

WATER PERMIT NO. 1629-1

Name of Applicant: Butte-Meade Sanitary Water District

Address: PO Box 5, Newell SD 57760

Phone: 456-2288

Amount of Water Claimed: 0.23 cfs (add'l)

Total Acres: NA

Source of Water Supply: groundwater - one well

Depth of Well: approximately 2300 feet deep

Water to be used for: rural water system

County: Butte

Type of Waste Disposal System: NA

Location: north side of Vale

PRIORITY Date Received: 8-11-95

Fee: \$250.00

Corrected Application Received: 8-16-95

Period of Annual Use: January 1 - December 31

Remarks: Increase the diversion rate authorized by Permit No. 950-1 from 0.10 to 0.33 cfs and to develop a new well to replace the existing well

Diversion Point: SW 1/4 SW 1/4

Section 28-T8N-R6E

Land to be Irrigated: NA

			28		
	⊗				

Reviewed and the Number Assigned on: 8-16-95

By: Karen Schlaak

Notice of Hearing - date to intervene: _____

**SOUTH DAKOTA
WATER PERMIT NO. 1629-1**

Date of first receipt of application August 11, 1995

Date of return to applicant for corrections, amendments or changes August 14, 1995

Date of receipt of corrected application August 16, 1995

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 1629-1 to Butte-Meade Sanitary Water District, PO Box 5, Newell SD 57760 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. 1629-1 appropriates 0.23 cubic feet of water second (cfs) by increasing the diversion rate authorized by Water Right No. 950-1. Water Right No. 950-1 appropriates 0.10 cfs from one well located in the SW 1/4 SW 1/4 Section 28-T8N-R6E. This permit authorizes development of a replacement well for the well authorized by Water Right No. 950-1. The proposed well, located in the same area as the existing well, will be approximately 2300 feet deep (Inyan Kara Formation) and proposes to increase the water appropriation from 0.10 cfs to 0.33 cfs. The water will be used as a second supply for the Butte-Meade Sanitary Water District which serves the towns of Nisland, Vale and Newell and rural users in Butte and Meade Counties.
2. The water appropriated shall be used for the purpose of supplying water to the Butte-Meade Sanitary Water District 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. 1629-1 is October 30, 1995.
5. The date from which applicant may claim right is August 11, 1995.
6. One-fifth of the construction is to be completed on or before April 30, 1998.
7. All construction is to be completed on or before October 30, 2000.
8. Water is to be put to beneficial use on or before October 30, 2004.
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 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.

(continued)

2. The well authorized by Permit No. 1629-1 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 (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:28.
3. Upon completion of the new well, the old well originally authorized by Water Right No. 950-1 must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04.
4. The well approved under this Permit shall be valved and the flow reduced to the amount needed or to a minimum when not being used (directly or for storage purposes). The well shall also be equipped with a pressure gauge and a record kept of any pressure fluctuations. Such records shall be available to the Chief Engineer upon request. If this well is abandoned or the Permit cancelled, the well must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04.

WATER MANAGEMENT BOARD

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

NOV 28 1995

date



FORM 2: Application for uses other than irrigation
(type or print)



Mail to:
Water Rights Division
Joe Foss Building
523 E Capitol
Pierre SD 57501-3181
605 773-3352

No. _____ Hydrologic Unit _____
Basin _____
Newspaper _____
(office use only)

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

Check use of water:

☐ Municipal ☐ Suburban Housing ☐ Recreational ☐ Institutional
☒ Rural Water System ☐ Commercial ☐ Fish & Wildlife ☐ Geothermal Heat
☐ Domestic ☐ Industrial ☐ Other _____
(over 18 gpm)

Type of Application: ☐ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
(check one) ☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____
☒ Amendment/Correction to Permit No. 950-1

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)
Increase diversion from 0.10 cfs to 0.33 cfs and develop new well to replace
existing

- Name of Applicant Butte-Meade Sanitary Water District Phone 456-2288
(check one) ☐ Owner ☐ Tenant/lessee
Mailing Address P.O. Box 5 Newell State SD 57760
(Street, RR, or Box) (City) (Zip Code)
- Amount of water claimed ~~0.33~~ 0.23 add 1 *CFS or 150 **GPM ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***Acre Feet - storage capacity of dam/dugout or annual use if applicable)
- Source of water supply 2300' deep well to Lakota Formation
- Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) 1045' ± North and
595' ± East of SW Corner of Section 28, T8N, R6E (SW 1/4 SW 1/4)
County Butte
- County or counties where water will be used Butte & Meade
- Annual period during which water is to be used All year Jan 1 - Dec 31
- Give a description of the 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)

Butte-Meade Sanitary Water District proposes to develop new well to replace the existing Vale Well and increase production up to 150 GPM. This new well will serve as second supply source for the rural water system. Existing Vale Well will not be used.

Attachments: Attach Form 2A if diversion is from a well or dugout, or if storage of water is proposed. Attach map and any other technical information. (see instructions)

STATE OF SOUTH DAKOTA)

County of Butte)^{SS}

I, Dale Knutson, 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 Dale E Knutson

Subscribed and sworn to before me this 9 day of August 19 95

MERRI STAPP, Notary Public
My Commission Expires Jan. 2, 2002

Merri Stapp

Notary Public

RECEIPT

414588

Division of Water Rights

South Dakota Department of Environment and Natural Resources

Pierre, August 16, 19 95

RECEIVED OF Butte-Mead Sanitary Water District, Box 5, Newell, SD 57760

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

Fee for Application for Permit No. <u>1629-1</u> to Appropriate Water, to construct and to put water to beneficial use _____	250	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 _____		

(Any Other Work Provided by Law)	Total	250 00

By

Chief Engineer

John Hatch
[Signature]

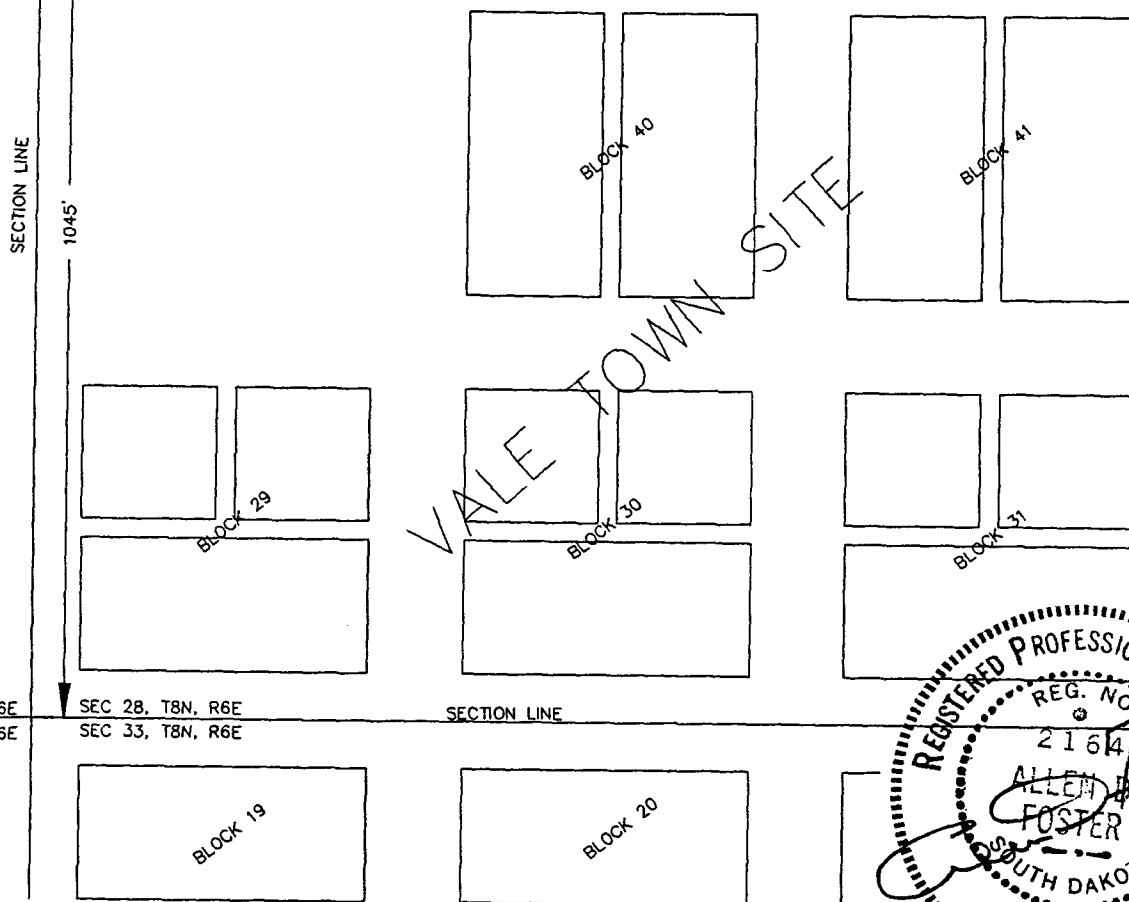
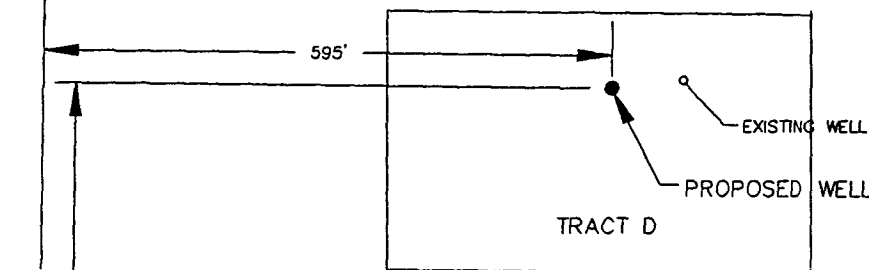
07-92

NOV 1993
WATER RIGHTS
PROGRAM
Plano, SD
16086284292

Date: Sept 27-96



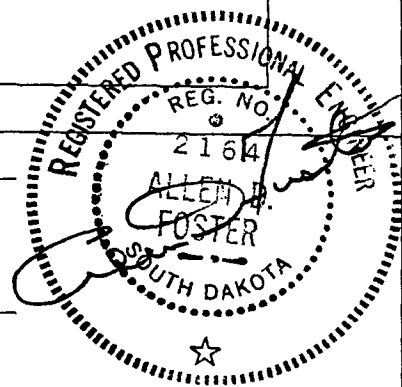
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0 100 200



SEC 29, T8N, R6E
SEC 32, T8N, R6E

SEC 28, T8N, R6E
SEC 33, T8N, R6E

SECTION LINE



F M G, Inc.

1823 West Main Street - Rapid City, SD 57702 (605) 342-4105

Surveyed By: DW & CG
Date: 7/12/95
Designed By: _____
Date: _____

Drawn By: KS
Date: 8/3/95
Checked By: ADF
Date: 8/3/95

WATER RIGHT LOCATION
SW 1/4 OF SEC 28, T8N, R7E, BHM
BUTTE COUNTY, SOUTH DAKOTA
BUTTE-MEADE SANITARY WATER DISTRICT

File Number
7727.01

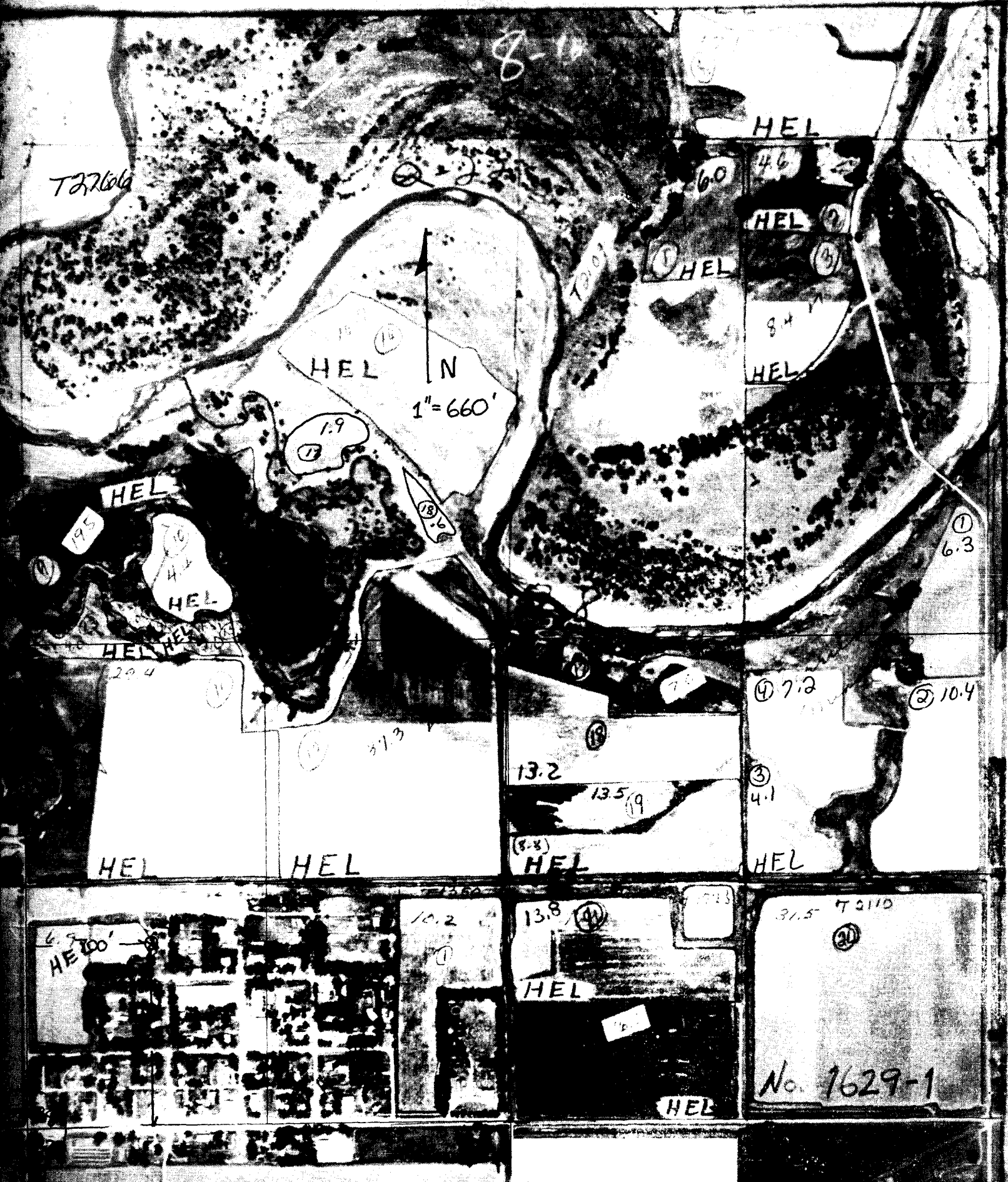
Figure Number
1

Location
SW 1/4

SEC 28, T8N, R7E
Black Hills Meridian

1629-1

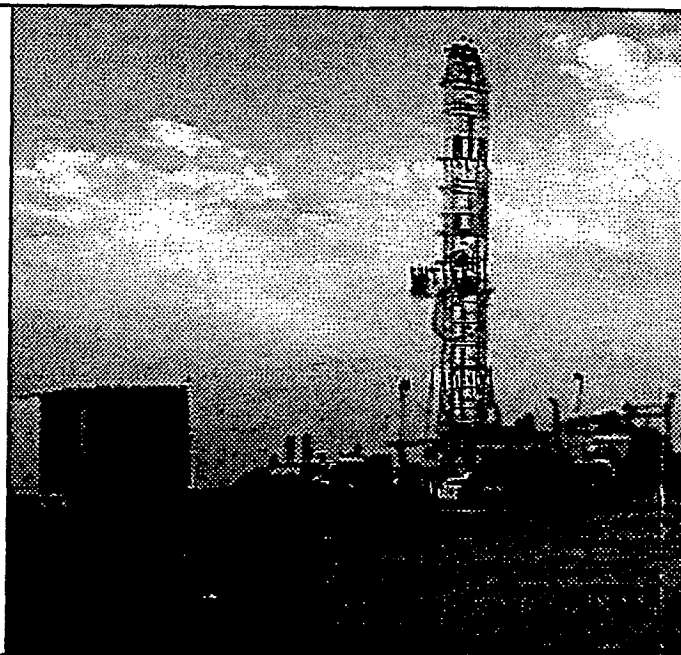
NOT TO SCALE



Butte Meade Sanitary Water District

Vale, Well #2

Well Construction and Testing Report



WESTON

Engineering, Inc.

P.O. Box 260
1401 Highway 16 East
Upton, Wyoming 82730
(307) 468-2427

P.O. Box 632007
2065 Sidewinder Dr., Suite 102
Park City, Utah 84068-2007
(801) 647-9866

P.O. Box 6037
121 Grand Ave., Suite 210
Laramie, Wyoming 82070
(307) 745-6118

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- Report of Well and Aquifer Testing
- Graphs of Pump Tests
- As-Built Diagrams
- Pump Curves
- Drilling Report and Well Development and Testing Summaries
- Flow Control Device Diagram

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- Step Test Data

Appendix B

- Constant Rate Test Data

Appendix C

- Geological Log Report

Pocket

- Geophysical Logs

WELL AND AQUIFER TESTING

Pump testing of Vale Well No. 2 was initiated on May 7, 1996 to determine to productive capacity of the well. The following sections provide brief summaries of the results of the step-drawdown, constant-discharge, and recovery tests. A 3 1/2-inch pump column was outfitted with an airline placed 571 feet below ground level. A GPM 6N180-18 pump with a 50 hp motor was set in the well with its top 581 feet below ground level. Discharge rates for both the step-drawdown and the constant-discharge tests were controlled using a gate valve and were measured using a water meter and an orifice weir and manometer tube. The shut-in pressure at the well was 21 pounds per square inch (psi), which is equivalent to a water level of 49 feet above ground level. Drawdowns are reported using 49 feet above ground level as the reference point, unless otherwise noted.

Step Test

A step test was conducted at Vale Well No. 2 on May 7, 1996. Discharge was held constant for a minimum of 60 minutes at rates of 40, 80, 120, and 160 gallons per minute (gpm) in an attempt to overcome the effects of storage casing.

Step tests provide an indication of the efficiency of water entry into a well. In an ideal or 100% efficient well, the relationship between the discharge rate and the observed drawdown will be linear; i.e., tripling the discharge rate will triple the drawdown. In order to assess the efficiency of water entry in Vale Well No. 2, data from the step test were plotted on a log-log scale (Figure 1). The line with a slope of one overlain on the data indicates the trend that would be shown in a 100% efficient well. The data collected during the Vale Well No. 2 step test follow this trend closely, indicating that the flow of water to the well and into the well is very efficient and that drawdown measured at low pumping rates can be extrapolated to predict the drawdown which will occur at higher pumping rates. The data collected during the step test are tabulated in Appendix (A).

Constant Rate Test

A 45-hour constant rate test was conducted at Vale Well No. 2 on May 7 to May 9, 1996. Based on the results of the step test, a pumping rate of 140 gpm was selected for the constant rate test. The data collected and observations made during this test are tabulated in Appendix (B). Figure 2 illustrates the results of the constant rate test using the semi-logarithmic method developed by Cooper and Jacob (1946). Important observations which may be made from this figure include the following:

- the effects of casing storage (t_c) described by Schafer (1978) lasted approximately 44 minutes at the pumping rate of 140 gpm;
- a straight-line match to the drawdown data yields aquifer transmissivities which vary with pumping duration, as shown by the break in slope at approximately 180 minutes. Early-time transmissivity was calculated to be 370 gallons per day per foot of drawdown (gpd/ft), while later-time transmissivity was calculated to be approximately 1,230 gpd/ft.

The change in slope observed at 180 minutes may be due to the cone of depression intersecting a higher permeability or thicker portion of the aquifer. In order to place greater stress on the aquifer and determine well performance at a higher pumping rate, the discharge rate was increased to 155 gpm after 1,250 minutes. This increased pumping rate resulted in approximately 65 feet of additional drawdown and a pumping water level of 450 feet (drawdown of 499 feet). A storage coefficient was not calculated due to the lack of an observation well.

Recovery Test

After the pumping tests at Vale Well No. 2 ended, recovery of the water level in the well was monitored using the airline. Within 76 minutes the water level reached the ground surface and the well began to flow. Because the well could not be shut in with the pump still in the well, no data were collected after the well began to flow. Figure 3 shows the residual drawdown plotted against the ratio T/T' , which represents the time since the constant rate test began (T) divided by the time since pumping ended (T').

BUTTE MEADE SANITARY WATER DISTRICT
VALE, WELL #2
SUMMARY OF STEP TEST DATA
CORRECTED HEAD
49 FEET POSITIVE FLOW PRESSURE
MAY 7, 1996

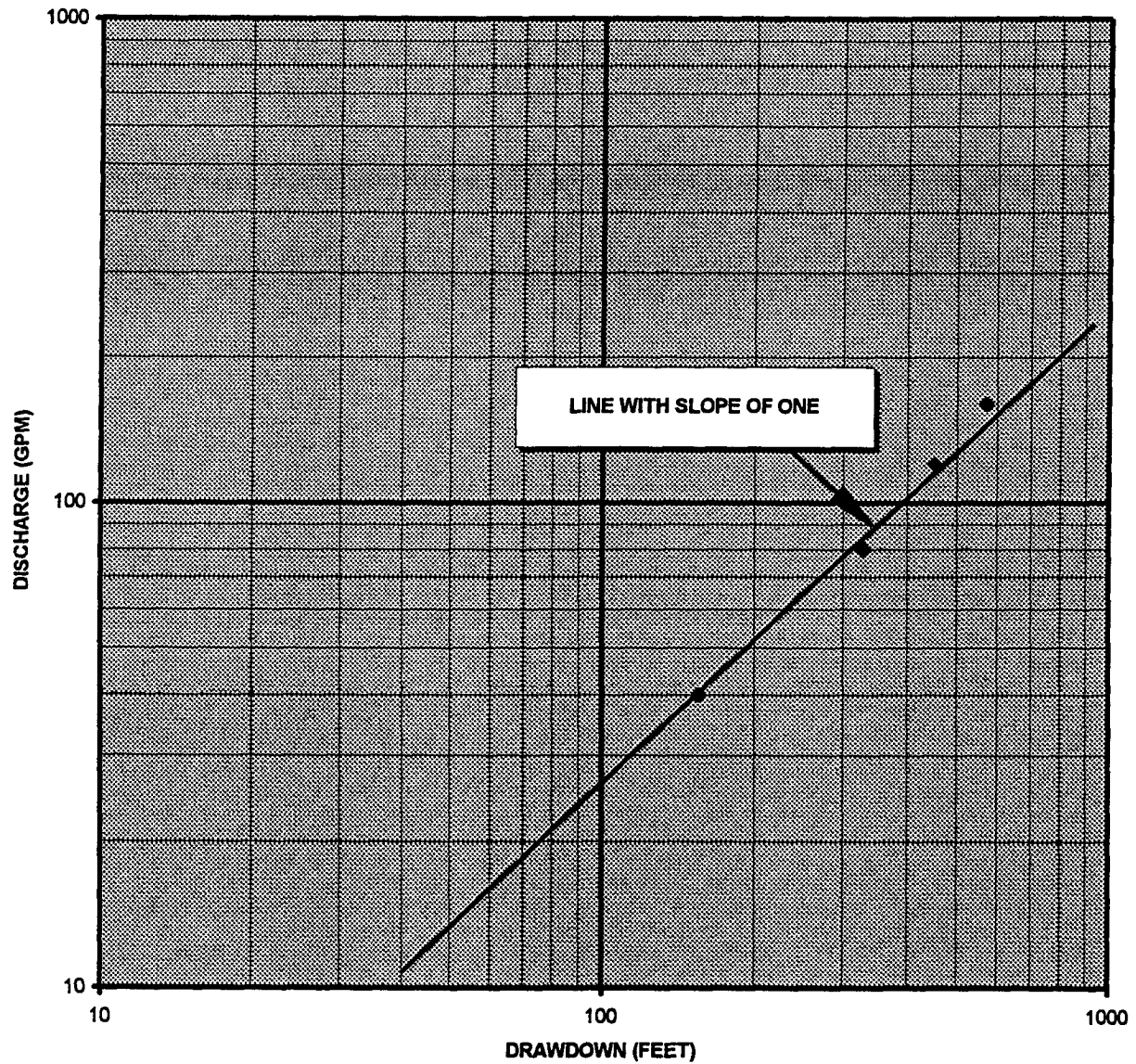


Figure 1

Butte Meade Sanitary Water District
Vale, Well #2
Constant Rate Test
May 7, 1996
(Reference Level = 49 Feet Above Ground Level)

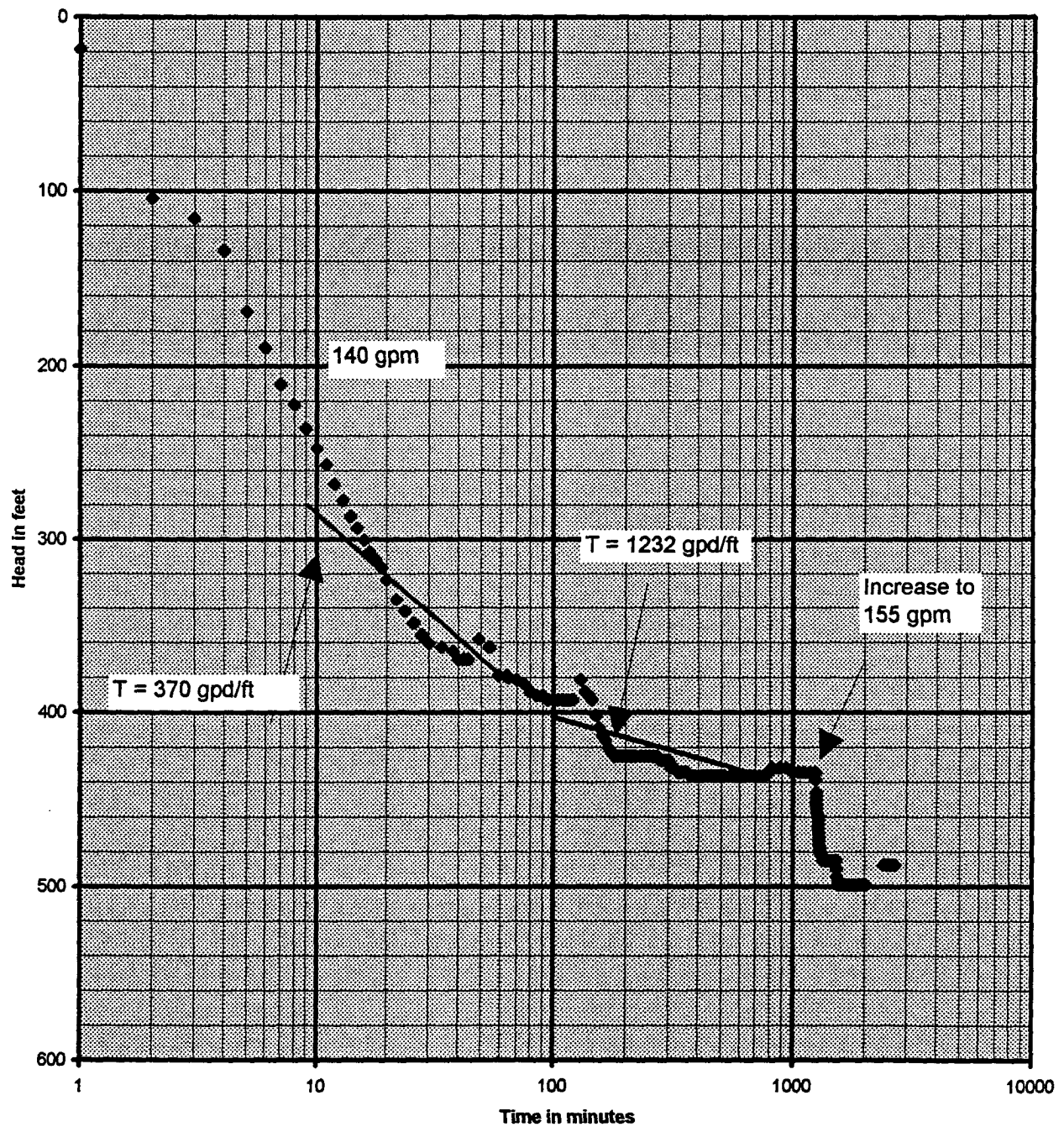
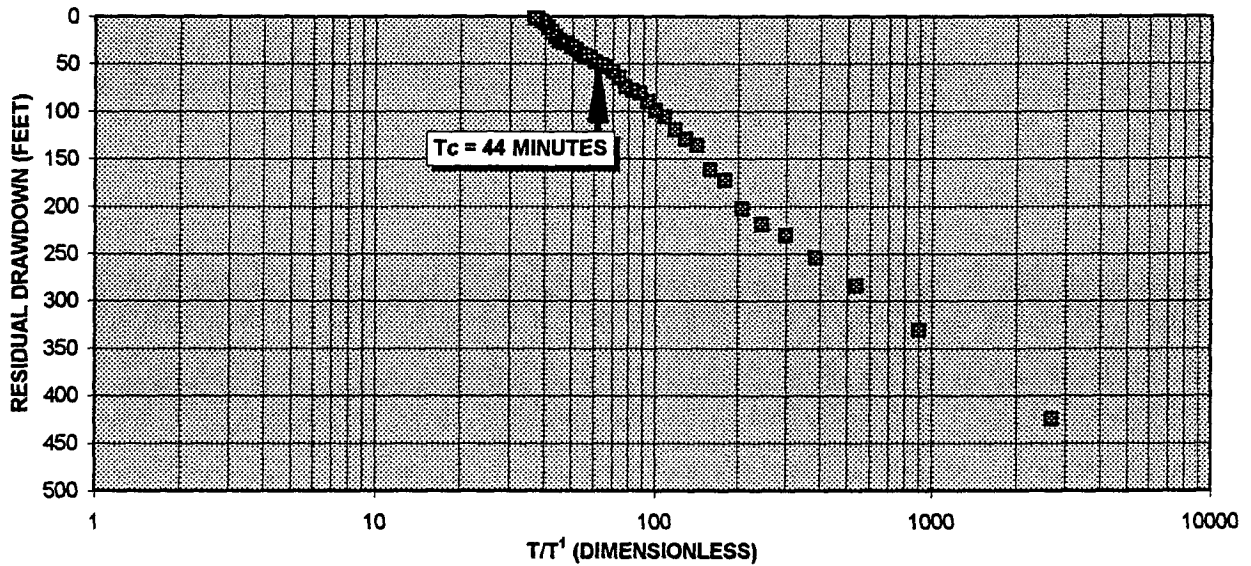


Figure 2

**BUTTE MEADE SANITARY WATER DISTRICT
VALE, WELL #2
RECOVERY FROM CONSTANT DISCHARGE TEST
MAY 7, 1996
(REFERENCE LEVEL = TOP OF CASING)**



**BUTTE MEADE SANITARY WATER DISTRICT
VALE, WELL #2
RECOVERY FROM CONSTANT DISCHARGE TEST
MAY 7, 1996
(REFERENCE LEVEL = 49 FEET ABOVE TOP OF CASING)**

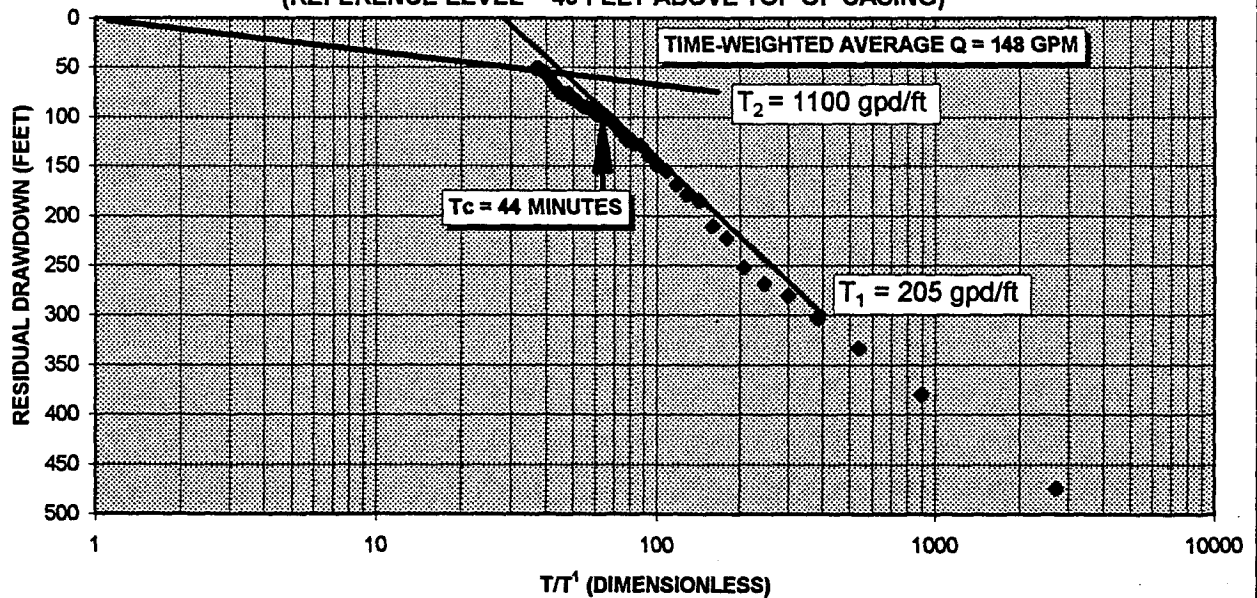
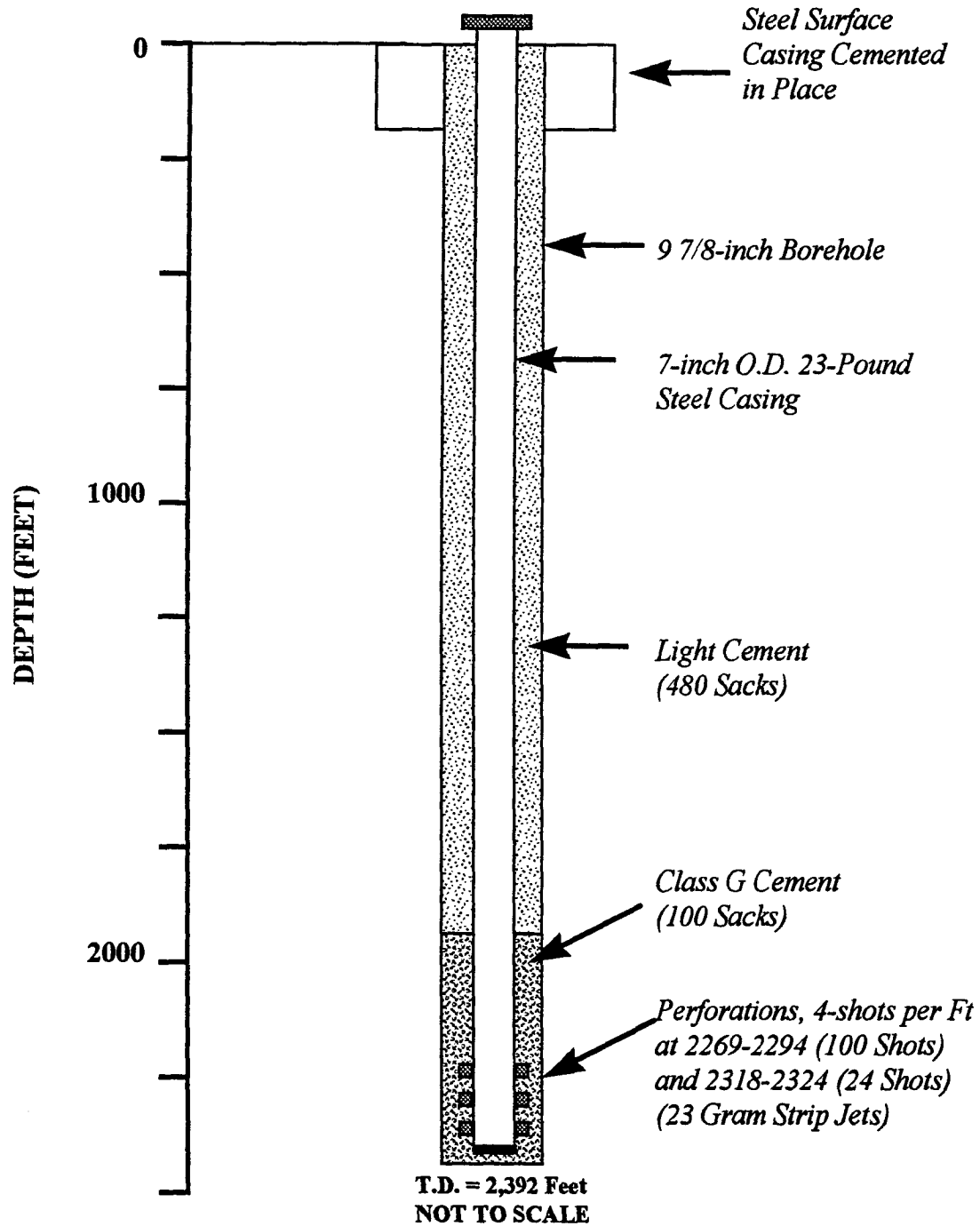


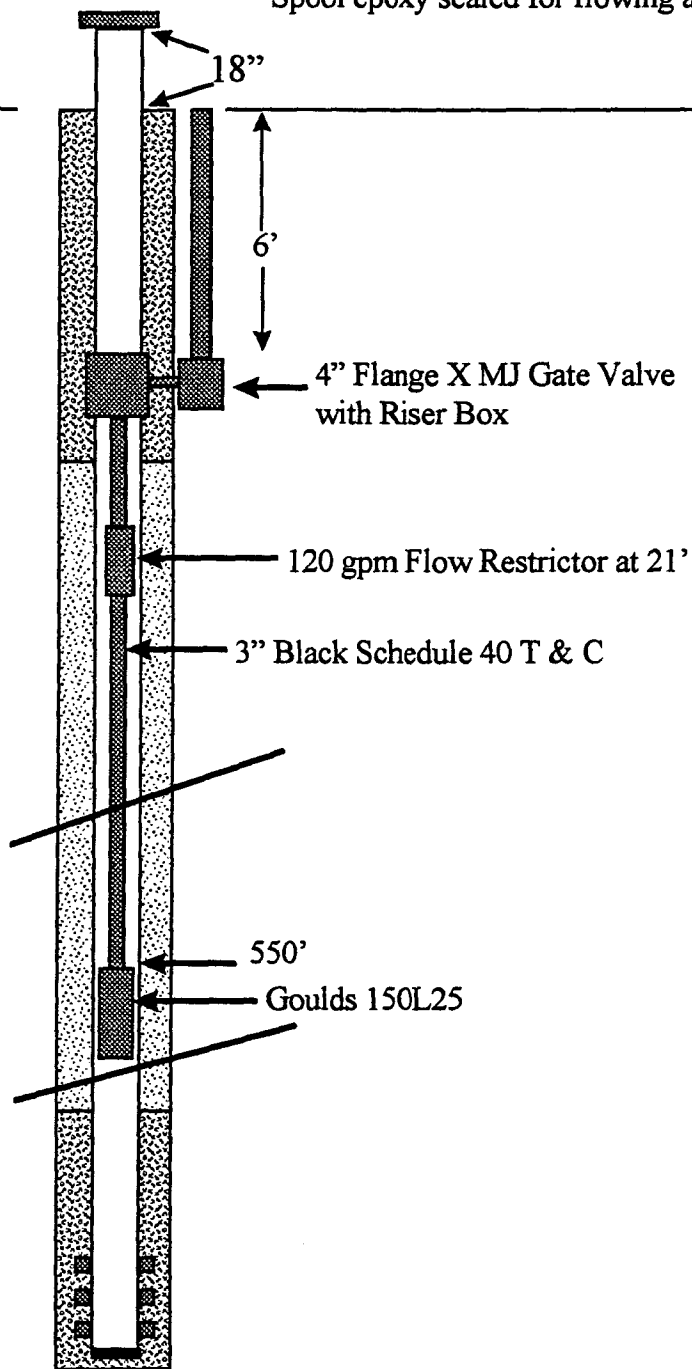
Figure 3

Shut-in pressure = 21.2 psi
(5/15/96)



Shut-in pressure = 21.2 psi
(5/15/96)

Baker Monitor 6.5 PS 6.6 7WBWEO3T3E
Spool epoxy sealed for flowing application



T.D. = 2,392 Feet
NOT TO SCALE

Goulds 60 Hz High Capacity Stainless Steel 6" Submersible Pumps

MODEL

70L, 90L, 150L,
200L, 300L

SPECIFICATIONS

Model	Horsepower	Discharge Connection	Recommended GPM Operating Range	GPM at Best Efficiency	Minimum Well Size	Rotation ^①
70L	3 - 25	3" NPT	25 - 100	70	6"	CCW
90L	5 - 30	3" NPT	40 - 130	90	6"	CCW
150L	5 - 40	3" NPT	50 - 240	150	6"	CCW
200L	7.5 - 40	3" NPT	70 - 310	200	6"	CCW
300L	5 - 40	3" NPT	100 - 450	300	6"	CCW

① Rotation when viewed from pump discharge end.

FEATURES

Powered for Continuous Operation: All ratings are within the working limits of the motor manufacturer. Pump can be operated continuously with no fear of damage to the motor.

Completely Field Serviceable: Easy to install and service. All parts easily dismantled if field service is ever necessary.

Diverse Application: Designed for commercial, municipal and agricultural water needs.

Polished Stainless Steel Casing: Durable in the most corrosive waters.

Bearings: Replaceable fluted NBR bearings allow excellent abrasives handling and wear resistance.

Built-in Rugged Check Valve: Positive sealing, stainless steel check valve assembly incorporated into discharge head.

Bowls: Stainless with pressed in NBR wear rings. 70L and 90L are a flat bowl design. 150L, 200L and 300L are a turbine bowl design.

Impellers: Rugged stainless steel construction resists mineral and algae deposits.

Stainless Steel Shaft Sleeve: Corrosion resistant.

Four-Fluted Shaft Design: Four sided stainless steel shaft eliminates impeller keys and provides positive drive.

Coupling: Heavy duty stainless steel, splined coupling for maximum load-carrying capability.

Suction Strainer: Stainless steel strainer restricts gravel and other debris from entering the pump.

Cable Guard: Stainless steel cable guard surrounds and protects motor leads.

Fasteners: All fasteners are stainless steel.

Franklin Electric Motor: Stainless steel casing and epoxy coated end bells resist corrosion. Water filled design provides a constant supply of lubrication. Hermetically sealed stator assures moisture free windings. Durable Kingsbury type thrust bearing absorbs all thrust. Replaceable motor lead assembly.

SYSTEM COMPONENTS

Pump/Water End:

- 6" Pump with 3" NPT discharge.
- 4" Motor Adapter on 3 and 5 HP models.
- 6" Motor Adapter on 7.5 HP and larger models.

Motor:

- 4" motor required for 3 HP and 5 HP pumps.
- 6" motor required for 7.5 HP and larger pumps.
- Effective February, 1994, 4" and 6" Franklin Electric Motors have motor leads installed at the factory.

Control Box: Required for all single phase motors.

Magnetic Starter: A magnetic starter and heaters* are required for all three phase units.

*Requires 3 ambient compensated (K type) quicktrip heaters.

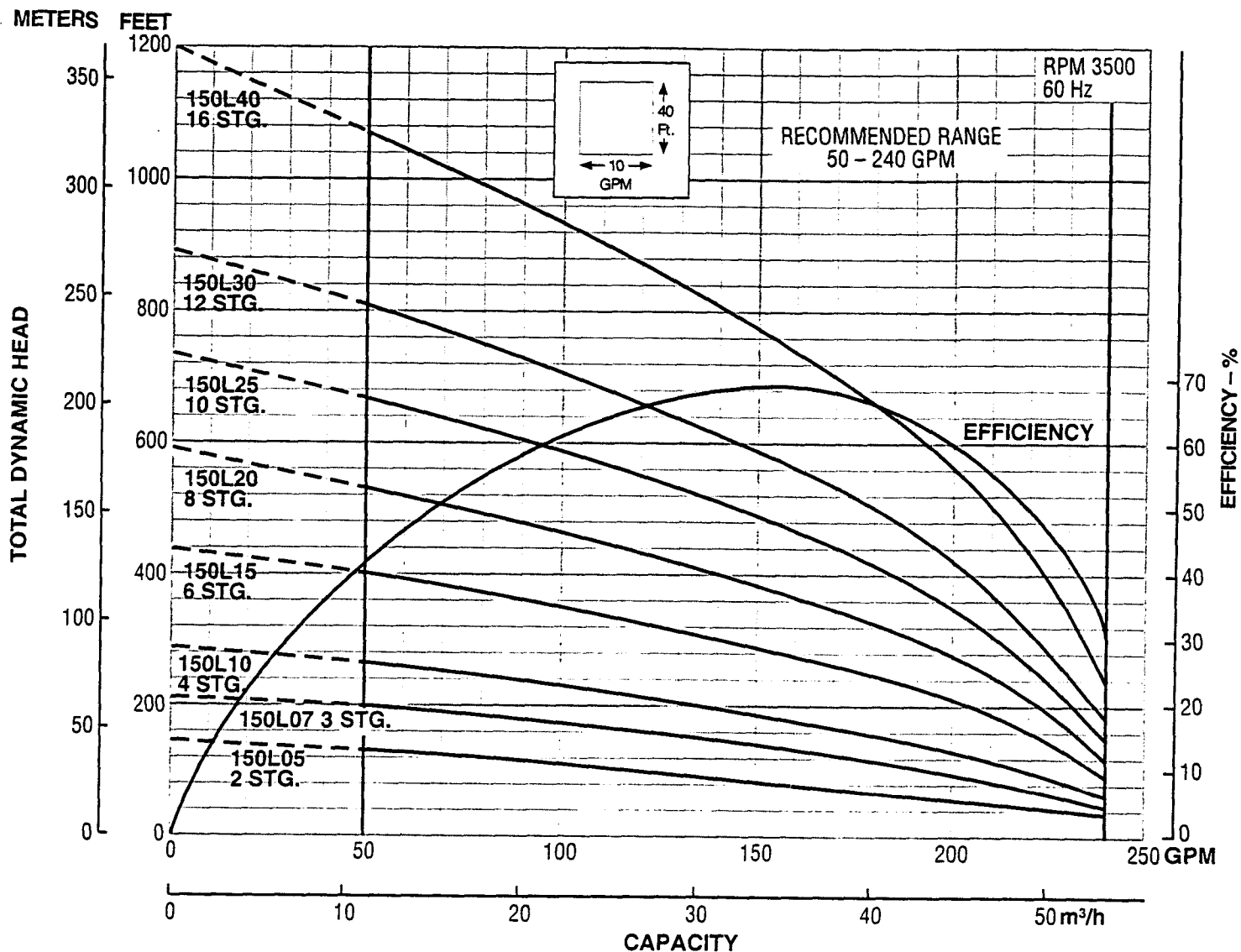
ALL COMPONENTS MUST BE ORDERED SEPARATELY AND ARE PACKAGED SEPARATELY.

ORDER NUMBER CODE

Pump Size/ Gallons per minute at Best Efficiency Point Pump Series	Horsepower Code - HP
70	03 = 3
90	05 = 5
150	07 = 7.5
200	10 = 10
300	15 = 15
	20 = 20
	25 = 25
	30 = 30
	40 = 40

"L" SERIES MATERIALS OF CONSTRUCTION

Part Name	Material
Shaft and Coupling	420, 421 Series SS
Motor Adapter and Discharge Head	304 Series SS
Bearing	NBR
Shaft Sleeves	304 Series SS
Bowl	304 Series SS
Diffuser and Impeller	304 Series SS
Casing	304 Series SS
Fasteners	304 Series SS
Cable Guard	304 Series SS
Suction Strainer	304 Series SS
Casing Nut	316L Powder Metal
Wear Rings	NBR



DIMENSIONS AND WEIGHTS

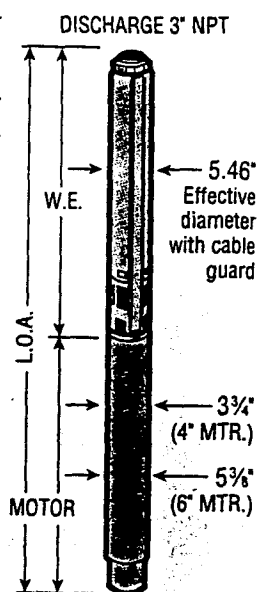
HP Stages	W.E. Order No.	Motor Order No.	PH	Motor Volts	Motor Length	W.E. Length	L.O.A.	Wt. (lbs.)
5	2	150L05	1	230	29.5	28.0	57.5	92
			2	200				
			3	230	23.5	28.0	51.5	92
			4	460				
			5	575				
7.5	3	150L07	1	230	28.0	32.5	60.5	179
			2	200				
			3	230	24.2	32.5	56.7	154
			4	460				
			5	575				
10	4	150L10	1	230	30.6	36.9	67.5	197
			2	200				
			3	230	25.5	36.9	62.4	167
			4	460				
			5	575				

HP Stages	W.E. Order No.	Motor Order No.	PH	Motor Volts	Motor Length	W.E. Length	L.O.A.	Wt. (lbs.)
15	6	150L15	1	230	33.1	45.8	78.9	216
			2	200				
			3	230	28.0	45.8	73.8	190
			4	460				
			5	575				
20	8	150L20	1	230	30.6	54.5	85.1	215
			2	200				
			3	230	30.6	54.5	85.1	215
			4	460				
			5	575				
25	10	150L25	1	230	33.2	63.4	96.6	233
			2	200				
			3	230	33.2	63.4	96.6	233
			4	460				
			5	575				
30	12	150L30	1	230	35.7	72.1	107.8	297
			2	200				
			3	230	35.7	72.1	107.8	297
			4	460				
			5	575				
40	16	150L40	1	230	40.8	89.8	130.6	340
			2	200				
			3	460	40.8	89.8	130.6	340

(All dimensions are in inches and weights in lbs. Do not use for construction purposes.)

*Non-stock motors have a six (6) week lead time.

Water end and motor must be ordered separately and are packaged separately.



Vale Water Improvement Project

Summary of Daily Drilling Reports

Date	Drilling Time	Footage	Deviation Record		Bit Record					Footage
	Hours	Feet	Depth	Deviation	No.	Size	Type	Depth In	Depth Out	Drilled
4/19/96	3.5	0 - 52			1	12 1/4		0	51	51
4/22/96	16.5	51 - 756	120	1/2	2	9 7/8	Blade	51	810	759
			210	1/2	3	9 7/8	FDS	810	1785	975
			330	0						
4/23/96	16	756 - 1160	845	1/2						
4/24/96	22.5	1160 - 1690	1328	1						
4/25/96	9	1690 - 1830			4	9 7/8	533	1785	2133	348
4/26/96	11.75	1830 - 2091								
4/27/96	9	2091 - 2180			5	9 7/8	HP115	2133	2300	167
4/28/96	18.75	2180 - 2303			6	9 7/8	M84F	2300	2399	99
4/29/96	11.5	2303 - 2398	2333	1						

Summary of Well Development and Testing

- 5/3/96 Log & perforate well
Begin airlift/Well development @ 11:40 a.m.

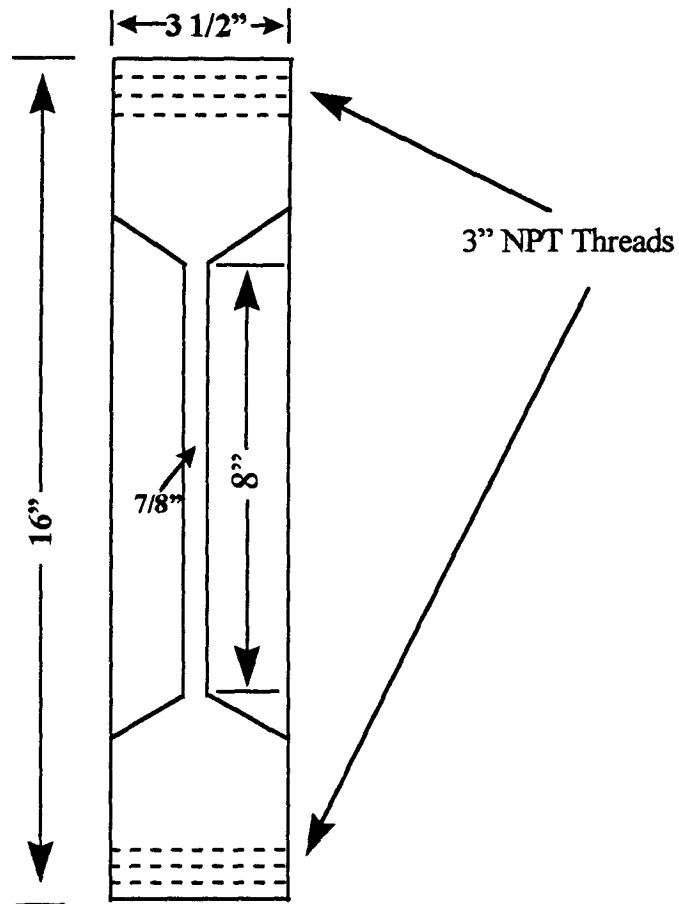
- 5/4/96 Continue well development until 1:40 p.m.
Shut down - Trip pipe from well
Prepare test pump, run test pump, pipe,
cable, airline & transducer in well.
Hook up pump and operate for 6 hours to check
pump & well response - shut down to await Datalogger.

- 5/7/96 Perform step test & recovery
Begin constant rate test

- 5/8/96 Continue constant rate test

- 5/9/96 Shut down constant rate test
Take recovery

VALE WATER IMPROVEMENT PROJECT



NOT TO SCALE

Flow Control Device for
120 GPM

Appendix

A

Vale Water Improvement Project
Pump Test Data
Step Test

Initial time 12:19	Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm	Comments
Pressure 240 psi	0	244	563.64			
	1	225	519.75	43.89	40	
	2	220	508.2	55.44	40	
	3	209	482.79	80.85	40	
	4	203	468.93	94.71	40	
	5	201	464.31	99.33	40	
	6	200	462	101.64	40	
	7	199	459.69	103.95	40	
	8	199	459.69	103.95	40	
	9	199	459.69	103.95	40	
	11	199	459.69	103.95	40	
	13	199	459.69	103.95	40	
	15	201	464.31	99.33	40	
	17	201	464.31	99.33	40	
	19	201	464.31	99.33	40	
	21	201	464.31	99.33	40	
	23	201	464.31	99.33	40	
	25	200	462	101.64	40	
	27	200	462	101.64	40	
	29	200	462	101.64	40	
	31	199	459.69	103.95	40	
	33	199	459.69	103.95	40	
	35	199	459.69	103.95	40	
	37	200	462	101.64	40	
	39	199	459.69	103.95	40	
	41	199	459.69	103.95	40	
	46	198	457.38	106.26	40	
	51	199	459.69	103.95	40	
	56	198	457.38	106.26	40	
	61	198	457.38	106.26	80	
	62	191	441.21	122.43	80	
	63	184	425.04	138.6	80	
	64	180	415.8	147.84	80	
	65	176	406.56	157.08	80	
	66	175	404.25	159.39	80	
	67	171	395.01	168.63	80	
	68	169	390.39	173.25	80	
	69	166	383.46	180.18	80	
	70	165	381.15	182.49	80	
	71	164	378.84	184.8	80	
	72	163	376.53	187.11	80	
	73	160	369.6	194.04	80	
	74	159	367.29	196.35	80	
	75	156	360.36	203.28	80	
	76	156	360.36	203.28	80	
	77	155	358.05	205.59	80	
	78	154	355.74	207.9	80	
	79	153	353.43	210.21	80	
	80	151	348.81	214.83	80	

Vale Water Improvement Project
Pump Test Data
Step Test

Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm	Comments
81	150	346.5	217.14	80	
82	150	346.5	217.14	80	
83	150	346.5	217.14	80	
84	149	344.19	219.45	80	
85	147	339.57	224.07	80	
86	146	337.26	226.38	80	
87	146	337.26	226.38	80	
88	145	334.95	228.69	80	
89	145	334.95	228.69	80	
90	145	334.95	228.69	80	
91	145	334.95	228.69	80	
93	144	332.64	231	80	
95	143	330.33	233.31	80	
97	142	328.02	235.62	80	
99	141	325.71	237.93	80	
101	141	325.71	237.93	80	
103	140	323.4	240.24	80	
105	140	323.4	240.24	80	
107	139	321.09	242.55	80	
109	138	318.78	244.86	80	
111	136	314.16	249.48	80	
113	135	311.85	251.79	80	
115	134	309.54	254.1	80	
117	134	309.54	254.1	80	
119	133	307.23	256.41	80	
121	131	302.61	261.03	80	
122	126	291.06	272.58	80	
123	123	284.13	279.51	120	
124	116	267.96	295.68	120	
125	111	256.41	307.23	120	
126	110	254.1	309.54	120	
127	107	247.17	316.47	120	
128	104	240.24	323.4	120	
129	101	233.31	330.33	120	
130	100	231	332.64	120	
131	98	226.38	337.26	120	
132	96	221.76	341.88	120	
133	95	219.45	344.19	120	
134	94	217.14	346.5	120	
135	93	214.83	348.81	120	
136	92	212.52	351.12	120	
137	90	207.9	355.74	120	
138	89	205.59	358.05	120	
139	87	200.97	362.67	120	
140	86	198.66	364.98	120	
141	85	196.35	367.29	120	
142	85	196.35	367.29	120	
143	84	194.04	369.6	120	
144	83	191.73	371.91	120	

Vale Water Improvement Project
Pump Test Data
Step Test

Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm	Comments
145	81	187.11	376.53	120	
146	81	187.11	376.53	120	
147	80	184.8	378.84	120	
148	80	184.8	378.84	120	
149	80	184.8	378.84	120	
150	80	184.8	378.84	120	
155	79	182.49	381.15	120	
160	74	170.94	392.7	120	
165	73	168.63	395.01	120	
170	74	170.94	392.7	120	
175	71	164.01	399.63	120	
180	70	161.7	401.94	120	
181	69	159.39	404.25	160	
182	64	147.84	415.8	160	
183	56	129.36	434.28	160	
184	50	115.5	448.14	160	
185	46	106.26	457.38	160	
186	45	103.95	459.69	160	
187	43	99.33	464.31	160	
188	40	92.4	471.24	160	
189	39	90.09	473.55	160	
190	38	87.78	475.86	160	
191	36	83.16	480.48	160	
192	35	80.85	482.79	160	
193	34	78.54	485.1	160	
194	32	73.92	489.72	160	
195	31	71.61	492.03	160	
196	30	69.3	494.34	160	
197	30	69.3	494.34	160	
198	30	69.3	494.34	160	
199	26	60.06	503.58	160	
200	20	46.2	517.44	160	
201	19	43.89	519.75	160	
202	19	43.89	519.75	160	
203	19	43.89	519.75	160	
204	16	36.96	526.68	160	Making some
205	16	36.96	526.68	160	fine silt
206	16	36.96	526.68	160	"
207	16	36.96	526.68	160	"
208	16	36.96	526.68	160	"
209	16	36.96	526.68	160	"
211	16	36.96	526.68	160	"
213	16	36.96	526.68	160	"
215	16	36.96	526.68	160	"
217	16	36.96	526.68	160	"
219	16	36.96	526.68	160	"
221	16	36.96	526.68	160	
226	18	41.58	522.06	160	Started making
231	18	41.58	522.06	155	sand

Vale Water Improvement Project
Pump Test Data
Step Test

Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm.	Comments
236	18	41.58	522.06	155	Sand
241	18	41.58	522.06	155	Pump shut down
246	42	97.02	466.62		Start recovery
251	75	173.25	390.39		
256	130	300.3	263.34		
261	135	311.85	251.79		
266	155	358.05	205.59		
271	169	390.39	173.25		
276	190	438.9	124.74		
281	215	496.65	66.99		
286	225	519.75	43.89		
291	229	528.99	34.65		
296	229	528.99	34.65		
301	224	517.44	46.2		
306	228	526.68	36.96		
311	230	531.3	32.34		
316	230	531.3	32.34		
321	232	535.92	27.72		
326	234	540.54	23.1		
331	235	542.85	20.79		
336	236	545.16	18.48		
341	236	545.16	18.48		
351	240	554.4	9.24		
356				140	

Appendix

B

Vale Water Improvement Project
Pump Test Data
Constant Rate

Initial time 6:20 p.m.
Pressure 244 psi

Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm	Comments
0	244	563.64			
1	236	545.16	18.48	140	Adj. down
2	199	459.69	103.95	140	Adj. down
3	194	448.14	115.5	140	Adj. up
4	186	429.66	133.98	140	Adj. up
5	171	395.01	168.63	140	
6	162	374.22	189.42	140	Adj. up
7	153	353.43	210.21	140	
8	148	341.88	221.76	140	Adj. up
9	142	328.02	235.62	140	Adj. up
10	137	316.47	247.17	140	~ a tsp sand, turbid
11	133	307.23	256.41	140	Adj. up
12	128	295.68	267.96	140	Clearing slightly small sand
13	124	286.44	277.2	140	Adj. up
14	120	277.2	286.44	140	
15	117	270.27	293.37	140	
16	114	263.34	300.3	140	
17	111	256.41	307.23	140	
18	109	251.79	311.85	140	Water turbid
19	107	247.17	316.47	140	~ tsp sand/4 gal.
20	104	240.24	323.4	140	more sand gray color
22	99	228.69	334.95	140	
24	96	221.76	341.88	140	
26	93	214.83	348.81	140	
28	90	207.9	355.74	140	
30	88	203.28	360.36	140	lots of sand ~ 1 1/2 cups/5 gal
34	87	200.97	362.67	140	Adj. up
38	86	198.66	364.98	140	Adj. up, Water clearing w/sand
40	84	194.04	369.6	140	Adj. down
42	84	194.04	369.6	140	Adj. up
44	84	194.04	369.6	140	TDS 475 ppm T 29.9°C
49	89	205.59	358.05	140	
54	87	200.97	362.67	140	
59	80	184.8	378.84	140	
64	80	184.8	378.84	140	
70	79	182.49	381.15	140	
75	78	180.18	383.46	140	
80	76	175.56	388.08	140	TDS 480 ppm T 27.7°C
85	75	173.25	390.39	140	
90	75	173.25	390.39	140	
95	74	170.94	392.7	140	
100	74	170.94	392.7	140	
105	74	170.94	392.7	140	
110	74	170.94	392.7	140	
115	74	170.94	392.7	140	
120	74	170.94	392.7	140	
130	79	182.49	381.15	140	
135	76	175.56	388.08	140	

Vale Water Improvement Project
Pump Test Data
Constant Rate

Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm	Comments
140	75	173.25	390.39	140	
145	74	170.94	392.7	140	
150	70	161.7	401.94	140	
155	67	154.77	408.87	140	
160	65	150.15	413.49	140	
165	64	147.84	415.8	140	TDS 480 ppm T 27.4°C
170	62	143.22	420.42	140	
175	61	140.91	422.73	140	
180	60	138.6	425.04	140	
185	60	138.6	425.04	140	
190	60	138.6	425.04	140	
195	60	138.6	425.04	140	
200	60	138.6	425.04	140	
205	60	138.6	425.04	140	
210	60	138.6	425.04	140	
215	60	138.6	425.04	140	
220	60	138.6	425.04	140	
230	60	138.6	425.04	140	
240	60	138.6	425.04	140	Water rose above 35.5" air bubbles raise it up, drops back down & repeats cycle, still at 140 gpm
250	60	138.6	425.04	140	
260	60	138.6	425.04	140	
270	60	138.6	425.04	140	
280	59	136.29	427.35	140	
290	59	136.29	427.35	140	
300	59	136.29	427.35	140	TDS 480 ppm T 28° C
310	57	131.67	431.97	140	
320	57	131.67	431.97	140	
330	56	129.36	434.28	140	
340	56	129.36	434.28	140	
350	56	129.36	434.28	140	
360	56	129.36	434.28	140	
370	55	127.05	436.59	140	
380	55	127.05	436.59	140	
390	55	127.05	436.59	140	
400	55	127.05	436.59	140	
410	55	127.05	436.59	140	
420	55	127.05	436.59	140	
430	55	127.05	436.59	140	
440	55	127.05	436.59	140	
450	55	127.05	436.59	140	
460	55	127.05	436.59	140	
470	55	127.05	436.59	140	
480	55	127.05	436.59	140	
490	55	127.05	436.59	140	
500	55	127.05	436.59	140	
510	55	127.05	436.59	140	
520	55	127.05	436.59	140	
550	55	127.05	436.59	140	
580	55	127.05	436.59	140	

Vale Water Improvement Project
Pump Test Data
Constant Rate

Time Minutes.	Pressure psi.	Head Feet	Drawdown Feet	Rate gpm.	Comments
610	55	127.05	436.59	140	
640	55	127.05	436.59	140	TDS 480 ppm T 28.3° C
670	55	127.05	436.59	140	Gauge quit working
700	55	127.05	436.59	140	(gpm?)
730	55	127.05	436.59	140	
760	55	127.05	436.59	140	
790	56	129.36	434.28	140	Idle gen. back to
820	57	131.67	431.97	140	62 cycles
880	57	131.67	431.97	140	Adj. up
940	57	131.67	431.97	140	
1000	56	129.36	434.28	140	
1060	56	129.36	434.28	140	
1120	56	129.36	434.28	140	Conductivity .96 ms/cm
1180	56	129.36	434.28	140	TDS 480 ppm T 28.7°C
1250	56	129.36	434.28	155	45" monometer
1251	54	124.74	438.9	155	
1252	51	117.81	445.83	155	
1253	50	115.5	448.14	155	
1254	50	115.5	448.14	155	
1255	49	113.19	450.45	155	
1256	49	113.19	450.45	155	
1257	48	110.88	452.76	155	
1258	48	110.88	452.76	155	
1259	47	108.57	455.07	155	
1260	47	108.57	455.07	155	
1261	47	108.57	455.07	155	
1262	46	106.26	457.38	155	
1263	46	106.26	457.38	155	
1264	46	106.26	457.38	155	
1265	46	106.26	457.38	155	
1266	46	106.26	457.38	155	
1267	46	106.26	457.38	155	
1268	46	106.26	457.38	155	
1269	46	106.26	457.38	155	
1270	46	106.26	457.38	155	
1271	45	103.95	459.69	155	Adj. up
1272	45	103.95	459.69	155	
1273	45	103.95	459.69	155	
1274	45	103.95	459.69	155	
1275	45	103.95	459.69	155	
1276	45	103.95	459.69	155	
1277	45	103.95	459.69	155	
1278	45	103.95	459.69	155	
1279	44	101.64	462	155	Adj. up
1280	43	99.33	464.31	155	
1281	43	99.33	464.31	155	
1282	43	99.33	464.31	155	Adj. up
1283	42	97.02	466.62	155	
1284	42	97.02	466.62	155	

Vale Water Improvement Project
Pump Test Data
Constant Rate

Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm	Comments
1285	41	94.71	468.93	155	
1286	40	92.4	471.24	155	
1287	40	92.4	471.24	155	
1288	39	90.09	473.55	155	
1289	38	87.78	475.86	155	
1290	38	87.78	475.86	155	
1300	37	85.47	478.17	155	
1310	36	83.16	480.48	155	
1320	36	83.16	480.48	155	Adj. up
1330	35	80.85	482.79	155	
1340	34	78.54	485.1	155	
1350	34	78.54	485.1	155	
1360	34	78.54	485.1	155	TDS 478 ppm T 29.5° C
1370	34	78.54	485.1	155	Cond. 960
1380	34	78.54	485.1	155	
1390	34	78.54	485.1	155	
1400	34	78.54	485.1	155	
1410	34	78.54	485.1	155	
1420	34	78.54	485.1	155	
1430	34	78.54	485.1	155	
1440	34	78.54	485.1	155	
1450	34	78.54	485.1	155	
1460	34	78.54	485.1	155	
1470	34	78.54	485.1	155	
1480	34	78.54	485.1	155	
1490	34	78.54	485.1	155	
1500	34	78.54	485.1	155	
1510	34	78.54	485.1	155	
1520	34	78.54	485.1	155	
1530	32	73.92	489.72	155	
1540	30	69.3	494.34	155	
1550	29	66.99	496.65	155	
1560	28	64.68	498.96	155	
1570	28	64.68	498.96	155	
1580	28	64.68	498.96	155	
1590	28	64.68	498.96	155	
1600	28	64.68	498.96	155	
1610	28	64.68	498.96	155	
1620	28	64.68	498.96	155	TDS 490 ppm
1630	28	64.68	498.96	155	Temp 23.6° C
1660	28	64.68	498.96	155	
1720	28	64.68	498.96	155	Monometer at 45"
1780	28	64.68	498.96	155	155 gpm
1840	28	64.68	498.96	155	
1900	28	64.68	498.96	155	
1960	28	64.68	498.96	155	
2020	28	64.68	498.96	155	
2395	33	76.23	487.41	155	481.63" Hermit
2440	33	76.23	487.41	155	

Vale Water Improvement Project
Pump Test Data
Constant Rate

Time Minutes	Pressure psi	Head Feet	Drawdown Feet	Rate gpm	Comments
2500	33	76.23	487.41	155	
2560	33	76.23	487.41	155	
2620	33	76.23	487.41	155	
2680	33	76.23	487.41	155	
2686	33	76.23	487.41	155	Last reading
2688	60	138.6	425.04	155	Well recovery
2690	101	233.31	330.33	155	
2692	121	279.51	284.13	155	
2694	134	309.54	254.1	155	
2696	144	332.64	231	155	
2698	149	344.19	219.45	155	
2700	156	360.36	203.28	155	
2702	169	390.39	173.25	155	
2704	174	401.94	161.7	155	
2706	185	427.35	136.29	155	
2708	188	434.28	129.36	155	
2710	192	443.52	120.12	155	
2712	198	457.38	106.26	155	
2714	201	464.31	99.33	155	
2716	205	473.55	90.09	155	
2718	209	482.79	80.85	155	
2720	210	485.1	78.54	155	
2722	212	489.72	73.92	155	
2724	216	498.96	64.68	155	
2726	219	505.89	57.75	155	
2728	221	510.51	53.13	155	
2730	222	512.82	50.82	155	
2732	223	515.13	48.51	155	
2734	225	519.75	43.89	155	
2736	226	522.06	41.58	155	
2738	227	524.37	39.27	155	
2740	229	528.99	34.65	155	
2742	230	531.3	32.34	155	
2744	232	535.92	27.72	155	
2746	232	535.92	27.72	155	
2748	233	538.23	25.41	155	
2750	235	542.85	20.79	155	
2752	237	547.47	16.17	155	
2754	239	552.09	11.55	155	
2756	241	556.71	6.93	155	
2758	242	559.02	4.62	155	
2760	243	561.33	2.31	155	
2762	243	561.33	2.31	155	
2764	244	563.64	0	155	Flowing

Appendix

C

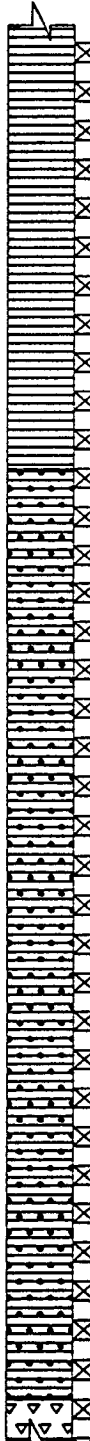
T8N R6E

PROJECT: VALE WATER SYSTEM WELL				GEOLOGIC LOG OF BOREHOLE WELL #1		BORING LOCATION: NE Corner of Vale, SD. (SW1/4 Sec28,T8N,R8E)				
LOCATION: VALE, SOUTH DAKOTA				 1823 WEST MAIN RAPID CITY, SOUTH DAKOTA 57702		GROUND ELEVATION: 2768				
PROJECT #: 7727.01						DATUM: Detail Topographic Map				
DATE STARTED: 22Apr96 COMP.: 2May96						BORING DIAMETER: 12" & 9"				
CONTRACTOR: Weston Engineering Co.						COLLAPSE DEPTH: No Collapse				
DRILL METHOD: Smith Rotary Drill Rig				FILL DEPTH: No Fill						
ELEVATION / DEPTH	WATER	GEOLOGY GRAPHIC	SAMPLE TYPE,#	USCS	DESCRIPTION	NM %	DD (pcf)	LL (%)	PI (%)	PID (ppm)
0		alluvium	S-0	CI	Lean clay, grayish brown, saturated, medium plasticity					
2750		alluvium	S-10	GW-GC	Well graded gravel with clay, brown, fine-medium, subrounded, low plasticity					
		weathered Pierre shale	S-20	CH	weathered Pierre shale, Fat Clay, dark gray, saturated, high plasticity					
		competent Pierre shale	S-30		competent Pierre shale, gray, blocky, silty, non calcareous, soft					
50			S-40							
			S-50							
2700			S-60							
			S-70		gray, blocky, silty, non-calcareous, soft					
			S-80							
100			S-90							
			S-100		gray, blocky, silty to sandy, non-calcareous, soft					
2650			S-110							
			S-120		slightly calcareous, moderately firm					
			S-130		gray, blocky, silty, slightly calcareous, moderately firm					
150			S-140							
			S-150							
2600			S-160							
			S-170							
			S-180							
200			S-190							
			S-200		moderately firm to soft					
2550			S-210							
			S-220		gray, blocky, silty, slightly calcareous, soft					
			S-230							
250			S-240							
			S-250							
2500			S-260							
			S-270							
			S-280		gray, blocky, silty, calcareous, soft					
			S-290							
300			S-300							
			S-310							
2450			S-320							
			S-330							
			S-340							
350			S-350							
			S-360							

SEE ATTACHED KEY FOR ABBREVIATIONS, NOTES & DESCRIPTIONS

T8N 26E

PROJECT: VALE WATER SYSTEM WELL		GEOLOGIC LOG OF BOREHOLE WELL #1		BORING LOCATION: NE Corner of Vale, SD. (SW1/4 Sec28, T8N, R8E)	
LOCATION: VALE, SOUTH DAKOTA				GROUND ELEVATION: 2768	
PROJECT #: 7727.01				DATUM: Detail Topographic Map	
DATE STARTED: 22Apr96 COMP.: 2May96				BORING DIAMETER: 12" & 9"	
CONTRACTOR: Weston Engineering Co.				COLLAPSE DEPTH: No Collapse	
DRILL METHOD: Smith Rotary Drill Rig		1823 WEST MAIN RAPID CITY, SOUTH DAKOTA 57702		FILL DEPTH: No Fill	

ELEVATION / DEPTH	WATER	GEOLOGY GRAPHIC	SAMPLE TYPE, #	USCS	DESCRIPTION	NM %	DD (pcf)	LL (%)	PI (%)	PID (ppm)	
2400			S-370		gray, blocky, fissile, calcareous, soft, occ. pyrite crystals						
			S-380								
			S-390								
400			S-400								
			S-410								
2350			S-420								
			S-430								
			S-440			gray, silty, calcareous, soft					
450			S-450								
			S-460			gray, blocky, slightly fissile, calcareous, moderately firm to soft					
2300			S-470								
			S-480			Niobrara shale with marl, gray spotted white, blocky, calcareous, moderately firm					
500			S-490			marl, gray, blocky, calcareous, slightly fissile, with fossil remains, moderately firm					
			S-500								
2250			S-510								
			S-520			gray, spotted white, blocky to platy, fissile, calcareous, firm					
			S-530								
			S-540								
550		S-550			gray, spotted white, blocky-platy, fissile, calcareous, firm						
		S-560									
2200		S-570									
		S-580									
		S-590			gray, with white spots, blocky to platy, fissile, calcareous, firm						
600		S-600									
		S-610									
2150		S-620									
		S-630									
		S-640									
650		S-650									
		S-660			gray with white spots, blocky to platy, calcareous, firm, pyritic						
2100		S-670									
		S-680									
		S-690									
700		S-700									
		S-710									
2050		Niobrara shale	S-720		fossiliferous						

SEE ATTACHED KEY FOR ABBREVIATIONS, NOTES & DESCRIPTIONS

PROJECT:		GEOLOGIC LOG		BORING LOCATION:						
VALE WATER SYSTEM WELL		OF		NE Corner of						
LOCATION: VALE, SOUTH DAKOTA		BOREHOLE WELL #1		Vale, SD. (SW1/4 Sec28,T8N,R8E)						
PROJECT #: 7727.01				GROUND ELEVATION: 2768						
DATE STARTED: 22Apr96 COMP.: 2May96				DATUM: Detail Topographic Map						
CONTRACTOR: Weston Engineering Co.				BORING DIAMETER: 12" & 9"						
DRILL METHOD: Smith Rotary Drill Rig				COLLAPSE DEPTH: No Collapse						
		FILL DEPTH: No Fill								
ELEVATION / DEPTH	WATER	GEOLOGY GRAPHIC	SAMPLE TYPE, #	USCS	DESCRIPTION	NM %	DD (pcf)	LL (%)	PI (%)	PID (ppm)
750		Niobrara shale	✕ S-730		dark gray, blocky, with occ. spotting, shell fragments, calcareous					
		Carlile shale	✕ S-740		Carlile shale possible Sage Breaks member: Shale is dark gray, blocky, slightly calcareous, moderately firm. Occ. sandstone, fine grained, light gray, friable, calcareous					
2000		Sage Breaks member	✕ S-750		gray-dark gray, blocky, firm, with occ. sandstone, gray, fine grained, well-sorted, calcareous, hard					
			✕ S-760		gray to dark gray with occ. brown, fine grained calcareous, with sandstone					
			✕ S-770		dark gray, blocky, firm					
			✕ S-780							
			✕ S-790							
800			✕ S-800							
			✕ S-810							
1950		Carlile shale	✕ S-820		Carlile shale with sandstone stringers, possible Turner member: shale is dark gray blocky, with pyrite crystals and shell fragments. Sandstone stringers, are fine grained, well-sorted subangular, calcite cemented, and friable.					
		Turner Sandy member	✕ S-830		with light gray bentonite					
			✕ S-840							
850			✕ S-850							
			✕ S-860							
1900			✕ S-870							
			✕ S-880							
			✕ S-890							
900			✕ S-900							
			✕ S-910		with occ. shell fragment					
1850		Carlile Turner Sandy member	✕ S-920		Carlile shale, possible Turner Sandy member, dark gray, blocky-play, fissile, occ. bentonite, pyrite crystals, shell fragments, firm some shale has a blue gray color, waxy hard, with light gray-buff colored cryptocrystalline limestone sucrosic with conchoidal fractures.					
			✕ S-930							
950			✕ S-940							
			✕ S-950							
1800		Carlile limestone	✕ S-960		shale interbedded with limestone: shale is black to dark gray, blocky-play, fissile, hard, shell fragments. Limestone is light gray-buff, cryptocrystalline, sucrosic, with conchoidal fracture.					
		Carlile Lower shale member	✕ S-970		shale-sandstone: Shale is dark gray-black, blocky-play, fissile, silty, calcareous, hard and occ. fine grained, well sorted, calcareous. Sandstone is gray-brown					
			✕ S-980							
1000			✕ S-990							
			✕ S-1000							
1750		Carlile shale limestone sandstone	✕ S-1010		Carlile shale with sandstone and interbedded limestone: Shale is black, blocky-play, fissile, calcareous, hard. Sandstone is fine-grained, well sorted, calcareous, firm. Limestone is white-buff, cryptocrystalline, with conchoidal fracturing.					
			✕ S-1020		with bentonite, light gray-white					
			✕ S-1030		without bentonite					
1050			✕ S-1040							
			✕ S-1050							
1700		Carlile shale and sandstone	✕ S-1060		Carlile shale with sandstone, Possible Lower shale member: Shale is black, blocky-play, silty, calcareous, firm. Sandstone is light gray, fine-grained, well sorted, hard, with occ. limestone fragments.					
			✕ S-1070		with bentonite white-light gray including bentonite					
			✕ S-1080							
			✕ S-1090							

SEE ATTACHED KEY FOR ABBREVIATIONS, NOTES & DESCRIPTIONS

T8N R6E

PROJECT:				GEOLOGIC LOG		BORING LOCATION: NE Corner of					
VALE WATER SYSTEM WELL				OF		Vale, SD. (SW1/4 Sec28, T8N, R8E)					
LOCATION: VALE, SOUTH DAKOTA				BOREHOLE WELL #1		GROUND ELEVATION: 2768					
PROJECT #: 7727.01						DATUM: Detail Topographic Map					
DATE STARTED: 22Apr96 COMP.: 2May96						BORING DIAMETER: 12" & 9"					
CONTRACTOR: Weston Engineering Co.						COLLAPSE DEPTH: No Collapse					
DRILL METHOD: Smith Rotary Drill Rig						FILL DEPTH: No Fill					
ELEVATION / DEPTH	WATER	GEOLOGY GRAPHIC	SAMPLE TYPE, #	USCS	DESCRIPTION	NM %	DD (pcf)	LL (%)	PI (%)	PID (ppm)	
1100		Greenhorn limestone	S-1100		Greenhorn shale with limestone, light gray-buff, cryptocrystalline, conchoidal fracture, hard						
1650			S-1110								
			S-1120								
			S-1130								
			S-1140								
1150		Greenhorn shale	S-1150		Greenhorn shale interbedded with limestone and sand concretions: Shale is dark gray-black, blocky-plate, fissile, calcareous, hard. Limestone is light gray-buff, cryptocrystalline, with conchoidal fracture, hard. Sandstone is probably from sand concretions, light gray, fine-grained, well sorted, calcareous, hard, some lamination of the shale						
1600			S-1160		with occ. pyrite crystals						
			S-1170								
			S-1180								
			S-1190								
1200			S-1190								
			S-1200								
1550			S-1210								
			S-1220								
			S-1230								
		Greenhorn shale	S-1240		Greenhorn shale with fossil shell fragments						
1250		Greenhorn shale	S-1250		Greenhorn shale, gray-black, blocky-plate, calcareous, fissile, firm-hard, occ. limestone and sandstone including shell fragments						
1500			S-1260		occ. light gray bentonite						
			S-1270		with some lamination of the dark gray shale						
			S-1280								
			S-1290								
1300			S-1300								
			S-1310								
1450			S-1320								
			S-1330								
		Belle Fourche Shale	S-1340		Belle Fourche shale, black, blocky-plate, slightly calcareous, fissile, hard, with occ. shell fragments						
1350			S-1350		with some bentonite						
			S-1360		no bentonite						
1400			S-1370								
			S-1380								
			S-1390		black-dark gray, blocky-plate, fissile, slightly calcareous, hard						
1400		Belle Fourche shale	S-1400		Belle Fourche shale with occ. shell fragment						
			S-1410								
1350			S-1420		with occ. mineral deposit						
			S-1430								
		Belle Fourche shale	S-1440		Belle Fourche shale, black-gray, blocky-plate, fissile, hard						
1450			S-1450								

SEE ATTACHED KEY FOR ABBREVIATIONS, NOTES & DESCRIPTIONS

T8N R8E

PROJECT: VALE WATER SYSTEM WELL		GEOLOGIC LOG OF BOREHOLE WELL #1		BORING LOCATION: NE Corner of Vale, SD. (SW1/4 Sec28, T8N, R8E)	
LOCATION: VALE, SOUTH DAKOTA		 1823 WEST MAIN RAPID CITY, SOUTH DAKOTA 57702		GROUND ELEVATION: 2768	
PROJECT #: 7727.01				DATUM: Detail Topographic Map	
DATE STARTED: 22Apr96 COMP.: 2May96				BORING DIAMETER: 12" & 9"	
CONTRACTOR: Weston Engineering Co.				COLLAPSE DEPTH: No Collapse	
DRILL METHOD: Smith Rotary Drill Rig				FILL DEPTH: No Fill	

ELEVATION / DEPTH	WATER	GEOLOGY GRAPHIC	SAMPLE TYPE, #	USCS	DESCRIPTION	NM %	DD (pcf)	LL (%)	PI (%)	PID (ppm)	
1300			S-1460		black-dark gray, blocky-platy, fissile, slightly calcareous, firm-hard						
			S-1470								
			S-1480								
			S-1490								
1500			S-1500								
			S-1510								
1250			S-1520								
			Belle Fourche Shale	S-1530		Belle Fourche shale with shell fragments					
			Belle Fourche Shale	S-1540							
1550			Belle Fourche shale	S-1550		Belle Fourche shale, dark gray-black, blocky to platy, fissile, with occ. limy concretions, firm-hard platy					
			S-1560								
1200		Belle Fourche shale	S-1570		Belle Fourche shale occ. shell fragments blocky-platy, hard						
			S-1580								
			S-1590								
1600			S-1600								
		Mowry shale	S-1610								
1150			S-1620		Mowry shale (possible contact), dark gray to black, blocky to platy, fissile, hard						
			S-1630								
			S-1640								
1650			S-1650								
			S-1660								
1100			S-1670								
			S-1680								
			S-1690								
1700		Skull Creek shale	S-1700								
			S-1710								
1050			S-1720		dark gray-black, blocky-platy, fissile, hard with occ. light gray to gray, silty shale layers with occ. siltstone						
			S-1730								
			S-1740								
1750			S-1750								
			S-1760								
1000			S-1770								
			S-1780								
			S-1790								
1800		Skull Creek shale	S-1800								
			S-1810								
950			S-1820		Skull Creek shale with occ. shell fragments						

SEE ATTACHED KEY FOR ABBREVIATIONS, NOTES & DESCRIPTIONS

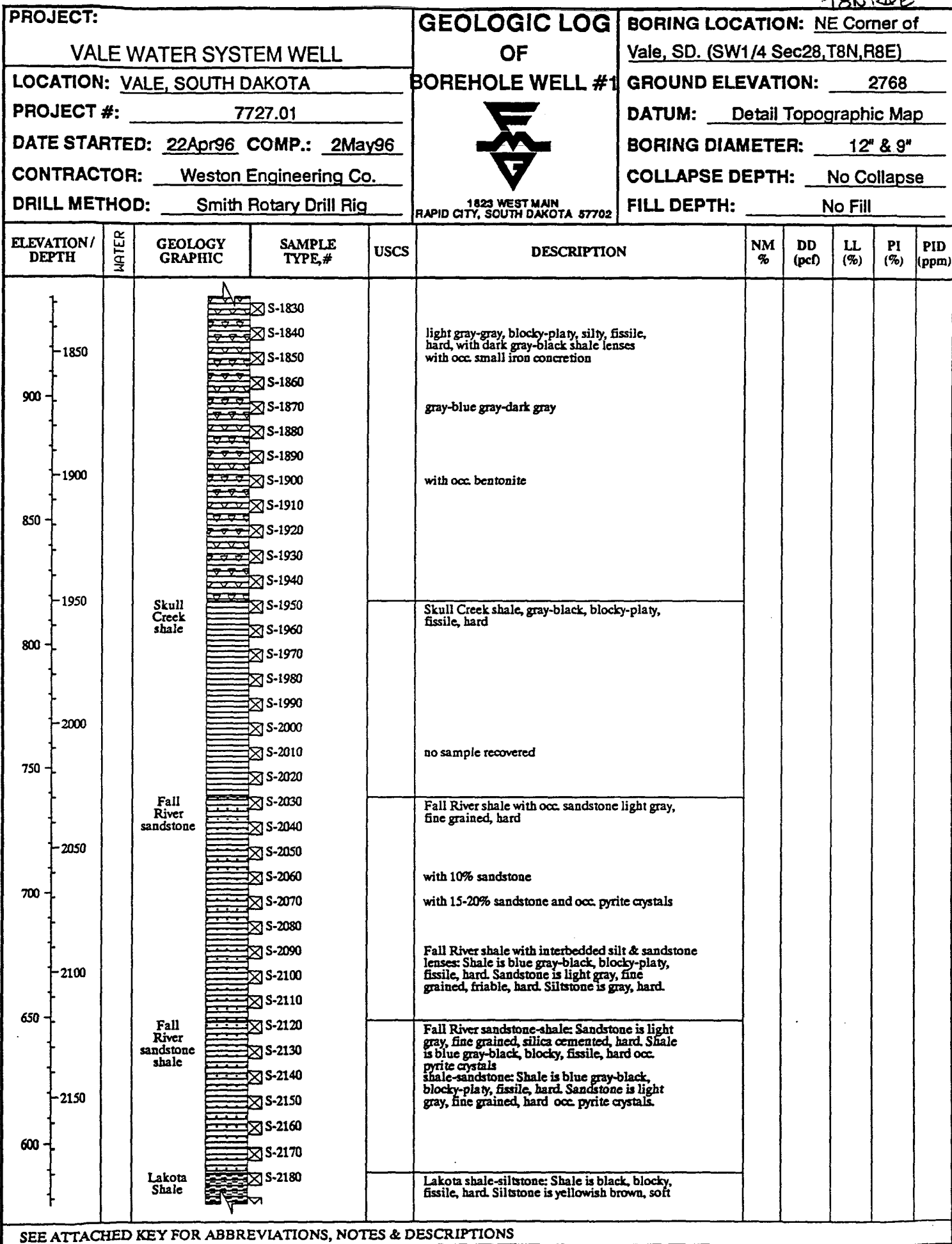


FIGURE 1 sheet 6 of 7

T8N R8E

PROJECT: VALE WATER SYSTEM WELL		GEOLOGIC LOG OF 		BORING LOCATION: NE Corner of Vale, SD. (SW1/4 Sec28, T8N, R8E)					
LOCATION: VALE, SOUTH DAKOTA		BOREHOLE WELL #1		GROUND ELEVATION: 2768					
PROJECT #: 7727.01		1823 WEST MAIN RAPID CITY, SOUTH DAKOTA 57702		DATUM: Detail Topographic Map					
DATE STARTED: 22Apr96 COMP.: 2May96				BORING DIAMETER: 12" & 9"					
CONTRACTOR: Weston Engineering Co.				COLLAPSE DEPTH: No Collapse					
DRILL METHOD: Smith Rotary Drill Rig				FILL DEPTH: No Fill					

ELEVATION/ DEPTH	WATER	GEOLOGY GRAPHIC	SAMPLE TYPE, #	USCS	DESCRIPTION	NM %	DD (pcf)	LL (%)	PI (%)	PID (ppm)
2200		Lakota siltstone sandstone	S-2190		shale-siltstone but the siltstone is light gray					
			S-2200		Lakota siltstone-sandstone with thin layers of shale: Siltstone is light gray, soft. Sandstone is light gray, fine grained, friable, shale, black, blocky, fissile, hard					
550			S-2210							
			S-2220							
			S-2230		with occ. light gray clay lense					
		Lakota shale sandstone	S-2240							
2250			S-2250		Lakota shale-sandstone: Shale is black, blocky-play, fissile, hard, with occ. pyrite crystals. Sandstone is light gray-brownish gray, fine-coarse grained, friable-hard, with occ. siltstone					
			S-2260							
500			S-2270							
			S-2280		with light gray bentonite					
		Lakota sandstone siltstone	S-2290							
2300			S-2300		Lakota sandstone with siltstone and occ. shale: Sandstone is light gray-brown, fine-coarse, subangular-subrounded, friable.					
		Lakota shale sandstone	S-2310							
450			S-2320		Lakota shale with sandstone and occ. siltstone: Shale is black, blocky, fissile, hard. Sandstone is gray-brown, fine-coarse, subangular-subrounded, friable					
			S-2330							
		Lakota shale sandstone	S-2340		Lakota shale with bentonite and sandstone: Shale is black, blocky-play, fissile, hard; bentonite, light gray, soft. Sandstone is gray-brown, fine-coarse, subrounded, friable.					
2350			S-2350							
		Morrison Fm contact Morrison shale sandstone	S-2360		Lakota sandstone with shale and siltstone, occ. bentonite. Sandstone is light gray, fine-medium, friable. Shale is black, blocky, fissile, hard. Siltstone is gray, soft, occ. bentonite and pyrite crystals.					
400			S-2370							
			S-2380		Morrison shale and sandstone: Shale is greenish gray-black, blocky, fissile, soft-hard, greenish gray looks bentonitic. Sandstone, light gray-brown, fine-coarse, subangular-subrounded, friable.					
			S-2390							
2400			S-2400		Morrison shale with bentonite and sandstone: Shale is dark gray-black, blocky-play, fissile, hard. Bentonite is greenish gray, soft-firm. Sandstone, gray-brown, fine-coarse, friable. no sample recovered, end of hole at 2400 feet.					
350										
2450										
300										
2500										
250										
2550										

SEE ATTACHED KEY FOR ABBREVIATIONS, NOTES & DESCRIPTIONS

KEY TO SYMBOLS

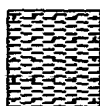
Symbol Description

Symbol Description

Strata symbols



Low plasticity
clay



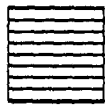
Siltstone with sandstone



Well graded gravel
with clay



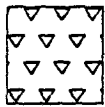
High plasticity
clay



Shale



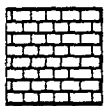
Marl



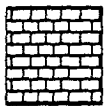
Shell
fragments



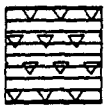
Shale with Sandstone
and limestone



Limestone



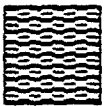
Shale with Limestone



Shale with shell fragments



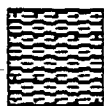
Sandstone with Shale



Shale with siltstone

KEY TO SYMBOLS

Symbol Description



sandstone with shale and siltstone

Misc. Symbols



Boring continues

Soil Samplers



Bulk Sample

Notes:

1. The exploratory borings were drilled on the dates presented on the boring logs. Please refer to the attached Soils Classification System Chart for more detailed explanations of the soils and their properties.
2. The Geologic Logs of the Boreholes and related information depict only the conditions and materials encountered at the specific boring location and at the particular time designated on the Logs. Soil conditions at other locations will likely vary from those indicated at each specific boring or sample location. The given depths of material changes & the sample depths shown are approximate. Variations may occur.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. The numbers adjacent to the SPT sample symbols are the blows/interval and represent the number of blows required to drive the split spoon sampler the given distance into the soil with a 140 Lb. hammer that drops 30 in. The "N" value for each given SPT is the number of blows required to drive the sampler into the last 12 inches of soil.
5. The Results of some tests conducted on samples recovered are reported on the Borehole Logs. Abbreviations used are:
 - NM = Natural Moisture Content of the Soil (in percent).
 - DD = Dry Density of the Soil (in Pounds per Cubic Foot).
 - LL = Atterberg Liquid Limit of the Soil (in percent).
 - PI = Atterberg Plasticity Index of the soil (in percent)
 - PID = Photolionization Detector Readings of Total Volatile Hydrocarbons in the Soil (in Parts per Million-ppm).



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

August 14, 1995

Butte-Meade Sanitary Water District
Dale Knutson
PO Box 5
Newell SD 57760

Dear Mr. Knutson:

The application for the Butte-Meade Sanitary Water District has been received. The filing fee for this application is \$250.00.

If you have any questions, please contact me or Eric Gronlund.

Sincerely,

Karen Schlaak

Karen Schlaak
Environmental Scientist
605773-3352

REPORT ON WATER PERMIT APPLICATION NO. 1629-1
for Butte-Meade Sanitary Water District
September 8, 1995

Application No. 1629-1 proposes to appropriate 0.23 cfs (104 gpm) by increasing the diversion rate authorized by Water Right No. 950-1. Water Right No. 950-1 appropriates 0.10 cfs (45 gpm) from one well located in the SW 1/4 SW 1/4 of section 28, T8N R6E in Butte County. This application requests to develop a replacement well for the well authorized by Water Right No. 950-1. This proposed well, located in the same area as the existing well, will be approximately 2300 feet deep and this application also requests an increase in the water appropriation from 0.10 cfs to 0.33 cfs. The water will be used as a second supply for the Butte-Meade Sanitary Water District which serves users in Butte and Meade Counties.

AQUIFER - INYAN KARA (INKR)

The Inyan Kara is an assemblage of sandstone, siltstone and shale made up of in descending order the Fall River, Fuson and Lakota Formations. The aquifer is confined and under artesian conditions and is approximately 200 feet thick in this area. The aquifer underlies 1.43 million acres and contains an estimated 21.46 million acre feet of recoverable water in storage in Butte County (Allen, 1984).

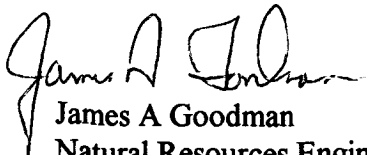
The Water Rights Program does not monitor any observation wells completed into the Inyan Kara aquifer in the immediate area. The closest observation well is MD-89A is located about 12 miles southeast of this application. The water level record indicates the aquifer is capable of sustaining additional withdrawals (Water Rights, 1995).

REVIEW OF EXISTING WATER PERMITS/RIGHTS

There are no other existing water permits/rights using the Inyan Kara as a water source in this area. Interference is not expected to be a concern. There are many domestic wells in the area south and west of this application which use the Inyan Kara as a water supply.

CONCLUSIONS

1. Water is available from the Inyan Kara.
2. The aquifer is confined and under artesian conditions. Pumping will create drawdown. This is not expected to adversely effect any other users in the area.
3. The well authorized by this application must be constructed in accordance with SD Well Construction Standards.
4. Since this application also includes the replacement of an existing well drilled under Water Right 950-1, upon completion of the new well the old well must be plugged pursuant to the 74:02:04:67 of the SD Well Construction Standards.


James A Goodman
Natural Resources Engineer

BIBLIOGRAPHY

Allen, J.C., D.L. Iles, A.K. Petres, 1984, Analysis of Groundwater and Streamflow Data Western Dakotas Region of South Dakota, for US Army Corps of Engineers, SD DENR, SDGS, Vermillion, SD, 57069.

Water Rights, 1995, Unpublished Observation Well Data for Meade County, SD DENR, Division of Environmental Services, Water Rights Program, Pierre, SD, 57501.

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 1629-1, Butte-Meade Sanitary Water District**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 1629-1, Butte-Meade Sanitary Water District, %Dale Knutson, P.O. Box 5, Newell, SD 57760

The Chief Engineer is recommending APPROVAL of Application No. 1629-1 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) in the public interest with the following qualifications:

1. 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.
2. The well authorized by Permit No. 1629-1 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 (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:28.
3. Upon completion of the new well, the old well originally authorized by Permit No. 950-1 must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04.
4. The well approved under this Permit shall be valved and the flow reduced to the amount needed or to a minimum when not being used. The well shall also be equipped with a pressure gauge and a record kept of any pressure fluctuations. Such records shall be available to the Chief Engineer upon request. If this well is abandoned or the Permit cancelled, the well must be plugged in accordance with the Water Management Board Rules, Chapter 74:02:04.

See report on application for additional information.



JOHN HATCH, Chief Engineer
September 29, 1995



**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.

October 5, 1995

Dale Knutson
Butte-Meade Sanitary Water District
P.O. Box 5
Newell, SD 57760

Dear Mr. Knutson:

Water Permit Application No. 1629-1 for rural water system 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 Publishers of the Butte County Valley Irrigator printed at Newell, SD (Ph # 605-456-2585) and Meade County Times Tribune printed at Sturgis, SD (Ph # 605-347-2503). 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 paper 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.



October 5, 1995

Butte County Valley Irrigator
Box 67
Newell, SD 57760

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 1629-1 to be published twice. Please publish the first notice on October 11, 1995, 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 Butte-Meade Sanitary Water district, %Dale Knutson, P.O. Box 5, Newell, SD 57760 (Ph # 605-456-2288).

A copy of BOTH publications must be SENT to the WATER RIGHTS PROGRAM. 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 / KS

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

TO: Eric Gronlund
Water Rights Program
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

October 5, 1995

Meade County Times Tribune
Box 69
Sturgis, SD 57785-0069

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 1629-1 to be published twice. Please publish the first notice on October 11, 1995, 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 Butte-Meade Sanitary Water District, %Dale Knutson, P.O. Box 5, Newell, SD 57760 (Ph # 605-456-2288).

A copy of BOTH publications must be SENT to the WATER RIGHTS PROGRAM. 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
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

TO: Eric Gronlund
Water Rights Program
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

Instruction to Newspaper - Publish first Notice on October 11, 1995 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 1629-1 to Appropriate Water

Notice is given that the Butte-Meade Sanitary Water District, P.O. Box 5, Newell, SD 57760 has filed an application for a water permit to appropriate 0.23 cubic feet of water per second (cfs) by increasing the diversion rate authorized by Water Right No. 950-1. Water Right No. 950-1 appropriates 0.10 cfs from one well located in the SW 1/4 SW 1/4 Section 28-T8N-R6E. This application requests to develop a replacement well for the well authorized by Water Right No. 950-1. The proposed well, located in the same area as the existing well, will be approximately 2300 feet deep (Inyan Kara Formation) and proposes to increase the water appropriation from 0.10 cfs to 0.33 cfs. The water will be used as a second supply for the Butte-Meade Sanitary Water District which serves the towns of Nisland, Vale and Newell and rural users in Butte and Meade Counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. APPROVAL because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the chief engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and chief engineer. The applicant must file a petition if contesting the chief engineer's recommendation. The Chief Engineer's address is "Water Rights Program, 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 October 30, 1995.

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. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

Faye D. Pate

Cost of Printing: 40.34



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. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

Published Wed., Oct. 11, 1995
and Wed., Oct. 18, 1995
Butte Co. Valley Irrigator
Newell, South Dakota 57760

Notice is given that the Butte-Meadow Sanitary Water District, P.O. Box 5, Newell, SD 57760 has filed an application for a water permit to appropriate 0.23 cubic feet of water per second (cfs) by increasing the diversion rate authorized by Water Right No. 950-1. Water Right No. 950-1 appropriates 0.10 cfs from one well located in the SW 1/4 SW1/4 Section 28-T8N-R6E. This application requests to develop a replacement well for the well authorized by Water

Jay D. Pate
(Signature)

Accountant
(Title)

(Date Signed)



PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
) SS
 County of Meade)

I, Faye D. Pate

certify that the attached printed Notice was
 taken from the Meade County Times-Tribune

printed and published in A Sturgis

County of Meade and State of

South Dakota. The notice was published in
 the newspaper on the following two dates:

October 18, 1995

October 11, 1995

Cost of Printing: 28.74

Faye D. Pate
 (Signature)

Accountant
 (Title)

(Date Signed)

Water application

NOTICE OF APPLICATION NO. 1629-1
to Appropriate Water

Notice is given that the Butte-Meade Sanitary Water District, P.O. Box 5, Newell, SD 57760 has filed an application for a water permit to appropriate 0.23 cubic feet of water per second (cfs) by increasing the diversion rate authorized by Water Right No. 950-1. Water Right No. 950-1 appropriates 0.10 cfs from one well located in the SW 1/4 SW 1/4 Section 28-T8N-R6E. This application requests to develop a replacement well for the well authorized by Water Right No. 950-1. The proposed well, located in the same area as the existing well, will be approximately 2300 feet deep (Inyan Kara Formation) and proposes to increase the water appropriation from 0.10 cfs to .33 cfs. The water will be used as a second supply for the Butte-Meade Sanitary Water District which serves the towns of Nisland, Vale and Newell and rural users in Butte and Meade Counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. APPROVAL because 1) unappropriated water is available, 2) existing rights will not be unlawfully

impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the chief engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the chief engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and chief engineer. The applicant must file a petition if contesting the chief engineer's recommendation. The Chief Engineer's address is

"Water Rights Program, 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 October 30, 1995.

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. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

Publ Oct. 11 and 18, 1995
Meade County Times-Tribune



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

NOV 28 1995

Dale Knutson
Butte-Meade Sanitary Water District
P.O. Box 5
Newell, SD 57760

Dear Mr. Knutson:

Enclosed is Water Permit No. 1629-1 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.

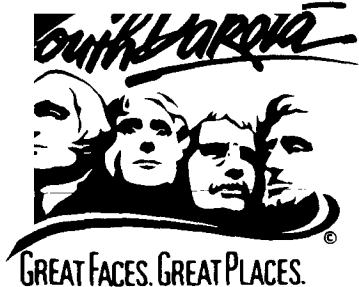
Very truly yours, -

JOHN HATCH, Chief Engineer
Water Rights Program
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.



Weston Engineering Inc.

DEPARTMENT OF HEALTH

LABORATORY SERVICES

500 East Capitol Avenue
Pierre, South Dakota 57501-5093
(605) 773-3368 FAX: (605) 773-6129

Submitter copy to:

BUTTE-MEADE RWS-0223
PO BOX 5
NEWELL, SD 57760-0005

* Page 1 of 2*

Date: 6/13/96



Spec #: E96IN002600

Subm #:

Lab: ENV CHEMISTRY

Tel #: (605) 773-3368

Source

BUTTE-MEADE RWS

Date Rcvd: 5/13/96

Time Rcvd: 0800

Date Coll: 5/9/96

Time Coll: 1500

County: BUTTE

Spec Type: WATER

Coll Site: WELL

Coll By: DALE KNUTSON

Date Built: 5/3/96

Source Sampled: VALE WELL (NEW)

Source: Well

Tap Location: PUMP DISCHARGE

Telephone Numbe* (605) 456-2288

Type of Sample: Raw

Type of Supply: Raw

Well Depth: 2370'

Sampling Loc: PUMP DISCHARGE

Supply Type: PUBLIC

Well Depth: 2370

Sample Purpose: ROUTINE

Final Results

Nitrate	0.1 mg/L
Fluoride	0.57 mg/L
Chloride	8.0 mg/L
Iron, Total	2.73 mg/L
Manganese	0.03 mg/L
Sulfate	199 mg/L
SOLIDS, TOTAL DISS.	512 mg/L
Ph	8.38 pH UNITS
Alkalinity-M	197 mg/L
Alkalinity-P	0 mg/L
Bicarbonate	246 mg/L
Carbonate	0 mg/L
Conductivity	816 umho/cm
Calcium	6.9 mg/L
Magnesium	2.0 mg/L
Hardness (calc)	25.5 mg/L
Langlier Index	-0.04
Sodium	166.2 mg/L
Potassium	3.8 mg/L

(continued)



**DEPARTMENT
OF HEALTH**

LABORATORY SERVICES

500 East Capitol Avenue
Pierre, South Dakota 57501-5093
(605) 773-3368 FAX: (605) 773-6129

Submitter copy to:

* Page 2 of 2*

Date: 6/13/96

BUTTE-MEADE RWS-0223
PO BOX 5
NEWELL, SD 57760-0005

Spec #: E96IN002600

Subm #:

Lab: ENV CHEMISTRY

Tel #: (605) 773-3368

Source

BUTTE-MEADE RWS

Specimen Comments:

Percent error 3.1/3.7



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

October 9, 1997

NOTICE

TO: Dale Knutson, Manager
Butte-Meade Sanitary Water District
PO Box 5
Newell, SD 57760

FROM: John Hatch, Chief Engineer
Water Rights Program
(605) 773-3352

SUBJECT: Schedule Hearing on Amendment to Qualification on Water Permit No. 1629-1

Butte-Meade Sanitary Water District holds Water Permit No. 1629-1 appropriating 0.23 cubic feet of water per second (cfs) by increasing the diversion rate authorized by Water Right No. 950-1. Water Right No. 950-1 appropriates 0.10 cfs water from one well. Permit No. 1629-1 also authorized development of a replacement well.

A qualification to Permit No. 1629-1 states, "Upon completion of the new well, the old well originally authorized by Water Right No. 950-1 must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04." An onsite permit investigation conducted by Ron Duvall on August 12, 1997, found the new well constructed and that the old well is maintained as a standby well.

The Water Management Board will consider amending Qualification No. 4 on Water Permit No. 1629-1 on December 3, 1997, at 10:00 am, in the Conference Room, Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Ave., Pierre, SD 57501. The agenda time is an estimate. The hearing on this amendment will be held pursuant to SDCL 46-1-14, 46-2-9, 46-2-11 and 46-2-17.

The Chief Engineer's revised recommendation is for the Board to amend qualification No. 4 to state, "If the well originally authorized by Water Right No. 950-1 is not maintained as a standby well it must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04. A standby well needs to be equipped with a functional motor and pump for immediate use upon demand."

If you have any questions regarding the proposed amendment, please contact Ron Duvall at (605) 773-3352.

CERTIFICATION

I hereby certify that on October 9, 1997, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated October 9, 1997, regarding Schedule Hearing on Amendment to Qualification on Water Permit No. 1629-1, addressed as stated below:

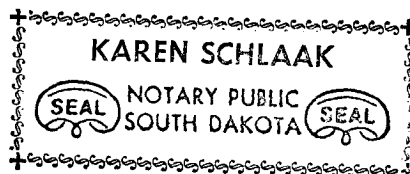
Dale Knutson, Manager, Butte-Meade Sanitary Water District, P.O. Box 5, Newell, SD 57760.


Cheryl F. Frost
Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 17th day of October, 1997


Notary Public



KAREN SCHLAACK, Notary Public
My Commission Expires
April 1, 2001



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

December 5, 1997

NOTICE

TO: Dale Knutson, Manager
Butte-Meade Sanitary Water District
PO Box 5
Newell, SD 57760

FROM: John Hatch, Chief Engineer
Water Rights Program
(605) 773-3352

SUBJECT: Amendment to Qualification on Water Permit No. 1629-1

On December 3, 1997, the Water Management Board approved an amendment to qualification No. 3 on Water Permit No. 1629-1. Previously this qualification required that the old Vale well authorized by Water Right No. 950-1 be plugged once the new well was completed. The purpose of this amendment is to allow the old Vale well to be maintained as a standby well by the District.

The Board amended qualification No. 3 as follows:

3. The old well originally authorized by Water Right No. 950-1 must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04 when the old well is no longer maintained as a standby well. A standby well needs to be equipped with a functional motor and pump for immediate use upon demand.

If you have any questions regarding the proposed amendment, please contact Ron Duvall at (605) 773-3352.

CERTIFICATION

I hereby certify that on December 5, 1997, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated December 5, 1997, regarding Amendment to Qualification on Water Permit No. 1629-1, addressed as stated below:

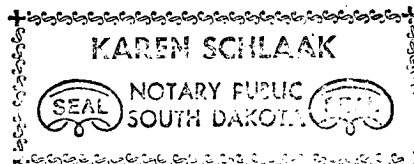
Dale Knutson, Manager, Butte-Meade Sanitary Water district, P.O. Box 5, Newell, SD 57760.


Cheryl F. Frost
Secretary

STATE OF SOUTH DAKOTA)
-----) SS
COUNTY OF HUGHES)

Sworn to, before me, this 8th day of December, 1997


Notary Public



KAREN SCHLAAK, Notary Public
My Commission Expires
April 1, 2001



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

December 12, 1997

1629-1

Butte-Meade Sanitary Water District
%Dale Knutson, Manager
P.O. Box 5
Newell, SD 57760

Dear Mr. Knutson:

The investigation of your water use system was conducted on August 12, 1997, by Ron Duvall, staff engineer. The investigation included the extent of application of water to beneficial use, as developed under Water Permit No. 1629-1. Your final water right document, the Water License, can now be issued.

Statutes require that we charge a \$50.00 fee for the investigation and issuance of the Water License. Upon receipt of the \$50.00 fee from you, we will begin processing your Water License.

**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 number. This will insure proper handling of the fee.

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

NO 415598

Pierre, January 15, 19 98

RECEIVED OF Butte-Meade Sanitary Water District, 117 Girard Ave., Box 5, Newell, SD 57760
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. 1629-1

Fee for Filing Transfer Form _____

Fee for Filing Extension Request _____

Fee for _____

(Any Other Work Provided by Law)

Total

50 00

By _____
Chief Engineer

John Hatch (Signature)

Water Rights Program -- File Documentation

NAME: Butte-Meade Sanitary Water District c/o Dale Knutson, Manager

ADDRESS: PO Box 5, Newell SD 57760

DATE: September 24, 1997 **COUNTY:** Butte **TELEPHONE:** (605) 456-2288

RE: Qualification on Permit No. 1629-1 to plug old well authorized by No. 950-1

COMMENTS:

On August 12, 1997 an onsite permit investigation of Permit No. 1629-1 was completed for purposes of licensing the water permit. Permit No. 1629-1 was approved as a replacement well for the well covered by Water Right No. 950-1. A qualification was included on No. 1629-1 that the old well covered by No. 950-1 was to be plugged upon completion of the replacement well.

According to Dale Knutson, Manager of the water system, the old well has not been plugged and is equipped with a functional motor and pump. Mr. Knutson would like the old well to be maintained as a standby well.

RECOMMENDED ACTION:

It is recommended that the following qualification on Permit No. 1629-1 be modified from:

3. Upon completion of the new well, the old well originally authorized by Water Right No. 950-1 must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04.

to:

3. The old well originally authorized by Water Right No. 950-1 must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04 when the old well is no longer maintained as a standby well. A standby well needs to be equipped with a functional motor and pump for immediate use upon demand.



Ron Duvall, Natural Resources Engineer
Water Rights Program

FIELD INVESTIGATION REPORT FOR PERMIT NO. 1629-1

DATE OF INVESTIGATION	August 12, 1997
NAME & ADDRESS OF INVESTIGATION CONTACT/ RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE	Dale Knutson, Manager
NAME & ADDRESS OF PERMIT HOLDER	Butte-Meade Sanitary District PO Box 5 Newell SD 57760
DIVERSION POINT LEGAL LOCATION	Well: $\approx$ 700 feet E and 1,050 feet N from the SW corner of section 28-T8N- R6E (SW$\frac{1}{4}$SW$\frac{1}{4}$)

Other permit(s) associated with the project: 950-1

WELL INFORMATION:

- 1) Well Drilling Firm: Weston Engineering
- 2) No. of Wells 1
- 3) Depth(s) 2,392 feet
- 4) Well log is available Y
- 5) Comment: Completed May 10, 1996

Screen:

- 1) Type none, perforated casing
- 2) Length 55 feet
- 3) Static water level flowing

Pump:

- 1) Make Goulds submersible
- 2) Model 150L25
- 3) Size 25 hp
- 4) Capacity $\approx$ 160 GPM

Casing:

- 1) Diameter 7 inches
- 2) Length 2392 feet
- 3) Type Steel

DISTRIBUTION LINES OR CANALS:

Water is used to supply the Butte-Meade Sanitary District including service to the towns of Nisland, Vale, Newell, as well as rural users in Butte and Meade counties.

PERMIT QUALIFICATIONS:

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

Permit No. 1629-1
Belle Fourche 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, August 12, 1997, made a thorough examination of the water use system constructed by Butte-Meade Sanitary Water District of PO Box 5, Newell SD 57760 holder of Permit No. 1629-1, bearing the priority of August 11, 1995 authorizing the diversion of 0.23 cu. ft. per second of the waters of Inyan Kara Formation for rural water system purposes, in Butte/Meade County.

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

A. Works used to divert the water:

Pump:

- 1) Make Goulds submersible
- 2) Model 150L25
- 3) Size 25 hp
- 4) Capacity ≈ 160 GPM

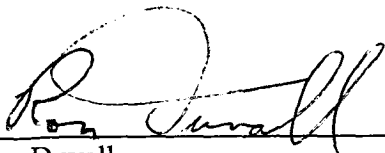
B. Works used to transport/apply water to place of use: -----

Water is used to supply the Butte-Meade Sanitary District including service to the towns of Nisland, Vale, Newell, as well as rural users in Butte and Meade counties.

The system is in the following condition good. The point of diversion is located Well: 700 feet E and 1,050 feet N from the SW corner of section 28-T8N-R6E (SW¼SW¼). The works are capable of diverting and conveying to the place of use 0.33 cu. ft. per second of water which is to be used for rural water system purposes. Water has been put to beneficial use to the maximum extent and the license should be issued for *0.33 cfs.

Applicable permit qualifications have been complied with: Yes X No

Exceptions to compliance are: none Date report completed: December 8, 1997



Ron Duvall
Natural Resources Engineer
DENR, Water Rights Program

Water Right No. 950-1 appropriates 0.10 cfs which is to be incorporated into No. 1629-1 for a total appropriation of 0.33 cfs. A priority date of September 15, 1971 is assigned to 0.10 cfs and August 11, 1995 to 0.23 cfs. The well authorized by No. 950-1 is equipped with a functional motor and pump and is being retained as a standby well.

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 1629-1

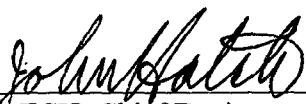
(1) Butte-Meade Sanitary Water District, PO Box 5, Newell SD 57760 made Application No. 1629-1, August 11, 1995 for a water permit to divert 0.23 cubic feet of water per second (cfs) from groundwater (one well), Butte County, South Dakota for rural water system purposes. Permit No. 1629-1, with a priority date of August 11, 1995 was approved October 30, 1995 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before October 30, 2000 and for the application to beneficial use of said water on or before October 30, 2004.

Water Right No. 950-1 appropriates 0.10 cfs from one well with a September 15, 1971 priority date. This well is retained as a standby well. On December 3, 1997, the Water Management Board amended a qualification of Water Permit No. 1629-1 stating the old well originally authorized by Water Right No. 950-1 must be plugged when the old well is no longer maintained as a standby well. The applicable portions of Water Right No. 950-1 have been incorporated into Water License No. 1629-1.

(2) It is certified that the applicant 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 0.33 cubic feet of water per second for beneficial use. The location of the diversion point is 700 feet east and 1,050 feet north from the southwest corner of Section 28-T8N-R6E (SW 1/4 SW 1/4).

(3) The applicant has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use. The water is used to supply the Butte-Meade Sanitary District including service to the towns of Nisland, Vale and Newell as well as the rural water users in Butte and Meade Counties.

(4) Pursuant to South Dakota Water Law 46-5-30.1 Butte-Meade Sanitary Water District, PO Box 5, Newell SD 57760 the holder and/or owner of Incorporated Water Permit No. 1629-1 is issued a license to appropriate water, the right to use 0.33 cubic feet of water per second from groundwater (one well) with priority dates of September 15, 1971 (0.10 cfs) and August 11, 1995 (0.23 cfs) 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 Permit No. 1629-1 and subject to South Dakota State Law.


JOHN HATCH, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

FEB 27 1998

date





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

FEB 27 1998

1629-1

Butte-Meade Sanitary Water District
%Dale Knutson, Manager
P.O. Box 5
Newell, SD 57760

Dear Mr. Knutson:

Enclosed is Water License No. 1629-1. This is the final water right document completing your process of obtaining a Water Right. Enclosed is Receipt No. 415598 in the amount of \$50.00 which you paid for the investigation and issuance of the Water License.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the well authorized by Water Right No. 1629-1, 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 License, the State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Very truly yours,

JOHN HATCH, Chief Engineer
Water Rights Program
(605) 773-3352

ks
enclosures

NOTE: The applicable portions of Water Right No. 950-1 have been incorporated into Water License No. 1629-1.