pH4	7/2/73	28	-	-	-
	6/19/74	95	-	-	-
Nitrate Nitrogen	7/2/73	54	-	-	-
Ammonia Nitrogen	7/2/73	1	-	-	-
Total Nitrogen	7/2/73	1	-	-	-
Chloride	7/2/73	40	-	-	-
	6/19/74	150	-	-	-
Suspended Solids	7/2/73	18	-	-	-
	6/19/74	45	-	-	-
Total Solids	6/19/74	3122	-	-	-
Asn	7/2/73	3	-	-	-
	6/19/74	32	-	-	-
Total Phosphate	7/2/73	3	-	-	-
	6/19/74	5	-	-	-
Detergents	7/2/73	2.34	-	-	-
COD	7/2/73	1380	-	-	-
	6/19/74	403	-	-	-
Ether Soluble Fraction	7/2/73	72	-	-	-
Initial D.O.	7/2/73	2.9	-	-	-
	6/19/74	0	-	-	-
BOD 2%	7/2/73	94	-	-	-
BOD 10%	7/2/73	70	-	-	-
	6/19/74	61	-	-	-

MTH 001 1138

EFFLUENT ANALYSES

Parameter	Sampling Date	1377 Rte. 206 Discharge to Becen Brook	Compo Indust. Discharge to Millstone R.	Compo Indust. Discharge to Catch Basin	P'ton. Airport Discharge to adjacent stream
Trichloroethene	11/14/79	-	ND	-	-
1,1,2,2-tetrachloroethane	11/14/79	-	ND	-	-
	4/4/83	-	-	-	ND
Methyl Ethyl Ketone	11/14/79	-	50,000ND	-	-
	3/26/81	-	3987	-	-
	4/4/83	-	-	-	7
m-xylene	11/14/79	-	350	-	-
	3/26/81	-	626	-	-
	4/4/83	-	-	-	ND
p-xylene	11/14/79	-	350	-	-
	3/26/81	-	626	-	-
	4/4/83	-	-	-	ND
o-xylene	11/14/79	-	225	-	-
	3/26/81	-	626	-	-
	4/4/83	-		-	ND
Dimethyl Formide	11/14/79	-	ND	-	-
	3/26/81	-	.225	-	-
	4/7/81	-	.487	-	-
	4/4/83	-	-	-	ND
Toluene	11/14/79	-	ND	-	-
	3/26/81	-	3790	-	-
	4/4/83	-	-	-	ND
	4/12/83	-	ND	2.0	-
Benzene	11/14/79	-	ND	-	-
	3/26/81	-	182	-	-
	4/4/83	-	-	-	ND
Chlorinated hydrocarbons	11/14/79	-	ND	-	-
	3/26/81	-	10ND	-	-
	4/7/81	-	5ND	-	-
	4/4/83	-	-	-	ND
Petroleum hydrocarbons	11/14/79	-	ND	-	-
	3/26/81	-	0.53	-	-
	4/4/83	-	-	-	ND
TOC	3/26/81	-	980	-	-
	4/7/81	-	55	-	-
	4/12/83	-	2.1	21.8	-

MTH 001 1139

EFFLUENT ANALYSES

Parameter	Sampling Date	1377 Rte. 286 Discharge to Beden Brook	Compo Indust. Discharge to Millstone R.	Compo Indust. Discharge to Catch Basin	P'ton. Airport Discharge to adjacent stream
Chloroform	4/12/83	-	ND	9.0	-
1,1,1 trichloroethane	4/12/83	-	ND	2.0	-
Bromodichloroethane	4/12/83	-	ND	1.0	-
TDS	4/12/83	-	-	446	-
Base Neutrals	4/12/83	-	-	5.0	-
Phenol	4/12/83	-	-	8.2	-

Note:

all concentrations in ppb
- not analyzed
ND not detected
ND+ not detected except for compounds indicated below

Form WAQC.400
1/79

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

WAQC 010

RECEIVED
APR 20 1987
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WA

PUBLIC WATER SYSTEM NAME AND ADDRESS

ELIZABETHTOWN WATER COMPANY - MAIN SUPPLY
ONE ELIZABETHTOWN PLAZA
ELIZABETH, NEW JERSEY 07202

PWS ID (1-7): 2 0 0 4 0 0 2

TRANSACTION CODE (8-9): 0 3

1-9 ABOVE	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	REMARKS (21)	ANALYSIS DATE MO DAY YR (22-27)	28-46 BELOW	SAMPLE ANALYZED BY:
DUP	1 0 2 2	Copper	9 0 3	< 0 0 1 0	2	0 3 1 4 8 7	DUP	H.C.
DUP	1 0 2 8	Iron	9 0 4	< 0 0 1 0	2	0 3 1 2 8 7	DUP	H.C.
DUP	1 0 3 2	Manganese	9 2 4	< 0 0 0 5	2	0 3 1 1 8 7	DUP	H.C.
DUP	1 0 5 2	Sodium	9 5 4	0 1 3 7	1	0 3 1 7 8 7	DUP	H.C.
DUP	1 0 9 5	Zinc	9 0 6	< 0 0 1 0	2	0 3 1 7 8 7	DUP	H.C.
DUP							DUP	
DUP							DUP	
DUP							DUP	
DUP							DUP	
DUP							DUP	

LOCATION CODE (29-30)	LOCATION NAME	SAMPLE DATE MO. DAY YR (31-36)	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY:
		0 3 0 6 8 7	D	1 3 3 5	1 8 0 2 4	E'town Water Co.Lab	N.D.B.

PREPARED BY Glenn Johansen DATE 4/13/87

APPROVED BY [signature] DATE

MAY 06 1987

NO. 61

SAMPLE TYPE KEY

C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

MTH 001 1141

Form WAQC.400
1/79

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

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APR 20 1987
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
DIV. OF SAFE DRINKING WATER

PWS ID: 2 0 0 4 0 0 2 (1-7)

TRANSACTION CODE: 0 3 (8-9)

PUBLIC WATER SYSTEM NAME AND ADDRESS:
Elizabethtown Water Company - Main Supply
One Elizabethtown Plaza
Elizabeth, New Jersey 07202

1-9 BELOW	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	ANALYSIS REMARKS (21)	ANALYSIS DATE MO (22-23)	DAY (24-25)	YR (26-27)	28-46 BELOW	SAMPLE ANALYZED BY
DUP	1045	Selenium	920	<0001	3	04	08	87	DUP	G.G.
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	

LOCATION CODE (28-30)	LOCATION NAME	SAMPLE DATE MO (31-33)	DAY	YR	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY
		03	06	87	D	1335	12129	Accutest Laboratories	N.D.B

PREPARED BY: Glenn Johansen DATE: 4/13/87

APPROVED BY: [signature] DATE: / /

MAY 06 1987

NO. 61

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

JUL 8 '87 11:26 PAGE.08

MTH 001 1142

NAQC.400

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

WAQC 010

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APR 20 1987

PUBLIC WATER SYSTEM NAME AND ADDRESS

ELIZABETHTOWN WATER COMPANY - MAIN SUPPLY
ONE ELIZABETHTOWN PLAZA
ELIZABETH, NEW JERSEY 07202

PWS ID: 2 0 0 4 0 0 2 (1-7)

TRANSACTION CODE: 0 3 (8-9)

CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	REMARKS (21)	ANALYSIS DATE MO (22-23)	DAY (24-25)	YR. (26-27)	28-46 BELOW	SAMPLE ANALYZED BY:
1005	ARSENIC	910	<0005	3	03	19	87	DUP	H.C.
1010	BARIUM	915	0083	3	04	01	87	DUP	H.C.
1015	CADMIUM	916	<0001	3	03	30	87	DUP	H.C.
1020	CHROMIUM	917	<0010	3	03	28	87	DUP	H.C.
1025	FLUORIDE	935	<0001	1	03	06	87	DUP	R.A.
1030	LEAD	918	<0010	3	03	26	87	DUP	H.C.
1035	MERCURY	912	<0005	4	03	13	87	DUP	H.C.
1040	NITRATE	931	0136	2	03	06	87	DUP	R.A.
~~1045~~	~~SELENIUM~~	~~911~~	~~<0005~~	~~3~~	~~03~~	~~18~~	~~87~~	DUP	~~H.C.~~
1050	SILVER	921	<0002	3	03	25	87	DUP	H.C.

LOCATION CODE (28-30)	LOCATION NAME	SAMPLE DATE MO (31-32)	DAY (33-34)	YR. (35-36)	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY:
		03	06	87	D	1335	18024	E'town Water Co.Lab	N.D.B.

* not certified for Selenium analysis.
(see attached)

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

PREPARED BY Glenn Johansen DATE 4/13/87

APPROVED BY [illegible] DATE

MAY 06 1987

NO. 61

MTH 001 1143

87.10/08 10:00 P07 *

Form WAQC.460
1/79

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

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PUBLIC WATER SYSTEM NAME AND ADDRESS

Elizabethtown Water Company - Princeton Supply
One Elizabethtown Plaza
Elizabeth, New Jersey 07202

PWS ID: 2040002 (1-7)
TRANSACTION CODE: 03 (8-9)

1-9 ABOVE	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	MRDL (21)	ANALYSIS DATE MO DAY YR (22-27)	28-46 BELOW	SAMPLE ANALYZED BY
DUP	2005	ENDRIN	941	<0001	4	090586	DUP	V.P.
DUP	2010	LINDANE	941	<0001	4	090586	DUP	V.P.
DUP	2015	METHOXYCHLOR	941	<0001	4	090586	DUP	V.P.
DUP	2020	TOXAPHENE	941	<0001	4	090586	DUP	V.P.
DUP	2105	2,4-D	942	<0002	4	090586	DUP	V.P.
DUP	2110	2,4,5-TP SILVEX	942	<0001	4	090586	DUP	V.P.
DUP							DUP	
DUP							DUP	
DUP							DUP	
DUP							DUP	
DUP							DUP	

LOCATION CODE (28-30)	LOCATION NAME	SAMPLE DATE MO DAY YR (31-36)	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY
001	Princeton	081886	D	1335	12129	Accutest Laboratories	A.A.

PREPARED BY Glenn Johansen DATE 9/8/86

APPROVED BY [illegible] DATE / /

MAR 0 2 1987

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

JUL 8 '87 11:23 MTH 001 1144

Form WAQC.400
1/79

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

WAQC 010

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BUREAU OF SAFE DRINKING WATER

PUBLIC WATER SYSTEM NAME AND ADDRESS

Elizabethtown Water Company - Main Supply
One Elizabethtown Plaza
Elizabeth, New Jersey 07202

PWS ID: 2 0 0 4 0 0 2 (1-7)

MONITORING CODE: 0 3 (8-9)

1-9 ABOVE	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	ANALYSIS REMARKS (21)	ANALYSIS DATE MO (22-23)	ANALYSIS DATE DAY	ANALYSIS DATE YR	28-46 BELOW	SAMPLE ANALYZED BY:
	2005	ENDRIN	941	<0001	4	09	05	86	DUP	V.P.
DUP	2010	LINDANE	941	<0001	4	09	05	86	DUP	V.P.
DUP	2015	METHOXYCHLOR	941	<0001	4	09	05	86	DUP	V.P.
DUP	2020	TOXAPHENE	941	<0001	4	09	05	86	DUP	V.P.
DUP	2105	2,4-D	942	<0002	4	09	05	86	DUP	V.P.
DUP	2110	2,4,5-TP SILVEX	942	<0001	4	09	05	86	DUP	V.P.
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	

LOCATION CODE (38-39)	LOCATION NAME	SAMPLE DATE MO	SAMPLE DATE DAY	SAMPLE DATE YR	SAMPLE TYPE (37)	SAMPLE TIME (40-41)	LAB ID (42-46)	LAB NAME	SAMPLE COLLECTED BY:
02	Piscataway	08	18	86	D	1230	12129	Acutest Laboratories	A.A.

PREPARED BY: Glenn Johansen DATE: 9/8/86

APPROVED BY: [illegible] DATE: / /

MAR 2 1987

SAMPLE TYPE KEY
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION SAMPLE
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

MTH 001 1145

New Jersey Department of Environmental Protection
Division of Water Resources, Bureau of Potable Water
CN-029, Trenton, N.J. 08625
Hazardous Contaminant Analysis Input

RECEIVED JUL 7 1986 NJ STATE DEPT. OF ENVIRONMENTAL PROTECTION BUREAU OF SAFE DRINKING WATER

OCT 21 1986

PS186

PWS ID: 2 0 0 4 0 0 2

Sample Type: 0 3

PUBLIC WATER SYSTEM NAME AND ADDRESS:
Elizabethtown Water Company - Princeton Supply
One Elizabethtown Plaza
Elizabeth, New Jersey 07202

Enter "<" sign if appropriate.

Contaminant ID	Contaminant Name	Analysis Method	Analysis PPM (Minus)	Analysis PPM (Decimal)	Analysis Date (Mo Day Yr)	Sample Analyzed By
2984	Trichloroethylene	217	<0001	3	052686	H.K.
2987	Tetrachloroethylene	217	<0001	3	052686	H.K.
2982	Carbon tetrachloride	217	<0001	3	052686	H.K.
2981	1,1,1 - Trichloroethane	217	<0001	3	052686	H.K.
2980	1,2 - Dichloroethane	217	<0001	3	052686	H.K.
2976	Vinyl chloride	217	<0001	3	052686	H.K.
2964	Methylene chloride	217	<0001	3	052686	H.K.
2990	Benzene	217	<0001	3	052686	H.K.
2989	Chlorobenzene	217	<0001	3	052686	H.K.
2406	1,2 - Dichlorobenzene	217	<0001	3	052686	H.K.
2402	1,3 - Dichlorobenzene	217	<0001	3	052686	H.K.
2404	1,4 - Dichlorobenzene	217	<0001	3	052686	H.K.
2378	1,2,4 - Trichlorobenzene	217	<0001	3	052686	H.K.
2977	1,1 - Dichloroethylene	217	<0001	3	052686	H.K.
2382	Trans - 1,2 - Dichloroethylene	217	<0001	3	052686	H.K.
2384	O-Xylene	217	<0001	3	052686	H.K.

MTH 001 1146

Sample Date (Mo Day Yr)	Sample (Type, Time)	Lab ID	Lab Name
051586	D 0920	0744	Garden State Labs.

Sample location (Street address and municipality):
Princeton Borough Hall
Monument Drive, Princeton (9-5-86A2P0)

Sample collected by: Walter Sawyer

Date: 5/15/86

I certify that this sample was collected by personnel authorized by the Department in a manner approved by the Department from the location described above.

Form WAQC.460
1/78

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM
CHEMICAL OR RADIOLOGICAL ANALYSIS INPUT

RECEIVI
DEC 17 1986
N.J. STATE DEPT. ENVIRONMENTAL PROTE
BUREAU OF SAFE DRINKIN

PUBLIC WATER SYSTEM NAME AND ADDRESS

ELIZABETHTOWN WATER COMPANY - MAIN SUPPLY
ONE ELIZABETHTOWN PLAZA
ELIZABETH, NEW JERSEY 07202

PWS ID: 2 0 0 4 0 0 2 (1-7)

TRANSACTION CODE: 0 3 (8-9)

1-8	CONTAMINANT ID (10-13)	CONTAMINANT NAME	ANALYSIS METHOD (14-16)	ANALYSIS RESULTS (17-20)	ANALYSIS SIGNIFS (21)	ANALYSIS DATE MO (22-23)	DAY	YR	26-48 BELOW	AN
DUP	2950	TOTAL TRIHALOMETHANES	943	0018	3	11	18	86	DUP	R
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	
DUP									DUP	

LOCATION CODE (28-29)	LOCATION NAME	SAMPLE DATE MO (30-32)	DAY	YR	SAMPLE TYPE (37)	SAMPLE TIME (38-41)	LAB ID (42-46)	LAB NAME	CO
	South Bound Brook	11	14	86	D	0830	18024	E'town Water Co.Lab	R

PREPARED BY Glenn Johansen DATE 12/2/86

APPROVED BY _____ DATE / /

SAMPLE TYPE CO
C - CHECK SAMPLE
D - REGULAR DISTRIBUTION
P - PLANT TAP SAMPLE
R - RAW WATER SAMPLE
S - SPECIAL SAMPLE

ENTERED
JAN 12 1987
NO. 30

JUL 8 '87 11:19 PAGE.03

MTH 001 1147

87. 10/08 10:00 P02 *

MB

ELIZABETHTOWN WATER COMPANY

ORGANIC ANALYSIS

RECEIVED
JUN 4 1987
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER

Date JANUARY - JUNE 1987

GENERAL SOURCE · RARITAN - MILLSTONE PLANT

Sample No. 1 Raritan-Millstone composite delivered water - 8:00 a.m., 1/14/87

Sample No. 2 Raritan-Millstone composite delivered water - 8:00 a.m., 2/13/87

Sample No. 3 Raritan-Millstone composite delivered water - 8:00 a.m., 3/20/87

Sample No. 4 Raritan-Millstone composite delivered water - 8:00 a.m., 4/22/87

Sample No. 5 Raritan-Millstone composite delivered water - 8:00 a.m., 5/22/87

Sample No. 6

PARAMETER	M.C.L. E.P.A. / DEP.	1	2	3	4	5	6
CHLORINATED HYDROCARBONS							
Lindane	0.004 mg/l						
Endrin	0.0002 mg/l						
Methoxychlor	0.100 mg/l						
Toxaphene	0.005 mg/l						
CHLOROPHENOXYS							
2, 4 - D	0.100 mg/l						
2, 4, 5 - TP Silvex	0.010 mg/l						
TRIHALOMETHANES							
Chloroform	—	0.008	0.005	0.011	0.018	0.018	
Bromodichloromethane	—	0.002	0.002	0.003	0.006	0.006	
Chlorodibromomethane	—	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Bromoform	—	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Total THM's	0.100 mg/l	0.010	0.007	0.014	0.024	0.024	
1,1,1-Trichloroethane	—	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Trichloroethylene	—	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Tetrachloroethylene	—	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Sample ID Number	—	OV6987	OV 12787	OV-27387	OV38187	OV49387	
Chlorine Residual (mg/l)	—	< .05/0.80	0.05/0.75	< 0.05/0.70	< .05/0.60	< .05/0.75	
Temperature, °F	—	38°	34°	46°	65°	62°	

MTH 001 1148

Appendix C

MTH 001 1149

APPENDIX C
LOGS OF TEST BORINGS

MTH 001 1150

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-1D SHEET 1 OF 7

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 99.5 ft	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 10 JUNE 1986	DATE FINISHED: 28 JUNE 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 7	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150.0 Ft	DEPTH TO ROCK: 0.0 Ft.
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 7	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 Ft.	NO. SAMPLES: DIST 3	UNDIST — CORE 15
CASING —		WATER LEVEL: FIRST —	COMP. — 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN. I.D. SPLIT SPOON		INSPECTOR: GLENN WYGANT	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BLS/IN.	RECOV., %	ROCK CORE: RECOVERY/RQD (%)	BEDDING	FRACTURE: SKETCH	CONDITION	FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE, deeply weathered; SM-SC-- Dark Reddish Brown (10R3/4) Sandy SAND, some Clay & Silt, dry.	1	S-1	4 8 13 15	1.0/2.0 = 50							
	2										
	3										
	4										
MUDSTONE as below, moist.	5	S-2	32 100	1.0/1.0 = 100							
	6										
	7										
	8										
	9										
MUDSTONE as below, moist.	10	S-3	100	5/5 = 100							
MUDSTONE; friable hardness, friable to weak strength, moderately weathered, stratification indistinct, intense to moderate fracture spacing (80% of fractures have a coating of tan and dark green clay), dark reddish brown (10R 3/4).	11	RUN 1			1.6/10.0 = 16 RQD		20	CP			Started core run at 1410
	12							CP	CI		
								CG			
								CP			
	13							CS	I		
	14							CG			
								CP	CI		
								CP			
	15							CP	M		
MUDSTONE and GYPSUM; Gypsum contains dessication cracks which were filled in by overlying mud (now mudstone), light gray (N7) 16.5 17.0								CP			Water level constant in wash tub.
	16							CP	CI		
								CS			
	17							CS	I	5.5 min./ft = 66 min/10 ft	
CALCAREOUS CLAYSTONE, low hardness, weak strength, moderately weathered, occasional dessication cracks, intense fracture spacing, blackish red (5R2/2)								CS			
	18				6.9/10.0 = 69% REC		NCR	NCR	NCR	NCR	
	19										

MTH 001 1151

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-1D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO LOC.	SAMPLES: PENETR. RESIST. BLS/IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
20.5							NCR	NCR	NCR	NCR	Stopped core run at 1515 6/10/86
SANDSTONE; moderate hardness, moderate strength, moderately weathered, fine grained, intense to slight fracture spacing (40% of fractures have a coating of dark green clay), many vugs (1/16" to 1/4") which are partly to completely occluded with calcite cement, dark reddish brown.	21	RUN 2			3.6/4.0 = 91 RQD; 4.0/4.0 = 100% REC			CP	I, S, M, Cl, M	35 min/4ft = 8.8 min/ft	Started core run at 1050 6/18/86; Water level remained constant in wash tub.
	22										
	23										
	24										Stopped core run at 1125
	25										
25.5 MUDSTONE; friable to low hardness, friable to weak strength, moderately weathered, stratification indistinct, close to moderate fracture spacing, dark reddish brown (10R3/4).	26	RUN 3			3.7/10.0 = 37 RQD			CS	Cl, M	40 min/10ft = 4 min/ft	Started core run at 1140
	27										
	28										
29.8 CALCAREOUS (MICRITIC) CLAYSTONE; friable hardness, friable strength, moderately weathered, horizontally laminated, intense to close fracture spacing, dark grey (N3). 32.3	29								Cl		Water level remained constant in wash tub.
	30										
SANDSTONE; moderate hardness, moderate strength, moderately weathered, fine grained, close to moderate fracture spacing (60% of fractures have a coating of dark green clay, 10% with calcite cement), dark reddish brown (10R3/4).	31								I		
	32										
	33				10.0/10.0 = 100% REC				Cl		
	34								M, Cl		Stopped core run at 1220
	35	RUN 4			6.8/10.0 = 68 RQD; 10.0/10.0 = 100% REC			CS	Cl	45 min/10ft = 4.5 min/ft	Started core run at 1305
	36										
	37							CP	I		
SANDSTONE as above, except intense to slight fracture spacing and many vugs (1/16" to 1/4") which are partly to completely occluded with calcite cement. 43.0	38										
	39							CS	Cl		Water level remained constant in wash tub.
	40										
	41							CP	I		
	42								Cl		
	43							CS	S, Cl		
SILTSTONE, as below.	44								S		Stopped core run at 1350

MTH 001 1152

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-1D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/ RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, close to slight fracture spacing (30% of fractures have a coating of dark green clay, 10% have calcite), several large solution channels (up to 1" wide) which are partly to completely occluded with calcite cement, dark reddish brown (10R3/4). 53.5	46–55	RUN 5			7.5/10.0 = 75 RQD; 10.0/10.0 = 100% REC	dessication cr., mottled	40; 70; 15	CS; CG; CG; CS; CG; CP; CP	CI; S; CI; M; CI	35 min/10 ft = 3.5 min/ft	Started core run at 1400; Water level remained constant in wash tub; stopped core run at 1435
ARGILLACEOUS DOLOSTONE; moderate hardness, moderate strength, slightly weathered, fine grained (micrite), mottled, dessication cracks, close to moderate fracture spacing, light gray (N7) to dark gray (N3). 55.7											
MUDSTONE; low hardness, weak strength, slightly weathered, stratification indistinct, crushed to slight fracture spacing (60% are completely occluded with calcite cement), dark reddish brown (10R3/4). 64.3	55–65	RUN 6			5.7/10.0 = 57 RQD; 10.0/10.0 = 100% REC	dessication cr., mottled	80; 20	CS; CP	CI; S; CI; M; CI; Cr	40 min/10 ft = 4 min./ft.	Started core run at 1445; Water level remained constant in wash tub; stopped core run at 1525
CLAYSTONE, dark reddish brown (10R3/4), interstratified with LIMESTONE (grainstone -- medium-sized sand), light gray (2.5Y7/2); moderate hardness, moderate strength, slightly weathered, ripples and horizontal laminations, close to moderate fracture spacing. 67.9	65–69	RUN 7			5.9/10.0 = 50 RQD	horizontal laminations and ripples; dessication cr. & burrows	15; 20	CS; CG; CG	CI; M; S	30 min/10 ft = 3 min/ft	Started core run at 1540; Water level remained constant in wash tub.
CALCAREOUS MUDSTONE, as below.											

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LOG OF BORING MW-1D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD, TN/	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
CALCAREOUS MUDSTONE; moderate hardness, weak strength, slightly weathered, dessication tracks and burrows, close to slight fracture spacing, dark reddish brown (10R3/4). 72.7	71	RUN 7 (CONTINUED)			10.0/10.0 = 100% REC	dessication ct. & burrows	10	CG	S		
	72								CI		
									S		
ARGILLACEOUS LIMESTONE; moderate hardness, moderate strength, slightly weathered, fine grained (micritic), horizontally laminated, close to slight fracture spacing, stratigraphic dip is 18°, light gray (N7) to dark gray (N3). 75.9	73					horizontal laminations	20	CP	CI		
								CS			
	74							CS	M		Stopped core run at 1610
SILTSTONE; moderate hardness, weak strength, slightly weathered, stratification indistinct, close to slight fracture spacing (20% of fractures have a coating of calcite and are completely occluded), many vugs (1/16" to 1/4") which are partly to completely occluded with calcite cement, dark reddish brown (10R3/4).	75	RUN 8			7.2/10.0 = 72 RQD		15	CG			Started core run at 1620
								CP	CI		
	76						15	CG	M		
	77								S		
	78							CP			
							10	CP	CI		Water loss (≈30 gal.) began at 77 feet.
	79							CG			
									S		
	80							CG			
								CP			
	81				9.4/10.0 = 94% REC		60		CI	3.5 min/10 ft	
	82							CG	M		
	83										
	84								S		Stopped core run at 1655
	85						NCR	NCR	NCR	NCR	
SILTSTONE, as above.	86	RUN 9			7.5/10.0 = 75 RQD		15	CG			Started core run at 1705
							10	CG	M		
	87						10	CP	CI		
	88							CG			
	89							CS	S	2.5 min/ft	Water loss during coring (≈100 gal.).
	90							CS			
	91										
	92				10.0/10.0 = 100% REC		20	CG			
	93							CG	CI		
								CP			
	94							CG	I	2.5 min/10 ft	Stopped core run at 1730

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LOG OF BORING MW-1D SHEET 5 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRATURE SPACING	DRILLING RATE	REMARKS
SILTSTONE, as above. 96.5	96	RUN 10			5.7/10.0 = 57 RQD		80	CG	CI		Started core run at 1740
	97						10 20				
	98						4		M		
MUDSTONE; low hardness, weak strength, slightly weathered, close to moderate fracture spacing (60% are completely occluded with calcite cement, some vugs (1/16" to 1/8") which are partly to completely occluded with calcite cement, dark reddish brown (10R3/4).	99						10		CI	2.5 min/10 ft = 2.5 min/ft	Water loss during coring (≈100 gal.)
	100						85 5 70	CS			
	101				10.0/10.0 = 100% REC		5		M		
	102						6 10 20		CI		
	103								M		
	104								CI		Stopped core run at 1805 6/18/86
	105	RUN 11			5.7/10.0 = 52 RQD	desic. mtld	5	CS	CI		6/19/86 Started core run at 0805
CALCAREOUS, DOLOMITIC CLAYSHALE; moderate hardness, moderate strength, slightly weathered, fine grained (micritic), rippled, horizontally laminated, intense to close fracture spacing, light gray (N7) to dark gray (N3). 106.2	106					horiz. lamin.					
	107							CG	I		* brecciated at 107.8
	108						4				
	109						5	CS	CI	40 min/10 ft = 4 min/ft.	water loss during coring (≈100 gal.)
DOLOMITIC SANDSTONE; moderate hardness, moderate strength, slightly weathered, close to slight fracture spacing, very dusky red (10R2.5/2). 109.7	110					ripples; horizontal laminations	16				
	111								S		
DOLOMITIC CLAYSTONE; moderate hardness, moderate strength, slightly weathered, horizontally laminated, mottled, dessication cracks, intense to slight fracture spacing, stratigraphic dip is 18°, dark gray (N3). 111.3	112				9.3/10.0 = 93% REC	dessication cracks,		CG	CI		
	113						10		M		
	114						10		CI		Stopped core run at 0845
	115						NCR	NCR	NCR	NCR	
	116	RUN 12			9.1/10.0 = 91 RQD	horiz. lamin.		CG	I		Started core run at 0900
	117					desic. cr. mottled	10				
SILTSTONE; low hardness, moderate strength, slightly weathered, close to moderate fracture spacing (70% are completely occluded with calcite cement), many vugs (1/16" to 1/4") which are completely occluded with calcite cement, dark reddish brown (10R3/4). 117.4	118						85		M	25 min/10 ft = 2.5 min/ft	Water loss during coring (≈170 gal)
	119						5		CI		

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WOODWARD-CLYDE CONSULTANTS

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LOG OF BORING MW-1D SHEET 6 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121	RUN 12 (CONTINUED)			10.0/10.0 = 100% REC			CG	CI, M, CI		
	122										
	123										
	124										Stopped core run at 0925
	125										Started core run at 0935
	126						10, 15				
	127						15		CI		
	128				63/10.0 = 63 RQD		10	CG			
	129						10		M		
SILTSTONE as above, except fracture at 131.2 feet having a wide aperture created by the dissolution of calcite cement	130	RUN 13			10.0/10.0 = 100% REC		70			30 min./10 ft = 3 min/ft	Water loss during coring (≈200 gal.)
	131						40	CP	CI		
	132						5				
	133						5		M		
	134						25, 25	CG	CI		Stopped core run at 1005
	135						5				Started core run at 1020
	136										
	137				7.2/10.0 = 72 RQD		20	CG			
	138						10				
SILTSTONE as above (run 12), except 80° fracture at 139.3 feet having a wide aperture created by the dissolution of calcite cement.	139						80	CS	CI		Water loss during coring (≈120 gal.)
	140	RUN 14			10.0/10.0 = 100% REC		45			35 min/10 ft = 3.5 min/ft	
	141										
	142						5				
	143						5, 20	CG	M		
	144						5		CI, M, CI		Stopped core ri at 1055

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LOG OF BORING MW-1D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE, as above (run 12).	146	RUN 15			RQD 4.6/5.0 = 92		25	CG	C1	20 min/5 ft = 4 min/ft	Started core run at 1110
	147						5		M		
	148				5.0/5.0 = 100% REC		25				Water loss during coring (≈40 gal.)
	149						20		C1		
	150						20		M		Stopped core run at 1130
							5		C1		
	151										BOTTOM OF HOLE
	152										NOTES: 1) HNU readings of all soil and rock samples was 0.0
	153										
	154										2) water losses during coring began at 77 feet, and thereafter were gradual.
	155										
	156										3) Drilling Equipment: 1500 Failing used to 21 ft, wire-line mobile used for subsequent rock coring, hole lastly drilled by Schramm Rotadrill T650.
	157										
	158										
	159										
	160										
	161										4) Failing rig used a 4 3/4 IN tricone during sampling and a 10 IN tricone for casing installation, Schramm rig used a 6 IN air hammer.
	162										
	163										
	164										
	165										
	166										
	167										
	168										
	169										

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-2D

SHEET 1 OF 7

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 61.4 ft.	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 9 Oct 1986	DATE FINISHED: 9 Oct 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 7	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150.0 ft.	DEPTH TO ROCK: 0.0 feet
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 7	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 ft.	NO. SAMPLES: DIST 2	UNDIST —— CORE ——
CASING: ——		WATER LEVEL: FIRST ——	COMPL. —— 24 HR ——
CASING HAMMER	WEIGHT (LB): ——	DROP (IN): ——	BORING ANGLE AND DIRECTION: VERTICAL
SAMPLER: 2 in. I.D. SPLIT SPOON			
SAMPLER HAMMER	WEIGHT (LB): 140	DROP (IN): 30	INSPECTOR: CARL VARTERESIAN

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC	PENETR. RESIST. BL/6 IN.	RECOV., %	ROCK CORE: RECOVERY/RQD (%)	BEDDING	FRACTURE: SKETCH	FRACTURE: COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
(BRUNSWICK FORMATION) MUDSTONE; deeply weathered, SM-SC Dark Reddish Brown (10 R 3/4) cmf SAND, Some (+) Clayey Silt, with occasional laminae of moderately weathered red brown, fine-grained SANDSTONE.	1	S-1	10 21 38 24/5	19/19 = 100%							
	2										
	3										
	4										
MUDSTONE; deeply/moderately weathered, SM-SC Dark reddish brown (10 Y 3/4) cmf SAND, Some (+) Silt+Clay, moderately fractured (fractured up to 0.2 inch thick and completely occluded by tan clay), moist.	5										
	6	S-2	30 51 14/5	15/15 = 100%							
	7										
	8										
	9										
	10										
	11										
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										

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WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-2D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
											10/9/86
	21										10/10/86 Drilling started at 0920
	22										
	23										
	24										
MUDSTONE; dark reddish brown (10R 3/4), fractures have coating of dark green and tan clay and calcite cement.	25									56 min/14 feet = 4 min/ft.	Sample collected at 25 feet
	26										
	27										
	28										No water losses during drilling
	29										
	30										
	31										
	32										
	33										
	34										Drilling stopped at 1016
MUDSTONE; as above, except laminated	35									85 min/15 feet = 5.6 min/ft	Drilling started at 1020 Sample collected at 35 feet
	36										
	37										
	38										No water losses during drilling
	39										
	40										
	41										Contact based on color change of drilling fluid
	42										
43.0 ARGILLACEOUS DOLOSTONE; very dusky red (10R 2/2), fine grained (micritic).	43										Sample collected at 43 feet
	44										

WOODWARD-CLYDE CONSULTANTS

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LOG OF BORING MW-2D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
46.0	46										Contact based on color change of drilling fluid
	47										
	48										
	49										Drilling stopped at 1145
MUDSTONE; dark reddish brown (10R 3/4), laminated.	50									130 min/15 feet = 8.7 min/ft	Drilling started at 1150 Sample collected at 50 feet
	51										
	52										
	53										
	54										No water losses during drilling
	55										
	56										
	57										
	58										
	59										
MUDSTONE; as above	60										Sample collected at 60 feet
	61										
	62										
	63										Drilling stopped at 1400 10/10/86
	64										
MUDSTONE; as above, except calcite occurs as fracture-filling cement	65										10/13/86 Drilling started at 1035 Sample collected at 65 feet
	66										
	67										
	68										
	69										
70.0											

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WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-2D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLOWS	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE: dark reddish brown (10R 3/4), laminated, calcite occurs as fracture-filling cement.	71									105 min/15 feet = 7 min/ft	
	72										
	73										
	74										
	75										Sample collected at 75 feet
	76										
	77										
	78										
	79										Drilling stopped at 1220
	80									105 min/15 feet = 7 min/ft	Drilling started at 1220
	81										
	82										
	83										
	84										
SILTSTONE; as above	85										Sample collected at 85 feet
	86										
	87										
	88										Water losses during drilling ≈ 50 gal.
	89										
	90										
	91										
	92										
	93										
	94										Drilling stopped at 1410

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LOG OF BORING MW-2D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; as above	96									200 min/15 feet = 13.3 min/ft.	Drilling started at 1715
	97										Sample collected at 95 feet
	98										
	99										
	100										Water losses during drilling ≈ 50 gal.
	101										
	102										
	103										
	104										
SILTSTONE; as above	105										Sample collected at 105 feet
	106										
	107										
	108										Drilling stopped at 1735 10/13/86
	109										
	110									115 min/15 feet = 7.7 min/ft.	10/14/86 Drilling started at 0730
	111										
	112										
	113										
	114										Sample collected
SILTSTONE; as above	115										
	116										
	117										Water losses during drilling ≈ 25 gal
	118										
	119										

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LOG OF BORING MW-2D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121										
	122										
	123										
	124										Drilling started at 0925
SILTSTONE; as above	125										Drilling started at 0930
	126										
	127										Sample collected at 125 feet.
	128										
	129										
	130									120 min/15 feet = 8 min/ft	Water losses during drilling ≈ 25 gal.
	131										
	132										
	133										
	134										
SILTSTONE; as above	135										Sample collected at 135 feet
	136										
	137										
	138										
	139										Drilling started at 1130
	140										Drilling stared at 1135
	141										
	142										
	143									60 min/10 ft = 6 min/ft	Water losses during drilling ≈ 25 gal.
	144										

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LOG OF BORING MW-2D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; as above											Sample [illegible] at [illegible]
	146										
	147										
	148										
	149										Drilling stopped at 1235
	150										BOTTOM OF HOLE
	151										NOTES:
	152										1) HNU readings of all soil and rock samples was 0.0 ppm.
	153										
	154										2) Water losses during drilling were gradual
	155										
	156										3) Drilling Equipment: Failing 1500 used for entire hole
	157										
	158										
	159										4) Failing rig used a 4 3/4 in tricone during soil sampling a 10 in tricone for casing installation, and a 6 in. tricone thereafter.
	160										
	161										
	162										
	163										
	164										
	165										5) Cuttings from mud rotary drilling were mostly fine-gravel in size
	166										
	167										
	168										
	169										

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LOG OF BORING MW-3D

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 141.8	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 16 JUNE 1986	DATE FINISHED:
DRILLING EQUIPMENT: SEE NOTE, SHEET 7	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150 Ft.	DEPTH TO ROCK: 3.0 Ft.
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 7	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 Ft.	NO. SAMPLES: DIST 11 / UNDIST —	CORE —
CASING —		WATER LEVEL: DIST —	COMPL — / 24 HR —
CASING HAMMER	WEIGHT (LB) — / DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN I.D. SPLIT SPOON		INSPECTOR: GLENN WYGANT	
SAMPLER HAMMER	WEIGHT (LB): 140 / DROP (IN): 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BLS/6IN.	RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SP-SM -- Dark Reddish Brown (10R3/4) cmf SAND, some mf Gravel, little (+) Clayey Silt, dry.	1	S-1	6 6 10 12	0.9/2.0 = 45							
(OVERBURDEN) (BRUNSWICK FORMATION) — 3.0	2										
	3										
	4										
	5										
MUDSTONE, deeply weathered; SM-SC Dark Reddish Brown (10R3/4) cmf SAND, some (+) Clay & Silt, moist.	6	S-2	4 9 10 10	1.1/2.0 = 55							
	7										
	8										
	9										
	10										
SAME.	11	S-3	4 5 8 10	1.3/2.0 = 65							
	12										
	13										
	14										
	15										
SAME.	16	S-4	5 8 8 8	1.5/2.0 = 75							
	17										
— 18.5	18										
	19										

MTH 001 1165

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LOG OF BORING MW-3D

SHEET 2 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	ROCK CORE: DRILLING RATE	REMARKS
SANDSTONE, deeply weathered; SC-SM-- Moderate Olive Brown (5Y4/4) mf SAND, some (-) Clay & Silt, moist.	21	S-5	7 11 14 15	1.5/2.0 = 75							
	22										
	23										
	24										
	25										
SAME.	26	S-6	7 9 13 16	1.5/2.0 = 75							
	27										
	28										
	29										
SANDSTONE, deeply weathered; SM-- Moderate Yellowish Brown (10YR5/4) mf SAND, little (+) Clayey Silt, moist.	30										
	31	S-7	17 19 30 51	1.2/2.0 = 60							
	32										
	33										
	34										
	35										
SAME.	36	S-8	11 16 24 24	1.3/2.0 = 65							
	37										
	38										
	39										
	40										
SAME.	41	S-9	27 57 82 85	1.2/2.0 = 60							
	42										
	43										
	44										

MTH 001 1166

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LOG OF BORING MW-3D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	ROCK CORE: DRILLING RATE	REMARKS
SANDSTONE; deeply weathered, Pale Yellowish Orange (10YR 8/6), dry.	46	S-10	18 100/5	.8/.9 = .89							
	47										
	48										
	49										
SANDSTONE; deeply/moderately weathered, Dark Yellowish Brown (10YR 4/2), dry.	50	S-11	55 65 100/4	0.8/1.3 = .62							
	51										
	52										
53.5	53										
ANHYDRITE; friable hardness, friable strength, deeply weathered, light brown (5YR 6/4). 55.4	54										
MUDSTONE; friable hardness, friable strength, deeply/moderately weathered, Close fracture spacing (fractures coated with chlorite), dark reddish brown (10R 3/4).	55	RUN 1			0.8/10.0 = 8 RQD			CS	CI		
	56										
	57										
	58										
	59										
	60										
	61				5.0/10.0 = 50% REC						
	62										
	63						NCR	NCR	NCR	NCR	
	64										
MUDSTONE, as above. 65.5	65								CI		6/20/86 Started core run at 0805
MUDSTONE as above, except moderately weathered and close to moderate fracture spacing.	66				1.0/5.0 = 20 RQD				M	3.5/5.0 = 7 min/ft	
	67						25		CI		Water level remained constant in wash tub.
	68	RUN 2			2.6/5.0 = 52% REC		NCR	NCR	NCR	NCR	
	69										Stopped core run at 0840 6/20/86

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LOG OF BORING MW-3D SHEET 4 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE as above, except close fracture spacing. 72.2	71	RUN 3			RQD 2.2/7.0 = 31			CS	C1	7.9 min/ft	6/23/86 Started core run at 0840
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, moderate to slight fracture spacing (80% of fractures are partly occluded with calcite cement), many vugs and solution channels (1/4" to 2") which are partly to completely occluded with calcite cement, dark reddish brown (10R3/4).	72						25				
	73								S		Water level remained constant in wash tub
	74						20	CG		55 min/7ft	
	75								M		
	76				5.0/7.0 = 71% REC		NCR	NCR	NCR	NCR	Stopped core run at 0935
	77	RUN 4			RQD 6.2/8.0 = 78				C1		Started core run at 0945
SILTSTONE as above, except close to slight fracture spacing.	78						10				
	79						16		S		
	80						35				
	81						5	CG		40 min/8ft = 5 min/ft	Water level remained constant in wash tub.
	82						15 40				
	83						1 40		M		
	84				8.0/8.0 = 100% REC		1	CP CP CP			Stopped core run at 1025
	85	RUN 5			RQD 1.5/10.0 = 15			CS	H		Started core run at 1030
SILTSTONE as above, except intense to close fracture spacing.	86										
	87										
	88							CG	C1	35 min/10ft = 3.5 min/ft	
	89						40 10				Water level remained constant in wash tub.
	90										
	91						1				
	92				6.1/10.0 = 61% REC		NCR	NCR	NCR	NCR	
	93										
	94										Stopped core run at 1105

MTH 001 1168

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LOG OF BORING MW-3D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: PENETR. RESIST. BL/6IN	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/RUN (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
[illegible] above, except [illegible] moderate fracture spacing.	96	RUN 6			9.6/10.0 = 96% REC; 7.1/10.0 = 71 RQD			CG	M	65 min/10 ft = 6.5 min/ft	Started core run at 1205
	97										
	98										
	99										Water level remained constant in wash tub.
	100										
	101							CP	CI		
	102										
	103							CG	M		
	104										Stopped core run at 1310
	105						NCR	NCR	NCR	NCR	
[illegible] as above except [illegible] fracture spacing.	106	RUN 7			8.9/10.0 = 89% REC; 4.8/10.0 = 48 RQD			CS; CP		50 min/10 ft = 5 min/ft	Started core run at 1345
	107								CI		
	108										
	109								M		Water level remained constant in wash tub.
	110							CG	CI		
	111								M		
	112										
	113								CI		
	114						NCR	CP; NCR	CI; NCR	NCR	Stopped core run at 1435
	115										
[illegible] above except [illegible] fracture spacing.	116	RUN 8			6.6/10.0 = 66 RQD		35		M	35 min/10 ft = 3.5 min/ft	Started core run at 1445
	117						46; 5				
	118						5; 30	CG	CI		Water level remained constant in wash tub.
	119						2				

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LOG OF BORING MW-5D SHEET 6 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR RESIST BLG/IN	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121	RUN 8 (continued)			10.0/10.0 = 100% REC		25, 15, 10, 60, 15	CG	CI		
	122										
	123										
	124										Stopped core run at 1520
	125										
125.8	126	RUN 9			6.8/10.0 = 68 RQD		70	CP	M		Started core run at 1535
[illegible] low roughness, moderate [illegible], slight, [illegible], stratification [illegible] moderate fracture [illegible] (calcite fractures are partially [illegible] filled by [illegible] inner (coarse) [illegible] and [illegible] (coarse), many [illegible] and [illegible] cracks (1/2" to 3") were [illegible] to complete [illegible] calcite [illegible] [illegible] reddish brown (5YR 3/4).	127							CP	CI		
	128							CG			
	129							CP			Water level remained constant in wash tub.
	130						20		M	30 min/10 ft = 3.0 min/ft.	
	131				10.0/10.0 = 100% REC		40	CG	CI		
	132						5				
	133										
	134						50				Stopped core run at 1605
	135	RUN 10			6.3/10.0 = 63 RQD			CG	CI		Started core run at 1615
	136						10	CP	M		
	137										
	138						5	CG	CI		
	139										
[illegible] as above.	140							CP			Water level remained constant in wash tub.
	141				10.0/10.0 = 100% REC		5		M	30 min/10 ft = 3.0 min/ft.	
	142						70	CG			
	143						20				
	144						5, 10		CI		Stopped core run at 1645

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LOG OF BORING MW-3D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR RESIST BLS/6 IN	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
[illegible] no closing except close [illegible] spacing	146	RUN 11			62 RQD 5.1 = 5.0		70	CG → CP	C1	2.0 min/5 ft = 4 min/ft	Started core run at 1655
	147						5	CG			water level remained constant in wash tub.
	148						3				
	149				100% REC 4.0 = 5.0		NCR	NCR	NCR	NCR	Stopped core run at 1715
	150										CONTINUED ON HOLE 1 [illegible]: 1) HNU readings of all soil and rock samples was 0.0 2) No significant water loss occurred while coring. 3) [illegible] Equipment: SCC [illegible] used to 65 ft, [illegible] Mobile used for subsequent rock coring, hole last drilled by Schramm Rotadrill T650. 4) Failing rig used a 4 3/4 IN tricone during sampling and a 10 IN tricone for casing installation. Schramm rig used a 6 IN air hammer.
	151										
	152										
	153										
	154										
	155										
	156										
	157										
	158										
	159										
	160										
	161										
	162										
	163										
	164										
	165										
	166										
	167										
	168										
	169										

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LOG OF BORING MW-3D

SHEET 1 OF 7

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 141.8	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 16 JUNE 1986	DATE FINISHED:
DRILLING EQUIPMENT: SEE NOTE, SHEET 7	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150 Ft.	DEPTH TO ROCK: 3.0 Ft.
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 7	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 Ft.	NO. SAMPLES: DIST 11	UNDIST —, CORE —
CASING —		WATER LEVEL: FIRST —	COMPL. —, 24 HR —
CASING HAMMER — WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN I.D. SPLIT SPOON		INSPECTOR: GLENN WYGANT	
SAMPLER HAMMER — WEIGHT (LB): 140	DROP (IN): 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BLS/6 IN.	RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SP-SM -- Dark Reddish Brown (10R3/4) cmf SAND, some mf Gravel, little (+) Clayey Silt, dry.	1	S-1	6 6 10 12	0.9/2.0 = 45							
(OVERBURDEN) 3.0 (BRUNSWICK FORMATION)	2, 3, 4										
MUDSTONE, deeply weathered; SM-SC Dark Reddish Brown (10R3/4) cmf SAND, some (+) Clay & Silt, moist.	5, 6, 7	S-2	4 9 10 10	1.1/2.0 = 55							
SAME.	8, 9, 10, 11	S-3	4 5 8 10	1.3/2.0 = 65							
SAME.	12, 13, 14, 15, 16	S-4	5 6 8 8	1.5/2.0 = 75							
18.5	17, 18, 19										

MTH 001 1172

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LOG OF BORING MW-3D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ RQD, (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SANDSTONE, deeply weathered; SC-SM-- Moderate Olive Brown (5Y4/4) mf SAND, some (-) Clay & Silt, moist.	21	S-5	7 11 14 15	1.5/2.0 = 75							
	22										
	23										
	24										
	25										
SAME.	26	S-6	7 9 13 16	1.5/2.0 = 75							
	27										
	28										
	29										
SANDSTONE, deeply weathered; SM-- Moderate Yellowish Brown (10YR5/4) mf SAND, little (+) Clayey Silt, moist.	30										
	31	S-7	17 19 30 51	1.2/2.0 = 60							
	32										
	33										
	34										
	35										
SAME.	36	S-8	11 16 84 24	1.3/2.0 = 65							
	37										
	38										
	39										
	40										
SAME.	41	S-9	27 57 82 85	1.2/2.0 = 60							
	42										
	43										
	44										

MTH 001 1173

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LOG OF BORING MW-3D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	ROCK CORE: DRILLING RATE	REMARKS
SANDSTONE; deeply weathered, Pale Yellowish Orange (10YR 8/6), dry.	46	S-10	18 100/5	.8/.9 = 89							
	47										
	48										
	49										
SANDSTONE; deeply/moderately weathered, Dark Yellowish Brown (10YR 4/2), dry.	50										
	51	S-11	55 65 100/4	0.8/1.3 = 62							
	52										
	53										
53.5											
	54										
ANHYDRITE; friable hardness, friable strength, deeply weathered, light brown (5YR 6/4). 55.4	55										
MUDSTONE; friable hardness, friable strength, deeply/moderately weathered, Close fracture spacing (fractures coated with chlorite), dark reddish brown (10R 3/4).	56	RUN 1			0.8/10.0 = 8 RQD						
	57							CS	CI		
	58										
	59										
	60										
	61				5.0/10.0 = 50% REC		NCR	NCR	NCR	NCR	
	62										
	63										
	64										
MUDSTONE, as above. 65.5	65										
MUDSTONE as above, except moderately weathered and close to moderate fracture spacing.	66	RUN 2			1.0/5.0 = 20 RQD				CI		6/20/86 Started core run at 0805
	67						25		M	3.5/5.0 = 7 min/ft	Water level remained constant in wash tub.
	68								CI		
	69				2.6/5.0 = 52% REC		NCR	NCR	NCR	NCR	Stopped core run at 0840 6/20/86

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LOG OF BORING MW-3D SHEET 4 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/RQD/RN	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE as above, except close fracture spacing. 72.2	71	RUN 3			2.2/7.0 = 31 RQD			CS	CI	7.9 min/ft	6/23/86 Started core run at 0840
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, moderate to slight fracture spacing (80% of fractures are partly occluded with calcite cement), many vugs and solution channels (1/4" to 2") which are partly to completely occluded with calcite cement, dark reddish brown (10R 3/4).	72						25				
	73								S		Water level remained constant in wash tub
	74						20	CG		55 min/7ft	
	75								M		
	76				5.0/7.0 = 71% REC		NCR	NCR	NCR	NCR	Stopped core run at 0935
	77								CI		Started core run at 0945
SILTSTONE as above, except close to slight fracture spacing.	78	RUN 4			6.2/8.0 = 78 RQD		10				
	79						10		S		
	80						35				Water level remained constant in wash tub.
	81						5	CG		40 min/8ft = 5 min/ft	
	82						15				
	83				8.0/8.0 = 100% REC		40		M		
	84						10	CP CP CP			Stopped core run at 1025
SILTSTONE as above, except intense to close fracture spacing.	85	RUN 5			1.5/10.0 = 15 RQD			CS	H	3.5 min/ft	Started core run at 1030
	86										
	87								CI		
	88							CG		35 min/10ft = 3.5 min/ft	Water level remained constant in wash tub.
	89						60				
	90						10				
	91										
	92				6.1/10.0 = 61% REC		NCR	NCR	NCR	NCR	
	93										
	94										Stopped core run at 1105

MTH 001 1175

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LOG OF BORING MW-3D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE: FRATURE SPACING	DRILLING RATE	REMARKS
SILTSTONE as above, except close to moderate fracture spacing.	96–105	RUN 6			9.6/10.0 = 96% REC; 7.1/10.0 = 71 RQD			CG; CP; CG	M; CI; M	65 min/10 ft = 6.5 min/ft	Started core run at 1205; Water level remained constant in wash tub.; Stopped core run at 1310
							NCR	NCR	NCR	NCR	
SILTSTONE as above, except intense to close fracture spacing.	105–114	RUN 7			8.9/10.0 = 89% REC; 4.8/10.0 = 48 RQD			CS; CP; CG; CP	CI; M; CI; M; CI; H	50 min/10 ft = 5 min/ft	Started core run at 1345; Water level remained constant in wash tub.; Stopped core run at 1435
							NCR	NCR	NCR	NCR	
SILTSTONE as above, except close to moderate fracture spacing.	114–119	RUN 8			6.6/10.0 = 66 RQD		35; 46; 9; 14; 20; 10	CG	M; CI	35 min/10 ft = 3.5 min/ft	Started core run at 1445; Water level remained constant in wash tub.

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LOG OF BORING MW-3D SHEET 6 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLOWS	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121	RUN 8 (CONTINUED)			10.0/10.0 = 100% REC		25, 10, 10	CG	CI		
	122										
	123						60				
	124						15				Stopped core run at 1520
	125										
SILTSTONE, as above. 126.8											Started core run at 1535
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, close to moderate fracture spacing (80% of fractures are partly to completely occluded by two generations of cement: inner (earlier) coating of chlorite and an outer (later) layer of calcite), many vugs and solution channels (1/4" to 3") which are partly to completely occluded with calcite cement, dark reddish brown (10R 3/4).	126	RUN 9			6.8/10.0 = 68 RQD		70	CP	M		
	127										
	128							CG	CI		
	129							CP			Water level remained constant in wash tub.
	130						20		M		
	131				10.0/10.0 = 100% REC		60				
	132						5	CG		30 min/10 ft = 3.0 min/ft.	
	133								CI		
	134						50				Stopped core run at 1605
	135							CG	CI		Started core run at 1615
	136	RUN 10			6.3/10.0 = 63 RQD		70	CP	M		
	137										
	138						5	CG	CI		
SILTSTONE as above.	139							CP			Water level remained constant in wash tub.
	140										
	141						5		M		
	142						70	CG		30 min/10 ft. = 3.0 min/ft.	
	143										
	144				10.0/10.0 = 100% REC		20, 5, 10		CI		Stopped core run at 1645

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LOG OF BORING MW-3D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE as above, except close fracture spacing.	146	RUN 11			3.1/5.0 = 62 RQD			CG, CP	CI	20 min/5 ft = 4 min/ft	Started core run at 1655
	147							CG			water level remained constant in wash tub.
	148										
	149				4.0/5.0 = 80% REC		NCR	NCR	NCR	NCR	Stopped core run at 1715
	150										BOTTOM OF HOLE
	151										NOTES:
	152										1) HNU readings of all soil and rock samples was 0.0
	153										2) No significant water loss occurred while coring.
	154										3) Drilling Equipment: 1500 Failing used to 65 ft, wire-line Mobile used for subsequent rock coring, hole lastly drilled by Schramm Rotadrill T650.
	155										
	156										
	157										
	158										
	159										
	160										4) Failing rig used a 4 3/4 IN tricone during sampling and a 10 IN tricone for casing installation. Schramm rig used a 6 IN air hammer.
	161										
	162										
	163										
	164										
	165										
	166										
	167										
	168										
	169										

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LOG OF BORING MW-4D

SHEET 1 OF 7

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 122.8 ft.	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 16 Sept 1986	DATE FINISHED: 30 Sept 1986
DRILLING EQUIPMENT: See note, sheet 11	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150.0 ft.	DEPTH TO ROCK: 3.5 ft.
SIZE AND TYPE OF BIT: See note, sheet 11	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10'	NO SAMPLES: DIST 3	UNDIST — CORE —
CASING: —		WATER LEVEL: FIRST —	COMPL — 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: vertical	
SAMPLER: 2 in. I.D. SPLIT SPOON		INSPECTOR: Carl Varteresian	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BL/6 IN.	RECOV., %	ROCK CORE: RECOVERY/RQD (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SM-SC, Moderate Reddish Brown (10R 4/6) cmf SAND, some (-) Clayey Silt, occasional pockets of limonite, dry.	1	S-1	7 8 12 13	1.7/2.0 = 79							
(OVERBURDEN) 3.5 (BRUNSWICK FORMATION)	2										
	3										
	4										
MUDSTONE; Deeply weathered; SM-SC Dark Reddish Brown (10R 3/4) cmf SAND, some (+) Silt & Clay, moist	5										
	6	S-2	7 11 20 27	1.4/2.0 = 71							
	7										
	8										
	9										
MUDSTONE; friable hardness, friable to weak strength, deeply/moderately weathered, moderately fractured, (30% of sample have small vugs filled with light tan clay), dark reddish brown (10R 3/4).	10										
	11	S-3	12 34 55 67	1.7/2.0 = 79							
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										9/16/86

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LOG OF BORING MW-4D

SHEET 2 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	21									1.5 min/5 feet	1505
	22										
	23										
	24										1520
MUDSTONE; dark reddish brown (10R 3/4).	25										
	26										1535
	27										Sample collected at 25 feet
	28										
	29										
	30									40 min/20 feet 2.0 min/ft	Water expelled at a rate of 10 gal/min
	31										
	32										
	33										
	34										
MUDSTONE; as above except calcite occurs as fracture-filling cement.	35										Sample collected at 35 feet
	36										
	37										
	38										
	39										
	40										
	41										
	42										
	43										
	44										Stopped drilling at 1615

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LOG OF BORING MW-4D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE; as above											Started drilling at 0830
	46										Sample collected at 45 feet
	47										
	48										
	49										Water expelled at a rate of 10 gal/min
	50										
	51										
	52										
	53										
	54										
MUDSTONE; as above	55										Sample collected at 55 feet
	56										
	57										
	58										
	59										
	60										
	61										
	62										
	63										
	64										Stopped drilling at 1710 9/29/86
MUDSTONE; as above except fractures have a coating of tan and dark green clay, and calcite on top of (later than) the clay.	65										9/30/86 Started drilling at 0810
	66										Sample collected at 0 feet
	67										
	68										
	69										
70.0											

40 min/20 feet

MTH 001 1181

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LOG OF BORING MW-4D

SHEET 4 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	71									35 min/20 feet = 1.8 min/ft	Water expelled at a rate of 10 gal/min
	72										
	73										
	74										Sample collected at 75 feet
SILTSTONE: dark reddish brown (10R 3/4), fractures coated with clay and calcite cement.	75										
	76										
77.5	77										
	78										
	79										
SANDSTONE; dark reddish brown (10R 3/4), fine grained, fractures coated with clay and calcite cement.	80										Sample collected at 80 feet
	81										
82.5	82										
	83										
	84										Stopped drilling at 84.5
SILTSTONE; dark reddish brown (10R 3/4), laminated, fractures filled with dark green and tan clay and calcite cement.	85									30 min/20 feet = 1.5 min/ft	[illegible]
	86										
	87										
	88										
	89										Water expelled at a rate of 15 gal/min
	90										
	91										
	92										
	93										
	94										

MTH 001 1182

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LOG OF BORING MW-4D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: PENETR. RESIST. BLOWS/FT	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; as above	96										Sample collected at 95 feet
97.5	97										
	98										
	99										
	100										
	101										
	102										
	103										
	104										Stopped drilling at 0925
MUDSTONE; dark reddish brown (10R 3/4), laminated, fractures coated w/ dark green and tan clay and calcite cement.	105									1.5 min/ft	Started drilling at 0930 Collected sample at 105 feet
	106										
	107										
	108										
	109										Water expelled at a rate of 20 gal/min
	110										
	111										
	112										
	113										contact based on color change in fluid
114.0	114										
ARGILLACEOUS DOLOSTONE; very dusky red (10R 2/2), laminated, fine grained (micritic), calcite occurs as fracture-filling cement.	115									2.5 min/ft	Collected sample at 115 feet
	116										
	117										
	118										
	119										

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LOG OF BORING MW-4D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121										
	122										
	123										
	124										Stopped drilling at 1055
ARGILLACEOUS DOLOSTONE; as above	125										Started drilling at 1010 Sample collected at 125 feet
	126										
	127										
	128										
	129										
	130										Water expelled at a rate of 20 gal/min
	131										
	132										
133.0	133										contact based on color change in drilling fluid
	134										
SILTSTONE; dark reddish brown (10R 3/4) laminated, calcite occurs as fracture-filling cement.	135										collected sample at 135 feet
	136										
	137										
	138										
	139									55 min/20 feet = 2.7 min/ft	
	140										
	141										
	142										
	143										
	144										Stopped drilling at 1105

MTH 001 1184

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LOG OF BORING MW-4D

SHEET 7 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; as above	146									12 min/5 ft. - 2.5 min/ft	Started drilling at 1110 Sample collected at [illegible] feet
	147										
	148										
	149										Stopped drilling at 1122 9/30/86
	150										BOTTOM OF HOLE
	151										NOTES:
	152										1) HNU readings of all soil and rock samples was 0.0 ppm
	153										2) Water discharge rates are approximate and represent average rates of water air lifted during drilling.
	154										
	155										
	156										
	157										3) Drilling equipment: Failing 1500 used to 20.0 feet, hole completed by Schramm Rotadrill T650.
	158										
	159										
	160										
	161										
	162										4) Failing rig used 10 in. tricone for casing installation, Schramm rig used a 6 in. air hammer
	163										
	164										
	165										
	166										
	167										5) Cuttings from air rotary drilling were mostly fine gravel in size.
	168										
	169										

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LOG OF BORING MW-5D

SHEET 1 OF 7

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 141.6 ft.	PROJECT NO.: B4C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 22 Sept 1986	DATE FINISHED: 24 Sept 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 7	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150 feet	DEPTH TO ROCK: 8.5 feet
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 7	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 FT.	NO. SAMPLES: DIST 5	UNDIST —; CORE —
CASING: —		WATER LEVEL: FIRST —	COMPL —; 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 in. I.D. SPLIT SPOON			
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30	INSPECTOR: CARL VARTERESIAN	

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BLS/IN.	RECOV., %	ROCK CORE: RECOVERY/RQD, (%)	BEDDING	FRACTURE: SKETCH	FRACTURE: COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SW-SM - Moderate Reddish Brown (10R4/6) c m f SAND, little (+) Silt, c f Gravel, dry.	1	S-1	6 12 11 15	1.8/2.0 = 95							
	2										
	3										
	4										
SM-SC - Moderate Reddish Brown (10R4/6) m f SAND, some (+) Clayey Silt, little c Sand, moist	5										
	6	S-2	17 33 36 44	0.8/2.0 = 40							
	7										
(OVERBURDEN) 8.5	8										
(BRUNSWICK FORMATION)	9										
MUDSTONE; friable hardness, friable strength, deeply/moderately weathered, moderately fractured (fractures up to 0.1 inch thick and completely occluded by dark green and tan clay), dark reddish brown (10R3/4).	10										
	11	S-3	18 16 23 26	1.1/2.0 = 53							
	12										
	13										
	14										
MUDSTONE; as above	15										
	16	S-4	8 15 22 24	1.2/2.0 = 60							
	17										
	18										
	19										

MTH 001 1186

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LOG OF BORING MW-5D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE: as above	21	S-5	12 28 26 40	14/20 = 70							
	22										
	23										
	24										
	25										No recovery
	26	S-6	30 56 100/0	0/24 = 0							
	27										
	28										
	29										
	30										
	31										
	32										
	33										
	34										Cutting collected from 35 feet Stopped drilling at 1200 9/22/86
MUDSTONE: dark reddish brown (10Y 3/4).	35										
	36									45 min/14 feet = 3.2 min/foot →	9/23/86 Started drilling at 0740
	37										
	38										
	39										
	40										
	41										Water level remained constant during drilling
	42										
	43										
	44										

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LOG OF BORING MW-5D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	46										
	47										
	48										
	49										Collected sample at 50 feet Stopped drilling at 0825
MUDSTONE; as above, except fracture-filling quartz cement abundant.	50									60 min/15 feet = 4 min/ft.	Started drilling at 0830
	51										
	52										
	53										
	54										
	55										Water level remained constant during drilling
	56										
	57										
	58										
	59										
	60										
	61										
	62										
	63										Collected sample at 65 feet
	64										Stopped drilling at 0930
MUDSTONE; as above	65										Started drilling at 0935
	66										
	67										
	68										
	69										
70?											

MTH 001 1188

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LOG OF BORING MW-5D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	71									100 min/15 feet = 6.7 min/ft	Water level remained constant during drilling
	72										
	73										
	74										
SILTSTONE; dark reddish brown (10R 3/4) laminated, fractures filled with dark green and [illegible] clay, little calcite present as fracture-filling cement.	75										Sample taken at 75 feet
	76										
	77										
	78										
	79										Drilling stopped at 1115
	80									90 min/15 feet = 6 min./ft.	Drilling started at 1120
	81										
	82										
	83										
	84										Water losses during drilling ≈ 100 gal began at 80 feet
	85										
	86										
	87										
	88										
	89										
SILTSTONE; as above, except calcite fracture-filling cement is more abundant than clay.	90										Sample taken at 90 feet
	91										
	92										
	93										
	94										Drilling stopped at 1235

MIH 001 1189

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CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-5D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
											Started drilling at 1255
	96										
	97										
	98										
	99										Water losses during drilling ≈ 100 gal
	100										
	101										
	102										
	103										
	104									85 min/15 feet = 5.7 min/ft.	
SILTSTONE; as above	105										Sample collected at 105 feet
	106										
	107										
	108										
	109										Drilling stopped at 1420
	110										Drilling started at 1425
	111										
	112										
	113										
	114									85 min/15 feet = 5.7 min/ft.	Water losses during drilling ≈ 100 gal
	115										
	116										
	117										
	118										
	119										

MTH 001 1190

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LOG OF BORING MW-5D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; as above, except fracture-filling cement is less abundant.	121										Sample collected at 120 feet
	122										
	123										
	124										Drilling stopped at 1550
	125									60 min/10 ft = 6 min/ft	Drilling started at 1600
	126										
	127										
	128										Water losses during drilling ≈ 50 gpm
	129										
	130										
	131										
	132										
	133										Drilling stopped at 1750 9/23/86
	134										
SILTSTONE; as above	135									40 min/5 ft = 8 min/ft	9/24/86 Drilling started at 0830 Sample collected at 135 feet
	136										
	137										
	138										
	139										Stopped drilling 0910
	140									120 min/10 ft = 12 min/ft	Started drilling at 0915
	141										
	142										Water losses during drilling ≈ 50 gpm
	143										
	144										

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LOG OF BORING MW-5D

SHEET 7 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
147.0 ARGILLACEOUS DOLOSTONE; very dusky red (10R 2/2), fine grained (micritic), calcite occurs as fracture-filling cement.	146										
	147										
	148										Collected sample [illegible] feet.
	149										Stopped drilling at 1115
	150										BOTTOM OF HOLE NOTES: 1) HNU readings of all soil and rock samples was 0.0ppm. 2) Water losses during drilling began at 80 feet and thereafter were gradual. 3) Drilling equipment: Failing 1500 was used for entire hole. 4) Failing rig used a 4¾ in. tricone during sampling and a 10 in. tricone for casing installation, and a 6 in. tricone to complete hole. 5) cuttings from mud rotary were mostly fine-gravel in size.
	151										
	152										
	153										
	154										
	155										
	156										
	157										
	158										
	159										
	160										
	161										
	162										
	163										
	164										
	165										
	166										
	167										
	168										
	169										

MTH 001 1192

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LOG OF BORING MW-6D

SHEET 1 OF 5

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 145.9 ft.	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 9 SEPT 1986	DATE FINISHED: 29 SEPT 1986
DRILLING EQUIPMENT: SEE NOTE SHEET 5	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 100 ft.	DEPTH TO ROCK: 3.5 ft.
SIZE AND TYPE OF BIT: SEE NOTE SHEET 5	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 FT.	NO. SAMPLES: DIST 6	UNDIST — CORE 7
CASING: —		WATER LEVEL: FIRST —	COMPL — 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN I.D. SPLIT SPOON		INSPECTOR: CARL VARTERESIAN	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BLS/IN.	RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	BEDDING	FRACTURE: SKETCH	CONDO.	FRACTURE SPACING	DRILLING RATE	REMARKS
SM-SC Light Brown (5YR 5/6) F SAND, some (-) Silt+Clay, dry	1	S-1	10 14 13 17	1.0/2.0 = 50							
	2										
(OVERBURDEN) 3.5 (BRUNSWICK FORMATION)	3										
	4										
MUDSTONE; Deeply weathered; SM-SC Moderate Brown (5YR 3/4) c m f SAND, some (+) Silt+Clay, moist.	5	S-2	31 42 33 32	1.2/2.0 = 58							
	6										
	7										
	8										
	9										
MUDSTONE; Deeply weathered; SM-SC Dark Reddish Brown (10R 3/4) m f SAND, some (+) Silt+Clay, moderately fractured (fractures up to 0.1 inches thick and completely occluded by 2 generations of fracture filling clay), moist	10	S-3	8 10 15 17	1.6/2.0 = 79							
	11										
	12										
	13										
	14										
MUDSTONE; as above	15	S-4	6 10 11 12	1.8/2.0 = 88							
	16										
	17										
	18										
	19										

MTH 001 1193

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LOG OF BORING MW-6D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ RQD, (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	ROCK CORE: DRILLING RATE	REMARKS
MUDSTONE; as above	21–22	S-5	13, 25, 26, 27	1.8/2.0 = 88							
	23–24										
	25										9/9/86
MUDSTONE; as above	25–27	S-6	19, 34, 60, 55	2.0/2.0 = 100							9/10/86
	28–29										
MUDSTONE; low hardness, weak strength, moderately weathered, stratification indistinct, intense to close fracture spacing (60% of fractures have partial coating of dark green and tan clay), dark reddish brown (10R 3/4).	30–36	RUN 1			1.0/10.0 = 10 RQD; 5.7/10.0 = 57% REC			CP, CG, CP	I, CI, I	6.0 min/10 ft = 6 min/ft	started core run at 0940. No water loss during drilling
	37–39						NCR	NCR	NCR	NCR	stopped core run at 1040 9/10/86
MUDSTONE; as above except only 40% of fractures have partial coating of dark green and tan clay.	40–44	RUN 2			0.9/10.0 = 9 RQD			CP	I, CI, I	6.0 min/10 ft = 6 min/ft	9/11/86 started core run at 0900. No water loss during drilling

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LOG OF BORING MW-6D SHEET 3 OF 5

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	ROCK CORE: DRILLING RATE	REMARKS
	46	RUN 2 (cont.)			5.5 ft/10 ft = 55% Rec			CP	I		
	47										
	48						NCR	NCR	NCR	NCR	
	49										stopped core run at 1000
	50										
MUDSTONE; as above except first appearance of small vugs (<1") partially filled with dark green and tan clay.	51	RUN 3			1.4/10.0 = 14 RQD		45/50 20	CP	cl	70 min/10 ft = 7 min/ft.	started core run at 1020
	52							CS	I		
	53						10		cl		
	54										Water Loss during drilling ≈ 100 gal
	55				6.6 ft/10 ft = 66% Rec			CP			
	56							CS			
	57										
	58						NCR	NCR	NCR	NCR	
	59										stopped core run at 1138
	60										
MUDSTONE; as above except 20% of fractures partially to completely filled with calcite cement 10% exhibit friable to low hardness, friable to low strength.	61	RUN 4			4/10 = 4/RQD		10 15	CP	cl	40 min/10 ft = 4 min/ft.	started core run at 1150
	62						5		I		
	63						4		cl		
	64							CS	I		
	65				9.5 ft/10 ft = 95% Rec				CR		Substantial water loss during drilling ≈ 250 gal.
	66								cl		
67.0									I		
SILTSTONE; low hardness, weak strength, slightly weathered, stratification indistinct, close to moderate fracture spacing, vugs and solution channels are completely filled with calcite cement, dark reddish brown (10R 3/4)	67								cl		
	68						20	CG	M		
	69						20 20				
							NCR	NCR	NCR	NCR	stopped core run at 1130

MTH 001 1195

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LOG OF BORING MW-6D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE; friable to low [illegible] strength, slightly to moderately weathered, strat. indistinct, close to intense fracture spacing, dark reddish brown (10R 3/4) 71.8	71						15	CP	CI CR		started core run at 1250
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, close to moderate fracture spacing (20% of fractures have a coating of dark green and tan clay with sparry calcite on top of (later thin) clay). Calcite cement has sealed some fractures dark reddish brown (10R 3/4).	72	RUN 5			68/10.0 = 68 RQD		32		CI	40 min/10 ft = 4 min/ft	
	73						30		M		water loss during drilling ≈ 50 gal
	74						20		CI		
	75				100% REC		15		M		
	76						20		CI		
	77						40	CG	M		
	78						20				
	79				10.0/10.0 =		40				
	80						20		I		stopped core run at 1330
SILTSTONE; as above except 30% of fractures have thick (½"-½") veins of dark green and tan clay	81	RUN 6			19 RQD		20	CS CP	M I M	20 min/10 ft = 2 min/ft	started core run at 1350
	82						75 80	CS	CI		
	83				1.9/10.0 =		90 93		I		Substantial water loss during drilling ≈ 200 gal
	84										
	85				47% REC						
	86										
	87						NCR	NCR	NCR	NCR	
	88										
	89				4.7/10.0 =						stopped core run at 1410
SILTSTONE; as above except 30% of fractures have calcite coating over the clay.	90	RUN 7			39 RQD		10	CP	CI	90 min/10 ft = 9 min/ft	started core run at 1530
	91						20				-hole collasping
	92								I		-substantial loss of water during drilling ≈ 500 gal
	93				3.9/10.0 =		10		CI		
	94							CG	M		

HT# 001 1196

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LOG OF BORING MW-6D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE: FRACTURE SPACING	DRILLING RATE	REMARKS
	96	RUN 7 (cont.)			9.97/10.0 = 100% R-C		20	CS	CI		
	97						20		M		
	98						20	CP	CL		
	99						30		I		
							20		CI		
	100								M		Stopped core run at 1700 9/11/86
	101										BOTTOM OF HOLE
	102										NOTES:
	103										1) HNU readings of all soil and rock samples was 0.0ppm.
	104										2) water losses begin at 55 ft and substantially increased at 85 ft
	105										3) Drilling Equipment: Failing 1500 used for entire hole.
	106										4) Failing rig used a 4 3/4 in. tricone during sampling, a 10 in. tricone for casing installation to a depth of 40 ft, and a 6 in. tricone thereafter.
	107										5) Hole began collasping at 80 ft. and was abandoned at 100 ft.
	108										
	109										
	110										
	111										
	112										
	113										
	114										
	115										
	116										
	117										
	118										
	119										

MTH 001 1197

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LOG OF BORING MW-7D

SHEET 1 OF 7

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 143.8 ft.	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 11 JUNE 1986	DATE FINISHED: 30 JUNE 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 7	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150 Ft.	DEPTH TO ROCK: 13.5 Ft.
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 7	SIZE AND TYPE CORE BARREL:	NO SAMPLES: DIST 6	UNDIST — CORE —
CASING:		WATER LEVEL: FIRST —	COMPL — 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN. I.D. SPLIT SPOON		INSPECTOR: CAROL SFORZA	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BL/6 IN.	RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
GP-GC -- Moderate Brown (5YR4/4) mf GRAVEL and cmf SAND, some Silty CLAY, moist.	5–7	S-1	8, 16, 29, 34	0.3/2.0 = 15							
SC-SM -- Moderate Yellowish Brown (10YR5/4) mf SAND, some Clay & Silt, some (-) mf Gravel, moist.	10–12	S-2	21, 21, 18, 21	0.5/2.0 = 25							
(OVERBURDEN) — 13.4 — (BRUNSWICK FORMATION)	13–14										contact based on color change in drilling fluid.
MUDSTONE, deeply weathered; SM-SC -- Dark Reddish Brown (10R3/4) cmf SAND, some (+) Clay & Silt, dry.	15–17	S-3	16, 22, 36, 39	0.7/2.0 = 35							

MTH 001 1198

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LOG OF BORING MW-7D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SAME.	21	S-4	17 18 25 30	0.2/2.0 = 10							
	22										
	23										
	24										
	25										
SAME (inferred from cuttings).	26	S-5	20 24 27 42	0.0/2.0 = 0							no recovery
	27										
	28										
	29										
SAME.	30	S-6	26 100	1.0/1.0 = 100							
	31										Started drilling, 1520
	32										
	33										
	34										
	35										
	36										
	37										
	38										
	39									23 min/11 ft = 2.1 min/ft	
	40										Cuttings collected from 40 feet
MUDSTONE; dark reddish brown (10 R 3/4); calcite occurs as fracture-filling cement.	41										Stopped drilling, 1543 6/11/86
	42										6/30/86
	43										Added rod, 0827
	44										

MTH 001 1199

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LOG OF BORING MW-7D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	46										
	47										
	48										
	49									34 min/18 ft = 1.9 min/ft.	
MUDSTONE, as above.	50										cuttings collected from 50 feet. no water expelled.
	51										
	52										
	53										
	54										
	55										
	56										
	57										
	58										
	59										cuttings collected from 60 feet.
MUDSTONE, as above.	60										stopped drilling 0901
											added rod, 0901
	61										
	62										
	63										
	64										
	65										
	66										
	67										
	68										
	69										
MUDSTONE, as above.											cuttings collected from 70 feet

MTH 001 1200

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LOG OF BORING MW-7D

SHEET 4 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	71									24 min./20 ft. = 1.2 min/ft	No water expelled.
	72										
	73										
	74										
	75										
	76										
	77										
	78										
	79										Cuttings collected from 80 feet. Stopped drilling, 0925
MUDSTONE, as above.	80										Added rod, 0925
	81										
	82										
	83										
	84										
85	85										
	86										
	87										
	88										
	89									40 min./20 ft. = 2 min/ft	no water expelled.
ARGILLACEOUS LIMESTONE; dark gray (N3), fine grained (micritic), calcite occurs as fracture-filling cement.	90										Cuttings collected from 90 feet.
	91										
	92										
	93										
	94										
95											

MTH 001 1201

LOG OF BORING MW-7D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRATURE SPACING	DRILLING RATE	REMARKS
	96										
	97										
	98										
	99										cuttings collected from 100 feet. Stopped drilling, 1005
MUDSTONE; dark reddish brown (10R3/4), calcite occurs as fracture filling cement.	100									15 min/10ft = 1.5 min/ft	Added rod, 1005
	101										
	102										
	103										
	104										Water expelled at a rate of 10 gal./min., dark reddish brown.
105	105										
	106										
	107										
	108										
CALCAREOUS MUDSTONE; dark reddish brown (10R3/4), calcite occurs as fracture-filling cement.	109										Cuttings collected from 110 feet. Stopped drilling, 1020
	110									21 min/10ft = 2.1 min/ft	Added rod, 1020
	111										
	112										
	113										Water expelled at a rate of 20 gal./min., dark reddish brown in color.
	114										
	115										
	116										
	117										
	118										
	119										Cuttings collected from 120 feet. Stopped drilling, 1041
CALCAREOUS MUDSTONE, as above.											

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-7D

SHEET 6 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
											Added rod, 1041
	121										
	122										
	123										
	124										Water expelled at a rate of 20 gal./min., dark reddish brown in color.
125	125									24 min/10 ft = 2.4 min/ft.	
	126										
	127										
	128										
	129										Cuttings collected from 130 feet.
MUDSTONE; dark reddish brown (10YR 3/4), calcite and light tan clay occurs as fracture-filling cements.	130										Stopped drilling 1105
											Added rod, 1105
	131										
	132										
	133										
	134										Water expelled at a rate of 30 gal./min., light reddish brown in color
	135										
	136										
	137									22 min./10 ft. = 2.2 min/ft	
	138										
	139										Cuttings collected from 140 feet.
MUDSTONE, as above.	140										Stopped drilling, 1127
											Added rod, 1127
	141										
	142										
	143										
	144										

MTH 001 1203

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CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-70 SHEET 7 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	146									10 min/10 ft = 1.0 min/ft	Water expelled at a rate of 40 gal./min, light reddish brown in color.
	147										
	148										
	149										Cuttings collected from 150 feet. Stopped drilling at 1137.
MUDSTONE, as above.	150										BOTTOM OF HOLE
	151										NOTES: 1) HNU readings of all soil and rock samples was c.o
	152										
	153										
	154										2) Water-discharge rates are approximate and represent average rates of water airlifted from the aquifer during drilling.
	155										
	156										
	157										3) Drilling Equipment: 1500 Failing used to 42 ft., hole completed by Schramm Rota-drill-T650.
	158										
	159										
	160										4) Failing rig used a 4 3/4 IN tricone during sampling and a 10 IN tricone for casing installation, Schramm rig used a 6 IN air hammer.
	161										
	162										
	163										5) Cuttings from air rotary drilling were mostly fine-gravel in size.
	164										
	165										
	166										
	167										
	168										
	169										

MTH 001 1204

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-9D

SHEET 1 OF 11

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 149.8	PROJECT NO: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 7 JUNE 1986	DATE FINISHED: 1 JULY 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 11	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 250 Ft	DEPTH TO ROCK: 8.5 Ft.
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 11	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 FT.	NO. SAMPLES: DIST 8	UNDIST —, CORE 25
CASING: —		WATER LEVEL: FIRST —	COMP. —, 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN I.D. SPLIT SPOON		INSPECTOR: GLENN WYGANT	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BL/6IN.	RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SW-SM--Moderate Brown (5YR 4/4) mf SAND, little Silt, dry.	1	S-1	7 17 18 21	1.0/2.0 = 50							
	2										
	3										
	4										
SM-SC-- Moderate Brown (5YR 4/4) cmf SAND, some Silty Clay, moist	5	S-2	6 8 9 9	1.8/2.0 = 90							
	6										
	7										
(OVERBURDEN) 8.5	8										contact based on color change in drilling fluid.
(BRUNSWICK FORMATION)	9										
MUDSTONE, deeply weathered; SM-SC Dark Reddish Brown (10R 3/4) cmf SAND, some (-) Clay & Silt, moist.	10	S-3	7 11 18 16	1.8/2.0 = 90							
	11										
	12										
	13										
	14										
SAME.	15	S-4	15 19 24 23	2.0/2.0 = 100							
	16										
	17										
	18										
	19										

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LOG OF BORING MW-9D SHEET 2 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SAME.	21	S-5	4 5 8 8	1.2/2.0 = 60							
	22										
	23										
	24										
	25										
SAME.	26	S-6	6 11 15 17	2.0/2.0 = 100							
	27										
	28										
	29										
MUDSTONE; friable hardness, friable strength, deeply/moderately weathered, moderately fractured (fractures up to 0.3 inches thick and completely occluded by two generations of fracture-filling clay), dark reddish brown (10R 3/4).	30										
	31	S-7	21 30 48 80	1.8/2.0 = 90							
	32										
	33										
	34										
	35										
MUDSTONE, as above.	36	S-8	50 60 62 67	2.0/2.0 = 100							
	37										6/7/86
MUDSTONE; friable hardness, friable to weak strength, deeply/moderately weathered, stratification indistinct, crushed to close fracture spacing (10% of fractures have a coating of tan and dark green clay), dark reddish brown (10R 3/4).	38	RUN 1			7.4/10.0 = 74% REC 1.7/10.0 = 17 RQD			CS CP	Cr Cl I	110 min/10 ft = 11 min/ft.	6/9/86 Started core run at 1130
	39							CS CS CP	Cl I		
	40							CS CS			
	41							CS CP	Cl		Water level remained constant in wash tub.
	42							CP CD	Cr Cl		
	43							CP	Cr		
	44										NCR

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LOG OF BORING MW-9D SHEET 3 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ RQD, (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	46	RUN 1 (CONT)					NCR	NCR	NCR	NCR	Stopped core run at 1320 6/9/86
MUDSTONE, as above.	47–49	RUN 2			2.3/7.0 = 33% REC; 0.0/2.0 = 0 RQD			CS CS CS CP CS	Cr Cl Cr Cl	40 min/3ft = 13 min/ft	6/12/86 Started core run at 1420 core barrel blocked-up at 50 ft, had to be hammered excessively—low RQD Stopped core run at 1500
	50						NCR	NCR	NCR		
MUDSTONE, as above.	50–55	RUN 3			0.4/5.0 = 8 RQD; 3.0/5.0 = 60% REC			CP	Cr Cl H	50 min/5ft = 5 min/ft	Started core run at 1540 Water level remained constant in wash tub.
	55						NCR	NCR	NCR	NCR	Stopped core run at 1630 6/12/86
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, crushed to close fracture spacing (20% of fractures have a coating of tan and dark green clay), dark reddish brown (10R3/4).	55–64	RUN 4			0.9/10.0 = 9 RQD; 9.0/10.0 = 90% REC			CS CS CS CS CS CS CP CS CS CS CS CS CG CP CG CP	Cl Cr Cl	70 min/10ft = 7 min/ft	6/12/86 Started core run at 0810 Water level remained constant in wash tub.
	64						NCR	NCR	NCR	NCR	Stopped core run at 0920
SILTSTONE as above, except intense to close fracture spacing.	65–69	RUN 5			0.9/7.0 = 13 RQD			CP CP CG CP CP	Cl	65 min/7ft = 9.3 min/ft	Started core run at 0940 Water level remained constant in wash tub.

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LOG OF BORING MW-9D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	71	RUN 5 (CONT.)			6.4/7.0 = 91% REC			CP	H		Stopped core run at 1045
	72						NCR	NCR	NCR	NCR	
SILTSTONE as above, except close fracture spacing. 74.5	73	RUN 6			1.3/5.0 = 26 RQD		60			45 min/5ft = 9 min/ft.	Started core run at 1120
	74						60				Water level remained constant in wash tub.
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, close to moderate fracture spacing (30% of fractures have a coating of tan and dark green clay), many vugs (1/16" to 3/4") which are partly to completely occluded with calcite cement, dark reddish brown (10R3/4)	75						35	CP	Cl		
	76				5.0/5.0 = 100% REC				M		Stopped core run at 1205
	77	RUN 7			7.0/10.0 = 70 RQD		20	CP CP		80 min/10ft = 8 min/ft.	Started core run at 1310
	78							CS	Cl		
	79										
	80						20				
	81								M		Water level remained constant in wash tub.
	82								I		
SILTSTONE as above, except intense to moderate fracture spacing.	83								Cl		
	84										
	85								M		
	86				9.7/10.0 = 97% REC			CP	Cl I		Stopped core run at 1430 6/13/86
	87									NCR	6/16/86
	88	RUN 8			0.0/10.0 = 0 RQD					80 min/7ft = 11.4 min./ft.	Started core run at 0700
	89										
90.5	90										Water level remained constant in wash tub.
	91				0.0/10.0 = 0% REC		NCR	NCR	NCR		Core bit was found to be lacking diamonds at the end of run (94).
	92										
	93										Stopped core run at 0820
	94							15	CS	Cl	Started core run at 0850

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LOG OF BORING MW-9D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRATURE SPACING	DRILLING RATE	REMARKS
SANDSTONE; moderate hardness, moderate strength, slightly weathered, fine grained, close to moderate fracture spacing, vugs(1/16" to 1/2") which are partly to completely occluded with calcite cement, dark reddish brown (10R 3/4).	96	RUN 9			7.6/10.0 = 76 RQD			CP	C1	80 min/10ft = 8 min/ft.	Water level remained constant in wash tub.
	97							CP			
								CP			
								CG			
	98							CG			
							20	CG			
	99							CP			
								CG			
	100				9.2/10.0 = 92% REC		20	CG			
							20	CG	M		
	101						20	CG			
	102							CP	C1		
									M		
	103						20	CS	C1		
							NCR	NCR	NCR	NCR	Stopped core run at 1010
	104	RUN 10			6.7/10.0 = 67 RQD				S	85 min/10ft = 8.5 min/ft.	Started core run at 1040
	105						20	CS	C1		
									M		
	106							CS			
								CP			
	107							CS	C1		
SANDSTONE as above, except close to slight fracture spacing (25% partly to completely occluded with calcite cement).	108							CG			Water level remained constant in wash tub.
								CG			
	109							CP			
								CP			
	110							CS	M		
								CS			
	111						20	CS			
								CG	C1		
	112										
	113				10.0/10.0 = 100% REC			CG			Stopped core run at 1205
								CG			
								CP			
	114	RUN 11			9.5/10.0 = 95 RQD			CP	C1	80 min/10ft = 8 min/ft	Started core run at 1220
	115						15	CS			
	116						15	CS	S		
SANDSTONE, as above.	117						15	CS			Water level remained constant in wash tub.
	118						20	CP			
								CP	C1		
	119				10.0/10.0 = 100% REC			CP			
									M		

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LOG OF BORING MW-9D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121	RUN 11 (cont.)					80	CG	M		
	122						80	CS / CG			
	123						NCR	NCR	NCR	NCR	Stopped core run at 1340
	124										
SANDSTONE; moderate hardness, moderate strength, slightly weathered, fine grained, close to moderate fracture spacing (80% partly to completely occluded with calcite cement, 10% with anhydrite), few calcite-filled vugs (1/16" to 1/8"), dark reddish brown (10 R 3/4).	125	RUN 12							CI		Started core run at 1400
	126				$\frac{4.3}{6.0}$ = 72 RQD				M		
	127							CS	CI	70 min/6 ft = 11.7 min/ft	Water level remained constant in wash tub
	128							CG	M		
	129								CI		
	130				$\frac{5.0}{6.0}$ = 83% REC		NCR	NCR	NCR	NCR	Stopped core run at 1510
SANDSTONE as above, except close to slight fracture spacing and calcite vein (1/4") at 138.0.	131	RUN 13									Started core run at 1515
	132								CI		
	133				$\frac{5.4}{8.5}$ = 64 RQD						
	134						20	CG	M		Water level remained constant in wash tub.
	135								S	65 min/8.5 ft = 7.6 min/ft.	
	136										
	137						20		M		
	138				$\frac{7.7}{8.5}$ = 91% REC		NCR	CP NCR	CI NCR	NCR	Stopped core run at 1620
SANDSTONE as above (run 13), except several calcite veins at 141.0.	139	RUN 14							CI		Started core run at 1630
	140								S		
	141				$\frac{7.3}{8.0}$ = 91 RQD				CI		
	142								S		Water level remained constant in wash tub.
	143									55 min/8 ft = 6.9	
	144				$\frac{8.0}{8.0}$ = 100% REC		25		M		

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CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-9D SHEET 7 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	146	RUN 14 (CONT)					20	CG	M		Stopped core run at 1725
SANDSTONE as above (run 13), except calcite veins are at 147 and 150 feet.	147	RUN 15			8.2/9.5 = 86 RQD; 9.5/9.5 = 100% REC			CP	S	65 min/9.5 ft = 6.8 min/ft	Started core run at 1730
	148							CS	CI		
	149							CS	M		
	150							CS	CI		Water level remained constant in wash tub.
	151							CS	M		
	152						50	CP; CG			
	153						30	CG			
	154							CG; CG			
	155							CS	CI		Stopped core run at 1835
SANDSTONE as above (run 13), except no calcite veins.	156	RUN 16			6.1/8.0 = 76 RQD; 8.0/8.0 = 100% REC			CP	CI	50 min/10 ft = 5 min/ft	Started core run at 1840
	157							CS			
	158							CS	S		
	159										Water level remained constant in wash tub.
	160								CI		
	161						20		M		
	162								CI		
	163						25; 20	CS; CP	M; CI		Stopped core run at 1930
SANDSTONE as above (run 16).	164	RUN 17			9.7/10.0 = 97 RQD; 10.0/10.0 = 100% REC		20		CI; M	10 min/10 ft = 4 min/ft	Started core run at 1935
	165										
	166						10	CG	S		Water level remained constant in wash tub
	167										
	168										
	169						10				

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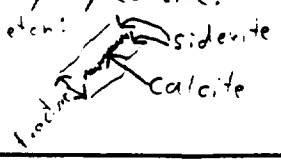
LOG OF BORING MW-9D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	171	RUN 17 (CONT.)					90, 10, 5, 10	CG	CI, S, M, CI		Stopped core run at 2010 6/16/86
	174							CP	CI		Started core run at 0655 6/17/86
SANDSTONE as above, except intense to slight fracture spacing and calcite vein at 177 feet.	175–184	RUN 18			RQD 9.5/10.0 = 95; REC 9.8/10.0 = 98%		15, 10, 10, 20	CG	S, M, CI, S, M, CI, M	55 min/10ft = 5.5 min/ft	Water level remained constant in wash tub. Stopped core run at 0750
	184								CI, I		Started core run at 0755
SANDSTONE, as above 188.8	185–188	RUN 19			RQD 8.4/10.0 = 84		5, 15, 15	CG	S, M	35 min/10ft = 3.5 min/ft	
ARGILLACEOUS LIMESTONE; moderate hardness, moderate strength, slightly weathered, fine grained (micritic), rippled, horizontally laminated, mottled, dessication cracks, close to slight fracture spacing, stratigraphic dip is 9°, light gray (N7) to dark gray (N3). 191.2	189–191								S, CI, S		Water level remained constant in wash tub.
SILTSTONE; low hardness, moderate strength, slightly weathered, moderate to slight fracture spacing (all are conjugate), occluded with calcite cement, dark reddish brown (10R3/4).	192–194				REC 10.0/10.0 = 100%		20		M		Stopped core run at 0830
	194							CG	M		Started core run at 0835

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-9D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
196.5	196	RUN 20			RQD				M		
	197				9.1/10.0 = 91				S		
	198								M	35 min/10 ft = 3.5 min/ft	Substantial water loss (≈ 90 gal.) began at 199 feet.
ARGILLACEOUS LIMESTONE, same as in RUN 19.	199							CG			
	200				10.0/10.0 = 100% REC				S		
	201										
	202								CI		
	203								S		Stopped core run at 0910
204.5	204							CP	CI		
	205	RUN 21			RQD				S		Started core run at 0915
SANDSTONE; moderate hardness, moderate strength, slightly weathered, fine grained, close to slight fracture spacing (50% partly to completely occluded with calcite cement), many calcite filled vugs (1/8" to 3/4"), dark reddish brown (10R 3/4).	206				10.0/10.0 = 100		20		M		
	207								S		
	208								M		Substantial water loss during coring (≈ 120 gal.)
	209										
	210						20	CG	S	30 min/10 ft = 3 min/ft	
	211										
	212				10.0/10.0 = 100% REC				S		
	213								CI		Stopped core run at 0945
	214								M		
Sandstone as above, except moderate to slight fracture spacing, and large 70° fracture at 214.5 that is filled mostly by siderite (1/2") and then lastly by calcite.	215	RUN 22			RQD				S		Started core run at 0955
Fracture sketch: 	216						15		M		
	217				10.0/10.0 = 100			CG			Substantial water loss during coring (≈ 180 gal.)
	218								S	45 min/10 ft = 4.5 min/ft	
	219						15		M		

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-9D SHEET 10 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	221	RUN 22 (cont.)			10.0/10.0=100% REC			CG	M		
	222								S		
	223								M		
									S		Stopped core run at 1040
	224										Started core run at 1045
	225	RUN 23			9.3/9.3=100 RQD			CG	M		
	226										
SANDSTONE as above, except moderate to massive fracture spacing, and siderite-calcite vein at 231 feet.	227								Mv		Substantial water loss during coring (≈140 gal.).
	228						10				
	229								S		
	230				9.3/9.3=100% REC					35 min/9.3 ft = 3.8 min/ft	
	231										
	232						10				
	233										Stopped core run at 1120
	234	RUN 24			10.0/10.0=100 RQD			CG	M		Started core run at 1130
	235										
	236										
SANDSTONE as above, except no siderite-calcite vein.	237								Mv		Substantial water loss during coring (≈180 gal.).
	238										
	239						10				
	240								S		
	241										
	242				10.0/10.0=100% REC		10			45 min/10 ft = 4.5 min/ft	
	243								M		Stopped core run at 1215
	244	RUN 25 (CONT)						CG	M		Started core run at 1230

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WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-9D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SANDSTONE as above (run 21) except close to slight fracture spacing.	246	RUN 25			RQD $\frac{6.7}{6.7}$=100		5	CG	M	30 min/6.7 ft = 4.5 min/ft	substantial water loss during coring (≈150 gal).
	247						5		C1		
	248								M		
	249				$\frac{6.7}{6.7}$=100% REC		15		S		Stopped core run at 1300
	250										BOTTOM OF HOLE
	251										NOTES: 1) HNU readings of all soil and rock samples was 0.0.
	252										
	253										
	254										2) water losses during coring began at 199 feet, and thereafter were gradual.
	255										
	256										3) Drilling Equipment: 1500 Failing used to 47 ft, wire-line mobile used for subsequent rock coring, hole lastly drilled by Schramm Rotadrill T 650.
	257										
	258										
	259										
	260										
	261										4) Failing rig used a 4 3/4 IN tricone during sampling and a 10 IN tricone for casing installation, Schramm rig used a 6 IN air hammer.
	262										
	263										
	264										
	265										
	266										
	267										
	268										
	269										

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WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-10D

SHEET 1 OF 11

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 151.7 ft.	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 29 MAY 1986	DATE FINISHED: 24 JUNE 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 11	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 250.0 Ft	DEPTH TO ROCK: 9.5 Ft.
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 11	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 FT.	NO SAMPLES: DIST 20	UNDIST —, CORE 23
CASING: —		WATER LEVEL: FIRST —	COMPL —, 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN. I.D. SPLIT SPOON		INSPECTOR: GLENN WYGANT	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BL/6 IN.	RECOV., %	ROCK CORE: RECOVERY/RQD (%)	BEDDING	FRACTURE: SKETCH	CONDO.	FRACTURE SPACING	DRILLING RATE	REMARKS
SM-SC -- Moderate Brown (5YR 4/4) f SAND, some (-) Silt & Clay, dry.	1	S-1	2 9 7 6	0.8/2.0 = 40							
SM-SC -- Moderate Brown (5YR 4/4) cmf SAND, some Silty Clay, dry.	2–3	S-2	7 5 6 6	1.6/2.0 = 50							
SAME.	4–5	S-3	6 10 10 9	1.1/2.0 = 55							
SAME.	6–7	S-4	6 8 12 14	1.6/2.0 = 80							
(OVERBURDEN) 9.5	8–9	S-5	11 14 16 21	0.0/2.0 = 0							No recovery.
(BRUNSWICK FORMATION) MUDSTONE, deeply weathered; SM-SC -- Dark Reddish Brown cmf SAND, some (-) Clay & Silt, moist.	10–11	S-6	18 19 10 14	1.3/2.0 = 65							Contact based on color change in drilling fluid from brown to reddish brown, and also on the change in color of subsequent sampler.
SAME.	12–13	S-7	4 4 3 4	1.4/2.0 = 70							
SAME.	14–15	S-8	3 3 4 8	0.6/2.0 = 30							
SAME.	16–17	S-9	5 7 10 15	1.3/2.0 = 65							
SAME.	18–19	S-10	10 10 14 20	2.0/2.0 = 100							5/29/86

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LOG OF BORING MW-10D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV. %	ROCK CORE: RECOVERY/ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
											5/30/86
SAME.	21	S-11	7 10 15 18	1.8/2.0 = 90							
MUDSTONE; friable hardness, friable strength, deeply/moderately weathered, moderately fractured (fractures up to 0.4 inches thick and completely occluded by two generations of fracture-filling clay) dark reddish brown (10R 3/4).	22										
	23	S-12	12 15 14 17	2.0/2.0 = 100							
	24										
MUDSTONE, as above.	25	S-13	12 15 16 21	2.0/2.0 = 100							
	26										
MUDSTONE, as above.	27	S-14	15 16 17 21	2.0/2.0 = 100							
	28										
MUDSTONE, as above.	29	S-15	17 19 25 28	2.0/2.0 = 100							
	30										
MUDSTONE, as above.	31	S-16	24 28 37 45	2.0/2.0 = 100							
	32										
MUDSTONE, as above.	33	S-17	29 36 48 65	2.0/2.0 = 100							At 34.0 ft., hardened shoe left in rock; hole redrilled 5.0 ft. to the north.
	34										
MUDSTONE, as above except moderately weathered, horizontal laminations.	35	S-18	36 42	1.0/1.0 = 100							3 IN. I.D. spoon driven with a 300 lb hammer.
MUDSTONE, as above.	36	S-19	34 39	1.0/1.0 = 100			70	70			
MUDSTONE, as above.	37	S-20	38 43	1.0/1.0 = 100			55	55			5/30/86
MUDSTONE; friable hardness, friable to weak strength, deeply/moderately weathered, stratification indistinct, crushed to close fracture spacing (60% of fractures have a coating of tan and dark green clay, several vugs (1/8" to 1/4") which are completely occluded with calcite cement, dark reddish brown (10R 3/4).	38	RUN 1			1.6/10.0 = 16 RQD		13 CS 10 CP 30 CP	CP	CI		6/2/86 Started core run at 0934
	39						CP	CP	I		
	40						CP	CP	CI		
	41						39 35 CP	CP	CI I		water level remained constant in wash tub.
	42						29 26 CP	CP	CI	71 min./10 ft = 7.1 min/ft	
	43				6.0/10.0 = 60% REC		26 CP	CP	CI		
	44						NCR	NCR	NCR	NCR	

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LOG OF BORING MW-10D

SHEET 3 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	46	RUN 1					NCR	NCR	NCR	NCR	Stopped core run at 1045 6/2/86
	47										6/3/86
MUDSTONE, as above. 48.5	48						15	CP	CI	55 min/8 ft = 6.9 min/ft	Started core run at 1015
MUDSTONE; friable to low hardness, friable to weak strength, moderately weathered, stratification indistinct, crushed to close fracture spacing (60% of fractures have a coating of tan and dark green clay), several vugs (1/8" to 1/4") which are partly to completely occluded with calcite cement, dark reddish brown (10R3/4).	49	RUN 2			1.2/8.0 = 15 RQD		15		I		
	50						25		CI		
	51				6.0/8.0 = 75% REC		15 80 10	CS CS			Water level remained constant in wash tub.
	52						10 30	CP CS			
	53										
	54						NCR	NCR	NCR	NCR	Stopped core run at 1110
	55										
	56						45		CI I CI I		Started core run at 1135
MUDSTONE; low hardness, weak strength, moderately weathered, stratification indistinct, intense to close fracture spacing (70% of fractures have a coating of tan and dark green clay), several vugs (1/8" to 1/4") which are partly to completely occluded with calcite cement, dark reddish brown (10R3/4).	57						10	CP			
	58										
	59				2.5/10.0 = 25 RQD			CS	CI		Water level remained constant in wash tub.
	60						15				
	61	RUN 3					10				
	62				9.8/10.0 = 98% REC		25	CP CP CP			
	63								I		
	64						10 10 20	CS CP	CI	93 min/10 ft. = 9.3 min/ft.	Stopped core run at 1308
	65										NCR
MUDSTONE as above, except close to moderate fracture spacing.	66						10	CP CP CP	CI		Started core run at 1346
	67				2.9/6.0 = 48 RQD		70		M		
	68	RUN 4			5.5/6.0 = 92% REC		30	CG GG		84 min/6.0 ft. = 14 min/ft	water level remained constant in wash tub.
	69						70	CG CG	CI		

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LOG OF BORING MW-10D SHEET 4 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND	ROCK CORE: WEATHERING	DRILLING RATE	REMARKS
70.7											Stopped core run at 1510
	71										NCR
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, close to moderate fracture spacing (70% of fractures have a coating of tan and dark green clay), many vugs and solution channels (1/8" to 1/2") which are partly to completely occluded with calcite cement, dark reddish brown (10R 3/4).	72	RUN 5			9.3/10.0 = 93% REC 7.0/10.0 = 70 RQD			CS CS	CI M	90 min/10 ft = 9 min/ft	Started core run at 1530
	73										
	74							CS	CI		
	75						40	CS	M		Water level remained constant in wash tub.
	76							CS	CI		
	77							CS CS			
	78							CP			
	79						20	CP CG CP	M		
	80										Stopped core run at 1700
	81						NCR	NCR	NCR	NCR	6/3/86
											6/4/86
SILTSTONE, as above.	82	RUN 6			9.5/10.0 = 95% REC 8.3/10.0 = 83 RQD		40	CS	CI	70 min/10 ft = 7 min/ft	Started core run at 0720
	83										
	84							CS	M		
	85						30 50				Water level remained constant in wash tub.
	86							CP	CI		
	87							CP CP			
	88						20	CS	M		
	89										
	90							CS	CI M		Stopped core run at 0830
	91										NCR
SILTSTONE, as above except that fractures have a coating of calcite ontop of (later than) the clay. Calcite cement has actually sealed some of the fractures.	92	RUN 7			7.8/10.0 = 78 RQD		30	CP CP	CI M	100 min/10 ft = 10 ft/min	Started core run at 0855
	93						30	CG CG	CI M		Water level remained constant in wash tub.
	94						80	CG	CI M		

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LOG OF BORING MW-10D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: WEATHERING	DRILLING RATE	REMARKS
	96	RUN 7 (CONTINUED)			10.0/10.0 = 100% REC		10	CP, CG	CI		
	97							CG	M		
	98						30	CG	CI, M		
	99							CG			
	100							CG, CS	CI		Stopped core run at 1035
	101	RUN 8			8.3/10.0 = 83 RQD			CG	CI	100 min/10 ft = 10 min/ft	Started core run at 1050
	102						10	CS	M		
	103						20	CS	CI		
SILTSTONE, as above (RUN 7).	104							CS	M		
	105						5	CS	CI		water level remained constant in wash tub.
	106							CG	M		
	107							CS	CI		
	108										
	109				10.9/10.0 = 100% REC		95	CP	M		
	110							CS			Stopped core run at 1230
	111							CS	CI		
	112	RUN 9			8.5/10.0 = 85 RQD			CS, CS	CI, M	120 min/10 ft = 12 min/ft	Started core run at 1240
	113							CP	CI		
	114							CS	M		
	115							CP	CI		
SILTSTONE, as above.	116				10.0/10.0 = 100% REC			CG	M		Water level remained constant in wash tub.
	117							CP	CI		
	118							CS	M		
	119							CS, CS			
								CP	CI		

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LOG OF BORING MW-10D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: WEATHERING	DRILLING RATE	REMARKS
									M		Stopped core run at 1440
	121										
	122										Started core run at 1450
	123	RUN 10			3.7/5.0 = 74% RQD 2.2/5.0 = 44			CS	CI	20 min/5 ft = 4 min/ft	Water level remained constant in wash tub.
SILTSTONE as above, except only close fracture spacing.	124										
	125						NCR	NCR	NCR	NCR	Stopped core run at 1510
	126										
	127				8.4/10.0 = 84 RQD			CG	M		Started core run at 1530
								CP	CI		
	128						60	CS			
	129							CP	M		
	130							CP			
SILTSTONE as above, except close to slight fracture spacing.	131	RUN 11			9.7/10.0 = 97% REC		65	CP CG	CI	80 min/10 ft = 8 min/ft	Water level remained constant in wash tub.
	132							CP	M		
	133								S		
	134							CP			
	135								M		Stopped core run at 1650
	136										NCR
137.0	137							CG	CI		Started core run at 1700
									M		
	138							CG	CI		
	139				8.5/10.0 = 85 RQD			CP	M		
	140							CG			
	141								CI		Water level remained constant in wash tub.
MUDSTONE; low hardness, weak strength, slightly weathered, stratification indistinct, intense to moderate fracture spacing (70% are partially filled with calcitic cement), dark reddish brown (10R 3/4).	142	RUN 12			9.4/10.0 = 94% REC						
	143							CG	I	130 min/10 ft = 13 min/ft	
	144								CI		Stopped core run at 1910

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LOG OF BORING MW-10D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
								CG	CI		
	146										NCR 6/4/86
MUDSTONE, as above.	147	RUN #13			9.1/10.0 = 91% REC 6.6/10.0 = 66 RQD		15, 10	CG	CI	5.5 min/ft = 55 min/10 ft	6/5/86 Started core run at 0835, using a new diamond bit.
	148										
	149						60				
	150										Water level remained constant in wash tub.
	151										
	152								M		
	153								CI		
	154							CS, CG	H		
	155							CS	CI		Stopped core run at 0930
							NCR	NCR	NCR	NCR	
MUDSTONE as above, except close to moderate fracture spacing.	156	RUN 14			9.3/10.0 = 93% REC 5.7/10.0 = 57 RQD				CI	6.5 min/ft = 65 min/10 ft	Started core run at 1030
	157								M		
	158						10				
	159						10	CG			
	160								CI		Water level remained constant in wash tub.
	161						70	CP			
	162							CP			
	163						5	CS			
	164						15	CG	M		
	165								CI		Stopped core run at 1135
							NCR	NCR	NCR	NCR	
	166	RUN 15			9.0/10.0 = 90 RQD		10				Started core run at 1200
	167										
MUDSTONE as above, except close fracture spacing. 168.4	168						60	CG	CI		Water loss during coring (≈200 gal.)
SILTSTONE, as below.	169						10		M		

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LOG OF BORING MW-10D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ROD, (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; low hardness, moderate strength, slightly weathered, stratification indistinct, intense to moderate fracture spacing (30% of fractures have a coating of calcite and are completely occluded), many vugs (1/8" to 1/4") which are completely occluded with calcite cement, dark reddish brown (10R3/4).	171	RUN 15 (CONTINUED)			9.7/10.0 = 97% REC		5	CG	M	70 min/10 ft = 7 min/ft	
	172								Cl		
	173						20		M		
	174						xxx	CP	Cl		
	175						20	CG CG	I Cl		Stopped core run at 1310
	176										NCR
SILTSTONE, as above.	177	RUN 16			7.2/10.0 = 72 RQD				Cl	70 min/10 ft = 7 min/ft	Started core run at 1335
	178										
	179								M		
	180								Cl		water loss during coring
	181								M		
	182										
	183				10.0/10.0 = 100% REC				Cl		
	184										
	185						X		M I		stopped core run at 1445
	186										
SILTSTONE as above, except intense to slight fracture spacing.	187	RUN 17			7.5/10.0 = 75 RQD		50	CG CG CS CG	Cl	75 min/10 ft = 7.5 min/ft	Started core run at 1505
	188						5		S		
	189								M		water loss during coring
	190						60		Cl		
	191							CG	M		
	192						5				
	193						5		Cl		
	194				10.0/10.0 = 100% REC		60				

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LOG OF BORING MW-10D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: SKETCH	ROCK CORE: CONDO.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
		RUN 17	(cont)					CG	CI, I		Stopped core run at 1620
	196							CS, CP	CI		Started core run at 1645
SILTSTONE as above, except close to slight fracture spacing.	197								S		
	198							CG	M		
	199							CG	S		
	200							CG		8.5 min/ft	Substantial water loss during coring (≈ 700 gal)
	201	RUN 18			5.5/10.0 = 55 RQD			CS	CI	"	
201.4					7.7/10.0 = 77% REC			CP		85 min/10 ft	
ARGILLACEOUS LIMESTONE; moderate hardness, moderate strength, slightly weathered, fine grained (micritic), mottled, dessication cracks, close fracture spacing, light gray (N7) to dark gray (N3).	202										
	203							CS			
	204						NCR	NCR	NCR	NCR	Stopped core run at 1810 6/5/86
	205										
	206										6/6/86 Started core run at 0840
	207							CG			
	208							CP	CI		
	209										
MUDSTONE; low hardness, weak strength, slightly weathered, stratification indistinct, close to slight fracture spacing (20% are completely occluded with calcite cement), dark reddish brown (10R 3/4).	210										Substantial water loss during coring (≈ 1000 gal)
	211	RUN 19			4.1/9.0 = 46 RQD				S	90 min/9 ft = 10 min/ft	
	212				8.5/9.0 = 94% REC			CG	CI		
213.0									M		
	213										
ARGILLACEOUS, DOLOMITIC LIMESTONE; moderate hardness, moderate strength, slightly weathered, fine grained (micritic), rippled, horizontally laminated, mottled, dessication cracks, intense to slight fracture spacing, stratigraphic dip is 20°, light gray (N7) to dark gray (N3).	214					dessication cracks, mottled			CI		Stopped core run at 1010
	215						NCR	NCR	NCR	NCR	
	216				RQD			CG	CI, S		Started core run at 1050
	217	RUN 20			6.3/10.0 = 63	rippled, horizontal laminations		CP	CI, I	90 min/10 ft = 9 min/ft	Substantial water loss during coring (≈ 1000 gal).
	218								CI		
	219							CG			

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LOG OF BORING MW-10D SHEET 10 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
221.5	221	RUN 20 (CONT.)			8.9/10.0 = 89% REC			CP	I		
SANDSTONE; moderate hardness, moderate strength, slightly weathered, fine grained, close to slight facture spacing, fenestral pores and burrows filled with equant calcite spar (fresh-water phreatic), some interparticle pores also filled with calcite, fractures are filled with two generations of cement: outer filling of siderite/ankerite with inner filling of equant calcite spar (freshwater phreatic), dark reddish brown (10R 3/4). 224.0	222						40 / 24	CG CG	M Cl		
	223								S		
	224						NCR	NCR	NCR	NCR	Stopped core run at 1220
	225								Cl		Started core run at 1335
	226	RUN 21			8.7/10.0 = 87 RQD						
	227						10		S		
	228										
	229						25		Cl		Substantial water loss during coring (≈ 900 gal.)
SANDSTONE; moderate hardness, moderate strength, slightly weathered, fine grained, close to slight fracture spacing (al completel, filled with calcite), many vugs which are partly to completely occluded with calcite cement, dark reddish brown (10R 3/4).	230									7.5 min/10 ft = 75 min/ft	
	231								M		
	232						10				
	233						5 / 5				
	234				10.0/10.0 = 100% REC				S		Stopped core run at 1450
	235						5		Cl		Started core run at 1820
	236	RUN 22			8.8/10.0 = 88 RQD			CP			
	237								Cl		
	238										
	239										Substantial water loss during coring (≈ 800 gal.)
SANDSTONE as above, except close to moderate fracture spacing.	240							CG	M		
	241								Cl		
	242									8 min/ft = 80 min/10 ft	
	243								M		
	244				10.0/10.0 = 100% REC				Cl		Stopped core run at 1940 6/6/86

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LOG OF BORING MW-10D SHEET 11 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SANDSTONE, as above.	246	RUN 23			5.0/5.0 = 100% 4.2/5.0 = 84		5	CG	CI	40 min/5 ft = 8 min/ft	Started core run at 0820 6/7/86
	247						10		M		Substantial water loss during coring (≈500 gal.).
	248								CI		
	249						6		M		Stopped core run at 0900
	250										BOTTOM OF HOLE
	251										NOTES:
	252										1) HNU readings of all soil and rock samples was 0.0.
	253										
	254										2) Water losses during coring were gradual.
	255										
	256										3) Drilling Equipment: 1500 Failing used to 250 ft., hole lastly drilled by Schramm Rota-drill-T650.
	257										
	258										
	259										
	260										4) Failing rig used a 4 3/4 IN tricone during sampling and a 10 IN tricone for casing installation, Schramm rig used a 6 IN air hammer.
	261										
	262										
	263										
	264										
	265										
	266										
	267										
	268										
	269										

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LOG OF BORING MW-11D SHEET 1 OF 11

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 128.0 ft	PROJECT NO: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 16 Sept 1986	DATE FINISHED: 3 Oct, 1986
DRILLING EQUIPMENT: See note, sheet 11	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 250.0 ft	DEPTH TO ROCK: 3.5 ft.
SIZE AND TYPE OF BIT: See note, sheet 11	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 FT.	NO SAMPLES: DIST 4	UNDIST — CORE —
CASING: —		WATER LEVEL: FIRST —	COMPL — 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: vertical	
SAMPLER: 2 in. I.D. SPLIT SPOON		INSPECTOR: Carl Varteresian	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BL/6 IN.	RECOV., %	ROCK CORE: RECOVERY/RQD (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SM, Dark Reddish Brown (10R3/4) cmf SAND, some Silt, little f. Gravel, mottled texture, dry	1	S-1	7 8 13 14	25 0.5/2.0							
	2										
(OVERBURDEN) 3.5 (BRUNSWICK FORMATION)	3										
	4										
MUDSTONE; deeply weathered, SM-SC Dark Reddish Brown (10 R 3/4) cmf SAND, some (+) Clayey Silt, dry.	5	S-2	13 13 21 27	71 1.4/2.0							
	6										
	7										
	8										
	9										
MUDSTONE; deeply/moderately weathered, SM-SC Dark Reddish Brown (10R3/4) cmf SAND, some (+) Clayey Silt, moist	10	S-3	10 19 21 27	75 1.5/2.0							
	11										
	12										
	13										
	14										
MUDSTONE; friable hardness, friable to weak strength, deeply/moderately weathered, moderately fractured, dark reddish brown (10 R 3/4).	15	S-4	26 60 100	100 1.5/1.5							
	16										
	17										
	18										
	19										

MTH 001 1227

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LOG OF BORING MW-11D

SHEET 2 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	21										
	22										
	23										
	24										9/17/86
MUDSTONE; dark reddish brown (10R3/4), dark green and tan clay present as fracture-filling cement.	25									20 min/20 feet = 1 min/ft.	10/2/86 Started drilling at 1120 Sample collected at 25 feet
	26										
	27										
	28										
	29										
30.0	30										Water expelled at a rate of 10 gal./min.
	31										
	32										
	33										
	34										
SILTSTONE; dark reddish brown (10R3/4), dark green and tan clay present as fracture-filling cement.	35										Sample collected at 35 feet
	36										
	37										
	38										
	39										
	40										
	41										
	42										
	43										
	44										Stopped drilling at 1140

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LOG OF BORING MW-11D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE, as above	46										Started drilling at 1140 Sample collected at 45 feet
	47										
	48										
	49										Water expelled at a rate of 10 gal./min.
	50										
	51										
	52										
	53										
	54										
SILTSTONE; as above	55									30 min/20 feet = 1.5 min/ft	Sample collected [illegible] feet
	56										
	57										
	58										
	59										
	60										
	61										
	62										
	63										
	64										Drilling stopped at 1210
SILTSTONE; as above, except calcite present as fracture filling cement.	65										Drilling started at 1215 Sample collected at [illegible] feet
	66										
	67										
	68										
	69										
70.0											

MTH 001 1229

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LOG OF BORING MW-11D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
CALCAREOUS SILTSTONE; dark reddish brown (10 Y 3/4), calcite occurs as void-filling cement.	71									30 min/20 feet = 1.5 min/ft	
	72										
	73										
	74										
	75										Sample collected at 75 feet
	76										
	77										Water expelled at a rate of 10 gal./min.
	78										
	79										
80.0	80										
	81										Contacts based on color change in drilling fluid.
	82										
	83										
	84										Drilling stopped at 1245
ARGILLACEOUS DOLOSTONE; very dusky red (10 R 2/2)	85									40 min/20 ft = 2.0 min/ft	Drilling started at 1255
	86										Sample collected at 85 feet
	87										
88.0	88										
	89										Water expelled at a rate of 10 gal./min.
	90										
	91										
	92										
	93										
	94										

MTH 001 1230

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LOG OF BORING MW-11D

SHEET 5 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRATURE SPACING	DRILLING RATE	REMARKS
CALCAREOUS SILTSTONE; blackish red (5 R 2/2), calcite occurs as void-filling cement.	96										Sample collected at 95 feet
	97										Contacts based on color change in drilling fluid.
98.0	98										
CALCAREOUS MUDSTONE; olive gray (5 Y 3/2) interbedded with MUDSTONE, grayish olive green (5 GY 3/2).	99										Sample collected at 99 feet
	100										
101.0	101										
ARGILLACEOUS DOLOSTONE; grayish black (N 2), fine grained (micritic).	102										Sample collected at 102 feet
	103										
	104										Drilling stopped at 1333
	105									40 min/20 feet = 2 min/ft	Drilling started at 1340
	106										
	107										
	108										
	109										
110.0	110										
MUDSTONE; olive gray (5 Y 3/2), calcite occurs as void-filling cement.	111										Sample collected at 111 feet
	112										
113.0	113										
CALCAREOUS SILTSTONE; blackish red (5 R 2/2) calcite occurs as void-filling cement	114										Sample collected at 113 feet
	115										
	116										Water expelled at a rate of 15 gal./min.
	117										
	118										
	119										

MTH 001 1231

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LOG OF BORING MW-11D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121										
	122										
	123										
	124										Drilling stopped at 1420
CALCAREOUS SILTSTONE; as above.	125									40 min/20 feet = 2.0 min/ft.	Drilling started at 1540 Sample collected at 125 feet
	126										
	127										
	128										
	129										
130.0	130										Water expelled at a rate of 15 gal/min.
	131										
	132										
	133										
	134										
MUDSTONE; blackish red (5R2/2) calcite occurs as void-filling cement.	135										Sample collected at 135 feet
	136										
	137										
	138										
	139										
140.0	140										
	141										
	142										
	143										
	144										Drilling stopped at 1620

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LOG OF BORING MW-11D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE; dark reddish brown (10R 3/4); calcite occurs as void-filling cement.	146									45 min/20 ft = 2.2 min/ft.	Drilling started at 1625
	147										Sample collected at 145 feet
	148										
	149										Water expelled at a rate of 15 gal./min
	150										
	151										
	152										
	153										
	154										
MUDSTONE; as above	155										Sample collected at 155 feet
	156										
	157										
	158										
	159										
	160										
	161										
	162										
	163										
	164										Drilling stopped at 1710
MUDSTONE; as above.	165										Drilling started at 1715
	166										
	167										Sample collected at 165 feet
	168										
	169										

MTH 001 1233

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LOG OF BORING MW-11D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD. (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	171									50 min/20 feet = 2.5 min/ft	Water expelled at a rate of 50 gal./min
	172										
	173										
	174										
MUDSTONE; as above.	175										Sample collected at 175 feet
	176										
	177										
	178										
	179										
	180										
	181										
	182										
	183										
	184										Drilling stopped at 1805 10/2/86
	185										
MUDSTONE; as above.	186									50 min/20 feet = 2.5 min/ft	10/3/86 Drilling started at 0810
	187										Sample collected at 187 feet
	188										
	189										
	190										Water expelled at a rate of 50 gal/min.
	191										
	192										
	193										
	194										

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LOG OF BORING MW-11D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE; as above											Sample collected at 195 feet
	196										
	197										Water expelled at a rate of 75 gal/min
	198										
	199										
	200										
	201										
	202										
	203										
	204										Drilling stopped at 0900
MUDSTONE; as above	205									45 min/20 ft 2.2 min/ft	Drilling started at 0905
	206										
	207										Sample collected at 205 feet
	208										
	209										Water expelled at a rate of 75 gal./min.
	210										
	211										
	212										
	213										
	214										Sample collected at 215 feet
MUDSTONE; as above	215										
	216										
	217										
	218										
	219										
220.0											

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LOG OF BORING MW-11D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	221										
	222										
	223										
	224										Drilling started at 0950
SILTSTONE; dark reddish brown (10R3/4), calcite occurs as void-filling cement.	225									50 min/20 ft = 2.2 min/ft.	Drilling started at 0950
	226										Sample collected at 225 feet
	227										
	228										
	229										
	230										Water expelled at a rate of 100 gal/min
	231										
	232										
	233										
	234										
SILTSTONE; as above	235										Sample collected at 235 feet
	236										
	237										
	238										
	239										
	240										
	241										
	242										
	243										
	244										
245.0											Drilling stopped at 1053

MTH 001 1236

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LOG OF BORING MW-11D SHEET 11 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE: dark reddish brown (10R 3/4), calcite occurs as void-filling cement.	246									12 in/5 ft = 2.5 in/ft	Drilling started at 1055 Sample collected [illegible] Drilling stopped at 1107 2/3/86
	247										
	248										
	249										
	250										BOTTOM OF HOLE
	251										NOTES: 1) HNU readings of all soil and rock samples was 0.0 ppm. 2) Water discharge rates are approximate and represent average rates of water airlifted from the aquifer during drilling 3) Drilling Equipment: Failing 1500 used to 25 ft., hole completed by Schramm Rota-drill T650. 4) Failing rig used a 4 3/4 in. tricone during sampling and a 10 in. tricone for casing installation. Schramm rig used a 6 in air hammer. 5) Cuttings from air rotary drilling were mostly fine-gravel in size.
	252										
	253										
	254										
	255										
	256										
	257										
	258										
	259										
	260										
	261										
	262										
	263										
	264										
	265										
	266										
	267										
	268										
	269										

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LOG OF BORING MW-13D

SHEET 1 OF 11

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 110.6 ft	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 19 JUNE 1986	DATE FINISHED: 2 JULY 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 11	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 250 Ft	DEPTH TO ROCK: 3.0 Ft
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 11	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10 ft.	NO SAMPLES: DIST 2; UNDIST —; CORE 25	
CASING: —		WATER LEVEL: FIRST —; COMPL —; 24 HR —	
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 IN I.D. SPLIT SPOON		INSPECTOR: GLENN WYGANT / CARL VARTERESIAN	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BL/6 IN.	RECOV., %	ROCK CORE: RECOVERY/RQD (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SW-SM -- Moderate Brown (5YR 4/4) f SAND, little Silt, dry.	1	S-1	6 7 16 16	0.7/2.0 = 35							
(OVERBURDEN) 3.0 (BRUNSWICK FORMATION)	2										
	3										
	4										
MUDSTONE, deeply weathered; SW-SM Dark Reddish Brown (10R3/4) f SAND, little Silt (as pockets), dry.	5	S-2	45 5 100/4	.7/1.4 = 50							
	6										
	7										
	8										
	9										
MUDSTONE; friable hardness, friable strength deeply/moderately weathered, intense to close fracture spacing (30% of fractures have a coating of dark green clay), several vugs (1/8"-1/4") which are partly to completely occluded with calcite cement, dark reddish brown (10R 3/4). 15.0	10	RUN 1		1.8/10.0 = 18% RQD				CS	Cl		
	11								I		
	12							CP	Cl		
	13						15	CS	I		
	14						15				
CALCAREOUS MUDSTONE; moderate hardness, moderate strength, slightly weathered, close fracture spacing, fractures are completely occluded with calcite cement, dark reddish brown (10R3/4) grading into light olive gray (5Y6/1).	15							CP	Cl		
	16						15				
	17						15	CG			
	18										
	19				8.2/10.0 = 86% REC		NCR	NCR	NCR	NCR	

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6/19/86

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	21	RUN 2			78% RQD; 3.9/5.0 =		5	CG	CI, M	20 min/5ft = 4 min/ft	Started core run at 1120 6/24/86
	22										Water level remained constant in wash tub.
	23						5	CS	CI		
24.5	24				100% REC; 5.0/5.0 =		10				
MUDSTONE; low hardness, weak strength, moderately weathered, close to slight fracture spacing, (30 % of fractures have coating of dark green clay), abundant vugs (25-35% of core, ⅛"-½"), which are partly to completely occluded by calcite cement, dark reddish brown (10R 3/4).	25						0				Stopped core run at 1140
	26	RUN 3			76% RQD; 7.6/10.0 =		0	CS	CI	45 min/10 ft = 4.5 min/ft	Started core run at 1205
	27						0				
	28							CP			
	29						5				Water loss during coring (≈ 50 gal.).
	30						0				
	31				100% REC; 10.0/10.0 =		10	CG	M		
	32										
	33						10		SI		
	34						10		CI		Stopped core run at 1250
	35	RUN 4			79% RQD; 7.9/10.0 =		8	CS	CI	40 min/10ft = 4 min/ft	Started core run at 1305
	36						20				
	37										
	38						5				
	39							CG CS			Water level remained constant in wash tub.
	40										
MUDSTONE, as above	41				100% REC; 10.0/10.0 =		15				
	42							CG			
	43										
	44						15				Stopped core run at 1345

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LOG OF BORING MW-13D SHEET 3 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE, as above	45	RUN 5			9.5/10.0 = 95% RQD		5	CG	C1	2.5 min/10ft = 2.5 min/ft	Started core run at 1355
	46										
	47										
	48						5		M		
	49						5				Water level remained constant in wash tub.
	50						10				
	51				10.0/10.0 = 100% REC		5		C1		
	52						30				
	53						5				
	54						15		S		Stopped core run at 1420
MUDSTONE, as above	55	RUN 6			7.6/10.0 = 76% RQD		0	CS	C1	45 min/10ft = 4.5 min/ft	Started core run at 1425
	56						10				
	57						10				
	58						5				
	59						5		M		Water level remained constant in wash tub.
MUDSTONE, as above except calcite-filled vugs occurs in less abundance (5-10% of core)	60						10	CG	C1		
	61				10.0/10.0 = 100% REC						
	62						10				
	63						10				
	64						20	CS	M		Stopped core run at 1510
	65						20		C1		
MUDSTONE, as above	66	RUN 7			6.3/10.0 = 63% RQD		10	CG	C1	75 min/10ft = 7.5 min/ft	Started core run at 1520
	67						10				
	68						5				Water level remained constant in wash tub.
	69						40				
							40				

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD/TN	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	ROCK CORE: DRILLING RATE	REMARKS
MUDSTONE, as above, except calcite veins occur in greater abundance (25%-35% of core)	71	RUN 7 CONTINUED			9.5/10.0 = 95% REC		5	CG	CI		
	72						5				
	73						16				
	74						10		M		Stopped core run at 1635
747											
CALCAREOUS MUDSTONE, moderate hardness, moderate strength, slightly weathered, close to slight fracture spacing, (70% of fractures are coated with calcite cement and dark green and tan clays, medium gray (N5) to dark greenish gray (5GY 4/1).	75						NCR	NCR	NCR	NCR	
	76	RUN 8			8.9/10.0 = 89% RQD		20	CS	M		Started core run at 1650
								CG	CI		
	77						0	CG	M		
								CS			
	78							CD	CI		
	79								S	8.5 min/ft	Water level constant in wash tub.
	80						10				
							5		M		
	81						16	CG			
	82						40		CI		
	83				9.7/10.0 = 97% REC				S	85 min/10 ft =	
	84										Stopped core run at 1815
											NCR 6/24/86
	85										6/25/86
CALAREOUS MUDSTONE, as above.	86	RUN 9			9.3/10.0 = 92% RQD		5	CS	CI		Started core run at 0730
	87										Changed coring bit at 85 ft., now using finer-sized diamonds.
	88								Ms		
	89										
	90						5	CS	CI		
	91				10.0/10.0 = 100% REC			CG	S	4.0 min/ft	Water level constant in wash tub
	92										
	93						20	CG		40 min/10 ft =	See page 11, note 5.
	94						20	CS CG	M		Stopped core run at 0810

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LOG OF BORING MW-13D SHEET 5 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRATURE SPACING	DRILLING RATE	REMARKS
CALCAREOUS MUDSTONE, as above 97.0	96	RUN 10			9.7/10.0 = 97%		10	CS CG CG	Cl		Started core run at 0820
	97						5	CS	M Cl		
CLAYSTONE; moderate hardness, moderate strength, slightly weathered, close to slight fracture spacing, abundant vugs (15% of core, less than 1/8" in diameter) are partially occluded with calcite cement, dark greenish gray (5GY 4/1).	98									30 min/10ft = 3 min/ft	
	99										Water level remained constant in wash tub
	100										
	101						5	CG	S		
	102										
	103										See page 11, note 5.
	104				10.0/10.0 = 100% REC		15		M		Stopped core run at 0850
	105							CS	Cl		
CLAYSTONE, as above.	106	RUN 11			8.4/10.0 = 84% RQD			CS CS	Cl		Started core run at 0905
	107										
	108						5				
	109									25 min/10ft = 2.5 min/ft	
	110							CG	S		Water level remained constant in wash tub.
	111						0				
	112										
	113						5				See page 11, note 5.
	114				10.0/10.0 = 100% REC				M		Stopped core run at 0930
	115							CS	Cl		
CLAYSTONE, as above.	116	RUN 12			9.6/10.0 = 96% RQD		5	CG	S	65 min/10ft = 6.5 min/ft	Started core run at 0940
	117										
	118						5	CG			Water level remained constant in wash tub.
	119										

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
CLAYSTONE, as above. 123.0	121–123	RUN 12 CONTINUED			9.6/10.0 = 96% REC		10, 0	CG, CS	S, CI		See page 11, note 5.
CLAYSTONE; moderate hardness, moderate strength, slightly weathered, close to moderate fracture spacing, dark greenish gray (5GY4/1) interstratified with gray sandstone having ripple laminations. 126.5	123–125						5	CG, CS	M, CI		Stopped core run at 1045
	125						NCR	NCR	NCR	NCR	
CLAYSTONE; moderate hardness, moderate strength, slightly weathered, close to slight fracture spacing, abundant vugs (15% of core, less than 1/8" in diameter) are partially occluded with calcite cement, dark greenish gray (5GY4/1).	125–135	RUN 13			9.1/10.0 = 91% RQD; 10.0/10.0 = 100% REC		15, 15, 20	CG	S	70 min/10 ft = 7 min/ft	Started core run at 1055; See page 11, note 5; Water level constant in wash tub; Stopped core run at 1205
CLAYSTONE, as above 138.0	135–138	RUN 14			7.4/10.0 = 74% RQD		10, 5, 10	CS	CI		Started core run at 1225
CLAYSTONE; moderate hardness, moderate strength, slightly weathered, close to massive fracture space, a large 70° fracture at 139.0 is filled mostly by calcite (1/8") and then lastly by chalcopyrite, chalcopyrite also occurs as isolated tetrahedrons, greenish gray (5GY6/1). 143.7	138–143				9.1/10.0 = 91% REC		50	CG, CS, CG	Ms, M, CI	35 min/10 ft = 3.5 min/ft	Substantial water loss during coring (≈450 gal.) began at 135 feet.
ARGILLACEOUS LIMESTONE; (description on sheet 7)	143–144						NCR	NCR	NCR	NCR	Stopped core run at 1300

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
ARGILLACEOUS LIMESTONE; moderate hardness, moderate strength, slightly weathered, fine grained (micritic), rippled, horizontally laminated, mottled, dessication cracks, massive fracture spacing, stratigraphic dip is 12°, greenish black (5 G 2/1). 149.2	146	RUN 15			9.7/10.0 = 97% RQD						Started core run at 1315
	147										
	148										
	149						25	CG	MV	30 min/10 ft = 3 min/ft	Substantial water loss during coring (≈300 gal.)
CALCAREOUS MUDSTONE; moderate hardness, moderate strength, slightly weathered, massive fracture spacing (all are completely occluded with calcite cement), greenish black (5 G 2/1).	150				9.8/10.0 = 98% REC						
	151										
	152										
	153										
	154										Stopped core run at 1345
	155										NCR
CALCAREOUS MUDSTONE, as above except abundant dessication cracks (1/16" to 1/8") completely filled with calcite cement, dark reddish brown (10R 3/4). 157.8	156	RUN 16			9.0/10.0 = 90% RQD				MV	65 min/10 ft = 6.5 min/ft	Started core run at 1355
	157						5	CS	cl		
ARGILLACEOUS LIMESTONE; moderate hardness, moderate strength, slightly weathered, fine grained (micritic), rippled, horizontally laminated, mottled, dessication cracks, slight to close fracture spacing, stratigraphic dip is 12°, grayish black (N2).	158						5				
	159							SG CS	M		Substantial water loss during coring (≈300 gal).
	160										
	161				10.0/10.0 = 100% REC						
	162							CG			
	163						5		S		@163, rig breaks down at 1420 (6/29/86) resumes at 0820 (6/30/86)
	164						15				Stopped core run at 0900
	165								M		
ARGILLACEOUS LIMESTONE, as above 167.0	166	RUN 17			10.0/10.0 = 100% RQD		5		M	10 min/10 ft = 5.0 min/ft	Started core run at 0920
	167							CG	S		
CALCAREOUS SILTSTONE; moderate hardness, moderate strength, slightly weathered, close to slight fracture spacing, a large 70° fracture at 166.5 is filled with calcite and isolated patches of pyrite, pyrite occurs as isolated euhedral cubes.	168						5		cl		Substantial water loss during coring (≈200 gal.)
	169						5		M		

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
CALCAREOUS SILTSTONE as above 172.3	171	RUN 17 (CONTINUED)			10.0/10.0 = 100% REC		5	GS	S, Cl, M		
SILTSTONE; moderate hardness, moderate strength, slightly weathered, close to slight fracture spacing, fractures are partially occluded with calcite cement and dark green clays, olive black (5Y 2/1).	172										
	173						50		S		
	174										Stopped core run at 1010
	175	RUN 18			9.1/10.0 = 91% RQD		75	GS	Cl		Started core run at 1025
	176						40, 70				
	177										
	178						70	CG	M		Substantial water loss during coring (≈ 150 gal.)
179.6	179						70				
SILTSTONE; moderate hardness, moderate strength, slightly weathered, close to slight fracture spacing, fractures completely occluded with calcite cement and dark green and tan clays, abundant vugs (1/8" - 1/2") are filled with calcite cement, dark reddish brown (10 R 3/4).	180				10.0/10.0 = 100% REC					50 min/10 ft = 5 min/ft	
	181						70				
	182						75	CS			
	183							CG	S		
	184						20		Cl		Stopped core run at 1115
	185	RUN 19			9.7/10.0 = 97% RQD		75		Started core run at 1215		
	186								M		
	187						70				
	188								Sl		
SILTSTONE as above	189						15	CG	Cl		Substantial water loss during coring (≈ 200 gal.)
	190										
	191				10.0/10.0 = 100% REC					60 min/10 ft = 6 min/ft	
	192						70		Sl		
	193										
	194										Stopped core run at 1315

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE, as above	196–204	RUN 20			9.4/10.0 = 94% REC; 8.3/10.0 = 83% RQD		10, 10, 15, 10, 5	CS, CG, CG, CS, CG, CP	C, M, Cl, M, Cl	30 min/10 ft = 3 min/ft	Started core run at 1325; substantial water loss during coring (≈200 gal.); stopped core run at 1355
	204–205						NCR	NCR	NCR	NCR	
SILTSTONE, as above except vugs less abundant and of smaller size (1/16"–1/8"), fractures are partially filled with calcite	205–215	RUN 21			10.0/10.0 = 100% REC; 9.5/10.0 = 95% RQD		15, 15, 0, 10, 5	CG, CS, CG, CS, CG, CS	Cl, M, Cl	45 min/10 ft = 4.5 min/ft	Started core run at 1405; Substantial water loss during coring (≈150 gal.). See page 11, note 5. stopped core run at 1450
SILTSTONE, as above	215–219	RUN 22			9.1/10.0 = 91% RQD		5, 0, 5	CG	Sl	45 min/10 ft = 4.5 min/ft	Started core run at 1505; Substantial water loss during coring (≈150 gal.).

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE: FRACTURE SPACING	DRILLING RATE	REMARKS
	221	RUN 22 (CONTINUED)			10.0/10.0 = 100% REC		5	CG	M		
	222						5		CI		See page 11, note 5.
	223								M		
	224										Stopped core run at 1550
	225							CS	CI		
	226	RUN 23			9.5/10.0 = 95% RQD		5	CS	CI		Started core run at 1605
	227										See page 11, note 5.
	228						10		M		
	229						15	CG		50 min/10 ft = 5 min/ft	Substantial water loss during coring (≈150 gal.)
	230						5				
SILTSTONE, as above except abundant vugs (1/8-1/4") are filled with calcite, fractures are completely occluded with calcite.	231				10.0/10.0 = 100% REC				CI		
	232						10				
	233							CS	M		
	234						15	CG			stopped core run at 1655
	235								CI		
	236	RUN 24			10.0/10.0 = 100% RQD		5		M		Started core run at 1710
	237								CI		
	238							CG	M		
SILTSTONE, as above	239								CI		Substantial water loss during coring (≈180 gal).
	240						5	CS	S		
	241								CI		
	242						5		S	45 min/10 ft = 4.5 min/ft	
	243								CI		
	244						10	CG	M		Stopped core run at 1755

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LOG OF BORING MW-13D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE SKETCH	ROCK CORE: FRACTURE COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	246	RUN 25			46/5.0 = 92% RQD				S	25 min/5ft = 5 min/ft	Started core run at 1810
	247										
	248						25	CG			
	249				5.0/5.0 = 100% REC				M		Stopped core run at 1835
SILTSTONE, as above	250										BOTTOM OF HOLE
	251										NOTES: 1) HNU readings of all soil and rock samples was 0.0
	252										2) Water losses during coring began at 135 feet, and thereafter were gradual.
	253										
	254										
	255										3) Drilling Equipment: 1500 Failing used to 20 ft, wire-line Mobile used for subsequent rock coring, hole lastly drilled by Schramm Rotadrill T650.
	256										
	257										
	258										
	259										
	260										4) Failing rig used a 4 3/4 IN tricone during sampling and a 10 IN tricone for casing installation, Schramm rig used a 6 IN air hammer.
	261										
	262										
	263										
	264										
	265										5) Rock core from 90 to 130 feet, and from 210 to 230 feet was vandalized prior to field descriptions. The recorded data represents an attempted reconstruction.
	266										
	267										
	268										
	269										

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LOG OF BORING MW-14D

SHEET 1 OF 7

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 73.1 ft.	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 18 Sept. 1986	DATE FINISHED: 1 Oct. 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 7	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 150.0 ft.	DEPTH TO ROCK: 1.0 ft.
SIZE AND TYPE OF BIT: SEE NOTE SHEET 7	SIZE AND TYPE CORE BARREL: NX DOUBLE-WALLED, 10ft	NO. SAMPLES: DIST 2	UNDIST —; CORE —
CASING: —		WATER LEVEL: FIRST —	COMPL. —; 24 HR —
CASING HAMMER: WEIGHT (LB) —	DROP (IN) —	BORING ANGLE AND DIRECTION: VERTICAL	
SAMPLER: 2 in. I.D. SPLIT SPOON		INSPECTOR: CARL VARTERESIAN	
SAMPLER HAMMER: WEIGHT (LB) 140	DROP (IN) 30		

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BLA/IN.	RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SM-SC - Dark Reddish Brown (10R 3/4) cm f SAND, some (+) Clay Silt, little (OVERBURDEN) & f Gravel, dry 1.0		S-1	9 50/1	0.3/0.5 = 67							Refusal at 7" depth probably due to quartzite cobble.
(BRUNSWICK FORMATION)	1										
	2										
	3										
	4										
MUDSTONE; friable hardness, friable strength, deeply/moderately weathered, moderately fractured (fractures up to 0.1 inch thick and completely occluded by dark green and tan clay) dark reddish brown (10R 3/4)	5	S-2	40 70 100/4	1.3/1.3 = 100							
	6										
	7										
	8										
	9										
	10										
	11										
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										9/16/86 10/1/86 Drilling Started at 0942

MTH 001 1249

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LOG OF BORING MW-14D

SHEET 2 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD, (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE; dark reddish brown (10R 3/4).	21									8 min./6 ft = 1.3 min/ft	Sample collected at 20 feet
	22										
	23										
	24										Drilling stopped at 0950
	25										Drilling started at 1105
	26										
	27										
	28										
	29										Water expelled at a rate of 10 gal/min
	30										
	31										
	32										
	33										
	34										
MUDSTONE; dark reddish brown (10 R 3/4), fractures coated with dark green and tan clay.	35									30 min/20 feet = 1.5 min/ft	Sample collected at 35 feet
	36										
	37										
	38										
	39										
	40										
	41										
	42										
	43										
	44										Drilling stopped at 1135

MTH 001 1250

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LOG OF BORING MW-14D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
MUDSTONE; as above, except calcite occures as fracture-filling cement.	46										Drilling Started at 11:40 Sample collected at 45 feet
	47										
	48										
	49										
50.0	50										
	51										Water expelled at a rate of 15 gal/min.
	52										
	53										
	54										
SILTSTONE; dark reddish brown (10R 3/4), fractures coated with clay and calcite cement.	55									10 min/20 feet = 1 min/ft.	Sample collected at 55 feet
	56										
	57										
	58										
	59										
	60										
	61										
	62										
	63										
	64										Drilling stopped at 1205
SILTSTONE; as above	65										Drilling started at 1205 Sample collected at 65 feet
	66										
	67										
	68										
	69										

MTH 001 1251

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LOG OF BORING MW-14D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	71										
	72										
	73										
	74										
SILTSTONE; as above.	75									25 min/20 feet = 1.3 min/ft	Sample collected at 75 feet
	76										
	77										Water expelled at a rate of 15 gal/min
	78										
	79										
	80										
	81										
	82										
	83										
	84										Drilling stopped at 1230
SILTSTONE; as above.	85									30 min/20 feet = 1.5 min/ft	Drilling started at 1235
	86										
	87										Sample collected at 85 feet
	88										
	89										
	90										
	91										
	92										
	93										
	94										

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LOG OF BORING MW-14D

SHEET 5 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE; as above											Sample collected at 95 feet
	96										
	97										
	98										Water expelled at a rate of 15 gal/min
	99										
	100										
	101										
	102										
	103										
	104										Drilling stopped at 1300
SILTSTONE; as above	105									35 min/20 feet - 1.8 min/ft	Drilling started at 1310 [illegible] at [illegible] feet
	106										
	107										
	108										
	109										
	110										
	111										
	112										
	113										Water expelled at a rate of 20 gal/min
	114										
SILTSTONE; as above, except fracture-filling clay and calcite are present in lower abundances.	115										Sample collected at 115 feet
	116										
	117										
	118										
	119										

MTH 001 1253

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LOG OF BORING MW-14D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121										
	122										
	123										
	124										Drilling stopped at 1345
SILTSTONE; as above	125										Drilling started at 1350
	126										
	127										Sample collected at 125 feet
	128										
	129										
	130										Water expelled at a rate of 50 gal/min
131.0	131										
	132									45 min/20 ft = 2.3 min/ft.	
	133										Contacts based on color change of drilling fluid
	134										
ARGILLACEOUS DOLOSTONE; very dusky red (10 R 2/2), fine grained (micritic), calcite occurs as fracture-filling cement.	135										Sample collected at 135 feet
137.0	136										
	137										
	138										
	139										
	140										
	141										
	142										
	143										
	144										Drilling stopped at 1435

MTH 001 1254

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LOG OF BORING MW-14D

SHEET 7 OF 7

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
SILTSTONE, dark reddish brown (10R 3/4), calcite and clay occurs as fracture-filling cement.	146									10 min/5 ft = 2 min/ft	Drilling Started at 1440 Sample collected at 145 feet
	147										
	148										
	149										Drilling stopped at 1450 10/1/86
	150										BOTTOM OF HOLE
	151										NOTES:
	152										1) HNU readings of all soil and rock samples was 0.0 ppm
	153										
	154										
	155										2) Water discharge rates are approximate and represent average rates of water airlifted from aquifer during drilling
	156										
	157										
	158										
	159										3) Drilling Equipment: Failing 1500 used to 19.0 ft, hole completed by Schramm Rotadrill T650.
	160										
	161										
	162										
	163										
	164										4) Failing rig used a 4¾ in. tricone during sampling and a 10 in tricone for casing installation. Schramm rig used a 6 in. air hammer.
	165										
	166										
	167										
	168										5) Cuttings from air rotary drilling were mostly fine-gravel in size.
	169										

MTH 001 1255

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LOG OF BORING MW-15D

SHEET 1 OF 11

PROJECT AND LOCATION: MTHD/RHMW SITE, SOMERSET CO., NEW JERSEY		SURFACE ELEVATION: 123.9	PROJECT NO.: 84C4007 A
DRILLING AGENCY: WARREN GEORGE, INC.	FOREMAN: TONY TIRRO	DATE STARTED: 13 JUNE 1986	DATE FINISHED: 26 JUNE 1986
DRILLING EQUIPMENT: SEE NOTE, SHEET 11	DRILLING MUD USED: BENTONITE (QUIK GEL)	COMPLETION DEPTH: 250.0 Ft.	DEPTH TO ROCK: 2.5 Ft.
SIZE AND TYPE OF BIT: SEE NOTE, SHEET 11	SIZE AND TYPE CORE BARREL: —	NO SAMPLES: DIST 4	UNDIST — CORE —
CASING: —		WATER LEVEL: FIRST —	COMPL — 24 HR —
CASING HAMMER: —	WEIGHT (LB): —	DROP (IN): —	BORING ANGLE AND DIRECTION: VERTICAL
SAMPLER: 2 IN. I.D. SPLIT SPOON			
SAMPLER HAMMER	WEIGHT (LB): 140	DROP (IN): 30	INSPECTOR: J. SCARROW/C. SFORZA

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	PENETR. RESIST. BL/6 IN.	RECOV., %	ROCK CORE: RECOVERY/RQD (%)	BEDDING	FRACTURE: SKETCH	COND.	FRACTURE SPACING	DRILLING RATE	REMARKS
SM-SC -- Moderate Brown (5YR4/4) mf SAND, some Silt & Clay, dry.	1	S-1	7 8 8 10	11.5/24 = 48							
(OVERBURDEN) 3.0 (BRUNSWICK FORMATION)	3										
MUDSTONE, deeply weathered; SM-SC -- Dark Reddish Brown cmf SAND, some clay & Silt, moist.	6	S-2	12 16 26 30	18/24 = 75							
SAME, but dry.	11	S-3	12 13 20 22	18/24 = 75							
SAME, but dry.	16	S-4	13 19 100/4	8.5/16 = 53							

MTH 001 1256

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	46										
	47										
	48										
	49										
	50										
	51										
	52										
	53										
	54										
MUDSTONE, as above.	55										Cuttings collected from 55 feet.
	56										
	57										
	58										
	59										
60 ?	60										
	61										
	62										
	63										
SANDSTONE; dark reddish brown (10R3/4), calcite occurs as fracture-filling cements.	64										
	65										Cuttings collected from 65 feet.
	66										
	67										
	68										MTH 001 1257
	69										
70 ?											

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	21										
	22										
	23										
	24										
MUDSTONE; dark reddish brown (10R3/4), calcite occurs as fracture-filling cement.	25										Cuttings collected from 25 feet. Stopped drilling 6/13/86
	26										6/25/86
	27										Started drilling
	28										
	29										
	30										
	31										
	32										
	33										
	34										
MUDSTONE, as above.	35										Cuttings collected from 35 feet.
	36										
	37										
	38										
	39										
	40										
	41										
	42										
	43										
	44										
MUDSTONE, as above.											Cuttings collected from 45 feet.

MTH 001 1258

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	71										
	72										
	73										
	74										
MUDSTONE; dark reddish brown (10R3/4), calcite occurs as fracture-filling cement.	75										Cuttings collected from 75 feet.
	76										
	77										
	78										
	79										
	80										
	81										
	82										
	83										
	84										
MUDSTONE, as above.	85										Cuttings collected from 85 feet.
	86										
	87										
	88										
	89										
	90										
	91										
	92										
	93										
	94										Cuttings collected from 95 feet.
MUDSTONE, as above.											

MTH 001 1259

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRATURE SPACING	DRILLING RATE	REMARKS
	96										
	97										
	98										
	99										
100?	100										
	101										
	102										
	103										
	104										
SILTSTONE; dark reddish brown (10R3/4), calcite occurs as fracture-filling cement.	105										Cuttings collected from 105 feet.
	106										
107.5	107										
	108										
	109										
	110										
	111										
	112										
	113										
	114										
DOLOMITIC LIMESTONE; brownish black (5YR2/1), fine grained (micritic).	115										Cuttings collected from 115 feet.
	116										
	117										
	118										
	119										
120?											

MTH 001 1260

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	121										
	122										
	123										
	124										
ARGILLACEOUS LIMESTONE; dark gray (N3), fine grained (micritic), Calcite occurs as fracture-filling cement.	125										Cuttings collected from 125 feet.
	126										
	127										
	128										
	129										
	130										
	131										
	132										
	133										
	134										Cuttings collected from 135 feet.
ARGILLACEOUS LIMESTONE, as above.	135										6/13/86 6/26/86 Added rod, 1143
	136										
	137										
	138										
	139										
	140										Water expelled at a rate of 50 gal./min., very dark gray in color.
	141										
	142										
	143										
	144										
ARGILLACEOUS LIMESTONE, as above.											Cuttings collected from 145 feet.

MTH 001 1261

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	146									37 min./20 ft = 1.8 min./ft	
	147										
	148										
	149										
150	150										Contact based on color change in drilling fluid, its now light gray in color.
	151										
	152										
	153										
CLAYSTONE; black (N1), pyrite occurs as isolated framboids.	154										Cuttings collected from 155 feet. Stopped drilling, 1220
	155									50 min./10 ft = 5.0 min./ft	Added rod, 1220
	156										
	157										
	158										
	159										Water expelled at a rate of 50 gal./min., light gray in color
	160										
	161										
	162										
	163										At 164 feet, drilling fluid changed to light tan.
164	164										Cuttings collected from 165 feet. Stopped drilling, 1310
ARGILLACEOUS LIMESTONE; dark gray (N3), fine grained (micritic), pyrite occurs as isolated framboids.	165								MTH 001 1262		Added rod, 1310
	166										
	167										
	168										Water expelled at a rate of 50 gal./min., light gray in color.
	169										

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BLS/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	171									57 min/10 ft = 5.7 min/ft	
	172										
	173										
	174										Cuttings collected from 175 feet. Stopped drilling, 1407
ARGILLACEOUS LIMESTONE, as above.	175										Added rod, 1407
	176									65 min/10 ft = 6.5 min/10 ft	
	177										
	178										
	179										Water expelled at a rate of 50 gal./min., light gray in color
180?	180										
	181										
	182										
	183										
	184										Cuttings collected from 185 feet. Stopped drilling, 1512
DOLOSTONE; dusky yellowish brown (10YR2/2), fine grained (micritic), pyrite occurs as isolated euhedral cubes.	185										Added rod, 1512
	186									48 min/ft = 4.8 min/ft	
	187										
	188										
	189										Water expelled at a rate of 50 gal./min., medium gray in color.
190?	190										
	191										
	192										
	193										
ARGILLACEOUS LIMESTONE; dark gray (N3), fine grained (micritic), calcite occurs as fracture-filling cement.	194										Cuttings collected from 195 feet. Stopped drilling, 1600

MTH 001 1263

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/ ROD. (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
	196									67 min/10ft = 6.7 min/ft	Added rod, 1600
	197										Water expelled at a rate of 50 gal./min., very dark grayish brown.
	198										
	199										
	200										
201	201										Contact based on color change in dilling fluid; its now light gray in color.
	202										
	203										
	204										Cuttings collected from 205 feet. Stopped drilling, 1707
CLAYSTONE; grayish black (N2), calcite occurs as fracture-filling cement, pyrite occurs as isolated framboids.	205									51 min/10ft = 5.1 min/ft	Added rod, 1707
	206										
	207										
	208										
	209										Water expelled at a rate of 50 gal./min., very-dark gray in color.
	210										
	211										
	212										
	213										
	214										Cuttings collected from 215 feet. Stopped drilling, 1758
CLAYSTONE, as above.	215										Added rod, 1758
	216										
	217										
	218										
	219										

MTH 001 1264

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
221	221										Drilling fluid dark gray. Contact based on color change in fluid.
	222										Water expelled at a rate of 50 gal./min., dark brown in color.
	223										
MUDSTONE; dark reddish brown (10R 3/4), calcite occurs as fracture-filling cement	224									7.2 min./10 ft = 7.2 min/ft	cuttings collected from 225 feet. Stopped drilling, 1910.
	225										Added rod, 1910
	226										
	227										
	228										Water expelled at a rate of 50 gal./min., reddish brown in color.
	229										
	230									42 min./10 ft = 4.2 min/ft	
	231										
	232										
	233										
	234										cuttings collected from 235 feet. Stopped drilling, 1952
MUDSTONE, as above.	235										Added rod, 1952
	236										
	237										
	238										Water expelled at a rate of 50 gal./min., reddish brown in color.
	239										
	240							MTH 001 1265			
	241									48 min/10 ft = 4.8 min/ft	
	242										
	243										
	244										cuttings collected from 245 feet. Stopped drilling, 2045
MUDSTONE, as above.											

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOG OF BORING MW-15D

SHEET 11 OF 11

DESCRIPTION	DEPTH, FT	SAMPLES: TYPE NO. LOC.	SAMPLES: PENETR. RESIST. BL/6 IN.	SAMPLES: RECOV., %	ROCK CORE: RECOVERY/RQD (%)	ROCK CORE: BEDDING	ROCK CORE: FRACTURE: SKETCH	ROCK CORE: FRACTURE: COND.	ROCK CORE: FRACTURE SPACING	DRILLING RATE	REMARKS
											Added rod, 2040
	246										
	247										Water expelled at a rate of 50 gal./min., reddish brown in color.
	248										
	249									17 min/5ft = 3.4 min/ft	cuttings collected from 250 feet
MUDSTONE, as above.	250										stopped drilling, 2057
	251										BOTTOM OF HOLE
	252										NOTES:
	253										1) HNU readings of all soil and rock samples was 0.0.
	254										2) water-discharge rates are approximate and represent average rates of water airlifted from the aquifer during drilling.
	255										
	256										
	257										3) Drilling Equipment: 1500 Failing used to 26 ft., hole completed by Schramm Rota-drill-T650.
	258										
	259										
	260										4) Failing rig used a 4 3/4 IN tricone for casing installation, Schramm rig used a 6 IN air hammer.
	261										
	262										
	263										5) Cuttings from air rotary drilling were mostly fine-gravel in size.
	264										
	265										
	266										
	267										
	268										
	269										

MTH 001 1266

Appendix D

APPENDIX D
MONITORING WELL INSTALLATION REPORTS

MTH 001 1268

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-1S	O.C. 101.97 ft. I.C. 100.60 ft.	8404007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	16 JUNE 1986	16 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

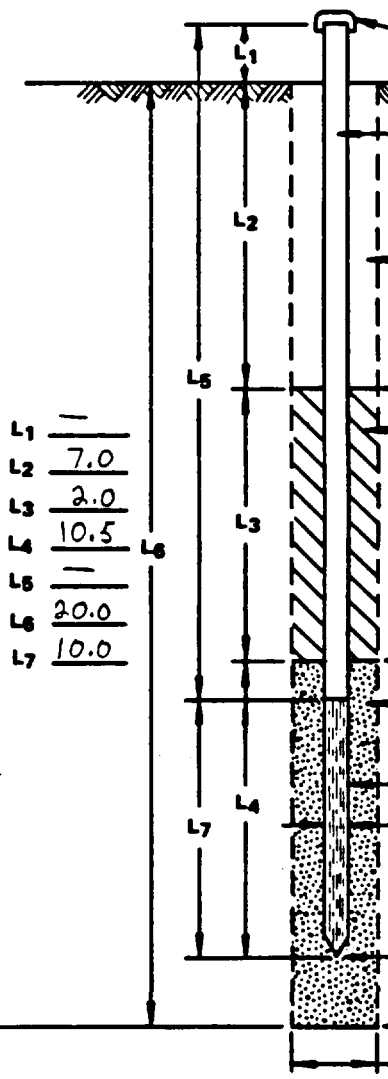
BORING

DEPTH IN FT	DESCRIPTION
0	
	MUDSTONE, dark reddish brown.
4	
	WEATHERED BEDROCK 7.0
	COMPETENT BEDROCK
8	
	MUDSTONE, dark reddish brown.
12	
16	16.5
	GYPSUM, light gray. 17.0
	CALCAREOUS CLAYSTONE, blackish red.
20	

MONITORING WELL

TYPE OF MONITORING WELL: weathered bedrock

GROUND ELEV. 99.5 ft. TOP OF RISER ELEV. see above



L1	—
L2	7.0
L3	2.0
L4	10.5
L5	—
L6	20.0
L7	10.0

VENTED CAP

I.D. OF RISER PIPE: 4.0 in.

TYPE OF PIPE: Stainless steel

TYPE OF BACKFILL AROUND RISER: cement-bentonite grout

TOP OF SEAL ELEV. 92.5 ft.

TYPE OF SEAL MATERIAL: bentonite pellets

TOP OF FILTER ELEV. 90.5 ft.

TYPE OF FILTER MATERIAL: no. 2 morie sand

SIZE OF OPENINGS: 0.01 in.

DIAMETER OF MONITOR WELL TIP: 4.0 in.

BOTTOM OF MON. WELL ELEV. 80.0 ft.

BOTTOM OF BORING ELEV. 79.5

DIAMETER OF BORING: 8.0 in.

REMARKS: 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) developme air lifted until dry, surged with 30 gallons of Rocky-Hill water, immediately air lifted again for approximately 15 minutes (became dry). Water jetted along entire screen length for 25 minutes using RockyHill water, air lifted approx. 15 min until dry.

INSPECTED BY: Jim Scarrow

--- CLYDE CONSULTANTS

MTH 001 1269

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-2S	O.C. 61.19 ft. I.C 61.09 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	9 Oct. 1986	9 Oct 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

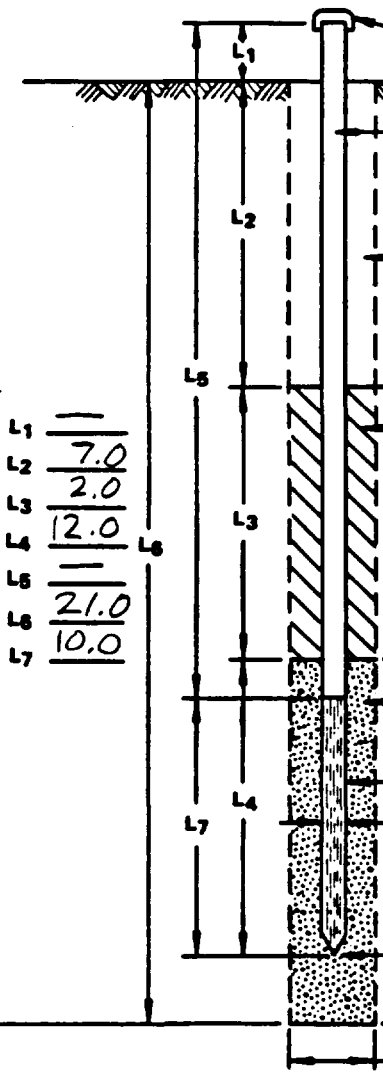
DEPTH IN FT	DESCRIPTION
0	
	MUDSTONE, dark reddish brown
4.2	
	(WEATHERED BEDROCK) 7.0
	(COMPETENT BEDROCK)
8.4	
	MUDSTONE, dark reddish brown
12.6	
16.8	
21.0	

MONITORING WELL

TYPE OF MONITORING WELL: WEATHERED BEDROCK

GROUND ELEV. 61.4 ft.

TOP OF RISER ELEV. See above



L_1	—
L_2	7.0
L_3	2.0
L_4	12.0
L_5	—
L_6	21.0
L_7	10.0

VENTED CAP

I.D. OF RISER PIPE: 4.0 in.

TYPE OF PIPE: stainless steel

TYPE OF BACKFILL AROUND RISER: cement-bentonite grout

TOP OF SEAL ELEV. 54.4 ft.

TYPE OF SEAL MATERIAL: bentonite pellets

TOP OF FILTER ELEV. 52.4 ft.

TYPE OF FILTER MATERIAL: no. 1 morie sand

SIZE OF OPENINGS: 0.010 in.

DIAMETER OF MONITOR WELL TIP: 4.0 in.

BOTTOM OF MON. WELL ELEV. 40.4 ft.

BOTTOM OF BORING ELEV. 40.4

DIAMETER OF BORING: 8.0 in

REMARKS: 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking flush mounted protective outer cover 4) development: air lifted until dry, allowed to recover, air lifted again until dry, repeated procedure for 1 hour (water expelled from hole had slight brown color at end of development). water jetted along entire screen length for 25 min. using Rocky Hill water, air lifted until dry.

INSPECTED BY: CARL VARTERESIAN

WOODWARD-CLYDE CONSULTANTS

MTH 001 1270

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-35	O.C. 142.71 ft. I.C. 142.64 ft.	84C4007 A28
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	18 JUNE 1986	19 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

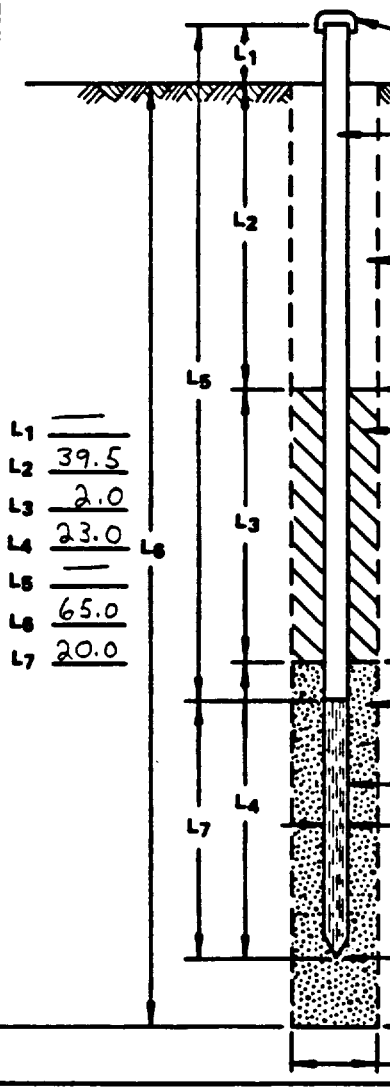
BORING

DEPTH IN FT	DESCRIPTION	
0	OVERBURDEN	3.0
	MUDSTONE, dark reddish brown.	18.5
	SANDSTONE, yellowish brown.	
	WEATHERED BEDROCK	50.0
	COMPETENT BEDROCK	
	SANDSTONE, yellowish brown.	53.5
	ANHYDRITE, light brown	55.4
	MUDSTONE, dark reddish brown.	
65		

MONITORING WELL

TYPE OF MONITORING WELL: weathered bedrock

GROUND ELEV. 141.8 ft. TOP OF RISER ELEV. See above



L1	—
L2	39.5
L3	2.0
L4	23.0
L5	—
L6	65.0
L7	20.0

VENTED CAP

I.D. OF RISER PIPE: 4.0 in.

TYPE OF PIPE: stainless steel

TYPE OF BACKFILL AROUND RISER: cement - bentonite grout

TOP OF SEAL ELEV. 102.3 ft.

TYPE OF SEAL MATERIAL: bentonite pellets

TOP OF FILTER ELEV. 100.3 ft

TYPE OF FILTER MATERIAL: no. 1 morie sand

SIZE OF OPENINGS: 0.01 in.

DIAMETER OF MONITOR WELL TIP: 4.0 in.

BOTTOM OF MON. WELL ELEV. 77.3 ft

BOTTOM OF BORING ELEV. 76.8

DIAMETER OF BORING: 8.0 in.

REMARKS: 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) developed air lifted until dry, surged with 30 gallons of Rocky-Hill water, immediately air lifted again for approximately 15 minutes (became dry). water jetted along entire screen length for 25 minutes using Rocky Hill water, air lifted until dry.

INSPECTED BY: Jim Scarrow

WOODWARD-CLYDE CONSULTANTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SUMMERSET, NJ	MW-4S	O.C. 124.24 ft. I.C. 123.43 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	16 SEPT, 1986	16 SEPT, 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

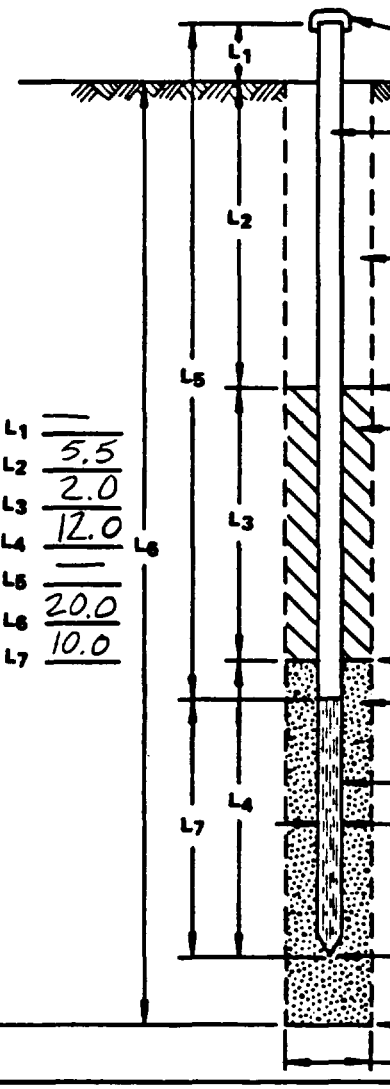
DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN 3.5
4	MUDSTONE dark reddish brown
8	
	WEATHERED BEDROCK 10.0
	COMPETENT BEDROCK
12	MUDSTONE, dark reddish brown
16	
20	

MONITORING WELL

TYPE OF MONITORING WELL weathered bedrock

GROUND ELEV. 122.8 ft. TOP OF RISER ELEV. see above

L1	—
L2	5.5
L3	2.0
L4	12.0
L5	—
L6	20.0
L7	10.0



VENTED CAP

I.D. OF RISER PIPE 4.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement-bentonite grout

TOP OF SEAL ELEV. 117.3 ft.

TYPE OF SEAL MATERIAL bentonite pellets

TOP OF FILTER ELEV. 115.3 ft

TYPE OF FILTER MATERIAL no. 1 mine sand

SIZE OF OPENINGS 0.010 in.

DIAMETER OF MONITOR WELL TIP 4.0 in.

BOTTOM OF MON. WELL ELEV. 103.3

BOTTOM OF BORING ELEV. 102.8

DIAMETER OF BORING 8.0 in.

REMARKS 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) development: air lifted until dry, water jetted along entire screen length for 25 min using Rocky Hill water, air lifted until dry, allowed to recover, air lifted until dry, repeated procedure for 30 minutes.

INSPECTED BY CARL VARTERESIAN

WOODWARD-CLYDE CONSULTANTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-5S	O.C. 142.76 ft. I.C. 141.73 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	25 Sept 1986	25 Sept 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

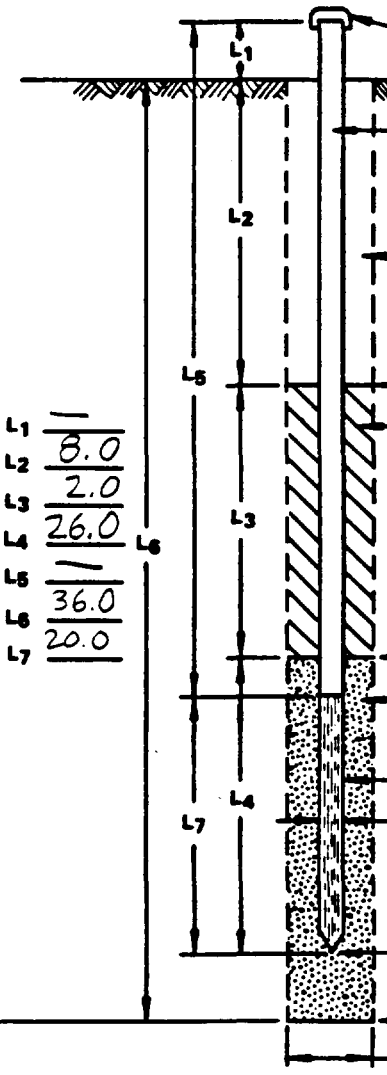
DEPTH IN FT	DESCRIPTION
0	
7.2	OVERBURDEN 8.5
14.4	MUDSTONE, dark reddish brown
21.6	
	WEATHERED BEDROCK / COMPETENT BEDROCK 26.0
28.8	MUDSTONE, dark reddish brown
36.0	

MONITORING WELL

TYPE OF MONITORING WELL: WEATHERED BEDROCK

GROUND ELEV. 141.6 ft. TOP OF RISER ELEV. See above

L1 —
L2 8.0
L3 2.0
L4 26.0
L5 —
L6 36.0
L7 20.0



VENTED CAP

I.D. OF RISER PIPE 4.0 in

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement-bentonite grout

TOP OF SEAL ELEV. 133.6 ft.

TYPE OF SEAL MATERIAL bentonite pellets

TOP OF FILTER ELEV. 131.6 ft.

TYPE OF FILTER MATERIAL no. 1 morie sand

SIZE OF OPENINGS 0.01 in.

DIAMETER OF MONITOR WELL TIP 4.0 in.

BOTTOM OF MON. WELL ELEV. 105.6 ft

BOTTOM OF BORING ELEV. 105.6

DIAMETER OF BORING 8.0 in

REMARKS 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installing; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking 3 in. I.D. protective casing; 4) development: air lifted until dry, surged with 30 gallons of Rocky Hill water, air lifted again for approximately 15 min (until dry), repeated for 2½ hours until evacuated water was clear, water jetted along entire screen length using Rocky Hill water, air lifted until dry.

INSPECTED BY C. Varteresian

—ORWARD—CLYDE CONSULTANTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO, NJ	MW-6S	O.C. 147.24 ft. I.C. 146.94 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	12 SEPT. 1986	15 Sept. 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

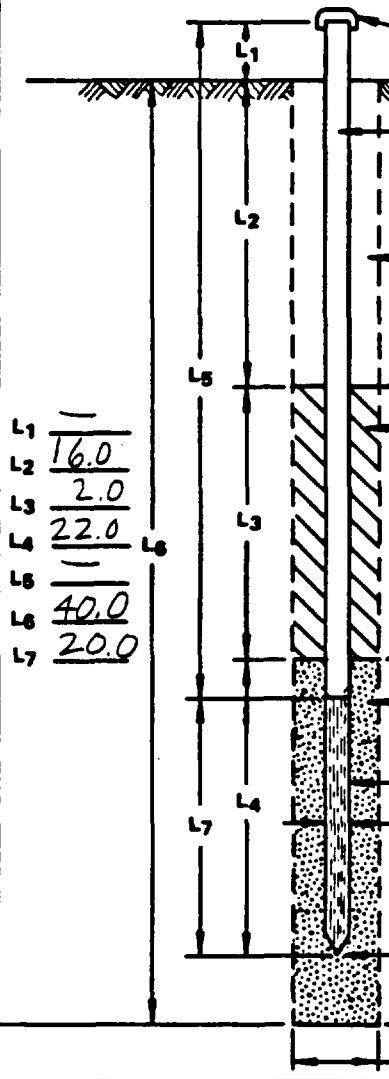
BORING

DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN 3.5
8	
	MUDSTONE, dark reddish brown
16	
24	
	WEATHERED BEDROCK 29.0
	COMPETENT BEDROCK
32	
	MUDSTONE, dark reddish brown
40	

MONITORING WELL

TYPE OF MONITORING WELL: weathered bedrock

GROUND ELEV. 145.9 TOP OF RISER ELEV. See above



L1	—
L2	16.0
L3	2.0
L4	22.0
L5	—
L6	40.0
L7	20.0

VENTED CAP

I.D. OF RISER PIPE: 4.0 in.

TYPE OF PIPE: stainless steel

TYPE OF BACKFILL AROUND RISER: cement-bentonite grout

TOP OF SEAL ELEV. 129.9 ft.

TYPE OF SEAL MATERIAL: bentonite pellets

TOP OF FILTER ELEV. 127.9 ft.

TYPE OF FILTER MATERIAL: no. 1 morie sand

SIZE OF OPENINGS: 0.01 in.

DIAMETER OF MONITOR WELL TIP: 4.0 in.

BOTTOM OF MON. WELL ELEV. 105.9 ft.

BOTTOM OF BORING ELEV. 105.9

DIAMETER OF BORING: 8.0 in

REMARKS: 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking 8 in I.D. protective outer casing; 4) development: air lifted until dry, surged with 40 gallons of Rocky Hill water, air lifted again for approximately 20 min (until dry), repeated procedure for 2½ hours until expelled water was clear, water jetted along entire screen length for 25 min using Rocky Hill water, air lifted until dry.

INSPECTED BY: Carl Vartereson
WOODWARD-CLYDE CONSULTANTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-75	O.C. 146.04 ft. I.C. 145.23 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	12 JUNE 1986	13 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

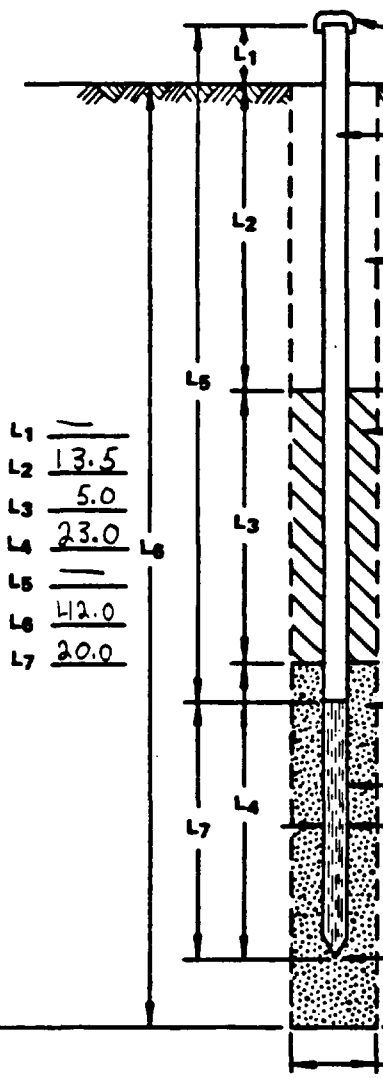
DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN
13.4	
	MUDSTONE, dark reddish brown.
	WEATHERED BEDROCK
31.0	COMPETENT BEDROCK
	MUDSTONE, dark reddish brown.
42	

MONITORING WELL

TYPE OF MONITORING WELL: Weathered bedrock

GROUND ELEV. 143.8 ft. TOP OF RISER ELEV. See above

L1 —
L2 13.5
L3 5.0
L4 23.0
L5 —
L6 42.0
L7 20.0



VENTED CAP

I.D. OF RISER PIPE 4.0 in.

TYPE OF PIPE Stainless steel

TYPE OF BACKFILL AROUND RISER cement-bentonite grout

TOP OF SEAL ELEV. 130.3 ft.

TYPE OF SEAL MATERIAL bentonite pellets

TOP OF FILTER ELEV. 125.3 ft.

TYPE OF FILTER MATERIAL no. 2 morie sand

SIZE OF OPENINGS 0.01 in.

DIAMETER OF MONITOR WELL TIP 4.0 in.

BOTTOM OF MON. WELL ELEV. 102.3 ft.

BOTTOM OF BORING ELEV. 101.8

DIAMETER OF BORING 8.0 in.

REMARKS 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) development air lifted until dry, surged with 30 gallons of Rocky-Hill water, immediately air lifted again for approximately 15 minutes (became dry). Water jetted along entire screen length using Rocky Hill water, air lifted until dry.

INSPECTED BY Jim Scarrow

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-95	O.C. 151.63 ft. I.C. 150.29 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	20 JUNE 1986	20 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

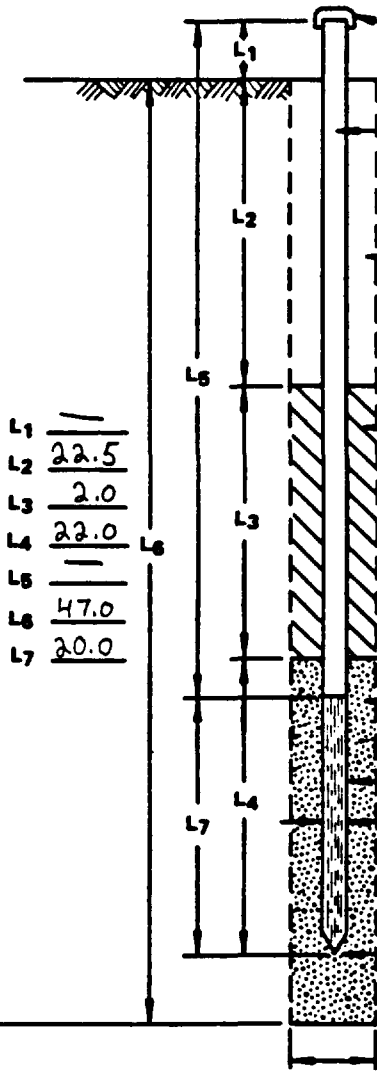
BORING

DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN
8.5	
	MUDSTONE, dark reddish brown.
	WEATHERED BEDROCK
35.0	
	COMPETENT BEDROCK
	MUDSTONE, dark reddish brown.
47	

MONITORING WELL

TYPE OF MONITORING WELL: weathered bedrock

GROUND ELEV. 149.8 ft. TOP OF RISER ELEV. See above



L1	—
L2	22.5
L3	2.0
L4	22.0
L5	—
L6	47.0
L7	20.0

VENTED CAP

I.D. OF RISER PIPE: 4.0 in.

TYPE OF PIPE: stainless steel

TYPE OF BACKFILL AROUND RISER: cement-bentonite grout

TOP OF SEAL ELEV. 127.3 ft.

TYPE OF SEAL MATERIAL: bentonite pellets

TOP OF FILTER ELEV. 125.3 ft

TYPE OF FILTER MATERIAL: no. 1 morie sand

SIZE OF OPENINGS: 0.01 in.

DIAMETER OF MONITOR WELL TIP: 4.0 in.

BOTTOM OF MON. WELL ELEV. 103.3 ft.

BOTTOM OF BORING ELEV. 102.8

DIAMETER OF BORING: 8.0 in.

REMARKS: 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) development: air lifted until dry, surged with 30 gallons of Rocky-Hill water, immediately air lifted again for approximately 15 minutes (became dry). Water jetted along entire screen length for 20 minutes using Rocky Hill water, air lifted until dry.

INSPECTED BY: Jim Scarrow

WOODWARD-CLYDE CONSULTANTS

MTH 001 1276

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-10S	O.C. 154.41 ft. I.C. 153.50 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	14 JUNE 1986	16 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

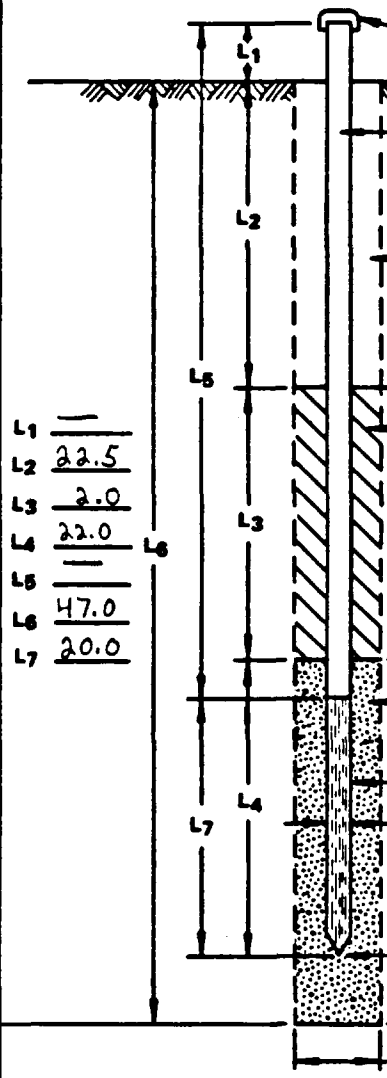
DEPTH IN FT	DESCRIPTION
0	OVERBURDEN
9.5	MUDSTONE, dark reddish brown.
34.0	WEATHERED BEDROCK / COMPETENT BEDROCK
	MUDSTONE, dark reddish brown.
47	

MONITORING WELL

TYPE OF MONITORING WELL: weathered bedrock

GROUND ELEV. 151.7 ft

TOP OF RISER ELEV. See above



L1 —
L2 22.5
L3 2.0
L4 22.0
L5 —
L6 47.0
L7 20.0

VENTED CAP

I.D. OF RISER PIPE 4.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement-bentonite grout

TOP OF SEAL ELEV. 129.2 ft.

TYPE OF SEAL MATERIAL bentonite pellets

TOP OF FILTER ELEV. 127.2 ft.

TYPE OF FILTER MATERIAL no. 2 morie sand

SIZE OF OPENINGS 0.01 in

DIAMETER OF MONITOR WELL TIP 4.0 in.

BOTTOM OF MON. WELL ELEV. 105.2 ft.

BOTTOM OF BORING ELEV. 104.7

DIAMETER OF BORING 8.0 in.

REMARKS 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) development: air lifted until dry, surged with 30 gallons of Rocky-Hill water, immediately air lifted again for approximately 15 minutes (became dry). Water jetted along entire screen length for 25 minutes using Rocky Hill water, air lifted until dry.

INSPECTED BY Jim Scarrow

WOODWARD-CLYDE CONSULTANTS

MTH 001 1277

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-11S	O.C. 130.35 ft. I.C. 129.98 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	16 SEPT 1986	17 Sept 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

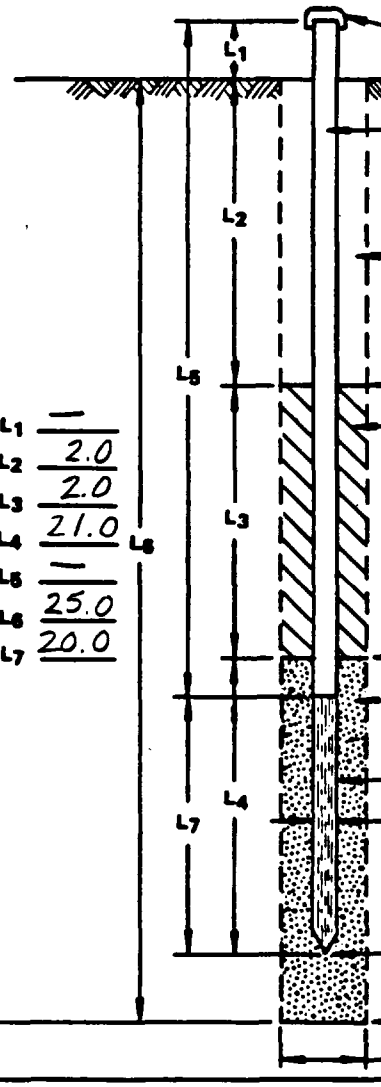
DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN 3.5
5	
	MUDSTONE, dark reddish brown
10	
15	WEATHERED BEDROCK 15.0
	COMPETENT BEDROCK
20	MUDSTONE, dark reddish brown
25	

MONITORING WELL

TYPE OF MONITORING WELL: weathered bedrock

GROUND ELEV. 128.0 ft.

TOP OF RISER ELEV. See above



L_1	—
L_2	2.0
L_3	2.0
L_4	21.0
L_5	—
L_6	25.0
L_7	20.0

VENTED CAP

I.D. OF RISER PIPE: 4.0 in.

TYPE OF PIPE: stainless steel

TYPE OF BACKFILL AROUND RISER: cement-bentonite grout

TOP OF SEAL ELEV. 126.0 ft

TYPE OF SEAL MATERIAL: bentonite pellets

TOP OF FILTER ELEV. 124.0 ft

TYPE OF FILTER MATERIAL: no. 1 MORIE SAND

SIZE OF OPENINGS: 0.010 in.

DIAMETER OF MONITOR WELL TIP: 4.0 in.

BOTTOM OF MON. WELL ELEV. 103.0 ft.

BOTTOM OF BORING ELEV. 103.0

DIAMETER OF BORING: 8.0 in

REMARKS: 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking 8 in. I.D. protective casing, 4) development: air lifted until dry, water jetted along entire screen length for 20 min using Rocky Hill water, air lifted until dry, allowed to recover air lifted until dry again, repeated procedure for 25 minutes.

INSPECTED BY: CARL VARTERESIAN

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-135	O.C. 113.37 ft. I.C. 111.81 ft.	84CH007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	19 JUNE 1986	19 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

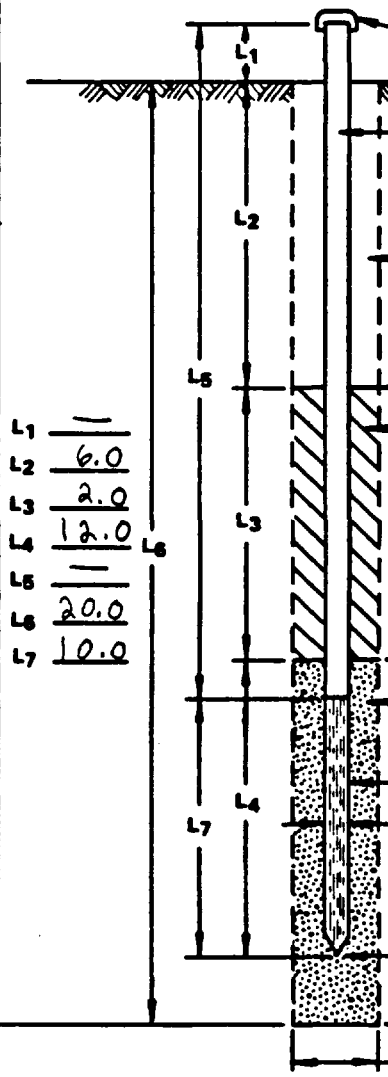
BORING

DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN 3.0
4	
	MUDSTONE, dark reddish brown.
8	
	WEATHERED BEDROCK 10.0 / COMPETENT BEDROCK
12	MUDSTONE, dark reddish brown 15.0
16	
	CALCAREOUS MUDSTONE, dark reddish brown
20	

MONITORING WELL

TYPE OF MONITORING WELL weathered bedrock

GROUND ELEV. 110.6 ft. TOP OF RISER ELEV. see above



L1 —
L2 6.0
L3 2.0
L4 12.0
L5 —
L6 20.0
L7 10.0

VENTED CAP

I.D. OF RISER PIPE 4.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement-bentonite grout

TOP OF SEAL ELEV. 104.6 ft.

TYPE OF SEAL MATERIAL bentonite pellets

TOP OF FILTER ELEV. 102.6 ft

TYPE OF FILTER MATERIAL No. 1 Morie Sand

SIZE OF OPENINGS 0.010 in.

DIAMETER OF MONITOR WELL TIP 4.0 in.

BOTTOM OF MON. WELL ELEV. 90.6 ft.

BOTTOM OF BORING ELEV. 90.6

DIAMETER OF BORING 8.0 in

REMARKS 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) development air lifted until dry, surged with 30 gallons of Rocky-Hill water, immediately air lift again for approximately 15 minutes (became dry).
Water jetted along entire screen length using Rock Hill water, air lifted until dry.

INSPECTED BY Jim Scarrow

WOODWARD-CLYDE CONSULTANTS

MTH 001 1279

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-14S	O.C. 75.82 ft. I.C. 74.71 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	18 Sept 1986	18 Sept 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

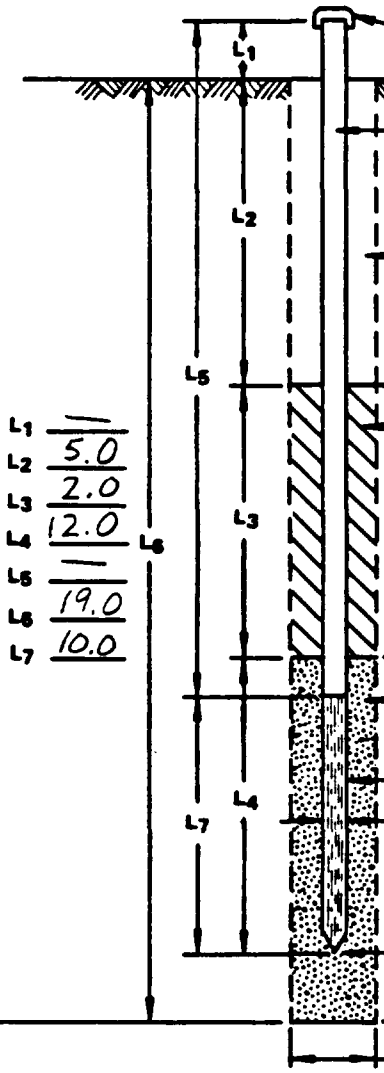
BORING

DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN 1.0
3.8	MUDSTONE, dark reddish brown
	WEATHERED BEDROCK 6.0
	COMPETENT BEDROCK
7.6	
	MUDSTONE dark reddish brown
11.4	
15.2	
19.0	

MONITORING WELL

TYPE OF MONITORING WELL: WEATHERED BEDROCK

GROUND ELEV. 73.1 ft. TOP OF RISER ELEV. See above



L1	—
L2	5.0
L3	2.0
L4	12.0
L5	—
L6	19.0
L7	10.0

VENTED CAP

I.D. OF RISER PIPE: 4.0 in.

TYPE OF PIPE: stainless steel

TYPE OF BACKFILL AROUND RISER: cement-bentonite grout

TOP OF SEAL ELEV. 68.1 ft.

TYPE OF SEAL MATERIAL: bentonite pellets

TOP OF FILTER ELEV. 66.1 ft

TYPE OF FILTER MATERIAL: No. 1 MORIE SAND

SIZE OF OPENINGS: 0.010 in.

DIAMETER OF MONITOR WELL TIP: 4.0 in.

BOTTOM OF MON. WELL ELEV. 54.1 ft.

BOTTOM OF BORING ELEV. 54.1

DIAMETER OF BORING: 8.0 in.

REMARKS: 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) development: air lifted until dry, water jetted along entire length of screen for 30 min using Rocky Hill water, air lifted until dry, allowed to recover, air lifted again, repeated procedure for 30 min.

INSPECTED BY: CARL VARTERESIAN
WOODWARD-CLYDE CONSULTANTS

MTH 001 1280

INSTALLATION REPORT
SHALLOW MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-155	O.C. 126.25 ft I.C. 125.50 ft.	84C4007 A28
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	13 JUNE 1986	14 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR & WATER JET	SEE REMARKS	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

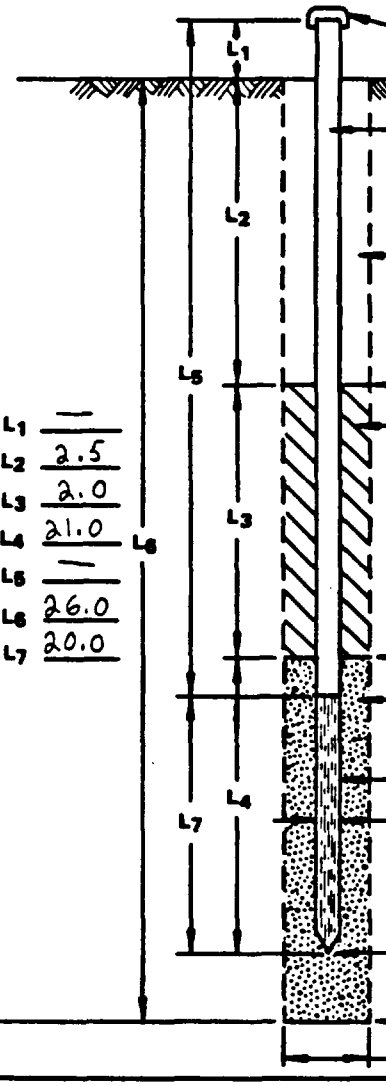
DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN 3.0
	MUDSTONE, dark reddish brown.
	WEATHERED BEDROCK 16.0
	COMPETENT BEDROCK
	MUDSTONE, dark reddish brown.
26	

MONITORING WELL

TYPE OF MONITORING WELL weathered bedrock

GROUND ELEV. 123.9 ft. TOP OF RISER ELEV. See above

L_1	—
L_2	2.5
L_3	2.0
L_4	21.0
L_5	—
L_6	26.0
L_7	20.0



VENTED CAP

I.D. OF RISER PIPE 4.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement-bentonite grout

TOP OF SEAL ELEV. 121.4 ft.

TYPE OF SEAL MATERIAL bentonite pellets

TOP OF FILTER ELEV. 119.4 ft

TYPE OF FILTER MATERIAL no. 2 morie sand

SIZE OF OPENINGS 0.010 in.

DIAMETER OF MONITOR WELL TIP 4.0 in.

BOTTOM OF MON. WELL ELEV. 98.4 ft.

BOTTOM OF BORING ELEV.

DIAMETER OF BORING 8.0 in

REMARKS 1) drilling mud was flushed out with freshwater after the completion of drilling and prior to well installation; 2) cement-bentonite seal was tremie grouted into annulus; 3) installed a locking, 8 in. I.D., protective casing; 4) development: air lifted until dry, surged with 30 gallons of Rocky-Hill water, immediately air lifted again for approximately 15 minutes (became dry).

INSPECTED BY Jim Scarrow

WOODWARD-CLYDE CONSULTANTS

Water jetted along entire screen length using Rocky Hill water, air lifted until dry.

MTH 001 1281

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-1D	O.C. 101.93 ft. I.C. 101.45 ft.	84C4007 A28
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	10 JUNE 1986	28 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈ 200	1250	1307

LOG OF MONITORING WELL

BORING

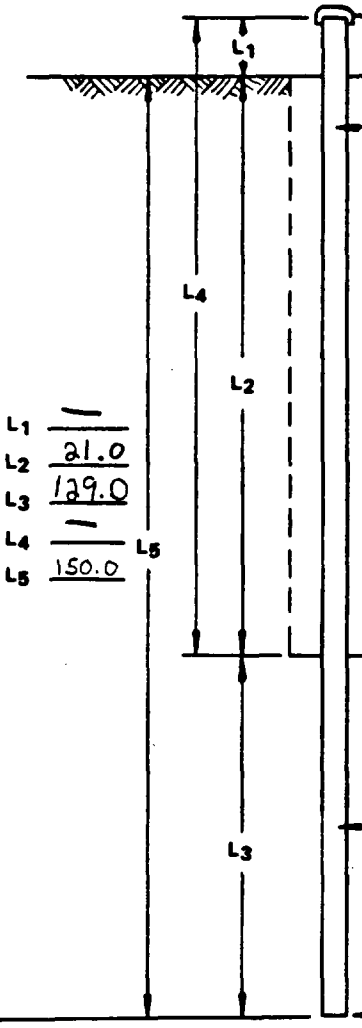
DEPTH IN FT	DESCRIPTION	
0	MUDSTONE, dark reddish brown.	
	WEATHERED BEDROCK	7.0
	COMPETENT BEDROCK	
	MUDSTONE, dark reddish brown.	16.5
	GYPSUM, light gray.	17.0
	CALCAREOUS CLAYSTONE, blackish red.	20.5
	SANDSTONE, dark reddish brown.	25.5
30	MUDSTONE, dark reddish brown.	29.8
	CALCAREOUS CLAYSTONE, dark grey.	32.3
	SANDSTONE, dark reddish brown.	43.0
	SILTSTONE, dark reddish brown.	53.5
	ARGILLACEOUS DOLOSTONE, dark gray.	55.7
60	MUDSTONE, dark reddish brown.	64.3
	CLAYSTONE, dark reddish brown.	67.9
	CALCAREOUS MUDSTONE, dark reddish brown.	72.7
	ARGILLACEOUS LIMESTONE, dark grey.	75.9
90	SILTSTONE, dark reddish brown.	96.5
	MUDSTONE, dark reddish brown.	106.2
	CALCAREOUS DOLOMITIC CLAYSHALE, dark gray.	109.7
	DOLOMITIC SANDSTONE, very dusky red.	111.3
	DOLOMITIC CLAYSTONE, dark gray.	117.4
120	SILTSTONE, dark reddish brown.	
150		

MONITORING WELL

TYPE OF MONITOR WELL: competent bedrock

GROUND ELEV.: 99.5 ft.

TOP OF RISER ELEV.: See above



L1 —
L2 21.0
L3 129.0
L4 —
L5 150.0

VENTED CAP

I.D. OF RISER PIPE: 6.0 in.

TYPE OF PIPE: stainless steel

TYPE OF BACKFILL AROUND RISER: cement grout

I. D. OF BORING: 10.5 in.

BOTTOM OF CASING ELEV.: 78.5 ft

I.D. OF OPEN HOLE: 6.0 in.

BOTTOM OF OPEN HOLE ELEV.: -50.5 ft.

REMARKS: 1) overburden casing was emplaced into a 10.5-inch diameter, 21.0-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for several days; 3) evacuated ground water changed, in color, from reddish brown to clear during well development; 4) installed a locking, 8in. I.D., protective casing

INSPECTED BY: J. Scarrow / C. Sforza

WOODWARD-CLYDE CONSULTANTS

MTH 001 1282

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-2D	O.C. 61.64 ft. I.C. 61.34 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	10 Oct 1986	14 Oct 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈200	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

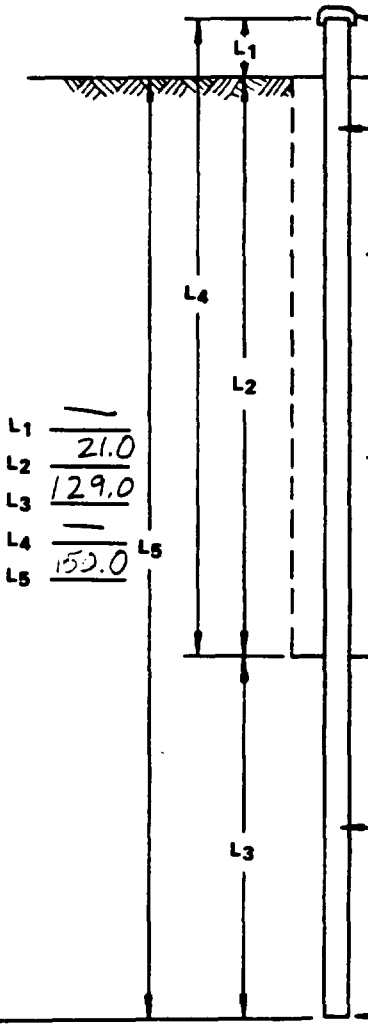
BORING

DEPTH IN FT	DESCRIPTION
0	MUDSTONE, dark reddish brown WEATHERED BEDROCK — 7.0
	COMPETENT BEDROCK
30	MUDSTONE, dark reddish brown
60	
	70.0
90	SILTSTONE, dark reddish brown
120	
150	

MONITORING WELL

TYPE OF MONITOR WELL: COMPETENT BEDROCK

GROUND ELEV. 61.4 ft. TOP OF RISER ELEV. see above



L1 —
L2 21.0
L3 129.0
L4 —
L5 150.0

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 40.4 ft.

I.D. OF OPEN HOLE 6.0 in

BOTTOM OF OPEN HOLE ELEV. −88.6

REMARKS 1) overburden casing emplaced into a 10.5 in. diameter, 21.0 foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set several days; 3) development: air lifted until dry, allowed to recover, air lifted again until dry, repeated procedure for 2 hours; evacuated water changed in color, from reddish brown to clear; 4) installed a locking, 8 in. I.D., protective casing.

INSPECTED BY CARL VARTERESIAN

WOODWARD-CLYDE CONSULTANTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-3D	O.C. 143.42 ft. I.C. 143.02 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	16 JUNE 1986	8 Oct 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈ 375	See Remarks	See Remarks

LOG OF MONITORING WELL

BORING

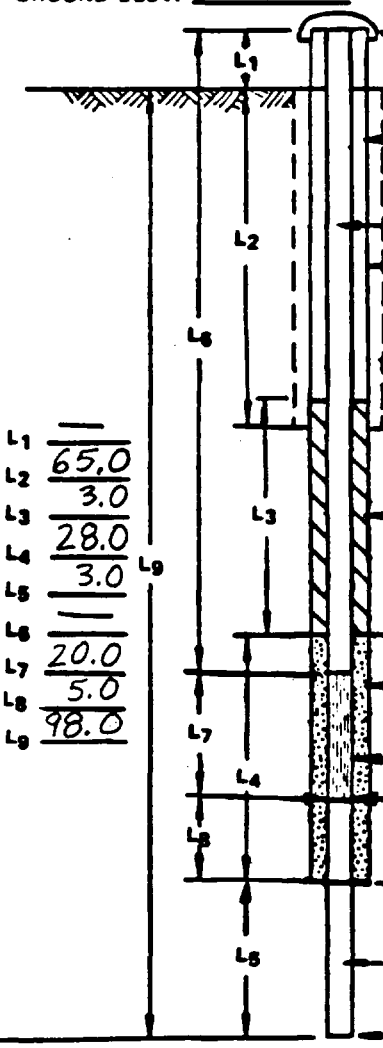
DEPTH IN FT	DESCRIPTION
0	OVERBURDEN 3.0
	MUDSTONE, dark reddish brown 18.5
30	SANDSTONE, yellowish brown
	WEATHERED BEDROCK
	SANDSTONE yel. brn COMPETENT BEDROCK 53.5
	ANHYDRITE, light brown 55.4
60	MUDSTONE, dark reddish brown 72.2
90	SILTSTONE, dark reddish brown
120	
150	

MONITORING WELL

TYPE OF MONITOR WELL: competent bedrock

GROUND ELEV. 141.8 ft.

TOP OF RISER ELEV. see above



L1	—
L2	65.0
L3	3.0
L4	28.0
L5	3.0
L6	—
L7	20.0
L8	5.0
L9	98.0

- VENTED CAP
- I.D. OF OUTER RISER: 6.0 in.
- TYPE OF PIPE: Stainless Steel
- I.D. OF INNER RISER: 4.0 in.
- TYPE OF BACKFILL AROUND RISER: cement grout
- I.D. OF BORING: 10.5 in.
- TOP OF SEAL ELEV.: 79.8 ft
- BOTTOM OF CASING ELEV.: 76.8 ft
- TYPE OF SEAL MATERIAL: bentonite pellets
- TOP OF FILTER ELEV.: 76.8 ft.
- TYPE OF FILTER MATERIAL: morie no. 1 sand
- SIZE OF OPENINGS: 0.01 in.
- DIAMETER OF MONITOR WELL TIP: 4.0 in.
- BOTTOM OF MON. WELL ELEV.: 48.8 ft.
- I.D. OF OPEN HOLE: 4.0 in.
- BOTTOM OF OPEN HOLE ELEV.: 43.8 ft

REMARKS: 1) overburden casing was emplaced into a 10.5 inch diameter, 65-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for several days 3) development: air lifted for 30 min; expelled water changed color, from reddish brown to clear, within 15 min. 4) installed a locking, 8 in. I.D. protective casing.

INSPECTED BY: J. Scarrow / C. Storza / C. Vartenssian

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-4D	O.C. 123.14 ft. I.C. 122.91 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC	TONY TIRRO	16 SEPT, 1986	30 SEPT, 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈300	1120	1220

LOG OF MONITORING WELL

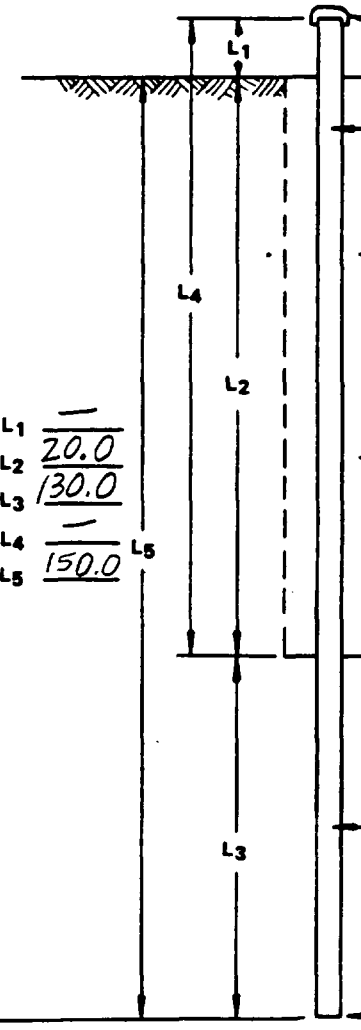
BORING

DEPTH IN FT	DESCRIPTION	
0	OVERBURDEN	3.5
	MUDSTONE, dark reddish brown WEATHERED BEDROCK	10.0
	COMPETENT BEDROCK	
30	MUDSTONE, dark reddish brown	
60		70.0
	SILTSTONE, dark reddish brown	77.5
	SANDSTONE, dark reddish brown	82.5
90	SILTSTONE, dark reddish brown	97.5
	MUDSTONE, dark reddish brown	114.0
120	ARGILLACEOUS DOLOSTONE, very dusky red	133.0
	SILTSTONE, dark reddish brown	
150		

MONITORING WELL

TYPE OF MONITOR WELL: Competent bedrock

GROUND ELEV. 122.8 ft. TOP OF RISER ELEV. see above



L1 —
L2 20.0
L3 130.0
L4 —
L5 150.0

VENTED CAP

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER Cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 102.8 ft.

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. -27.2 ft.

REMARKS 1) overburden casing was emplaced into a 10.5-inch diameter, 20.0 foot hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for 2 weeks; 3) development: air lifted until dry, allowed to recover, air lifted again until dry, repeated procedure for 1 hour. Water had slight brown color at end of development; 4) installed a locking, 8 in. I.D. protective casing

INSPECTED BY CARL VARTERESIAN

WOODWARD-CLYDE CONSULTANTS

MTH 001 1285

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-5D	O.C. 142.26 ft. I.C. 142.07 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	22 Sept 1986	24 Sept 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈ 350	SEE REMARKS	SEE REMARKS

LOG OF MONITORING WELL

BORING

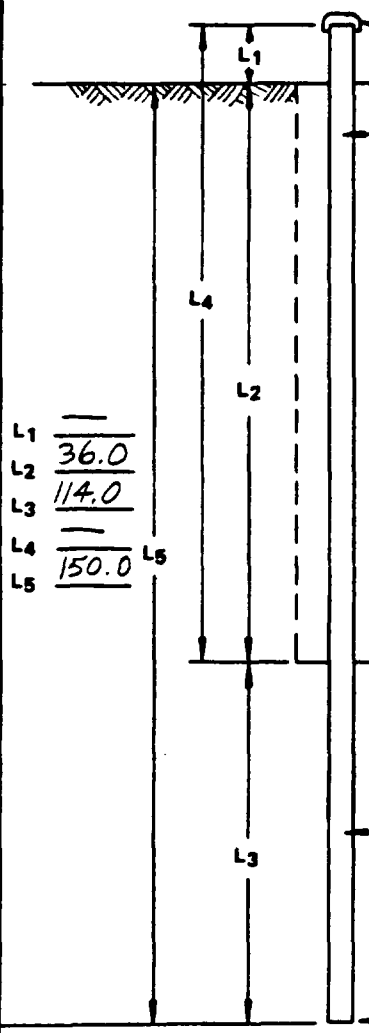
DEPTH IN FT	DESCRIPTION
0	OVERBURDEN — 8.5
	MUDSTONE, dark reddish brown
	WEATHERED BEDROCK — 26.0
30	COMPETENT BEDROCK
	MUDSTONE, dark reddish brown
60	70.0
90	SILTSTONE, dark reddish brown
120	147.0
150	ARGILLACEOUS DOLOSTONE very dusky red

MONITORING WELL

TYPE OF MONITOR WELL: COMPETENT BEDROCK

GROUND ELEV. 141.6 ft.

TOP OF RISER ELEV. see above



L1 —
L2 36.0
L3 114.0
L4 —
L5 150.0

VENTED CAP

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 105.6 ft.

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. −8.4

REMARKS 1) overburden casing was emplaced into a 10.5 in. diameter, 36.0 foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set overnight; 3) development: air lifted until dry, allowed to recover, air lifted again until dry, repeated procedure for 3 hours, evacuated ground water changed, in color, from reddish brown to clear; 4) installed a locking, 8 in. I.D., protective casing

INSPECTED BY CARL VARTERESIAN
WOODWARD-CLYDE CONSULTANTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE SOMERSET, NJ	MW-6D	O.C. 148.17 ft. I.C. 147.74 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	9 SEPT 1986	29 SEPT 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈600	0830	01130

LOG OF MONITORING WELL

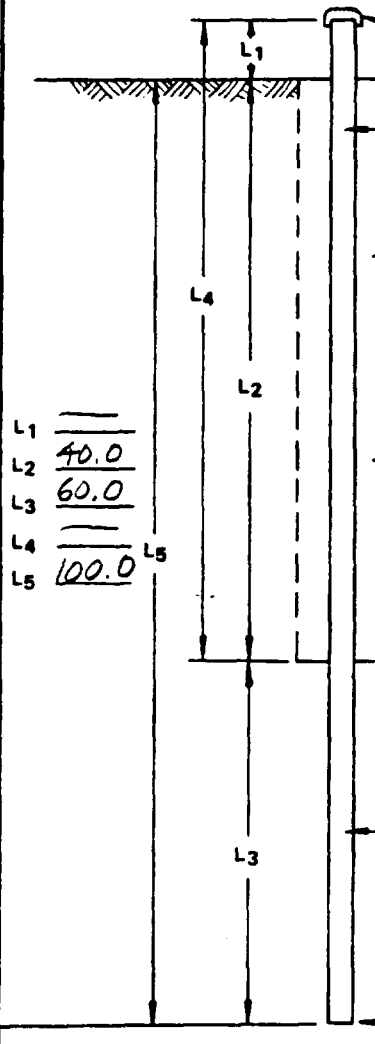
BORING

DEPTH IN FT	DESCRIPTION	
0	OVERBURDEN	3.5
	MUDSTONE, dark reddish brown	
20	WEATHERED BEDROCK / COMPETENT BEDROCK	29.0
40	MUDSTONE, dark reddish brown	
60		68.0
	SILTSTONE, dark reddish brown	70.0
	MUDSTONE, dark reddish brown	72.0
80	SILTSTONE, dark reddish brown	
100		

MONITORING WELL

TYPE OF MONITOR WELL: COMPETENT BEDROCK

GROUND ELEV. 145.9 ft. TOP OF RISER ELEV. See above



L1 —
L2 40.0
L3 60.0
L4 —
L5 100.0

VENTED CAP

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 105.9 ft

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. 45.9 ft.

REMARKS 1) overburden casing was emplaced into a 10.5 in. diameter, 40.0 foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for 3 weeks; 3) development: air lifted until dry, allowed to recover, air lifted again until dry, repeated procedure for 3 hours, until expelled water was clear; 4) installed a locking, 8 in. I.D., protective casing.

INSPECTED BY CARL VARTERESIAN

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-7D	O.C. 145.50 ft. I.C. 145.26 ft.	84C4007 A28
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	11 JUNE 1986	30 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈400	1137	1147

LOG OF MONITORING WELL

BORING

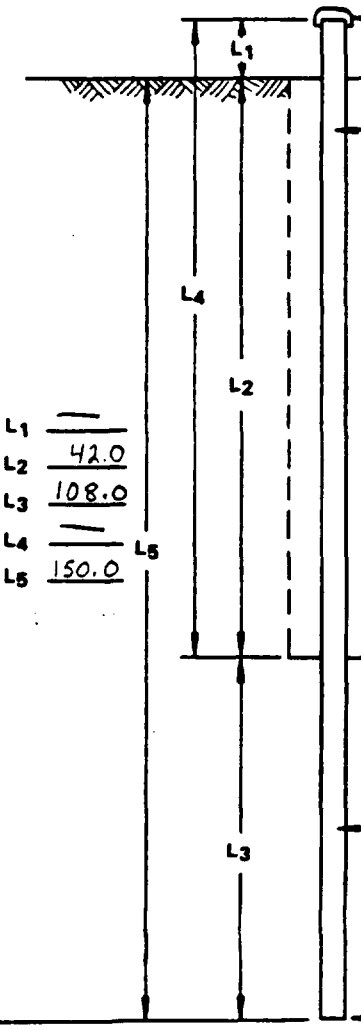
DEPTH IN FT	DESCRIPTION
0	
	OVERBURDEN — 13.4
	MUDSTONE, dark reddish brown.
30	WEATHERED BEDROCK — 31.0
	COMPETENT BEDROCK
60	MUDSTONE, dark reddish brown.
	85
90	ARGILLACEOUS LIMESTONE, dark gray. — 95
	MUDSTONE, dark reddish brown. — 105
120	CALCAREOUS MUDSTONE, dark reddish brown. — 125
	MUDSTONE, dark reddish brown.
150	

MONITORING WELL

TYPE OF MONITOR WELL: competent bedrock

GROUND ELEV. 143.8 ft.

TOP OF RISER ELEV. see above



L1 —
L2 42.0
L3 108.0
L4 —
L5 150.0

VENTED CAP

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE Stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 101.8 ft.

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. −6.2

REMARKS 1) overburden casing was emplaced into a 10.5-inch diameter, 42-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for several days; 3) evacuated ground water changed, in color, from reddish brown to clear during well development; 4) installed a locking

INSPECTED BY J. Scarrow / C. Sforza

WOODWARD-CLYDE CONSULTANTS

MTH 001 1288

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-9D	O.C. 151.96 ft. I.C. 151.88 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	7 JUNE 1986	1 JULY 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈ 1300	0959	1025

LOG OF MONITORING WELL

BORING

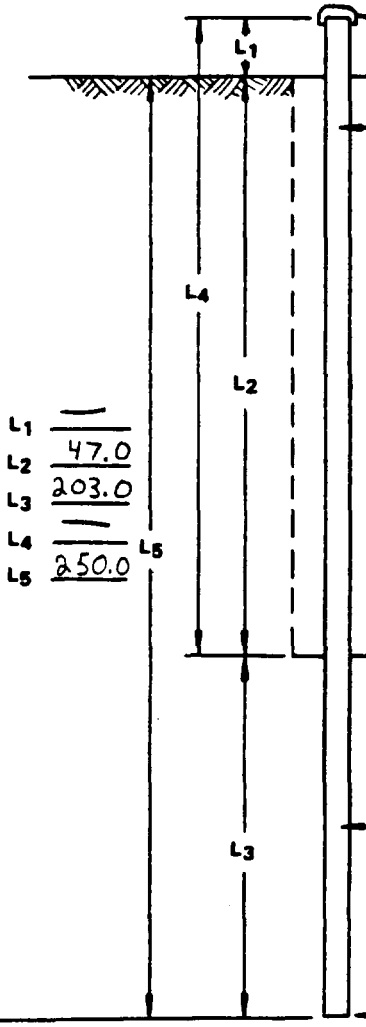
DEPTH IN FT	DESCRIPTION	
0	OVERBURDEN	8.5
	MUDSTONE, dark reddish brown.	
	WEATHERED BEDROCK / COMPETENT BEDROCK	35.0
50	MUDSTONE, dark reddish brown.	55.5
	SILTSTONE, dark reddish brown.	90.5
100	SANDSTONE, dark reddish brown.	188.8
150	ARGILLACEOUS LIMESTONE, light gray.	191.2
	SILTSTONE, dark reddish brown.	196.5
200	ARGILLACEOUS LIMESTONE, light gray.	204.5
	SANDSTONE, dark reddish brown.	
250		

MONITORING WELL

TYPE OF MONITOR WELL: competent bedrock

GROUND ELEV. 149.8 ft.

TOP OF RISER ELEV. See above



L1	—
L2	47.0
L3	203.0
L4	—
L5	250.0

VENTED CAP

I.D. OF RISER PIPE: 6.0 in.

TYPE OF PIPE: Stainless steel

TYPE OF BACKFILL AROUND RISER: cement grout

I. D. OF BORING: 10.5 in.

BOTTOM OF CASING ELEV. 102.8 ft.

I.D. OF OPEN HOLE: 6.0 in.

BOTTOM OF OPEN HOLE ELEV. -100.2 ft.

REMARKS: 1) overburden casing was emplaced into a 10.5-inch diameter, 47.0-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allow to set for several days; 3) evacuated ground water was clear, in color, throughout well development. 4) installed a locking, 8 in. I.D., protective casing.

INSPECTED BY: J. Scarrow/C. Sforza

MTH 001 1289

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MT HD/RHMW SITE, SOMERSET CO., NJ	MW-10D	O.C. 153.02 ft. I.C. 152.75 ft.	84C4007 A28
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	29 MAY 1986	24 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈800	1552	1605

LOG OF MONITORING WELL

BORING

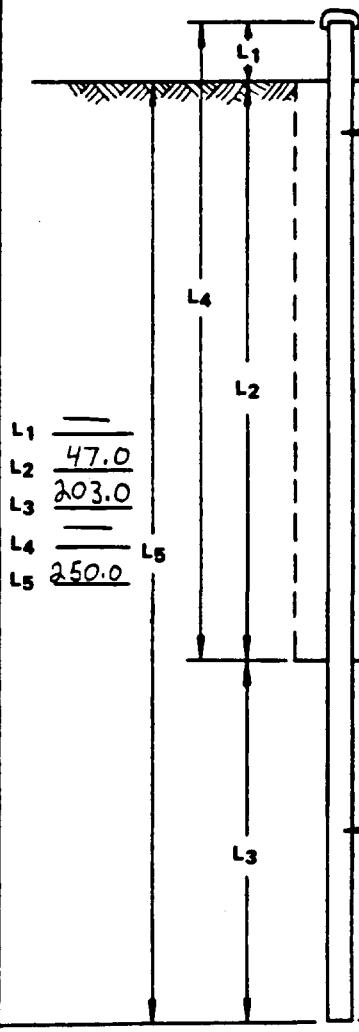
DEPTH IN FT	DESCRIPTION
0	OVERBURDEN — 9.5
	MUDSTONE, dark reddish brown.
	WEATHERED BEDROCK / COMPETENT BEDROCK — 34.0
50	MUDSTONE, dark reddish brown.
	70.7
100	SILTSTONE, dark reddish brown.
	137.0
150	MUDSTONE, dark reddish brown.
	168.4
	SILTSTONE, dark reddish brown.
200	201.4
	ARGILLACEOUS LIMESTONE, dark gray. 207.5
	MUDSTONE, dark reddish brown. 213.0
	ARGIL. DOLOM. LIMESTONE, dark gray. 221.5
	SANDSTONE, dark reddish brown.
250	

MONITORING WELL

TYPE OF MONITOR WELL: competent bedrock

GROUND ELEV. 151.7 ft.

TOP OF RISER ELEV. see above



L1 —
L2 47.0
L3 203.0
L4 —
L5 250.0

VENTED CAP

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 104.7 ft.

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. -98.3

REMARKS 1) overburden casing was emplaced into a 10.5-inch diameter, 47.0-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for several days; 3) evacuated ground water was clear, in color, throughout well development; 4) installed a locking, 8 in. I.D., protective casing.

INSPECTED BY J. Scarrow/C. Sforza

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET, NJ	MW-11D	O.C. 129.81 ft. I.C. 128.84 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	16 SEPT, 1986	3 OCT, 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈ 400	1115	1135

LOG OF MONITORING WELL

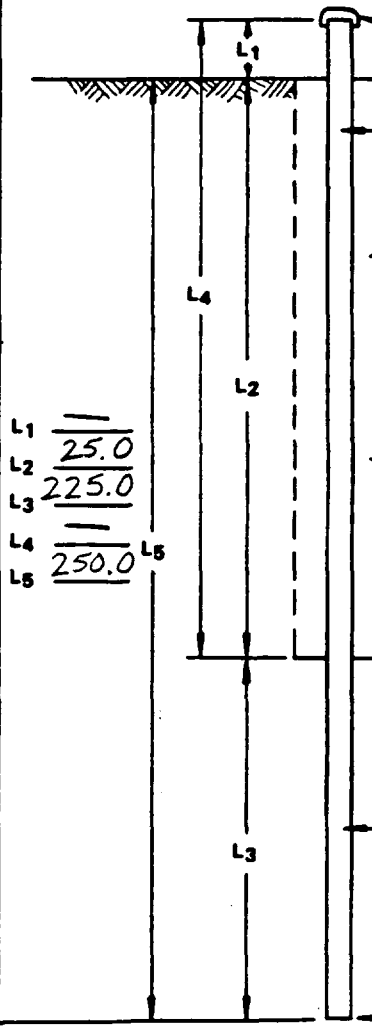
BORING

DEPTH IN FT	DESCRIPTION	
0	OVERBURDEN	3.5
	MUDSTONE, dark reddish brown WEATHERED BEDROCK	10.0
	COMPETENT BEDROCK	
	MUDSTONE, dark reddish brown	30.0
50	SILTSTONE, dark reddish brown	70.0
	CALCAREOUS SILTSTONE, dark reddish brown	80.0
	ARGILLACEOUS DOLOSTONE, very dusky red	88.0
	CALCAREOUS SILTSTONE, blackish red	98.0
100	CALCAREOUS MUDSTONE, olive gray	101.0
	ARGILLACEOUS DOLOSTONE, grayish black	110.0
	MUDSTONE, olive gray	123.0
	CALCAREOUS SILTSTONE, blackish red	130.0
	MUDSTONE, blackish red	140.0
150	MUDSTONE, dark reddish brown	
200		220.0
	SILTSTONE, dark reddish brown	245.0
250	MUDSTONE, dark reddish brown	

MONITORING WELL

TYPE OF MONITOR WELL: COMPETENT BEDROCK

GROUND ELEV. 128.0 ft. TOP OF RISER ELEV. See above



L1 —
L2 25.0
L3 225.0
L4 —
L5 250.0

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 103.0 ft.

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. -122.0 ft.

REMARKS 1) overburden casing was emplaced into a 10.5-inch diameter, 25.0-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for two weeks; 3) development: air lifted for 20 min; expelled water changed color, from reddish brown to clear, within 10 minutes; 4) installed a locking, 8 in. I.D., protective casing.

INSPECTED BY CARL VARTERESIAN

MTH 001 1291 VTS

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-13D	O.C. 112.42 ft. I.C. 112.13 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	19 JUNE 1986	2 JULY 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈900	0810	0827

LOG OF MONITORING WELL

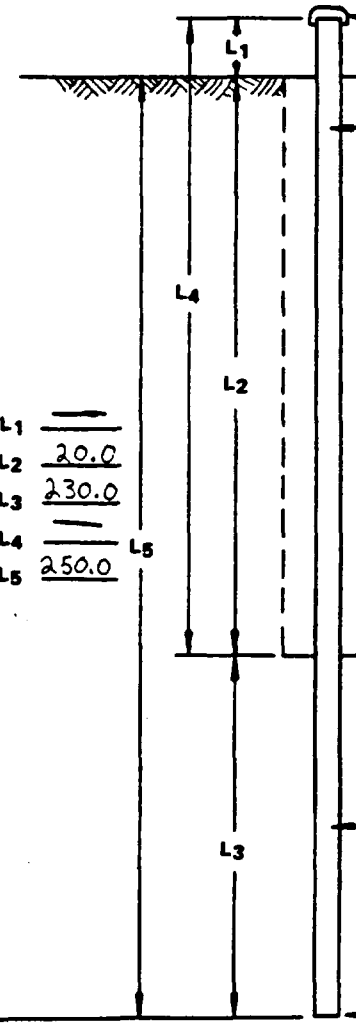
BORING

DEPTH IN FT	DESCRIPTION
0	OVERBURDEN 3.0
	MUDSTONE, dark reddish brown WEATH. B.R. 10.0
	SAME. → COMPETENT BEDROCK 15.0
	CALCAREOUS MUDSTONE, dark reddish brown. 24.5
50	MUDSTONE, dark reddish brown. 74.7
	CALCAREOUS MUDSTONE, dark reddish brown. 97.0
100	CLAYSTONE, gray. 143.7
	ARGILLACEOUS LIMESTONE, greenish black. 149.2
150	CALCAREOUS MUDSTONE, dark reddish brown 167.8
	ARGILLACEOUS LIMESTONE, grayish black. 167.0
	CALCAREOUS SILTSTONE, dark reddish brown 172.3
200	SILTSTONE, dark reddish brown.
250	

MONITORING WELL

TYPE OF MONITOR WELL: competent bedrock

GROUND ELEV. 110.6 ft. TOP OF RISER ELEV. See above



L1 —
L2 20.0
L3 230.0
L4 —
L5 250.0

VENTED CAP

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE Stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 90.6 ft.

I.D. OF OPEN HOLE 3.0 in.

BOTTOM OF OPEN HOLE ELEV. -139.4 ft.

REMARKS 1) overburden casing was emplaced into a 10.5-inch diameter, 20.0-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for several days; 3) evacuated ground water was clear, in color, throughout well development; 4) installed a locking, 8 in. I.D., protective casing.

INSPECTED BY J. Scarrow/C. Sforza

WOODWARD-CLYDE CONSULTANTS

WOODWARD–CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE SOMERSET, NJ	MW-14D	O.C. 74.63 ft. I.C. 73.73 ft.	84C4007A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	18 Sept 1986	1 Oct, 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈ 500	1500	1700

LOG OF MONITORING WELL

BORING

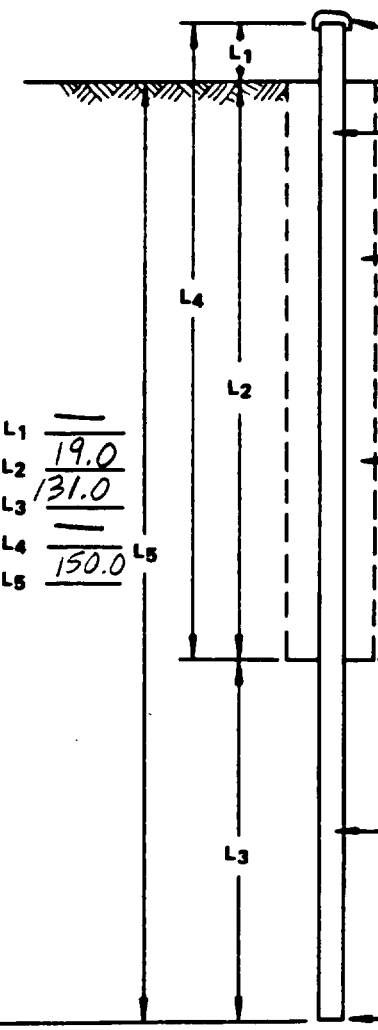
DEPTH IN FT	DESCRIPTION
0	OVERBURDEN 1.0
	MUDSTONE, dark reddish brown, WEATHERED BEDROCK 6.0
	COMPETENT BEDROCK
	MUDSTONE, dark reddish brown
30	
	50.0
60	
	SILTSTONE, dark reddish brown
90	
120	
	131.0
	ARGILLACEOUS DOLOSTONE, very dusky red 137.0
	SILTSTONE, dark reddish brown
150	

MONITORING WELL

TYPE OF MONITOR WELL: COMPETENT BEDROCK

GROUND ELEV. 73.1 ft.

TOP OF RISER ELEV. see above



I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 54.1 ft.

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. -76.9 ft.

L1 —
L2 19.0
L3 131.0
L4 —
L5 150.0

REMARKS 1) overburden casing was emplaced into a 10.5 in. diameter, 19.0 foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for one week; 3) development: air lifted until dry, allowed to recharge, air lifted again until dry, repeated proceedure for 2 hours. Water had slight brown color at end of development; 4) installed a locking 8 in. I.D., protective casing.

INSPECTED BY CARL VARTERESIAN

MTH 001 1293

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

INSTALLATION REPORT
DEEP MONITORING WELL

PROJECT AND LOCATION	WELL NO.	ELEVATION DATUM	PROJECT NO.
MTHD/RHMW SITE, SOMERSET CO., NJ	MW-15D	O.C. 125.20 ft. I.C. 124.88 ft.	84C4007 A2B
DRILLING AGENCY	**FOREMAN**	**DATE INSTALLATION STARTED**	**DATE INSTALLATION FINISHED**
WARREN GEORGE, INC.	TONY TIRRO	11 JUNE 1986	30 JUNE 1986
DEVELOPMENT EQUIPMENT	**GALLONS REMOVED**	**TIME DEVELOPMENT STARTED**	**TIME DEVELOPMENT COMPLETED**
AIR COMPRESSOR	≈ 200	2057	2105

LOG OF MONITORING WELL

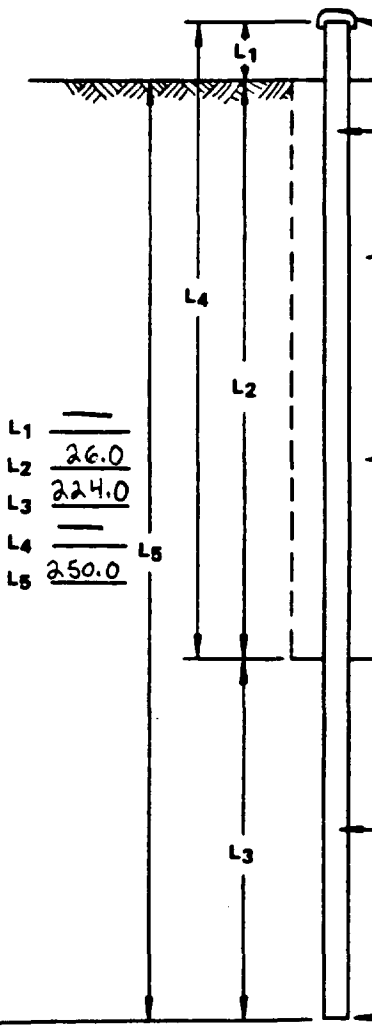
BORING

DEPTH IN FT	DESCRIPTION	
0	OVERBURDEN	3.0
	MUDSTONE, dark reddish brown. WEATHERED BEDROCK	26.0
	COMPETENT BEDROCK	
50	MUDSTONE, dark reddish brown.	60?
	SANDSTONE, dark reddish brown.	70?
	MUDSTONE, dark reddish brown.	100?
100	SILTSTONE, dark reddish brown.	107.5
	DOLOMITIC LIMESTONE, brownish black.	120?
	ARGILLACEOUS LIMESTONE, dark gray.	150
150	CLAYSTONE, black	164
	ARGILLACEOUS LIMESTONE, dark gray.	180?
	DOLOSTONE, dusky yellowish brown.	190?
200	ARGILLACEOUS LIMESTONE, dark gray.	221
	Claystone, grayish black.	221
	MUDSTONE, dark reddish brown.	
250		

MONITORING WELL

TYPE OF MONITOR WELL: competent bedrock

GROUND ELEV. 123.9 ft. TOP OF RISER ELEV. See above



VENTED CAP

I.D. OF RISER PIPE 6.0 in.

TYPE OF PIPE stainless steel

TYPE OF BACKFILL AROUND RISER cement grout

I. D. OF BORING 10.5 in.

BOTTOM OF CASING ELEV. 97.9 ft.

I.D. OF OPEN HOLE 6.0 in.

BOTTOM OF OPEN HOLE ELEV. −126.1 ft.

REMARKS 1) overburden casing was emplaced into a 10.5-inch diameter, 26.0-foot deep hole; 2) cement was tremie grouted into annulus around overburden casing, and allowed to set for several days; 3) evacuated ground water changed, in color, from reddish brown to clear during well development; 4) installed a locking, 8 in. I.D., protective casing.

INSPECTED BY J. Scarrow/C. Sforza

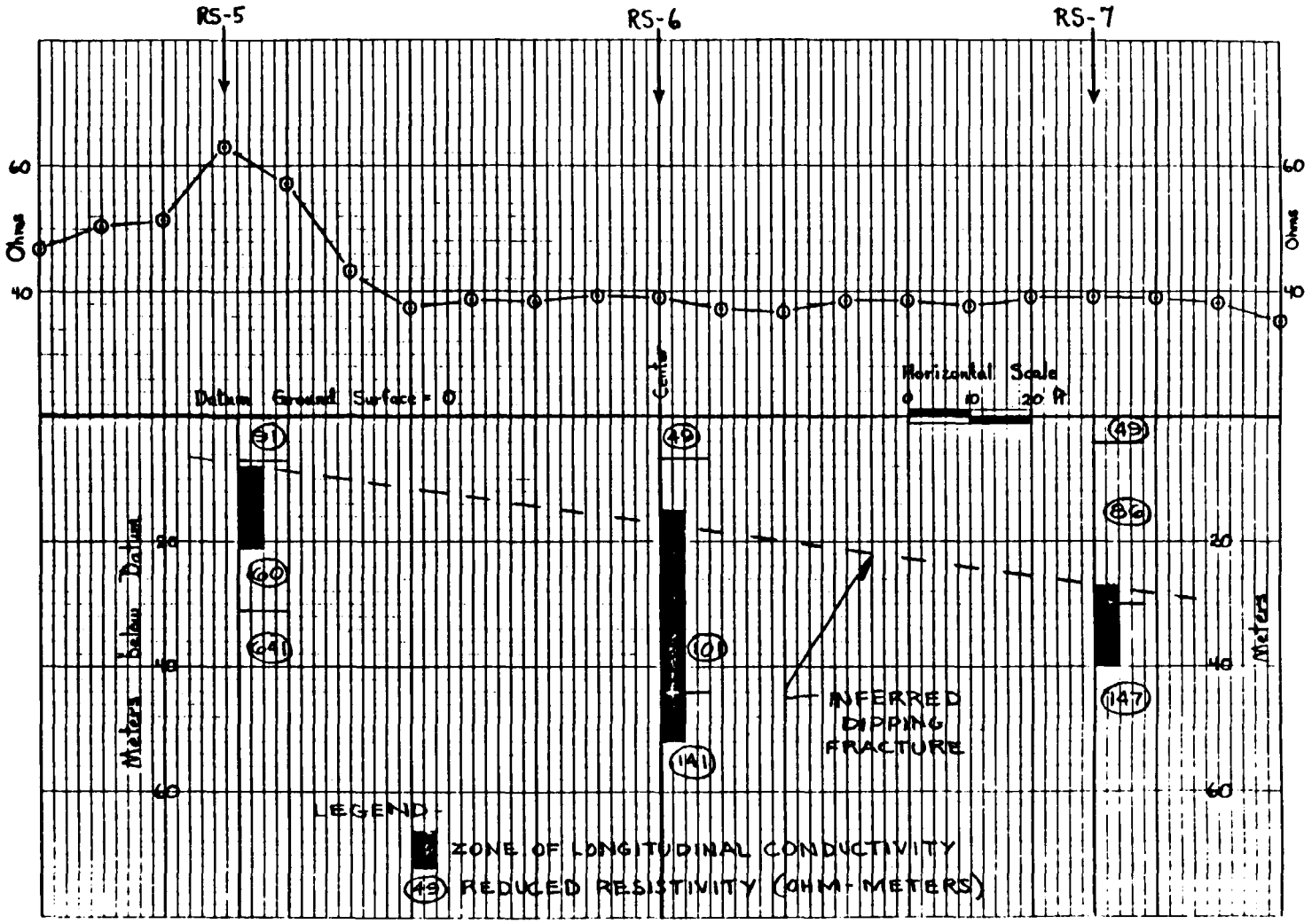
MTH 001 1294

Appendix E

MTH 001 1295

APPENDIX E
RESULTS OF GEOPHYSICAL SURVEYS

MTH 001 1296

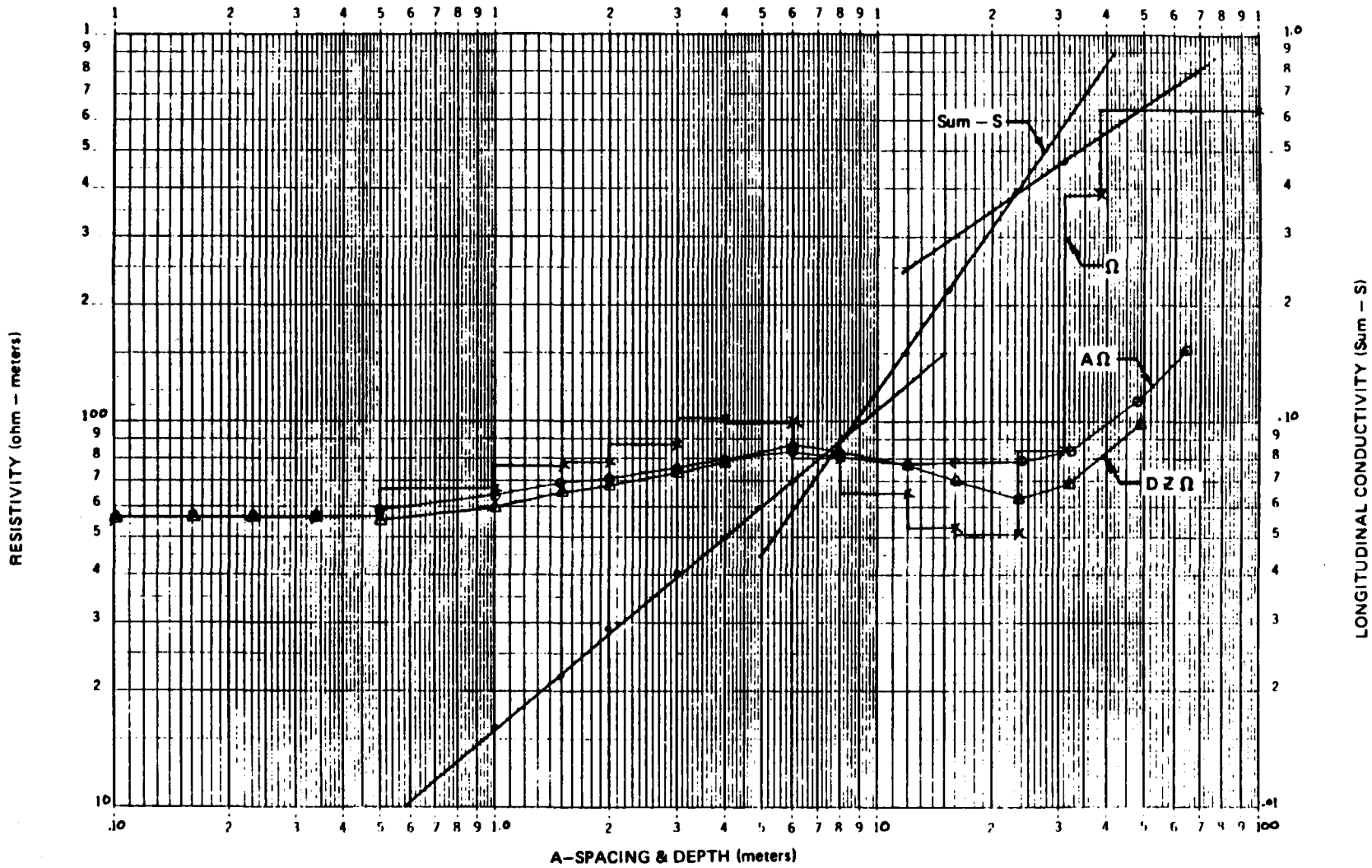


MONTGOMERY TOWNSHIP: LINE # 1
SCHLUMBERGER PROFILE AND WENNER SOUNDINGS

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F-1

MTH 001 1297



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

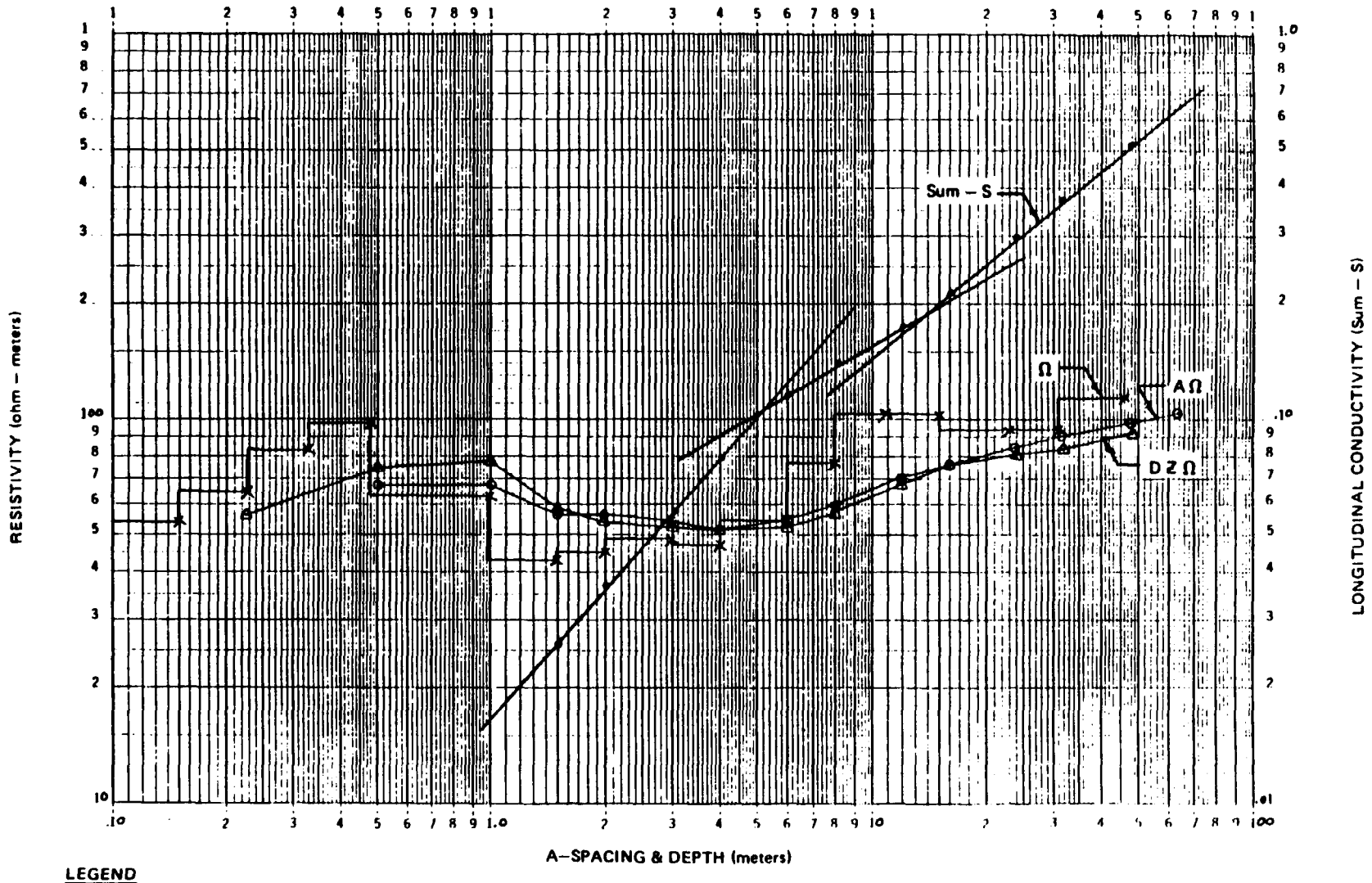
LINE # 1; STATION 0 + 70 NE, (RS-5)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–2

MTH 001 1298



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

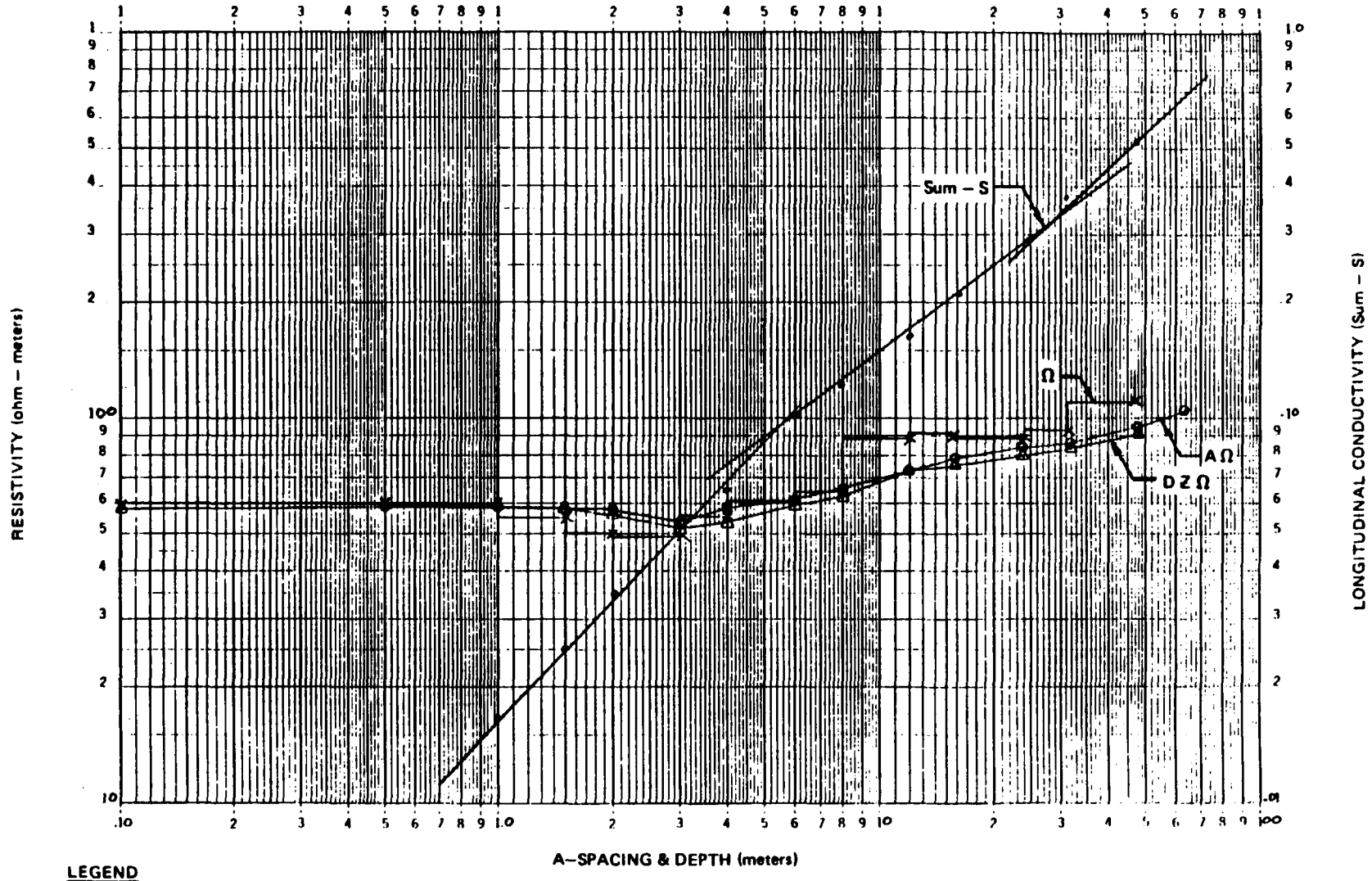
LINE # 1; STATION 0 + 00, (RS-6)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–3

MTH 001 1299



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

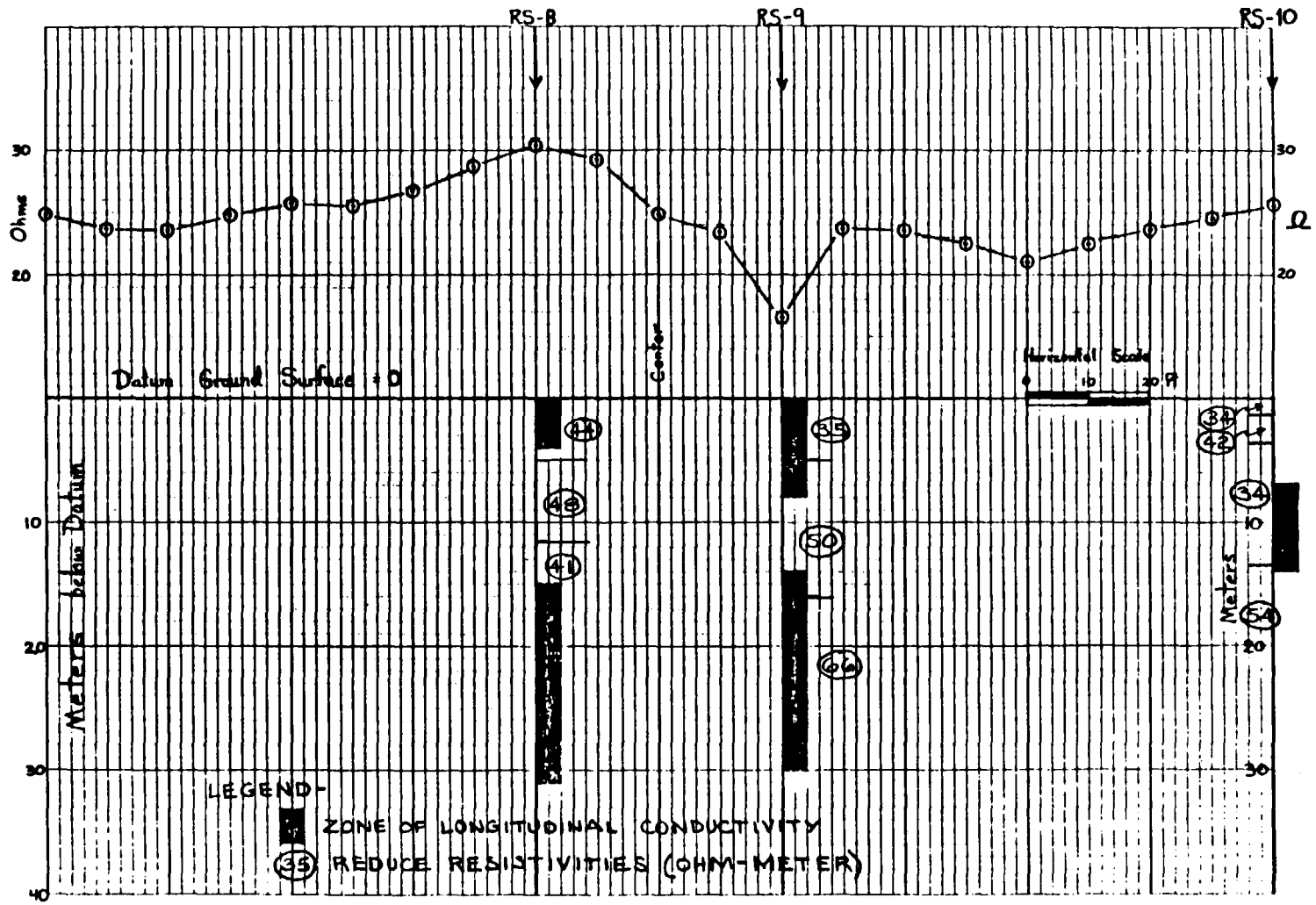
LINE # 1; STATION 0 + 70 SW, (RS-7)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–4

MTH 001 1300

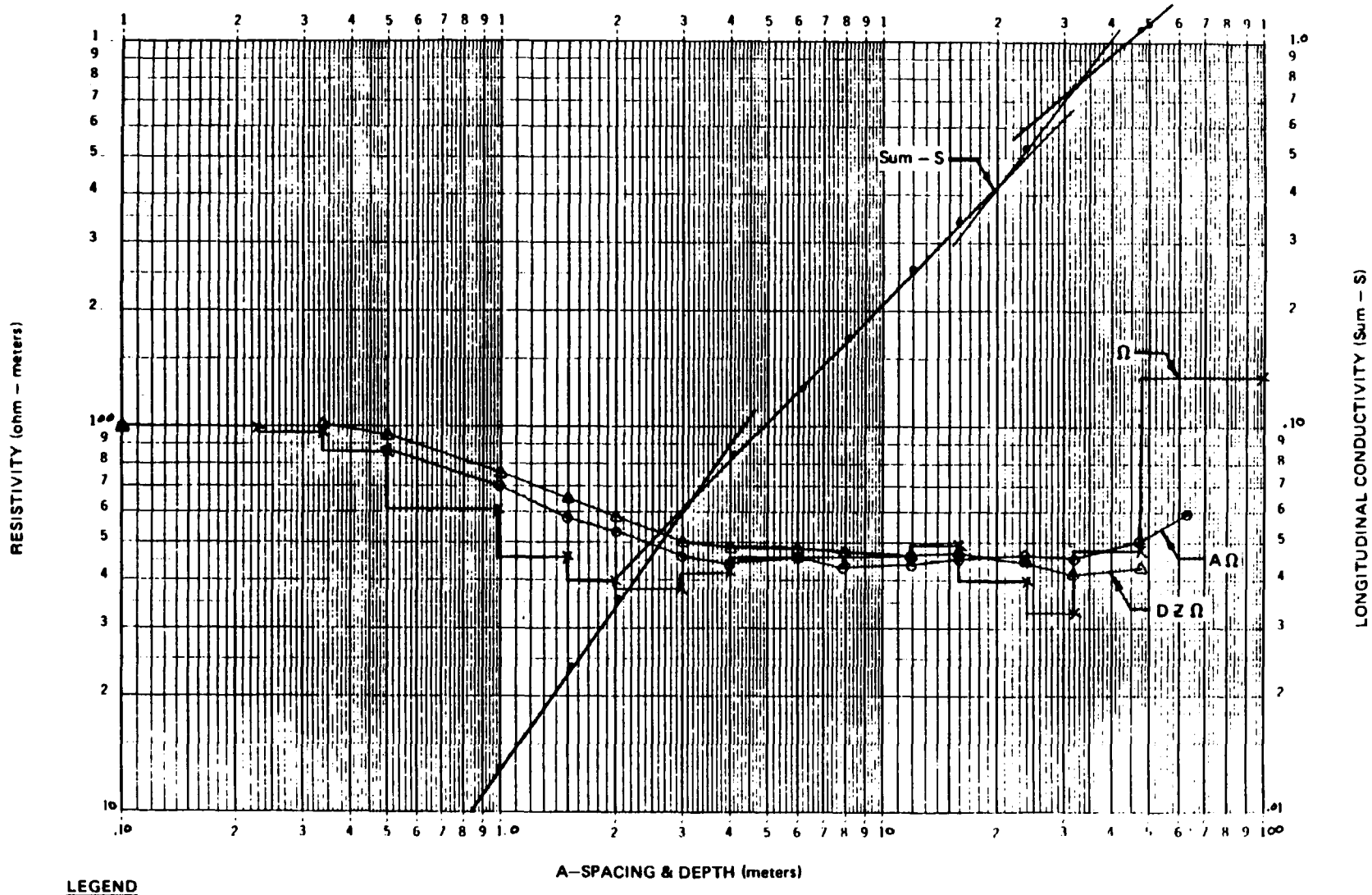


MONTGOMERY TOWNSHIP: LINE #2
SCHLUMBERGER PROFILE AND
WENNER SOUNDINGS

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F-5

MTH 001 1301



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

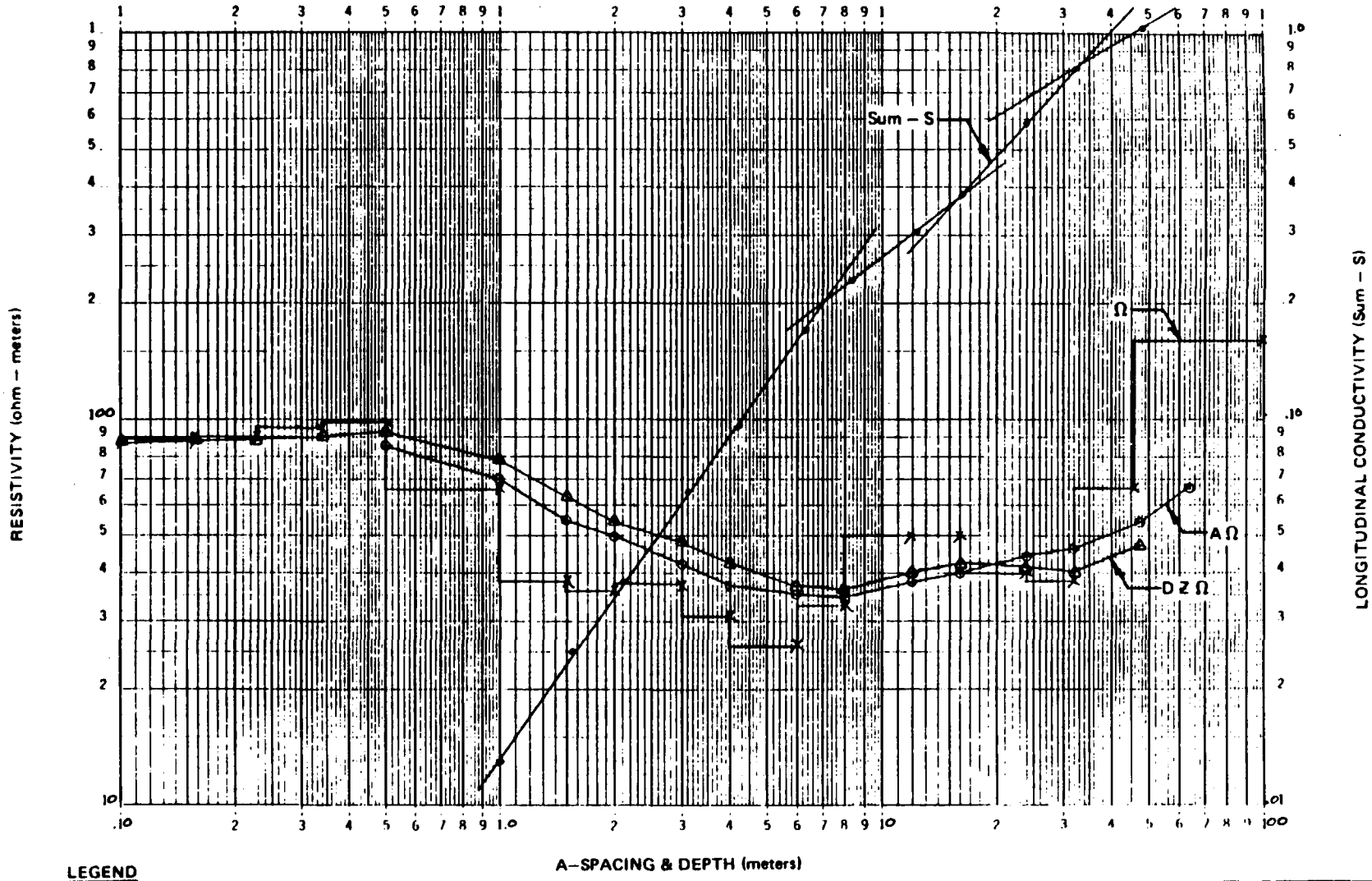
LINE # 2; STATION 0 + 20 W, (RS-8)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–6

MTH 001 1302



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

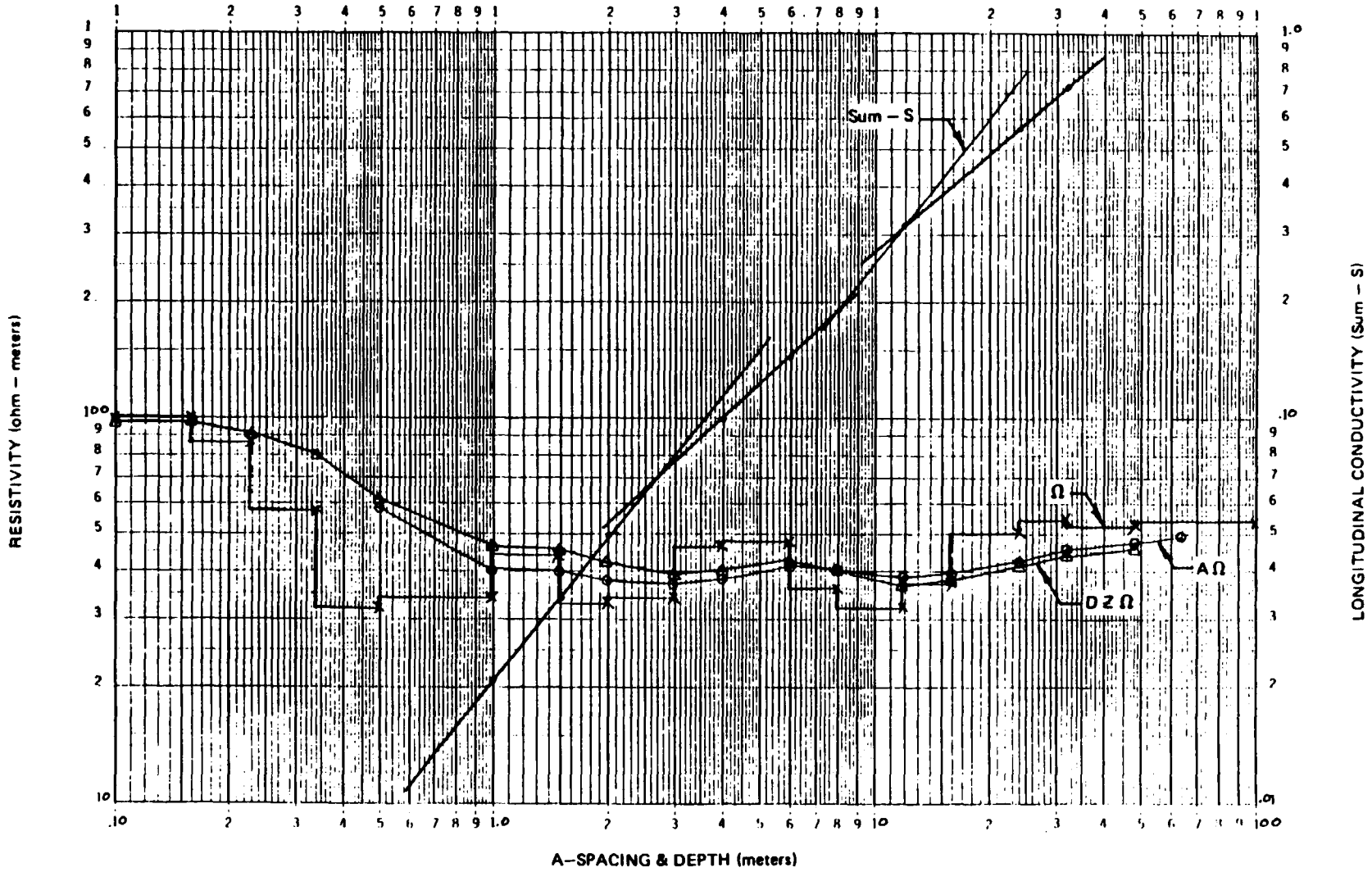
LINE # 2; STATION 0 + 20 E, (RS-9)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–7

MTH 001 1303



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

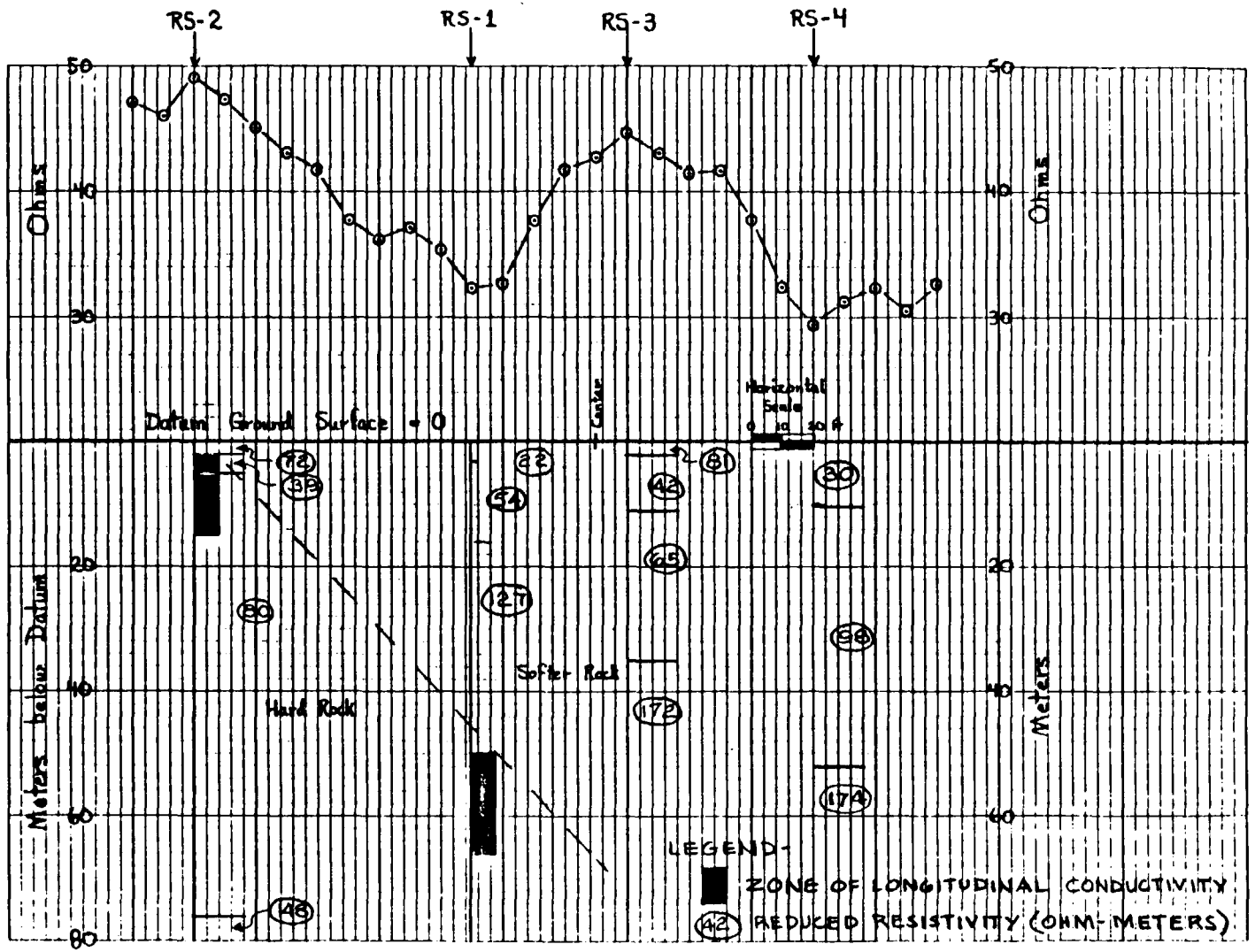
LINE # 2; STATION 0 + 80 E, (RS-10)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–8

MTH 001 1304

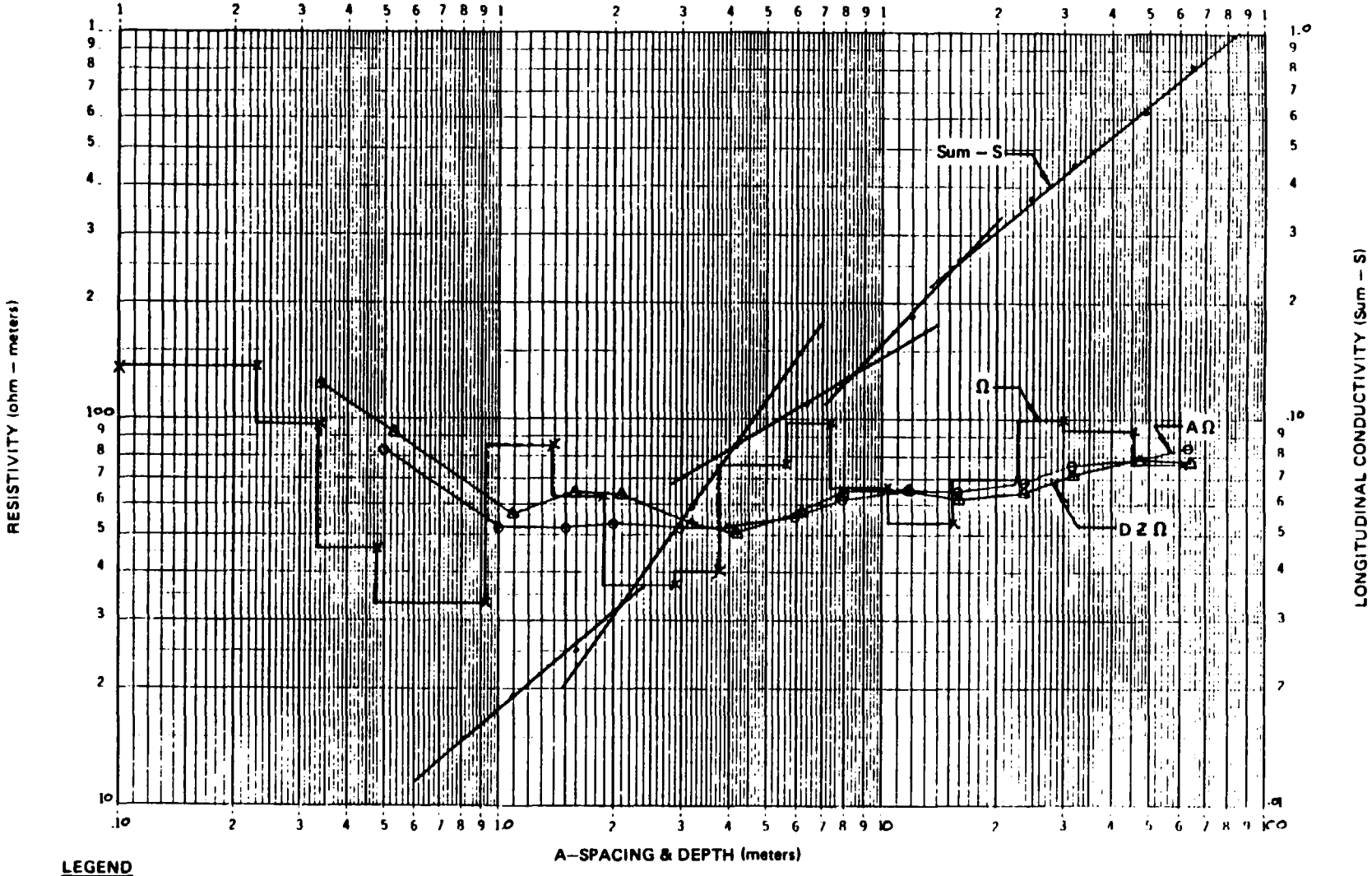


MONTGOMERY TOWNSHIP: LINE #3
SCHLUMBERGER PROFILE AND
WENNER SOUNDINGS

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F-9

MTH 001 1305



LEGEND

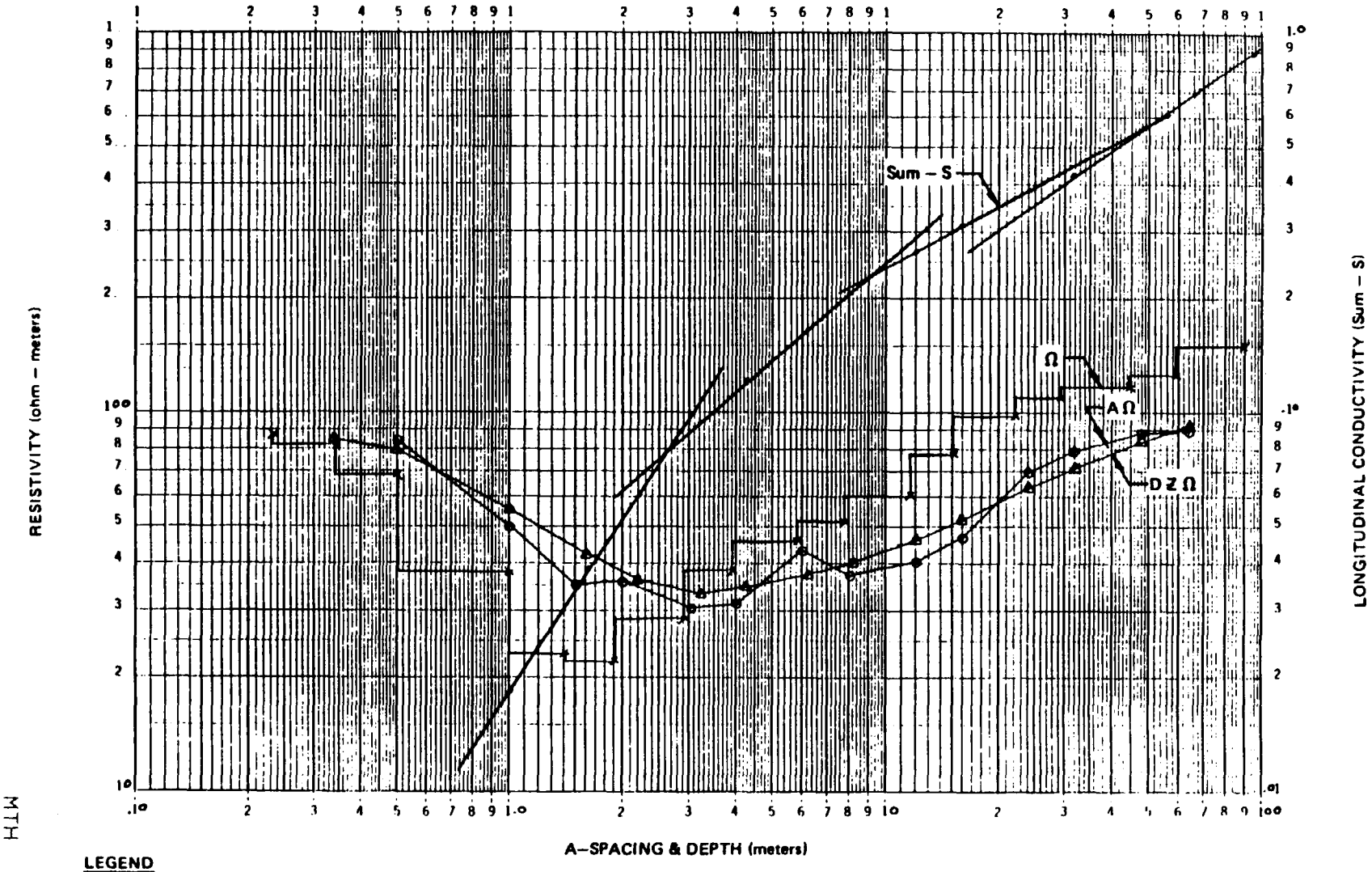
AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE
LINE # 3; STATION 1 + 30, (RS-2)

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–10

MTH 001 1306



LEGEND

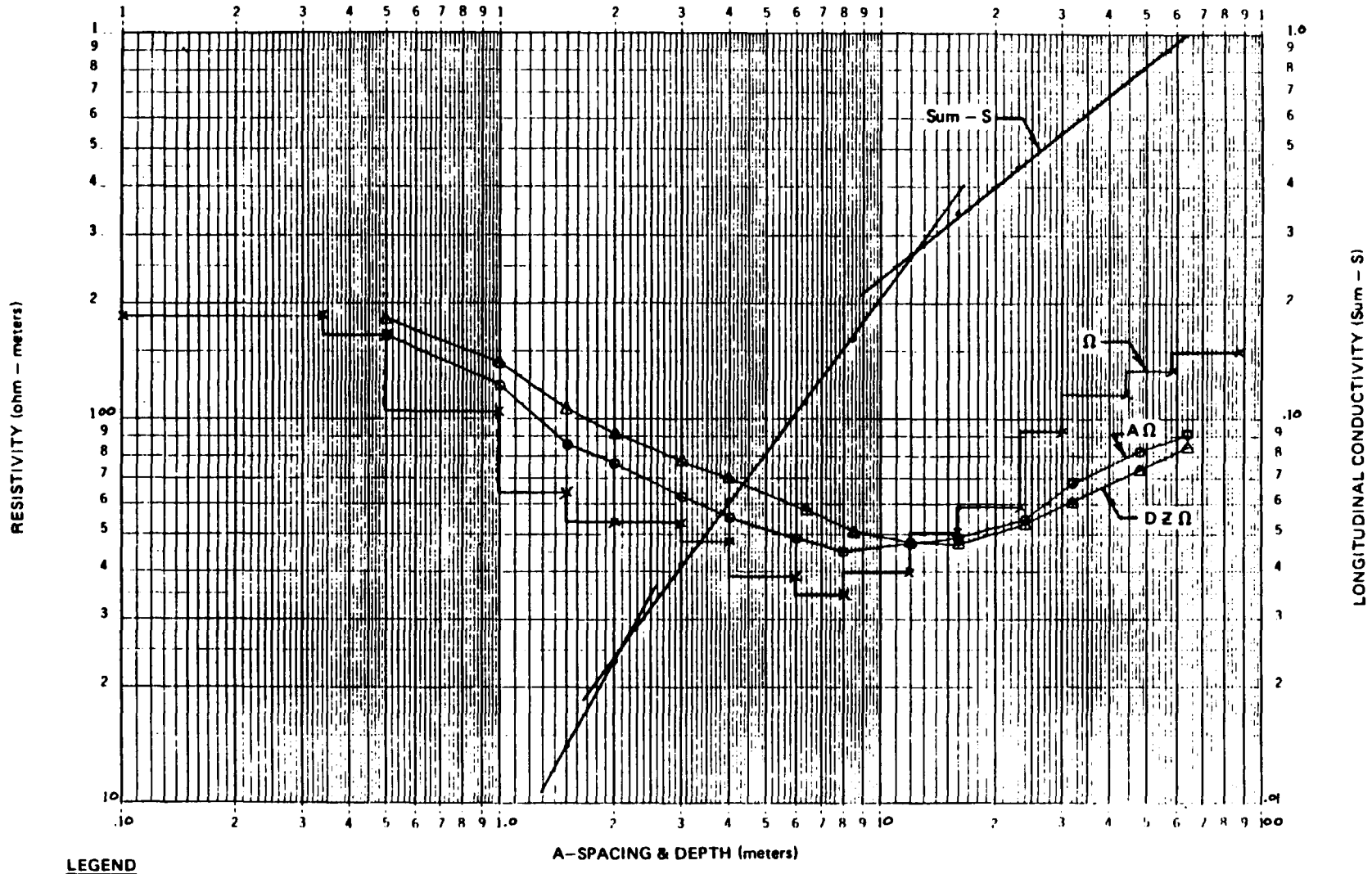
AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE
LINE # 3; STATION 0 + 40 W, (RS-1)

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–11

MTH 001 1307



LEGEND

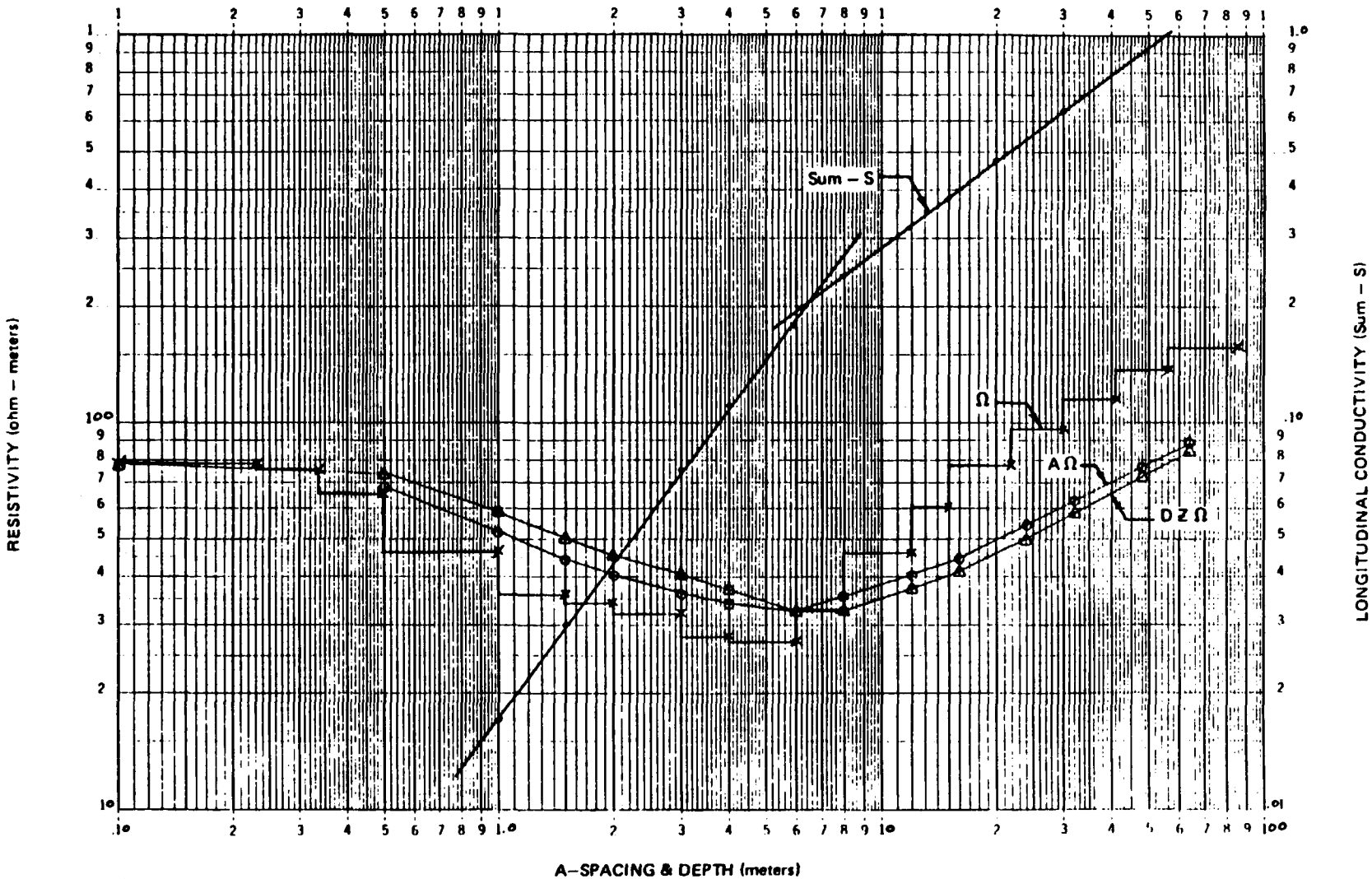
AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE
LINE # 3; STATION 0 + 10 E, (RS-3)

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–12

MTH 001 1308



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

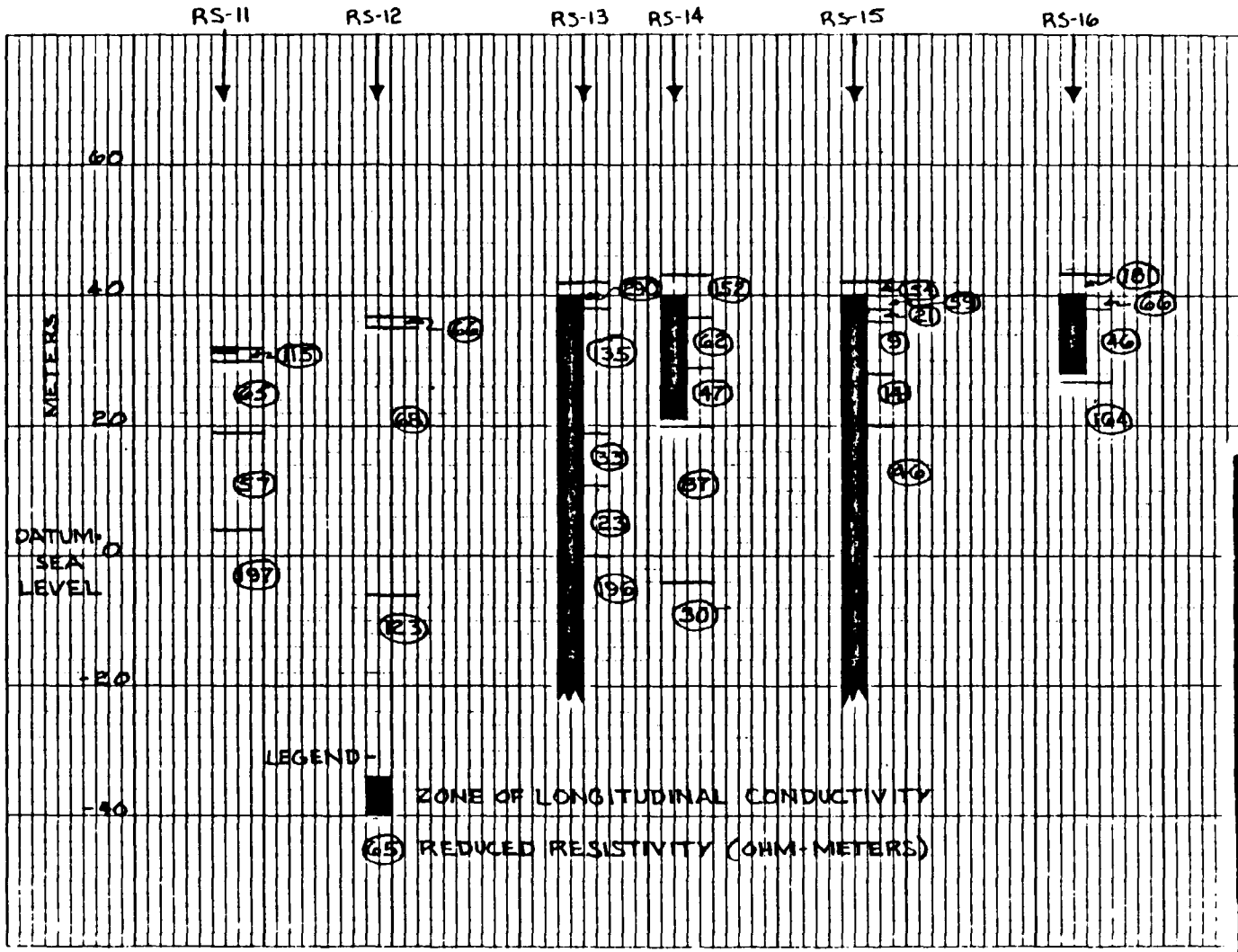
LINE # 3; STATION 1 + 10 E, (RS-4)

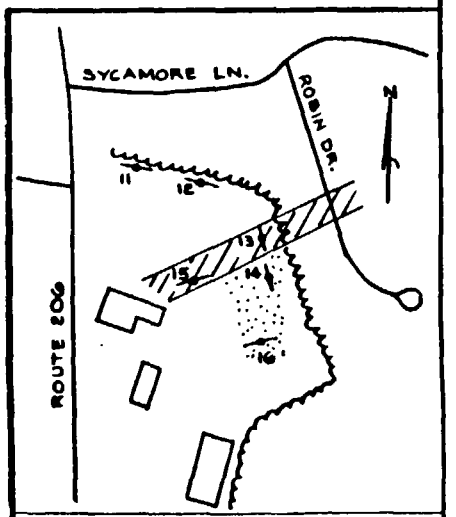
WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–13

MTH 001 1309



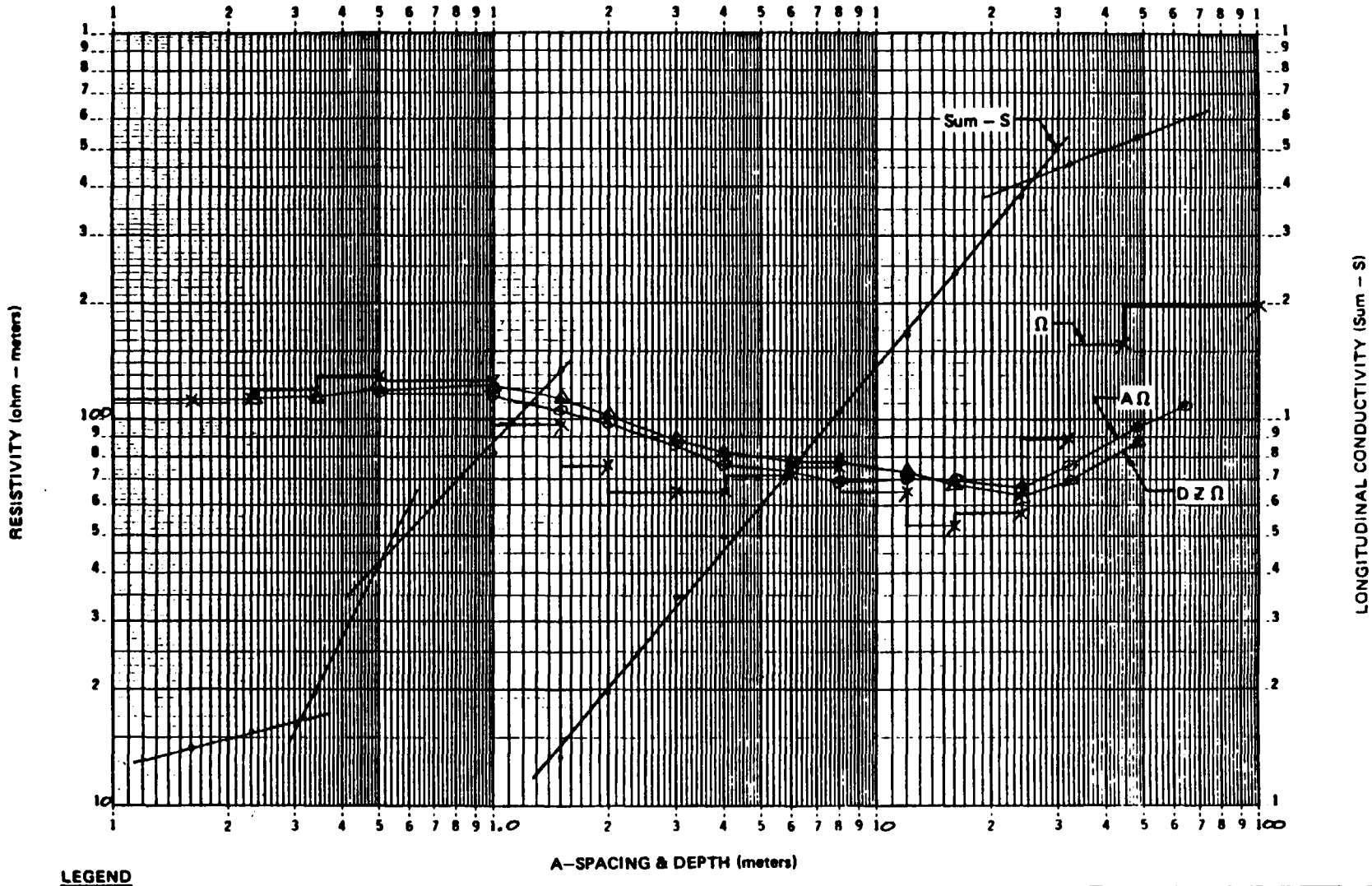


MONTGOMERY TOWNSHIP
AREA NO. 4
WENNER SOUNDINGS

WOODWARD—CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F—14

MTH 001 1310



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

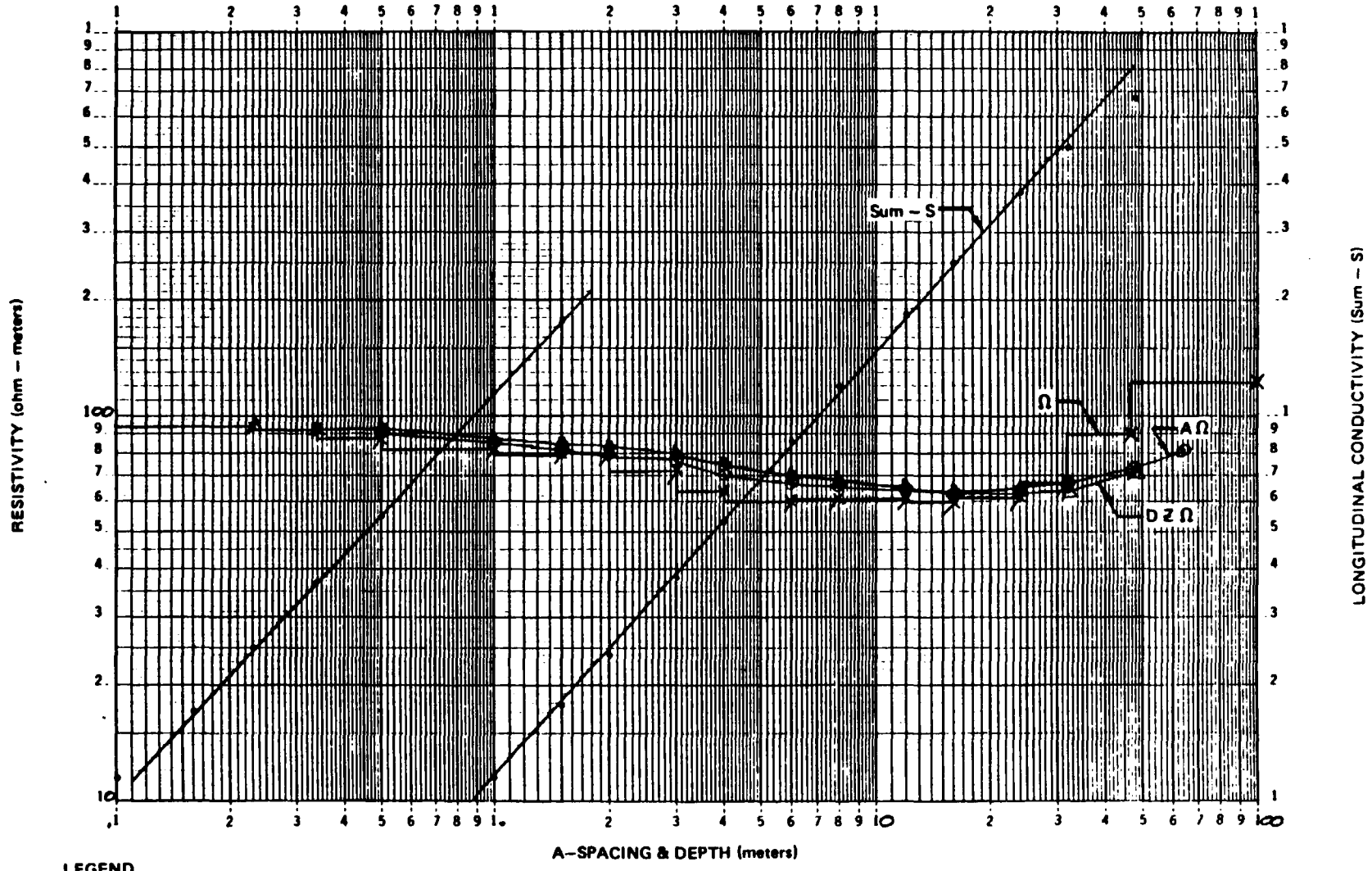
WENNER SOUNDING (RS-11)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–15

MTH 001 1311



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

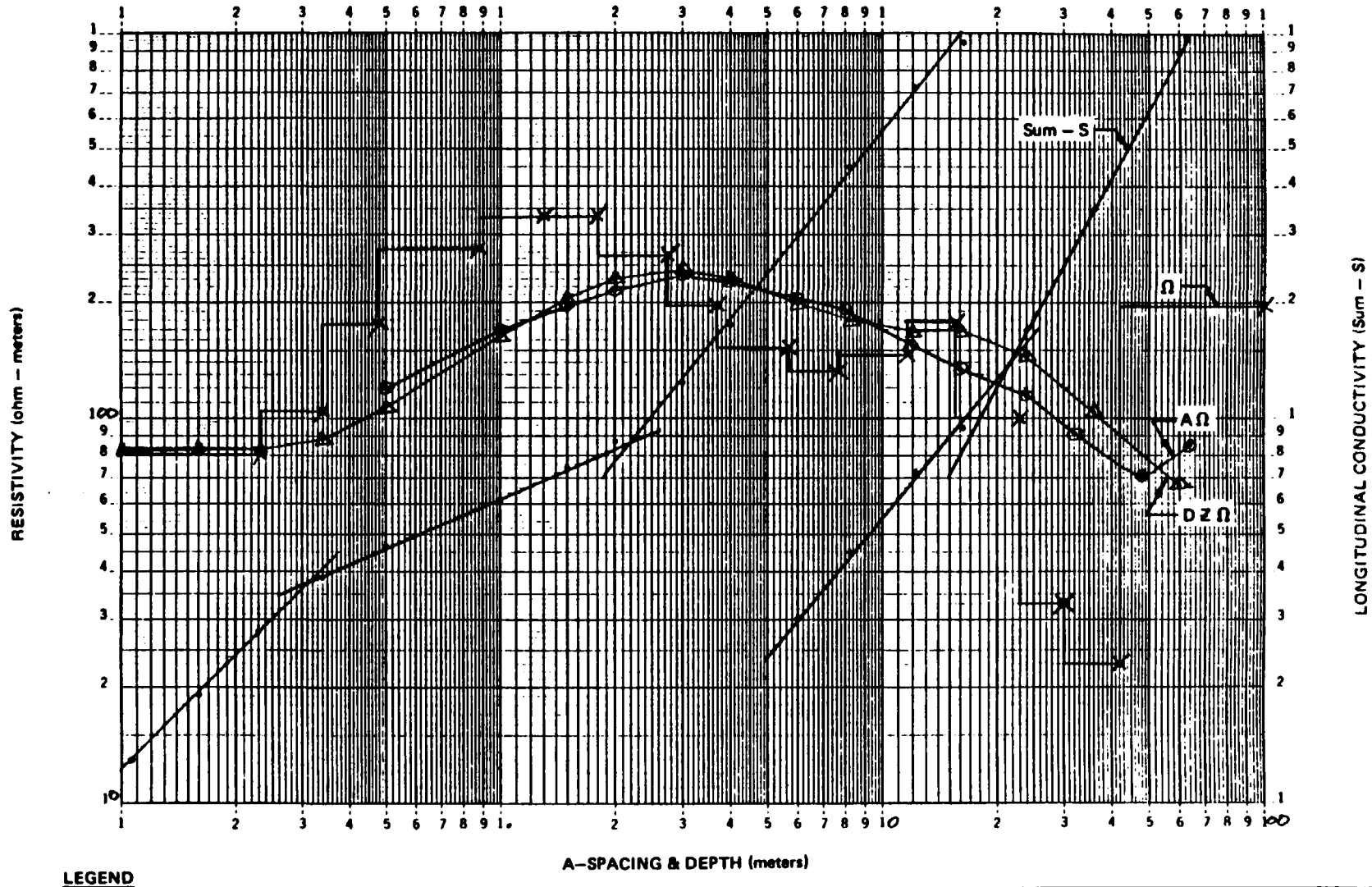
WENNER SOUNDING (RS-12)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–16

MTH 001 1312



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISITVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

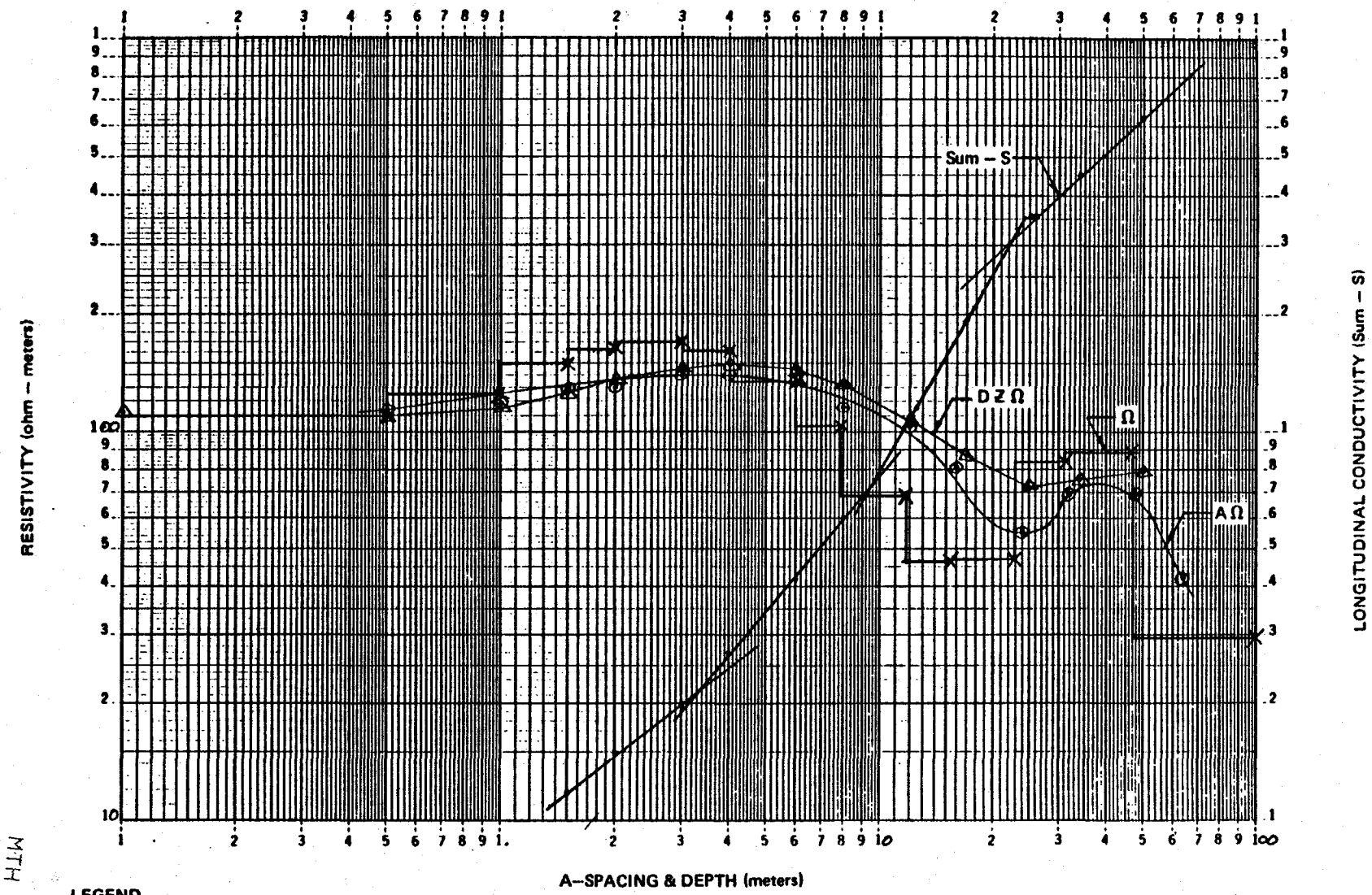
WENNER SOUNDING (RS-13)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–17

MTH 001 1313



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

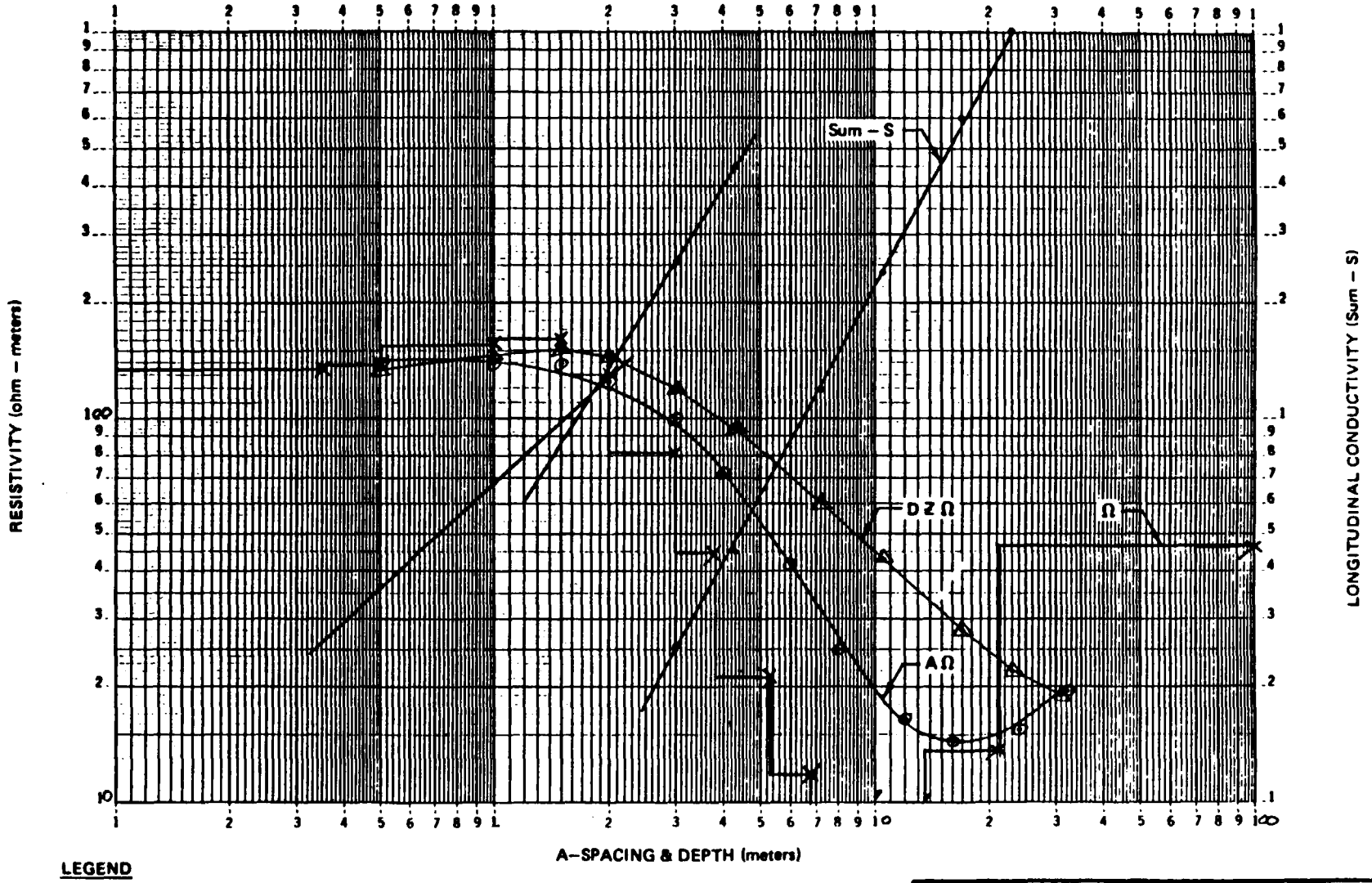
WENNER SOUNDING (RS-14)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–18

MTH 001 1314



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

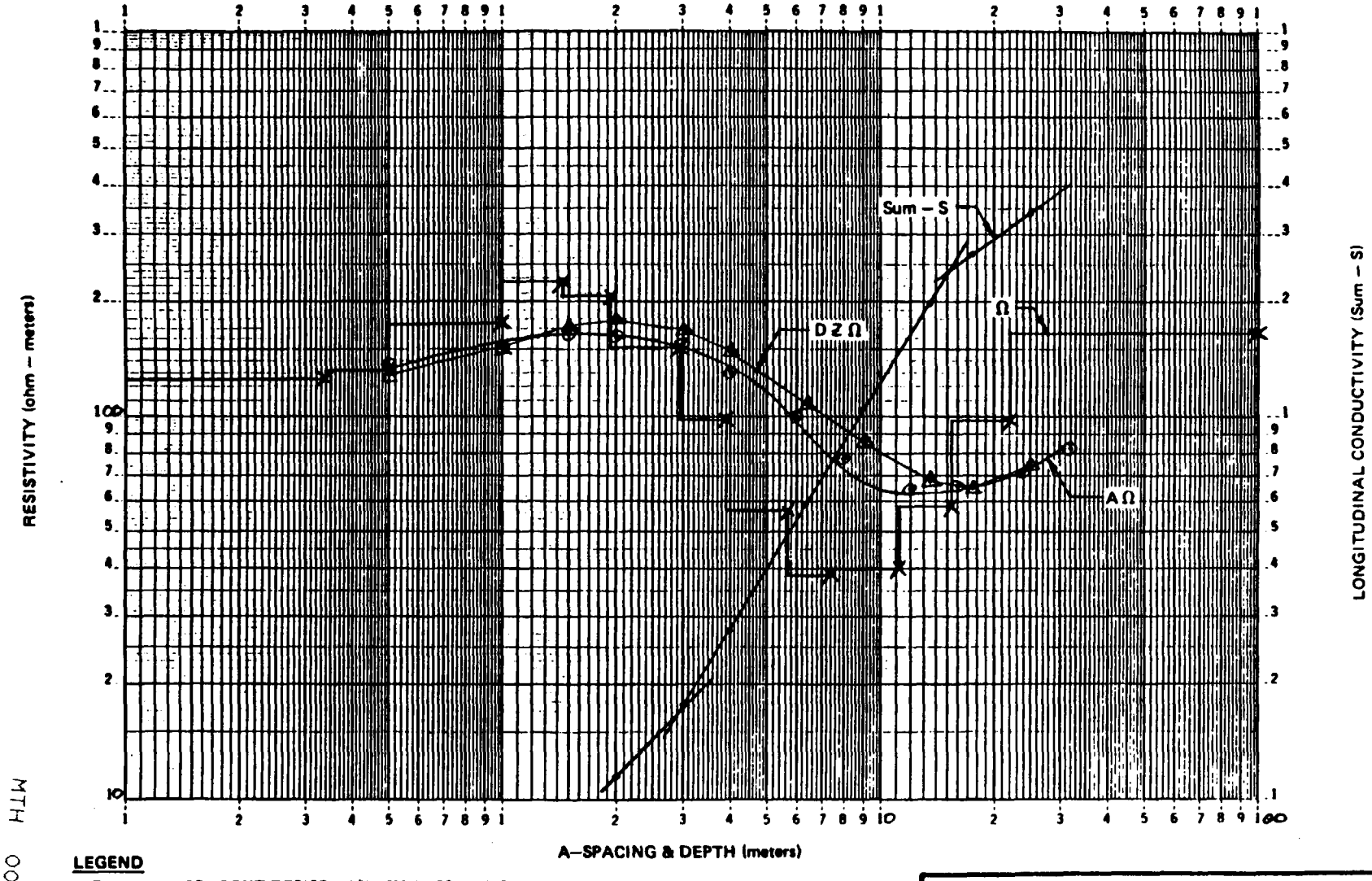
WENNER SOUNDING (RS-15)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–18

MTH 001 1315



LEGEND

AΩ	APPARENT RESISTIVITY BY A–SPACING
Ω	INVERSE CALCULATION OF RESISTIVITY BY DEPTH
DZΩ	DAR ZARROUK ESTIMATE OF APPARENT RESISTIVITY BY DEPTH
Sum – S	RELATIVE CHANGE IN LONGITUDINAL CONDUCTIVITY WITH DEPTH

MTHD / RHMW SITE

WENNER SOUNDING (RS-16)

WOODWARD—CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR. BY:	BTD	SCALE:	AS SHOWN	PROJ. NO.:	84C4007A
CK'D. BY:	RGG	DATE:	3 DEC 1985	FIG. NO.:	F–20

MTH 001 1316

Appendix F

MTH 001 1317

APPENDIX F
FIRST ROUND MONITORING AND DOMESTIC WELL CHEMICAL ANALYSES

MTH 001 1318

FIRST ROUND MONITORING WELL SAMPLING ANALYSES

		SITE	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW
		POINT	MW-1D	MW-1S	MW-2D	MW-2S	MW-3D
		SAMPLE	116	101	144	131	136
		CCN	108771	108765	111136	111118	111123
		DATE	11/19/86	11/19/86	12/04/86	12/04/86	12/04/86
		MATRIX	WA	WA	WA	WA	WA
CMPD	CL	CMPD-DESC					
101	M	ANTIMONY					82
102	M	ARSENIC	16		[4.2]	[3.6]	
103	M	BERYLLIUM	[1.9]	[1.9]			12
104	M	CADMIUM					
105	M	CHROMIUM		[8.8]	19	24	304
106	M	COPPER	29	[6.9]	[18]	[23]	412
107	M	LEAD		6.7	[3.8]	11	686
108	M	MERCURY					0.44
109	M	NICKEL					246
111	M	SILVER		24	[7.6]		11
113	M	ZINC	47	39	37	53	723
114	M	BARIUM	212	[133]	[131]	[133]	1660
115	M	IRON	4410	2810	1650	2960	116000
116	M	MANGANESE	283	695	140	206	4870
117	M	VANADIUM	[9.7]	[4.3]		[10]	153
118	M	ALUMINUM	3520	2720	633	3810	102000
120	M	COBALT	[17]	[19]			72
121	M	MAGNESIUM	14900	12800	10500	6350	125000
129	M	CALCIUM	30800	9800	42700	12500	1240000
130	M	SODIUM	9180	10300	9880	23900	88400
131	M	POTASSIUM	[2730]	[2970]	[2230]	[2810]	56600
211	V	CHLOROFORM					
222	V	METHYLENE CHLORIDE	11		[1.7]		
224	V	TETRACHLOROETHENE					
225	V	TOLUENE					
226	V	TRANS-1,2-DICHLOROETHENE					[1.2]
229	V	TRICHLOROETHENE			34		
252	V	ACETONE	24	22b			13
413	B	BIS(2-ETHYLHEXYL)PHTHALATE	[3.8]	[2]	[9.4]		24
424	B	DIETHYLPHTHALATE					58
443	B	N-NITROSODIPHENYLAMINE(1)					
445	B	PYRENE					
610	A	PHENOL					[3.6]
706	P	CHLORDANE					
1002	C	PHENOLS					63

Note: all concentrations in ppb;
b - compound also appeared in lab blank;
[ ] - concentration is below contract required detection limit.

FIRST ROUND MONITORING WELL SAMPLING ANANLYSES (cont.)

CMPD	CL	CMPD-DESC	MTHD/RHMW MW-3D dup	MTHD/RHMW MW-3S	MTHD/RHMW MW-4D	MTHD/RHMW MW-4D airp	MTHD/RHMW MW-4S airp
		SITE	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW
		POINT	MW-3D dup	MW-3S	MW-4D	MW-4D airp	MW-4S airp
		SAMPLE	142	138	139	156	102
		CCN	111131	109288	109430	111133	109287
		DATE	12/04/86	11/20/86	11/21/86	12/04/86	11/20/86
		MATRIX	WA	WA	WA	WA	WA
101	M	ANTIMONY	114				
102	M	ARSENIC	186			[7.9]	
103	M	BERYLLIUM	17	7.6	[2.9]		[4.2]
104	M	CADMIUM					7
105	M	CHROMIUM	406	90	20	10	44
106	M	COPPER	457	581	28	29	30
107	M	LEAD	786	17		21	26
108	M	MERCURY					0.2
109	M	NICKEL	340	78			51
111	M	SILVER				[6.3]	
113	M	ZINC	958	303	105	68	162
114	M	BARIUM	2300	513	[102]	409	311
115	M	IRON	165000	68000	764	27500	22200
116	M	MANGANESE	6370	1490	75	1060	215
117	M	VANADIUM	225	102		[12]	[44]
118	M	ALUMINUM	140000	42400	555	1320	22800
120	M	COBALT	98	[44]	[7.4]		[24]
121	M	MAGNESIUM	193000	25400	6800	8390	21600
129	M	CALCIUM	2230000	17100	11700	63000	6280
130	M	SODIUM	82200	10500	10200	15000	21200
131	M	POTASSIUM	53200	6010	[1530]		[3450]
211	V	CHLOROFORM		17	17		
222	V	METHYLENE CHLORIDE	[1.9]			[1.5]	
224	V	TETRACHLOROETHENE		[5.6]	[4]		
225	V	TOLUENE					
226	V	TRANS-1,2-DICHLOROETHENE					
229	V	TRICHLOROETHENE	13	320	240		
252	V	ACETONE	17b		11b	[3.7]	80
413	B	BIS(2-ETHYLHEXYL)PHTHALATE	48	[13]		[7]	12
424	B	DIETHYLPHTHALATE					
443	B	N-NITROSODIPHENYLAMINE(1)					
445	B	PYRENE					
610	A	PHENOL	[19]				
706	P	CHLORDANE					
1002	C	PHENOLS	57				

Note: all concentrations in ppb;
b - compound also appeared in lab blank;
[ ] - concentration is below contract required detection limit.

FIRST ROUND MONITORING WELL SAMPLING ANANLYSES (cont.)

CMPD	CL	CMPD-DESC	MTHD/RHMW MW-5D 134 109427 11/21/86 WA	MTHD/RHMW MW-5D airp 146 111115 12/04/86 WA	MTHD/RHMW MW-6D 108 109289 11/20/86 WA	MTHD/RHMW MW-7D 111 108759 11/19/86 WA	MTHD/RHMW MW-7S 107 108740 11/19/86 WA
101	M	ANTIMONY					
102	M	ARSENIC		[8.4]			[3.1]
103	M	BERYLLIUM			[3.8]	[2.8]	[3.8]
104	M	CADMIUM					
105	M	CHROMIUM	60		14		19
106	M	COPPER	[14]	[18]	28	[2.2]	35
107	M	LEAD	20		7		9.7
108	M	MERCURY					
109	M	NICKEL	104				41
111	M	SILVER		18			
113	M	ZINC	178	42	49	28	217
114	M	BARIUM	544	[39]	[167]	[138]	293
115	M	IRON	17800	19800	6280	[73]	18500
116	M	MANGANESE	1500	336	539		676
117	M	VANADIUM	[30]	[6.7]	[8.6]		[20]
118	M	ALUMINUM	22600	250	5000	[42]	12900
120	M	COBALT	[29]		[15]	[6.8]	[24]
121	M	MAGNESIUM	28700	17600	8360	11800	15800
129	M	CALCIUM	27300	32800	12700	12300	14100
130	M	SODIUM	8660	18000	7140	13100	13600
131	M	POTASSIUM	5610	[1120]	[2880]	[2830]	[4530]
211	V	CHLOROFORM				[19]	[18]
222	V	METHYLENE CHLORIDE	[3.9]		[3.1]		
224	V	TETRACHLOROETHENE				37	43
225	V	TOLUENE					
226	V	TRANS-1,2-DICHLOROETHENE				25	24
229	V	TRICHLOROETHENE				650	650
252	V	ACETONE				75b	
413	B	BIS(2-ETHYLHEXYL)PHTHALATE		[6.4]			
424	B	DIETHYLPHTHALATE					
443	B	N-NITROSODIPHENYLAMINE(1)					
445	B	PYRENE					
610	A	PHENOL					
706	P	CHLORDANE					
1002	C	PHENOLS					

Note: all concentrations in ppb;
b - compound also appeared in lab blank;
[ ] - concentration is below contract required detection limit.

FIRST ROUND MONITORING WELL SAMPLING ANANLYSES (cont.)

CMPD	CL	CMPD-DESC	MTHD/RHMW MW-9D 114 108732 11/19/86 WA	MTHD/RHMW MW-9D dup 115 108729 11/19/86 WA	MTHD/RHMW MW-10D 147 109428 11/21/86 WA	MTHD/RHMW MW-11D #137 111243 12/03/86 WA	MTHD/RHMW MW-11S #157 111245 12/03/86 WA
101	M	ANTIMONY					
102	M	ARSENIC	[3.6]			[4.1]	
103	M	BERYLLIUM	[3.8]	[3.8]	[1.9]		
104	M	CADMIUM					
105	M	CHROMIUM				10	6
106	M	COPPER	[17]	28	[1.1]	[18]	31
107	M	LEAD			[4.7]	8.1	39
108	M	MERCURY					
109	M	NICKEL					54
111	M	SILVER				[5.7]	
113	M	ZINC	33	53	[19]	45	160
114	M	BARIUM	[117]	[111]	[98]	[57]	232
115	M	IRON	381	318	477	839	18400
116	M	MANGANESE	72	68	25	40	1150
117	M	VANADIUM					[33]
118	M	ALUMINUM	280	222	367	501	23400
120	M	COBALT		[6.8]			[23]
121	M	MAGNESIUM	11800	11200	6430	6720	19100
129	M	CALCIUM	23700	23200	14300	15300	9290
130	M	SODIUM	13300	13000	8420	9470	7600
131	M	POTASSIUM	[1770]	[2020]	[1850]	[2060]	[3940]
211	V	CHLOROFORM					
222	V	METHYLENE CHLORIDE			[3.7]		
224	V	TETRACHLOROETHENE					
225	V	TOLUENE					
226	V	TRANS-1,2-DICHLOROETHENE					
229	V	TRICHLOROETHENE	6.3	6.3			
252	V	ACETONE					
413	B	BIS(2-ETHYLHEXYL)PHTHALATE				[17]	[5.8]
424	B	DIETHYLPHTHALATE				[3]	
443	B	N-NITROSODIPHENYLAMINE(1)				[2.6]	
445	B	PYRENE					
610	A	PHENOL					
706	P	CHLORDANE			1.3		
1002	C	PHENOLS					

Note: all concentrations in ppb;
b - compound also appeared in lab blank;
[ ] - concentration is below contract required detection limit.

FIRST ROUND MONITORING WELL SAMPLING ANANLYSES (cont.)

		SITE	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW
		POINT	MW-13D	MW-13S	MW-14D	MW-14S	MW-15D
		SAMPLE	149	109	#105	#103	100
		CCN	109284	108721	111247	111252	109426
		DATE	11/20/86	11/19/86	12/03/86	12/03/86	11/21/86
		MATRIX	WA	WA	WA	WA	WA
CMPD	CL	CMPD-DESC					
101	M	ANTIMONY					
102	M	ARSENIC			[5.2]		[3.1]
103	M	BERYLLIUM	[3.8]	[3.8]			[1.9]
104	M	CADMIUM					
105	M	CHROMIUM	[6.6]		[8.5]		
106	M	COPPER		53	[18]	[8.1]	
107	M	LEAD	13		6.1		
108	M	MERCURY					
109	M	NICKEL					
111	M	SILVER		36			
113	M	ZINC	[19]	73	52	29	[12]
114	M	BARIUM	[46]	[34]	222	[80]	[48]
115	M	IRON	770	486	4720	295	387
116	M	MANGANESE	116	22	427		46
117	M	VANADIUM			[16]		[2]
118	M	ALUMINUM	651	470	5730	402	307
120	M	COBALT		[6.8]			
121	M	MAGNESIUM	[4120]	[4130]	9080	7200	8020
129	M	CALCIUM	12700	5880	19800	8880	34600
130	M	SODIUM	7030	5460	11700	17600	11100
131	M	POTASSIUM	[1850]	[1950]	[2560]	[2150]	[1790]
211	V	CHLOROFORM					
222	V	METHYLENE CHLORIDE		2b		[3.3]	8.3b
224	V	TETRACHLOROETHENE					[1.4]
225	V	TOLUENE					
226	V	TRANS-1,2-DICHLOROETHENE					
229	V	TRICHLOROETHENE					
252	V	ACETONE	22	18b			
413	B	BIS(2-ETHYLHEXYL)PHTHALATE			[8.2]	[6.6]	
424	B	DIETHYLPHTHALATE					
443	B	N-NITROSODIPHENYLAMINE(1)					
445	B	PYRENE					
610	A	PHENOL					
706	P	CHLORDANE					
1002	C	PHENOLS					

Note: all concentrations in ppb;
b - compound also appeared in lab blank;
[ ] - concentration is below contract required detection limit.

FIELD AND TRIP BLANKS FOR FIRST ROUND MONITORING WELL SAMPLING

		SITE	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW
		POINT	11/18 FB	11/18 TB	11/19 FB	11/20 FB	11/20 TB	11/21 FB
		SAMPLE	113	300	112	135	400	133
		CCN	108735	108748	108768	109285	109290	109429
		DATE	11/19/86	11/19/86	11/19/86	11/20/86	11/20/86	11/21/86
		MATRIX	WA	WA	WA	WA	WA	WA
CMPD	CL	CMPD-DESC						
103	M	BERYLLIUM	[3.8]	[1.9]	[3.8]	[3.8]	[3.8]	
105	M	CHROMIUM		15				
106	M	COPPER	[8]	[1.1]	[3.4]			[2.2]
108	M	MERCURY			1.4			
110	M	SELENIUM						
111	M	SILVER						
113	M	ZINC	[13]	[11]	[17]	[19]	[3.6]	23
114	M	BARIUM				[1.3]		[2.4]
115	M	IRON	[29]	[70]	[22]	[28]	[14]	[61]
116	M	MANGANESE						
118	M	ALUMINUM	[31]			[25]		[62]
120	M	COBALT						
129	M	CALCIUM	[22]	[17]	[138]	[307]	[15]	[262]
130	M	SODIUM	[1960]					
222	V	METHYLENE CHLORIDE	6.7b	5	17	[4]		[3.9]b
413	B	BIS(2-ETHYLHEXYL)PHTHALATE						

Note: all concentrations in ppb;
b - compound also appeared in lab blank;
[ ] - concentration is below contract detection limits.

FIELD AND TRIP BLANKS FOR FIRST ROUND MONITORING WELL SAMPLING

		SITE	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW	MTHD/RHMW
		POINT	11/21 TB	12/3 FB	12/3 TB	12/4 FB	12/4 TB
		SAMPLE	500	#145	#600	132	700
		CCN	109436	111251	111249	111125	111129
		DATE	11/21/86	12/03/86	12/03/86	12/04/86	12/04/86
		MATRIX	WA	WA	WA	WA	WA
CMPD	CL	CMPD-DESC					
103	M	BERYLLIUM					
105	M	CHROMIUM	12	[9.7]			
106	M	COPPER	[8.2]	[18]	[17]	[18]	[6.1]
108	M	MERCURY					
110	M	SELENIUM					5.3
111	M	SILVER				19	22
113	M	ZINC	20	30	24	50	[19]
114	M	BARIUM					
115	M	IRON	[72]	[66]	[31]	[28]	[35]
116	M	MANGANESE	[2]				
118	M	ALUMINUM		[33]		[26]	[24]
120	M	COBALT	[7.4]				
129	M	CALCIUM	[30]	[179]	[113]	[224]	[132]
130	M	SODIUM					
222	V	METHYLENE CHLORIDE	8.8b	29		7	
413	B	BIS(2-ETHYLHEXYL)PHTHALATE		[3.2]		[2.8]	[2.2]

Note: all concentrations in ppb;
b - compound also appeared in lab blank;
[ ] - concentration is below contract detection limits.

ROUND ONE
MONITORING WELL SAMPLES
TENTATIVELY IDENTIFIED COMPOUNDS

Sampling Location	MW-1S	MW-2S	MW-3D*	MW-4S	MW-5D	MW-11D	MW-15D	Field Blank 12/03/86	Trip Blank 11/21/86	Field Blank 11/18/86	Field Blank 12/04/86	Field Blank 11/21/86
Sample No.	101	131	136	102	134	137	100	145	500	113	132	133
Piperidine,1-ethyl -2-methyl-	20											
Pentane,2-Methoxy -2,4,4-Trimethyl		17										
Phenol,2-Fluoro-				42								
Nonanoic Acid				13								
Aziridine,2-Hexyl-					14							
Hexadecanoic Acid						9						
1,2-Benzenedi-carboxylic Acid, Diheptyl ester						12						
Hydrobromicacid							29					
Ethane,1,1,2-Trichloro-1,2,2-Trifluoro-							120					
Pyridine, Pentachloro-								55				
Benzene, 1,2-Dimethyl-									8			
Oxirane, (Butoxymethyl)-										9	6	
Phenol,2,4,6-Tribromo-											81	
Naptho[2,3-B] Thiophene, 4,9-Dimethyl-											140	
9-Octadecenamide, (2)-												17
Tridecane,4,8-Dimethyl-			10									
Docosane			23									
Cyclohexane, 1,1'-[1,2-Bis)(1,1-Dimethylethyl) -1,2-ET			14									
1-Nonene,4,6,8-Trimethyl-			19									
Hexadecane			20									
1-Octanol,2-Butyl-			13									
Docosane			19									
9-Eicosene,(E)-			8									
Eicosane,10-Methyl-			15									
1-Octanol,2-Butyl-			29									
Heptacosane			15									
Aziridine,1-Hexyl-			13									

* Duplicate of this sample had no T.I.C.'s.
Note: All concentrations in ppb; all concentrations are estimated.

j87-60

DOMESTIC POTABLE WELL SAMPLING

MTH 001 1327

FIRST ROUND PRIVATE DOMESTIC WELL SAMPLING ANALYSES

COMPUCHEM SAMPLE NUMBER	89387	89376	89333	89381	89385	89386	89356	89368
WCC SAMPLE NUMBER	017	030	020	034	035	023	022	032
SAMPLING DATE	6/6/86	6/6/86	6/5/86	6/6/86	6/6/86	6/5/86	6/5/86	6/6/86
SAMPLING LOCATION	9/8	9/2.04 + 2.4	9/9.1	9/5	9/7 + 7.0	29002 28	29002 24	29002 22
Methylene Chloride	[4.1]	*	*	*	[2.1]	5.8	[3.2]	[1.1]
Acetone	[6.4]	*	*	*	*	*	[7.3]	[5.3]
Diethyl phthalate	*	*	*	*	*	*	*	*
1,1 Dichloroethane	*	*	*	*	*	*	[3.5]	8.6
1,1,1 Trichloroethane	*	*	*	*	*	*	*	*
Trichloroethene	*	*	*	*	*	*	46	28
Tetrachloroethene	*	*	*	*	*	*	*	*
Di-n-butylphthalate	*	*	*	*	*	*	*	*
Toluene	*	*	*	*	*	*	*	*
Ethyl Benzene	*	*	*	*	*	*	*	*
trans-1,2 - dichloroethene	*	*	*	*	*	*	[3.5]	[4.0]
Chlorodane	*	*	*	*	*	*	*	*
Chloroform	*	*	*	*	*	*	*	*
Bromodichloromethane	*	*	*	*	*	*	*	*
Aluminum	[102]	[146]	[147]	161	[153]	[39]	[160]	[191]
Arsenic	*	*	*	*	*	*	10	10
Barium	[54]	[9.7]	[142]	[12]	201	[70]	[114]	[120]
Beryllium	*	*	*	*	*	*	*	*
Cadmium	*	5.1	*	*	4.6	*	*	*
Calcium	34600	336000	41700	19600	38900	8800	46200	50700
Chromium	[4.1]	15	[9.7]	13	15	[6.4]	13	11
Cobalt	[5.0]	13	[8.3]	11	[12]	[6.1]	[25]	[8.6]
Copper	31	31	196	120	30	118	47	31
Iron	[62]	[60]	[46]	[68]	[48]	[30]	163	116
Lead	18	[2.1]	[4.4]	8.4	[4.8]	[4.0]	143	[4.0]
Magnesium	5340	8690	75600	5760	6880	5720	19600	20300
Manganese	[5.2]	[6.1]	[5.3]	[6.1]	6.0	[4.2]	74	94
Mercury	*	[0.18]	[0.14]	[0.14]	[0.14]	[0.14]	[0.18]	0.14
Nickel	[14]	[13]	[16]	[16]	[19]	[18]	[27]	[33]
Potassium	*	*	[1900]	*	*	*	*	*
Silver	10	40	10	180	10	10	*	10
Sodium	13200	13700	17600	10100	19600	7740	15300	16900
Thallium	*	*	*	*	*	*	*	*
Vanadium	5	[16]	[9.1]	[9.9]	[15]	[3.9]	[7.9]	8.1
Zinc	74	112	40	60	71	77	48	123
Cyanide	*	*	*	*	*	*	*	*
Phenols	*	*	*	*	*	*	*	*

Notes: All concentrations reported in ppb.
* Below Method Detection Limit.
[ ] Value less than detection limit specified in lab contract
(b) Compound also appeared in analysis of laboratory blank.

FIRST ROUND PRIVATE DOMESTIC WELL SAMPLING ANALYSES (cont.)

COMPUCHEM SAMPLE NUMBER	89321	89338	89328	89392	89366	89334	89323	89439
WCC SAMPLE NUMBER	018	015	026	029	027	024	036	039
SAMPLING DATE	6/5/86	6/5/86	6/6/86	6/6/86	6/6/86	6/6/86	6/6/86	6/6/86
SAMPLING LOCATION	29002 30	29002 33	29001 5A	29001 5A	23001 20	29001 2	29001 4	29002 4
Methylene Chloride	[3.1]	*	*	*	*	*	*	*
Acetone	[5.7]	*	*	*	*	*	[4.6]b	*
Diethyl phthalate	*	*	*	*	*	*	*	*
1,1 Dichloroethane	*	[5.8]	*	*	*	*	*	*
1,1,1 Trichloroethane	*	*	*	*	*	*	*	*
Trichloroethene	86	340	*	*	[1.9]	*	*	58
Tetrachloroethene	[1.4]	11	*	*	*	*	*	[1.8]
Di-n-butylphthalate	*	*	*	*	*	*	*	*
Toluene	*	*	*	*	*	*	*	*
Ethyl Benzene	*	*	*	*	*	*	*	*
trans-1,2 - dichloroethene	[3.7]	17	*	*	*	*	*	[4.0]
Chlorodane	*	*	*	*	*	*	*	*
Chloroform	*	*	*	*	*	*	*	*
Bromodichloromethane	*	*	*	*	*	*	*	*
Aluminum	[98]	[89]	[84]	[54]	[150]	[154]	[93]	[76]
Arsenic	*	10	*	*	39	[7.5]	*	*
Barium	[73]	[88]	295	306	[106]	[6.7]	[8.4]	[82]
Beryllium	*	*	*	*	*	*	*	*
Cadmium	*	*	*	[4.1]	*	[4.8]	[4.7]	*
Calcium	6250	28600	25500	26200	22400	289000	232000	30500
Chromium	19	[12]	[9.2]	[7.6]	11	[8.8]	[9.3]	[8.2]
Cobalt	81	[8.6]	[8.9]	[7.9]	[8.4]	*	[7.8]	[7.2]
Copper	94	[23]	31	30	31	31	144	28
Iron	262	656	[70]	[75]	[69]	196	3840	[23]
Lead	2170	19	[3.2]	*	[3.5]	*	*	28
Magnesium	5490	11800	6080	6240	9480	60800	54500	11700
Manganese	29	[6.1]	[5.4]	[5.2]	[5.9]	295	222	*
Mercury	0.24	*	*	*	*	[0.18]	[0.14]	[0.14]
Nickel	[25]	[21]	[12]	[17]	[24]	28	[37]	[20]
Potassium	*	*	*	*	[1500]	[1700]	*	*
Silver	20	10	10	*	30	10	*	*
Sodium	11000	2600	12000	9750	14000	57900	10	10800
Thallium	*	*	*	*	*	*	*	*
Vanadium	[6.6]	14	[9.4]	[7.2]	[20]	[4.6]	42600	6.5
Zinc	62	205	36	47	45	32	[15]	36
Cyanide	*	*	*	*	*	*	99	*
Phenols	*	*	30	*	11	*	20	*

Notes: All concentrations reported in ppb.
* Below Method Detection Limit.
[ ] Value less than detection limit specified in lab contract
(b) Compound also appeared in analysis of laboratory blank.

FIRST ROUND PRIVATE DOMESTIC WELL SAMPLING ANALYSES (cont.)

COMPUCHEM SAMPLE NUMBER	89388	89332	89383	89324	89445	89354	89355	89359
WCC SAMPLE NUMBER	041	019	021	025	038	001	002	003
SAMPLING DATE	6/6/86	6/5/86	6/5/86	6/6/86	6/6/86	6/5/86	6/5/86	6/5/86
SAMPLING LOCATION	23001 17	29002 14	29002 11	29002 12	28001 66	29002 43	29003 7	29003 12
Methylene Chloride	*	*	*	[1.8]	24	*	*	*
Acetone	*	[4.7]b	*	[5.9]b	*	[4.5]b	[5.7]b	*
Diethyl phthalate	*	*	*	*	*	*	*	*
1,1 Dichloroethane	*	7.1	*	*	*	[3.8]	*	[4.0]
1,1,1 Trichloroethane	*	[3.7]	*	*	*	*	*	*
Trichloroethene	*	72	220	64	*	35	*	32
Tetrachloroethene	*	[1.9]	[26]	*	*	*	*	*
Di-n-butylphthalate	*	*	*	*	[1.5]	*	*	*
Toluene	*	*	*	*	[4.7]	*	*	*
Ethyl Benzene	*	*	*	*	*	*	*	*
trans-1,2 - dichloroethene	*	[3.4]	7.6	*	*	*	*	*
Chlorodane	*	*	*	*	*	*	*	*
Chloroform	*	*	*	*	11	*	*	*
Bromodichloromethane	*	*	*	*	[2.8]	*	*	*
Aluminum	[73]	[140]	[86]	[173]	[115]	[157]	[163]	[176]
Arsenic	*	*	[4.2]	*	*	[5.1]	*	[8.7]
Barium	[199]	[72]	[135]	[85]	[39]	[121]	[58]	[165]
Beryllium	*	*	*	*	*	*	*	*
Cadmium	*	*	5.3	*	[4.1]	*	*	*
Calcium	28300	32100	32500	16000	33600	21600	6060	25100
Chromium	[7.8]	12	13	11	[7.6]	[5.0]	[8.5]	10
Cobalt	[8.0]	[9.5]	[10]	[8.8]	[7.4]	[42]	[7.8]	[8.9]
Copper	30	47	94	47	76	[26]	126	31
Iron	[25]	[97]	[30]	125	[74]	[86]	[56]	[89]
Lead	[2.8]	[3.6]	40	6.1	18	740	*	5.0
Magnesium	12400	17000	12500	9510	8120	8097	[3920]	11200
Manganese	[3.7]	[13]	[5.3]	18	[6.0]	[5.9]	[6.2]	[5.6]
Mercury	*	*	*	[0.18]	*	[0.18]	[0.14]	[0.14]
Nickel	[23]	[19]	[15]	[25]	[16]	[12]	[15]	*
Potassium	*	*	*	[1600]	*	*	*	*
Silver	*	20	10	*	10	*	*	*
Sodium	13000	12900	15000	15800	11100	8035	13600	13900
Thallium	*	*	*	*	*	*	*	*
Vanadium	[7.6]	[8.5]	[10]	8.0	[4.8]	[4.5]	[4.3]	[11]
Zinc	69	39	54	148	32	82	47	44
Cyanide	*	*	*	*	*	*	*	*
Phenols	*	*	54	*	*	*	*	*

Notes: All concentrations reported in ppb.
* Below Method Detection Limit.
[ ] Value less than detection limit specified in lab contract
(b) Compound also appeared in analysis of laboratory blank.

FIRST ROUND PRIVATE DOMESTIC WELL SAMPLING ANALYSES (cont.)

COMPUCHEM SAMPLE NUMBER	89361	89364	89311	89319	89326	89312	89357	89314
WCC SAMPLE NUMBER	004	005	006	007	008	009	012	011
SAMPLING DATE	6/5/86	6/5/86	6/5/86	6/5/86	6/5/86	6/5/86	6/5/86	6/6/86
SAMPLING LOCATION	29002 37	29003 15	29003 5	29002 40	29002 40	29002 17	29002 8	23001 27
Methylene Chloride	16	[1.7]	7.1	[2.4]	[1.8]	[3.0]	*	*
Acetone	12	[5.2]b	*	*	[4.8]b	*	*	[6.4]b
Diethyl phthalate	[4.2]	*	*	*	*	*	*	*
1,1 Dichloroethane	*	[2.6]	*	[4.5]	5.6	*	*	*
1,1,1 Trichloroethane	*	*	*	*	*	*	*	*
Trichloroethene	[2.5]	24	[3.8]	40	44	[3.9]	18	60
Tetrachloroethene	*	*	*	*	[1.5]	*	*	*
Di-n-butylphthalate	*	*	*	*	*	*	*	*
Toluene	*	*	*	*	*	*	*	*
Ethyl Benzene	5.3	*	*	*	*	*	*	*
trans-1,2 - dichloroethene	*	*	*	*	*	*	*	[4.4]
Chlorodane	*	*	*	*	*	0.76	*	*
Chloroform	*	*	*	*	*	*	*	*
Bromodichloromethane	*	*	*	*	*	*	*	*
Aluminum	[168]	[76]	*	[151]	[109]	*	144	*
Arsenic	[4.4]	[8.5]	*	18	20	*	[7.2]	*
Barium	[135]	[118]	[151]	[142]	[144]	[105]	[62]	[106]
Beryllium	*	*	*	*	*	*	*	*
Cadmium	*	*	*	*	*	*	*	*
Calcium	30200	21700	29500	25400	25000	14800	37100	33700
Chromium	[9.5]	12	*	10	11	*	11	*
Cobalt	[7.2]	[9.4]	*	[8.3]	[7.9]	*	[18]	*
Copper	31	[18]	114	31	31	171	47	45
Iron	124	[26]	[18]	510	514	[15]	[57]	*
Lead	7.0	*	6.0	7.7	*	[4.7]	91	[4.4]
Magnesium	10500	8100	12100	10600	10600	7220	17000	9530
Manganese	[6.1]	[3.6]	*	[6.2]	[6.1]	*	44	*
Mercury	[0.18]	*	*	[0.18]	0.24	*	[0.14]	*
Nickel	[16]	[14]	*	[12]	[14]	*	[11]	*
Potassium	*	*	*	*	*	*	*	*
Silver	10	*	*	10	*	*	*	*
Sodium	15400	9040	5160	14700	14100	6440	10600	5660
Thallium	*	*	[2.6]	*	*	[5.5]	*	[4.4]
Vanadium	[8.2]	[9.6]	*	[13]	[13]	*	[6.8]	*
Zinc	70	38	178	138	148	26	43	31
Cyanide	*	*	*	*	*	*	*	*
Phenols	*	*	*	13	*	*	*	*

Notes: All concentrations reported in ppb.
* Below Method Detection Limit.
[ ] Value less than detection limit specified in lab contract
(b) Compound also appeared in analysis of laboratory blank.

FIRST ROUND PRIVATE DOMESTIC WELL SAMPLING ANALYSES (cont.)

COMPUCHEM SAMPLE NUMBER	89348	89382	89337	89384	89339	89855	89313	89391
WCC SAMPLE NUMBER	014	037	033	016	013	Blank	010	6686
SAMPLING DATE	6/5/86	6/6/86	6/6/86	6/5/86	6/5/86	6/5/86	6/5/86	6/6/86
SAMPLING LOCATION	23001 28	23001 23	29003 18	28001 37	29001 1	Trip Blank	Field Blank	Trip Blank
Methylene Chloride	*	[4.0]	[2.1]	*	*	*	[4.6]	8.0
Acetone	[3.5]	*	*	*	*	*	[5.9]	*
Diethyl phthalate	*	*	*	*	*	*	*	*
1,1 Dichloroethane	[1.5]	*	*	*	*	*	*	*
1,1,1 Trichloroethane	*	*	*	*	*	*	*	*
Trichloroethene	140	72	*	*	*	*	*	*
Tetrachloroethene	[2.1]	*	*	*	*	*	*	*
Di-n-butylphthalate	*	*	*	*	*	*	*	*
Toluene	*	*	*	*	*	*	*	*
Ethyl Benzene	*	*	*	*	*	*	*	*
trans-1,2 - dichloroethene	5.6	5.3	*	*	*	*	*	*
Chlorodane	*	*	*	*	*	*	*	*
Chloroform	*	*	*	*	*	*	*	*
Bromodichloromethane	*	*	*	*	*	*	*	*
Aluminum	[113]	[153]	[88]	[117]	116	V	*	[135]
Arsenic	*	*	*	*	*	O	*	*
Barium	[125]	[107]	[131]	[102]	233	L	*	[3.0]
Beryllium	*	*	*	*	*	A	*	*
Cadmium	*	5.7	*	*	9.8	T	*	*
Calcium	29800	32800	24100	24000	32400	I	[107]	[1240]
Chromium	[6.9]	13	117	15	14	L	*	[7.1]
Cobalt	[7.0]	[11]	[10]	[12]	[11]	E	*	[8.1]
Copper	41	31	31	46	31	S	26	30
Iron	44	[59]	[56]	[40]	107		*	[86]
Lead	[3.6]	*	20	7.0	7.0	O	5.3	10
Magnesium	9050	9440	7920	7750	11100	N	*	[171]
Manganese	[4.2]	5.6	[6.1]	[5.3]	15	L	*	[5.2]
Mercury	[0.14]	*	*	[0.18	*	Y	*	[0.18]
Nickel	[14]	71	[14]	[10]	[19]		*	[23]
Potassium	*	*	*	*	*		*	*
Silver	10	10	20	10	10		*	10
Sodium	10000	14100	9270	12400	14600		*	[2820]
Thallium	*	*	*	*	*		[2.8]	*
Vanadium	[5.7]	[10]	[11]	[13]	[13]		*	[4.9]
Zinc	73	29	95	42	48		24	30
Cyanide	*	*	*	*	*		*	*
Phenols	*	*	*	*	*		*	54

Notes: All concentrations reported in ppb.
* Below Method Detection Limit.
[ ] Value less than detection limit specified in lab contract
(b) Compound also appeared in analysis of laboratory blank.

FIRST ROUND PRIVATE DOMESTIC WELL SAMPLING ANALYSES (cont.)

COMPUCHEM SAMPLE NUMBER	89377
WCC SAMPLE NUMBER	043
SAMPLING DATE	6/6/86
SAMPLING LOCATION	Field Blank
Methylene Chloride	[4.8]
Acetone	[7.4]b
Diethyl phthalate	*
1,1 Dichloroethane	*
1,1,1 Trichloroethane	*
Trichloroethene	*
Tetrachloroethene	*
Di-n-butylphthalate	[2.0]
Toluene	*
Ethyl Benzene	*
trans-1,2 - dichloroethene	*
Chlorodane	*
Chloroform	*
Bromodichloromethane	*
Aluminum	222
Arsenic	*
Barium	[3.8]
Beryllium	*
Cadmium	*
Calcium	[1320]
Chromium	17
Cobalt	[15]
Copper	31
Iron	[50]
Lead	[2.1]
Magnesium	[198]
Manganese	[5.5]
Mercury	0.24
Nickel	[20]
Potassium	*
Silver	10
Sodium	9020
Thallium	[11]
Vanadium	30
Zinc	*
Cyanide	*
Phenols	

Notes: All concentrations reported in ppb.
* Below Method Detection Limit.
[ ] Value less than detection limit specified in lab contract
(b) Compound also appeared in analysis of laboratory blank.

ROUND ONE
POTABLE WELL SAMPLE
TENTATIVELY IDENTIFIED COMPOUNDS

Block	230001	29002	28001	29002	29002	23001
Lot	28	33	37	11	24	23
Sample No.	014	015	016	021	022	037
*Ethane,1,1,2-Trichloro-1,2,2-Trifluoro	10	12		12		4
2H-3,9A-Methano-1-Benzoxepin,Octahydro-2,2,5A,9-Tet			12			
1,3-Cyclopentanedione, 2-Chloro-				40		
3H-1,2-Dithiol-3-One, 4,5-Dimethyl-				22		
1-Penten-3-One,1-(4-Chlorophenyl)-				15		
1,3-Cyclopentanedione, 2-Chloro-				38		
1H-Indol-4-OL,3-Methyl-				49		
1-Penten-3-One,1-(4-Chlorophenyl)-				30		
1,3,5,7-Cyclooctatetraene					9	

* Described as possible laboratory contaminant.
Note: All concentrations in ppb; all concentrations are estimated.

j87-61

Appendix G

MTH 001 1335

APPENDIX G
AQUIFER TEST DATA

RB87-133G

MTH 001 1336

TABLE G-1
THEIS SOLUTIONS TO PUMPING TEST DATA

Well	Description	Log s	Log t	s (ft)	t (min)	T (gpd/ft)	r (ft)	S
Pumping Well	Recovery	.60	1.33	3.98	21.38	7,141	NA	NA
MW-9D	Drawdown	.65	.58	4.43	3.80	6,416	200	.032
MW-9D	Recovery	.59	1.63	3.87	42.66	7,344	200	.415
MW-10D	Drawdown	.58	.88	3.80	7.59	7,479	650	.007
MW-10D	Recovery	.56	1.60	3.63	39.81	7,829	650	.039

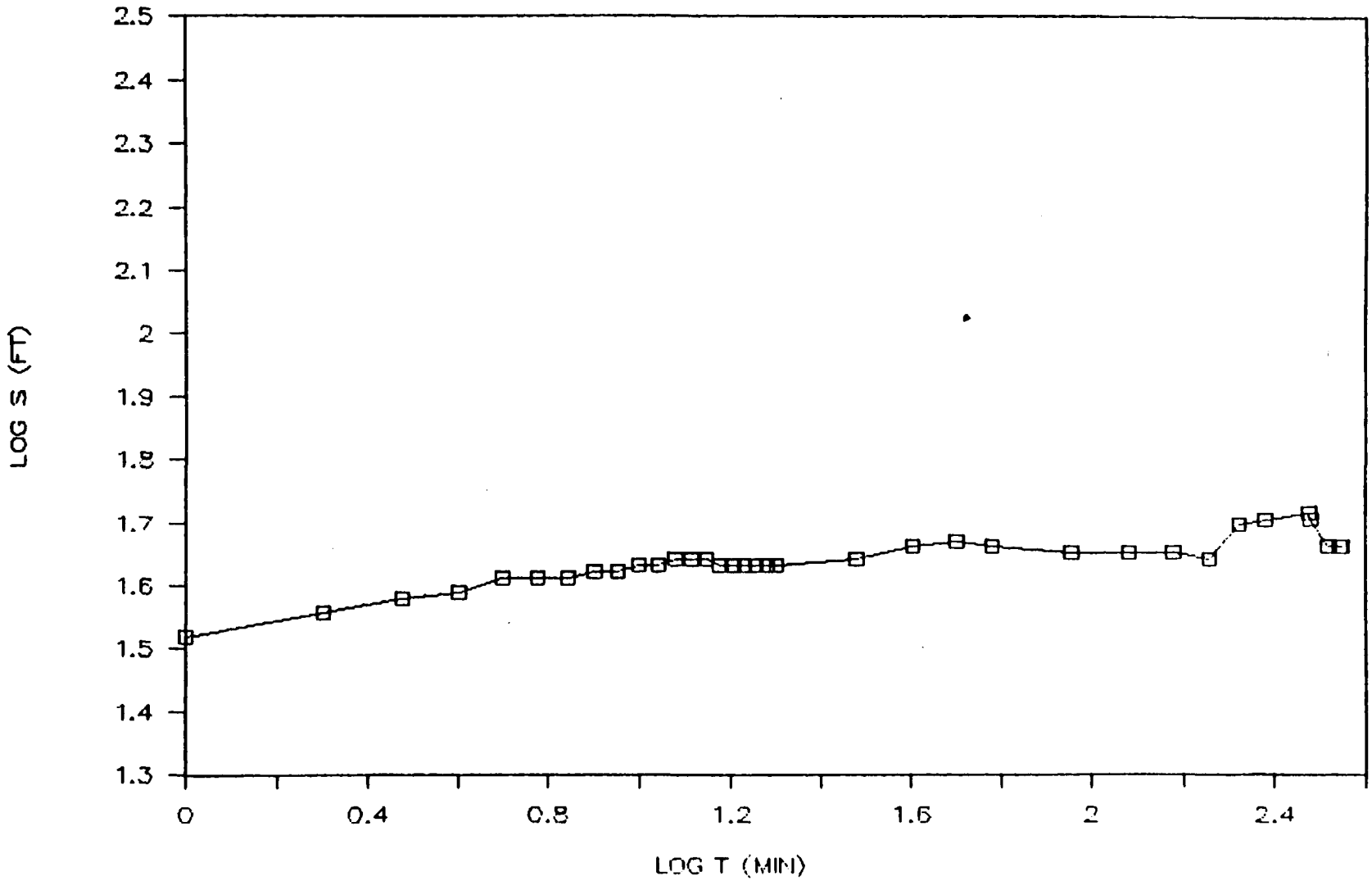
Notes:

1. All match points used u = .1, W(u) = 1.0

2. Drawdown data from the pumping well, and drawdown and recovery data from 7D, 11D and 15D were not analyzed because the data plots could not be matched to the Theis type curve.

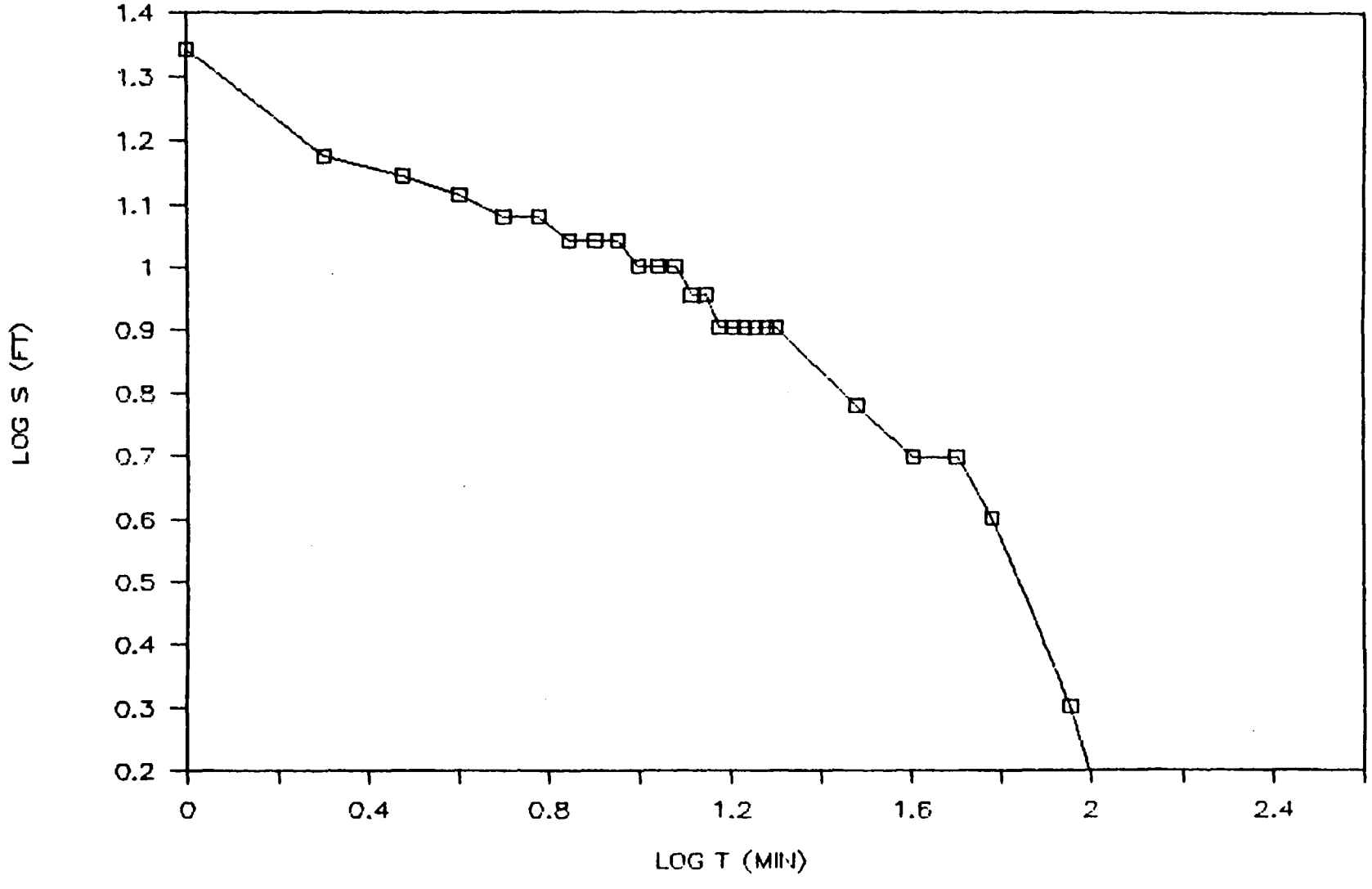
MTH 001 1337

PUMPING WELL. DRAWDOWN



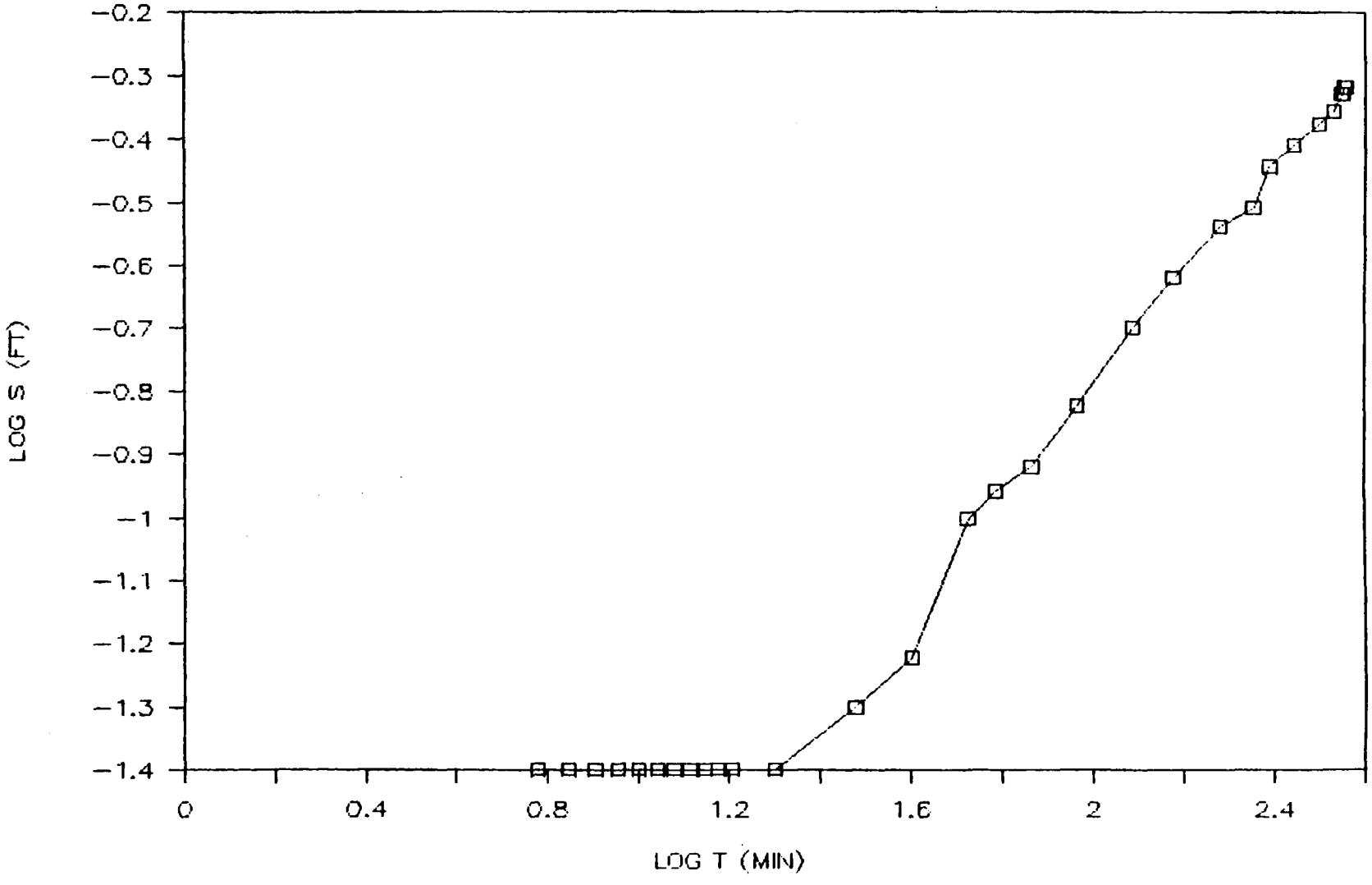
MTH 001 1338

PUMPING WELL. RECOVERY

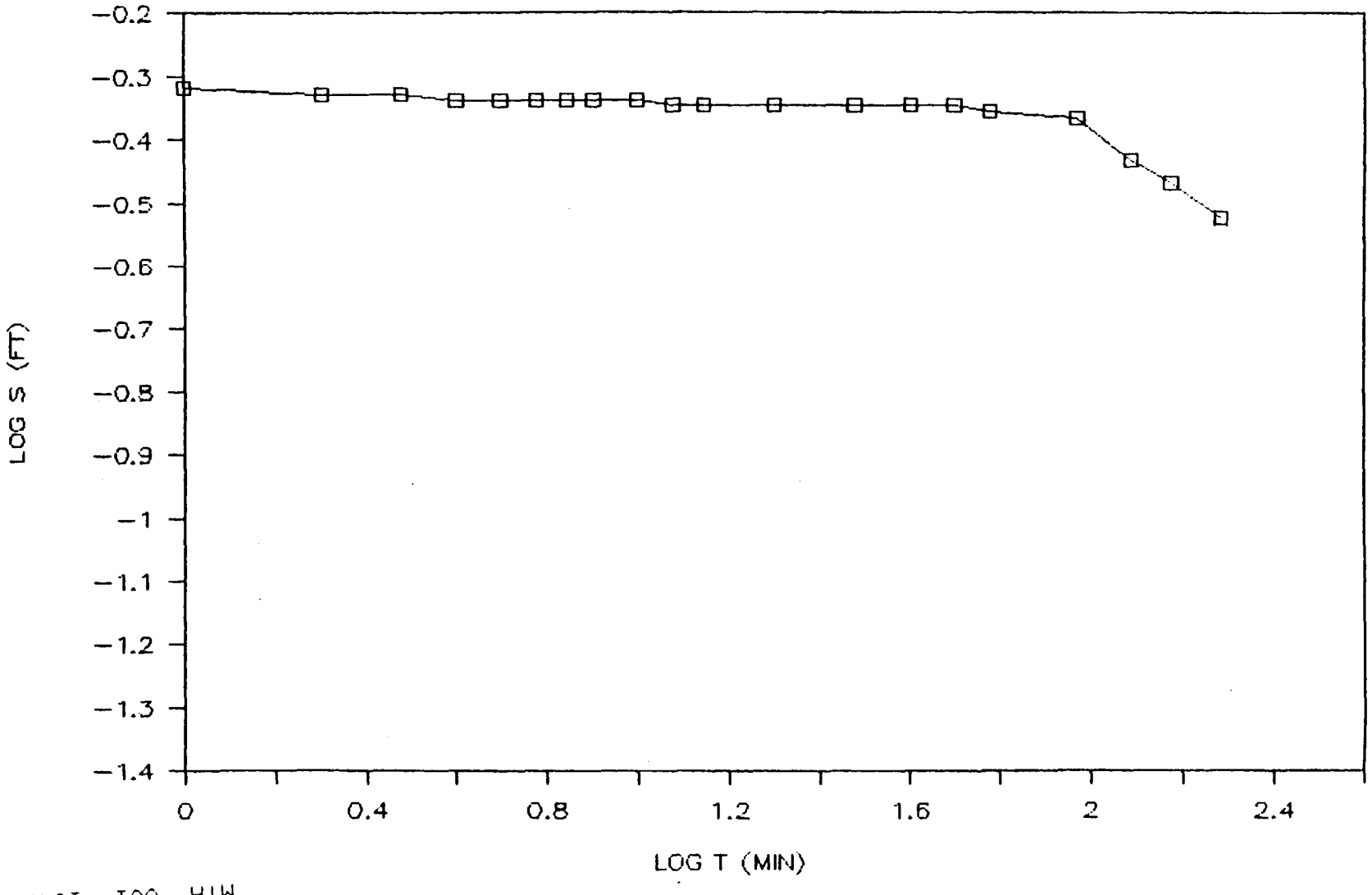


MTH 001 1339

WELL 7D. DRAWDOWN

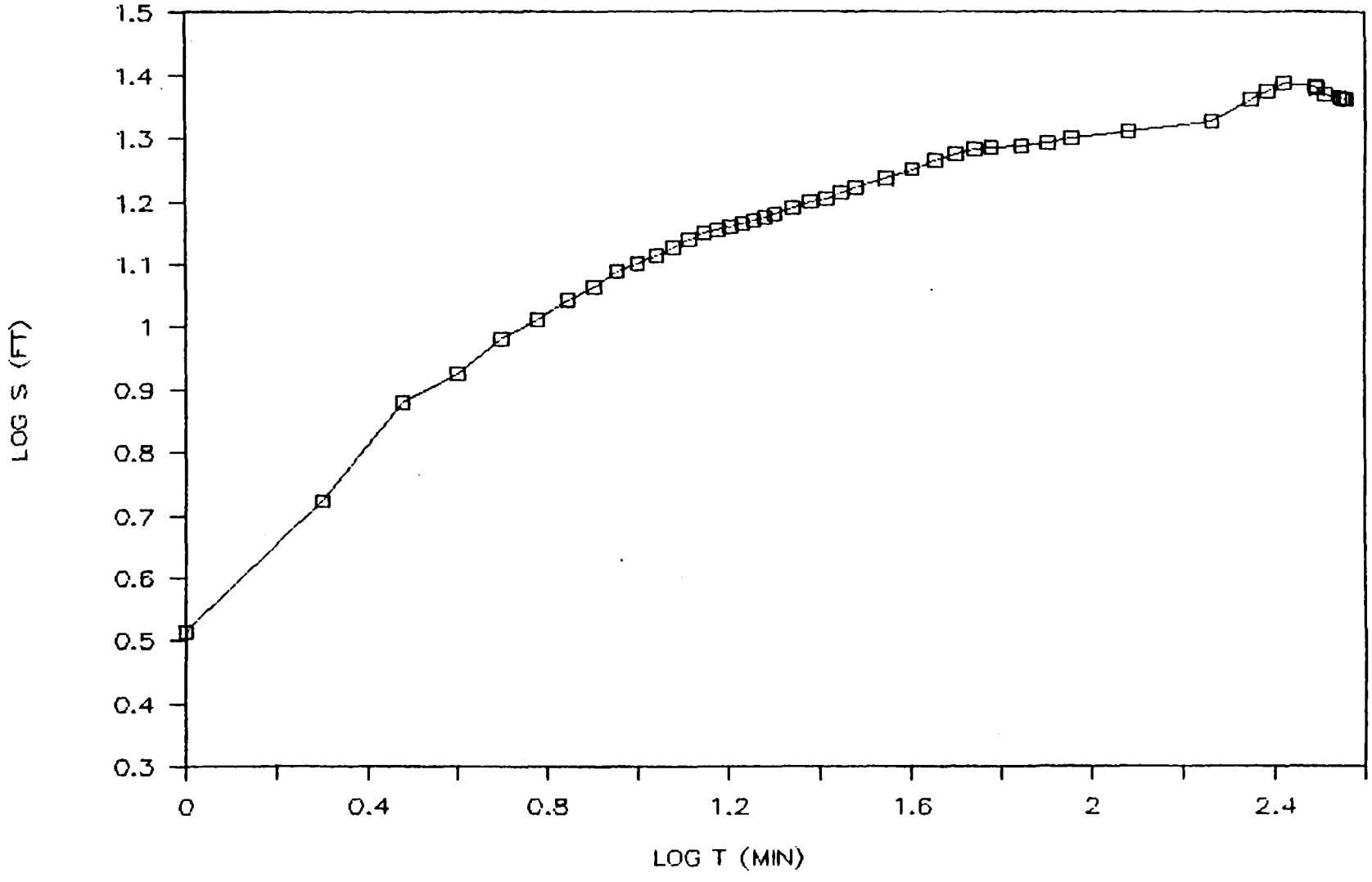


WELL 7D. RECOVERY

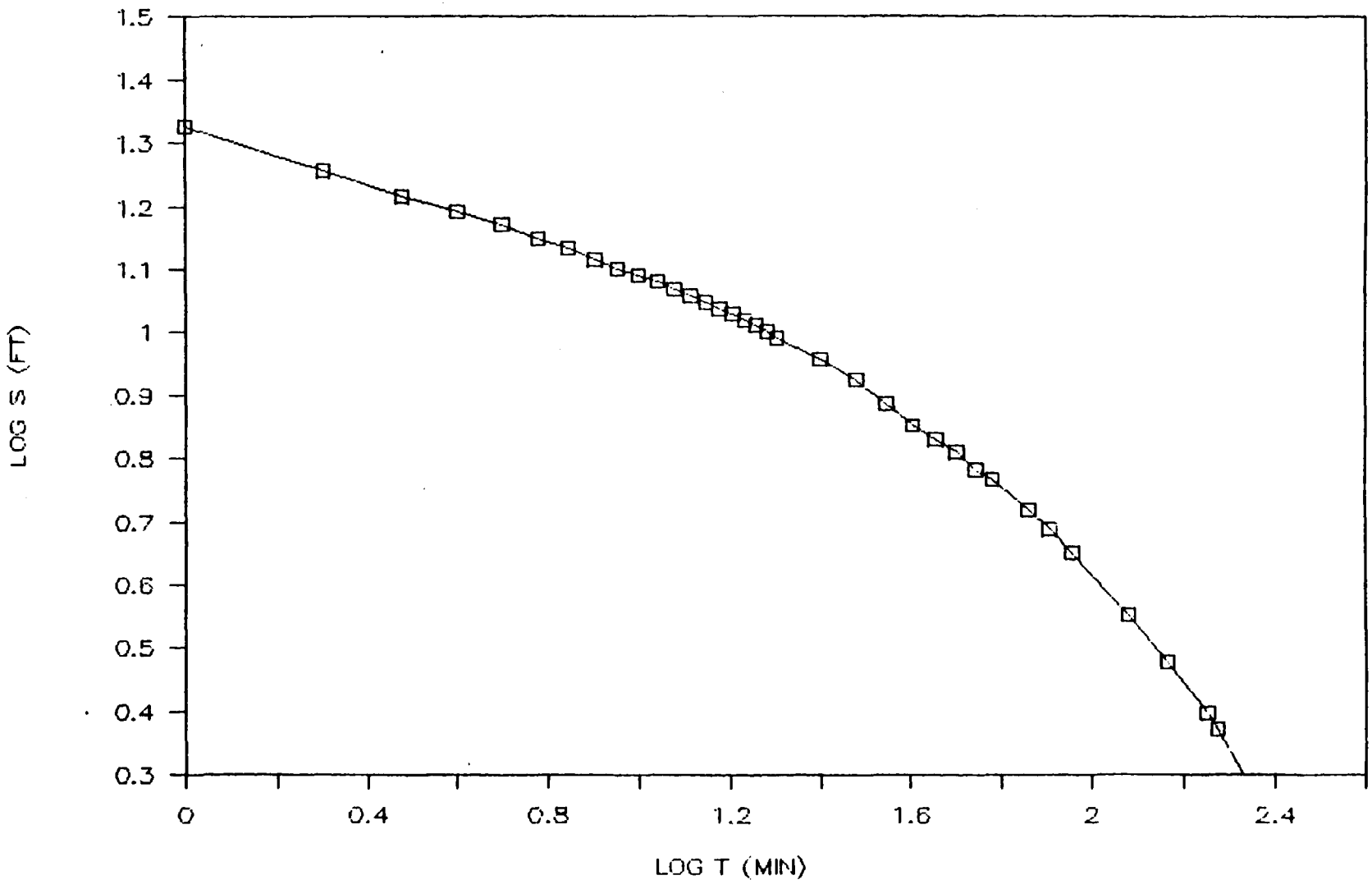


MTH 001 1341

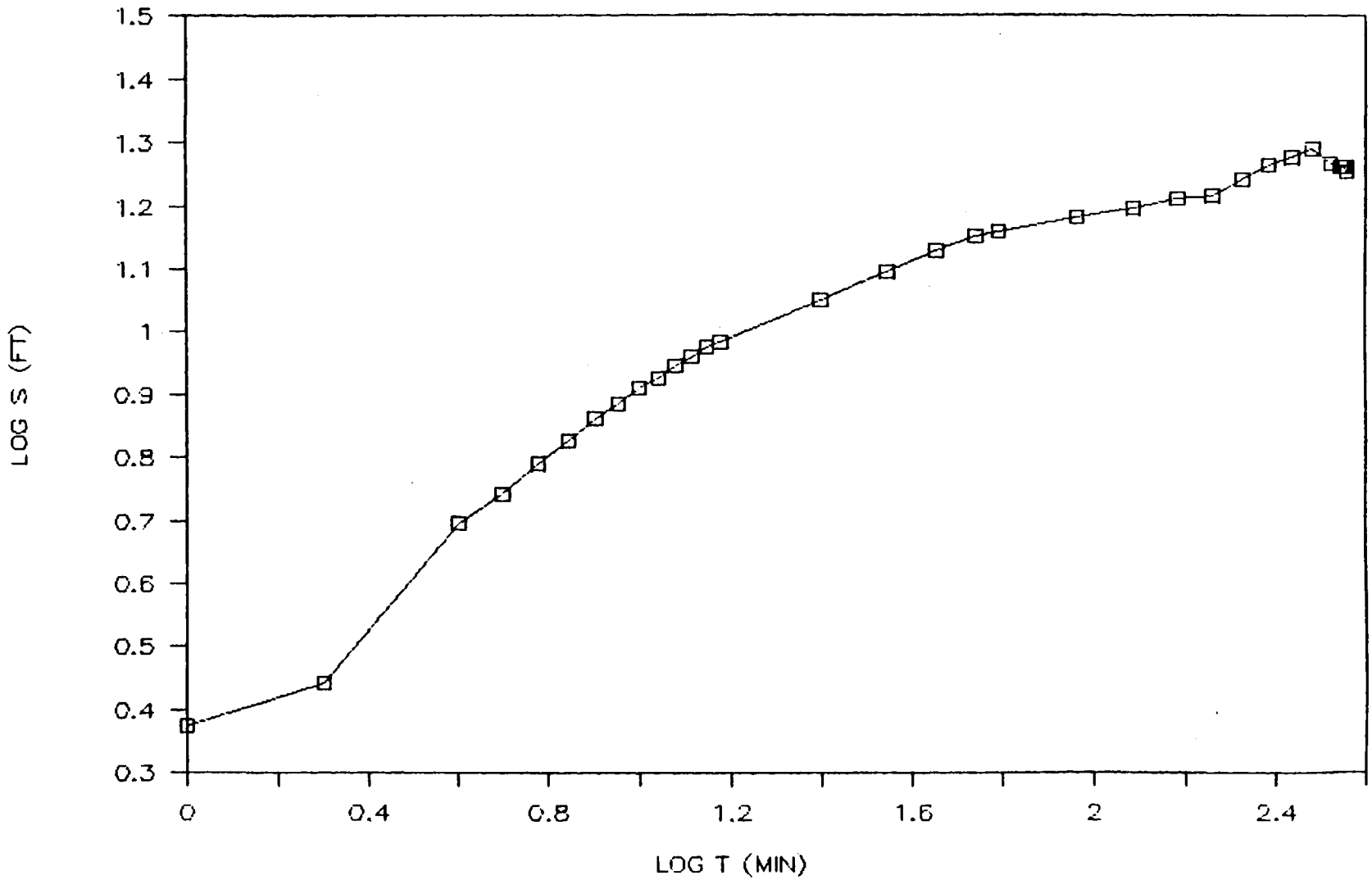
WELL 9D. DRAWDOWN



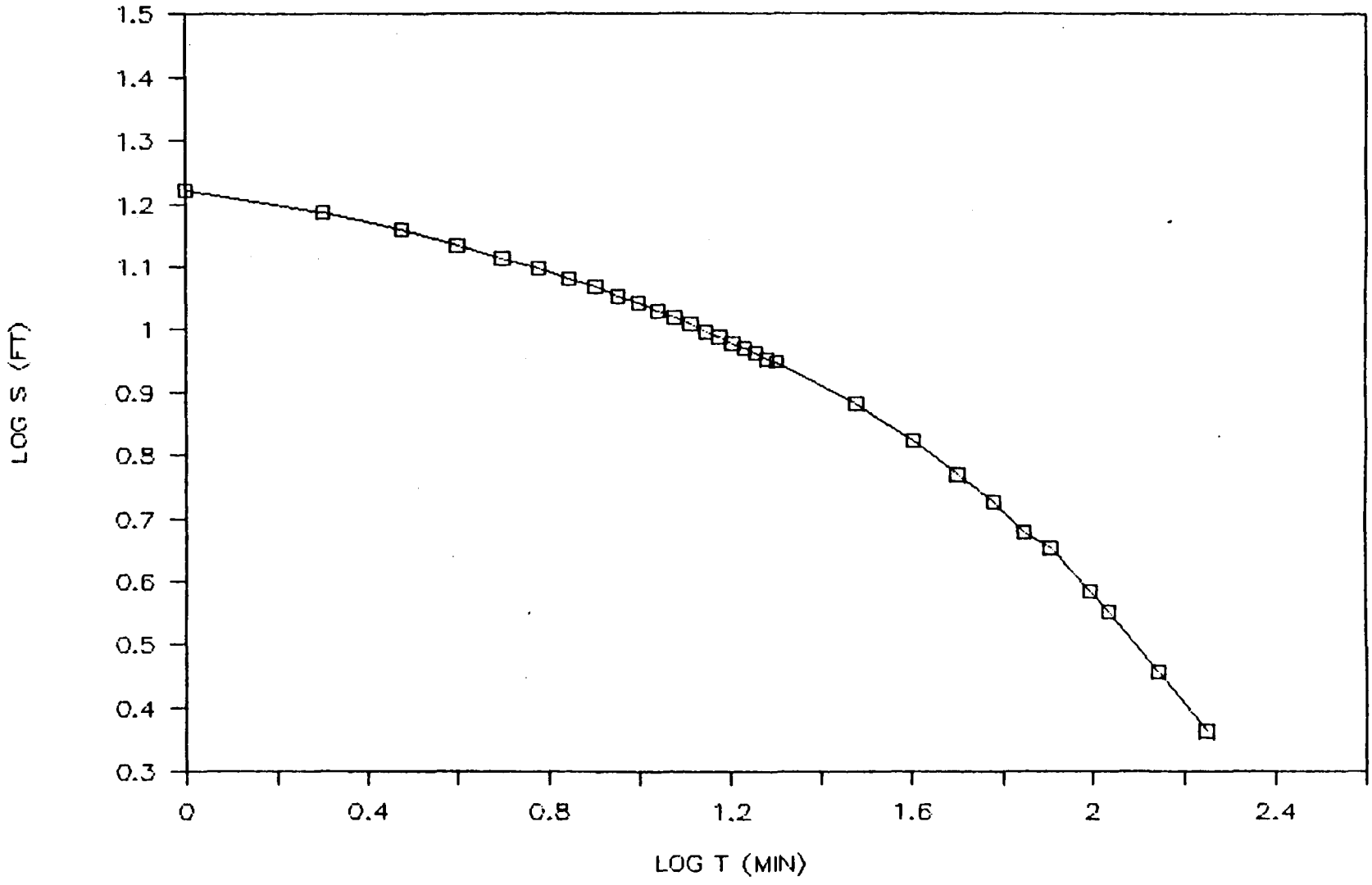
WELL 9D, RECOVERY



WELL 10D. DRAWDOWN

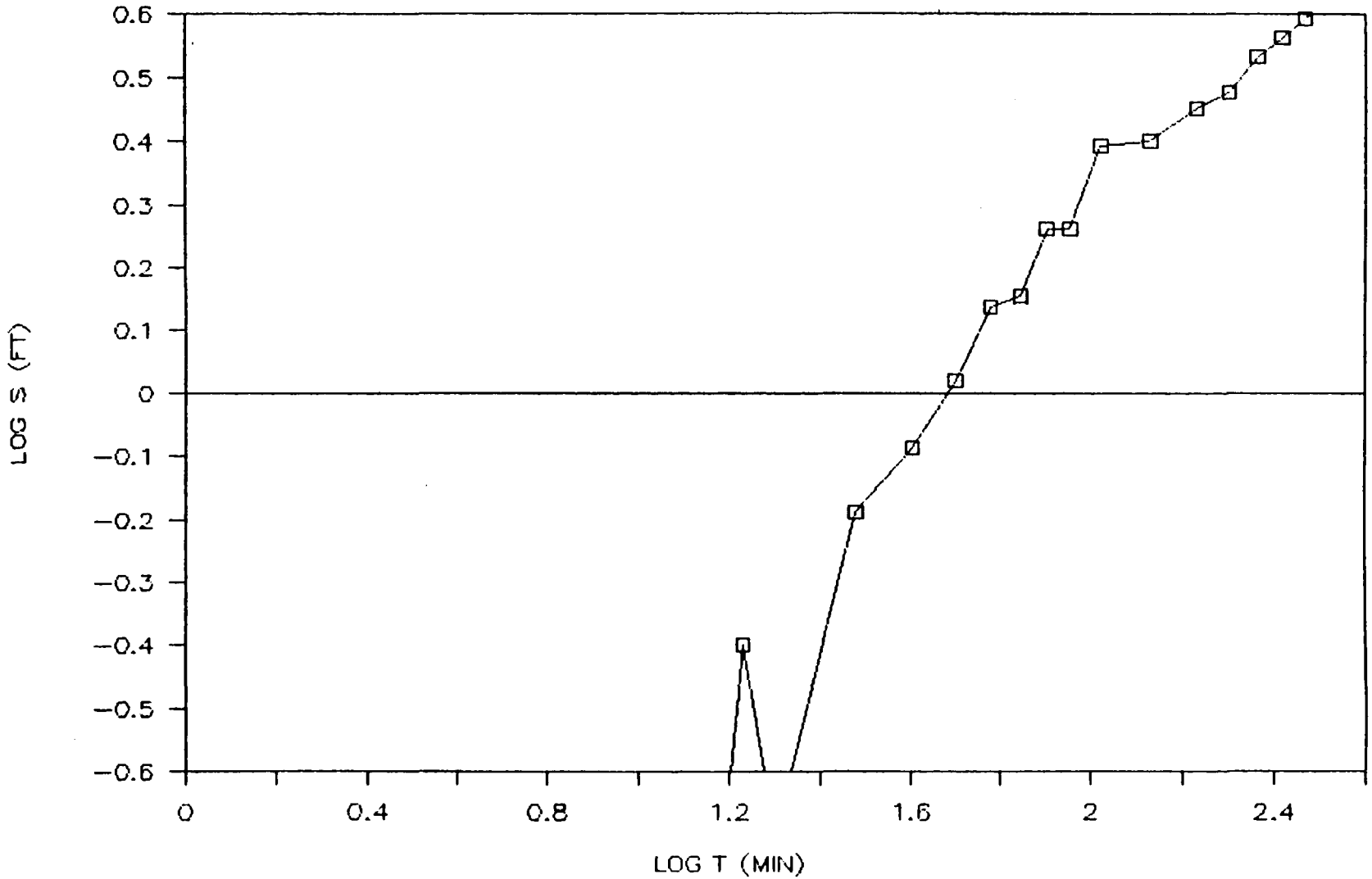


WELL 10D. RECOVERY

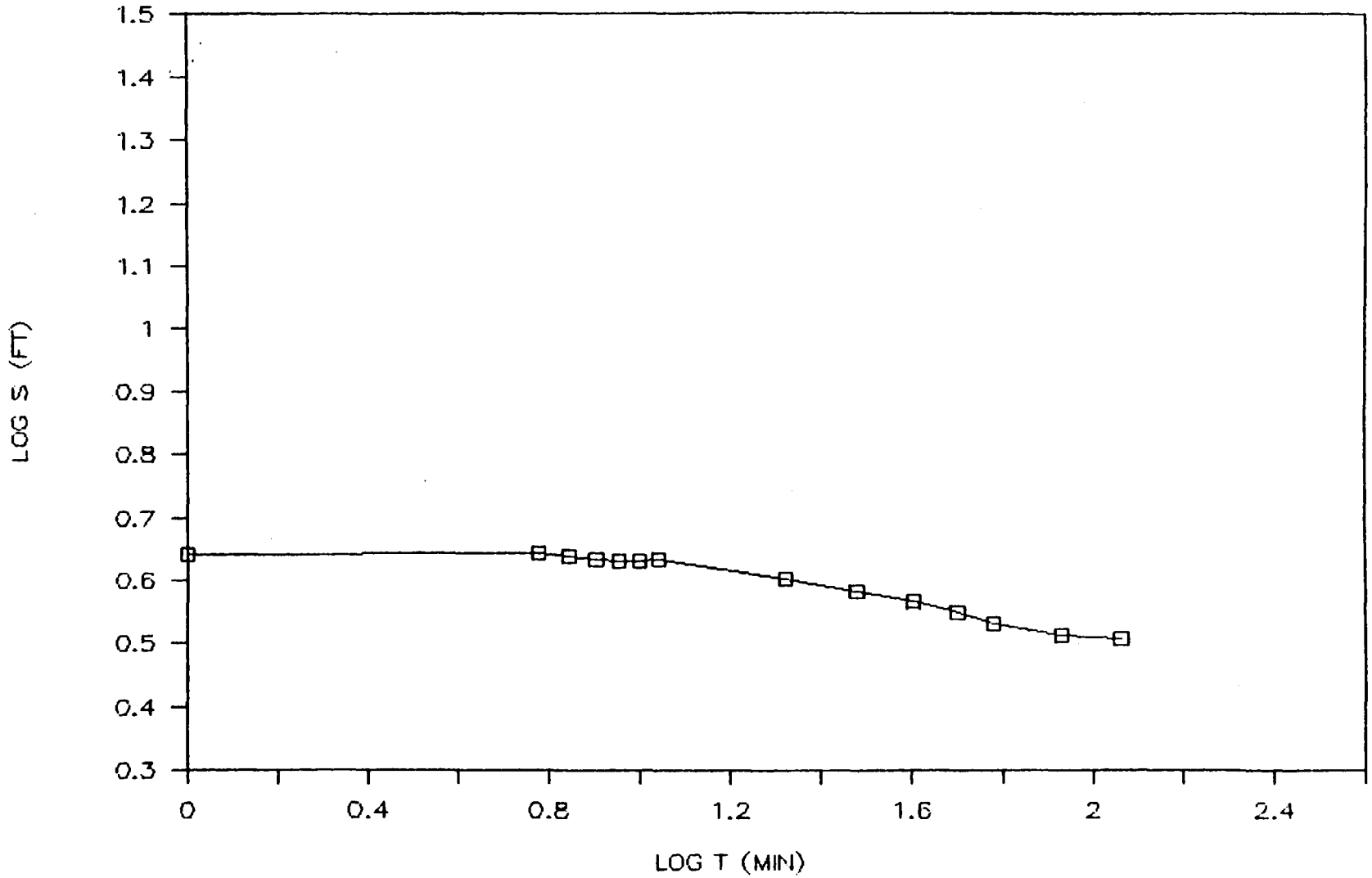


MTH 001 1345

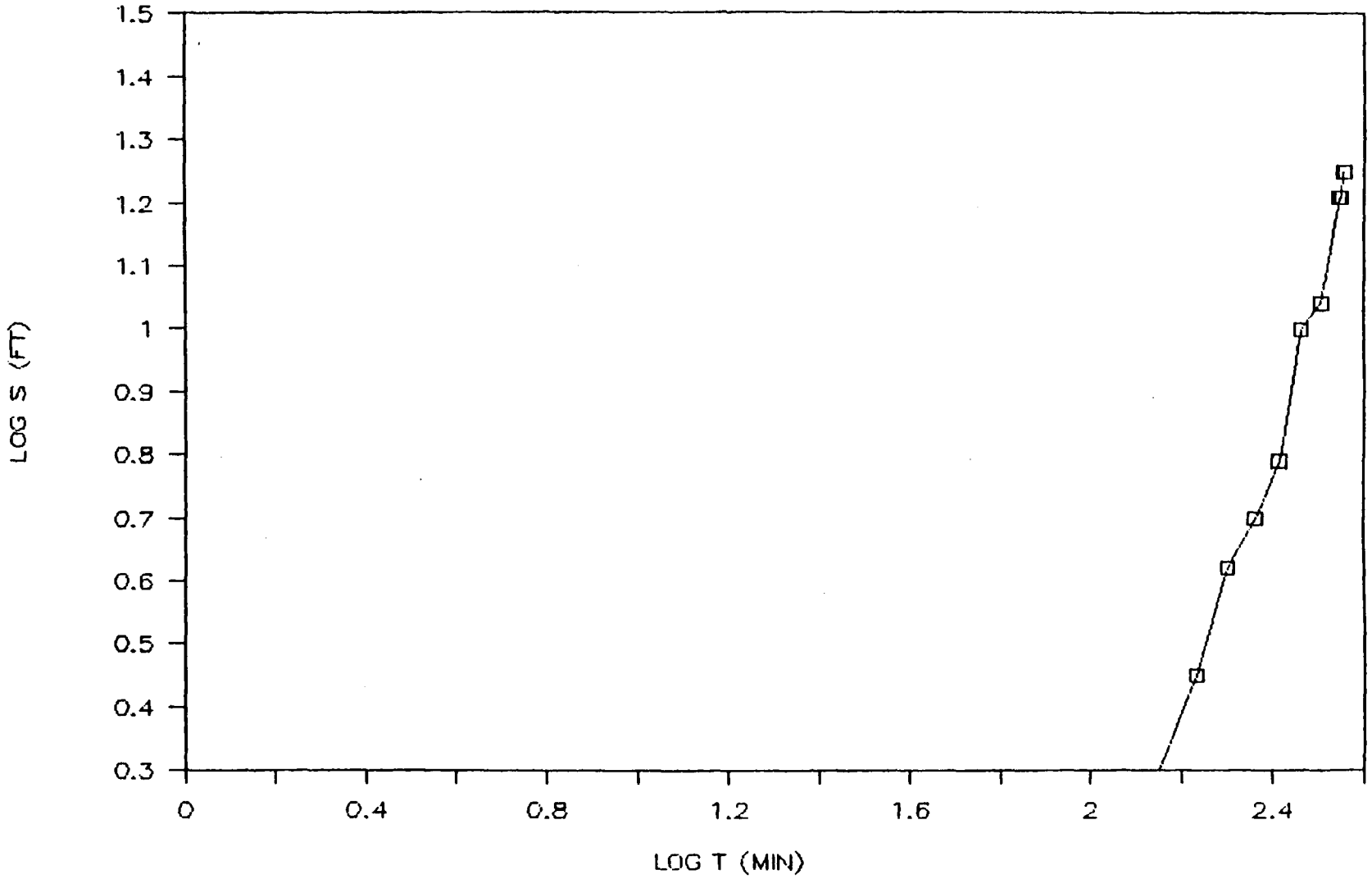
WELL 11D. DRAWDOWN



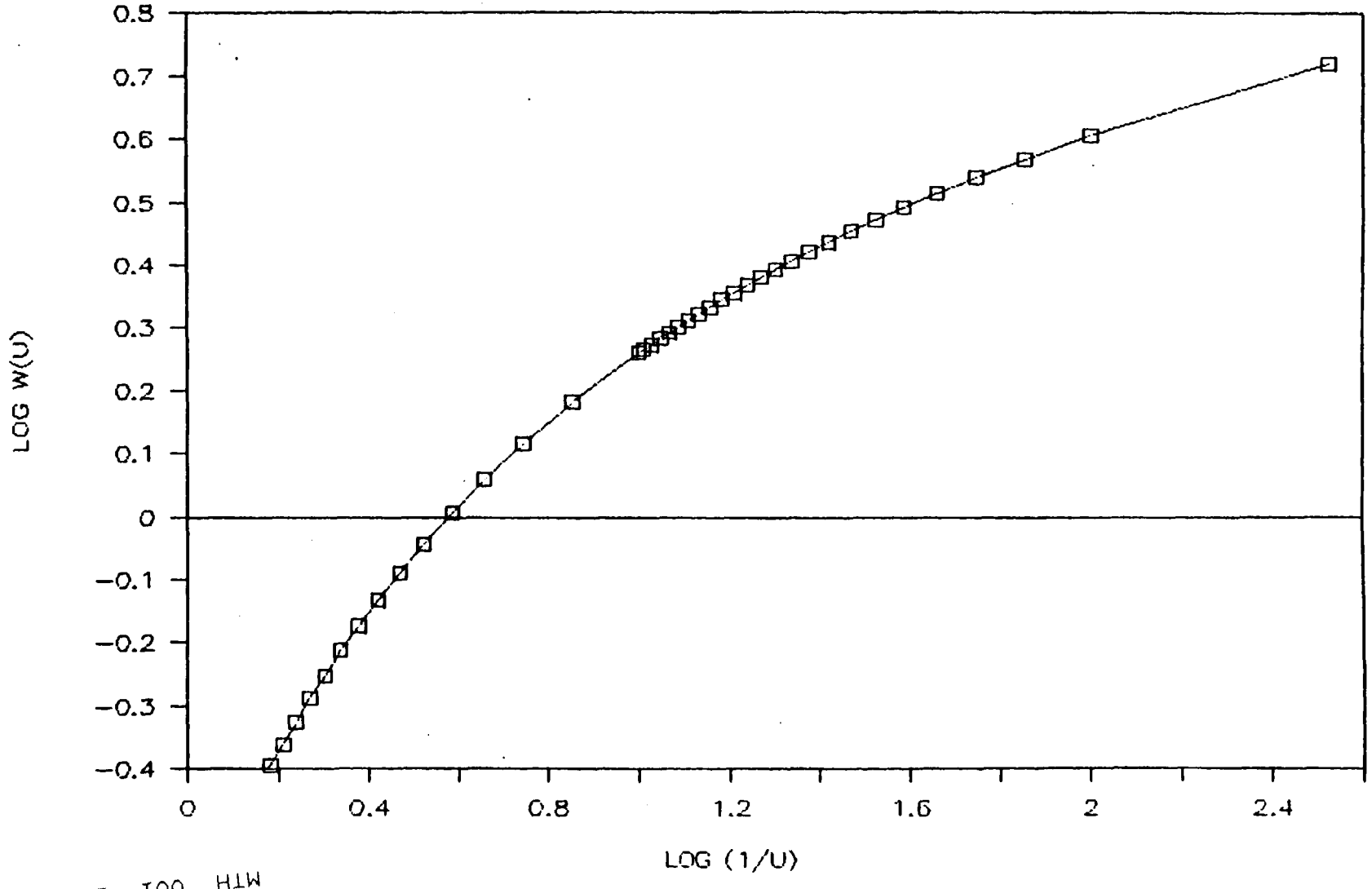
WELL 11D. RECOVERY



WELL 15D. DRAWDOWN



THEIS TYPE CURVE



MTH 001 1349

WELL 15D. RECOVERY

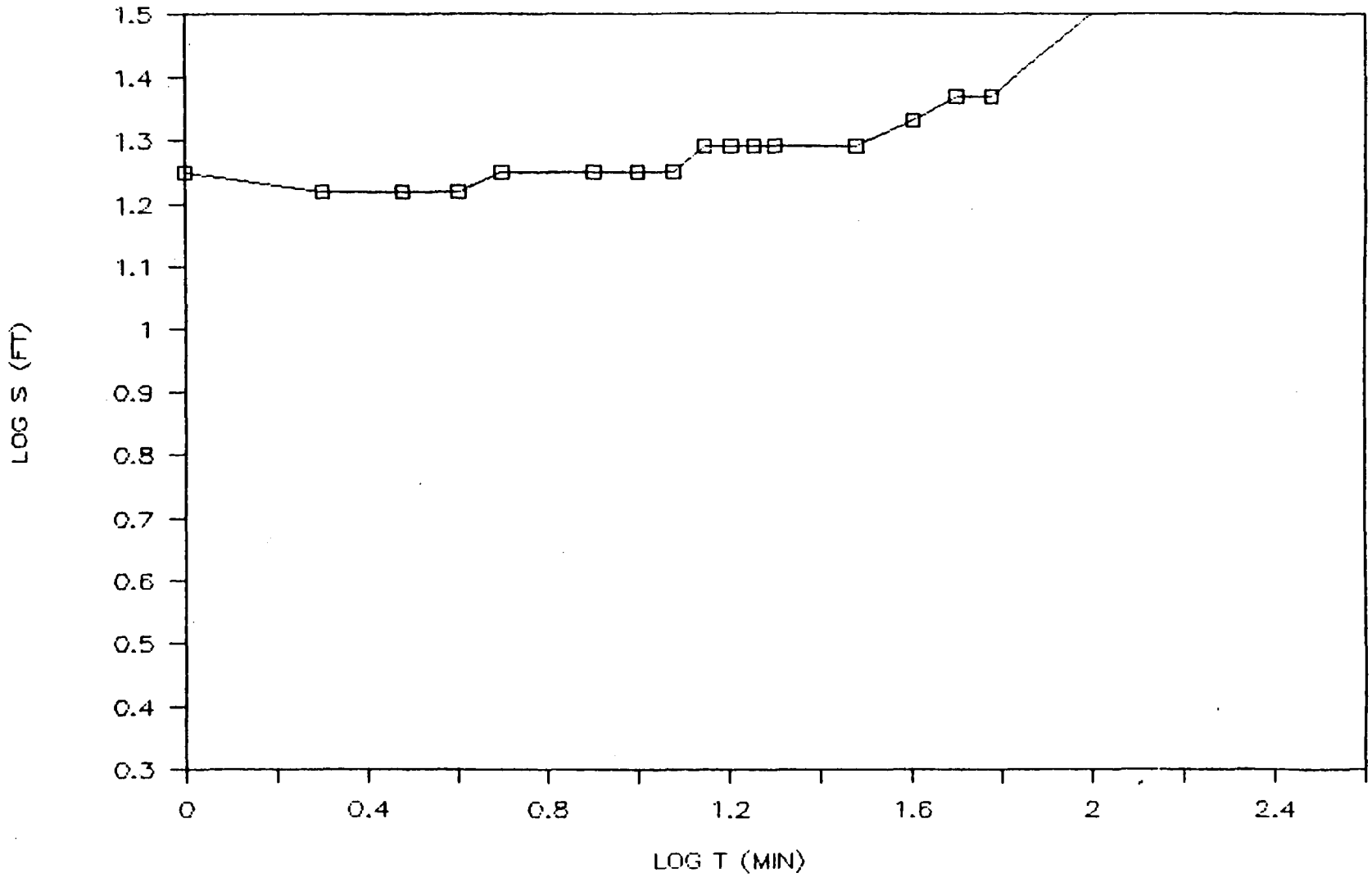
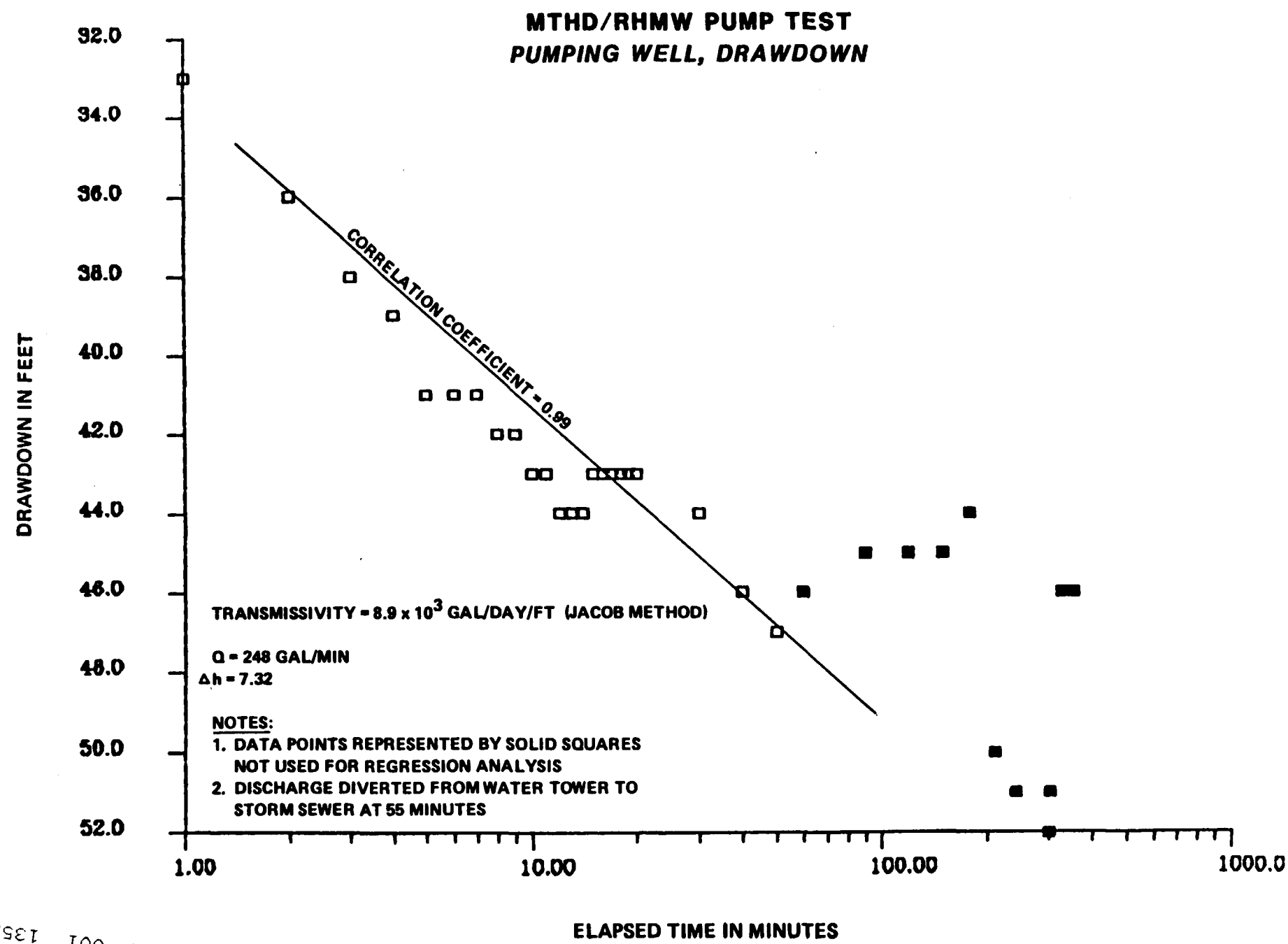


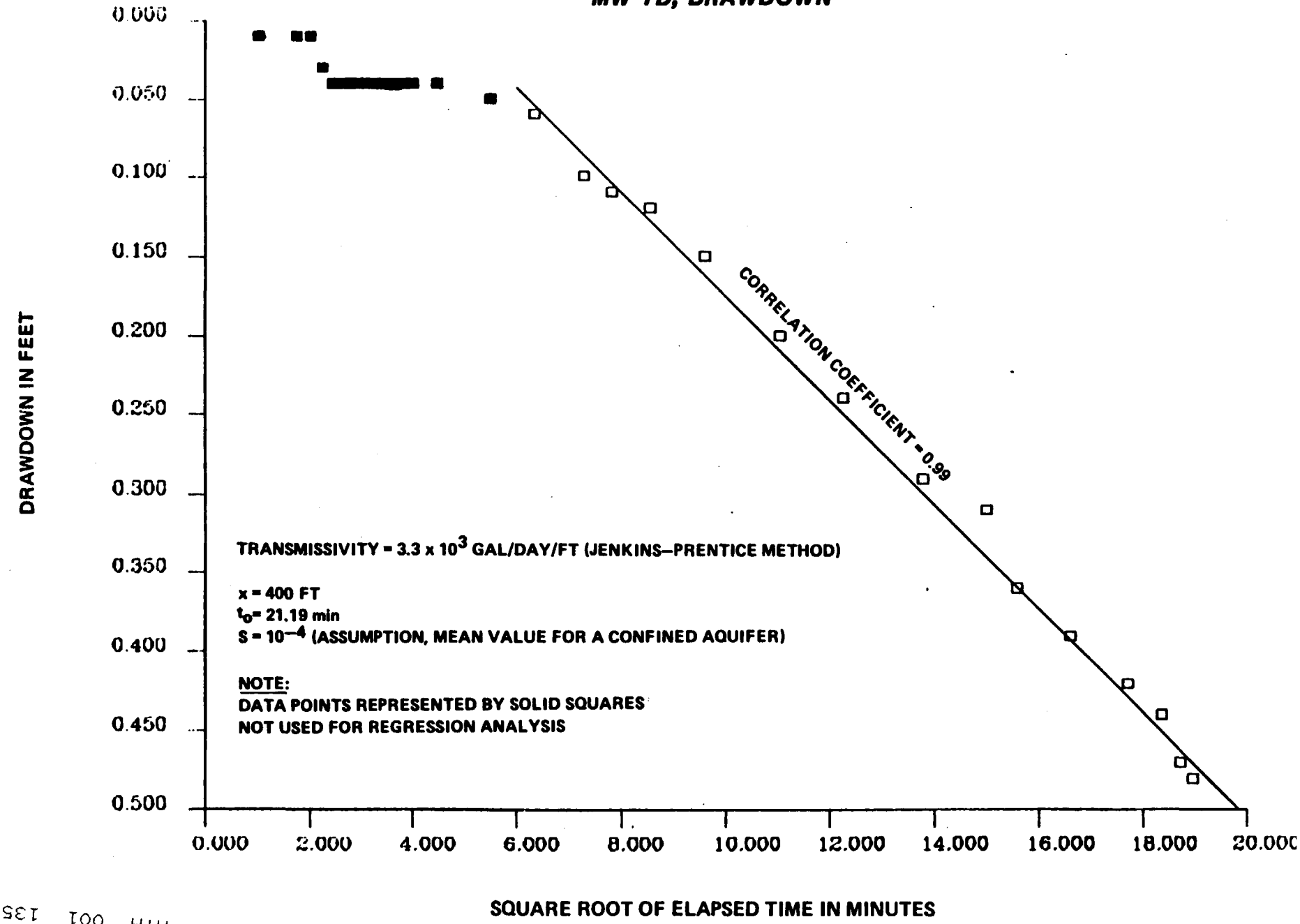
TABLE G-2
JACOB SOLUTIONS TO PUMPING TEST DATA

Well	Description	r (ft)	t (min)	T (gpd/ft)	S
Pumping Well	Drawdown	0		8.9×10^3	
Pumping Well	Recovery	0		8.1×10^3	
MW-9D	Drawdown	200	0.40	7.3×10^3	1.5×10^{-5}
MW-9D	Recovery	200		8.1×10^3	
MW-10D	Drawdown	650	0.88	8.5×10^3	0.4×10^{-5}
MW-10D	Recovery	650		9.4×10^3	


MTHD/RHMW PUMP TEST
PUMPING WELL, DRAWDOWN
DRAWDOWN IN FEET
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0
52.0
CORRELATION COEFFICIENT = 0.99
TRANSMISSIVITY = 8.9 x 10^3 GAL/DAY/FT (JACOB METHOD)
Q = 248 GAL/MIN
Δh = 7.32
NOTES:
1. DATA POINTS REPRESENTED BY SOLID SQUARES NOT USED FOR REGRESSION ANALYSIS
2. DISCHARGE DIVERTED FROM WATER TOWER TO STORM SEWER AT 55 MINUTES
1.00
10.00
100.00
1000.0
ELAPSED TIME IN MINUTES

MTH 001 1352

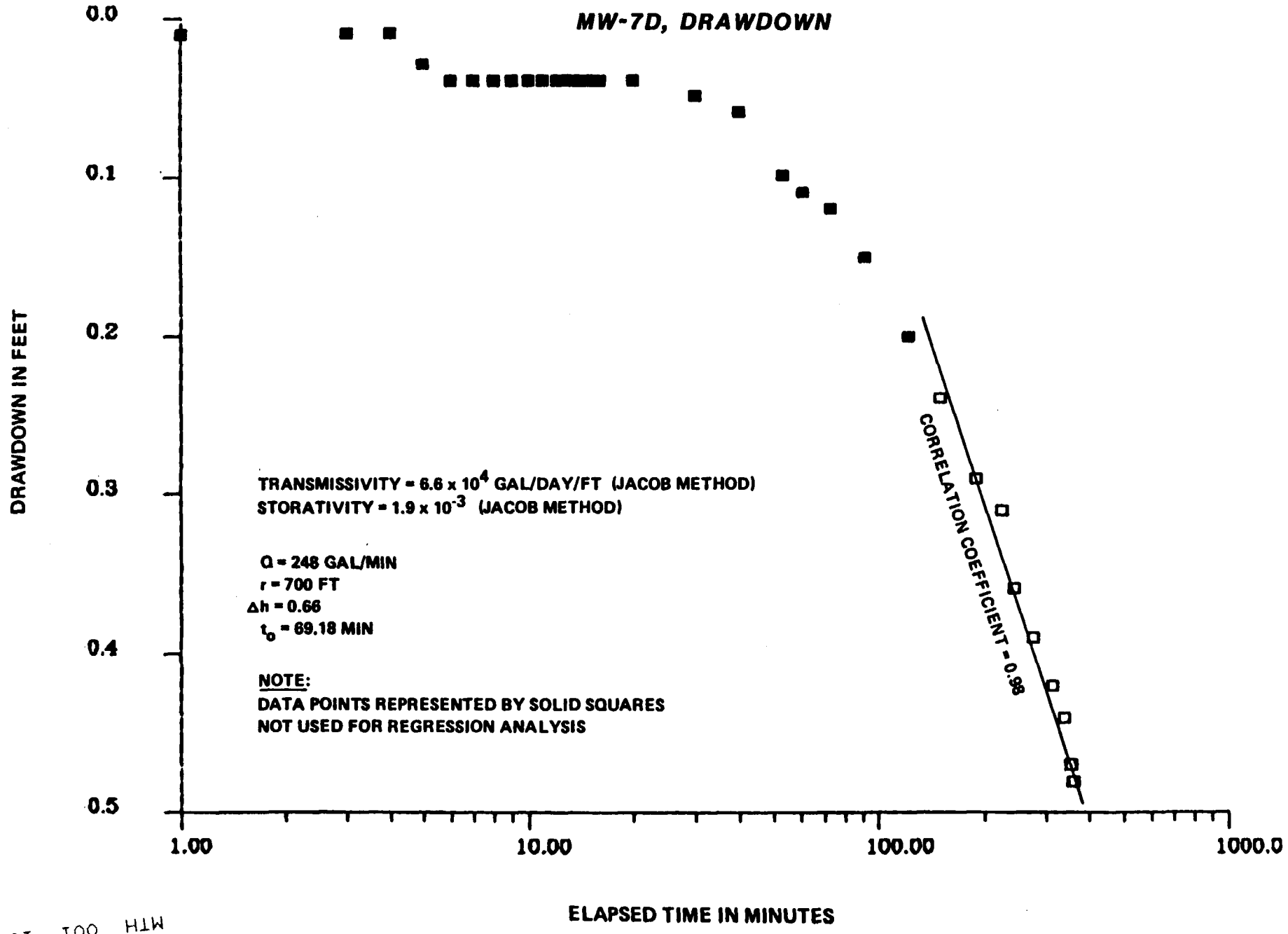
MTHD/RHMW PUMP TEST
MW-7D, DRAWDOWN



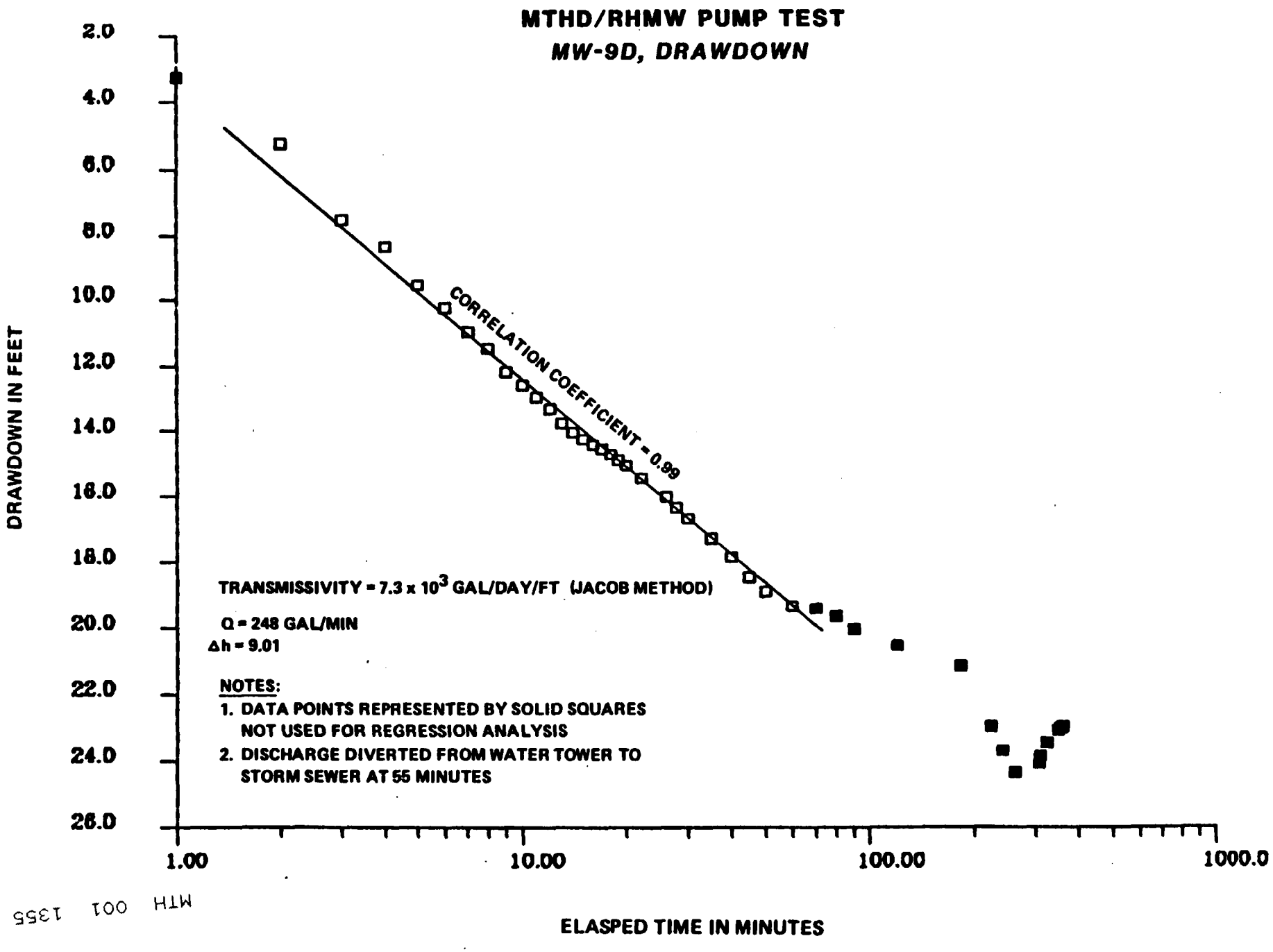
MTH 001 1353

MTHD/RHMW PUMP TEST

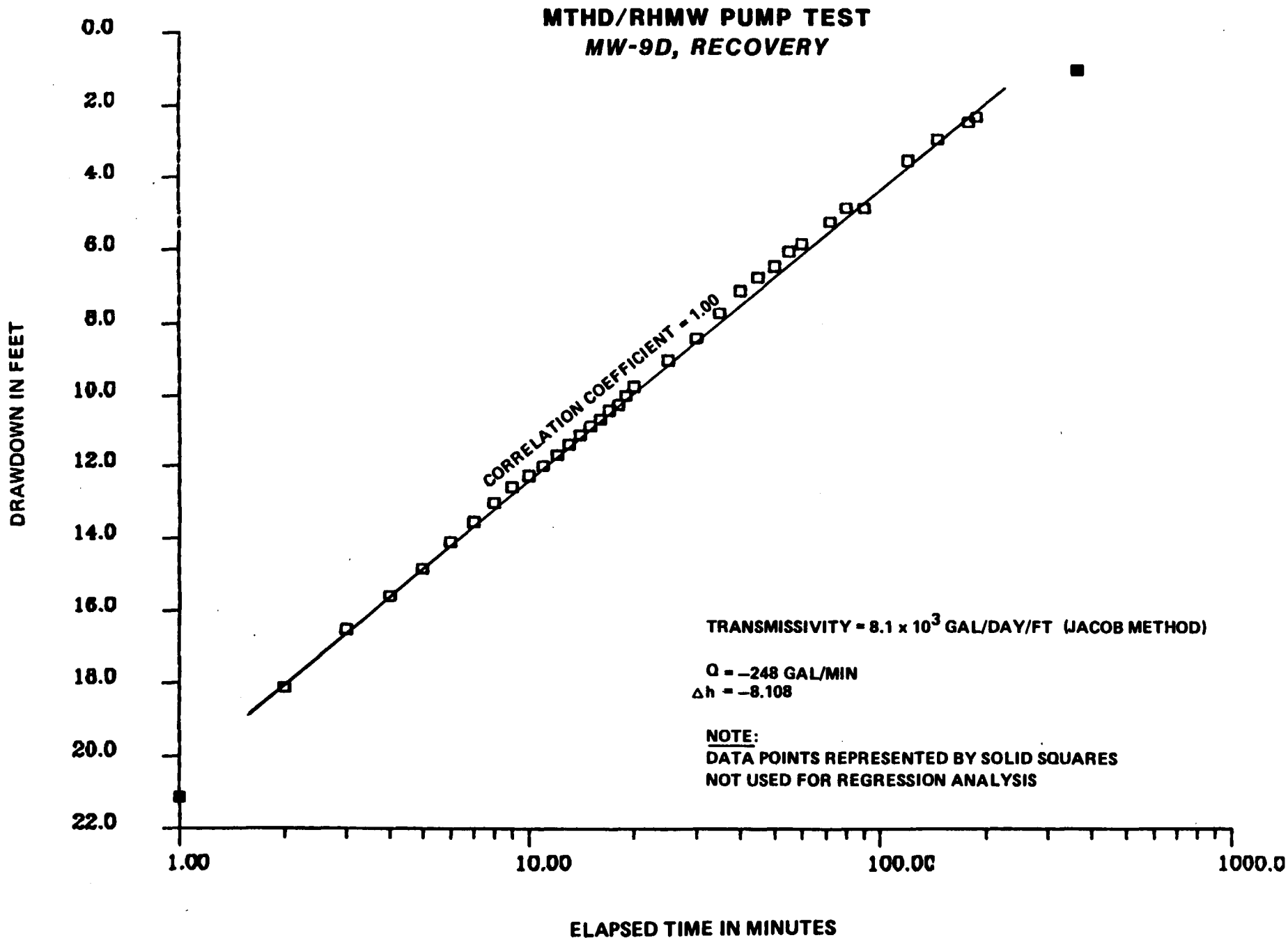
MW-7D, DRAWDOWN



MTH 001 1354


MTHD/RHMW PUMP TEST
MW-9D, DRAWDOWN
DRAWDOWN IN FEET
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
1.00
10.00
100.00
1000.0
ELASPED TIME IN MINUTES
CORRELATION COEFFICIENT = 0.99
TRANSMISSIVITY = 7.3 x 10^3 GAL/DAY/FT (JACOB METHOD)
Q = 248 GAL/MIN
Δh = 9.01
NOTES:
1. DATA POINTS REPRESENTED BY SOLID SQUARES NOT USED FOR REGRESSION ANALYSIS
2. DISCHARGE DIVERTED FROM WATER TOWER TO STORM SEWER AT 55 MINUTES

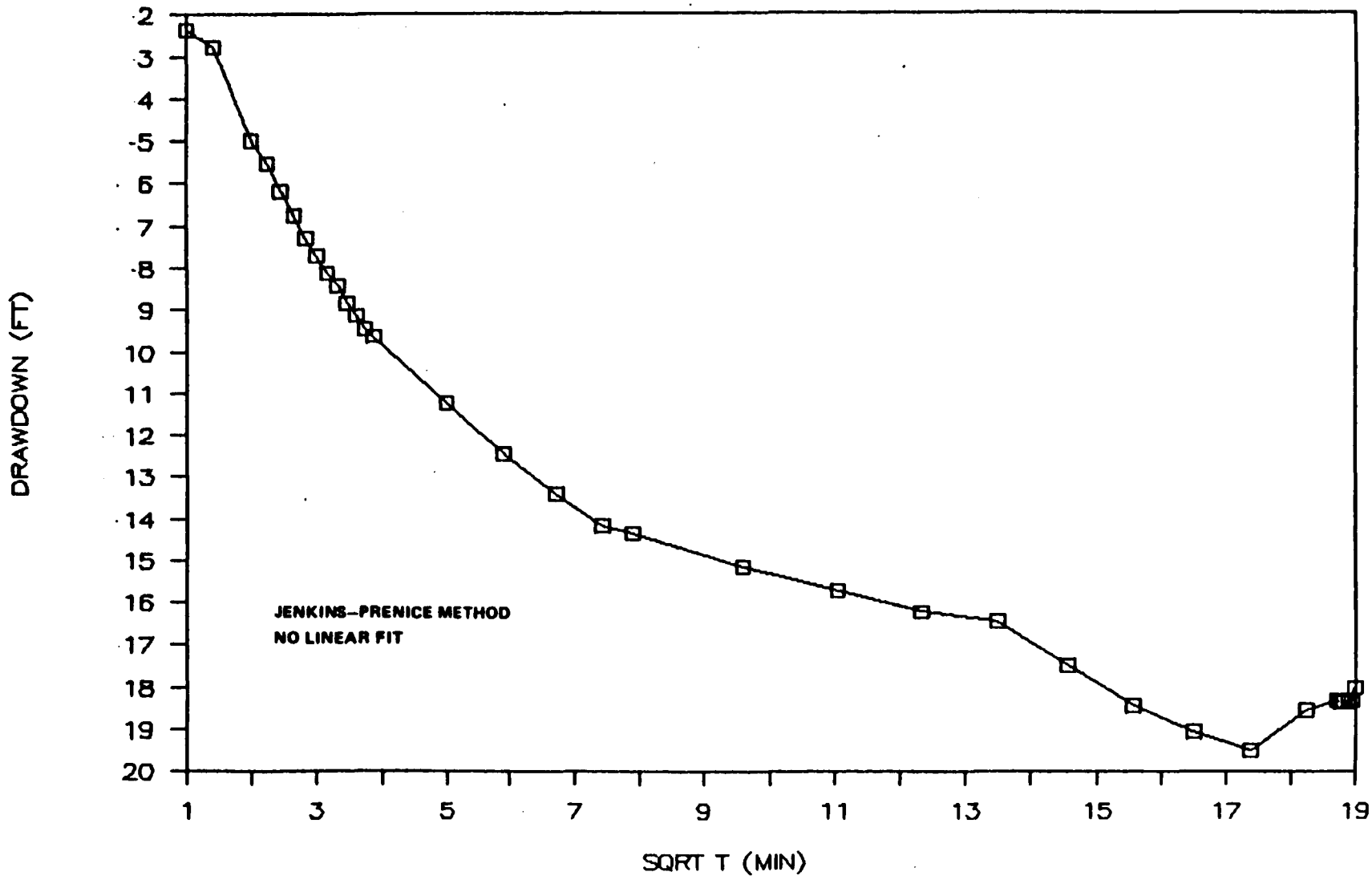
MTH 001 1355


MTHD/RHMW PUMP TEST
MW-9D, RECOVERY
DRAWDOWN IN FEET
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
CORRELATION COEFFICIENT = 1.00
TRANSMISSIVITY = 8.1 x 10^3 GAL/DAY/FT (JACOB METHOD)
Q = –248 GAL/MIN
Δh = –8.108
NOTE:
DATA POINTS REPRESENTED BY SOLID SQUARES
NOT USED FOR REGRESSION ANALYSIS
1.00
10.00
100.00
1000.0
ELAPSED TIME IN MINUTES

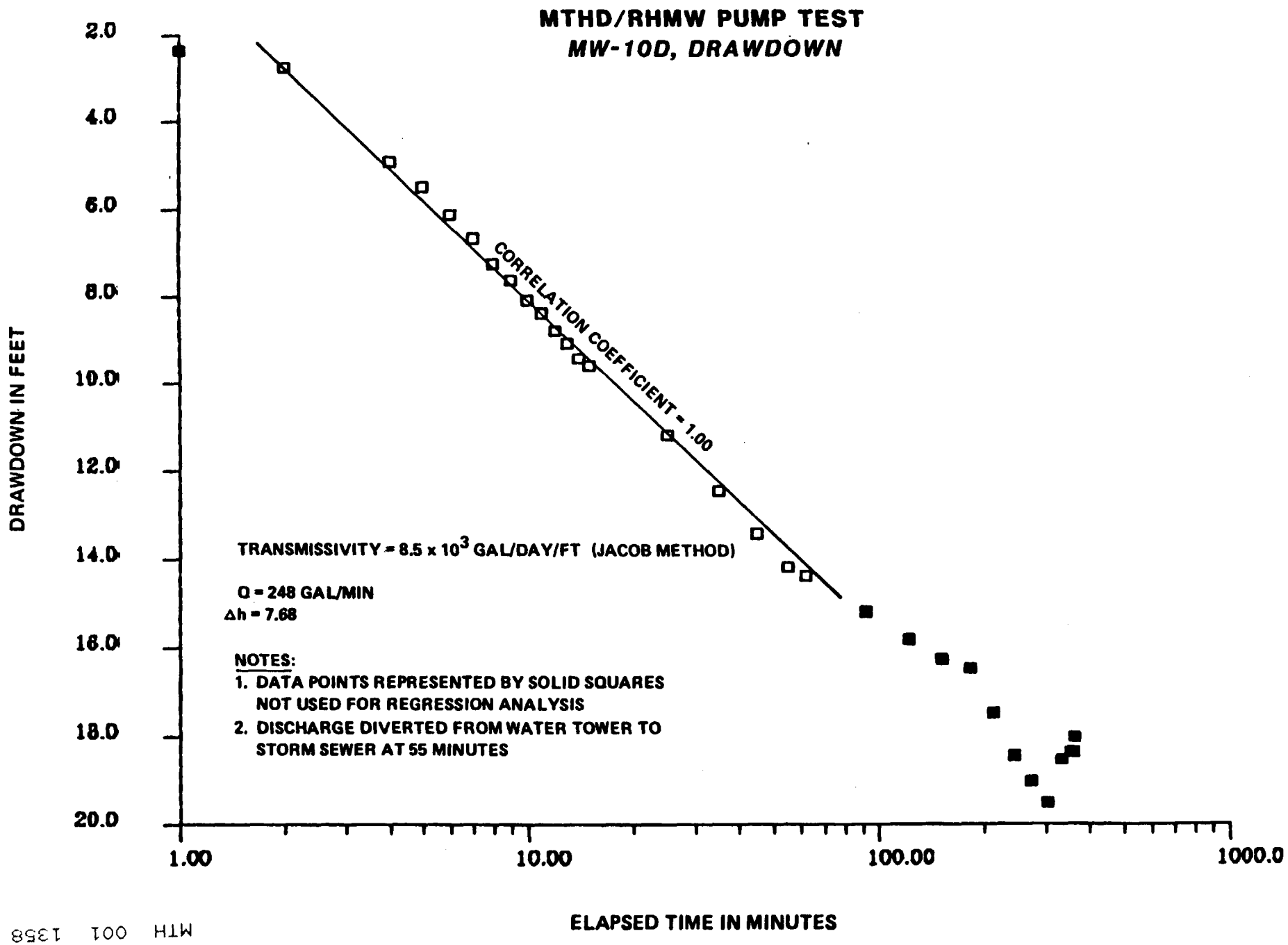
MTH 001 1356

MTHD/RHMW PUMP TEST

MW-10D, DRAWDOWN

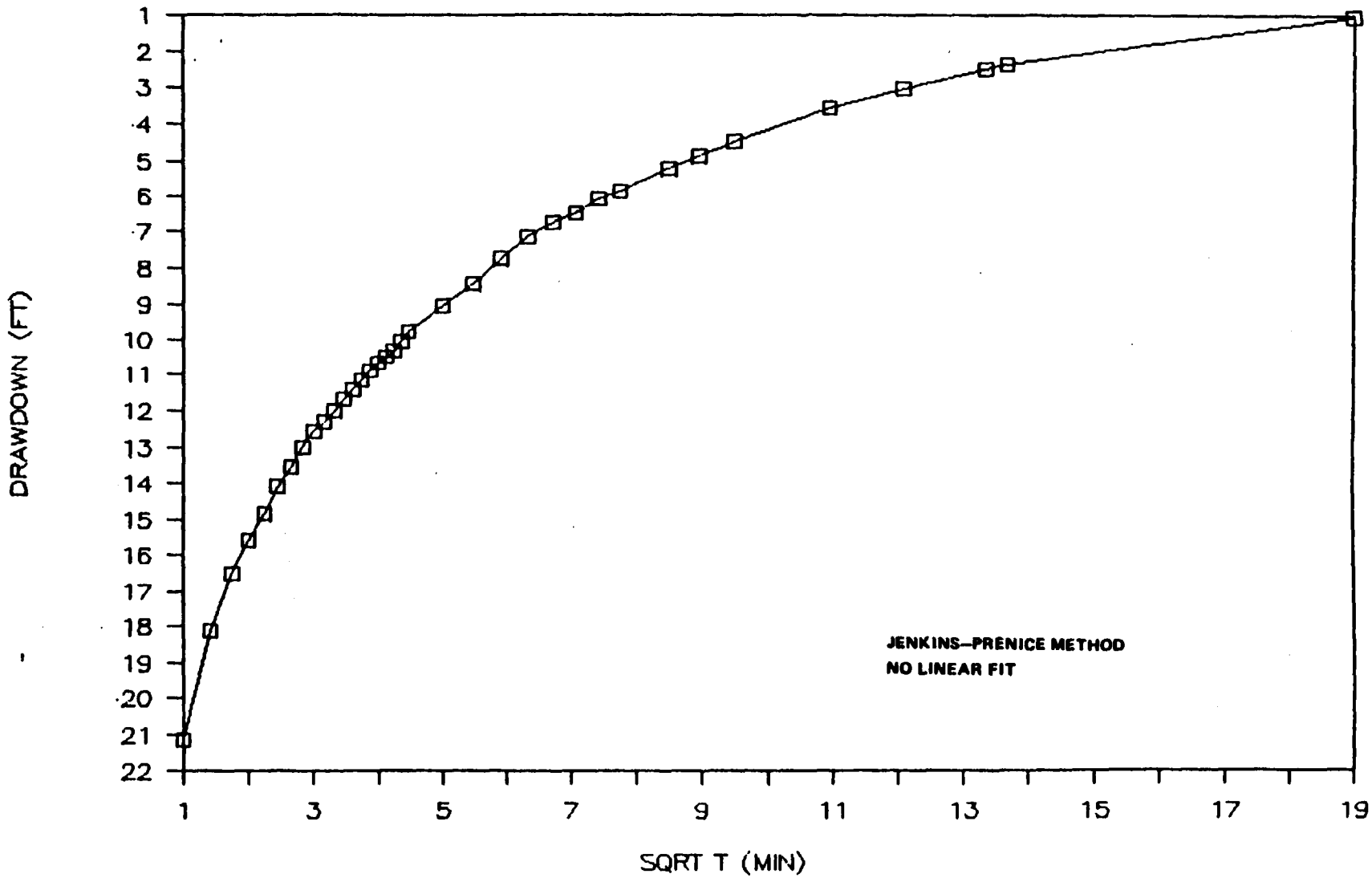


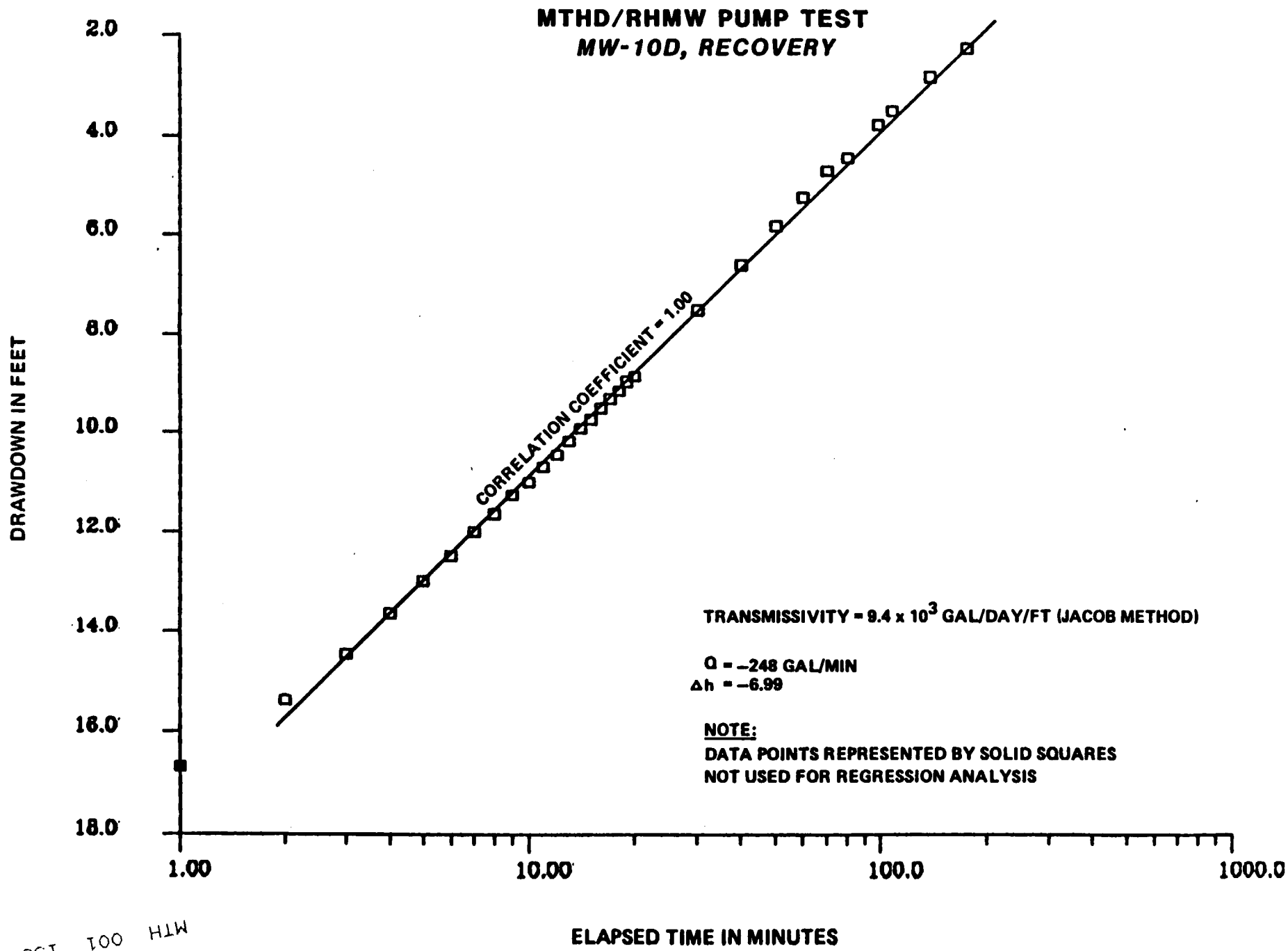
MTH 001 1357


MTHD/RHMW PUMP TEST
MW-10D, DRAWDOWN
DRAWDOWN IN FEET
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
1.00
10.00
100.00
1000.0
ELAPSED TIME IN MINUTES
CORRELATION COEFFICIENT = 1.00
TRANSMISSIVITY = 8.5 x 10^3 GAL/DAY/FT (JACOB METHOD)
Q = 248 GAL/MIN
Δh = 7.68
NOTES:
1. DATA POINTS REPRESENTED BY SOLID SQUARES NOT USED FOR REGRESSION ANALYSIS
2. DISCHARGE DIVERTED FROM WATER TOWER TO STORM SEWER AT 55 MINUTES

MTH 001 1358

MTHD/RHMW PUMP TEST
MW-9D, RECOVERY

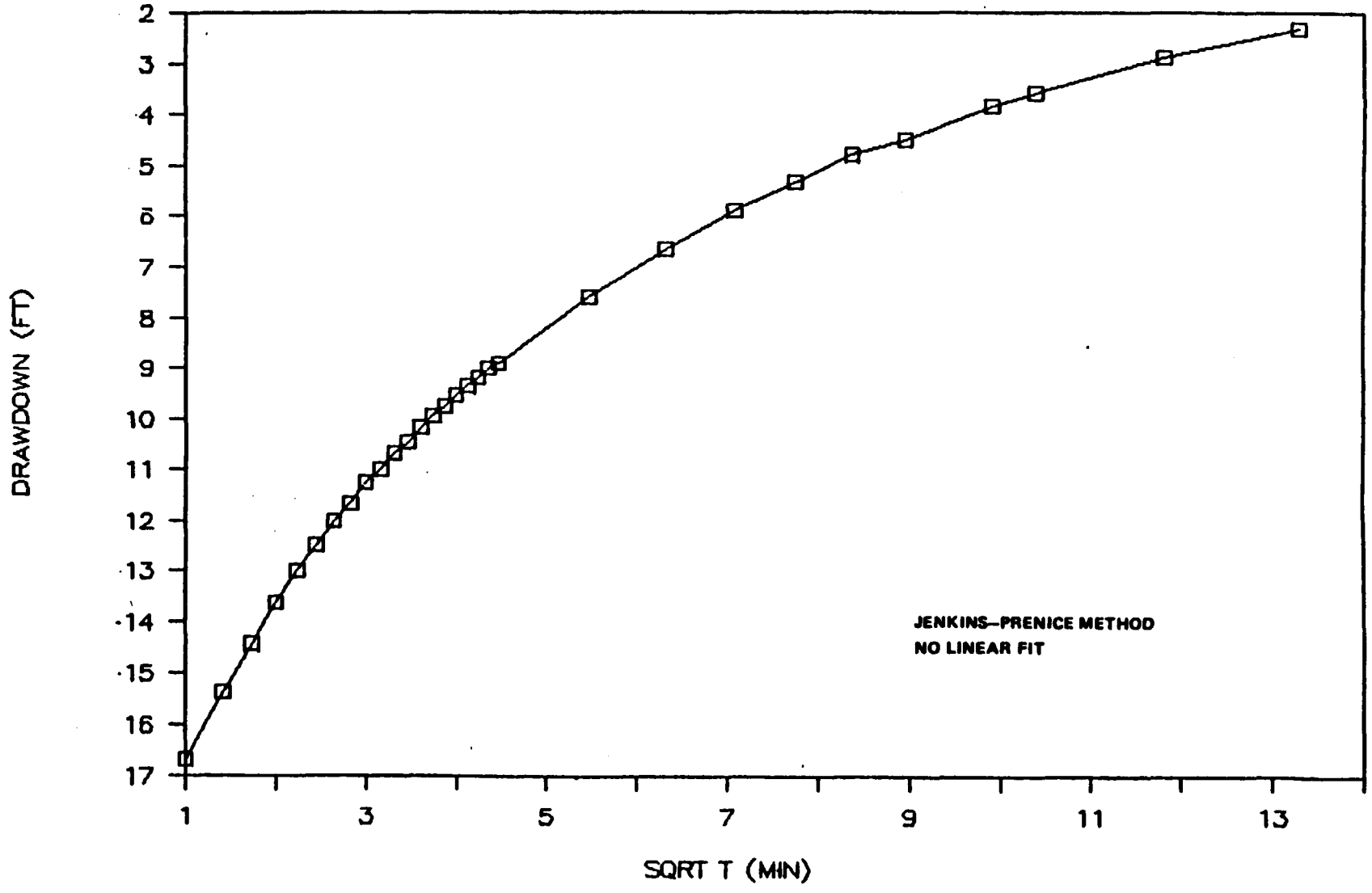



MTHD/RHMW PUMP TEST
MW-10D, RECOVERY
CORRELATION COEFFICIENT = 1.00
TRANSMISSIVITY = 9.4 x 10^3 GAL/DAY/FT (JACOB METHOD)
Q = –248 GAL/MIN
Δh = –6.99
NOTE:
DATA POINTS REPRESENTED BY SOLID SQUARES
NOT USED FOR REGRESSION ANALYSIS
DRAWDOWN IN FEET
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
1.00
10.00
100.0
1000.0
ELAPSED TIME IN MINUTES

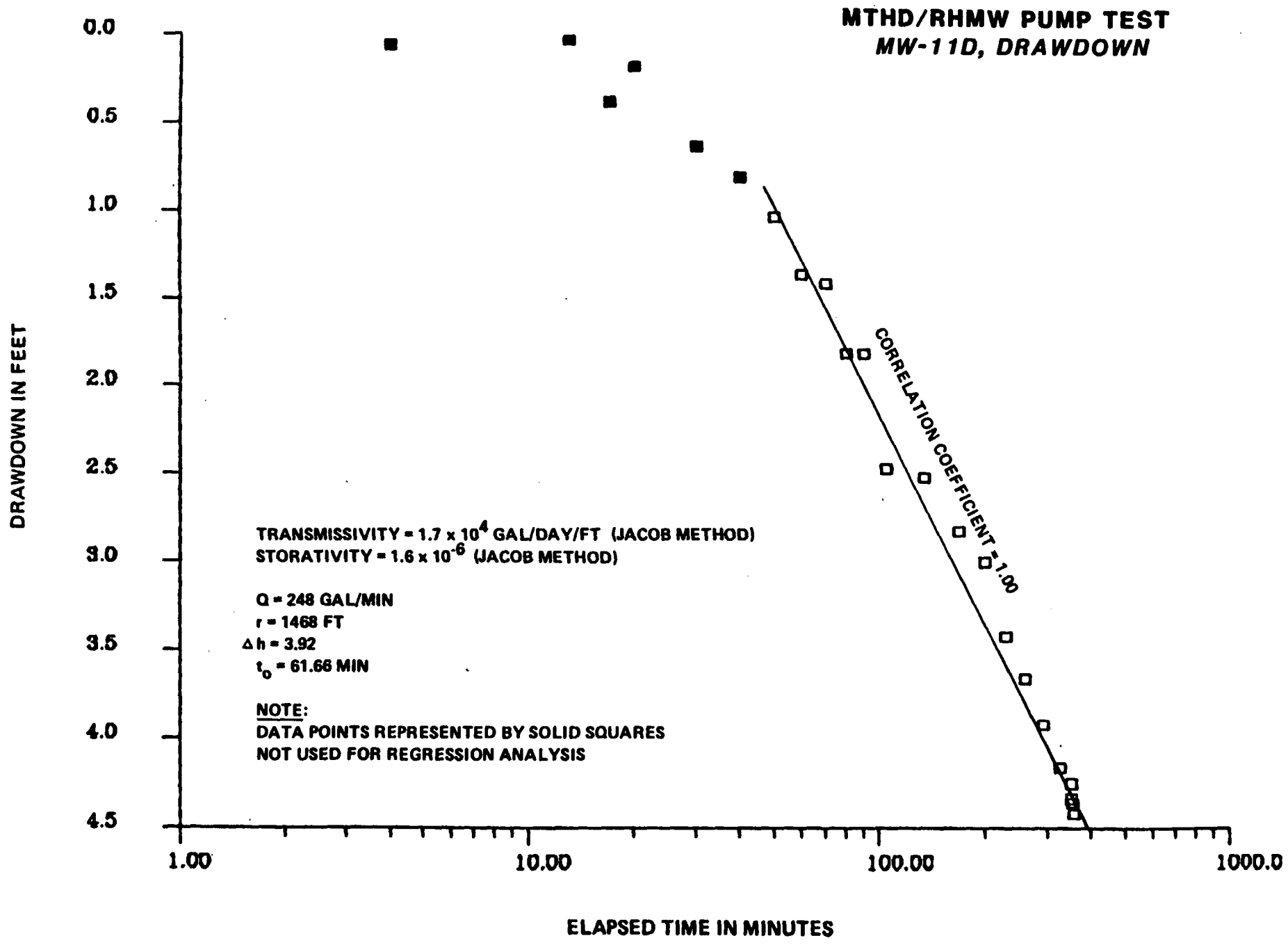
MTH 001 1360

MTHD/RHMW PUMP TEST

MW-10D, RECOVERY

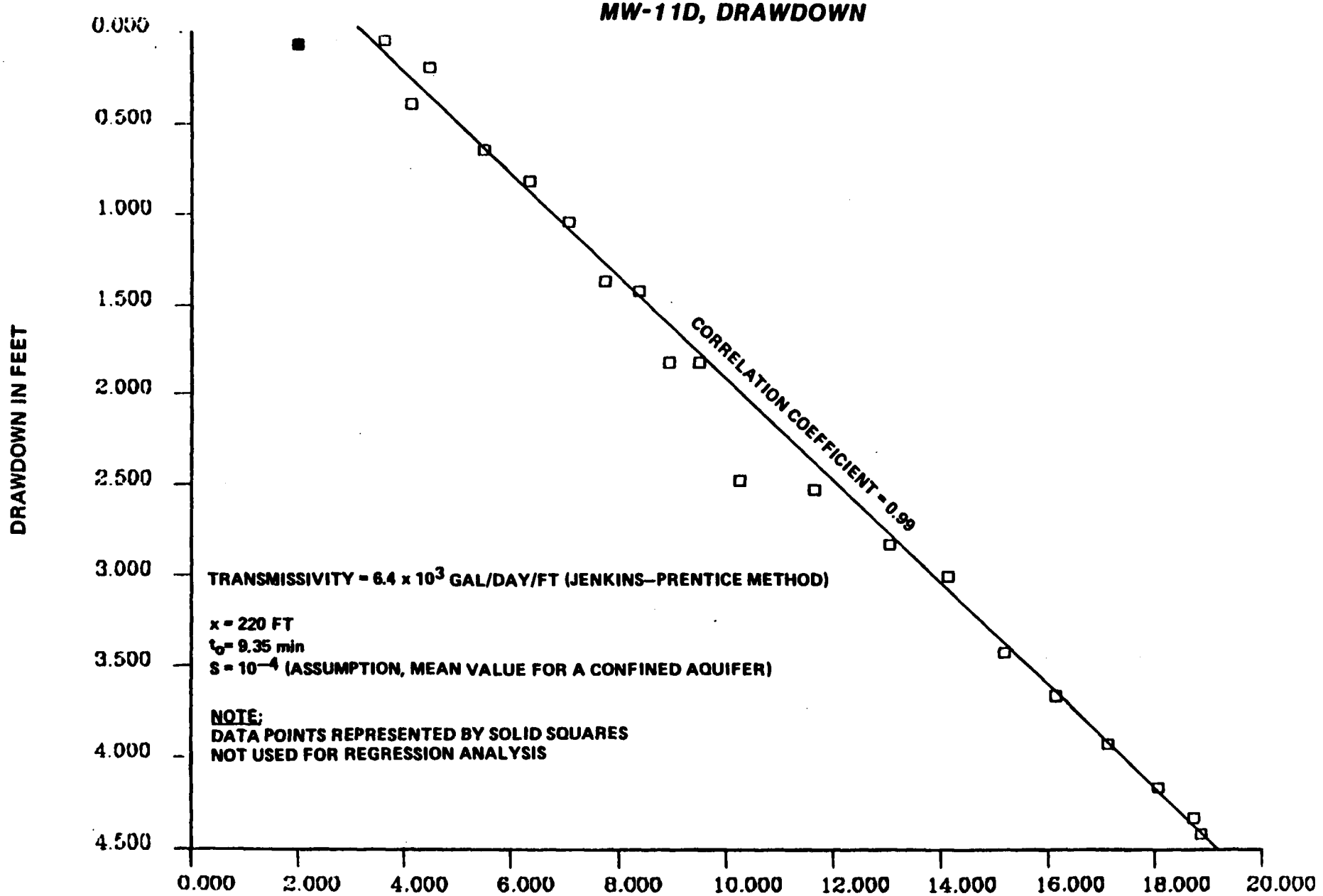


MTH 001 1361


MTHD/RHMW PUMP TEST
MW-11D, DRAWDOWN
DRAWDOWN IN FEET
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
1.00
10.00
100.00
1000.0
ELAPSED TIME IN MINUTES
CORRELATION COEFFICIENT = 1.00
TRANSMISSIVITY = 1.7 x 10^4 GAL/DAY/FT (JACOB METHOD)
STORATIVITY = 1.6 x 10^-6 (JACOB METHOD)
Q = 248 GAL/MIN
r = 1468 FT
Δh = 3.92
t_o = 61.66 MIN
NOTE:
DATA POINTS REPRESENTED BY SOLID SQUARES
NOT USED FOR REGRESSION ANALYSIS

MTH 001 1362

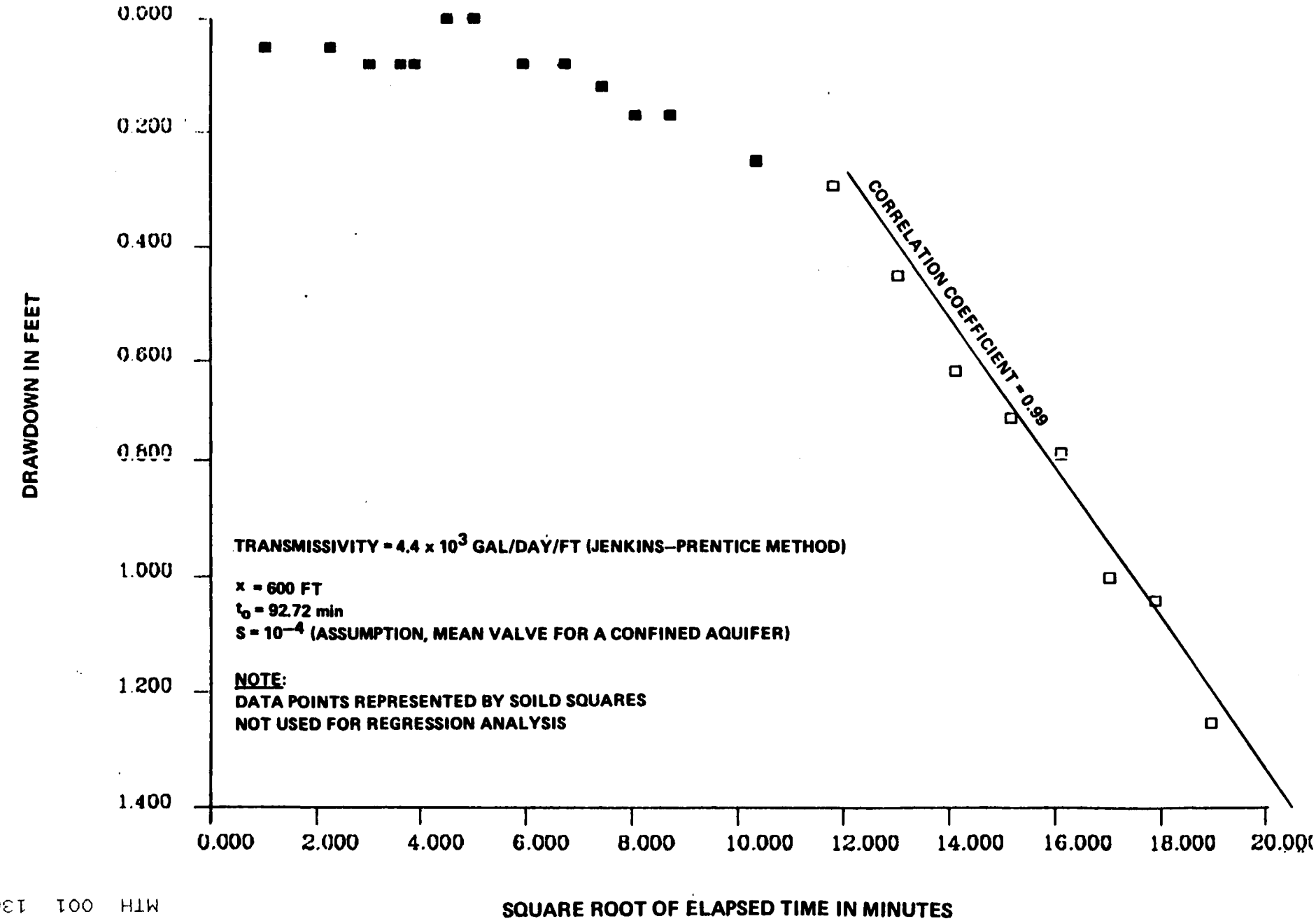
MTHD/RHMW PUMP TEST
MW-11D, DRAWDOWN



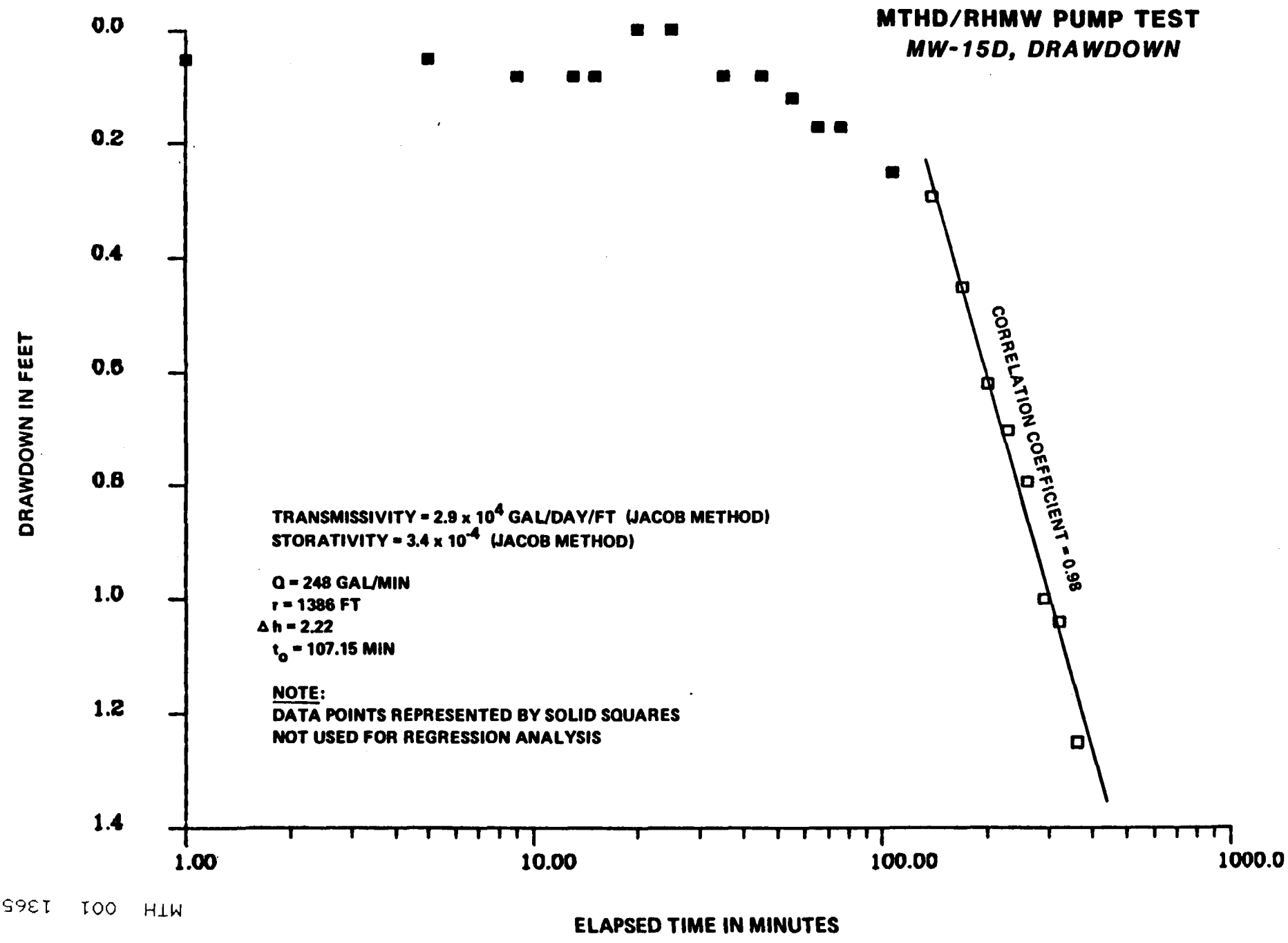
MTH 001 1363

MTHD/RHMW PUMP TEST

MW-15D, DRAWDOWN

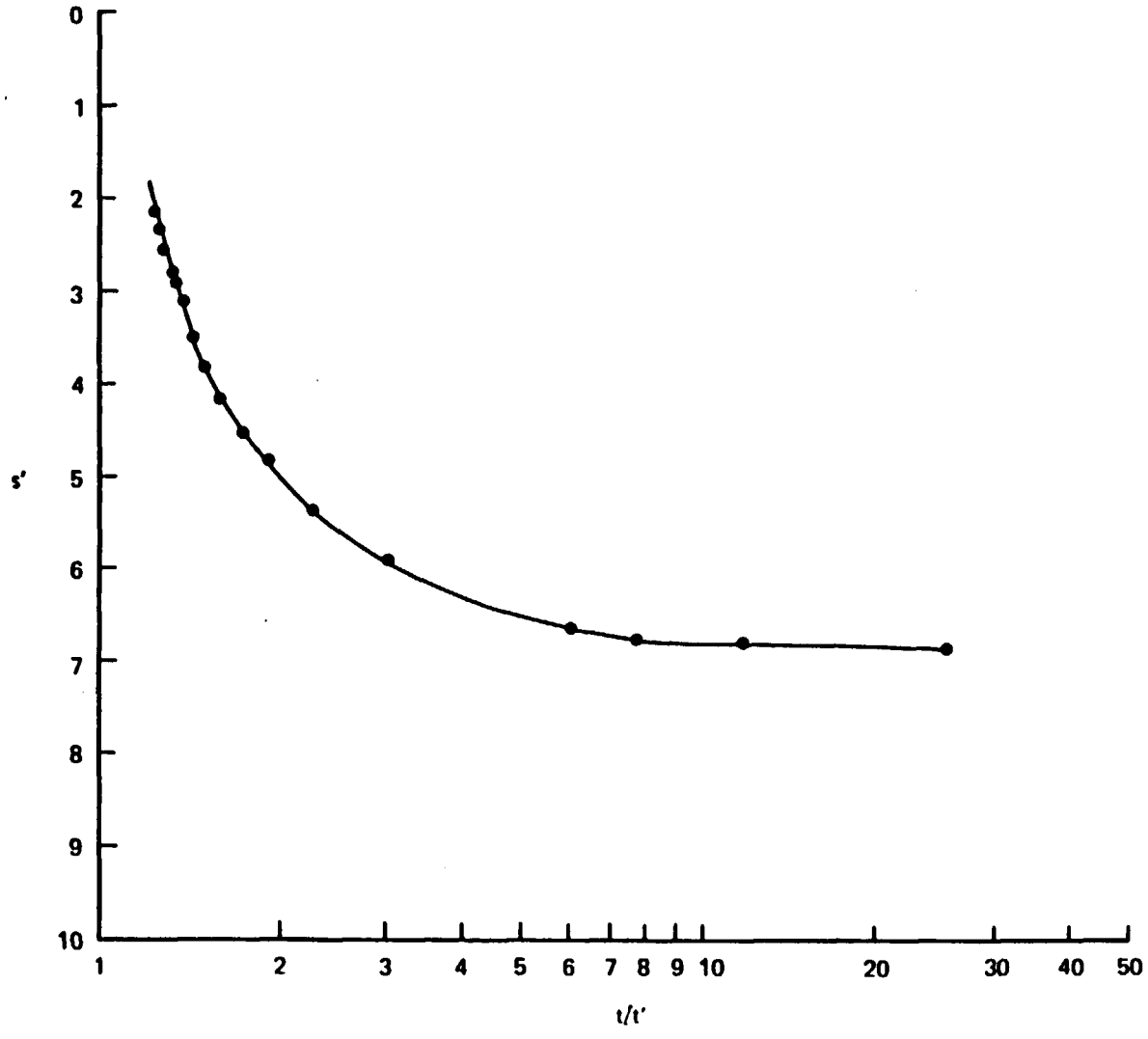


MTH 001 1364


MTHD/RHMW PUMP TEST
MW-15D, DRAWDOWN
DRAWDOWN IN FEET
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.00
10.00
100.00
1000.0
ELAPSED TIME IN MINUTES
CORRELATION COEFFICIENT = 0.98
TRANSMISSIVITY = 2.9 x 10^4 GAL/DAY/FT (JACOB METHOD)
STORATIVITY = 3.4 x 10^-4 (JACOB METHOD)
Q = 248 GAL/MIN
r = 1386 FT
Δh = 2.22
t_o = 107.15 MIN
NOTE:
DATA POINTS REPRESENTED BY SOLID SQUARES
NOT USED FOR REGRESSION ANALYSIS

MTH 001 1365

MTHD SLUG TEST
MW–2D, RISING HEAD



SLUG TEST
DATA REDUCTION

MTH 001 1367

PROGRAM SLUGT, VERSION 3,JAN. 1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG-TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
(1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 1967 (ARTICLE IN VOL.3,NO.1 OF WRR ENTITLED 'RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER')
(2) METHOD OF BOUWER AND RICE, 1976 (ARTICLE IN VOL. 12, NO.3 OF WRR ENTITLED 'A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS')

PROJECT NO.: 87N0000 CLIENT: NJDEP

SITE LOCATION: MTHD/RHMW DATE OF SLUG TEST: 3 Nov 1986

FIELD INVESTIGATOR: Carl Vartarasian

WELL NO.: MW-2D

INPUT DATA ARE:

INNER CASING DIAMETER = 6.00 INCHES
INNER SCREEN OR OPEN-HOLE DIAMETER = 6.00 INCHES
DIAMETER OF DRILLED HOLE = 6.00 INCHES
ESTIMATED POROSITY OF GRAVEL PACK = .30
LENGTH OF SCREEN OR INTAKE PORTION = 129.00 FEET
DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN = 127.90 FEET
THICKNESS OF SATURATED AQUIFER ZONE = 128.00 FEET
FALLING-HEAD INDEX = 0 ('1' IF FALLING,'0' IF RISING)
NUMBER OF HEAD-TIME DATA POINTS = 8

TIME (seconds)	HEAD (FEET)
15.00	6.750
50.00	5.910
110.00	4.820
200.00	3.790
290.00	2.890
380.00	2.290
440.00	1.960
500.00	1.680

SUCCESSIVE COMPUTED VALUES FOR H0 (FEET)

6.7739
6.8126

MTH 001 1368

METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

COMPUTED RESULTS:

COMPUTED VALUE OF H0 = 6.81 FEET

NOTE: TRANSMISSIVITY UNITS ARE IN FT**2/seconds AND PERMEABILITY UNITS ARE IN FT/seconds

ALPHA	STORATIVITY	MEAN TRANSMIS-SIVITY	MEAN PERMEA-BILITY	MINIMUM TRANS.	MAXIMUM TRANS.	RATIO OF 'T' RANGE TO TBAR	ROOT MEAN SQUARE OF TIME DEVIATIONS	DIFFERENCE IN RMS
1.000e-01	1.000e-01	1.015e-04	7.927e-07	1.655e-06	1.679e-04	1.638106	159.02	.00
1.000e-02	1.000e-02	1.987e-04	1.553e-06	5.316e-06	2.820e-04	1.392267	105.85	53.17
1.000e-03	1.000e-03	3.034e-04	2.370e-06	2.144e-05	3.942e-04	1.228723	77.92	27.93
1.000e-04	1.000e-04	4.077e-04	3.186e-06	4.552e-05	5.036e-04	1.123514	63.41	14.51
1.000e-05	1.000e-05	5.105e-04	3.988e-06	7.061e-05	6.112e-04	1.059007	54.92	8.49
1.000e-06	1.000e-06	6.116e-04	4.779e-06	9.538e-05	7.178e-04	1.017667	49.70	5.22
1.000e-07	1.000e-07	7.119e-04	5.561e-06	1.195e-04	8.241e-04	.989712	46.12	3.58
1.000e-08	1.000e-08	8.113e-04	6.339e-06	1.433e-04	9.359e-04	.976892	43.51	2.61
1.000e-09	1.000e-09	9.103e-04	7.112e-06	1.672e-04	1.050e-03	.969895	41.53	1.98
1.000e-10	1.000e-10	1.009e-03	7.880e-06	1.901e-04	1.168e-03	.969965	40.02	1.51

****

METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY = 3.83e-06 FT/seconds = 1.17e-04 CM/seconds

TRANSMISSIVITY = 4.90e-04 FT**2/seconds

MW-2D

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY = 3.83e-06 FT/seconds = 1.17e-04 CM/seconds

TRANSMISSIVITY = 4.90e-04 FT**2/seconds

MTH 001 1369

PROGRAM SLUGT, VERSION 3, JAN. 1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG-TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
(1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 1967 (ARTICLE IN VOL.3,NO.1 OF WRR ENTITLED 'RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER')
(2) METHOD OF BOUWER AND RICE, 1976 (ARTICLE IN VOL. 12, NO.3 OF WRR ENTITLED 'A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS')

PROJECT NO.: 87N0000 CLIENT: NJDEP

SITE LOCATION: MTHD/RHMW DATE OF SLUG TEST: 1 Dec 1986

FIELD INVESTIGATOR: Carl Vartereslan

WELL NO.: MW-4D

INPUT DATA ARE:

INNER CASING DIAMETER = 6.00 INCHES
INNER SCREEN OR OPEN-HOLE DIAMETER = 6.00 INCHES
DIAMETER OF DRILLED HOLE = 6.00 INCHES
ESTIMATED POROSITY OF GRAVEL PACK = .30
LENGTH OF SCREEN OR INTAKE PORTION = 130.00 FEET
DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN = 130.00 FEET
THICKNESS OF SATURATED AQUIFER ZONE = 130.00 FEET
FALLING-HEAD INDEX = 0 ('1' IF FALLING,'0' IF RISING)
NUMBER OF HEAD-TIME DATA POINTS = 8

TIME (seconds)	HEAD (FEET)
60.00	4.000
90.00	2.880
120.00	2.010
150.00	1.360
180.00	.890
210.00	.590
240.00	.460
270.00	.380

SUCCESSIVE COMPUTED VALUES FOR H0 (FEET)
8.0093
8.6730
9.0354
8.7497
8.3399

METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

COMPUTED RESULTS:

COMPUTED VALUE OF H0 = 8.34 FEET

NOTE: TRANSMISSIVITY UNITS ARE IN FT**2/seconds AND PERMEABILITY UNITS ARE IN FT/seconds

ALPHA	STORATIVITY	MEAN TRANSMIS-SIVITY	MEAN PERMEA-BILITY	MINIMUM TRANS.	MAXIMUM TRANS.	RATIO OF 'T' RANGE TO TBAR	ROOT MEAN SQUARE OF TIME DEVIATIONS	DIFFERENCE IN RMS
1.000e-01	1.000e-01	1.063e-03	8.175e-06	4.798e-04	1.641e-03	1.092866	74.90	.00
1.000e-02	1.000e-02	1.518e-03	1.168e-05	9.650e-04	2.022e-03	.695886	47.83	27.07
1.000e-03	1.000e-03	1.959e-03	1.507e-05	1.453e-03	2.393e-03	.479555	31.75	16.08
1.000e-04	1.000e-04	2.306e-03	1.773e-05	1.946e-03	2.795e-03	.368083	20.41	11.33
1.000e-05	1.000e-05	2.594e-03	1.995e-05	2.330e-03	3.027e-03	.268404	17.78	2.64
1.000e-06	1.000e-06	2.987e-03	2.298e-05	2.706e-03	3.466e-03	.254365	15.42	2.36
1.000e-07	1.000e-07	3.432e-03	2.640e-05	3.178e-03	3.696e-03	.150763	9.11	6.31
1.000e-08	1.000e-08	3.963e-03	3.048e-05	3.511e-03	4.328e-03	.206252	12.95	-3.84
1.000e-09	1.000e-09	4.419e-03	3.399e-05	4.043e-03	4.930e-03	.200790	12.62	.33
1.000e-10	1.000e-10	4.838e-03	3.722e-05	4.471e-03	5.437e-03	.199688	11.51	1.10

****

METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY = 1.49e-05 FT/seconds = 4.54e-04 CM/seconds

MW-4D

TRANSMISSIVITY = 1.93e-03 FT**2/seconds

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY = 1.49e-05 FT/seconds = 4.54e-04 CM/seconds

TRANSMISSIVITY = 1.93e-03 FT**2/seconds

MTH 001 1371

PROGRAM SLUGT, VERSION 3,JAN.' 1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG-TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
(1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 1967 (ARTICLE IN VOL.3,NO.1 OF WRR ENTITLED 'RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER')
(2) METHOD OF BOUWER AND RICE, 1976 (ARTICLE IN VOL. 12, NO.3 OF WRR ENTITLED 'A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS')

PROJECT NO.: 87N0000 CLIENT: NJDEP

SITE LOCATION: MTHD/RHMW DATE OF SLUG TEST: 1 Dec 1986

FIELD INVESTIGATOR: Carl Vartaresian

WELL NO.: MW-6D

INPUT DATA ARE:

INNER CASING DIAMETER = 6.00 INCHES
INNER SCREEN OR OPEN-HOLE DIAMETER = 6.00 INCHES
DIAMETER OF DRILLED HOLE = 6.00 INCHES
ESTIMATED POROSITY OF GRAVEL PACK = .30
NUMBER OF HEAD-TIME DATA POINTS = 8

LENGTH OF SCREEN OR INTAKE PORTION = 60.00 FEET
DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN = 62.31 FEET
THICKNESS OF SATURATED AQUIFER ZONE = 60.00 FEET
FALLING-HEAD INDEX = 0 ('1' IF FALLING,'0' IF RISING)

TIME (seconds)	HEAD (FEET)
5.00	1.560
10.00	1.430
40.00	1.040
70.00	.720
100.00	.550
130.00	.420
190.00	.370
310.00	.330

SUCCESSIVE COMPUTED VALUES FOR H0 (FEET)
1.2030
1.4444
1.5909
1.6140

METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

COMPUTED RESULTS:

COMPUTED VALUE OF H0 = 1.61 FEET

NOTE: TRANSMISSIVITY UNITS ARE IN FT**2/seconds AND PERMEABILITY UNITS ARE IN FT/seconds

ALPHA	STORATIVITY	MEAN TRANSMIS-SIVITY	MEAN PERMEA-BILITY	MINIMUM TRANS.	MAXIMUM TRANS.	RATIO OF 'T' RANGE TO TBAR	ROOT MEAN SQUARE OF TIME DEVIATIONS	DIFFERENCE IN RMS
1.000e-01	1.000e-01	3.656e-04	6.093e-06	2.567e-05	6.035e-04	1.580756	42.36	.00
1.000e-02	1.000e-02	7.043e-04	1.174e-05	1.439e-04	1.027e-03	1.254411	36.83	5.53
1.000e-03	1.000e-03	1.079e-03	1.798e-05	3.852e-04	1.443e-03	.981046	39.08	-2.25
1.000e-04	1.000e-04	1.454e-03	2.424e-05	6.634e-04	1.862e-03	.823906	41.78	-2.70
1.000e-05	1.000e-05	1.822e-03	3.037e-05	9.392e-04	2.310e-03	.751956	43.67	-1.90
1.000e-06	1.000e-06	2.187e-03	3.645e-05	1.209e-03	2.756e-03	.707373	45.06	-1.38
1.000e-07	1.000e-07	2.547e-03	4.245e-05	1.474e-03	3.195e-03	.675697	46.06	-1.00
1.000e-08	1.000e-08	2.904e-03	4.841e-05	1.725e-03	3.632e-03	.656544	46.81	-.75
1.000e-09	1.000e-09	3.259e-03	5.432e-05	1.916e-03	4.066e-03	.659546	47.44	-.62
1.000e-10	1.000e-10	3.606e-03	6.010e-05	2.055e-03	4.498e-03	.677530	49.33	-1.89

****

METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

MW-6D

PERMEABILITY = 2.48e-05 FT/seconds = 7.56e-04 CM/seconds

TRANSMISSIVITY = 1.49e-03 FT**2/seconds

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY = 2.48e-05 FT/seconds = 7.56e-04 CM/seconds

TRANSMISSIVITY = 1.49e-03 FT**2/seconds

MTH 001 1373

PROGRAM SLUGT, VERSION 3, JAN. 1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG-TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
(1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 1967 (ARTICLE IN VOL.3,NO.1 OF WRR ENTITLED 'RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER')
(2) METHOD OF BOUWER AND RICE, 1976 (ARTICLE IN VOL. 12, NO.3 OF WRR ENTITLED 'A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS')

PROJECT NO.: 87N0000 CLIENT: NJDEP

SITE LOCATION: MTHD/RHMW DATE OF SLUG TEST: 3 Nov 1986

FIELD INVESTIGATOR: Carl Varteresian

WELL NO.: MW-7D

INPUT DATA ARE:

INNER CASING DIAMETER = 6.00 INCHES
INNER SCREEN OR OPEN-HOLE DIAMETER = 6.00 INCHES
DIAMETER OF DRILLED HOLE = 6.00 INCHES
ESTIMATED POROSITY OF GRAVEL PACK = .30
LENGTH OF SCREEN OR INTAKE PORTION = 108.00 FEET
DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN = 108.00 FEET
THICKNESS OF SATURATED AQUIFER ZONE = 108.00 FEET
FALLING-HEAD INDEX = 0 ('1' IF FALLING,'0' IF RISING)
NUMBER OF HEAD-TIME DATA POINTS = 8

TIME (seconds)	HEAD (FEET)
60.00	1.800
90.00	1.240
120.00	.980
150.00	.810
180.00	.540
210.00	.430
240.00	.350
330.00	.260

SUCCESSIVE COMPUTED VALUES FOR H0 (FEET)

2.3855
2.9597
3.0573
3.0792

METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

COMPUTED RESULTS:

COMPUTED VALUE OF H0 = 3.08 FEET

NOTE: TRANSMISSIVITY UNITS ARE IN FT**2/seconds AND PERMEABILITY UNITS ARE IN FT/seconds

ALPHA	STORATIVITY	MEAN TRANSMIS-SIVITY	MEAN PERMEA-BILITY	MINIMUM TRANS.	MAXIMUM TRANS.	RATIO OF 'T' RANGE TO TBAR	ROOT MEAN SQUARE OF TIME DEVIATIONS	DIFFERENCE IN RMS
1.000e-01	1.000e-01	6.036e-04	5.589e-06	2.852e-04	8.176e-04	.881931	53.67	.00
1.000e-02	1.000e-02	9.618e-04	8.906e-06	6.312e-04	1.165e-03	.555483	28.43	25.24
1.000e-03	1.000e-03	1.320e-03	1.222e-05	9.958e-04	1.507e-03	.387000	18.18	10.25
1.000e-04	1.000e-04	1.672e-03	1.548e-05	1.350e-03	1.847e-03	.297082	14.93	3.25
1.000e-05	1.000e-05	2.022e-03	1.873e-05	1.702e-03	2.205e-03	.248702	14.30	.63
1.000e-06	1.000e-06	2.316e-03	2.144e-05	1.736e-03	2.572e-03	.360769	32.11	-17.81
1.000e-07	1.000e-07	2.594e-03	2.402e-05	1.830e-03	2.936e-03	.426684	36.82	-4.71
1.000e-08	1.000e-08	2.875e-03	2.662e-05	2.173e-03	3.297e-03	.390992	31.66	5.16
1.000e-09	1.000e-09	3.191e-03	2.954e-05	2.610e-03	3.595e-03	.308717	24.11	7.55
1.000e-10	1.000e-10	3.536e-03	3.274e-05	3.054e-03	3.974e-03	.260281	17.57	6.54

****

METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY = 1.35e-05 FT/seconds = 4.10e-04 CM/seconds

TRANSMISSIVITY = 1.45e-03 FT**2/seconds

MW-7D

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY = 1.35e-05 FT/seconds = 4.10e-04 CM/seconds

TRANSMISSIVITY = 1.45e-03 FT**2/seconds

MTH 001 1375

PROGRAM SLUGT, VERSION 3,JAN.'1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG-TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
(1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 1967 (ARTICLE IN VOL.3,NO.1 OF WRR ENTITLED 'RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER')
(2) METHOD OF BOUWER AND RICE, 1976 (ARTICLE IN VOL. 12, NO.3 OF WRR ENTITLED 'A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS')

PROJECT NO.: 87N0000 CLIENT: NJDEP

SITE LOCATION: MTHD/RHMW DATE OF SLUG TEST: 2 Dec 1986

FIELD INVESTIGATOR: Carl Vorteresian

WELL NO.: MW-13D

INPUT DATA ARE:

INNER CASING DIAMETER = 6.00 INCHES
INNER SCREEN OR OPEN-HOLE DIAMETER = 6.00 INCHES
DIAMETER OF DRILLED HOLE = 6.00 INCHES
ESTIMATED POROSITY OF GRAVEL PACK = .30
LENGTH OF SCREEN OR INTAKE PORTION = 230.00 FEET
DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN = 230.00 FEET
THICKNESS OF SATURATED AQUIFER ZONE = 230.00 FEET
FALLING-HEAD INDEX = 0 ('1' IF FALLING,'0' IF RISING)
NUMBER OF HEAD-TIME DATA POINTS = 8

TIME (seconds)	HEAD (FEET)
60.00	2.440
90.00	1.940
120.00	1.620
150.00	1.460
180.00	1.400
240.00	1.180
300.00	1.020
360.00	.910

SUCCESSIVE COMPUTED VALUES FOR H0 (FEET)
2.5170
2.6299
2.7785
3.0299
3.3408

MTH 001 1376

METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

COMPUTED RESULTS:

COMPUTED VALUE OF H0 = 3.34 FEET

NOTE: TRANSMISSIVITY UNITS ARE IN FT**2/seconds AND PERMEABILITY UNITS ARE IN FT/seconds

ALPHA	STORATIVITY	MEAN TRANSMIS-SIVITY	MEAN PERMEA-BILITY	MINIMUM TRANS.	MAXIMUM TRANS.	RATIO OF 'T' RANGE TO TBAR	ROOT MEAN SQUARE OF TIME DEVIATIONS	DIFFERENCE IN RMS
1.000e-01	1.000e-01	2.032e-04	8.834e-07	1.171e-04	2.340e-04	.575491	15.93	.00
1.000e-02	1.000e-02	3.964e-04	1.723e-06	3.053e-04	4.727e-04	.422373	19.61	-3.67
1.000e-03	1.000e-03	5.958e-04	2.590e-06	4.978e-04	7.133e-04	.361748	27.32	-7.71
1.000e-04	1.000e-04	7.925e-04	3.446e-06	6.386e-04	9.560e-04	.400567	31.72	-4.40
1.000e-05	1.000e-05	9.855e-04	4.285e-06	7.780e-04	1.191e-03	.418730	34.23	-2.51
1.000e-06	1.000e-06	1.176e-03	5.114e-06	9.161e-04	1.424e-03	.431693	35.93	-1.70
1.000e-07	1.000e-07	1.365e-03	5.933e-06	1.053e-03	1.654e-03	.440509	37.07	-1.14
1.000e-08	1.000e-08	1.552e-03	6.748e-06	1.189e-03	1.883e-03	.446806	37.93	-.86
1.000e-09	1.000e-09	1.738e-03	7.558e-06	1.325e-03	2.110e-03	.451877	38.61	-.68
1.000e-10	1.000e-10	1.924e-03	8.363e-06	1.460e-03	2.336e-03	.455584	39.13	-.52

****

METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY = 4.49e-06 FT/seconds = 1.37e-04 CM/seconds

TRANSMISSIVITY = 1.03e-03 FT**2/seconds

MW-13D

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY = 4.49e-06 FT/seconds = 1.37e-04 CM/seconds

TRANSMISSIVITY = 1.03e-03 FT**2/seconds

MTH 001 1377

PROGRAM SLUGT, VERSION 3,JAN.' 1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG-TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
(1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 1967 (ARTICLE IN VOL.3,NO.1 OF WRR ENTITLED 'RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER')
(2) METHOD OF BOUWER AND RICE, 1976 (ARTICLE IN VOL. 12, NO.3 OF WRR ENTITLED 'A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS')

PROJECT NO.: 87N0000 CLIENT: NJDEP

SITE LOCATION: MTHO/RHMW DATE OF SLUG TEST: 1 Dec 1986

FIELD INVESTIGATOR: Carl Varteresian

WELL NO.: MW-14D

INPUT DATA ARE:

INNER CASING DIAMETER = 6.00 INCHES
INNER SCREEN OR OPEN-HOLE DIAMETER = 6.00 INCHES
DIAMETER OF DRILLED HOLE = 6.00 INCHES
ESTIMATED POROSITY OF GRAVEL PACK = .30
NUMBER OF HEAD-TIME DATA POINTS = 8

LENGTH OF SCREEN OR INTAKE PORTION = 131.00 FEET
DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN = 137.80 FEET
THICKNESS OF SATURATED AQUIFER ZONE = 131.00 FEET
FALLING-HEAD INDEX = 0 ('1' IF FALLING,'0' IF RISING)

TIME (seconds)	HEAD (FEET)
90.00	6.360
150.00	5.260
210.00	4.260
270.00	3.490
330.00	2.790
390.00	2.190
450.00	1.830
570.00	1.120

SUCCESSIVE COMPUTED VALUES FOR H0 (FEET)

9.0484
8.8659
8.8991

METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

COMPUTED RESULTS:

COMPUTED VALUE OF H0 = 8.90 FEET

NOTE: TRANSMISSIVITY UNITS ARE IN FT**2/seconds AND PERMEABILITY UNITS ARE IN FT/seconds

ALPHA	STORATIVITY	MEAN TRANSMIS-SIVITY	MEAN PERMEA-BILITY	MINIMUM TRANS.	MAXIMUM TRANS.	RATIO OF 'T' RANGE TO TBAR	ROOT MEAN SQUARE OF TIME DEVIATIONS	DIFFERENCE IN RMS
1.000e-01	1.000e-01	1.806e-04	1.379e-06	8.731e-05	3.122e-04	1.245257	160.24	.00
1.000e-02	1.000e-02	3.199e-04	2.442e-06	2.229e-04	4.536e-04	.721000	92.78	67.46
1.000e-03	1.000e-03	4.621e-04	3.528e-06	3.754e-04	5.911e-04	.466631	62.02	30.76
1.000e-04	1.000e-04	6.022e-04	4.597e-06	5.260e-04	7.285e-04	.336384	46.56	15.46
1.000e-05	1.000e-05	7.401e-04	5.650e-06	6.651e-04	8.658e-04	.271228	37.54	9.02
1.000e-06	1.000e-06	8.764e-04	6.690e-06	8.014e-04	1.002e-03	.228791	31.59	5.95
1.000e-07	1.000e-07	1.005e-03	7.672e-06	9.350e-04	1.086e-03	.150711	20.18	11.42
1.000e-08	1.000e-08	1.122e-03	8.564e-06	1.068e-03	1.193e-03	.111682	14.98	5.20
1.000e-09	1.000e-09	1.250e-03	9.542e-06	1.172e-03	1.328e-03	.124869	17.68	-2.70
1.000e-10	1.000e-10	1.382e-03	1.055e-05	1.329e-03	1.462e-03	.096252	12.14	5.54

****

METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY = 4.34e-06 FT/seconds = 1.32e-04 CM/seconds

TRANSMISSIVITY = 5.68e-04 FT**2/seconds

MW-14D

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY = 4.34e-06 FT/seconds = 1.32e-04 CM/seconds

TRANSMISSIVITY = 5.68e-04 FT**2/seconds

MTH 001 1379

PROGRAM SLUGT, VERSION 3,JAN. 1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG-TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
(1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 1967 (ARTICLE IN VOL.3,NO.1 OF WRR ENTITLED 'RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER')
(2) METHOD OF BOUWER AND RICE, 1976 (ARTICLE IN VOL. 12, NO.3 OF WRR ENTITLED 'A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS')

PROJECT NO.: 87N0000 CLIENT: NJDEP

SITE LOCATION: MTHD/RHMW DATE OF SLUG TEST: 1 Dec 1986

FIELD INVESTIGATOR: Carl Varteresian

WELL NO.: MW-15D

INPUT DATA ARE:

INNER CASING DIAMETER = 6.00 INCHES
INNER SCREEN OR OPEN-HOLE DIAMETER = 6.00 INCHES
DIAMETER OF DRILLED HOLE = 6.00 INCHES
ESTIMATED POROSITY OF GRAVEL PACK = .30
NUMBER OF HEAD-TIME DATA POINTS = 8

LENGTH OF SCREEN OR INTAKE PORTION = 224.00 FEET
DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN = 226.60 FEET
THICKNESS OF SATURATED AQUIFER ZONE = 224.00 FEET
FALLING-HEAD INDEX = 0 ('1' IF FALLING,'0' IF RISING)

TIME (seconds)	HEAD (FEET)
30.00	4.480
60.00	3.480
180.00	1.780
300.00	1.240
420.00	.950
540.00	.770
660.00	.640
780.00	.560

SUCCESSIVE COMPUTED VALUES FOR H0 (FEET)
3.5623
3.8115
4.0788
4.3916
4.7529

MTH 001 1380

METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

COMPUTED RESULTS:

COMPUTED VALUE OF H0 = 4.75 FEET

NOTE: TRANSMISSIVITY UNITS ARE IN FT**2/seconds AND PERMEABILITY UNITS ARE IN FT/seconds

ALPHA	STORATIVITY	MEAN TRANSMIS-SIVITY	MEAN PERMEA-BILITY	MINIMUM TRANS.	MAXIMUM TRANS.	RATIO OF 'T' RANGE TO TBAR	ROOT MEAN SQUARE OF TIME DEVIATIONS	DIFFERENCE IN RMS
1.000e-01	1.000e-01	2.071e-04	9.246e-07	1.214e-05	2.607e-04	1.200054	96.71	.00
1.000e-02	1.000e-02	3.498e-04	1.562e-06	5.649e-05	4.730e-04	1.190576	53.00	43.71
1.000e-03	1.000e-03	4.988e-04	2.227e-06	1.312e-04	6.980e-04	1.136298	50.55	2.45
1.000e-04	1.000e-04	6.454e-04	2.881e-06	2.120e-04	9.112e-04	1.083172	57.74	-7.19
1.000e-05	1.000e-05	7.907e-04	3.530e-06	2.912e-04	1.124e-03	1.053034	64.32	-6.58
1.000e-06	1.000e-06	9.344e-04	4.171e-06	3.688e-04	1.334e-03	1.032780	69.39	-5.07
1.000e-07	1.000e-07	1.067e-03	4.762e-06	4.453e-04	1.541e-03	1.027325	88.40	-19.01
1.000e-08	1.000e-08	1.182e-03	5.277e-06	5.208e-04	1.748e-03	1.038051	111.88	-23.48
1.000e-09	1.000e-09	1.301e-03	5.807e-06	5.957e-04	1.953e-03	1.043345	116.02	-4.14
1.000e-10	1.000e-10	1.431e-03	6.388e-06	6.699e-04	2.157e-03	1.039279	109.40	6.63

****

METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY = 3.77e-06 FT/seconds = 1.15e-04 CM/seconds

TRANSMISSIVITY = 8.45e-04 FT**2/seconds

MW-15D

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY = 3.77e-06 FT/seconds = 1.15e-04 CM/seconds

TRANSMISSIVITY = 8.45e-04 FT**2/seconds

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Appendix H

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TABLE H-1. INDICATOR CHEMICAL SELECTION (CONTINUED)

Substance	Priority Group[1]	Maximum Concentration ()g/l) RW	Maximum Concentration ()g/l) MW	Standard[3] ()g/l)	# Detected / # Analyzed[4] RW	# Detected / # Analyzed[4] MW	Blanks	Carcinogenic Weight of Evidence Oral	Carcinogenic Weight of Evidence Inhal	Other Notes	Include as Indicator Chemical
Cyclopropylbenzene	NL	-	-	-	-	-	NA	-	-	Detected in only two wells in 1982. Unclear whether analysis was done at other sampling dates. Not detected in RI sampling.	No
N-Nitrosodiphenylamine	1	-	[2.6]	-	0/37	1/25	OK	-	-	Found in monitoring well. One sample only.	No
Bis(2 ethylhexyl)phthlate	1	-	48	51	0/37	11/25	CONT	B2	B2	Found in monitoring wells only, below level of standard.	No
Di-n-butylphthlate	3	-	-	-	1/37	-	CONT	-	-	Minimal contamination.	No
Phenols	2-4	54	63	-	5/37	2/25	OK	*	*	*Some phenols are B2 weighted, others are not listed.	No
Aluminum	NL	[191]	140,000	-	34/37	25/25	CONT	-	-	All are [ ] below detection, so estimated except for 3 samples. Trip: [135] Field: 222)g/l	No
Arsenic	1	39	186*	50	13/27	11/25	OK	A	A	* Was not detected in duplicate sample. Some other values above detection limits.	Yes
Barium	NL	306	2,300	1,000	37/37	25/25	CONT	-	-	4 of the 37 were above level of detection.	Yes

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TABLE H-1. INDICATOR CHEMICAL SELECTION (CONTINUED)

Substance	Priority Group[1]	Maximum Concentration ()g/l) RW	Maximum Concentration ()g/l) MW	Standard[3] ()g/l)	# Detected / # Analyzed[4] RW	# Detected / # Analyzed[4] MW	Blanks	Carcinogenic Weight of Evidence Oral	Carcinogenic Weight of Evidence Inhal	Other Notes	Include as Indicator Chemical
Beryllium	1	-	17	1000	0/37	16/25	CONT	B1	B1	Carcinogen. Present above detection limit in MW3D & MW3S, MW3D possible grout contamination, other values below detection limit.	Yes
Cadmium	1	9.8	7	10	9/37	1/25	OK	NA	B1	Carcinogen. Only 4 occurrences above detection limit, no level reported > twice the detection limit.	No
Calcium	NL	336,000	2,230,000	-	37/37	25/25	CONT	-	-	Two highest readings in MW3D, possible grout contamination.	No
Chromium	1	117	406	50	3/37	16/37	CONT	NA	A	Carcinogen - high conc. Two highest readings in MW3D; possible grout contamination; also in MW3S.	Yes
Cobalt	NL	81	98	-	33/37	14/25	CONT	-	-		No
Copper	3	196	581	1,300	37/37	23/25	CONT	-	-		No
Iron	NL	3,840	165,000	-	36/37	25/25	CONT	-	-		No
Lead	1	2,170	786	50	30/37	17/25	CONT	-	-	High conc. when compared with standard.	Yes
Magnesium	NL	75,600	193,000	-	37/37	25/25	CONT	-	-		No

TABLE H-1. INDICATOR CHEMICAL SELECTION (CONTINUED)

Substance	Priority Group[1]	Maximum Concentration ()g/l) RW	Maximum Concentration ()g/l) MW	Standard[3] ()g/l)	# Detected / # Analyzed[4] RW	# Detected / # Analyzed[4] MW	Blanks	Carcinogenic Weight of Evidence Oral	Carcinogenic Weight of Evidence Inhal	Other Notes	Include as Indicator Chemical
Manganese	NL	295	6,370	-	33/37	23/25	CONT	-	-		No
Mercury	2	0.24	0.44	2	20/36	2/25	CONT	-	-		No
Nickel	1	71	340	350	32/36	7/25	CONT	A	A	Carcinogen. Eight readings above detection limit, highest in MW3D, also in MW3S. Possible grout contamination in MW3D.	Yes
Potassium	-	[1,900]	56,600	-	4/36	24/25	-	-	-		No
Silver	3	180	36	50	21/36	7/25	CONT	-	-	Frequently detected, one reading in RW above standard, 24 readings above detection limit.	Yes
Sodium	-	57,900	88,400	-	36/36	25/25	CONT	-	-	American Heart Association suggests 20 mg/l. EPA does not have health based standard.	No
Thallium	4	[5.5]	-	-	3/36	-	CONT	--	-		No
Vanadium	-	42,600	225	-	33/36	15/25	CONT	-	-		No
Zinc	2	205	958	5,000	36/36	25/25	CONT	-	-		No
Cyanide	1	99	-	750	1/36	0/25	OK	-	-		No

(1) Priority Group from Federal Regulations.
(2) Maximum concentration detected in any of the sampling rounds, data from Table B-1.
(3) Standard referenced in Table 2-1.
(4) Number of times the contaminant was detected/number of samples analyzed is for date from the most recent sampling rounds (1986). Tables in Appendix B.
(5) Carcinogenic weight of evidence for oral and inhaled exposures from ICF, 1986.

NL - Not Listed
CONT - Contamination in blanks
RW - Residential Well
MW - Monitoring Well

TABLE H-2. BASIC PROPERTIES OF INDICATOR CHEMICALS

	CAS Number	Molecular Formula	Molecular Weight	Phase at 25°C	Density g/ml	Solubility in Water mg/L	Boiling Point °C	Melting Point °C	Vapor Pressure mm Hg	Color
Trichloroethene	79-01-6	C_2HCl_3	131.40	liquid	1.464	1.10×10^3	87	-73	58	colorless
Tetrachloroethene	127-18-4	C_2Cl_4	165.85	liquid	1.62	1.50×10^2	121	-19	14	colorless
Chlordane	57-74-9	$C_{10}H_6Cl_8$	409.80	viscous liq.		5.60×10^{-1}	decomposes		1×10^{-5}	amber
Arsenic	7740-38-2	As	74.92	solid	5.727	insol.	613 sublimes	817	0.00	gray, shiny
Barium	7740-39-3	Ba	137.33	solid	3.6	decomposes	1640	725	0.00	yellowish, white
Beryllium	7440-41-7	Be	9.01	solid	1.85	insol.	2500	1287	0.00	gray
Chromium	7440-47-3	Cr	51.996	solid	7.20	insol.	2642	1900	0.00	steel gray
Lead	7439-92-1	Pb	207.2	solid	11.288	insol.	1740	327.4	0.00	bluish-white, silvery gray
Nickel	7440-02-0	Ni	58.69	solid	8.9	insol.	2837	1550	0.00	lustrous white/silver
Silver	7440-22-4	Ag	107.87	solid	10.5	insol.	2000	960.5	0.00	white metallic

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TABLE H-3. DOT HAZARD CLASS AND CHEMICAL FATE DATA FOR INDICATOR CHEMICALS

	DOT HAZARD CLASS 49 CFR 172	Log Kow	Koc ml/g	Henry's Law Coefficient atm/m^3/mol	Fish BCF (l/kg)
Trichlorethene	No DOT Hazard Class (ORM-A) Toxic by inhalation	2.38	126	9.1×10^{-3}	10.6
Tetrachloroethene	No DOT Hazard Class (ORM-A) Moderately toxic	2.6	364	2.59×10^{-2}	31
Chlordane	Flammable Liquid Toxic by ingestion, inhalation and contact	3.32	1.4×10^{5}	9.63×10^{-6}	1.4×10^{4}
Arsenic	POISON B Highly toxic by inhalation and ingestion	NA	NA	NA	44
Barium	No DOT Hazard Class	NA	NA	NA	NA
Beryllium	POISON B Highly toxic by inhalation	NA	NA	NA	19
Chromium^{+3}	No DOT Hazard Class (ORM-E) Carcinogenic	NA	NA	NA	16
Chromium^{+6}	No DOT Hazard Class (ORM-E) Carcinogenic	NA	NA	NA	16
Lead	POISON B Toxic by inhalation and ingestion	NA	NA	NA	49
Nickel	POISON B Carcinogenic/Toxic	NA	NA	NA	47
Silver	Various Hazard Classes depending on compound	NA	NA	NA	3.08×10^{3}

1. Koc estimated by the following equation: log Koc = (-0.55* logs) + 3.64 (Note: S in mg/l)
2. NA = Information not available
3. Log of the octanol water partitioning coefficient

TABLE H-4. SCORING FOR INDICATOR CHEMICAL SELECTION

	C plume max. conc. (a) (ug/l)	C plume mean conc. (b) (ug/l)	NC/PC (c)	T toxicity factor (d) (oral, water, only)	CT/IS (max) (e)	CT/IS (mean) (e)	Tentative rank (max)	Tentative rank (mean)
arsenic	186	13.40	PC	4.07E+00	757.0	54.5	1	1
trichloroethene	650	53.70	PC	4.29E-03	2.8	0.2	2	3
chloroform	19	6.00	PC	5.63E-02	1.1	0.3	3	2
chlordane	1.3	0.50	PC	4.32E-01	0.6	0.2	4	4
tetrachloroethene	43	6.40	PC	8.86E-03	0.38	0.06	5	5
bis(2-ethylhexyl)phthalate	48	3.81	PC	5.71E-04	0.027	0.002	6	6
chromium	406	22.80	PC	NA			7	7
nickel	340	51.80	PC	NA			8	8
methylene chloride	24	4.90	PC	NA			9	9
beryllium	17	5.50	PC	NA			10	10
cadmium	9.8	5.00	PC	NA			11	11
barium	2300	173.65	NC	4.08E+00	9384.0	708.5	1	1
vanadium	42600	801.39	NC	1.43E-01	6091.8	114.6	2	6
silver	180	14.90	NC	2.00E+01	3600.0	298.0	3	2
arsenic	186	13.40	NC	1.80E+01	3348.0	241.2	4	4
lead	2170	90.30	NC	8.93E-01	1937.8	80.6	5	7
nickel	340	51.80	NC	4.26E+00	1448.4	220.7	6	5
trichloroethene	650	53.70	NC	1.05E+00	682.5	56.4	7	8
antimony	114	63.04	NC	4.35E+00	495.9	274.2	8	3
copper	581	73.09	NC	7.14E-01	414.8	52.2	9	9
zinc	958	103.80	NC	1.07E-01	102.5	11.1	10	11
cadmium	9.8	5.00	NC	4.45E+00	43.6	22.3	11	10
mercury	0.44	0.21	NC	1.84E+01	8.1	3.9	12	12
phenols	54	14.01	NC	1.00E-01	5.4	1.4	13	14
di-n-butylphthalate	10	10.00	NC	3.81E-01	3.8	3.8	14	13
1,2-dichloroethene	25	5.79	NC	5.29E-02	1.3	0.3	15	15
tetrachloroethene	43	6.40	NC	9.62E-03	0.4	0.1	16	16
1,1-dichloroethane	8.6	3.22	NC	2.58E-02	0.2	0.1	17	17
ethylbenzene	5.3	5.55	NC	1.10E-02	0.1	0.1	18	18
toluene	5	5.00	NC	5.20E-03	0.03	0.03	19	19
methylene chloride	24	4.90	NC	9.20E-04	0.022	0.005	20	20
diethylphthalate	58	10.77	NC	2.67E-04	0.015	0.003	21	21
1,1,1-trichloroethane	3.7	3.25	NC	7.33E-04	0.003	0.002	22	22
iron	165000	8756.67	NC	NA				
manganese	6370	356.01	NC	NA				
chromium	406	22.80	NC	NA				
cyanide	99	12.47	NC	NA				
chloroform	19	6.00	NC	NA				
beryllium	17	5.50	NC	NA				
pyrene	10	10.00	NC	NA				
thallium	5.5	9.51	NC	NA				
chlordane	1.3	0.50	NC	NA				
calcium	2230000	101806.73						
magnesium	193000	19343.04						
aluminum	140000	6676.80						
sodium	88400	15244.45						
potassium	56600	4145.45						
cobalt	98	21.16						
acetone	80	10.14						
n-nitrosodiphenylamine	10	10.00						
bromodichloromethane	5	5.00						

a. plume max. concentration based on all MW and RW data with the exception of the local background wells MW6, MW11, MW13, MW15.
b. plume mean concentration based on all MW and RW data with the exception of the local background wells MW6, MW11, MW13, MW15.
c. PC indicates potential carcinogen, NC indicates non-carcinogen.
d. toxicity factors from Exhibit C-3 and C-4, Superfund Public Health Evaluation Manual, Oct. 1986.
e. CT and IS listed together since for this single media, single route calculation CT = IS = conc.(C) x toxicity factor(T)

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Human Exposures to Volatile Halogenated Organic Chemicals in Indoor and Outdoor Air

by Julian B. Andelman*

Volatile halogenated organic chemicals are found in indoor and outdoor air, often at concentrations substantially above those in remote, unpopulated areas. The outdoor ambient concentrations vary considerably among sampling stations throughout the United States, as well as diurnally and daily. The vapor pressures and air-water equilibrium (Henry's Law) constants of these chemicals influence considerably the likely relative human exposures for the air and water routes.

Volatilization of chemicals from indoor uses of water can be a substantial source of exposure, as shown for radon-222. Measurements of air concentrations of trichloroethylene (TCE) in showers using TCE contaminated groundwater show increases with time to as high as one-third of occupational threshold limit values. Using a scaled down experimental shower, such volatilization and subsequent decay in air was also demonstrated.

Using a simplified indoor air model and assuming complete volatilization from a full range of typical water uses within the home, calculations indicate that the expected air inhalation exposures can be substantially higher than those from ingestion of these chemicals in drinking water. Although the regulation of toxic chemicals in potable water supplies has focused traditionally on direct ingestion, the volatilization and inhalation from other much greater volume indoor uses of water should be considered as well.

Introduction

As measurement capabilities increase along with awareness and concern about the releases to the air of a variety of volatile organic chemicals, some systematic monitoring has been instituted to assess the range and variabilities of likely human exposures, particularly in outdoor ambient air, and more recently indoor air as well. Because of the wide use of petroleum and other fossil fuels and the volatility of many of their chemical components, aliphatic and aromatic hydrocarbons have been widely studied both in outdoor and indoor air. Thus for example, Simoneit has shown that aerosols from urbanized areas of the western U.S. contain extractable organic matter composed mainly of petroleum residues (*1*). A National Academy of Sciences report notes that a variety of aromatic and aliphatic hydrocarbons have been detected in indoor air (*2*).

However, there has been increasing attention to low molecular weight, volatile, halogenated compounds because of their wide use, well-known toxicological effects, and awareness of their presence in the environment that results in actual or potential human exposures, such as from contaminated groundwater and improperly managed hazardous waste sites. An example of an evaluation of such exposures to and risks from some of these chemicals is found in a publication of the National Academy of Sciences (*3*) which shows that indoor and outdoor air exposures for many of these chemicals can be as important as those from food and water. Because these and other low molecular weight halogenated organics are potential agents of chronic human disease, the normally low air exposures are of concern and need to be assessed further. The focus of this paper will then be on such compounds in indoor and outdoor air, with particular attention to the chlorinated methanes and ethylenes for which the environmental data base has begun to be developed.

Three separate aspects will be addressed. First will be a discussion of physicochemical characteristics that will affect the movement and interactions of volatile chemicals between gaseous, aerosol and water phases. Second, will be a brief survey of several chlorinated methanes and ethylenes in indoor and primarily outdoor air. Finally, there will a discussion of one particular route of indoor release of volatile chemicals, namely from potable waters used within homes. This will include an evaluation of parameters that will affect human

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exposures from this route, evidence of such releases within homes, and experimental simulation of such emissions.

Physicochemical Aspects

The volatilization of chemicals into air has physicochemical components that affect the likely concentrations that can occur, as well as the fraction that may be found in the particulate as compared to the gaseous state. Of direct interest are the vapor pressures of the pure compound P_A, expressible in such units as mm Hg (torr) or atmospheres. Table 1 shows such values of vapor pressure at 25°C for several anthropogenic organic chemicals, along with their Henry's Law coefficients H, which is the ratio of their air concentrations in equilibrium with those in water. Thus, at equilibrium with P_A (having units of atm) and the water concentration C_W (in units of mole/m^3)

$$P_A = HC_W \quad (1)$$

H is often conveniently estimated as the ratio of the vapor pressure of a pure compound divided by its water solubility (7).

Table 1. Henry's Law constant and vapor pressure at 25°C for several anthropogenic chemicals.

Compound	Vapor pressure, mm Hg	H, atm-m^3/mole
Tricholoroethylene	74[a]	9.9×10^{-10}
Benzene[c]	95	5.5×10^{-3}
Aroclor 1248[c]	4.9×10^{-4}	3.5×10^{-3}
Lindane[c]	9.4×10^{-6}	4.9×10^{-7}
DDT[c]	1.0×10^{-7}	3.9×10^{-5}

[a] Data of Dilling et al. (4).
[b] Data of Roberts and Dandliker (5).
[c] Data of Makay and Leinonen (6).

Although there is the temptation to define volatile chemicals of interest simply as those with vapor pressures above a given value, e.g., 1 mm Hg, the H values are also of importance. The larger the H, the greater is the likely human exposure through the air route for a given vapor pressure. A possible reference point in this regard is that value of H which would correspond to equal quantities of the chemical in 20 m^3 of air and 2 L water, the approximate daily amounts taken in by reference man (8). On this basis with the use of Eq. (1), the criterion value of H would be 2.5×10^{-6} atm-m^3/mole, which would satisfied by all the compounds in Table 1 except for lindane. As is apparent, compounds with widely different vapor pressures can meet the criterion of H being greater than 2.5×10^{-6}.

The Henry's Law relationship is also relevant to the concentrations of volatile organic chemicals that may be found in rainfall, such as those reported by Kawamura and Kaplan (9) as shown in Table 2. Their presence is not unexpected in those ambient atmospheres containing these compounds in the gaseous state, since the large surface to mass ratio of the water droplets in precipitation encourages the rapid equilibration between the air and water phases. For example, for tetrachloroethylene using an H value of 1.5×10^{-2} atm-m^3/mole at 25°C (5) and the rain concentration of 21 ng/L shown in Table 2, one calculates a corresponding air equilibrium concentration of 7200 ng/m^3, which is not substantially different from the range of means of 2000 to 4000 ng/m^3 for several U.S. cities reported by Singh et al. (10).

Table 2. Concentrations of several volatile organic chemicals in Los Angeles rainwater.[a]

Compound	Concn, ng/L
1,2-Dichloroethylene	230
Chloroform	250
1,1,1-Trichloroethylene	69
Tetrachloroethylene	21
Toluene	76

[a] Data of Kawamura and Kaplan (9).

Another essential physicochemical interaction is that discussed by Junge, namely, the likely sorption of a volatile component onto aerosols (11). Using the well-known Langmuir absorption relationship, he calculated the expected absorbed fraction of volatile chemicals as a function of aerosol concentration and vapor pressure of the pure compound. His calculations showed that as the aerosol surface concentration per volume of air θ increases, so does the fraction ϕ of the volatile chemical absorbed onto the aerosol surface. Using a typical upper limit of θ for urban aerosols of 2×10^{-5}, his relationships indicate that only for vapor pressures greater than 10^{-4} mm Hg will ϕ be small and most of the volatile chemical exist in the unsorbed vapor form. As shown in Table 1, the vapor pressures of lindane and DDT are well below this value, while those of trichloroethylene, benzene, and Aroclor 1248 are well above it.

Junge's analysis does not address specifically the expected increase in sorbability onto aerosols containing organic matter. Nevertheless, this concept is an important one. Thus both high values of H and the vapor pressure of the pure compound are necessary for volatile organics to constitute an important source of exposure in the gaseous state. If sorbed onto aerosols, such compounds can also clearly constitute a health hazard. However, their behavior and potential for removal are different than when in the gaseous state. Such controls on the distribution of volatile organic chemicals between the gaseous state, aerosols, and water need to be understood and considered in assessing human exposures to such chemicals in air.

Field Surveys

Two recent field surveys of outdoor air concentrations in U.S. cities are of particular interest in that they include low molecular weight volatile halogenated organic chemicals. One is by Singh et al. which was a

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study in 1980–1981 of seven widely scattered cities (*10*). The second investigated three urban areas in New Jersey in 1981–1982, as reported by Harkov et al. (*12*).

A summary of some of the results of these studies is shown in Table 3 for several chlorinated methanes and ethylenes. For comparison, surface level background concentrations are shown, based primarily on data from a Pacific marine site at 40° N. In every instance, with the exception of the New Jersey values for carbon tetrachloride, the mean concentrations are substantially above background, and quite variable among the cities. The maximum values reported by Singh et al. (*10*) and shown in Table 3 range from 100 to 1000 times the background concentrations. Also, the variability among cities is substantial. For seven U.S. cities (Table 3), the range of the means varied from a factor of about two for tetrachloroethylene to as high as seventeen for dichloromethane.

Diurnal variations can be quite pronounced as shown for trichloroethylene (TCE) in Houston and Denver by Singh et al. (*10*). For both cities the concentrations were considerably above the remote area background concentration of 15 ppt (parts per trillion), and the late night concentrations were distinctly higher than those in the daytime. The mean diurnal concentrations were as high as 400 to 500 ppt. Knowledge of such variations are of importance in assessing human exposures and in undertaking a sampling program.

Similarly, substantial daily variations were also found for TCE in three cities in New Jersey in the summer of 1981, as reported by Harkov et al. (*12*). They noted that 90% of TCE is used for degreasing and cleaning metals, and that peak concentrations are likely to reflect such regional meteorological events as stagnation. They found that such peak concentrations of volatile organics in the summer of 1981 were as much as two to ten times the seasonal average, and that these occurred during periods of stagnation and a high pressure system. A comparison of the geometric mean concentrations in ppb for four halogenated organic chemicals during these episodic periods with the means for the full six week sampling period in 1981 is shown in Table 4 for the three New Jersey cities. In Newark and Elizabeth all the mean halogenated organic chemical concentrations were higher in the episodic periods.

It is also of interest to compare indoor and outdoor concentrations for these chlorinated volatile organics, although data collected systematically for this purpose are not generally available. Such indoor air measurements have been made by Harsch and Rassmussen, as reported by the National Academy of Sciences (*3*). The range of these reported concentrations are shown in Table 5 for dichloromethane, chloroform, and carbon tetrachloride along with the corresponding outdoor air concentrations from Table 3. The range of the indoor concentrations is considerable and can be substantially greater than background. Nevertheless, it is typically within the general range encompassed by the outdoor air measurements. However, it should be emphasized that the comparative data do not reflect a study of spe-

Table 3. Outdoor air concentrations for several U.S. cities for selected chlorinated organics.

	Air concentrations, ppt (V/V)						
	Seven U.S. cities, 1980–1981[a]				New Jersey, 1981[b]		
Compound	Range of means	Max.	Background	Staten Island	Newark	Eliz.	Camden
Dichloromethane	390–6,760	57,000	50	1,610	350	230	720
Chloroform	81–900	5,100	20	150	60	100	40
Carbon tetrachloride	130–400	2,900	135	310	10	10	10
Trichloroethylene	96–230	2,500	15	170	500	270	210
Tetrachloroethylene	290–590	7,600	50	290	450	310	240

[a] Data of Singh et al. (*10*), arithmetic means, one week period.
[b] Data of Harkov et al. (*12*), geometric means, six weeks in summer.

Table 4. Ambient air concentrations of chlorinated volatile organics in three New Jersey cities in oxidant episode and other periods.[a]

	Chlorinated volatile organics, ppb					
	Newark		Elizabeth		Camden	
Compound	EP[b]	SWG[c]	EP[b]	SWG[c]	EP[b]	SWG[c]
Vinylidene chloride	0.59	0.38	0.78	0.35	0.31	0.36
Methylene chloride	0.56	0.35	0.27	0.23	0.48	0.72
Trichloroethylene	0.69	0.50	0.70	0.27	0.23	0.21
Perchloroethylene	0.56	0.45	0.70	0.31	0.26	0.24

[a] Data of Harkov et al. (*12*).
[b] Episode periods associated with regional oxidant (7/19–21, 8/3–5, 8/10–13), geometric means.
[c] Six weeks geometric means.

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Table 5. Comparison of some indoor and outdoor air concentrations for chlorinated methanes.

Compound	Air concentrations, ppt (V/V)			
	Outdoor air[a]			Indoor air[b] (range)
	Range of means	Max.	Background	
Dichloromethane	390–6,760	57,000	50	170–14,000
Chloroform	81–900	5,100	20	14–730
Carbon tetrachloride	130–400	2,900	135	140–460

[a] Data of Singh et al. (10), arithmetic means, seven cities.
[b] NAS data (3).

cific indoor sites relative to their corresponding outdoor locations.

Indoor Volatilization from Water

Volatilization of chemicals from indoor uses of water can be a substantial source of human exposure as discussed by Prichard and Gesell for radon-222 (13). As shown in Table 6, indoor water uses other than for drinking and kitchen constitute the greatest sources of radon release, the efficiency of transfer for radon from water to air varying from 30 to 90%, the weighted mean being 50%. These data indicate that the volatilization from indoor water uses can be quite variable and substantial.

Wadden and Scheff (14) have discussed the various models used to estimate expected indoor pollutant concentrations, including one- and multidimensional models, as well as empirical models based on statistical evaluation of concurrent indoor and outdoor air concentrations and other relevant terms. The single compartment model has been widely used and can be greatly simplified to include a mixing factor k to take into account incomplete air mixing, along with the rate of air exchange with the outdoors, q.

On using such a model for indoor volatilization of chemicals from water, the expected steady-state air concentration C_A can thus be calculated simply from and is proportional to a source term S for airborne or volatile materials with units of mass per hour, such that

$$C_A = S/(kq) \qquad (2)$$

For k and q values of 0.15 and 338 m³/hr, respectively, C_A becomes equal to 0.02S. Where the source is the water used indoors, S is simply the product $30C_W$, where 30 L/hr is a typical indoor water use for a family of four and C_W is the concentration in the water of the chemical of interest. It is assumed the latter is completely volatilized. Substituting these relationships into Eq. (2) one obtains

$$C_A = 0.6C_W \qquad (3)$$

Thus, the expected air concentration is simply directly proportional to the water concentration, the proportionality constant being 0.6 L/m³. The corresponding dimensionless constant is 6×10^{-4}. This number is useful to compare with the dimensionless H values, which for trichloroethylene is about 0.4. The significance is that when the H value is substantially above the indoor air source term constant, the tendency to reach equilibrium is displaced greatly in the direction of essentially complete volatilization. Whether this in fact will occur will depend to a great extent on the time of exposure to air and the surface area of the water use.

The next question is that of the relative exposures to a volatile pollutant from the ingestion and inhalation routes. Taking adult man as an example, one can use a daily respiratory volume of 20 m³ and a daily water intake of as much as 2 L or as little as 0.15 L, which encompass a likely range that can be encountered (8). The daily ingestion from water of a volatile constituent is then calculated simply by multiplying the concentration in water (mg/L) by either 2 or 0.015. Using Eq. (3) to estimate C_A from the volatilization process, the daily intake from air is the product of 20 times C_A, the air concentration. The resulting relationships are presented in Table 7 for the generalized water concentration of a constituent C_W and a specific example of the latter, namely, 0.01 mg/L. It is apparent that exposure

Table 6. Radon release from domestic use of water containing radon, 1000 pCi/L.[a]

Use	Daily consumption, L	Transfer efficiency, %	Radon liberated, pCi
Showers	150	63	94,500
Tub baths	150	47	70,500
Toilet	365	30	109,500
Laundry	130	90	117,000
Dishwasher	55	90	49,500
Drinking and kitchen	30	30	9,000
Cleaning	10	90	9,000
Total	890		459,000

[a] Data of Prichard and Gesell (13).

Table 7. Estimated indoor inhalation and ingestion exposures for an adult male from volatile chemicals in water using a one-compartment indoor air quality model.

Water conc. mg/L	Uptake, mg/day		
	Air	2 L intake	0.15 L intake
C_W	$12C_W$	$2C_W$	$0.15C_W$
0.01	0.12	0.02	0.0015

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from the air route is substantially greater than that from water ingestion using this single-compartment air model and the assumptions stated above. If a daily ingestion of 2 L is assumed, the air uptake is higher by a factor of 6. This ratio becomes much larger, namely 80, if the smaller estimate of 150 mL per day is used for water ingestion. One should be cautious, however, in using these ratios as more than an example of the relative uptakes that can occur via the drinking water and air inhalation routes within the home. Nevertheless, they do indicate the possibility of substantially greater air exposures to volatilized constituents from water used within the home and, therefore, the need to consider this route of exposure in assessing possible health effects from such contaminants in potable water supplies.

Couch and Andelman (*15*) investigated the possible volatilization of trichloroethylene (TCE) into indoor air within buildings in a small community using individual wells obtaining water from an aquifer measured to contain about 40 mg TCE

. By using a continuous real-time monitor with an infrared detector, measurements were taken in closed rooms in two homes and a small municipal building on one day in July 1983. Prior to turning on water in bathrooms, no TCE could be detected in the indoor air above the detection limit for the instrument, namely 0.5 mg/m^3. However, TCE was readily detected in the bathrooms with water running. The air concentration levels increased with time as shown in Table 8, as expected. In home B, the highest concentration measured after 17 min of the shower running was 81 mg/m^3, approximately one-third of the American Conference of Government Industrial Hygienists (ACGIH) time-weighted threshold limit value of 270 mg/m^3 for the work environment (*16*). To estimate the possible dose within these homes from these shower inhalation exposures, one can take a value of about 40 mg/m^3 as the average air concentration during the shower period. Assuming 1 hr per week in the shower and an air breathing volume of 1.2 m^3 in that hour, this would correspond to a potential intake of 48 mg TCE/week (neglecting any question of the fraction of the dose that is absorbed). If one also assumes an ingestion of the contaminated water of 150 mL/day (2.1 L/week), the water dose if 42 mg TCE/week, indicating that shower air and ingestion doses are comparable. One would also expect an increased air dose from exposure elsewhere in the home as a result of TCE volatilizing from other water uses.

Table 8. Indoor air concentrations of tricholoroethylene (TCE) in buildings using well water containing TCE, ca. 40 mg/L.[a]

Location	Time	Concn. mg/m^3
Municipal bldg.		
Ladies rest room, water running	12:20 PM	35
Home A		
Kitchen	1:34 PM	ND[b]
Bathroom, shower on	1:53	32
	1:56	48
	2:01	67
	2:03	72
Home B		
Bathroom, upstairs, shower on	2:20 PM	ND
	2:27	19
	2:30	35
	2:33	40
	2:37	81
Bathroom, downstairs, shower on	3:08 PM	ND
	3:17	64
	3:24	67

[a] Data of Couch and Andelman (*15*).
[b] ND = not detected above detection limit of 0.5 mg/m^3

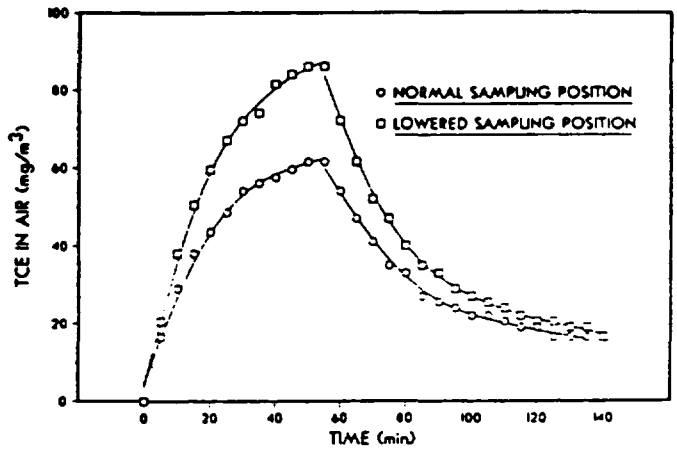

FIGURE 1. TCE in air withdrawn from shower.

Experiments have been undertaken by Couch and Andelman (*15*) to simulate the air exposures that can be encountered in showers using water contaminated with volatile chemicals, initially trichloroethylene (TCE). Some early results are given in Figure 1, which shows the build-up of TCE in air withdrawn from the shower at two sampling positions. When steady state was reached after about 55 min the injection of TCE was discontinued, and the subsequent decay was also monitored. The air withdrawal rate was 0.05 shower volumes/min; the shower volume, 0.1 m^3; the water flow rate, 0.2 L/min; TCE water concentration, 3.8 mg/L; and the water temperature, 23°C.

Although the TCE is injected continuously, as it volatilizes it is expected and was found that the air concentration did level off to a steady state, the concentration at which the rate of volatilization equals the rate of withdrawal by the controlled air flow. There is evidence for nonuniform air mixing, as shown in Figure 1 by the higher steady-state air concentration with the lowered sampling position. It was calculated that if the TCE were to volatilize completely, the predicted uniformly mixed steady-state concentration would have been 152 mg TCE/m^3 (0.76 mg TCE/min input to the shower divided by 0.005 L air/min withdrawn from shower), substantially higher than the measured values

MTH 001 1394

'2 and 86. The lower values could indicate incomplete ıtilization, but incomplete mixing, as noted above, ikely to have accounted for a good part of the ıerence.

It is apparent from such experimental and field stud- that both high point-source exposures, as well as re generalized high indoor air levels can arise by olatilization of chemicals from indoor water uses. Since ny groundwater supplies are known to be contami- ed by volatile chlorinated organics, this route of ex- sure should be considered in assessing sources of ndoor air pollutants, as well as in the development of gulations to limit such exposures from public water pplies.

Summary and Conclusions

Low molecular weight volatile organic chemicals of anthropogenic origin, including chlorinated compounds, are widely distributed in urban ambient air at concen- ations substantially above background levels in re- ote areas. Not unexpectedly they can also be found at similar concentrations in indoor air. Although the utdoor air concentrations are typically in the range of arts per billion and lower, there are considerable diur- nal and longer time variations which should be consid- ered in estimating human exposures. Many of these ompounds are likely or suspect human mutagens or arcinogens, so that continuing surveillance and as- ssment of the human exposures and possible health effects is prudent.

The indoor and outdoor air concentrations of volatile hemicals in the gaseous state are greatly influenced by physicochemical properties, especially solubility in water, vapor pressure of the pure compounds, their bility to sorb onto air particulates, and the rates at which they can volatilize from aqueous solution. Such properties will affect not only their ultimate concentra- ions in ambient outdoor air, but also indoor air expo- sures. Lower aqueous solubility will increase the likelihood of their being found in the gaseous state, as will high vapor pressure. Even with volatilization, re- duced vapor pressure will increase the likelihood of their sorption onto air particulates.

Volatilization of chemicals from indoor water uses is of growing interest and concern, particularly as water supplies become increasingly contaminated. Resulting indoor air exposures and the factors that can influence them need to be further characterized. Although the regulation of toxic chemicals in potable water supplies has focused traditionally on direct ingestion, the vola- tilization and inhalation from other much greater vol- ume indoor uses of water should be considered, with focus also on the large exposures that can result from bathing and showering.

The author gratefully acknowledges the support for this research by the U.S. Environmental Protection Agency (EPA) under coop- erative agreement No. CR-810543 between the EPA Office of Re- search and Development, Washington, DC and the University of Pittsburgh Center for Environmental Epidemiology.

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MTH 001 1395

APPENDIX H
PUBLIC HEALTH ASSESSMENT SUPPORT DATA

MTH 001 1396

TABLE H-1. INDICATOR CHEMICAL SELECTION

Substance	Priority Group[1]	Maximum Concentration ()g/l) RW	Maximum Concentration ()g/l) MW	Standard[3] ()g/l)	# Detected / # Analyzed[4] RW	# Detected / # Analyzed[4] MW	Blanks	Carcinogenic Weight of Evidence Oral	Carcinogenic Weight of Evidence Inhal	Other Notes	Include as Indicator Chemical
Tetrachloroethene	1	[26]	43	1	7/37	4/25	OK	B2	B2	Detected in wells 1979 through 1986. Low levels.	Yes
Ethylbenzene	3	5.3	-	680	1/37	0/25	OK	-	-	Only detected once, low concentration	No
Chloroform	1	-	[19]	100	1/37	4/25	OK	B2	B2	One high reading in 1982, detected a total of six times since 1979, other levels range 2-11 ppb.	No
Chlordane	2	0.76	1.3	0.5	1/37	1/25	OK	B2	B2	Low level contamination one residential well, one monitoring well 1986. High KoC.	Yes
Toluene	2	-	-	2000	1/37	0/25	OK	-	-	Detected only twice over time, once 1982, once in 1986. Low concentrations.	No
Carbon Tetrachloride	2	-	-	2	0/37	0/25	NA	B2	B2	Not detected in RI (1986) samples. Detected in five Montg. township residential wells in 1980 sampling round only.	No
1,1-Dichloroethene	2	-	-	2	0/37	0/25	NA	C	C	Detected in one well in 1979 and one well in 1980 only.	No

MTH 001 1397

TABLE H-1. INDICATOR CHEMICAL SELECTION (CONTINUED)

Substance	Priority Group[1]	Maximum Concentration ()g/l) RW	Maximum Concentration ()g/l) MW	Standard[3] ()g/l)	# Detected / # Analyzed[4] RW	# Detected / # Analyzed[4] MW	Blanks	Carcinogenic Weight of Evidence Oral	Carcinogenic Weight of Evidence Inhal	Other Notes	Include as Indicator Chemical
1,2-Dichlorethane	2	-	-	2	0/37	0/25	NA	B2	B2	Detected in four Montgomery township residential wells in 1982 only.	No
Trichlorofluoromethane	4	-	-	-	0/37	0/25	NA	-	-	Detected in one Montgomery township housing development residential well in 1980. Detected in a couple of other wells which were not identified as in the development.	No
Bromodichloromethane	2	-	-	100	1/37	0/25	OK	-	-	Part of trihalomethanes. Detected in one sample 1982 one in 1986.	No
1,1-Dichloroethane	3	8.6	-		10/37	0/25	OK	-	-	Low level contamination detected in 1986, and 1982. Detected in eight housing development wells 1982.	No
1,1,1-Trichloroethane	3	3.7	-	26	1/37	0/25	OK	-	-	Low level contamination 1986. Some low level contamination other years.	No
Trichloroethene	1	340	650	1	21/37	8/25	OK	B2	B2	Water solubility 1.1 X 10^3 mg/l. Contaminant most frequently detected over time.	Yes
Methylene Chloride	1	16	11	2	16/37	10/25	CONT	B2	B2	Present in blanks at same levels as in samples. Present in background wells.	No

TABLE H-1. INDICATOR CHEMICAL SELECTION (CONTINUED)

Substance	Priority Group[1]	Maximum Concentration ()g/l) RW	Maximum Concentration ()g/l) MW	Standard[3] ()g/l)	# Detected / # Analyzed[4] RW	# Detected / # Analyzed[4] MW	Blanks	Carcinogenic Evidence Weight of Oral	Carcinogenic Evidence Weight of Inhal	Other Notes	Include as Indicator Chemical
Acetone	NL	12	80	-	13/37	8/25	CONT	-	-	Low toxicity, low level of concentration with some blank contamination.	No
Diethyl phthalate	4	[4.2]	58	-	1/37	2/25	OK	-	-		No
Trans-1,2-Dichloro-ethene	3	17	25	10	10/37	3/25	OK	-	-	Low level contamination	No
O-Dichlorobenzene	4	-	-	600	0/37	0/25	NA	-	-	Detected in two wells in 1982 only. Not detected in RI sampling.	No
1,2,4-Trichlorobenzene	4	-	-	8	0/37	0/25	NA	-	-	Detected in two wells in 1982 only. Not detected in RI sampling.	No
N-Butyl-benzene	NL	-	-	-	-	-	NA	-	-	Detected in only two wells in 1982. Unclear whether analysis was done at other sampling dates. Not detected in RI sampling.	No
2,3-Benzofuran	NL	-	-	-	-	-	NA	-	-	Detected in only two wells in 1982. Unclear whether analysis was done at other sampling dates. Not detected in RI sampling.	No

MTH 001 1399

Appendix I

APPENDIX I
PRELIMINARY CAPITAL AND O&M COSTS FOR ALTERNATIVES 3A AND 3B

MTH 001 1401

TABLE I-1. PRELIMINARY CAPITAL AND O&M COSTS FOR INDIVIDUAL WELL TREATMENT - AIR STRIPPING WITH ACTIVATED CARBON ADSORPTION

Capital Cost Per Individual System	Cost,$
- Foundation and Storage Facilities	3,600
- Mech/Pumps/Disinfection	2,600
- Packed Tower aeration and carbon adsorption system	17,200
- Winterization	2,100
Subtotal per Residence	$25,500
Subtotal Capital Cost for 39 Residences	$995,000
- Analytical (Startup)	11,000
- Engineering and Contingencies (35%)	$249,000
TOTAL CAPITAL COST FOR 39 RESIDENCES	$1,255,000
Annual O&M Cost per Individual System	
- Analytical Monitoring	2,250
- Utility	150
- Carbon Replacement	200
- Miscellaneous	100
Subtotal per Residence	2,700
TOTAL O&M COST FOR 39 RESIDENCES	$105,000

For 4 residences
Capital Cost 128,718
O&M 10769.23

MTH 001 1402

-COM000053

TABLE I-2. PRELIMINARY CAPITAL AND O&M COSTS FOR INDIVIDUAL WELL TREATMENT - ACTIVATED CARBON ADSORPTION

Capital Cost Per Individual System	Cost,$
- Foundation and Storage Facilities	3600
- Mech/Pumps/Disinfection	2600
- Carbon Adsorption System	3200
- Winterization	1000
Subtotal per residence	$ 10,400
Subtotal Capital Cost for 39 Residences	$406,000
- Analytical (Startup)	11,000
- Engineering and Contingencies (35%)	142,000
TOTAL CAPITAL COST FOR 39 RESIDENCES	$559,000
Annual O&M Cost per Individual System	
- Analytical Monitoring	9000
- Utility	100
- Carbon Replacement	500
- Miscellaneous	100
Subtotal per residence	9,700
TOTAL O&M COST FOR 39 RESIDENCES	$378,000

MTH 001 1403

-COM000053

We agree that all remedial actions selected in Superfund must be protective of human health and the environment and attain all applicable or relevant and appropriate requirements (unless a waiver is invoked). The mandate that remedies be cost-effective does not, therefore, compromise the mandate to be protective and attain ARARs.

Furthermore, the Agency recognizes that once a requirement is determined to be relevant and appropriate, it must be attained in the remedial action. Your statement that relevant and appropriate standards not be "shunted aside" is fully consistent with EPA's existing policy to comply with requirements that are determined to be applicable or relevant and appropriate to a site.

Your letter asserts that there is a statutory presumption that certain standards will be applicable or relevant and appropriate to cleanup of contaminated ground water. While certain standards, such as the RCRA ground water protection standard, are likely to be applicable in many situations at CERCLA sites, it is ultimately the responsibility of EPA under section 121 to determine what standards are applicable or relevant and appropriate. While some general classifications can be made, the determination of what requirements are applicable or relevant and appropriate often will require a case-by-case analysis. The standards you cite, including the RCRA ground water protection standard, MCLs, MCLGs, and water quality criteria, are potentially relevant and appropriate to circumstances of ground water contamination. The determination of what standards are in fact relevant and appropriate at a site must be made on a case-by-case basis within the general guidelines of the Agency.

For this reason we cannot agree with your assertion that the law "makes it clear" that MCLGs "must be attained by Superfund cleanups of ground water." The law instead states that MCLGs shall be attained "where such goals... are relevant and appropriate under the circumstances of the release or threatened release." There is in fact no mention of ground water in respect to MCLGs, although the Agency recognizes that appropriate Safe Drinking Water Act standards should be applied to ground water that could be used for drinking.

The key issue is whether MCLs or MCLGs, or both, may be relevant and appropriate for the cleanup of ground water that is an actual or potential source of drinking water. Your letter asserts that "[i]n any circumstances in which MCLs are relevant and appropriate, MCLGs are equally relevant and appropriate." The Agency disagrees with this interpretation. The statutory language of section 121 does not set up any such presumption. Moreover, differences in the way each standard is determined and in the purpose for which each is derived may affect their relevance or appropriateness to cleanup of ground water at a CERCLA site. For example, MCLGs are health-based goals set at levels at which no adverse health effects may arise, with a margin of safety. MCLs are the legally enforceable standards for drinking water, which are set as close to the health-based goal as feasible. These and other factors may lead EPA to conclude that an MCL, rather than an MCLG, is the relevant and appropriate standard.

MTH 001 1404

In fact, the Agency believes that MCLs will generally be the applicable or relevant and appropriate requirement for determining cleanup levels of ground water that may be used for drinking water. The Agency recognizes that there may be special circumstances where protection of human health or the environment requires more stringent standards than MCLs, as with multiple contaminants or pathways of exposure that present extraordinary risks. In such cases, the Agency will make a site-specific determination of the more stringent standards by considering MCLGs, our policy on use of appropriate risk ranges for carcinogens, levels of quantification, and other pertinent guidelines.

EPA believes that MCLs are protective of public health. As the legally enforceable standards under the Safe Drinking Water Act, they represent the level of water quality that the Federal government believes is acceptable for over 200 million Americans to consume every day from public drinking water supplies. The Congress has provided that EPA must consider a variety of factors, including cost and the technology available to public treatment systems, when establishing the MCLs. EPA does not believe that by giving EPA the authority to consider these factors when setting MCLs the Congress has established a standard-setting process that compromises protection of public health. Given this perspective on the MCLs, we believe it is contradictory to expect, as a general matter, that a higher level of water quality must be attained at a Superfund site, particularly where the cleanup concerns ground water that may be used in the future, but is not currently being consumed. Moreover, in other regulatory contexts, such as the RCRA ground water protection standards, the Agency has considered MCLs to be appropriate for setting levels of ground water cleanup.

You raise several technical issues against the use of MCLs. You point out that technical impracticability should not be grounds for finding that an MCLG is not relevant and appropriate, since there is a waiver to deal with requirements that cannot be attained. EPA agrees: the primary motivation is to select the relevant and appropriate health level.

You also argue that because MCLs may be based on treatment technologies suitable for public water supplies, they cannot be appropriate for Superfund situations, where treatment technologies are different in both cost and availability. While EPA considers the best technologies available to municipalities in setting MCLs, the whole purpose under the Safe Drinking Water Act is to set levels in drinking water that are protective. Moreover, although the Superfund program may be able to afford more expensive technologies than public water supply systems, treatment of contaminated ground water at Superfund sites is often much more difficult than routine treatment of public water supplies.

You also object to the Agency's use of a risk range in the determination of what standards are relevant and appropriate. We have a responsibility, however, to determine what level of cleanup is necessary to protect public health and the environment. While relevant and appropriate requirements are used to achieve the requisite degree of protection, the statute does not direct EPA to eliminate all risk. We believe that a risk range of 10^{-4} to 10^{-7} individual lifetime risk for carcinogens provides adequate

MTH 001 1405

protection of human health and provides a sound basis for determining when requirements are relevant and appropriate. There are, of course, other factors besides this risk range, such as non-human impacts, which may be used in deciding when a particular requirement is relevant and appropriate.

We expect that MCLs for all carcinogens will be set within the risk range that the Agency has determined is acceptable for residual risks after control of contaminants. Furthermore, for non-carcinogens, which are the majority of chemicals to be controlled, MCLs will nearly always be set at the MCLG. These standards will assure that even sensitive populations will experience no adverse health effects. Thus, there will be no difference in the protectiveness of MCLGs and MCLs for most contaminants, and, as discussed above, the MCLs provide a sufficient level of protectiveness even for carcinogens.

Finally, while Superfund actions are consistent with EPA's Groundwater Protection Strategy, the purpose of the strategy is not to "allow degradation," but rather to clean up ground water to its highest beneficial use. For ground water that is or may be used for drinking, EPA applies drinking water standards; for ground water that is not drinkable because of either natural salinity or widespread, irreversible degradation, EPA considers other standards of protectiveness, such as for biota or other environmental elements.

I appreciate the opportunity to discuss with you these difficult issues in the implementation of the new Superfund program. I can assure you that I and the rest of the Agency are committed to making this program effective in protecting public health and the environment from uncontrolled hazardous releases and past contamination. We will continue to implement the new requirements in as expeditious and thorough a manner as possible.

Sincerely,

Lee M. Thomas

MTH 001 1406

AWEISSMAN:lh:PAS:WH-548D:S315:382-2182:4/23/87:5/6/87 AL701142

Appendix J

MTH 001 1407

APPENDIX J
PROPOSED APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

MTH 001 1408

J. Bee

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 21 1987

THE ADMINISTRATOR

Honorable James J. Florio
Chairman
Subcommittee on Commerce, Consumer
Protection and Competitiveness
Committee on Energy and Commerce
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in response to your letter of March 27, 1987, regarding the Agency's implementation of the Superfund Amendments and Reauthorization Act of 1986 (SARA). You expressed particular interest in the Agency's forthcoming interim guidance on cleanup standards, especially applicable or relevant and appropriate requirements (ARARs), based on section 121 of SARA. I would like to explain to you the Agency's plans regarding ARARs and to address your concerns regarding key ARAR policy issues.

As you know, prior to SARA the Agency already had in place a policy to comply with other Federal laws in CERCLA response actions. Section 121 in many respects codifies this policy, while extending it to include State requirements as potential ARARs and Maximum Contaminant Level Goals and Federal Water Quality Criteria as potentially relevant and appropriate requirements. In addition, Congress added two waivers and eliminated one waiver under the old policy.

The Agency plans to implement the new compliance requirements in several ways. Most importantly, we are revising the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to conform with the new requirements of SARA, and are on schedule to complete the revisions by the statutory deadline of April 1988. We are also drafting operational guidance in the form of a Superfund Manual on Compliance with Other Laws, which will explain how to determine the ARARs for a given site and how to comply with the Federal environmental statutes. Finally, we will soon be issuing a short interim guidance on ARARs to explain the nature of these requirements.

Although your letter focuses on Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) under the Safe Drinking Water Act, I would like to begin by addressing your more general remarks on determining appropriate cleanup levels.

MTH 001 1409

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26 March 1987

Commissioner Richard T. Dewling
Department of Environmental Protection
CN 402
Trenton, New Jersey 08625

Dear Commissioner:

I am pleased to submit on behalf of the Institute its recommendations for maximum contaminant levels in drinking water. The processes by which these levels were derived are described in the Institute report presented on the following pages.

We appreciate the diligence and competence of those in the Departments of Health and, especially, Environmental Protection who designed and supervised studies, evaluated information, prepared reports and otherwise provided essential staff services to the Institute.

The variety of chemicals produced and the extent of their use have been increasing remarkably in recent years. The sensitivity of our measurement techniques has been improving. One of the results of these trends is more widespread evidence of low-level contamination of our environment. Some of these chemicals may bring more harm than benefit but no one is empowered to make that a binding judgment. In time the public interest may penetrate the system that decides which chemicals are to be made and delivered to the environment.

As you know better than we do, an element of our environment which is vulnerable, and is of paramount public concern, is the quality of our drinking water supplies. Under the terms of the N.J. Safe Drinking Water Act, the Institute is directed to recommend to you maximum contaminant levels for chemicals listed in the law.

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Available knowledge of the effect of these chemicals upon human health is incomplete. For many of the chemicals we seek to regulate there probably is no level below which they are harmless. We have observed the statutory criteria, considered the most current and best health-effects information, determined analytical sensitivities, and evaluated existing water treatment technologies. From this review we have developed health-based numbers, practical quantitation levels, and maximum contaminant levels. Generally our MCL values are more conservative than those proposed by the EPA. In some cases, the recommended MCL is considerably higher than the health-based number, reflecting analytical limitations. We decided that in an enforceable regulation persons cannot be held to a performance standard that cannot reliably be measured in our best laboratories. As sensitivity improves, the MCL should be lowered in these cases.

In the course of our work, we have been assured that usable, costly treatment techniques exist to remove these contaminants to concentrations below the recommended levels. The application of treatment where it is needed should bring these contaminant levels as close as possible to the goal of zero.

Institute members hope that these recommendations will assist you in the difficult task of preparing the necessary regulations.

We intend to submit at a later date recommendations concerning chemicals not listed in the statute, the conduct of the safe drinking water program, and needed changes in the law.

Sincerely,

Richard J. Sullivan
Chairman

RJS:jeb

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EXECUTIVE SUMMARY

Overview

Over the past ten to fifteen years, the vulnerability of our nation's potable water supplies to organic pollutant contamination has become increasingly evident through a variety of drinking water quality evaluation surveys and reports of specific contamination cases. Volatile organic chemicals (VOCs) have received particular attention due to their potential adverse health effects, their potential to contaminate groundwater supplies, and the relative ease of analytical detection of these substances. Concern has also centered around certain chlorinated organics such as polychlorinated biphenyls and chlorinated pesticides, primarily due to their persistence in the environment and their toxicity.

In the past, a number of New Jersey potable water supplies have been demonstrated to be contaminated with generally low levels of VOCs and chlorinated organic contaminants. The State Safe Drinking Water Act (P.L.1983, c.443) was amended in 1984 (A-280 amendments) to assure that all New Jersey public community water supplies would be monitored on a routine basis for a specified list of twenty-two VOCs and chlorinated organics, many of which are among the most commonly detected organic contaminants in drinking water. The comprehensive nature of the New Jersey A-280 monitoring requirements are more extensive than those of any other known state or federal drinking water programs.

The A-280 amendments also mandate the establishment of maximum contaminant levels (MCLs) for the twenty-two specified contaminants. Additional hazardous contaminants are to be evaluated for possible inclusion by regulation in the A-280 monitoring and standard setting process. Maximum contaminant levels are to be set for carcinogenic contaminants at levels which would lead to the development of cancer in no more than one in one million persons ingesting the contaminant over a lifetime, within the limits of medical, scientific and technological feasibility. The MCLs for noncarcinogens are to be established, within the limits of practicability and feasibility, at levels which eliminate all adverse physiological effects following ingestion. Additional statuatory guidance regarding the state MCLs is that in no case shall the New Jersey standards be any less stringent than corresponding federal standards, and standards need not be established for any hazardous contaminant until the presence of the substance has been detected by tests required by the A-280 amendments. The owner or operator of each water system, upon receipt of test results that confirm that an MCL has been violated, must bring the water into compliance with the MCL within a year. The U.S. Environmental Protection Agency has proposed but not yet adopted standards for eight of the A-280 contaminants.

The amendments established the New Jersey Drinking Water Quality Institute (Institute) to provide external input into the

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overall A-280 program, the specific generation of maximum contaminant levels, and the selection of additional contaminants. This Institute consists of 15 members from the public, the academic community, the state's water purveyors, and two state agencies. A listing of Institute representatives is provided in Appendix A. This report summarizes the initial set of recommendations from the Institute to the Commissioner of the New Jersey Department of Environmental Protection. These recommendations are centered around the activities undertaken by the Institute to establish MCLs for the initial list of contaminants.

To derive the MCLs, the Institute evaluated three key elements: health effects, analytical methodologies and their reliability, and water treatment capabilities. Adverse health effects were evaluated initially by categorizing the contaminants according to the level of evidence of human carcinogenicity. Quantitative risk assessments were then conducted based on selected sensitive health endpoints to establish health-based levels in drinking water. Standard analytical methods available for 16 of the 22 compounds were evaluated through laboratory studies and an examination of available U.S. Environmental Protection Agency data. Based upon a review of the detection and quantitation information provided, practical quantitation levels were developed. Practical quantitation levels are concentrations at which quantitation can be achieved within defined limits of uncertainty, Two treatment technologies, air stripping and granular activated carbon contacting, were also investigated for the 16 contaminants. The Institute determined that it was technologically feasible and practicable to remove these A-280 organics from drinking water.

Recommendations

Based upon the deliberations of the Institute members, specific recommendations for the A-280 program have been developed and are presented in the accompanying document. The following list is intended to highlight the most significant recommendations:

1. Institute recommended MCLs for lifetime exposure to contaminants in potable water are:

Contaminant	MCL (ug/l)
1) Benzene	1
2) Carbon Tetrachloride	2
3) Chlordane	0.5
4) Chlorobenzene	4
5) o-Dichlorobenzene	600
m-Dichlorobenzene	600
p-Dichlorobenzene	6
6) 1,2-Dichloroethane	2
7) 1,1-Dichloroethylene	2
8) cis-and trans-1,2-Dichloroethylene	10

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9)	Methylene Chloride	2
10)	Polychlorinated Biphenyls	0.5
11)	Tetrachloroethylene	1
12)	Trichlorobenzenes	8
13)	1,1,1-Trichloroethane	26
14)	Trichloroethylene	1
15)	Vinyl Chloride	5
16)	Xylenes	44

MCLs could not be established for the following contaminants specified in the A-280 amendments because of the lack of current standardized analytical methodology: ethylene glycol, formaldehyde, n-hexane, kerosene, and methyl ethyl ketone.

2. The Institute recognizes that the toxicological database for these chemicals is a constantly evolving set of information, and that new advances in analytical methodologies for the detection of organics in potable water may occur in the future. Maximum contaminant levels were set for some chemicals at concentrations above the health-based goals. Such MCLs were established at the lowest reliable quantitation levels based on presently available methodologies. For these reasons, it is recommended that the Institute re-evaluate the MCLs at least every three years to reflect the most current technical information.

3. In addition to reporting values at or above the practical quantitation levels determined by the Institute, the levels at which quantitation can be achieved with acceptable uncertainty, laboratories should be required to report any level of contamination between the practical quantitation levels and the individual laboratory's method detection limits (MDL). These results should be qualified as estimated values. This reporting is of particular importance for chemicals for which the health-based goal is below the practical quantitation level.

4. A standardized procedure should be identified for the determination of MDLs by all A-280 laboratories. Laboratories should be required to determine MDLs for each instrument at a set frequency.

5. Due in part to the fact that kerosene is actually a mixture of a variety of hydrocarbon compounds, the Institute recommends that kerosene be removed from the original list of 22 contaminants. An MCL for one component of kerosene, benzene, has been recommended.

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