

Considered: _____

WATER PERMIT NO. 5608-3

Phone: 605 297-3334

Name of Applicant: TM Rural Water District

Post Office Address: PO Box 445, Parker SD 57053

Amount of Water Claimed: 1.34 cfs (970 ac-ft) Total Acres: _____

Source of Water Supply: groundwater

Water to be used for: rural water system use County: McCook

About 1 miles north of Dolton

PROOF OF PUBLICATION: Received _____ Not Received _____

APPLICATION: Approved _____ Subject to _____

F.F.& C/.L. Adopted _____ Not Approved _____ Deferred _____

PRIORITY Date Received: 1-13-92 Fee: \$375 Remarks Withdrawal

from future use permit no. 5358-3

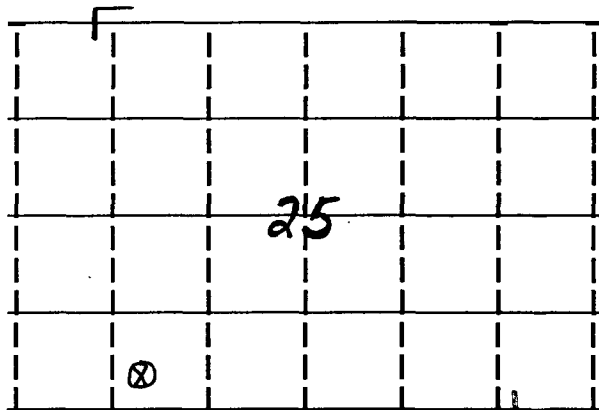
Corrected Application Received _____ Period of Annual Use Jan 1 - Dec 31

WATER QUALITY APPROVAL RECEIVED _____ APPROVED/CONDITIONAL (Circle one)

WI-1 Description same as Application YES _____ NO _____ REMARKS _____

Diversion Point: SW 1/4 SW 1/4 Sec 25-T101N-R55W

Land to be Irrigated: _____



Well Log: Driller: Layne-Western Co., Inc. Licensed YES X NO _____

Depth of Well: 370' REMARKS _____

Type of Map: topo PREPARED BY: Daryl C. Englund Reviewed and the Number

Assigned on 1-14-92 By Karen Schlaak



No. 5608-3 Hydrologic Unit 10170102
 Map No. _____ Basin Vermillion River
 Newspaper See list

Application for Permit To Appropriate Water Within The State Of South Dakota

Check one or more of the following:
 Industrial ☐ Commercial ☐ Municipal ☐ Other Common Distribution System ☐
 Water System ☒ Suburban Housing ☐ Geothermal Heat ☐ Institutional ☐ Recreational ☐
 Domestic ☐ (above 18gpm) Other ☐

Type of Application: Check one or more of the following

New ☐ Vested Right ☐ Future Use ☐ Change Use ☒

☐ Amend Permit No. _____ with old priority date retained

Change diversion point(s) ☐ Add diversion point(s) ☐ Other ☐ _____

☐ Application to: Change diversion point(s) ☐ Add diversion point(s) ☐ on Permit No. _____

☒ Construction to use water reserved by Future Use Permit No. 5358-3

1. Name of Applicant TM Rural Water District Phone No. (605) 297-3334

Post Office Address PO Box 445 Parker State SD Zip Code 57053
(Street, RR or Box) (City)

2. Amount of water claimed (c.f.s.) 1.34 cfs (970 acre-feet annually)

3. Source of water supply Unnamed Pleistocene (Outwash) Basal Aquifer

4. Location of point of diversion See Attached Map

N 50°3.3'E 200.48' from Southwest Corner Section 25, T101N, R55W, 5th P.M.

(SW 1/4 SW 1/4) County McCook
Hutchinson, Miner, Minnehaha

5. Counties where water will be used Turner, and McCook, Counties

6. Annual period during which water is to be used January 1 through December 31

7. Give a brief description of proposed project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

See Attached Engineering Report.

Project consists of a groundwater well and a 600 GPM capacity submersible turbine pump and motor.

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map (see instruction)

STATE OF SOUTH DAKOTA)
 County of McCook)^{ss}

I, Kenneth Pedersen, Manager, T-M Rural Water Dist. the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.

Signed Kenneth Pedersen

Subscribed and sworn to before me this 10 day of January 1992

Shirley Lee Konda
 Notary Public
My Commission Expires 11-29-98

**SOUTH DAKOTA
WATER PERMIT No. 5608-3**

Date of first receipt of application January 13, 1992.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 5608-3 to TM Rural Water District, PO Box 445, Parker SD 57053 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 5608-3 authorizes construction and placement to beneficial use 1.34 cubic feet of water per second (970 acre feet annually) from one well (Upper Vermillion Missouri Aquifer also known as Unnamed Pleistocene Basal Aquifer) 368 feet deep located in the SW 1/4 SW 1/4 Section 25-T101N-R55W. This water was appropriated and reserved by future use Permit No. 5358-3.
2. The water appropriated shall be used for the purpose of supplying water in Turner, McCook, Minnehaha, Miner and Hutchinson Counties and may not exceed the amount of water needed for beneficial use for rural water system purposes.
3. The water is to be used during the following described annual period: January 1 - December 31.
4. The date of approval of Permit No. 5608-3 is March 18, 1992.
5. The date from which applicant may claim right is October 11, 1989.
6. One-fifth of the construction is to be completed on or before September 18, 1994.
7. All construction is to be completed on or before March 18, 1997.
8. Water is to be put to beneficial use on or before March 18, 2001.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. The well authorized by Permit No. 5608-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted with cement (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:30.

(continued)

2. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
3. That the TM Rural Water District report to the Chief Engineer annually the amount of water withdrawn each year from the Upper Vermillion Missouri Aquifer.

WATER MANAGEMENT BOARD

By: *John Hatch*
Chief Engineer, Water Rights Division
Department of Environment and Natural Resources

MAR 19 1992
date

Supplemental Information

(type or print in ink)



1. Well Information - Proposed construction

- a) Drill Hole Diameter 28 inches Depth 368 feet
- b) Casing Type Steel Diameter 12.75" O.D. Thickness 0.375 inches
Wire Wrap
- c) Screen Type Stainless Steel Diameter 12.75" O.D. Thickness 0.375 inches
- d) Gravel Pack Thickness 8 inches Length of Gravel Pack 97 feet
- e) Depth to Top of Water Bearing Material 282 feet
- f) Depth to Water (ground surface to water level) 96 feet
- g) Distance to nearest existing domestic well:
 On applicants property N/A On property owned by others 1600 feet

2. Dugout Information Estimates

- a) Surface Dimensions --- Depth ---
- b) Depth to water (ground surface to water level) ---

3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below. The locations of each dam should be shown on the map submitted with the application.

- a) If a private engineering firm or government agency was involved in the design of this dam please give their name and address

b) Freeboard ---

c) Crest Width ---

Crest Length ---

d) Height ---

e) Primary Outlet Capacity ---
 If Pipe, diameter ---

f) Secondary Spillway Capacity ---
 Spillway width ---

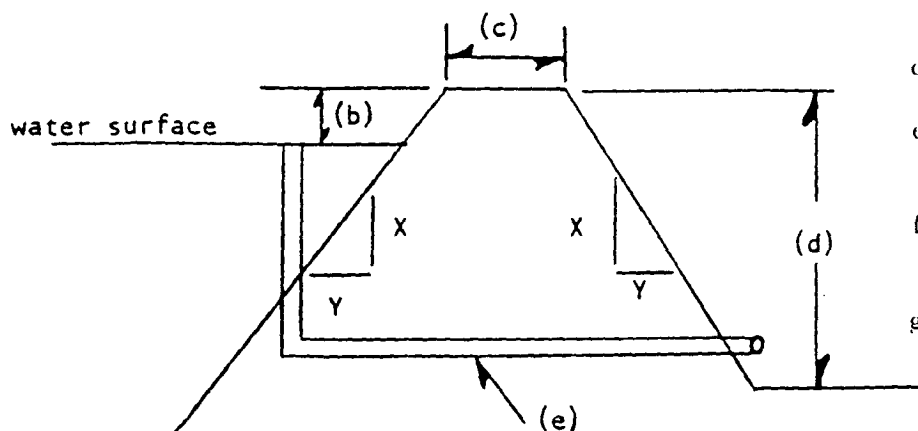
g) X & Y Slope
 Upstream ---

Downstream ---

Surface Area of Impoundment ---

Storage --- acre feet

Drainage area above dam ---



Signature of Applicant Kenneth Pedersen

Manager, T-M Rural Water District

W. 1/4 COR. SEC. 25-101-55
 FOUND CONC. NAIL IN
 CENTER OF U.S. HWY. #81

W. LINE SW 1/4 SEC. 25-101-55
 AND CENTERLINE U.S. HWY. #81

STATE OF SOUTH DAKOTA
 HIGHWAY NO. 81 R.O.W.

WELL SITE NO. 4

1.00 ACRES TOTAL
 0.16 ACRES PUBLIC ROAD EASEMENT
 0.84 ACRES NET

S. 89°23'05" W.
 208.71'

N. 00°00'00" E. - 208.72'

N. 89°23'05" E. - 2,656.88'

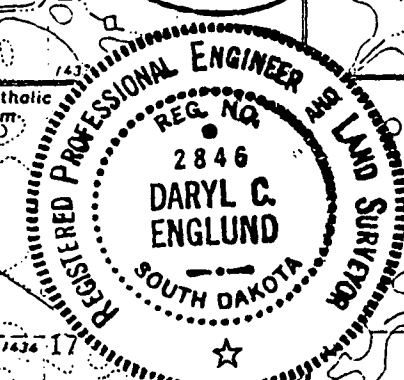
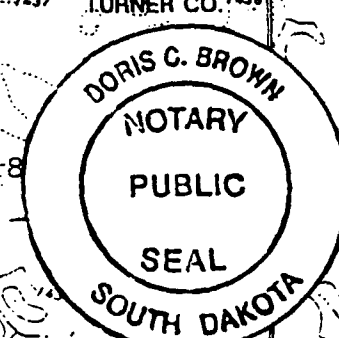
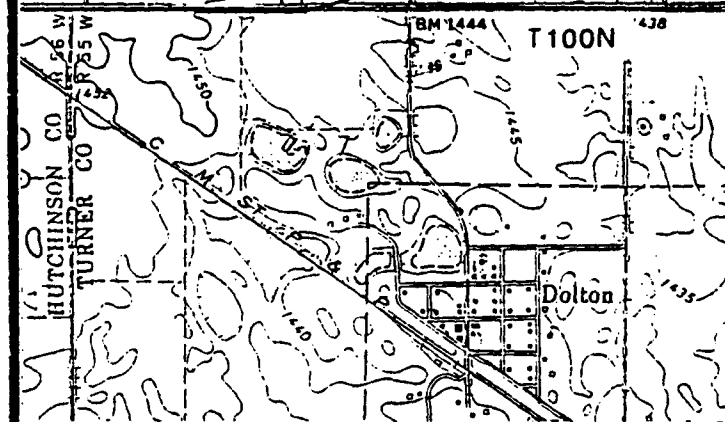
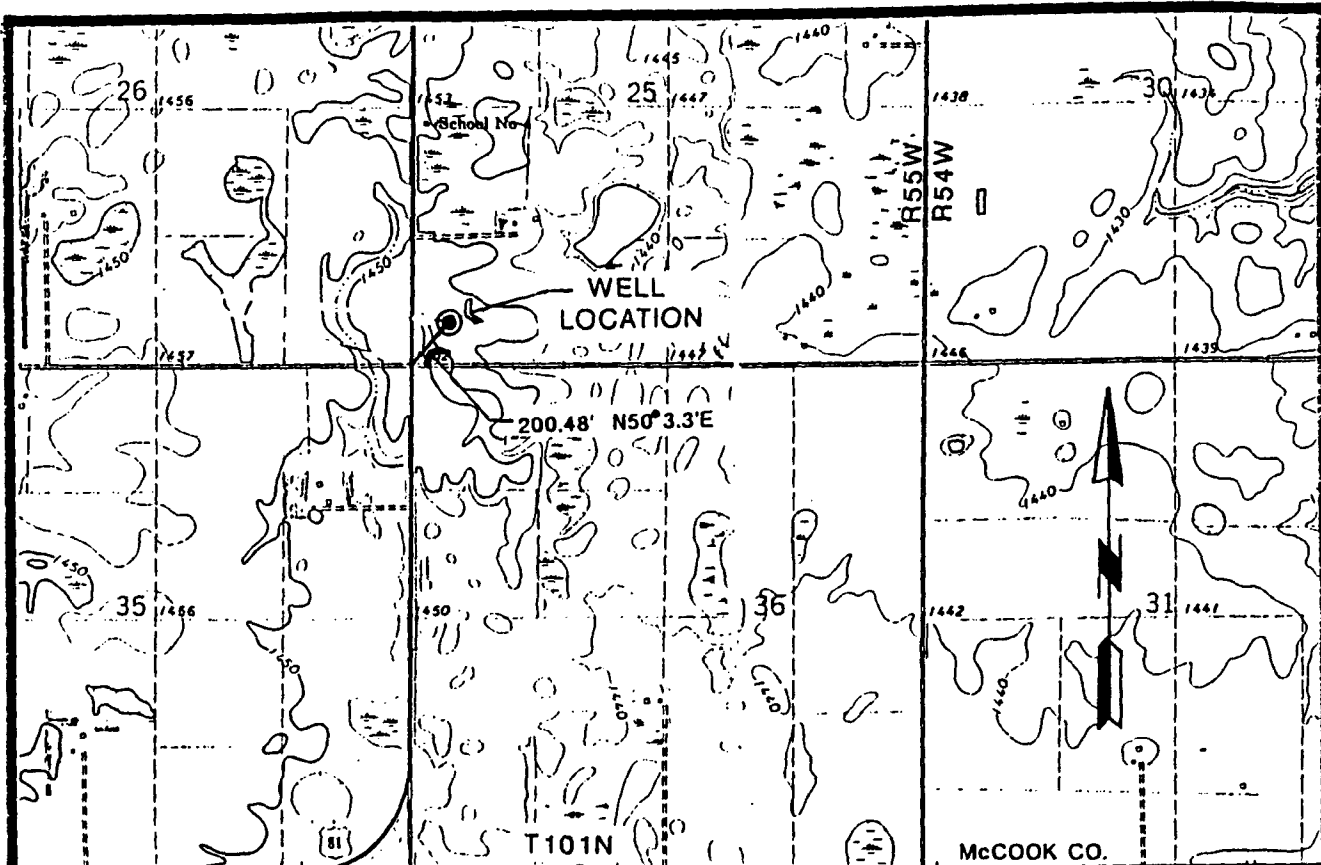
SW COR. SEC. 25-101-55
 FOUND CONC. NAIL IN CENTER
 OF 1/4 COR.

S. LINE SW 1/4 SEC. 25-101-55

S. 1/4 COR.
 SEC. 25-101-55



- △ FOUND MONUMENT
- SET NAIL
- SET 1/2"
- SET RAILROAD



SURVEYOR'S CERTIFICATE

STATE OF SOUTH DAKOTA
COUNTY OF BROOKINGS

I, DARYL ENGLUND, A REGISTERED LAND SURVEYOR IN THE STATE OF SOUTH DAKOTA, DO HEREBY CERTIFY THAT AT THE REQUEST OF THE T-M RURAL WATER DISTRICT, PARKER, SOUTH DAKOTA, I DID PREPARE THE MAP ON THIS SHEET FROM EXISTING INFORMATION AND THAT I DID SURVEY AND LOCATE THE SITES FOR WHICH APPLICATION FOR AN APPROPRIATIVE WATER RIGHTS TO WITHDRAW UNDERGROUND WATERS FOR RURAL WATER SUPPLY PURPOSES IS MADE, AND THAT THIS MAP IS A TRUE REPRESENTATION THEREOF.

IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND AND SEAL THIS 9th DAY OF January, A.D. 1992.

Daryl C. Englund
REGISTERED LAND SURVEYOR

STATE OF SOUTH DAKOTA
COUNTY OF BROOKINGS

ON THIS DAY, BEFORE ME, THE UNDERSIGNED, A NOTARY PUBLIC WITHIN AND FOR SAID STATE AND COUNTY, PERSONALLY APPEARED DARYL ENGLUND, KNOWN TO ME TO BE THE PERSON WHO EXECUTED THE FOREGOING SURVEYOR'S CERTIFICATE AND ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME.

WITNESS MY HAND AND SEAL THIS 9th DAY OF January, A.D. 1992.

Doris C. Brown
NOTARY PUBLIC

MY COMMISSION EXPIRES 12-9-97

T-M RURAL WATER DISTRICT

PARKER, SOUTH DAKOTA

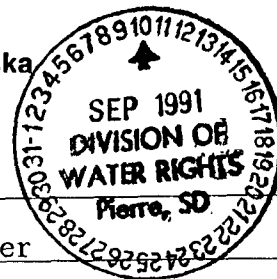
WATER RIGHTS MAP

Layne-Western Company, Inc.

4430 Commercial Avenue

Omaha, Nebraska

TEST WELL REPORT



City and State Dolton, SD

Date 7-17-91

Contract T.M. Rural Water

Driller Jim Rentschler

Test No. 91-1

Helpers Lyle Porter

Static Water Level 100'

Test Log

<u>0- 10 Brown sandy clay</u>	<u>154-160 Fine sand, trace clay</u>
<u>10- 15 Coarse & fine sand & clay, gravel & rocks</u>	<u>160-170 Fine-med. sand, trace coarse</u>
<u>15- 93 Blue sandy clay</u>	<u>170-180 Med. & fine sand</u>
<u>93- 94 Boulders & clay</u>	<u>180-190 Med. & fine sand, trace clay</u>
<u>94-112 Sandy blue clay</u>	<u>190-200 Med. & fine sand</u>
<u>112-114 Sandy clay & boulders</u>	<u>200-215 Medium sand</u>
<u>114-145 Blue clay</u>	<u>215-220 Sand with clay</u>
<u>145-150 Fine sand w/clay</u>	<u>220-223 Medium sand</u>
<u>150-154 Blue clay</u>	<u>223-225 Sand & clay</u>

Size Mud Pit—Length 12', Width 5', Depth 2'

WATER BEARING FORMATION DATA

Depth	Vis-Secs.	Inches Mud Taken from Pit	Drilling Time
<u>160 to 180</u>	<u>30</u>	<u>1"</u>	
<u>180 to 200</u>	<u>30</u>	<u>3/4"</u>	
<u>200 to 220</u>	<u>30</u>	<u>1/2"</u>	
<u>220 to 240</u>	<u>30</u>	<u>0</u>	
<u>240 to 260</u>	<u>30</u>	<u>0</u>	
<u>260 to 280</u>	<u>30</u>	<u>0</u>	
<u>280 to 300</u>	<u>40</u>	<u>0</u>	

LOCATION: 2 miles North of Dolton, East side of Hwy. 81

REMARKS: Should pump 802 GPM Put in 4" PVC well, pumped & took water samples.

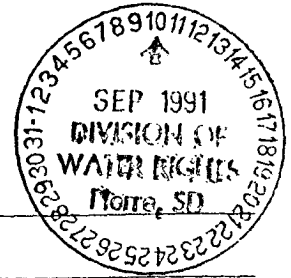
MAKE SKETCH ON BACK OF THIS SHEET SHOWING LOCATION TIEING IT INTO PERMANENT STRUCTURES AS MUCH AS POSSIBLE

Layne-Western Company, Inc.

4430 Commercial Avenue

Omaha, Nebraska

TEST WELL REPORT



City and State _____

Date _____

Contract T.M. R.W.D.

Driller _____

Test No. 91-1

Helpers _____

Static Water Level _____

Test Log _____

225-227 Medium sand	283-288 Med. to coarse sand, some gravel,
227-235 Med & fine sand w/clay	some quartzite, some hard
235-236 Boulders	288-305 Coarse & fine sand, trace of gravel,
236-245 Fine & med. sand	some hard.
245-255 Coarse & fine sand, some gravel	305-306 Very hard quartzite
caved a little	306-370 Fine & coarse sand, trace gravel
255-265 Boulders & sandy clay	370-372 Sandy clay
265-282 Sand clay	372-386 Fine & coarse sand, some gravel, some lignite
282-283 Very hard quartzite	386-387 Very hard quartzite

Size Mud Pit—Length 12', Width 5', Depth 2'

WATER BEARING FORMATION DATA

Depth	Vis-Seconds	Inches Mud Taken from Pit	Drilling Time
300 to 320	35	0	
320 to 340	32	1/4	
340 to 360	32	1/2	
360 to 386	32	1/2	
to			
to			
to			

LOCATION: _____

REMARKS: _____

MAKE SKETCH ON BACK OF THIS SHEET SHOWING LOCATION TIEING IT INTO PERMANENT STRUCTURES AS MUCH AS POSSIBLE

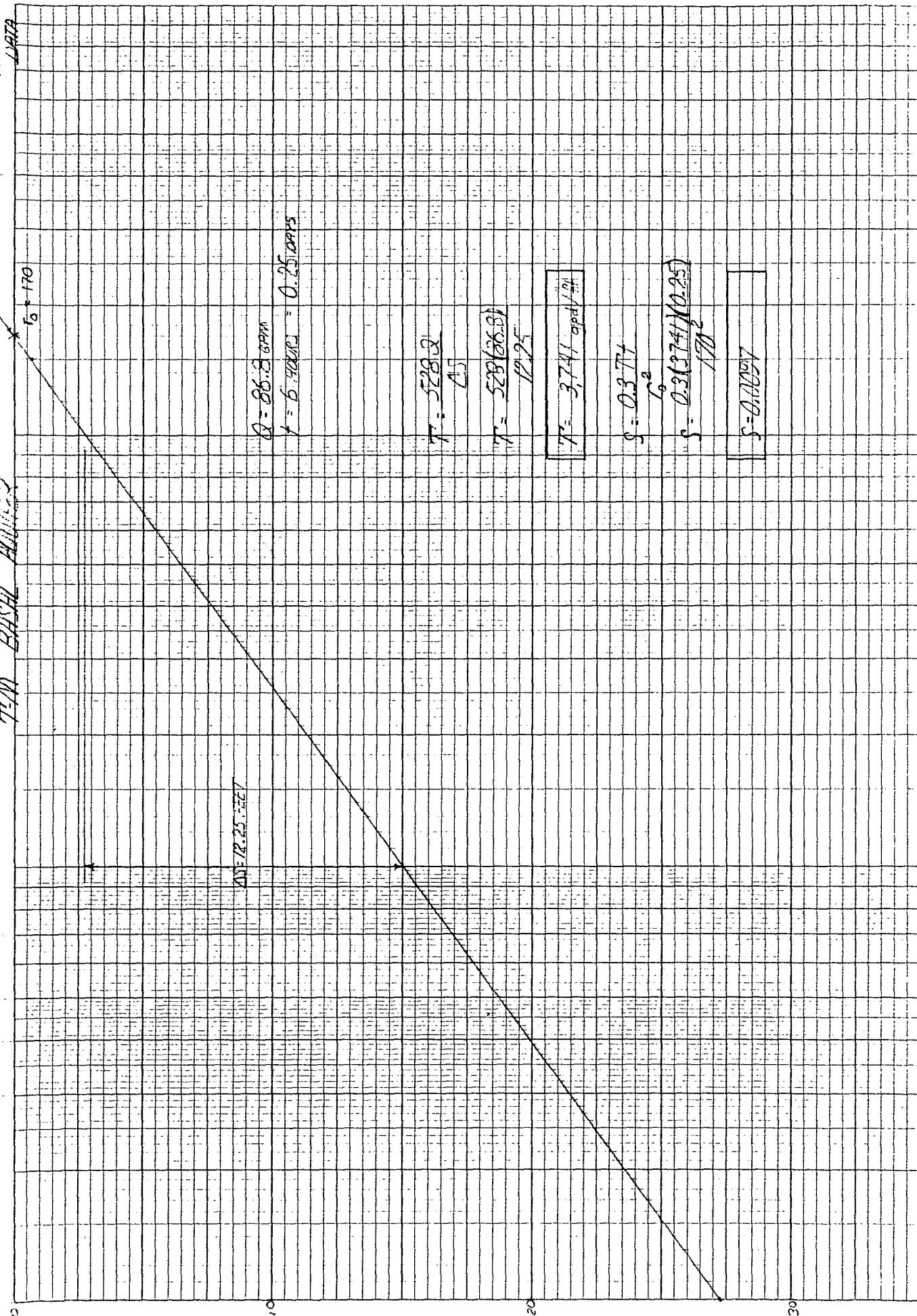
A circular library stamp from the University of Michigan Library. The text "UNIVERSITY OF MICHIGAN LIBRARY" is curved along the top inner edge. The date "SEP 1991" is stamped in the center. The text "LIBRARY OF THE" is curved along the bottom inner edge. There is also some faint, illegible text at the very bottom of the stamp.

[illegible]

46 5493

25 SEP 1964
K&E
FORM LAM-112

DISTANCE-DRAINAGE TWO BASAL POINTS



DISTANCE FROM OBSERVE WELL IN FEET

DRAINAGE IN FEET

1. Contract 72-1397 TM Rural Water District Date 11-19-91

2. City and State Dolton, S.D. Driller Gary McCracken

3. Well No. 1 at test hole No. _____ Well location (attach map) _____

4. Work completed _____ No of man hours as charged to job on time sheet _____

5. MATERIAL:

	LENGTH	DIA.	GAUGE OR WALL THICKNESS	MATERIAL	TYPE	NO. OF OPENINGS
6. Screen	<u>81.0</u>	<u>12.75</u>	<u>.375</u>	<u>SS</u>	<u>wire wrap</u>	<u>.035</u>
7. Inner Casing	_____	_____	_____	_____	_____	_____
8. Outer Casing	<u>291</u>	<u>12.75</u>	<u>.375</u>	<u>black</u>	<u>blank</u>	_____

9. _____ tons of gravel used in the well. Size Northern "0"

10. Test of well. Did you use test or permanent pump? _____ Size of Bowl _____ Stages _____

11. Size of orifice _____ inch by _____ inch. Orifice tube reading _____ inches.

12. Pumping test — measurements from ground level:

TIME	G.P.M.	STATIC	DRAWDOWN	PUMPING LEVEL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

13. Recovery in 5 minutes _____, in 30 minutes _____

14. Did you seal bottom of well? yes Thickness .375 inches, material SS

15. Well underreamed? no From _____ feet to _____ feet, _____ feet to _____ feet.

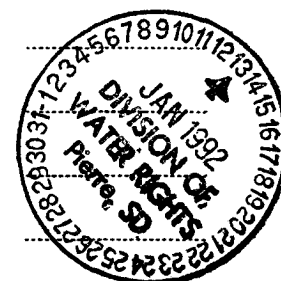
16. If all screen was not placed at bottom, state how it was spaced.

From _____ feet to _____ feet; from _____ feet to _____ feet; from _____ feet to _____ feet.

17. Depth of well from ground level to top of plug 368 Size of drilled hole 28"

18. Was cement placed around or between any of the casings? yes

19. If so, state where, how much and method used. 262 ft. to 5 ft. 40 yds
tremmie

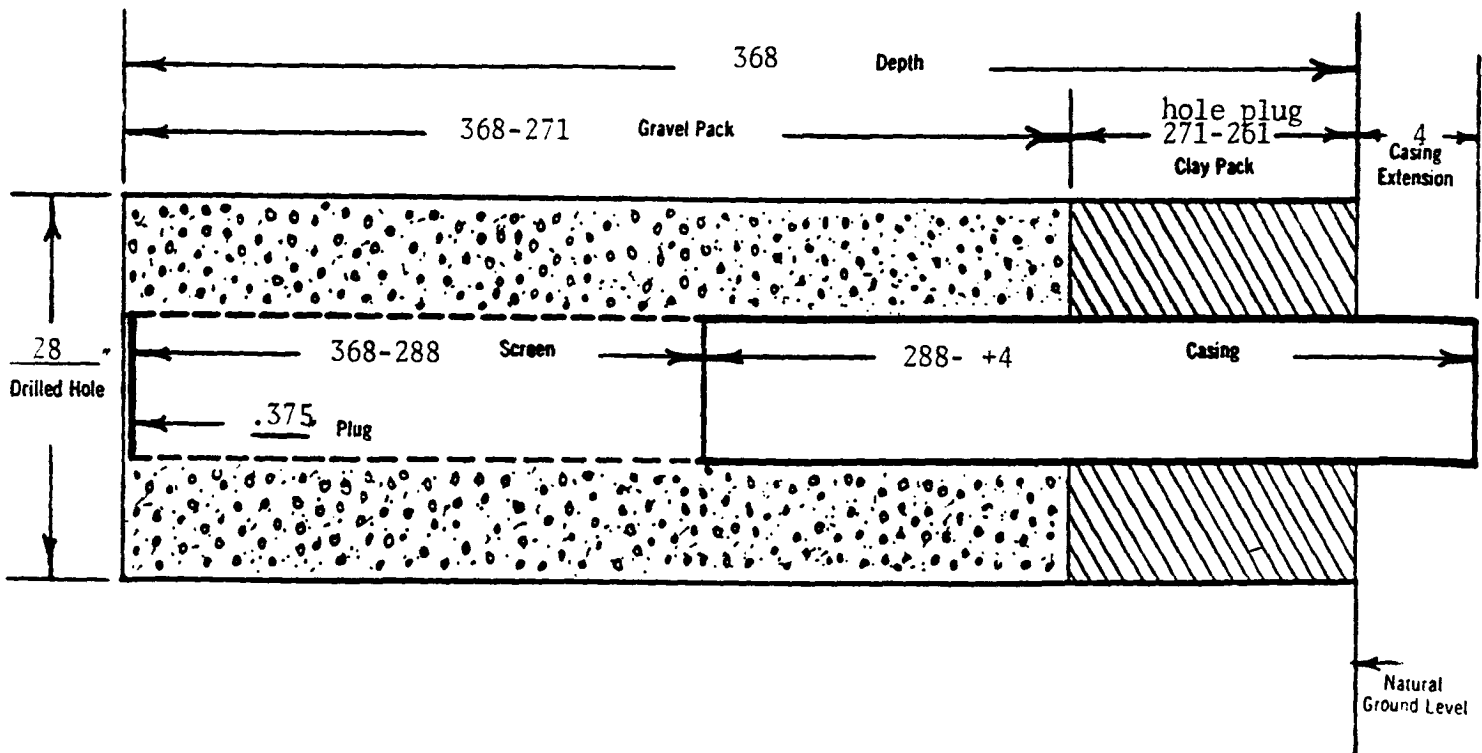
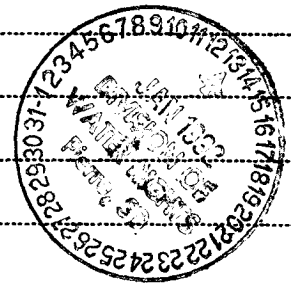


CONTRACT 72-1397 TM Rural Water District

Well No. 1

Log of well from ground level:

Feet	to	Feet	Formation
0	to	2	Top Soil
2	to	24	Yellow Clay
24	to	35	Blue Clay With Gravel Layers
35	to	72	Blue Clay Gravel Mixed
72	to	102	Blue Clay
102	to	119	Blue Clay & Gravel
119	to	162	Blue Clay
162	to	185	Course Sand
185	to	205	Blue Clay With Sand Lenses
205	to	282	Blue Clay & Boulders
282	to	286	Course Sand & Blue Clay Layers
286	to	306	Medium to Course Sand, Fine Gravel
306	to	308	Course Sand
308	to	310	Boulders
310	to	368	Course to Medium Sand
368	to	370	Gray Clay



LAYNE-WESTERN COMPANY, INC.
OMAHA, NEBRASKA/SIOUX CITY, IOWA
PLUMBNESS & ALIGNMENT TEST



CUSTOMER: TMRWD Dolton, S.D. 72-1397

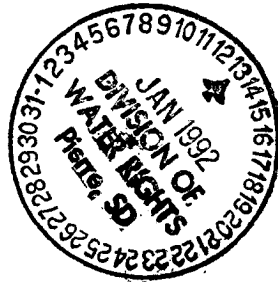
FOREMAN: Gary McCracken

DATE COMPLETED: _____

WELL NO.: _____

	<u>NORTH/SOUTH</u>	<u>EAST/WEST</u>
0	6	6 $\frac{1}{4}$
10	5 $\frac{3}{4}$	6 $\frac{3}{8}$
20	6	6 $\frac{3}{8}$
30	6	6 $\frac{1}{2}$
40	5 $\frac{3}{4}$	6 $\frac{1}{2}$
50	5 $\frac{3}{4}$	6 $\frac{3}{4}$
60	5 $\frac{3}{4}$	6 $\frac{3}{4}$
70	6	7
80	5 $\frac{3}{4}$	6 $\frac{3}{4}$
90	6	6 $\frac{3}{4}$
100	6	6 $\frac{3}{4}$
110	6	6 $\frac{3}{4}$
120	6	6 $\frac{3}{4}$
130	6	6 $\frac{3}{4}$
140	5 $\frac{3}{4}$	6 $\frac{3}{4}$
150	5 $\frac{3}{4}$	6 $\frac{3}{4}$
160	5 $\frac{3}{4}$	6 $\frac{3}{4}$
170	6	6 $\frac{3}{4}$
180	5 $\frac{3}{4}$	6 $\frac{3}{4}$
190	6	6 $\frac{3}{4}$
200	5 $\frac{3}{4}$	7
210	5 $\frac{3}{4}$	7
220	5 $\frac{3}{4}$	7
230	6	7
240	5 $\frac{3}{4}$	6 $\frac{3}{4}$
250	5 $\frac{3}{4}$	7
260	5 $\frac{3}{4}$	7
270	6	7
280	6	7
290		
300		
310		
320		
330		
340		
350		





LAYNE-WESTERN COMPANY, INC.
OMAHA, NEBRASKA
WELL SCREEN/CASING INSTALLATION

JOB NAME: TM Rural Water District Dolton SD

SCREEN (FROM BOTTOM TO TOP)

INSTALLED BY: Gary McCracken
SIZE: 12 3/4

1. 20.25
2. 20.25
3. 20.25
4. 20.25
5.
6.
7.
8.
9.
10.

11.
12.
13.
14.
15.

CASING (FROM BOTTOM TO TOP)

INSTALLED BY: Gary McCracken
SIZE: 12 3/4
ANY MATERIAL CUT FROM LAST PIECE
(YES/NO) IF SO, HOW MUCH: 13'

1. 22.1
2. 22.0
3. 22.6
4. 21.1
5. 21.7
6. 21.4
7. 21.6
8. 21.7
9. 21.6
10. 21.7

11. 21.6
12. 21.6
13. 21.6
14. 22.1
15.
16.
17.
18.
19.
20.

TRAUT



WELLS

OPERATING & MAINTENANCE MANUAL

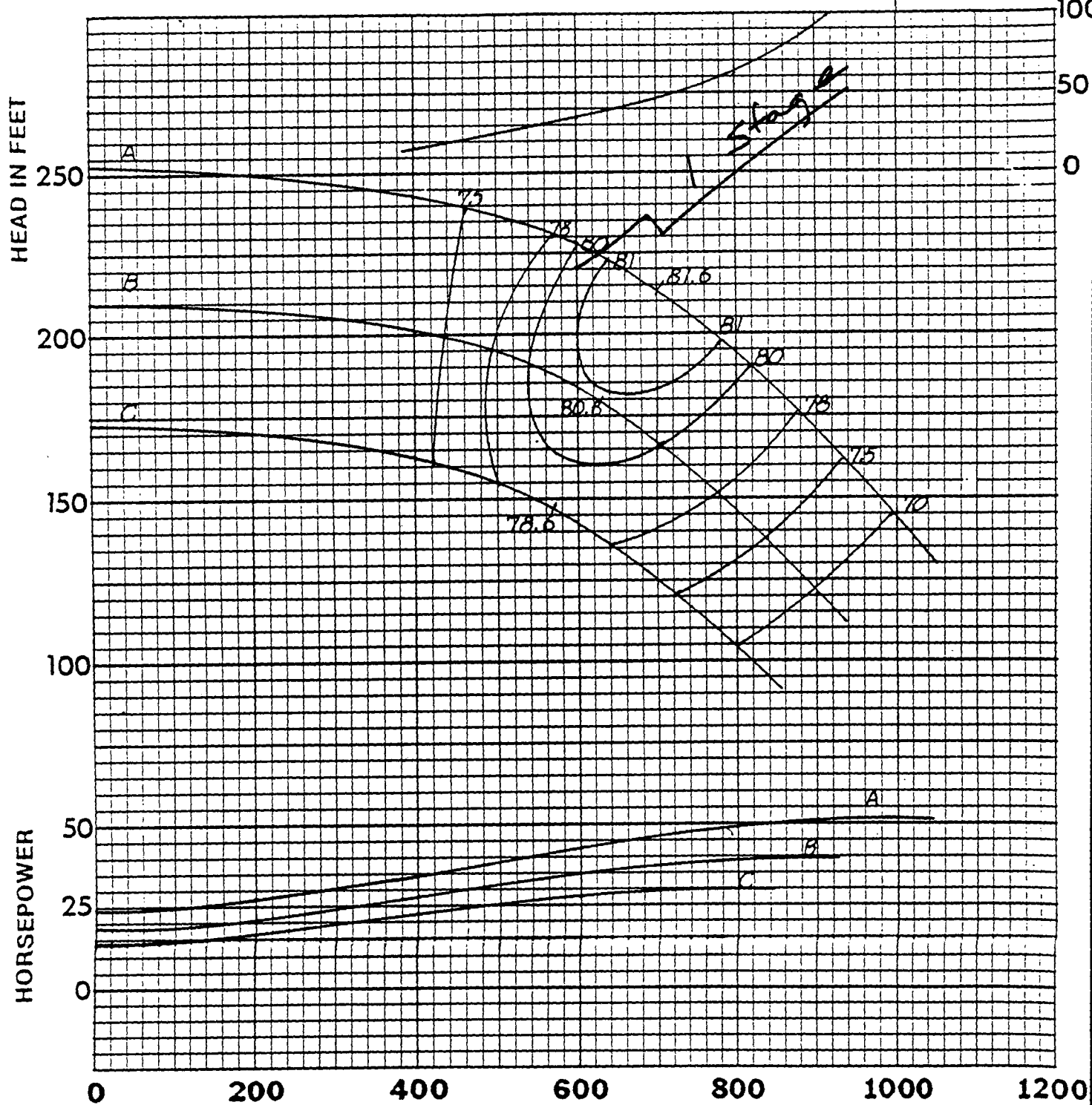
AMERICAN TURBINE PUMP FRANKLIN MOTOR

Well No. 4
T-M Rural Water
Parker, SD

For Parts or Service:

Mark J. Traut Wells, Inc.
151 72nd Avenue South
St. Cloud, MN 56301

800-728-5091


CAPACITY IN U.S. G.P.M.

Impeller - Bronze		Bowl Length 1st Stage	26
Bowl - Cast Iron/Enamel		Bowl Length Additional Stage	7.375
Bowl Bearings -	BRASS	Impeller - Weight	8.7
Bowl Shaft -	S. S.	Impeller Shaft Diameter	1.5
Thrust Factor	3.27	Impeller End Lateral	.560
Bowl Wt. 1st Stage (lbs.)	170	Column Pipe Size	4-5-6
Bowl Wt. Additional Stage (lbs.)	60	Suction Pipe Size	5

IMPELLER DATA

IMPELLER NO. L-30 TYPE ENC DIAMETER: A 7.70", B 7.2", C 6.7", D ",
 EFFICIENCY CORRECTION: ONE STAGE DEDUCT 4%, TWO STAGE DEDUCT 3%,
 THREE STAGE DEDUCT 2%, FOUR STAGE DEDUCT 1%
 EFFECTIVE EYE AREA 7.24 sq. inches. NUMBER OF VANES 8
 THRUST CONSTANT K 3.27 lbs./ft. of head. WEIGHT 8.7 lbs.
 WR^2 .325 lbs. ft.². EYE FLUID VELOCITY CK .0443 ft./sec./GPM.
 PERIPHERAL VELOCITY 15.35 ft./sec./inch of impeller dia. Ns 1629

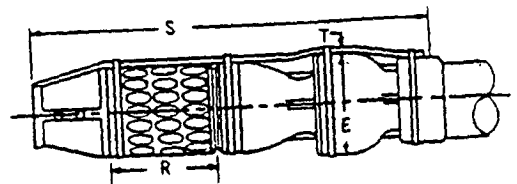
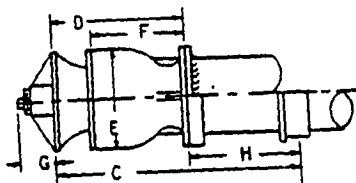
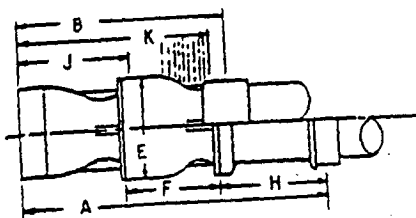
BOWL DATA

BOWL NO. 10-L CONNECTION TYPE BOLT NOMINAL DIAMETER (E) 9.650".
 MINIMUM DIAMETER (E) 9.50".
 COLUMN PIPE SIZE 6" STANDARD, 8" MAXIMUM, 4" MINIMUM.
 SUCTION PIPE SIZE 5" STANDARD, 5" MAXIMUM.
 PUMP SHAFT DIAMETER 1.5" STANDARD, 1.75" MAXIMUM.
 LATERAL .560" STANDARD, .750" MAXIMUM.
 SHAFT BEARING CLEARANCE .010 IMPELLER SKIRT CLEARANCE .015
 MAXIMUM NUMBER OF STAGES 3 (std. construction).
 MAXIMUM HEAD 613 ft. (std. construction). MAXIMUM SPHERE SIZE .550".
 PROJECTIONS ABOVE COLUMN PIPE BUTT: TUBE; SHAFT - FOR EITHER OPEN OR ENCLOSED
 LINESHAFT.

DIMENSIONS

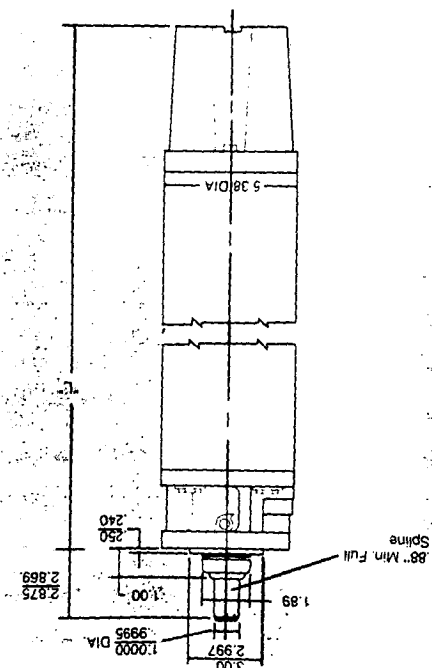
- A - Length one stage assembly with discharge bowl.
- B - Length one stage assembly less discharge bowl.
- C - Length one stage assembly with discharge bowl and bell.
- D - Length one stage assembly less discharge bowl with bell.
- E - Bowl Diameter.
- F - Length of additional stage.
- G - Hub projection on bell suction.
- H - Length of discharge bowl.
- J - Length of impeller eye above bottom of bowl.
- K - Minimum required submergence.
- R - Length submersible suction inlet.
- S - Length one stage submersible assembly.
- T - Height of cable guard.

DIMENSION	A	B	C	D	E	F	G	H	J	K	R	S	T
INCHES	26	14.8	26	14.8	9.6	7.37		1.11	7.25	5.5			



SUPER-6" SUBMERSIBLE MOTORS

DIMENSIONS



AVAILABILITY

Single Phase				Three Phase			
Capacitor start, capacitor run (control box required)							
hp	kW	ins	cm	Shipping Weight	lbs	kg	
5.0	3.7	25.44	64.6	105	47.7		
7.5	5.5	24.19	61.4	95	43.1		
10.0	7.5	25.44	64.6	105	47.7		
15.0	11.0	28.00	71.1	120	54.5		
20.0	15.0	30.56	77.6	135	61.3		
25.0	18.5	33.13	84.2	148	67.2		
30.0	22.0	35.69	90.7	162	73.5		
40.0	30.0	40.81	103.7	195	88.5		
50.0	37.0	57.83	146.9	310	140.6		
60.0	45.0	63.83	162.1	340	154.2		
① 60 Hz - Nominal 3,450 RPM							
50 Hz - Nominal 2,875 RPM							

CONSTRUCTION MATERIALS

Component

1 Castings	Gray Iron	Ni-Resist Type 1B	316S.S.	316S.S.	Chemical (316 STNLS)
2. Stator Shell	301S.S.	316S.S.	316S.S.	316S.S.	
3. Stator Ends	Low Carbon Steel	316S.S.	316S.S.	316S.S.	
4. Shaft Extension	303S.S. Except 17-4S.S. On 40-60hp	17-4S.S.	17-4S.S.	17-4S.S.	
5. Fasteners	400 Series S.S.	316S.S.	316S.S.	316S.S.	
6. Seal Cover	304S.S. & Sintered Bronze	316S.S.	316S.S.	316S.S.	
7. Seal	Nitrile Carbon Ceramic Face	Nitrile Carbon Ceramic Face	Nitrile Carbon Ceramic Face	Nitrile Carbon Ceramic Face	
8. Diaphragm	Nitrile Rubber	Type 200 Hydrin	Type 200 Hydrin	Type 200 Hydrin	
9. Diaphragm Plate	304S.S.	316S.S.	316S.S.	316S.S.	
10. Diaphragm Spring	302S.S.	17-7S.S.	17-7S.S.	17-7S.S.	
11. Slinger	Nitrile Rubber	Type 100 Hydrin	Type 100 Hydrin	Type 100 Hydrin	
12. Lead Wire (or Cable)②	Neoprene	②	②	②	
13. Lead Sleeve②	Nickle Plated 330 Alloy Brass	316S.S.	316S.S.	316S.S.	
14. Lead Potting②	Epoxy	Epoxy	Epoxy	Epoxy	
15. Lead Jam Nut②	SAE 360 Brass	316S.S.	316S.S.	316S.S.	
16. Filter	Delrin & Polyester	316S.S. Plug	316S.S. Plug	316S.S. Plug	
Standard Water Well					
Saltwater (Ni-Resist)					
Chemical (316 STNLS)					

② Ordered separately for saltwater and Chemical motors. Supplied on standard water well.

Specifications subject to change without notice. Contact F.E. if current material types are required for bid specifications.

Franklin Electric



400 E. Spring Street, Bluffton, Indiana 46714
219-824-2900

Well Data

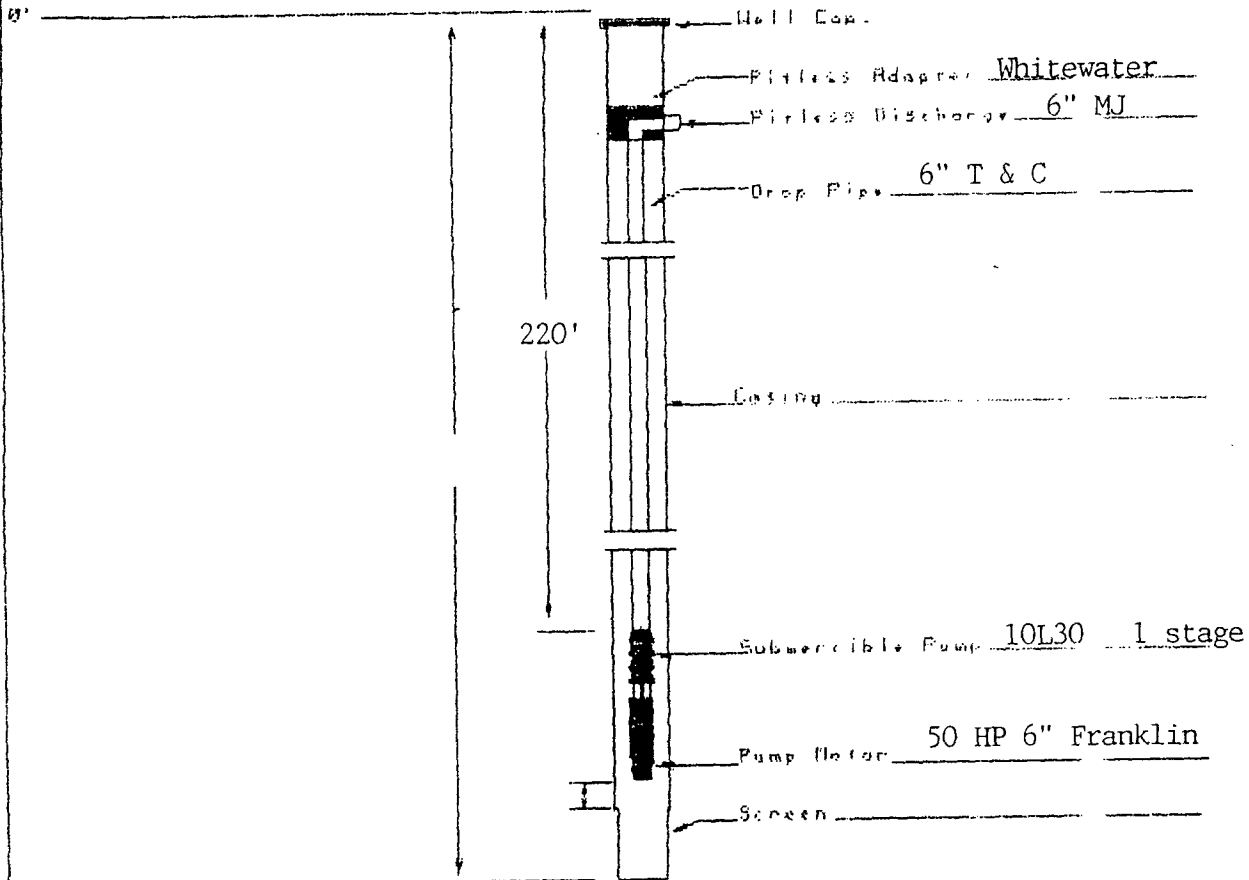
Static W/L _____
Drawdown _____
Drilling Date _____
Driller _____
Orig. Casing Elev. _____
SDHS

Pump Data

Manufacturer American Turbine
Installation Date 6/15/92
Installer Traut Wells
Capacity 220' 600 GPM
Motor HP 50 RPM 3450
Volts 460 Phase 3

Well Log

Depth In Feet / Formation



Well No. 4
T-M Rural Water
Parker, SD

Super-6 Dimensions

4 holes
1/2-20 UNF
4.38 dia. B.C.

5.000 dia.
2.875
2.869

2.50
2.40

5.38 dia. B.C.

2.50 dia.

SUPER-6 Availability

Six Inch Motors

h.p.	volts	max amps.	"L" dimen.	mtr. wgt.	thrust capacity
5	230	27.5	30.83"	103#	1500#
7½	230	42.1	33.39"	117#	1500#
10	230	51.0	35.95"	130#	3500#
5	200	19.1	28.26"	88#	1500#
	230	16.6	28.26"	88#	1500#
	460/380	8.3	28.26"	88#	1500#
	575	6.6	28.26"	88#	1500#
7½	200	28.3	29.58"	100#	1500#
	230	24.6	29.58"	100#	1500#
	460/380	12.3	29.58"	100#	1500#
	575	9.8	29.58"	100#	1500#
10	200	37.0	30.83"	105#	3500#
	230	32.2	30.83"	105#	3500#
	460/380	16.1	30.83"	105#	3500#
	575	12.9	30.83"	105#	3500#
15	200	54.5	33.39"	120#	3500#
	230	47.4	33.39"	120#	3500#
	460/380	23.7	33.39"	120#	3500#
	575	19.0	33.39"	120#	3500#
20	200	69.7	35.95"	132#	3500#
	230	60.6	35.95"	132#	3500#
	460/380	30.3	35.95"	132#	3500#
	575	24.4	35.95"	132#	3500#
25	200	86.3	38.51"	145#	3500#
	230	75.0	38.51"	145#	3500#
	460/380	37.5	38.51"	145#	3500#
	575	30.0	38.51"	145#	3500#
30	200	104.0	41.08"	160#	3500#
	230	90.4	41.08"	160#	3500#
	460/380	45.2	41.08"	160#	3500#
	575	36.2	41.08"	160#	3500#
40	460/380	62.0	46.20"	190#	3500#
	575	49.6	46.20"	190#	3500#
50	460/380	77.0	60.70"	265#	3500#
	575	61.6	60.70"	265#	3500#

① 60 HZ ratings listed; refer to factory for 50 HZ

② Franklin control box required

③ 60/50 HZ, 3450/2875 r.p.m.

STOCK LOCATIONS

Strategically located stock quantities make the Super-6 motor quickly available in the major market areas of the world.

Arizona—Precision Electric
1822 E. Jackson St., Phoenix, AZ 80534
602/252-2821

California—Franklin Electric
6677 E. 26th St., Los Angeles, CA 90040
213/722-7787

California Electric Co.
3015 Adeline St., Oakland, CA 94608
415/665-6100

Colorado—Wazee Electric Co.
2020 W. Barbary Place, Denver, CO 80204
303/892-7003

Florida—Franklin Electric
3624 Silver Star Rd., Orlando, FL 32808
305/293-0041

Georgia—Electric Control Products
2375 John Glenn Dr., Suite 105, Atlanta, GA 30341
404/455-1216

Indiana—Franklin Electric
400 E. Spring St. Bluffton, IN 46714
219/824-2900

Minnesota—Electric Motor Repair, Inc.
2010 North 4th St., Minneapolis, MN 55411
612/522-3318

Missouri—Missouri Machinery
and Engineering Company, Inc.
918 South 4th St., St. Louis, MO 63102
314/231-9806

New Jersey—Industrial Electric Service Co., Inc.
259-263 Goffle Rd., Hawthorne, NJ 07507
201/423-1212

North Carolina—Submersible Motor Repair
502 S. White St., Wake Forest, NC 27587
919/556-3229

Oklahoma—Franklin Electric
270 West Stovall Rd., Wilburton, OK 74758
918/465-2348

Oregon—Walker Electric Works
206 N.W. 10th Ave., Portland, OR 97209
503/226-6828

Tennessee—Southern Electric Co.
812 Porter St., Memphis, TN 38104
901/794-4651

Texas—Brandon & Clark Electric Co.
3623 Ave. H., Lubbock, TX 79404
806/747-3861

Canada-Alberta—Foothills Electric of Canada Ltd.
#3, 3924-3A Street N.E. Calgary, Alberta T2E 6R4
403/277-3522

Canada-Ontario—Franklin Electric of Canada Ltd.
Highway 81 North, Strathroy, Ont. N7G 2B8
519/245-3200



Franklin Electric

IMPELLER DATA

IMPELLER NO. L-30 TYPE ENC. DIAMETER: A 7.70", B 7.2", C 6.7", D ", "
 EFFICIENCY CORRECTION: ONE STAGE DEDUCT 4 %, TWO STAGE DEDUCT 3 %, %
 THREE STAGE DEDUCT 2 %, FOUR STAGE DEDUCT 1 %
 EFFECTIVE EYE AREA 7.24 sq. inches. NUMBER OF VANES 8
 THRUST CONSTANT K 3.27 lbs./ft. of head. WEIGHT 8.7 lbs.
 WR^2 .325 lbs. ft.². EYE FLUID VELOCITY CK .0443 ft./sec./GPM.
 PERIPHERAL VELOCITY 15.35 ft./sec./inch of impeller dia. Ns 1629

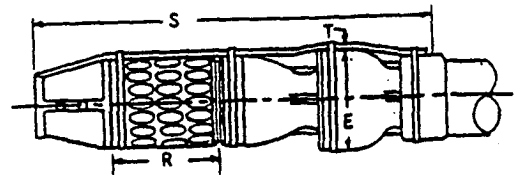
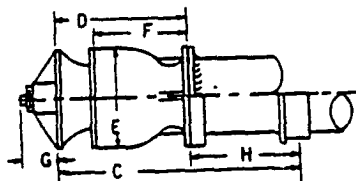
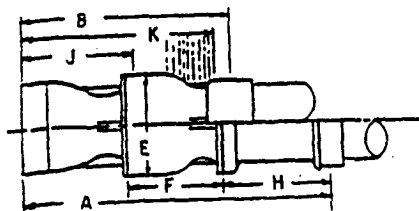
BOWL DATA

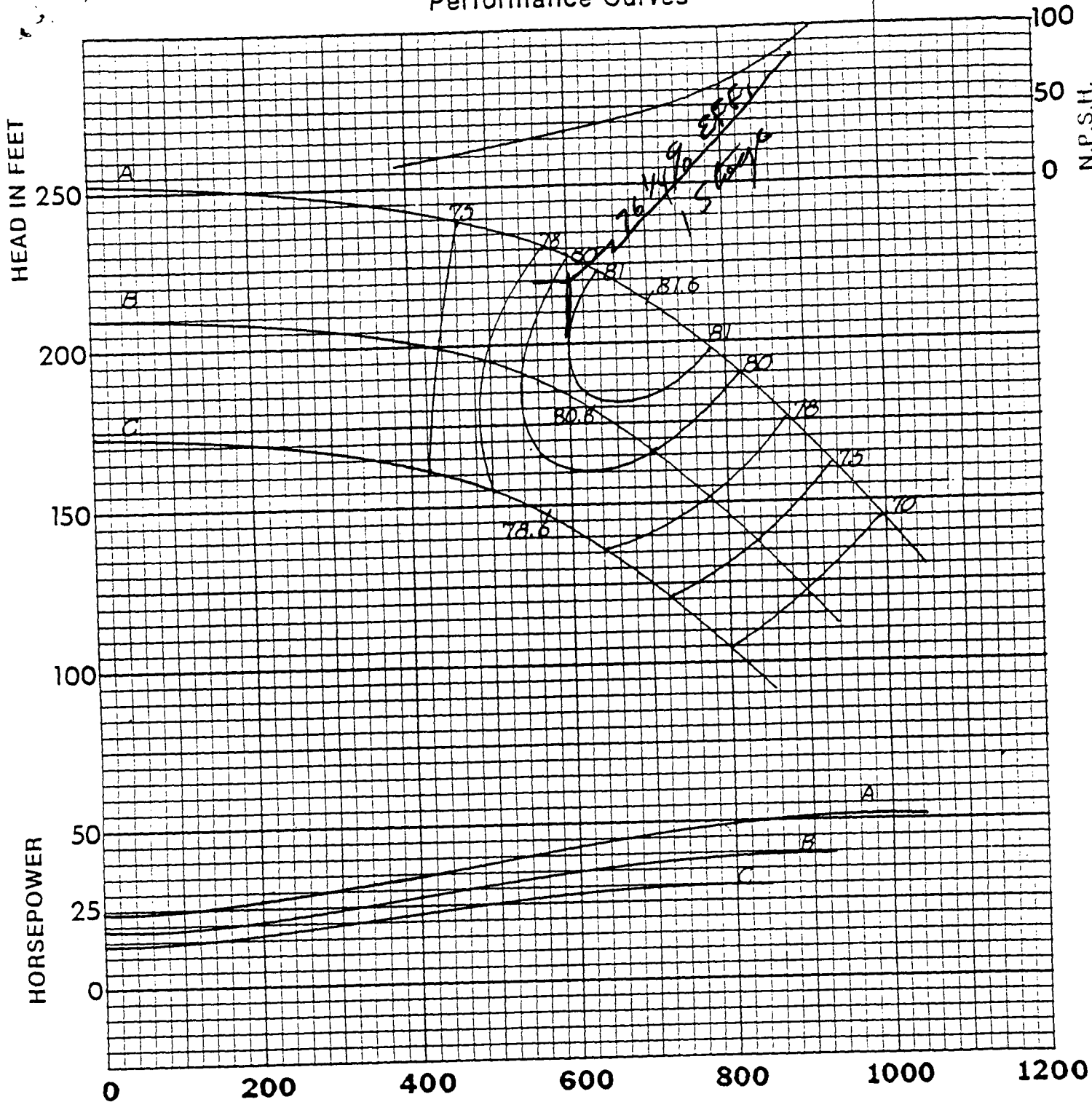
BOWL NO. 10-L CONNECTION TYPE BOLT NOMINAL DIAMETER (E) 9.650".
 MINIMUM DIAMETER (E) 9.50".
 COLUMN PIPE SIZE 6" STANDARD, 8" MAXIMUM, 4" MINIMUM.
 SUCTION PIPE SIZE 5" STANDARD, 5" MAXIMUM.
 PUMP SHAFT DIAMETER 1.5" STANDARD 1.75" MAXIMUM.
 LATERAL .560" STANDARD, .750" MAXIMUM.
 SHAFT BEARING CLEARANCE .010 IMPELLER SKIRT CLEARANCE .015.
 MAXIMUM NUMBER OF STAGES 3 (std. construction).
 MAXIMUM HEAD 613 ft. (std. construction). MAXIMUM SPHERE SIZE .550".
 PROJECTIONS ABOVE COLUMN PIPE BUTT: TUBE; SHAFT - FOR EITHER OPEN OR ENCLOSED
 LINESHAFT.

DIMENSIONS

- A - Length one stage assembly with discharge bowl.
- B - Length one stage assembly less discharge bowl.
- C - Length one stage assembly with discharge bowl and bell.
- D - Length one stage assembly less discharge bowl with bell.
- E - Bowl Diameter.
- F - Length of additional stage.
- G - Hub projection on bell suction.
- H - Length of discharge bowl.
- J - Length of impeller eye above bottom of bowl.
- K - Minimum required submergence.
- R - Length submersible suction inlet.
- S - Length one stage submersible assembly.
- T - Height of cable guard.

DIMENSION	A	B	C	D	E	F	G	H	J	K	R	S	T
INCHES	26	14.8	26	14.8	9.6	7.37		1.11	7.25	5.5			




CAPACITY IN U.S. G.P.M.

Impeller - Bronze		Bowl Length 1st Stage	26
Bowl - Cast Iron/Enamel		Bowl Length Additional Stage	7.375
Bowl Bearings -	BRASS	Impeller - Weight	8.7
Bowl Shaft -	S.S.	Impeller Shaft Diameter	1.5
Thrust Factor	3.27	Impeller End Lateral	.560
Bowl Wt. 1st Stage (lbs.)	170	Column Pipe Size	4-5-6
Bowl Wt. Additional Stage (lbs.)	60	Suction Pipe Size	5

AGREEMENT

This Agreement made and entered into this 3 day of October, 1990, by and between TM Rural Water District, a political subdivision, of Parker, Turner County, South Dakota (hereinafter referred to as TM), and Hanson Rural Water System, Inc., a non-profit corporation, located in Emery, Hanson County, South Dakota (hereinafter referred to as Hanson), WITNESSETH:

WHEREAS, TM and Hanson both are organized and operate for the purpose of providing water supply and distribution systems to rural and municipal users within their respective service areas; and

WHEREAS, TM and Hanson have previously withdrawn water from the Dolton Aquifer to provide water to their respective users; and

WHEREAS, the Department of Water and Natural Resources has determined that the recharge capability of the Dolton Aquifer cannot be accurately determined and that it is necessary to limit water withdrawals from the Dolton Aquifer in order to protect the aquifer; and

WHEREAS, the Water Management Board has entered an Order dated January 4, 1990 directing TM to locate an alternate or supplemental source of water; and

WHEREAS, the South Dakota Geological Survey has been engaged to perform test drilling and test pumping in order to identify an alternate or supplemental source of water in a potential water source located under the Dolton Aquifer (basal aquifer) in the area of Dolton, South Dakota; and

WHEREAS, TM Rural Water District presently holds a future use per-

mit for 1,500 acre feet of water from the Dolton aquifer; and

WHEREAS, it is in the best interests of both TM and Hanson to jointly fund the study of the quantity and quality of the water available from from basal aquifer; and

WHEREAS, it is also in the best interests of the parties to determine the manner in which they will share in the use of any water identified as being available from the basal aquifer.

THEREFORE, the parties agree as follows:

That the cost of the test drilling, test pumping and study presently contracted for with the South Dakota Geological Survey shall be shared equally by the systems.

That if the present studies conducted by the South Dakota Geological Survey of the aquifer find a sufficient quantity of water of acceptable quality is available from such aquifer to provide water for both rural water systems, the systems will take steps to withdraw water pursuant to a permit which shall be obtained pursuant to the Future Use Permit #5358-3 presently held by TM.

That water withdrawn from the the aquifer being studied by the Geological Survey shall be shared by TM and Hanson in the following proportions:

TM shall be entitled to seventy-five percent (75%) of the available acre feet of water permitted to be withdrawn subject to any permit granted pursuant to Future Use Permit #5358-3.

Hanson shall be entitled to twenty-five percent (25%) of the available acre feet of water permitted to be withdrawn by any permit granted pursuant to Future Use Permit #5358-3.

That a cooperative agreement between the parties hereto shall be drafted and executed which shall apportion water withdrawn and all expenses relating to the development of the water source.

That any agreement negotiated by the parties shall be presented to the Board of Water Management for approval.

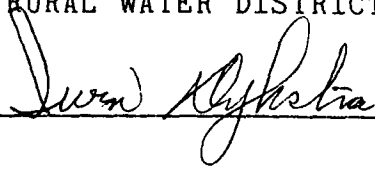
That pending the grant of a withdrawal permit TM shall maintain exclusive right to its existing future use permit and will retain priority on all rights afforded by that permit.

That if adequate quantities of water are identified from the Dolton aquifer or any aquifer thereto, Hanson shall apply for a water use permit for withdrawal of water from the aquifer.

That if a water permit is granted to Hanson and at such future time the water is withdrawn pursuant to such permit, the parties shall agree to provide TM twenty-five percent (25%) of all water withdrawn pursuant to the Hanson County use permit.

That in the alternative Hanson shall release TM from its obligation to provide Hanson twenty-five percent (25%) of the water to Hanson pursuant to the agreement referred to above and Hanson shall be entitled to all water provided under the Hanson permit.

TM RURAL WATER DISTRICT

By 

HANSON RURAL WATER SYSTEM, INC.

By 

5608-3



92USEWTP.WKS

WTP		Water Usage In Gallons	
1992	Meter Reading	Monthly Use	Daily Average
1/1	154,210,000	14,190,000	457,742
2/1	168,400,000	14,310,000	511,071
3/1	182,710,000	16,790,000	541,613
4/1	199,500,000	16,750,000	558,333
5/1	4,750,000 NEW METER	22,670,000	731,290
6/1	27,420,000	22,510,000	750,333
7/1	49,930,000	18,720,000	603,871
8/1	68,650,000	17,780,000	573,548
9/1	86,430,000	17,660,000	588,667
10/1	104,090,000	16,800,000	541,935
11/1	120,890,000	15,100,000	503,333
12/1	135,990,000	17,490,000	564,194
1/1	153,480,000		

YTD		Monthly	
Usage	210,770,000	Average	17,564,167

1992 UVM #4 Use	2,816,800
1992 Dolton Water Use	207,953,200

1992 Dolton Water Rights 236,722,443

% of Dolton Rights Used	87.8%
Percent of Year Used	100.0%

**WTP Water Usage
In Gallons**

1993	Meter Reading	Monthly Use	Daily Average
1/1	153,480,000	16,760,000	540,645
2/1	170,240,000	15,660,000	559,286
3/1	185,900,000	18,550,000	598,387
4/1	204,450,000	18,840,000	628,000
5/1	223,290,000	19,590,000	631,935
6/1	242,880,000	20,150,000	671,667
7/1	263,030,000	21,200,000	683,871
8/1	284,230,000	22,890,000	738,387
9/1	307,120,000	20,280,000	676,000
10/1	327,400,000	21,340,000	688,387
11/1	348,740,000	18,790,000	626,333
12/1	367,530,000	18,800,000	606,452
1/1	386,330,000		
YTD Usage	232,850,000	Monthly Average 19,404,167	DAILY AVG 637,446

WELL #4

Meter Reading	Monthly Use	Percent of Total
2,816,800	1,638,200	10%
4,455,000	6,307,600	40%
10,762,600	6,924,360	37%
17,686,960	6,612,680	35%
24,299,640	6,532,626	33%
30,832,266	6,551,234	33%
37,383,500	5,837,961	28%
43,221,461	5,481,039	24%
48,702,500	4,682,300	23%
53,384,800	6,358,100	30%
59,742,900	4,559,400	24%
64,302,300	5,247,100	28%
69,549,400		

USE FROM EACH AQUIFER	Percent of Total
1993 UVM #4 Use 66,732,600	29%
1993 Doltion Water Use 166,117,400	71%

WATER RIGHT STATUS	
1993 Doltion Water Rights 250,925,790	
% of Doltion Rights Used 66.2%	
Percent of Year Used 100.0%	



RECEIPT

Division of Water Rights

South Dakota Department of Water and Natural Resources

413011

Pierre, January 14, 1992

RECEIVED OF T M Rural Water District, Box 445, Parker, SD 57053

the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>5608-3</u> to Appropriate Water, to construct works and to put water to beneficial use	375	00
Fee for Application for Permit No. _____ to Appropriate Water for Future Use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____		
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for Certified Copy of _____		
Fee for Print Copy of Map _____		
Fee for Certifying _____		
Fee for _____		
(Any Other Work Provided by Law)	Total	375 00

By John Hatch
Chief Engineer



ENGINEERING REPORT
DEVELOPMENT OF
WATER SUPPLY WELL NO. 4
T-M RURAL WATER DISTRICT

PREPARED FOR
BOARD OF DIRECTORS
T-M RURAL WATER DISTRICT

PREPARED BY
BANNER ASSOCIATES, INC.
CONSULTING ENGINEERS AND ARCHITECTS
BROOKINGS, SOUTH DAKOTA

JANUARY, 1992

ENGINEERING REPORT
DEVELOPMENT OF WATER SUPPLY WELL NO. 4
T-M RURAL WATER DISTRICT

SECTION 1 - INTRODUCTION

The T-M Rural Water District is a rural water district providing potable water to small communities and rural residents in Turner and McCook counties in South Dakota. The water supply for the water district is a series of three wells in the Dolton Aquifer near Dolton, South Dakota. The water levels in the Dolton Aquifer have been dropping since the development of the water supply wells. Because the aquifer levels have dropped, an alternate source of water must be found.

SECTION 2 - STATEMENT OF NEED

The State of South Dakota imposed a water rights limitation of 646 acre-feet per year on the T-M Rural Water District (T-M) in 1989 . The water rights limitation was imposed because the Dolton aquifer from which T-M gets their water has shown a decline in static water elevations. Well monitoring studies completed by South Dakota Geological Survey (SDGS) and South Dakota Department of Environment and Natural Resources (SDDENR) Division of Water Rights indicate that there has been a steady decline in the water elevation since 1980.

The 1990 water production records at the Dolton Water Treatment Plant indicate that 204,600,000 gallons of water were treated in 1990. This translates into 627.8 Ac-ft of water which is 97.1% of the water rights limitation. T-M Rural Water District has identified four communities and 660 non-users within their present system that are potential new users. Based on this information the projected average day demand on the system 20 years hence would be 1.24 million gallons per day or approximately 1390 Ac-ft, which is 744 Ac-ft above their present water rights limitation. Thus T-M cannot expand and will have a shortfall of available water if another source is not found.

T-M has committed numerous hours and several thousand dollars in study and research for an alternate water source. Alternate sources that have been considered are; Kingbrook Rural Water System, B-Y Water District, the Lewis and

Clark Rural Water System and an aquifer below the Dolton Aquifer known as the Basal Aquifer. The Kingbrook Rural Water System does not have the excess capacity to meet the demands required. The B-Y Water District has water available for the T-M Rural Water District. The point of connection to the B-Y Water District could be at either the Menno pump station or at the water treatment plant located west of Yankton, S.D. If the connection is made at the Menno pump station, the water would be provided on an "off-peak" basis. The estimates of quantity of water available indicate the T-M Rural Water District could purchase approximately 40-50% of their water from the B-Y system at this location. If a pipeline were constructed from the B-Y water treatment plant to the T-M Rural Water District, the B-Y system could furnish the entire amount of water required by the T-M Rural Water District. A third solution considered is for the T-M Rural Water District to obtain water from the proposed Lewis and Clark Rural Water system. The Lewis and Clark system is currently in the feasibility evaluation process and the capability to deliver water is still several years in the future. Thus an interim or alternative water source will be required. This report will focus on development of a well in the aquifer below the Dolton Aquifer, known as the Basal Aquifer which appears to have the capacity to provide the water necessary to serve as a supplement to the Dolton Aquifer. The water quality of the Basal Aquifer is not as good as the Dolton Aquifer. It has higher concentrations of sulfates, hardness, and total dissolved solids. The Basal Aquifer alternative has the advantages of being in close proximity to the present water treatment plant and lower estimated cost for development than the other alternatives considered. The Basal Aquifer can serve as a supplement to the Dolton Aquifer with the present water treatment system. If it were to be used as a complete replacement water source, additional water treatment for the reduction of sulfates may be required.

SECTION 3 - DESCRIPTION OF WELL AND CONNECTING PIPING

3.0 General

The development of a water supply source in the Basal Aquifer will require the construction of a well and the raw water pipeline necessary to connect the well to the water treatment plant. The site for the proposed well is a well site purchased by the T-M Rural Water District for development of another well in the Dolton aquifer. Since no further development of this aquifer is permitted, the site will be used to develop a well in the Basal aquifer. The location of the Basal aquifer has been identified through geological investigations performed by the South Dakota Geological Survey. The location of the proposed well is indicated in Figure 3-1.

The cost for development of a water supply well at the location shown will include investigation and testing of the aquifer, construction of the well, installation of pitless adapter unit, pump, and column pipe in the well, construction of electrical and control systems to operate the well, construction of the raw water pipeline to the water treatment plant, and fencing and site grading at the well site.

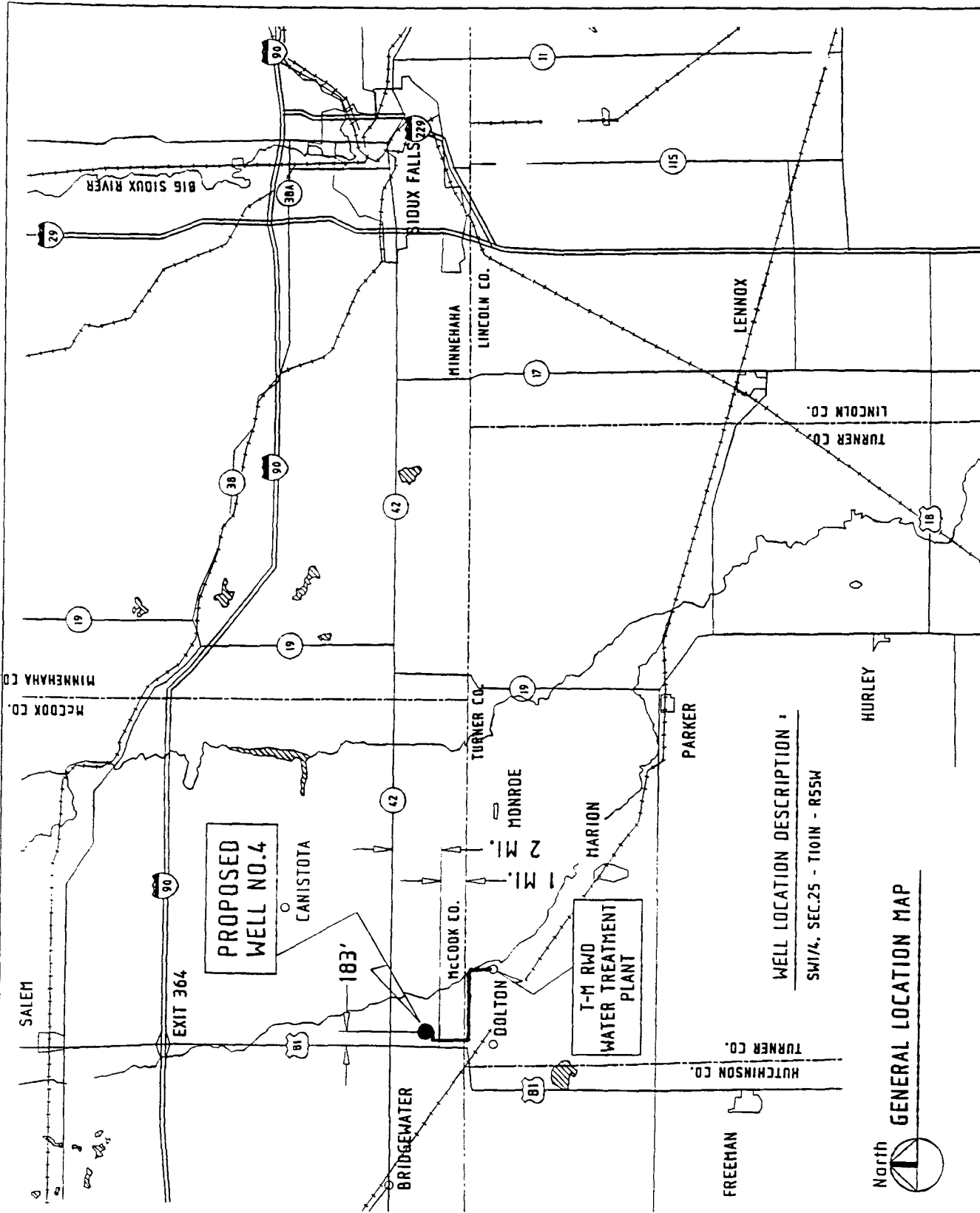
The work necessary to develop a well in this location has been divided into three phases. Phase 1 is the investigative work necessary to determine if it is feasible to develop a well in the Basal aquifer. Phase 2 is the work necessary to drill a production test well and perform a pump test. Phase 3 is the work necessary to install a pump, controls, and raw water pipeline.

Phase 1 work included the following tasks:

- Drilling a 4" test well to log the formation.
- Pumping the 4" test well to obtain water samples for analysis.

Phase 2 work included the following tasks:

- Drilling a 2" monitoring well.
- Drilling a 12" production test well.
- Production pump test on the 12" well to determine aquifer characteristics and anticipated yield.



BANNER

BANNER ASSOCIATES, INC. • CONSULTING ENGINEERS & ARCHITECTS
 409 22nd AVE. S. • P.O. BOX 298 - BROOKINGS, SD 57006-0298 • 605/692-6342

SITE LOCATION MAP

FIGURE

3-1

Phase 3 work includes:

- Installation of pump and column pipe in the production well
- Construction of electrical and control systems necessary for well control.
- Construction of the raw water line necessary to connect the well to the water treatment plant.
- Well site fencing, grading, and seeding.

A 4" test well has been constructed on the site to log the formation and obtain water samples. Based on the data collected from the 4" test well, a 12" test well was drilled and tested. The costs for these activities are summarized in Table 3-1 for the Phase 1 and Phase 2 costs. The plans and specifications for the Phase 3 work are scheduled to be completed in January, 1992.

The estimated cost of the work required under Phase 3 is presented in Section 6. The Phase 3 work will not require financial assistance. This project should not have an impact on the monthly minimum user rates for the system if the Capital Reserve account is replenished at the current rate.

TABLE 3-1

T-M RURAL WATER DISTRICT
CONSTRUCTION COST
PHASE 1 AND PHASE II

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
PHASE 1				
4" Test Well Drilling	387	L.F.	4.50	\$ 1,741
Well Casing & Sealing	330	L.F.	9.50	\$ 3,135
Well Screen & Gravel Pack	20	L.F.	10.50	\$ 210
Well Head Concrete Collar	1	L.S.	335	\$ 335
Well Development	1	L.S.	720	\$ 720
Pump Testing	6	Hrs.	50	\$ 300
8" Lockable Well Protect. Cover	1	L.S.	200	\$ 200
Mobilization/Demob.	1	L.S.	863	\$ 863
SUBTOTAL - PHASE 1				\$7,504
PHASE 2				
2" Monitoring Well	1	L.S.	6,800	\$ 6,800
Mobilization/Demob.	1	L.S.	6,373	\$ 6,373
Drill Production Well	370	L.F.	23.40	\$ 8,658
12" Well Casing	291	L.F.	23	\$ 6,693
12" Well Screen	81	L.F.	92	\$ 7,452
Gravel Pack	99	L.F.	22.00	\$ 2,178
Bentonite Hole Plug	15	L.F.	54	\$ 810
Development of Well	16	Hours	95	\$ 1,520
Production Pump Test	70	Hours	43	\$ 3,010
Concrete Grout Seal	256	L.F.	29.50	\$ 7,552
SUBTOTAL - PHASE 2				\$ 51,046
TOTAL CONSTRUCTION COST - PHASE 1 AND PHASE 2				\$ 58,550

SECTION 4 - EVALUATION OF BASAL AQUIFER PRODUCTION WELL

4.0 General:

An Evaluation Report of the Basal Aquifer Production Well was authorized under contract between Banner Associates, Inc. and T-M Rural Water District dated May 20, 1991.

T-M Rural Water District in conjunction with the South Dakota Geological Survey and the U.S. Geological Survey has been conducting tests and studies of the Basal Aquifer for water quality and quantity in and around the Dolton area. A water supply production well, located 2 miles north of Dolton, S.D. just off Highway 81 in Section 25 - Township 101 North - Range 55 West, McCook County, was drilled into the Basal Aquifer as a part of the tests and studies. The production well was test pumped to determine the potential yield and recharge of the Basal Aquifer.

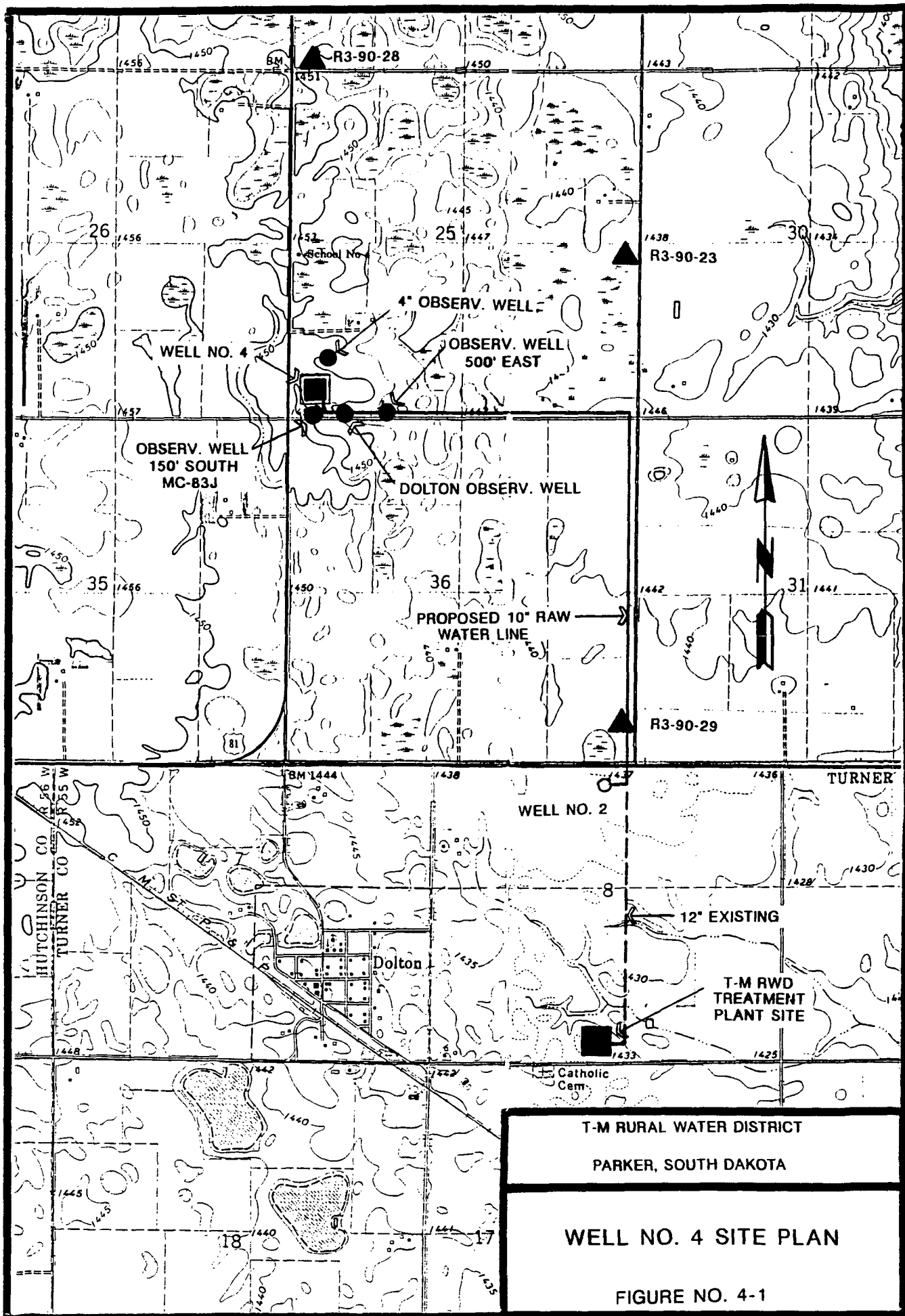
The purpose of this report is to evaluate the feasibility of supplying T-M Rural Water District with a blend of water from the Basal Aquifer and the Dolton Aquifer. Figure No. 4.1 shows a layout plan of the well field, pipeline and Treatment Plant site.

4.1 BASAL AQUIFER WATER QUALITY.

A. Safe Drinking Water Act:

1. Introduction: The Federal Government (U.S. Public Health Service) has regulated the quality of drinking water since 1914. The current regulations are the result of the enactment of the 1974 Safe Drinking Water Act (SDWA) and the subsequent amendments thereto.

2. Primary Standards: The primary standards, which specify approval limits for health, give maximum contaminant levels (MCL's) for microbial contamination, inorganic chemicals, radionuclides and turbidity. The primary standards are enforced by the South Dakota Department of Environment and Natural Resources (SDDENR) and EPA.



3. Secondary Standards: Secondary standards are recommended limits for esthetics that render a drinking water less desirable for use. Secondary standards recommend contaminant levels for inorganic chemicals, total dissolved solids, corrosivity, color and odor. The Secondary-maximum contaminant levels (S-MCL) are non-enforceable at the Federal level. The individual states may enact laws and regulations to govern secondary standards. The SDDENR has currently not enacted regulations for secondary standards.

B. Basal Aquifer Water Quality: Table 4-1 summarizes the results of the Basal Aquifer Water Quality Analyses for the Production Well. The water for these analyses was collected at the beginning, middle and near the end of the 70-hour pump test.

TABLE 4-1

WATER QUALITY RESULTS
T-M RWD WELL #4

	12" Production Well			4" Observ. Well mg/l 7-24-91	Standard or MCL
	Sample #1 mg/l 12-9-91	Sample #2 mg/l 12-10-91	Sample #3 mg/l 12-12-91		
Calcium	180	180	182	116	
Magnesium	23	23	23	470	
Sodium	94	95	96	90.1	
Bicarbonate	337	334	337	270	
Sulfate	463	462	466	458	400
Chloride	9	11	10	10.9	250
pH	7.51	7.41	7.59	7.61	
Conductivity	1477	1477	1477	1391	
Iron	0.51	0.94	1.17	0.73	0.3
Manganese	1.40	1.43	1.48	0.77	0.05
Total Solids	1100	1044	1084	1084	500
Fluoride	<0.5	<0.5	<0.5	0.41	4
Hardness	544	544	550	483	
Grains	31.8	31.8	32.2	28.2	
Alkalinity-M (CaCO ₃)	276	274	276	221	
Alkalinity-P (CaCO ₃)	0	0	0	0	
Nitrate-N	0.05	0.02	0.02	0.5	10
Nitrite-N				0	1
Potassium				9.8	
Arsenic				5.2 ug/l	50
Barium				86 ug/l	1000
Lead				<1 ug/l	10
Gross Radium				0.2 pCi/l	5

The analyses which were completed do not include all of the parameters required for the Safe Drinking Water Act (SDWA) primary and secondary standards. The parameters tested were those which were considered critical.

The chemical analysis of the water taken from the Basal Aquifer production well during the pump test indicates that the corrected gross radium was 0.2 pCi/l. The SDWA primary standard for gross radium is 5 pCi/l at the point of distribution to the consumer.

The chemical analyses also indicates that the Basal Aquifer water exceeded the SDWA Secondary Standards for sulfates, iron, manganese and total solids. The SDWA secondary standard levels are recommended levels and are not enforceable by the Government; however, water quality that exceeds the secondary standards may have undesirable sight, taste, smell or color which may offend the consumer. The water from this formation can be used if treated prior to use. The water is suitable for use as blend water for the present supply.

The sulfates and total dissolved solids in the Basal Aquifer water may have a laxative effect when used for human consumption. The iron and manganese may cause brownish-colored stains to laundry and plumbing fixtures if not removed by treatment. The iron content could also contribute to encrustation of water mains. The existing treatment process is capable of removing iron and manganese to acceptable levels.

Although hardness in water is not regulated by the SDWA, it is a parameter that the supplier and consumer should be aware of. The Basal Aquifer water is classified as a very hard water. Hard waters are as satisfactory for human consumption as soft waters and are generally considered to be those waters that require considerable amounts of soap to produce a foam or lather and that also produce scale in hot water pipes, heaters, boilers and other facilities in which the water temperature is artificially increased.

4.2 Basal Aquifer Water Quantity:

1. General: Two contracts for drilling and testing of the aquifer were awarded to Layne-Western Co., Inc. of Omaha, Nebraska. The first well drilled was a 4" test well for preliminary indication of water quality and formation characteristics. The second well project included a 12"

production test well and a 2" monitoring well. The 4" test well was drilled in July, 1991. The 12" test well was drilled in November, 1991. In addition, the South Dakota Geological Survey also drilled four (4) observation wells. Figure 4-1 - "Well Site Plan", illustrates the location of the observation and production wells.

2. Aquifer Formation: The Basal Creek Aquifer Formation at the Production Well as shown on Figure 4-1 starts approximately 286 feet below the ground surface and extends to approximately 368 feet below the ground surface. The 82 feet of formation consists of medium to coarse grain sands, well sorted and varied in color from brown to pink. Drillers logs for the observation wells and production well are attached in Appendix II.

Soil samples from the production well aquifer formation, drillers log and electric (E) log were collected by Layne-Western Co., Inc. for analysis and recommendation on screen size, gravel pack and maximum theoretical yield of the aquifer. Layne-Western's analyses recommended a twelve (12) inch diameter by 80 foot long stainless steel screen with a number 35 (0.035 inch) slot and a number 0 filter pack. Layne-Western's recommendations were based on a maximum well yield of 600 gallons per minute. Cross-sections of the production well and the observation wells and the Sand Analysis Report by Layne-Western Company, Inc. are attached in Appendix 2.

The South Dakota Geological Survey performed the E-log on the 4" observation well following drilling operations. The results of the E-log are also attached in Appendix 2.

3. Pump Test Data: The twelve (12) inch diameter production well was pumped at a weighted average rate of 850 gallons per minute for 70 hours during the period of December 9, 1991 to December 12, 1991. Well drawdown data was monitored and recorded at appropriate time intervals throughout the 70 hour pump test. Well recovery data was also monitored and recorded at the appropriate time intervals for 48 hours following the pump test. Daily readings of recovery were continued for a total of 7 days following the pump test.

The pump test and recovery data for the main production well and observation wells are attached in Appendix 3.

4. Well Hydraulics:

a. General: The primary purpose of well hydraulic calculations are to determine how much water will move through the aquifer formation and how much water can be removed from the formation by pumping. If these two items can be accurately predicted, then the following items can also be predicted:

- Aquifer drawdown at various distances from the production well.
- Production well drawdown at any time after pumping starts.
- The effects of multiple wells.
- Aquifer drawdown at various pumping rates.
- Well efficiency.

b. Coefficient of Transmissivity (T): The Coefficient of Transmissivity (T) indicates how much water will move through the aquifer formation. The Coefficient of Transmissivity of an aquifer is the rate at which water flows through a vertical strip of aquifer one (1) foot wide and extending through the full saturated thickness under a hydraulic gradient of 100 percent.

The Coefficient of Transmissivity is calculated from the pumping rate and the slope of the time-drawdown graph. The following formula is used to calculate the Coefficient of Transmissivity:

$$T = \frac{2640}{\Delta S}$$

where T = coefficient of transmissivity in gpd/ft.
Q = pumping rate in gpm
 ΔS = slope of the time-drawdown graph

Time-drawdown graphs were plotted from the pump drawdown tests for the observation wells. The calculations for the Coefficient of Transmissivity (T) are shown on Table 4-2. The Coefficient of Transmissivity varied from 101,900 gpd/ft to 104,700 gpd/ft based on pumping data, and from 110,000 to 125,000 gpd/ft based on recovery

TABLE 4-2
T-M RURAL WATER DISTRICT
SUMMARY OF WELL EVALUATION

PUMPED DATA

WELL SITE	TRANSMISSIVITY GPD/FT	HORIZ. HYD. CONDUCT. GPD/SQ.FT.	STORATIVITY DIMENSIONLESS
12" PRODUCTION WELL	34,120	416.1	2.388E-06
4" OBSERVATION WELL	104,740	1,277.3	1.000E-03
OBSERVATION WELL 150' SOUTH	101,897	1,242.1	8.750E-05
OBSERVATION WELL 500' EAST	103,775	1,265.5	7.450E-05

RECOVERY DATA

WELL SITE	TRANSMISSIVITY GPD/FT	HORIZ. HYD. CONDUCT. GPD/SQ.FT.
12" PRODUCTION WELL	68,888	840.1
4" OBSERVATION WELL	123,056	1,500.7
OBSERVATION WELL 150' SOUTH	125,107	1,252.7
OBSERVATION WELL 500' EAST	110,388	1,346.2

data. The time-drawdown graphs for observation wells are illustrated in Figure 4-2. The distance-drawdown graph is illustrated in Figure 4-3.

c. Coefficient of Storage (S): The Coefficient of Storage (S), determines how much water can be removed from the formation by pumping. The Coefficient of Storage can be further defined as representing the volume of water released from storage per unit of aquifer storage area per unit change in head.

The Coefficient of Storage is also readily calculated from the time-drawdown graph. The Coefficient of Storage is calculated from the following formula:

$$S = \frac{0.3 T t_0}{r^2}$$

where S = Storage Coefficient

T = Coefficient of Transmissivity in gpd/ft

t₀ = intercept of the straight line at zero drawdown in days

r = distance, in ft., from the pumped well to observation well where the drawdown measurements were made.

The Coefficient of Storage (S) varied from 1.0×10^{-3} to 8.8×10^{-5} . The calculations for the Coefficient of Storage are shown on Table 4-5.

d. Well Efficiency: The efficiency of a well is a ratio between theoretical drawdown and actual drawdown of the pumped well. The factors affecting well efficiency are:

- Well screen, slot size and length of screen;
- Gravel pack, size and gradation;
- Well development;
- Placement of well screen.

The theoretical water surface elevation when pumping the well is 1342.4. The actual water surface elevation when pumping was 1280 at a pumping rate of 850 gpm. This relatively low efficiency is apparently due to the selection of screen size and gravel pack.

T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR ALL THE OBSERVATION WELLS NEAR THE PUMP

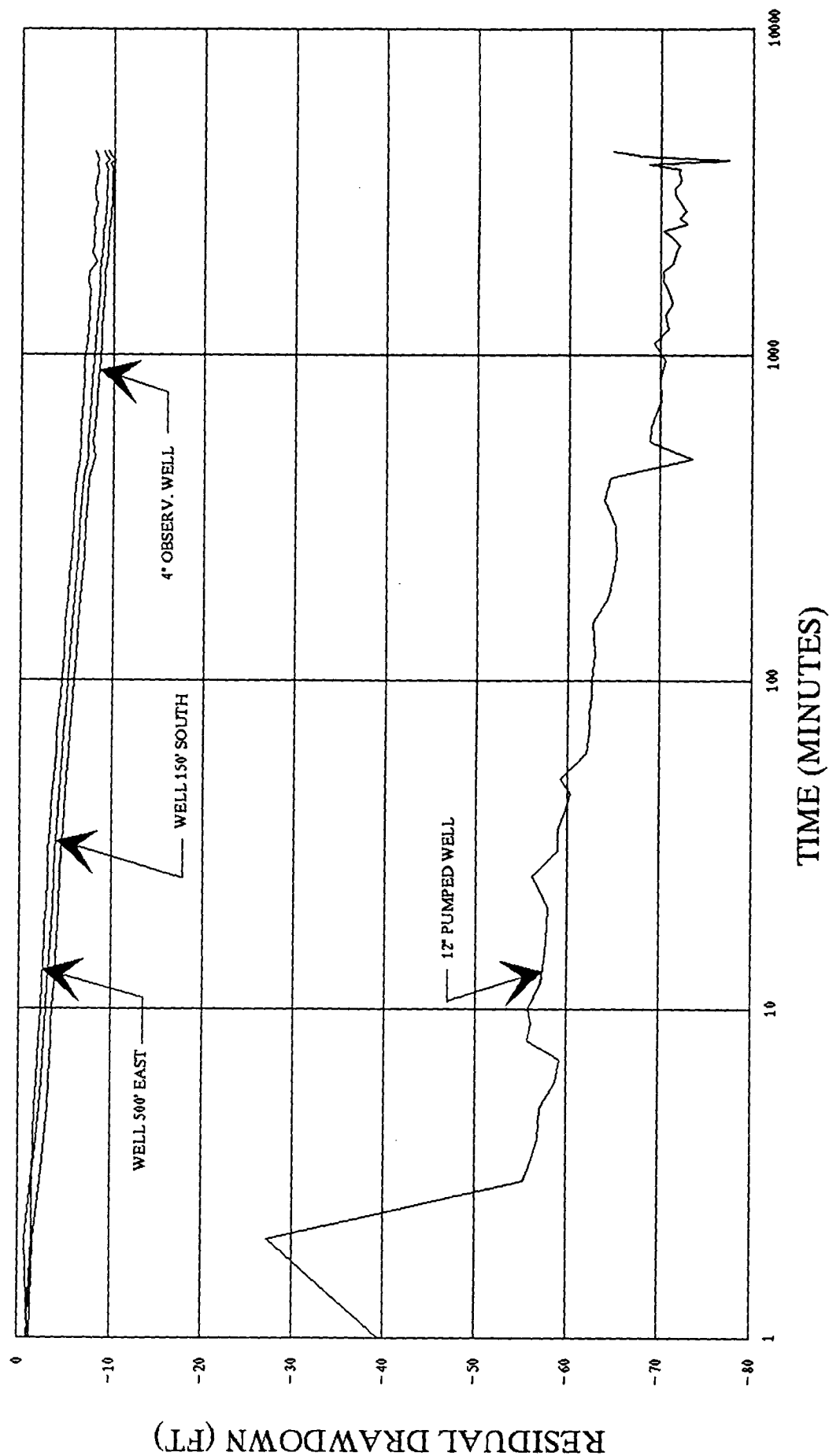
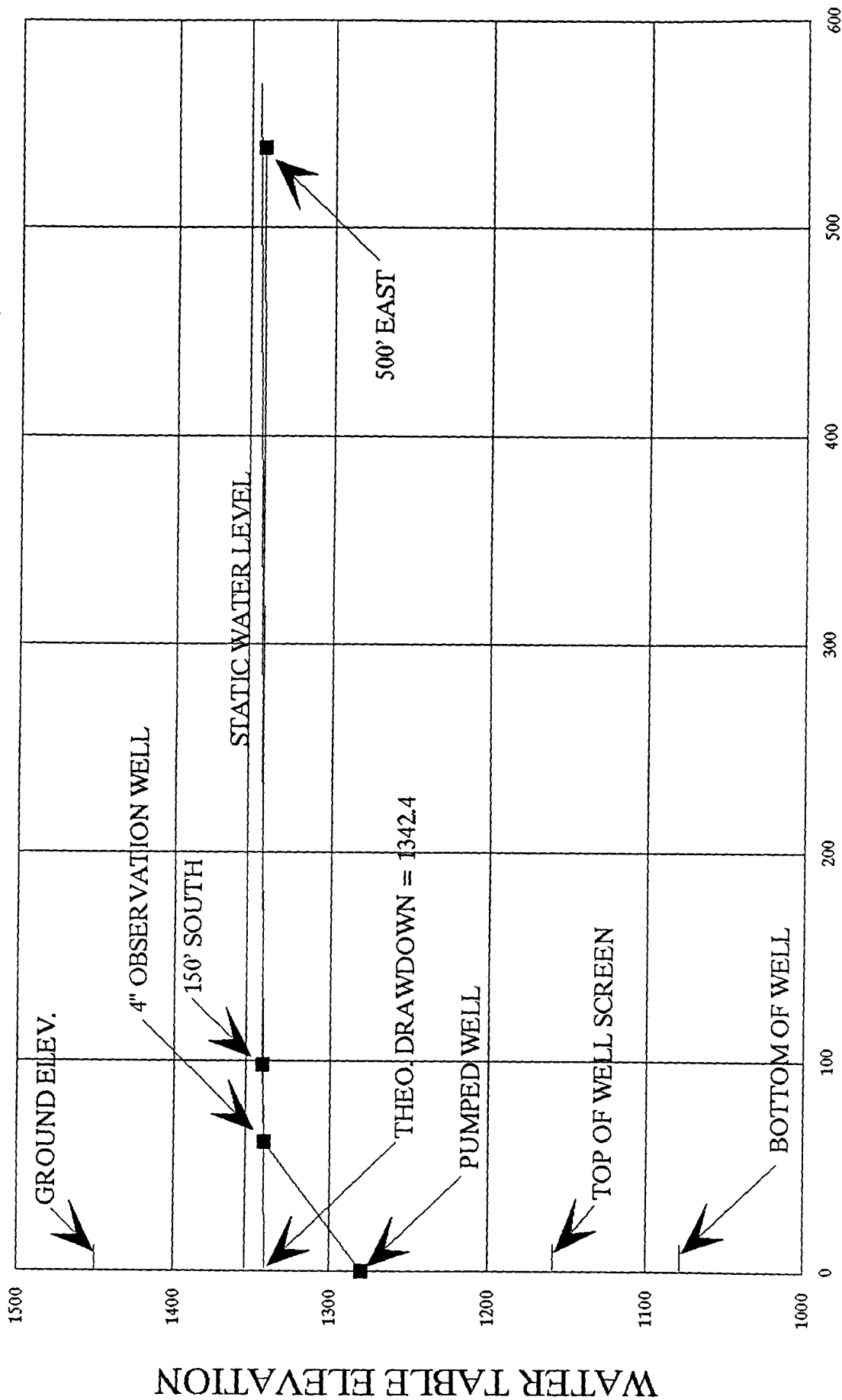


FIGURE NO. 4-2

T-M RURAL WATER SYSTEM

PLOT OF DRAWDOWN VS. DISTANCE



DISTANCE FROM PUMPED WELL

FIGURE NO. 4-3

A sample of the formation sand was collected and a sieve analysis was performed. The sieve analysis indicated the grain size for 90% retained was 0.0375 inches. The gravel pack and screen was sized to prevent movement of the formation sand through the gravel pack and screen. The small particle size required for the gravel pack decreases the efficiency of the well through the gravel pack and screen. A larger particle size for the gravel pack would increase the well efficiency. However, this would increase the risk of sand moving through the gravel pack. Pump efficiency would decrease and maintenance costs would increase if sand was pumped through the impellers. The low efficiency of the Production Well will result in delivering the water from the aquifer at somewhat higher energy costs.

e. Recommended Pumping Rate: Figure No. 4-4 illustrates the Production Well time-drawdown diagram and the predicted drawdown at the recommended pumping rate of 600 gpm. The diagram indicates that if the Production Well is pumped at a rate of 600 gallons per minute (gpm), a drawdown of 60 feet would occur approximately 19 days after pumping started. The water level at the Production Well would be 125 feet above the well screen with 60 feet of drawdown, assuming no interference from other wells.

f. Water Rights: T-M Rural Water District currently holds a future use permit (Permit No. 5358-3) for water from the Basal Aquifer. An application for a permit to appropriate water at a rate of up to 1.34 cfs has been filed with the South Dakota Department of Environment and Natural Resources. The permit application is expected to be acted upon at the March 4, 1992 meeting of the South Dakota Water Management Board.

T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE 12" PUMPED WELL

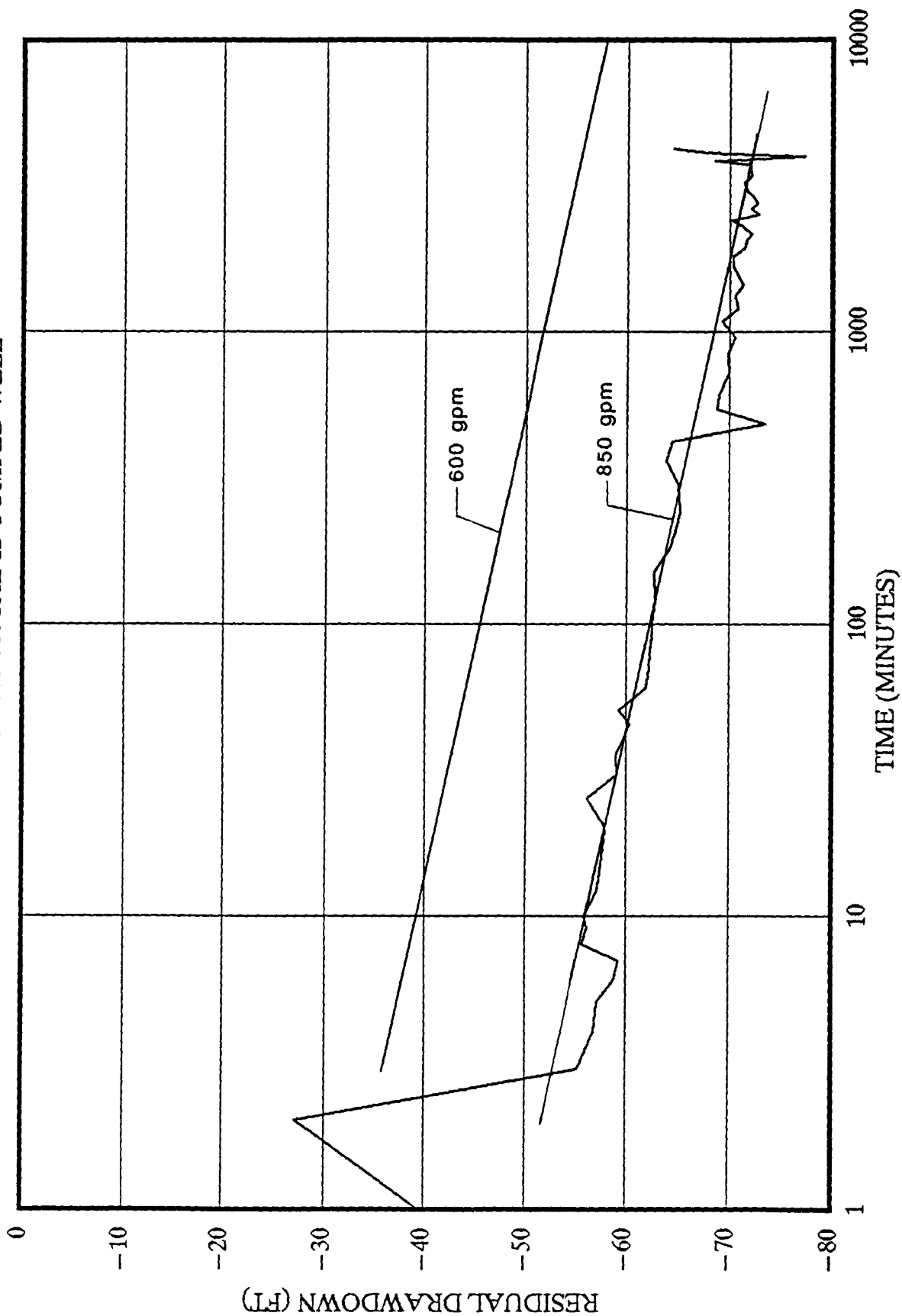


FIGURE NO. 4-4

SECTION 5 EVALUATION OF WATER QUALITY

5.0 GENERAL. Water quality evaluations were performed for 25%, 50%, and 75% blend ratios of Dolton aquifer water to the Basal Aquifer water. The anticipated water quality for each of the blend ratios is presented in Table 5-1. The water quality data presented were obtained from a combination of sources including the South Dakota Geological Survey and tests performed on samples collected from the 4" test well constructed in July, 1991. The data presented are from several samples, not a single sample. Complete water quality analysis of single samples are included in Section 4.

If the water is blended, the blended water will have higher sulfates, higher hardness, and higher total dissolved solids concentrations than the water from the Dolton aquifer. A 50% blend of the water sources would result in an increase of approximately 275 mg/l of total hardness, 220 mg/l of sulfate, and 250 mg/l of total dissolved solids. A change of this magnitude will be noticeable to the consumer if it were made in one step. If the blend ratio were increased gradually, the consumer would be able to acclimate to the changing water quality.

As a part of the evaluation, the calcium carbonate stability of the water was evaluated. The Dolton aquifer water characteristics were plotted on Caldwell-Lawrence diagrams to determine their calcium carbonate precipitation potential and stable pH. The Dolton aquifer water does not fit the standard diagrams due to its unusually low calcium concentration. The Dolton aquifer water appears to have a tendency to dissolve calcium carbonate. This characteristic is of special concern due to the "lead/copper rules" implemented earlier this year since those rules require a public water supply to provide water that is non-corrosive. Water that is aggressive to calcium carbonate will also tend to leach lead from soldered joints. Blending Basal Aquifer water and Dolton Aquifer water would reduce the tendency to dissolve calcium carbonate, however that tendency would still exist at a blend ratio of 25% Basal water. The blending of this water would be beneficial in that it would reduce the amount of chemical required to stabilize the water.

TABLE 5-1
T-M RWS WATER QUALITY EVALUATION
BLENDING OF WATER FROM DOLTON AQUIFER AND BASAL AQUIFER

PARAMETER	UNITS	AQUIFER		BLEND PROPORTIONS		
		DOLTON (6-29-89)	BASAL (AUG,91)	25% BASAL	50% BASAL	75% BASAL
Iron	mg/l	1.15	1.8	1.31	1.48	1.64
Manganese	mg/l	0.05	0.82	0.24	0.44	0.63
Chloride	mg/l	41.3	14	34.48	27.65	20.83
Alkalinity	mg/l	407	358	395	383	370
Total Hardness	mg/l	94.3	647	232	371	509
Calcium (CaCO3)	mg/l	62	443	157	253	348
Sodium	mg/l	177	128	165	153	140
Sulfate	mg/l	0	458	115	229	344
Tot D Solids	mg/l	593	1084	716	839	961
Fluoride	mg/l	1.11	0.44	0.94	0.78	0.61
pH		7.74	7.4	7.66	7.57	7.49
Ca Prec. Pot.	mg/l	10	38	17	25	33
		(10-2-89)				
Arsenic	ug/l	0	3.4	0.9	1.7	2.6
Barium	ug/l	353	53	278	203	128
Cadmium	ug/l	0	0	0	0	0
Chromium	ug/l	3.7	0	2.8	1.9	0.9
Lead	ug/l	23.5	0	17.6	11.8	5.9
Nitrate	mg/l	0.12	0	0.09	0.06	0.03
Selenium	ug/l	2.14	0	1.61	1.07	0.54
Silver	ug/l	0	0	0	0	0

SECTION 6: ESTIMATE OF COSTS PHASE 2

6.0 General: Phase 2 consists of the installation of the pump and column pipe in the production well, the installation of the well electrical and control system, and the construction of the raw water line necessary to connect the new well to the existing system. The well site fencing, grading and seeding will be completed by T-M Rural Water District personnel.

6.1 Project Description and Estimated Costs: Well No. 4 is located approximately 2 miles north and 1 mile west of the T-M Rural Water District Treatment Plant site. The raw water line from the new well will be connected to the existing 12" water line near Well No. 2, which is located approximately 1 mile north of the treatment plant. The well will be fitted with a submersible pump 8" column pipe and pitless adapter. Due to the water quality, the water from Well No. 4 (basal aquifer) will be blended with Well No. 3 (Dolton aquifer) to produce a better water quality. Thus, Wells 3 and 4 will require variable frequency drives for pumping rate adjustment. Network analyses were run to determine the horsepower requirements and pipeline sizing. The network analyses are included in Appendix 4. The cost of a 10" raw water line was compared to the cost of a 12" raw water line. The costs associated with each are included in Table 6-1.

6.2 Project Financing: T-M Rural Water District has the funds available in a capital reserve fund to construct this project. Thus, outside financing will not be necessary. The Water District should implement a schedule for restoration of the Capital Reserve. The user charges have been adequate to accumulate the reserve account; thus an increase in user rates should not be necessary.

TABLE 6-1

OPINION OF PROBABLE COST
T-M RURAL WATER DISTRICT
PHASE 3 - PUMP, CONTROLS AND
CONNECTING RAW WATER PIPE LINE

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	10" WATER MAIN		12" WATER MAIN	
				UNIT COST	TOTAL COST	UNIT COST	TOTAL COST
1	RAW WATER PIPE LINE	11050	L.F.	\$8.00	\$88,400.00	\$11.00	\$121,550.00
2	GATE VALVE AND BOX	3	EACH	\$650.00	\$1,950.00	\$790.00	\$2,370.00
3	AIR RELEASE VALVE	2	EACH	\$625.00	\$1,250.00	\$625.00	\$1,250.00
4	GRANULAR EMBEDMENT	65	TON	\$13.00	\$845.00	\$13.00	\$845.00
5	GRAVEL SURFACING	20	TON	\$7.75	\$155.00	\$7.75	\$155.00
6	F & I FLUSHING HYDRANT	1	EACH	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00
7	CONNECTION AT WELL # 2	1	EACH	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00
8	PITLESS ADAPTER & VALVE	1	L.S.	\$7,000.00	\$7,000.00	\$7,000.00	\$7,000.00
9	SUBMERSIBLE PUMP	1	L.S.	\$6,200.00	\$6,200.00	\$6,200.00	\$6,200.00
10	CONCRETE PAD AT WELL	1	L.S.	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00
11	6" COLUMN PIPE	200	L.F.	\$25.00	\$5,000.00	\$25.00	\$5,000.00
12	FLOWMETERS	1	EACH	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00
13	ELECT. & CONTROL SYSTEMS	1	L.S.	\$35,000.00	\$35,000.00	\$35,000.00	\$35,000.00
14	VARIABLE FREQUENCY DRIVES	2	EACH	\$8,500.00	\$17,000.00	\$8,500.00	\$17,000.00
15	TELEMETRY LINE	1	L.S.	\$5,000.00	\$5,000.00	\$5,000.00	\$5,000.00
TOTAL CONSTRUCTION COST					\$173,800.00		\$207,370.00
CONTINGENCIES					\$17,000.00		\$20,000.00
ENGINEERING AND ADMINISTRATION					\$21,000.00		\$21,000.00
OPINION OF PROBABLE TOTAL PROJECT COSTS					\$211,800.00		\$248,370.00

NOTE: T-M RWD WILL PROVIDE THE SITE GRADING, SITE RESTORATION,
SITE DRAINAGE, SEEDING, PAINTING, FENCING AND GATES.

SECTION 7: SUMMARY AND RECOMMENDATIONS

7.0 Summary:

The T-M Rural Water District must develop an alternate source of water in order to meet the water demands of their present customers. Development of an additional water supply will also permit the District to connect some additional users which have requested water service. Several alternatives have been considered including:

- Connection to B-Y Rural Water
- Connection to Kingbrook Rural Water
- Connection to Lewis and Clark Rural Water system
- Development of a well or wells in the Basal aquifer

The construction of a well in the Basal aquifer will provide the T-M Rural Water District an economical alternate source of water to supplement and replace a portion of the water presently drawn from the Dolton aquifer. The Basal Aquifer should not be considered a viable source of water to totally replace the Dolton Aquifer unless further water treatment is provided for the reduction of sulfate concentrations.

The total project budget for the development of a 600 gpm production well in the Basal aquifer is estimated to be approximately \$260,000. The development of the well is divided into two phases of work. The first phase of the work has been completed which consisted of the investigations necessary to determine the location and design of the well and the construction of the well. The second phase of the work is the installation of the pump, piping, electrical and control systems necessary to place the well into production and connect it to the water treatment plant. The project budget for this work is approximately \$202,100.

The use of the water from the Basal Aquifer will change the water quality delivered to the consumers in the T-M Rural Water District. The data presented indicate the water will meet the requirements of the Safe Drinking Water Act. The increased levels of hardness, sulfates, and total dissolved solids will be noticeable to the consumer and a gradual transition is recommended if the water is used.

The increase in hardness which will result from blending the water will be beneficial in making the water less aggressive to calcium carbonate. This characteristic would provide protection from leaching of lead from solder in plumbing systems. Control of corrosivity of the water is required by the "lead rules" which were implemented on January 1, 1991.

7.1 Recommendations and Implementation Schedule:

The data collected to date indicates the Basal aquifer will provide a useable water supply to supplement the Dolton aquifer water. The development of this water supply will require several actions by the T-M Rural Water District. These actions are summarized in the following table. It is recommended that the T-M Rural Water District proceed with these actions on a timely basis.

TABLE 7-1
IMPLEMENTATION ACTIVITIES AND SCHEDULE

ACTIVITY	COMPLETION DATE
Complete and Submit Water Rights Application	Jan. 15, 1992
Prepare Plans and Specifications for Well pump, piping, electrical, and controls	Jan. 31, 1992
Open bids for well pump, piping, electrical and controls	Feb. 24, 1992
Receive permit to appropriate water	Mar. 4, 1992
Award Contracts for Construction	Mar. 5, 1992
Complete construction of well	Aug. 1, 1992
Evaluate need for modifications to water treatment plant	Jan. 1, 1993

APPENDIX 1

WATER QUALITY LAB ANALYSIS

REPORT OF ANALYSIS
Water Quality Laboratory
Water Resources Research Institute
South Dakota State University
Brookings, SD 57007

01/02/91

Turner

Name: TM Rural Water District
Address: PO Box 445
Parker, SD 57053

Date Rec'd DEC 20, 1991
Lab Sample No. 91-0588
Source
Legal ID:

WATER ANALYSIS

Calcium (Ca)	180	ppm	8.98	me/l
Magnesium (Mg)	23	ppm	1.89	me/l
Sodium (Na)	94	ppm	4.09	me/l
Potassium (K)		ppm		me/l
Sulfate (SO4)	463	ppm	9.64	me/l
Nitrate as N (NO3)	0.050	ppm****	0.00	me/l
Organic Nitrogen as N		ppm		
Ammonia Nitrogen as N		ppm		
Nitrite as N (NO2)		ppm		
Ortho Phosphorus		ppm		
Total Phosphorus		ppm		
Chloride (Cl)	9	ppm	0.25	me/l
Bicarbonate (HCO3)	337	ppm	5.52	me/l
Carbonate (CO3)	0	ppm	0.00	me/l
Iron (Fe)	0.51	ppm	0.02	me/l
Fluoride (F)		ppm		me/l
Manganese (Mn)	1.40	ppm		
Boron (B)		ppm		
Hardness (EDTA as CaCO3)	544	ppm	31.81	g.p.g.
Total Solids	1100	ppm		
Total Cations			14.97	me/l
Total Anions			15.42	me/l
Alkalinity (Methyl Orange)	276	ppm(as CaCO3)		
Alkalinity (Phenolphthalein)	0	ppm(as CaCO3)		
Electrical Conductivity	1500	micromhos per cm at 25°C		
Sodium Adsorption Ratio	1.75	Adjusted SAR	4.39	
Sodium	27.37	% of Cations		
Residual Sodium Carbonate	0.00	me/l		
pH	7.51			

g.p.g. = grains per gallon

ppm = parts per million

me/l = millequivalents per liter

****Recommended Maximum Contaminant Level of 10 ppm for Human Consumption.

COMMENTS: #1 12-9-91 10:30 am Fluoride is less than .5 ppm

Analysis By: Shirley Mittan

Service Performed:

Total Cost: \$ 36.00

Amount Received: 0.00

Balance Due: 36.00

Make checks payable to: SDSU Water Quality Lab

Please write lab number on your check!

Lab Sample No. 91-0588

REPORT OF ANALYSIS
Water Quality Laboratory
Water Resources Research Institute
South Dakota State University
Brookings, SD 57007

01/02/91

Turner

Name: TM Rural Water District
Address: PO Box 445
Parker, SD 57053

Date Rec'd DEC 20, 1991
Lab Sample No. 91-0589
Source
Legal ID:

WATER ANALYSIS

Calcium (Ca)	180	ppm	8.98	me/l
Magnesium (Mg)	23	ppm	1.89	me/l
Sodium (Na)	95	ppm	4.13	me/l
Potassium (K)		ppm		me/l
Sulfate (SO4)	462	ppm	9.62	me/l
Nitrate as N (NO3)	0.020	ppm****	0.00	me/l
Organic Nitrogen as N		ppm		
Ammonia Nitrogen as N		ppm		
Nitrite as N (NO2)		ppm		
Ortho Phosphorus		ppm		
Total Phosphorus		ppm		
Chloride (Cl)	11	ppm	0.31	me/l
Bicarbonate (HCO3)	334	ppm	5.48	me/l
Carbonate (CO3)	0	ppm	0.00	me/l
Iron (Fe)	0.94	ppm	0.03	me/l
Fluoride (F)		ppm		me/l
Manganese (Mn)	1.43	ppm		
Boron (B)		ppm		
Hardness (EDTA as CaCO3)	544	ppm	31.81	g.p.g.
Total Solids	1044	ppm		
Total Cations			15.01	me/l
Total Anions			15.41	me/l
Alkalinity (Methyl Orange)	274	ppm(as CaCO3)		
Alkalinity (Phenolphthalein)	0	ppm(as CaCO3)		
Electrical Conductivity	1500	micromhos per cm at 25°C		
Sodium Adsorption Ratio	1.77	Adjusted SAR	4.43	
Sodium	27.58	% of Cations		
Residual Sodium Carbonate	0.00	me/l		
pH	7.41			

g.p.g. = grains per gallon

ppm = parts per million

me/l = miliequivalents per liter

****Recommended Maximum Contaminant Level of 10 ppm for Human Consumption.

COMMENTS: #2 12-10-91 2:30 pm Fluoride is less than .5 ppm

Analysis By: Shirley Mittan

Service Performed:

Total Cost:	\$ 36.00
Amount Received:	0.00
Balance Due:	36.00

Make checks payable to: SDSU Water Quality Lab
Please write lab number on your check!
Lab Sample No. 91-0589

REPORT OF ANALYSIS
Water Quality Laboratory
Water Resources Research Institute
South Dakota State University
Brookings, SD 57007

01/02/91

Turner

Name: TM Rural Water District
Address: PO Box 445
Parker, SD 57053

Date Rec'd DEC 20, 1991
Lab Sample No. 91-0590
Source
Legal ID:

WATER ANALYSIS

Calcium (Ca)	182	ppm	9.08	me/l
Magnesium (Mg)	23	ppm	1.89	me/l
Sodium (Na)	96	ppm	4.17	me/l
Potassium (K)		ppm		me/l
Sulfate (SO4)	466	ppm	9.70	me/l
Nitrate as N (NO3)	0.020	ppm****	0.00	me/l
Organic Nitrogen as N		ppm		
Ammonia Nitrogen as N		ppm		
Nitrite as N (NO2)		ppm		
Ortho Phosphorus		ppm		
Total Phosphorus		ppm		
Chloride (Cl)	10	ppm	0.28	me/l
Bicarbonate (HCO3)	337	ppm	5.52	me/l
Carbonate (CO3)	0	ppm	0.00	me/l
Iron (Fe)	1.17	ppm	0.04	me/l
Fluoride (F)		ppm		me/l
Manganese (Mn)	1.48	ppm		
Boron (B)		ppm		
Hardness (EDTA as CaCO3)	550	ppm	32.16	g.p.g.
Total Solids	1084	ppm		
Total Cations			15.17	me/l
Total Anions			15.51	me/l
Alkalinity (Methyl Orange)	276	ppm(as CaCO3)		
Alkalinity (Phenolphthalein)	0	ppm(as CaCO3)		
Electrical Conductivity	1500	micromhos per cm at 25°C		
Sodium Adsorption Ratio	1.78	Adjusted SAR	4.47	
Sodium	27.60	% of Cations		
Residual Sodium Carbonate	0.00	me/l		
pH	7.59			

g.p.g. = grains per gallon

ppm = parts per million

me/l = millequivalents per liter

***Recommended Maximum Contaminant Level of 10 ppm for Human Consumption.

COMMENTS: #30 12-12-91 7:20 am Fluoride is less than .5 ppm

Analysis By: Shirley Mittan

Service Performed:

Total Cost:	\$ 36.00
Amount Received:	0.00
Balance Due:	36.00

Make checks payable to: SDSU Water Quality Lab
Please write lab number on your check!
Lab Sample No. 91-0590

773-3368

SOUTH DAKOTA DEPARTMENT OF WATER AND NATURAL RESOURCES

Office of Drinking Water

Chemical Analytical Data

Water Supply: TM Rural WaterDate Collection: 7/24/91 Time: _____EPA ID #: 0999

Report to be Returned to: _____

Source Sampled: Test Well #4 Depth: 352TM Rural WaterDate Built: 7/19/91Box 445Type of Sample: Raw X Treated _____ Composite _____Parker S.D 5705-3Location of Sampling Tap: Well

Comments: _____

Treatment Processes: _____

Received by Lab: _____ Time: _____

Report Sent by Lab: _____

Parameter	Maximum Limit	Results	Parameter	Suggested Limit	Results
☒ Arsenic	50 ug/L	5.2	☒ Chloride	250 mg/L	102.9
☒ Barium	1000 ug/L	86	☒ Iron	0.3 mg/L	0.73
☒ Cadmium	10 ug/L		☒ Manganese	0.05 mg/L	0.77
☒ Chromium	50 ug/L		☒ Sulfate	250 mg/L	458
☒ Lead	50 ug/L	21	☒ Tot. Diss. Solids (TDS)	500 mg/L	1034
☒ Mercury	2 ug/L		☒ Lab pH	6.5-8.5	7.41
☒ Nitrate (as N)	10 mg/L	0.05	☒ Alkalinity - M (CaCO ₃)	mg/L	221
☒ Nitrite (as N)	1 mg/L	0	☒ Alkalinity - P (CaCO ₃)	mg/L	0
☒ Selenium	10 ug/L	21	☒ Bicarbonate	mg/L	270
☒ Silver	50 ug/L		☒ Carbonate	mg/L	0
☒ Fluoride	4.0 mg/L	0.41	☒ Spec Cond @ °C	umhos/cm	1391
☒ Gross alpha	15 pCi/L		☒ Calcium	mg/L	116
☒ Gross beta	pCi/L		☒ Magnesium	mg/L	470
☒ Gross radium ~~5~~ 5	pCi/L	2	☒ Hardness (CaCO ₃) gpg: 28.2 gpg	mg/L	483
☒ Radium 226	pCi/L		Langlier Index		
☒ Radium 228	pCi/L		☒ Sodium	mg/L	90.1
☒ Uranium	pCi/L		☒ Potassium	mg/L	9.8
☒ Radon	pCi/L		Field temperature	°F	°C
☒ VOCs			Field pH	6.5-8.5	
Unregulated organics					
SOCs					
THMs					
LAB COMMENTS:			mg/L = milligrams/Liter = parts/million (ppm)		
			ug/L = micrograms/Liter = parts/billion (ppb)		
			gpg = grains per gallon		
			pCi/L = picocuries/Liter		
Percentage of Error:			LAB NUMBER:		

APPENDIX 2

WELL DRILLER'S LOG

1. Contract 72-1397 TM Rural Water District Date 11-19-912. City and State Dolton, S.D. Driller Gary McCracken3. Well No. 1 at test hole No. _____ Well location (attach map) _____

4. Work completed _____ No of man hours as charged to job on time sheet _____

5. MATERIAL:	LENGTH	DIA.	GAUGE OR WALL THICKNESS	MATERIAL	TYPE	NO. OF OPENINGS
6. Screen	<u>81.0</u>	<u>12.75</u>	<u>.375</u>	<u>SS</u>	<u>wire wrap</u>	<u>.035</u>

7. Inner Casing _____

8. Outer Casing 291 12.75 .375 black blank9. _____ tons of gravel used in the well. Size Northern "0"

10. Test of well. Did you use test or permanent pump? _____

11. Size of orifice _____ inch by _____ inch. Orifice tube reading _____ inches.

Size of Bowl

Stages

12. Pumping test — measurements from ground level:

TIME	G.P.M.	STATIC	DRAWDOWN	PUMPING LEVEL
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

13. Recovery in 5 minutes _____, in 30 minutes _____

14. Did you seal bottom of well? yes Thickness .375 inches, material SS15. Well underreamed? no From _____ feet to _____ feet, _____ feet to _____ feet.

16. If all screen was not placed at bottom, state how it was spaced.

From _____ feet to _____ feet; from _____ feet to _____ feet; from _____ feet to _____ feet.

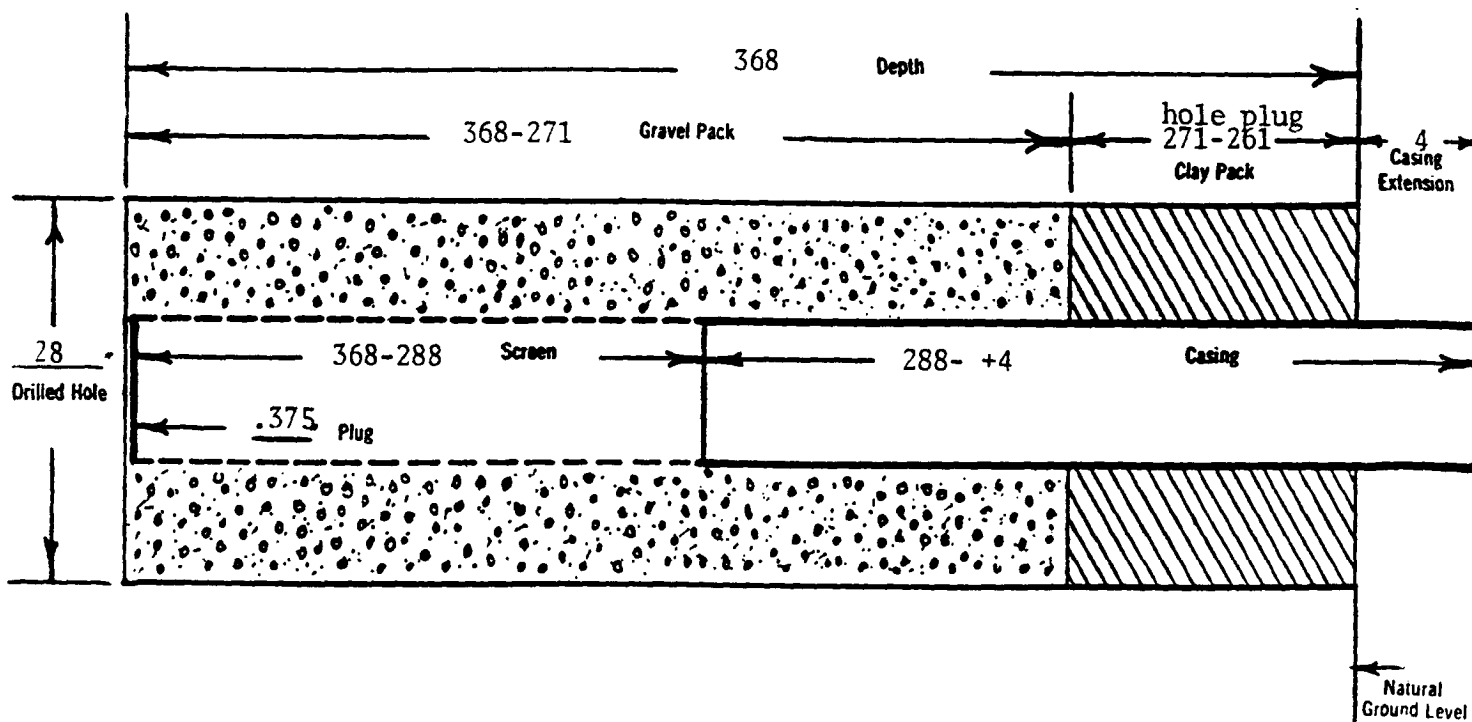
17. Depth of well from ground level to top of plug 368 Size of drilled hole 28"18. Was cement placed around or between any of the casings? yes19. If so, state where, how much and method used. 262 ft. to 5 ft. 40 ydstrenmie

CONTRACT 72-1397 TM Rural Water District

Well No. 1

Log of well from ground level:

Feet	Feet	Formation
0	2	Top Soil
2	24	Yellow Clay
24	35	Blue Clay With Gravel Layers
35	72	Blue Clay Gravel Mixed
72	102	Blue Clay
102	119	Blue Clay & Gravel
119	162	Blue Clay
162	185	Course Sand
185	205	Blue Clay With Sand Lenses
205	282	Blue Clay & Boulders
282	286	Course Sand & Blue Clay Layers
286	306	Medium to Course Sand, Fine Gravel
306	308	Course Sand
308	310	Boulders
310	368	Course to Medium Sand
368	370	Gray Clay



LAYNE-WESTERN COMPANY, INC.
OMAHA, NEBRASKA/SIOUX CITY, IOWA
PLUMBNESS & ALIGNMENT TEST

CUSTOMER: TMRWD Dolton, S.D. 72-1397

FOREMAN: Gary McCracken

DATE COMPLETED: _____

WELL NO.: _____

	<u>NORTH/SOUTH</u>	<u>EAST/WEST</u>
0	6	6 $\frac{1}{4}$
10	5 3/4	6 3/8
20	6	6 3/8
30	6	6 $\frac{1}{2}$
40	5 3/4	6 $\frac{1}{2}$
50	5 3/4	6 3/4
60	5 3/4	6 3/4
70	6	7
80	5 3/4	6 3/4
90	6	6 3/4
100	6	6 3/4
110	6	6 3/4
120	6	6 3/4
130	6	6 3/4
140	5 3/4	6 3/4
150	5 3/4	6 3/4
160	5 3/4	6 3/4
170	6	6 3/4
180	5 3/4	6 3/4
190	6	6 3/4
200	5 3/4	7
210	5 3/4	7
220	5 3/4	7
230	6	7
240	5 3/4	6 3/4
250	5 3/4	7
260	5 3/4	7
270	6	7
280	6	7
290		
300		
310		
320		
330		
340		
350		

LAYNE-WESTERN COMPANY, INC.
OMAHA, NEBRASKA
WELL SCREEN/CASING INSTALLATION

JOB NAME: TM Rural Water District Dolton SD

SCREEN (FROM BOTTOM TO TOP)

INSTALLED BY: Gary McCracken

SIZE: 12 3/4

1. 20.25
2. 20.25
3. 20.25
4. 20.25
5.
6.
7.
8.
9.
10.

11.
12.
13.
14.
15.

CASING (FROM BOTTOM TO TOP)

INSTALLED BY: Gary McCracken

SIZE: 12 3/4

ANY MATERIAL CUT FROM LAST PIECE
(YES/NO) IF SO, HOW MUCH: 13'

1. 22.1
2. 22.0
3. 22.6
4. 21.1
5. 21.7
6. 21.4
7. 21.6
8. 21.7
9. 21.6
10. 21.7

11. 21.6
12. 21.6
13. 21.6
14. 22.1
15.
16.
17.
18.
19.
20.

Contract

TM Rural Water

Date

10-17-91

2. City and State

Mo Delfon S.D.

Driller

Diane Tersch

3. Well No.

P320mtr

at test hole No.

1

Well location (attach map)

4. Work completed

No of man hours as charged to job on time sheet

5. MATERIAL:

LENGTH

DIA.

GAUGE OR
WALL THICKNESS

MATERIAL

TYPE

NO. OF
OPENINGS

6. Screen

20'

2"

Sch 80

PVC

MonoFlex

-020

7. Inner Casing

357

2'

11"

11"

11"

Blank

8. Outer Casing

9. $\frac{3}{4}$ tons of gravel used in the well. Size

.020

10. Test of well. Did you use test or permanent pump?

A.R.

Size of Bowl

Stages

11. Size of orifice

inch by

inch

Orifice tube reading

inches

12. Pumping test — measurements from ground level:

TIME

G.P.M.

STATIC

DRAWDOWN

PUMPING LEVEL

2 hr

10

—

—

—

13. Recovery in 5 minutes

in 30 minutes

14. Did you seal bottom of well?

Yes

Thickness

inches, material

Sch 80 PVC Cap

15. Well underreamed?

From

feet to

feet,

feet to

feet.

16. If all screen was not placed at bottom, state how it was spaced.

From

feet to

feet; from

feet to

feet; from

feet to

feet.

17. Depth of well from ground level to top of plug

37.5

Size of drilled hole

6 1/4"

18. Was cement placed around or between any of the casings?

Top

337'

19. If so, state where, how much and method used.

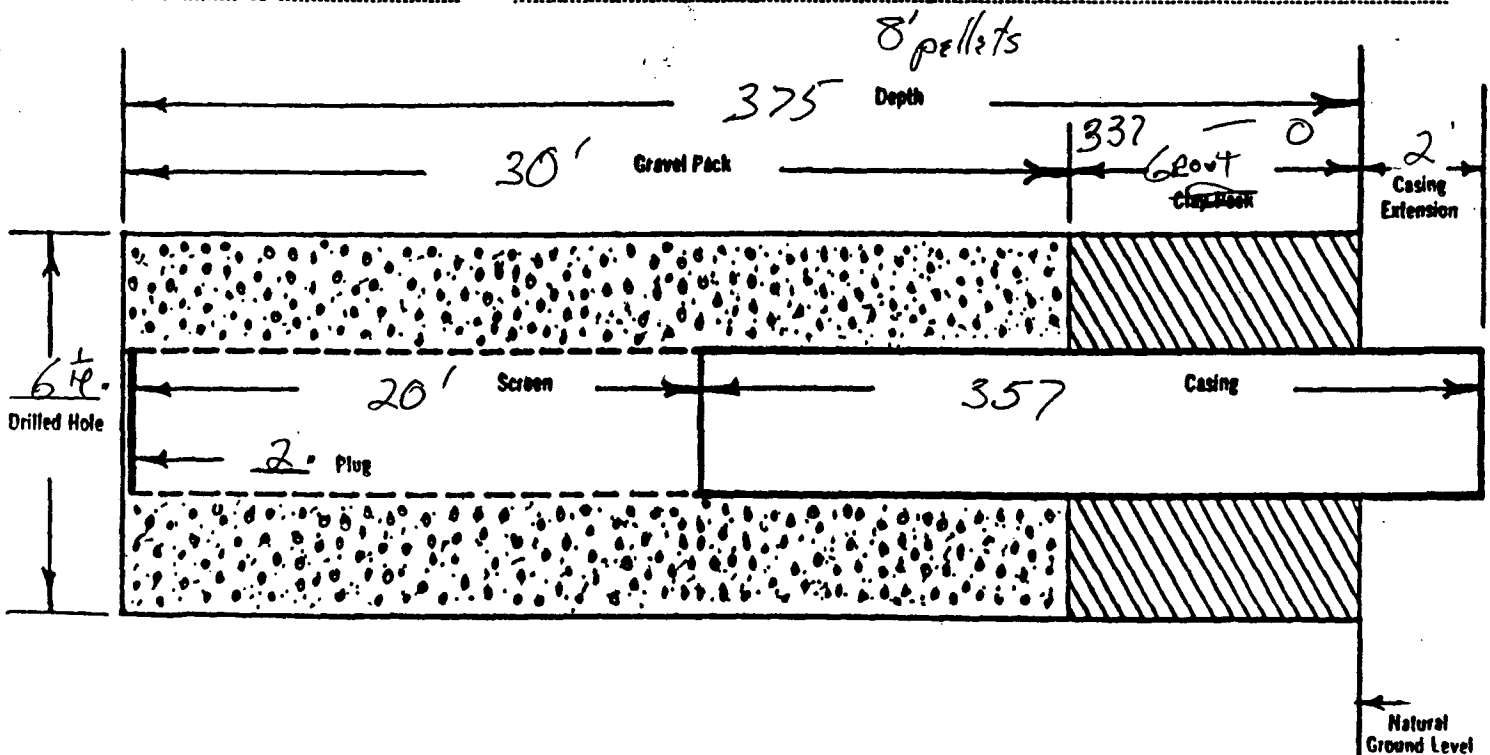
Tremie Pressure Grout

ACT

Well No.

Log of well from ground level:

Foot	Foot	Formation
0	to 15	Brown Clay & Rocks
15	to 150	Sandy Dark Gray Clu
150	to 223	~~Coarse~~ Coarse & Fine Gray Sand
223	to 291	Sand & clay
291	to 292	Quartzite (Hard)
292	to 307	Hard Gr
307	to 317	Sand
317	to 325	Q
325	to 338	Soly c L
338	to 382	Medium Fine Sand
382	to 385	Quartzite
	to	
	to	
	to	
	to	
	to	



Layne Western Company, Inc.

4430 Commercial Avenue

Omaha, Nebraska

TEST WELL REPORT

City and State Dolton, SD Date 7-17-91

Contract T.M. Rural Water Driller Jim Rentschler

Test No. 91-1 Helpers Lyle Porter

Static Water Level 100'

Test Log _____

<u>0- 10</u>	<u>Brown sandy clay</u>	<u>154-160</u>	<u>Fine sand, trace clay</u>
<u>10- 15</u>	<u>Coarse & fine sand & clay, gravel & rocks</u>	<u>160-170</u>	<u>Fine-med. sand, trace coarse</u>
<u>15- 93</u>	<u>Blue sandy clay</u>	<u>170-180</u>	<u>Med. & fine sand</u>
<u>93- 94</u>	<u>Boulders & clay</u>	<u>180-190</u>	<u>Med. & fine sand, trace clay</u>
<u>94-112</u>	<u>Sandy blue clay</u>	<u>190-200</u>	<u>Med. & fine sand</u>
<u>112-114</u>	<u>Sandy clay & boulders</u>	<u>200-215</u>	<u>Medium sand</u>
<u>114-145</u>	<u>Blue clay</u>	<u>215-220</u>	<u>Sand with clay</u>
<u>145-150</u>	<u>Fine sand w/clay</u>	<u>220-223</u>	<u>Medium sand</u>
<u>150-154</u>	<u>Blue clay</u>	<u>223-225</u>	<u>Sand & clay</u>

Size Mud Pit—Length 12', Width 5', Depth 2'

WATER BEARING FORMATION DATA

Depth	Vis-Secs.	Inches Mud Taken from Pit	Drilling Time
<u>160</u> to <u>180</u>	<u>30</u>	<u>1"</u>	
<u>180</u> to <u>200</u>	<u>30</u>	<u>3/4"</u>	
<u>200</u> to <u>220</u>	<u>30</u>	<u>1/2"</u>	
<u>220</u> to <u>240</u>	<u>30</u>	<u>0</u>	
<u>240</u> to <u>260</u>	<u>30</u>	<u>0</u>	
<u>260</u> to <u>280</u>	<u>30</u>	<u>0</u>	
<u>280</u> to <u>300</u>	<u>40</u>	<u>0</u>	

LOCATION: 2 miles North of Dolton, East side of Hwy. 81

REMARKS: Should pump 802 GPM Put in 4" PVC well, pumped & took water samples.

MAKE SKETCH ON BACK OF THIS SHEET SHOWING LOCATION TIEING IT INTO PERMANENT STRUCTURES AS MUCH AS POSSIBLE

Layn Western Company Inc.
4430 Commercial Avenue - Omaha, Nebraska

TEST WELL REPORT

City and State _____ Date _____

Contract T.M. R.W.D. Driller _____

Test No. 91-1 Helpers _____

Static Water Level _____

Test Log

<u>225-227 Medium sand</u>	<u>283-288 Med. to coarse sand, some gravel,</u>
<u>227-235 Med & fine sand w/clay</u>	<u>some quartzite, some hard</u>
<u>235-236 Boulders</u>	<u>288-305 Coarse & fine sand, trace of gravel,</u>
<u>236-245 Fine & med. sand</u>	<u>some hard.</u>
<u>245-255 Coarse & fine sand, some gravel</u>	<u>305-306 Very hard quartzite</u>
<u>caved a little</u>	<u>306-370 Fine & coarse sand, trace gravel</u>
<u>255-265 Boulders & sandy clay</u>	<u>370-372 Sandy clay</u>
<u>265-282 Sand clay</u>	<u>372-386 Fine & coarse sand, some gravel, some</u>
<u>282-283 Very hard quartzite</u>	<u>lignite</u>
	<u>386-387 Very hard quartzite</u>

Size Mud Pit—Length 12', Width 5', Depth 2'

WATER BEARING FORMATION DATA

Depth	Vis.-Seconds	Inches Mud Taken from Pit	Drilling Time
<u>300 to 320</u>	<u>35</u>	<u>0</u>	_____
<u>320 to 340</u>	<u>32</u>	<u>1/4</u>	_____
<u>340 to 360</u>	<u>32</u>	<u>1/2</u>	_____
<u>360 to 386</u>	<u>32</u>	<u>1/2</u>	_____
<u>to</u>	_____	_____	_____
<u>to</u>	_____	_____	_____
<u>to</u>	_____	_____	_____

LOCATION: _____

REMARKS: _____

Layne-Western Company, Inc.

Well Information

Omaha, Nebraska

1. Contract.....T.M. RWD.....Date 7-24-91
2. City and State.....Dolton, SD.....Driller.....Jim Rentschler
3. Well No. 91-1.....at test hole No. 91-1.....Well location (attach map) 2 miles North
.....of Dolton, East side of Hwy. 81
4. Work completed.....No of man hours as charged to job on time sheet.....

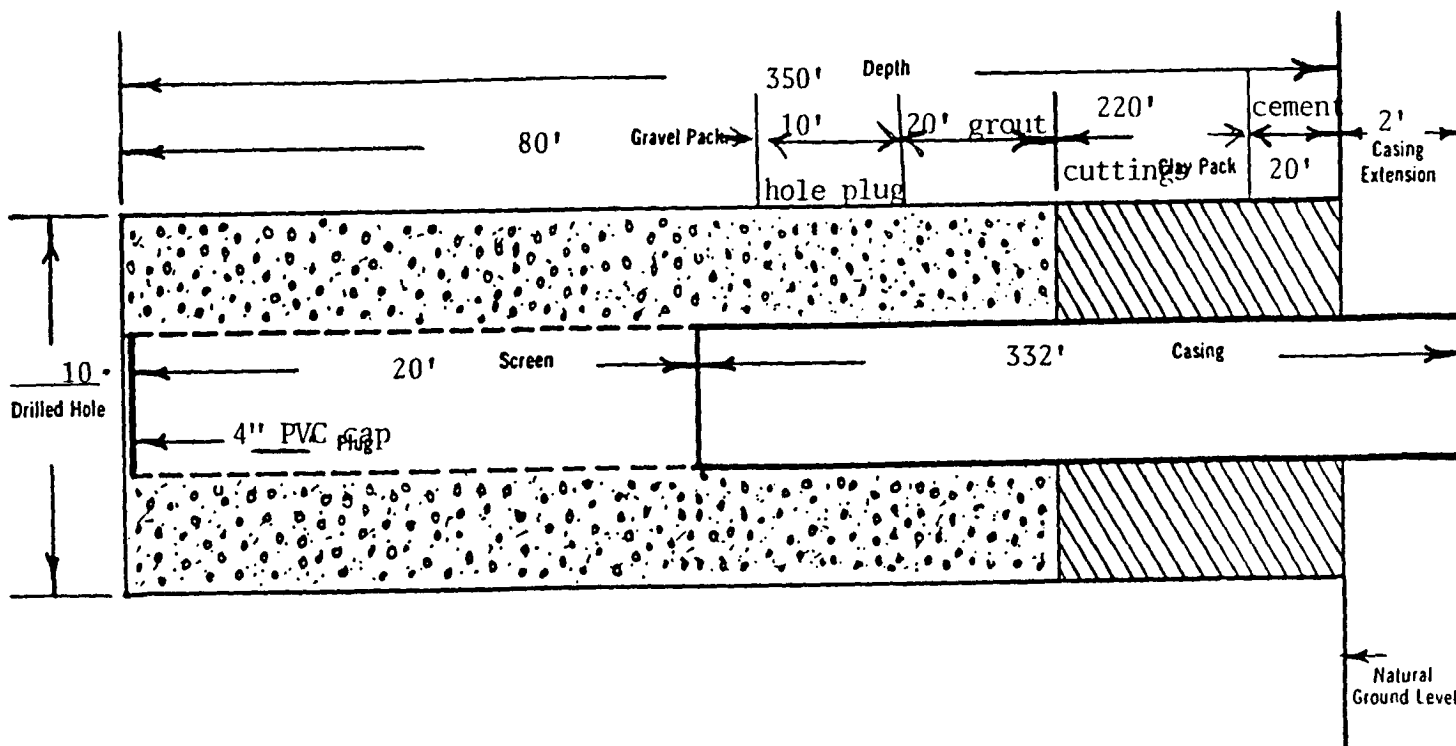
- | 5. MATERIAL: | LENGTH | DIA. | GAUGE OR
WALL THICKNESS | MATERIAL | TYPE | NO. OF
OPENINGS |
|---|--------|------|----------------------------|----------|------------|--------------------|
| 6. Screen | 20' | 4" | Sch. 40 | PVC | Crestline | factory
slot |
| 7. Inner Casing | 332' | 4" | Sch. 40 | PVC | Eagle | --- |
| 8. Outer Casing | 5' | 8" | Std. Wt. | Steel | Protective | casing |
| 9. 5 tons of gravel used in the well. Size concrete mix | | | | | | |
| 10. Test of well. Did you use test or permanent pump? test 7.5 HP sub.
Size of Bowl Stages | | | | | | |
| 11. Size of orifice 4 inch by 2 inch. Orifice tube reading 33 inches. | | | | | | |
| 12. Pumping test — measurements from ground level: | | | | | | |

TIME	G.P.M.	STATIC TOC	DRAWDOWN	PUMPING LEVEL	TOC
6 hrs.	86.8	100'7"	27'3"	127'10"	

Basal aquifer piezometer dropped 8" during pump test, 150' S.

13. Recovery in 5 minutes full, in 30 minutes
14. Did you seal bottom of well? yes Thickness inches, material 4" PVC cap
15. Well underreamed? no From feet to feet, feet to feet.
16. If all screen was not placed at bottom, state how it was spaced.
From 350 feet to 330 feet; from feet to feet; from feet to feet.
17. Depth of well from ground level to top of plug 350 Size of drilled hole 10"
18. Was cement placed around or between any of the casings? yes, 260'-270' hole plug
19. If so, state where, how much and method used. 240'-260'; tremied in grout,
0'-20' concrete with 10' pad

Well No...91-1

[illegible]

APPENDIX 3

**PUMP TEST DATA
AND
RECOVERY DATA**

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. 12 IN. PUMPED WELL

DATE

12/9/91

STATIC READING 100.08 (ELEV. = 1352.11)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCH. FLOW GPM	CUMMUL. FLOW GPM
0	9:07	100.08	0.00	0	0
1	9:08	139.55	-39.47	835	835
2	9:09	127.30	-27.22	835	1670
3	9:10	155.40	-55.32	835	2505
4	9:11	157.00	-56.92	835	3340
5	9:12	157.30	-57.22	835	4175
6	9:13	158.90	-58.82	835	5010
7	9:14	159.40	-59.32	835	5845
8	9:15	155.85	-55.77	835	6680
9	9:16	156.30	-56.22	835	7515
10	9:17	156.00	-55.92	835	8350
12	9:19	157.30	-57.22	853	10056
14	9:21	157.60	-57.52	853	11762
16	9:23	157.80	-57.72	853	13468
18	9:25	157.95	-57.87	853	15174
20	9:27	158.10	-58.02	853	16880
25	9:32	156.30	-56.22	853	21145
30	9:37	159.20	-59.12	853	25410
35	9:42	159.10	-59.02	853	29675
40	9:47	159.90	-59.82	853	33940
45	9:52	160.50	-60.42	853	38205
50	9:57	159.40	-59.32	853	42470
55	10:02	160.90	-60.82	853	46735
60	10:07	162.10	-62.02	853	51000
70	10:17	162.40	-62.32	853	59530
80	10:27	162.45	-62.37	853	68060
90	10:37	162.65	-62.57	858	76640
100	10:47	162.60	-62.52	858	85220
120	11:07	162.95	-62.87	858	102380
150	11:37	162.80	-62.72	858	128120
180	12:07	164.40	-64.32	867	154130

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. 12 IN. PUMPED WELL

DATE

12/9/91

STATIC READING 100.08 (ELEV. = 1352.11)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCH. FLOW GPM	CUMMUL. FLOW GPM
210	12:37	165.00	-64.92	867	180140
240	1:07	165.35	-65.27	867	206150
300	2:07	165.20	-65.12	867	258170
360	3:07	164.00	-63.92	835	308270
420	4:07	164.60	-64.52	835	358370
480	5:07	173.60	-73.52	932	414290
540	6:07	168.90	-68.82	876	466850
600	7:07	169.10	-69.02	876	519410
660	8:07	169.55	-69.47	876	571970
720	9:07	170.10	-70.02	880	624770
840	11:07	170.00	-69.92	880	730370
960	1:07	170.60	-70.52	880	835970
1080	3:07	169.35	-69.27	883	941930
1200	5:07	170.90	-70.82	880	1047530
1320	7:07	170.60	-70.52	878	1152890
1440	9:07	171.40	-71.32	876	1258010
1560	11:07	170.90	-70.82	871	1362530
1680	1:07	170.40	-70.32	867	1466570
1800	3:07	170.40	-70.32	862	1570010
1920	5:07	171.50	-71.42	871	1674530
2040	7:07	171.70	-71.62	871	1779050
2160	9:07	172.15	-72.07	816	1876970
2280	11:07	171.33	-71.25	862	1980410
2400	1:07	170.32	-70.24	846	2081930
2520	3:07	172.85	-72.77	876	2187050
2640	5:07	172.15	-72.07	869	2291330
2760	7:07	172.75	-72.67	869	2395610
2880	9:07	172.40	-72.32	871	2500130
3000	11:07	171.95	-71.87	867	2604170
3120	1:07	171.60	-71.52	862	2707610
3240	3:07	171.55	-71.47	862	2811050

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

OBSRV. WELL NO. 12 IN. PUMPED WELL

DATE

12/9/91

STATIC READING 100.08 (ELEV. = 1352.11)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCH. FLOW GPM	CUMMUL. FLOW GPM
3360	5:07	172.13	-72.05	867	2915090
3480	7:07	172.20	-72.12	867	3019130
3600	9:07	172.05	-71.97	867	3123170
3720	11:07	172.12	-72.04	867	3227210
3840	1:07	168.70	-68.62	792	3322250
3960	3:07	177.40	-77.32	910	3431450
4080	5:07	167.90	-67.82	816	3529370
4200	7:07	164.70	-64.62	816	3627290

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

RECOVERY DATA SHEET

OBSERV. WELL NO. 12 IN. PUMPED WELL

DATE 12/12/91

STATIC READING 100.08 (ELEV. = 1352.11)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
1	7:30	109.00	-8.92
2	7:31	107.10	-7.02
3	7:32	106.66	-6.58
4	7:33	106.50	-6.42
5	7:34	106.37	-6.29
6	7:35	106.16	-6.08
7	7:36	106.10	-6.02
8	7:37	105.97	-5.89
9	7:38	105.90	-5.82
10	7:39	105.80	-5.72
12	7:41	105.70	-5.62
14	7:43	105.60	-5.52
16	7:45	105.55	-5.47
18	7:47	105.50	-5.42
20	7:49	105.40	-5.32
25	7:54	105.40	-5.32
30	7:59	105.30	-5.22
35	8:04	105.20	-5.12
40	8:09	105.10	-5.02
45	8:14	105.00	-4.92
50	8:19	104.80	-4.72
55	8:24	104.80	-4.72
60	8:29	104.70	-4.62
70	8:39	104.60	-4.52
80	8:49	104.45	-4.37
90	8:59	104.50	-4.42
100	9:09	104.25	-4.17
110	9:19	104.10	-4.02
140	9:49	103.89	-3.81
170	10:19	103.72	-3.64
200	10:49	103.58	-3.50
230	11:19	103.32	-3.24
290	12:19	103.10	-3.02

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

RECOVERY DATA SHEET

OBSERV. WELL NO. 12 IN. PUMPED WELL

DATE 12/12/91

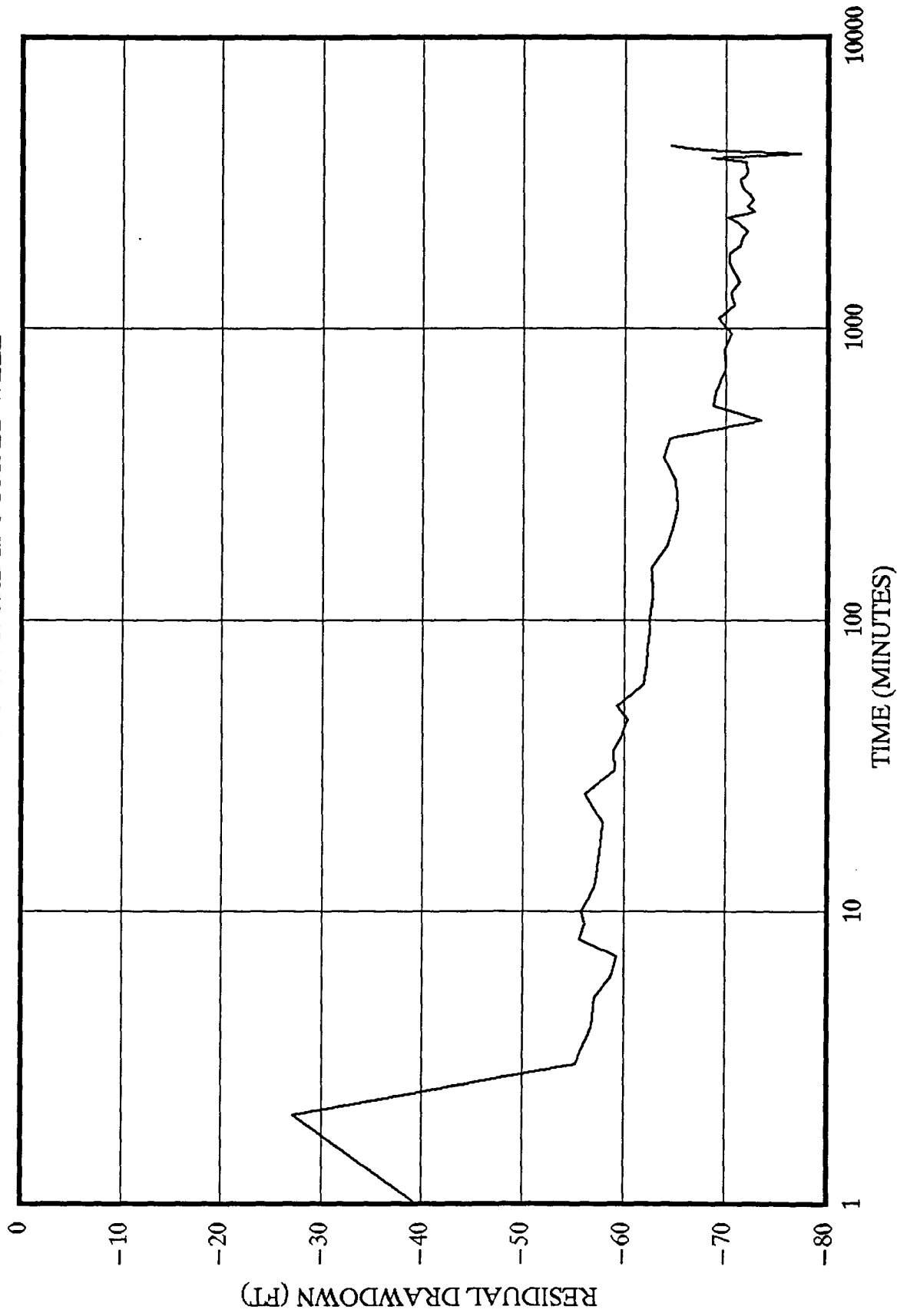
STATIC READING 100.08 (ELEV. = 1352.11)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
350	1:19	102.95	-2.87
410	2:19	102.78	-2.70
470	3:19*	102.62	-2.54
530	4:19*	102.72	-2.64
590	5:19*	102.65	-2.57
650	6:19*	102.51	-2.43
720	7:19*	101.97	-1.89
840	9:19*	102.58	-2.50
957	11:26*	102.35	-2.27
1079	1:28*	102.23	-2.15
1197	3:26*	102.08	-2.00
1315	5:24*	102.05	-1.97
1440	7:29*	101.96	-1.88
1558	9:27*	101.93	-1.85
1675	11:24*	101.87	-1.79
1798	1:27*	101.80	-1.72
1910	3:19*	101.81	-1.73
2035	5:24*	101.81	-1.73
2150	7:19*	101.77	-1.69
2270	9:19*	101.74	-1.66
2392	11:21*	101.68	-1.60
2514	1:23*	101.68	-1.60
2635	3:24*	101.72	-1.64
2755	5:24*	101.68	-1.60
2875	7:24*	101.64	-1.56
4500	10:29	100.00	0.08
5940	10:29	99.37	0.71
7380	10:29	99.42	0.66
10162	8:51	98.05	2.03
12961	7:30	97.14	2.94

* - A DIFFERENT M-SCOPE WAS USED (1.42' WAS ADDED TO EACH VALUE)

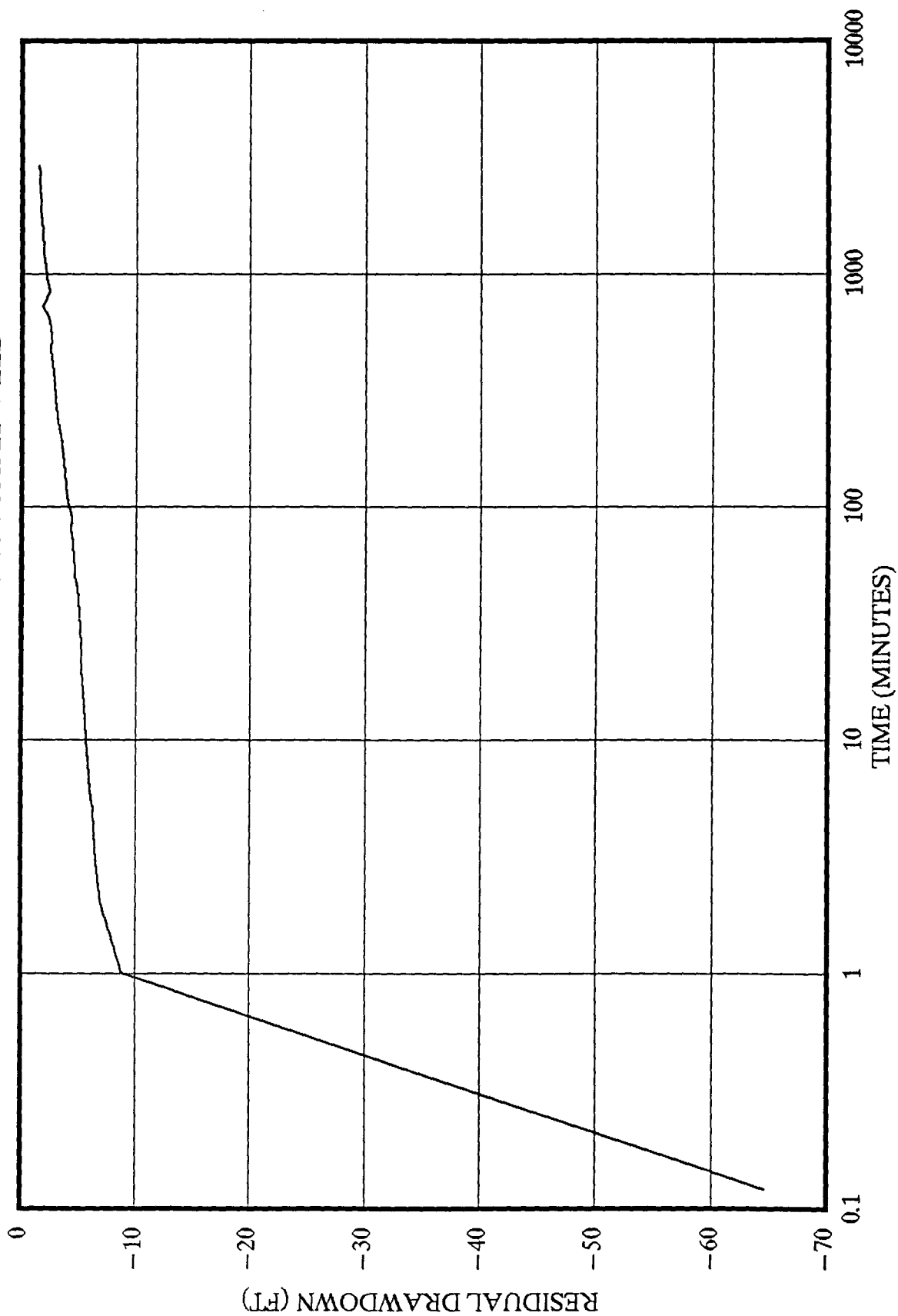
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE 12" PUMPED WELL



T-M RURAL WATER SYSTEM

RECOVERY DATA FOR THE 12" PUMPED WELL



**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. 4" OBSERV. WELL

DATE

12/9/91

STATIC READING 99.47 (ELEV. = 1352.57)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
0	9:07	99.47	0.00	0
1	9:08	100.80	-1.33	835
2	9:09	101.10	-1.63	835
3	9:10	101.90	-2.43	835
4	9:11	102.30	-2.83	835
5	9:12	102.60	-3.13	835
6	9:13	102.75	-3.28	835
7	9:14	102.85	-3.38	835
8	9:15	102.90	-3.43	835
9	9:16	103.00	-3.53	835
10	9:17	103.10	-3.63	835
12	9:19	103.25	-3.78	853
14	9:21	103.40	-3.93	853
16	9:23	103.50	-4.03	853
18	9:25	103.60	-4.13	853
20	9:27	103.70	-4.23	853
25	9:32	103.80	-4.33	853
30	9:37	103.95	-4.48	853
35	9:42	104.10	-4.63	853
40	9:47	104.25	-4.78	853
45	9:52	104.40	-4.93	853
50	9:57	104.50	-5.03	853
55	10:02	104.60	-5.13	853
60	10:07	104.70	-5.23	853
70	10:17	104.85	-5.38	853
80	10:27	105.00	-5.53	853
90	10:37	105.10	-5.63	858
100	10:47	105.25	-5.78	858
120	11:07	105.45	-5.98	858
150	11:37	105.65	-6.18	858
180	12:07	105.95	-6.48	867

**T - M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. 4" OBSERV. WELL

DATE

12/9/91

STATIC READING 99.47 (ELEV. = 1352.57)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
210	12:37	106.15	-6.68	867
240	1:07	106.35	-6.88	867
300	2:07	106.50	-7.03	867
360	3:07	106.65	-7.18	835
420	4:07	106.80	-7.33	835
480	5:07	107.42	-7.95	932
540	6:07	107.30	-7.83	876
600	7:07	107.50	-8.03	876
660	8:07	107.55	-8.08	876
720	9:07	107.65	-8.18	880
840	11:07	107.80	-8.33	880
960	1:07	108.00	-8.53	880
1080	3:07	108.10	-8.63	883
1200	5:07	108.15	-8.68	880
1320	7:07	108.30	-8.83	878
1440	9:07	108.40	-8.93	876
1560	11:07	108.45	-8.98	871
1680	1:07	108.45	-8.98	867
1800	3:07	108.50	-9.03	862
1920	5:07	108.66	-9.19	871
2040	7:07	108.82	-9.35	871
2160	9:07	108.82	-9.35	816
2280	11:07	108.85	-9.38	862
2400	1:07	108.87	-9.40	846
2520	3:07	109.05	-9.58	876
2640	5:07	109.07	-9.60	869
2760	7:07	109.16	-9.69	869
2880	9:07	109.18	-9.71	871
3000	11:07	109.19	-9.72	867
3120	1:07	109.18	-9.71	862
3240	3:07	109.20	-9.73	862

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. 4" OBSERV. WELL

DATE

12/9/91

STATIC READING 99.47 (ELEV. = 1352.57)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
3360	5:07	109.28	-9.81	867
3480	7:07	109.27	-9.80	867
3600	9:07	109.28	-9.81	867
3720	11:07	109.32	-9.85	867
3840	1:07	109.00	-9.53	792
3960	3:07	109.60	-10.13	910
4080	5:07	109.15	-9.68	816
4200	7:07	108.83	-9.36	816

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

RECOVERY DATA SHEET

OBSERV. WELL NO. 4" OBSERV. WELL

DATE 12/12/91

STATIC READING 99.47 (ELEV. = 1352.57)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
1	7:30	106.95	-7.48
2	7:31	106.48	-7.01
3	7:32	106.28	-6.81
4	7:33	106.02	-6.55
5	7:34	105.90	-6.43
6	7:35	105.73	-6.26
7	7:36	105.60	-6.13
8	7:37	105.50	-6.03
9	7:38	105.45	-5.98
10	7:39	105.42	-5.95
12	7:41	105.23	-5.76
14	7:43	105.14	-5.67
16	7:45	105.04	-5.57
18	7:47	104.96	-5.49
20	7:49	104.88	-5.41
25	7:54	104.73	-5.26
30	7:59	104.61	-5.14
35	8:04	104.50	-5.03
40	8:09	104.43	-4.96
45	8:14	104.31	-4.84
50	8:19	104.21	-4.74
55	8:24	104.14	-4.67
60	8:29	104.06	-4.59
70	8:39	103.92	-4.45
80	8:49	103.80	-4.33
90	8:59	103.70	-4.23
100	9:09	103.59	-4.12
120	9:29	103.41	-3.94
150	9:59	102.70	-3.23
180	10:29	102.48	-3.01
210	10:59	102.32	-2.85
240	11:29	102.49	-3.02
300	12:29	101.93	-2.46

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

RECOVERY DATA SHEET

OBSERV. WELL NO. 4" OBSERV. WELL

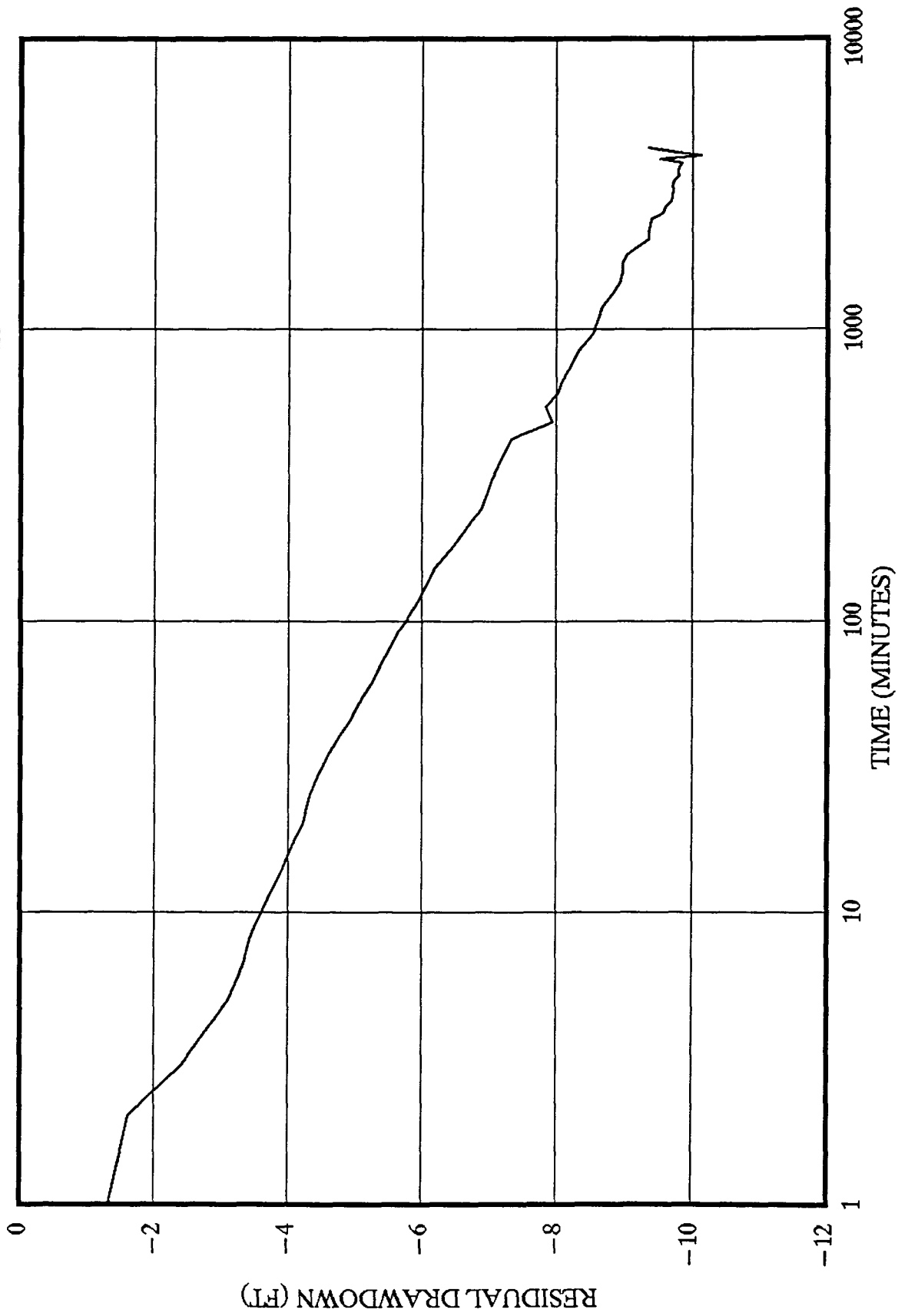
DATE 12/12/91

STATIC READING 99.47 (ELEV. = 1352.57)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
360	1:29	101.71	-2.24
420	2:29	101.57	-2.10
481	3:30	101.45	-1.98
541	4:30	101.38	-1.91
601	5:30	101.23	-1.76
661	6:30	101.10	-1.63
731	7:40	101.04	-1.57
841	9:30	101.00	-1.53
959	11:28	100.81	-1.34
1078	1:27	100.70	-1.23
1197	3:26	100.60	-1.13
1316	5:25	100.51	-1.04
1436	7:25	100.48	-1.01
1556	9:25	100.40	-0.93
1677	11:26	100.35	-0.88
1796	1:25	100.27	-0.80
1911	3:20	100.23	-0.76
2046	5:35	100.20	-0.73
2161	7:30	100.26	-0.79
2276	9:25	100.24	-0.77
2396	11:25	100.26	-0.79
2516	1:25	100.20	-0.73
2636	3:25	100.30	-0.83
2756	5:25	100.26	-0.79
2876	7:25	100.22	-0.75
4500	10:29	99.70	-0.23
5940	10:29	99.42	0.05
7380	10:29	99.43	0.04
10160	8:49	99.35	0.12
12970	7:39	99.28	0.19

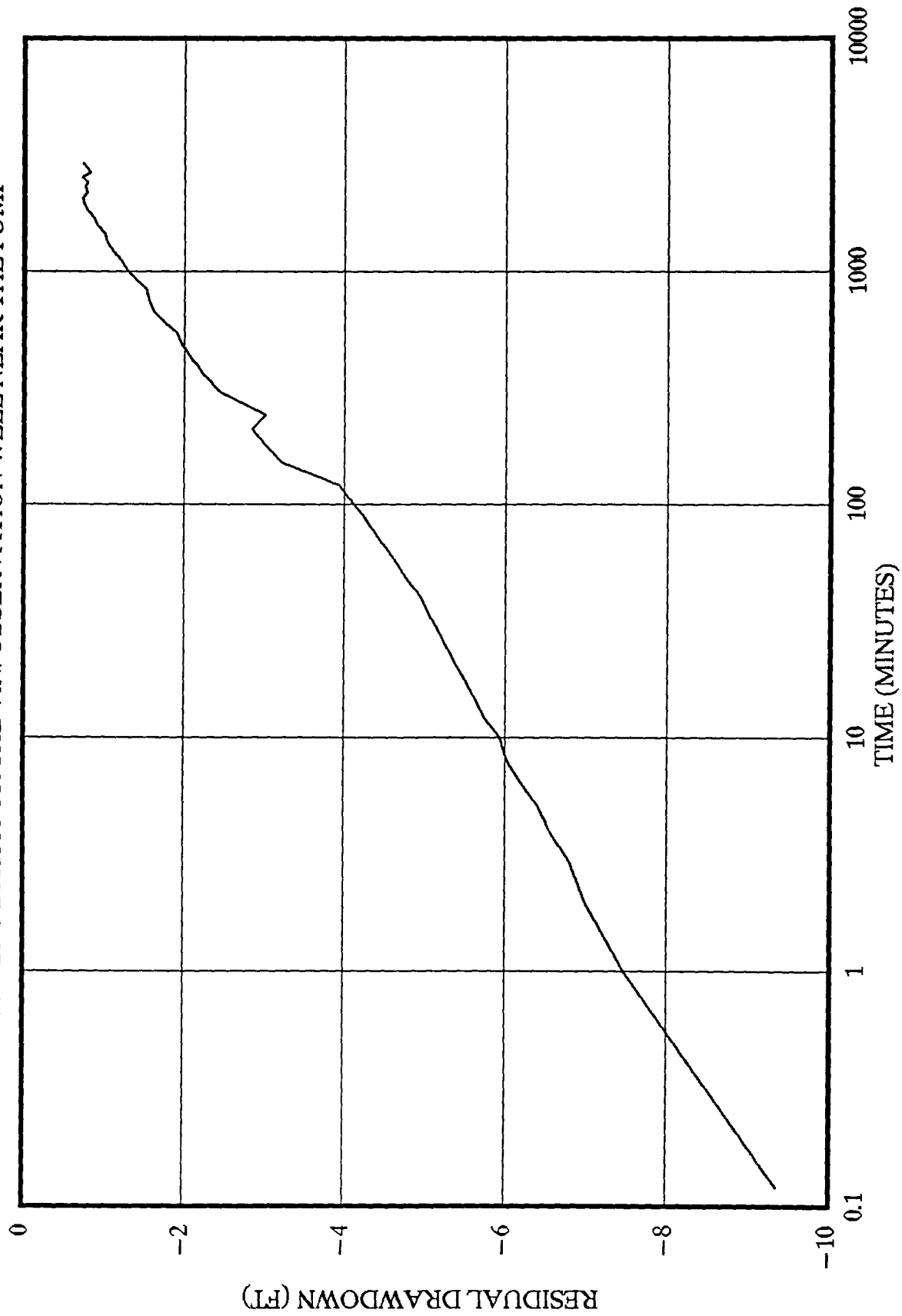
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE 4" OBSERVATION WELL



T-M RURAL WATER SYSTEM

RECOVERY DATA FOR THE 4 IN. OBSERVATION WELL NEAR THE PUMP



**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. WELL 150' SOUTH

DATE

12/9/91

STATIC READING 95.41 (ELEV. = 1353.15)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
0	9:07	95.41	0.00	0
1	9:08	96.50	-1.09	835
2	9:09	96.17	-0.76	835
3	9:10	96.77	-1.36	835
4	9:11	97.39	-1.98	835
5	9:12	97.73	-2.32	835
6	9:13	97.92	-2.51	835
7	9:14	98.04	-2.63	835
8	9:15	98.14	-2.73	835
9	9:16	98.22	-2.81	835
10	9:17	98.32	-2.91	835
12	9:19	98.47	-3.06	853
14	9:21	98.63	-3.22	853
16	9:23	98.75	-3.34	853
18	9:25	98.85	-3.44	853
20	9:27	98.96	-3.55	853
25	9:32	99.14	-3.73	853
30	9:37	99.25	-3.84	853
35	9:42	99.40	-3.99	853
40	9:47	99.53	-4.12	853
45	9:52	99.69	-4.28	853
50	9:57	99.78	-4.37	853
55	10:02	99.87	-4.46	853
60	10:07	99.97	-4.56	853
70	10:17	100.14	-4.73	853
80	10:27	100.30	-4.89	853
90	10:37	100.44	-5.03	858
100	10:47	100.53	-5.12	858
120	11:07	100.76	-5.35	858
150	11:37	100.98	-5.57	858
180	12:07	101.21	-5.80	867

**T - M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. WELL 150' SOUTH

DATE

12/9/91

STATIC READING 95.41 (ELEV. = 1353.15)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
210	12:37	101.40	-5.99	867
240	1:07	101.65	-6.24	867
300	2:07	101.81	-6.40	867
360	3:07	102.00	-6.59	835
420	4:07	102.18	-6.77	835
480	5:07	102.67	-7.26	932
540	6:07	102.66	-7.25	876
600	7:07	102.75	-7.34	876
660	8:07	102.87	-7.46	876
720	9:07	102.97	-7.56	880
840	11:07	103.10	-7.69	880
960	1:07	103.30	-7.89	880
1080	3:07	103.45	-8.04	883
1200	5:07	103.55	-8.14	880
1320	7:07	103.61	-8.20	878
1440	9:07	103.72	-8.31	876
1560	11:07	103.82	-8.41	871
1680	1:07	103.80	-8.39	867
1800	3:07	103.90	-8.49	862
1920	5:07	104.00	-8.59	871
2040	7:07	104.06	-8.65	871
2160	9:07	104.17	-8.76	816
2280	11:07	104.20	-8.79	862
2400	1:07	104.20	-8.79	846
2520	3:07	104.40	-8.99	876
2640	5:07	104.42	-9.01	869
2760	7:07	104.50	-9.09	869
2880	9:07	104.53	-9.12	871
3000	11:07	104.60	-9.19	867
3120	1:07	104.53	-9.12	862
3240	3:07	104.63	-9.22	862

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

OBSRV. WELL NO. WELL 150' SOUTH

DATE

12/9/91

STATIC READING 95.41 (ELEV. = 1353.15)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
3360	5:07	104.62	-9.21	867
3480	7:07	104.65	-9.24	867
3600	9:07	104.63	-9.22	867
3720	11:07	104.67	-9.26	867
3840	1:07	104.38	-8.97	792
3960	3:07	104.86	-9.45	910
4080	5:07	104.50	-9.09	816
4200	7:07	104.25	-8.84	816

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

RECOVERY DATA SHEET

OBSERV. WELL NO. WELL 150' SOUTH

DATE 12/12/91

STATIC READING 95.41 (ELEV. = 1353.15)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
1	7:30	102.86	-7.45
2	7:31	102.41	-7.00
3	7:32	102.12	-6.71
4	7:33	101.95	-6.54
5	7:34	101.77	-6.36
6	7:35	101.65	-6.24
7	7:36	101.54	-6.13
8	7:37	101.43	-6.02
9	7:38	101.37	-5.96
10	7:39	101.29	-5.88
12	7:41	101.15	-5.74
14	7:43	101.06	-5.65
16	7:45	100.97	-5.56
18	7:47	100.89	-5.48
20	7:49	100.80	-5.39
25	7:54	100.65	-5.24
30	7:59	100.52	-5.11
35	8:04	100.41	-5.00
40	8:09	100.30	-4.89
45	8:14	100.21	-4.80
50	8:19	100.12	-4.71
55	8:24	100.04	-4.63
60	8:29	99.99	-4.58
70	8:39	99.85	-4.44
80	8:49	99.70	-4.29
90	8:59	99.60	-4.19
100	9:09	99.49	-4.08
120	9:29	99.30	-3.89
150	9:59	99.13	-3.72
180	10:29	99.00	-3.59
210	10:59	98.77	-3.36
240	11:29	98.68	-3.27
300	12:29	98.37	-2.96

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

RECOVERY DATA SHEET

OBSERV. WELL NO. WELL 150' SOUTH

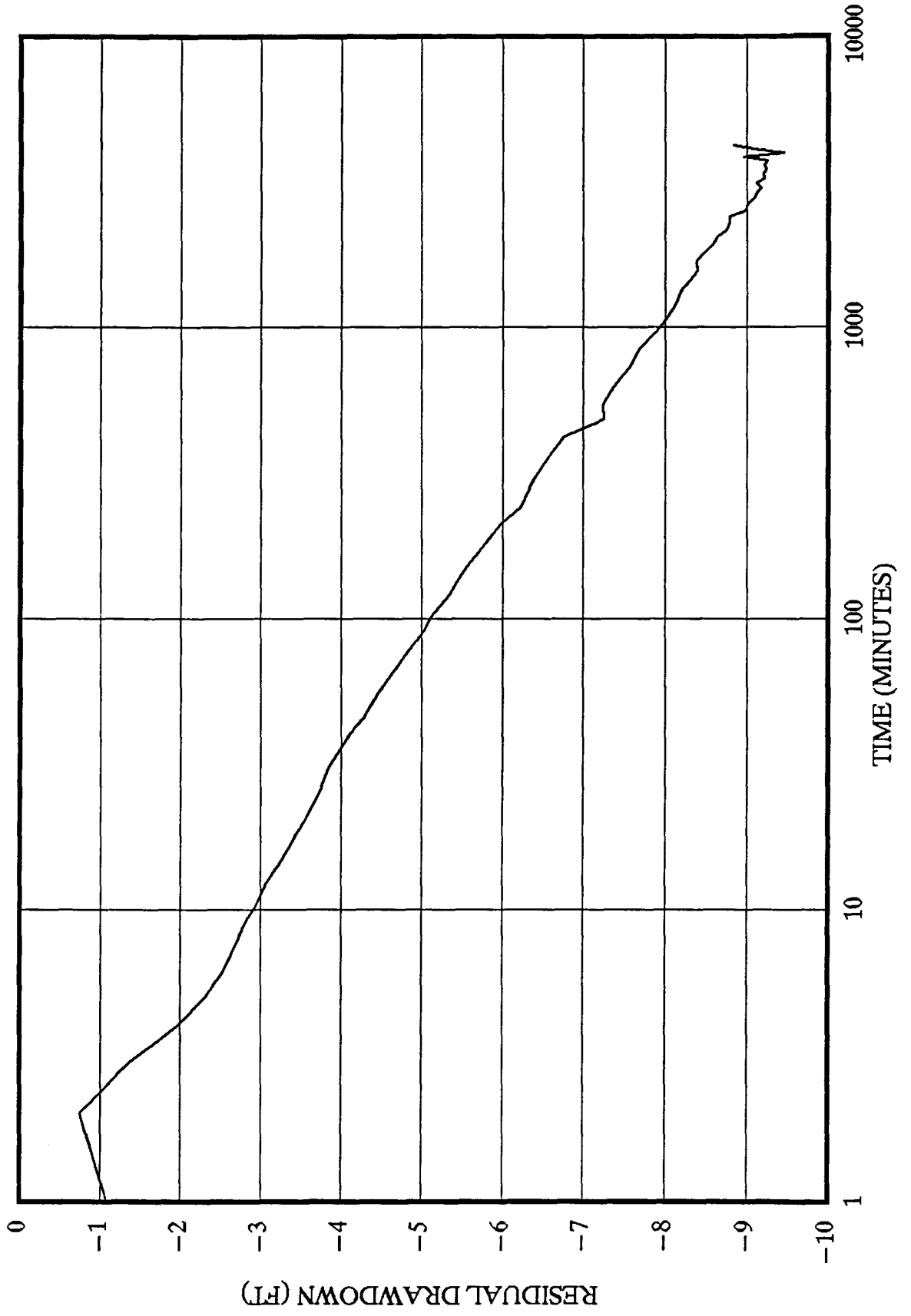
DATE 12/12/91

STATIC READING 95.41 (ELEV. = 1353.15)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
360	1:29	98.17	-2.76
432	2:41	97.97	-2.56
480	3:29	97.88	-2.47
540	4:29	97.75	-2.34
604	5:33	97.70	-2.29
660	6:29	97.60	-2.19
720	7:29	97.52	-2.11
844	9:33	97.37	-1.96
967	11:36	97.22	-1.81
1089	1:38	97.12	-1.71
1209	3:38	97.03	-1.62
1329	5:38	96.95	-1.54
1447	7:36	96.89	-1.48
1565	9:34	96.86	-1.45
1681	11:30	96.79	-1.38
1807	1:36	96.74	-1.33
1918	3:27	96.75	-1.34
2055	5:44	96.75	-1.34
2165	7:34	96.70	-1.29
2287	9:36	96.70	-1.29
2403	11:32	96.68	-1.27
2524	1:33	96.65	-1.24
2646	3:35	96.63	-1.22
2765	5:34	96.60	-1.19
2885	7:34	96.57	-1.16
4500	10:29	96.37	-0.96
5940	10:29	96.10	-0.69
7380	10:29	96.11	-0.70
10169	8:58	96.00	-0.59
12976	7:45	95.97	-0.56

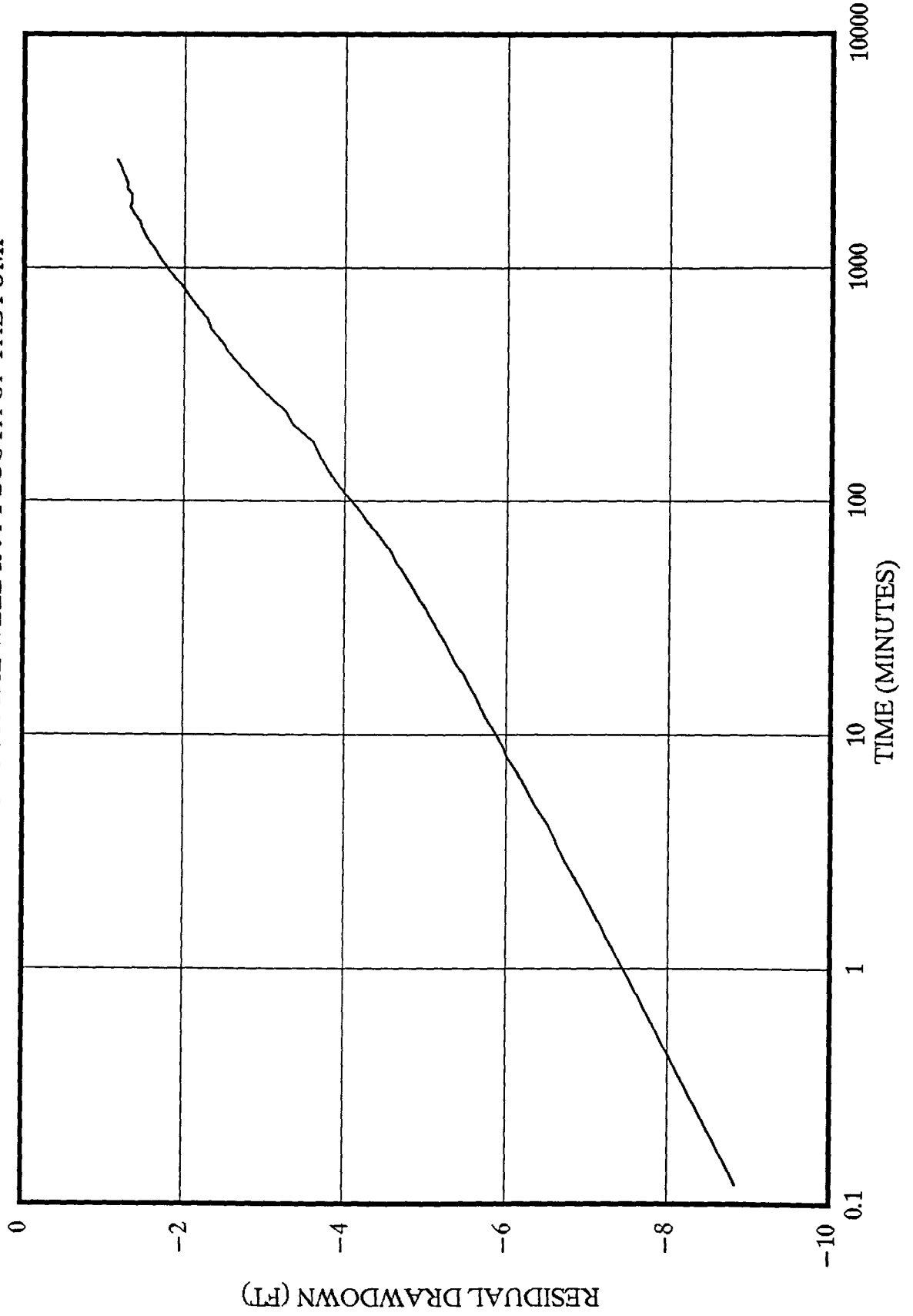
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE WELL 150' SOUTH



T-M RURAL WATER SYSTEM

RECOVERY DATA FOR THE WELL 150 FT SOUTH OF THE PUMP



**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. WELL 500' EAST

DATE

12/9/91

STATIC READING 95.46 (ELEV. = 1353.92)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
0	9:07	95.46	0.00	0
1	9:08	96.40	-0.94	835
2	9:09	96.93	-1.47	835
3	9:10	96.93	-1.47	835
4	9:11	97.12	-1.66	835
5	9:12	97.20	-1.74	835
6	9:13	97.40	-1.94	835
7	9:14	97.48	-2.02	835
8	9:15	97.65	-2.19	835
9	9:16	97.71	-2.25	835
10	9:17	97.80	-2.34	835
12	9:19	97.90	-2.44	853
14	9:21	98.01	-2.55	853
16	9:23	98.14	-2.68	853
18	9:25	98.23	-2.77	853
20	9:27	98.34	-2.88	853
25	9:32	98.47	-3.01	853
30	9:37	98.54	-3.08	853
35	9:42	98.71	-3.25	853
40	9:47	98.82	-3.36	853
45	9:52	98.90	-3.44	853
50	9:57	99.10	-3.64	853
55	10:02	99.30	-3.84	853
60	10:07	99.33	-3.87	853
70	10:17	99.35	-3.89	853
80	10:27	99.61	-4.15	853
90	10:37	99.80	-4.34	858
100	10:47	99.97	-4.51	858
120	11:07	100.15	-4.69	858
150	11:37	100.31	-4.85	858
180	12:07	100.58	-5.12	867

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. WELL 500' EAST

DATE

12/9/91

STATIC READING 95.46 (ELEV. = 1353.92)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
210	12:37	100.67	-5.21	867
240	1:07	100.90	-5.44	867
300	2:07	101.18	-5.72	867
360	3:07	101.28	-5.82	835
420	4:07	101.50	-6.04	835
480	5:07	101.77	-6.31	932
540	6:07	101.96	-6.50	876
600	7:07	101.93	-6.47	876
660	8:07	102.03	-6.57	876
720	9:07	102.11	-6.65	880
840	11:07	102.30	-6.84	880
960	1:07	102.30	-6.84	880
1080	3:07	102.57	-7.11	883
1200	5:07	102.68	-7.22	880
1320	7:07	102.79	-7.33	878
1440	9:07	102.81	-7.35	876
1560	11:07	102.88	-7.42	871
1680	1:07	102.74	-7.28	867
1800	3:07	102.82	-7.36	862
1920	5:07	103.60	-8.14	871
2040	7:07	103.08	-7.62	871
2160	9:07	103.23	-7.77	816
2280	11:07	103.27	-7.81	862
2400	1:07	103.31	-7.85	846
2520	3:07	103.27	-7.81	876
2640	5:07	103.28	-7.82	869
2760	7:07	103.46	-8.00	869
2880	9:07	103.54	-8.08	871
3000	11:07	103.46	-8.00	867
3120	1:07	103.34	-7.88	862
3240	3:07	103.38	-7.92	862

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

OBSRV. WELL NO. WELL 500' EAST

DATE 12/9/91

STATIC READING 95.46 (ELEV. = 1353.92)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
3360	5:07	103.47	-8.01	867
3480	7:07	103.56	-8.10	867
3600	9:07	103.62	-8.16	867
3720	11:07	103.63	-8.17	867
3840	1:07	103.51	-8.05	792
3960	3:07	103.73	-8.27	910
4080	5:07	103.55	-8.09	816
4200	7:07	103.30	-7.84	816

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

RECOVERY DATA SHEET

OBSERV. WELL NO. WELL 500' EAST

DATE 12/12/91

STATIC READING 95.46 (ELEV. = 1353.92)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
1	7:30	103.33	-7.87
2	7:31	103.21	-7.75
3	7:32	102.87	-7.41
4	7:33	102.83	-7.37
5	7:34	102.68	-7.22
6	7:35	102.60	-7.14
7	7:36	102.50	-7.04
8	7:37	102.46	-7.00
9	7:38	102.29	-6.83
10	7:39	102.25	-6.79
12	7:41	102.01	-6.55
14	7:43	101.93	-6.47
16	7:45	101.82	-6.36
18	7:47	101.70	-6.24
20	7:49	101.46	-6.00
25	7:54	101.40	-5.94
30	7:59	101.35	-5.89
35	8:04	101.28	-5.82
40	8:09	101.14	-5.68
45	8:14	101.00	-5.54
50	8:19	100.95	-5.49
55	8:24	100.83	-5.37
60	8:29	100.76	-5.30
70	8:39	100.61	-5.15
80	8:49	100.46	-5.00
90	8:59	100.33	-4.87
100	9:09	100.21	-4.75
120	9:29	100.07	-4.61
150	9:59	99.80	-4.34
180	10:29	99.56	-4.10
210	10:59	99.45	-3.99
240	11:29	99.35	-3.89
300	12:29	99.05	-3.59

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

RECOVERY DATA SHEET

OBSERV. WELL NO. WELL 500' EAST

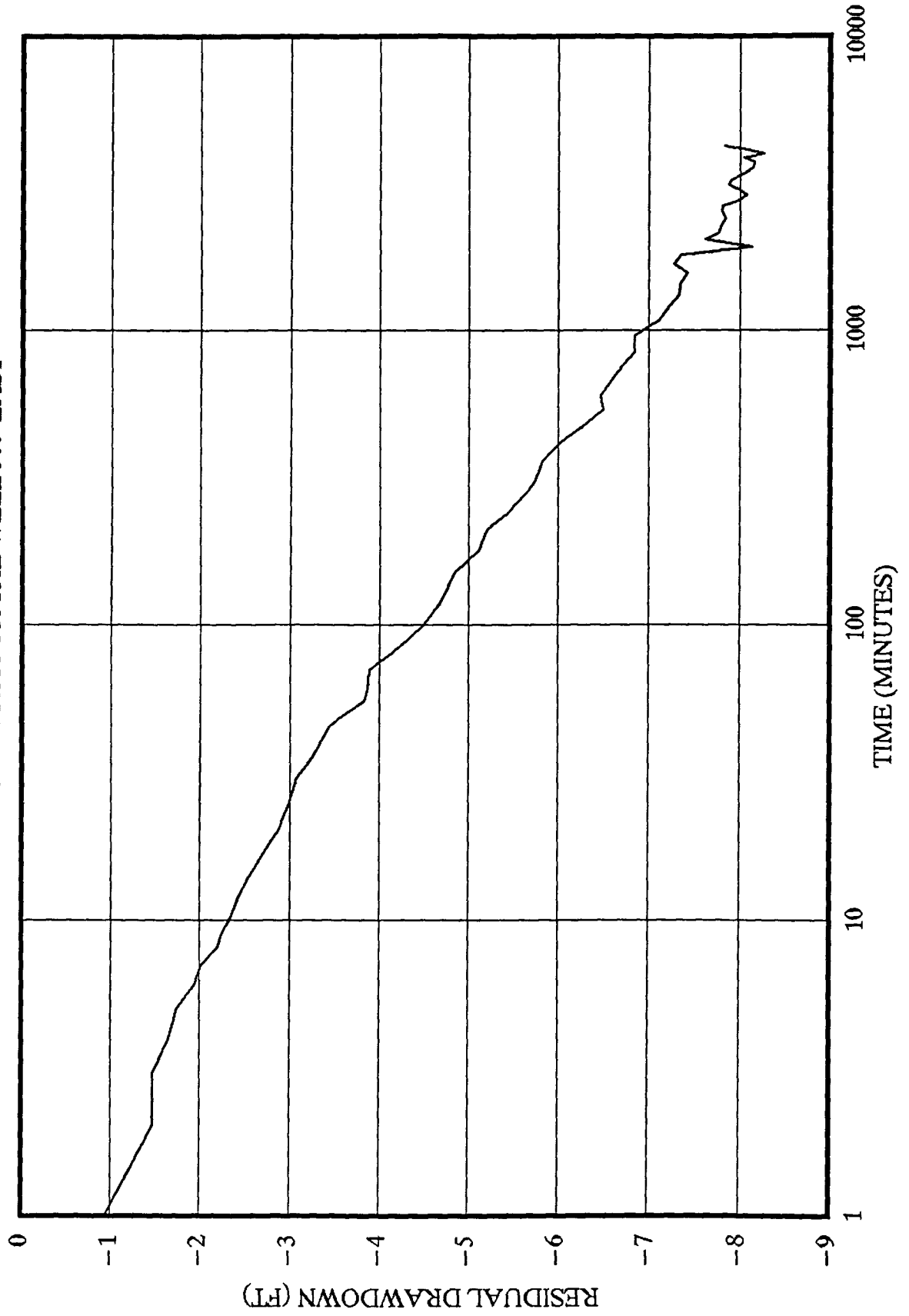
DATE 12/12/91

STATIC READING 95.46 (ELEV. = 1353.92)

TIME SINCE RECOVERY STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
360	1:29	98.85	-3.39
434	2:43	98.81	-3.35
487	3:36	98.59	-3.13
540	4:29	98.51	-3.05
600	5:29	98.40	-2.94
660	6:29	98.34	-2.88
720	7:29	98.27	-2.81
840	9:29	98.16	-2.70
970	11:39	98.13	-2.67
1090	1:39	98.00	-2.54
1212	3:41	97.90	-2.44
1333	5:42	97.84	-2.38
1450	7:39	97.62	-2.16
1560	9:29	97.48	-2.02
1680	11:29	97.44	-1.98
1800	1:29	97.41	-1.95
1934	3:43	97.38	-1.92
2059	5:48	97.30	-1.84
2172	7:41	97.31	-1.85
2291	9:40	97.26	-1.80
2406	11:35	97.10	-1.64
2527	1:36	97.03	-1.57
2649	3:38	97.02	-1.56
2769	5:38	97.03	-1.57
2888	7:37	97.11	-1.65
4500	10:29	97.00	-1.54
5940	10:29	96.75	-1.29
7380	10:29	96.77	-1.31
10179	9:08	96.71	-1.25
12981	7:50	96.60	-1.14

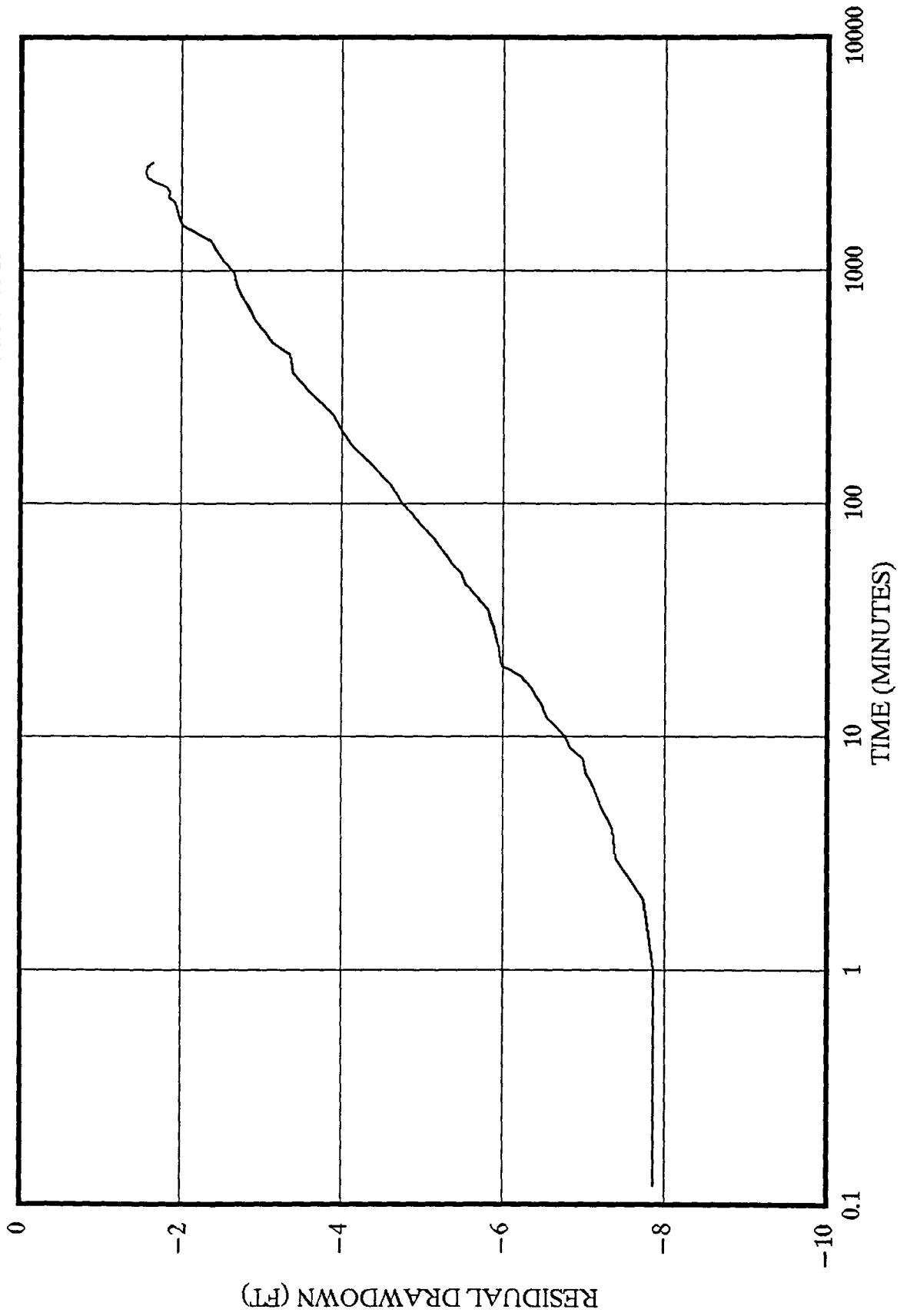
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE WELL 500' EAST



T-M RURAL WATER SYSTEM

RECOVERY DATA FOR THE WELL 500 FT EAST OF THE PUMP



**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE EAST

DATE 12/9/91

STATIC READING 90.52 (ELEV. = 1349.48)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
0	9:07	90.52	0.00
121	11:08	90.58	-0.06
182	12:09	90.65	-0.13
243	1:10	90.71	-0.19
303	2:10	90.79	-0.27
368	3:15	90.85	-0.33
434	4:21	90.88	-0.35
488	5:15	91.02	-0.50
546	6:13	91.08	-0.56
613	7:20	91.06	-0.54
669	8:16	91.21	-0.69
729	9:16	91.25	-0.73
846	11:13	91.38	-0.85
970	1:17	91.44	-0.92
1086	3:13	91.50	-0.98
1207	5:14	91.58	-1.06
1348	7:35	91.75	-1.23
1448	9:15	91.73	-1.21
1569	11:16	91.81	-1.29
1702	1:29	91.88	-1.35
1807	3:14	91.94	-1.42
1926	5:13	92.10	-1.58
2044	7:11	92.08	-1.56
2167	9:14	92.19	-1.67
2287	11:14	92.27	-1.75
2407	1:14	92.27	-1.75
2527	3:14	92.35	-1.83
2649	5:16	92.38	-1.85
2771	7:18	92.42	-1.90
2889	9:16	92.48	-1.96
3006	11:13	92.50	-1.98

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE EAST

DATE 12/9/91

STATIC READING 90.52 (ELEV. = 1349.48)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
3123	1:10	92.52	-2.00
3243	3:10	92.54	-2.02
3365	5:12	92.58	-2.06
3486	7:13	92.60	-2.08
3606	9:13	92.67	-2.15
3726	11:13	92.65	-2.13
3851	1:18	92.71	-2.19
3971	3:18	92.71	-2.19
4084	5:11	92.71	-2.19
28	7:58*	92.75	-2.23
72	8:42*	92.75	-2.23
100	9:10*	92.71	-2.19
142	9:52*	92.71	-2.19
197	10:47*	92.63	-2.10
256	11:46*	92.54	-2.02
305	12:35*	92.52	-2.00
368	1:38*	92.50	-1.98
439	2:49*	92.40	-1.88
492	3:42*	92.38	-1.85
553	4:43*	92.33	-1.81
615	5:45*	92.27	-1.75
675	6:45*	92.25	-1.73
735	7:45*	92.21	-1.69
868	9:58*	92.17	-1.65
975	11:45*	92.08	-1.56
1097	1:47*	92.04	-1.52
1217	3:47*	91.96	-1.44
1337	5:47*	91.88	-1.35
1455	7:45*	91.83	-1.31
1608	10:18*	91.79	-1.27
1702	11:52*	91.77	-1.25

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE EAST

DATE 12/9/91

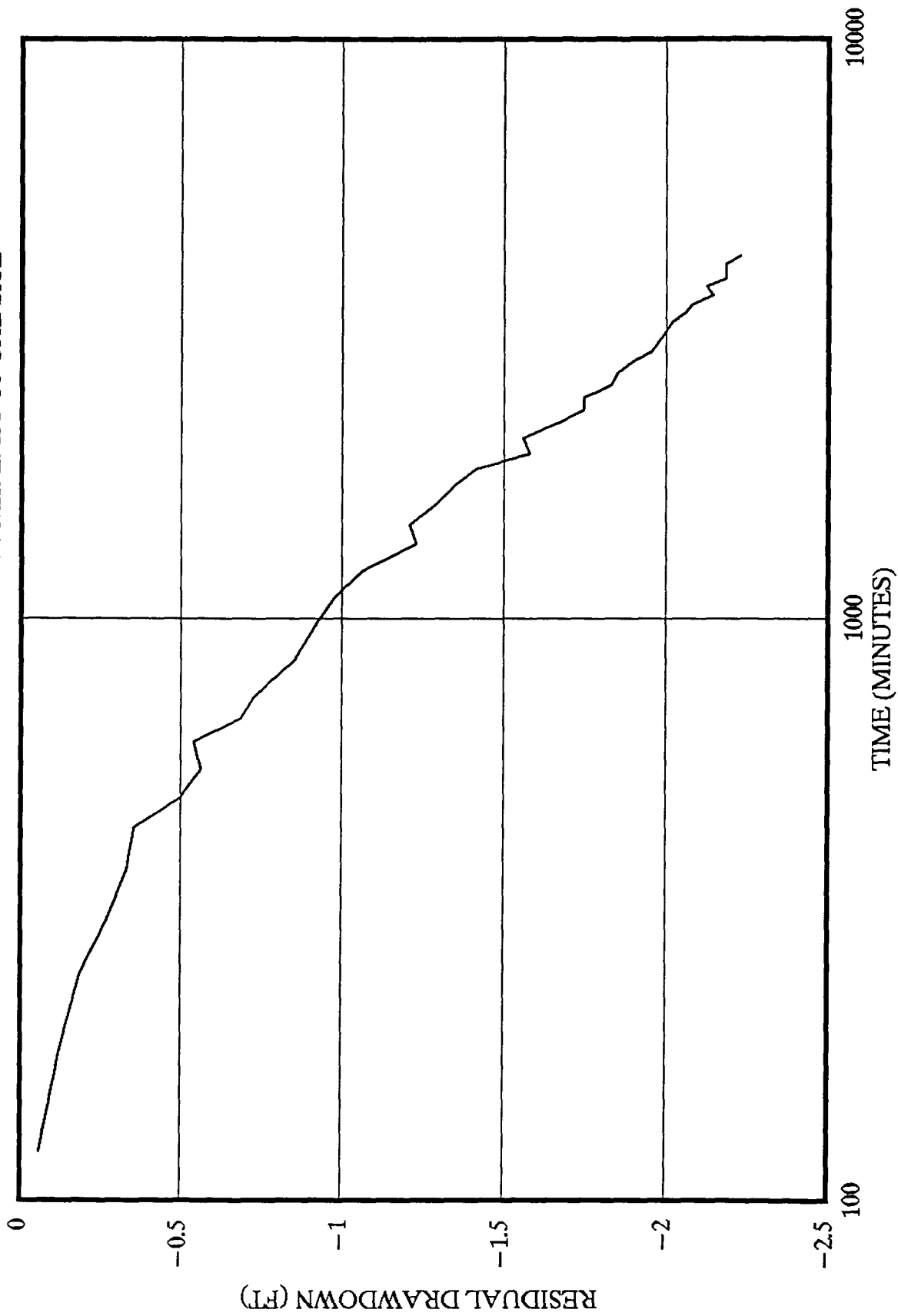
STATIC READING 90.52 (ELEV. = 1349.48)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
1818	1:48*	91.75	-1.23
1941	3:51*	91.75	-1.23
2063	5:53*	91.71	-1.19
2180	7:50*	91.73	-1.21
2295	9:45*	91.67	-1.15
2413	11:43*	91.75	-1.23
2534	1:44*	91.71	-1.19
2655	3:45*	91.69	-1.17
2774	5:44*	91.67	-1.15
2893	7:43*	91.67	-1.15

* - RECOVERY PERIOD (PUMP IS SHUT-OFF)

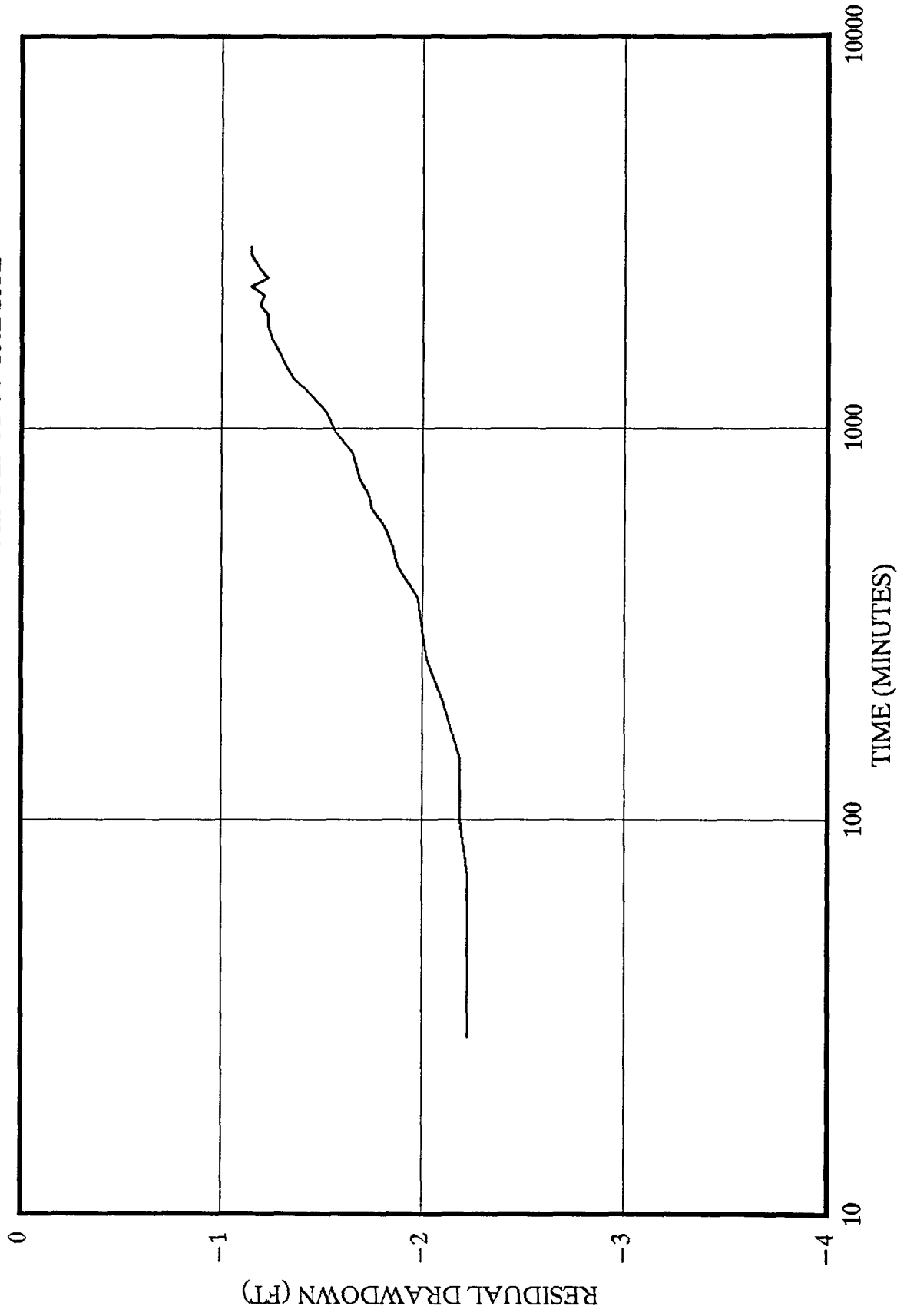
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE WELL 1 MILE EAST OF THE SITE



T-M RURAL WATER SYSTEM

RECOVERY DATA FOR THE WELL 1 MILE EAST OF THE SITE



**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTIONWELL**

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE NORTH

DATE 12/9/91

STATIC READING 98.54 (ELEV. = 1353.46)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
0	9:07	98.54	0.00
126	11:13	98.83	-0.29
186	12:13	99.02	-0.48
249	1:16	99.17	-0.63
307	2:14	99.31	-0.77
374	3:21	99.44	-0.90
439	4:26	99.63	-1.08
495	5:22	99.65	-1.10
555	6:22	99.75	-1.21
620	7:27	99.81	-1.27
675	8:22	99.96	-1.42
735	9:22	100.00	-1.46
855	11:22	100.13	-1.58
976	1:23	100.21	-1.67
1091	3:18	100.29	-1.75
1213	5:20	100.38	-1.83
1353	7:40	100.48	-1.94
1453	9:20	100.48	-1.94
1577	11:24	100.56	-2.02
1688	1:15	100.63	-2.08
1813	3:20	100.69	-2.15
1934	5:21	100.73	-2.19
2050	7:17	100.77	-2.23
2175	9:22	101.00	-2.46
2294	11:21	101.02	-2.48
2413	1:20	101.02	-2.48
2533	3:20	101.13	-2.58
2654	5:21	101.17	-2.63
2776	7:23	101.21	-2.67
2894	9:21	101.27	-2.73
3011	11:18	101.21	-2.67

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE NORTH

DATE 12/9/91

STATIC READING 98.54 (ELEV. = 1353.46)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
3129	1:16	101.25	-2.71
3247	3:14	101.29	-2.75
3371	5:18	101.29	-2.75
3492	7:19	101.31	-2.77
3611	9:18	101.35	-2.81
3732	11:19	101.40	-2.85
3856	1:23	101.46	-2.92
3977	3:24	101.44	-2.90
4089	5:16	101.42	-2.88
33	8:03*	101.44	-2.90
78	8:48*	101.31	-2.77
110	9:20*	101.17	-2.63
148	9:58*	101.06	-2.52
202	10:52*	100.96	-2.42
260	11:50*	100.83	-2.29
311	12:41*	100.73	-2.19
371	1:41*	100.60	-2.06
444	2:54*	100.54	-2.00
497	3:47*	100.48	-1.94
560	4:50*	100.42	-1.88
620	5:50*	100.35	-1.81
681	6:51*	100.29	-1.75
745	7:55*	100.25	-1.71
870	10:00*	100.21	-1.67
981	11:51*	100.13	-1.58
1102	1:52*	100.04	-1.50
1222	3:52*	99.96	-1.42
1342	5:52*	99.92	-1.38
1460	7:50*	99.88	-1.33
1604	10:14*	99.81	-1.27
1708	11:58*	99.75	-1.21

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE NORTH

DATE 12/9/91

STATIC READING 98.54 (ELEV. = 1353.46)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
1824	1:54*	99.75	-1.21
1946	3:56*	99.75	-1.21
2070	6:00*	99.75	-1.21
2189	7:59*	99.75	-1.21
2300	9:50*	99.75	-1.21
2418	11:48*	99.71	-1.17
2540	1:50*	99.75	-1.21
2660	3:50*	99.75	-1.21
2778	5:48*	99.75	-1.21
2900	7:50*	99.71	-1.17

* - RECOVERY PERIOD (PUMP IS SHUT-OFF)

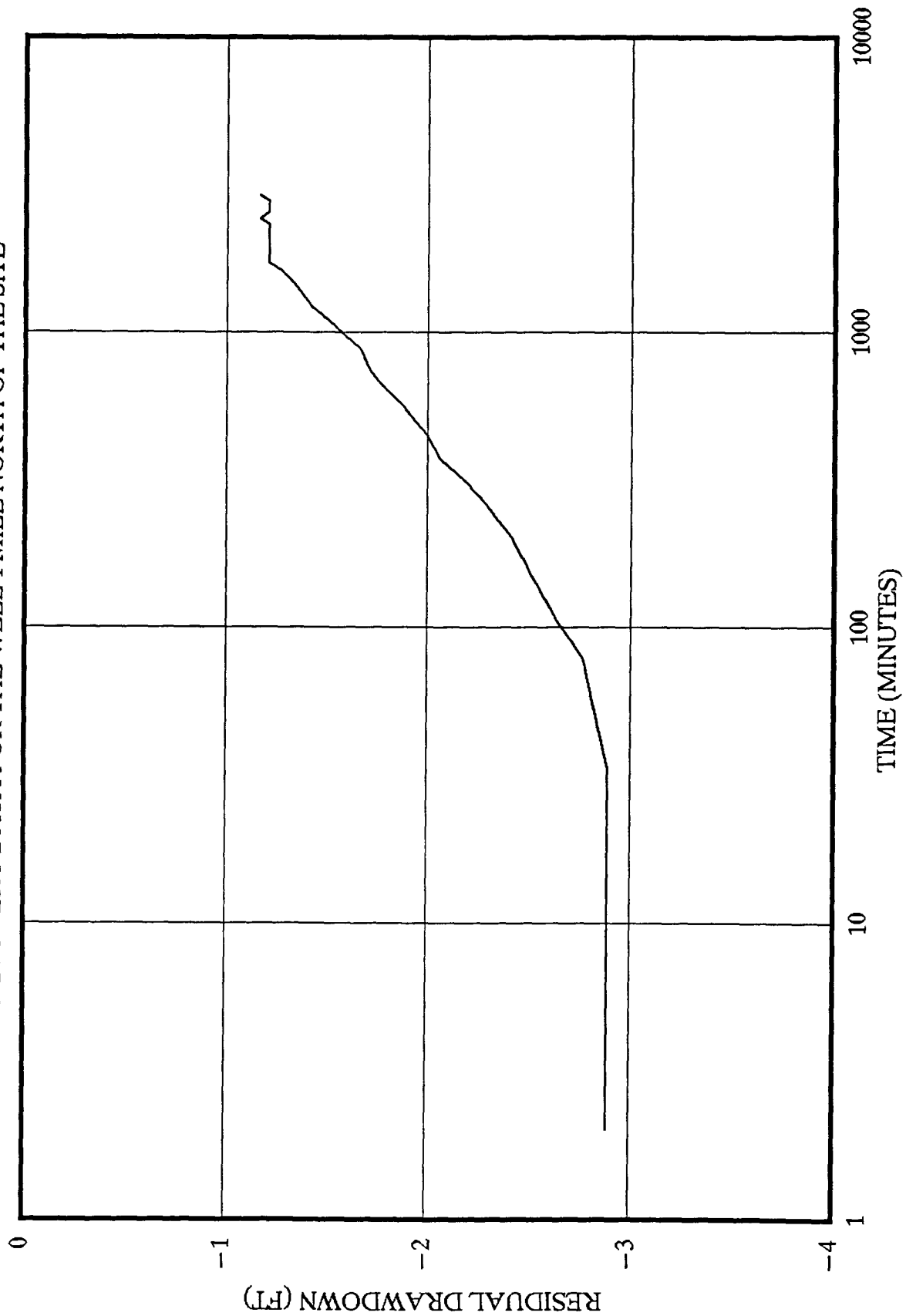
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE WELL 1 MILE NORTH OF THE SITE



T-M RURAL WATER SYSTEM

RECOVERY DATA FOR THE WELL 1 MILE NORTH OF THE SITE



**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE SOUTH
& 1 MILE EAST

DATE 12/9/91

STATIC READING 88.10 (ELEV. = 1349.90)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
0	9:07	88.10	0.00
136	11:23	88.17	-0.06
196	12:23	88.19	-0.08
257	1:24	88.27	-0.17
313	2:20	88.33	-0.23
380	3:27	88.44	-0.33
447	4:34	88.48	-0.38
503	5:30	88.54	-0.44
564	6:31	88.60	-0.50
629	7:36	88.67	-0.56
683	8:30	88.71	-0.60
743	9:30	88.79	-0.69
863	11:30	88.92	-0.81
983	1:30	89.00	-0.90
1100	3:27	89.10	-1.00
1221	5:28	89.21	-1.10
1340	7:27	89.25	-1.15
1466	9:33	89.29	-1.19
1586	11:33	89.35	-1.25
1696	1:23	89.44	-1.33
1821	3:28	89.52	-1.42
1941	5:28	89.63	-1.52
2067	7:34	89.69	-1.58
2183	9:30	89.79	-1.69
2301	11:28	89.90	-1.79
2421	1:28	89.98	-1.88
2541	3:28	90.04	-1.94
2661	5:28	90.13	-2.02
2786	7:33	90.08	-1.98
2901	9:28	90.10	-2.00
3018	11:25	90.15	-2.04

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSERV. WELL NO. 1 MILE SOUTH
& 1 MILE EAST

DATE 12/9/91

STATIC READING 88.10 (ELEV. = 1349.90)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
3136	1:23	90.19	-2.08
3255	3:22	90.25	-2.15
3380	5:27	90.27	-2.17
3501	7:28	90.29	-2.19
3619	9:26	90.38	-2.27
3741	11:28	90.33	-2.23
3862	1:29	90.46	-2.35
3983	3:30	90.42	-2.31
4096	5:23	90.50	-2.40
42	8:12*	90.50	-2.40
84	8:54*	90.50	-2.40
117	9:27*	90.42	-2.31
155	10:05*	90.42	-2.31
210	11:00*	90.38	-2.27
266	11:56*	90.33	-2.23
317	12:47*	90.29	-2.19
378	1:48*	90.23	-2.13
451	3:01*	90.23	-2.13
503	3:53*	90.17	-2.06
565	4:55*	90.15	-2.04
625	5:55*	90.10	-2.00
690	7:00*	90.08	-1.98
750	8:00*	90.02	-1.92
878	10:08*	90.00	-1.90
988	11:58*	89.96	-1.85
1110	2:00*	89.83	-1.73
1228	3:58*	89.75	-1.65
1350	6:00*	89.67	-1.56
1470	8:00*	89.67	-1.56
1615	10:25*	89.56	-1.46
1715	12:05*	89.54	-1.44

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

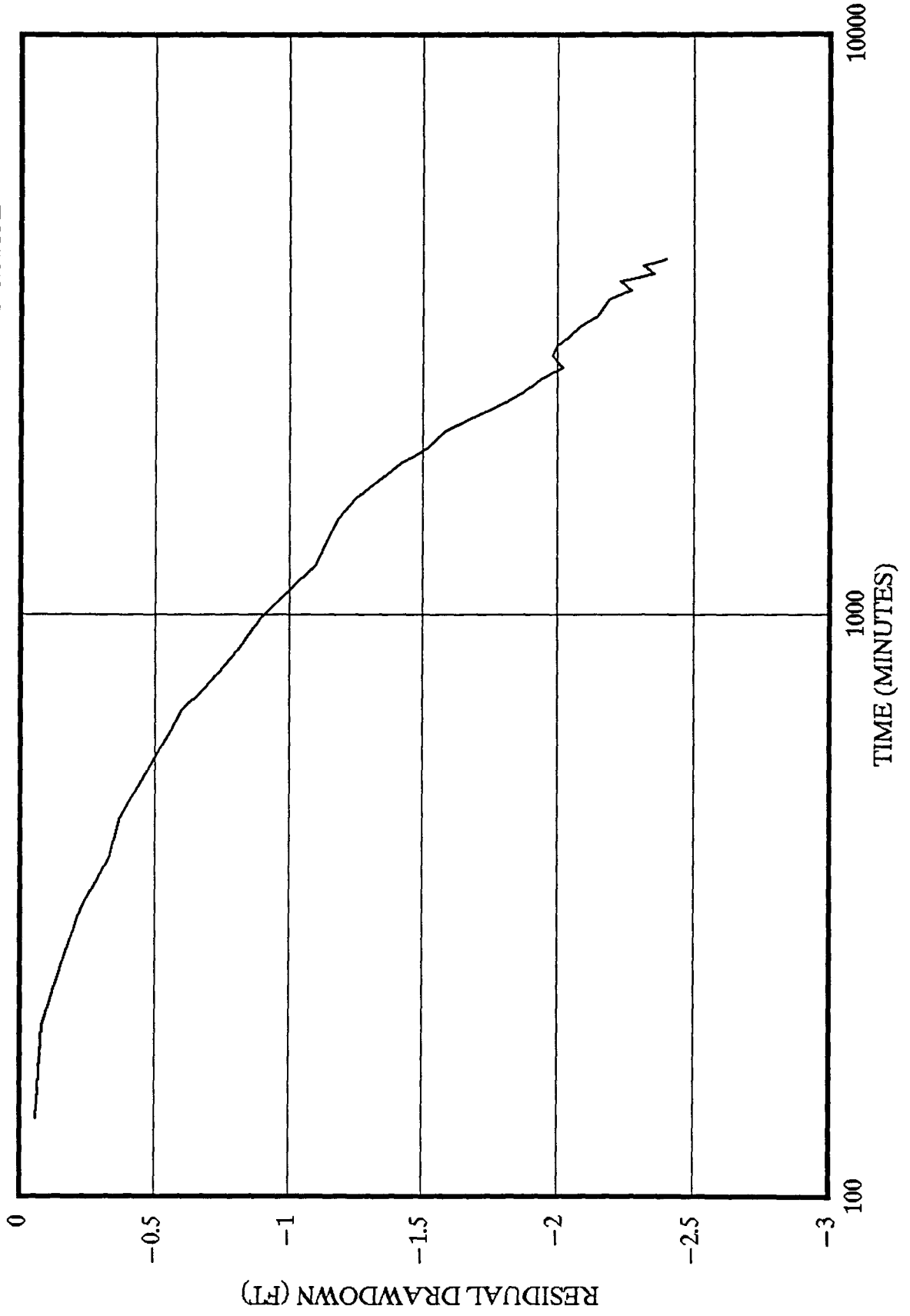
OBSERV. WELL NO. 1 MILE SOUTH DATE 12/9/91
& 1 MILE EAST
STATIC READING 88.10 (ELEV. = 1349.90)

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft
1835	2:05*	89.52	-1.42
1952	4:02*	89.52	-1.42
2077	6:07*	89.52	-1.42
2195	8:05*	89.52	-1.42
2305	9:55*	89.52	-1.42
2425	11:55*	89.50	-1.40
2548	1:58*	89.50	-1.40
2668	3:58*	89.50	-1.40
2785	5:55*	89.50	-1.40
2909	7:59*	89.50	-1.40

* - RECOVERY PERIOD (PUMP IS SHUT-OFF)

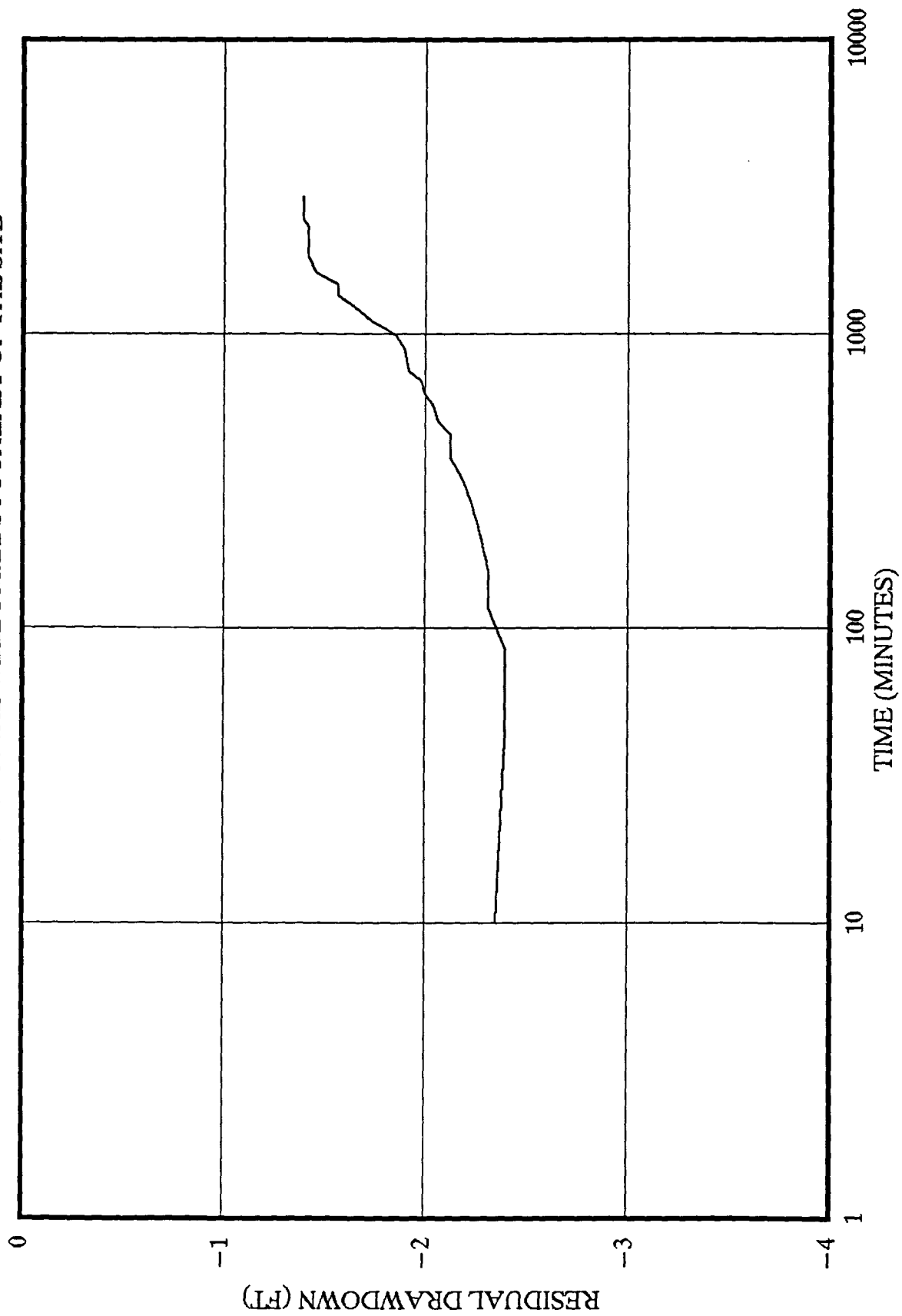
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE WELL 1 MILE SOUTHEAST OF THE SITE



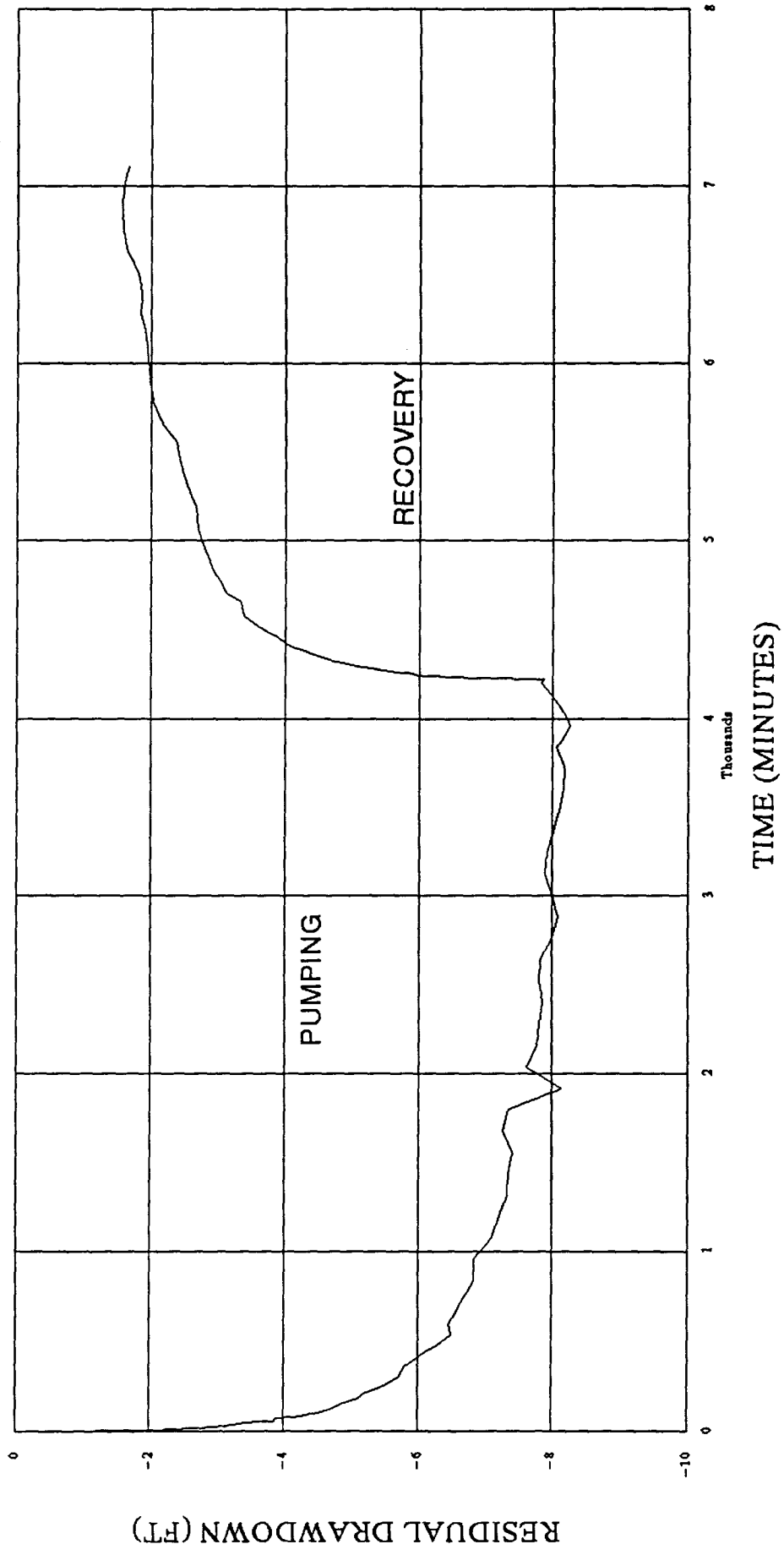
T-M RURAL WATER SYSTEM

RECOVERY DATA FOR THE WELL 1 MILE SOUTHEAST OF THE SITE



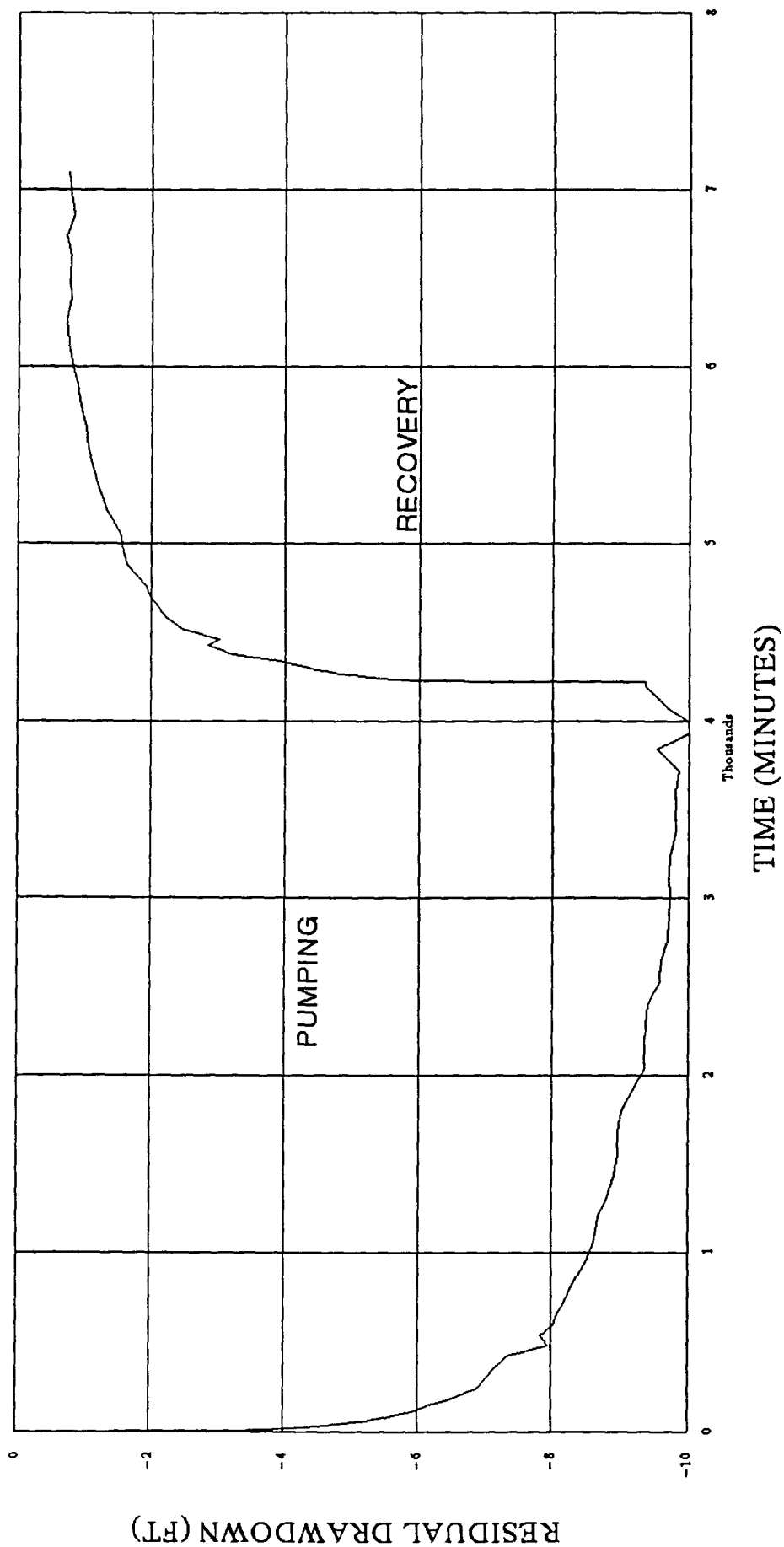
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE WELL 500' EAST OF THE PUMP



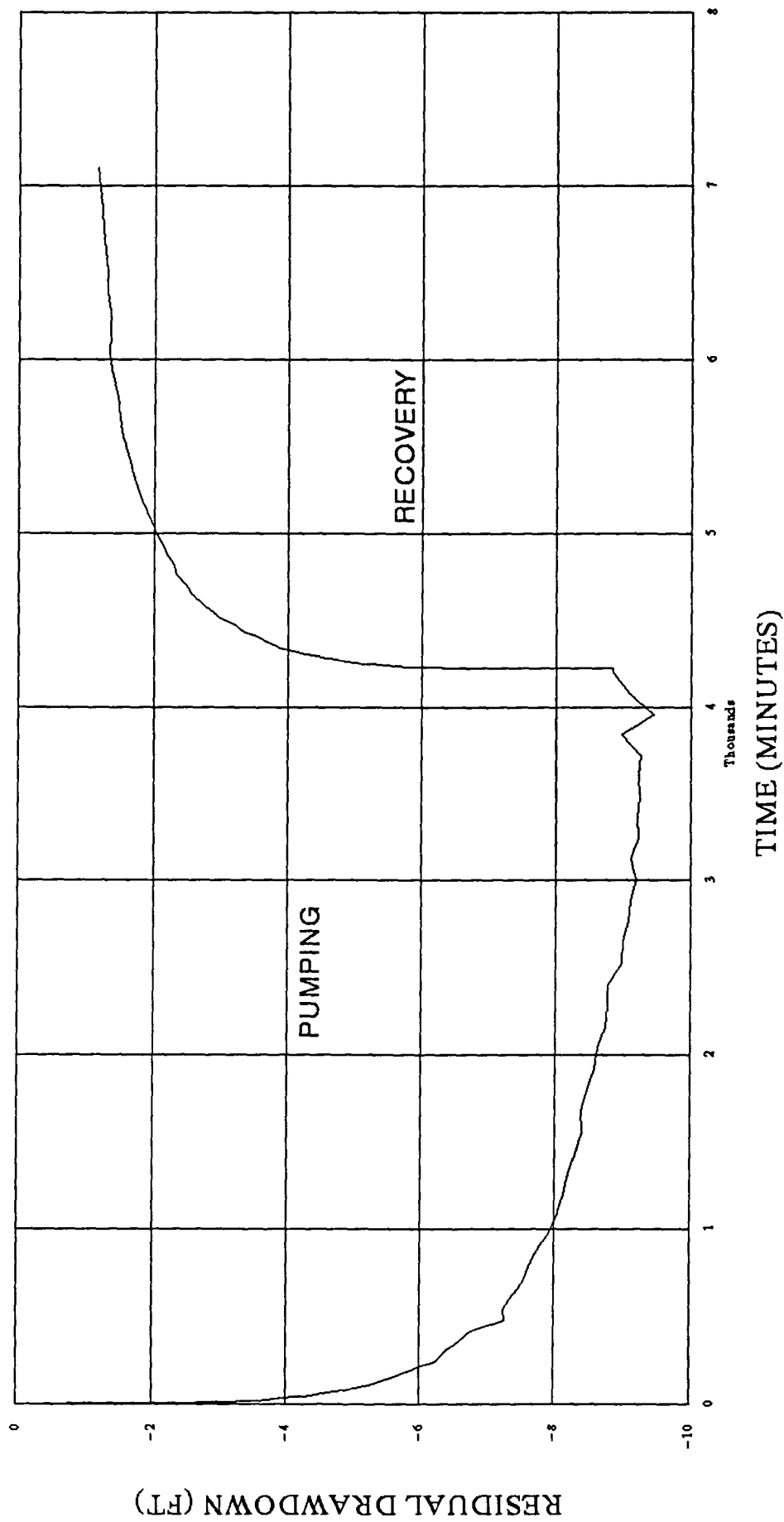
T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE 4 INCH OBSERVATION WELL



T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE WELL 150' SOUTH OF THE PUMP



**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. DOLTON AQUIFER WELL

DATE

12/9/91

STATIC READING 108.30

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
0	9:07	108.30	0.00	0
1	9:08	108.30	0.00	835
2	9:09	108.30	0.00	835
3	9:10	108.30	0.00	835
4	9:11	108.30	0.00	835
5	9:12	108.30	0.00	835
6	9:13	108.30	0.00	835
7	9:14	108.30	0.00	835
8	9:15	108.30	0.00	835
9	9:16	108.30	0.00	835
10	9:17	108.30	0.00	835
12	9:19	108.30	0.00	853
14	9:21	108.30	0.00	853
16	9:23	108.30	0.00	853
18	9:25	108.30	0.00	853
20	9:27	108.30	0.00	853
25	9:32	108.30	0.00	853
30	9:37	108.30	0.00	853
35	9:42	108.30	0.00	853
40	9:47	108.30	0.00	853
45	9:52	108.30	0.00	853
50	9:57	108.30	0.00	853
55	10:02	108.30	0.00	853
60	10:07	108.30	0.00	853
70	10:17	108.30	0.00	853
80	10:27	108.30	0.00	853
90	10:37	108.30	0.00	858
100	10:47	108.30	0.00	858
120	11:07	108.30	0.00	858
150	11:37	108.33	-0.03	858
180	12:07	108.33	-0.03	867

**T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL**

PUMP TEST DATA SHEET

OBSRV. WELL NO. DOLTON AQUIFER WELL

DATE

12/9/91

STATIC READING 108.30

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
210	12:37	108.34	-0.04	867
240	1:07	108.34	-0.04	867
300	2:07	108.34	-0.04	867
360	3:07	108.33	-0.03	835
420	4:07	108.38	-0.08	835
480	5:07	108.40	-0.10	932
540	6:07	108.30	0.00	876
600	7:07	108.33	-0.03	876
656	8:03	108.50	-0.20	876
716	9:03	108.50	-0.20	880
836	11:03	108.50	-0.20	880
956	1:03	108.50	-0.20	880
1076	3:03	108.50	-0.20	883
1196	5:03	108.50	-0.20	880
1316	7:03	108.41	-0.11	878
1437	9:04	108.32	-0.02	876
1561	11:08	108.30	0.00	871
1671	12:58	108.30	0.00	867
1797	3:04	108.35	-0.05	862
1918	5:05	108.35	-0.05	871
2031	6:58	108.40	-0.10	871
2151	8:58	108.50	-0.20	816
2276	11:03	108.50	-0.20	862
2396	1:03	108.50	-0.20	846
2516	3:03	108.50	-0.20	876
2636	5:03	108.50	-0.20	869
2756	7:03	108.50	-0.20	869
2878	9:05	108.46	-0.16	871
2996	11:03	108.46	-0.16	867
3116	1:03	108.48	-0.18	862
3236	3:03	108.45	-0.15	862

T-M RURAL WATER DISTRICT
PARKER, SOUTH DAKOTA
12-INCH PRODUCTION WELL

PUMP TEST DATA SHEET

OBSRV. WELL NO. DOLTON AQUIFER WELL

DATE

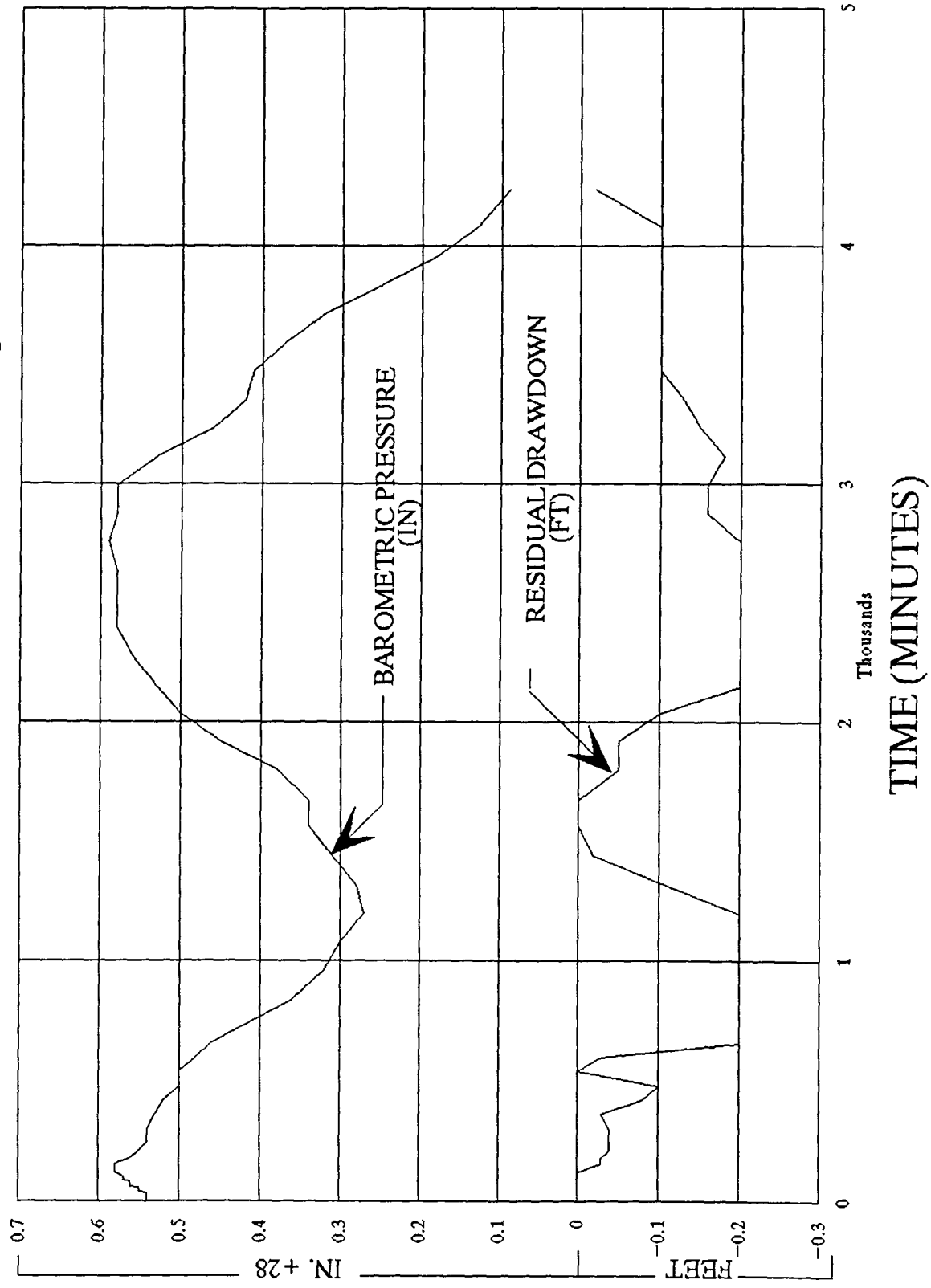
12/9/91

STATIC READING 108.30

TIME SINCE PUMP TEST STARTED t Min	OBSERVATION CLOCK TIME	DEPTH TO WATER H	RESIDUAL DRAWDOWN s ft	DISCHARGE FLOW GPM
3356	5:03	108.43	-0.13	867
3476	7:03	108.40	-0.10	867
3596	9:03	108.40	-0.10	867
3716	11:03	108.40	-0.10	867
3836	1:03	108.40	-0.10	792
3956	3:03	108.40	-0.10	910
4076	5:03	108.40	-0.10	816
4236	7:43	108.32	-0.02	816

T-M RURAL WATER SYSTEM

PUMP TEST DATA FOR THE DOLTON AQUIFER WELL



APPENDIX 4

NETWORK ANALYSIS

- 10" RAW WATERLINE
- 12" RAW WATERLINE

PUMPING SYSTEM EVALUATION JANUARY 3, 1992
 10" RAW WATER LINE FROM WELL #4 TO WELL #2
 THEN EXISTING 12" WATER MAIN TO TREATMENT PLANT
 INPUT FILE T-M10.DAT IN THE 750901 DIRECTORY

ALL DEMAND FLOWS ARE MULTIPLIED BY 1.0000

PIPES 8
 NODES 9
 SOURCE PUMPS 2
 BOOSTER PUMPS 0
 RESERVOIRS 1
 MINOR LOSSES 0
 PRVS 0
 NOZZLES 0
 CHECK VALVES 0
 BACK PRES V. 0
 DIF. HEAD DEV 0
 SPECIFIED Q 0
 SPECIFIED P 0

NODES AT SOURCE PUMPS AND RESERVOIRS THAT HAVE BEEN ELIMINATED:
 100 107 108

PUMPS:

PIPE	2ND ORDER COEF	LINEAR COEF	SHUT-OFF HEAD	SUMP ELEV
101	-21.824	-106.971	377.00	1301.20
1.0 PUMPS ARE IN PARALLEL AT STA. 1 IN PIPE 101				
108	-21.824	-106.971	356.00	1301.20
1.0 PUMPS ARE IN PARALLEL AT STA. 2 IN PIPE 108				

RESERVOIRS PLUS NOZZLES:

NO.	PIPE	NODE	ELEVATION
1	-107	107	1458.00

SOL. BY UTIL. SPARSE MATRIX METHODS

FLOW FROM PUMPS AND RESERVOIRS EQUALS 0.00

ITERATION= 1 SUM OF DIFFERENCES= 0.151E-01
 ITERATION= 2 SUM OF DIFFERENCES= 0.527E-04

LOSSES DUE TO FLUID FRICTION IN ALL PIPES

POWER LOSS= 8.191 H.P. = 6.111 KWATTS. ENERGY LOSS= 146.660 KWHRs /DAY

PUMPS:

NODE	PIPE	HEAD	FLOW	HORSEPOWER	KILOWATTS	KWATT-HRS/DAY
100	101	194.11	602.42	29.56	22.05	529.21
108	108	173.30	601.90	26.37	19.67	472.07

THE MIN. PRESSURE OF 2880.000 PSF (OR N/SQM) IS NOT SATISFIED AT THE FOLLOWING NODES

106	10.90	105	11.17	104	15.11	103	15.68
102	16.60	101	18.68				

UNITS OF SOLUTION ARE:

DIAMETERS - inch
 LENGTH - feet
 HEADS - feet
 ELEVATIONS - feet
 PRESSURES - psi
 FLOWRATES - gpm

HAZEN-WILLIAMS FORMULA USED FOR COMPUTING HEAD LOSSES

PIPE DATA:

PIPE NO.	NODES		LENGTH	DIAM	COEF	FLOW RATE	VELOCITY	HEAD LOSS	HLOSS /1000
	FROM	TO							
101	100	101	100.	10.0	140.0	602.	2.46	0.21	2.10
102	101	102	5134.	10.0	140.0	602.	2.46	10.79	2.10
103	102	103	5285.	10.0	140.0	602.	2.46	11.11	2.10
104	103	104	150.	10.0	140.0	602.	2.46	0.32	2.10
105	104	105	4519.	12.0	140.0	1204.	3.42	14.10	3.12
106	105	106	200.	12.0	140.0	1204.	3.42	0.62	3.12
* 107	106	107	50.	12.0	140.0	1204.	3.42	0.16	3.12
108	108	104	260.	8.0	140.0	602.	3.84	1.62	6.22

AV. VEL= 2.99 AV. HL/1000= 2.999 MAX VEL= 3.84 MIN VEL= 2.46

NODE DATA:

NODE NO.	DEMAND (cfs)	DEMAND (gpm)	ELEV	HEAD	PRESSURE	HGL ELEV
101	0.000	0.00	1452.	43.10	18.68	1495.10
102	0.000	0.00	1446.	38.31	16.60	1484.31
103	0.000	0.00	1437.	36.20	15.68	1473.20
104	0.000	0.00	1438.	34.88	15.11	1472.88
105	0.000	0.00	1433.	25.78	11.17	1458.78
106	0.000	0.00	1433.	25.16	10.90	1458.16
100	-1.342	-602.42	1452.	-150.80	-65.35	1301.20
108	-1.341	-601.90	1438.	-136.80	-59.28	1301.20
107	2.683	1204.32	1458.	0.00	0.00	1458.00

AV. HEAD= -9.35 AV. HGL= 1433.65 MAX HEAD= 43.10 MIN HEAD= -150.80

T-M RURAL WATER DISTRICT
 RAW WATER LINE FROM WELL #4 TO WELL #2
 ACTUAL WELL EFFECIENCY
 12" WATER MAIN
 INPUT FILE T-M12.DAT IN THE 750901 DIRECTORY

ALL DEMAND FLOWS ARE MULTIPLIED BY 1.0000

PIPES 8
 NODES 9
 SOURCE PUMPS 2
 BOOSTER PUMPS 0
 RESERVOIRS 1
 MINOR LOSSES 0
 PRVS 0
 NOZZLES 0
 CHECK VALVES 0
 BACK PRES V. 0
 DIF. HEAD DEV 0
 SPECIFIED Q 0
 SPECIFIED P 0

NODES AT SOURCE PUMPS AND RESERVOIRS THAT HAVE BEEN ELIMINATED:
 100 107 108

PUMPS:

PIPE	2ND ORDER COEF	LINEAR COEF	SHUT-OFF HEAD	SUMP ELEV
101	-21.824	-106.971	363.00	1301.20
1.0 PUMPS ARE IN PARALLEL AT STA. 1 IN PIPE 101				
108	-21.824	-106.971	356.00	1301.20
1.0 PUMPS ARE IN PARALLEL AT STA. 2 IN PIPE 108				

RESERVOIRS PLUS NOZZLES:

NO.	PIPE	NODE	ELEVATION
1	-107	107	1458.00

SOL. BY UTIL. SPARSE MATRIX METHODS

FLOW FROM PUMPS AND RESERVOIRS EQUALS 0.00

ITERATION= 1 SUM OF DIFFERENCES= 0.677E-02

LOSSES DUE TO FLUID FRICTION IN ALL PIPES

POWER LOSS= 6.150 H.P. = 4.588 KWATTS. ENERGY LOSS= 110.105 KWHRS /DAY

PUMPS:

NODE	PIPE	HEAD	FLOW	HORSEPOWER	KILOWATTS	KWATT-HRS/DAY
100	101	180.81	600.51	27.45	20.48	491.40
108	108	173.26	602.02	26.37	19.67	472.05

THE MIN. PRESSURE OF 2880.000 PSF (OR N/SQM) IS NOT SATISFIED AT THE FOLLOWING NODES

106	10.90	105	11.17	104	15.10	103	15.59
102	13.65	101	12.97				

UNITS OF SOLUTION ARE:

DIAMETERS - inch
 LENGTH - feet
 HEADS - feet
 ELEVATIONS - feet
 PRESSURES - psi
 FLOWRATES - gpm

HAZEN-WILLIAMS FORMULA USED FOR COMPUTING HEAD LOSSES

PIPE DATA:

PIPE NO.	NODES FROM	TO	LENGTH	DIAM	COEF	FLOW RATE	VELOCITY	HEAD LOSS	HLOSS /1000
101	100	101	100.	12.0	140.0	601.	1.70	0.09	0.86
102	101	102	5134.	12.0	140.0	601.	1.70	4.41	0.86
103	102	103	5285.	12.0	140.0	601.	1.70	4.54	0.86
104	103	104	150.	12.0	140.0	601.	1.70	0.13	0.86
105	104	105	4519.	12.0	140.0	1203.	3.41	14.06	3.11
106	105	106	200.	12.0	140.0	1203.	3.41	0.62	3.11
* 107	106	107	50.	12.0	140.0	1203.	3.41	0.16	3.11
108	108	104	260.	8.0	140.0	602.	3.84	1.62	6.23

AV. VEL=	2.61	AV. HL/1000=	2.375	MAX VEL=	3.84	MIN VEL=	1.70		

NODE DATA:

NODE NO.	DEMAND (cfs)	DEMAND (gpm)	ELEV	HEAD	PRESSURE	HGL ELEV
101	0.000	0.00	1452.	29.93	12.97	1481.93
102	0.000	0.00	1446.	31.51	13.65	1477.51
103	0.000	0.00	1437.	35.97	15.59	1472.97
104	0.000	0.00	1438.	34.84	15.10	1472.84
105	0.000	0.00	1433.	25.78	11.17	1458.78
106	0.000	0.00	1433.	25.16	10.90	1458.16
100	-1.338	-600.51	1452.	-150.80	-65.35	1301.20
108	-1.341	-602.02	1438.	-136.80	-59.28	1301.20
107	2.679	1202.53	1458.	0.00	0.00	1458.00

AV. HEAD= -11.60 AV. HGL= 1431.40 MAX HEAD= 35.97 MIN HEAD= -150.80

Water Rights Division - DENR
Conversation File Documentation

NAME OF PERSON OR FILE: TM Rural Water District

ADDRESS: _____ COUNTY: TU, MC, MA, MR, HT

DATE: 1/13/92 TELEPHONE: 297-3334

RE: Conversation with Ken Pedersen, Manager

COMMENTS:

I called Ken Pedersen in regards to their January 13, 1992 submittal to place water reserved by FU Permit No. 5358-3 to beneficial use. He stated that the water used should be 970 acre-feet annually which is using water from the 1.34 cfs on a continuance basis. He stated this is because down the road 5 to 7 year they may be using on a continuous basis (they just don't know right now).

Mr. Pedersen stated that besides use in Turner and McCook Counties that water will also be used in Minnehaha, Miner and Hutchinson County.

File in Permit or other file as necessary. Use to document conversations and what the other party was told; why action or decision was made.

NAME: Eric Henderson

TM RURAL WATER DISTRICT
WATER PERMIT NO. 5608-3
JANUARY 30, 1992

Water Permit Application No. 5608-3 was filed by TM Rural Water District to construct and place to beneficial use 1.34 cubic feet of water per second (970 acre feet annually) from one well. The well is 368 feet deep and located in the SW 1/4 SW 1/4 section 25 T101N R55W will withdraw water from the Upper Vermillion Missouri Aquifer. The water was appropriated and reserved by future use Permit No. 5358-3. The water will be used to supply the TM Rural Water District serving Turner, McCook, Minnehaha, Miner and Hutchinson Counties.

TM Rural Water District needs the water from the Upper Vermillion Missouri aquifer due to limitations placed on the Dolton aquifer (TM's present water source). The Water Management Board placed limitations on the amount of water that TM can withdraw from the Dolton aquifer because of declining water levels. The Upper Vermillion Missouri aquifer will serve to supplement the water from the Dolton aquifer.

Aquifer: Upper Vermillion Missouri UVM

The Upper Vermillion Missouri aquifer is composed of fine sand to medium pebble gravel. The aquifer trends northwest to southeast, lies on a preglacial bedrock channel and is underlaid by the Niobrara Formation and/or Sioux Quartzite (Lindgren 1990). The aquifer is mapped in Turner County and a portion of the aquifer is mapped in McCook County (Schulz 1991).

Recharge to the Upper Vermillion-Missouri aquifer is from the Niobrara aquifer, by direct infiltration of precipitation where the aquifer is at or near land surface and from fractures in the Sioux Quartzite. The Water Rights Division monitors four observation wells in the UVM aquifer. The water levels measurements reflect the long term trends of precipitation and the affects from irrigation withdrawals. During the period of 1984 thru 1986 the normal precipitation for the Dolton area was exceeded in some cases by 30 inches. This precipitation was reflected by record water levels in observation wells. Since 1987 the water levels have continued to decline (see attached hydrographs).

The following water rights/permits have been issued from the UVM aquifer in the vicinity of the proposed well site for No. 5608-3:

4747-3 Brian W. Schmidt, irrigates 160 acres in SW 1/4 Section 12
T100N R55W with 2.28 cfs of water. Priority date, April 27, 1981

4747-3A Brian W. Schmidt, adds one additional point of diversion to
No. 4747-3

4752-3 Tommy Thomas, irrigates 186 acres in NE 1/4 & SE 1/4 Section
19 T100N R55W with 1.78 cfs of water. Priority date, May 1, 1981

5236-3 Vernon J. Hofer, irrigates 480 acres in NE 1/4 & NW 1/4 Section 29 T100N R55W with 6.85 cfs of water. Priority date, September 22, 1988. No. 5236-3 reinstates Water Permit No. 4924-3 for Mr. Hofer. Water Permit No. 4924-3 was cancelled for non-construction.

5358-3 TM Rural Water District Future Use. Appropriated 1500 acre feet of water from portions of T100N R54W, T99N R54W, T99N R55W, T100N R55W, T100N R56W, T101N R54W, and T101N R55W. Priority date, October 11, 1989.

During the 1991 irrigation season Mr. Schmidt utilized 75 acre feet of water and Mr. Thomas utilized 78 acre feet of water. Mr. Hofer has not constructed his irrigation system.

Conclusions:

1. Studies have been completed defining the Upper Vermillion Missouri aquifer in Turner County and portions of McCook County. These studies indicate a reasonable probability that unappropriated water is available for Water Permit Application No. 5608-3.
2. Observation wells exist to monitor the Upper Vermillion Missouri aquifer.
3. Approval and operation of Water Permit Application No. 5608-3 should have a minimal affect on existing water rights/permits from the Upper Vermillion Missouri aquifer.
4. Approval of Water Permit Application No. 5608-3 for 970 acre feet will reduce the amount of water reserved under Future Use Permit No. 5358-3 from 1500 acre feet to 530 acre feet of water.
5. The well authorized by No. 5608-3 must be constructed in accordance to SD Well Construction Standards 78:02:04:30.



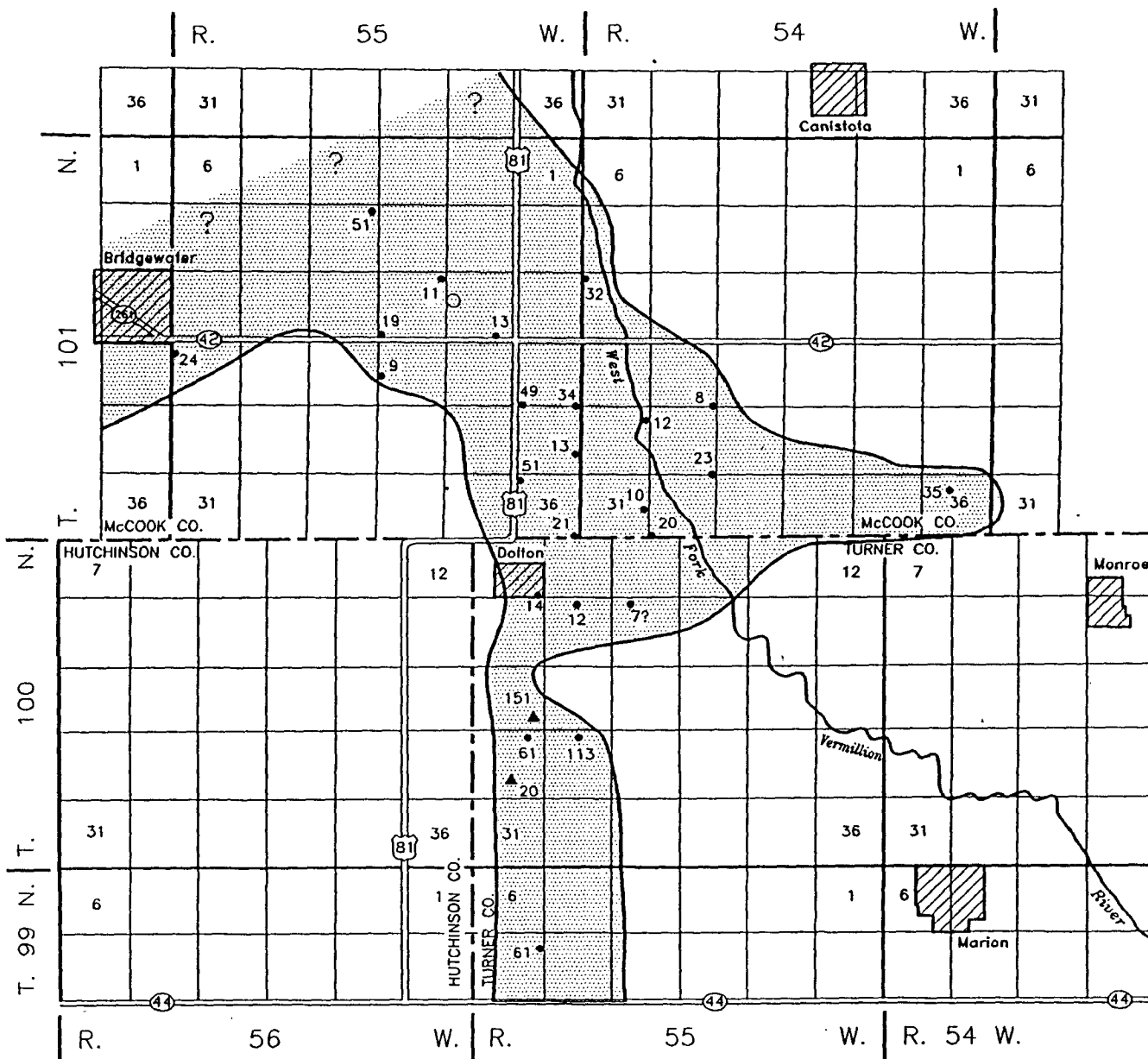
Gale N. Selken P.E.
Natural Resources Engineer IV

References:

Division of Water Rights, 1991, Observation Well Files, DWNR,
Division of Water Rights, Joe Foss Building, Pierre, SD

Division of Water Rights, 1990, Irrigation Report by Aquifer,
DWNR, Division of Water Rights, Joe Foss Building, Pierre,
SD

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and Upper Big Sioux River, South Dakota and Iowa, U. S. Army
Corps of Engineers contract No. DACW 45-80-C0185, DWNR,
Office of Geological Survey, Vermillion, SD.
- Lindgren, Richard J. and Hansen, Donald S. 1990
Water Resources of Hutchinson and Turner Counties, South Dakota
U.S. Geological Survey Water Resources Investigation Report
90-4093, Huron, South Dakota
- Schulz, Layne 1991. Investigation of the Basal Outwash in the Dolton
Vicinity Open File Report 64-UR DENR Division of Geological Survey
Science Center USD Vermillion SD.



61 • Test hole or well where basal aquifer material is present. Number denotes thickness in feet.

○ Test hole in which no basal aquifer material was encountered.

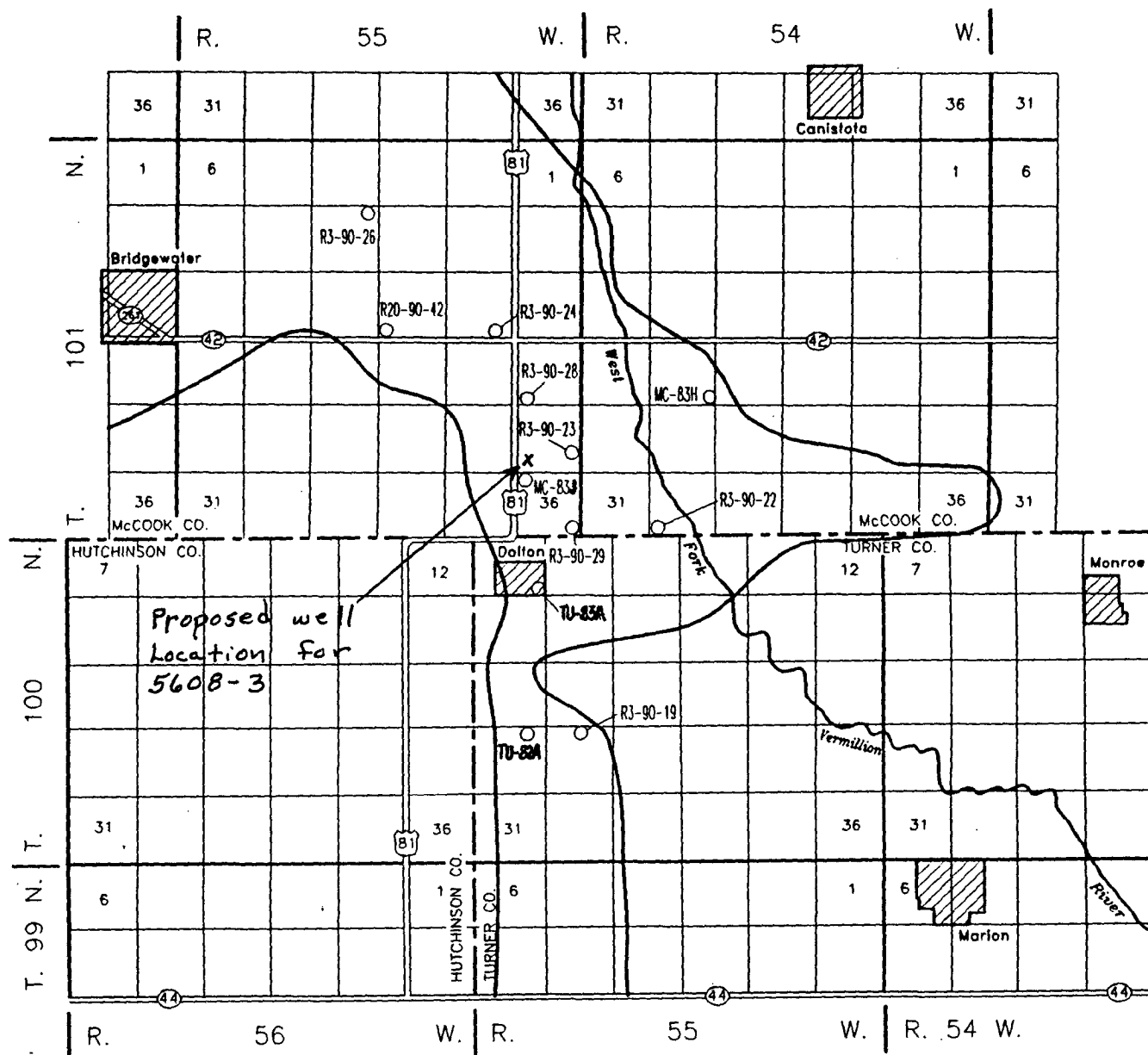
20 ▲ Private well completed in the basal aquifer material. Number denotes thickness in feet.

Approximate areal extent of the basal-outwash aquifer.

— Approximate boundary of the basal-outwash aquifer.

0 1 2 3 4
MILES

Figure 8. Approximate areal extent and thickness of the basal-outwash aquifer.



R3-90-19
O Observation well sampled for water-quality analysis. Numbers and letters are the well identification.

— Approximate boundary of the basal-outwash aquifer.



Figure 9. Water-sample locations.

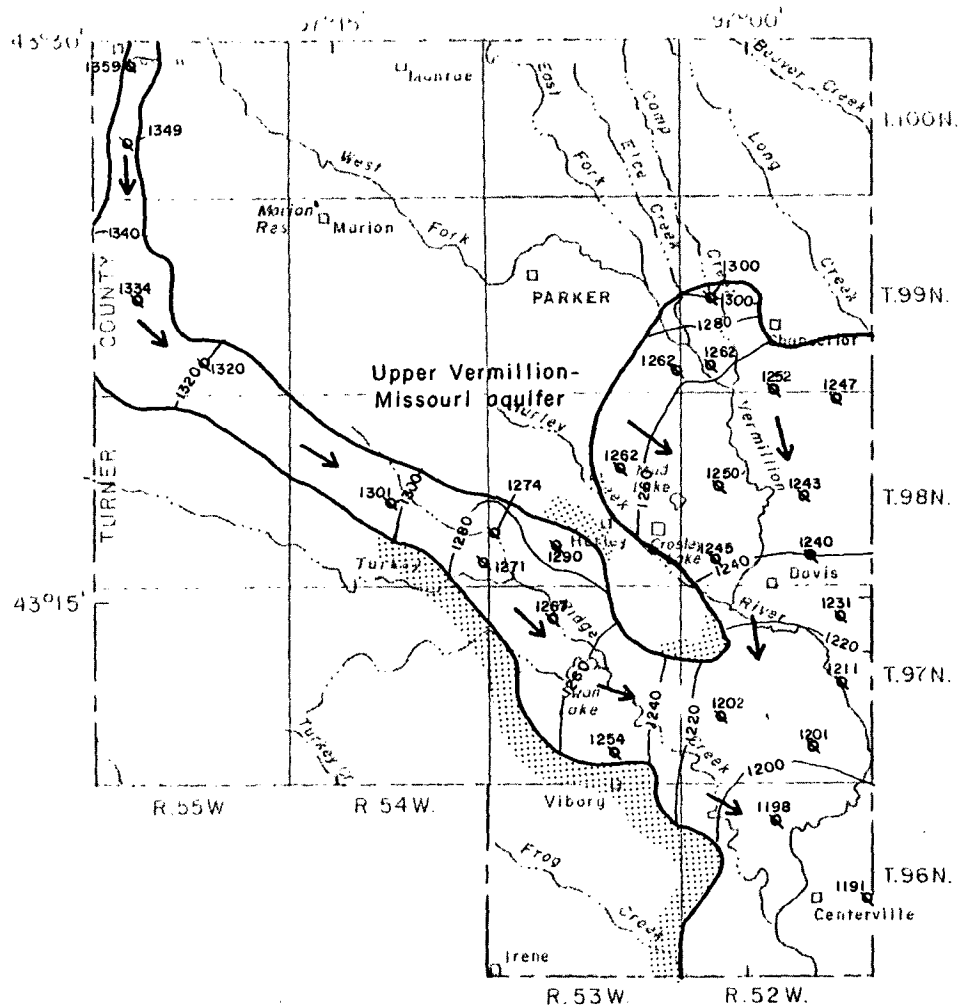
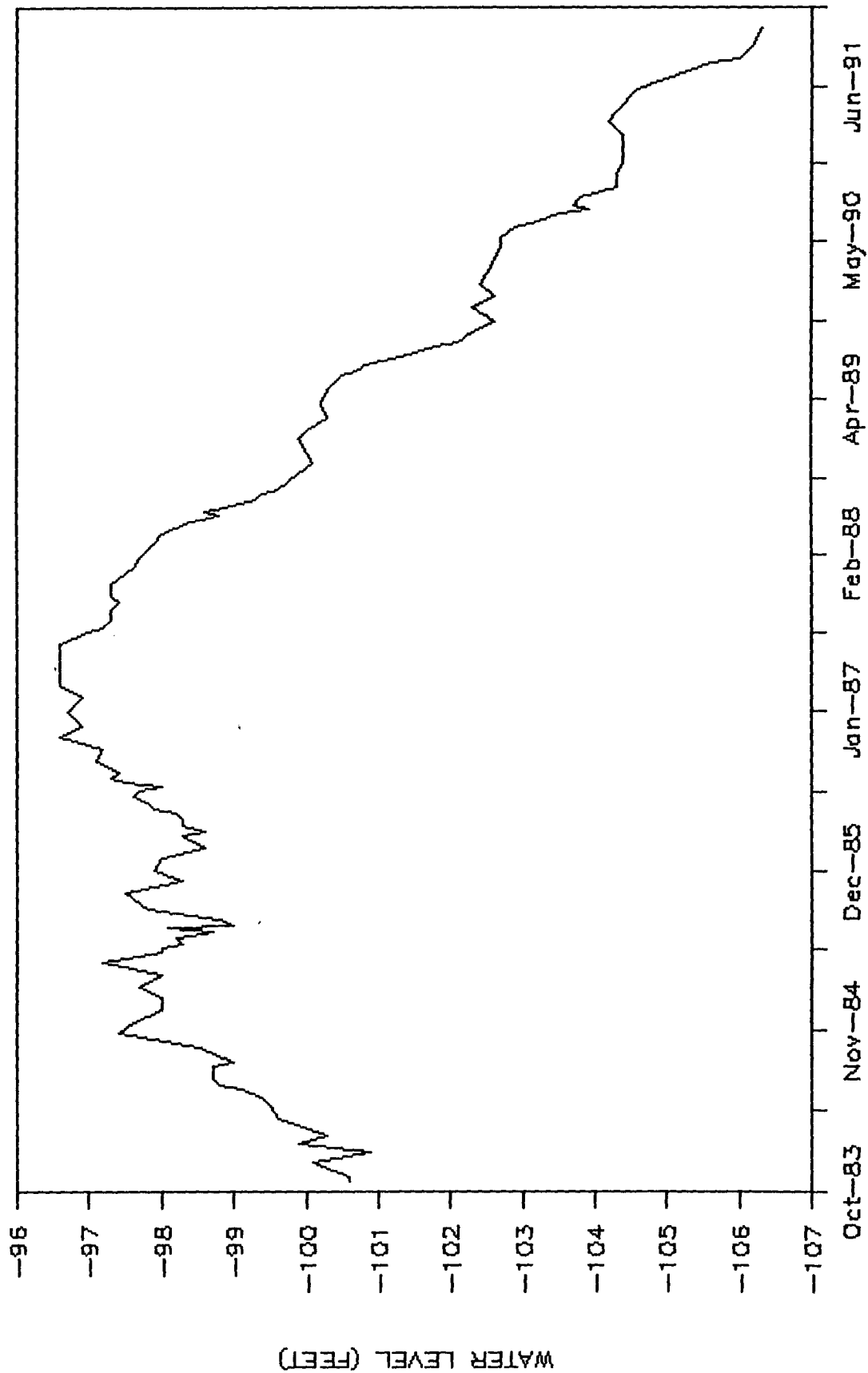


Figure 23.--Potentiometric surface of the Upper Vermillion-Missouri, Lower James-Missouri, and Choteau aquifers in Hutchinson and Turner Counties (November 1986)--Continued.

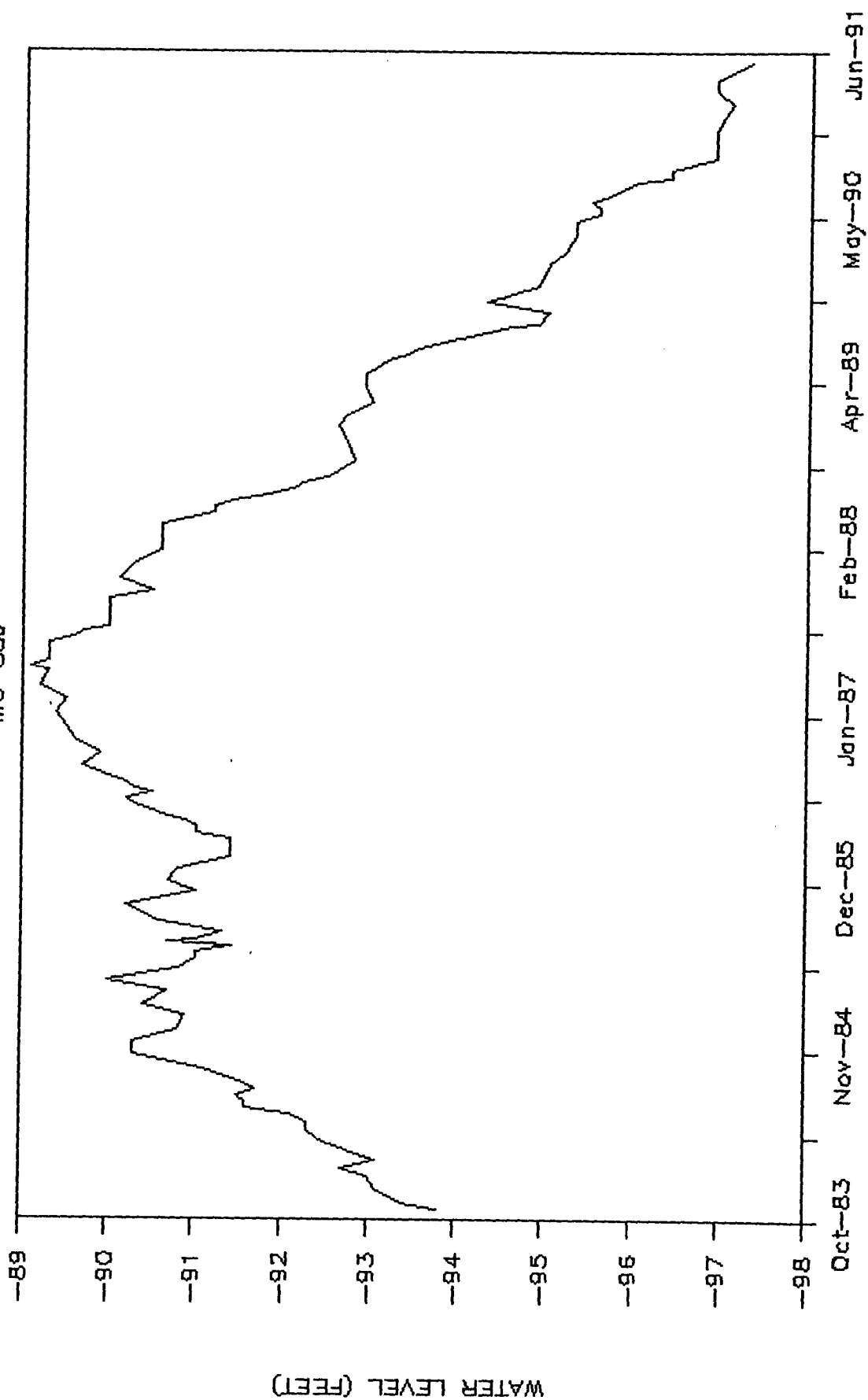
WATER RIGHTS OBSERVATION WELL

MC-83G



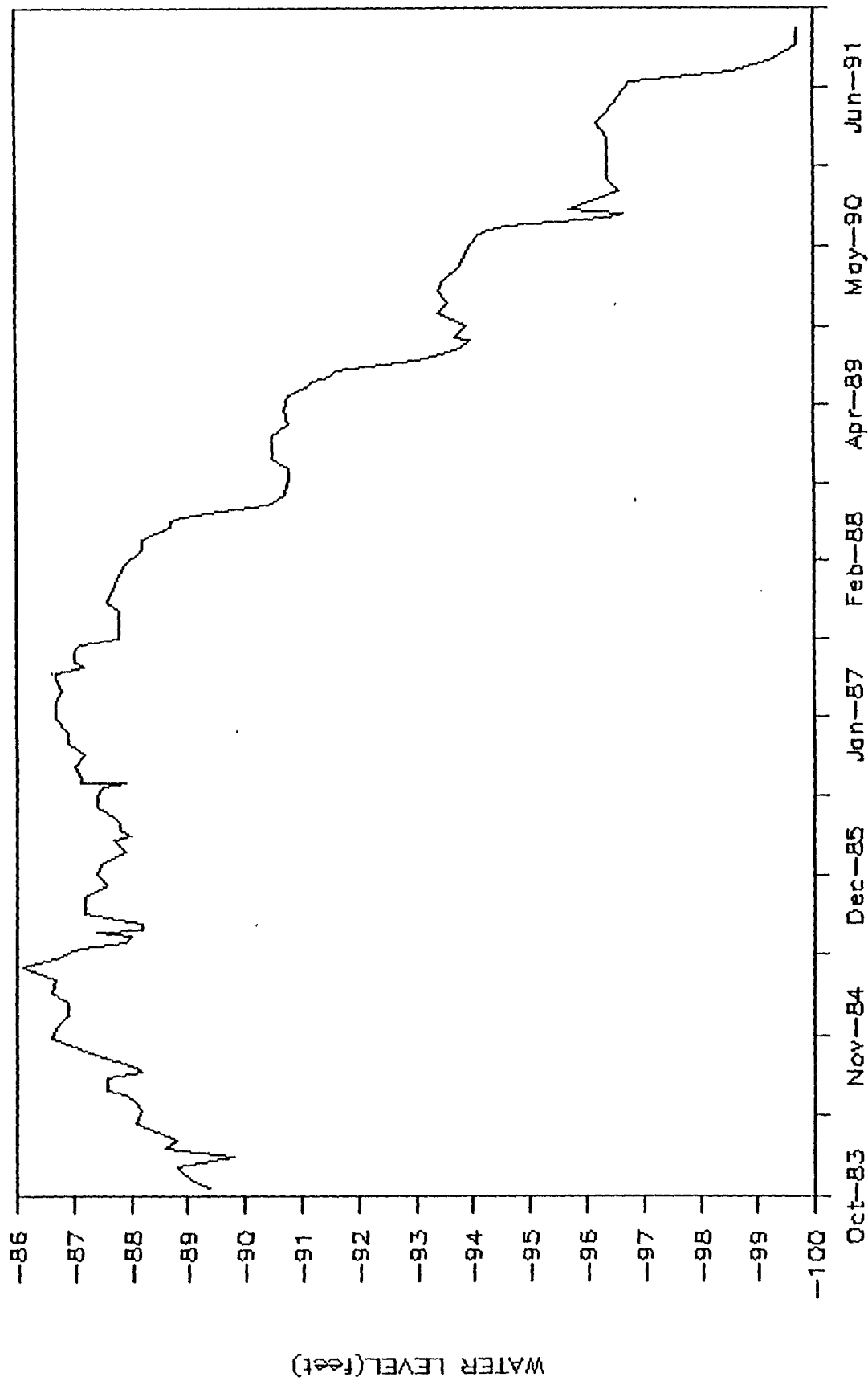
WATER RIGHTS OBSERVATION WELL

MC-83J



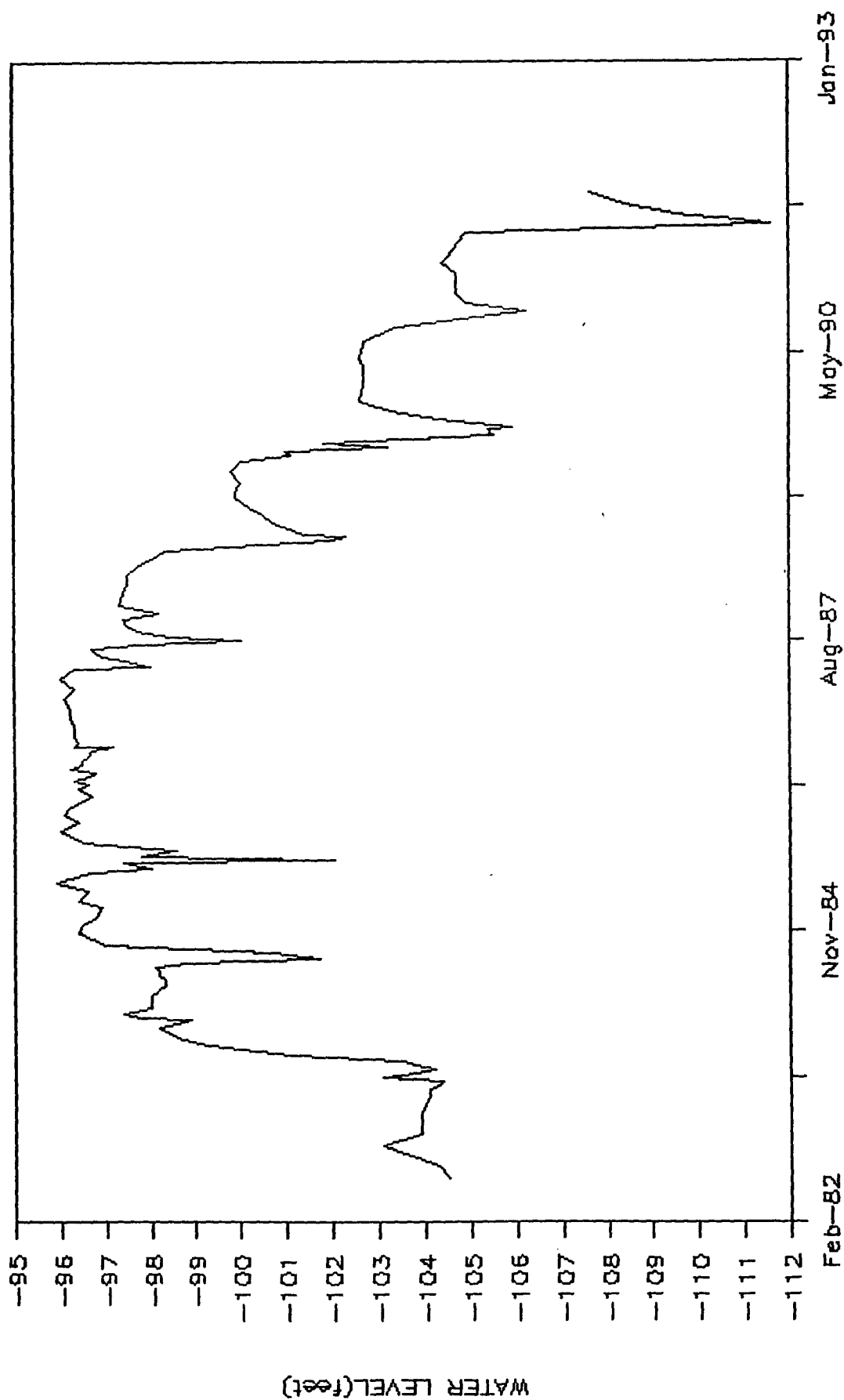
WATER RIGHTS OBSERVATION WELL

TU-83A



WATER RIGHTS OBSERVATION WELL

TU-82A



RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 5608-3. TM Rural Water District

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Environment and Natural Resources concerning Water Permit Application No. 5608-3, PO Box 445, Parker, SD 57053.

The Chief Engineer is recommending APPROVAL of Application No. 5608-3 because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) in the public interest with the following qualifications:

1. The well authorized by Permit No. 5608-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted with cement (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:30.
2. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
3. That the TM Rural Water District report to the Chief Engineer annually the amount of water withdrawn each year from the Upper Vermillion Missouri Aquifer.

See report on application for additional information.



JOHN HATCH, Chief Engineer
February 11, 1992



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

February 12, 1992

Buzz Mason
Hanson Rural Water
Box 96
Emery, SD 57332

Dear Mr. Mason:

Enclosed for your information is a copy of a Notice of Hearing for Application No. 5608-3, TM Rural Water District.

Sincerely,

Eric Gronlund
Eric Gronlund
Natural Resources Engineer
(605) 773-3352

Enclosure



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

February 14, 1992

Buzz Mason
Hanson Rural Water
Box 96
Emery, SD 57332

Dear Mr. Mason:

Enclosed for your information is a copy of the report and
recommendation for Application No. 5608-3, TM Rural Water District.

Sincerely,

A handwritten signature in cursive script that reads 'Jaci R Konop'.

Jaci R Konop
Senior Secretary
(605) 773-3352

Enclosure



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

February 12, 1992

The New Era
Box 577
Parker, SD 57053

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 5608-3 to be published twice. Please publish the first notice on February 20, 1992, with the second publication 7 days later.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you make the first publication. Please BILL the APPLICANT for the cost of publication. The APPLICANT is TM Rural Water District, PO Box 445, Parker, SD 57053.

A copy of BOTH publications must be SENT to the WATER RIGHTS DIVISION. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. No action may be taken on the permit application until proof of publication has been received.

Sincerely,

Eric Gronlund

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

FIRST TRANSMITTAL NOTICE

TO: Eric Gronlund
Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

No. _____

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to
Appropriate Water by Application No. _____ which was first published in our issue
of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

February 12, 1992

Salem Special
Box 220
Salem, SD 57058

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 5608-3 to be published twice. Please publish the first notice on February 20, 1992, with the second publication 7 days later.

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Natural Resources Engineer
605 773-3352

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Date _____

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Name _____

Newspaper _____



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

February 12, 1992

Freeman Courier
Box 950
Freeman, SD 57029

ATTENTION: Legal Department

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Sincerely,

Eric Gronlund
Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

FIRST TRANSMITTAL NOTICE

TO: Eric Gronlund
Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

No. _____

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to
Appropriate Water by Application No. _____ which was first published in our issue
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Name

Newspaper



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

February 12, 1992

Miner County Pioneer
Box 9
Howard, SD 57349

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 5608-3 to be published twice. Please publish the first notice on February 20, 1992, with the second publication 7 days later.

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Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

No. _____

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Name

Newspaper



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPERS RIGHT AWAY.

February 12, 1992

Kenneth Pedersen
TM Rural Water District
PO Box 445
Parker, SD 57053

Dear Mr. Pedersen:

Water Permit Application No. 5608-3 for rural water system use use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of The New Era printed at Parker, SD; Salem Special printed at Salem, SD; Freeman Courier printed at Freeman, SD; Miner County Pioneer printed at Howard, SD; and Argus-Leader printed at Sioux Falls, SD. For your information, a copy of the notice, the recommendation of the Chief Engineer and a report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your Notice of Hearing and to arrange for payment. Early contact with the papers can eliminate delays. The publishers have been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. The newspapers have been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

February 12, 1992

Argus-Leader
PO Box 5034
Sioux Falls, SD 57117-5034

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 5608-3 to be published twice. Please publish the first notice on February 19, 1992, with the second publication 7 days later.

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Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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FIRST TRANSMITTAL NOTICE

TO: Eric Gronlund
Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

No. _____

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to
Appropriate Water by Application No. _____ which was first published in our issue
of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper

TM Rural Water District



P.O. Box 445, Parker, South Dakota 57053 • Phone (605) 297-3334

February 14, 1992

Water Management Board
Department of Water & Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181



Subject: Progress Report

Dear Board Members:

In 1989 a restriction was imposed on the water rights of users in the Dolton aquifer. TM Rural Water District was directed at that time to investigate an alternate supply. The District has taken that order very seriously. I would like to review TM's efforts in finding an alternate water supply.

TM has severely restricted growth during the last two years and has taken steps to conserve water.

TM continued its involvement in and support of the Lewis and Clark Rural Water System (formally the Southeast SD Water Supply System)

The study of a hookup to B-Y Water District (that was in progress last year at this time) indicated that the costs were too high for TM to take on alone. B-Y Water District is currently doing a study for a pipeline to Hanson RWS, TMRWD and several towns along the way. TM funded the first study and has contributed to B-Y's study.

The shorter term solution than either of these, but yet determined to be necessary for the well-being of the District was to develop a well in the basal aquifer.

The District has drilled and tested a well near Dolton. Based on the results of the testing, TM has applied for water rights and TM is proceeding with bidding for the completion of the controls and a pipeline to the water treatment plant.

The quality of this water is a concern. The sulfates and total dissolved solids are high. The iron and manganese are very high. This quality of water is not usable by itself. However, jar testing indicates that a blend of the waters from the Dolton and basal aquifers is possible. The dilution factor will reduce the total sulfates to a level that would meet the proposed standards.

TM has spent over \$10,000 in support of Lewis and Clark and the B-Y studies. TM has spent \$17,000 in the exploration of the basal aquifer and has invested \$73,000 in the development of a well. The District is anticipating that completion of the well will require an additional \$250,000.

I believe that TM has taken prompt and positive actions in response to the order to find a supplemental source of water.

Respectfully submitted,


Ken Pedersen
Manager

§20

Instruction to Newspaper - Publish first Notice on February 19, 1992, with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 5608-3 to Appropriate Water

Notice is given that TM Rural Water District, PO Box 445, Parker, SD 57053 has filed an application for a water permit to construct and place to beneficial use 1.34 cubic feet of water per second (970 acre-feet annually) from one well (Upper Vermillion Missouri Aquifer also known as Unnamed Pleistocene Basal Aquifer) 368 feet deep located in the SW 1/4 SW 1/4 Section 25-T101N-R55W. This water was appropriated and reserved by Future Use Permit No. 5358-3. The water will be used to supply the TM Rural Water District serving Turner, McCook, Minnehaha, Miner and Hutchinson Counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 5608-3 because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. Unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation, the Water Management Board will NOT CONDUCT a HEARING to consider this application and the chief engineer will issue the permit as recommended. Petitions filed in support of the application will NOT require the Board to hear the application.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by March 9, 1992. The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

For purposes of publishing 1) the notice of hearing on Application No. 5608-3 and 2) the chief engineer's recommendation, a meeting at the Division of Water Rights office to hear this application is scheduled for March 18, 1992, at 9:00 am in Room 413, Joe Foss Building, 523 E Capitol, Pierre SD. If this application is opposed or the recommendation is contested, the March 18, 1992, hearing date will be rescheduled for a regularly scheduled Board meeting. Notice of the time and place of the rescheduled hearing before the Board will be given by First Class Mail to the applicant and persons filing petitions. Anyone not filing a petition, but interested in attending the hearing, may contact the Division of Water Rights to confirm a hearing date and location. The March 18, 1992, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by March 9, 1992.

If a hearing is held, the Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing. Any hearing will be an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. Contact the Water Rights Division to request copies of information pertaining to this application or to assure access to the hearing by the handicapped.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-26; 46-5-38 thru 46-5-40; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; 74:02:01:24 thru 74:02:01:25.

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
 County Minnehaha) ss.

I, M. DEVISH

certify that the attached printed Notice was taken
 from the Argus Leader

A newspaper which during the whole time of publication of
 said notice herein after stated, has been and is printed and
 published in the _____

city of Sioux Falls

County of Minnehaha and State of South Dakota;
 that the said notice was published in said newspaper on the
 following two dates:

Wednesday, February 19, 1992

Wednesday February 26, 1992

Mary Devish
 (Signature)
Controller
 (Title)
2/26/92
 (Date Signed)

Cost of Printing: \$126.04

Billed to: TM Rural Water



**NOTICE OF HEARING on
 Application No. 5608-3 to
 Appropriate Water**

Notice is given that TM Rural Water District, PO Box 445, Parker, SD 57053 has filed an application for a water permit to construct and place to beneficial use 1.34 cubic feet of water per second (970 acre-feet annually) from one well (Upper Vermillion Missouri Aquifer also known as Unnamed Pleistocene Basal Aquifer) 368 feet deep located in the SW 1/4 SW 1/4 Section 25-T101N-R55W. This water was appropriated and reserved by Future Use Permit No. 5358-3. The water will be used to supply the TM Rural Water District serving Turner, McCook, Minnehaha, Miner and Hutchinson Counties.

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Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation.

The Chief Engineer's recommendation is "Water Rights Division, Room Building, 523 E Capitol, Pierre SD 57501 (505 773-3855) and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by March 9, 1992. The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

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2056

Feb. 19, 26, 1992

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
 County McCook) ss.



I, Troy Schwane
 certify that the attached printed Notice was taken
 from the Salem Special

A newspaper which during the whole time of publication of
 said notice herein after stated, has been and is printed and
 published in the Salem Special

City of Salem

County of McCook and State of South Dakota;
 that the said notice was published in said newspaper on the
 following two dates:

Feb. 20, 1992

Feb. 27, 1992

Troy Schwane
 (Signature)

Published
 (Title)

2-28-92
 (Date Signed)

Cost of Printing: \$64.44

Notice of Hearing

on Application No. 5608-3
 to Appropriate Water

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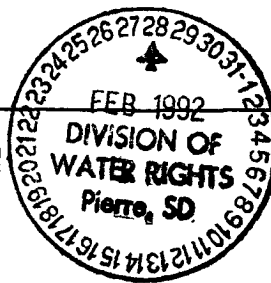
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2/20, 2/27



PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
) ss.
 County _____)

I, Jim Waltner

certify that the attached printed Notice was taken
 from the Freeman Courier

A newspaper which during the whole time of publication of
 said notice herein after stated, has been and is printed and
 published in the city
 of Freeman

County of Hutchinson and State of South Dakota;
 that the said notice was published in said newspaper on the
 following two dates:

February 19

February 26

Jim Waltner
 (Signature)

publisher
 (Title)

2/27/92
 (Date Signed)

Cost of Printing: _____

Notice of Hearing on Application No. 5608-3 to Appropriate Water

Notice is given that TM Rural Water District, PO Box 445, Parker, SD 57053 has filed an application for a water permit to construct and place to beneficial use 1.34 cubic feet of water per second (970 acre-feet annually) from one well (Upper Vermillion Missouri Aquifer also known as Unnamed Pleistocene Basal Aquifer) 368 feet deep located in the SW 1/4 SW 1/4 Section 25-T101N-R55W. This water was appropriated and reserved by Future Use Permit No. 5358-3. The water will be used to supply the TM Rural Water District serving Turner, McCook, Minnehaha, Miner and Hutchinson Counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 5608-3 because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. Unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation, the Water Management Board will NOT CONDUCT a HEARING to consider this application and the chief engineer will issue the permit as recommended. Petitions filed in support of the application will NOT require the Board to hear the application.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by March 9, 1992. The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

For purposes of publishing 1) the notice of hearing on Application No. 5608-3 and 2) the chief engineer's recommendation, a meeting at the Division of Wa-

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ter Rights office to hear this application is scheduled for March 18, 1992, at 9:00 am in Room 413, Joe Foss Building, 523 E Capitol, Pierre SD. If this application is opposed or the recommendation is contested, the March 18, 1992, hearing date will be rescheduled for a regularly scheduled Board meeting. Notice of the time and place of the rescheduled hearing before the Board will be given by First Class Mail to the applicant and persons filing petitions. Anyone not filing a petition, but interested in attending the hearing, may contact the Division of Water Rights to confirm a hearing date and location. The March 18, 1992, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by March 9, 1992.

If a hearing is held, the Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing. Any hearing will be an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. Contact the Water Rights Division to request copies of information pertaining to this application or to assure access to the hearing by the handicapped.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-26; 46-5-38 thru 46-5-40; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; 74:02:01:24 thru 74:02:01:25.

**NOTICE OF HEARING on
Application No. 5608-3
to Appropriate Water**



AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA, County of Miner: ss.

Danny Schwans of said County and State, being duly sworn, on his oath says: That the Miner County Pioneer is a legal newspaper of general circulation, printed and published in Howard, said County and State, by Danny Schwans, and has been such newspaper during the time hereinafter mentioned; and that I, Danny Schwans, the undersigned, am publisher of said newspaper, in charge of the advertising department thereof, and have personal knowledge of all the facts stated in this affidavit, and that the advertisement or notice headed Notice of Hearing on Application

No. 5608-3 to Appropriate Water

a printed copy of which is hereunto attached, was printed and published in the regular and entire issue of said newspaper and not in a supplement, once each week for ... 2 ...

successive weeks, the first publication being made on the 20 day of Feb ... 1992

and the last publication on the 27 day of Feb ... 1992

The first publication being made on the 20 day of Feb ... 1992

The second publication being made on the 27 day of Feb ... 1992

The third publication being made on the day of 19....

The fourth publication being made on the day of 19....

The fifth publication being made on the day of 19....

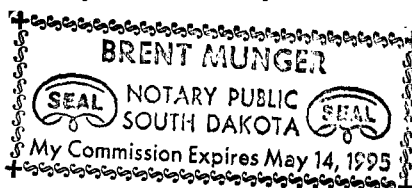
That said newspaper is a legal newspaper, and has a bona fide circulation of more than two hundred copies weekly, and has been published within the County of Miner, for more than fifty-two successive weeks next prior to the first publication of said notice, and is printed in an office maintained in Howard, South Dakota, the place of publication of said newspaper. That the full amount of fees for publication of the annexed notice is \$6.50 and inures solely to the benefit of said publisher; that no agreement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any person whomever.

Danny Schwans

Subscribed and sworn to me this 28th day of Feb ... 1992

Brent Munger

My Commission expires the 14th day of May ... 1995



Notice is given that TM Rural Water District, PO Box 445, Parker, SD 57053 has filed an application for a water permit to construct and place to beneficial use 1.34 cubic feet of water per second (970 acre-feet annually) from one well (Upper Vermillion Missouri Aquifer also known as Unnamed Pleistocene Basal Aquifer) 368 feet deep located in the SW1/4SW1/4 Section 25-T101N-R55W. This water was appropriated and reserved by Future Use Permit No. 5358-3. The water will be used to supply the TM Rural Water District serving Turner, McCook, Minnehaha, Miner and Hutchinson Counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 5608-3 because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. Unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation, the Water Management Board will NOT CONDUCT a HEARING to consider this application and the chief engineer will issue the permit as recommended. Petitions filed in support of the application will NOT require the Board to hear the application.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E Capitol, Pierre, SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by March 9, 1992. The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

For purposes of publishing 1) the notice of hearing on Application No. 5608-3 and 2) the chief engineer's recommendation, a meeting at the Division of Water Rights office to hear this application is scheduled for March 18, 1992, at 9:00 a.m. in Room 413, Joe Foss Building, 523 E Capitol, Pierre, SD. If this application is opposed or the recommendation is contested, the March 18, 1992,

hearing date will be rescheduled for a regularly scheduled Board meeting. Notice of the time and place of the rescheduled hearing before the Board will be given by First Class Mail to the applicant and persons filing petitions. Anyone not filing a petition, but interested in attending the hearing, may contact the Division of Water Rights to confirm a hearing date and location. The March 18, 1992, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by March 9, 1992.

If a hearing is held, the Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing. Any hearing will be an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. Contact the Water Rights Division to request copies of information pertaining to this application or to assure access to the hearing by the handicapped.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-26; 46-5-38 thru 46-5-40; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; 74:02:01:24 thru 74:02:01:25.

(Feb. 20-27)

PROOF OF PUBLICATION

NOTICE OF HEARING on Application No. 5608-3 to Appropriate Water

STATE OF SOUTH DAKOTA)
County Turner) ss.

I, BRETT MUNGER

certify that the attached printed Notice was from the Parker News

A newspaper which during the whole time of publication said notice herein after stated, has been and is prior published in the City of Parker

County of Turner and State of South Dakota that the said notice was published in said newspaper following two dates:

Feb 20, 1992

Feb 27, 1992

Brett Munger
(Signature)

Asst Editor
(Title)

3/6/92
(Date Signed)

Cost of Printing: \$50.40

Notice is given that TM Rural Water District No. 4445, Parker, SD 57053 has filed an application for a water permit to construct and place a beneficial use 1.34 cubic feet of water per second (970 acre-feet annually) from one well (Upper Vermillion Missouri Aquifer also known as Unnamed Pleistocene Basal Aquifer) 368 feet deep located in the SW1/4 SW1/4 Section 25-T101N-R55W. This water was appropriated and reserved by Future Use Permit No. 3358-3. The water will be used to supply the TM Rural Water District serving Turner, McCook, Minnehaha, Miner and Hutchinson Counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 5608-3 because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. Unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation, the Water Management Board will NOT CONDUCT a HEARING to consider this application and the chief engineer will issue the permit as recommended. Petitions filed in support of the application will NOT require the Board to hear the application.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E. Capitol, Pierre, SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the application must be filed by March 9, 1992. The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

For purposes of publishing 1) the notice of hearing on Application No. 5608-3 and 2) the chief engineer's recommendation, a meeting at the Division of Water Rights office to hear this application is scheduled for March 18, 1992, at 9:00 AM in Room 413, Joe Foss Building, 523 E. Capitol, Pierre, SD. If this application is opposed or the recommendation is contested, the March 18, 1992, hearing date will be rescheduled for a regularly scheduled Board meeting. Notice of the time and place of the rescheduled hearing before the Board will be given by First Class Mail to the application and persons filing petitions. Anyone not filing a petition, but interested in attending the hearing, may contact the Division of Water Rights to confirm a hearing date and location. The March 18, 1992, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by March 9, 1992.

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This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1(11) thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-26; 46-5-38 thru 46-5-40; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; 74:02:01:24 thru 74:02:01:25.

(2-4c47--Publish Feb. 20, 92)





Bartlett & West
Engineers, Inc.



February 29, 1992

Hanson Rural Water System, Inc.
P.O. Box 96
Emery, SD 57332

Attn: Mr. Francis Mason, Manager

BW W.O. 3041.00

**HRWS - NOTICE OF HEARING ON APPLICATION #5608-3
TO APPROPRIATE WATER FOR T-M RURAL WATER DISTRICT**

You have provided us with a copy of the Notice of Hearing on Application #5608-3 to Appropriate Water. The Notice of Hearing is for an application by the T-M Rural Water District to appropriate water from the Basal Aquifer (Upper Vermillion Missouri Aquifer) in the amount of 970 acre-feet annually. This water was previously appropriated and reserved by Future Use Permit No. 5358-3. You have asked that we comment regarding this application.

As you are aware, there is a rather large, complicated, and sometimes tumultuous history regarding both Water Systems which has led to the pursuit of an alternate water source(s) for both Systems. In summary, both Systems were developed with the Dolton Aquifer as the water source. Due to depleting supplies in the Dolton Aquifer both Water Systems were advised by the Water Rights Board to pursue and secure alternate water sources within a 5 year period of the September, 1989 hearing. At that time it was advanced that it would be appropriate that both Systems jointly pursue a search for an alternate source(s) due to the proximity of their treatment and supply facilities. We understand that to date, both Systems have jointly made a request to the B-Y Water System, are each participating in the Lewis & Clark Regional Water Supply System, and have jointly participated in a study of a previously unnamed Basal Aquifer which is now known to be a part of the Upper Vermillion Missouri Aquifer. Based on these actions, it appears that both Systems have recognized that the current problem which they each face (having a depleting water source and finding of an alternate source) is a joint or regional problem rather than two individual problems. The solution(s) either short range or long term to this immediate problem appear to be best served by a joint effort and sharing of costs whenever possible. In addition to the above actions, the two Systems have taken steps to attempt to draft

(701) 258-1110

2718 Gateway Ave., Suite 201

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P.O. Box 1077

Bismarck, ND 58502

OTHER OFFICE
Topeka, KS

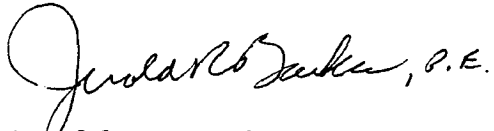
an agreement regarding the possible use of the Basal Aquifer as a stop-gap and/or long range solution. These actions included an agreement which would transfer 25% of T-M's rights under the existing future use permit to Hanson Rural Water System (HRWS). HRWS has also made application for a future use permit from the Basal Aquifer. We understand that a portion of that permit would be assigned to the T-M Water System. Currently that future use permit application has been tabled.

The above brings us to the current application of the T-M Rural Water System for diversion of 970 acre feet of water from the Basal Aquifer. As we have discussed, HRWS' concerns regarding this permit application are due to the uncertainties with which the other actions surrounding this permit application will be affected. The information currently available on the Basal Aquifer is not conclusive and leads us to be somewhat cautious as we sense a feeling of "Deja Vu" when dealing with confined aquifers in this region. Discussions with the State indicate that they feel that based on current data, the Basal Aquifer is recharging and will be able to be a more stable water supply than the Dolton Aquifer. The question still remains as to the quantity of water it can supply. Also, the water quality of the Basal Aquifer is significantly poorer than that existing in the Dolton and will require blending and/or treatment. Initially the Basal appears to be an interim solution or "stop-gap" solution until a more permanent solution to the problem can be found. It is our understanding that HRWS is not opposed to T-M obtaining a water supply from the Basal Aquifer as long as it does not adversely affect HRWS' ability to obtain short or long term relief by the avenues previously discussed. Namely the current questions which arise and are related to the current water right application are as follows:

1. Will the Water Rights Board recognize the current agreement to transfer 25% of the existing future use permit of T-M to HRWS with the same priority date?
2. If T-M is able to obtain the 970 acre foot diversion requested, will Hanson be allowed to obtain a 323 acre feet (25% of 970) diversion from the Basal Aquifer?
3. Will the 970 acre feet appropriation be added to the existing water right appropriation from the Dolton Aquifer or will the existing use of the Dolton Aquifer be limited based on some ratio of use with the Basal Aquifer water? This question would also pertain to HRWS should they obtain a water right.
4. Is it possible to address the handling of the Basal Aquifer among the two Rural Water Systems and have it included in the existing permit application without adversely affecting the permit application approval process of the existing application by T-M?

As we have previously discussed and as I have discussed with T-M, Banner & Associates, S.D. Geological Survey, and SDDENR; HRWS is not opposed to T-M developing the aquifer or obtaining the water right if the above items are properly addressed. It would appear to us that the best way to resolve these items are to have all the parties involved in a discussion(s) and draft a plan under which this Regional problem will be solved both in the short and in the long term. It may be appropriate to have these items addressed prior to this water permit application being approved. The consequences of waiting until after the approval are uncertain and should be discussed with legal counsel. It is our opinion that the key to this Regional problem is continued cooperation, coordination, and communication between the parties involved so that misunderstandings and misconceptions do not develop. We are certainly willing to help in any way in which you feel appropriate.

BARTLETT & WEST ENGINEERS, INC..



Jerold R. Backes, P.E.
Project Manager

cc: HRWS - Mitchell
FmHA (State & District)
SDDENR - Gale Selken
TM - Ken Pedersen
Banner & Assoc. - Dave Odens
SD Geological Survey - Assad Barari
File: HRWS Corresp.

HANSON RURAL WATER SYSTEM, INC.
Post Office Box 324
Emery, South Dakota 57332

March 2, 1992



South Dakota Department of
Environment & Natural Resources
Water Rights Division
Attn: Gale Selken
Foss Building
523 East Capitol
Pierre, SD 57501

Re: Notice of Hearing
Application #5608-3 to
Appropriate Water

Dear Mr. Selken:

We recently reviewed a Notice of Hearing on Application #5608-3 to Appropriate Water from the Basal Aquifer by the T-M Rural Water District. As I believe you are aware we have been participating with T-M on a study of the Basal Aquifer as a supplemental or alternative supply for both the T-M and Hanson Rural Water System. Prior to receipt of the Notice we were unaware that T-M was pursuing a permit for a point of diversion in the Basal Aquifer. We have, for sometime, known about T-M's Future Use Permit which was approved sometime ago. In point of fact we have entered into an agreement with T-M for Hanson Rural Water System to utilize twenty-five percent (25%) of T-M's future use.

Please take note that HANSON RURAL WATER SYSTEM, INC., IS NOT OPPOSED TO T-M OBTAINING A POINT OF DIVERSION IN THE BASAL AQUIFER. THE COMMENTS THAT FOLLOW SHOULD NOT BE CONSTRUED AS AN OBJECTION TO OR PROTEST OF T-M'S PERMIT APPLICATION. However, the application does raise several questions regarding our course of action with regard to finding an alternate or supplemental water source than the Dolton Aquifer. Those questions were posed in a letter to you from Bartlett & West Engineers under date of February 29, 1992. We will appreciate any answers which you may have to those specific concerns. Hanson Rural Water System realizes that you can not provide any "guaranteed" answers to our concerns. However, please provide the best answers you can based on current data and your understanding of the situation and permitting process. Our specific questions are:

1. Will the Water Rights Board recognize the current agreement to transfer 25% of T-M's existing future use permit to Hanson Rural Water System with the same priority date?

2. If T-M is able to obtain the 970 acre foot diversion requested will Hanson Rural Water System be allowed to obtain a 323 acre foot (25% of 970) diversion from the Basal Aquifer?
3. Will T-M's 970 acre-foot diversion be added to its existing diversion from the Dolton Aquifer or will the existing use of the Dolton Aquifer be limited based on some ratio of diversions from the Basal Aquifer? This will also effect any permit that Hanson Rural Water System may receive in the future pertaining to either aquifer.
4. What will be the effect on Hanson Rural Water System's current application for a future use permit in the Basal Aquifer if T-M obtains a 970 acre-foot diversion permit?
5. Recognizing that Hanson Rural Water System and T-M share a common problem in finding satisfactory alternate or supplemental sources to the Dolton Aquifer, are there any other steps or actions you feel we can take to aid in solving this joint problem?

I will appreciate any information you may be able to provide regarding these issues. As indicated above, Hanson Rural Water System is not opposed to T-M's diversion permit. However, the situation faced by both systems requires the issues set forth above to be addressed prior to issuance of the diversion permit. Hanson Rural Water System firmly believes that the potential future use of the Basal Aquifer could cause a variety of mutual problems for it and T-M. We hope those future problems can be resolved now, rather than at some later date.

Sincerely,

A handwritten signature in cursive script, appearing to read "Francis Mason".

Francis Mason, Manager
Hanson Rural Water System, Inc.

cc: Bartlett & West
FmHa
General Counsel



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

March 9, 1992

Hanson Rural Water System Inc.
PO Box 324
Emery, SD 57332

Re: Questions TM's Application No. 5608-3

Dear Mr. Mason:

This letter is response to your letter dated March 2, 1992 in which you asked several questions.

1. Will the Water Rights Board recognize the current agreement to transfer 25% of TM's existing future use permit to Hanson Rural Water System with the same priority date?

The contractual agreement between TM and Hanson doesn't have to be recognized by the Water Management Board. The transfer of a portion of the right could take place by transfer or assignment of a portion of the right under SDCL 46-5-30.3 thru SDCL 46-5-32. A transfer would maintain the same priority date as the original permit.

2. If TM is able to obtain the 970 acre foot diversion requested will Hanson Rural Water System be allowed to obtain a 323 acre foot (25% of 970) diversion from the Basal Aquifer?

Again by transfer or assignment under your contractual agreement 25% of the 970 acre-foot diversion (242.5 acre-feet) could be transferred to Hanson.

3. Will TM's 970 acre-foot diversion be added to its existing diversion from the Dolton Aquifer or will the existing use of the Dolton Aquifer be limited based on some ratio of diversions from the Basal Aquifer? This will also effect any permit that Hanson Rural Water System may receive in the future pertaining to either aquifer.

As applied for the 970 acre-foot diversion would be in addition to existing permits. Keep in mind that the Water Management Board directed both rural water systems to find a new water source other than the Dolton aquifer.

Hanson Rural Water System, Inc.

March 9, 1992

Page 2

4. What will be the effect on Hanson Rural Water System's current application for a future use permit in the Basal Aquifer if TM obtains a 970 acre-foot diversions permit?

TM already has a future use permit from the Basal Aquifer for 1500 acre-feet. Until the Basal Aquifer is proven to provide adequate water it would not be responsible to grant additional applications from the Basal. From this point of view TM's application would have the affect of being a test of the aquifer without Hanson having a financial responsibility in the test.

5. Recognizing that Hanson Rural Water System and TM share a common problem in finding satisfactory alternate or supplemental sources to the Dolton Aquifer, are there any other steps or actions you feel we can take to aid in solving this joint problem?

I believe that both rural water systems need to work together to solve the water shortage problem. This could be in the form of a pipeline funded by both rural water systems, possibly combining the systems to form one system to lower costs, or some other joint venture.

Sincerely,



Gale N. Selken P.E.

Natural Resources Engineer IV

Water Rights Division, DENR

cc: Jerry Backes, Bartlett & West
Ken Pederson, TM Rural Water System
Assad Barraï, DENR Geological Survey



DEPARTMENT OF ENVIRONMENT
& NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

FACSIMILE TRANSMITTAL COVER SHEET

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Buzz Mason

DESTINATION: Hanson Rural Water System

ADDRESS: Emery

PHONE: _____ FAX: 605-996-1256

MESSAGE: _____

FROM: Gale N Selken

AGENCY: DENR Water Rights

ADDRESS: Pierre

PHONE: 273-3352 FAX: _____

*** THIS TRANSMISSION INCLUDES 3 PAGES INCLUDING THIS PAGE ***

IF THERE IS ANY PROBLEM WITH THIS TRANSMITTAL, PLEASE CALL
(605) 773- 3352 . THANK YOU.



MAR 19 1992

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

Kenneth Pedersen, Manager
TM Rural Water District
PO Box 445
Parker, SD 57053

Dear Mr. Pedersen:

Enclosed is Water Permit No. 5608-3 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Also enclosed is Form 10, Notice of Completion of Works and Application of Water to Beneficial Use, which you are to complete and submit to the Chief Engineer when you have completed the system and/or have put the water to beneficial use. An inspection can then be scheduled so that the Water License may be issued, thus completing your acquisition of a Water Right.

Very truly yours,

JOHN HATCH, Chief Engineer
Water Rights Division
605 773-3352

enclosures

PLEASE NOTE: Certain changes can be made in your permit within the five year construction period, usually without affecting the priority date provided an application to amend your permit is made within the five year period - i.e. changes in location or number of diversion points (wells) or location of land to be irrigated. Well locations for wells into the same aquifer can be moved up to 660 feet without application.

Applications to amend a permit after the five year construction period will be assigned a new priority date. Applications to change water sources, to add lands or increase original diversion rates, if approved will usually receive the date of the new application as a priority date regardless of the five year construction period.



NOTICE OF COMPLETION OF WORKS AND APPLICATION OF WATER TO BENEFICIAL USE

Date September 23, 1992

TO: Water Rights Division, DENR
523 E. Capitol
Pierre, SD 57501-3181

FROM: TM Rural Water District Box 445
(name) (address)

Parker, SD 57053 297-3334
(city) (state) (zip) (phone)

I have completed the construction of the water diversion system and I have put the water to beneficial use to the maximum extent it is going to be used. I have not exceeded the amounts specified in Water Permit No. 56083.

Water Permit No. 56083 states that the diversion system is to be constructed by March 18, 1997, and that the water is put to beneficial use by March 18, 2001.
(date) (date)

The diversion system was completed on September 2, 1992.
(date)

Applying the water to beneficial use was ^{started} completed on Sept 8, 1992.
(date)

You may schedule an inspection so that the Water License may be issued.

Ken Pedersen, Mgr
(signature)



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

December 23, 1992

Ken Pedersen
TM Rural Water District
PO Box 445
Parker SD 57053

Dear Mr. Pedersen:

Pursuant to a qualification on Water Permit/Right No(s).
5608-3 (Upper Vermillion Missouri Aquifer) & 4988-3
(Dolton Aquifer), I am requesting that the TM Rural Water
District report the amount of water diverted under the
permit(s) during 1992. Please respond by January 15,
1993.

If you have any questions concerning this or other water
rights questions, please contact Barry McLaury, Natural
Resources Analyst, (605) 773-3352.

Very truly yours,

RON DUVALL, Natural Resources Engineer
for JOHN HATCH, Chief Engineer
Water Rights Division

5608-3



TM Rural Water District

P.O. Box 445, Parker, South Dakota 57053 • Phone (605) 297-3334

Department of Environment and Natural Resources
Water Rights Division
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

1/5/93

Attention: Ron Duvall

Re: Water Use during 1992

Dear Mr. Duvall:

TM Rural Water District used the following amounts of water from the named aquifers during 1992.

Dolton (4988-3)	207,953,200 gallons
Upper Vermillion Missouri (5608-3)	2,816,800 gallons

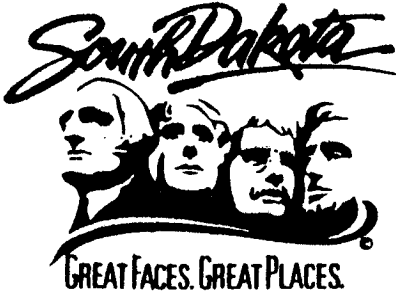
I am enclosing a copy of my water usage report for the year.

If you need more information please contact me.

Sincerely,

Ken Pedersen
Manager

DENRWUSE.WPS



5608-3

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

January 13, 1994

Ken Pedersen
TM Rural Water District
PO Box 445
Parker, SD 57053

Dear Mr. Pedersen:

Pursuant to a qualification on Water Permit/Right Nos. 5608-3 (Upper Vermillion Missouri Aquifer) & 4988-3 (Dolton Aquifer), I am requesting that the TM Rural Water District report the total amount of water diverted from the Upper Vermillion Missouri Aquifer and the Dolton Aquifer during 1993. Please respond by January 31, 1994.

If you have any questions concerning this or other water rights questions, please contact Barry McLaury, Natural Resources Analyst, (605) 773-3352.

Sincerely,

RON DUVAL, Natural Resources Engineer
for JOHN HATCH, Chief Engineer
Water Rights Division

TM Rural Water District



P.O. Box 445, Parker, South Dakota 57053 • Phone (605) 297-3334

January 17, 1994

Department of Environment and Natural Resources
Water Rights Division
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Attention: Ron Duvall

Re: Water Use during 1993

Dear Mr. Duvall:

TM Rural Water District used the following amounts of water from the named aquifers during 1993.

Dolton (4988-3)	166,117,400 gallons
Upper Vermillion Missouri (5608-3)	66,732,600 gallons

I am enclosing a copy of my water usage report for the year.

If you need more information please contact me.

Sincerely,

Ken Pedersen
Manager

Permit No. 5608-3
Vermillion River - Water District

Report of Examination of Works and/or Application of Water to Beneficial Use

TO: Chief Engineer, Water Rights Program, DENR, Foss Bldg., Pierre, SD 57501

I have this day, **November 1, 1999**, made a thorough examination of the water use system constructed by **TM Rural Water District of PO Box 445, Parker, SD, 57053** holder of Permit Nos. **5608-3**, bearing the priority of **October 11, 1989** authorizing the diversion of **1.34** cu. ft. per second of **Upper Vermillion Missouri aquifer** for **rural water system use** purposes, in **Hutchinson, McCook, Miner, Turner and Minnehaha** Counties.

I have to report on the conditions of the same as follows:

A. Works used to divert the water:

One 12 inch diameter well 368 feet deep, screened with 81 feet of 35 slot stainless steel wirewrap screen, equipped with an American Turbine submersible pump with a Franklin 50 HP electric motor capable of producing 600 gpm.

B. Works used to transport water to place of use:

Raw water line from the well to the treatment plant located in the southeast of the southwest of section 8, T100N R55W in Turner County.

C. Works used to apply water to beneficial use:

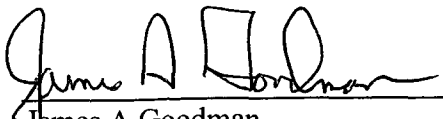
Buried pipelines from the treatment plant to rural and municipal customers.

The system is in the following condition, **excellent**. The point of diversion is located **150 feet east and 124 feet north of the southwest corner of section 25, T101N R55W in McCook County**. The works are capable of diverting and conveying to the place of use **1.34** cu. ft. per second of water for **rural water system use**. Water has been put to beneficial use to the maximum extent as follows:

The license should be issued for **1.34** cfs and applicable portions of Water Permit No. 5608A-3 including connection of the City of Hurley, Town of Dolton, and bulk service distribution system at Swan Lake can be incorporated into this license.

Applicable permit qualifications have been complied with: Yes ☒ No ☐

Exceptions to compliance are: **none** Date report completed: **November 18, 1999**



James A Goodman
Natural Resources Engineer
DENR, Water Rights Program

FIELD INVESTIGATION REPORT FOR PERMIT NO. 5608-3

DATE OF INVESTIGATION:	November 1, 1999
NAME & ADDRESS OF INVESTIGATION CONTACT/ RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE	Ken Pedersen, Manager
NAME & ADDRESS OF PERMIT HOLDER	TM Rural Water District PO Box 445 Parker, SD 57053
DIVERSION POINT LEGAL LOCATION	Well #4, located 150 feet east and 124 feet north of the southwest corner of section 25, T101N R55W in McCook County.

Other permit(s) associated with the project: 5608A-3, Future Use 5358-3

WELL INFORMATION:

- 1) Well Drilling Firm: Layne-Western Company, Inc.
- 2) No. of Wells one
- 3) Depth(s) 368 feet
- 4) Well log is available Y/N
- 5) Comment: _____

Casing:

- 1) Diameter 12 inches
- 2) Length 291 feet
- 3) Type steel

Screen:

- 1) Type wirewrap stainless steel (.035 inch /35 slot)
- 2) Length 81 feet
- 3) Static water level 100 feet

Pump:

- 1) Make American Turbine submersible pump
- 2) Model 10L-30
- 3) Size 6 inch
- 4) Capacity 600 GPM

PERMIT NO. 5608-3

Motor:

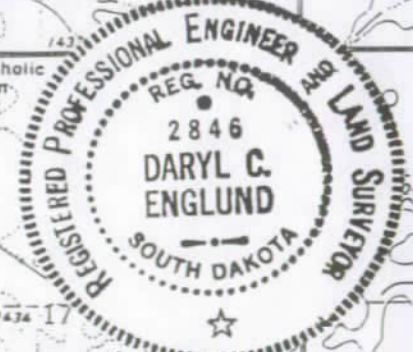
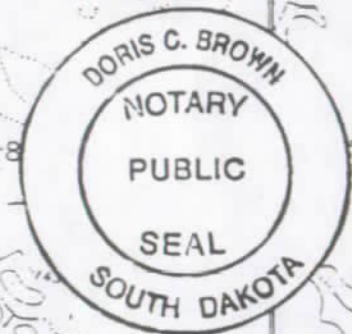
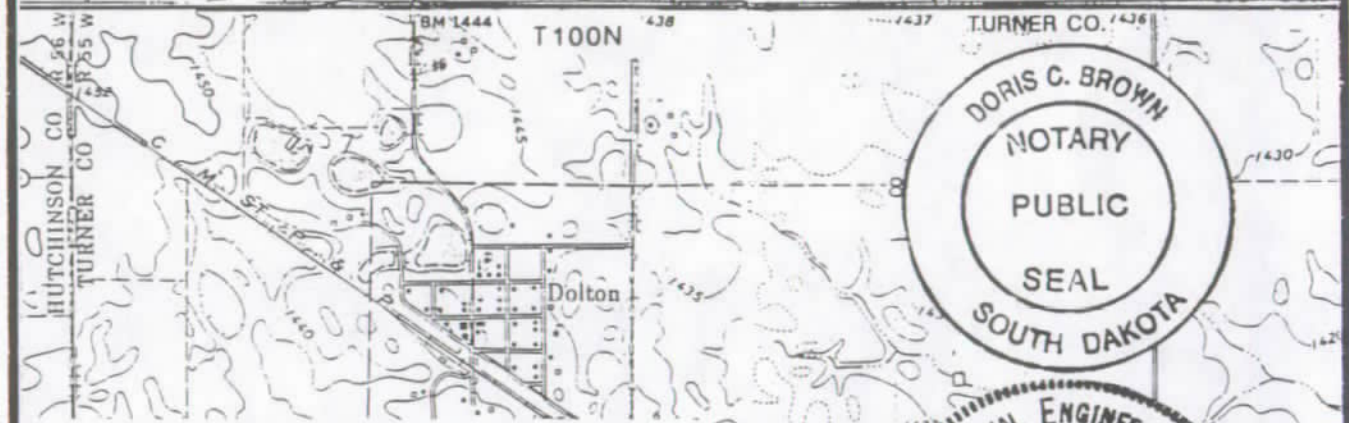
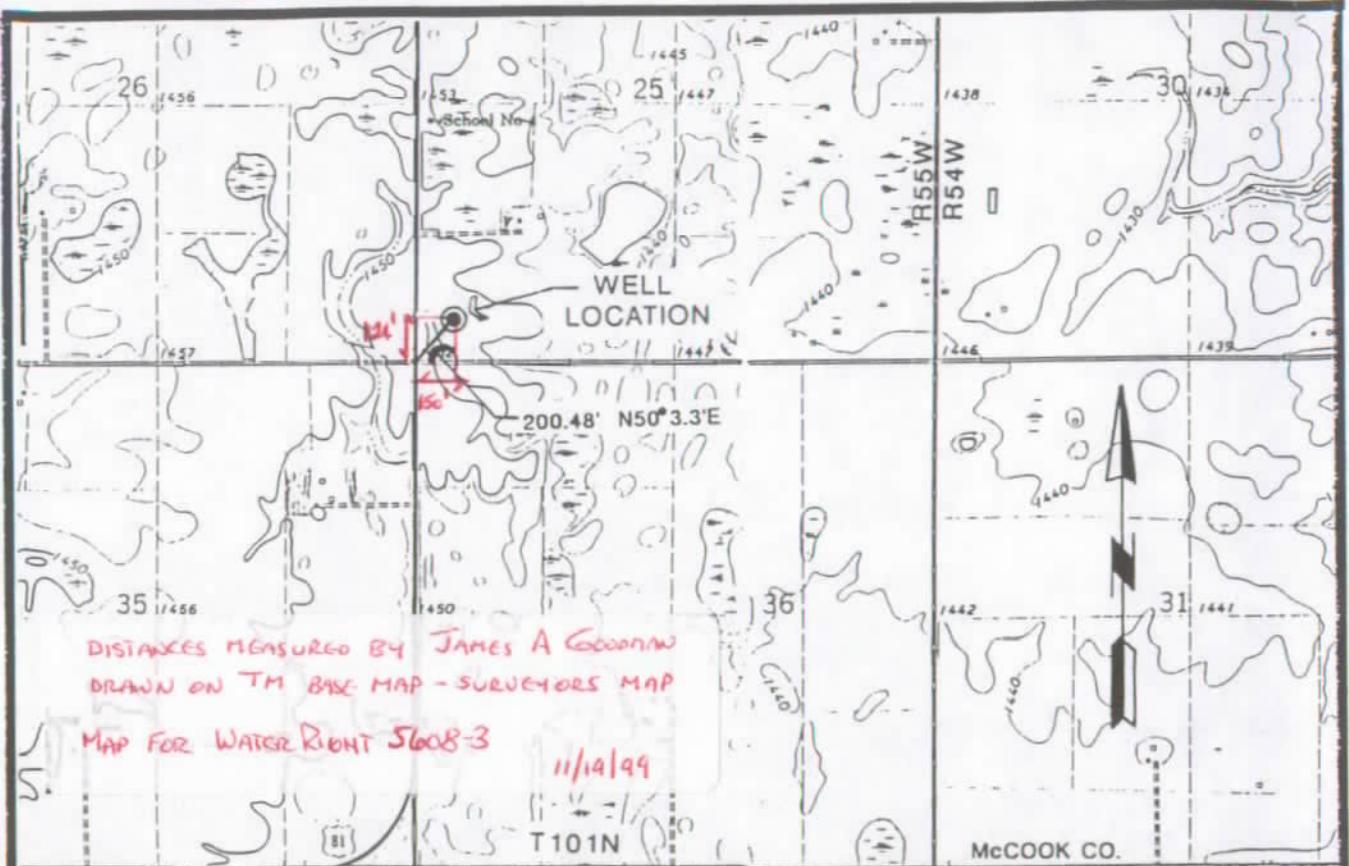
- 1) Make Franklin
- 2) Model No. super 6 inch
- 3) Horsepower rating 50 hp

PERMIT QUALIFICATIONS:

- 1) Special qualifications to permit being abided by Y/N
- 2) All structures, wells and lands on map Y/N

T101N R55W

WATER RIGHT 5608-3



SURVEYOR'S CERTIFICATE

STATE OF SOUTH DAKOTA SS
COUNTY OF BROOKINGS

I, DARYL ENGLUND, A REGISTERED LAND SURVEYOR IN THE STATE OF SOUTH DAKOTA, DO HEREBY CERTIFY THAT AT THE REQUEST OF THE T-M RURAL WATER DISTRICT, PARKER, SOUTH DAKOTA, I DID PREPARE THE MAP ON THIS SHEET FROM EXISTING INFORMATION AND THAT I DID SURVEY AND LOCATE THE SITES FOR WHICH APPLICATION FOR AN APPROPRIATE WATER RIGHTS TO WITHDRAW UNDERGROUND WATERS FOR RURAL WATER SUPPLY PURPOSES IS MADE, AND THAT THIS MAP IS A TRUE REPRESENTATION THEREOF.

IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND AND SEAL THIS 9th DAY OF January, A.D. 1992.

Daryl C. Englund
REGISTERED LAND SURVEYOR

STATE OF SOUTH DAKOTA SS
COUNTY OF BROOKINGS

ON THIS DAY, BEFORE ME, THE UNDERSIGNED, A NOTARY PUBLIC WITHIN AND FOR SAID STATE AND COUNTY, PERSONALLY APPEARED DARYL ENGLUND, KNOWN TO ME TO BE THE PERSON WHO EXECUTED THE FOREGOING SURVEYOR'S CERTIFICATE AND ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME.

WITNESS MY HAND AND SEAL THIS 9th DAY OF January, A.D. 1992.

Doris C. Brown
NOTARY PUBLIC

MY COMMISSION EXPIRES 12-9-97

T-M RURAL WATER DISTRICT

PARKER, SOUTH DAKOTA

WATER RIGHTS MAP



STATE OF SOUTH DAKOTA

WATER LICENSE NO. 5608-3

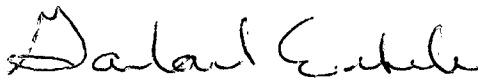
(1) TM Rural Water District, PO Box 445, Parker SD 57053 made Application No. 5608-3, January 13, 1992 for a water permit to divert 1.34 cubic feet of water per second (970 acre-feet annually) from groundwater (one well), McCook County, South Dakota for rural water system use purposes. Permit No. 5608-3, with a priority date of October 11, 1989 (established by Future Use Permit No. 5358-3) was approved March 18, 1992 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before March 18, 1997 and for the application to beneficial use of said water on or before March 18, 2001.

Water Permit No. 5608A-3 authorized the connection of the City of Hurley, the Town of Dolton and the bulk service to the distribution system at Swan Lake to the TM Rural Water District. No increase in the diversion rate was authorized. The applicable portions of No. 5608A-3 are incorporated into Water License No. 5608-3.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 1.34 cubic feet of water per second (970 acre-feet annually) for beneficial use. The location of the diversion point is 150 feet east and 124 feet north of the southwest corner of Section 25-T101N-R55W (SW ¼ SW ¼).

(3) The permit holder has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use to supply users in Hutchinson, McCook, Miner, Turner and Minnehaha Counties.

(4) Pursuant to South Dakota Water Law 46-5-30.1 TM Rural Water District, PO Box 445, Parker SD 57053 the holder and/or owner of Incorporated Water Right No. 5608-3 is issued a license to appropriate water, the right to use 1.34 cubic feet of water per second (970 acre-feet annually) from groundwater (one well) with a priority date of October 11, 1989 (established by Future Use Permit No. 5358-3) from the location specified in (2) of this license for rural water system use. This license is subject to any limitations or qualifications listed in Incorporated Water Right No. 5608-3 and subject to South Dakota State Law.



GARLAND ERBELE, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

APR 10 2000

date





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

February 1, 2000

4988-3
5608-3

TM Rural Water District
Ken Pedersen, Manager
P.O. Box 445
Parker, SD 57053

Dear Mr. Pedersen:

The investigation of your water use systems was conducted on November 1, 1999, by James A. Goodman, staff engineer. The investigation included the extent of application of water to beneficial use, as developed under Water Permit Nos. 4988-3 and 5608-3. Your final water right documents, the Water Licenses, can now be issued. Upon licensing, the applicable portions of Water Permit No. 5608A-3 will be incorporated into 5608-3.

Statutes require that we charge a \$50.00 fee per license (\$100.00 total) for the investigation and issuance of the Water Licenses. Upon receipt of the \$50.00 fee per license from you (\$100.00 total), we will begin processing your Water Licenses.

**Please remit fee to:
Department of Environment & Natural Resources
Water Rights Program
523 E. Capitol
Pierre, SD 57501-3181**

Sincerely,

Cheryl F. Frost
Secretary
Water Rights Program
(605) 773-3352

NOTE: On check or money order, please specify your permit numbers. This will insure proper handling of the fee.

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

N2 416410

Pierre, _____ March 2, 2000

RECEIVED OF TM Rufin Water District, Box 445, Parker, SD 57053
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct
and to put water to beneficial use _____

Fee for Application for Permit No. _____ to Appropriate Water, for Future
Use _____

Fee to retain Future Use Permit No. _____ after period of seven years.

Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water
License No. 5608-3

50 00

Fee for Filing Transfer Form _____

Fee for Filing Extension Request _____

Fee for _____

(Any Other Work Provided by Law)

Total

50 00

By

Harland Labele
Chief Engineer



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

APR 10 2000

4988-3
5608-3

TM Rural Water District
Ken Pedersen, Manager
P.O. Box 445
Parker, SD 57053

Dear Mr. Pedersen:

Enclosed are Water License Nos. 4988-3 and 5608-3. These are the final water right documents completing your process of obtaining a Water Right. Enclosed are Receipt Nos. 416409 and 416410 in the amount of \$50.00 each which you paid for the investigation and issuance of the Water Licenses.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the wells authorized by Water Right Nos. 4988-3 and 5608-3, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

As long as you use the water beneficially, as stated in the Water Licenses, the State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Sincerely,

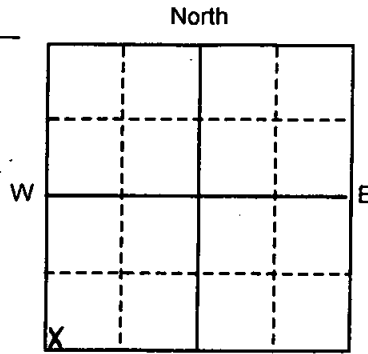
Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

ks
enclosures

NOTE: The applicable portions of No. 5608A-3 are incorporated into Water License No. 5608-3.

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SW 1/4 SW 1/4 Sec 25 Twp 101N Rg 55WCounty McCookPlease mark well
location with an "X"

Well Completion Date

June 5, 2018

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?
1,000.0 ft. from feed lot (identify source)

PROPOSED USE:

☐ Domestic/Stock ☒ Municipal ☐ Business ☐ Test holes
☐ Irrigation ☐ Industrial ☐ Institutional ☐ Monitoring well

METHOD OF DRILLING:

Mud rotary

CASING DATA:

☒ Steel ☐ Plastic ☐ Other

If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
LB/FT	16.00 IN	0.0 FT	300.0 FT	22.00 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
Neat cement		Lb/gal	0.0 Ft	295.0 Ft
14 yds		Lb/gal	Ft	Ft

Describe grouting procedure
Tremie piped

SCREEN:

☐ Perforated pipe ☒ Manufactured
Diameter 16.00 Inches Length 90.0 FeetMaterial Stainless steelSlot Size .025 Set From 300.0 Feet to 390.0 Feet

Other information

WAS A PACKER OR SEAL USED?

☐ Yes ☒ No

If so, what material?

Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☒ Yes, How? Chlorinated
Lab to which water ☐ No, Why Not?

quality sample sent for analysis

Well Owner: TM Rural Water

Business Name:

Address: PO Box 445City, State, Zip: Parker SD 57053

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Top soil	0	4
Clay-brown	4	24
Clay-blue - soft	24	66
Clay-blue w/some sand layers & coal	66	114
Sand & coal w/some clay	114	117
Clay-blue, sandy	117	132
Sand	132	134
Clay-blue w/few thin sand layers	134	139

Cont'd on page 2

STATIC WATER LEVEL 101.5 FEET

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ Inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

Reduced flow rate _____ GPM

Can well be completely shut in?

WELL TEST DATA:

☒ Pumped Describe:☐ Bailed☐ Other

Pumping Level Below Land Surface

168.0 Ft. After 6.0 Hrs. pumped 780.0 GPM

_____ Ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate: _____ GPM

REMARKS

GPS: N43 30' 53.2" W97 23' 14.9"

Replacement well
5608-3

RECEIVED

JUL 05 2018

WATER RIGHTS
PROGRAMThis well was drilled under license # 475 and this report is true and accurate.Drilling firm: Thein Well Co., Inc.

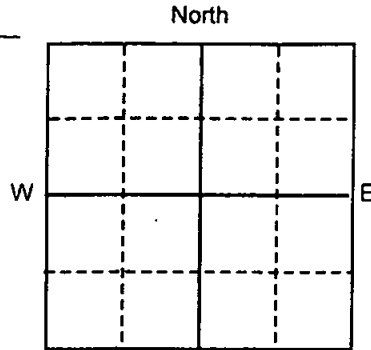
Signature of License Representative:

Signature of Well Owner or Equitable Property Holder:

Date: 06-27-18

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SW ¼ SW ¼ Sec 25 Twp 101N Rg 55WCounty McCookPlease mark well
location with an "X"

Well Completion Date

June 5, 2018

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?
ft. from _____ (identify source)

PROPOSED USE:

☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test holes
☐ Irrigation ☐ Industrial ☐ Institutional ☐ Monitoring well

METHOD OF DRILLING:

CASING DATA:

☐ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
		Lb/gal	Ft	Ft
		Lb/gal	Ft	Ft

Describe grouting procedure _____

SCREEN:

☐ Perforated pipe ☐ Manufactured

Diameter _____ Inches Length _____ Feet

Material _____

Slot Size _____ Set From _____ Feet to _____ Feet

Other information _____

WAS A PACKER OR SEAL USED?

☐ Yes ☐ No

If so, what material? _____

Describe packer(s) and location _____

DISINFECTION: Was well disinfected upon completion?

☐ Yes, How? _____

☐ No, Why Not? _____
Lab to which water
quality sample sent for analysis _____Well Owner: TM Rural Water

Business Name: _____

Address: PO Box 445City, State, Zip: Parker SD 57053

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Med sand, some wood	139	161
Clay	161	164
Med-fine sand, some rocks	164	234
Clay - very sandy	234	238
Sand	238	246
Clay-blue, sandy	246	256
Clay-blue (rock at 264')	256	291
Fine gravel, some rocks	291	337

Cont'd on page 3

STATIC WATER LEVEL

FEET

If flowing: closed in pressure _____

PSI

GPM flow _____ through _____

Inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other _____

Reduced flow rate _____

GPM

Can well be completely shut in?

WELL TEST DATA:

☐ Pumped Describe: _____

☐ Bailed

☐ Other

Pumping Level Below Land Surface

_____ Ft. After _____ Hrs. pumped _____ GPM

_____ Ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate: _____ GPM

REMARKS

GPS: N43 30' 53.2" W97 23' 14.9"

This well was drilled under license # 475 and this
report is true and accurate.Drilling firm: Thein Well Co., Inc.

Signature of License Representative: _____

Signature of Well Owner or Equitable Property Holder: _____

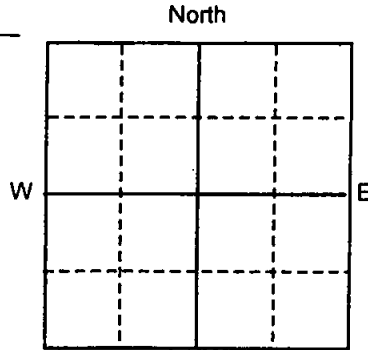
Date: _____

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SW ¼ SW ¼ Sec 25 Twp 101N Rg 55W

County McCook

Please mark well
location with an "X"

Well Completion Date

June 5, 2018

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?
ft. from (identify source)

PROPOSED USE:

☐ Domestic/Stock ☐ Municipal ☐ Business ☐ Test holes
☐ Irrigation ☐ Industrial ☐ Institutional ☐ Monitoring well

METHOD OF DRILLING:

CASING DATA:

☐ Steel ☐ Plastic ☐ Other

If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
		Lb/gal	Ft	Ft
		Lb/gal	Ft	Ft

Describe grouting procedure

SCREEN:

☐ Perforated pipe ☐ Manufactured

Diameter _____ Inches Length _____ Feet

Material _____

Slot Size _____ Set From _____ Feet to _____ Feet

Other information

WAS A PACKER OR SEAL USED?

☐ Yes ☐ No

If so, what material?

Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☐ Yes, How?

☐ No, Why Not?
Lab to which water
quality sample sent for analysis

Well Owner: TM Rural Water

Business Name:

Address: PO Box 445

City, State, Zip: Parker SD 57053

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Sand & gravel (less consolidated)	337	372
Gravel	372	391
Quartzite	391	

STATIC WATER LEVEL

FEET

If flowing: closed in pressure

PSI

GPM flow _____ through _____

Inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

Reduced flow rate

GPM

Can well be completely shut in?

WELL TEST DATA:

☐ Pumped Describe:☐ Bailed☐ Other

Pumping Level Below Land Surface

_____ Ft. After _____ Hrs. pumped _____ GPM

_____ Ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate: _____ GPM

REMARKS

GPS: N43 30' 53.2" W97 23' 14.9"

This well was drilled under license # 475 and this report is true and accurate.

Drilling firm: Thein Well Co., Inc.

Signature of License Representative:

Signature of Well Owner or Equitable Property Holder:

Date:



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3182
<http://denr.sd.gov>

August 16, 2018

TM Rural Water District
c/o Jay Jorgensen
PO Box 445
Parker SD 57053

Dear Mr. Jorgensen:

A well driller completion report filed by Thein Well Co Inc shows they recently completed a new well for TM Rural Water District.

A review of our files indicates Water Right No. 5608-3 was licensed for 600 gallons per minute (gpm) from one well, approximately 368 feet deep located in SE 1/4 SE 1/4 Section 25-T101N-R55W. This appears to be the same location as identified on the new well report.

Mr. Jorgensen, is this a replacement well or an additional well which does not increase the total appropriation of 600 gpm? If the authorized diversion rate is increased, a new water permit will need to be obtained. Once we know this information, we can determine what additional action, if any, needs to be taken to ensure the water right accurately reflects the districts use.

Please contact Eric Gronlund or me regarding the status of this well or if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Karen Schlaak".

Karen Schlaak
Water Rights Program
605 773-3352
karen.schlaak@state.sd.us

Schlaak, Karen

From: Jay Jorgensen <Jay.Jorgensen@tmruralwater.com>
Sent: Monday, August 20, 2018 10:50 AM
To: Schlaak, Karen
Subject: [EXT] Letter Received concerning Water Right No. 5608-3
Attachments: Letter from DENR Dated 08-16-18.pdf

Importance: High

Good morning Ms. Schlaak,

I received the attached letter concerning the well recently drilled for TM Rural Water District at the same location as an existing well under Water Right No. 5608-3 by Thein Well Company.

This is a replacement Well for this site and has yet to be put into service. Once put into service the plan is to seal the old well. At this time TM Rural Water District does not plan to increase our total appropriation of 600 GPM.

In the email chain shown below I informed your office of what TM planned to do. I am guessing since this email is dated back in March, the original email may have been misplaced or overlooked. Happens in my office all the time.

Please let me know if you need any additional information or documentation.

Thank you,

Jay Jorgensen
Manager
TM Rural Water District

From: Jay Jorgensen [<mailto:Jay.Jorgensen@tmruralwater.com>]
Sent: Monday, March 19, 2018 2:50 PM
To: DENR INTERNET INFORMATION
Subject: [EXT] Atten: Eric Gronlund
Importance: High

Eric,
Per our conversation a couple of weeks ago regarding the replacement of an existing production well, please accept this email as notification that TM plans to have this well replaced on the same 1 acre site as the previous well and will be located 45 feet north of the existing well. Replacement of this well is due to the original well's casing corroding. Attached document shows location of existing well and a site plan shows where the new well will be placed.

Thein Well out of Spicer MN will be drilling the replacement well starting the week of March 26th, 2018. Please let me know if you need any additional information.

Thanks,
Jay

Compl Rpt:
Last Name:RURAL WATER
First Name:TM
Business:TM RURAL WATER
County:McCook
Well Type:MUN
Township:
Range:

Section:25
QQ:SWSW
Latitude:43.516072
Longitude:-97.38555
Driller No.:513
Compl Date: "Wed, 17 Jul 1991 00:00:00 GMT"
Permit No.:5608-3
Depth:387

From: Jay Jorgensen [<mailto:Jay.Jorgensen@tmruralwater.com>]
Sent: Monday, March 19, 2018 3:47 PM
To: Gronlund, Eric
Subject: RE: [EXT] Atten: Eric Gronlund
Importance: High

Eric,
See below, thanks for the quick response.
Jay

From: Gronlund, Eric [<mailto:Eric.Gronlund@state.sd.us>]
Sent: Monday, March 19, 2018 3:36 PM
To: 'jay.jorgensen@tmruralwater.com'
Subject: FW: Atten: Eric Gronlund
Importance: High

Jay

This is a replacement for the well authorized by Water Right No. 5608-3. The water right appropriates 1.34 cubic feet of water per second (601 gpm) from one well (368 feet deep). The water source is the Upper Vermillion Missouri aquifer also known at the Unnamed Pleistocene Basal aquifer.

Will the diversion from the replacement well exceed 1.34 cfs (601 gpm)? That is the plan but waiting for test pumping of well to determine maximum rate the well could pump and whether it is more or less than previous hole.

Is the replacement will still planned to be in the same source at a depth around 368 feet deep? By moving the replacement 45' to the north the test hole showed the formation that we are currently in went down to 391' and will allow for an additional 15 to 20 ' of screen. Please let me know if this is an issue as the District wishes to go to the bottom of the formation. The well driller will be drilling the replacement well at the same location as this test hole.

Based is replacement well being in the same legal location as authorized, it is allowed provided the same source and no additional diversion rate and water is appropriated. If it is determined that this replacement well is capable of providing a higher rate of flow TM would of course abide by the current restriction not to go above 601 GPM. How would TM proceed if we wished to increase the diversion rate at this site in the future? I assume an updated water right would be required or would a whole new Water Right need to be applied for?

From: Gronlund, Eric [<mailto:Eric.Gronlund@state.sd.us>]
Sent: Monday, March 19, 2018 4:05 PM
To: 'Jay Jorgensen'
Subject: RE: Atten: Eric Gronlund

If the 601 gpm diversion rate is exceeded, TM will need to file a water permit application for whatever the incremental increase in diversion rate is above 601 gpm.

The water right is dictated by the water source, not necessarily by the depth. As long as TM remains in the same water source you are fine being a little deeper.

Jay Jorgensen
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