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# FINAL
# REMEDIAL INVESTIGATION REPORT FOR THE BAIER SITE AND McCARL SITE
# LEE COUNTY, IOWA

JANUARY 16, 1991

Prepared For:

E.I. du Pont de Nemours & Company
Wilmington, Delaware 19898

VOLUME 2 OF 3

Site: EI DUPONT
ID # IAD990060580
Break: B.C.
Other: AB
1/16/91

PREPARED BY:

WOODWARD-CLYDE CONSULTANTS
5055 ANTIOCH ROAD
OVERLAND PARK, KANSAS 66203

WCC PROJECT NUMBER 89C75831

# APPENDIX A

# BAIER SITE BORINGS LOGS AND MONITORING WELL INSTALLATION REPORTS

## BORING LOG
## LEGEND AND NOMENCLATURE

Items shown on boring logs refer to the following:

1. Depth - Depth below reference elevation, ground surface unless otherwise shown

2. Sample - Types designated by letter

   D - Disturbed sample, obtained from auger cuttings or wash water for classification purposes only

   S - Split-spoon sample, obtained by driving 2-inch split-spoon to determine penetration resistance and allow classification

   C - Liner tube sample, obtained by penetration of thick, wall sampler containing 2-inch-diameter liner tubes (California sampler)

   U - Undisturbed sample, obtained by penetration of minimum 3-inch-diameter, thin-wall tube using an open or, where indicated, fixed-piston sampling head

   Rec - Recovery is expressed as a ratio of the length recovered to the total length pushed or driven (in inches), i.e., $\frac{8}{12}$

   Resist - Resistance is designated as follows:

   P - Sample pushed in one continuous movement by hydraulic rig action, maximum hydraulic pressure shown where pertinent

   $^{3}6_{9}$ - Numbers indicate blows per 6 inches of sampler penetration when driven by a 140-pound hammer falling freely 30 inches. The Standard Penetration Resistance is the number of blows for the last 12 inches of penetration of the split-spoon sampler, e.g., 15. Note that a blow count can be given for the California sampler, but this is not the Standard Penetration Resistance.

3. Description - Description of material according to the Unified Soil Classification: word description gives soil constituents, consistency or density, and other appropriate classification characteristics. Unified Soil Classification symbols are shown on the USC column. Geologic names, where appropriate, are shown under Special Notes. A solid line indicates stratigraphic change; a dashed line indicates approximate location of stratigraphic change.

4. Special Notes and Field Observations - Pertinent observations made by inspector during drilling including type of boring, free water level, water seepage, fluid loss, hole termination depth, etc.

5. Legend -

HSA - Hollow stem auger
CFA - Continuous flight auger
ATD - At time of drilling
AD - After drilling
DWL - Drill water loss
DWR - Drill water return
BOB - Bottom of Boring

▼ Water depth at specified time after drilling

← Water entry depth at time of drilling

# BORING LOG

SHEET 1 OF 6

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/24/89

MW-D2

PROJECT LOCATION Ft. Madison, Iowa

RIG Gardner-Denver 500

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS None detected ATD *

SURFACE ELEVATION 705.4 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 |  |  |  | Stiff, dark brown, low plastic Silty CLAY (Topsoil) | OL<br>CL | Boring advanced with 4" diameter bit and water |
|  |  |  |  | Very stiff, light gray-brown, low to medium plastic, Silty CLAY with trace of root hairs and organics | CL | (Loess)<br>WC≤PL |
|  | S | 18/24 | 5<br>8<br>8<br>7 |  |  | WC>PL<br>*Water information may be masked by drilling fluid |
| 5 |  |  |  |  |  |  |
|  |  |  |  | Stiff-very stiff, orange-brown, medium plastic, Silty CLAY with trace of very fine to fine grained sand and trace of coarse grained sand |  | (Weathered Glacial Till) |
|  | S | 20/24 | 5<br>7<br>8<br>9 |  |  | WC≤PL |
| 10 |  |  |  |  |  |  |
|  |  |  |  | Medium dense, dark orange-brown, low to medium plastic, very fine grained Sandy SILT with pockets of Silty CLAY and with trace of coarse grained sand | ML<br>w/CL | WC<PL |
|  | S | 20/24 | 4<br>8<br>9<br>12 |  |  |  |
| 15 |  |  |  |  |  |  |
|  |  |  |  | Becoming light brown with less sand |  |  |
|  | S | 20/24 | 10<br>12<br>15<br>18 |  |  |  |
|  |  |  |  | Hard, light brown, medium-highly plastic CLAY with very fine-medium grained Sandy, Silty CLAY with trace of gravel | CL<br>CH | (Glacial Till)<br>WC≤PL |
| 20 |  |  |  |  |  |  |
|  |  |  |  | Becoming light gray with brown mottling |  |  |
|  | S | 20/24 | 3<br>4<br>7<br>18 |  |  |  |
| 25 |  |  |  | Becoming light gray |  |  |

# BORING LOG

SHEET 2 OF 6

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/24/89

MW-D2

PROJECT LOCATION Ft. Madison, Iowa

RIG Gardner-Denver 500

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 705.4 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 25 | | | | SAME: Very stiff-hard, light gray, medium to highly plastic, Silty CLAY with trace of fine-coarse grained sand and gravel | CL<br>CH | (Glacial Till)<br>WC = PL |
| | S | 22/24 | 3<br>5<br>7<br>12 | Becoming light brown with black streaks (coal?) | | WC≥PL |
| 30 | | | | Becoming light gray | | |
| | S | 18/18 | 7<br>13<br>20 | Becoming mottled red-brown and light gray | | |
| 35 | | | | | | |
| | S | 18/18 | 7<br>16<br>21 | | | WC<PL |
| 40 | | | | | | |
| | | | | With cobbles or boulder at 41.5' | | Pushed rock to side of boring |
| | S | 17/18 | 7<br>17<br>26 | Becoming light red-brown, with trace to some fine-medium grained sand with trace of gravel | | WC<PL |
| 45 | | | | | | |
| | | | | With occasional cobbles and pockets (½" diameter) of fine gray sand | | |
| | S | 18/18 | 9<br>14<br>24 | | | WC<PL |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/25/89

MW-D2

PROJECT LOCATION Ft. Madison, Iowa

RIG Gardner-Denver 500

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 705.4 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | | | | SAME: Hard, light brown, medium-highly plastic Silty CLAY with trace to some fine-medium grained sand with occasional gravel, cobbles, and pockets (½" diameter) of fine grained, gray sand | CL, CH | (Glacial Till)<br>WC<PL |
| | S | 18/18 | 11<br>26<br>31 | | | WC<PL |
| 55 | | | | | | |
| | S | 18/18 | 9<br>22<br>39 | With thin (5") seam of gray, fine grained sand | w/SP | |
| 60 | | | | | | |
| | | | | Hard, light-dark gray, medium-highly plastic Silty CLAY with trace of fine-medium grained sand | | (Unoxidized Glacial Till)<br>WC<PL |
| | S | 18/18 | 9<br>14<br>30 | With thin (4") seam of light gray, very fine grained sand | | |
| 65 | | | | Becoming dark gray | | |
| | S | 12/12 | 19<br>48 | | | WC<PL |
| 70 | | | | | | |
| | S | 18/18 | 14<br>21<br>34 | | | WC≤PL |
| 75 | | | | | | |

# BORING LOG

SHEET 4 OF 6

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/25/89

MW-D2

PROJECT LOCATION Ft. Madison, Iowa

RIG Gardner-Denver 500

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 105.4 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 75 | | | | SAME: Hard, dark gray, medium-highly plastic, Silty CLAY with trace of fine-medium grained sand and with occasional gravel and cobble | CL-CH | (Glacial Till)<br>WC≤PL |
| | S | 12/12 | 18<br>54 | | | |
| 80 | | | | With thin seam (3") of very fine grained Silty SAND | w/SM | Dry |
| | | | | Becoming moister and very stiff-hard | | WC≥PL |
| | S | 18/18 | 8<br>15<br>20 | | | |
| 85 | | | | With possible 6"-8" sand seam | | |
| | S | 18/18 | 10<br>16<br>25 | | | |
| 90 | | | | | | |
| | | | | | | WC>PL |
| | S | 18/18 | 7<br>11<br>24 | | | |
| 95 | | | | | | |
| | | | | With limestone cobble | | |
| | S | 18/18 | 12<br>24<br>35 | With some fine-coarse grained sand with numerous coal fragments | | WC≥PL |
| 100 | | | | | | |

# BORING LOG

SHEET 5 OF 6

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/26/89

MW-D2

PROJECT LOCATION Ft. Madison, Iowa

RIG Gardner-Denver 500

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 705.4 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 100 | | | | SAME: Hard, dark gray, medium-highly plastic Silty CLAY with some fine-coarse grained sand and trace of gravel and occasional cobble | CL<br>CH | (Unoxidized Glacial Till)<br>WC≤PL<br>WC>PL |
| | S | 18/18 | 7<br>18<br>40 | | | |
| 105 | | | | | | |
| | | | | With trace to some sand | | |
| | S | 18/18 | 10<br>12<br>21 | | | |
| 110 | | | | | | |
| | | | | Hard, dark brown, medium-highly plastic, Silty CLAY with some fine to coarse grained sand | | (Slightly weathered oxidized Till)<br>WC<PL |
| | S | 18/18 | 12<br>26<br>32 | | | |
| 115 | | | | | | |
| | | | | With occasional cobble | | |
| | S | 17/18 | 16<br>30<br>32 | | | |
| 120 | | | | | | |
| | | | | Dense, gray, very fine grained Silty SAND with alternating layer of hard, gray, low plastic Silty CLAY with trace of sand | SM<br>&<br>CL | Moist |
| | S | 8/8 | 64<br>32<br>2 | | | |
| 125 | | | | | | |

# BORING LOG

SHEET 6 OF 6

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/26/89

MW-D2

PROJECT LOCATION Ft. Madison, Iowa

RIG Gardner-Denver 500

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 705.4 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 125 |  |  |  | Hard, dark gray, medium-highly plastic, Silty CLAY with trace to some fine-medium grained sand | CL<br>CH | Glacial Till (Neb.) |
|  | S | 4/6 | 70 | Very dense, gray, very fine-fine grained Silty SAND with alternating layers (1"-3") of silt with no sand; thin (1") streaks of highly plastic clay | SM<br>w/ML<br>&<br>CH | (Glacial Alluvium)<br>Wet to saturated |
| 130 |  |  |  |  |  |  |
|  | S | 5/6 | 73 | Very dense, light gray, low plastic SILT with traces of very fine sand with alternating layers or seams (1"-6") of fine grained, Silty SAND | ML<br>w/SP<br>&<br>SM | Moist<br>WC = PL |
| 135 |  |  |  |  |  |  |
|  | S | 12/12 | 23<br>46 | Hard, dark gray, medium-highly plastic Silty CLAY with trace of fine-medium sand | CL<br>CH | (Unoxidized Glacial Till)<br>WC<PL |
| 140 |  |  |  |  |  |  |
|  |  |  |  | With occasional cobble |  | WC≥PL |
|  | S | 11/12 | 28<br>47 | With blue shale fragments |  |  |
| 145 |  |  |  |  |  |  |
|  |  |  |  |  |  | Bottom of Boring<br>150.0'<br>Monitoring well installed upon upon completion |
|  | S | 16/18 | 12<br>20<br>37 |  |  |  |
| 150 |  |  |  |  |  |  |

# BORING LOG

SHEET 1 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/26/89

MW-E

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS 45.2'ATD (EL 646.3)

SURFACE ELEVATION 691.5 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 | CME* CS | 60/60 |  | Soft, dark brown, dry, low plastic, very Silty CLAY with trace of fine grained sand and roots<br>Soft, light brown-brown, low plastic, very Silty CLAY with trace of roots (topsoil)<br>Hard, dull reddish-brown, medium-highly plastic, Silty CLAY<br>Becoming dark reddish-brown with trace of fine grained sand and gravel | CL<br>CL<br>CH | Boring advanced with 6" diameter HSA<br>WC< PL<br>Dessication cracks from 2.5'-5.5'<br>*Samples obtained with 5.0'CME continuous sampler (CME-CS) |
| 5 | CME CS | 60/60 |  |  |  | WC< PL |
| 10 | CME CS | 60/60 |  | With hard lenses |  | Clay lenses at 11.8-12.0' and 14.3'-14.5' |
| 15 | CME CS | 60/60 |  | With some sand<br>With hard, highly plastic CLAY layers with trace-some fine grained sand and fine-coarse grained gravel | w/CH | Dessication cracks from 14.0'-15.5'<br>WC< PL<br>Clay layers from 17.1'-17.6' and 18.7'-19.1'<br>WC≥ PL for clay layer |
| 20 | CME CS | 60/60 |  | Becoming very stiff, with trace to some fine-coarse grained gravel with some horizontal and vertical fractures showing iron staining |  | WC> PL |
| 25 |  |  |  |  |  |  |

# BORING LOG

SHEET 2 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/26/89

MW-E

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS @ 45.2'ATD (EL 646.3)

SURFACE ELEVATION 691.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 25 | CME<br>CS | 60<br>60 |  | SAME: Very stiff, dark reddish-brown, medium-highly plastic Silty CLAY<br>With occasional pockets of hard, reddish-brown, medium plastic Sandy, Silty CLAY (< ½" thick) | CL<br>CH | WC≤PL<br>Horizontal and vertical fractures present |
| 30 | CME<br>CS | 60<br>60 |  | Becoming hard, reddish-brown, with some sand and fine-coarse grained gravel with pockets of very stiff, gray, medium-highly plastic, Silty CLAY |  | WC>PL<br>No horizontal or vertical fractures |
| 35 | CME<br>CS | 60<br>60 |  | With trace of coarse grained sand<br>Becoming grayish-reddish brown |  | WC>PL |
| 40 | CME<br>CS | 60<br>60 |  | Becoming reddish-brown with some sand and trace of fine-coarse grained gravel with pocket of dense, wet, fine-coarse grained sandy gravel with trace of silt<br>With lenses of stiff, highly plastic, Silty CLAY with trace of fine grained sand |  |  |
| 45 | CME<br>CS | 60<br>60 |  | Medium dense, wet, reddish-brown, medium grained, poorly graded SAND with trace to some silt and trace of coarse grained sand and fine grained gravel | SP | ◄ Water detected ATD |
|  |  |  |  | Very stiff, dark gray, medium-highly plastic, Silty CLAY with trace to some fine grained sand and pockets of medium dense, moist, grayish-brown, silty sand (≤ 1") and occasional vertical fractures with iron staining | CL<br>CH<br>w/SM | WC<PL |
| 50 |  |  |  |  |  |  |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/26/89

MW-E

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS @ 45.2'ATD (EL 646.3)

SURFACE ELEVATION 691.3

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | U | 11<br>12 | P | SAME: Very stiff, dark gray, medium-highly plastic, Silty CLAY with trace to some fine grained sand with pockets of medium dense, moist, grayish-brown, silty sand (≤1") and occasional vertical fracture with iron staining | CL<br>CH | |
| | | | | | | Bottom of Boring 51.0'<br>Monitoring well installed upon completion |
| 55 | | | | | | |
| 60 | | | | | | |
| 65 | | | | | | |
| 70 | | | | | | |
| 75 | | | | | | |

WOODWARD-CLYDE CONSULTANTS

# BORING LOG

SHEET 1 OF 2

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/24/89

MW-F

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Soft, grayish-brown, Silty CLAY with trace of roots (topsoil) | CL | Boring advanced with 6" diameter HSA |
| | CME* CS | 60/60 | | Stiff, yellowish-brown, low plastic Silty CLAY with trace of roots | CL<br>CH | WC<PL (Loess)<br>*Samples obtained with 5.0' CME continuous sampler (CME-CS) |
| | | | | Firm-stiff, reddish-brown, medium-highly plastic, Silty CLAY with trace of roots and coarse grained gravel | | With dessication fractures (Glacial Till) |
| | | | | Becoming grayish-brown to reddish-brown with interbedded lenses of fine grained sand | | |
| 5 | CME CS | 60/60 | | Becoming soft | | WC<PL |
| | | | | Becoming stiff with some fine to coarse grained gravel | | |
| | | | | Medium dense, reddish-brown, fine-medium grained, poorly graded Silty SAND | SM | |
| | | | | Stiff, reddish-brown, medium-highly plastic, Silty CLAY with trace of fine grained sand | CL<br>CH | |
| 10 | | | | | | WC<PL |
| | CME CS | 60/60 | | Medium dense, damp, multi-colored, fine-medium grained, Clayey Sand with some coarse grained sand and fine-medium grained gravel | SC | |
| | | | | Stiff, brownish-gray to dull reddish-brown, medium-highly plastic, Silty CLAY with trace of fine grained sand and fine-coarse grained gravel | CL<br>CH | WC≤PL |
| 15 | | | | With pockets of grayish-brown, fine grained sand | | WC>PL |
| | CME CS | 60/60 | | Becoming soft | | |
| | | | | Becoming stiff | | |
| 20 | | | | | | WC<PL |
| | CME CS | 60/60 | | With trace of medium grained sand | | |
| 25 | | | | | | |

WOODWARD-CLYDE CONSULTANTS

# BORING LOG

SHEET 2 OF 2

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/24/89

MW-F

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CME<br>CS | 60/60 | | Very stiff, yellowish-brown, medium plastic, Sandy, Silty CLAY with gray mottles and a trace of fine grained gravel | CL | WC<PL |
| | | | | | | WC≥PL |
| 30 | CME<br>CS | 60/60 | | With vertical veins of gray, Sandy, Silty CLAY and a trace of fine-coarse grained gravel | | |
| 35 | CME<br>CS | 60/60 | | With trace of fine-coarse grained gravel and cobbles | | WC≥PL |
| | | | | Becoming medium-highly plastic | CL,<br>CH | WC>PL |
| 40 | | | | Medium dense, reddish-brown, Silty SAND with trace of clay and fine-coarse grained gravel | SM | |
| | CME<br>CS | 60/60 | | Very stiff, dull reddish-brown to olive drab, medium-highly plastic, Silty CLAY with trace of fine-coarse grained gravel | CL,<br>CH | WC<PL |
| | | | | Very stiff-hard, medium-highly plastic, Silty CLAY with a trace of fine grained sand and fine-medium grained gravel | | |
| 45 | CME<br>CS | 60/60 | | | | |
| | | | | | | Bottom of Boring 50.0'<br>Monitoring well installed upon completion |
| 50 | | | | | | |

# BORING LOG

SHEET 1 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/3/90

MW-F2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690.9 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | CS | 58/60 | P | Loose, light grayish-brown, low plastic, organic, Clayey SILT with roots and desiccation cracks (Topsoil) | OL | Boring advanced with 8" diameter HSA; with 3.5" diameter CME continuous sampler |
| | | | | Loose, reddish-brown, low-medium plastic, Clayey SILT, with desiccation fractures | ML | (Loess)<br>WC<PL |
| 5 | CS | 60/60 | P | Becoming olive-brown with gray mottling, and vertical fractures, with trace of sand and gravel | | WC≤PL |
| 10 | CS | 60/60 | P | Firm-stiff, olive brown, medium-highly plastic, Silty CLAY, with horizontal and vertical fractures lined with carbonate material<br>With thin layer (4") of sand | CL-CH | WC>PL |
| | | | | With trace of sand and gravel | | |
| 15 | CS | 60/60 | P | With cobbles | | |
| 20 | CS | 60/60 | P | Becoming stiff-very stiff, reddish-brown with vertical fractures | | WC>PL |
| | | | | With some red (iron?) staining and several high angle fractures | | |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/3/90

MW-F2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690.9 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 25 | CS | 56/60 | P | SAME: Stiff-very stiff, reddish-brown, medium-highly plastic, Silty CLAY, with some vertical and high angle fractures<br>Becoming olive drab with red mottling | CL-CH | WC>PL |
|  |  |  |  | Dense, well graded, gray SAND | SW | Very moist |
| 30 | CS | 60/60 | P | Stiff-very stiff, olive-brown, medium-highly plastic, Silty CLAY, with horizontal and vertical fractures with carbonate lining, and orange-brown mottling | CH | WC>PL |
| 35 | CS | 60/60 | P | With small (0.5-1") diameter manganese (?) nodules and horizontal fractures |  |  |
| 40 | CS | 60/60 | P | Becoming very stiff-hard, light tannish-brown |  |  |
| 45 | CS | 36/36 | P | Becoming reddish-brown |  |  |
|  |  |  |  | Very stiff-hard, dark gray, medium-highly plastic CLAY, with trace of silt, fine-coarse grained sand and fine gravel | CL-CH | (Unweathered Glacial Till) |
| 50 |  |  |  |  |  |  |

# BORING LOG

SHEET 3 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/13/90

MW-F2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690.9

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | | | | SAME: Very stiff-hard, dark gray, medium-highly plastic CLAY with trace of silt, fine-coarse grained sand and fine gravel | CL-CH | 10" diameter steel casing installed to 53'<br>No sample recovery due to obstruction in hole |
| 55 | | | | | | |
| | | | | With dense, poorly graded, gray, fine grained SAND with some silt | w/SP | |
| | CS | 30/30 | P | Very stiff, gray, highly plastic CLAY with trace of silt, coarse grained sand, and fine gravel | CH | WC<PL |
| 60 | CS | 54/56 | P | | | |
| | | | | Medium dense, gray, moderately well graded, fine-coarse grained SAND with some silt and fine gravel<br>Grading to fine sand with some silt | SW-SP | |
| | | | | Very stiff, gray, highly plastic CLAY with trace of silt, coarse sand and fine gravel | CH | WC<PL |
| 65 | CS | 44/60 | P | Dense, poorly graded, fine-coarse grained SAND with some silt | SP | |
| | | | | Very stiff, gray, highly plastic CLAY with trace of silt, coarse sand, and fine gravel | CH | |
| | | | | Dense, brownish-gray, fine-medium grained SAND with trace of silt | SP | Wet<br>WC>PL |
| 70 | CS | 0/48 | P | | | |
| | CS | 54/54 | P | Very stiff, gray, highly plastic CLAY with trace of silt, coarse sand, and fine gravel | CH | |
| 75 | | | | | | |

# BORING LOG

SHEET 4 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/13/90

MW-F2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690.9

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 75 | | | | SAME: Very stiff, gray, highly plastic CLAY with trace of silt, coarse sand, and fine gravel | CH | WC<PL |
| | CS | 18/18 | P | With thin layer (1") of dense, poorly graded, fine-medium sand | | |
| 80 | CS | 60/60 | P | | | WC<PL |
| 85 | CS | 60/60 | P | With occasional medium gravel | | WC≤PL |
| 90 | CS | 60/60 | P | | | WC≥PL |
| 95 | CS | 60/60 | P | With thin layer (3") of dense, poorly graded, dark gray, fine sand<br>With thin layer (4") of dense, poorly graded, gray, fine-medium sand with some silt | | |
| | | | | Very stiff, olive drab-brown, medium-highly plastic CLAY with some silt, trace of coarse sand, and fine-coarse gravel | CL-CH | |
| 100 | | | | | | |

# BORING LOG

SHEET 5 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/13/90

MW-F2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690.9

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 100 | CS | 60/60 | P | SAME: Very stiff, olive drab-brown, medium-highly plastic CLAY with some silt, trace of coarse sand, and fine-coarse gravel | CL-CH | WC≥PL |
| | | | | Very stiff, gray, highly plastic CLAY with trace of silt and coarse sand | CH | WC≥PL |
| 105 | CS | 60/60 | P | With a trace to some silt and trace of coarse gravel | | WC≤PL |
| 110 | CS | 60/60 | P | | | |
| | | | | Very stiff, light olive drab to gray, medium-highly plastic CLAY with trace of silt, coarse grained sand and fine gravel, with occasional thin pockets (±1") of fine sand | CL-CH | WC≤PL |
| 115 | CS | 60/60 | P | | | |
| | | | | Dense, poorly graded, light olive-drab to gray, fine-medium SAND, with trace of silt and coarse grained sand | SP | |
| 120 | CS | 60/60 | P | Very stiff, light olive drab to gray, medium-highly plastic CLAY with trace of silt, fine-coarse grained sand, and fine gravel | CL-CH | |
| 125 | | | | | | |

# BORING LOG

SHEET 6 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/13/90

MW-F2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 690.9

ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 125 | CS | 60/60 | P | SAME: Very stiff, olive drab-gray, medium-highly plastic CLAY with trace of silt, fine-coarse sand and fine gravel<br>With thin layer of dense, slightly olive-drab-gray silt with some fine sand | CL-CH | WC≤PL |
| | | | | Dense, light olive drab to gray, poorly graded, fine-medium grained SAND with trace of coarse grained sand and silt | SP | |
| | | | | Very stiff, light olive drab to gray, medium-highly plastic CLAY with trace of silt, coarse grained sand, and fine-coarse gravel | CL-CH | |
| 130 | CS | 60/60 | P | | | WC<PL |
| | | | | With single subvertical fracture | | |
| 135 | CS | 60/60 | P | | | |
| | | | | Becoming highly plastic with trace of coarse sand | CH | WC>PL |
| | | | | | | Bottom of Boring 139.0'<br>Monitoring well installed upon completion |
| 140 | | | | | | |
| 145 | | | | | | |
| 150 | | | | | | |

# BORING LOG

SHEET 1 OF 3
PROJECT NO. 89C7583
DATE 7/28/89
RIG CME-75
WATER ENTERS None detected ATD

PROJECT NAME DUPONT

**MW-G**

PROJECT LOCATION Ft. Madison, Iowa
LOGGED BY K. Doeden DRILLED BY Layne-Western
SURFACE ELEVATION 702.7 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 0 | CME* CS | 51/54 | | Soft-firm, dark brown, low plastic, Silty CLAY with trace of roots and fine grained sand (topsoil) | CL | Boring advanced with 6" diameter HSA |
| | | | | Very stiff, reddish-brown, medium-highly plastic, Silty CLAY with dark reddish-brown to gray mottles | CL-CH | WC<PL<br>(Loess) |
| | | | | Becoming firm and grayish-brown | | WC>PL<br>*Samples obtained with 5.0' CME continuous sampler (CME-CS) |
| 5 | CME CS | 60/60 | | | | |
| | | | | Very stiff, dark reddish-brown, medium plastic, Silty CLAY with trace of fine-medium grained gravel | CL | WC<PL<br>(Till) |
| 10 | CME CS | 60/60 | | Becoming firm dark reddish-brown to gray mottles | | WC≤PL |
| | | | | With pockets of medium dense, moist, reddish-brown fine grained sand | w/SP | WC<PL<br>Blocky with horizontal fractures |
| 15 | CME CS | 60/60 | | Very stiff, dull reddish-brown, low-medium plastic, very Silty CLAY with trace of fine grained sand and fine-medium grained gravel | | WC<PL |
| 20 | CME CS | 60/60 | | Becoming medium-highly plastic, with vertical fractures with iron staining | CL-CH | WC≤PL |
| | | | | With pocket of stiff, dark reddish-brown, sandy Silty CLAY (2") | | WC≥PL |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 3

PROJECT NO. 89C7583

DATE 7/28/89

RIG CME-75

WATER ENTERS None detected ATD

PROJECT NAME DUPONT

MW-G

PROJECT LOCATION Ft. Madison, Iowa

LOGGED BY K. Doeden DRILLED BY Layne-Western

SURFACE ELEVATION 702.7 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CME<br>CS | 52/60 | | Very stiff, dull reddish-brown to grayish-brown, medium plastic, Silty CLAY with trace of sand | CL | WC>PL |
| | | | | With lense of medium dense, reddish-brown to grayish brown, fine-medium grained, clayey, silty sand | w/SC | WC<PL |
| | | | | Hard, grayish-brown, low-medium plastic, Silty CLAY with trace of fine grained gravel and sand, and blocky with iron stained fractures with blue-gray mottles | | |
| 30 | CME<br>CS | 60/60 | | | | |
| | | | | Hard, reddish-brown, low plastic, Sandy, Silty CLAY with trace of fine grained gravel | | WC>PL<br>WC≤PL |
| 35 | CME<br>CS | 60/60 | | With pockets of fine-coarse grained gravel | | WC≥PL |
| | | | | With blocky structure<br>Becoming medium-highly plastic | CL<br>CH | |
| 40 | CME<br>CS | 36/60 | | | | WC≥PL |
| 45 | CME<br>CS | 60/60 | | With trace to some fine grained sand and blue-gray mottles | | WC<PL<br>Recovery was full length but only half of normal diameter because of gravel in shoe of CME-CS |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/28/89

MW-G

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-75

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 702.7 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 50 | CME<br>CS | 60<br>60 | | SAME: Hard, dull reddish-brown, medium-highly plastic, Silty CLAY with some fine grained sand and trace of fine-coarse grained gravel | CL<br>CH | Full recovery length for only half normal diameter due to gravel or cobble<br>WC>PL |
| 55 | | | | | | Boring advanced from 54.5'-57.0' with carbide center bit in HSA (no sample) |
| | CME<br>CS | 22<br>30 | | Medium dense, very moist, dull reddish-brown, Silty SAND with trace of clay | SM | |
| | | | | Hard, gray, medium-highly plastic, Silty CLAY with trace of fine grained sand | CL<br>CH | |
| 60 | U | 3/12 | P | | | |
| | | | | | | Bottom of Boring 60.5'<br>Monitoring well installed upon completion |
| 65 | | | | | | |
| 70 | | | | | | |
| 75 | | | | | | |

# BORING LOG

SHEET 1 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/29/89

MW-H

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS ± 15.0'ATD (EL 689.8)

SURFACE ELEVATION 704.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 | CME* CS | 49/60 |  | Very stiff, light brown, low plastic, Silty CLAY with root hairs | CL | Boring advanced with 8" diameter HSA<br>Dry<br>Dessicated<br>WC<PL |
|  |  |  |  | Becoming stiff, medium brown with gray streaks |  | Moist |
|  |  |  |  |  |  | *Samples obtained with 5.0' CME continued sampler (CME-CS) |
| 5 | CME CS | 60/60 |  | Becoming wet |  |  |
|  |  |  |  | Stiff-very stiff, dark red-brown, medium-highly plastic Silty CLAY with trace of fine to medium grained sand | CL<br>CH | (Weathered oxidized Glacial Till)<br>WC<PL |
| 10 | CME CS | 60/60 |  |  |  |  |
|  |  |  |  | With rust-orange, very fine Silty SAND to Sandy SILT grading to a fine-coarse Clayey SAND | w/SM<br>ML<br>SC | ← Trace of water detected ATD |
| 15 | CME CS | 60/60 |  | Medium dense, light brown, low plastic, very fine grained Sandy SILT alternating with fine grained Silty SAND seams (1") | SM & ML | (Glacial Alluvium)<br>WC near PL |
|  |  |  |  | Stiff-very stiff, light brown, medium-highly plastic CLAY with trace of fine-coarse sand | CL<br>CH | WC near PL<br>(Glacial Till)<br>Vertical fracture<br>WC>PL |
| 20 | CME CS | 60/60 |  | Medium dense, light brown, fine-coarse grained Silty SAND with trace of gravel | SM | (Glacial Outwash)<br>Moist |
|  |  |  |  | Very stiff, light red-brown, medium-highly plastic Silty CLAY with trace of sand and gravel | CL<br>CH | (Glacial Till)<br>WC≥PL |
|  |  |  |  | Becoming hard, light gray-brown |  | Vertical fracture |
| 25 |  |  |  |  |  |  |

# BORING LOG

SHEET 2 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/29/89

MW-H

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS @ 15.0'ATD (EL 689.8)

SURFACE ELEVATION 704.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 25 | CME<br>CS | 60/60 | | SAME: Very stiff-hard, light gray-brown, medium to highly plastic Silty CLAY with trace of medium-coarse grained sand and gravel | CL<br>CH | (Glacial Till)<br>WC ≥ PL<br>Vertical fracture from 27.5' to 30.5' where fracture surface is blue-gray |
| 30 | CME<br>CS | 60/60 | | With thin (3") silty sand seam | w/SM | ▼ Water level in unfinished hole drilled to 35.0'<br>With horizontal fracture |
| 35 | CME<br>CS | 60/60 | | Becoming red-brown | | Vertical fracture from 35.0' to 38.5'<br>WC near PL |
| 40 | CME<br>CS | 60/60 | | With trace to some fine-coarse grained sand and occasional cobble | | With numerous vertical fractures |
| 45 | | | | | | |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/30/89

MW-H

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS @ 15.0'ATD (EL 689.8)

SURFACE ELEVATION 704.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 50 | CME<br>CS | 42/42 | P | SAME: Hard, light red-brown, medium-highly plastic Silty CLAY with trace to some fine-coarse grained sand with occasional cobble | CL<br>CH | (Glacial Till Oxidized)<br>WC = PL |
|  | D |  |  | Dense, light grayish-brown, fine grained Clayey SAND | SC | Sample refused on rock at 53.5', converted to center rock bit |
| 55 |  |  |  | Stiff, dark gray, medium-highly plastic Silty CLAY | CL<br>CH | Bottom of Boring 55.5'<br>Monitoring well installed upon completion |
| 60 |  |  |  |  |  |  |
| 65 |  |  |  |  |  |  |
| 70 |  |  |  |  |  |  |
| 75 |  |  |  |  |  |  |

# BORING LOG

SHEET 1 OF 2

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/27/89

MW-1

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-75

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS ± 27.5'ATD (EL 686.7)

SURFACE ELEVATION 714.2 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | CME* CS | 60/60 | | Soft, brown, low plastic, Silty CLAY with trace of roots (topsoil) | CL | Boring advanced with 6" diameter HSA |
| | | | | Soft, tannish-brown, low plastic, Silty CLAY with trace of roots | | WC<PL<br>Dessication cracks at 1.5'<br>(Loess)<br>WC<PL<br>*Samples obtained with 5.0' CME continuous sampler (CME-CS) |
| 5 | CME CS | 60/60 | | With some lenses of gray, medium plastic, Silty CLAY | | WC<PL |
| 10 | CME CS | 60/60 | | Hard, dark reddish-brown, medium-highly plastic, very Silty CLAY with trace of sand | CL<br>CH | (Till) |
| | | | | With reddish-brown and gray mottles | | |
| 15 | CME CS | 60/60 | | With small (2") pockets of dry, reddish-brown, silty sand | w/SM | Dessication cracks<br>WC>PL |
| | | | | Very stiff, dull reddish-brown to grayish-brown, medium-highly plastic, very Silty CLAY with occasional pockets of damp, dull reddish-brown silty sand with trace of fine grained gravel | | |
| 20 | CME CS | 60/60 | | | | WC>PL |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 2

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/27/89

MW-1

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-75

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS ± 27.5'ATD (EL 686.7)

SURFACE ELEVATION 714.2

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CME<br>CS | 56/60 | | SAME: Very stiff, dull reddish-brown to grayish-brown, medium-highly plastic, very Silty CLAY<br>With some fine-coarse grained gravel<br>With pockets of medium dense, dull reddish-brown, silty, fine-coarse grained sand | CL-CH | Boring relocated 5.0' West of original borehole<br>← Water enters ATD |
| 30 | CME<br>CS | 60/60 | | Medium dense, reddish-brown, very moist, Silty, Clayey, fine-medium grained SAND with some fine-coarse grained gravel | SM-SC | |
| 35 | CME<br>CS | 60/60 | | Very stiff, gray, medium-highly plastic, Silty CLAY with trace of fine grained sand<br>Becoming dark gray | CL-CH | WC > PL |
| 40 | | | | | | Bottom of Boring 40.0'<br>Monitoring well installed upon completion |
| 45 | | | | | | |
| 50 | | | | | | |

# BORING LOG

SHEET 1 OF 3

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/2/90

MW-J

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS ▽ 38' ATD (EL 664.3 ATD)

SURFACE ELEVATION 702.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | CS | 56/60 | P | Loose, light gray, low plastic SILT, with some rusted metal | ML | Boring advanced with 8" OD HSA, 3½" diameter CME Continuous Sampler |
| | | | | Becoming firm, reddish-brown, with vertical fractures | | Probably FILL at surface<br>WC<PL |
| 5 | CS | 60/60 | P | | | |
| | | | | Stiff, brownish-red, medium-highly plastic, Silty CLAY, with trace of sand and fine gravel | CL-CH | WC>PL |
| 10 | CS | 60/60 | P | | | |
| | | | | Loose, reddish-brown, low-medium plastic, Clayey SILT | ML | WC>PL |
| | | | | Firm-stiff, reddish-brown, medium-highly plastic CLAY, with occasional carbonaceous gravel | CL-CH | WC>PL |
| 15 | CS | 60/60 | P | | | |
| | | | | Dense, reddish-brown, poorly graded, medium grained SAND with silt | SM-SP | Moist |
| | | | | Medium dense, greenish-gray, low-medium plastic, Clayey SILT, with carbonaceous material | ML | |
| 20 | CS | 60/60 | P | | | |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 3

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/2/90

MW-J

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS @ 38' ATD

(EL 664.3 ATD)

SURFACE ELEVATION 702.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | | | | SAME: Medium dense, greenish-gray, low plastic, Clayey SILT | ML | |
| | CS | 60/60 | P | Stiff, dark gray, highly plastic CLAY, with silt, carbonaceous material, and horizontal and vertical fractures | CH | WC < PL |
| 30 | CS | 60/60 | P | Fractures becoming filled with carbonaceous sand and gravel | | ← Water enters ATD |
| 35 | CS | 60/60 | P | | | |
| | | | | Dense, reddish-brown, poorly graded, medium grained SAND | SP | |
| | | | | Very stiff, reddish-brown, highly plastic CLAY, with trace of sand, and carbonaceous material | CH | WC > PL |
| 40 | CS | 36/60 | P | Dense, reddish-brown, poorly graded, medium grained SAND | SP | |
| | | | | Very stiff, reddish-brown, highly plastic CLAY with silt and trace of sand | CH | WC > PL |
| 45 | CS | 60/60 | P | | | |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

MW-J

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

DATE 5/2/90

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS @ 38' ATD

(EL 664.3 ATD)

SURFACE ELEVATION 702.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | | | | SAME: Very stiff, reddish-brown, highly plastic CLAY, with silt and trace of sand | CH | WC >PL |
| | CS | 60/60 | P | Becoming olive brown | | |
| | | | | Becoming dark gray-olive brown | | |
| 55 | | | | Becoming dark gray | | (Unweathered Glacial Till) |
| | CS | 36/36 | P | | | |
| | | | | | | Bottom of Boring 58.0'<br>Monitoring well installed upon completion |
| 60 | | | | | | |
| 65 | | | | | | |
| 70 | | | | | | |
| 75 | | | | | | |

# BORING LOG

SHEET 1 OF 3

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90

MW-K1

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS ≈ 42' ATD

(EL 662.3 ATD)

SURFACE ELEVATION 704.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | CS | $\frac{60}{60}$ | P | Very soft, dark brown, low plastic, organic, Silty CLAY with root hairs (Topsoil) | OL | Boring advanced with 8" HSA, with 3½" diameter CME Continuous Sampler |
| | | | | Loose, light brownish-gray, low-medium plastic, Clayey SILT, with manganese (?) nodules and root hairs | ML | (Loess)<br>WC < PL |
| 5 | CS | $\frac{60}{60}$ | P | Becoming very dry and very silty | | WC < PL |
| | | | | Loose, reddish-brown, low-medium plastic, Clayey SILT with subvertical and horizontal fractures coated with calcareous material and black manganese (?) staining | | |
| 10 | CS | $\frac{60}{60}$ | P | Firm-stiff, reddish-brown, medium plastic, Silty CLAY with trace of sand and coarse gravel and vertical and subvertical fractures lined with calcareous material and black manganese (?) staining | CL | WC ≤ PL |
| 15 | CS | $\frac{60}{60}$ | P | With thin layer (3") of sand<br>Becoming highly plastic | CH | WC > PL |
| | | | | Medium dense, reddish-brown, poorly graded medium grained SAND | SP | Moist |
| 20 | CS | $\frac{60}{60}$ | P | | | |
| | | | | Loose, dark brownish-red, low-medium plastic, Clayey SILT, with trace of sand and gravel, and fractures lined with calcareous material | ML | WC > PL |
| | | | | Medium dense, reddish-brown, poorly graded, medium grained SAND with med-coarse gravel. | SP | Moist |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 3

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90

MW-K1

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS ≅ 42' ATD (EL 662.3 ATD)

SURFACE ELEVATION 704.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CS | 41/60 | P | Medium dense, reddish-brown, poorly graded SAND with trace of gravel | SP | Saturated |
| | | | | Loose, dark grayish-brown, low plastic, Sandy SILT | ML | WC > PL |
| | | | | Medium dense, reddish-brown, poorly graded SAND | SP | Moist |
| 30 | CS | 60/60 | P | Loose, dark gray, medium plastic, Clayey SILT, with red mottling and trace of sand and gravel | ML | WC > PL |
| | | | | Stiff, reddish-brown, highly plastic CLAY with silt | CH | WC > PL |
| 35 | CS | 60/60 | P | With abundant horizontal and vertical fractures lined with calcareous material | | WC > PL<br>Saturated |
| 40 | CS | 60/60 | P | | | ← Water enters ATD |
| 45 | CS | 60/60 | P | With manganese (?) nodules | | WC ≥ PL |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90

MW-K1

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp

DRILLED BY Layne Western

WATER ENTERS @ 42' ATD
(EL 662.3 ATD)

SURFACE ELEVATION 704.3

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | CS | $\frac{60}{60}$ | P | SAME: Stiff, reddish-brown, highly plastic, CLAY with silt | CH | |
| | | | | Loose, reddish-gray, low-medium plastic, Clayey SILT, with trace of sand | ML | WC<PL |
| 55 | CS | $\frac{60}{60}$ | P | | | |
| | | | | Very stiff, dark gray, medium-highly plastic, Silty CLAY, with trace of sand and gravel | CL-CH | (Unweathered Glacial Till) |
| 60 | CS | $\frac{60}{60}$ | P | | | WC>PL |
| 65 | | | | | | Bottom of Boring 65.0'<br>Monitoring well installed upon completion |
| 70 | | | | | | |
| 75 | | | | | | |

# BORING LOG

SHEET 1 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90

MW-K2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 703.7 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Very soft, dark brown, low plastic, organic, Silty CLAY with root hairs | OL | Boring advanced with 8" HSA, with 3½" diameter C' Continuous Sampler |
| | CS | 60/60 | P | Loose, light brownish-gray, low-medium plastic, Clayey SILT, with manganese (?) nodules and root hairs | ML | WC<PL<br>*Prior to introduction of drilling fluid @ 65' |
| 5 | | | | Becoming very dry and very silty | | |
| | CS | 60/60 | P | | | WC<PL |
| | | | | Loose, reddish-brown, low-medium plastic, Clayey SILT, with high angle and horizontal fractures coated with carbonaceous material and black manganese (?) staining | | WC≤PL |
| 10 | | | | | | |
| | CS | 60/60 | P | Firm-stiff, reddish-brown, medium plastic, Silty CLAY with trace of sand and coarse gravel, with vertical and high angle fractures lined with calcareous material and black manganese (?) staining | CL | WC>PL |
| 15 | | | | With thin layer (3") of sand | | |
| | CS | 60/60 | P | Becoming highly plastic | CH | |
| | | | | Medium dense, reddish-brown, poorly graded, medium grained SAND | SP | WC>PL |
| 20 | | | | | | |
| | CS | 50/60 | P | | | |
| | | | | Loose, dark brownish-red, low-medium plastic, Clayey SILT, with trace of sand and gravel, with fractures lined with calcareous material | ML | WC>PL |
| | | | | Medium dense, reddish-brown, poorly graded, medium grained SAND with med-coarse gravel | SP | |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90

MW-K2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD *

SURFACE ELEVATION 703.7 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CS | 41/60 | P | Medium dense, reddish-brown, poorly graded SAND with trace of gravel | SP | Saturated |
| | | | | Loose, dark grayish-brown, low plastic, Sandy SILT | ML | WC > PL |
| | | | | Medium dense, reddish-brown, poorly graded SAND | SP | |
| 30 | CS | 60/60 | P | Loose, dark gray, medium plastic, Clayey SILT, with red mottling and trace of sand and gravel | ML | WC > PL |
| | | | | Stiff, reddish-brown, highly plastic CLAY with silt | CH | WC > PL |
| 35 | CS | 60/60 | P | With abundant horizontal and vertical | | WC > PL<br>Saturated |
| 40 | CS | 60/60 | P | | | |
| 45 | CS | 60/60 | P | With manganese (?) nodules | | WC > PL<br>Moist |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90-6/6/90

MW-K2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD *

SURFACE ELEVATION 703.7 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | CS | 60/60 | P | SAME: Stiff, reddish-brown, highly plastic, CLAY with silt | CH | WC≥PL |
| | | | | Loose, reddish-gray, medium-highly plastic, Clayey SILT, with trace of sand | ML-MH | WC<PL |
| 55 | CS | 60/60 | P | | | |
| | | | | Very stiff, dark gray, medium-highly plastic, Silty CLAY with trace of sand and gravel | CL-CH | (Unweathered Glacial Till)<br>WC>PL |
| 60 | CS | 60/60 | P | | | |
| | | | | | | Boring reamed with 14" tri-cone rotary bit prior to installation of 10" diameter steel casing to 65' |
| 65 | CS | 52/60 | P | Becoming gray | | |
| 70 | CS | 60/60 | P | | | |
| | | | | With thin layer (4") of dense, gray, fine grained SAND | w/SP | |
| 75 | | | | | | |

# BORING LOG

SHEET 4 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

MW-K2

DATE 6/6/90

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 703.7

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 75 | CS | 60/60 | P | Dense, gray, poorly graded, fine grained SAND | SP | |
| | | | | Very stiff, gray, medium-highly plastic CLAY with some fine-coarse sand | CL-CH | |
| | | | | Dense, moderately well graded, Clayey, Gravelly, gray, fine-coarse grained SAND | SC | Not saturated |
| | | | | Dense, gray, poorly graded, fine-coarse grained SAND, with some fine gravel | SP | |
| 80 | CS | 60/60 | P | Very stiff-hard, dark gray, highly plastic CLAY with trace of fine-coarse grained sand and fine gravel | CH | WC<PL |
| 85 | CS | 60/60 | P | | | WC≥PL |
| | | | | With thin layer (4") of dense, poorly graded, fine-medium grained sand with trace of coarse grained sand | w/SP | |
| 90 | CS | 60/60 | P | | | |
| 95 | CS | 57/60 | P | | | WC≤PL |
| | | | | Dense, gray, poorly graded, fine grained SAND with trace of silt | SP | |
| | | | | Very stiff-hard, dark gray, highly plastic CLAY with trace of fine-coarse grained sand and fine gravel | CH | WC≤PL |
| 100 | | | | | | |

# BORING LOG

SHEET 5 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/6/90

MW-K2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 703.7

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 100 | CS | 60/60 | P | Dense, poorly graded, fine-grained SAND, with trace of silt | SP | |
| | | | | Very stiff-hard, dark gray, highly plastic CLAY with trace of fine-coarse grained sand and fine gravel | CH | WC $\geq$ PL |
| 105 | CS | 60/60 | P | | | WC$<$PL |
| 110 | CS | 60/60 | P | With thin layer (5") of dense, gray, moderately well graded, fine-coarse grained sand with some silt and fine gravel | SP-SW | |
| | | | | Grading to fine sand | | |
| | | | | Very stiff-hard, brown-olive drab, medium-highly plastic CLAY with silt and trace of fine-coarse grained sand and fine gravel | CL-CH | |
| | | | | Becoming olive drab-gray | | |
| 115 | CS | 60/60 | P | With thin layer (4") of dense, poorly graded, olive-drab to gray SILT grading into thin layer (6") of silty, fine SAND | ML-SM | |
| | | | | | | WC$<$PL |
| 120 | CS | 60/60 | P | Dense, poorly graded, olive drab-gray, Silty SAND | SM | |
| | | | | Very stiff, olive drab-gray, medium-highly plastic CLAY with silt and fine-medium sand | CL-CH | |
| | | | | Dense, olive drab to gray, poorly graded, fine-medium grained SAND | SP | Saturated |
| 125 | | | | | | |

# BORING LOG

SHEET 6 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/6/90

MW-K2

PROJECT LOCATION Ft. Madison, Iowa/Baier Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 703.7

ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 125 | CS | 60/60 | P | Very stiff-hard, olive drab-gray, highly plastic CLAY with trace of silt, medium-coarse sand and fine gravel | CH |  |
|  |  |  |  | Dense, olive drab to gray, poorly graded SILT with trace of fine-coarse grained sand and fine gravel | ML |  |
| 130 |  |  |  | Grading to fine-medium grained sand | SP |  |
|  | CS | 60/60 | P | Very stiff-hard, medium-highly plastic CLAY with some silt and trace of fine-coarse sand and fine gravel | CL-CH | WC≥PL |
|  |  |  |  | With thin layer (3") of dense, poorly graded, olive drab SILT | MW |  |
|  |  |  |  | Dense, olive drab, poorly graded SILT, with some fine grained sand | ML |  |
| 135 | CS | 60/60 | P | Very stiff-hard, gray, medium-highly plastic CLAY with some silt and trace of fine-coarse sand and gravel | CL-CH |  |
|  |  |  |  |  | CL-CH |  |
| 140 |  |  |  |  |  | Bottom of Boring 140.0'<br>Monitoring well installed upon completion |
| 145 |  |  |  |  |  |  |
| 150 |  |  |  |  |  |  |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/21/89

BB-1

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 702.62

ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 |  |  |  | Loose, brown SILT with trace of roots | ML | Boring advanced with 12" diameter CFA<br>12" diameter PVC casing installed to 2.5' |
|  | S | 19/24 | * | Stiff, brown-reddish brown, low plastic, Silty CLAY | CL | Dry<br>WC < PL<br>Boring continued with 6" diameter HSA |
| 5 | S | 22/24 |  |  |  | WC > PL<br>*Samples were driven but blow counts not recorded |
|  | S | 24/24 |  | Becoming firm |  |  |
|  | S | 24/24 |  | With some fine grained sand |  |  |
| 10 | S | 24/24 |  | Very stiff, dark reddish-brown, low plastic, Sandy, Silty CLAY with some fine grained gravel |  | WC > PL |
|  | S | 18/24 |  | Becoming very sandy |  |  |
| 15 | S | 18/24 |  | Becoming soft |  |  |
|  | S | 22/24 |  | Medium dense, brown to reddish-brown, fine-medium grained, Silty SAND with some fine-medium grained gravel | SM | Moist |
|  | S | 22/24 |  | Stiff, reddish-brown, low plastic, Silty, very Sandy, CLAY with some fine gravel | CL | WC > PL |
| 20 |  |  |  | Medium dense, brown-reddish brown, fine-medium grained Silty SAND with fine to medium gravel | SM | Bottom of Boring 20.0'<br>Boring grouted to ground surface upon completion |
| 25 |  |  |  |  |  |  |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/18/89-7/20/89

BD-1

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 708.69 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 0 | | | | Loose, white-yellowish brown, Silty, Sandy Ash FILL<br>Loose, light gray, Gravelly, Sandy, Silty FILL<br>With pieces of metal cans | FILL | Boring advanced with 12" diameter CFA<br>12" diameter PVC casing installed to 5.5'<br>Dry<br>*Samples were driven but blow counts not recorded |
| 5 | S | 19/24 | * | Firm, olive green to reddish-brown, low to medium plastic, Silty CLAY | CL | Boring continued with 6" diameter HSA<br>WC>PL |
| | S | 24/24 | | | | While recovery was full, a piece of gravel made thickness of sample 1/3 of normal size |
| 10 | S | 24/24 | | | | WC>PL |
| | S | 24/24 | | Becoming brown-reddish brown with trace of fine grained gravel | | |
| | S | 24/24 | | Becoming stiff to very stiff | | |
| 15 | S | 15/18 | | With fine grained sand and gravel | | |
| | S | 24/24 | | Becoming firm | | |
| 20 | S | 24/24 | | With some gravel | | |
| | S | 24/24 | | | | Boring grouted to ground surface upon completion |
| | S | 24/24 | | | | Bottom of Boring 24.5' |
| 25 | | | | | | |

WOODWARD-CLYDE CONSULTANTS

# BORING LOG

SHEET 1 OF 1
PROJECT NO. 89C7583
DATE 7/18/89-7/20/89
RIG CME-550
WATER ENTERS None detected ATD

PROJECT NAME DUPONT

BD-2

PROJECT LOCATION Ft. Madison, Iowa
LOGGED BY K. Doeden DRILLED BY Layne-Western
SURFACE ELEVATION 708.91 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 |  |  |  | Loose, light brown, Gravelly, Silty, Sandy FILL | F<br>I<br>L<br>L | Boring advanced with 12" diameter CFA 12" diameter PVC casing installed to 4.0' |
|  | S | 16/24 | * | Soft to firm, olive green to brown, low to medium plastic, Silty CLAY | CL | Boring continued with 6" diameter HSA<br>WC ≥ PL |
| 5 | S | 24/24 |  | Becoming mostly dull reddish-brown |  | *Samples were driven but blow counts not recorded |
|  | S | 24/24 |  | Becoming soft |  | WC > PL |
| 10 | S | 24/24 |  | Firm-stiff, brown to reddish-brown, low plastic, Silty CLAY |  |  |
|  | S | 21/24 |  | Stiff-very stiff, dark reddish-brown, low plastic, Silty CLAY with trace of fine grained gravel and sand |  |  |
|  | S | 24/24 |  | Becoming very silty and sandy |  |  |
| 15 | S | 24/24 |  |  |  |  |
|  | S | 24/24 |  | Becoming brown-reddish brown |  | WC > PL |
| 20 | S | 24/24 |  | With some fine grained sand and gravel |  |  |
|  | S | 24/24 |  |  |  | Boring grouted to ground surface upon completion |
| 25 |  |  |  |  |  | Bottom of Boring 23.0' |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/18/89-7/19/89

BS-1

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 706.05

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Loose, dark brown to black, Gravelly, Sandy, Silty FILL | F<br>I<br>L<br>L | Boring advanced with 12" diameter CFA<br>12" diameter PVC casing installed to 2.3' |
| | | | | Firm, olive green to brown, low to medium plastic, Silty CLAY | CL | Damp<br>WC < PL<br>Boring continued with 6" diameter HSA<br>*Samples were driven but blow counts not recorded |
| | S | $\frac{20}{24}$ | * | | | |
| 5 | S | $\frac{22}{24}$ | | Becoming reddish-brown | | |
| | | | | | | Bottom of Boring 7.3'<br>Boring grouted to ground surface upon completion |
| 10 | | | | | | |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/18/89-7/19/89

BS-2

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 706.57 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 0 | | | | Loose, brown, Gravelly, Sandy, Silty FILL with some paint sludge and fragments of white hardened waste sludge | FILL | Boring advanced with 12" diameter CFA 12" diameter PVC casing installed to 4.75' |
| | | | | Becoming wet | | Paint can lid retrieved in cuttings |
| 5 | S | 10/21 | * | Firm, reddish-brown, low plastic, Silty CLAY | CL | WC > PL |
| | S | 24/24 | | Becoming soft, olive green to reddish brown | | *Samples were driven but blow counts not recorded |
| | S | 12/12 | | | | |
| 10 | | | | | | Bottom of Boring 8.75'<br>Boring grouted to ground surface upon completion |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/18/89

BS-3

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION Not Available ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Loose, light brown, Gravelly, Sandy, Silty FILL with some metals fragments at 1.0'<br>Becoming brown to dark brown | FILL | Boring advanced with 12" diameter CFA<br>12" diameter PVC casing installed to 6.0'<br>*Samples were driven but blow counts not recorded |
| 5 | S | 24/24 | * | Soft, olive green to slightly reddish-brown, low plastic, Silty CLAY | CL | Boring continued with 6" diameter HSA<br>WC>PL |
| | S | 24/24 | | | | |
| 10 | S | 12/12 | | | | Bottom of Boring 10.25'<br>Boring grouted to ground surface upon completion |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/18/89

BS-4

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 705.88

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Loose, Sandy, Silty FILL | FILL | Boring advanced with 12" diameter CFA<br>12" diameter PVC casing installed to 3.0'<br>Boring continued with 6" diameter HSA<br>WC > PL<br>*Samples were driven but blow counts not recorded |
| | S | 19/24 | * | Soft-firm, olive green, low-medium plastic, Silty CLAY | CL | |
| | | | | Becoming firm-stiff, brown to reddish-brown | | |
| 5 | S | 24/24 | | | | |
| | S | 24/24 | | With some fine grained sand | | |
| | | | | | | Bottom of Boring 8.0'<br>Boring grouted to ground surface upon completion |
| 10 | | | | | | |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/19/89

BS-5

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 703.98

ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 0 | | | | Loose, brown to dark brown, Gravelly, Sandy, Silty FILL with some pieces of paint sludge and metal | FILL | Boring advanced with 12" diameter CFA |
| | S | 17/24 | * | Firm, brown to reddish-brown, low plastic, Silty CLAY | CL | 12" diameter PVC casing installed to 1.5'<br>Damp |
| | S | 24/24 | | Soft-firm, olive green to dull reddish brown, low to medium plastic Silty CLAY | | Boring continued with 6" diameter HSA<br>WC > PL<br>*Samples were driven but blow counts not recorded |
| 5 | S | 24/24 | | Becoming very silty with trace of fine grained sand | | WC > PL |
| | | | | | | Bottom of Boring 7.0'<br>Boring grouted to ground surface upon completion |
| 10 | | | | | | |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/19/89

BS-6

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 695.97

ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 |  |  |  | Loose, brown to gray, Sandy, Silty FILL with some paint sludge and metal | FILL | Boring advanced with 12" diameter CFA<br>12" diameter PVC casing installed to 2.0'<br>Boring continued with 6" diameter HSA<br>*Samples were driven but blow counts not recorded |
|  |  |  |  | Soft, olive green to slightly reddish brown, low to medium plastic, Silty CLAY | CL |  |
|  | S | 24/24 | * |  |  |  |
| 5 | S | 21/24 |  | Very stiff, dark reddish-brown, low plastic, very Silty CLAY with some fine grained sand and trace of fine gravel |  |  |
|  |  |  |  |  |  | Bottom of Boring 6.25'<br>Boring grouted to ground surface upon completion |
| 10 |  |  |  |  |  |  |
| 15 |  |  |  |  |  |  |
| 20 |  |  |  |  |  |  |
| 25 |  |  |  |  |  |  |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/19/89

BS-7

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 695.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 |  |  |  | Loose, dark brown, Gravelly, Sandy, Silty FILL with some paint sludge and metal | FILL | Boring advanced with 12" diameter CFA 12" diameter PVC casing installed to 3.0' |
|  | S | $\frac{17}{24}$ | * | Soft, olive green to reddish-brownm low to medium plastic, Silty CLAY | CL | WC > PL<br>Boring continued with 6" diameter HSA<br>*Samples were driven but blow counts not recorded |
| 5 | S | $\frac{22}{24}$ |  | Becoming dark reddish-brown with trace of fine grained gravel |  | WC > PL |
|  | S | $\frac{18}{24}$ |  | Becoming firm, with some fine grained sand and trace of fine grained gravel |  |  |
|  |  |  |  |  |  | Bottom of Boring 8.0'<br>Boring grouted to ground surface upon completion |
| 10 |  |  |  |  |  |  |
| 15 |  |  |  |  |  |  |
| 20 |  |  |  |  |  |  |
| 25 |  |  |  |  |  |  |

# BORING LOG

SHEET 1 OF 1

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/19/89

BS-8

PROJECT LOCATION Ft. Madison, Iowa

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne-Western

WATER ENTERS None detected ATD

SURFACE ELEVATION Not Available

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Loose, brown, Silty FILL with lense of reddish-brown ash | FILL | Boring advanced with 12" diameter CFA<br>12" diameter PVC casing installed to 1.5'<br>Boring continued with 6" diameter HSA<br>*Samples were driven but blow counts not recorded |
| | | | | Loose, brown SILT | ML | |
| | S | 8/24 | * | Becoming dense to medium dense and light tan to brown | | |
| 5 | S | 15/24 | | Stiff, olive green to reddish-brown, low plastic, Silty CLAY | CL | Dry<br>WC > PL |
| | | | | | | Bottom of Boring 6.75'<br>Boring grouted to ground surface upon completion |
| 10 | | | | | | |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |

WOODWARD-CLYDE CONSULTANTS

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Layne-Western

**Inspected by** D. Jorgenson

**Method of Installation** Mobile B-61 w/ 8" HSA

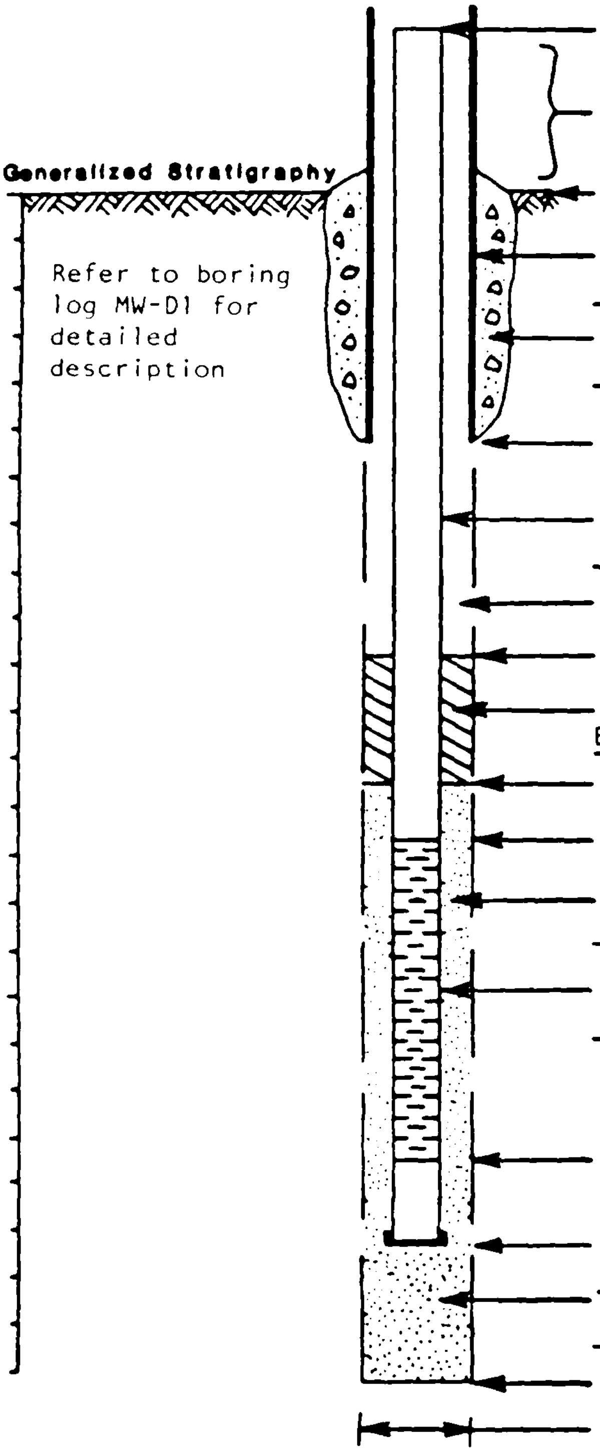
**Remarks**

**Piez./Well No.** MW-D1

**Project No.** 89C7583

**Date** 7/29/89

**Time** 7:30 p.m.



Refer to boring log MW-D1 for detailed description

**Elevation of top of riser pipe** 707.57

**Height of riser above ground** 2.6'

**Ground Elevation** 705.0

**I.D./Type of surface casing** 3.7" Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC

**Type of backfill** Volclay Grout

**Depth of top of seal** 39.5'

**Type of seal** Fine Sand 39.0'-39.5'; Bentonite Pellets 39.5'-41.5'; Fine Sand 41.5'-42.0'

**Depth of top of filter pack** 41.5'

**Depth of top of screen** 43.8'

**Type of filter pack** Coarse sand

**I.D./Type of screen** 2"/SCH 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 58.8'

**Depth of bottom of plugged blank section** 59.0'

**Type of backfill below observation well** Coarse Sand

**Depth of bottom of boring** 60.0'

**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Layne-Western

**Inspected by** D. Jorgenson

**Method of Installation** 6¼" tri-cone rotary

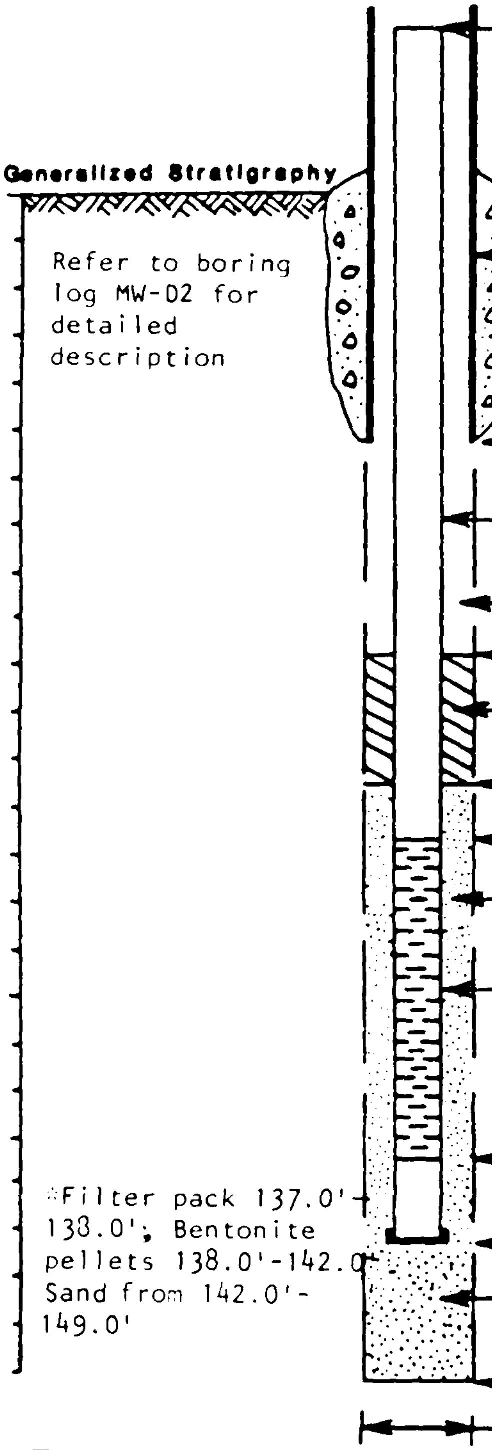
**Remarks** Very little water loss, not measurable (<20 gal)

**Piez./Well No.** MW-02

**Project No.** 89C7583

**Date** 7/28/89

**Time** 9:00 p.m. completion



Refer to boring log MW-02 for detailed description

*Filter pack 137.0'-138.0'; Bentonite pellets 138.0'-142.0'; Sand from 142.0'-149.0'

**Elevation of top of riser pipe** 707.78

**Height of riser above ground** ±2.4'

**Ground Elevation** 705.4

**I.D./Type of surface casing** 3.7"/Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC

**Type of backfill** Volclay Grout

**Depth of top of seal** 106.0'

**Type of seal** Thick bentonite slurry with buffer sand

**Depth of top of filter pack** 118.0'

**Depth of top of screen** 122.0'

**Type of filter pack** Coarse sand

**I.D./Type of screen** 2"/SCH 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 137.0'

**Depth of bottom of plugged blank section** 137.2'

**Type of backfill below observation well** *

**Depth of bottom of boring** 149.0'

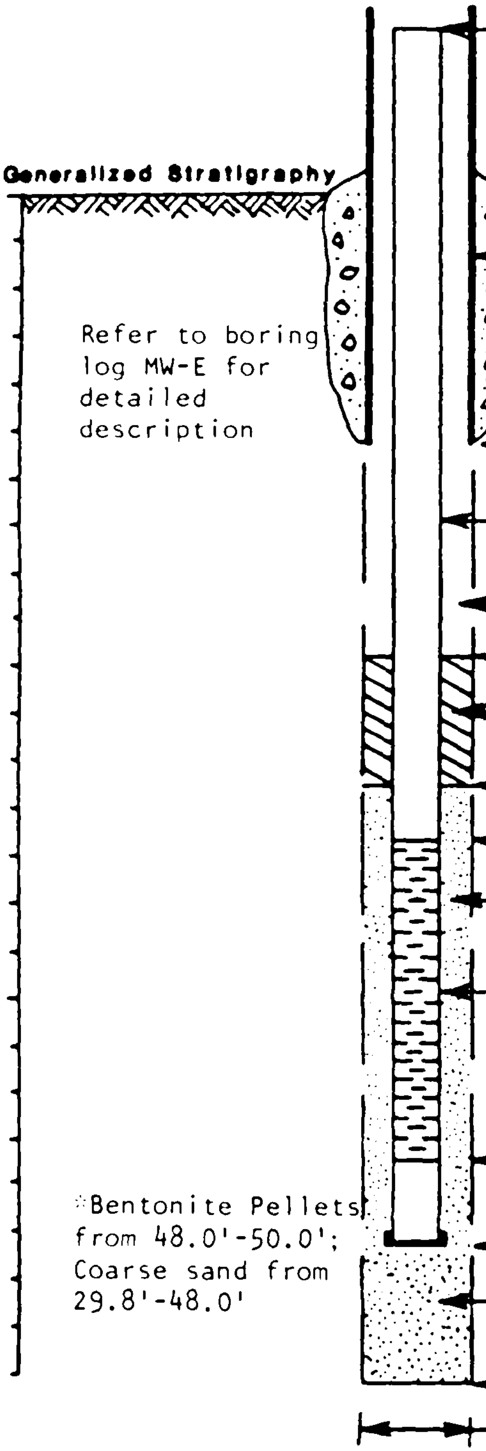
**Diameter of boring** 6¼"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA
**Location** Baier Site
**Installed by** Layne-Western
**Inspected by** K. Doeden
**Method of Installation** CME-550 with 8" HSA
**Remarks**

**Piez./Well No.** MW-E
**Project No.** 89C7583
**Date** 7/26/89
**Time** 5:53 p.m.



**Generalized Stratigraphy**

Refer to boring log MW-E for detailed description

*Bentonite Pellets from 48.0'-50.0'; Coarse sand from 29.8'-48.0'

**Elevation of top of riser pipe** 694.44

**Height of riser above ground** 2.9'

**Ground Elevation** 691.5

**I.D./Type of surface casing** 3.7" Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC

**Type of backfill** Volclay Grout

**Depth of top of seal** 26.5'

**Type of seal** Fine sand 26.0'-26.5'; Bentonite Pellets, 26.5'-28.7', Fine Sand 28.7'-29.7'

**Depth of top of filter pack** 28.7'

**Depth of top of screen** 31.8'

**Type of filter pack** Coarse sand

**I.D./Type of screen** 2"/SCH 40 (Machine slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 46.8'

**Depth of bottom of plugged blank section** 47.0'

**Type of backfill below observation well** *

**Depth of bottom of boring** 50.0'

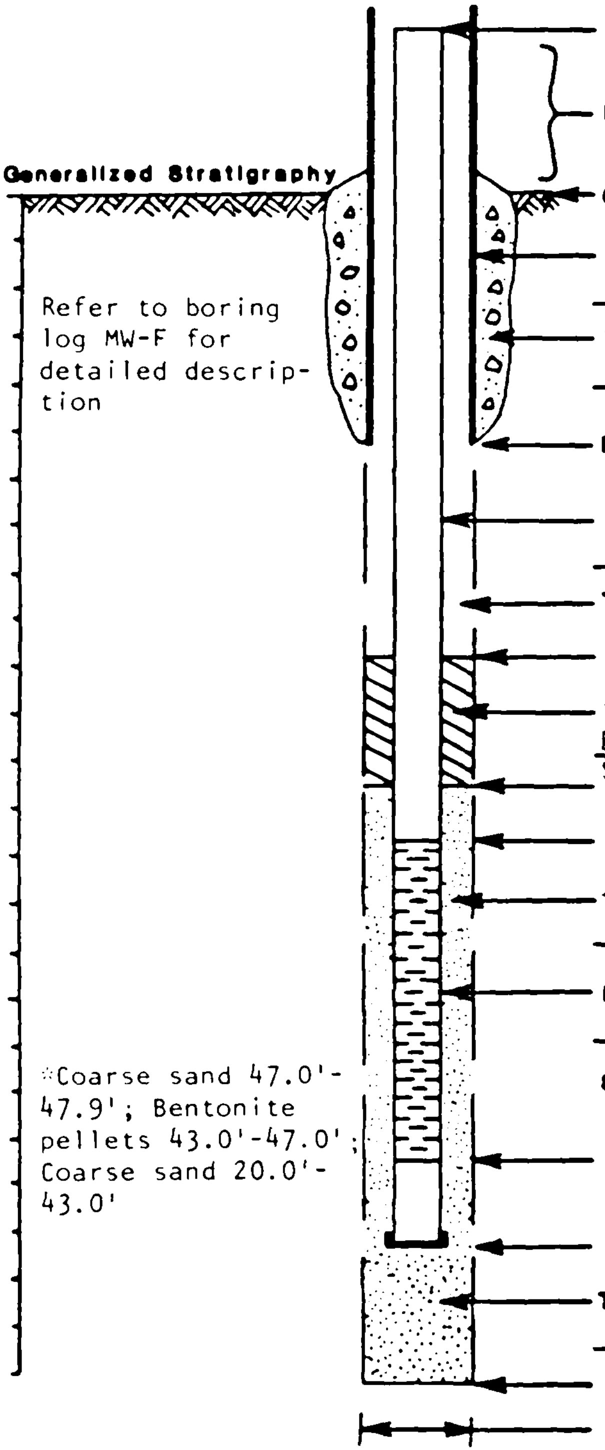
**Diameter of boring** 6"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA
**Location** Baier Site
**Installed by** Layne-Western
**Inspected by** K. Doeden
**Method of Installation** CME-550 with 8" HSA
**Remarks**

**Piez./Well No.** MW-F
**Project No.** 89C7583
**Date** 7/25/89
**Time** 6:15 p.m.



Refer to boring log MW-F for detailed description

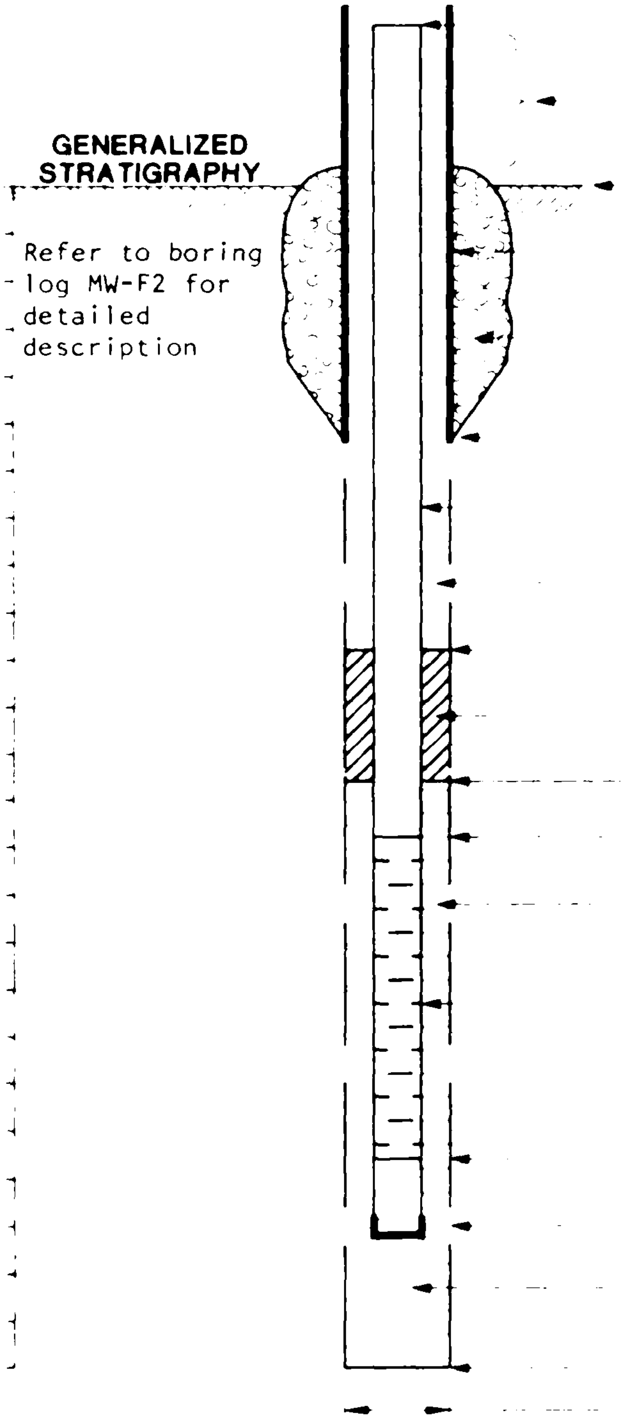
*Coarse sand 47.0'-47.9'; Bentonite pellets 43.0'-47.0'; Coarse sand 20.0'-43.0'

**Elevation of top of riser pipe** 692.5
**Height of riser above ground** 2.5'
**Ground Elevation** 690.0
**I.D./Type of surface casing** 3.7" Steel Locking Protective Casing
**Type of surface seal** Concrete
**Depth of surface seal** 3.0'
**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC
**Type of backfill** Volclay Grout
**Depth of top of seal** 17.0'
**Type of seal** Fine sand 19.5'-20.0'; Bentonite Pellets 17.0'-19.5'; Fine Sand 16.3'-17.0'
**Depth of top of filter pack** 19.5'
**Depth of top of screen** 22.0'
**Type of filter pack** Coarse Sand
**I.D./Type of screen** 2"/SCH 40 Threaded PVC
**Screen slot size** 0.010"
**Depth of bottom of screen** 41.6'
**Depth of bottom of plugged blank section** 41.8'
**Type of backfill below observation well** *
**Depth of bottom of boring** 47.9'
**Diameter of boring** 6"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA
**Piez./Well No.** MW-F2
**Location** Baier Site
**Project No.** 89C7583-1
**Installed by** Layne Western
**Date** 6/15/90
**Inspected by** Klaas Doeden
**Time** 2:00 p.m.
**Method of Installation** Plain States MR300F with 8" HSA
**Remarks**



**Elevation of top of riser pipe** 692.91

**Height of riser above ground** 2.0'

**Ground Elevation** 690.9

**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 110.0'

**Type of seal** "Enviroplug" pellets 110.0'-113.5'; Fine sand 113.5'-114.0'

**Depth of top of filter pack** 114.0'

**Depth of top of screen** 116.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 (Machine slot) Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 131.0'

**Depth of bottom of plugged bank section** 133.2'

**Type of backfill below observation well** Medium sand 40/30 131.5'-138.2'; "hole plug pellets" 133.2';-138.8'

**Depth of bottom of boring** 133.2'

**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Layne-Western

**Inspected by** K. Doeden

**Method of Installation** CME-550 with 8" HSA

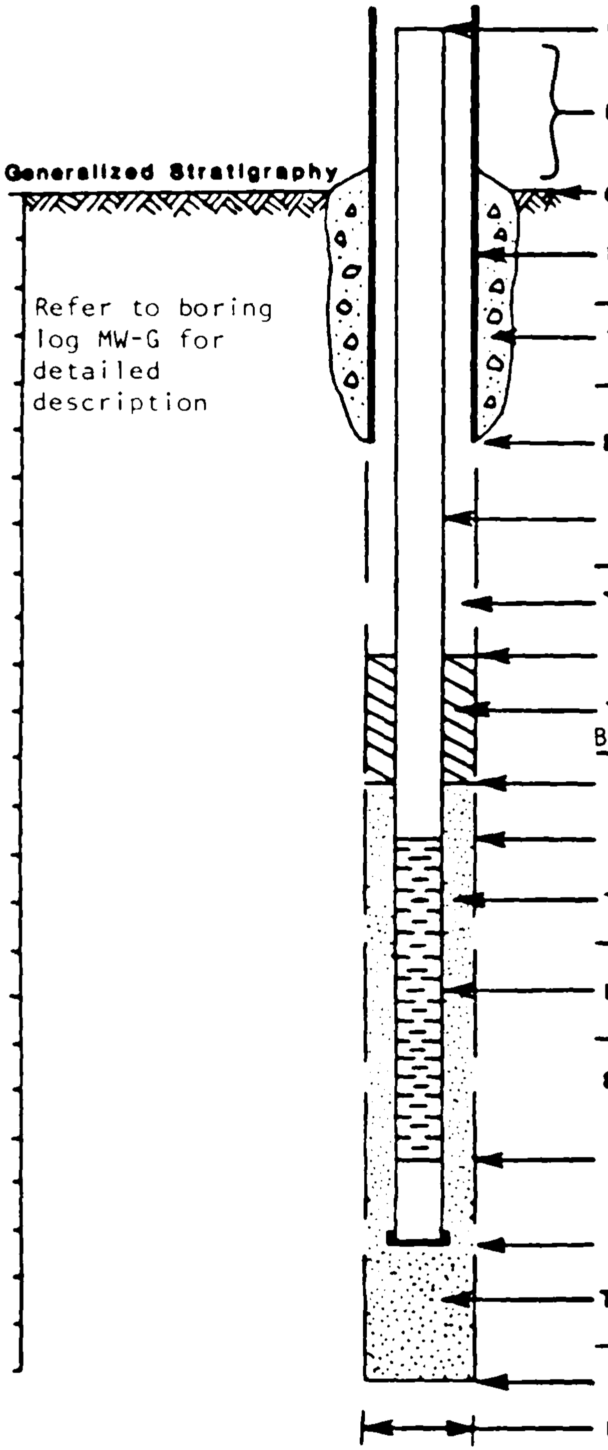
**Remarks**

**Piez./Well No.** MW-G

**Project No.** 89C7583

**Date** 7/29/89

**Time** 8:57 a.m.



Refer to boring log MW-G for detailed description

**Elevation of top of riser pipe** 704.95

**Height of riser above ground** 2.2'

**Ground Elevation** 702.7

**I.D./Type of surface casing** 3.7" Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC

**Type of backfill** Volclay grout

**Depth of top of seal** 38.5'

**Type of seal** Fine sand 38.0'-38.0' Bentonite Pellets 38.5'-40.5' Fine sand 40.5'-41.3'

**Depth of top of filter pack** 40.5'

**Depth of top of screen** 42.8'

**Type of filter pack** Coarse sand

**I.D./Type of screen** 2"/SCH 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 57.8'

**Depth of bottom of plugged blank section** 58.0'

**Type of backfill below observation well** Coarse sand

**Depth of bottom of boring** 60.5'

**Diameter of boring** 6"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Layne-Western

**Inspected by** D. Jorgenson

**Piez./Well No.** MW-H

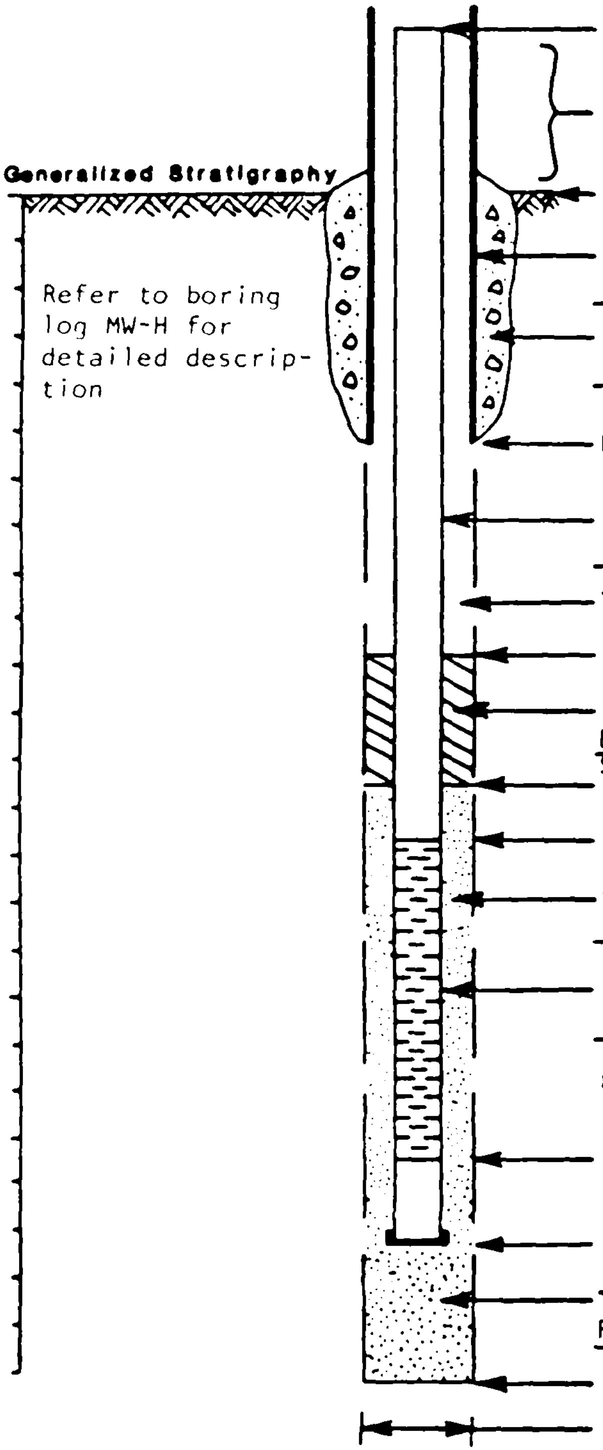
**Project No.** 89C7583

**Date** 7/30/89

**Time** 5:33 p.m. completed

**Method of Installation** Mobile B-61 with 8" HSA

**Remarks** Volclay installed on 7/31/89



Refer to boring log MW-H for detailed description

**Elevation of top of riser pipe** 706.76

**Height of riser above ground** ±2.0'

**Ground Elevation** 704.8

**I.D./Type of surface casing** 3.7"/Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC

**Type of backfill** Volclay Grout

**Depth of top of seal** 16.0'

**Type of seal** Buffer sand 19.0'-19.6'; Bentonite pellets 16.0'-19.0'; Buffer Sand 15.5'-16.0'

**Depth of top of filter pack** 19.0'

**Depth of top of screen** 21.9'

**Type of filter pack** Coarse Sand

**I.D./Type of screen** 2"/SCH 40 (Machine slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 36.9'

**Depth of bottom of plugged blank section** 37.1'

**Type of backfill below observation well** Filter pack with bentonite pellets 54.0'-55.0'

**Depth of bottom of boring** 55.0'

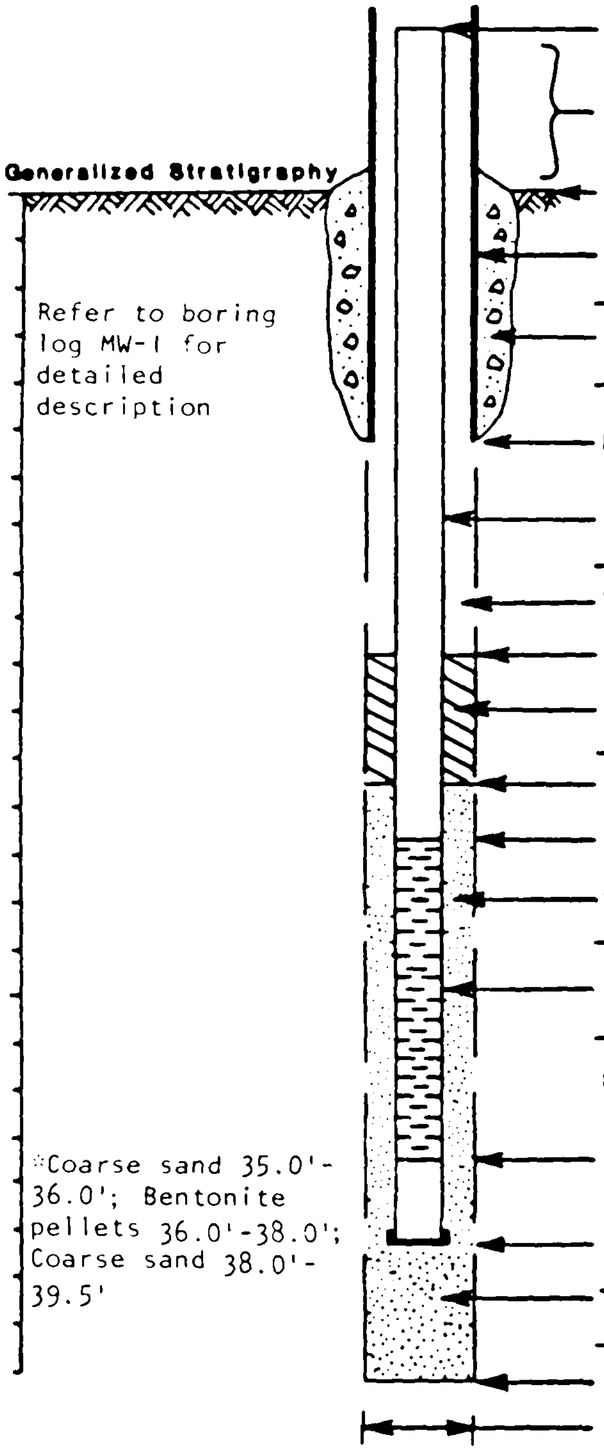
**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA
**Location** Baier Site
**Installed by** Layne-Western
**Inspected by** K. Doeden
**Method of Installation** CME-550 with 8" HSA
**Remarks**

**Piez./Well No.** MW-1
**Project No.** 89C7583
**Date** 7/28/89
**Time** 9:52 a.m.



Refer to boring log MW-1 for detailed description

☆Coarse sand 35.0'-36.0'; Bentonite pellets 36.0'-38.0'; Coarse sand 38.0'-39.5'

**Elevation of top of riser pipe** 705.64
**Height of riser above ground** 2.4'
**Ground Elevation** 714.2
**I.D./Type of surface casing** 3.7"/Steel Locking Protective Casing
**Type of surface seal** Concrete
**Depth of surface seal** 3.0'
**I.D./Type of riser pipe** 2"/ SCH 40 Threaded PVC
**Type of backfill** Volclay Grout
**Depth of top of seal** 15.4'
**Type of seal** Fine sand 14.9'-15.4'; Bentonite Pellets 15.4'-17.4'; Fine Sand 17.4'-17.9'
**Depth of top of filter pack** 17.4'
**Depth of top of screen** 19.8'
**Type of filter pack** Coarse sand
**I.D./Type of screen** 2"/ SCH 40 (Machine slot) Threaded PVC
**Screen slot size** 0.010"
**Depth of bottom of screen** 34.8'
**Depth of bottom of plugged blank section** 35.0'
**Type of backfill below observation well** ☆
**Depth of bottom of boring** 39.5'
**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Layne Western

**Inspected by** B. Hedenkamp

**Method of Installation** CME 550 with 8" HSA

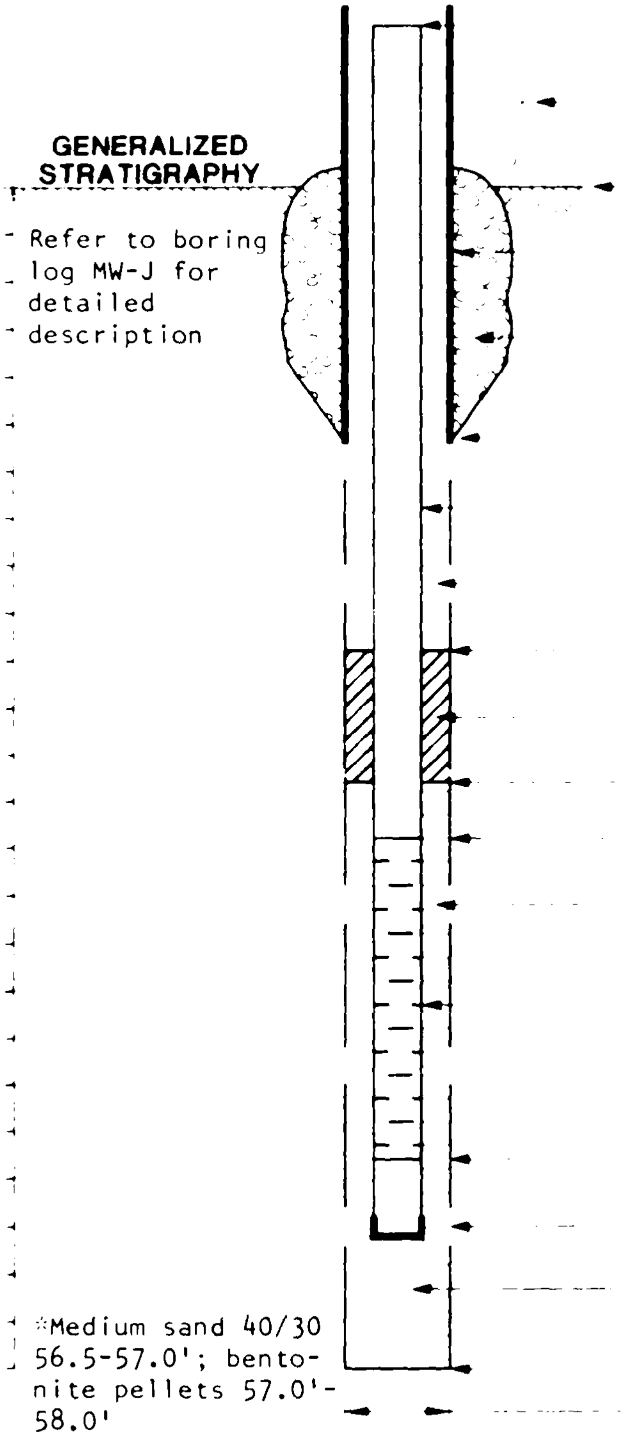
**Remarks**

**Piez./Well No** MW-J

**Project No.** 89C7583-1

**Date** 5/2-3/90

**Time** 8:00 p.m.



Refer to boring log MW-J for detailed description

*Medium sand 40/30 56.5-57.0'; bentonite pellets 57.0'-58.0'

**Elevation of top of riser pipe** 704.16

**Height of riser above ground** 1.8'

**Ground Elevation** 702.3

**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 5.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 36.0'

**Type of seal** Bentonite Pellets

**Depth of top of filter pack** 39.0'

**Depth of top of screen** 41.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 56.0'

**Depth of bottom of plugged bank section** 56.5'

**Type of backfill below observation well** *

**Depth of bottom of boring** 58.0'

**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Layne Western

**Inspected by** Bret Hedenkamp

**Method of Installation** CME 550 with 8" HSA

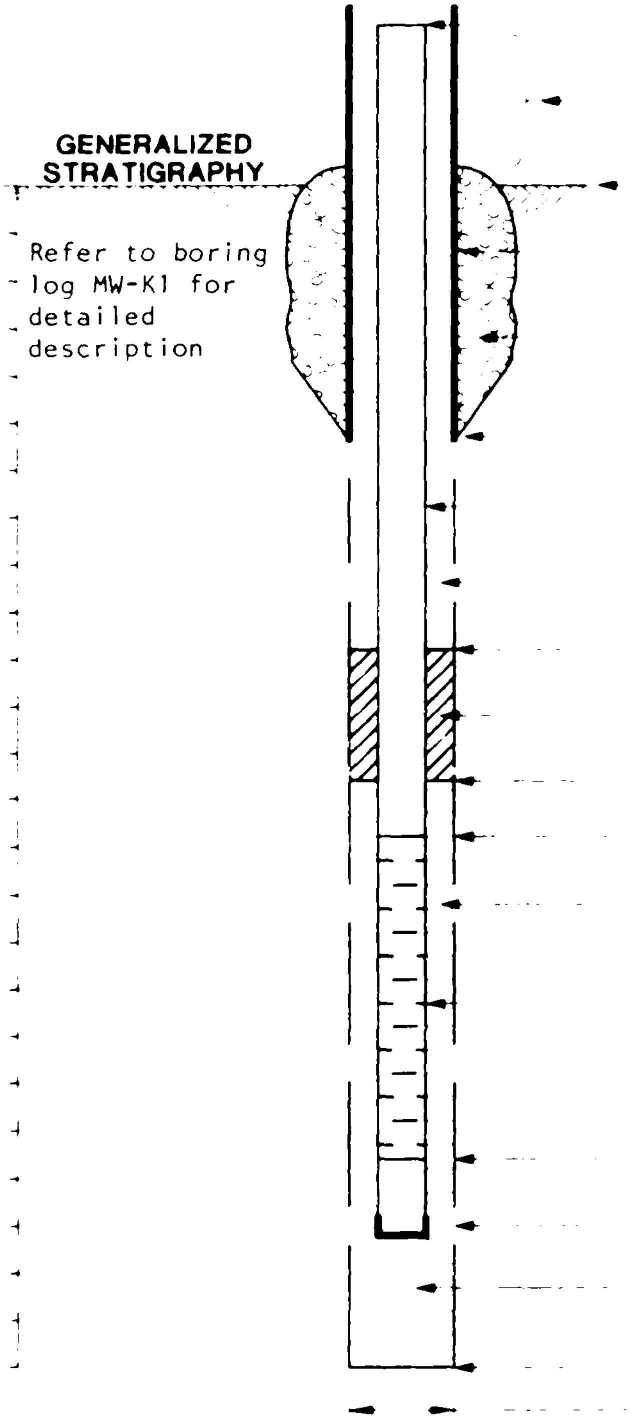
**Remarks**

**Piez./Well No.** MW-K1

**Project No.** 89C7583-1

**Date** 5/1-2/90

**Time** 6:00 p.m.



**Elevation of top of riser pipe** 705.61

**Height of riser above ground** 1.6'

**Ground Elevation** 704.05

**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 5.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 5.0'

**Type of seal** Bentonite Pellets

**Depth of top of filter pack** 46.0'

**Depth of top of screen** 48.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 58.0'

**Depth of bottom of plugged bank section** 58.5'

**Type of backfill below observation well** Medium sand 40/30

**Depth of bottom of boring** 65.0'

**Diameter of boring** 8"

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Layne Western

**Inspected by** Klaas Doeden

**Method of Installation** Plain States MR300F with 8" HSA

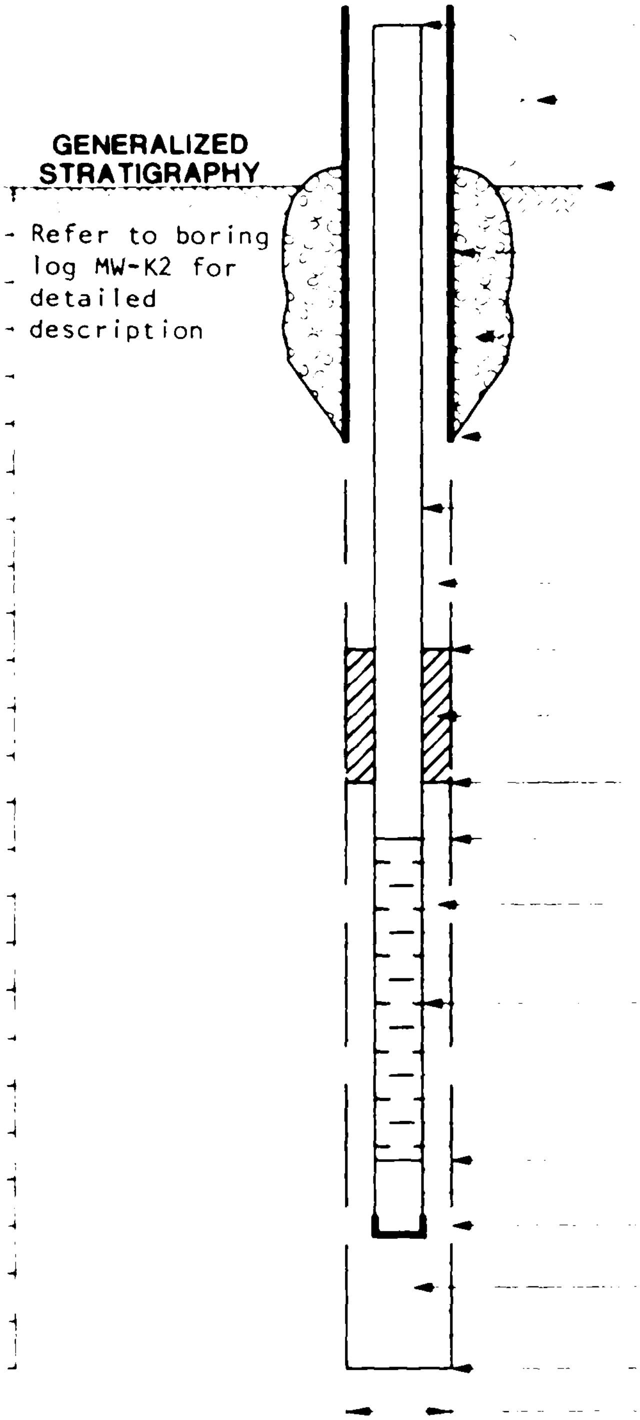
**Remarks**

**Piez./Well No.** MW-K2

**Project No.** 89C7583-1

**Date** 6/7/90

**Time** 7:30 a.m.



**Elevation of top of riser pipe** 705.85

**Height of riser above ground** 2.2'

**Ground Elevation** 703.7

**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2" SCH. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 115.0'

**Type of seal** "Enviroplug" pellets 115.0'-118.5'; Fine sand 118.5'-119.0'

**Depth of top of filter pack** 119.0'

**Depth of top of screen** 121.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 (Machine slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 136.0'

**Depth of bottom of plugged bank section** 136.5'

**Type of backfill below observation well** Medium sand 40/30 136.5'-140.0'

**Depth of bottom of boring** 140.0'

**Diameter of boring** 8 inches

**Woodward-Clyde Consultants**

JE JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE/WELL CONSTRUCTION LOG

SITE ID: DuPont X-23 LOCATION ID: Fedler JL1 FIELD REP: Bill Gresham

APPROX. SITE COORDINATES (FT.): N ____ E ____

GROUND ELEVATION (FT. MSL): ____ COMPLETION DATE: 11 July 1990

## BOREHOLE SUMMARY

DRILLER: Don Carlson J+R Drilling

RIG TYPE: CME-750

| BIT TYPE | HOLE DIA (In.) | END ● DEPTH (ft.) | FLUID TYPE |
|---|---|---|---|
| hollow stem auger | 7 | 67.5 | — |
| | | | |
| | | | |
| | | | |

## CASING SUMMARY

| CASING TYPE * | DESCRIPTION | DIA. (In.) | END ✚ DEPTH (ft.) |
|---|---|---|---|
| N | bentonite pellets | — | [illegible] |
| N | filter pack | — | 49.[illegible] |
| S | .01 slot PVC sch.40 | 2 | 68.[illegible] |
| B | schedule 40 PVC | 2 | 53.0 |
| | | | |
| | | | |
| | | | |

* P-Protective S-Screen B-Blank O-Open N-None

✚ Depth from Top of Casing

## CONSTRUCTION TIME LOG

| ACTIVITY | START DATE | START TIME | END TIME |
|---|---|---|---|
| DRILLING | 7/11/90 | 0900 | 1130 |
| CASING | 7/11/90 | 1400 | 1415 |
| FILTER PACK | 7/11/90 | 1415 | 1420 |
| SEAL | 7/11/90 | 1420 | 1425 |
| BACKFILL | 7/11/90 | 1430 | 1500 |
| DEVELOPMENT | 7/14/90 | 0800<br>1400 | 1040<br>1500 |
| OTHER | | | |

## WELL CONSTRUCTION

| TYPE CODE * | DESCRIPTION | END ● DEPTH (ft.) |
|---|---|---|
| S | bentonite pellets | 67.5 |
| F | sand | 67.0 |
| S | bentonite pellets | 480 |
| 3 | 3% bentonite grout | 44.0 |
| | | |
| | | |
| | | |
| | | |

* 3 - Backfill S - Seal F - Filter Pack

● Depth from Ground Surface

## WELL DEVELOPMENT

COMMENTS: First development included surging and pumping with QED air development pump. It kept going dry, producing ≈4 gallons. Added distilled

**JE JACOBS ENGINEERING GROUP INC.**
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# WELL COMPLETION RECORD

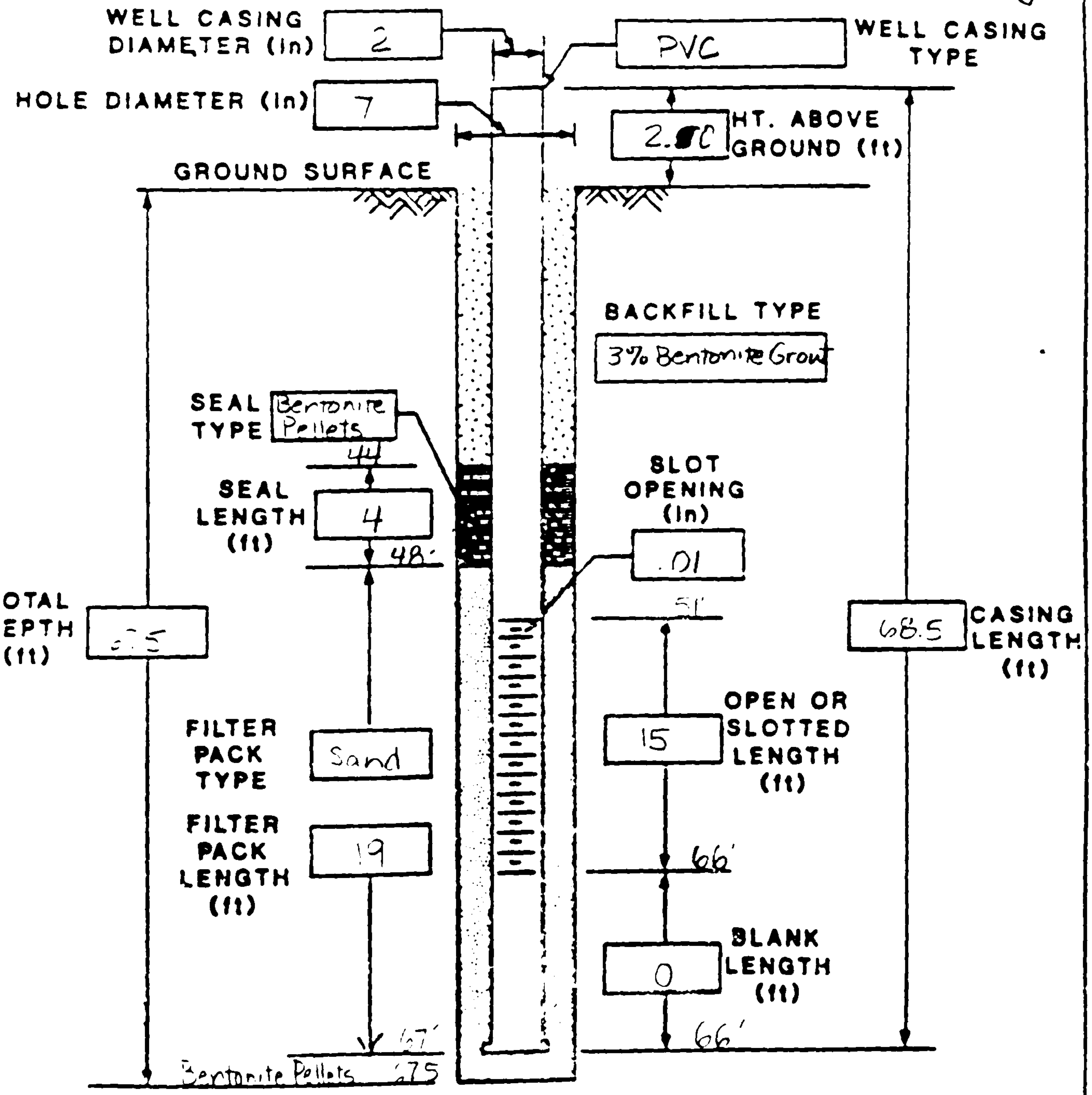
SITE ID: DuPont X-23 LOCATION ID: Fedler JL1 DATE INSTALLED: [illegible] July 1990

APPROX. SITE COORDINATES:(FT.) N ______ E ______

OPEN AREA PER LINEAL FT. (IN²/FT.) ______

FORMATION OF COMPLETION: ______

FIELD REP.: Bill Gresham DRILLER: Don Carlson J&B Drilling



WELL CASING DIAMETER (In): 2

WELL CASING TYPE: PVC

HOLE DIAMETER (In): 7

HT. ABOVE GROUND (ft): 2.0

BACKFILL TYPE: 3% Bentonite Grout

SEAL TYPE: Bentonite Pellets

SEAL LENGTH (ft): 4

SLOT OPENING (In): .01

TOTAL DEPTH (ft): 67.5

CASING LENGTH (ft): 68.5

OPEN OR SLOTTED LENGTH (ft): 15

FILTER PACK TYPE: Sand

FILTER PACK LENGTH (ft): 19

BLANK LENGTH (ft): 0

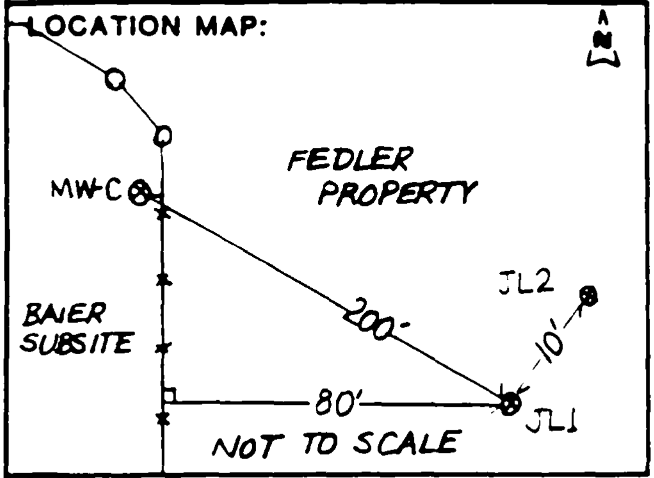
COMMENTS: ______

**JE JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 1 of 1

LOCATION MAP:



SITE ID: DuPont X-23 LOCATION ID: Fedler JL1
SITE COORDINATES (ft.):
N ________ E ________
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 3¾" HSA w/3" ~~SPLIT BARREL SAMPLER~~ CENTER PLUG
DRILLING CONTR.: J+R Drilling
DATE STARTED: 11 July 1990
DATE COMPLETED: 11 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ________
SITE CONDITION ________

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | A | | | | | SILTY LEAN CLAY med, damp, brn, contains rootlets, organics. TOPSOIL. 0.7 |
| | | | | | | | | | SILTY LEAN CLAY, med., moist, lt. grayish-brn., occ. rootlets, sl. Fe staining |
| 5 | | | | | | | | | 6.0 |
| | | | | | | 3¾" HSA W/CENTER PLUG | | | SILTY LEAN CLAY med, moist, lt. brn, sl. mottled, occ gravel, occ. limonite nodules |
| 10 | | | | | | | | | |
| 15 | | | | | | | | | increasingly sandy (f gr, poorly sorted) w/depth |
| 20 | | | | | | | | | increasing moisture content w/ depth |
| 25 | | | | | | | | | color more red w/depth |
| | | | | | | | | | increasing stiffness w/depth |
| 30 | | | | ↓ | | | | | |

COMMENTS: No samples were collected

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-2S (4/85)

JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 2 of 7

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler JL1
SITE COORDINATES (ft.):
N ____ E ____
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 3¾" HSA w/CENTER PLUG or 3" SPLIT BARREL SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 11 July 1990
DATE COMPLETED: 11 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION
SITE CONDITION

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | | |
| | | | | A | | 3¾" HSA W/CENTER PLUG | | | SILTY LEAN CLAY, stiff, moist, reddish-brn, contains material grading from f.gr. sand to gravel (<1" dia) |
| 35 | | | | | | | | | |
| 40 CHANGE IN SCALE | | | | | | 40.0 | | | CHANGE IN SCALE 40 |
| | | | | U | | PUSH 1<br>D-5.2'<br>R-5.2'<br>3¾" HSA W/3" SPLIT BARREL SAMPLER | | | |
| 41 | | | | | | | | | |
| | | | | | | | | | lg pc of granite |
| 42 | | | | | | | | | |
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |

COMMENTS: switched from center plug to split barrel sampler at 40ft.

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

# JACOBS ENGINEERING GROUP INC.

ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

## BOREHOLE LOG (SOIL)

Page 3 of 7

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler JL1
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): ______
DRILLING METHOD: 3¾ HSA w/3" SPLIT BARREL SAMPLER
DRILLING CONTR.: J+B Drilling
DATE STARTED: 11 July 1990
DATE COMPLETED: 11 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 44 | | | | U | | | | | SILTY LEAN CLAY, stiff, moist, reddish-brn., contains material grading from f. gr. sand to gravel (< 1" dia) |
| 45 | | | | | | 452 | | | |
| 46 | | | | | | PUSH 2<br>D-5.0'<br>R-5.0'<br>3¾"HSA w/3" SPLIT BARREL SAMPLER | | | |
| 47 | | | | | | | | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | ↓ | | | | | |

COMMENTS: ______

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JE JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 4 of 7

LOCATION MAP: N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL1
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: ¾" HSA w/ 3" SPLIT BARREL SAMPLER
DRILLING CONTR.: J and R Drilling
DATE STARTED: 11 July 1990
DATE COMPLETED: 11 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | BLOWS ~~PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 50 | | | | U | | 50.2 | | | SILTY LEAN CLAY, stiff, moist reddish brn., contains material grading from f. gr. sand to gravel (<1" dia) |
| | | | | | | PUSH 3<br>D-5.0<br>R-5.0<br>3¾" HSA<br>W/3" SPLIT<br>BARREL<br>SAMPLER | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | o | - Fe concretion |
| 53 | | | | | | | | | |
| 54 | | | | | | | | O | - lg pc. SANDSTONE gravel |
| 55 | | | | | | 55.2 | | | |
| | | | | | | PUSH 4<br>D-2.0'<br>R-2.0' | | | |
| 56 | | | | ↓ | | | | | |

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 5 of 7

LOCATION MAP:

N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL1
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): ______
DRILLING METHOD: 3¾" HSA w/ 3" SPLIT BARREL SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 11 July 1990
DATE COMPLETED: 11 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH 56 | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 IN.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | U | | 3¾" HSA W/ 3" SPLIT BARREL SAMPLER | | | SILTY LEAN CLAY, stiff, moist, reddish-brn, contains material ranging from f.gr. sand to gravel (< 1" dia.) 56.8 |
| 57 | | | | | | 57.2' | | | SILTY SAND, stiff, saturated, lt. brn, contains gravel 57.8 |
| 58 | | | | | | PUSH 5, D-3.8' R-3.8' 3¾" HSA W/ 3" SPLIT BARREL SAMPLER | | | SILTY, SANDY, CLAY, stiff, wet, lt. grayish brn, mottled, contains gravel<br>TOP OF UNWEATHERED TILL 58.8 |
| 59 | | | | | | | | | SILTY SANDY CLAY, v. stiff, moist, brownish-gray<br>interbedded w/ f.gr, tannish-gray, wet SAND<br>contains ≈ 5% gravel |
| 60 | | | | | | | | | 60.6 SAND 61.0 |
| 61 | | | | | | 61.0<br>PUSH 6 D-5.0 R-5.0 | | | |
| 62 | | | | ↓ | | | | | |

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 6 of 7

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler JLI
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): ______
DRILLING METHOD: 3¾" HSA w/ 3" SPLIT BARREL SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 11 July 1990
DATE COMPLETED: 11 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 62 | | | | U | | 3¾' HSA w/ 3" SPLIT BARREL SAMPLER | | | SILTY-SANDY LEAN CLAY, v. stiff, moist, brownish-gray<br>interbedded w/ f. gr., tannish-gray, wet SAND<br>contains ≈ 5% gravel |
| 63 | | | | | | | | | 63.6<br>SAND<br>64.0 |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | 66.0 | | | |
| | | | | | | PUSH 7<br>D - 3.4'<br>R - 3.4'<br>3¾" HSA W/ 3" SPLIT BARREL SAMPLER | | | |
| 67 | | | | | | | | | |
| 68 | | | | ↓ | | | | | |

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 7 of 7

LOCATION MAP:

N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL1
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): ______
DRILLING METHOD: 3¾" HSA w/3" SPLIT BARREL SAMPLER
DRILLING CONTR.: I+B Drilling
DATE STARTED: 11 July 1990
DATE COMPLETED: 11 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 68 | | | | | | | | | SILTY SANDY LEAN CLAY, v. stiff, moist, brownish-gray |
| | | | | | | | | | interbedded w/ f gr, wet, tannish-gray SAND |
| 69 | | | | | | | | | contains ≈ 5% gravel (½" dia) |
| | | | | | | | | | B.O.H. 69.4 FT. T.C. |
| | | | | | | | | | No REFUSAL |
| | | | | | | | | | No FREE WATER ENCOUNTERED |
| | | | | | | | | | SEE WELL DIAGRAM |

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JE JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE/WELL CONSTRUCTION LOG

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2 FIELD REP: Bill Gresham

APPROX. SITE COORDINATES (FT.): N ____ E ____

GROUND ELEVATION (FT. MSL): ____ COMPLETION DATE: 13 July 1990

## BOREHOLE SUMMARY

DRILLER: Ray Coons / Don Carlson
J&R Drilling

RIG TYPE: CME-750

| BIT TYPE | HOLE DIA. (in.) | END DEPTH ● (ft.) | FLUID TYPE |
|---|---|---|---|
| hollow stem auger | 11.5 | 7[illegible] | — |
| | — | 144[illegible] | — |
| | | | |
| | | | |

## CASING SUMMARY

| CASING TYPE ● | DESCRIPTION | DIA. (in.) | END DEPTH ✚ (ft.) |
|---|---|---|---|
| N | bentonite pellets | — | 14[illegible] |
| N | filter pack | — | +1[illegible] |
| B | schedule 40 PVC | 4 | 1329 |
| [illegible] | .01 slot sched 40 PVC | 4 | 1324 |
| [illegible] | schedule 40 PVC | 4 | 11[illegible] |
| | | | |
| | | | |
| | | | |

● P-Protective S-Screen B-Blank O-Open N-None

✚ Depth from Top of Casing

## CONSTRUCTION TIME LOG

| ACTIVITY | START DATE | START TIME | END TIME |
|---|---|---|---|
| DRILLING | 6/28/90 | 1120 | 1235 |
| | | 1305 | 1635 |
| | 7/12/90 | 0525 | 1155 |
| | | 1230 | 1630 |
| | 7/13/90 | 1000 | 1015 |
| CASING surface | [illegible]/23/90 | [illegible]30 | 2030 |
| | 7/13/90 | 1145 | 1230 |
| FILTER PACK | 7/13/90 | 1235 | 1250 |
| SEAL 1434 | 7/13/90 | 1250 | 1300 |
| BACKFILL grout surface casing | 7/[illegible]/90 | [illegible]30 | 2000 |
| | 7/13/90 | 1510 | 1640 |
| DEVELOPMENT | 7/15/90 | 1500 | 1520 |
| | | 540 | 1740 |
| OTHER | | | |

## WELL CONSTRUCTION

| TYPE CODE ● | DESCRIPTION | END DEPTH ● (ft.) |
|---|---|---|
| S | bentonite pellets | 141.5 |
| F | sand | 139.5 |
| S | bentonite pellets | 113.0 |
| B | 3% bentonite grout | 109.0 |
| | | |
| | | |
| | | |
| | | |

● B - Backfill S - Seal F - Filter Pack

● Depth from Ground Surface

## WELL DEVELOPMENT

COMMENTS: Development included 20 minutes surging with "A rod" surge block, then pumping with QED air development pump producing 55 gallons.

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# WELL COMPLETION RECORD

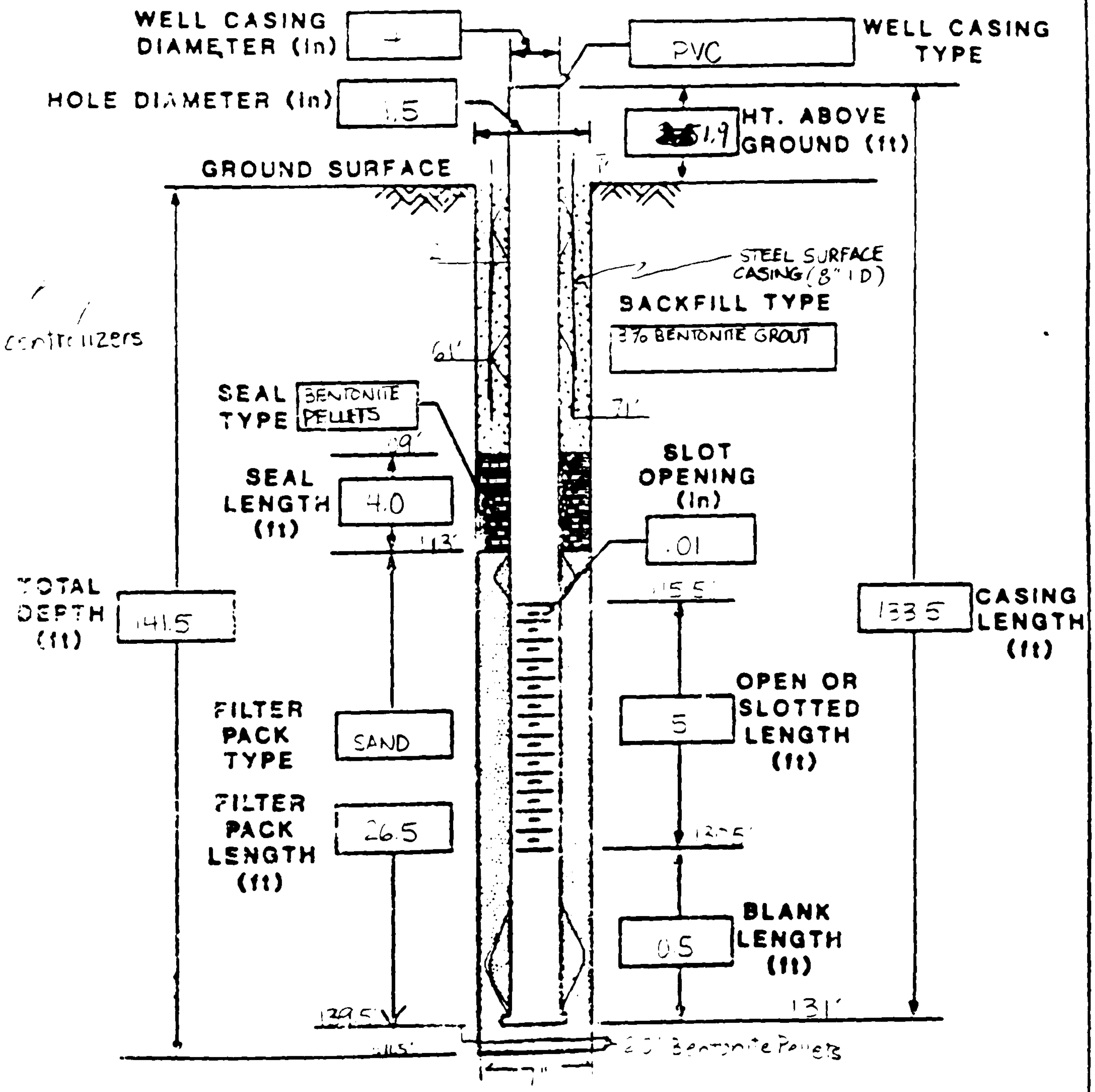
SITE ID: DuPont X-23 LOCATION ID: Fedler JL2 DATE INSTALLED: July 13, 1990

APPROX. SITE COORDINATES: (FT.) N ______ E ______

OPEN AREA PER LINEAL FT. ($IN^2$/FT.) ______

FORMATION OF COMPLETION: ______

FIELD REP.: Bill Gresham DRILLER: Don Carlson J+R Drilling



WELL CASING DIAMETER (in): –

WELL CASING TYPE: PVC

HOLE DIAMETER (in): .5

HT. ABOVE GROUND (ft): 1.9

BACKFILL TYPE: 3% BENTONITE GROUT

SEAL TYPE: BENTONITE PELLETS

SEAL LENGTH (ft): 4.0

SLOT OPENING (in): .01

TOTAL DEPTH (ft): 141.5

CASING LENGTH (ft): 133.5

FILTER PACK TYPE: SAND

FILTER PACK LENGTH (ft): 26.5

OPEN OR SLOTTED LENGTH (ft): 5

BLANK LENGTH (ft): 0.5

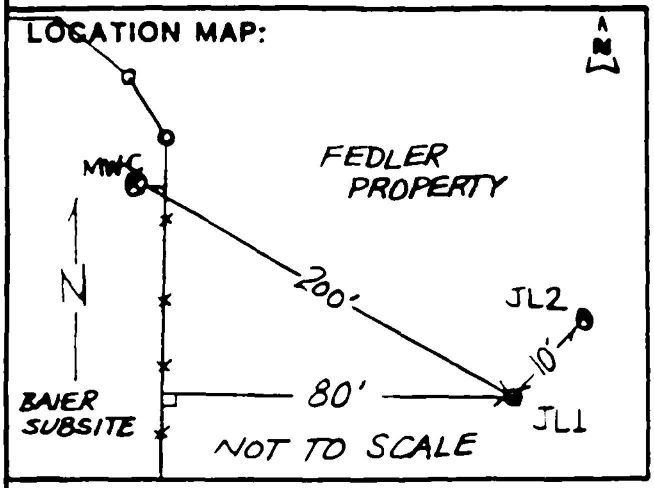
COMMENTS: ______

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 1 of 13

LOCATION MAP:



SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ________ E ________
GROUND ELEVATION (ft. MSL): 705.7
DRILLING METHOD: 3¾" HSA w/ 3" SPLIT BARREL SAMPLER ~~3¾" HSA w/ [illegible]~~
DRILLING CONTR.: J+R DRILLING
DATE STARTED: 28 JUNE 1990
DATE COMPLETED: 13 JULY 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ________
SITE CONDITION ________

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | U | DSX 23-001 | PUSH 1<br>D-3.7'<br>R-3.7'<br>3¾" HSA<br>W/ 3" SPLIT<br>BARREL<br>SAMPLER | | | SILTY LEAN CLAY, med., damp, brn, contains rootlets, organics<br>TOPSOIL<br>0.7 |
| | | | | | | | | | SILTY LEAN CLAY, med., moist, lt. grayish brn., occ rootlets, sl. Fe staining |
| 2 | | | | | DSX 23-002 | | | | |
| 3 | | | | | | | | | |
| 3.7 | | | | | | 3.7 | | | |
| 4 | | | | | DSX 23-003 | PUSH 2<br>D-3.7<br>D-3.7<br>3¾" HSA<br>W/ 3" SPLIT<br>BARREL<br>SAMPLER | | | |
| 5 | | | | | | | | | |
| 6 | | | | ↓ | | | | | |

COMMENTS: Volatiles samples taken 1.5'-2.0', 3.5'-4.0', 5.5'-6.0';

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-2S (4/85)

# BOREHOLE LOG (SOIL)

Page 2 of 3

LOCATION MAP:

N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): ______
DRILLING METHOD: Hollow stem auger/centerplug
DRILLING CONTR.: J and R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 7 | CHANGE IN SCALE | | | | | | | | CHANGE IN SCALE CHANGE IN MATERIAL AT 6. |
| 7.4 | | | | U | | PUSH 2 SEE ABOVE 7.4 | | | SILTY LEAN CLAY, stiff, damp, lt. grayish brn, contains Fe staining and Fe nodules (≈.10" dia) |
| | | | | A | | | | | |
| 10 | | | | ↓ | | | | | 10.0 |
| | | | | | | | | | SILTY LEAN CLAY, med., moist, lt. brn, sl. mottled, contains gravel<br>– QUARTZITE GRAVEL (5%), v. hard, sl. granular, xline, dk. brn and lt. tan |
| 15 | | | | | | 6¼"HSA W/CENTER PLUG | | | 14.0 |
| | | | | | | | | | becoming increasingly sandy (fine-grained, poorly sorted) with depth |
| 20 | | | | | | | | | increasing moisture content with depth |
| 25 | | | | | | | | | color becoming more reddish with depth |
| 30 | | | | | | | | | increasing stiffness with depth |
| 35 | | | | ↓ | | | | | |

COMMENTS: AFTER UPPER 7.4 FEET WAS SAMPLED, HOLE WAS DRILLED OUT WITH 6¼" HOLLOW STEM AUGERS WITH A CENTER PLUG

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 3 of 13

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): ______
DRILLING METHOD: 6 1/4 HSA w/CENTER PLUG
DRILLING CONTR.: J+R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 In.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 35 | | | | A | | | | | SILTY-SANDY LEAN CLAY, stiff, moist, reddish brn., occ gravel<br>36'-37' GRAVEL, quartzite, lt. tan, <1" dia. |
| 40 | | | | ↓ | | 6 1/4" HSA W/CENTER PLUG | | | |
| 45 | | | | | | | | | |
| 50 | | | | | | | | | |
| 55 | | | | | | | | | 580 |
| 60 | | | | | | | | | SILTY-SANDY LEAN CLAY, stiff, moist, dk grayish-brn, occ. gravel (<5%) <1/2" dia. |
| 65 | | | | ↓ | | | | | |

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-2S (4/85)

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 4 of 13

LOCATION MAP: N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 6¼" HSA w/C [illegible] 3¾" HSA w/ SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

GROUNDWATER LEVELS

| DATE | TIME | DEPTH (ft.) |
|---|---|---|
| 6/28/90 | 1630 | 66.0' |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 IN.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 65 ▼ | | | | A | | 6¼" HSA W/CENTER PLUG | | | 60 SILTY-SANDY LEAN CLAY, stiff, moist, dk. grayish brn, occ. gravel (<5%) < ½" dia. saturated zone 70.0 |
| 70 ▲ | | | | | | 71.0 | | | |
| 75 | | | | | | 3¾" HSA W/CENTER PLUG | | | |
| 80 | | | | | | | | | |
| 85 | | | | | | 89.0 | | | |
| 90 CHANGE IN SCALE | | | | U | | PUSH 3 D-5.0' R-5.0' | | | |
| 91 | | | | | | | | | |

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COMMENTS: End of shift 6/28 72 feet of surface casing was set to a depth of 71.0. On 7/10, surface casing was pressure grouted in. On 7/12 grout plug was drilled through and boring was advanced. Continuous sampling began below 90 feet.

SAMPLE TYPE
- A - Auger cuttings
- S - 2" O.D. 1.38" I.D. drive sample
- U - 3" O.D. 2.42" I.D. tube sample
- T - 3" O.D. thin-walled Shelby tube

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 5 of 13

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL):
DRILLING METHOD: 3¾" HSA w/SPLIT BARREL SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 91 | | | | U | | 3¾" HSA w/3" SPLIT BARREL SAMPLER | | | SILTY-SANDY LEAN CLAY, stiff, moist, dk grayish-brn., occ gravel (<5%) < ½" dia |
| 92 | | | | | | | | | |
| 93 | | | | | | | | | gravel content and size increasing with depth |
| 94 | | | | | | 94.0 | | | |
| | | | | | | PUSH4<br>D- 5.0'<br>R- 5.0'<br>3¾" HSA W/3" SPLIT BARREL SAMPLER | | | |
| 95 | | | | | | | | | |
| 96 | | | | | | | | | |
| 97 | | | | ↓ | | | | | |

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 6 of 13

LOCATION MAP: N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ________ E ________
GROUND ELEVATION (ft. MSL): ________
DRILLING METHOD: 3¾" HSA w/SPLIT BARREL SAMPLER
DRILLING CONTR.: J&R Drilling
DATE STARTED: 8 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ________
SITE CONDITION ________

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 97 | | | | U | | | | | SILTY-SANDY LEAN CLAY, stiff, moist, dk. brownish-gray, approx. 10% gravel (< 1" dia.) |
| 98 | | | | | | | | | |
| 99 | | | | | | 990 | | | |
| | | | | | | PUSH5'<br>D-5.0'<br>R-5.0'<br>3¾" HSA<br>w/3" SPLIT<br>BARREL<br>SAMPLER | | | |
| 100 | | | | | | | | | |
| | | | | | | | | o | gravel |
| 101 | | | | | | | | | |
| | | | | | | | | o | gravel |
| 102 | | | | | | | | | |
| 103 | | | | ↓ | | | | O | - cobble |

COMMENTS: ________

| SAMPLE TYPE |
|---|
| A - Auger cuttings |
| S - 2" O.D. 1.38" I.D. drive sample |
| U - 3" O.D. 2.42" I.D. tube sample |
| T - 3" O.D. thin-walled Shelby tube |

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 7 of 13

LOCATION MAP: N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ____ E ____
GROUND ELEVATION (ft. MSL): ____
DRILLING METHOD: 3¾' HSA w/SPLIT BARREL SAMPLER CENTER PLUG
DRILLING CONTR.: J&R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ____
SITE CONDITION ____

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 103 | | | | U | | | | | SILTY-SANDY LEAN CLAY, stiff, moist, dk. brownish-gray, approx. 10% gravel (< 1½" dia.) |
| 104 | | | | ↓ | | 104.0<br>PUSH 6,<br>D-1.6',<br>R-1.6'<br>3¾" HSA w/3" SPLIT BARREL SAMPLER | | | |
| 105 | | | | ↓ | | 105.6 | | | – cobble (Diorite?) |
| 106 | | | | A | | 3¾" HSA w/CENTER PLUG | | | |
| 107 | | | | | | | | | |
| 108 | | | | | | | | | |
| 109 | | | | ↓ | | 109 | | | |

COMMENTS: Large cobble at 105.6 ft stopped split barrel sampler, center plug was inserted to cut through down to 109 ft. Sampling with barrel resumed at 109 ft

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-2S (4/85)

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 8 of 13

LOCATION MAP:

N

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ____ E ____
GROUND ELEVATION (ft. MSL): ____
DRILLING METHOD: 3¾"HSA w/ SPLIT BARREL SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ____
SITE CONDITION ____

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 109 | | | | U | | PUSH 7<br>D-5.0<br>R-5.0<br>3¾"HSA w/3" SPLIT BARREL SAMPLER | | | SILTY-SANDY LEAN CLAY, stiff, moist, dk. brownish-gray, approx. 10% gravel (< 1½" dia) |
| 110 | | | | | | | | | |
| 111 | | | | | | | | | |
| 112 | | | | | | | | | |
| 113 | | | | | | | | | |
| 114 | | | | | | 114.0 | | | |
| | | | | | | PUSH 8<br>D-5.0<br>R-4.6 | | | |
| 115 | | | | | | | | | |

COMMENTS: ____

SAMPLE TYPE
A - Auger cuttings
B - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 9 of 13

LOCATION MAP:

N

SITE ID: DuPont Y-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ________ E ________
GROUND ELEVATION (ft. MSL): ________
DRILLING METHOD: 3¾" HSA w/SPLIT BARREL SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ________
SITE CONDITION ________

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 115 | | | | U | | 3¾"HSA w/3" SPLIT BARREL SAMPLER | | | see above 115.4 |
| | | | | | | | | | SILTY SAND, stiff, saturated, poorly sorted, brownish-gray, mottled, occ gravelly |
| 116 | | | | | | | | | 116.4 |
| | | | | | | | | | SANDY SILT, stiff, wet, f.gr.-v.f.gr., tannish-gray, occ. gravel (< 1" dia.) |
| 117 | | | | | | | | | |
| 118 | | | | | | | | | |
| 119 | | | | | | 119.0 | | | 119.4 |
| | | | | | | PUSH 9<br>D-5.0<br>R-5.0<br>3¾"HSA w/ 3" SPLIT BARREL SAMPLER | | | SANDY SILTY LEAN CLAY, v. stiff, wet, brownish-gray, |
| 120 | | | | | | | | | |
| 121 | | | | ↓ | | | | | |

COMMENTS: ________

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 10 of 13

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler II 2
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft, MSL): ______
DRILLING METHOD: 3¾" HSA w/3" SPLIT BARREL SAMPLER
DRILLING CONTR.: J+R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 121 | | | | U | | | | | SANDY SILTY LEAN CLAY, v. stiff, wet, brownish-gray |
| 122 | | | | | | | | | 122.4 |
| | | | | | | | | | SILTY SAND, stiff, saturated, grayish-brn, f gr - coarse, poorly sorted 12 |
| 123 | | | | | | | | | SANDY SILT, v. stiff, brownish-gray, wet, v. f gr - coarse, poorly sorted, occ. gravel (< 1" dia.) |
| 124 | | | | | | 124.0 | | | |
| | | | | | | PUSH 10<br>D-5.0<br>R-4.6<br>3¾" HSA w/ 3" SPLIT BARREL SAMPLER | | | |
| 125 | | | | | | | | | |
| 126 | | | | | | | | | 126.6 |
| | | | | | | | | | SAND, sl. silty, stiff, saturated, brownish gray, med - coarse gr., poorly sorted |
| 127 | | | | ↓ | | | | | |

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-2S (4/85)

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 11 of 13

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler II.2
SITE COORDINATES (ft.):
N ________ E ________
GROUND ELEVATION (ft. MSL): ________
DRILLING METHOD: 3¾"HSA w/3"SPLIT BARREL SAMPLER
DRILLING CONTR.: T&R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 3 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ________
SITE CONDITION ________

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 127 | | | | U | | | | | SANDY SILT, v. stiff, brownish-gray, wet, v.f gr-coarse, poorly sorted, occ. gravel, (< 1" dia.)<br>127.8 |
| 128 | | | | | | | | | SANDY SILT, v. stiff, wet, brownish-gray |
| 129 | | | | | | 129.0<br>PUSH 11<br>D-5.0'<br>R-4.4' | | | 129.2<br>SAND, loose, saturated, brownish-gray, f gr-med gr, sl. silty, occ. gravel |
| 130 | | | | | | 3¾" HSA w/3" SPLIT BARREL SAMPLER | | | |
| 131 | | | | | | | | | |
| 132 | | | | | | | | | |
| 133 | | | | ↓ | | | | | |

COMMENTS: ________

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 12 of 13

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): ______
DRILLING METHOD: 3¾" HSA W/3" SPLIT BARREL SAMPLER
DRILLING CONTR.: J+B Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 133 | | | | U | | | | | SAND, loose, saturated, brownish-gray, f. gr.-med. gr., sl. silty, occ. gravel<br>133.8 |
| 134 | | | | | | 134<br>PUSH 12<br>D-5.0'<br>R-2.6'<br>3¾" HSA w/3" SPLIT BARREL SAMPLER | | | SANDY SILT, v. stiff, wet, brownish-gray<br>134.4<br>SILTY SANDY LEAN CLAY, v. stiff, wet, brownish-gray, |
| 135 | | | | | | | | | |
| 136 | | | | | | | | | |
| 137 | | | | | | | | | |
| 138 | | | | | | | | | |
| 139 | | | | ↓ | | | | | |

COMMENTS: ______

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE LOG (SOIL)

Page 13 of 13

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler JL2
SITE COORDINATES (ft.):
N ______ E ______
GROUND ELEVATION (ft. MSL): -
DRILLING METHOD: 3¾" HSA W/CENTER PLUG
DRILLING CONTR.: J&R Drilling
DATE STARTED: 28 June 1990
DATE COMPLETED: 13 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ______
SITE CONDITION ______

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| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | ~~BLOWS PER 6 in.~~ COMMENTS | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 139 | | | | A | | 3¾" HSA W/CENTER PLUG | | | SILTY SANDY LEAN CLAY, v. stiff, wet, brownish-gray |
| 140 | | | | | | | | | |
| 141 | | | | | | | | | |
| 142 | | | | | | | | | |
| 143 | | | | | | | | | |
| 144 | | | | ↓ | | | | | B.O.H. 144.0' |
| | | | | | | | | | NO REFUSAL<br>WATER ENCOUNTERED AT 66.0' AND 115.4'<br>SEE DIAGRAM |

sta
shi
7/1

COMMENTS: ______

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-2S (4/85)

# APPENDIX B

# BAIER SITE PIEZOMETER INSTALLATION REPORTS

# BORING LOG
# LEGEND AND NOMENCLATURE

Items shown on boring logs refer to the following:

1. Depth - Depth below reference elevation, ground surface unless otherwise shown

2. Sample - Types designated by letter

   D - Disturbed sample, obtained from auger cuttings or wash water for classification purposes only

   S - Split-spoon sample, obtained by driving 2-inch split-spoon to determine penetration resistance and allow classification

   C - Liner tube sample, obtained by penetration of thick, wall sampler containing 2-inch-diameter liner tubes (California sampler)

   U - Undisturbed sample, obtained by penetration of minimum 3-inch-diameter, thin-wall tube using an open or, where indicated, fixed-piston sampling head

   Rec - Recovery is expressed as a ratio of the length recovered to the total length pushed or driven (in inches), i.e., $\frac{8}{12}$

   Resist - Resistance is designated as follows:

   P - Sample pushed in one continuous movement by hydraulic rig action, maximum hydraulic pressure shown where pertinent

   $^{3}6_{9}$ - Numbers indicate blows per 6 inches of sampler penetration when driven by a 140-pound hammer falling freely 30 inches. The Standard Penetration Resistance is the number of blows for the last 12 inches of penetration of the split-spoon sampler, e.g., 15. Note that a blow count can be given for the California sampler, but this is not the Standard Penetration Resistance.

3. Description - Description of material according to the Unified Soil Classification: word description gives soil constituents, consistency or density, and other appropriate classification characteristics. Unified Soil Classification symbols are shown on the USC column. Geologic names, where appropriate, are shown under Special Notes. A solid line indicates stratigraphic change; a dashed line indicates approximate location of stratigraphic change.

4. Special Notes and Field Observations - Pertinent observations made by inspector during drilling including type of boring, free water level, water seepage, fluid loss, hole termination depth, etc.

5. Legend -

   HSA - Hollow stem auger
   CFA - Continuous flight auger
   ATD - At time of drilling
   AD - After drilling
   DWL - Drill water loss
   DWR - Drill water return
   BOB - Bottom of Boring

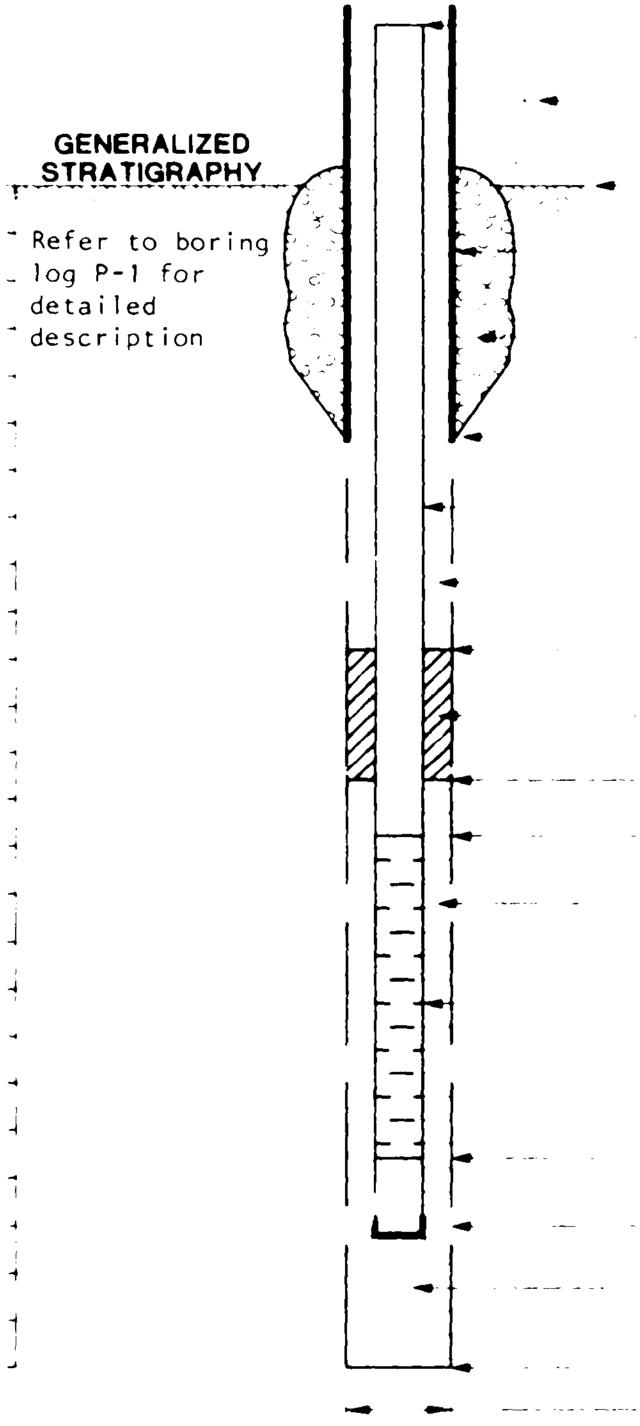
   ▼ Water depth at specified time after drilling

   ← Water entry depth at time of drilling

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** Du Pont - Ft. Madison, Iowa
**Location** Baier Site
**Installed by** Bret Hedenkamp
**Inspected by** Bret Hedenkamp
**Method of Installation** Hand Auger
**Remarks**

**Piez./Well No** P-1
**Project No.** 89C7583-1
**Date** 5/13/90
**Time** 1:00 p.m.



**Elevation of top of riser pipe** 660.30
**Height of riser above ground** 2.5'
**Ground Elevation** 657.8
**I.D./Type of surface casing** N/A
**Type of surface seal** N/A
**Depth of surface seal** 4.5'
**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC
**Type of backfill** "Pure Gold" grout
**Depth of top of seal** 4.5'
**Type of seal** "Enviroplug" pellets
**Depth of top of filter pack** 6.5'
**Depth of top of screen** 7.5'
**Type of filter pack** Medium sand 40/30 (Muscatine)
**I.D./Type of screen** 2" Sch. 40 (Machine Slot) Threaded PVC
**Screen slot size** 0.010 inch
**Depth of bottom of screen** 9.5'
**Depth of bottom of plugged bank section** 10.0'
**Type of backfill below observation well** Medium sand 40/30
**Depth of bottom of boring** 10.0'
**Diameter of boring** 3"

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA

**Location** Ft. Madison, Iowa

**Installed by** K. Doeden

**Inspected by** K. Doeden

**Method of Installation** Hand Auger

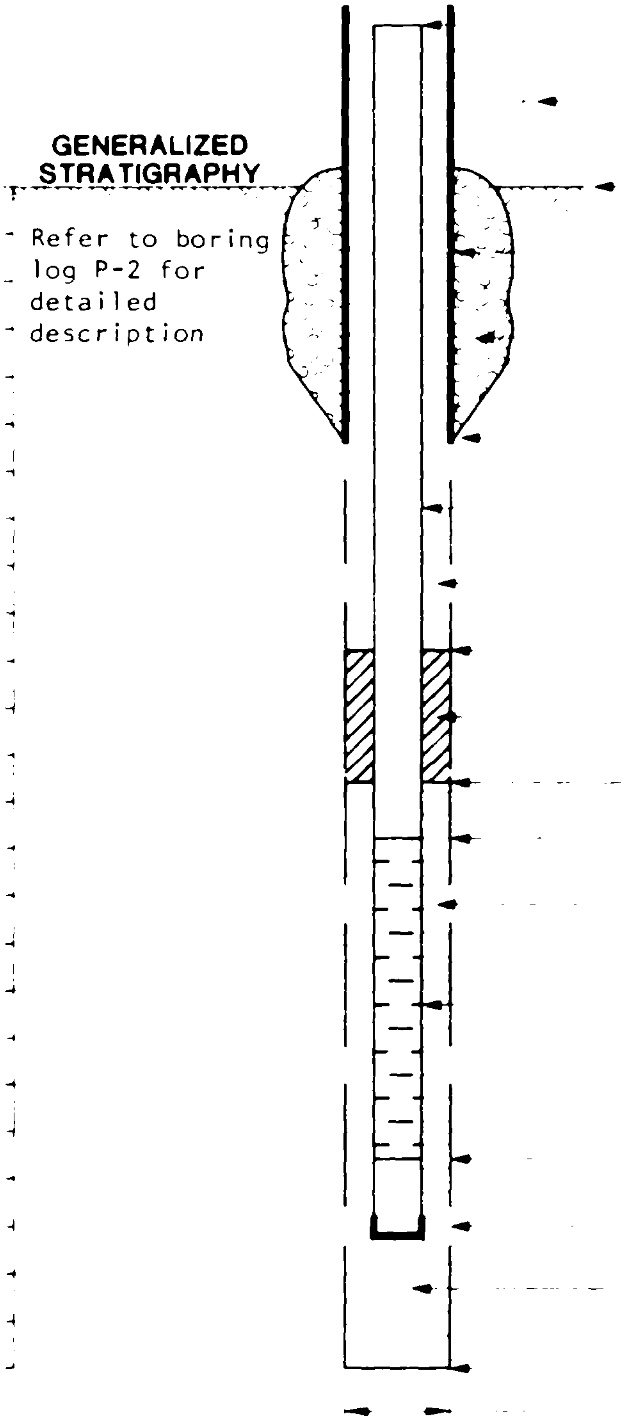
**Remarks**

**Piez./Well No** P-2

**Project No.** 89C7583-1

**Date** 5/13/90

**Time** 2:25 p.m.



Refer to boring log P-2 for detailed description

**Elevation of top of riser pipe** 646.86

**Height of riser above ground** 1.5'

**Ground Elevation** 645.4

**I.D./Type of surface casing** N/A

**Type of surface seal** N/A

**Depth of surface seal** 2.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 2.0'

**Type of seal** Bentonite pellets

**Depth of top of filter pack** 3.5'

**Depth of top of screen** 4.5'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 6.5'

**Depth of bottom of plugged bank section** 7.0'

**Type of backfill below observation well** Medium sand 40/30

**Depth of bottom of boring** 7.5'

**Diameter of boring** 4"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** Bret Hedenkamp

**Inspected by** Bret Hedenkamp

**Method of Installation** Hand Auger

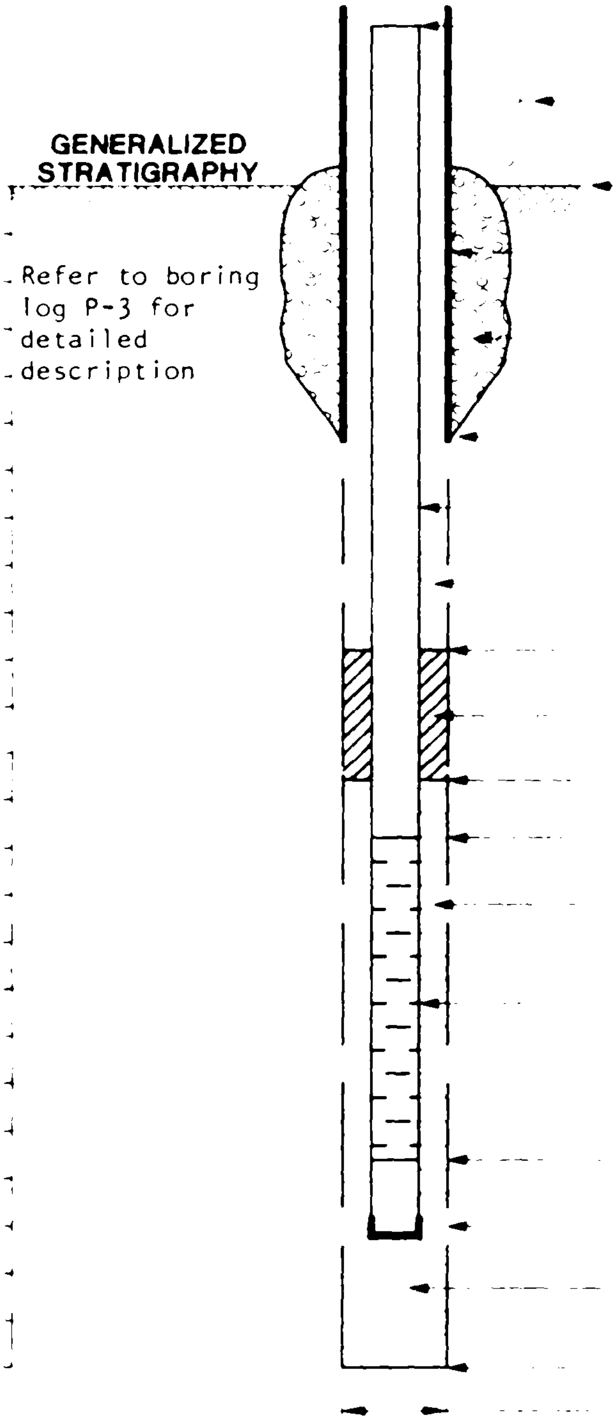
**Remarks**

**Piez./Well No.** P-3

**Project No.** 89C7583-1

**Date** 5/12/90

**Time** 11:30 a.m.



**Elevation of top of riser pipe** 651.60

**Height of riser above ground** 1.8'

**Ground Elevation** 649.8

**I.D./Type of surface casing** N/A

**Type of surface seal** N/A

**Depth of surface seal** 2.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 2.0'

**Type of seal** Bentonite Pellets

**Depth of top of filter pack** 4.0'

**Depth of top of screen** 5.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 7.0'

**Depth of bottom of plugged bank section** 7.5'

**Type of backfill below observation well** Medium sand 40/30

**Depth of bottom of boring** 8.0'

**Diameter of boring** 4"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA

**Location** Baier Site

**Installed by** K. Doeden

**Inspected by** K. Doeden

**Method of Installation** Hand Auger

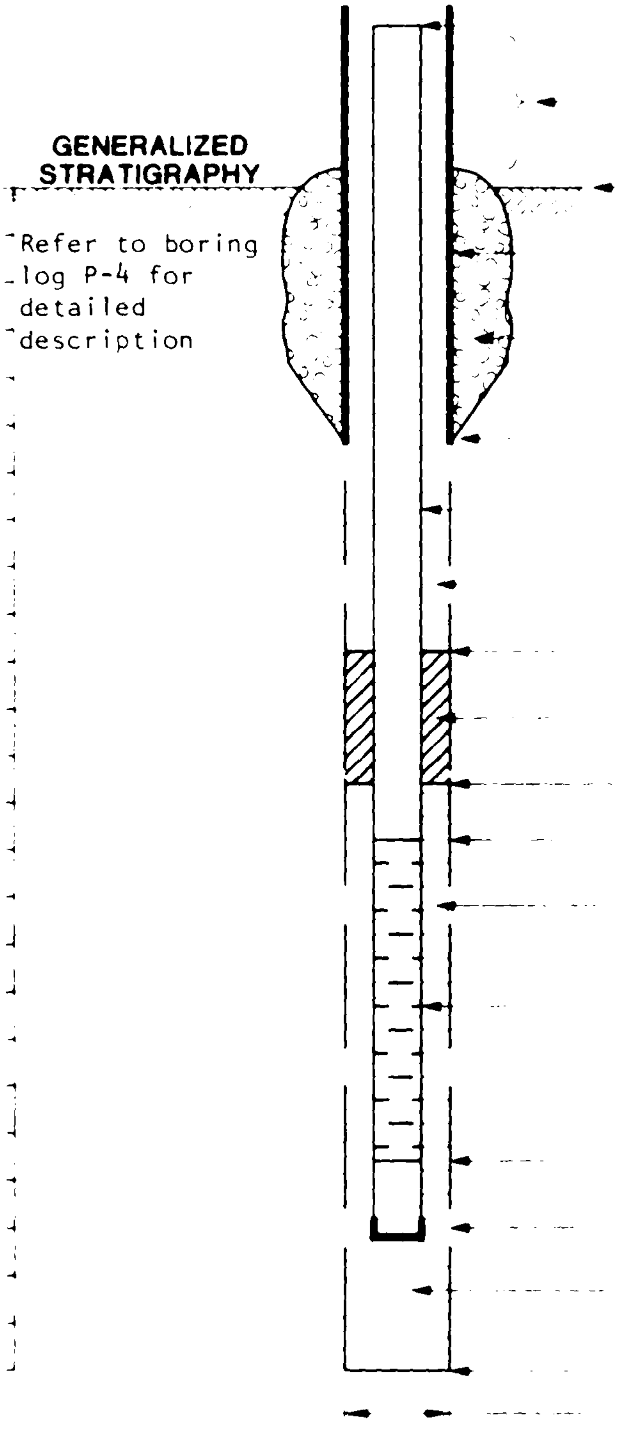
**Remarks**

**Piez./Well No.** P-4

**Project No.** 89C7583-1

**Date** 5/12/90

**Time** 3:20 p.m.



**Elevation of top of riser pipe** 643.19

**Height of riser above ground** 2.1'

**Ground Elevation** 641.1

**I.D./Type of surface casing** N/A

**Type of surface seal** N/A

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 3.0'

**Type of seal** Bentonite Pellets

**Depth of top of filter pack** 5.0'

**Depth of top of screen** 6.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 8.0'

**Depth of bottom of plugged bank section** 8.5'

**Type of backfill below observation well** Medium sand 40/30

**Depth of bottom of boring** 9.0'

**Diameter of boring** 4"

**Woodward-Clyde Consultants**

**JE** JACOBS ENGINEERING GROUP INC.
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# BOREHOLE/WELL CONSTRUCTION LOG

SITE ID: DuPont X-23 LOCATION ID: Fedler F-5 FIELD REP: Bill Gresram

APPROX. SITE COORDINATES (FT.): N ____ E ____

GROUND ELEVATION (FT. MSL): ____ COMPLETION DATE: 15 July 1990

## BOREHOLE SUMMARY

DRILLER: Bill Gresram

RIG TYPE: 3inch hand auger

| BIT TYPE | HOLE DIA (in) | END DEPTH* (ft.) | FLUID TYPE |
|---|---|---|---|
| 3" hand auger | 3.5 | 2.0 | |
| | | | |
| | | | |
| | | | |

## CASING SUMMARY

| CASING TYPE* | DESCRIPTION | DIA. (in.) | END DEPTH✤ (ft.) |
|---|---|---|---|
| N | bentonite pellets | – | 11.0 |
| S | 01 slot PVC sched. 40 | 2 | 10.5 |
| B | schedule 40 PVC | 2 | 0 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

* P-Protective S-Screen B-Blank O-Open N-None

✤ Depth from Top of Casing

## WELL CONSTRUCTION

| TYPE CODE* | DESCRIPTION | END DEPTH* (ft.) |
|---|---|---|
| S | bentonite pellets | 9.0 |
| F | sand | 8.5 |
| S | bentonite pellets | 6.1 |
| B | grout | 3.6 |
| | | |
| | | |
| | | |
| | | |
| | | |

* B - Backfill S - Seal F - Filter Pack

* Depth from Ground Surface

## CONSTRUCTION TIME LOG

| ACTIVITY | START DATE | START TIME | END TIME |
|---|---|---|---|
| DRILLING | 7/15/90 | 0725 | 0835 |
| CASING | 7/15/90 | 1115 | 1120 |
| FILTER PACK | 7/15/90 | 1120 | 1125 |
| SEAL | 7/15/90 | 1125<br>1335 | 1215<br>1340 |
| BACKFILL | 7/15/90 | 1340 | 1345 |
| DEVELOPMENT | | | |
| OTHER | | | |

## WELL DEVELOPMENT

COMMENTS: ____

**JE JACOBS ENGINEERING GROUP INC.**
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# WELL COMPLETION RECORD

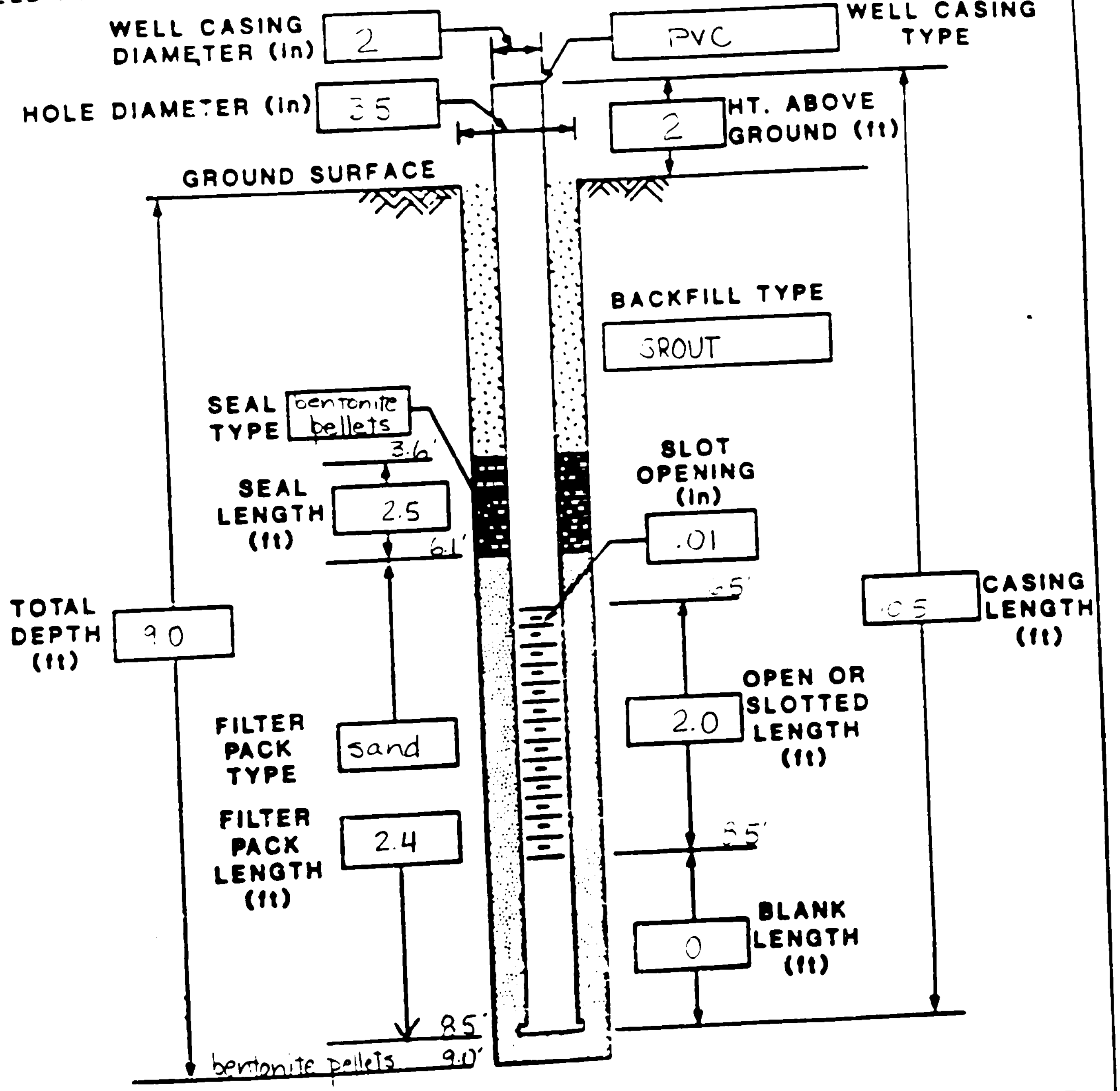
SITE ID: DuPont X-23 LOCATION ID: Fedler P-5 DATE INSTALLED: 5 July 1990

APPROX. SITE COORDINATES:(FT.) N ______ E ______

OPEN AREA PER LINEAL FT. ($IN^2$/FT.) ______

FORMATION OF COMPLETION: ______

FIELD REP.: Bill Gresham DRILLER: Bill Gresham



WELL CASING DIAMETER (in): 2

WELL CASING TYPE: PVC

HOLE DIAMETER (in): 3.5

HT. ABOVE GROUND (ft): 2

GROUND SURFACE

BACKFILL TYPE: GROUT

SEAL TYPE: bentonite pellets

3.6'

SEAL LENGTH (ft): 2.5

6.1'

SLOT OPENING (In): .01

6.5'

CASING LENGTH (ft): 10.5

TOTAL DEPTH (ft): 9.0

OPEN OR SLOTTED LENGTH (ft): 2.0

FILTER PACK TYPE: sand

FILTER PACK LENGTH (ft): 2.4

8.5'

BLANK LENGTH (ft): 0

8.5'

bentonite pellets 9.0'

COMMENTS: ______

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 1 of 2

LOCATION MAP: N

SITE ID: DuPont X-23 LOCATION ID: Fedler P-5
SITE COORDINATES (ft.):
N ________ E ________
GROUND ELEVATION (ft. MSL): ________
DRILLING METHOD: hand auger (3" dia barrel)
DRILLING CONTR.: JEG
DATE STARTED: 15 July 1990
DATE COMPLETED: 15 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ________
SITE CONDITION ________

| DEPTH | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | BLOWS PER 6 in. | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | SILTY SANDY LEAN CLAY, med., moist, dk. brn., contains rootlets, organic mat'l 1.0 |
| 1 | | | | | | | | | SILTY SANDY LEAN CLAY, stiff, moist, brn, sl. mottled, occ rootlets, 2.0 |
| 2 | | | | | | | | | SANDY SILT, stiff, moist, reddish-brn, v.f - f gr., poorly sorted 2.4<br>SILTY SAND, stiff, moist-wet, reddish-brn, v.f.-f.gr., poorly sorted 3.2 |
| 3 | | | | | | | | | SAND, stiff, lt. reddish-brn, v.f.-f.gr., wet |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | gravelly zone |
| 6 | | | | | | | | | |

COMMENTS: ________

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

JEG-AL-ENG-2S (4/86)

**JACOBS ENGINEERING GROUP INC.**
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

# BOREHOLE LOG (SOIL)

Page 2 of 2

LOCATION MAP:

SITE ID: DuPont X-23 LOCATION ID: Fedler P-5
SITE COORDINATES (ft.):
N ________ E ________
GROUND ELEVATION (ft. MSL): ________
DRILLING METHOD: hand auger (3" dia. barrel)
DRILLING CONTR.: JEG
DATE STARTED: 15 July 1990
DATE COMPLETED: 15 July 1990
FIELD REP.: Bill Gresham

| GROUNDWATER LEVELS | | |
|---|---|---|
| DATE | TIME | DEPTH (ft.) |
| | | |
| | | |
| | | |

LOCATION DESCRIPTION ________
SITE CONDITION ________

| DEPTH<br>6 | SAMPLE INTERVAL | SAMPLE RECOVERY | SAMPLE RETAINED | TYPE | ID | BLOWS PER 6 In. | N VALUE | USCS | VISUAL CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | SAND, stiff, wet, lt. reddish-brn, v.f.-f.gr. |
| 7 | | | | | | | | | |
| | | | | | | | | | TOP OF UNWEATHERED TILL 7.8 |
| 8 | | | | | | | | | SILTY-SANDY LEAN CLAY, v. stiff, moist, dk ~~brownish~~-gray |
| 9 | | | | | | | | | B.O.H. 9.0' |
| | | | | | | | | | No REFUSAL<br>No FREE WATER ENCOUNTERED<br>SEE DIAGRAM |
| 10 | | | | | | | | | |

COMMENTS: ________

**SAMPLE TYPE**
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sam
U - 3" O.D. 2.42" I.D. tube samp
T - 3" O.D. thin-walled Shelby tu

# APPENDIX C

# MCCARL SITE BORING LOGS AND MONITORING WELL INSTALLATION REPORTS

# BORING LOG
## LEGEND AND NOMENCLATURE

Items shown on boring logs refer to the following:

1. <u>Depth</u> - Depth below reference elevation, ground surface unless otherwise shown

2. <u>Sample</u> - Types designated by letter

   D - Disturbed sample, obtained from auger cuttings or wash water for classification purposes only

   S - Split-spoon sample, obtained by driving 2-inch split-spoon to determine penetration resistance and allow classification

   C - Liner tube sample, obtained by penetration of thick, wall sampler containing 2-inch-diameter liner tubes (California sampler)

   U - Undisturbed sample, obtained by penetration of minimum 3-inch-diameter, thin-wall tube using an open or, where indicated, fixed-piston sampling head

   Rec - Recovery is expressed as a ratio of the length recovered to the total length pushed or driven (in inches), i.e., $\frac{8}{12}$

   Resist - Resistance is designated as follows:

   P - Sample pushed in one continuous movement by hydraulic rig action, maximum hydraulic pressure shown where pertinent

   $^{3}6_{9}$ - Numbers indicate blows per 6 inches of sampler penetration when driven by a 140-pound hammer falling freely 30 inches. The Standard Penetration Resistance is the number of blows for the last 12 inches of penetration of the split-spoon sampler, e.g., 15. Note that a blow count can be given for the California sampler, but this is not the Standard Penetration Resistance.

3. <u>Description</u> - Description of material according to the Unified Soil Classification: word description gives soil constituents, consistency or density, and other appropriate classification characteristics. Unified Soil Classification symbols are shown on the USC column. Geologic names, where appropriate, are shown under Special Notes. A solid line indicates stratigraphic change; a dashed line indicates approximate location of stratigraphic change.

4. <u>Special Notes and Field Observations</u> - Pertinent observations made by inspector during drilling including type of boring, free water level, water seepage, fluid loss, hole termination depth, etc.

5. <u>Legend</u> -

   HSA - Hollow stem auger
   CFA - Continuous flight auger
   ATD - At time of drilling
   AD - After drilling
   DWL - Drill water loss
   DWR - Drill water return
   BOB - Bottom of Boring

   ▼ Water depth at specified time after drilling

   ← Water entry depth at time of drilling

# BORING LOG

SHEET 1 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/9/90

MC-3C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 711.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Loose, low plastic, organic, Clayey SILT, with root hairs | OL | Boring advanced with 8" diameter HSA with 3½" diameter CME continuous sampler |
| | CS | 40/60 | P | Loose, orange-brown, low-medium plastic, Clayey SILT with desiccation fractures | ML | WC > PL<br>(Loess) |
| | | | | Very stiff, gray, highly plastic CLAY with silt, iron staining (?) and roots present | CH | (Weathered Glacial Till)<br>WC < PL |
| 5 | CS | 60/60 | P | Becoming dark blackish-brown with roots and trace of sand | | |
| 10 | CS | 60/60 | P | Becoming gray with red mottling and manganese (?) staining, with fractures, with root holes | | |
| 15 | CS | 60/60 | P | Becoming dark olive brown with sand and gravel, with manganese (?) nodules and root holes | | WC < PL |
| 20 | CS | 60/60 | P | Becoming light gray, with sand and gravel and subvertical fractures | | WC < PL |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 89C7583-1

MC-3C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 711.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 25 | CS | 60/60 | P | SAME: Very stiff, light gray, highly plastic CLAY with silt, and vertical and horizontal fractures | CH | WC≤PL |
| 30 | CS | 60/60 | P | Becoming stiff, reddish-brown, medium-highly plastic | CL-CH | WC≤PL |
| | | | | Stiff, gray, low plastic, Clayey SILT, with trace of sand | ML | |
| 35 | CS | 60/60 | P | | | |
| | | | | Loose-medium dense, reddish-brown, low-medium plastic, Clayey SILT, with trace of sand, gravel, and cobbles | ML | WC > PL |
| 40 | CS | 60/60 | P | | | |
| | | | | Dense, moderately well graded SAND, with clay and silt, with horizontal fractures | SW-SP | Moist |
| 45 | CS | 0/60 | P | | | No sample recovery due to cobble in borehole<br>Subsurface description based on drilling characteristics only |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/9/90

MC-3C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 711.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 50 | CS | 0/60 | P | SAME: Dense, moderately well graded SAND, with clay and silt, with horizontal fractures | SW-SP | No sample recovery due to cobble in borehole<br>Subsurface description based on drilling characteristics only<br>May have highly plastic clay zones |
| 55 | CS | 0/60 | P |  |  |  |
| 60 | CS | 0/60 | P |  |  |  |
| 65 | CS | 12/18 | 40<br>35<br>20 | Very stiff, dark gray, highly plastic, Silty CLAY, with trace of sand | CH | (Unweathered Glacial Till) |
|  | CS | 48/48 | P |  |  |  |
| 70 | CS | 48/48 | P | With trace of silt, fine grained sand, and gravel |  | WC<PL |
|  |  |  |  | With layers of dense, gray, poorly graded, fine-grained sand | w/SP |  |
|  |  |  |  | With layer of dense, gray, poorly graded, silty, fine grained sand | w/SM |  |
| 75 |  |  |  |  |  |  |

# BORING LOG

SHEET 4 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/2/90

MC-3C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 711.6

ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 75 | CS | 60/60 | P | With layer (5") of very dense, poorly graded, gray, fine-medium grained sand | CH w/SP |  |
|  |  |  |  | With layer (8") of very dense, poorly graded, silty, fine-grained sand | w/SM |  |
|  |  |  |  | With layer (8") of very dense, poorly graded, silty, fine grained sand |  |  |
| 80 | CS | 60/60 | P |  |  | WC<PL |
|  |  |  |  | With fine gravel |  |  |
|  |  |  |  | With layer (11") of medium dense, poorly graded, fine gravel, grading quickly to fine grained sand |  |  |
| 85 | CS | 60/60 | P | With layer (6") of dense, gray, poorly graded, fine-medium grained sand |  |  |
|  |  |  |  | With layer (6") of dense, gray, poorly graded, fine-medium grained sand |  |  |
|  |  |  |  |  |  | WC<PL |
|  |  |  |  | With layer (8") of dense, gray, poorly graded, fine-medium sand with trace of coarse grained sand and fine gravel |  |  |
| 90 | CS | 37/48 | P | Dense, gray, moderately well graded, fine-coarse grained SAND with some fine gravel and trace of silt and medium-coarse gravel | SP-SW |  |
|  | CS | 18/18 | P | Dense, gray, poorly graded, fine-medium grained SAND with a trace of silt and fine gravel | SP |  |
| 95 | CS | 55/60 | P |  |  |  |
|  |  |  |  | Very stiff-hard, gray, highly plastic CLAY, with trace of silt, fine-coarse sand and fine gravel | CH | WC<PL |
|  |  |  |  | With layer (3") of dense, gray, Clayey SILT | w/ML |  |
| 100 |  |  |  |  |  |  |

# BORING LOG

SHEET 5 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/2/90

MC-3C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 711.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 100 | CS | 48/60 | P | Dense, gray, moderately well graded, fine-coarse grained SAND with some silt and fine-coarse grained gravel | SP-SW | |
| 105 | CS | 46/60 | P | | | |
| | | | | Very stiff-hard, gray, highly plastic CLAY with trace of silt, fine-coarse | CH | WC< PL |
| 110 | CS | 60/60 | P | With layer (6") of very stiff, reddish-brown, highly plastic CLAY<br>With pockets and lenses (1-2") of dull reddish-brown, interbedded in gray CLAY and a single subvertical fracture with reddish-brown iron staining<br>With layer (3") of dense, poorly graded, medium-fine grained sand | | |
| 115 | CS | 60/60 | P | With pockets and lenses ( 3") of dull reddish-brown to olive drab, very stiff, highly plastic CLAY with trace of coarse sand and fine-medium gravel | | WC≤PL |
| 120 | CS | 60/60 | P | Becoming dull reddish-brown<br>Becoming gray | | |
| 125 | | | | | | |

# BORING LOG

SHEET 6 OF 6

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 6/2/90

MC-3C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY K. Doeden DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 711.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 125 | CS | 60/60 | P | SAME: Very stiff-hard, gray, highly plastic CLAY, with trace of silt, fine-coarse grained sand, and fine gravel | CH | |
| 130 | | | | | | Bottom of Boring 130.0'<br>Monitoring well installed upon completion |
| 135 | | | | | | |
| 140 | | | | | | |
| 145 | | | | | | |
| 150 | | | | | | |

# BORING LOG

SHEET 1 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 8/1/89

MC-4B

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS 28.5'ATD (EL 684.1)

SURFACE ELEVATION 712.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 0 | CME * CS | 45/60 |  | Medium dense, light brown, low plastic Silt FILL with trace of sand | FILL | Boring advanced with 8" diameter HSA<br>Dry<br>(Modified Loess) |
|  |  |  |  | Stiff, light reddish brown, low plastic Silty CLAY with trace of root holes | CL | WC > PL<br>*Samples obtained with 5.0' CME continuous sampler (CME-CS) |
| 5 | CME CS | 60/60 |  | With a highly dessicated layer at 5.0'<br>Becoming light gray with red mottling |  |  |
|  |  |  |  | Stiff-very stiff, dark gray with light red mottling, highly plastic CLAY with trace of gravel and some silt | CH | (Weathered Glacial Till)<br>WC ≥ PL |
| 10 | CME CS | 60/60 |  |  |  |  |
|  |  |  |  | Very stiff, light red-brown, medium-highly plastic Silty CLAY with trace to some fine-coarse grained sand | CL-CH | (Oxidized)<br>(Glacial Till)<br>WC ≤ PL |
|  |  |  |  | Firm, light gray and light brown, medium plastic, Silty CLAY with some fine-coarse grained sand | CL |  |
| 15 |  |  |  |  |  | WC > PL<br>Wet to saturated |
|  | CME CS | 60/60 |  | Hard, light red-brown, medium-highly plastic, Silty CLAY with some fine-coarse grained sand | CL-CH | (Oxidized Glacial Till) |
| 20 | CME CS | 60/60 |  |  |  |  |
|  |  |  |  | Hard, light gray, highly plastic CLAY<br>With wet sand seam (2") at 24.2' | CH | WC > PL |
| 25 |  |  |  |  |  |  |

# BORING LOG

SHEET 2 OF 3
PROJECT NO. 89C7583
DATE 8/1/89
RIG Mobile B-61
WATER ENTERS ± 28.5'ATD
(EL 684.1)

PROJECT NAME DUPONT

MC-4B

PROJECT LOCATION Ft. Madison, Iowa
LOGGED BY D. Jorgenson DRILLED BY Layne-Western
SURFACE ELEVATION 712.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | | | | SAME: Hard, light gray, highly plastic CLAY with trace of fine grained sand | CH | WC > PL |
| | CME<br>CS | 60/60 | | | | ← Water detected ATD |
| 30 | CME<br>CS | 60/60 | | | | |
| | | | | Hard, light red-brown, with light gray mottling, medium-highly plastic, Silty CLAY with fine-coarse grained sand and gravel | CL<br>CH | (Glacial Till)<br>(Oxidized)<br>WC = PL |
| 35 | CME<br>CS | 60/60 | | | | Verticle fracture |
| | | | | With trace to some fine-coarse grained sand and gravel | | Horizontal fracture<br>With numerous verticle fractures |
| 40 | CME<br>CS | 60/60 | | | | |
| 45 | CME<br>CS | 60/60 | | | | |
| | | | | Dense, gray, fine grained SAND becoming light brown, fine grained and Silty | SP<br>SM | (Glacial Alluvium)<br>Wet |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 8/1/89

MC-4B

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS @ 28.5'ATD (EL 684.1)

SURFACE ELEVATION 712.6 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 50 | CME<br>CS | 60/60 | | Hard, red-brown, medium-highly plastic Silty CLAY with trace to some fine-coarse grained sand and gravel | CL<br>CH | (Oxidized Glacial Till)<br>WC = PL |
| 55 | CME<br>CS | 60/60 | | With small (2") fine grained sand pockets<br>Becoming brown | | (Glacial Till Unoxidized) |
| | | | | Hard, dark gray, medium-highly plastic Silty CLAY with trace of fine-coarse grained sand and gravel | | |
| 60 | | | | | | Bottom of Boring 10.0'<br>Monitoring well installed upon completion |
| 65 | | | | | | |
| 70 | | | | | | |
| 75 | | | | | | |

WOODWARD-CLYDE CONSULTANTS

# BORING LOG

SHEET 1 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90-5/10/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG Plains States MR300F

LOGGED BY M. Wilson DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION ELEVATION DATUM

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | | | | Loose, light gray, Clayey SILT | MC | Boring advanced with 2" HSA |
| | CS | 43/48 | | Stiff, light gray-brown with orange mottling, medium plastic CLAY with sub-horizontal dessication | CM | |
| | | | | | | WC<PL |
| 5 | CS | 6/60 | | Firm, light gray-brown, low plastic CLAY | CL | WC≥PL<br>Reamed boring to 14" using mud rotary to 63' bgs<br>Pushed 10" steel welded casing 7" into 63'7" and grouted outer anulus with cement/ bentonite grout |
| 10 | | | | Becoming medium gray with dark red mottling, blocky, stiff, with trace disseminated, coarse sand | | |
| | CS | 60/60 | | Becoming orange-brown, with light gray mottling, with trace black organic matter and trace disseminated white, cherty, coarse sand and fine gravel | | |
| 15 | CS | 60/60 | | With occasional veins of calcite | | |
| 20 | CS | 60/60 | | Becoming brown with light gray mottling, with subvertical and subhorizontal fractures, with wood fragments, and with lenses (1" thick) of light gray, clayey silt | | |
| | | | | Stiff, medium gray, highly plastic CLAY, with rootlets along subvertical fractures | CH | WC≥PL |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG PS MR300F

LOGGED BY M. Wilson

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION ______ ELEVATION DATUM ______

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CS | 60/60 | | Very stiff, medium gray, highly plastic CLAY with occasional disseminated, coarse sand | CH | WC<PL |
| | | | | With no red-brown mottling | | |
| 30 | CS | 60/60 | | | | |
| | | | | Stiff, light gray with orange-brown mottling, medium plastic CLAY, with common disseminated, fine to coarse sand and occasional fine gravel with possible small manganese (?) nodules | CM | WC<PL |
| 35 | CS | 60/60 | | Becoming orange brown with light gray mottling | | |
| | | | | With occasional fine-coarse gravel consisting of sandstone, chert, and highly weathered granite | | |
| 40 | | | | With common subvertical fractures | | |
| | C | 60/60 | | With trace of coarse gravel | | |
| | | | | With subvertical and subhorizontal fractures | | |
| 45 | CS | 60/60 | | With veins of light gray, silty clay | | |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/1/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG PS MR300F

LOGGED BY M. Wilson DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION ELEVATION DATUM

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | | | | SAME: Stiff, orange-brown with light gray mottling, medium plastic CLAY with trace of fine sand and occasional fine-coarse gravel | CM | |
| | | | | Very stiff, dark gray, highly plastic CLAY With trace disseminated coarse sand and fine gravel<br>Becoming orange-brown with gray mottling | CH | |
| | | | | Becoming dark gray | | |
| 55 | CS | 60/60 | | Becoming orange brown | | |
| | | | | Dense, light gray, Clayey SILT and dense, light brown, poorly graded, fine SAND | MC-SP | |
| | | | | Very stiff, dark gray, highly plastic CLAY, with trace disseminated coarse sand and occasional fine, unweathered granite gravel and unoxidized wood fragments | CH | |
| 60 | CS | 48/48 | | | | |
| | | | | With 1" layer of dense, light gray, fine, Silty SAND | | $WC \geq PL$<br>Stopped drilling 5/1/90 |
| | CS | 12/12 | | Becoming olive-brown | | Reamed with mud rotary 14" tri-cone to 63' bgs. Flushed 10" welded steel surface casing to 63'7" bgs 5/2/90 |
| 65 | CS | 60/60 | | Dense, brown, poorly graded, fine, Clayey SAND | SC | |
| | | | | Hard, dark gray with olive brown, highly plastic CLAY, with coarse sand and gravel, subvertical streak of stiff, olive-brown, low plastic, Silty CLAY | CH-CL | Performed open borehole test on interval 64' to 73' bgs 5/4/90 |
| | | | | Hard, dark gray with olive-brown, highly plastic CLAY with disseminated coarse sand and fine gravel | CH | |
| 70 | CS | 60/60 | | | | |
| | | | | With 3" layer of loowe brown, poorly graded, medium SAND | | |
| | CS | 12/12 | | | | |
| 75 | | | | | | |

# BORING LOG

SHEET 4 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/3/90-5/4/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG PS MR300F

LOGGED BY M. Wilson

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION

ELEVATION DATUM

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 75 | CS | 48/48 | | SAME: Hard, dark gray, highly plastic CLAY with trace disseminated coarse sand and fine gravel, with occasional coarse gravel and thin (< 1") lenses of fine sand | CH-SP | WC > PL |
| | | | | Dense, light brown, poorly graded, medium grained SAND | SP | |
| 80 | CS | 60/60 | | Hard, dark gray with olive brown, highly plastic CLAY, with trace disseminated, coarse chert sand and fine chert and granite gravel, with thin (< 0.5") subvertical lenses of sand | CH | WC > PL |
| | | | | With occasional coarse gravel | | Stopped drilling 5/3/90 |
| | | | | With 2" layer of dense, brown, poorly graded, fine SAND | | Resumed drilling 5/4/90 |
| 85 | CS | 60/60 | | With 3" layer of dense, brown, poorly graded, fine SAND | | |
| 90 | CS | 60/60 | | With 2" layer of dense, brown, poorly graded, fine, Silty SAND | | |
| 95 | CS | 60/60 | | With occasional gravel | | |
| 100 | | | | | | |

# BORING LOG

SHEET 5 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/4/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG PS MR300F

LOGGED BY M. Wilson

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION

ELEVATION DATUM

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 100 | CS | 60/60 |  | SAME: Hard, dark gray, highly plastic CLAY with occasional disseminated, medium chert sand and fine gravel | CH | WC<PL |
| 105 | CS | 60/60 |  | With 3" layer of loose, brown, well graded, sandy gravel<br>With trace disseminated, fine-coarse sand and gravel |  | Stopped drilling 5/4/90 |
|  | CS | 12/12 |  |  |  | Resumed drilling 5/7/90 |
| 110 | CS | 48/48 |  | With 1" layers of medium-coarse sand |  |  |
| 115 | CS | 60/60 |  | Dense, light brown, poorly graded, fine SAND<br>Becoming medium-coarse sand | SP |  |
|  |  |  |  | Hard, dark gray, highly plastic CLAY with occasional disseminated, medium chert sand and fine gravel | CH |  |
|  |  |  |  | Dense, light brown, poorly graded, medium-coarse SAND, with trace gravel and wood | SP |  |
| 120 |  |  |  | Hard, dark gray, highly plastic CLAY, with disseminated sand and fine gravel<br>With occasional coarse gravel<br>Becoming dark gray with olive brown mottling | CH |  |
|  | CS | 60/60 |  |  |  |  |
| 125 |  |  |  | Becoming dark gray |  |  |

# BORING LOG

SHEET 6 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/7/90-5/8/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG PS MR300F

LOGGED BY M. Wilson DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION ELEVATION DATUM

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 125 | CS | 60/60 | | SAME: Hard, dark gray, highly plastic CLAY with trace disseminated sand and fine gravel and occasional coarse gravel<br>With 2" layer of fine SAND | CH | WC< PL |
| | | | | With 1" layer of SILT | | |
| 130 | CS | 60/60 | | | | |
| 135 | CS | 60/60 | | With 2" lense of coarse SAND<br>With trace coarse limestone gravel | | |
| | | | | With 4" layer of medium-coarse sand | w/SP | |
| 140 | CS | 60/60 | | With 5" layer of coarse SAND | w/SP | |
| | SS | 16/18 | >50 | | | Sample refused after 18 inches |
| 145 | SS | 18/18 | 24<br>>50 | Very hard, dark gray, highly plastic, Silty CLAY with thin layers ( 0.5") of Clayey SILT | | Resume drilling<br>5/8/90<br>WC< PL |
| | SS | 24/24 | >50 | | | |
| | SS | 12/12 | >50 | Very dense, gray, poorly graded, Sandy SILT with thin (<3") layers of clay | MS | |
| 150 | | | | | | |

# BORING LOG

SHEET 7 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/9/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG PS MR300F

LOGGED BY M. Wilson

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION

ELEVATION DATUM

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 150 | | | | SAME: Very dense, gray, poorly graded, Sandy SILT, with thin layers of clay | MS | |
| | SS | 12/12 | >50 | | | |
| | SS | 6/6 | >50 | Very dense, gray, poorly graded, Silty, fine SAND | SP | |
| | | | | Very dense, gray, poorly graded, Sandy SILT | MS | |
| | | | | Very hard, dark gray, highly plastic CLAY with trace disseminated sand and fine gravel | CH | WC<PL |
| 155 | | | | | | |
| | SS | 18/18 | >50 | | | |
| 160 | | | | | | |
| | SS | 24/24 | >50 | | | |
| 165 | | | | | | |
| | | | | Becoming stiff | | |
| | SS | 24/24 | >50 | | | |
| 170 | | | | | | |
| | SS | 24/24 | >50 | Becoming very hard, slight brownish-dark gray | | |
| 175 | | | | | | |

# BORING LOG

SHEET 8 OF 8

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/10/90

MC-4C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG PS MR300F

LOGGED BY M. Wilson DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION ELEVATION DATUM

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 175 | | | | SAME: Very hard, dark gray, highly plastic CLAY, with trace disseminated sand and fine gravel | CH | |
| | SS | $\frac{24}{24}$ | 50 | With occasional calcite grades | | |
| 180 | | | | | | |
| | | | | Becoming very dark gray | | |
| | SS | $\frac{24}{24}$ | 50 | With subvertical planes (approx. 1mm thick) of light gray, fine-medium sand | | |
| 185 | | | | | | |
| | SS | $\frac{24}{24}$ | 50 | With greenish-gray dolomite and light gray (weathered orange) rock fragments | | |
| 190 | | | | | | Bottom of Boring 190.0'<br>Monitoring well installed upon completion of boring |
| 195 | | | | | | |
| 200 | | | | | | |

# BORING LOG

SHEET 1 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/31/89

MC-5

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS ≈ 37.0'ATD (EL 672.8)

SURFACE ELEVATION 709.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 0 | CME*<br>CS | 30<br>48 | | Stiff, gray, fine-coarse grained Sandy, Silt FILL with cans and rubble debris with purple clayey sludge from 0.8' to 1.3'<br>With metal fragments<br>With numerous wood debris<br>With large amount of organic matter (leaves) | FILL | Boring advanced with 8" diameter HSA<br>Strong paint and thinner odor<br>*Samples obtained with 5.0' CME continuous sampler (CME-CS) |
| 5 | CME<br>CS | 60<br>60 | | Stiff-very stiff, bluish-gray, highly plastic CLAY with silt and with trace of fine-medium grained sand | CH | Discolored<br>(Glacial Till)<br>WC > PL |
| 10 | CME<br>CS | 60<br>60 | | Stiff-very stiff, light brown with gray, highly plastic CLAY with silt and with trace of fine-medium grained sand<br>Becoming light red-brown<br>With trace to some fine-coarse grained sand with trace of gravel<br>With rust-orange, thin, fine-coarse grained silty sand layer (6") | w/SM | (Oxidized Glacial Till)<br>WC ≥ PL |
| 15 | CME<br>CS | 60<br>60 | | Stiff, light brown, low plastic, Silty CLAY with numerous thin (1"-3") silty sand seams<br>Becoming sandy with gravel | CL<br>w/SM | (Glacial Till)<br>WC ≥ PL |
| 20 | CME<br>CS | 60<br>60 | | Medium dense, light brown, low plastic, Clayey SILT alternating with Silty SAND | ML<br>&<br>SM | (Glacial Alluvium)<br>WC = PL<br>Moist-wet |
| | | | | Very stiff, light brown, medium-highly plastic Silty CLAY with trace of fine-coarse sand | CL<br>CH | (Oxidized)<br>WC = PL |
| | | | | Very stiff, light gray-red, highly plastic CLAY with trace of fine grained sand | CH | |
| 25 | | | | | | |

WOODWARD-CLYDE CONSULTANTS

# BORING LOG

SHEET 2 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 7/31/89

MC-5

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS @ 37.0'ATD (EL 672.8)

SURFACE ELEVATION 709.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CME<br>CS | 60/60 | | SAME: Very stiff, light gray-red, highly plastic CLAY with trace of fine grained sand<br>Becoming light gray<br>With trace of red-brown mottling | CH | (Oxidized Till)<br>$WC \geq PL$ |
| 30 | CME<br>CS | 60/60 | | | | |
| | | | | Very stiff, dark red-brown, medium-highly plastic, fine-coarse grained Sandy CLAY with trace of gravel | CL-CH | $WC \leq PL$ |
| 35 | CME<br>CS | 60/60 | | With trace to some sand | | ← Water enters ATD |
| 40 | CME<br>CS | 60/60 | | | | |
| 45 | CME<br>CS | 60/60 | | | | |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 8/1/89

MC-5

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS ± 37.0' ATD (EL 672.8)

SURFACE ELEVATION 709.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | | | | SAME: Hard, light red-brown, medium-highly plastic CLAY with silt and with trace to some fine-coarse grained sand and gravel | CL<br>CH | (Oxidized Glacial Till)<br>WC = PL |
| | CME<br>CS | 60<br>60 | | Hard, dark gray, medium-highly plastic CLAY with silt and with some fine-coarse grained sand<br>Becoming mottled brown and light gray | | |
| 55 | CME<br>CS | 60<br>60 | | Hard, dark gray, medium-highly plastic CLAY with trace of fine-coarse grained sand and gravel | | (Unoxidized Glacial Till)<br>WC = PL |
| 60 | | | | | | Bottom of Boring 60.0'<br>Monitoring well installed upon completion |
| 65 | | | | | | |
| 70 | | | | | | |
| 75 | | | | | | |

WOODWARD-CLYDE CONSULTANTS

# BORING LOG

SHEET 1 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 8/2/89

MC-6

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS @ 38.0'ATD (EL 672.8)

SURFACE ELEVATION 710.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 0 | | | | Hard, light brown, highly dessicated, very Silty CLAY with numerous roots and root holes | CL | Boring advanced with 8" diameter HSA (Loess) |
| | CME*<br>CS | 36/36 | | | | WC<PL<br>Dry<br>*Samples obtained with 5.0' CME continuous sampler |
| | | | | Becoming dark gray and medium plastic | | (Modified Loess)<br>(CME-CS) |
| 5 | CME<br>CS | 60/60 | | | | WC<PL |
| | | | | Very stiff, dark red-brown with light gray mottling, medium to highly plastic Silty CLAY with trace of sand | CL<br>CH | (Weathered Glacial Till)<br>WC = PL |
| 10 | CME<br>CS | 60/60 | | With gray dessicated layer (5")<br>With thin buff silt seam (2") | | Highly fractured from 10.0'-13.5' |
| | | | | Medium dense, yellow, low plastic SILT | ML | Dry |
| | | | | Very stiff, light red-brown with light gray, medium-highly plastic Silty CLAY with trace of fine-coarse grained sand and gravel | CL<br>CH | (Oxidized Glacial Till)<br>WC≤PL |
| 15 | CME<br>CS | 60/60 | | | | |
| 20 | CME | 60/60 | | | | |
| | | | | Medium dense, low plastic SILT | ML | Dry<br>(Glacial Alluvium) |
| | | | | Very stiff, light red-brown with gray seams (3") medium-highly plastic Silty CLAY with sand | CL<br>CH | (Oxidized Glacial Till) |
| | | | | Hard, light gray, highly plastic CLAY with trace of sand | CH | |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 8/3/89

MC-6

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson DRILLED BY Layne-Western

WATER ENTERS ± 38.0'ATD (EL 672.8)

SURFACE ELEVATION 710.8 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | | | | Hard, light gray, highly plastic CLAY with trace of sand | CH | |
| | CME CS | 60/60 | | Hard, light grayish-brown with slight red mottling, medium-highly plastic Silty CLAY with trace of sand | CL/CH | (Glacial Till Slightly oxidized)<br>WC < PL |
| | | | | Becoming dark reddish-brown | | (Oxidized) |
| 30 | CME CS | 60/60 | | Becoming light red-brown | | |
| | | | | Becoming firm-stiff | | Wet<br>WC ≥ PL |
| | | | | Becoming hard, dark red-brown with trace to some sand | | WC < PL |
| 35 | CME CS | 60/60 | | | | |
| | | | | Dense, light red-brown, fine grained SAND grading to a fine Silty SAND to Sandy SILT | SP/SM/ML | ← Water enters ATD<br>(Glacial Alluvium) |
| 40 | CME CS | 60/60 | | Very stiff-hard, light red-brown, medium-highly plastic Silty CLAY with trace to some fine-coarse grained sand | CL/CH | (Oxidized Glacial Till)<br>WC near PL |
| 45 | CME | 60/60 | | | | |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 3

PROJECT NAME DUPONT

PROJECT NO. 89C7583

DATE 8/3/89

MC-6

PROJECT LOCATION Ft. Madison, Iowa

RIG Mobile B-61

LOGGED BY D. Jorgenson

DRILLED BY Layne-Western

WATER ENTERS 38.0'ATD (EL 672.8)

SURFACE ELEVATION 710.8

ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 50 | CME<br>CS | 60/60 | | SAME: Very stiff-hard, light reddish-brown, medium-highly plastic Silty CLAY with trace to some fine-coarse grained sand and gravel | CL<br>CH | (Oxidized Glacial Till)<br>WC = PL |
| 55 | CME<br>CS | 60/60 | | | | |
| | | | | Hard, brown with dark gray patches, medium-highly plastic Silty CLAY with trace of sand and gravel | | (Transitional Till)<br>WC = PL |
| 60 | CME<br>CS | 60/60 | | | | |
| | | | | Hard, gray, highly plastic CLAY with silt and with trace to some fine-coarse sand and gravel | CH | (Unoxidized Till)<br>WC < PL |
| | | | | | | Bottom of Boring<br>64.0'<br>Monitoring well installed upon completion |
| 65 | | | | | | |
| 70 | | | | | | |
| 75 | | | | | | |

# BORING LOG

SHEET 1 OF 7

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/4/90

MC-6C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD *

SURFACE ELEVATION 712.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 0 | | | | Loose, dark grayish-brown, low plastic, Clayey SILT with roots | ML | Boring advanced with 8" diameter HSA with 3.5" diameter CME Continuous sampler (Loess) |
| | CS | 60/60 | P | Firm-stiff, light gray, medium plastic, Silty CLAY and Clayey SILT with red mottling, vertical dessication cracks and roots | CL-ML | WC<PL<br>*Prior to introduction of drilling fluid @ 68' |
| 5 | CS | 60/60 | P | Becoming very stiff, dark gray, with manganese (?) staining in desiccation cracks | | WC<PL |
| | | | | With more horizontal fractures | | |
| 10 | CS | 60/60 | P | Stiff-very stiff, reddish-brown, medium-highly plastic, Silty CLAY, with trace of sand and gravel and horizontal, vertical and subvertical fractures | CL-CH | (Weathered Glacial Till) |
| | | | | Loose-medium dense, light gray, low-medium plastic, Clayey SILT | ML | WC<PL |
| | | | | Stiff-very stiff, orangish-brown, highly plastic, Silty CLAY with fractures and gravel | CH | |
| 15 | CS | 60/60 | P | | | WC>PL |
| | | | | Becoming less fractured, with manganese (?) nodules | | |
| 20 | CS | 60/60 | P | Very stiff-hard, dark gray, Silty CLAY, with occasional subvertical fractures | | WC>PL |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 7

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/4/90

MC-6C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD *

SURFACE ELEVATION 712.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | CS | 60/60 | P | SAME: Very stiff-hard, dark gray, highly plastic CLAY with reddish-brown mottling, trace of sand and fine gravel, and occasional subvertical fractures | CH | WC > PL |
| 30 | CS | 60/60 | P | Loose-medium dense, gray, medium plastic, Clayey SILT, with red mottling | ML | WC < PL |
| | | | | Stiff-very stiff, reddish-brown, highly plastic CLAY with silt and gray mottling | CH | WC > PL |
| 35 | CS | 60/60 | P | Loose, reddish-brown, low-medium plastic, Clayey SILT with trace of fine-medium sand | ML | WC > PL |
| | | | | Dense, reddish-brown, moderately well graded, fine-coarse grained SAND with silt | SW-SP | Moist |
| | | | | Firm-stiff, reddish-brown, medium-highly plastic, Silty CLAY with vertical and subvertical fractures and with manganese (?) staining | CL-CH | WC > PL |
| 40 | CS | 60/60 | P | | | |
| 45 | CS | 60/60 | P | Dense, poorly graded SAND with carbonate fines | SP | Saturated |
| | | | | Dense, reddish-brown, moderately well graded, fine-coarse grained SAND, with reddish-brown clay | SW-SP w/CL | |
| 50 | | | | | | |

# BORING LOG

SHEET 3 OF 7

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/4/90

MC-6C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 50 | CS | 60/60 | P | SAME: Dense, reddish-brown, moderately well graded, fine-coarse grained SAND, with reddish-brown CLAY | SW-SP w/CL | Moist |
|  |  |  |  | Very stiff, light reddish-brown, highly plastic CLAY with silt and fine-medium grained sand and fine gravel | CH | WC>PL |
| 55 | CS | 60/60 | P | Becoming light tan with red mottling<br>Becoming olive-drab<br>Becoming dark gray |  |  |
| 60 | CS | 36/36 | P | Becoming olive-drab |  |  |
|  |  |  |  | Dense, olive-drab, poorly graded, fine-medium grained SAND | SP | Moist |
|  | CS | 60/60 | P |  |  |  |
| 65 |  |  |  | Stiff, olive-drab, highly plastic CLAY with silt and trace of fine-medium grained sand and fine gravel<br>Becoming dark gray | CH | WC>PL |
|  | S | 8/18 | >50 | Medium dense, gray, poorly graded, Silty, Clayey, fine grained SAND | SM-SC | Continued drilling with mud rotary |
| 70 | S | 19/24 | >50 |  |  |  |
|  | S | 24/24 | >50 | Hard, dark gray, highly plastic CLAY with some silt, fine-coarse grained sand, and fine gravel<br>With thin, olive-drab pockets | CH |  |
|  | S | 18/18 | >50 |  |  |  |
| 75 |  |  |  |  |  |  |

# BORING LOG

SHEET 4 OF 7

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/13/90

MC-6C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY K. Doeden

DRILLED BY Layne Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 712.3

ELEVATION DATUM NGVD

| DEPTH | SAMPLE |  |  | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
|  | TYPE | REC | RESIST |  |  |  |
| 75 | S | 12/12 | >50 | Dense, brown, poorly graded, fine grained SAND | SP |  |
|  | CS | 12/12 | P | Hard, dark gray, highly plastic CLAY, with some silt, fine-coarse grained sand, and fine gravel | CH | WC< PL |
|  | CS | 8/8 | P |  |  |  |
|  | CS | 15/15 | P | Thin (1") layer of medium grained, poorly graded sand | w/SP | WC $\geq$ PL |
| 80 | CS | 60/60 | P |  |  |  |
|  |  |  |  | Very dense, dark gray-gray, very fine grained, poorly graded, Silty SAND | SM |  |
|  |  |  |  | Hard, dark gray, highly plastic CLAY, with some silt and fine-coarse grained sand | CH | WC $\geq$ PL |
| 85 | CS | 60/60 | P | With thin (1-2") layer of dense, fine grained, poorly graded SAND | w/SP |  |
| 90 | CS | 60/60 | P | With trace of fine and medium grained gravel |  | WC $\geq$ PL |
| 95 | CS | 60/60 | P | Contains some small (1-2") angular coal (?) fragments |  |  |
| 100 |  |  |  |  |  |  |

# BORING LOG

SHEET 5 OF 7

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/22/90

MC-6C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY C. Fitzgerald DRILLED BY Layne Western

WATER ENTERS None detected ATD*

SURFACE ELEVATION 712.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 100 | CS | 60/60 | P | SAME: Hard, dark gray, highly plastic CLAY, with some silt and fine-coarse grained sand and fine gravel | CH | WC≥PL |
| 105 | CS | 60/60 | P | With thin (±3") seam of fine grained, poorly graded, Silty SAND | w/SM | WC≥PL |
| 110 | CS | 60/60 | P | With some small areas of olive-brown mottling | | |
| | | | | Very dense, dark gray, fine grained, poorly graded, Silty SAND, with some medium grained gravel | SM | |
| | | | | Hard, dark gray, highly plastic CLAY, with some silt and fine-coarse grained sand and trace of fine gravel | CH | |
| 115 | CS | 24/24 | P | | | |
| | CS | 48/48 | P | With thin (2") seam of fine grained, Silty SAND, with trace of fine gravel | w/SM | |
| | | | | With small areas (1-2") of olive-brown mottling | | WC≥PL |
| 120 | CS | 60/60 | P | Becoming olive brown | | |
| | | | | Becoming dark gray | | WC≥PL |
| | | | | With 6" seam of dense, medium-coarse grained SAND | w/SP | |
| 125 | | | | | | |

# BORING LOG

SHEET 6 OF 7

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/23/90

MC-6C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY C. Fitzgerald DRILLED BY Layne Western

WATER ENTERS None detected ATD *

SURFACE ELEVATION 712.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 125 | CS | 60/60 | P | SAME: Hard, dark gray, highly plastic CLAY with some silt and fine-coarse grained sand and trace of fine-medium gravel | CH | $WC \geq PL$ |
| | | | | Hard, gray-dark gray, low plastic SILT with trace of clay | ML | $WC < PL$ |
| 130 | CS | 60/60 | P | Hard, dark gray, highly plastic CLAY, with some silt and fine-coarse grained sand and trace fine-coarse gravel | CH | $WC \geq PL$ |
| 135 | CS | 60/60 | P | With a few small (<1") angular coal (?) fragments | | |
| | | | | Dense, gray, fine-medium grained, poorly graded SAND with trace of silt | SP | |
| | | | | Hard, dark gray, highly plastic CLAY with some silt and fine-coarse grained sand and trace of fine-coarse gravel | CH | |
| 140 | CS | 14/60 | P | | | Large pebble stuck in continuous sampler preventing recovery |
| 145 | CS | 12/12 | P | With occasional angular rock fragments | | |
| | CS | 36/36 | P | | | |
| 150 | | | | | | |

# BORING LOG

SHEET 7 OF 7

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/25/90

MC-6C

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY C. Fitagerald DRILLED BY Layne Western

WATER ENTERS None detected ATD *

SURFACE ELEVATION 712.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C. | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 150 | CS | 48/48 | P | SAME: Hard, dark gray, highly plastic CLAY with some silt and fine-coarse grained sand and trace fine-medium gravel | CH | WC ≥ PL |
| 155 | CS | 60/60 | P | | | |
| 160 | CS | 60/60 | P | | | Advanced augers 1' without continuous sampler to get past a cobble or boulder |
| 165 | CS | 60/60 | P | | | |
| 170 | | | | | | Bottom of Boring 169.0'<br>Monitoring well installed upon completion |
| 175 | | | | | | |

# BORING LOG

SHEET 1 OF 2

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/10/90

MC-7

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp

DRILLED BY Layne Western

WATER ENTERS None detected ATD

SURFACE ELEVATION 692.3

ELEVATION DATUM NGVD

| DEPTH | SAMPLE TYPE | SAMPLE REC | SAMPLE RESIST | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| 0 | CS | 42/54 | P | Loose, reddish-brown, low plastic, Clayey SILT, with trace of sand and gravel | ML | Boring advanced with 8" diameter HSA; 3.5" diameter CME Continuous Sampler<br>WC > PL |
| | | | | Firm-stiff, dark gray, medium-highly plastic, Silty CLAY, with subvertical fractures filled with carbonaceous sands | CL-CH | |
| 5 | CS | 60/60 | P | | | |
| | | | | Becoming very stiff and highly plastic | CH | WC >PL |
| 10 | CS | 60/60 | P | Becoming reddish-brown with horizontal and subvertical fractures | | |
| 15 | CS | 60/60 | P | With fractures lined with manganese (?) staining and carbonate sand and gravel | | |
| 20 | CS | 60/60 | P | With manganese nodules (?) and highly weathered gravel and cobbles | | |
| 25 | | | | | | |

# BORING LOG

SHEET 2 OF 2

PROJECT NAME DU PONT - FT. MADISON

PROJECT NO. 89C7583-1

DATE 5/10/90

MC-7

PROJECT LOCATION Ft. Madison, Iowa/McCarl Site

RIG CME-550

LOGGED BY B. Hedenkamp DRILLED BY Layne Western

WATER ENTERS None detected ATD

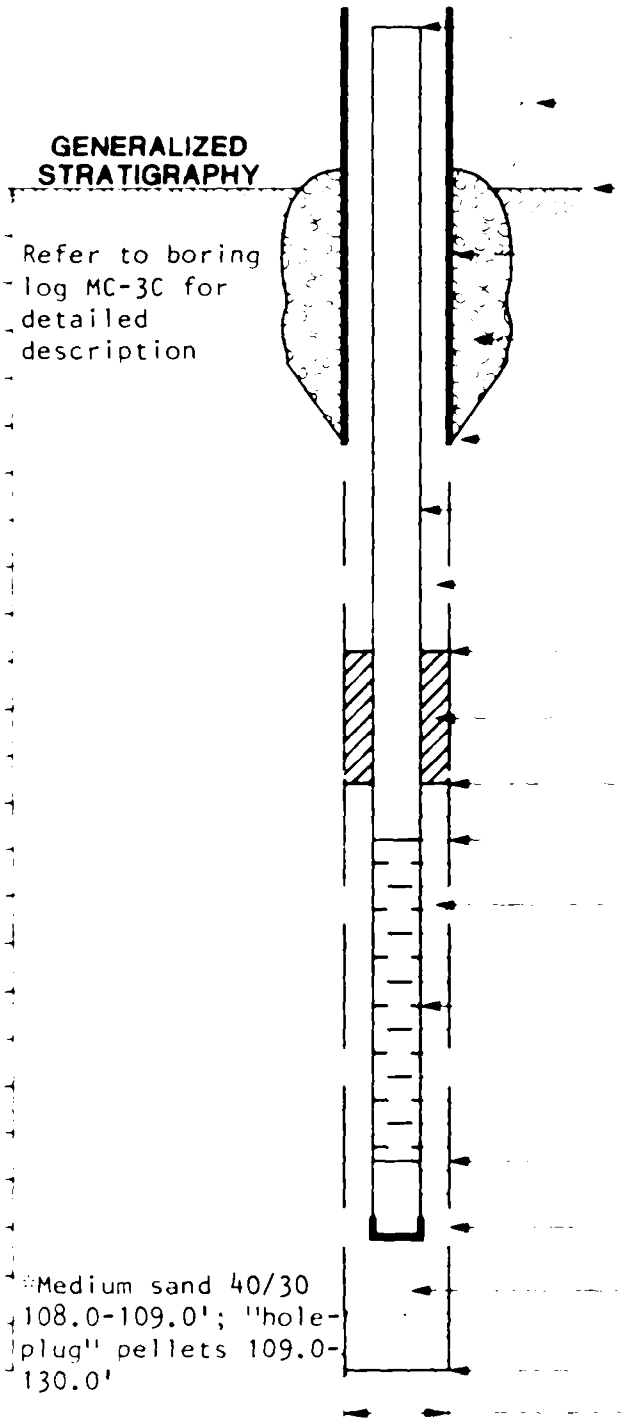
SURFACE ELEVATION 692.3 ELEVATION DATUM NGVD

| DEPTH | SAMPLE | | | DESCRIPTION | U.S.C | SPECIAL NOTES AND FIELD OBSERVATIONS |
|---|---|---|---|---|---|---|
| | TYPE | REC | RESIST | | | |
| 25 | | | | SAME: Very stiff, olive-brown, highly plastic CLAY with gravel | CH | |
| | CS | $\frac{60}{60}$ | P | | | WC > PL |
| 30 | CS | $\frac{60}{60}$ | P | | | |
| 35 | CS | $\frac{60}{60}$ | P | Dense, poorly graded SAND (remnant limestone cobble) | SP | dry |
| | | | | Very stiff, olive brown, highly plastic CLAY<br>Becoming dark gray | CH | WC > PL (Unweathered Glacial Till) |
| 40 | | | | | | Bottom of Boring 39.5'<br>Monitoring well installed upon completion |
| 45 | | | | | | |
| 50 | | | | | | |

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA
**Location** McCarl Site
**Installed by** Layne Western
**Inspected by** Klaas Doeden
**Method of Installation** Plain States MR300F with 8" HSA
**Remarks**

**Piez./Well No.** MC-3C
**Project No.** 89C7583-1
**Date** 6/3/90
**Time** 2:20 p.m.



Refer to boring log MC-3C for detailed description

∴Medium sand 40/30 108.0-109.0'; "hole-plug" pellets 109.0-130.0'

**Elevation of top of riser pipe** 713.98

**Height of riser above ground** 2.4'

**Ground Elevation** 711.6

**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 4.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 86.5'

**Type of seal** "Enviroplug" pellets 86.5-89.5'; fine sand 89.5-90.0'

**Depth of top of filter pack** 90.5'

**Depth of top of screen** 92.5'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 107.5'

**Depth of bottom of plugged bank section** 108.5'

**Type of backfill below observation well** ∴

**Depth of bottom of boring** 130.0'

**Diameter of boring** 8"

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON
**Location** McCarl Site
**Installed by** Layne-Western
**Inspected by** D. Jorgenson
**Method of Installation** Mobile B-61 with 8" HSA
**Remarks**

**Piez./Well No.** MC-4A
**Project No.** 89C7583
**Date** 8/3/89
**Time** 7:35 p.m. completed

**Elevation of top of riser pipe** 714.54

**Height of riser above ground** ± 2.0'

**Ground Elevation** 712.5

**I.D./Type of surface casing** 3.7" Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 2.7'

**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC

**Type of backfill** Volclay Grout

**Depth of top of seal** 8.3'

**Type of seal** Buffer Sand 7.8'-8.3'; Bentonite Pellets 8.3'-11.0'; Buffer Sand 11.0'-11.5'

**Depth of top of filter pack** 11.0'

**Depth of top of screen** 13.5'

**Type of filter pack** Coarse Sand

**I.D./Type of screen** 2"/SCH 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 16.5'

**Depth of bottom of plugged blank section** 16.5'

**Type of backfill below observation well** None

**Depth of bottom of boring** 16.5'

**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT MADISON

**Location** McCarl Site

**Installed by** Layne-Western

**Inspected by** D. Jorgenson

**Method of Installation** Mobile B-61 w/ 8" HSA

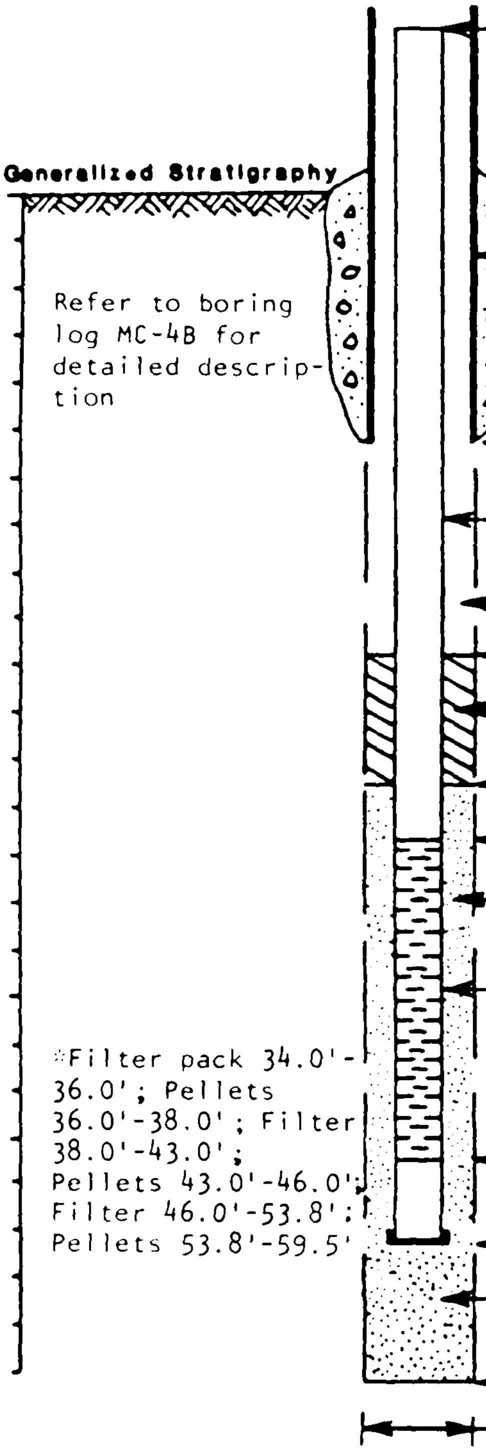
**Remarks**

**Piez./Well No.** MC-4B

**Project No.** 89C7583

**Date** 8/2/89

**Time** 4:40 p.m. completed



Refer to boring log MC-4B for detailed description

*Filter pack 34.0'-36.0'; Pellets 36.0'-38.0'; Filter 38.0'-43.0'; Pellets 43.0'-46.0'; Filter 46.0'-53.8'; Pellets 53.8'-59.5'

**Elevation of top of riser pipe** 714.65

**Height of riser above ground** ± 2.0'

**Ground Elevation** 712.6

**I.D./Type of surface casing** 3.7"/Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC

**Type of backfill** Volclay Grout

**Depth of top of seal** 13.0'

**Type of seal** Buffer Sand 17.0'-17.5'; Bentonite Pellets 13.0'-17.0' Buffer Sand 12.6'-13.0'

**Depth of top of filter pack** 17.0'

**Depth of top of screen** 19.0'

**Type of filter pack** Coarse Sand

**I.D./Type of screen** 2"/SCH 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 34.0'

**Depth of bottom of plugged blank section** 34.2'

**Type of backfill below observation well** *

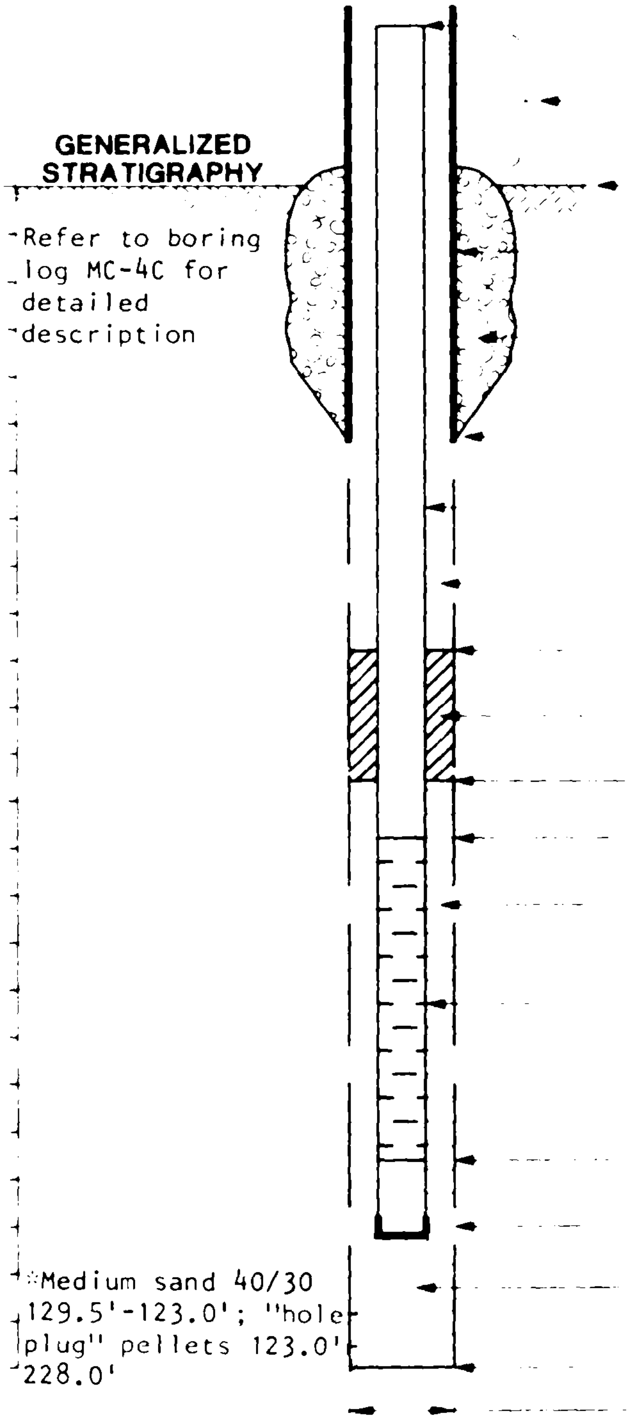
**Depth of bottom of boring** 59.5'

**Diameter of boring** 8"

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA
**Location** McCarl Site
**Installed by** Layne Western
**Inspected by** Klaas Doeden
**Method of Installation** Plain States MR300F with 8" HSA
**Remarks**

**Piez./Well No.** MC-4C
**Project No.** 89C7583-1
**Date** 5/29/90
**Time** 2:40 p.m.



Refer to boring log MC-4C for detailed description

*Medium sand 40/30 129.5'-123.0'; "hole plug" pellets 123.0'-228.0'

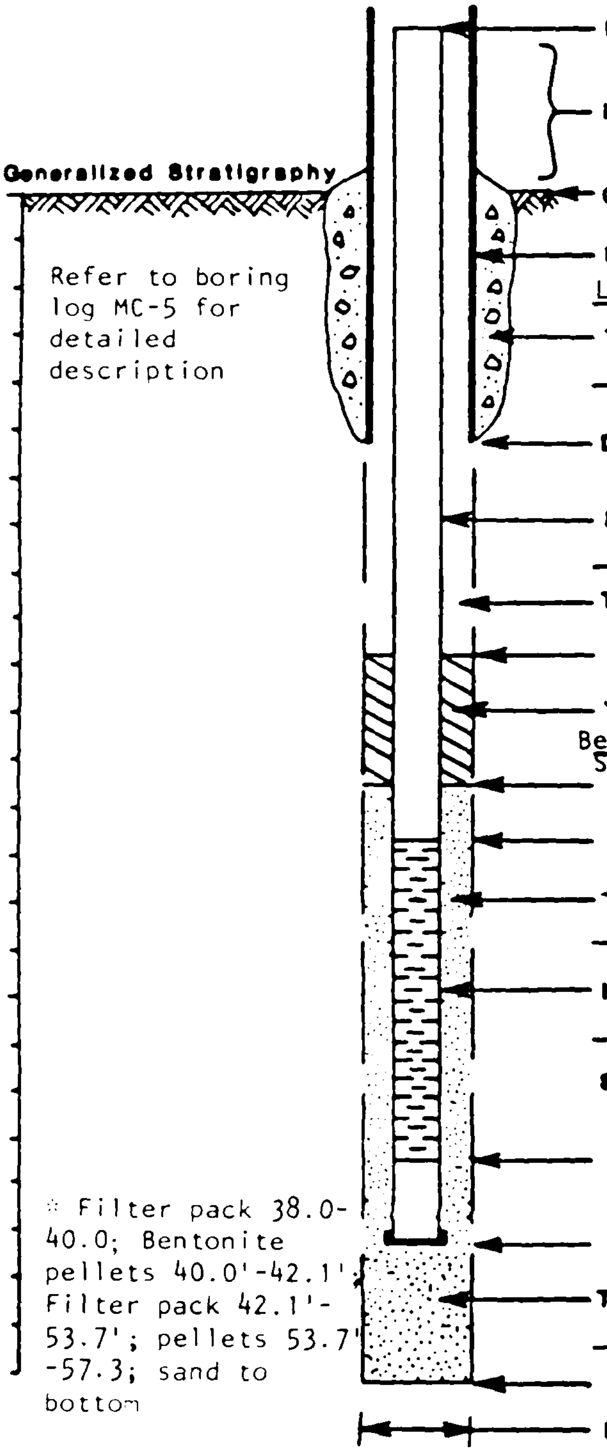
**Elevation of top of riser pipe** 714.26
**Height of riser above ground** 1.4'
**Ground Elevation** 712.9
**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing
**Type of surface seal** Concrete
**Depth of surface seal** 4.0'
**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC
**Type of backfill** "Pure Gold" grout
**Depth of top of seal** 99.0'
**Type of seal** "Enviroplug" pellets 99.0'-102.0'; Fine sand 102.0'-102.5'
**Depth of top of filter pack** 102.5'
**Depth of top of screen** 105.0'
**Type of filter pack** Medium sand 40/30 (Muscatine)
**I.D./Type of screen** 2" Sch. 40 Threaded PVC
**Screen slot size** 0.010 inch
**Depth of bottom of screen** 120.0'
**Depth of bottom of plugged bank section** 120.5'
**Type of backfill below observation well** *
**Depth of bottom of boring** 228.0'
**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA
**Location** McCarl Site
**Installed by** Layne-Western
**Inspected by** D. Jorgenson
**Method of Installation** Mobile B-61 w/ 8'' HSA
**Remarks**

**Piez./Well No.** MC-5
**Project No.** 89C7583
**Date** 8/1/89
**Time** 3:50 p.m. completed



Refer to boring log MC-5 for detailed description

∴ Filter pack 38.0-40.0; Bentonite pellets 40.0'-42.1'; Filter pack 42.1'-53.7'; pellets 53.7'-57.3; sand to bottom

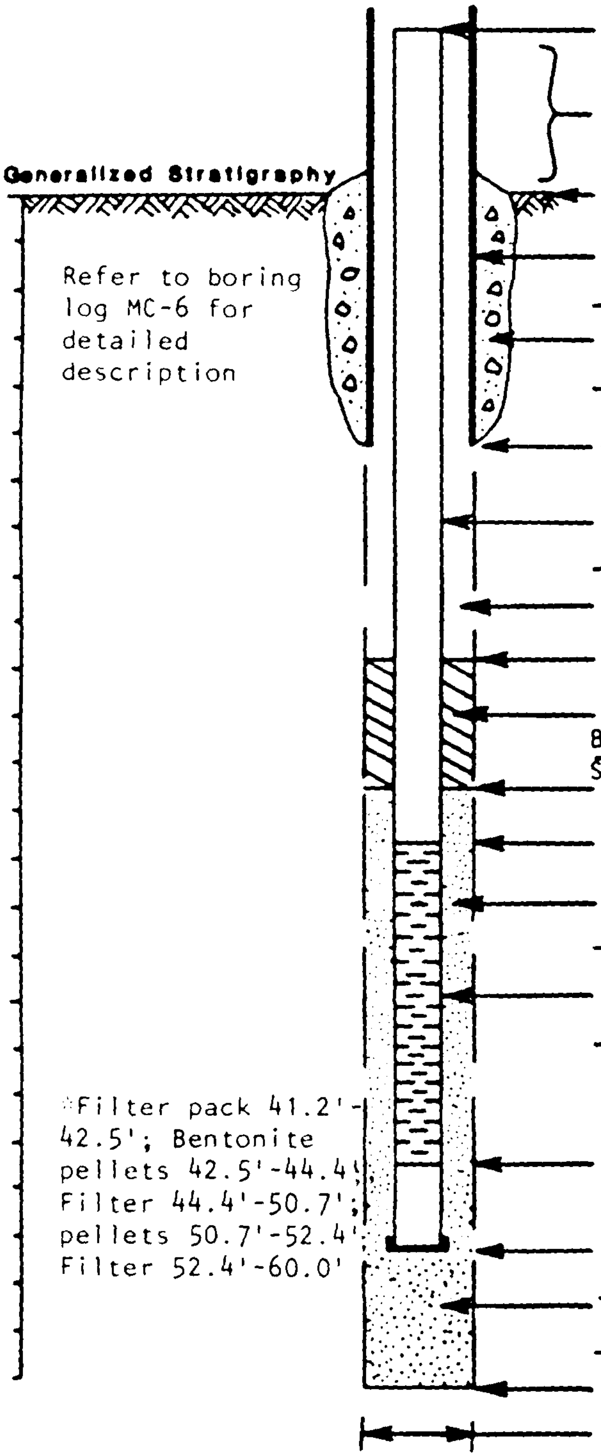
**Elevation of top of riser pipe** 711.76
**Height of riser above ground** ± 2.0'
**Ground Elevation** 709.8
**I.D./Type of surface casing** 3.7''/Steel Locking Protective Casing
**Type of surface seal** Concrete
**Depth of surface seal** 3.0'
**I.D./Type of riser pipe** 2''/SCH 40 Threaded PVC
**Type of backfill** Volclay Grout
**Depth of top of seal** 17.8'
**Type of seal** Buffer Sand 20.0'-20.8'; Bentonite Pellets 17.8'-20.0'; Buffer Sand 17.1'-17.8'
**Depth of top of filter pack** 20.0'
**Depth of top of screen** 23.0'
**Type of filter pack** Coarse Sand
**I.D./Type of screen** 2''/SCH 40 (Machine Slot) Threaded PVC
**Screen slot size** 0.010''
**Depth of bottom of screen** 38.0'
**Depth of bottom of plugged blank section** 38.2'
**Type of backfill below observation well** ∴
**Depth of bottom of boring** 60.0'
**Diameter of boring** 8''

***Woodward-Clyde Consultants***

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DUPONT - FT. MADISON, IOWA
**Location** McCarl Site
**Installed by** Layne-Western
**Inspected by** D. Jorgenson
**Method of Installation** Mobile B-61 w/ 8" HSA
**Remarks**

**Piez./Well No.** MC-6
**Project No.** 89C7583
**Date** 8/3/89
**Time** 4:30 p.m. completed



Refer to boring log MC-6 for detailed description

*Filter pack 41.2'-42.5'; Bentonite pellets 42.5'-44.4'; Filter 44.4'-50.7'; pellets 50.7'-52.4'; Filter 52.4'-60.0'

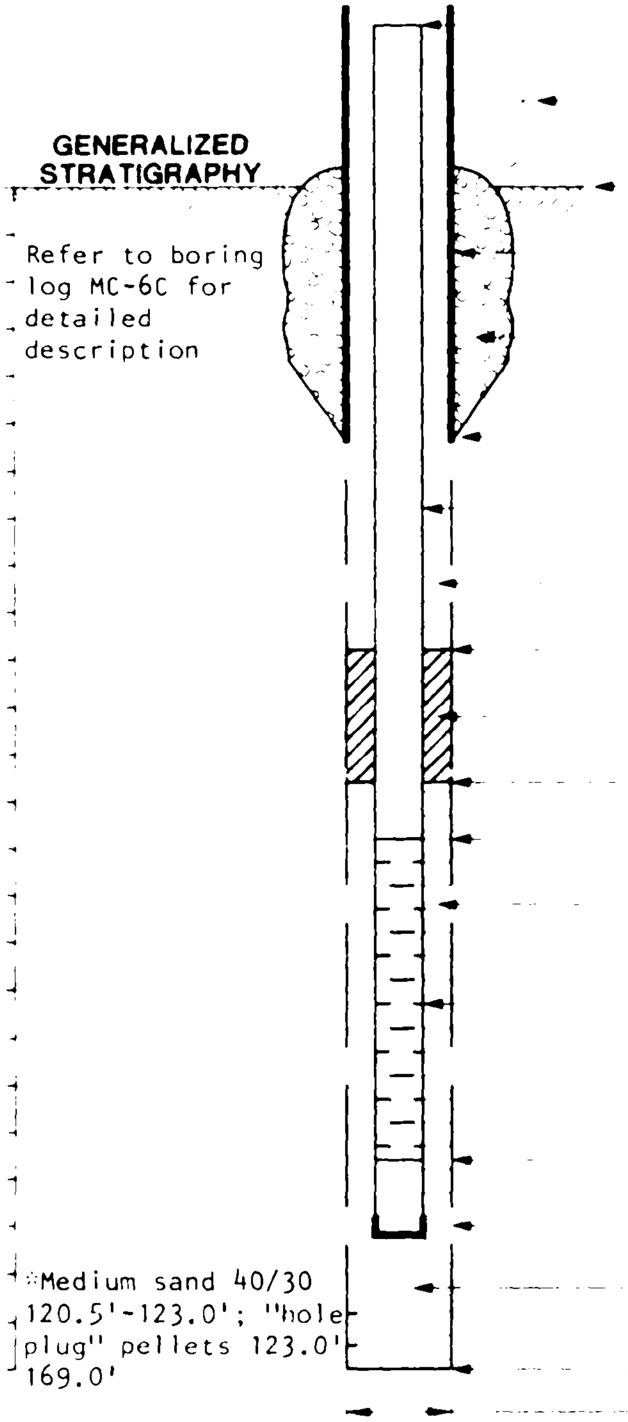
**Elevation of top of riser pipe** 712.85
**Height of riser above ground** ±2.0'
**Ground Elevation** 710.8
**I.D./Type of surface casing** 3.7"/Steel Locking Protective Casing
**Type of surface seal** Concrete
**Depth of surface seal** 3.0'
**I.D./Type of riser pipe** 2"/SCH 40 Threaded PVC
**Type of backfill** Volclay Grout
**Depth of top of seal** 21.2'
**Type of seal** Buffer Sand 20.7'-21.2'; Bentonite Pellets 21.2'-23.6'; Buffer Sand 23.6'-24.1'
**Depth of top of filter pack** 23.6'
**Depth of top of screen** 26.0'
**Type of filter pack** Coarse Sand
**I.D./Type of screen** 2"/SCH 40 (Machine Slot) Threaded PVC
**Screen slot size** 0.010"
**Depth of bottom of screen** 41.0'
**Depth of bottom of plugged blank section** 41.2'
**Type of backfill below observation well** *
**Depth of bottom of boring** 64.0'
**Diameter of boring** 8"

**Woodward-Clyde Consultants**

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA
**Location** McCarl Site
**Installed by** Layne Western
**Inspected by** Klaas Doeden
**Method of Installation** Plain States MR300F with 8" HSA
**Remarks**

**Piez./Well No** MC-6C
**Project No.** 89C7583-1
**Date** 5/29/90
**Time** 6:15 p.m.



Refer to boring log MC-6C for detailed description

*Medium sand 40/30 120.5'-123.0'; "hole plug" pellets 123.0'-169.0'

**Elevation of top of riser pipe** 714.51

**Height of riser above ground** 2.3'

**Ground Elevation** 712.2

**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 3.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 90.0'

**Type of seal** "Enviroplug" pellets 90.0'-95.0'; Slough 95.0-191,5'; fine sand 101.5-102.0'

**Depth of top of filter pack** 102.0'

**Depth of top of screen** 105.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 (Machine Slot) Threaded PVC

**Screen slot size** 0.010"

**Depth of bottom of screen** 120.0'

**Depth of bottom of plugged bank section** 120.5'

**Type of backfill below observation well**
*

**Depth of bottom of boring** 169.0'

**Diameter of boring** 8"

Woodward-Clyde Consultants

# GROUND WATER OBSERVATION WELL REPORT

**Project Name** DU PONT - FT. MADISON, IOWA

**Location** McCarl Site

**Installed by** Layne Western

**Inspected by** Bret Hedenkamp

**Method of Installation** CME 550 with 8" HSA

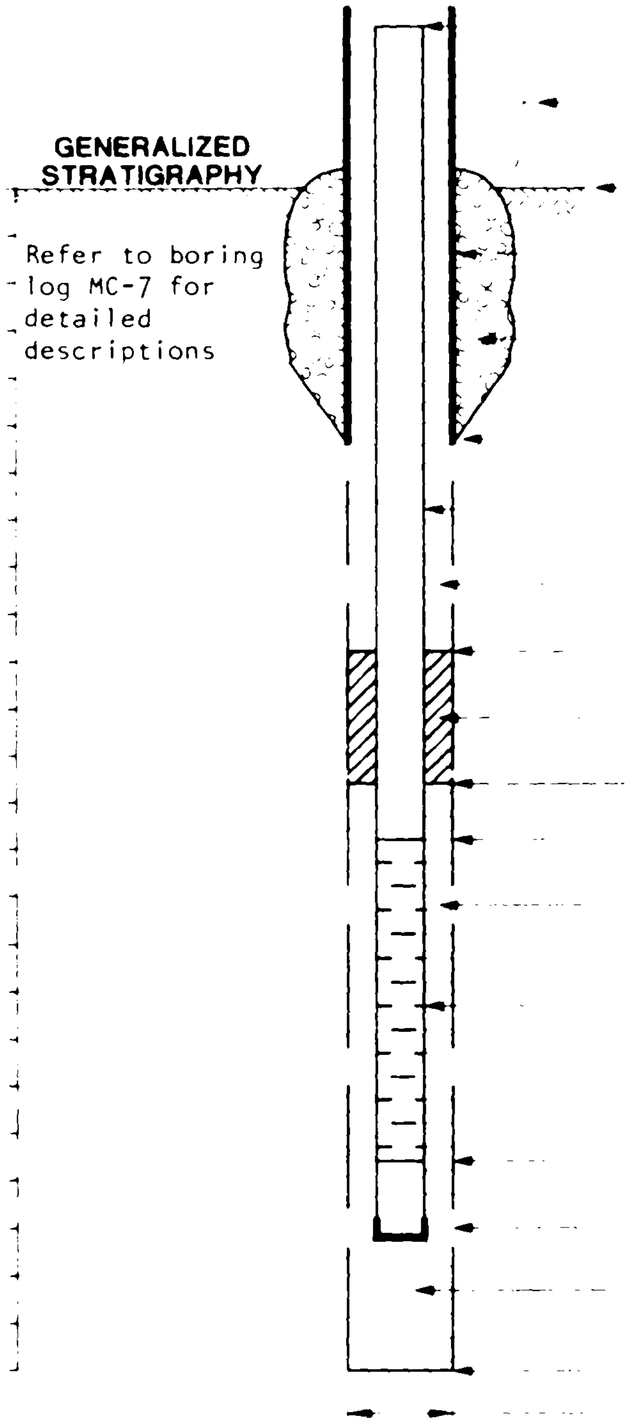
**Remarks**

**Piez./Well No.** MC-7

**Project No.** 89C7583-1

**Date** 5/10/90

**Time** 4:00 p.m.



**Elevation of top of riser pipe** 694.16

**Height of riser above ground** 1.9'

**Ground Elevation** 692.3

**I.D./Type of surface casing** 3.7"/ Steel Locking Protective Casing

**Type of surface seal** Concrete

**Depth of surface seal** 5.0'

**I.D./Type of riser pipe** 2" Sch. 40 Threaded PVC

**Type of backfill** "Pure Gold" grout

**Depth of top of seal** 17.0'

**Type of seal** Bentonite pellets 17.0-20.0'; fine sand 20.0-21.0'

**Depth of top of filter pack** 21.0'

**Depth of top of screen** 23.0'

**Type of filter pack** Medium sand 40/30 (Muscatine)

**I.D./Type of screen** 2" Sch. 40 Threaded PVC

**Screen slot size** 0.010 inch

**Depth of bottom of screen** 38.0'

**Depth of bottom of plugged bank section** 39.0'

**Type of backfill below observation well** Medium sand 40/30

**Depth of bottom of boring** 39.5'

**Diameter of boring** 8"

Woodward-Clyde Consultants

# APPENDIX D

# SLUG TEST ANALYSIS AND DATA

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF ATTACHMENTS

## I. INTRODUCTION

From August 6 to 10, 1990, WCC performed slug tests on selected monitoring wells located at Du Pont Baier and McCarl sites near Fort Madison, Iowa. At Baier site, monitoring wells MW-F2, MW-J, MW-K1, and MW-K2 were tested for both falling and rising head conditions. The selected wells at McCarl site were MC-3, MC-3C, MC-4A, MC-4C, and MC-6C. Wells MC-3 and MC-4A were tested only for rising head conditions due to the fact that water levels were below the top of screen.

These tests were performed with the purpose of estimating the local horizontal hydraulic conductivity of the Glacial Till at the sites. The analysis and conclusions derived herein are based on the results given by SLUGT, (version 7, 1988) and verified by hand calculation using the Cooper-Bredehoeft-Papadopulos Method.

During slug testing, water level was collected with two data loggers (In-Situ, Inc., Hermit SE 1000B), units 323 and 1017.

Geologic and ground water conditions observed at the time of drilling and well installation are indicated on the boring logs and ground water observation well reports in Appendices A and C. Slug test field data as recorded by the data loggers are presented in Attachment 2.

## II. ANALYTICAL PROCEDURES

The program SLUGT, version 7, is designed to follow two common methods to measure hydraulic conductivity (K). These methods are known as the Cooper, Bredehoeft-Papadopulos Method (1967) and Bouwer and Rice Method (1976).

At the Baier Site, the data from wells MW-F2, MW-J, and MW-K2, match the typical storativity-relative head curves of the Cooper-Bredehoeft-Papadopulos Method. Thus, giving good results for both falling and rising head analysis. Under similar testing conditions, the same order of magnitude in the results was observed at McCarl Site at wells MC-3 and MC-3C.

Bouwer and Rice Method gives an acceptable range of results for other wells where the first method does not provide with an acceptable match of field data with typical curves. Analytical calculations and curves are presented in Attachment 1.

## III. RESULTS

For each monitoring well at least one value of hydraulic conductivity was obtained by either method. In about 50% of the total number of tests, the goodness of the data will provide reasonable results by both methods. Table 1 presents the resulting calculated and estimated K values for each well.

## IV. CONCLUSIONS

The four monitoring wells at Baier site can be grouped into two general categories based on well depth and earth material screened. Wells MW-J and MW-K1, of similar depth, are screened within the approximate depth interval 40 to 60 feet below the ground surface. They are mostly screened in the weathered Glacial Till except for the last 2 to 3 feet which are in the unweathered portion of it. Monitoring wells MW-F2 and MW-K2 are both screened within the approximate depth interval 116 to 136 feet below ground surface which is essentially in the unweathered Glacial Till.

At McCarl site wells, MC-3 and MC-4A are not at the same depth, but their screens cover a depth from 20 to 50 feet below the ground surface in the weathered Glacial Till. Wells MC-3C, MC-4C, and MC-6C are not at the same depth, but they are all placed to cover a screened depth interval 92.5 to 120 feet below the ground surface placed into the unweathered portion of the Glacial Till.

It should be noted that one of the field objectives of well installation was to construct and screen them where more permeable zones were encountered during drilling. Consequently, these slug tests represent the evaluation of more permeable zones.

The magnitude of the K values obtained from the calculations varies within a reasonable range, one order of magnitude, for both sites (see Table 1). It should be noted, however, that the glacial materials beneath the sites are heterogeneous and anisotropic. As shown in all boring logs, present and past investigations, significant stratigraphic layering, structure, and general heterogeneity is present.

The estimated K values shown in Table 1 represent order of magnitude hydraulic conductivity values for the materials in the tested intervals. These values were obtained as the average of the computed value by the two methods.

It is understood that in some cases the relatively low permeability of these soils would not allow a sudden drop in water levels after the slug is in place. Therefore, the Cooper, Bredehoeft, and Papadopulos method will not provide useful information while the Bouwer and Rice method will give some reference value to be used in the analysis of the site.

At the Baier site, the range in K values for the two shallow water bearing wells MW-J and MW-K1 is relatively narrow $1.0x10^{-3}$ to $3.0x10^{-3}$ cm/sec. The other two wells, MW-K2 and MW-F2, in the deeper water bearing zone have a range of K values between $2.5x10^{-3}$ to $3.0x10^{-4}$ cm/sec.

Shallow water bearing wells at McCarl site, MC-3 and MC-4A, have a range of K values between $1.5x10^{-3}$ to $9.0x10^{-3}$ cm/sec. Wells MC-3C, MC-4C, and MC-6C have a range of K values from $2.5x10^{-3}$ to $6.0x10^{-3}$ cm/sec.

There is a correlation between the presence of predominately sandy layers within the screened interval and the magnitude of the calculated K values. (See Table 2). At the Baier site, wells MW-F2, MW-K2, and MW-J are screened across some material identified as poorly-graded sands or gravely sands.

At the McCarl site, wells MC-3C, MC-4C, and MC-6C are also screened across poorly-graded sands or gravely sands. The apparent correlation provides evidence that slug test results are reasonably representative for the earth materials tested and the test conditions.

## TABLE 1

## SLUG TEST RESULTS
## BY METHOD AND K VALUES ESTIMATES

| | | Slug Test Results by Method | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | by Cooper, Bredenholft & Popadopulos | | by Bouwer & Rice | | Estimated Values of | | | |
| Well ID | Test Conditions | Storativity | Transmissivity ($ft^2$/sec) | K ($ft^2$/sec) | Transmissivity ($ft^2$/sec) | Storativity | Transmissivity ($ft^2$/sec) | K (ft/sec) | K (cm/sec) |
| **McCarl Site** | | | | | | | | | |
| MC-3 | R | $1x10^{-1}$ | $6.88x10^{-3}$ | $3.4x10^{-4}$ | $2.2x10^{-3}$ | $1x10^{-1}$ | $2x10^{-3}$ | $3x10^{-4}$ | $9.0x10^{-3}$ |
| MC-3C | F | $1x10^{-2}$ | $6.88x10^{-3}$ | $1.3x10^{-4}$ | $6.6x10^{-3}$ | | $4x10^{-3}$ | $8x10^{-5}$ | $2.5x10^{-3}$ |
| MC-3C | R | Not acceptable match (NAM) | --------- | $3.5x10^{-5}$ | $1.7x10^{-3}$ | | | | |
| MC-4A | R | NAM | --------- | $4.7x10^{-5}$ | $6.9x10^{-4}$ | | $7x10^{-4}$ | $5x10^{-5}$ | $1.5x10^{-3}$ |
| MC-4C | F | NAM | --------- | $3.2x10^{-4}$ | $1.25x10^{-2}$ | | $7x10^{-3}$ | $2x10^{-4}$ | $6.0x10^{-3}$ |
| MC-4C | R | NAM | --------- | $4.1x10^{-5}$ | $1.7x10^{-3}$ | | | | |
| MC-6C | F | NAM | --------- | $2.02x10^{-4}$ | $8.7x10^{-3}$ | | $5x10^{-3}$ | $1.0x10^{-4}$ | $3.0x10^{-3}$ |
| MC-6C | R | NAM | --------- | $1.44x10^{-5}$ | $6.13x10^{-4}$ | | | | |
| **Baier Site** | | | | | | | | | |
| MW-F2 | F | | | | | $1x10^{-3}$ | $1x10^{-3}$ | $8.0x10^{-5}$ | $2.5x10^{-3}$ |
| MW-F2 | R | $1x10^{-1}$ | $4.6x10^{-6}$ | $8.2x10^{-5}$ | $4.6x10^{-3}$ | | | | |
| MW-J | F | $1x10^{-1}$ | $1.8x10^{-4}$ | $6.2x10^{-5}$ | $8.5x10^{-5}$ | $1x10^{-1}$ | $2x10^{-4}$ | $4.0x10^{-5}$ | $1.0x10^{-3}$ |
| MW-J | R | $1x10^{-1}$ | $7.22x10^{-5}$ | $1.3x10^{-5}$ | $2.8x10^{-4}$ | | | | |
| MW-K1 | F | NAM | | $1.9x10^{-4}$ | $2.8x10^{-3}$ | $1x10^{-1}$ | $1x10^{-3}$ | $1.0x10^{-4}$ | $3.0x10^{-3}$ |
| MW-K1 | R | $1.0x10^{-1}$ | $1.82x10^{-5}$ | $9.7x10^{-5}$ | $1.5x10^{-3}$ | | | | |
| MW-K2 | F | $1.0x10^{-2}$ | $2.9x10^{-5}$ | $6.0x10^{-6}$ | $1.76x10^{-4}$ | $1x10^{-1}$ | $2x10^{-4}$ | $9x10^{-6}$ | $3.0x10^{-4}$ |
| MW-K2 | R | $1.0x10^{-1}$ | $1.82x10^{-5}$ | $1.3x10^{-5}$ | $3.8x10^{-4}$ | | | | |

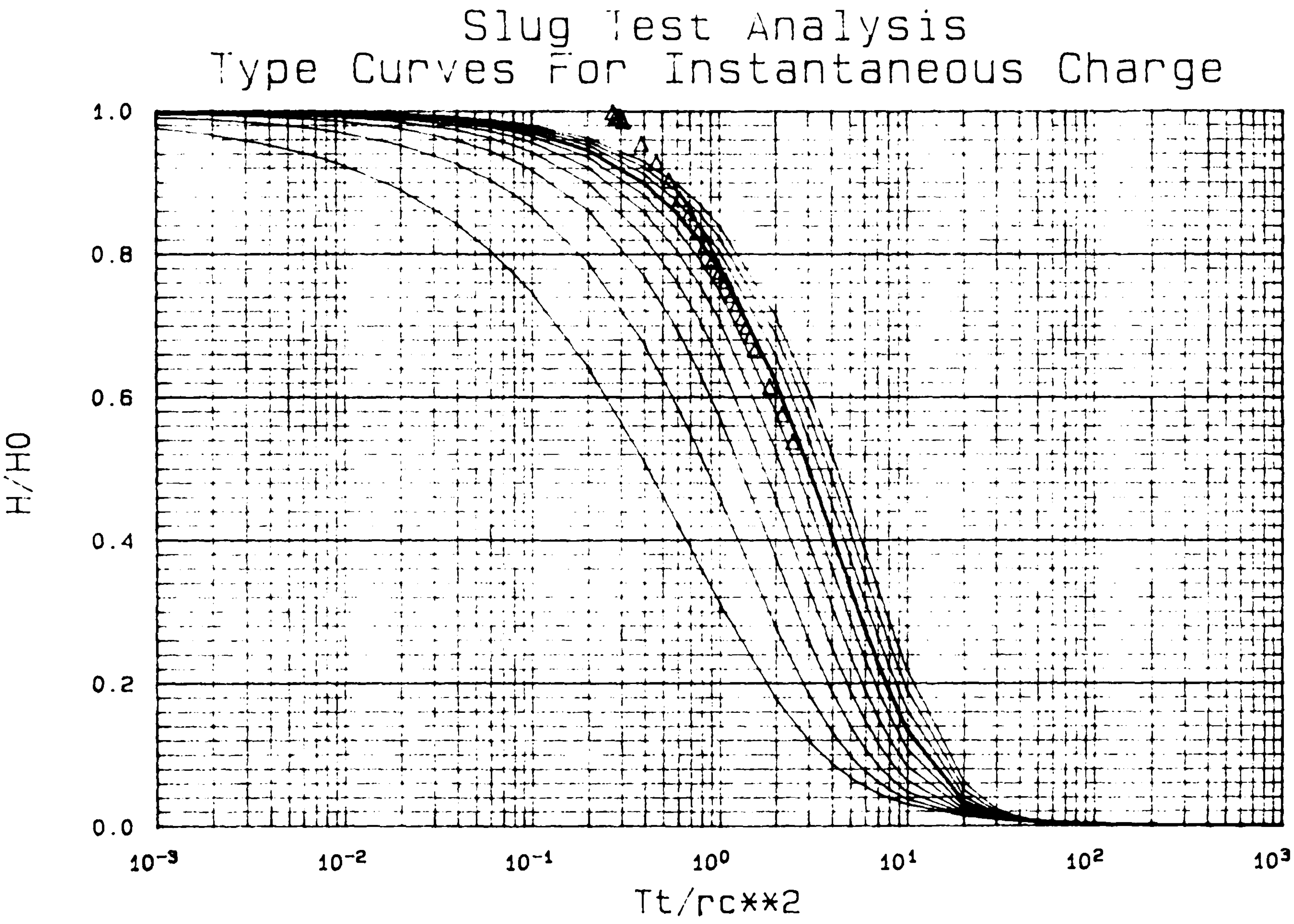
# TABLE 2

## SAND LAYER WITHIN SCREENED INTERVAL

| Well ID | Top of Layer From Ground Surface (ft.) | Bottom of Layer From Ground Surface (ft.) | Sand Layer Thickness (ft.) | Sand Layer to Screened Interval (%) | USC | Screened Depth Interval (ft.) |
|---|---|---|---|---|---|---|
| **Baier Site** | | | | | | |
| MWF2 | 119.0 | 128.0 | 1.4 | 9.3 | SP | 116-131 |
| MWK2 | 121.0 | 136.0 | 5.7 | 38 | SP | 121-136 |
| MWJ | 40.0 | 44.0 | 4.0 | 27 | SP | 41-56 |
| **McCarl Site** | | | | | | |
| MC3C | 93.5 | 106.5 | 9.5 | 63 | SP-SW | 92.5-107.5 |
| MC4C | 115.5 | 119.2 | 2.7 | 18 | SP | 105.0-120.0 |
| MC6C | 111.0 | 112.0 | 1.0 | 6.7 | SP | 105.0-120.0 |

# ATTACHMENT 1

## MWF2-F


Slug Test Analysis
Type Curves For Instantaneous Charge
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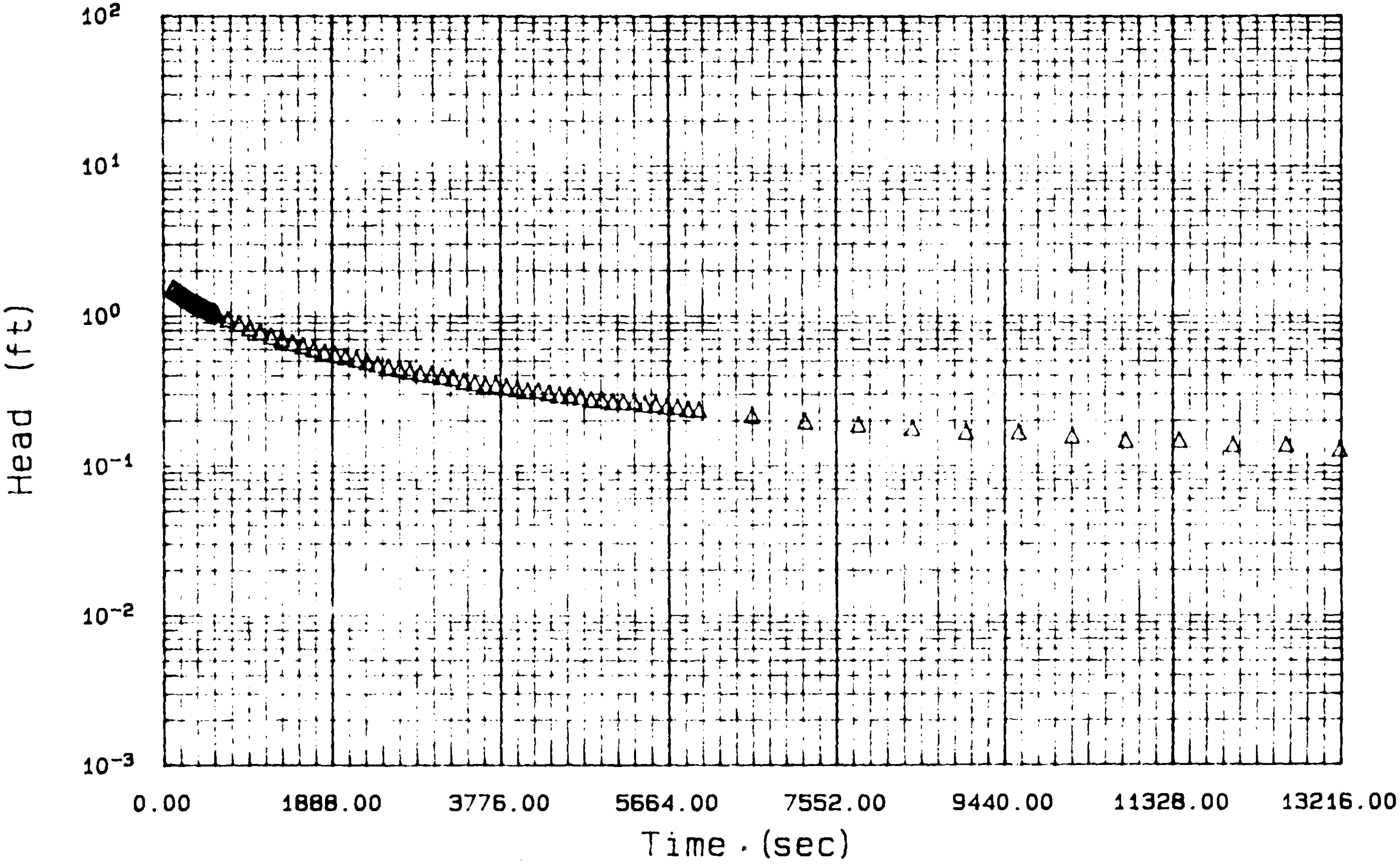
0.8
0.6
0.4
0.2
0.0
H/H0
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2

# 89c7583-1 Dupont Baier Site
## Well mwf2-f Date 08/09/90



[illegible]

[illegible]

[illegible] 1.5 FEET

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

| ALPHA | STORATIVITY | MEAN TRANSMISSIVITY | MEAN PERMEABILITY | MINIMUM TRANS. | MAXIMUM TRANS. | RATIO OF "T" RANGE TO TMAX | ROOT MEAN SQUARE OF TIME DEVIATIONS | DIFFERENCE IN RMS |
|---|---|---|---|---|---|---|---|---|
| 1.000E 01 | 1.000E 01 | 2.2771E 05 | [illegible] | ********* | 2.026E 04 | 25.345[illegible] | 5656.30 | 0.00 |
| 1.000E 02 | 1.000E 02 | 1.524E [illegible] | 1.[illegible] | ********* | 6.00[illegible]E 04 | [illegible] | 1[illegible].48 | 40[illegible] |
| 1.000E [illegible] | 1.000E [illegible] | [illegible] | [illegible] | ********* | [illegible] | [illegible] | [illegible] | [illegible] |
| 1.000E 04 | 1.000E 04 | [illegible].44E [illegible] | [illegible] | ********* | 1.[illegible] | [illegible] | [illegible] | [illegible] |
| 1.000E 05 | 1.000E 05 | [illegible]E 05 | [illegible] | ********* | [illegible] | [illegible] | [illegible] | [illegible] |
| 1.000E 06 | 1.000E 06 | [illegible]E 05 | [illegible] | ********* | [illegible] | [illegible] | [illegible] | [illegible] |
| 1.000E 07 | 1.000E 07 | [illegible]E 05 | 4.556E 06 | ********* | [illegible]E 07 | 17.[illegible] | [illegible].75 | [illegible].42 |
| 1.000E 08 | 1.000E 08 | [illegible]E 05 | [illegible] | ********* | [illegible]E 07 | 43.[illegible] | 5601.63 | 171.27 |
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| [illegible] | [illegible] | [illegible] | [illegible] | ********* | [illegible] | [illegible] | [illegible] | [illegible] |

[illegible]

[illegible]

```
[illegible]

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

 PERMEABILITY =  8.24E-05 FT/SECOND        =  2.51E-03 CM/SECOND

 TRANSMISSIVITY =  4.[illegible]E-0[illegible] FT**2/SEC [illegible]


COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

 [illegible]

 [illegible]
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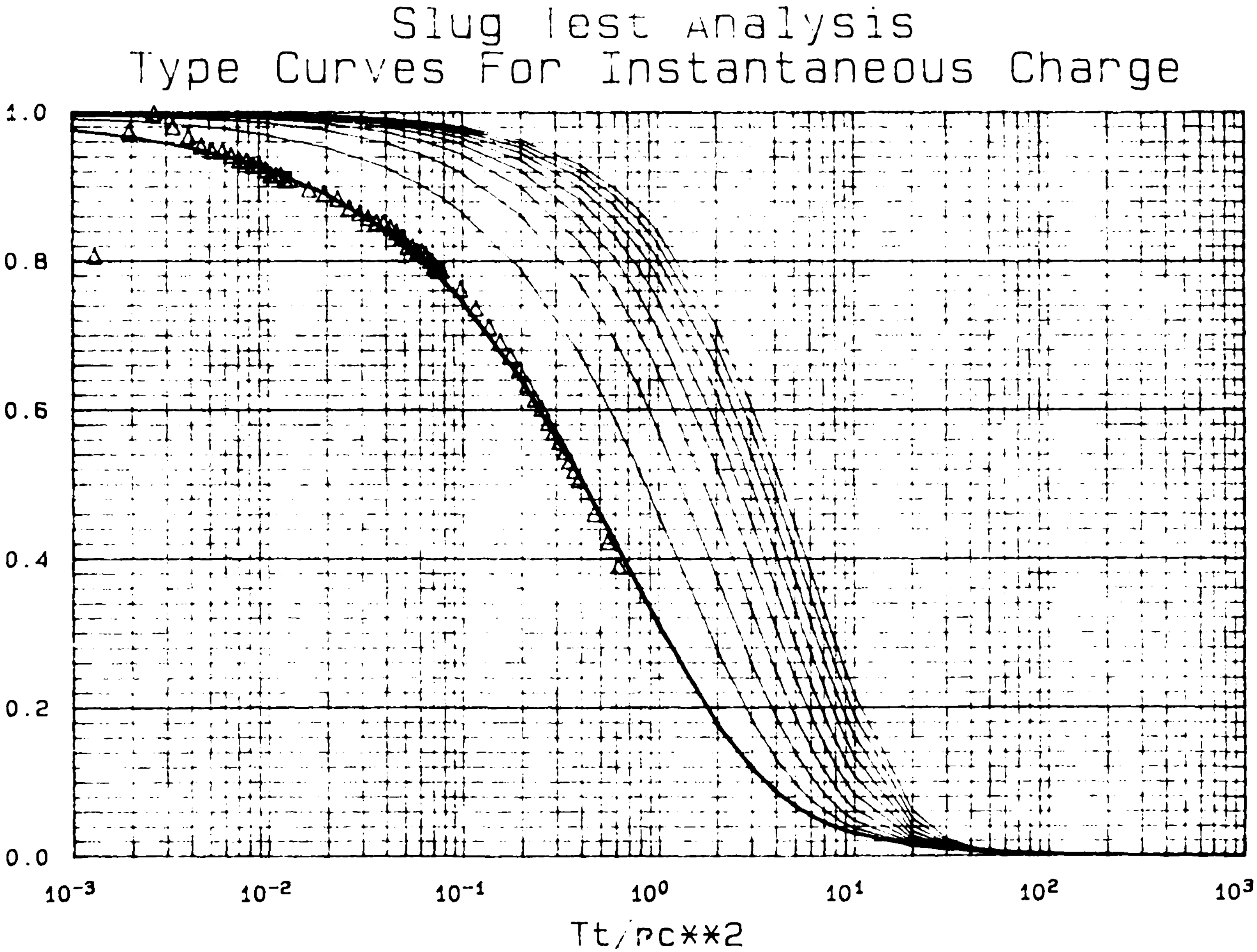
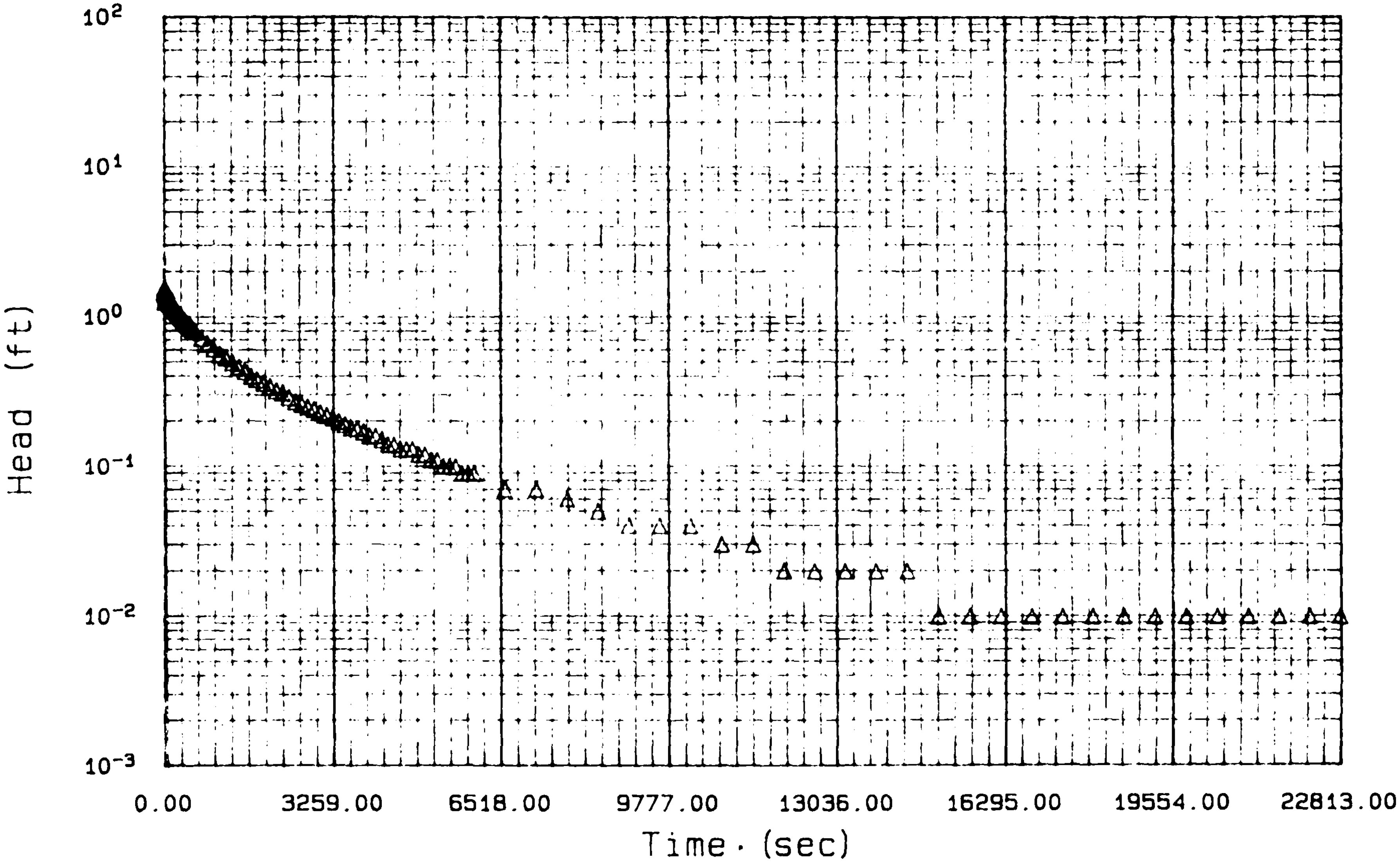
## MWF2-R


Slug Test Analysis
Type Curves For Instantaneous Charge
H/HO
1.0
0.8
0.6
0.4
0.2
0.0
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2

89c7583-1 Dupont Baier Site
Well mwf2-r Date 08/09/90



```
                          PROGRAM SLUG1, VERSION 7,FEB. 1988

     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.: 89c7583-1                           CLIENT: Dupont

     SITE LOCATION: Baier Site                        DATE OF SLUG TEST: 08/02/90

     FIELD INVESTIGATOR: B. Hedenkamp & K. Rauch

                              WELL NO.: MW1-1 ✓

                              INPUT PARAMETERS

     INNER CASING DIAMETER =   2.00 INCHES                    LENGTH OF SCREEN OR INTAKE PORTION =  15.00 FEET
     INNER SCREEN OR OPEN-HOLE DIAMETER =   2.00 INCHES       DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =  22.85✓FEET
     DIAMETER OF DRILLED HOLE =   8.00 INCHES                 THICKNESS OF SATURATED AQUIFER ZONE =  [illegible] FEET✓
     ESTIMATED POROSITY OF GRAVEL PACK = 0.15                 CODE NO. HEAD INDEX =  1✓("1" IF [illegible],"2" IF [illegible])

                         NUMBER OF HEAD-TIME DATA POINTS =    71

                               TIME                HEAD
                              (MIN)                (FT)

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                               3.00               [illegible]
                               4.00               [illegible]
                               5.00               [illegible]
                               6.00               [illegible]
                               7.00               1.090
                               8.00               1.080
                               9.00               1.070
                              10.00               1.060
                              11.00               [illegible]
                              12.00               [illegible]
                              13.00               [illegible]
                              14.00               1.010
                              15.00               [illegible]
                              16.00               [illegible]
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                              18.00               [illegible]
                              19.00               [illegible]
                              20.00               [illegible]
                              25.00               [illegible]
                              30.00               [illegible]
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                              45.00               [illegible]
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```

| | |
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| 50.00 | [illegible] |
| [illegible] | [illegible] |
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| | |
|---|---|
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| 130.00 | 0.220 |
| 210.00 | [illegible] |
| [illegible] | [illegible] |
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| 360.00 | 0.090 |
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| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

COMPUTED VALUES FOR [illegible] [illegible]

```
                         METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                      COMPUTED RESULTS:

                              COMPUTED VALUE OF HO =   1.56 FEET

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

    ALPHA      STORATIVITY     MEAN        MEAN       MINIMUM     MAXIMUM       RATIO OF     ROOT MEAN    DIFFERENCE
                             TRANSMIS-    PERMEA-      TRANS.      TRANS.     "T" RANGE TO   SQUARE OF      IN RMS
                              SIVITY      BILITY                                  TMAX          FMH
                                                                                             DEVIATIONS

  1.000E-01    1.000E-01    *********    *********   *********   4.415E-03     *********     875.18        0.00
  1.000E-02    1.000E-02    *********    *********   *********   6.911E-03     *********     [illegible]   -55.88
  1.000E-03    1.000E-03    *********    *********   *********   [illegible]   *********     [illegible]   [illegible]
  1.000E-04    1.000E-04    *********    *********   *********   1.125E-02     *********     [illegible]   [illegible]
  1.000E-05    1.000E-05    *********    *********   *********   1.411E-02     *********     [illegible]   [illegible]
  1.000E-06    1.000E-06    *********    *********   *********   [illegible]   *********     [illegible]   [illegible]
  1.000E-07    1.000E-07    *********    *********   *********   1.882E-02     *********     [illegible]   [illegible]
  1.000E-08    1.000E-08    *********    *********   *********   2.115E-02     *********     [illegible]   9.33
  1.000E-09    1.000E-09    *********    *********   *********   [illegible]   *********     [illegible]   [illegible]
  1.000E-10    1.000E-10    *********    *********   *********   [illegible]   *********     [illegible]   [illegible]

                                  [illegible]

                  [illegible]

                  [illegible]
                  [illegible]
```

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[illegible]

PERMEABILITY = 6.16E-05 FT/SECOND       =  1.88E-03 CM/SECOND
TRANSMISSIVITY = 1.44E-03 FT**2/SECOND

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

[illegible]
TRANSMISSIVITY = [illegible] FT**2/SECOND
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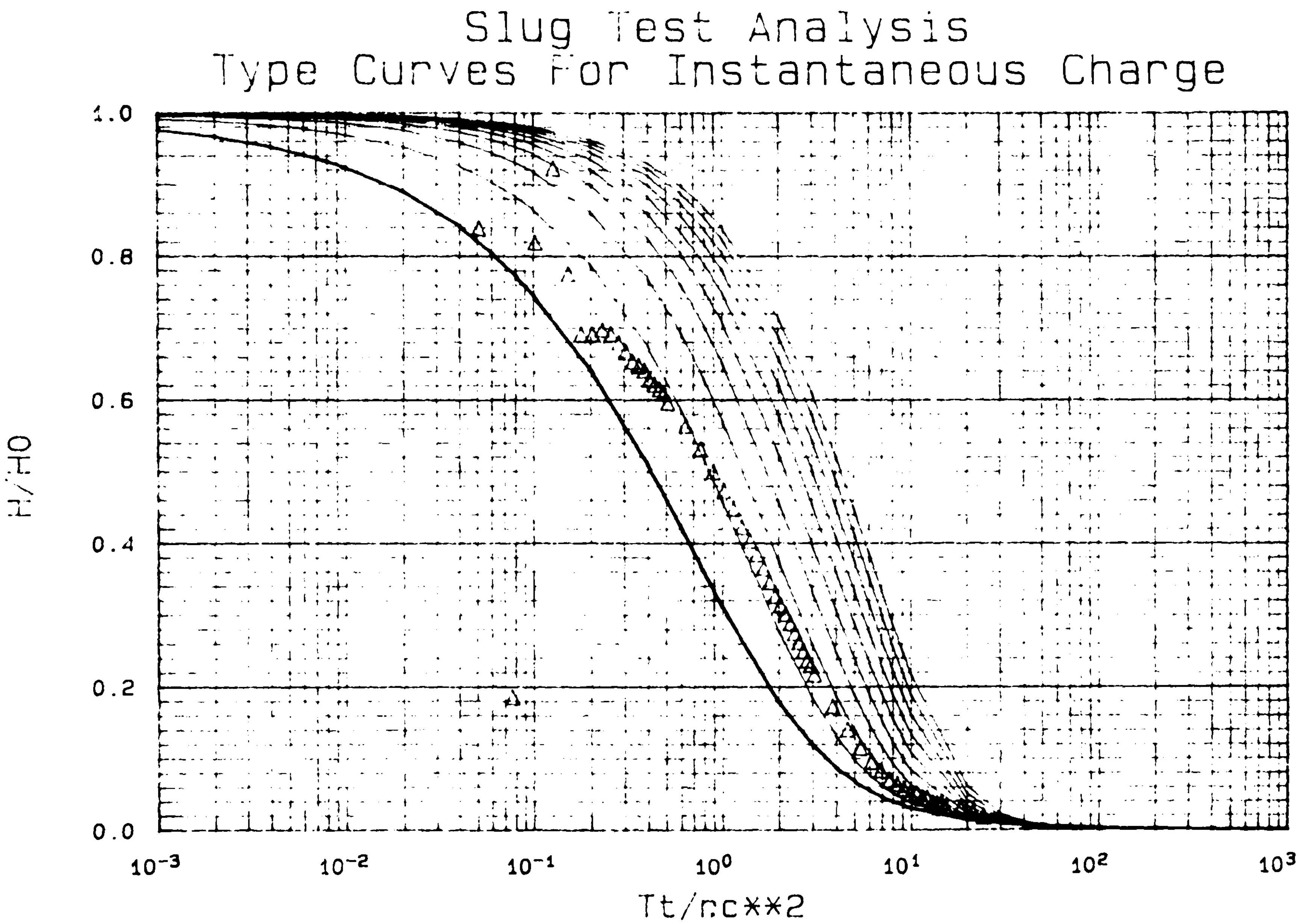
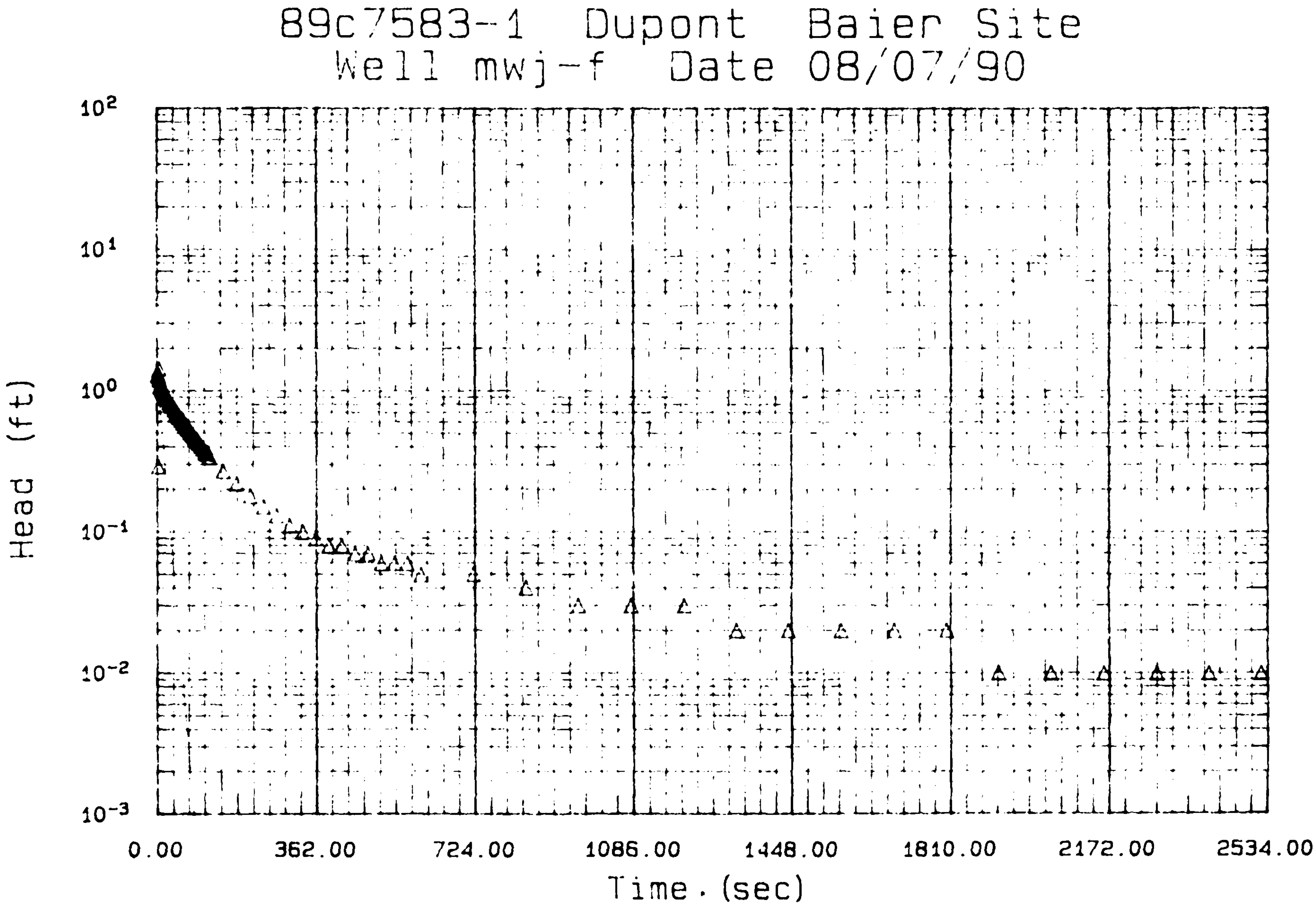
## MWJ-F



Slug Test Analysis
Type Curves For Instantaneous Charge
1.0
0.8
0.6
0.4
0.2
0.0
H/HO
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2


89c7583-1 Dupont Baier Site
Well mwj-f Date 08/07/90
Head (ft)
$10^2$
$10^1$
$10^0$
$10^{-1}$
$10^{-2}$
$10^{-3}$
0.00
362.00
724.00
1086.00
1448.00
1810.00
2172.00
2534.00
Time (sec)

```
                         PROGRAM SLUGT, VERSION 7,FEB. 1988

THIS PROGRAM CALCULATES HYDRAULIC CONDUCTIVITY 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.: [illegible] 1                              CLIENT: Dupont

SITE LOCATION: Baier Site                                DATE OF SLUG TEST: 08/07/90

FIELD INVESTIGATOR: [illegible] Hedenkamp & T. Rauch

                              WELL I.D.: [illegible] ✓

                              INPUT DATA ARE:

INNER CASING DIAMETER =    2.00 INCHES                LENGTH OF SCREEN OR INTAKE PORTION =   15.00 FEET
INNER SCREEN OR OPEN HOLE DIAMETER = [illegible]      [illegible] FEET ✓
DIAMETER OF DRILLED HOLE = [illegible] INCHES         [illegible] ✓
ESTIMATED POROSITY OF GRAVEL PACK = 0.15              [illegible] ✓ [illegible]

                   NUMBER OF HEAD-TIME DATA POINTS =   9[illegible]

                       [illegible]            [illegible]
                       [illegible]            [illegible]
```

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 90.00 | 0.540 |
| 95.00 | [illegible] |
| 100.00 | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 120.00 | 0.450 |
| 150.00 | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 240.00 | 0.180 |
| 270.00 | 0.150 |
| 300.00 | 0.140 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 420.00 | 0.100 |
| 450.00 | 0.100 |
| 480.00 | 0.100 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
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| [illegible] | [illegible] |
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| [illegible] | [illegible] |
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| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

```
[illegible]                    0.020
[illegible]                    0.000

HO SPECIFIED BY USER

[illegible] VALUE FOR HO ( [illegible] )      [illegible]
```

```
                    METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                              COMPUTED RESULTS:

                       COMPUTED VALUE OF H      [illegible] FEET

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

    ALPHA        STORATIVITY      MEAN          MEAN          MINIMUM        MAXIMUM        RATIO OF       ROOT MEAN      DIFFERENCE
                                  TRANSMIS-     PERMEA-       TRANS.         TRANS.         "T" RANGE TO   SQUARE OF      IN RMS
                                  SIVITY        BILITY                                      TBAR           THE
                                                                                                           DEVIATIONS

  1.000E-01      1.000E-01      5.049E-05     3.365E-06     1.[illegible]E-05    9.440E-05      1.528024       12[illegible].19      0.00

  1.[illegible]  [illegible]    [illegible]   [illegible]   [illegible]    [illegible]    1.[illegible]  [illegible]    [illegible]

  1.[illegible]  [illegible]    [illegible]   [illegible]   [illegible]    [illegible]    [illegible]    [illegible]    [illegible]

  1.000E-04      1.[illegible]E-04    1.527E-04     1.018E-05     [illegible]    [illegible]E-04    2.28[illegible]    [illegible].46    64.54

  [illegible]    [illegible]    1.[illegible]E-04    1.[illegible]E-05    [illegible]    [illegible]E-04    [illegible]    [illegible]    [illegible]

  1.000E-06      1.[illegible]  [illegible]E-04    1.40[illegible]E-05    [illegible]    [illegible]E-04    [illegible]    [illegible]    [illegible]

  1.000E-07      1.[illegible]E-07    2.41[illegible]E-04    1.609E-05     [illegible]E-05    6.927E-04      2.744665       [illegible].79    60.06

  1.[illegible]  [illegible]    [illegible]   [illegible]   [illegible]    [illegible]    [illegible]    [illegible]    [illegible]

  [illegible]    [illegible]    [illegible]   [illegible]   [illegible]    [illegible]    [illegible]

  1.000E-10      1.[illegible]E-10    [illegible]E-04    [illegible]    [illegible]    [illegible]    [illegible]    [illegible]    [illegible].47


                         [illegible] MATCH RESULTS:

               [illegible]

                 [illegible]
                 STORATIVITY        [illegible]
```

```
        [illegible]

  COMPUTED RESULTS USING [illegible] OF [illegible] FILE:

   PERMEABILITY =  1.29E-05 FT/SECOND       =  3.93E-04 CM/SECOND

   TRANSMISSIVITY = [illegible] FT**2/SECOND

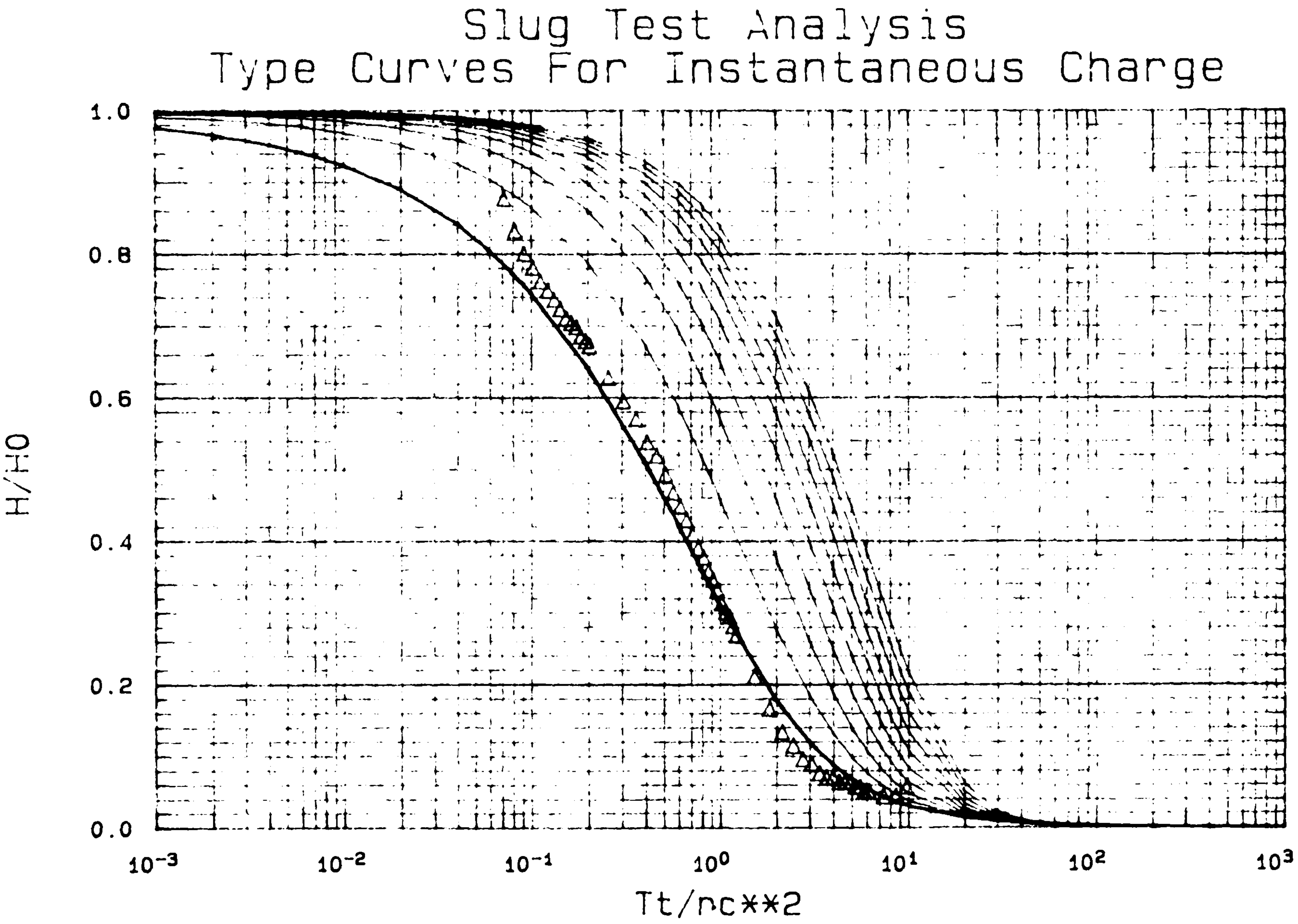


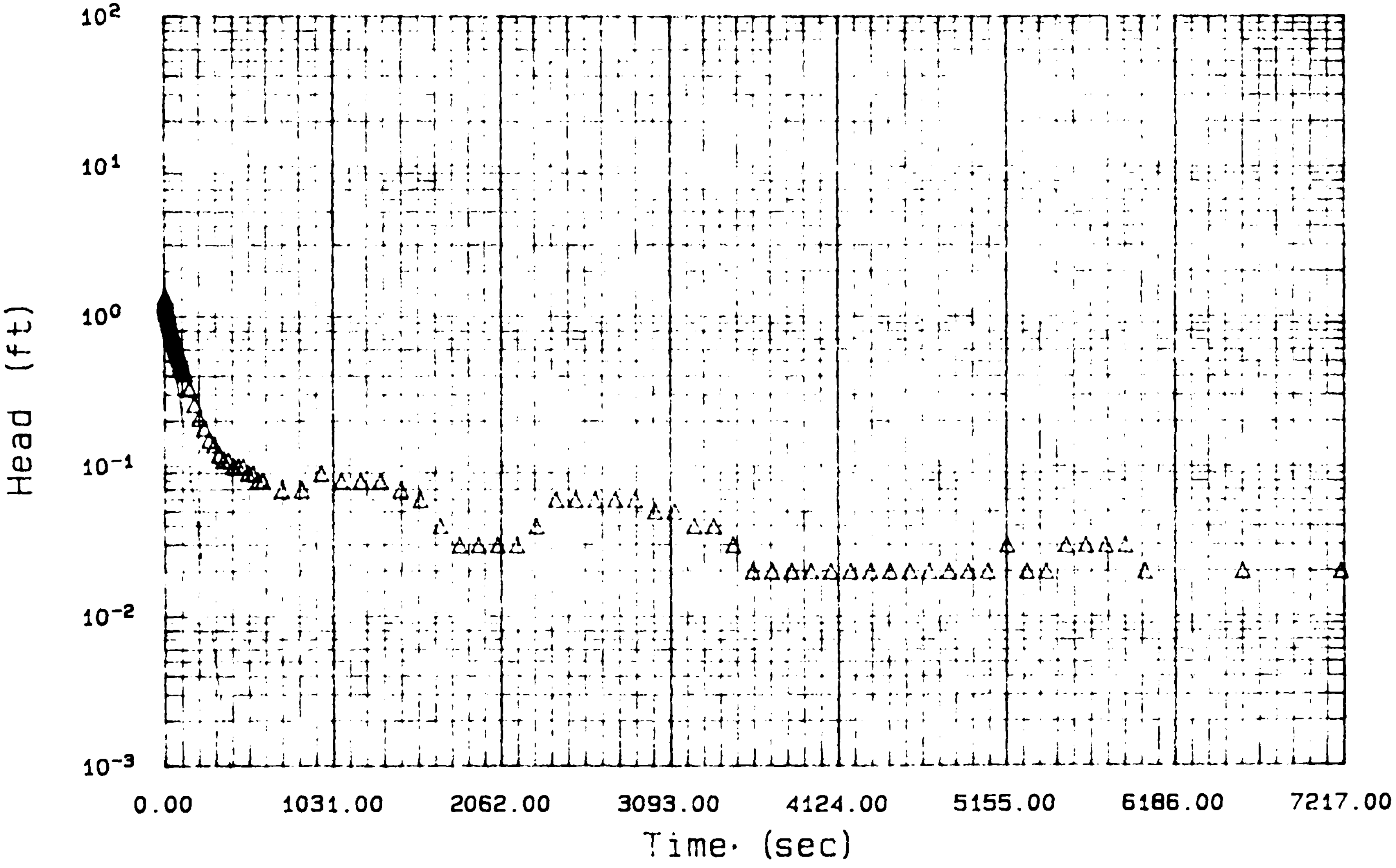
  COMPUTED RESULTS USING [illegible]:

   PERMEABILITY =  1.[illegible] FT/SECOND       [illegible] CM/SECOND

   TRANSMISSIVITY = [illegible]-4 FT**2/SECOND
```

## MWJ-R


Slug Test Analysis
Type Curves For Instantaneous Charge
1.0
0.8
0.6
0.4
0.2
0.0
H/HO
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2



89c7583-1 Dupont Baier Site
Well mwj-r Date 08/07/90

```
                    PROGRAM SLUGT, VERSION 2,FEB. 1988

THIS PROGRAM CALCULATES HYDRAULIC CONDUCTIVITY FROM SLUG TEST DATA BASED ON TWO ANALYTICAL METHODS:
        (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.: 890[illegible] 1                          CLIENT: Dupont

SITE LOCATION: Baier Site                              DATE OF SLUG TEST: 08/07/90

FIELD INVESTIGATOR: B. Hedenkamp & E. Rauch

                         WELL NO.: MW-[illegible] ✓

                         INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES            LENGTH OF SCREEN OR INTAKE PORTION =   10.00 FEET
INNER SCREEN OR OPEN HOLE DIAMETER =   2.00 INCHES   DEPTH FROM WATER TABLE TO BOTTOM OF SCREEN =   18.4[illegible] FEET ✓
DIAMETER OF DRILLED HOLE =   8.00 INCHES           THICKNESS OF SATURATED AQUIFER =   34.[illegible] FEET ✓
ESTIMATED POROSITY OF GRAVEL PACK = 0.15          FREE OR HEAD INDEX =  1 ✓("1" IF FREE HEAD,"2" IF CONFINED)

               NUMBER OF HEAD-TIME DATA POINTS =   101

                  TIME                HEAD
                (SECONDS)            (FEET)

                  1.00               [illegible]
                  1.[illegible]      [illegible]
                  [illegible]        [illegible]
                  [illegible]        [illegible]
                  4.00               [illegible].640
                  5.00               [illegible]
                  6.00               [illegible]
                  [illegible]        [illegible]
                  [illegible]        [illegible]
                  [illegible]        [illegible]
                 10.00               [illegible]
                 11.[illegible]      [illegible]
                 12.[illegible]      [illegible]
                 [illegible]         [illegible]
                 [illegible]         [illegible]
                 [illegible]         [illegible]
                 16.00               [illegible]
                 17.00               [illegible]
                 18.00               [illegible]
                 19.[illegible]      [illegible]
                 [illegible]         [illegible]
                 [illegible]         [illegible]
                 30.00               [illegible]
                 35.00               [illegible]
                 40.00               [illegible]
```

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 55.00 | [illegible] |
| 60.00 | [illegible] |
| 65.00 | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 85.00 | [illegible] |
| 90.00 | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 5520.00 | 1.720 |
| 5640.00 | 1.710 |
| 5760.00 | 1.700 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 7200.00 | 1.550 |
| 7800.00 | 1.490 |
| 8400.00 | 1.430 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 11400.00 | [illegible] |
| 12000.00 | 1.140 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 14400.00 | 0.980 |
| 15000.00 | 0.940 |
| 15600.00 | 0.910 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | 0.750 |
| [illegible] | 0.720 |

| | |
|---|---|
| 38400.00 | [illegible] |
| 39000.00 | [illegible] |
| 39600.00 | 0.170 |
| 40200.00 | 0.160 |
| 40800.00 | 0.150 |
| 41400.00 | [illegible] |
| 42000.00 | [illegible] |
| 42600.00 | [illegible] |
| 43200.00 | 0.110 |
| 43800.00 | 0.100 |
| 44400.00 | 0.100 |
| [illegible] | [illegible] |
| 45600.00 | [illegible] |
| [illegible] | [illegible] |
| 46800.00 | [illegible] |
| 47400.00 | [illegible] |
| 48000.00 | 0.050 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 50400.00 | 0.070 |
| 51000.00 | 0.030 |
| 51600.00 | 0.020 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

HO SPECIFIED BY USER

```
                         METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                     COMPUTED RESULTS:

                            COMPUTED VALUE OF H0        [illegible] FEET

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

    ALPHA      STORATIVITY     MEAN         MEAN        MINIMUM       MAXIMUM       RATIO OF     ROOT MEAN     DIFFERENCE
                             TRANSMIS-     PERMEA-       TRANS.        TRANS.     "T" RANGE TO   SQUARE OF       IN RMS
                               SIVITY       BILITY                                   TRAN          FIT.
                                                                                               DEVIATION

  1.000E-01    1.000E-01    1.368E-05    1.368E-06    *********    7.203E-04     56.928341    16267.28         0.00

  1.000E-02    1.000E-02    [illegible]  [illegible]  *********    [illegible]   [illegible]  [illegible]   [illegible]

  1.000E-03    1.000E-03    [illegible]  [illegible]  *********    [illegible]   [illegible]  [illegible]   [illegible]

  1.000E-04    1.000E-04    8.236E-05    8.236E-06    *********    3.836E-03     47.947548    [illegible]    -366.01

  1.000E-05    1.000E-05    1.041E-04    1.041E-05    *********    [illegible]   [illegible]  [illegible]   [illegible]

  1.000E-06    1.000E-06    1.302E-04    1.302E-05    *********    5.827E-03     [illegible]  [illegible]   -102.97

  1.000E-07    1.000E-07    1.553E-04    1.553E-05    2.014E-07    6.889E-03     44.349[illegible] [illegible] -61.46

  [illegible]  [illegible]  [illegible]  [illegible]  *********    [illegible]   [illegible]  [illegible]   [illegible]

  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]  [illegible]   [illegible]  [illegible]   [illegible]

  1.000E-10    1.000E-10    [illegible]E-04 [illegible] [illegible] 9.865E-03    44.1[illegible] [illegible]   25.96


                                  MANUAL CURVE MATCH RESULTS:

                            [illegible]
```

```
COMPUTED RESULTS USING [illegible]:

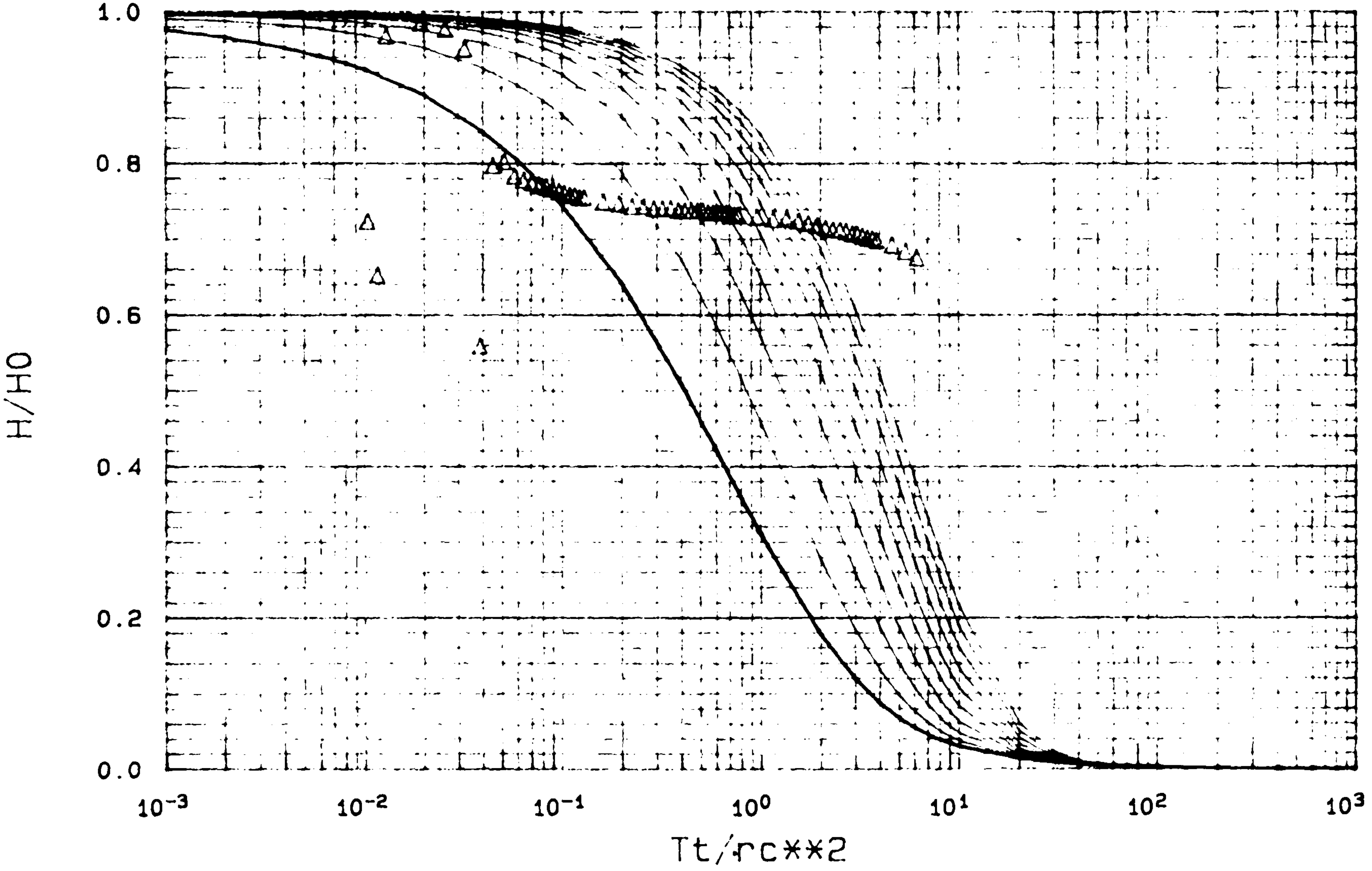
PERMEABILITY =  1.85E-04 FT/SECOND  [illegible].44E-03 CM/SECOND
TRANSMISSIVITY = [illegible]

[illegible]

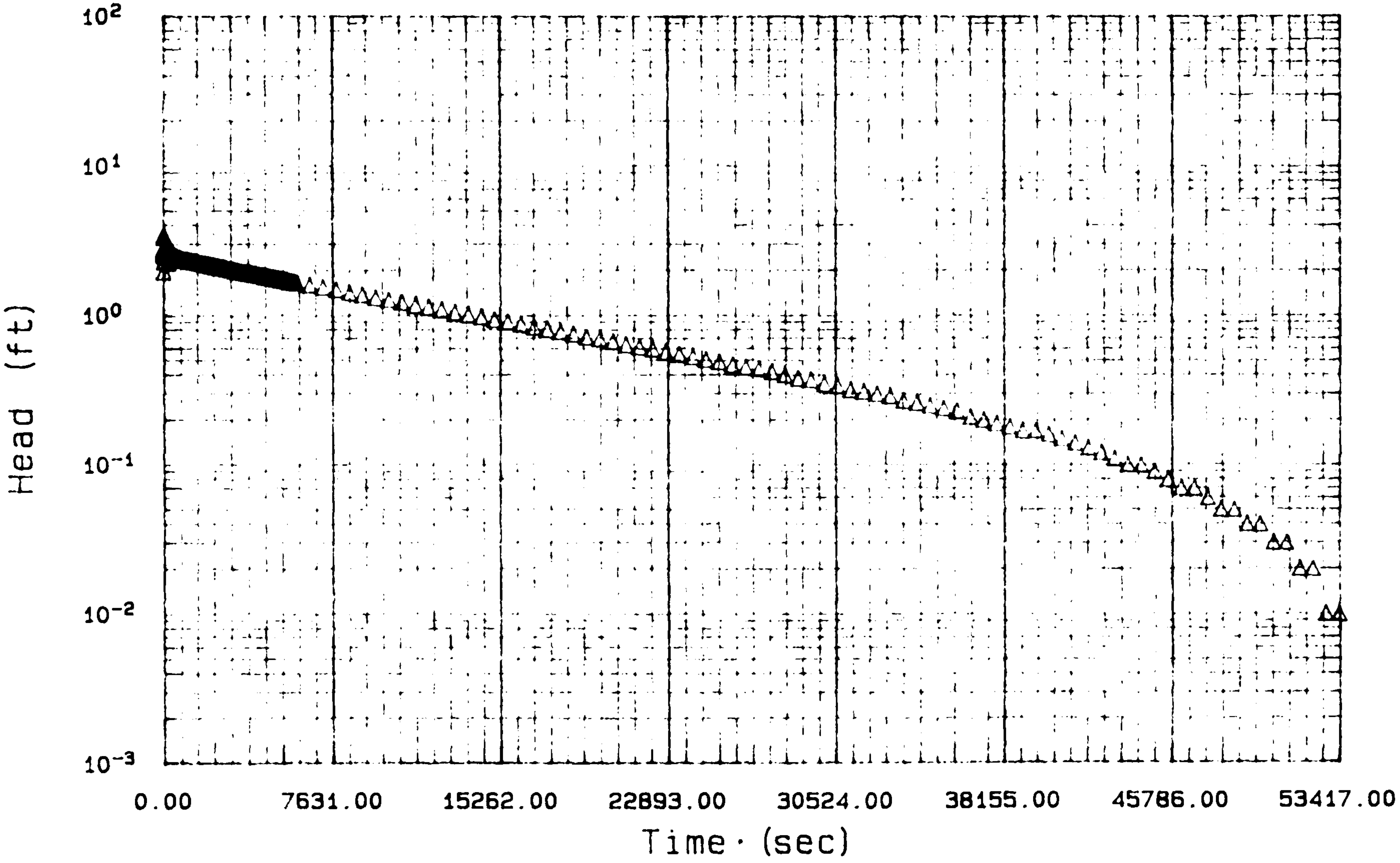
PERMEABILITY = [illegible] CM/SECOND
TRANSMISSIVITY = [illegible]
```

## MWK 1-F

# Slug Test Analysis
# Type Curves For Instantaneous Charge



89c7583-1 Dupont Baier Site
Well mwk1-f Date 08/07/90



```
                         PROGRAM SLUGT, VERSION 7,FEB. 1988

    THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG TEST DATA BASED ON TWO ANALYTICAL REFERENCES:
            (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.: 89C7587-1                            CLIENT: Dupont

    SITE LOCATION: Baier Site                         DATE OF SLUG TEST: 08/07/90

    FIELD INVESTIGATOR: B. Hedenkamp & F. Rauch

                              WELL NO.: [illegible] ✓

                              INPUT DATA ARE:

    INNER CASING DIAMETER =    2.00 INCHES            LENGTH OF SCREEN OR INTAKE PORTION =   10.00 FEET
    INNER SCREEN OR OPEN-HOLE DIAMETER =    2.00 INCHES   DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =   14.[illegible] FEET ✓
    DIAMETER OF DRILLED HOLE =    3.00 INCHES         THICKNESS OF SATURATED AQUIFER (H) =    15.[illegible] FEET ✓
    ESTIMATED POROSITY OF GRAVEL PACK = 0.15          FALLING HEAD INDEX = 0 ✓("1" IF FALLING,"0" IF RISING)


                     NUMBER OF HEAD-TIME DATA POINTS =    181

                        TIME                HEAD
                     (SECONDS)             (FEET)

                         2.00              2.38[illegible]
                         3.00              [illegible]
                         4.00              [illegible]
                         5.00              [illegible]
                         6.00              3.150
                         7.00              3.070
                         8.00              3.140
                         9.00              [illegible]
                        10.00              [illegible]
                        11.00              [illegible]
                        12.00              3.010
                        13.00              3.010
                        14.00              [illegible]
                        15.00              [illegible]
                        16.00              [illegible]
                        17.00              [illegible]
                        18.00              2.9[illegible]
                        19.00              2.9[illegible]
                        20.00              2.9[illegible]
                        25.00              2.9[illegible]
                        30.00              2.9[illegible]
                        35.00              [illegible]
                        40.00              2.9[illegible]
                        45.00              2.910
                        50.00              2.9[illegible]
```

| | |
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| 55.00 | [illegible] |
| 60.00 | [illegible] |
| 65.00 | 2.900 |
| 70.00 | 1.370 |
| 75.00 | 1.890 |
| 80.00 | [illegible] |
| 85.00 | [illegible] |
| 90.00 | [illegible] |
| 95.00 | 2.880 |
| 100.00 | 1.370 |

| | |
|---|---|
| [illegible] | [illegible] |
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| 120.00 | 2.660 |
| 150.00 | 2.830 |
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| [illegible] | [illegible] |
| 240. | [illegible] |
| 270.00 | 2.310 |
| 300.00 | 2.800 |
| 330.00 | 2.790 |
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| 480.00 | [illegible] |
| 510.00 | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
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| 840.00 | [illegible] |
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| 1560.00 | [illegible] |
| 1680.00 | [illegible] |
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| [illegible] | [illegible] |
| 840 | [illegible] |
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| [illegible] | [illegible] |

| | |
|---|---|
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| [illegible] | [illegible] |
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| 5280.00 | 1.[illegible] |
| 6000.00 | 1.[illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 8400.00 | [illegible] |
| 9000.00 | 1.46 |
| 9600.00 | 1.520 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | 1.41 |
| [illegible] | [illegible] |
| [illegible] | 1.[illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
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| [illegible] | 1.[illegible] |
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| [illegible] | 1.[illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| 40200.00 | [illegible] |
| 40800.00 | [illegible] |
| 41400.00 | 0.450 |
| 42000.00 | 0.450 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 44400.00 | [illegible] |
| 45000.00 | [illegible] |
| 45600.00 | 0.410 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
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| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 51600.00 | [illegible] |
| 52200.00 | 0.350 |
| 52800.00 | 0.350 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

HO SPECIFIED BY USER

[illegible]

```
                         METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                       COMPUTED RESULTS:

                             COMPUTED VALUE OF [illegible] = [illegible] FEET

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

   ALPHA       STORATIVITY     MEAN        MEAN       MINIMUM     MAXIMUM     RATIO OF     ROOT MEAN    DIFFERENCE
                             TRANSMIS    PERMEA      TRANS.      TRANS.     [illegible]  [illegible]   IN [illegible]
                              SIVITY      BILITY                              [illegible]    TIME
                                                                                         [illegible]

 1.000E-01     1.000E-01     4.034E-06   4.034E-07   *********   1.906E-04   [illegible]  [illegible]     0.00

 1.000E-02     1.000E-02     1.247E-05   [illegible] *********   [illegible] [illegible]  [illegible]  [illegible]

 [illegible]   [illegible]   [illegible] [illegible] *********   [illegible] [illegible]  [illegible]  [illegible]

 1.000E-04     1.000E-04     3.435E-05   3.435E-06   *********   1.544E-03   45.466563    [illegible]   -134.30

 1.000E-05     1.000E-05     4.517E-05   4.517E-06   [illegible] [illegible] [illegible]  [illegible]  [illegible]

 1.000E-06     1.000E-06     5.568E-05   5.568E-06   *********   [illegible] [illegible]  [illegible]  [illegible]

 1.000E-07     1.000E-07     6.600E-05   6.600E-06   *********   2.719E-03   [illegible]  [illegible]    -62.62

 [illegible]   [illegible]   [illegible] [illegible] [illegible] [illegible] [illegible]  [illegible]  [illegible]

 [illegible]   [illegible]   [illegible] [illegible] *********   [illegible] [illegible]  [illegible]  [illegible]

 1.000E-10     1.000E-10     9.668E-05   9.668E-06   [illegible] [illegible] [illegible]  [illegible]  [illegible]


                                    MANUAL CURVE MATCH RESULTS:

                         [illegible]

                           [illegible]
                         STORATIVITY      = [illegible]
```

```
[illegible]

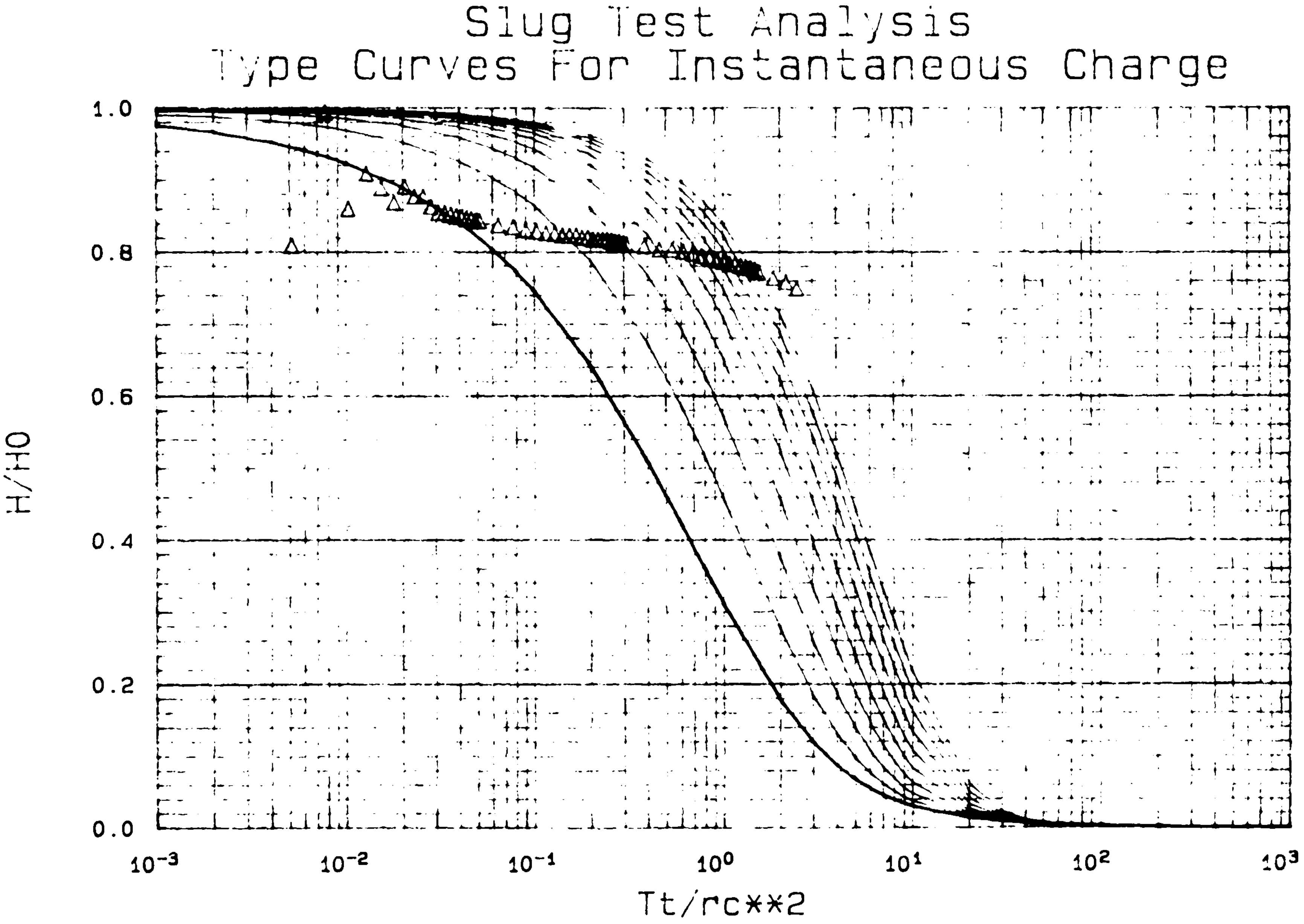
COMPUTED [illegible] DIAMETER OF DRILLED HOLE:

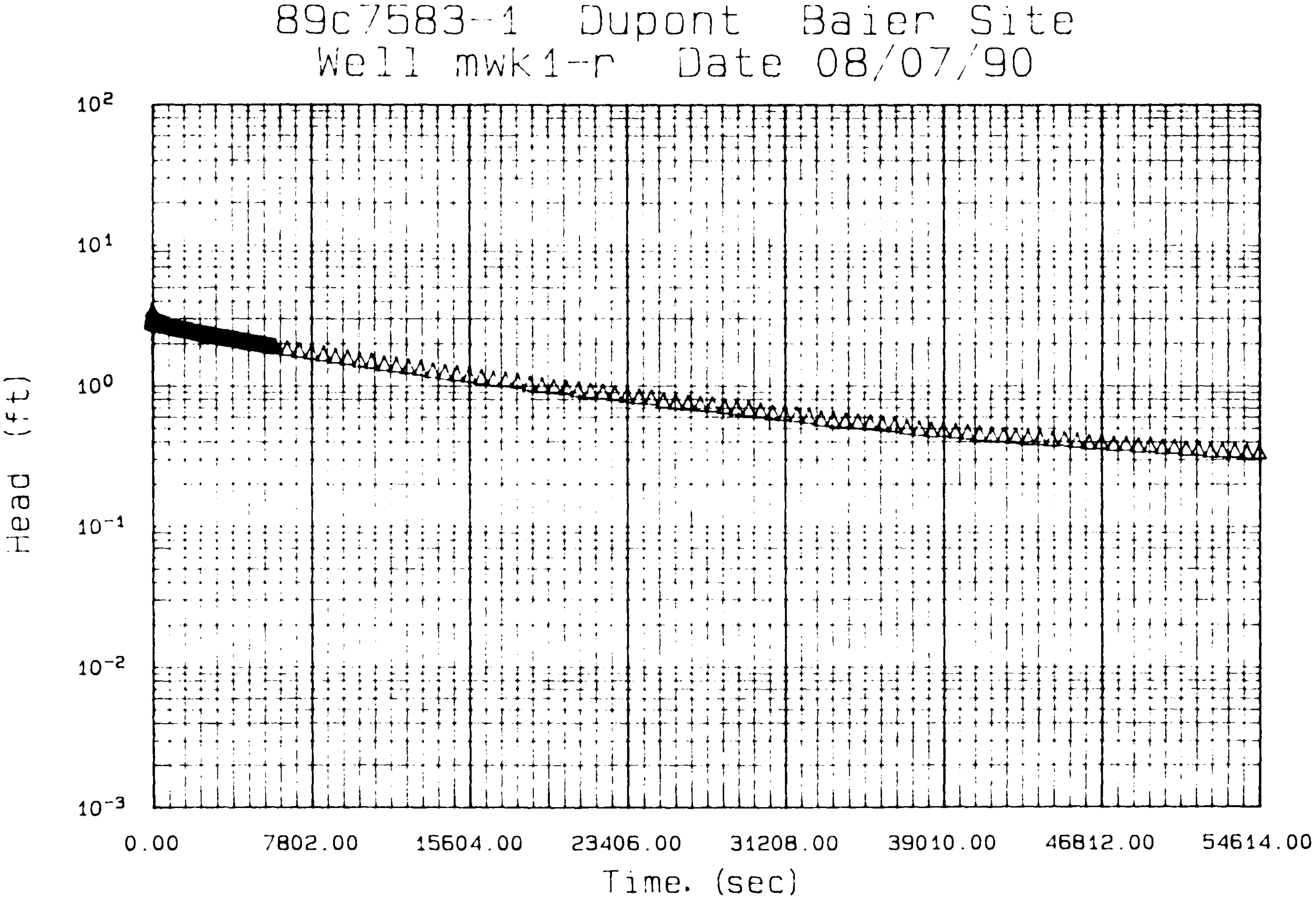
PERMEABILITY = 9.[illegible]E-05 FT/SECOND        =  2.95E-03 CM/SECOND
TRANSMISSIVITY = [illegible] FT**2/SECOND

COMPUTED [illegible]:

PERMEABILITY = [illegible]E-04 FT/SECOND        =  4.[illegible]E-0[illegible] CM/SECOND
TRANSMISSIVITY = [illegible]E-0[illegible] FT**2/SECOND
```

## MWK1-R


Slug Test Analysis
Type Curves For Instantaneous Charge
1.0
0.8
0.6
0.4
0.2
0.0
H/HO
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2



89c7583-1 Dupont Baier Site
Well mwk1-r Date 08/07/90

```
                              PROGRAM SLUG?, VERSION ?,FEB. 1988

      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.: [illegible]-1                                CLIENT: Dupont

      SITE LOCATION: Baier Site                                 DATE OF SLUG TEST: 08/08/90

      FIELD INVESTIGATOR: B. Hedenkamp & [illegible] Rauch

                                  WELL [illegible] ✓

                                  INPUT DATA ARE:

      INNER CASING DIAMETER =    2.00 INCHES                      LENGTH OF SCREEN OR INTAKE PORTION =   15.00 FEET
      INNER SCREEN OR OPEN HOLE DIAMETER =   2.00 INCHES          DEPTH FROM STATIC LEVEL TO TOP OF SCREEN =  [illegible] FEET ✓
      DIAMETER OF DRILLED HOLE =    8.00 INCHES                   THICKNESS OF SATURATED AQUIFER ZONE =   [illegible] FEET ✓
      ESTIMATED POROSITY OF GRAVEL PACK = 0.15                    FALLING HEAD INDEX =  1 ✓("1" IF FALLING,"2" IF RISING)

                        NUMBER OF HEAD-TIME DATA POINTS =    171

                                  TIME                  HEAD
                                (SECONDS)              (FEET)

                                  9.000                1.45?
                                 [illegible]           [illegible]
                                 [illegible]           [illegible]
                                 [illegible]           [illegible]
                                 13.000                1.440
                                 14.000                1.490
                                 15.000                1.450
                                 [illegible]           [illegible]
                                 [illegible]           [illegible]
                                 [illegible]           [illegible]
                                 19.000                [illegible]
                                 20.000                [illegible]
                                 25.000                [illegible]
                                 [illegible]           [illegible]
                                 [illegible]           [illegible]
                                 [illegible]           [illegible]
                                 45.000                1.2?0
                                 50.000                1.240
                                 55.000                1.2??
                                 [illegible]           [illegible]
                                 65.000                [illegible]
                                 [illegible]           [illegible]
                                 75.000                1.150
                                 80.000                1.1?0
                                 85.000                [illegible]
```

|  |  |
|---|---|
| 90.00 | [illegible] |
| 95.00 | [illegible] |
| 100.00 | 1.070 |
| 105.00 | 1.060 |
| 110.00 | 1.050 |
| 115.00 | [illegible] |
| 120.00 | [illegible] |
| 150.00 | [illegible] |
| 180.00 | 0.910 |
| 210.00 | 0.870 |

| | |
|---|---|
| 240.00 | 0.840 |
| 270.00 | 0.810 |
| 300.00 | 0.790 |
| 330.00 | 0.770 |
| 360.00 | 0.750 |
| 390.00 | [illegible] |
| 420.00 | [illegible] |
| 450.00 | [illegible] |
| 480.00 | 0.690 |
| 510.00 | 0.680 |
| 540.00 | 0.670 |
| [illegible] | [illegible] |
| 600.00 | [illegible] |
| 720.00 | [illegible] |
| 840.00 | 0.610 |
| 960.00 | 0.590 |
| 1080.00 | 0.570 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 1560.00 | 0.520 |
| 1680.00 | 0.520 |
| 1800.00 | 0.520 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 2280.00 | 0.500 |
| 2400.00 | 0.490 |
| 2520.00 | 0.480 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
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| [illegible] | [illegible] |
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| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 9000.00 | 0.330 |
| 9600.00 | 0.320 |
| 10200.00 | 0.310 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 12600.00 | 0.280 |
| 13200.00 | 0.270 |
| 13800.00 | 0.260 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | 0.240 |
| [illegible] | [illegible] |
| 17400.00 | 0.230 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 19800.00 | 0.210 |
| 20400.00 | 0.200 |
| 21000.00 | 0.200 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | 0.180 |
| 24000.00 | 0.180 |
| 24600.00 | 0.180 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 28200.00 | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 31200.00 | [illegible] |
| [illegible] | [illegible] |

```
[illegible]          [illegible]
44400.00             [illegible]
45000.00             0.080
45600.00             0.080
46200.00             0.070
[illegible]          [illegible]
[illegible]          [illegible]
[illegible]          [illegible]
48600.00             0.060
49200.00             0.060
49800.00             0.060
[illegible]          [illegible]
[illegible]          [illegible]
[illegible]          [illegible]
[illegible]          [illegible]
[illegible]          [illegible]

[illegible]

COMPUTED VALUE FOR HO (FEET)      1.5000
```

```
                                  METHOD OF [illegible]

                                          COMPUTED RESULTS:

                                 COMPUTED VALUE OF [illegible]      [illegible] FEET

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

      ALPHA         STORATIVITY       MEAN          MEAN          MINIMUM        MAXIMUM       RATIO OF       ROOT MEAN     DIFFERENCE
                                   TRANSMIS       PERMEA          TRANS.         TRANS.     "T" RANGE TO    SQUARE OF       IN RMS
                                    SIVITY        BILITY                                       TBAR            TIME
                                                                                                            DEVIATIONS

   1.000E-01        1.000E-01     3.498E-06     2.[illegible]E-07     8.[illegible]E-07     1.08[illegible]E-05      2.854246      15[illegible].71          0.00

   1.000E-[illegible]        1.[illegible]     6.171E-[illegible]     5.451E-[illegible]     1.11[illegible]     [illegible]     [illegible]     [illegible]     [illegible]

   1.[illegible]        1.[illegible]     1.[illegible]4E-05     [illegible]     [illegible]     [illegible]     4.[illegible]     [illegible]     1[illegible]

   1.000E-04        1.000E-04     1.954E-05     1.303E-06     1.3[illegible]E-06     1.006E-04      5.078863      20202.01        512.51

   1.000E-05        1.000E-05     2.512E-05     1.674E-[illegible]     [illegible]     1.3[illegible]E-04     5.[illegible]     [illegible].14     [illegible]71.13

   1.000E-06        1.000E-06     3.[illegible]E-05     2.040E-[illegible]     [illegible]     1.[illegible]24E-04     5.[illegible]     [illegible]     12[illegible]

   1.000E-07        1.000E-07     3.602E-05     2.401E-06     1.888E-05     2.073E-04      5.701683      20625.76        -31.71

   1.000E-08        [illegible]     4.141E-05     [illegible]     [illegible]     [illegible]41[illegible]E-04     5.[illegible]     [illegible]     [illegible]

   [illegible]        [illegible]     [illegible]     [illegible]     [illegible]     [illegible]     5.[illegible]     [illegible]     [illegible]

   1.000E-10        1.000E-10     5.210E-05     3.474E-06     [illegible]     [illegible]E-04      5.896439      [illegible]        9.30


                                           MANUAL CURVE MATCH RESULTS:

                                   [illegible]     1.[illegible]     [illegible]

                                    [illegible]
                                  STORATIVITY     = 1.[illegible]
```

```
[illegible] AND SIZE

[illegible] RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY =  5.97E-06 FT/SECOND        =  1.82E-04 CM/SECOND

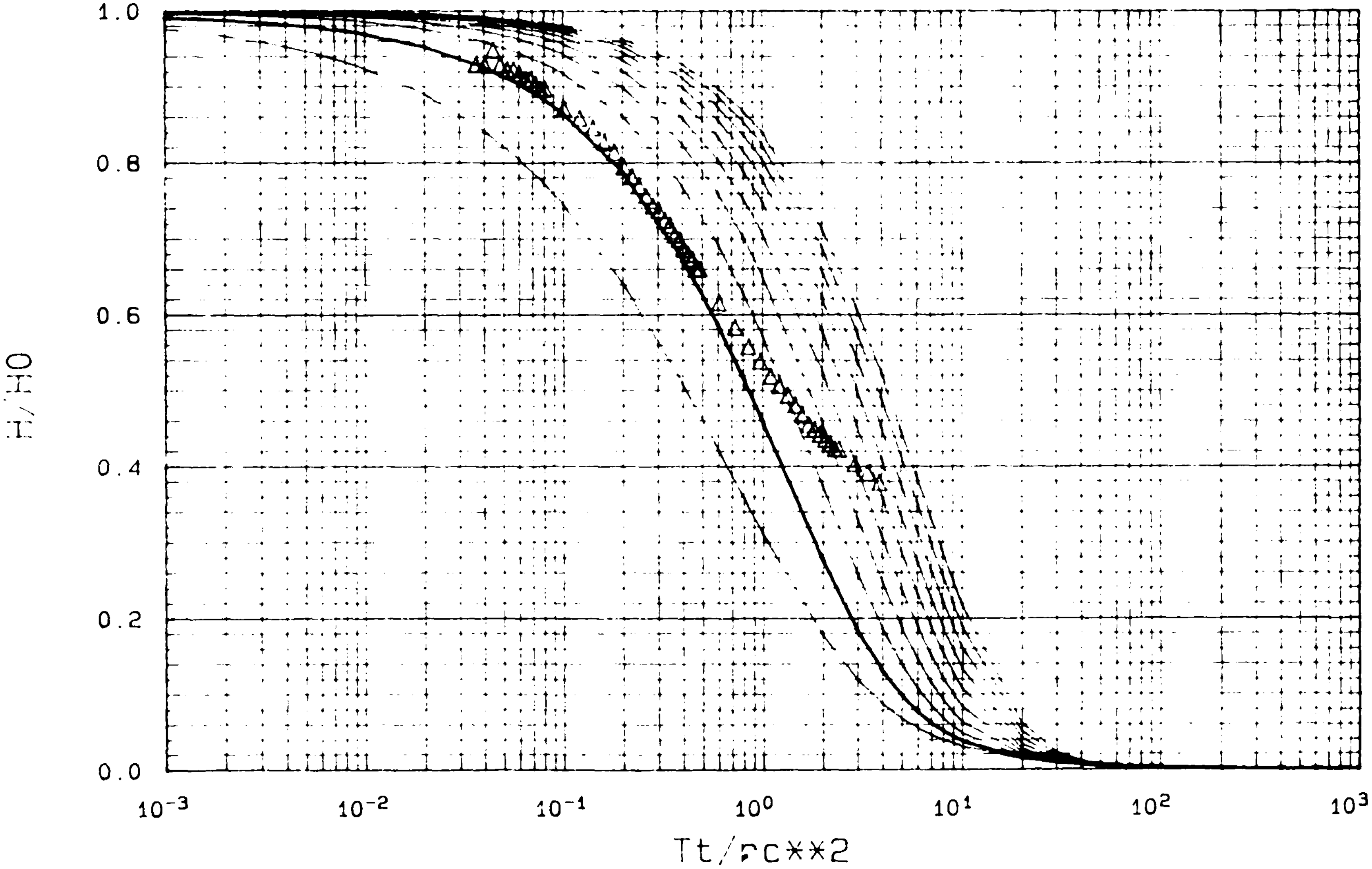
TRANSMISSIVITY =  1.[illegible]E-04 FT**2/SECOND


[illegible] DIAMETER [illegible]:

PERMEABILITY =  8.15E-06 FT/SECOND        =  2.48E-04 CM/SECOND

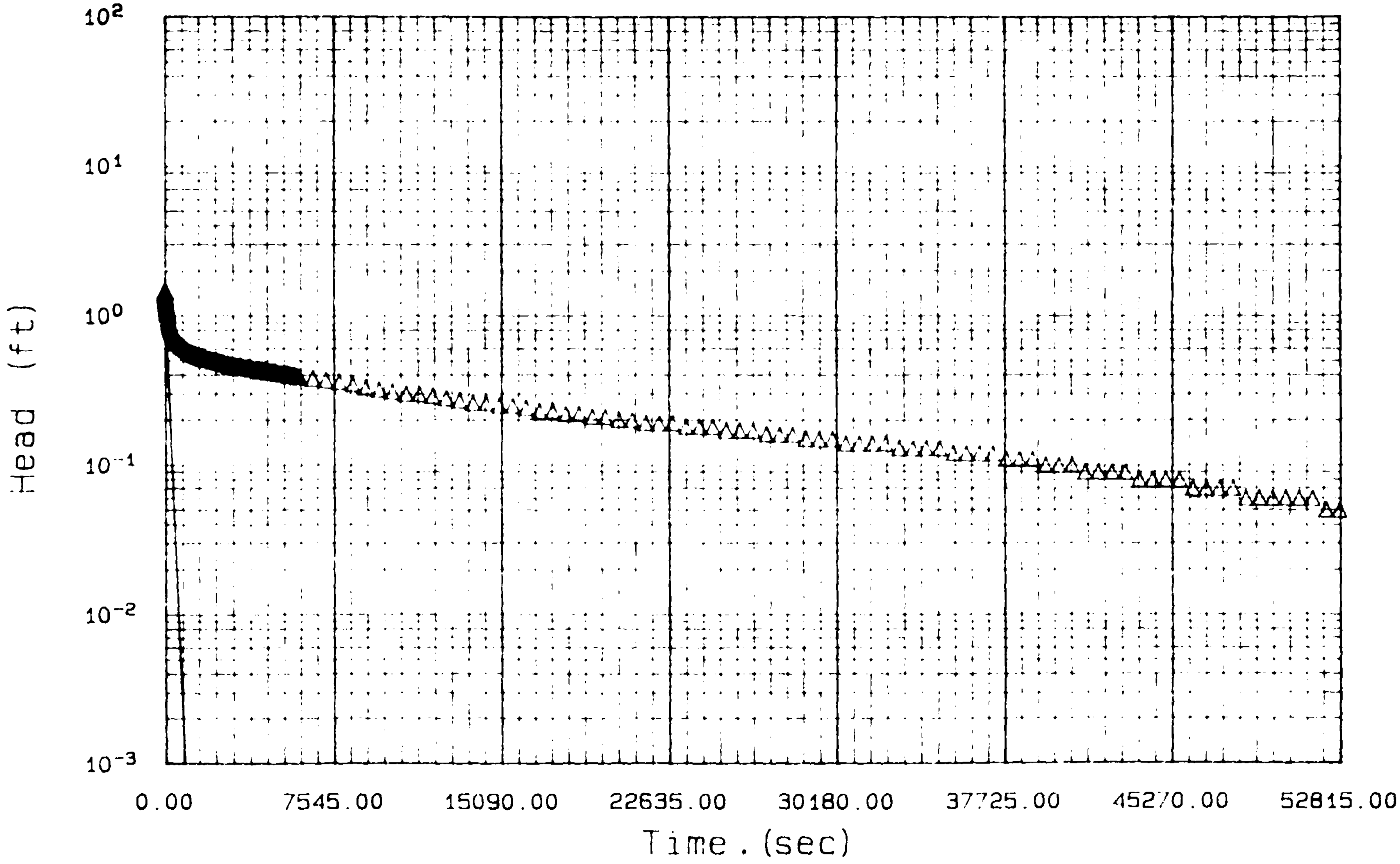
TRANSMISSIVITY =  2.40E-04 FT**2/SECOND
```

## MWK2-F



Slug Test Analysis
Type Curves For Instantaneous Charge

89c7583-1 Dupont Baier Site
Well mwk2-f Date 08/08/90



```
                              PROGRAM SLUGT, VERSION 7,FEB. 1988

     THIS PROGRAM CALCULATES MEAN HYDRAULIC CONDUCTIVITIES FROM SLUG TEST DATA BASED ON TWO ANALYTICAL APPROACHES:
              (1) METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS, 196[illegible] (ARTICLE IN VOL. [illegible], NO.[illegible] 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.: 39C758 [illegible] 1                                   CLIENT: Dupont

     SITE LOCATION: Baier Site                                         DATE OF SLUG TEST: 08/08/90

     FIELD INVESTIGATOR: B. Hedenkamp & F. Rauch

                                    WELL NO.: [illegible] ✓

                                    INPUT DATA ARE :

     INNER CASING DIAMETER =    2.00 INCHES                            LENGTH OF SCREEN OR INTAKE PORTION =    15.00 FEET ✓
     INNER SCREEN OR OPEN HOLE DIAMETER =    2.00 INCHES               [illegible] BOTTOM [illegible] SCREEN =    20.50 FEET ✓
     DIAMETER OF DRILLED HOLE =    8.00 INCHES                         THICKNESS OF SATURATED [illegible] =    [illegible].00 FEET ✓
     ESTIMATED POROSITY OF GRAVEL PACK = 0.15                          FALLING HEAD TEST? = F ✓ ("F" IF FALLING,"R" IF RISING)

                         NUMBER OF HEAD-TIME DATA POINTS =    111

                               TIME              HEAD
                             (SECONDS)          (FEET)

                               8.00             1.5[illegible]
                               9.[illegible]    [illegible]
                              [illegible]       [illegible]
                              [illegible]       [illegible]
                              12.00             1.410
                              13.00             1.[illegible]50
                              14.00             1.[illegible]6[illegible]
                              [illegible]       [illegible]
                              [illegible]       [illegible]
                              [illegible]       [illegible]
                              18.00             1.[illegible]40
                              19.00             1.[illegible]6
                              [illegible].00    [illegible]
                              [illegible]       [illegible]
                              [illegible]       [illegible]
                              [illegible]       [illegible]
                              40.00             1.[illegible]
                              45.00             1.190
                              50.00             1.1[illegible]0
                              [illegible]       [illegible]
                              [illegible]       [illegible]
                              [illegible]       1.[illegible]4[illegible]
                              70.00             1.04[illegible]
                              75.00             1.0[illegible]
                              [illegible]       [illegible]
```

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 95.00 | 0.960 |
| 100.00 | 0.990 |
| 105.00 | 0.970 |
| [illegible] | [illegible] |
| 115.00 | [illegible] |
| [illegible] | [illegible] |
| 150.00 | 0.860 |
| 180.00 | 0.800 |

| | |
|---|---|
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | 0.680 |
| 300.00 | 0.650 |
| 330.00 | 0.6[illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 450.00 | 0.560 |
| 480.00 | 0.540 |
| 510.00 | 0.5[illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 960.00 | 0.410 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| 1440.00 | [illegible] |
| 1560.00 | 0.360 |
| 1680.00 | 0.360 |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

```
   [illegible]          [illegible]
   [illegible]          [illegible]
   8400.00              0.200
   9000.00              0.200
   9600.00              0.190
   [illegible]          [illegible]
   [illegible]          [illegible]
   [illegible]          [illegible]
   12000.00             0.180
   12600.00             0.170
   13200.00             0.160
   [illegible]          [illegible]
   [illegible]          [illegible]
   [illegible]          [illegible]
   [illegible]          [illegible]
   [illegible]          [illegible]

   [illegible]

   COMPUTED VALUE FOR HO (FEET)     1.5600
```

```
                         METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                      COMPUTED RESULTS:

                              COMPUTED VALUE OF HO =    1.5[illegible] FEET

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

   ALPHA       STORATIVITY       MEAN          MEAN         MINIMUM       MAXIMUM       RATIO OF      ROOT MEAN     DIFFERENCE
                               TRANSMIS-     PERMEA-         TRANS.        TRANS.     DIFFERENCE TO   SQUARE OF      IN RMS
                                SIVITY        BILITY                                     TRAN           THE
                                                                                                     DEVIATIONS

 1.000E-01      1.000E-01     8.558E-06     5.706E-07     1.598E-06     5.403E-05      6.126157      3993.19         0.00
 1.000E-02      1.000E-02     1.974E-05     1.316E-06     [illegible]   1.5[illegible]E-04  [illegible]1191  4[illegible]  46[illegible]
 1.000E-03      1.000E-03     [illegible]   [illegible]   [illegible]   [illegible]    [illegible]   45[illegible]  [illegible]
 1.000E-04      1.000E-04     4.589E-05     3.059E-06     3.499E-06     [illegible]E-04 3.482848     46[illegible]3.27  -74.20
 1.000E-05      1.000E-05     [illegible]   [illegible]   4.1[illegible]E-06  [illegible]  [illegible]  [illegible]   [illegible]
 1.000E-06      1.000E-06     7.117E-05     4.[illegible]E-06  4.0[illegible]E-06  [illegible]  [illegible]  [illegible]  [illegible]
 1.000E-07      1.000E-07     8.356E-05     5.571E-06     4.068E-06     7.360E-04      8.758670      4731.06       -47.79
 1.000E-08      1.000E-08     9.[illegible]E-05  [illegible]  [illegible]  [illegible]  [illegible]  4[illegible]  [illegible]
 [illegible]    [illegible]   [illegible]   [illegible]   [illegible]   [illegible]    [illegible]   [illegible]   [illegible]
 1.000E-10      1.000E-10     1.178E-04     [illegible]   6.46[illegible]E-06  1.0[illegible]  [illegible]  47[illegible]  [illegible]

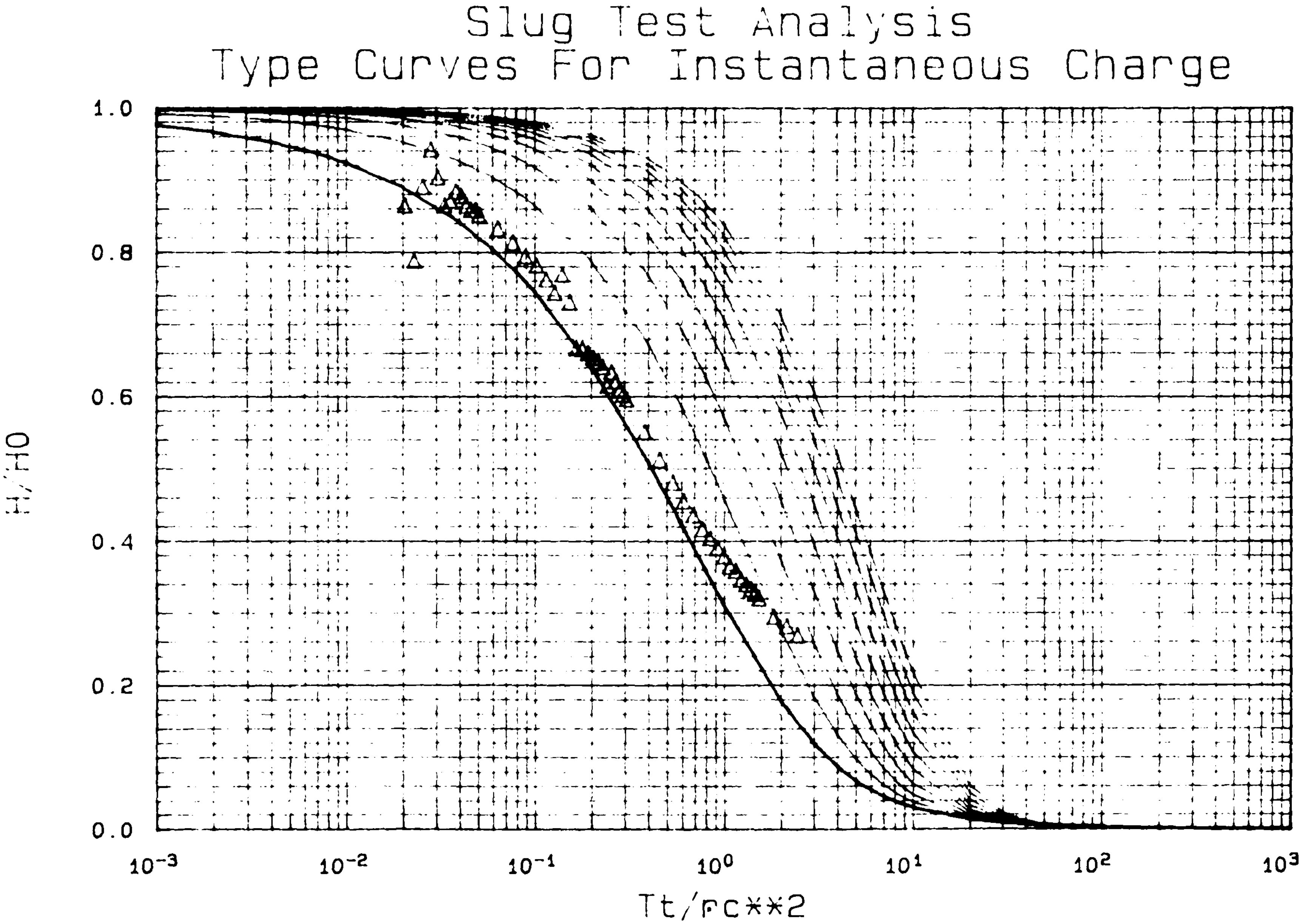
                                      MANUAL CURVE MATCH RESULTS:

                        [illegible]

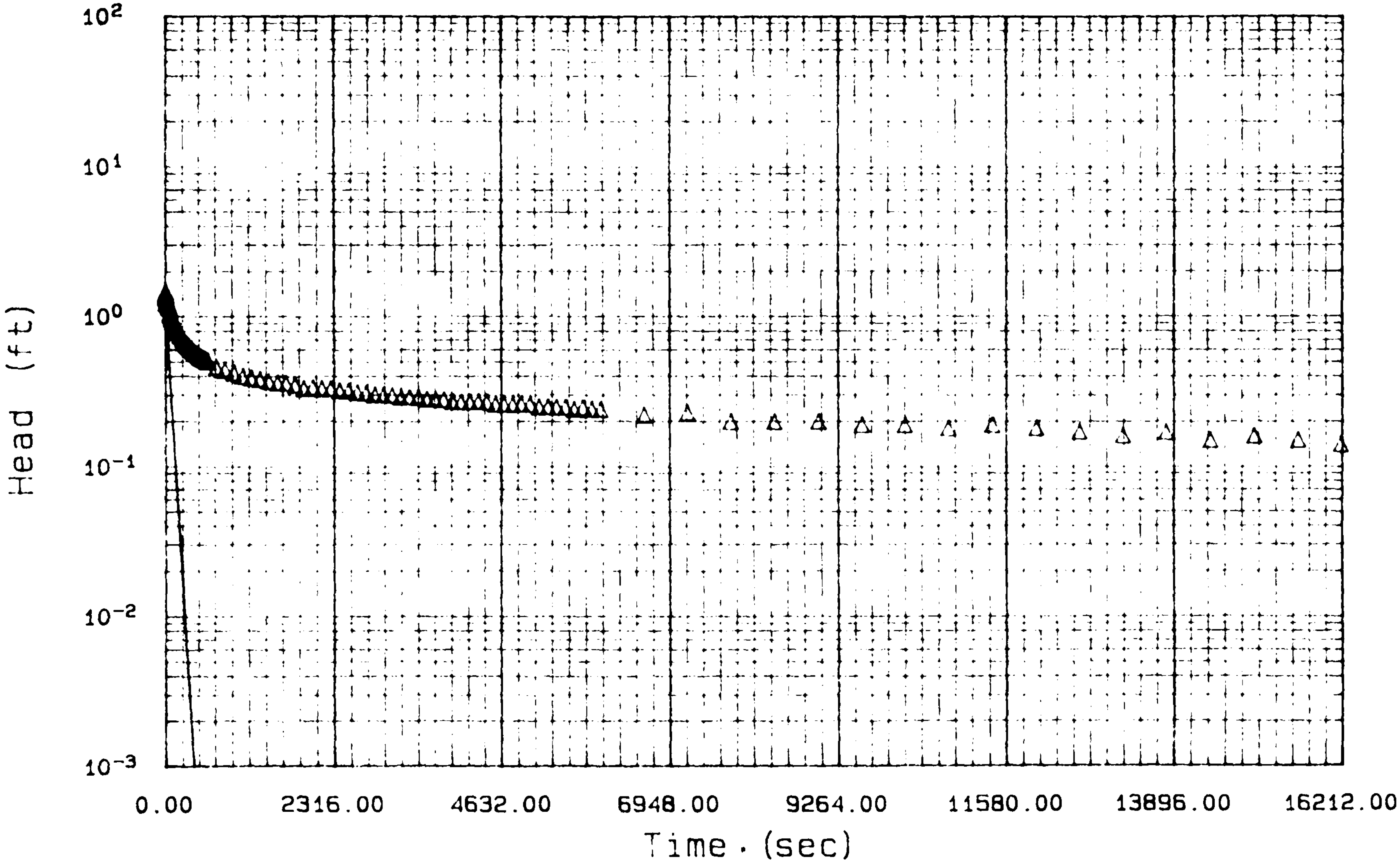
                           [illegible]
                           STORATIVITY  =  1.000E-01
```

```
[illegible] TOWER [illegible]
COMPUTED [illegible] USING DIAMETER [illegible] FT [illegible] :
PERMEABILITY =  1.32E-05 FT/SECOND        =  4.04E-04 CM/SECOND
TRANSMISSIVITY = [illegible]
COMPUTED [illegible] :
PERMEABILITY =  1.81E-05 FT/SECOND [illegible] CM/SECOND
TRANSMISSIVITY =  5.25E-04 FT**2/SECOND
```

## MWk2-R


Slug Test Analysis
Type Curves For Instantaneous Charge
H/HO
1.0
0.8
0.6
0.4
0.2
0.0
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2

## 89c7583-1 Dupont Baier Site
## Well mwk2-r Date 08/08/90



[illegible]

THIS PROGRAM [illegible]
(1) METHOD OF [illegible]
[illegible]
(2) METHOD OF [illegible]
[illegible] TEST FOR DETERMINING [illegible]
WITH COMPLETELY [illegible]

[illegible]

**Mc4a-r**

[illegible]

NUMBER OF [illegible]

| | |
|---|---|
| [illegible] | 0.620 |
| [illegible] | 0.520 |
| [illegible] | 0.610 |
| [illegible] | 0.600 |
| [illegible] | 0.610 |
| [illegible] | 0.610 |
| [illegible] | 0.610 |
| [illegible] | 0.610 |
| [illegible] | 0.610 |
| [illegible] | 0.500 |

|  |  |
|---|---|
| 110.00 | 0.500 |
| [illegible] | 0.500 |
| [illegible] | 0.500 |
| 150.00 | 0.500 |
| 160.00 | 0.500 |
| 210.00 | 0.500 |
| [illegible] | [illegible] |

METHOD [illegible]

[illegible] :

COMPUTED [illegible]

NOTE : TRANSMISSIVITY UNITS ARE IN [illegible] ; [illegible] PERMEABILITY UNITS ARE IN [illegible]

| ALPHA | [illegible] | MEAN TRANSMISSIVITY | MEAN PERMEABILITY | MINIMUM TRANS. | MAXIMUM TRANS. | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|
| [illegible] | 1.[illegible]E [illegible]1 | [illegible].509E 05 | [illegible] | [illegible] | [illegible]E 04 | [illegible] | [illegible] | [illegible] |
| [illegible] | 1.[illegible] | [illegible].175E 05 | 4.[illegible] | [illegible] | 1.[illegible] | 1.[illegible] | [illegible] | 4.[illegible] |
| [illegible] | [illegible] | [illegible]E 04 | [illegible] | [illegible] | [illegible] | 1.[illegible] | [illegible] | [illegible] |
| 1.[illegible] | [illegible] 04 | 1.54[illegible] 04 | 1.[illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | 1.[illegible] 05 | [illegible].918E 04 | 1.[illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 1.[illegible] 06 | 1.[illegible] 06 | [illegible] 04 | 1.5[illegible] | [illegible] | [illegible] | 15.[illegible] | [illegible] | [illegible] |
| 1.[illegible] 07 | 1.[illegible] 07 | [illegible]3E 04 | 1.[illegible] | [illegible] | 4.1[illegible] | 15.[illegible] | [illegible] | 14.54 |
| 1.[illegible] | 1.[illegible] | [illegible] 04 | [illegible] | [illegible] | 4.[illegible] | 15.4[illegible] | 1[illegible] 14.[illegible] | [illegible]1.15 |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 1.[illegible] 10 | 1.[illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

[illegible]

[illegible]

```
[illegible] BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

 PERMEABILITY =  4.[illegible] FT/SECOND        [illegible] 1.4[illegible]

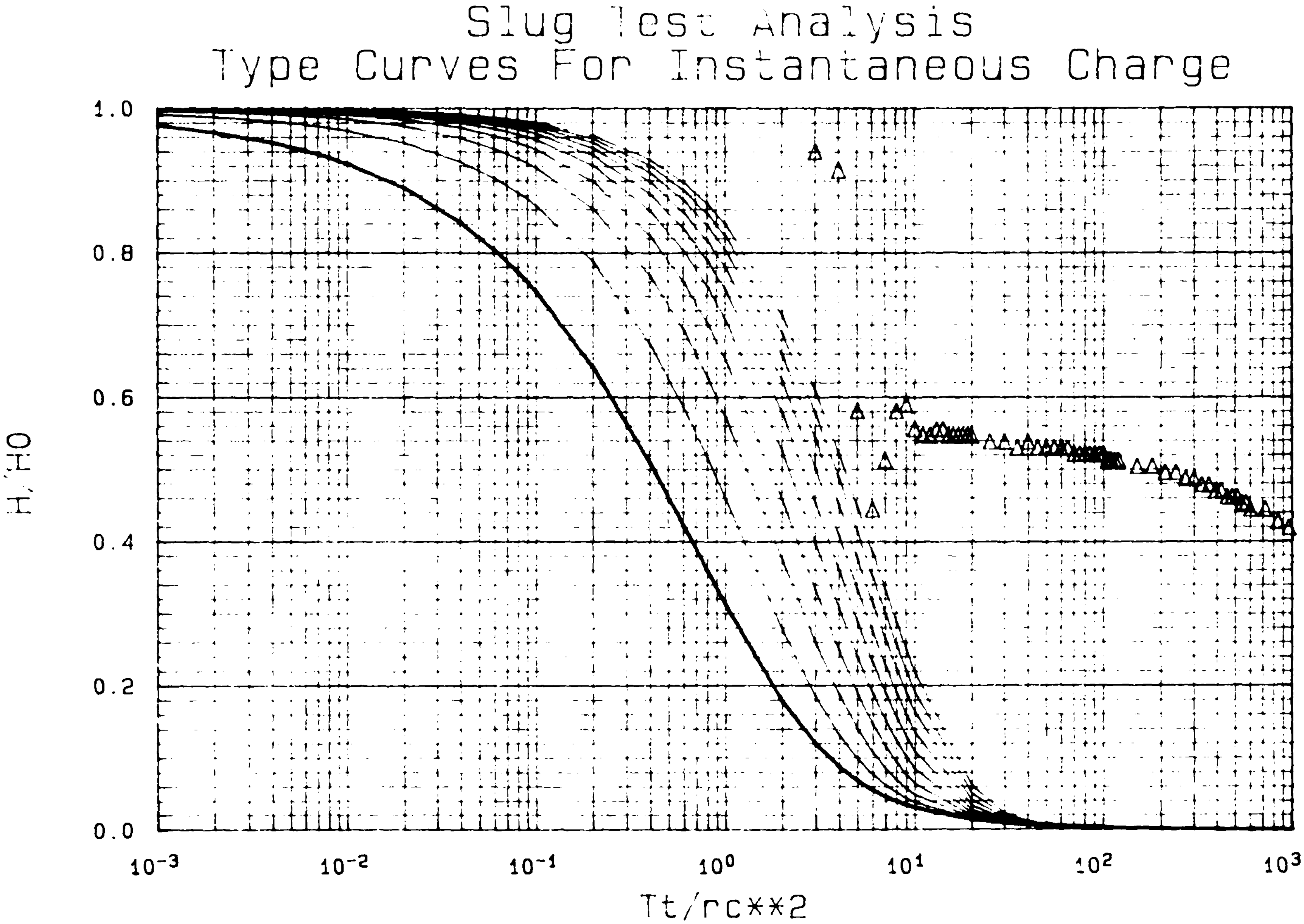
 TRANSMISSIVITY =   .[illegible]-4 FT**2/SECOND

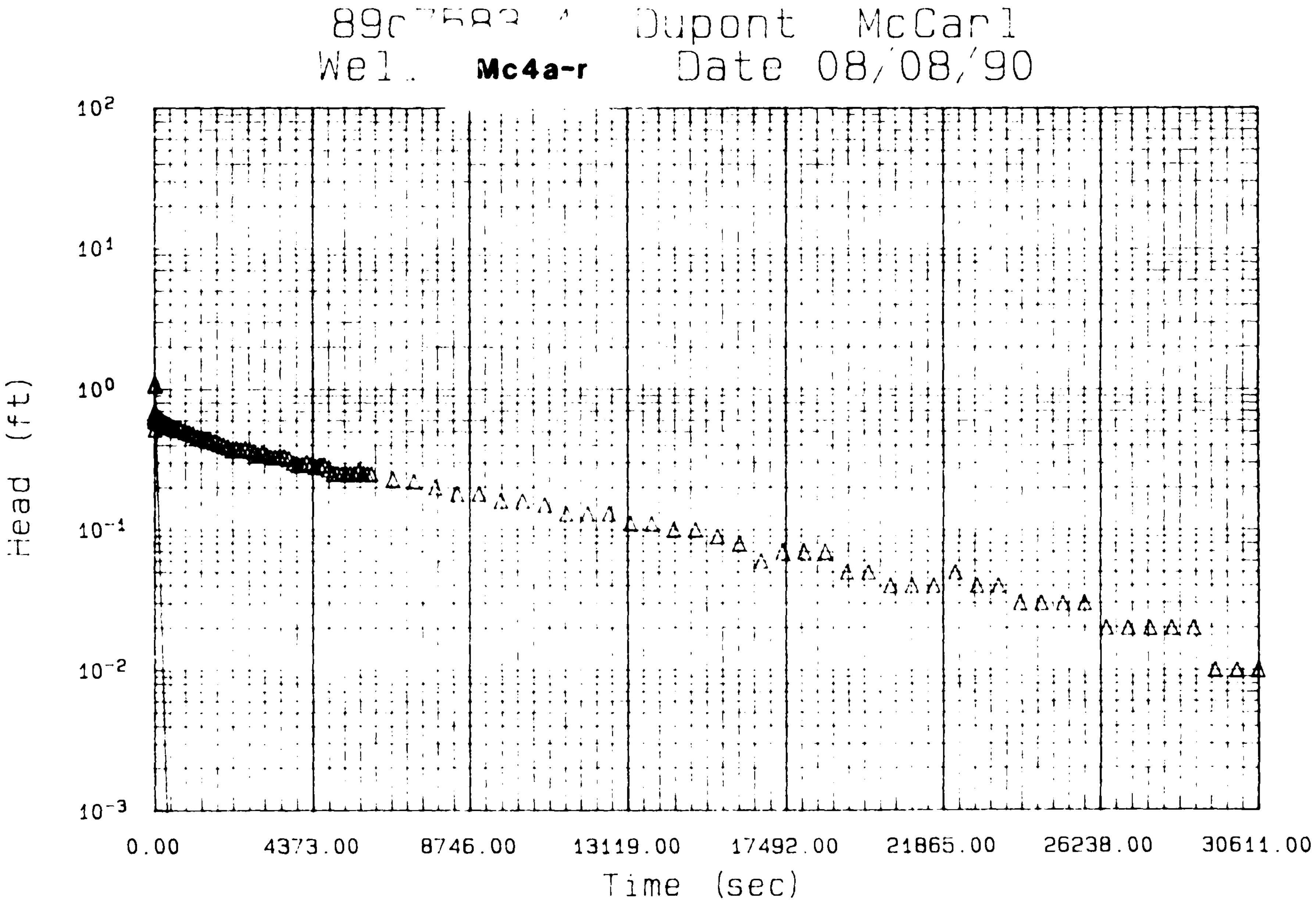

COMPUTED RESULTS USING DIAMETER OF [illegible]:

 PERMEABILITY = [illegible]            [illegible] .1[illegible]

 TRANSMISSIVITY =   .[illegible]-4 FT**2/SECOND
```

## MC4A-R


Slug Test Analysis
Type Curves For Instantaneous Charge
1.0
0.8
0.6
0.4
0.2
0.0
H/HO
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2


89c7583 4 Dupont McCarl
Well **Mc4a-r** Date 08/08/90
Head (ft)
10²
10¹
10⁰
10⁻¹
10⁻²
10⁻³
0.00
4373.00
8746.00
13119.00
17492.00
21865.00
26238.00
30611.00
Time (sec)

```
                         PROGRAM SLUGT, VERSION 7,FEB. 1988

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.: 89c7583-1                          CLIENT: Dupont

SITE LOCATION: McCarl                           DATE OF SLUG TEST: 08/08-09/90

FIELD INVESTIGATOR: B. Hedenkamp

                              WELL NO.: mc3-r

                              INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES              LENGTH OF SCREEN OR INTAKE PORTION =  20.00 FEET
INNER SCREEN OR OPEN-HOLE DIAMETER =   2.00 INCHES DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =   6.44 FEET
DIAMETER OF DRILLED HOLE =   7.25 INCHES           THICKNESS OF SATURATED AQUIFER ZONE =   6.44 FEET
ESTIMATED POROSITY OF GRAVEL PACK = 0.15           FALLING-HEAD INDEX =  0  ("1" IF FALLING,"0" IF RISING)


                 NUMBER OF HEAD-TIME DATA POINTS =   150


                      TIME           HEAD
                    (SECOND )       (FEET)

                       3.00          1.190
                       4.00          1.170
                       5.00          1.130
                       6.00          1.100
                       7.00          1.090
                       8.00          1.080
                       9.00          1.070
                      10.00          1.070
                      11.00          1.060
                      12.00          1.050
                      13.00          1.040
                      14.00          1.040
                      15.00          1.030
                      16.00          1.020
                      17.00          1.010
                      18.00          1.010
                      19.00          1.000
                      20.00          0.990
                      25.00          0.960
                      30.00          0.930
                      35.00          0.910
                      40.00          0.880
                      45.00          0.860
                      50.00          0.830
                      55.00          0.790
```

| | |
|---|---|
| 60.00 | 0.790 |
| 65.00 | 0.760 |
| 70.00 | 0.750 |
| 75.00 | 0.730 |
| 80.00 | 0.710 |
| 85.00 | 0.690 |
| 90.00 | 0.670 |
| 95.00 | 0.650 |
| 100.00 | 0.640 |
| 105.00 | 0.620 |

| | |
|---|---|
| 110.00 | 0.600 |
| 115.00 | 0.590 |
| 120.00 | 0.580 |
| 150.00 | 0.510 |
| 180.00 | 0.450 |
| 210.00 | 0.410 |
| 240.00 | 0.380 |
| 270.00 | 0.350 |
| 300.00 | 0.330 |
| 330.00 | 0.310 |
| 360.00 | 0.300 |
| 390.00 | 0.280 |
| 420.00 | 0.270 |
| 450.00 | 0.260 |
| 480.00 | 0.250 |
| 510.00 | 0.240 |
| 540.00 | 0.240 |
| 570.00 | 0.230 |
| 600.00 | 0.220 |
| 720.00 | 0.210 |
| 840.00 | 0.190 |
| 960.00 | 0.190 |
| 1080.00 | 0.190 |
| 1200.00 | 0.180 |
| 1320.00 | 0.160 |
| 1440.00 | 0.160 |
| 1560.00 | 0.150 |
| 1680.00 | 0.150 |
| 1800.00 | 0.150 |
| 1920.00 | 0.150 |
| 2040.00 | 0.140 |
| 2160.00 | 0.140 |
| 2280.00 | 0.130 |
| 2400.00 | 0.130 |
| 2520.00 | 0.120 |
| 2640.00 | 0.120 |
| 2760.00 | 0.120 |
| 2880.00 | 0.120 |
| 3000.00 | 0.110 |
| 3120.00 | 0.110 |
| 3240.00 | 0.110 |
| 3360.00 | 0.110 |
| 3480.00 | 0.110 |
| 3600.00 | 0.100 |
| 3720.00 | 0.100 |
| 3840.00 | 0.100 |
| 3960.00 | 0.100 |
| 4080.00 | 0.100 |
| 4200.00 | 0.100 |
| 4320.00 | 0.100 |
| 4440.00 | 0.090 |
| 4560.00 | 0.090 |
| 4680.00 | 0.090 |
| 4800.00 | 0.090 |
| 4920.00 | 0.090 |
| 5040.00 | 0.090 |
| 5160.00 | 0.090 |
| 5280.00 | 0.090 |
| 5400.00 | 0.090 |
| 5520.00 | 0.090 |

| | |
|---|---|
| 5640.00 | 0.090 |
| 5760.00 | 0.090 |
| 5880.00 | 0.090 |
| 6000.00 | 0.080 |
| 6600.00 | 0.080 |
| 7200.00 | 0.080 |
| 7800.00 | 0.070 |
| 8400.00 | 0.070 |
| 9000.00 | 0.070 |
| 9600.00 | 0.070 |
| 10200.00 | 0.060 |
| 10800.00 | 0.060 |
| 11400.00 | 0.060 |
| 12000.00 | 0.060 |
| 12600.00 | 0.050 |
| 13200.00 | 0.050 |
| 13800.00 | 0.050 |
| 14400.00 | 0.050 |
| 15000.00 | 0.040 |
| 15600.00 | 0.040 |
| 16200.00 | 0.040 |
| 16800.00 | 0.040 |
| 17400.00 | 0.040 |
| 18000.00 | 0.040 |
| 18600.00 | 0.040 |
| 19200.00 | 0.040 |
| 19800.00 | 0.030 |
| 20400.00 | 0.030 |
| 21000.00 | 0.030 |
| 21600.00 | 0.030 |
| 22200.00 | 0.030 |
| 22800.00 | 0.030 |
| 23400.00 | 0.030 |
| 24000.00 | 0.030 |
| 24600.00 | 0.020 |
| 25200.00 | 0.020 |
| 25800.00 | 0.020 |
| 26400.00 | 0.020 |
| 27000.00 | 0.020 |
| 27600.00 | 0.020 |
| 28200.00 | 0.020 |
| 28800.00 | 0.020 |
| 29400.00 | 0.020 |
| 30000.00 | 0.020 |
| 30600.00 | 0.020 |
| 31200.00 | 0.020 |
| 31800.00 | 0.020 |
| 32400.00 | 0.010 |
| 33000.00 | 0.010 |
| 33600.00 | 0.010 |
| 34200.00 | 0.010 |
| 34800.00 | 0.010 |
| 35400.00 | 0.010 |
| 36000.00 | 0.010 |
| 36600.00 | 0.010 |

```
                         METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                      COMPUTED RESULTS:


                              COMPUTED VALUE OF HO =   1.56 FEET

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

   ALPHA      STORATIVITY     MEAN        MEAN        MINIMUM      MAXIMUM      RATIO OF     ROOT MEAN    DIFFERENCE
                            TRANSMIS-    PERMEA-       TRANS.       TRANS.     "T" RANGE TO  SQUARE OF     IN RMS
                             SIVITY      BILITY                                   TBAR          TIME
                                                                                             DEVIATIONS

 1.000E-01    1.000E-01    2.910E-05    1.455E-06    4.004E-06    2.024E-04     6.816978     10859.92        0.00

 1.000E-02    1.000E-02    5.952E-05    2.976E-06    4.313E-06    5.537E-04     9.229571     12233.08    -1373.16

 1.000E-03    1.000E-03    9.237E-05    4.619E-06    4.725E-06    9.626E-04    10.370318     12713.34     -480.27

 1.000E-04    1.000E-04    1.246E-04    6.232E-06    5.446E-06    1.368E-03    10.935285     12933.41     -220.07

 1.000E-05    1.000E-05    1.558E-04    7.789E-06    5.937E-06    1.765E-03    11.292962     13058.87     -125.46

 1.000E-06    1.000E-06    1.865E-04    9.326E-06    6.334E-06    2.155E-03    11.519403     13132.90      -74.03

 1.000E-07    1.000E-07    2.173E-04    1.086E-05    6.869E-06    2.529E-03    11.656131     13188.21      -55.31

 1.000E-08    1.000E-08    2.481E-04    1.240E-05    7.266E-06    2.920E-03    11.743636     13224.75      -36.54

 1.000E-09    1.000E-09    2.787E-04    1.393E-05    7.780E-06    3.299E-03    11.811671     13249.27      -24.52

 1.000E-10    1.000E-10    3.091E-04    1.546E-05    8.372E-06    3.677E-03    11.865964     13270.22      -20.96



                                  MANUAL CURVE MATCH RESULTS:


                          MATCH POINT AT Tt/rc**2 = 1.0, TIME =      0.9919

                            TRANSMISSIVITY = 6.8885E-03 FEET**2/SECOND
                            STORATIVITY    = 1.0000E-01
```

```
         METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:


 PERMEABILITY =  3.41E-04 FT/SECOND       =  1.04E-02 CM/SECOND

 TRANSMISSIVITY =  2.20E-03 FT**2/SECOND



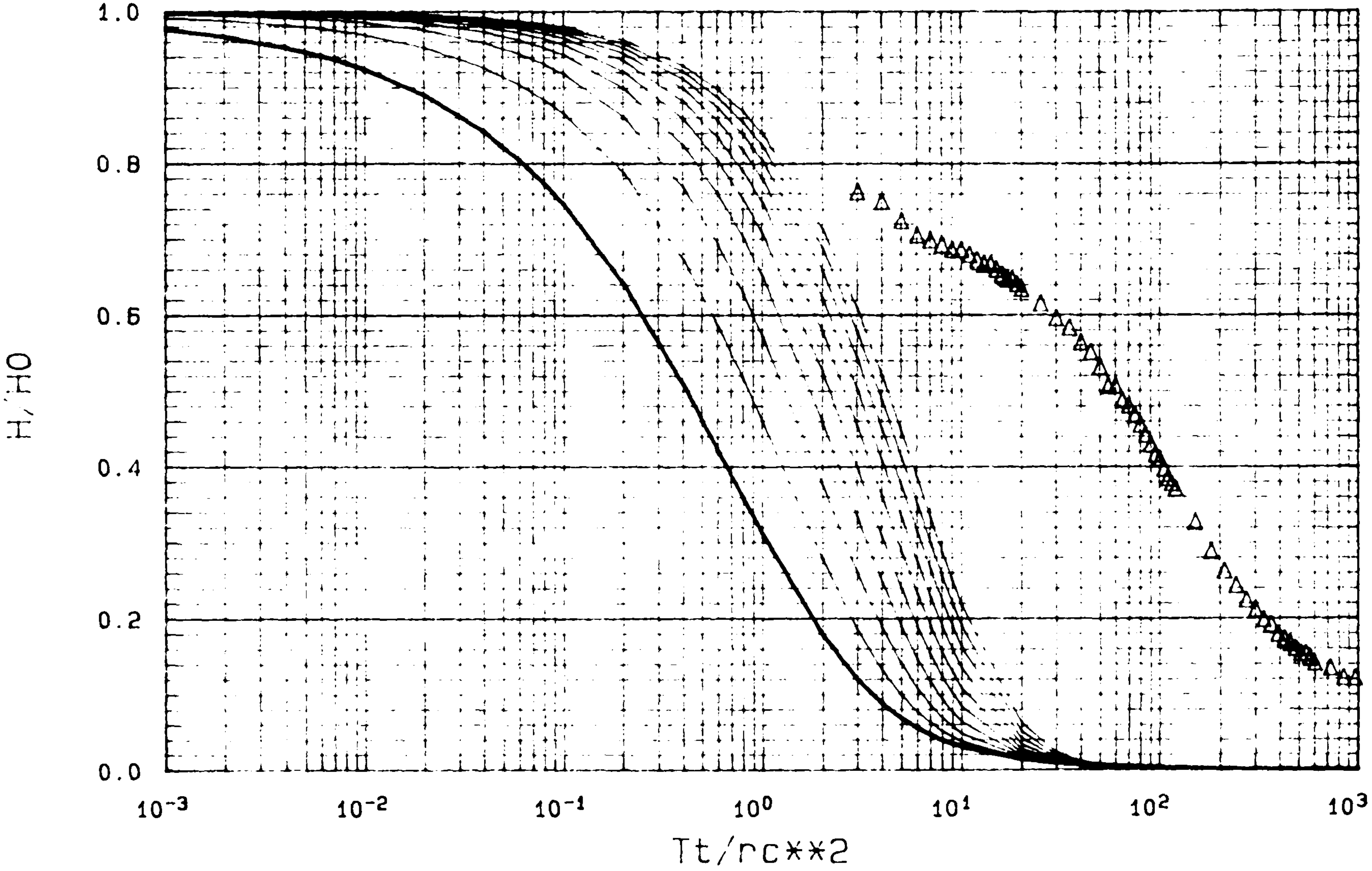

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:


 PERMEABILITY =  1.78E-04 FT/SECOND       =  5.44E-03 CM/SECOND

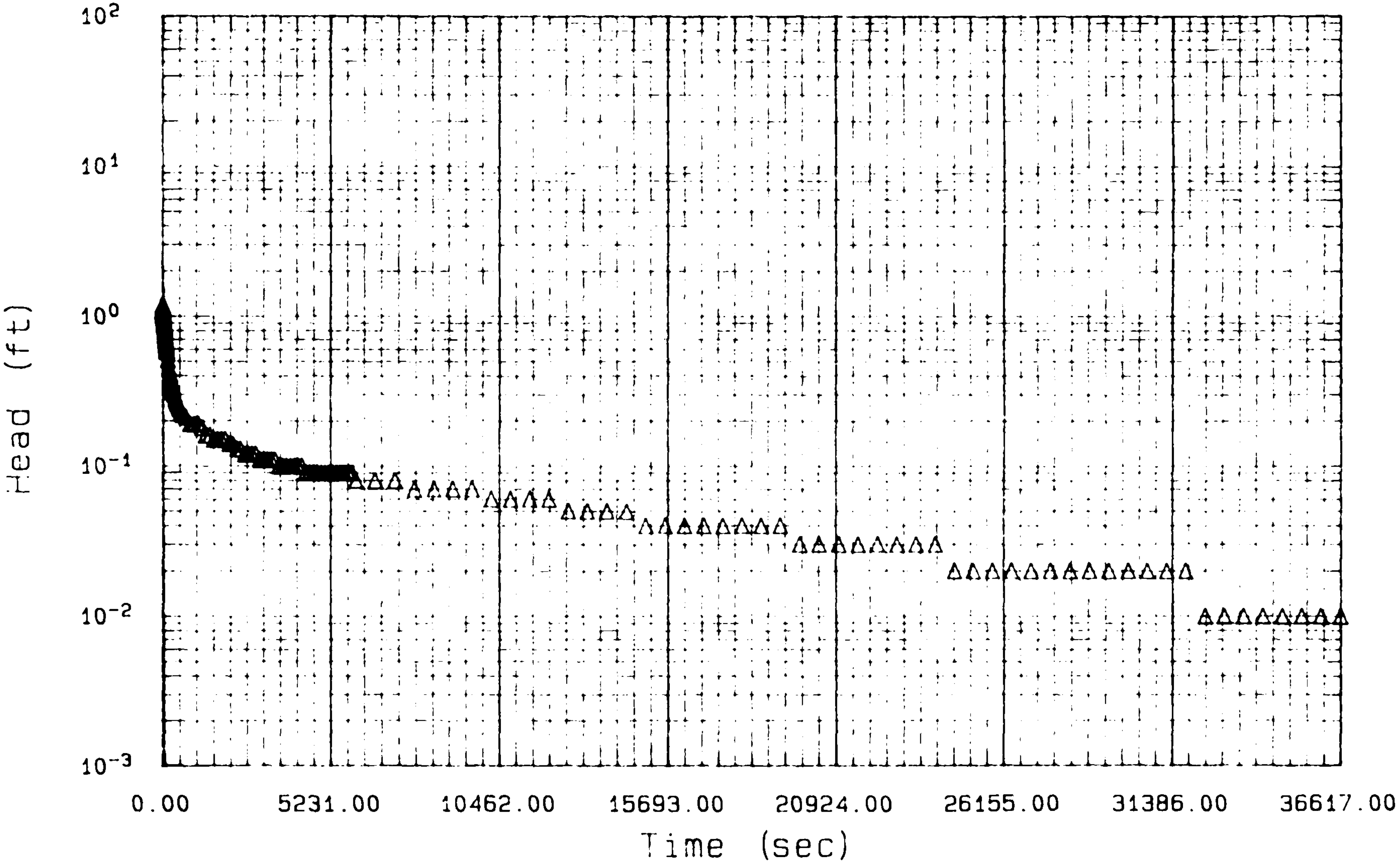
 TRANSMISSIVITY =  1.15E-03 FT**2/SECOND
```

# MC3-R

## Slug Test Analysis
## Type Curves For Instantaneous Charge



89c7583-1 Dupont McCarl
Well mc3-r Date 08/08-09/90



```
                         PROGRAM SLUGT, VERSION 7,FEB. 1988

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.: 89c7583-1                          CLIENT: Dupont

SITE LOCATION: McCarl                           DATE OF SLUG TEST: 08/09-10/90

FIELD INVESTIGATOR: S. Hedenkamp

                             WELL NO.: mcocr.dat

                             INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES              LENGTH OF SCREEN OR INTAKE PORTION =  15.00 FEET
INNER SCREEN OR OPEN-HOLE DIAMETER =   2.00 INCHES DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =  42.09 FEET
DIAMETER OF DRILLED HOLE =   8.00 INCHES           THICKNESS OF SATURATED AQUIFER ZONE =  42.59 FEET
ESTIMATED POROSITY OF GRAVEL PACK = 0.15           FALLING-HEAD INDEX =  0 -("1" IF FALLING,"0" IF RISING)


                  NUMBER OF HEAD-TIME DATA POINTS =   153


                            TIME            HEAD
                          (SECOND  )       (FEET)

                            8.00           1.010
                            9.00           1.090
                           10.00           1.060
                           11.00           1.030
                           12.00           1.040
                           13.00           1.020
                           14.00           1.030
                           15.00           1.020
                           16.00           1.020
                           17.00           1.010
                           18.00           1.010
                           19.00           0.990
                           20.00           1.000
                           25.00           0.980
                           30.00           0.970
                           35.00           0.960
                           40.00           0.950
                           45.00           0.930
                           50.00           0.930
                           55.00           0.910
                           60.00           0.930
                           65.00           0.910
                           70.00           0.900
                           75.00           0.900
                           80.00           0.910
```

| | |
|---|---|
| 85.00 | 0.910 |
| 90.00 | 0.890 |
| 95.00 | 0.890 |
| 100.00 | 0.880 |
| 105.00 | 0.880 |
| 110.00 | 0.880 |
| 115.00 | 0.870 |
| 120.00 | 0.870 |
| 150.00 | 0.860 |
| 180.00 | 0.840 |

| | |
|---|---|
| 210.00 | 0.840 |
| 240.00 | 0.830 |
| 270.00 | 0.820 |
| 300.00 | 0.810 |
| 330.00 | 0.810 |
| 360.00 | 0.800 |
| 390.00 | 0.800 |
| 420.00 | 0.790 |
| 450.00 | 0.790 |
| 480.00 | 0.780 |
| 510.00 | 0.780 |
| 540.00 | 0.780 |
| 570.00 | 0.770 |
| 600.00 | 0.770 |
| 720.00 | 0.760 |
| 840.00 | 0.750 |
| 960.00 | 0.750 |
| 1080.00 | 0.740 |
| 1200.00 | 0.730 |
| 1320.00 | 0.730 |
| 1440.00 | 0.720 |
| 1560.00 | 0.720 |
| 1680.00 | 0.710 |
| 1800.00 | 0.710 |
| 1920.00 | 0.710 |
| 2040.00 | 0.700 |
| 2160.00 | 0.700 |
| 2280.00 | 0.700 |
| 2400.00 | 0.690 |
| 2520.00 | 0.690 |
| 2640.00 | 0.690 |
| 2760.00 | 0.680 |
| 2880.00 | 0.680 |
| 3000.00 | 0.680 |
| 3120.00 | 0.680 |
| 3240.00 | 0.670 |
| 3360.00 | 0.670 |
| 3480.00 | 0.670 |
| 3600.00 | 0.670 |
| 3720.00 | 0.670 |
| 3840.00 | 0.660 |
| 3960.00 | 0.660 |
| 4080.00 | 0.660 |
| 4200.00 | 0.660 |
| 4320.00 | 0.660 |
| 4440.00 | 0.660 |
| 4560.00 | 0.650 |
| 4680.00 | 0.650 |
| 4800.00 | 0.650 |
| 4920.00 | 0.650 |
| 5040.00 | 0.650 |
| 5160.00 | 0.650 |
| 5280.00 | 0.650 |
| 5400.00 | 0.640 |
| 5520.00 | 0.640 |
| 5640.00 | 0.640 |
| 5760.00 | 0.640 |
| 5880.00 | 0.640 |
| 6000.00 | 0.640 |
| 6600.00 | 0.630 |

| | |
|---|---|
| 7200.00 | 0.630 |
| 7800.00 | 0.630 |
| 8400.00 | 0.630 |
| 9000.00 | 0.620 |
| 9600.00 | 0.620 |
| 10200.00 | 0.620 |
| 10800.00 | 0.620 |
| 11400.00 | 0.620 |
| 12000.00 | 0.620 |
| 12600.00 | 0.610 |
| 13200.00 | 0.610 |
| 13800.00 | 0.610 |
| 14400.00 | 0.610 |
| 15000.00 | 0.610 |
| 15600.00 | 0.610 |
| 16200.00 | 0.610 |
| 16800.00 | 0.600 |
| 17400.00 | 0.600 |
| 18000.00 | 0.600 |
| 18600.00 | 0.610 |
| 19200.00 | 0.610 |
| 19800.00 | 0.610 |
| 20400.00 | 0.610 |
| 21000.00 | 0.610 |
| 21600.00 | 0.610 |
| 22200.00 | 0.610 |
| 22800.00 | 0.610 |
| 23400.00 | 0.610 |
| 24000.00 | 0.610 |
| 24600.00 | 0.610 |
| 25200.00 | 0.610 |
| 25800.00 | 0.610 |
| 26400.00 | 0.610 |
| 27000.00 | 0.610 |
| 27600.00 | 0.610 |
| 28200.00 | 0.610 |
| 28800.00 | 0.620 |
| 29400.00 | 0.610 |
| 30000.00 | 0.620 |
| 30600.00 | 0.620 |
| 31200.00 | 0.620 |
| 31800.00 | 0.620 |
| 32400.00 | 0.620 |
| 33000.00 | 0.620 |
| 33600.00 | 0.620 |
| 34200.00 | 0.620 |
| 34800.00 | 0.620 |
| 35400.00 | 0.620 |
| 36000.00 | 0.620 |
| 36600.00 | 0.620 |
| 37200.00 | 0.620 |
| 37800.00 | 0.620 |
| 38400.00 | 0.620 |
| 39000.00 | 0.620 |
| 39600.00 | 0.620 |
| 40200.00 | 0.620 |
| 40800.00 | 0.630 |
| 41400.00 | 0.630 |

```
HO SPECIFIED BY USER


COMPUTED VALUE FOR HO (FEET)    1.1700
```

```
                         METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                    COMPUTED RESULTS:


                           COMPUTED VALUE OF HO =   1.17 FEET

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

   ALPHA      STORATIVITY    MEAN       MEAN      MINIMUM     MAXIMUM     RATIO OF    ROOT MEAN   DIFFERENCE
                          TRANSMIS-   PERMEA-     TRANS.       TRANS.    *** RANGE TO  SQUARE OF    IN RMS
                            SIVITY     BILITY                               TBAR        TIME
                                                                                      DEVIATIONS

 1.000E-01   1.000E-01   2.752E-06   1.835E-07   5.818E-08   2.641E-05    9.576103   15755.38       0.00

 1.000E-02   1.000E-02   8.265E-06   5.510E-07   1.233E-07   8.905E-05   10.759587   15924.68    -169.30

 1.000E-03   1.000E-03   1.519E-05   1.013E-06   1.902E-07   1.711E-04   11.250791   15989.41     -64.73

 1.000E-04   1.000E-04   2.217E-05   1.478E-06   2.563E-07   2.543E-04   11.456016   16015.13     -25.72

 1.000E-05   1.000E-05   2.901E-05   1.934E-06   3.223E-07   3.358E-04   11.565717   16027.52     -12.39

 1.000E-06   1.000E-06   3.571E-05   2.381E-06   3.857E-07   4.156E-04   11.627642   16035.63      -8.11

 1.000E-07   1.000E-07   4.233E-05   2.822E-06   4.494E-07   4.944E-04   11.669664   16040.59      -4.96

 1.000E-08   1.000E-08   4.887E-05   3.258E-06   5.125E-07   5.723E-04   11.699155   16044.19      -3.59

 1.000E-09   1.000E-09   5.538E-05   3.692E-06   5.750E-07   6.497E-04   11.720910   16046.93      -2.75

 1.000E-10   1.000E-10   6.185E-05   4.123E-06   6.376E-07   7.266E-04   11.738236   16048.99      -2.06



                                  MANUAL CURVE MATCH RESULTS:


                         NO ACCEPTABLE MATCH, UNCONFINED CONDITIONS IMPLIED
```

```
        METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:


 PERMEABILITY =  1.44E-05 FT/SECOND       =  4.38E-04 CM/SECOND

 TRANSMISSIVITY =  6.13E-04 FT**2/SECOND



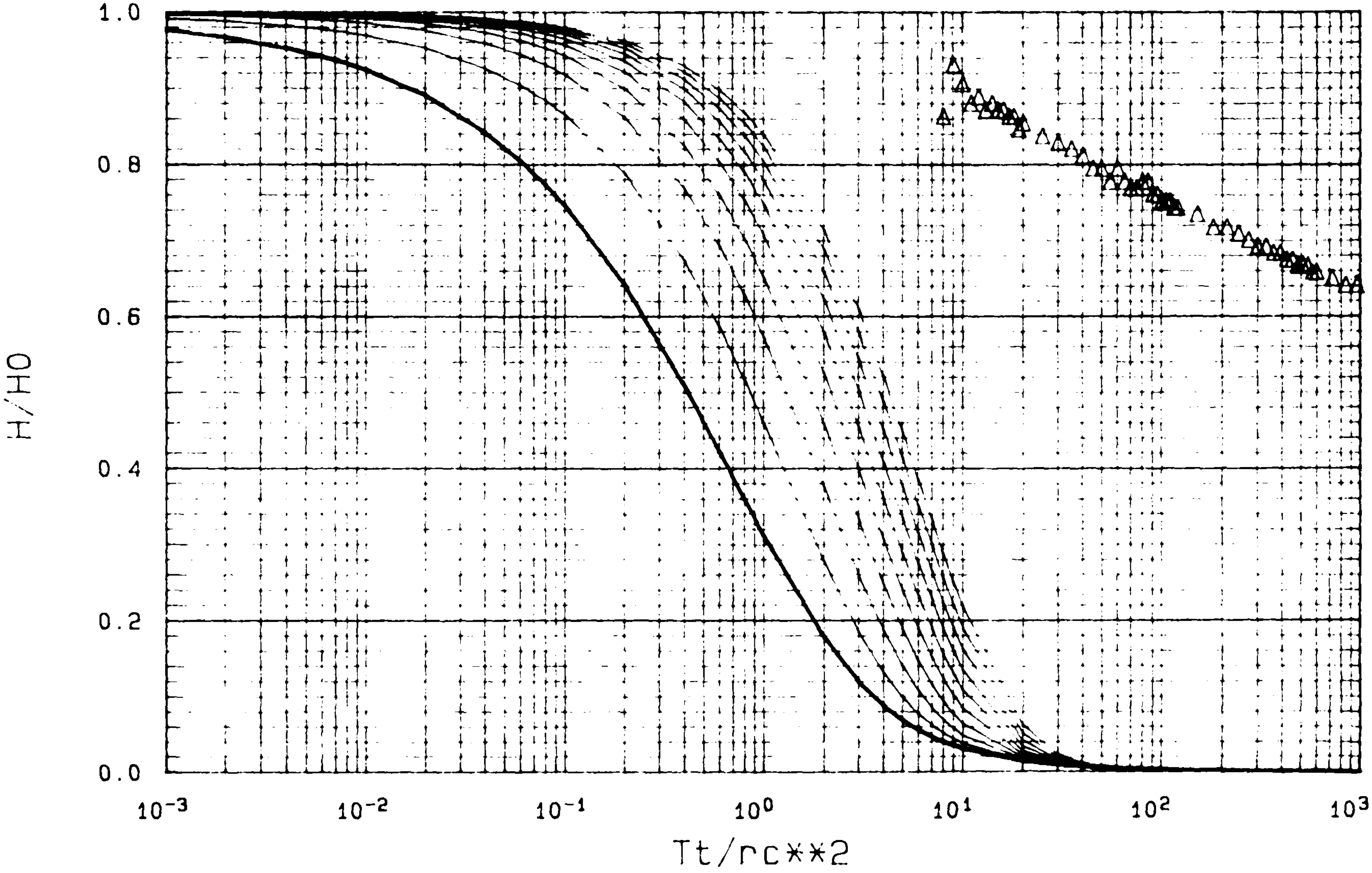
COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:


 PERMEABILITY =  1.94E-05 FT/SECOND       =  5.91E-04 CM/SECOND

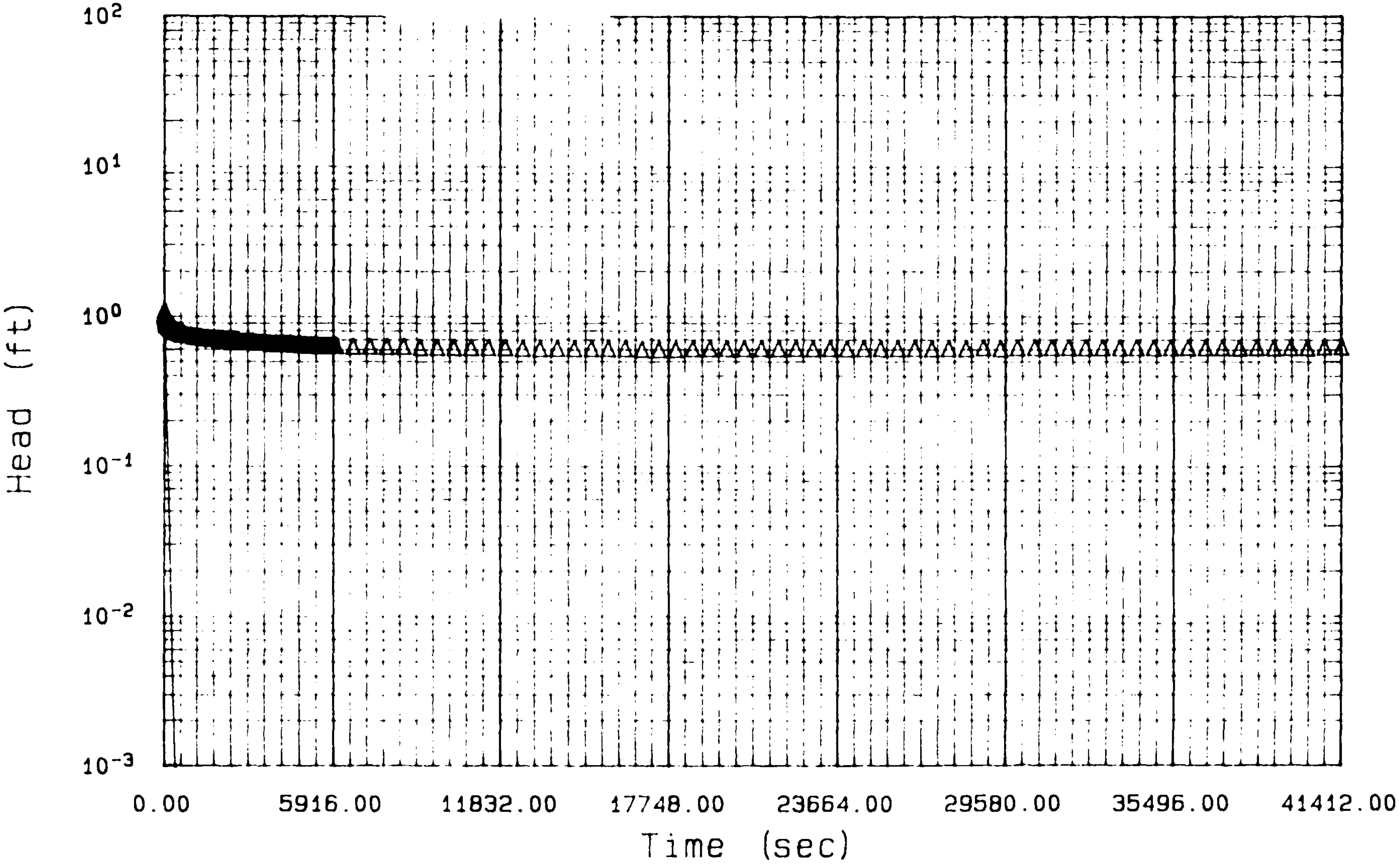
 TRANSMISSIVITY =  8.26E-04 FT**2/SECOND
```

**MC6C-R**

# Slug Test Analysis
# Type Curves For Instantaneous Charge



89c7583-1 Dupont McCarl
Well **Mc6c-r** at Date 08/09-10/90



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                              PROGRAM SLUGT, VERSION 7,FEB. 1988

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.: 89c7583-1                                CLIENT: Dupont

SITE LOCATION: McCarl                                 DATE OF SLUG TEST: 08/09/90

FIELD INVESTIGATOR: B. Hedenkamp

                                 WELL NO.: mc6c-f.

                                 INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES                  LENGTH OF SCREEN OR INTAKE PORTION =  15.00 FEET
INNER SCREEN OR OPEN-HOLE DIAMETER =   2.00 INCHES     DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =  42.53 FEET
DIAMETER OF DRILLED HOLE =   8.00 INCHES               THICKNESS OF SATURATED AQUIFER ZONE =  43.03 FEET
ESTIMATED POROSITY OF GRAVEL PACK = 0.15               FALLING-HEAD INDEX =  1  ("1" IF FALLING,"0" IF RISING)


                         NUMBER OF HEAD-TIME DATA POINTS =   143


                              TIME            HEAD
                           (SECOND )         (FEET)

                              3.00            0.540
                              4.00            0.160
                              5.00            0.410
                              6.00            0.250
                              7.00            0.350
                              8.00            0.290
                              9.00            0.330
                             10.00            0.300
                             11.00            0.310
                             12.00            0.310
                             13.00            0.290
                             14.00            0.310
                             15.00            0.310
                             16.00            0.310
                             17.00            0.300
                             18.00            0.330
                             19.00            0.300
                             20.00            0.300
                             25.00            0.290
                             30.00            0.290
                             35.00            0.290
                             40.00            0.280
                             45.00            0.280
                             50.00            0.280
                             55.00            0.270
```

| | |
|---|---|
| 60.00 | 0.270 |
| 65.00 | 0.270 |
| 70.00 | 0.260 |
| 75.00 | 0.260 |
| 80.00 | 0.300 |
| 85.00 | 0.260 |
| 90.00 | 0.260 |
| 95.00 | 0.260 |
| 100.00 | 0.260 |
| 105.00 | 0.250 |

| | |
|---|---|
| 110.00 | 0.250 |
| 115.00 | 0.250 |
| 120.00 | 0.250 |
| 150.00 | 0.240 |
| 180.00 | 0.230 |
| 210.00 | 0.230 |
| 240.00 | 0.220 |
| 270.00 | 0.220 |
| 300.00 | 0.210 |
| 330.00 | 0.210 |
| 360.00 | 0.200 |
| 390.00 | 0.200 |
| 420.00 | 0.200 |
| 450.00 | 0.190 |
| 480.00 | 0.190 |
| 510.00 | 0.190 |
| 540.00 | 0.180 |
| 570.00 | 0.180 |
| 600.00 | 0.180 |
| 720.00 | 0.170 |
| 840.00 | 0.160 |
| 960.00 | 0.150 |
| 1080.00 | 0.140 |
| 1200.00 | 0.130 |
| 1320.00 | 0.130 |
| 1440.00 | 0.130 |
| 1560.00 | 0.120 |
| 1680.00 | 0.120 |
| 1800.00 | 0.110 |
| 1920.00 | 0.110 |
| 2040.00 | 0.110 |
| 2160.00 | 0.100 |
| 2280.00 | 0.100 |
| 2400.00 | 0.090 |
| 2520.00 | 0.090 |
| 2640.00 | 0.090 |
| 2760.00 | 0.080 |
| 2880.00 | 0.080 |
| 3000.00 | 0.080 |
| 3120.00 | 0.070 |
| 3240.00 | 0.070 |
| 3360.00 | 0.070 |
| 3480.00 | 0.070 |
| 3600.00 | 0.070 |
| 3720.00 | 0.060 |
| 3840.00 | 0.060 |
| 3960.00 | 0.060 |
| 4080.00 | 0.060 |
| 4200.00 | 0.050 |
| 4320.00 | 0.050 |
| 4440.00 | 0.050 |
| 4560.00 | 0.050 |
| 4680.00 | 0.050 |
| 4800.00 | 0.040 |
| 4920.00 | 0.040 |
| 5040.00 | 0.040 |
| 5160.00 | 0.040 |
| 5280.00 | 0.040 |
| 5400.00 | 0.040 |
| 5520.00 | 0.030 |

```
 5640.00          0.030
 5760.00          0.030
 5880.00          0.030
 6000.00          0.030
 6600.00          0.020
 7200.00          0.020
 7800.00          0.010
 8400.00          0.010
 9000.00          0.010
 9600.00          0.010
10200.00          0.010
10800.00          0.010
11400.00          0.010
12000.00          0.010
12600.00          0.010
13200.00          0.020
13800.00          0.020
14400.00          0.030
15000.00          0.040
15600.00          0.050
16200.00          0.060
16800.00          0.060
17400.00          0.070
18000.00          0.070
18600.00          0.070
19200.00          0.070
19800.00          0.070
28400.00          0.070
21000.00          0.060
21600.00          0.060
22200.00          0.060
22800.00          0.060
23400.00          0.050
24000.00          0.050
24600.00          0.040
25200.00          0.040
25800.00          0.040
26400.00          0.030
27000.00          0.030
27600.00          0.030
28200.00          0.030
28800.00          0.020
29400.00          0.020
30000.00          0.020
30600.00          0.010
31200.00          0.010
31800.00          0.010
32400.00          0.010


   HO SPECIFIED BY USER


   COMPUTED VALUE FOR HO (FEET)    1.1700
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                          METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                     COMPUTED RESULTS:


                               COMPUTED VALUE OF HO =   1.17 FEET

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

    ALPHA      STORATIVITY     MEAN        MEAN       MINIMUM      MAXIMUM     RATIO OF    ROOT MEAN   DIFFERENCE
                             TRANSMIS-    PERMEA-     TRANS.       TRANS.     "T" RANGE TO  SQUARE OF    IN RMS
                              SIVITY      BILITY                               TBAR          TIME
                                                                                          DEVIATIONS

  1.000E-01    1.000E-01    6.916E-06   4.611E-07   **********   4.540E-03   **********  **********       0.00

  1.000E-02    1.000E-02    1.395E-04   9.297E-06   **********   6.730E-03   61.767879    62706.84  **********

  1.000E-03    1.000E-03    1.338E-04   8.921E-06   **********   8.839E-03   **********   50697.18    12009.66

  1.000E-04    1.000E-04    3.011E-04   2.007E-05   **********   1.093E-02   47.478088    22304.32    28392.86

  1.000E-05    1.000E-05    4.467E 04   2.978E-05   **********   1.303E-02   31.693216    15701.42     6602.90

  1.000E-06    1.000E-06    5.797E-04   3.865E-05   **********   1.511E-02   26.743736    13196.26     2505.16

  1.000E-07    1.000E-07    3.446E-04   2.297E-05   **********   1.718E 02   79.774933    40066.51   -26870.25

  1.000E-08    1.000E-08   **********  **********   **********   1.722E-02   **********   10183.50    29883.02

  1.000E-09    1.000E-09    2.644E-04   1.763E-05   **********   1.809E-02   **********   26047.62   -15864.12

  1.000E-10    1.000E-10    8.408E-04   5.605E-05   **********   2.008E-02   33.455490    13469.00    12578.61



                                  MANUAL CURVE MATCH RESULTS:


                         NO ACCEPTABLE MATCH, UNCONFINED CONDITIONS IMPLIED
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```
          METHOD OF BOUWER AND RICE

 COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:


  PERMEABILITY =  2.02E-04 FT/SECOND       =  6.15E-03 CM/SECOND

  TRANSMISSIVITY =  8.69E-03 FT**2/SECOND

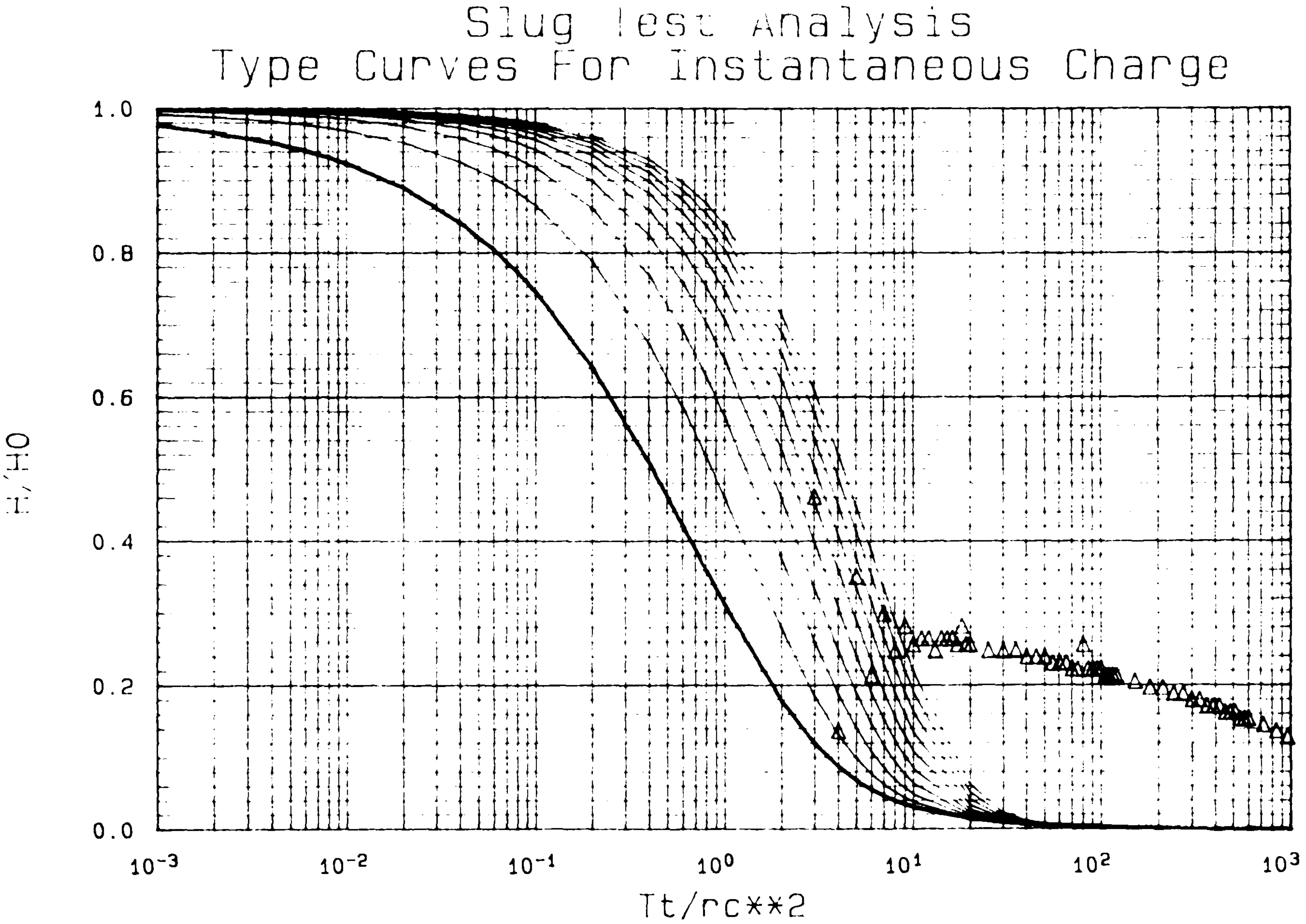


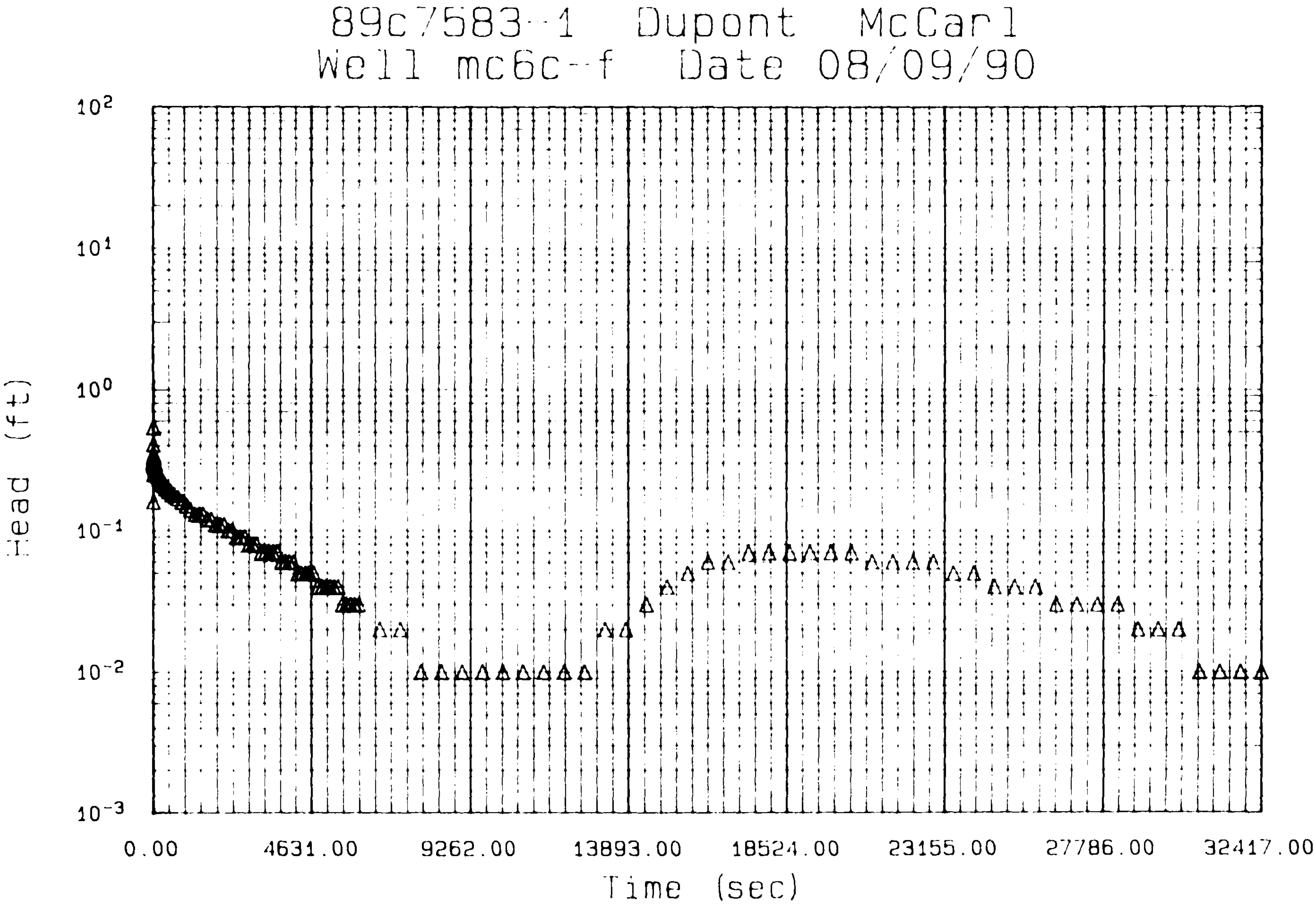

 COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:


  PERMEABILITY =  2.72E-04 FT/SECOND       =  8.29E-03 CM/SECOND

  TRANSMISSIVITY =  1.17E-02 FT**2/SECOND
```

## MC6C-F


Slug Test Analysis
Type Curves For Instantaneous Charge
1.0
0.8
0.6
0.4
0.2
0.0
H/HO
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2


89c7583-1 Dupont McCarl
Well mc6c-f Date 08/09/90
10²
10¹
10⁰
10⁻¹
10⁻²
10⁻³
Head (ft)
0.00
4631.00
9262.00
13893.00
18524.00
23155.00
27786.00
32417.00
Time (sec)

```
                         PROGRAM SLUGT, VERSION 7,FEB. 1988

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.: 89c7583-1                           CLIENT: Dupont

SITE LOCATION: McCarl Site                       DATE OF SLUG TEST: 06/09-10/90

FIELD INVESTIGATOR: B. Hedenkamp

                              WELL NO.: mc4c-r

                              INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES              LENGTH OF SCREEN OR INTAKE PORTION =  15.00 FEET
INNER SCREEN OR OPEN-HOLE DIAMETER =  2.00 INCHES  DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =  40.20 FEET
DIAMETER OF DRILLED HOLE =  9.00 INCHES            THICKNESS OF SATURATED AQUIFER ZONE =  40.70 FEET
ESTIMATED POROSITY OF GRAVEL PACK = 0.15           FALLING-HEAD INDEX =  0  ("1" IF FALLING,"0" IF RISING)


                    NUMBER OF HEAD-TIME DATA POINTS =   137


                          TIME              HEAD
                        (SECOND )          (FEET)

                           1.00             1.110
                           1.20             0.410
                           1.40             0.130
                           1.60             0.250
                           1.80             0.650
                           2.00             1.110
                           3.00             0.980
                           4.00             0.980
                           5.00             0.950
                           6.00             0.920
                           7.00             0.910
                           8.00             0.900
                           9.00             0.890
                          10.00             0.880
                          11.00             0.870
                          12.00             0.860
                          13.00             0.860
                          14.00             0.860
                          15.00             0.850
                          16.00             0.850
                          17.00             0.850
                          18.00             0.850
                          19.00             0.870
                          20.00             0.860
                          25.00             0.880
```

| | |
|---|---|
| 30.00 | 0.830 |
| 35.00 | 0.820 |
| 40.00 | 0.810 |
| 45.00 | 0.800 |
| 50.00 | 0.790 |
| 55.00 | 0.790 |
| 60.00 | 0.780 |
| 65.00 | 0.780 |
| 70.00 | 0.770 |
| 75.00 | 0.770 |

| | |
|---|---|
| 80.00 | 0.770 |
| 85.00 | 0.760 |
| 90.00 | 0.760 |
| 95.00 | 0.760 |
| 100.00 | 0.750 |
| 105.00 | 0.750 |
| 110.00 | 0.750 |
| 115.00 | 0.750 |
| 120.00 | 0.740 |
| 150.00 | 0.730 |
| 180.00 | 0.720 |
| 210.00 | 0.710 |
| 240.00 | 0.710 |
| 270.00 | 0.710 |
| 300.00 | 0.700 |
| 330.00 | 0.700 |
| 360.00 | 0.690 |
| 390.00 | 0.690 |
| 420.00 | 0.690 |
| 450.00 | 0.690 |
| 480.00 | 0.690 |
| 510.00 | 0.680 |
| 540.00 | 0.680 |
| 570.00 | 0.680 |
| 600.00 | 0.680 |
| 720.00 | 0.680 |
| 840.00 | 0.670 |
| 960.00 | 0.670 |
| 1080.00 | 0.670 |
| 1200.00 | 0.660 |
| 1320.00 | 0.660 |
| 1440.00 | 0.660 |
| 1560.00 | 0.660 |
| 1680.00 | 0.650 |
| 1800.00 | 0.650 |
| 1920.00 | 0.650 |
| 2040.00 | 0.650 |
| 2160.00 | 0.640 |
| 2280.00 | 0.640 |
| 2400.00 | 0.640 |
| 2520.00 | 0.630 |
| 2640.00 | 0.630 |
| 2760.00 | 0.630 |
| 2880.00 | 0.630 |
| 3000.00 | 0.630 |
| 3120.00 | 0.620 |
| 3240.00 | 0.620 |
| 3360.00 | 0.620 |
| 3480.00 | 0.620 |
| 3600.00 | 0.620 |
| 3720.00 | 0.610 |
| 3840.00 | 0.610 |
| 3960.00 | 0.610 |
| 4080.00 | 0.610 |
| 4200.00 | 0.610 |
| 4320.00 | 0.610 |
| 4440.00 | 0.600 |
| 4560.00 | 0.600 |
| 4680.00 | 0.600 |
| 4800.00 | 0.600 |

```
4920.00               0.600
5040.00               0.600
5160.00               0.600
5280.00               0.600
5400.00               0.600
5520.00               0.600
5640.00               0.590
5760.00               0.590
5880.00               0.590
6000.00               0.590
6600.00               0.590
7200.00               0.580
7800.00               0.580
8400.00               0.580
9000.00               0.570
9600.00               0.570
10200.00              0.570
10800.00              0.560
11400.00              0.560
12000.00              0.560
12600.00              0.550
13200.00              0.550
13800.00              0.540
14400.00              0.540
15000.00              0.540
15600.00              0.540
16200.00              0.540
16800.00              0.530
17400.00              0.530
18000.00              0.530
18600.00              0.530
19200.00              0.520
19800.00              0.520
20400.00              0.520
21000.00              0.520
21600.00              0.510
22200.00              0.510
22800.00              0.510
23400.00              0.510
24000.00              0.500
24600.00              0.500
25200.00              0.500


 HO SPECIFIED BY USER


 COMPUTED VALUE FOR HO (FEET)     1.1700
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                    METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                              COMPUTED RESULTS:


                      COMPUTED VALUE OF HO =   1.17 FEET

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

  ALPHA      STORATIVITY     MEAN        MEAN      MINIMUM     MAXIMUM     RATIO OF    ROOT MEAN   DIFFERENCE
                           TRANSMIS-    PERMEA-     TRANS.      TRANS.    "T" RANGE TO  SQUARE OF    IN RMS
                            SIVITY      BILITY                              TBAR        TIME
                                                                                      DEVIATIONS

 1.000E-01   1.000E-01   *********   *********   *********   1.592E-02   *********   8407.88      0.00
 1.000E-02   1.000E-02   *********   *********   *********   2.263E-02   *********   8408.07     -0.19
 1.000E-03   1.000E-03   *********   *********   *********   2.919E-02   *********   8408.25     -0.18
 1.000E-04   1.000E-04   *********   *********   *********   3.573E-02   *********   8407.82      0.42
 1.000E-05   1.000E-05   *********   *********   *********   4.228E-02   *********   8407.98     -0.16
 1.000E-06   1.000E-06   *********   *********   *********   4.879E-02   *********   8407.80      0.18
 1.000E-07   1.000E-07   *********   *********   *********   4.762E-02   *********   8407.48      0.32
 1.000E-08   1.000E-08   *********   *********   *********   4.966E-02   *********   8407.85     -0.36
 1.000E-09   1.000E-09   *********   *********   *********   5.644E-02   *********   8408.24     -0.39
 1.000E-10   1.000E-10   *********   *********   *********   6.545E-02   *********   8408.67     -0.43


                              MANUAL CURVE MATCH RESULTS:


                  NO ACCEPTABLE MATCH, UNCONFINED CONDITIONS IMPLIED
```

```
        METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:


 PERMEABILITY =  4.10E-05 FT/SECOND       =  1.25E-03 CM/SECOND

 TRANSMISSIVITY =  1.67E-03 FT**2/SECOND

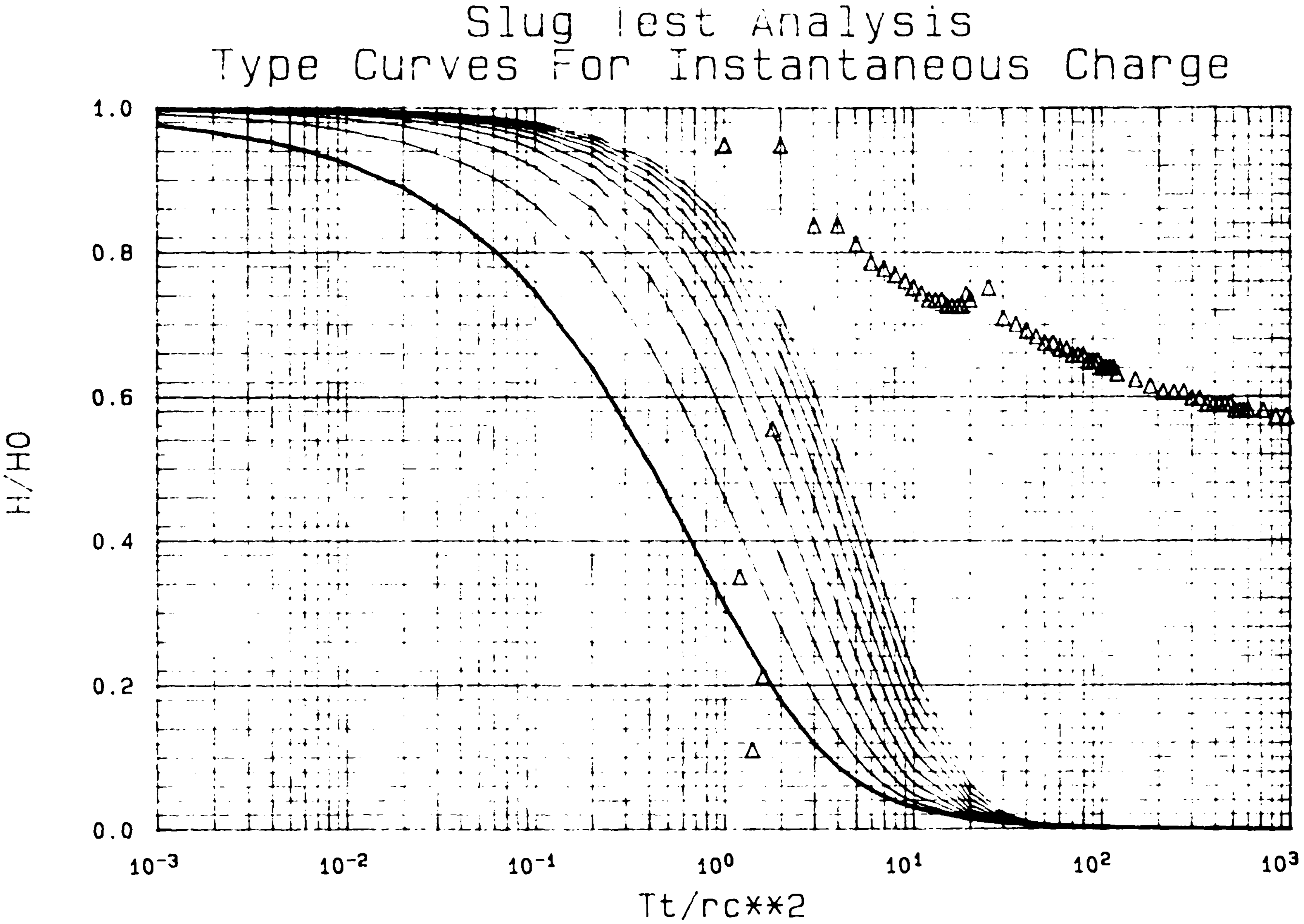


COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:


 PERMEABILITY =  5.54E-05 FT/SECOND       =  1.69E-03 CM/SECOND

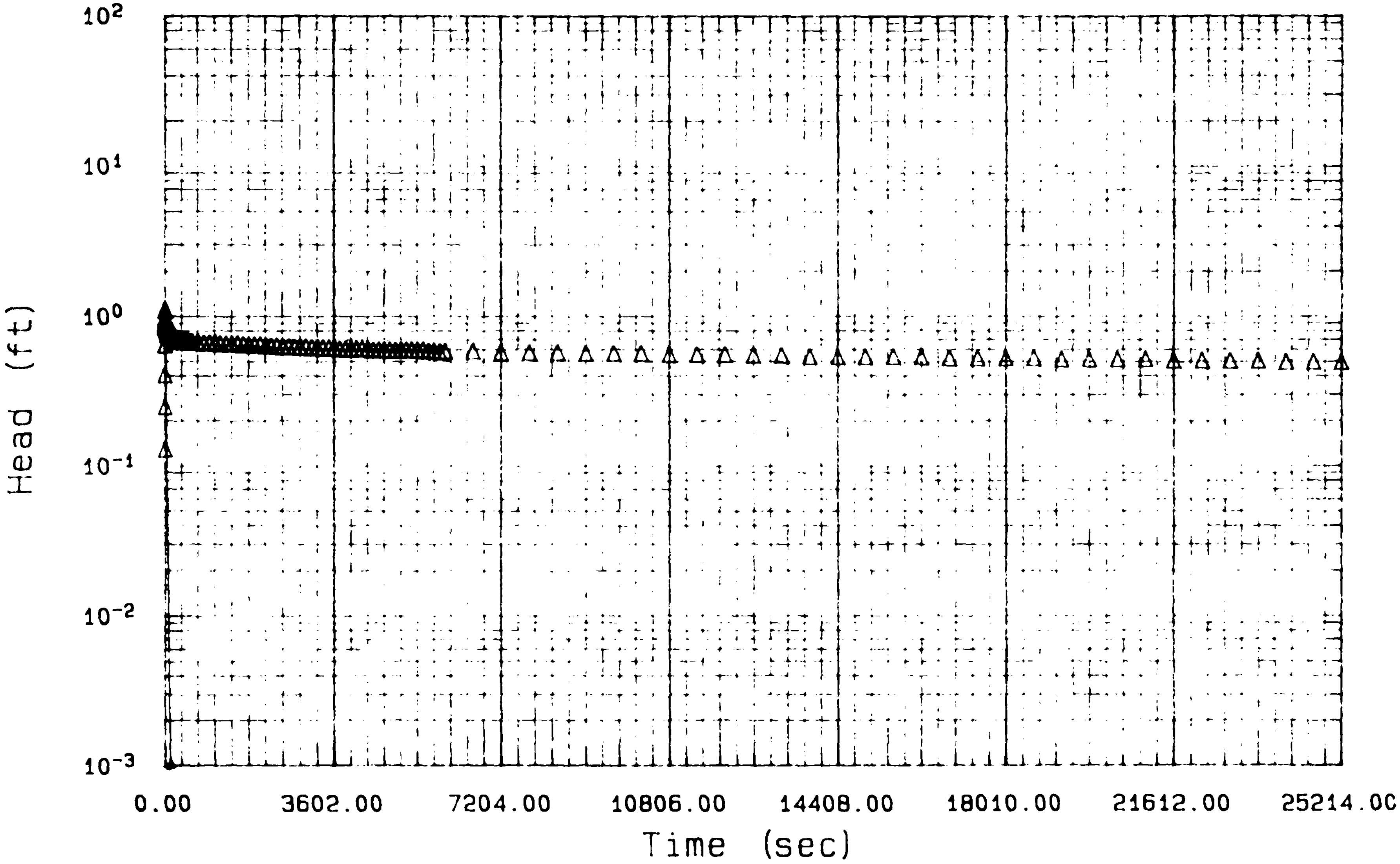
 TRANSMISSIVITY =  2.25E-03 FT**2/SECOND
```

**MC4C-R**



Slug Test Analysis
Type Curves For Instantaneous Charge
1.0
0.8
0.6
0.4
0.2
0.0
H/HO
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2

# 89c7583-1 Dupont McCarl Site
# Well mc4c-r Date 08/09-10/90



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                         PROGRAM SLUGT, VERSION 7,FEB. 1988

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.: 89c7583-1                        CLIENT: Dupont

SITE LOCATION: McCarl                         DATE OF SLUG TEST: 08/08-09/90

FIELD INVESTIGATOR: B. Hedenkamp

                              WELL NO.: mc4c-f

                              INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES                 LENGTH OF SCREEN OR INTAKE PORTION =  15.00 FEET
INNER SCREEN OR OPEN-HOLE DIAMETER =   2.00 INCHES    DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =  39.52 FEET
DIAMETER OF DRILLED HOLE =   8.00 INCHES              THICKNESS OF SATURATED AQUIFER ZONE =  40.02 FEET
ESTIMATED POROSITY OF GRAVEL PACK = 0.25              FALLING-HEAD INDEX =  1  ("1" IF FALLING,"0" IF RISING)


                   NUMBER OF HEAD-TIME DATA POINTS =   155


                      TIME            HEAD
                     SECOND          (FEET)

                       3.00           0.350
                       4.00           0.530
                       5.00           0.240
                       6.00           0.480
                       7.00           0.290
                       8.00           0.400
                       9.00           0.320
                      10.00           0.360
                      11.00           0.320
                      12.00           0.330
                      13.00           0.320
                      14.00           0.320
                      15.00           0.310
                      16.00           0.310
                      17.00           0.310
                      18.00           0.300
                      19.00           0.300
                      20.00           0.300
                      25.00           0.290
                      30.00           0.280
                      35.00           0.280
                      40.00           0.270
                      45.00           0.270
                      50.00           0.260
                      55.00           0.260
```

| | |
|---|---|
| 60.00 | 0.260 |
| 65.00 | 0.250 |
| 70.00 | 0.250 |
| 75.00 | 0.240 |
| 80.00 | 0.260 |
| 85.00 | 0.240 |
| 90.00 | 0.230 |
| 95.00 | 0.230 |
| 100.00 | 0.230 |
| 105.00 | 0.230 |

| | |
|---|---|
| 110.00 | 0.230 |
| 115.00 | 0.220 |
| 120.00 | 0.220 |
| 150.00 | 0.210 |
| 180.00 | 0.200 |
| 210.00 | 0.200 |
| 240.00 | 0.200 |
| 270.00 | 0.190 |
| 300.00 | 0.190 |
| 330.00 | 0.180 |
| 360.00 | 0.180 |
| 390.00 | 0.180 |
| 420.00 | 0.170 |
| 450.00 | 0.170 |
| 480.00 | 0.170 |
| 510.00 | 0.170 |
| 540.00 | 0.160 |
| 570.00 | 0.160 |
| 600.00 | 0.160 |
| 720.00 | 0.150 |
| 840.00 | 0.150 |
| 960.00 | 0.140 |
| 1080.00 | 0.140 |
| 1200.00 | 0.130 |
| 1320.00 | 0.130 |
| 1440.00 | 0.130 |
| 1560.00 | 0.120 |
| 1680.00 | 0.120 |
| 1800.00 | 0.120 |
| 1920.00 | 0.110 |
| 2040.00 | 0.110 |
| 2160.00 | 0.110 |
| 2280.00 | 0.110 |
| 2400.00 | 0.110 |
| 2520.00 | 0.100 |
| 2640.00 | 0.100 |
| 2760.00 | 0.100 |
| 2880.00 | 0.100 |
| 3000.00 | 0.090 |
| 3120.00 | 0.090 |
| 3240.00 | 0.090 |
| 3360.00 | 0.090 |
| 3480.00 | 0.090 |
| 3600.00 | 0.090 |
| 3720.00 | 0.090 |
| 3840.00 | 0.090 |
| 3960.00 | 0.080 |
| 4080.00 | 0.080 |
| 4200.00 | 0.080 |
| 4320.00 | 0.080 |
| 4440.00 | 0.080 |
| 4560.00 | 0.080 |
| 4680.00 | 0.080 |
| 4800.00 | 0.080 |
| 4920.00 | 0.070 |
| 5040.00 | 0.070 |
| 5160.00 | 0.070 |
| 5280.00 | 0.070 |
| 5400.00 | 0.070 |
| 5520.00 | 0.070 |

| | |
|---|---|
| 5640.00 | 0.070 |
| 5760.00 | 0.070 |
| 5880.00 | 0.070 |
| 6000.00 | 0.070 |
| 6600.00 | 0.060 |
| 7200.00 | 0.060 |
| 7800.00 | 0.060 |
| 8400.00 | 0.060 |
| 9000.00 | 0.050 |
| 9600.00 | 0.050 |
| 10200.00 | 0.050 |
| 10800.00 | 0.040 |
| 11400.00 | 0.040 |
| 12000.00 | 0.040 |
| 12600.00 | 0.040 |
| 13200.00 | 0.040 |
| 13800.00 | 0.030 |
| 14400.00 | 0.030 |
| 15000.00 | 0.030 |
| 15600.00 | 0.030 |
| 16200.00 | 0.030 |
| 16800.00 | 0.030 |
| 17400.00 | 0.030 |
| 18000.00 | 0.030 |
| 18600.00 | 0.030 |
| 19200.00 | 0.020 |
| 19800.00 | 0.020 |
| 20400.00 | 0.020 |
| 21000.00 | 0.020 |
| 21600.00 | 0.020 |
| 22200.00 | 0.020 |
| 22800.00 | 0.020 |
| 23400.00 | 0.020 |
| 24000.00 | 0.020 |
| 24600.00 | 0.020 |
| 25200.00 | 0.020 |
| 25800.00 | 0.020 |
| 26400.00 | 0.020 |
| 27000.00 | 0.020 |
| 27600.00 | 0.020 |
| 28200.00 | 0.020 |
| 28800.00 | 0.020 |
| 29400.00 | 0.020 |
| 30000.00 | 0.010 |
| 30600.00 | 0.010 |
| 31200.00 | 0.010 |
| 31800.00 | 0.010 |
| 32400.00 | 0.010 |
| 33000.00 | 0.010 |
| 33600.00 | 0.010 |
| 34200.00 | 0.010 |
| 34800.00 | 0.010 |
| 35400.00 | 0.010 |
| 36000.00 | 0.010 |
| 36600.00 | 0.010 |
| 37200.00 | 0.010 |
| 37800.00 | 0.010 |
| 38400.00 | 0.010 |
| 39000.00 | 0.010 |
| 39600.00 | 0.010 |

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HO SPECIFIED BY USER


COMPUTED VALUE FOR HO (FEET)    1.1700
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                        METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                      COMPUTED RESULTS:


                              COMPUTED VALUE OF HO =   1.17 FEET

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

   ALPHA      STORATIVITY     MEAN        MEAN       MINIMUM     MAXIMUM     RATIO OF     ROOT MEAN   DIFFERENCE
                            TRANSMIS-    PERMEA-      TRANS.      TRANS.    "T" RANGE TO  SQUARE OF    IN RMS
                             SIVITY      BILITY                               TBAR          TIME
                                                                                         DEVIATIONS

 1.000E-01    1.000E-01    1.310E-04   8.730E-06   3.816E-06   2.441E-03   18.609451    14536.84       0.00

 1.000E-02    1.000E-02    2.294E-04   1.529E-05   4.254E-06   4.229E-03   18.461088    14788.72    -251.88

 1.000E-03    1.000E-03    3.194E-04   2.130E-05   4.715E-06   6.014E-03   18.811056    14882.48     -93.76

 1.000E-04    1.000E-04    4.069E-04   2.713E-05   4.901E-06   7.774E-03   19.094007    14936.36     -53.88

 1.000E-05    1.000E-05    4.923E-04   3.282E-05   5.184E-06   9.509E-03   19.304649    14968.31     -31.95

 1.000E-06    1.000E-06    5.785E-04   3.856E-05   5.643E-06   1.122E-02   19.384394    14988.55     -20.24

 1.000E-07    1.000E-07    6.628E-04   4.418E-05   6.272E-06   1.291E-02   19.474760    15001.58     -13.03

 1.000E-08    1.000E-08    7.464E-04   4.976E-05   6.971E-06   1.460E-02   19.551250    15010.34      -8.76

 1.000E-09    1.000E-09    8.624E-04   5.749E-05   7.298E-06   1.629E-02   20.279514    15012.91      -2.57

 1.000E-10    1.000E-10    5.574E-04   3.716E-05   *********   1.795E-02   94.248711    14918.20      94.71


                                   MANUAL CURVE MATCH RESULTS:


                          NO ACCEPTABLE MATCH, UNCONFINED CONDITIONS IMPLIED
```

```
        METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:


 PERMEABILITY =  3.12E-04 FT/SECOND      =  9.49E-03 CM/SECOND

 TRANSMISSIVITY =  1.25E-02 FT**2/SECOND



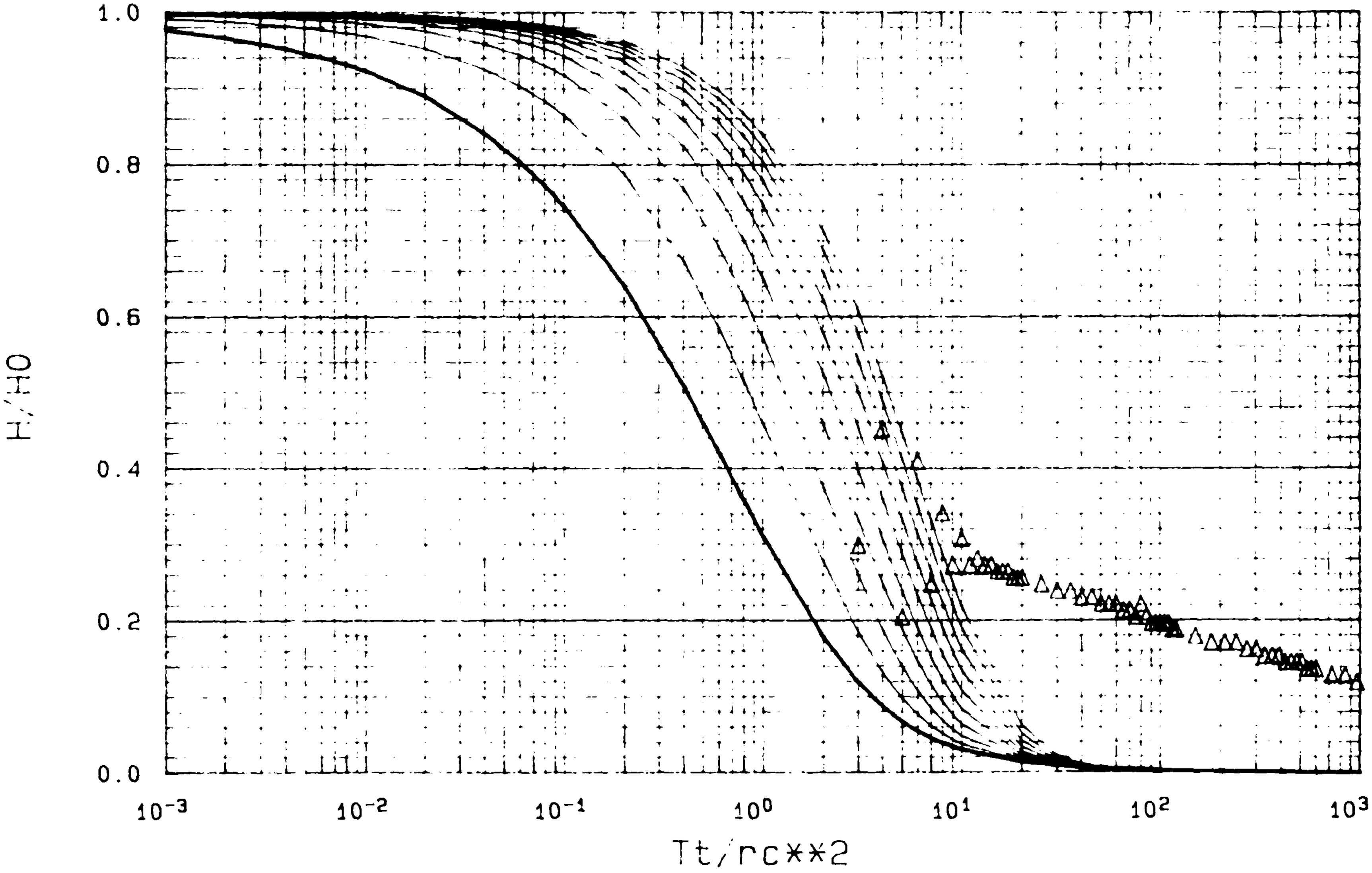

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:


 PERMEABILITY =  4.21E-04 FT/SECOND      =  1.28E-02 CM/SECOND

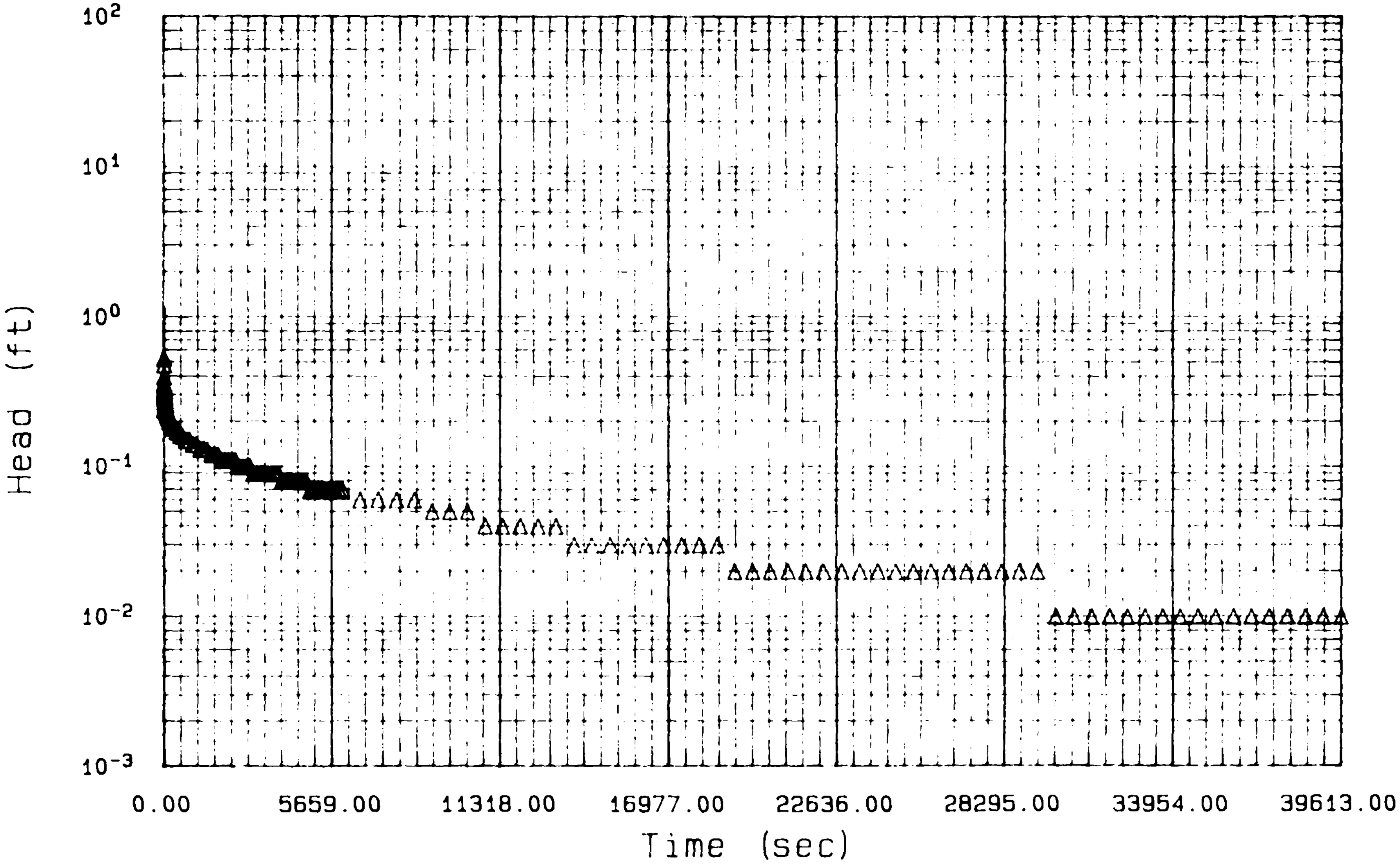
 TRANSMISSIVITY =  1.68E-02 FT**2/SECOND
```

## MC4C-F

# Slug Test Analysis
# Type Curves For Instantaneous Charge



# 89c7583-1 Dupont McCarl
# Well mc4c-f Date 08/08-09/90



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                         PROGRAM SLUGT, VERSION 7,FEB. 1988

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.: 89c7593-1                              CLIENT: Dupont

SITE LOCATION: McCarl                               DATE OF SLUG TEST: 08/09/90

FIELD INVESTIGATOR: B. Hedenkamp

                              WELL NO.: mc3c-f ✓

                              INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES                LENGTH OF SCREEN OR INTAKE PORTION =  15.00 FEET
INNER SCREEN OR OPEN-HOLE DIAMETER =   2.00 INCHES   DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =  49.93 FEET
DIAMETER OF DRILLED HOLE =   8.00 INCHES             THICKNESS OF SATURATED AQUIFER ZONE =  50.93 FEET ✓
ESTIMATED POROSITY OF GRAVEL PACK = 0.15             FALLING-HEAD INDEX =  1  ("1" IF FALLING,"0" IF RISING)


                      NUMBER OF HEAD-TIME DATA POINTS =    56


                         TIME             HEAD
                       (SECOND)          (FEET)

                          3.00            0.950
                          4.00            0.920
                          5.00            0.850
                          6.00            0.940
                          7.00            0.720
                          8.00            0.670
                          9.00            0.620
                         10.00            0.580
                         11.00            0.540
                         12.00            0.510
                         13.00            0.470
                         14.00            0.450
                         15.00            0.420
                         16.00            0.400
                         17.00            0.380
                         18.00            0.370
                         19.00            0.360
                         20.00            0.360
                         25.00            0.280
                         30.00            0.240
                         35.00            0.210
                         40.00            0.200
                         45.00            0.190
                         50.00            0.180
                         55.00            0.170
```

| | |
|---|---|
| 60.00 | 0.160 |
| 65.00 | 0.150 |
| 70.00 | 0.150 |
| 75.00 | 0.150 |
| 80.00 | 0.140 |
| 85.00 | 0.140 |
| 90.00 | 0.140 |
| 95.00 | 0.130 |
| 100.00 | 0.130 |
| 105.00 | 0.120 |

```
110.00                 0.120
115.00                 0.120
120.00                 0.120
150.00                 0.100
180.00                 0.090
210.00                 0.080
240.00                 0.060
270.00                 0.060
300.00                 0.050
330.00                 0.040
360.00                 0.040
390.00                 0.030
420.00                 0.030
450.00                 0.020
480.00                 0.020
510.00                 0.020
540.00                 0.020
570.00                 0.010
600.00                 0.010
720.00                 0.010
840.00                 0.010


HO SPECIFIED BY USER


COMPUTED VALUE FOR HO (FEET)     1.5600
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```
                  METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                              COMPUTED RESULTS:


                   COMPUTED VALUE OF HO =   1.56 FEET

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

  ALPHA      STORATIVITY     MEAN        MEAN       MINIMUM      MAXIMUM     RATIO OF      ROOT MEAN    DIFFERENCE
                 -         TRANSMIS-    PERMEA-      TRANS.       TRANS.     "T" RANGE TO  SQUARE OF     IN RMS
                            SIVITY      BILITY                               TBAR            TIME
                                                                                          DEVIATIONS

1.000E-01    1.000E-01    3.935E-04   2.623E-05   2.111E-04   5.583E-04    0.882371       70.31        0.00
1.000E-02    1.000E-02    5.988E-04   3.992E-05   2.300E-04   1.260E-03    1.719983      111.28      -40.97
1.000E-03    1.000E-03    8.034E-04   5.356E-05   2.492E-04   2.009E-03    2.190680      141.39      -30.11
1.000E-04    1.000E-04    1.005E-03   6.700E-05   2.599E-04   2.740E-03    2.467870      159.46      -18.07
1.000E-05    1.000E-05    1.200E-03   8.000E-05   3.039E-04   3.460E-03    2.630334      171.05      -11.59
1.000E-06    1.000E-06    1.373E-03   9.154E-05   3.620E-04   4.174E-03    2.776390      177.68       -6.64
1.000E-07    1.000E-07    1.543E-03   1.029E-04   3.894E-04   4.878E-03    2.908169      182.89       -5.20
1.000E-08    1.000E-08    1.729E-03   1.153E-04   4.279E-04   5.573E-03    2.975295      187.19       -4.30
1.000E-09    1.000E-09    1.935E-03   1.290E-04   4.445E-04   6.268E-03    3.009806      190.83       -3.64
1.000E-10    1.000E-10    2.148E-03   1.432E 04   4.601E-04   6.959E 03    3.025159      194.08       -3.25



                           MANUAL CURVE MATCH RESULTS:


              MATCH POINT AT Tt/rc**2 = 1.0, TIME =      0.9919

                TRANSMISSIVITY = 6.8885E-03 FEET**2/SECOND
                STORATIVITY    = 1.0000E-02
```

```
         METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:


 PERMEABILITY =  1.30E-04 FT/SECOND       =  3.95E-03 CM/SECOND

 TRANSMISSIVITY =  6.60E-03 FT**2/SECOND

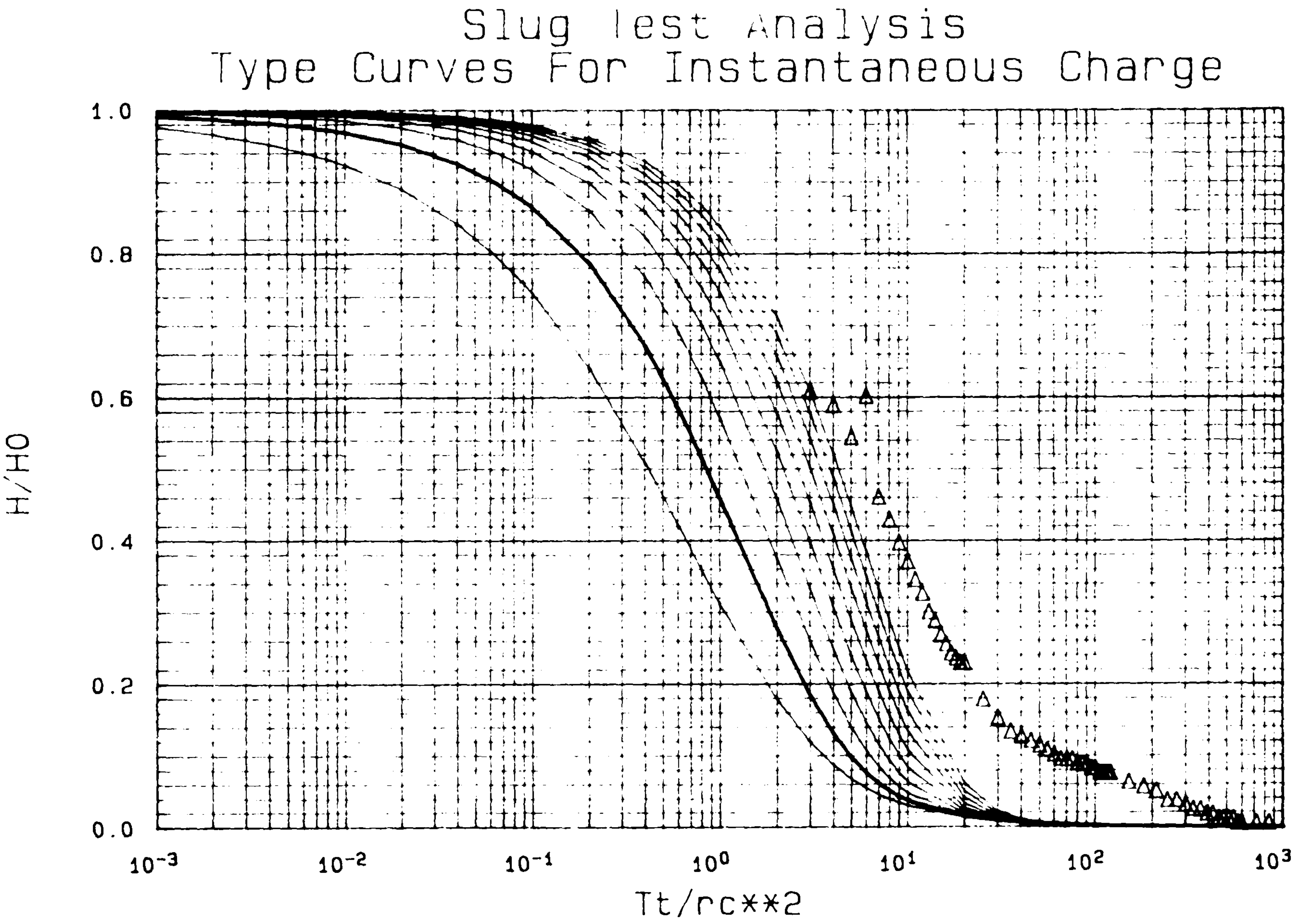



COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

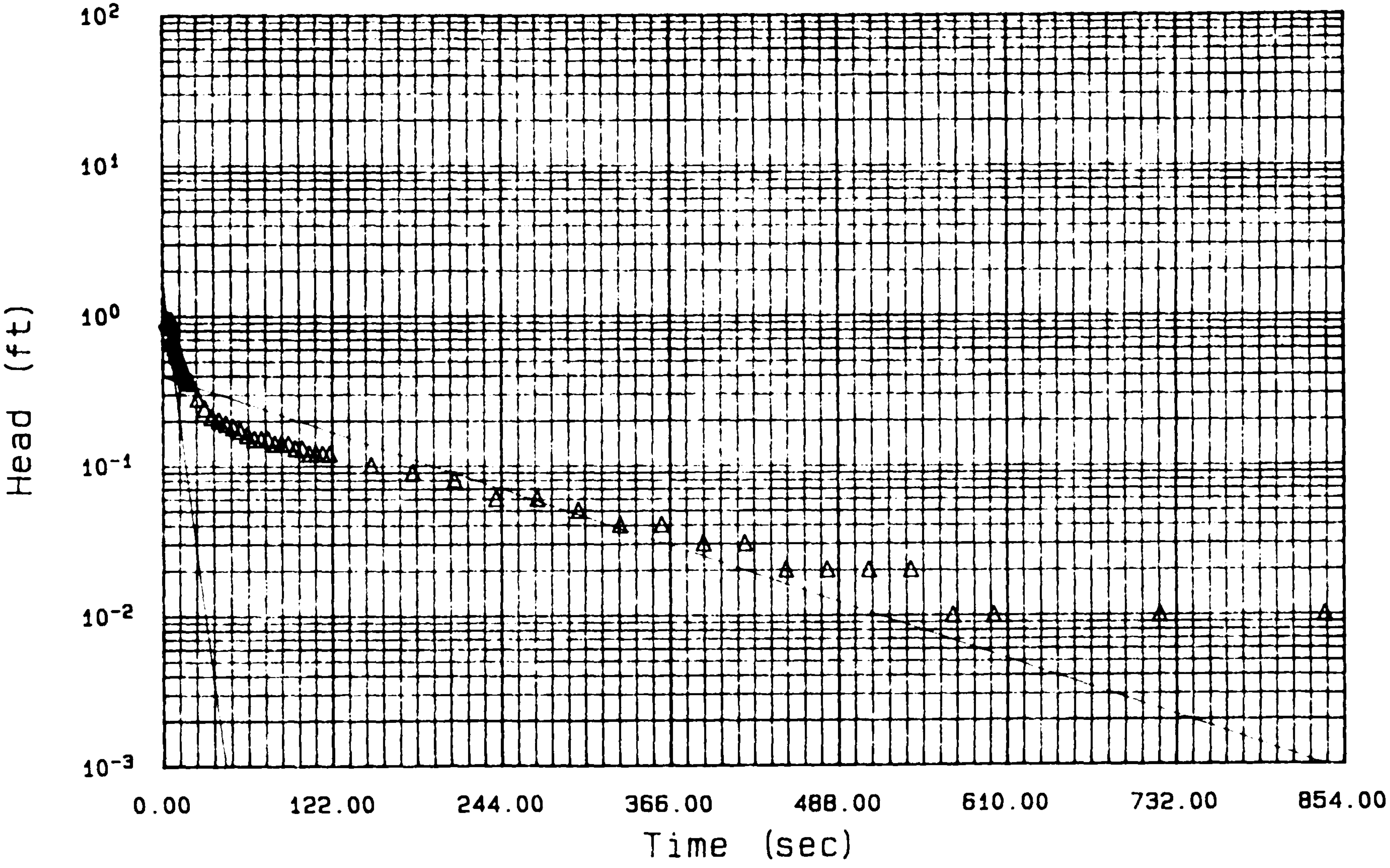

 PERMEABILITY =  1.75E-04 FT/SECOND       =  5.33E-03 CM/SECOND

 TRANSMISSIVITY =  8.91E-03 FT**2/SECOND
```

## MC3C-F


Slug Test Analysis
Type Curves For Instantaneous Charge
1.0
0.8
0.6
0.4
0.2
0.0
H/HO
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^{0}$
$10^{1}$
$10^{2}$
$10^{3}$
Tt/rc**2

89c7583-1 Dupont McCarl Site
Well mc3c-f Date 08/09/90



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                        PROGRAM SLUGT, VERSION 7,FEB. 1988

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.: 89c7583-1                              CLIENT: Dupont

SITE LOCATION: McCarl Site                          DATE OF SLUG TEST: 08/09/90

FIELD INVESTIGATOR: B. Hedenkamp

                              WELL NO.: mc3c-r  .

                              INPUT DATA ARE:

INNER CASING DIAMETER =   2.00 INCHES                 LENGTH OF SCREEN OR INTAKE PORTION =  15.00 FEET
INNER SCREEN OR OPEN-HOLE DIAMETER =   2.00 INCHES    DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN =  48.64 FEET  -
DIAMETER OF DRILLED HOLE =   8.00 INCHES              THICKNESS OF SATURATED AQUIFER ZONE =  49.64 FEET  -
ESTIMATED POROSITY OF GRAVEL PACK = 0.35              FALLING-HEAD INDEX =  0 ("1" IF FALLING,"0" IF RISING)


                    NUMBER OF HEAD-TIME DATA POINTS =   131


                             TIME              HEAD
                           (SECOND)           (FEET)

                             13.00             0.870
                             14.00             0.870
                             15.00             0.850
                             16.00             0.850
                             17.00             0.850
                             18.00             0.850
                             19.00             0.850
                             20.00             0.850
                             25.00             0.840
                             30.00             0.840
                             35.00             0.830
                             40.00             0.840
                             45.00             0.830
                             50.00             0.830
                             55.00             0.830
                             60.00             0.830
                             65.00             0.830
                             70.00             0.810
                             75.00             0.810
                             80.00             0.810
                             85.00             0.810
                             90.00             0.810
                             95.00             0.810
                            100.00             0.810
                            105.00             0.800
```

| | |
|---|---|
| 110.00 | 0.800 |
| 115.00 | 0.800 |
| 120.00 | 0.800 |
| 150.00 | 0.790 |
| 180.00 | 0.790 |
| 210.00 | 0.770 |
| 240.00 | 0.770 |
| 270.00 | 0.760 |
| 300.00 | 0.760 |
| 330.00 | 0.750 |

| | |
|---|---|
| 360.00 | 0.750 |
| 390.00 | 0.730 |
| 420.00 | 0.730 |
| 450.00 | 0.720 |
| 480.00 | 0.720 |
| 510.00 | 0.720 |
| 540.00 | 0.710 |
| 570.00 | 0.710 |
| 600.00 | 0.690 |
| 720.00 | 0.690 |
| 840.00 | 0.670 |
| 960.00 | 0.650 |
| 1080.00 | 0.640 |
| 1200.00 | 0.610 |
| 1320.00 | 0.600 |
| 1440.00 | 0.590 |
| 1560.00 | 0.570 |
| 1680.00 | 0.560 |
| 1800.00 | 0.550 |
| 1920.00 | 0.530 |
| 2040.00 | 0.520 |
| 2160.00 | 0.490 |
| 2280.00 | 0.510 |
| 2400.00 | 0.490 |
| 2520.00 | 0.510 |
| 2640.00 | 0.490 |
| 2760.00 | 0.480 |
| 2880.00 | 0.450 |
| 3000.00 | 0.470 |
| 3120.00 | 0.450 |
| 3240.00 | 0.440 |
| 3360.00 | 0.440 |
| 3480.00 | 0.440 |
| 3600.00 | 0.440 |
| 3720.00 | 0.430 |
| 3840.00 | 0.400 |
| 3960.00 | 0.390 |
| 4030.00 | 0.390 |
| 4200.00 | 0.400 |
| 4320.00 | 0.390 |
| 4440.00 | 0.370 |
| 4560.00 | 0.390 |
| 4680.00 | 0.390 |
| 4800.00 | 0.360 |
| 4920.00 | 0.330 |
| 5040.00 | 0.330 |
| 5160.00 | 0.330 |
| 5280.00 | 0.330 |
| 5400.00 | 0.330 |
| 5520.00 | 0.330 |
| 5640.00 | 0.350 |
| 5760.00 | 0.330 |
| 5880.00 | 0.330 |
| 6000.00 | 0.330 |
| 6600.00 | 0.310 |
| 7200.00 | 0.290 |
| 7800.00 | 0.270 |
| 8400.00 | 0.240 |
| 9000.00 | 0.240 |
| 9600.00 | 0.210 |

```
10200.00          0.210
10800.00          0.200
11400.00          0.170
12000.00          0.170
12600.00          0.170
13200.00          0.150
13800.00          0.150
14400.00          0.130
15000.00          0.130
15600.00          0.120
16200.00          0.110
16800.00          0.080
17400.00          0.090
18000.00          0.090
18600.00          0.090
19200.00          0.070
19800.00          0.070
20400.00          0.050
21000.00          0.050
21600.00          0.050
22200.00          0.070
22800.00          0.050
23400.00          0.050
24000.00          0.040
24600.00          0.040
25200.00          0.040
25800.00          0.040
26400.00          0.030
27000.00          0.030
27600.00          0.030
28200.00          0.030
29800.00          0.030
29400.00          0.010
30000.00          0.010
30600.00          0.010
31200.00          0.010


  HO SPECIFIED BY USER


  COMPUTED VALUE FOR HO (FEET)    1.5600
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```
                         METHOD OF COOPER, BREDEHOEFT AND PAPADOPULOS

                                      COMPUTED RESULTS:


                              COMPUTED VALUE OF HO =   1.56 FEET

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

   ALPHA      STORATIVITY     MEAN        MEAN       MINIMUM     MAXIMUM      RATIO OF     ROOT MEAN   DIFFERENCE
                            TRANSMIS-    PERMEA-      TRANS.      TRANS.    "T" RANGE TO   SQUARE OF     IN RMS
                             SIVITY      BILITY                                 TBAR          TIME
                                                                                           DEVIATIONS

1.000E-01     1.000E-01    1.833E-05   1.222E-06   1.784E-06   1.682E-04     9.075055      9151.57        0.00

1.000E-02     1.000E-02    3.746E-05   2.497E-06   2.548E-06   3.627E-04     9.613156     10242.75    -1091.18

1.000E-03     1.000E-03    5.714E-05   3.809E-06   3.127E-06   5.653E-04     9.838675     10635.35     -392.60

1.000E-04     1.000E-04    7.653E-05   5.102E-06   2.946E-06   7.630E-04     9.931352     10824.86     -189.51

1.000E-05     1.000E-05    9.575E-05   6.383E-06   3.189E-06   9.600E-04     9.992324     10939.04     -114.17

1.000E-06     1.000E-06    1.145E-04   7.635E-06   3.770E-06   1.153E-03    10.032151     11003.65      -64.62

1.000E-07     1.000E-07    1.332E-04   9.882E-06   4.495E-06   1.343E-03    10.049019     11039.59      -35.94

1.000E-08     1.000E-08    1.518E-04   1.012E-05   5.320E-06   1.533E-03    10.067568     11075.66      -36.07

1.000E-09     1.000E-09    1.702E-04   1.135E-05   6.086E-06   1.721E-03    10.078925     11093.90      -18.25

1.000E-10     1.000E-10    1.886E-04   1.257E-05   6.405E-06   1.909E-03    10.089270     11111.69      -17.78



                                 MANUAL CURVE MATCH RESULTS:


                          NO ACCEPTABLE MATCH, UNCONFINED CONDITIONS IMPLIED
```

```
        METHOD OF BOUWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:


 PERMEABILITY =  3.51E-05 FT/SECOND      =  1.07E-03 CM/SECOND

 TRANSMISSIVITY =  1.74E-03 FT**2/SECOND



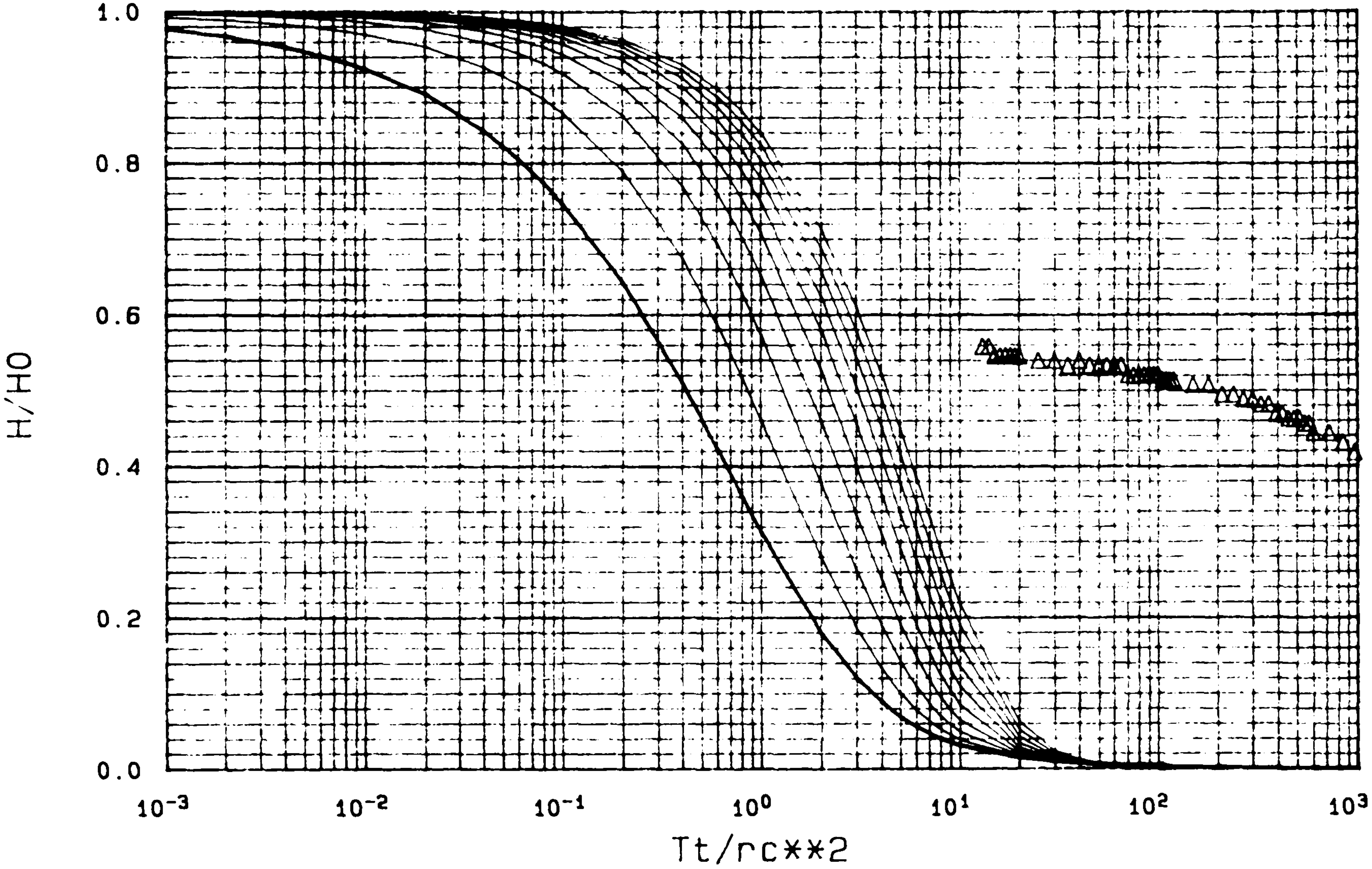

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:


 PERMEABILITY =  4.74E-05 FT/SECOND      =  1.44E-03 CM/SECOND

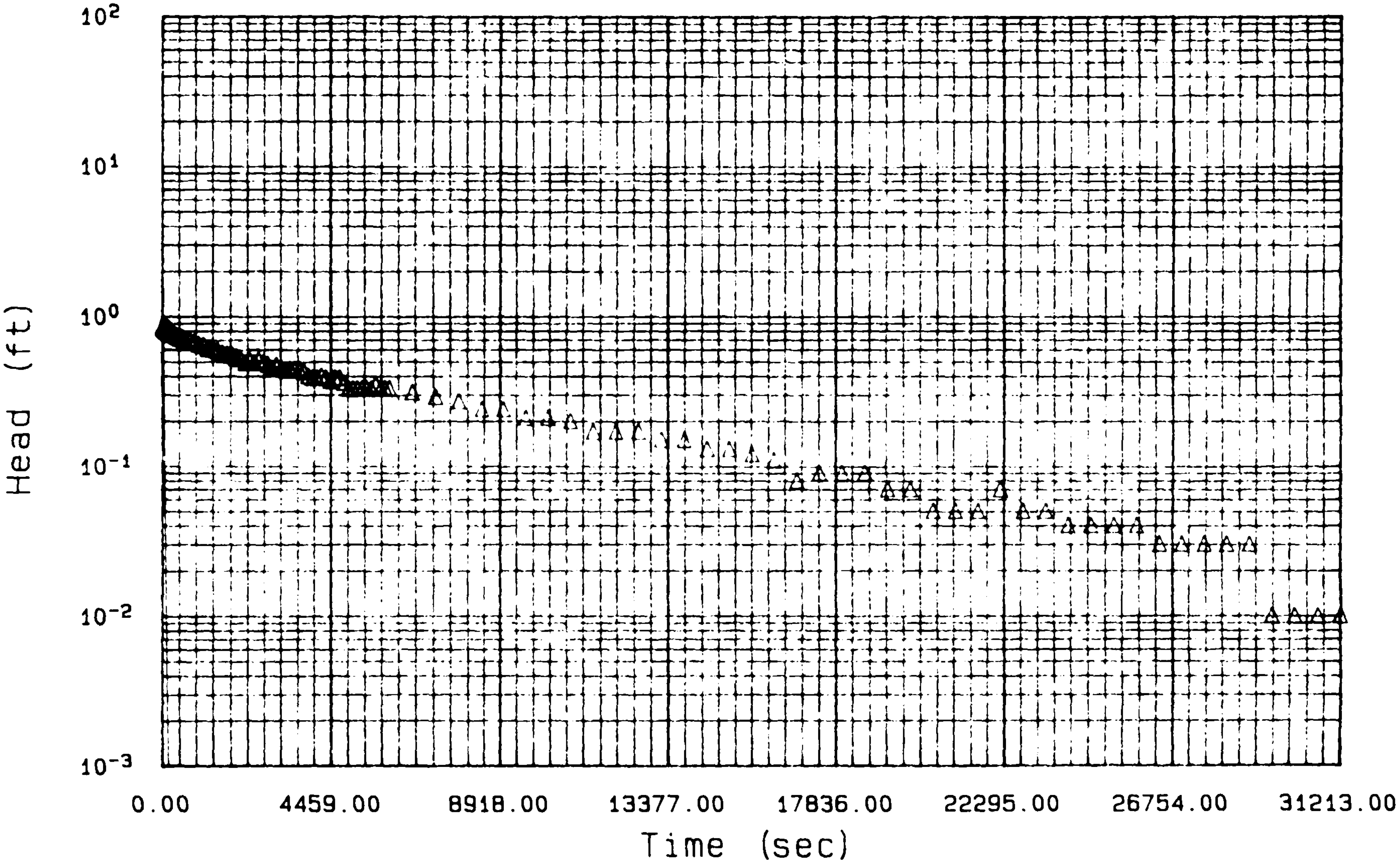
 TRANSMISSIVITY =  2.35E-03 FT**2/SECOND
```

## MC3C-R

# Slug Test Analysis
# Type Curves For Instantaneous Charge



# 89c7583-1 Dupont McCarl Site
# Well mc3c-r Date 08/09/90



# ATTACHMENT 2

**MEMORANDUM**

To: Whomever From: B.K. Rauch

Date: 10 August 1990

Subject: 89C7583-1 DuPont Slug Tests, Ft. Madison, IA

-------------------------------------------------------

This diskette contains three types of data files generated by the Hermit SE-1000B Environmental Data logger, used to record water levels during slug tests conducted the week of 6-10 August 1990.

Header (.HDR) Files

.HDR files contain two columns of data, they are:

- Elapsed Time (in minutes) and
- Value, which is the water level, expressed in feet above the transducer probe.

A value of 12.42, for example, means that the transducer probe was submerged to a depth of 12.42 feet below the top of water at the time of that reading.

.HDR files also contain a header, generated by the Hermit, containing information about the instrument settings and test start and stop times. To that, we have added some additional information about the type of test being conducted (rising or falling head), well number and the type of slug that was used.

Print (.PRN) Files

.PRN files are nondelimited ASCII numeric data files with no headers. Column one contains Elapsed Times (in minutes). Column two contains the values recorded by the Hermit, again in feet of water above the transducer probe.

.PRN files are suitable for direct importation to Lotus 123 or Harvard Graphics for graphing or data transformation.

Backup (.BAK) files

.BAK files for each .HDR file were created by QEdit at the time that the original .HDR files were edited. .BAK files contain the original, unedited header file created by the Hermit SE-1000B at the time of downloading.

```
89C7583-1: DUPONT
FORT MADISON, IOWA
WELL MC-4C
FALLING HEAD TEST
BY: BAH & BKR
USING 36"x 1.25" SLUG
--------------------
       SE1000B
  Environmental Logger
     08/09  10:47

  Unit# 00323  Test# 0

 INPUT 1:  Level (F)

 Reference          0.00
 Scale factor      10.06
 Offset             0.00

 Step# 0   08/08  21:01

 Elapsed Time     Value
 ------------   ---------
    0.0000        20.63
    0.0033        20.63
    0.0066        20.64
    0.0099        20.64
    0.0133        22.19
    0.0166        22.53
    0.0200        23.10
    0.0233        23.62
    0.0266        22.96
    0.0300        21.86
    0.0333        21.08
    0.0500        21.45
    0.0666        21.63
    0.0833        21.34
    0.1000        21.58
    0.1166        21.39
    0.1333        21.50
    0.1500        21.42
    0.1666        21.46
    0.1833        21.42
    0.2000        21.43
    0.2166        21.42
    0.2333        21.42
    0.2500        21.41
    0.2666        21.41
    0.2833        21.41
    0.3000        21.40
    0.3166        21.40
    0.3333        21.40
    0.4167        21.39
    0.5000        21.38
```

| | |
|---|---|
| 0.5833 | 21.38 |

| | |
|---|---|
| 0.6667 | 21.37 |
| 0.7500 | 21.37 |
| 0.8333 | 21.36 |
| 0.9167 | 21.36 |
| 1.0000 | 21.36 |
| 1.0833 | 21.35 |
| 1.1667 | 21.35 |
| 1.2500 | 21.34 |
| 1.3333 | 21.36 |
| 1.4166 | 21.34 |
| 1.5000 | 21.33 |
| 1.5833 | 21.33 |
| 1.6667 | 21.33 |
| 1.7500 | 21.33 |
| 1.8333 | 21.33 |
| 1.9167 | 21.32 |
| 2.0000 | 21.32 |
| 2.5000 | 21.31 |
| 3.0000 | 21.30 |
| 3.5000 | 21.30 |
| 4.0000 | 21.30 |
| 4.5000 | 21.29 |
| 5.0000 | 21.29 |
| 5.5000 | 21.28 |
| 6.0000 | 21.28 |
| 6.5000 | 21.28 |
| 7.0000 | 21.27 |
| 7.5000 | 21.27 |
| 8.0000 | 21.27 |
| 8.5000 | 21.27 |
| 9.0000 | 21.26 |
| 9.5000 | 21.26 |
| 10.0000 | 21.26 |
| 12.0000 | 21.25 |
| 14.0000 | 21.25 |
| 16.0000 | 21.24 |
| 18.0000 | 21.24 |
| 20.0000 | 21.23 |
| 22.0000 | 21.23 |
| 24.0000 | 21.23 |
| 26.0000 | 21.22 |
| 28.0000 | 21.22 |
| 30.0000 | 21.22 |
| 32.0000 | 21.21 |
| 34.0000 | 21.21 |
| 36.0000 | 21.21 |
| 38.0000 | 21.21 |
| 40.0000 | 21.21 |
| 42.0000 | 21.20 |
| 44.0000 | 21.20 |
| 46.0000 | 21.20 |
| 48.0000 | 21.20 |
| 50.0000 | 21.19 |
| 52.0000 | 21.19 |

| | |
|---|---|
| 56.0000 | 21.19 |
| 58.0000 | 21.19 |
| 60.0000 | 21.19 |
| 62.0000 | 21.19 |
| 64.0000 | 21.19 |
| 66.0000 | 21.18 |
| 68.0000 | 21.18 |
| 70.0000 | 21.18 |
| 72.0000 | 21.18 |
| 74.0000 | 21.18 |
| 76.0000 | 21.18 |
| 78.0000 | 21.18 |
| 80.0000 | 21.18 |
| 82.0000 | 21.17 |
| 84.0000 | 21.17 |
| 86.0000 | 21.17 |
| 88.0000 | 21.17 |
| 90.0000 | 21.17 |
| 92.0000 | 21.17 |
| 94.0000 | 21.17 |
| 96.0000 | 21.17 |
| 98.0000 | 21.17 |
| 100.000 | 21.17 |
| 110.000 | 21.16 |
| 120.000 | 21.16 |
| 130.000 | 21.16 |
| 140.000 | 21.16 |
| 150.000 | 21.15 |
| 160.000 | 21.15 |
| 170.000 | 21.15 |
| 180.000 | 21.14 |
| 190.000 | 21.14 |
| 200.000 | 21.14 |
| 210.000 | 21.14 |
| 220.000 | 21.14 |
| 230.000 | 21.13 |
| 240.000 | 21.13 |
| 250.000 | 21.13 |
| 260.000 | 21.13 |
| 270.000 | 21.13 |
| 280.000 | 21.13 |
| 290.000 | 21.13 |
| 300.000 | 21.13 |
| 310.000 | 21.13 |
| 320.000 | 21.12 |
| 330.000 | 21.12 |
| 340.000 | 21.12 |
| 350.000 | 21.12 |
| 360.000 | 21.12 |
| 370.000 | 21.12 |
| 380.000 | 21.12 |
| 390.000 | 21.12 |
| 400.000 | 21.12 |
| 410.000 | 21.12 |

|  |  |
|---|---|
| 430.000 | 21.12 |
| 440.000 | 21.12 |
| 450.000 | 21.12 |
| 460.000 | 21.12 |
| 470.000 | 21.12 |
| 480.000 | 21.12 |
| 490.000 | 21.12 |
| 500.000 | 21.11 |
| 510.000 | 21.11 |
| 520.000 | 21.11 |
| 530.000 | 21.11 |
| 540.000 | 21.11 |
| 550.000 | 21.11 |
| 560.000 | 21.11 |
| 570.000 | 21.11 |
| 580.000 | 21.11 |
| 590.000 | 21.11 |
| 600.000 | 21.11 |
| 610.000 | 21.11 |
| 620.000 | 21.11 |
| 630.000 | 21.11 |
| 640.000 | 21.11 |
| 650.000 | 21.11 |
| 660.000 | 21.11 |
| 670.000 | 21.10 |
| 680.000 | 21.10 |
| 690.000 | 21.10 |
| 700.000 | 21.10 |
| 710.000 | 21.10 |
| 720.000 | 21.10 |
| 730.000 | 21.10 |
| 740.000 | 21.10 |
| 750.000 | 21.10 |
| 760.000 | 21.10 |
| 770.000 | 21.10 |
| 780.000 | 21.10 |
| 790.000 | 21.10 |
| 800.000 | 21.10 |
| 810.000 | 21.10 |
| 820.000 | 21.10 |

MC4B-2

```
MC4-R.HDR              Monday, August 13, 1990 3:33 pm             Page 1


89C7583-1 : DUPONT
MC-4 Rising Head
36 inch slug
BAH & BKR

         SE1000B
  Environmental Logger
       08/08  20:44

  Unit# 00323  Test# 0

 INPUT 1:  Level (F)

 Reference          0.00
 Scale factor      10.06
 Offset             0.00

 Step# 0   08/08  10:48

 Elapsed Time    Value
 ------------  ---------
    0.0000       13.09
    0.0033       12.42
    0.0066       12.59
    0.0099       13.44
    0.0133       15.66
    0.0166       16.19
    0.0200       14.60
    0.0233       13.45
    0.0266       12.90
    0.0300       13.78
    0.0333       14.89
    0.0500       13.90
    0.0666       13.93
    0.0833       14.32
    0.1000       14.48
    0.1166       14.40
    0.1333       14.32
    0.1500       14.31
    0.1666       14.35
    0.1833       14.36
    0.2000       14.36
    0.2166       14.35
    0.2333       14.35
    0.2500       14.36
    0.2666       14.36
    0.2833       14.36
    0.3000       14.36
    0.3166       14.36
    0.3333       14.36
    0.4167       14.37
    0.5000       14.37
    0.5833       14.38
    0.6667       14.37
```

| | |
|---|---|
| 0.8333 | 14.38 |
| 0.9167 | 14.38 |
| 1.0000 | 14.38 |
| 1.0833 | 14.38 |
| 1.1667 | 14.39 |
| 1.2500 | 14.39 |
| 1.3333 | 14.39 |
| 1.4166 | 14.39 |
| 1.5000 | 14.39 |
| 1.5833 | 14.39 |
| 1.6667 | 14.39 |
| 1.7500 | 14.40 |
| 1.8333 | 14.40 |
| 1.9167 | 14.40 |
| 2.0000 | 14.40 |
| 2.5000 | 14.41 |
| 3.0000 | 14.41 |
| 3.5000 | 14.42 |
| 4.0000 | 14.42 |
| 4.5000 | 14.43 |
| 5.0000 | 14.43 |
| 5.5000 | 14.44 |
| 6.0000 | 14.44 |
| 6.5000 | 14.45 |
| 7.0000 | 14.45 |
| 7.5000 | 14.46 |
| 8.0000 | 14.46 |
| 8.5000 | 14.46 |
| 9.0000 | 14.47 |
| 9.5000 | 14.47 |
| 10.0000 | 14.48 |
| 12.0000 | 14.48 |
| 14.0000 | 14.50 |
| 16.0000 | 14.51 |
| 18.0000 | 14.52 |
| 20.0000 | 14.54 |
| 22.0000 | 14.55 |
| 24.0000 | 14.56 |
| 26.0000 | 14.57 |
| 28.0000 | 14.58 |
| 30.0000 | 14.59 |
| 32.0000 | 14.60 |
| 34.0000 | 14.61 |
| 36.0000 | 14.63 |
| 38.0000 | 14.62 |
| 40.0000 | 14.63 |
| 42.0000 | 14.62 |
| 44.0000 | 14.63 |
| 46.0000 | 14.64 |
| 48.0000 | 14.66 |
| 50.0000 | 14.65 |
| 52.0000 | 14.66 |
| 54.0000 | 14.67 |
| 56.0000 | 14.67 |

| | |
|---|---|
| 60.0000 | 14.67 |
| 62.0000 | 14.68 |
| 64.0000 | 14.70 |
| 66.0000 | 14.71 |
| 68.0000 | 14.71 |
| 70.0000 | 14.70 |
| 72.0000 | 14.71 |
| 74.0000 | 14.72 |
| 76.0000 | 14.71 |
| 78.0000 | 14.71 |
| 80.0000 | 14.73 |
| 82.0000 | 14.75 |
| 84.0000 | 14.75 |
| 86.0000 | 14.75 |
| 88.0000 | 14.75 |
| 90.0000 | 14.75 |
| 92.0000 | 14.75 |
| 94.0000 | 14.74 |
| 96.0000 | 14.75 |
| 98.0000 | 14.75 |
| 100.000 | 14.75 |
| 110.000 | 14.77 |
| 120.000 | 14.78 |
| 130.000 | 14.80 |
| 140.000 | 14.82 |
| 150.000 | 14.82 |
| 160.000 | 14.84 |
| 170.000 | 14.84 |
| 180.000 | 14.85 |
| 190.000 | 14.87 |
| 200.000 | 14.87 |
| 210.000 | 14.87 |
| 220.000 | 14.89 |
| 230.000 | 14.89 |
| 240.000 | 14.90 |
| 250.000 | 14.90 |
| 260.000 | 14.91 |
| 270.000 | 14.92 |
| 280.000 | 14.94 |
| 290.000 | 14.93 |
| 300.000 | 14.93 |
| 310.000 | 14.93 |
| 320.000 | 14.95 |
| 330.000 | 14.95 |
| 340.000 | 14.96 |
| 350.000 | 14.96 |
| 360.000 | 14.96 |
| 370.000 | 14.95 |
| 380.000 | 14.96 |
| 390.000 | 14.96 |
| 400.000 | 14.97 |
| 410.000 | 14.97 |
| 420.000 | 14.97 |
| 430.000 | 14.97 |

```
450.000       14.98
460.000       14.98
470.000       14.98
480.000       14.98
490.000       14.99
500.000       14.99
510.000       14.99
520.000       14.99
530.000       15.00
540.000       15.00
550.000       15.01
560.000       15.00
570.000       15.00
580.000       15.00
590.000       15.00
```

```
89C7583-1: DUPONT
FORT MADISON, IOWA
WELL MC-3
RISING HEAD TEST
BY: BAH & BKR
USING 48"x 1.25" SLUG
---------------------
       SE1000B
  Environmental Logger
     08/09  03:26

  Unit# 01017  Test# 0

 INPUT 1:  Level (F)

 Reference         0.00
 Scale factor     10.04
 Offset            0.00

 Step# 0   08/08  15:31

 Elapsed Time     Value
 ------------   ---------
     0.0000       13.47
     0.0033       12.66
     0.0066       11.81
     0.0099        8.25
     0.0133        8.15
     0.0166        8.61
     0.0200       15.23
     0.0233       10.83
     0.0266        9.69
     0.0300       11.78
     0.0333       11.62
     0.0500       11.15
     0.0666       11.17
     0.0833       11.21
     0.1000       11.24
     0.1166       11.25
     0.1333       11.26
     0.1500       11.27
     0.1666       11.27
     0.1833       11.28
     0.2000       11.29
     0.2166       11.30
     0.2333       11.30
     0.2500       11.31
     0.2666       11.32
     0.2833       11.33
     0.3000       11.33
     0.3166       11.34
     0.3333       11.35
     0.4167       11.38
     0.5000       11.41
```

| | |
|---|---|
| 0.5833 | 11.43 |

| | |
|---|---|
| 0.6667 | 11.46 |
| 0.7500 | 11.48 |
| 0.8333 | 11.51 |
| 0.9167 | 11.55 |
| 1.0000 | 11.55 |
| 1.0833 | 11.58 |
| 1.1667 | 11.59 |
| 1.2500 | 11.61 |
| 1.3333 | 11.63 |
| 1.4166 | 11.65 |
| 1.5000 | 11.67 |
| 1.5833 | 11.69 |
| 1.6667 | 11.70 |
| 1.7500 | 11.72 |
| 1.8333 | 11.74 |
| 1.9167 | 11.75 |
| 2.0000 | 11.76 |
| 2.5000 | 11.83 |
| 3.0000 | 11.89 |
| 3.5000 | 11.93 |
| 4.0000 | 11.96 |
| 4.5000 | 11.99 |
| 5.0000 | 12.01 |
| 5.5000 | 12.03 |
| 6.0000 | 12.04 |
| 6.5000 | 12.06 |
| 7.0000 | 12.07 |
| 7.5000 | 12.08 |
| 8.0000 | 12.09 |
| 8.5000 | 12.10 |
| 9.0000 | 12.10 |
| 9.5000 | 12.11 |
| 10.0000 | 12.12 |
| 12.0000 | 12.13 |
| 14.0000 | 12.15 |
| 16.0000 | 12.15 |
| 18.0000 | 12.15 |
| 20.0000 | 12.16 |
| 22.0000 | 12.18 |
| 24.0000 | 12.18 |
| 26.0000 | 12.19 |
| 28.0000 | 12.19 |
| 30.0000 | 12.19 |
| 32.0000 | 12.19 |
| 34.0000 | 12.20 |
| 36.0000 | 12.20 |
| 38.0000 | 12.21 |
| 40.0000 | 12.21 |
| 42.0000 | 12.22 |
| 44.0000 | 12.22 |
| 46.0000 | 12.22 |
| 48.0000 | 12.22 |
| 50.0000 | 12.23 |
| 52.0000 | 12.23 |

| | |
|---|---|
| 54.0000 | 12.23 |

```
 56.0000        12.23
 58.0000        12.23
 60.0000        12.24
 62.0000        12.24
 64.0000        12.24
 66.0000        12.24
 68.0000        12.24
 70.0000        12.24
 72.0000        12.24
 74.0000        12.25
 76.0000        12.25
 78.0000        12.25
 80.0000        12.25
 82.0000        12.25
 84.0000        12.25
 86.0000        12.25
 88.0000        12.25
 90.0000        12.25
 92.0000        12.25
 94.0000        12.25
 96.0000        12.25
 98.0000        12.25
 100.000        12.26
 110.000        12.26
 120.000        12.26
 130.000        12.27
 140.000        12.27
 150.000        12.27
 160.000        12.27
 170.000        12.28
 180.000        12.28
 190.000        12.28
 200.000        12.28
 210.000        12.29
 220.000        12.29
 230.000        12.29
 240.000        12.29
 250.000        12.30
 260.000        12.30
 270.000        12.30
 280.000        12.30
 290.000        12.30
 300.000        12.30
 310.000        12.30
 320.000        12.30
 330.000        12.31
 340.000        12.31
 350.000        12.31
 360.000        12.31
 370.000        12.31
 380.000        12.31
 390.000        12.31
 400.000        12.31
 410.000        12.32
```

| | |
|---|---|
| 420.000 | 12.32 |

| | |
|---|---|
| 430.000 | 12.32 |
| 440.000 | 12.32 |
| 450.000 | 12.32 |
| 460.000 | 12.32 |
| 470.000 | 12.32 |
| 480.000 | 12.32 |
| 490.000 | 12.32 |
| 500.000 | 12.32 |
| 510.000 | 12.32 |
| 520.000 | 12.32 |
| 530.000 | 12.32 |
| 540.000 | 12.33 |
| 550.000 | 12.33 |
| 560.000 | 12.33 |
| 570.000 | 12.33 |
| 580.000 | 12.33 |
| 590.000 | 12.33 |
| 600.000 | 12.33 |
| 610.000 | 12.33 |
| 620.000 | 12.34 |
| 630.000 | 12.34 |
| 640.000 | 12.34 |
| 650.000 | 12.34 |
| 660.000 | 12.34 |
| 670.000 | 12.34 |
| 680.000 | 12.34 |
| 690.000 | 12.34 |
| 700.000 | 12.34 |

```
89C7583-1: DUPONT
FORT MADISON, IOWA
WELL MC-3C
RISING HEAD TEST
BY: BAH & BKR
USING 48"x 1.25" SLUG
---------------------
       SE1000B
  Environmental Logger
     08/09  11:18

  Unit# 01017  Test# 0

INPUT 1:  Level (F)

Reference         0.00
Scale factor     10.04
Offset            0.00

Step# 0   08/09  10:36

Elapsed Time    Value
------------  ---------
   0.0000        16.19
   0.0033        16.09
   0.0066        16.59
   0.0099        16.42
   0.0133        16.57
   0.0166        14.46
   0.0200        15.58
   0.0233        15.16
   0.0266        13.48
   0.0300        14.07
   0.0333        16.50
   0.0500        14.92
   0.0666        15.10
   0.0833        15.23
   0.1000        15.33
   0.1166        15.42
   0.1333        15.51
   0.1500        15.58
   0.1666        15.63
   0.1833        15.68
   0.2000        15.73
   0.2166        15.77
   0.2333        15.81
   0.2500        15.84
   0.2666        15.87
   0.2833        15.89
   0.3000        15.92
   0.3166        15.94
   0.3333        15.95
   0.4167        16.03
   0.5000        16.07
```

| | |
|---|---|
| 0.5833 | 16.10 |

| | |
|---|---|
| 0.6667 | 16.12 |
| 0.7500 | 16.14 |
| 0.8333 | 16.15 |
| 0.9167 | 16.16 |
| 1.0000 | 16.16 |
| 1.0833 | 16.17 |
| 1.1667 | 16.18 |
| 1.2500 | 16.18 |
| 1.3333 | 16.19 |
| 1.4166 | 16.19 |
| 1.5000 | 16.19 |
| 1.5833 | 16.20 |
| 1.6667 | 16.20 |
| 1.7500 | 16.21 |
| 1.8333 | 16.21 |
| 1.9167 | 16.21 |
| 2.0000 | 16.22 |
| 2.5000 | 16.24 |
| 3.0000 | 16.25 |
| 3.5000 | 16.26 |
| 4.0000 | 16.27 |
| 4.5000 | 16.28 |
| 5.0000 | 16.29 |
| 5.5000 | 16.29 |
| 6.0000 | 16.30 |
| 6.5000 | 16.30 |
| 7.0000 | 16.31 |
| 7.5000 | 16.31 |
| 8.0000 | 16.32 |
| 8.5000 | 16.32 |
| 9.0000 | 16.32 |
| 9.5000 | 16.32 |
| 10.0000 | 16.32 |
| 12.0000 | 16.33 |
| 14.0000 | 16.34 |
| 16.0000 | 16.33 |
| 18.0000 | 16.34 |
| 20.0000 | 16.35 |
| 22.0000 | 16.35 |
| 24.0000 | 16.35 |
| 26.0000 | 16.35 |
| 28.0000 | 16.35 |

```
98C7583-1: DUPONT
FORT MADISON, IOWA
WELL MC-3C
FALLING HEAD TEST
BY: BAH & BKR
USING 48"x 1.25" SLUG
----------------------
       SE1000B
  Environmental Logger
      08/09  11:56

  Unit# 01017  Test# 0

 INPUT 1:  Level (F)

 Reference         0.00
 Scale factor     10.04
 Offset            0.00

 Step# 0   08/09  11:30

 Elapsed Time    Value
 ------------  ---------
    0.0000       17.66
    0.0033       18.70
    0.0066       18.88
    0.0099       18.52
    0.0133       18.11
    0.0166       18.34
    0.0200       18.28
    0.0233       18.20
    0.0266       18.15
    0.0300       18.15
    0.0333       18.11
    0.0500       17.31
    0.0666       17.28
    0.0833       17.21
    0.1000       17.30
    0.1166       17.08
    0.1333       17.03
    0.1500       16.98
    0.1666       16.94
    0.1833       16.90
    0.2000       16.87
    0.2166       16.83
    0.2333       16.81
    0.2500       16.78
    0.2666       16.76
    0.2833       16.74
    0.3000       16.73
    0.3166       16.72
    0.3333       16.72
    0.4167       16.64
    0.5000       16.60
```

| | |
|---|---|
| 0.5833 | 16.57 |

| | |
|---|---|
| 0.6667 | 16.56 |
| 0.7500 | 16.55 |
| 0.8333 | 16.54 |
| 0.9167 | 16.53 |
| 1.0000 | 16.52 |
| 1.0833 | 16.51 |
| 1.1667 | 16.51 |
| 1.2500 | 16.51 |
| 1.3333 | 16.50 |
| 1.4166 | 16.50 |
| 1.5000 | 16.50 |
| 1.5833 | 16.49 |
| 1.6667 | 16.49 |
| 1.7500 | 16.48 |
| 1.8333 | 16.48 |
| 1.9167 | 16.48 |
| 2.0000 | 16.48 |
| 2.5000 | 16.46 |
| 3.0000 | 16.45 |
| 3.5000 | 16.44 |
| 4.0000 | 16.42 |
| 4.5000 | 16.42 |
| 5.0000 | 16.41 |
| 5.5000 | 16.40 |
| 6.0000 | 16.40 |
| 6.5000 | 16.39 |
| 7.0000 | 16.39 |
| 7.5000 | 16.38 |
| 8.0000 | 16.38 |
| 8.5000 | 16.38 |
| 9.0000 | 16.38 |
| 9.5000 | 16.37 |
| 10.0000 | 16.37 |
| 12.0000 | 16.37 |
| 14.0000 | 16.37 |
| 16.0000 | 16.36 |
| 18.0000 | 16.36 |

```
89C7583-1: DUPONT
FORT MADISON, IOWA
WELL MC-4C
RISING HEAD TEST
BY: BAH & BKR
USING [redacted]"x 1.25" SLUG
      3'
-----------------------
        SE1000B
  Environmental Logger
      08/09  18:14

  Unit# 00323  Test# 0

 INPUT 1:  Level (F)

 Reference         0.00
 Scale factor     10.06
 Offset            0.00

 Step# 0   08/09  11:07

 Elapsed Time    Value
 ------------   ---------
    0.0000        18.67
    0.0033        18.31
    0.0066        19.16
    0.0099        18.47
    0.0133        19.19
    0.0166        19.99
    0.0200        20.69
    0.0233        20.97
    0.0266        20.85
    0.0300        20.45
    0.0333        19.99
    0.0500        20.12
    0.0666        20.12
    0.0833        20.15
    0.1000        20.18
    0.1166        20.19
    0.1333        20.20
    0.1500        20.21
    0.1666        20.22
    0.1833        20.23
    0.2000        20.24
    0.2166        20.24
    0.2333        20.24
    0.2500        20.25
    0.2666        20.25
    0.2833        20.25
    0.3000        20.25
    0.3166        20.23
    0.3333        20.24
    0.4167        20.22
    0.5000        20.27
```

| | |
|---|---|
| 0.5833 | 20.28 |

| | |
|---|---|
| 0.6667 | 20.29 |
| 0.7500 | 20.30 |
| 0.8333 | 20.31 |
| 0.9167 | 20.31 |
| 1.0000 | 20.32 |
| 1.0833 | 20.32 |
| 1.1667 | 20.33 |
| 1.2500 | 20.33 |
| 1.3333 | 20.33 |
| 1.4166 | 20.34 |
| 1.5000 | 20.34 |
| 1.5833 | 20.34 |
| 1.6667 | 20.35 |
| 1.7500 | 20.35 |
| 1.8333 | 20.35 |
| 1.9167 | 20.35 |
| 2.0000 | 20.36 |
| 2.5000 | 20.37 |
| 3.0000 | 20.38 |
| 3.5000 | 20.39 |
| 4.0000 | 20.39 |
| 4.5000 | 20.39 |
| 5.0000 | 20.40 |
| 5.5000 | 20.40 |
| 6.0000 | 20.41 |
| 6.5000 | 20.41 |
| 7.0000 | 20.41 |
| 7.5000 | 20.41 |
| 8.0000 | 20.41 |
| 8.5000 | 20.42 |
| 9.0000 | 20.42 |
| 9.5000 | 20.42 |
| 10.0000 | 20.42 |
| 12.0000 | 20.42 |
| 14.0000 | 20.43 |
| 16.0000 | 20.43 |
| 18.0000 | 20.43 |
| 20.0000 | 20.44 |
| 22.0000 | 20.44 |
| 24.0000 | 20.44 |
| 26.0000 | 20.44 |
| 28.0000 | 20.45 |
| 30.0000 | 20.45 |
| 32.0000 | 20.45 |
| 34.0000 | 20.45 |
| 36.0000 | 20.46 |
| 38.0000 | 20.46 |
| 40.0000 | 20.46 |
| 42.0000 | 20.47 |
| 44.0000 | 20.47 |
| 46.0000 | 20.47 |
| 48.0000 | 20.47 |
| 50.0000 | 20.47 |
| 52.0000 | 20.48 |

| | |
|---|---|
| 54.0000 | 20.48 |

```
 56.0000      20.48
 58.0000      20.48
 60.0000      20.48
 62.0000      20.49
 64.0000      20.49
 66.0000      20.49
 68.0000      20.49
 70.0000      20.49
 72.0000      20.49
 74.0000      20.50
 76.0000      20.50
 78.0000      20.50
 80.0000      20.50
 82.0000      20.50
 84.0000      20.50
 86.0000      20.50
 88.0000      20.50
 90.0000      20.50
 92.0000      20.50
 94.0000      20.51
 96.0000      20.51
 98.0000      20.51
 100.000      20.51
 110.000      20.51
 120.000      20.52
 130.000      20.52
 140.000      20.52
 150.000      20.53
 160.000      20.53
 170.000      20.53
 180.000      20.54
 190.000      20.54
 200.000      20.54
 210.000      20.55
 220.000      20.55
 230.000      20.56
 240.000      20.56
 250.000      20.56
 260.000      20.56
 270.000      20.56
 280.000      20.57
 290.000      20.57
 300.000      20.57
 310.000      20.57
 320.000      20.58
 330.000      20.58
 340.000      20.58
 350.000      20.58
 360.000      20.59
 370.000      20.59
 380.000      20.59
 390.000      20.59
 400.000      20.60
 410.000      20.60
```

| | |
|---|---|
| 420.000 | 20.60 |

```
89C7583-1: DUPONT
Well MC-6C
Falling Head Test
36"x 1.25" Slug
Test by BAH & BKR
-----------------
        SE1000B
  Environmental Logger
      08/09  21:56

  Unit# 01017  Test# 0

 INPUT 1:  Level (F)

 Reference          0.00
 Scale factor      10.04
 Offset             0.00

 Step# 0   08/09  12:12

 Elapsed Time     Value
 ------------   ---------
    0.0000        21.46
    0.0033        21.61
    0.0066        21.74
    0.0099        21.74
    0.0133        21.63
    0.0166        21.60
    0.0200        21.46
    0.0233        21.09
    0.0266        20.84
    0.0300        20.80
    0.0333        20.82
    0.0500        21.37
    0.0666        20.99
    0.0833        21.24
    0.1000        21.08
    0.1166        21.18
    0.1333        21.12
    0.1500        21.16
    0.1666        21.13
    0.1833        21.14
    0.2000        21.14
    0.2166        21.12
    0.2333        21.14
    0.2500        21.14
    0.2666        21.14
    0.2833        21.13
    0.3000        21.16
    0.3166        21.13
    0.3333        21.13
    0.4167        21.12
    0.5000        21.12
    0.5833        21.12
```

| | |
|---|---|
| 0.6667 | 21.11 |

```
   0.7500      21.11
   0.8333      21.11
   0.9167      21.10
   1.0000      21.10
   1.0833      21.10
   1.1667      21.09
   1.2500      21.09
   1.3333      21.13
   1.4166      21.09
   1.5000      21.09
   1.5833      21.09
   1.6667      21.09
   1.7500      21.08
   1.8333      21.08
   1.9167      21.08
   2.0000      21.08
   2.5000      21.07
   3.0000      21.06
   3.5000      21.06
   4.0000      21.05
   4.5000      21.05
   5.0000      21.04
   5.5000      21.04
   6.0000      21.03
   6.5000      21.03
   7.0000      21.03
   7.5000      21.02
   8.0000      21.02
   8.5000      21.02
   9.0000      21.01
   9.5000      21.01
  10.0000      21.01
  12.0000      21.00
  14.0000      20.99
  16.0000      20.98
  18.0000      20.97
  20.0000      20.96
  22.0000      20.96
  24.0000      20.96
  26.0000      20.95
  28.0000      20.95
  30.0000      20.94
  32.0000      20.94
  34.0000      20.94
  36.0000      20.93
  38.0000      20.93
  40.0000      20.92
  42.0000      20.92
  44.0000      20.92
  46.0000      20.91
  48.0000      20.91
  50.0000      20.91
  52.0000      20.90
  54.0000      20.90
```

| | |
|---|---|
| 56.0000 | 20.90 |

| | |
|---|---|
| 58.0000 | 20.90 |
| 60.0000 | 20.90 |
| 62.0000 | 20.89 |
| 64.0000 | 20.89 |
| 66.0000 | 20.89 |
| 68.0000 | 20.89 |
| 70.0000 | 20.88 |
| 72.0000 | 20.88 |
| 74.0000 | 20.88 |
| 76.0000 | 20.88 |
| 78.0000 | 20.88 |
| 80.0000 | 20.87 |
| 82.0000 | 20.87 |
| 84.0000 | 20.87 |
| 86.0000 | 20.87 |
| 88.0000 | 20.87 |
| 90.0000 | 20.87 |
| 92.0000 | 20.86 |
| 94.0000 | 20.86 |
| 96.0000 | 20.86 |
| 98.0000 | 20.86 |
| 100.000 | 20.86 |
| 110.000 | 20.85 |
| 120.000 | 20.85 |
| 130.000 | 20.84 |
| 140.000 | 20.83 |
| 150.000 | 20.83 |
| 160.000 | 20.83 |
| 170.000 | 20.83 |
| 180.000 | 20.83 |
| 190.000 | 20.83 |
| 200.000 | 20.84 |
| 210.000 | 20.84 |
| 220.000 | 20.85 |
| 230.000 | 20.85 |
| 240.000 | 20.86 |
| 250.000 | 20.87 |
| 260.000 | 20.88 |
| 270.000 | 20.89 |
| 280.000 | 20.89 |
| 290.000 | 20.90 |
| 300.000 | 20.90 |
| 310.000 | 20.90 |
| 320.000 | 20.90 |
| 330.000 | 20.90 |
| 340.000 | 20.90 |
| 350.000 | 20.89 |
| 360.000 | 20.89 |
| 370.000 | 20.89 |
| 380.000 | 20.89 |
| 390.000 | 20.88 |
| 400.000 | 20.88 |
| 410.000 | 20.87 |
| 420.000 | 20.87 |

| | |
|---|---|
| 430.000 | 20.87 |

```
  440.000        20.86
  450.000        20.86
  460.000        20.86
  470.000        20.86
  480.000        20.85
  490.000        20.85
  500.000        20.85
  510.000        20.84
  520.000        20.84
  530.000        20.84
  540.000        20.84
  550.000        20.83
  560.000        20.83
  570.000        20.83
```

```
89C7583-1: DUPONT
FORT MADISON, IOWA
WELL MW-F2
FALLING HEAD TEST
USING 48"x 1.25" SLUG
BY: BAH & BKR
---------------------

        SE1000B
  Environmental Logger
     08/09  22:30

  Unit# 00323  Test# 0

 INPUT 1:  Level (F)

 Reference          0.00
 Scale factor      10.06
 Offset             0.00

 Step# 0   08/09  18:42

 Elapsed Time     Value
 ------------   ---------
     0.0000       17.06
     0.0033       17.07
     0.0066       20.66
     0.0099       20.24
     0.0133       20.06
     0.0166       19.54
     0.0200       19.32
     0.0233       19.02
     0.0266       18.18
     0.0300       17.48
     0.0333       18.25
     0.0500       18.47
     0.0666       18.65
     0.0833       18.64
     0.1000       18.62 ✓
     0.1166       18.62 ✓
     0.1333       18.62 ✓
     0.1500       18.61 ✓
     0.1666       18.61 ✓
     0.1833       18.60 ✓
     0.2000       18.60 ✓
     0.2166       18.59
     0.2333       18.59
     0.2500       18.58 ✓
     0.2666       18.58
     0.2833       18.57
     0.3000       18.57 ✓
     0.3166       18.57
     0.3333       18.56 ✓
     0.4167       18.55
```

| | |
|---|---|
| 0.5000 | 18.54 |

| | | |
|---|---|---|
| 0.5833 | 18.52 | |
| 0.6667 | 18.51 | ✓ |
| 0.7500 | 18.50 | |
| 0.8333 | 18.49 | ✓ |
| 0.9167 | 18.48 | |
| 1.0000 | 18.47 | ✓ |
| 1.0833 | 18.46 | |
| 1.1667 | 18.44 | ✓ |
| 1.2500 | 18.43 | |
| 1.3333 | 18.42 | ✓ |
| 1.4166 | 18.42 | |
| 1.5000 | 18.41 | ✓ |
| 1.5833 | 18.40 | |
| 1.6667 | 18.39 | ✓ |
| 1.7500 | 18.38 | |
| 1.8333 | 18.37 | |
| 1.9167 | 18.37 | |
| 2.0000 | 18.36 | |
| 2.5000 | 18.31 | ✓ |
| 3.0000 | 18.27 | |
| 3.5000 | 18.23 | ✓ |
| 4.0000 | 18.19 | |
| 4.5000 | 18.16 | ✓ |
| 5.0000 | 18.12 | |
| 5.5000 | 18.09 | ✓ |
| 6.0000 | 18.06 | |
| 6.5000 | 18.03 | ✓ |
| 7.0000 | 18.01 | |
| 7.5000 | 17.98 | ✓ |
| 8.0000 | 17.96 | |
| 8.5000 | 17.93 | ✓ |
| 9.0000 | 17.91 | |
| 9.5000 | 17.89 | ✓ |
| 10.0000 | 17.86 | ✓ |
| 12.0000 | 17.78 | ✓ |
| 14.0000 | 17.72 | ✓ |
| 16.0000 | 17.66 | ✓ |
| 18.0000 | 17.61 | ✓ |
| 20.0000 | 17.56 | ✓ |
| 22.0000 | 17.53 | |
| 24.0000 | 17.49 | ✓ |
| 26.0000 | 17.46 | |
| 28.0000 | 17.43 | ✓ |
| 30.0000 | 17.40 | |
| 32.0000 | 17.38 | ✓ |
| 34.0000 | 17.36 | |
| 36.0000 | 17.34 | |
| 38.0000 | 17.32 | ✓ |
| 40.0000 | 17.30 | |
| 42.0000 | 17.28 | ✓ |
| 44.0000 | 17.27 | |
| 46.0000 | 17.25 | ✓ |
| 48.0000 | 17.24 | |
| 50.0000 | 17.23 | |

| | |
|---|---|
| 52.0000 | 17.22 |

| | |
|---|---|
| 54.0000 | 17.21 ✓ |
| 56.0000 | 17.19 |
| 58.0000 | 17.18 |
| 60.0000 | 17.17 ✓ |
| 62.0000 | 17.17 |
| 64.0000 | 17.16 |
| 66.0000 | 17.15 |
| 68.0000 | 17.14 |
| 70.0000 | 17.14 ✓ |
| 72.0000 | 17.13 |
| 74.0000 | 17.12 |
| 76.0000 | 17.12 ✓ |
| 78.0000 | 17.11 |
| 80.0000 | 17.10 |
| 82.0000 | 17.10 |
| 84.0000 | 17.09 ✓ |
| 86.0000 | 17.09 |
| 88.0000 | 17.09 |
| 90.0000 | 17.08 |
| 92.0000 | 17.08 |
| 94.0000 | 17.07 |
| 96.0000 | 17.07 |
| 98.0000 | 17.06 |
| 100.000 | 17.06 |
| 110.000 | 17.04 |
| 120.000 | 17.02 |
| 130.000 | 17.01 |
| 140.000 | 17.00 |
| 150.000 | 16.99 |
| 160.000 | 16.99 |
| 170.000 | 16.98 |
| 180.000 | 16.97 |
| 190.000 | 16.97 |
| 200.000 | 16.96 |
| 210.000 | 16.96 |
| 220.000 | 16.95 |

```
89C7583-1: DUPONT
Well MW-F2
Rising Head Test
48"x 1.25" Slug
By: BAH & BKR
----------------
       SE1000B
  Environmental Logger
      08/10  09:17

  Unit# 00323  Test# 0

 INPUT 1:  Level (F)

 Reference        0.00
 Scale factor    10.06
 Offset           0.00

 Step# 0    08/09  22:38

 Elapsed Time    Value
 ------------  ---------
    0.0000       13.31
    0.0033       13.46
    0.0066       15.84
    0.0099       14.26
    0.0133       16.06
    0.0166       16.15
    0.0200       15.19
    0.0233       14.69
    0.0266       14.74
    0.0300       15.20
    0.0333       15.56
    0.0500       15.30
    0.0666       15.26 ✓
    0.0833       15.29 ✓
    0.1000       15.31 ✓
    0.1166       15.33 ✓
    0.1333       15.34 ✓
    0.1500       15.34 ✓
    0.1666       15.35 ✓
    0.1833       15.36
    0.2000       15.36
    0.2166       15.37
    0.2333       15.37
    0.2500       15.38
    0.2666       15.39
    0.2833       15.39
    0.3000       15.39
    0.3166       15.40
    0.3333       15.40 ✓
    0.4167       15.42
    0.5000       15.43 ✓
    0.5833       15.44
```

| | |
|---|---|
| 0.6667 | 15.46 ✓ |

| | | |
|---|---|---|
| 0.7500 | 15.47 | |
| 0.8333 | 15.48 | ✓ |
| 0.9167 | 15.49 | |
| 1.0000 | 15.49 | ✓ |
| 1.0833 | 15.50 | |
| 1.1667 | 15.51 | ✓ |
| 1.2500 | 15.52 | |
| 1.3333 | 15.54 | ✓ |
| 1.4166 | 15.54 | |
| 1.5000 | 15.55 | ✓ |
| 1.5833 | 15.55 | |
| 1.6667 | 15.56 | ✓ |
| 1.7500 | 15.57 | |
| 1.8333 | 15.58 | ✓ |
| 1.9167 | 15.59 | |
| 2.0000 | 15.59 | ✓ |
| 2.5000 | 15.63 | |
| 3.0000 | 15.67 | ✓ |
| 3.5000 | 15.71 | |
| 4.0000 | 15.74 | ✓ |
| 4.5000 | 15.77 | |
| 5.0000 | 15.80 | ✓ |
| 5.5000 | 15.83 | |
| 6.0000 | 15.86 | ✓ |
| 6.5000 | 15.88 | |
| 7.0000 | 15.91 | ✓ |
| 7.5000 | 15.93 | |
| 8.0000 | 15.95 | ✓ |
| 8.5000 | 15.97 | |
| 9.0000 | 15.99 | ✓ |
| 9.5000 | 16.01 | |
| 10.0000 | 16.03 | ✓ |
| 12.0000 | 16.10 | |
| 14.0000 | 16.16 | ✓ |
| 16.0000 | 16.21 | |
| 18.0000 | 16.26 | ✓ |
| 20.0000 | 16.29 | |
| 22.0000 | 16.33 | ✓ |
| 24.0000 | 16.36 | |
| 26.0000 | 16.39 | ✓ |
| 28.0000 | 16.42 | |
| 30.0000 | 16.44 | ✓ |
| 32.0000 | 16.46 | |
| 34.0000 | 16.48 | ✓ |
| 36.0000 | 16.50 | |
| 38.0000 | 16.51 | ✓ |
| 40.0000 | 16.53 | |
| 42.0000 | 16.55 | ✓ |
| 44.0000 | 16.56 | |
| 46.0000 | 16.57 | ✓ |
| 48.0000 | 16.58 | |
| 50.0000 | 16.59 | ✓ |
| 52.0000 | 16.60 | |
| 54.0000 | 16.61 | ✓ |

| | |
|---|---|
| 56.0000 | 16.62 |

| | |
|---|---|
| 58.0000 | 16.63 ✓ |
| 60.0000 | 16.64 |
| 62.0000 | 16.64 |
| 64.0000 | 16.65 |
| 66.0000 | 16.66 ✓ |
| 68.0000 | 16.66 |
| 70.0000 | 16.67 |
| 72.0000 | 16.68 |
| 74.0000 | 16.68 ✓ |
| 76.0000 | 16.69 |
| 78.0000 | 16.69 |
| 80.0000 | 16.69 |
| 82.0000 | 16.70 ✓ |
| 84.0000 | 16.70 |
| 86.0000 | 16.71 |
| 88.0000 | 16.71 |
| 90.0000 | 16.72 ✓ |
| 92.0000 | 16.72 |
| 94.0000 | 16.72 |
| 96.0000 | 16.73 |
| 98.0000 | 16.73 |
| 100.000 | 16.73 ✓ |
| 110.000 | 16.75 |
| 120.000 | 16.75 |
| 130.000 | 16.76 ✓ |
| 140.000 | 16.77 |
| 150.000 | 16.78 |
| 160.000 | 16.78 ✓ |
| 170.000 | 16.78 |
| 180.000 | 16.79 |
| 190.000 | 16.79 ✓ |
| 200.000 | 16.80 |
| 210.000 | 16.80 |
| 220.000 | 16.80 ✓ |
| 230.000 | 16.80 |
| 240.000 | 16.80 |
| 250.000 | 16.81 |
| 260.000 | 16.81 |
| 270.000 | 16.81 |
| 280.000 | 16.81 |
| 290.000 | 16.81 |
| 300.000 | 16.81 |
| 310.000 ✓ | 16.81 ✓ |
| 320.000 | 16.81 |
| 330.000 | 16.81 |
| 340.000 | 16.81 |
| 350.000 | 16.81 |
| 360.000 | 16.81 |
| 370.000 | 16.81 |
| 380.000 | 16.81 |
| 390.000 | 16.82 |
| 400.000 | 16.82 |
| 410.000 | 16.82 |
| 420.000 ✓ | 16.82 ✓ |

| | |
|---|---|
| 430.000 | 16.82 |

| | |
|---|---|
| 440.000 | 16.82 |
| 450.000 | 16.82 |
| 460.000 | 16.82 |
| 470.000 | 16.82 |
| 480.000 | 16.82 |
| 490.000 | 16.82 |
| 500.000 | 16.82 |
| 510.000 | 16.82 |
| 520.000 | 16.82 |
| 530.000 | 16.82 |
| 540.000 | 16.82 |
| 550.000 | 16.82 |
| 560.000 | 16.82 |
| 570.000 | 16.82 |
| 580.000 | 16.82 |
| 590.000 | 16.82 |
| 600.000 | 16.82 |
| 610.000 | 16.82 |
| 620.000 | 16.82 |

```
89C7583-1: DUPONT
Well MC-6C
Rising Head Test
36"x 1.25" Slug
By Bah & BKR
---------------
        SE1000B
  Environmental Logger
      08/10  09:51

  Unit# 01017  Test# 0

 INPUT 1:  Level (F)

 Reference          0.00
 Scale factor      10.04
 Offset             0.00

 Step# 0   08/09  22:09

 Elapsed Time     Value
 ------------   ---------
    0.0000        20.82
    0.0033        20.72
    0.0066        19.30
    0.0099        18.39
    0.0133        20.53
    0.0166        17.81
    0.0200        18.09
    0.0233        19.03
    0.0266        20.07
    0.0300        20.86
    0.0333        20.99
    0.0500        18.84
    0.0666        20.25
    0.0833        19.37
    0.1000        19.95
    0.1166        19.62
    0.1333        19.82
    0.1500        19.74
    0.1666        19.77
    0.1833        19.80
    0.2000        19.79
    0.2166        19.81
    0.2333        19.80
    0.2500        19.81
    0.2666        19.81
    0.2833        19.82
    0.3000        19.82
    0.3166        19.84
    0.3333        19.83
    0.4167        19.85
    0.5000        19.86
    0.5833        19.87
```

| | |
|---|---|
| 0.6667 | 19.88 |

| | |
|---|---|
| 0.7500 | 19.90 |
| 0.8333 | 19.90 |
| 0.9167 | 19.92 |
| 1.0000 | 19.90 |
| 1.0833 | 19.92 |
| 1.1667 | 19.93 |
| 1.2500 | 19.93 |
| 1.3333 | 19.92 |
| 1.4166 | 19.92 |
| 1.5000 | 19.94 |
| 1.5833 | 19.94 |
| 1.6667 | 19.95 |
| 1.7500 | 19.95 |
| 1.8333 | 19.95 |
| 1.9167 | 19.96 |
| 2.0000 | 19.96 |
| 2.5000 | 19.97 |
| 3.0000 | 19.99 |
| 3.5000 | 19.99 |
| 4.0000 | 20.00 |
| 4.5000 | 20.01 |
| 5.0000 | 20.02 |
| 5.5000 | 20.02 |
| 6.0000 | 20.03 |
| 6.5000 | 20.03 |
| 7.0000 | 20.04 |
| 7.5000 | 20.04 |
| 8.0000 | 20.05 |
| 8.5000 | 20.05 |
| 9.0000 | 20.05 |
| 9.5000 | 20.06 |
| 10.0000 | 20.06 |
| 12.0000 | 20.07 |
| 14.0000 | 20.08 |
| 16.0000 | 20.08 |
| 18.0000 | 20.09 |
| 20.0000 | 20.10 |
| 22.0000 | 20.10 |
| 24.0000 | 20.11 |
| 26.0000 | 20.11 |
| 28.0000 | 20.12 |
| 30.0000 | 20.12 |
| 32.0000 | 20.12 |
| 34.0000 | 20.13 |
| 36.0000 | 20.13 |
| 38.0000 | 20.13 |
| 40.0000 | 20.14 |
| 42.0000 | 20.14 |
| 44.0000 | 20.14 |
| 46.0000 | 20.15 |
| 48.0000 | 20.15 |
| 50.0000 | 20.15 |
| 52.0000 | 20.15 |
| 54.0000 | 20.16 |

| | |
|---|---|
| 56.0000 | 20.16 |

| | |
|---|---|
| 58.0000 | 20.16 |
| 60.0000 | 20.16 |
| 62.0000 | 20.16 |
| 64.0000 | 20.17 |
| 66.0000 | 20.17 |
| 68.0000 | 20.17 |
| 70.0000 | 20.17 |
| 72.0000 | 20.17 |
| 74.0000 | 20.17 |
| 76.0000 | 20.18 |
| 78.0000 | 20.18 |
| 80.0000 | 20.18 |
| 82.0000 | 20.18 |
| 84.0000 | 20.18 |
| 86.0000 | 20.18 |
| 88.0000 | 20.18 |
| 90.0000 | 20.19 |
| 92.0000 | 20.19 |
| 94.0000 | 20.19 |
| 96.0000 | 20.19 |
| 98.0000 | 20.19 |
| 100.000 | 20.19 |
| 110.000 | 20.20 |
| 120.000 | 20.20 |
| 130.000 | 20.20 |
| 140.000 | 20.20 |
| 150.000 | 20.21 |
| 160.000 | 20.21 |
| 170.000 | 20.21 |
| 180.000 | 20.21 |
| 190.000 | 20.21 |
| 200.000 | 20.21 |
| 210.000 | 20.22 |
| 220.000 | 20.22 |
| 230.000 | 20.22 |
| 240.000 | 20.22 |
| 250.000 | 20.22 |
| 260.000 | 20.22 |
| 270.000 | 20.22 |
| 280.000 | 20.23 |
| 290.000 | 20.23 |
| 300.000 | 20.23 |
| 310.000 | 20.22 |
| 320.000 | 20.22 |
| 330.000 | 20.22 |
| 340.000 | 20.22 |
| 350.000 | 20.22 |
| 360.000 | 20.22 |
| 370.000 | 20.22 |
| 380.000 | 20.22 |
| 390.000 | 20.22 |
| 400.000 | 20.22 |
| 410.000 | 20.22 |
| 420.000 | 20.22 |

| | |
|---|---|
| 430.000 | 20.22 |

| | |
|---|---|
| 440.000 | 20.22 |
| 450.000 | 20.22 |
| 460.000 | 20.22 |
| 470.000 | 20.22 |
| 480.000 | 20.21 |
| 490.000 | 20.22 |
| 500.000 | 20.21 |
| 510.000 | 20.21 |
| 520.000 | 20.21 |
| 530.000 | 20.21 |
| 540.000 | 20.21 |
| 550.000 | 20.21 |
| 560.000 | 20.21 |
| 570.000 | 20.21 |
| 580.000 | 20.21 |
| 590.000 | 20.21 |
| 600.000 | 20.21 |
| 610.000 | 20.21 |
| 620.000 | 20.21 |
| 630.000 | 20.21 |
| 640.000 | 20.21 |
| 650.000 | 20.21 |
| 660.000 | 20.21 |
| 670.000 | 20.21 |
| 680.000 | 20.20 |
| 690.000 | 20.20 |

```
89C7583-1: DUPONT
FORT MADISON, IOW
WELL: MW-J
RISING HEAD TEST
BY: BAH & BKR
---------------------
       SE1000B
  Environmental Logger
     08/07  16:36

  Unit# 01017  Test# 0

 INPUT 1:  Level (F)

 Reference         0.00
 Scale factor     10.04
 Offset            0.00

 Step# 0   08/07  14:22

 Elapsed Time    Value
 ------------  ---------
    0.0000       13.51
    0.0033       15.65
    0.0066       16.56
    0.0099       16.76
    0.0133       15.50
    0.0166       14.99
    0.0200       15.60
    0.0233       16.41
    0.0266       16.37
    0.0300       15.70
    0.0333       15.40
    0.0500       15.64
    0.0666       15.79 ✓
    0.0833       15.88
    0.1000       15.26
    0.1166       15.93 ✓
    0.1333       16.00 ✓
    0.1500       16.05 ✓
    0.1666       16.08 ✓
    0.1833       16.11 ✓
    0.2000       16.13 ✓
    0.2166       16.15 ✓
    0.2333       16.17 ✓
    0.2500       16.19 ✓
    0.2666       16.20 ✓
    0.2833       16.21 ✓
    0.3000       16.23 ✓
    0.3166       16.24 ✓
    0.3333       16.25 ✓
    0.4167       16.32
    0.5000       16.37 ✓
    0.5833       16.41
```

| | |
|---|---|
| 0.6667 | 16.46 |

| | | |
|---|---|---|
| 0.7500 | 16.49 | |
| 0.8333 | 16.53 | ✓ |
| 0.9167 | 16.57 | |
| 1.0000 | 16.60 | ✓ |
| 1.0833 | 16.63 | |
| 1.1667 | 16.66 | ✓ |
| 1.2500 | 16.69 | |
| 1.3333 | 16.71 | ✓ |
| 1.4166 | 16.74 | |
| 1.5000 | 16.76 | ✓ |
| 1.5833 | 16.78 | |
| 1.6667 | 16.81 | ✓ |
| 1.7500 | 16.83 | |
| 1.8333 | 16.84 | |
| 1.9167 | 16.86 | |
| 2.0000 | 16.88 | ✓ |
| 2.5000 | 16.97 | ✓ |
| 3.0000 | 17.04 | ✓ |
| 3.5000 | 17.09 | ✓ |
| 4.0000 | 17.12 | ✓ |
| 4.5000 | 17.15 | ✓ |
| 5.0000 | 17.16 | ✓ |
| 5.5000 | 17.18 | |
| 6.0000 | 17.19 | ✓ |
| 6.5000 | 17.19 | |
| 7.0000 | 17.20 | ✓ |
| 7.5000 | 17.20 | |
| 8.0000 | 17.20 | ✓ |
| 8.5000 | 17.21 | |
| 9.0000 | 17.21 | ✓ |
| 9.5000 | 17.22 | |
| 10.0000 | 17.22 | ✓ |
| 12.0000 | 17.23 | |
| 14.0000 | 17.23 | ✓ |
| 16.0000 | 17.21 | |
| 18.0000 | 17.22 | ✓ |
| 20.0000 | 17.22 | |
| 22.0000 | 17.22 | ✓ |
| 24.0000 | 17.23 | |
| 26.0000 | 17.24 | ✓ |
| 28.0000 | 17.26 | ✓ |
| 30.0000 | 17.27 | ✓ |
| 32.0000 | 17.27 | |
| 34.0000 | 17.27 | ✓ |
| 36.0000 | 17.27 | |
| 38.0000 | 17.26 | ✓ |
| 40.0000 | 17.24 | |
| 42.0000 | 17.24 | ✓ |
| 44.0000 | 17.24 | |
| 46.0000 | 17.24 | |
| 48.0000 | 17.24 | |
| 50.0000 | 17.25 | |
| 52.0000 | 17.25 | |
| 54.0000 | 17.26 | ✓ |

| | |
|---|---|
| 56.0000 | 17.26 |

| | |
|---|---|
| 58.0000 | 17.27 |
| 60.0000 | 17.28 |
| 62.0000 | 17.28 |
| 64.0000 | 17.28 |
| 66.0000 | 17.28 ✓ |
| 68.0000 | 17.28 |
| 70.0000 | 17.28 |
| 72.0000 | 17.28 |
| 74.0000 | 17.28 |
| 76.0000 | 17.28 |
| 78.0000 | 17.28 ✓ |
| 80.0000 | 17.28 |
| 82.0000 | 17.28 |
| 84.0000 | 17.28 |
| 86.0000 | 17.27 |
| 88.0000 | 17.28 |
| 90.0000 | 17.28 |
| 92.0000 | 17.27 |
| 94.0000 | 17.27 |
| 96.0000 | 17.27 |
| 98.0000 | 17.27 |
| 100.000 | 17.28 |
| 110.000 | 17.28 |
| 120.000 | 17.28 |

```
89C7583-1: DUPONT RI
FORT MADISON, IOWA
WELL MW-K1
FALLING HEAD TEST
BY: BAH, BKR
NOTE: THIS TEST CONDUCTED
WITH HERMIT DSP. (DISPLAY)
SET TO READ FROM TOP OF
CASING (TOC). DATA SHOULD
BE TRANSFORMED TO BE CONSISTENT
WITH TESTS CONDUCTED IN THE OTHER
WELLS.
--------------------


        SE1000B
   Environmental Logger
      08/07  07:35

   Unit# 00323  Test# 0

  INPUT 1:  Level (F) TOC

  Reference          0.00
  Scale factor      10.06
  Offset             0.00

  Step# 0   08/06   16:02

  Elapsed Time     Value
  ------------  ---------
     0.0000       -17.73
     0.0033       -22.63
     0.0066       -23.09
     0.0099       -18.86
     0.0133       -17.30
     0.0166       -19.13
     0.0200       -21.30
     0.0233       -20.77
     0.0266       -18.93
     0.0300       -18.68
     0.0333       -19.79
     0.0500       -19.85
     0.0666       -19.82
     0.0833       -19.73
     0.1000       -18.35
     0.1166       -19.19
     0.1333       -19.21
     0.1500       -19.14
     0.1666       -19.12
     0.1833       -19.11
     0.2000       -19.10
     0.2166       -19.09
     0.2333       -19.08
     0.2500       -19.07
```

| | |
|---|---|
| 0.2666 | -19.06 |

| | |
|---|---|
| 0.2833 | -19.05 |
| 0.3000 | -19.05 |
| 0.3166 | -19.04 |
| 0.3333 | -19.04 |
| 0.4167 | -19.02 |
| 0.5000 | -19.01 |
| 0.5833 | -19.00 |
| 0.6667 | -19.00 |
| 0.7500 | -18.99 |
| 0.8333 | -18.99 |
| 0.9167 | -18.99 |
| 1.0000 | -18.98 |
| 1.0833 | -18.98 |
| 1.1667 | -18.98 |
| 1.2500 | -18.98 |
| 1.3333 | -18.98 |
| 1.4166 | -18.97 |
| 1.5000 | -18.97 |
| 1.5833 | -18.97 |
| 1.6667 | -18.97 |
| 1.7500 | -18.97 |
| 1.8333 | -18.96 |
| 1.9167 | -18.96 |
| 2.0000 | -18.96 |
| 2.5000 | -18.95 |
| 3.0000 | -18.94 |
| 3.5000 | -18.94 |
| 4.0000 | -18.93 |
| 4.5000 | -18.92 |
| 5.0000 | -18.91 |
| 5.5000 | -18.90 |
| 6.0000 | -18.89 |
| 6.5000 | -18.89 |
| 7.0000 | -18.88 |
| 7.5000 | -18.87 |
| 8.0000 | -18.87 |
| 8.5000 | -18.86 |
| 9.0000 | -18.85 |
| 9.5000 | -18.85 |
| 10.0000 | -18.84 |
| 12.0000 | -18.82 |
| 14.0000 | -18.79 |
| 16.0000 | -18.76 |
| 18.0000 | -18.75 |
| 20.0000 | -18.72 |
| 22.0000 | -18.70 |
| 24.0000 | -18.68 |
| 26.0000 | -18.66 |
| 28.0000 | -18.63 |
| 30.0000 | -18.62 |
| 32.0000 | -18.60 |
| 34.0000 | -18.58 |
| 36.0000 | -18.56 |
| 38.0000 | -18.54 |

| | |
|---|---|
| 40.0000 | -18.52 |

| | |
|---|---|
| 42.0000 | -18.50 |
| 44.0000 | -18.48 |
| 46.0000 | -18.47 |
| 48.0000 | -18.45 |
| 50.0000 | -18.43 |
| 52.0000 | -18.41 |
| 54.0000 | -18.40 |
| 56.0000 | -18.38 |
| 58.0000 | -18.36 |
| 60.0000 | -18.35 |
| 62.0000 | -18.33 |
| 64.0000 | -18.32 |
| 66.0000 | -18.30 |
| 68.0000 | -18.28 |
| 70.0000 | -18.27 |
| 72.0000 | -18.25 |
| 74.0000 | -18.24 |
| 76.0000 | -18.22 |
| 78.0000 | -18.21 |
| 80.0000 | -18.19 |
| 82.0000 | -18.18 |
| 84.0000 | -18.16 |
| 86.0000 | -18.15 |
| 88.0000 | -18.13 |
| 90.0000 | -18.12 |
| 92.0000 | -18.10 |
| 94.0000 | -18.09 |
| 96.0000 | -18.08 |
| 98.0000 | -18.06 |
| 100.000 | -18.05 |
| 110.000 | -17.98 |
| 120.000 | -17.93 |
| 130.000 | -17.87 |
| 140.000 | -17.81 |
| 150.000 | -17.76 |
| 160.000 | -17.70 |
| 170.000 | -17.66 |
| 180.000 | -17.61 |
| 190.000 | -17.56 |
| 200.000 | -17.52 |
| 210.000 | -17.48 |
| 220.000 | -17.43 |
| 230.000 | -17.40 |
| 240.000 | -17.36 |
| 250.000 | -17.32 |
| 260.000 | -17.29 |
| 270.000 | -17.25 |
| 280.000 | -17.22 |
| 290.000 | -17.19 |
| 300.000 | -17.16 |
| 310.000 | -17.13 |
| 320.000 | -17.10 |
| 330.000 | -17.08 |
| 340.000 | -17.05 |

| | |
|---|---|
| 350.000 | -17.02 |

```
360.000     -17.00
370.000     -16.98
380.000     -16.95
390.000     -16.93
400.000     -16.91
410.000     -16.89
420.000     -16.87
430.000     -16.85
440.000     -16.83
450.000     -16.82
460.000     -16.80
470.000     -16.78
480.000     -16.76
490.000     -16.75
500.000     -16.73
510.000     -16.72
520.000     -16.70
530.000     -16.69
540.000     -16.68
550.000     -16.67
560.000     -16.65
570.000     -16.64
580.000     -16.63
590.000     -16.62
600.000     -16.61
610.000     -16.59
620.000     -16.58
630.000     -16.57
640.000     -16.56
650.000     -16.55
660.000     -16.55
670.000     -16.54
680.000     -16.53
690.000     -16.52
700.000     -16.51
710.000     -16.50
720.000     -16.49
730.000     -16.48
740.000     -16.48
750.000     -16.47
760.000     -16.46
770.000     -16.45
780.000     -16.45
790.000     -16.44
800.000     -16.43
810.000     -16.43
820.000     -16.42
830.000     -16.42
840.000     -16.41
850.000     -16.41
860.000     -16.40
870.000     -16.40
880.000     -16.39
890.000     -16.39
```

| | |
|---|---|
| 900.000 | -16.38 |

```
910.000          -16.38
```

```
89C8573-1: DUPONT
FORT MADISON, IOWA
WELL MW-J FALLING HEAD TEST
BY: BAH & BKR
----------------------
        SE1000B
  Environmental Logger
     08/07  17:42

  Unit# 01017  Test# 0

 INPUT 1:  Level (F)

 Reference        0.00
 Scale factor    10.04
 Offset           0.00

 Step# 0   08/07  16:53

 Elapsed Time    Value
 ------------  ---------
    0.0000       17.22 ✓
    0.0033       17.22
    0.0066       17.22
    0.0099       17.23
    0.0133       20.14
    0.0166       23.19
    0.0200       21.08
    0.0233       17.28
    0.0266       14.54
    0.0300       16.13
    0.0333       18.61
    0.0500       17.59
    0.0666       18.58
    0.0833       18.74 ✓
    0.1000       18.51 ✓
    0.1166       18.38 ✓
    0.1333       18.38 ✓
    0.1500       18.39 ✓
    0.1666       18.38 ✓
    0.1833       18.36
    0.2000       18.34
    0.2166       18.32
    0.2333       18.31
    0.2500       18.30 ✓
    0.2666       18.28
    0.2833       18.27
    0.3000       18.26
    0.3166       18.25
    0.3333       18.23 ✓
    0.4167       18.18
    0.5000       18.13 ✓
    0.5833       18.08
    0.6667       18.04 ✓
```

| | |
|---|---|
| 0.7500 | 18.00 |

| | |
|---|---|
| 0.8333 | 17.96 ✓ |
| 0.9167 | 17.93 |
| 1.0000 | 17.90 ✓ |
| 1.0833 | 17.87 |
| 1.1667 | 17.84 ✓ |
| 1.2500 | 17.81 |
| 1.3333 | 17.79 ✓ |
| 1.4166 | 17.77 |
| 1.5000 | 17.75 ✓ |
| 1.5833 | 17.73 |
| 1.6667 ✓ | 17.71 ✓ |
| 1.7500 | 17.69 |
| 1.8333 | 17.67 ✓ |
| 1.9167 | 17.66 |
| 2.0000 | 17.64 ✓ |
| 2.5000 | 17.57 |
| 3.0000 | 17.52 ✓ |
| 3.5000 | 17.48 |
| 4.0000 | 17.45 ✓ |
| 4.5000 | 17.43 |
| 5.0000 | 17.41 ✓ |
| 5.5000 | 17.40 |
| 6.0000 | 17.39 ✓ |
| 6.5000 | 17.38 |
| 7.0000 | 17.38 ✓ |
| 7.5000 | 17.37 |
| 8.0000 | 17.37 ✓ |
| 8.5000 | 17.36 |
| 9.0000 | 17.36 ✓ |
| 9.5000 | 17.36 |
| 10.0000 | 17.35 ✓ |
| 12.0000 | 17.35 ✓ |
| 14.0000 | 17.34 ✓ |
| 16.0000 | 17.33 ✓ |
| 18.0000 | 17.33 ✓ |
| 20.0000 | 17.33 ✓ |
| 22.0000 | 17.32 |
| 24.0000 | 17.32 ✓ |
| 26.0000 | 17.32 |
| 28.0000 | 17.32 ✓ |
| 30.0000 | 17.32 |
| 32.0000 | 17.31 ✓ |
| 34.0000 | 17.31 |
| 36.0000 | 17.31 ✓ |
| 38.0000 | 17.31 |
| 40.0000 | 17.31 ✓ |
| 42.0000 | 17.31 |
| 44.0000 | 17.30 ✓ |

89C7583-1: DUPONT
FORT MADISON, IA
WELL MW-K1
RISING HEAD TEST
BY: BAH, BKR

NOTE: FOR THIS TEST, THE HERMIT WAS SET TO RECORD DATA FROM THE TOP OF CASING (TOC). DATA SHOULD BE TRANSFORMED TO CONFORM WITH TESTS TAKEN IN OTHER WELLS THAT RECORDED DATA FROM THE TOP OF THE GROUND WATER SURFACE.

```
---------------------
       SE1000B
  Environmental Logger
      08/08  00:23

 Unit# 00323  Test# 0

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      10.06
Offset             0.00

Step# 0   08/07  09:04

Elapsed Time    Value
------------  ---------
   0.0000      -11.02
   0.0033       -4.86
   0.0066       -2.36
   0.0099       -3.22
   0.0133       -4.36
   0.0166      -12.88
   0.0200      -19.43
   0.0233       -9.05
   0.0266      -10.80
   0.0300      -16.13
   0.0333      -13.53
   0.0500      -12.88
   0.0666      -13.35
   0.0833      -13.18
   0.1000      -13.25
   0.1166      -13.32
   0.1333      -13.24
   0.1500      -13.29
   0.1666      -13.29
   0.1833      -13.34
   0.2000      -13.37
   0.2166      -13.37
   0.2333      -13.38
```

| | |
|---|---|
| 0.2500 | -13.39 |

| | |
|---|---|
| 0.2666 | -13.39 |
| 0.2833 | -13.40 |
| 0.3000 | -13.40 |
| 0.3166 | -13.41 |
| 0.3333 | -13.41 |
| 0.4167 | -13.43 |
| 0.5000 | -13.44 |
| 0.5833 | -13.45 |
| 0.6667 | -13.46 |
| 0.7500 | -13.47 |
| 0.8333 | -13.47 |
| 0.9167 | -13.48 |
| 1.0000 | -13.48 |
| 1.0833 | -13.48 |
| 1.1667 | -13.49 |
| 1.2500 | -13.49 |
| 1.3333 | -13.50 |
| 1.4166 | -13.50 |
| 1.5000 | -13.50 |
| 1.5833 | -13.50 |
| 1.6667 | -13.51 |
| 1.7500 | -13.51 |
| 1.8333 | -13.51 |
| 1.9167 | -13.52 |
| 2.0000 | -13.52 |
| 2.5000 | -13.53 |
| 3.0000 | -13.55 |
| 3.5000 | -13.55 |
| 4.0000 | -13.56 |
| 4.5000 | -13.57 |
| 5.0000 | -13.58 |
| 5.5000 | -13.59 |
| 6.0000 | -13.60 |
| 6.5000 | -13.61 |
| 7.0000 | -13.62 |
| 7.5000 | -13.62 |
| 8.0000 | -13.63 |
| 8.5000 | -13.64 |
| 9.0000 | -13.64 |
| 9.5000 | -13.65 |
| 10.0000 | -13.66 |
| 12.0000 | -13.69 |
| 14.0000 | -13.71 |
| 16.0000 | -13.74 |
| 18.0000 | -13.76 |
| 20.0000 | -13.78 |
| 22.0000 | -13.81 |
| 24.0000 | -13.82 |
| 26.0000 | -13.85 |
| 28.0000 | -13.87 |
| 30.0000 | -13.89 |
| 32.0000 | -13.91 |
| 34.0000 | -13.93 |
| 36.0000 | -13.95 |

| | |
|---|---|
| 38.0000 | -13.97 |

| | |
|---|---|
| 40.0000 | -13.99 |
| 42.0000 | -14.01 |
| 44.0000 | -14.03 |
| 46.0000 | -14.04 |
| 48.0000 | -14.06 |
| 50.0000 | -14.08 |
| 52.0000 | -14.09 |
| 54.0000 | -14.11 |
| 56.0000 | -14.13 |
| 58.0000 | -14.15 |
| 60.0000 | -14.16 |
| 62.0000 | -14.18 |
| 64.0000 | -14.19 |
| 66.0000 | -14.21 |
| 68.0000 | -14.22 |
| 70.0000 | -14.24 |
| 72.0000 | -14.26 |
| 74.0000 | -14.27 |
| 76.0000 | -14.29 |
| 78.0000 | -14.30 |
| 80.0000 | -14.32 |
| 82.0000 | -14.33 |
| 84.0000 | -14.35 |
| 86.0000 | -14.36 |
| 88.0000 | -14.37 |
| 90.0000 | -14.39 |
| 92.0000 | -14.40 |
| 94.0000 | -14.42 |
| 96.0000 | -14.43 |
| 98.0000 | -14.44 |
| 100.000 | -14.46 |
| 110.000 | -14.52 |
| 120.000 | -14.58 |
| 130.000 | -14.63 |
| 140.000 | -14.69 |
| 150.000 | -14.74 |
| 160.000 | -14.79 |
| 170.000 | -14.84 |
| 180.000 | -14.88 |
| 190.000 | -14.93 |
| 200.000 | -14.97 |
| 210.000 | -15.00 |
| 220.000 | -15.04 |
| 230.000 | -15.09 |
| 240.000 | -15.12 |
| 250.000 | -15.15 |
| 260.000 | -15.18 |
| 270.000 | -15.22 |
| 280.000 | -15.25 |
| 290.000 | -15.27 |
| 300.000 | -15.29 |
| 310.000 | -15.34 |
| 320.000 | -15.36 |
| 330.000 | -15.39 |

| | |
|---|---|
| 340.000 | -15.40 |

| | |
|---|---|
| 350.000 | -15.44 |
| 360.000 | -15.45 |
| 370.000 | -15.47 |
| 380.000 | -15.49 |
| 390.000 | -15.52 |
| 400.000 | -15.54 |
| 410.000 | -15.55 |
| 420.000 | -15.59 |
| 430.000 | -15.61 |
| 440.000 | -15.62 |
| 450.000 | -15.63 |
| 460.000 | -15.64 |
| 470.000 | -15.66 |
| 480.000 | -15.68 |
| 490.000 | -15.69 |
| 500.000 | -15.71 |
| 510.000 | -15.73 |
| 520.000 | -15.74 |
| 530.000 | -15.75 |
| 540.000 | -15.77 |
| 550.000 | -15.79 |
| 560.000 | -15.80 |
| 570.000 | -15.81 |
| 580.000 | -15.82 |
| 590.000 | -15.83 |
| 600.000 | -15.84 |
| 610.000 | -15.85 |
| 620.000 | -15.87 |
| 630.000 | -15.88 |
| 640.000 | -15.89 |
| 650.000 | -15.89 |
| 660.000 | -15.90 |
| 670.000 | -15.91 |
| 680.000 | -15.92 |
| 690.000 | -15.93 |
| 700.000 | -15.93 |
| 710.000 | -15.94 |
| 720.000 | -15.95 |
| 730.000 | -15.95 |
| 740.000 | -15.96 |
| 750.000 | -15.96 |
| 760.000 | -15.97 |
| 770.000 | -15.98 |
| 780.000 | -15.98 |
| 790.000 | -15.99 |
| 800.000 | -15.99 |
| 810.000 | -16.00 |
| 820.000 | -16.00 |
| 830.000 | -16.01 |
| 840.000 | -16.01 |
| 850.000 | -16.02 |
| 860.000 | -16.02 |
| 870.000 | -16.03 |
| 880.000 | -16.03 |

| | |
|---|---|
| 890.000 | -16.03 |

| | |
|---|---|
| 900.000 | -16.04 |
| 910.000 | -16.04 |

```
89C7583-1 : DUPONT
FORT MADISON, IOWA
WELL MW-K2
FALLING HEAD TEST
BY: BAH & BKR
--------------------
     SE1000B
 Environmental Logger
     08/08  09:20

 Unit# 01017  Test# 0

INPUT 1:  Level (F)

Reference          0.00
Scale factor      10.04
Offset             0.00

Step# 0   08/07  18:29

Elapsed Time     Value
------------   ---------
   0.0000        16.15
   0.0033        17.68
   0.0066        18.96
   0.0099        20.70
   0.0133        20.25
   0.0166        18.54
   0.0200        17.01
   0.0233        16.56
   0.0266        17.16
   0.0300        18.25
   0.0333        19.00
   0.0500        17.12
   0.0666        17.16
   0.0833        17.90
   0.1000        17.38
   0.1166        17.41
   0.1333        17.58
   0.1500        17.45
   0.1666        17.45
   0.1833        17.48
   0.2000        17.45
   0.2166        17.44
   0.2333        17.44
   0.2500        17.43
   0.2666        17.42
   0.2833        17.42
   0.3000        17.41
   0.3166        17.40
   0.3333        17.40
   0.4167        17.36
   0.5000        17.34
   0.5833        17.32
```

| | |
|---|---|
| 0.6667 | 17.29 |

| | |
|---|---|
| 0.7500 | 17.27 |
| 0.8333 | 17.24 |
| 0.9167 | 17.22 |
| 1.0000 | 17.20 |
| 1.0833 | 17.18 |
| 1.1667 | 17.16 |
| 1.2500 | 17.15 |
| 1.3333 | 17.13 |
| 1.4166 | 17.12 |
| 1.5000 | 17.10 |
| 1.5833 | 17.09 |
| 1.6667 | 17.07 |
| 1.7500 | 17.06 |
| 1.8333 | 17.05 |
| 1.9167 | 17.03 |
| 2.0000 | 17.03 |
| 2.5000 | 16.96 |
| 3.0000 | 16.91 |
| 3.5000 | 16.87 |
| 4.0000 | 16.84 |
| 4.5000 | 16.81 |
| 5.0000 | 16.79 |
| 5.5000 | 16.77 |
| 6.0000 | 16.75 |
| 6.5000 | 16.73 |
| 7.0000 | 16.71 |
| 7.5000 | 16.70 |
| 8.0000 | 16.69 |
| 8.5000 | 16.68 |
| 9.0000 | 16.67 |
| 9.5000 | 16.66 |
| 10.0000 | 16.66 |
| 12.0000 | 16.63 |
| 14.0000 | 16.61 |
| 16.0000 | 16.59 |
| 18.0000 | 16.57 |
| 20.0000 | 16.56 |
| 22.0000 | 16.55 |
| 24.0000 | 16.54 |
| 26.0000 | 16.53 |
| 28.0000 | 16.52 |
| 30.0000 | 16.52 |
| 32.0000 | 16.51 |
| 34.0000 | 16.51 |
| 36.0000 | 16.50 |
| 38.0000 | 16.50 |
| 40.0000 | 16.49 |
| 42.0000 | 16.49 |
| 44.0000 | 16.48 |
| 46.0000 | 16.48 |
| 48.0000 | 16.47 |
| 50.0000 | 16.47 |
| 52.0000 | 16.46 |
| 54.0000 | 16.46 |

|  |  |
|---|---|
| 56.0000 | 16.46 |

| | |
|---|---|
| 58.0000 | 16.45 |
| 60.0000 | 16.45 |
| 62.0000 | 16.45 |
| 64.0000 | 16.44 |
| 66.0000 | 16.44 |
| 68.0000 | 16.44 |
| 70.0000 | 16.43 |
| 72.0000 | 16.43 |
| 74.0000 | 16.43 |
| 76.0000 | 16.42 |
| 78.0000 | 16.42 |
| 80.0000 | 16.42 |
| 82.0000 | 16.42 |
| 84.0000 | 16.41 |
| 86.0000 | 16.41 |
| 88.0000 | 16.41 |
| 90.0000 | 16.41 |
| 92.0000 | 16.40 |
| 94.0000 | 16.40 |
| 96.0000 | 16.40 |
| 98.0000 | 16.39 |
| 100.000 | 16.39 |
| 110.000 | 16.38 |
| 120.000 | 16.37 |
| 130.000 | 16.36 |
| 140.000 | 16.35 |
| 150.000 | 16.33 |
| 160.000 | 16.32 |
| 170.000 | 16.31 |
| 180.000 | 16.30 |
| 190.000 | 16.30 |
| 200.000 | 16.29 |
| 210.000 | 16.28 |
| 220.000 | 16.27 |
| 230.000 | 16.26 |
| 240.000 | 16.26 |
| 250.000 | 16.25 |
| 260.000 | 16.25 |
| 270.000 | 16.24 |
| 280.000 | 16.23 |
| 290.000 | 16.23 |
| 300.000 | 16.22 |
| 310.000 | 16.22 |
| 320.000 | 16.21 |
| 330.000 | 16.21 |
| 340.000 | 16.20 |
| 350.000 | 16.20 |
| 360.000 | 16.19 |
| 370.000 | 16.19 |
| 380.000 | 16.19 |
| 390.000 | 16.18 |
| 400.000 | 16.18 |
| 410.000 | 16.18 |
| 420.000 | 16.17 |

| | |
|---|---|
| 430.000 | 16.17 |

| | |
|---|---|
| 440.000 | 16.17 |
| 450.000 | 16.16 |
| 460.000 | 16.16 |
| 470.000 | 16.16 |
| 480.000 | 16.15 |
| 490.000 | 16.15 |
| 500.000 | 16.15 |
| 510.000 | 16.14 |
| 520.000 | 16.14 |
| 530.000 | 16.14 |
| 540.000 | 16.14 |
| 550.000 | 16.13 |
| 560.000 | 16.13 |
| 570.000 | 16.13 |
| 580.000 | 16.13 |
| 590.000 | 16.12 |
| 600.000 | 16.12 |
| 610.000 | 16.12 |
| 620.000 | 16.12 |
| 630.000 | 16.11 |
| 640.000 | 16.11 |
| 650.000 | 16.11 |
| 660.000 | 16.10 |
| 670.000 | 16.10 |
| 680.000 | 16.10 |
| 690.000 | 16.09 |
| 700.000 | 16.09 |
| 710.000 | 16.09 |
| 720.000 | 16.09 |
| 730.000 | 16.08 |
| 740.000 | 16.08 |
| 750.000 | 16.08 |
| 760.000 | 16.08 |
| 770.000 | 16.07 |
| 780.000 | 16.07 |
| 790.000 | 16.07 |
| 800.000 | 16.07 |
| 810.000 | 16.06 |
| 820.000 | 16.06 |
| 830.000 | 16.06 |
| 840.000 | 16.06 |
| 850.000 | 16.06 |
| 860.000 | 16.06 |
| 870.000 | 16.05 |
| 880.000 | 16.05 |
| 890.000 | 0.00 |

```
89C7583-1: DUPONT
FORT MADISON, IOWA
WELL MW-K2
RISING HEAD TEST
BY: BAH & BKR
USING: 48"x 1.25" SLUG
---------------------
        SE1000B
  Environmental Logger
     08/08  14:13

  Unit# 01017  Test# 0

 INPUT 1:  Level (F)

 Reference          0.00
 Scale factor      10.04
 Offset             0.00

 Step# 0   08/08  09:31

 Elapsed Time     Value
 ------------  ---------
    0.0000        15.59
    0.0033        12.81
    0.0066        11.44
    0.0099        10.42
    0.0133        12.79
    0.0166        15.22
    0.0200        17.49
    0.0233        16.52
    0.0266        13.92
    0.0300        12.30
    0.0333        12.38
    0.0500        13.59
    0.0666        15.29
    0.0833        15.07
    0.1000        14.25
    0.1166        14.23
    0.1333        14.65
    0.1500        14.77
    0.1666        14.61
    0.1833        14.53
    0.2000        14.59
    0.2166        14.65
    0.2333        14.64
    0.2500        14.62
    0.2666        14.63
    0.2833        14.65
    0.3000        14.66
    0.3166        14.66
    0.3333        14.67
    0.4167        14.70
    0.5000        14.73
```

| | |
|---|---|
| 0.6667 | 14.78 |
| 0.7500 | 14.81 |
| 0.8333 | 14.84 |
| 0.9167 | 14.80 |
| 1.0000 | 14.86 |
| 1.0833 | 14.96 |
| 1.1667 | 12.99 |
| 1.2500 | 11.26 |
| 1.3333 | 12.19 |
| 1.4166 | 10.95 |
| 1.5000 | 11.82 |
| 1.5833 | 15.04 |
| 1.6667 | 15.01 |
| 1.7500 | 15.03 |
| 1.8333 | 15.05 |
| 1.9167 | 15.06 |
| 2.0000 | 15.07 |
| 2.5000 | 15.14 |
| 3.0000 | 15.20 |
| 3.5000 | 15.25 |
| 4.0000 | 15.29 |
| 4.5000 | 15.32 |
| 5.0000 | 15.35 |
| 5.5000 | 15.37 |
| 6.0000 | 15.39 |
| 6.5000 | 15.41 |
| 7.0000 | 15.43 |
| 7.5000 | 15.44 |
| 8.0000 | 15.46 |
| 8.5000 | 15.47 |
| 9.0000 | 15.48 |
| 9.5000 | 15.49 |
| 10.0000 | 15.50 |
| 12.0000 | 15.54 |
| 14.0000 | 15.56 |
| 16.0000 | 15.58 |
| 18.0000 | 15.60 |
| 20.0000 | 15.61 |
| 22.0000 | 15.62 |
| 24.0000 | 15.63 |
| 26.0000 | 15.64 |
| 28.0000 | 15.64 |
| 30.0000 | 15.65 |
| 32.0000 | 15.67 |
| 34.0000 | 15.66 |
| 36.0000 | 15.67 |
| 38.0000 | 15.67 |
| 40.0000 | 15.68 |
| 42.0000 | 15.68 |
| 44.0000 | 15.69 |
| 46.0000 | 15.69 |
| 48.0000 | 15.70 |
| 50.0000 | 15.70 |
| 52.0000 | 15.70 |

| | |
|---|---|
| 54.0000 | 15.71 |

| | |
|---|---|
| 56.0000 | 15.71 |
| 58.0000 | 15.71 |
| 60.0000 | 15.72 |
| 62.0000 | 15.72 |
| 64.0000 | 15.72 |
| 66.0000 | 15.73 |
| 68.0000 | 15.73 |
| 70.0000 | 15.73 |
| 72.0000 | 15.73 |
| 74.0000 | 15.73 |
| 76.0000 | 15.74 |
| 78.0000 | 15.74 |
| 80.0000 | 15.74 |
| 82.0000 | 15.74 |
| 84.0000 | 15.74 |
| 86.0000 | 15.75 |
| 88.0000 | 15.75 |
| 90.0000 | 15.75 |
| 92.0000 | 15.75 |
| 94.0000 | 15.76 |
| 96.0000 | 15.75 |
| 98.0000 | 15.76 |
| 100.000 | 15.76 |
| 110.000 | 15.78 |
| 120.000 | 15.77 |
| 130.000 | 15.80 |
| 140.000 | 15.80 |
| 150.000 | 15.80 |
| 160.000 | 15.81 |
| 170.000 | 15.81 |
| 180.000 | 15.82 |
| 190.000 | 15.81 |
| 200.000 | 15.82 |
| 210.000 | 15.83 |
| 220.000 | 15.84 |
| 230.000 | 15.83 |
| 240.000 | 15.85 |
| 250.000 | 15.84 |
| 260.000 | 15.85 |
| 270.000 | 15.86 |