

insidered: _____

Copy

WATER PERMIT NO. 5395-3
PH# 582-6515
MAP No. _____

of Applicant City of Brandon

Office Address Box 95 Brandon SD 57005

Amount of Water Claimed 0.43 cfs Total Acres N/A

Source of Water Supply Split Rock Creek Aquifer

Water to be used for municipal County Minnehaha

About _____ miles _____ of Brandon

PROOF OF PUBLICATION: Received _____ Not Received _____

APPLICATION: Approved _____ Subject to _____

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

PRIORITY _____ Date Received March 8, 1990 Fee 250⁰⁰ Remarks increase diversion
rate from existing well

Corrected Application Received _____ Period of Annual Use continuous

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

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

Diversion Point well No. 3 SW¹/₄ of
Section 35 - T102N - R48W

Land to be Irrigated _____

		35			
⊗					

Well Log: Driller Grimshaw Licensed YES ☒ NO ☐

Depth of Well 222 ft REMARKS _____

Type of Map topo PREPARED BY Steve Brockmueller Reviewed and the Number

assigned on March 13, 1990 By Eric Munk

Mail to: Water Rights Div.
DWNR, Foss Bldg.
Pierre, SD 57501
(605) 773-3352

No. <u>5395-3</u>	Hydrologic Unit <u>101 702 03</u>
Map No. _____	Basin <u>Big Sioux</u>
Newspaper <u>Brandon Challenger</u>	<u>(Wed) Box 99 Dell Rapids</u>
<u>Argus Leader</u>	<u>Box 5034</u>

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

Check use of water: Industrial ☐ Commercial ☐ Municipal ☒ Other Common Distribution System ☐
Rural Water System ☐ Suburban Housing ☐ Geothermal Heat ☐ Institutional ☐ Recreational ☐
Domestic ☐ (above 18gpm) Other ☐

Type of Application: Check one or more of the following

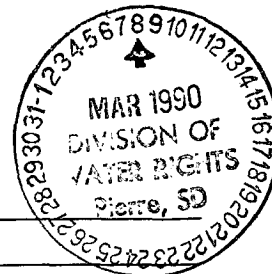
New ☒ Vested Right ☐ Future Use ☐ Change Use ☐

☐ 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. _____



1. Name of Applicant City of Brandon Phone No. 582-6515

Post Office Address Box 95 Brandon, South Dakota State 57005
(Street, RR or Box) (City) Zip Code

2. Amount of water claimed (c.f.s.) 0.43 cfs (200 gpm) Increase ex. from 0.89 cfs (400 gpm) to 1.32 cfs (600 gpm)

3. Source of water supply Groundwater - Split Rock Creek Aquifer NW $\frac{1}{4}$ SW $\frac{1}{4}$ of _____

4. Location of point of diversion Existing City well no. 3 located in/Section 35, T102N, R48W.

_____ County Minnehaha

5. Counties where water will be used Minnehaha

6. Annual period during which water is to be used continuous Jan 1 - Dec 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)

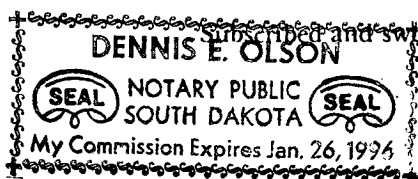
The City of Brandon is proposing to upgrade their existing well no. 3 by installing chemical feed equipment and automated controls. They also propose to install a new pump and motor sized for 600 gpm to provide needed reserve capacity to the City of Brandon water supply. See the transmittal letter and enclosed letter dated August 25, 1989 from the South Dakota Geological Survey.

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 Minnehaha) ss

I, Dennis A. Kleinvächter, Mayor, City of Brandon 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 Dennis A. Kleinvächter
6th day of March 1990
Dennis E. Olson
Notary Public



**SOUTH DAKOTA
WATER PERMIT No. 5395-3**

Date of first receipt of application March 8, 1990.

The Water Management Board approved Water Permit Application No. 5395-3 on May 24, 1990 for the City of Brandon, Box 95, Brandon, SD 57005 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. 5395-3 appropriates additional water from one existing well (Split Rock Creek Aquifer) 222 feet deep located in the NW1/4 SW1/4 of Section 35 T102N-R48W. Water Right Nos. 1804-3 and 5296-3 authorize a combined appropriation of 0.89 cubic feet of water per second (cfs) from well No. 3. This application authorizes an additional appropriation of 0.43 cfs from well No. 3 bringing the maximum diversion rate from 0.89 cfs to 1.32 cfs from this well.
2. The water appropriated shall be used for the purpose of supplying the City of Brandon's water needs and may not exceed the amount of water needed for beneficial use for municipal purposes.
3. The water is to be used during the following described annual period: January 1 - December 31.
4. The date from which applicant may claim right is March 8, 1990.
5. One-fifth of the construction is to be completed on or before November 24, 1992.
6. All construction is to be completed on or before May 24, 1995.
7. Water is to be put to beneficial use on or before May 24, 1999.
8. 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 wells 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.

WATER MANAGEMENT BOARD

By: 
Chief Engineer, Water Rights Division
Department of Water and Natural Resources

JUL 10 1990
(date)

Supplemental Information

(type or print in ink)



1. Well Information - ~~Proposed~~ Existing construction

- a) Drill Hole Diameter not available Depth 222'
- b) Casing Type Steel Diameter 12" Thickness not available
- c) Screen Type Stainless Steel Diameter 12" Thickness not available
- d) Gravel Pack Thickness not available Length of Gravel Pack 42'
- e) Depth to Top of Water Bearing Material 179'
- f) Depth to Water (ground surface to water level) 54.40'
- g) Distance to nearest existing domestic well:
 On applicants property 5000' On property owned by others _____

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 _____

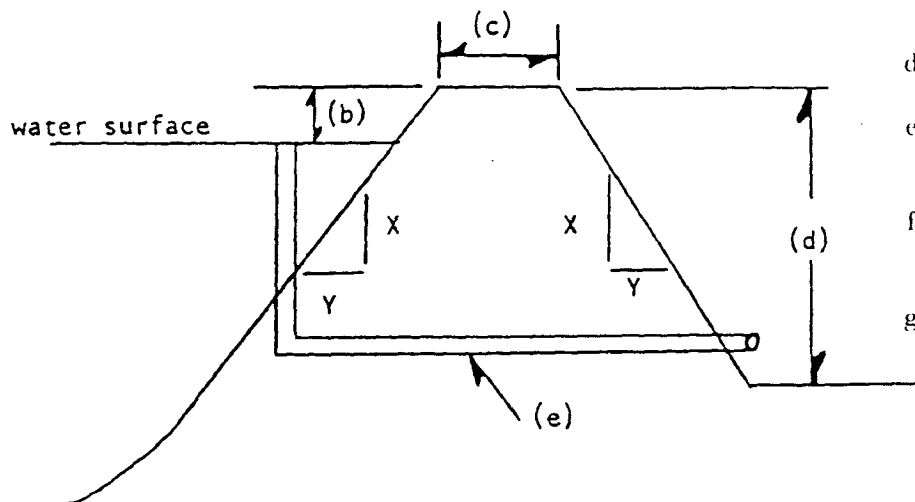
g) X & Y Slope
 Upstream _____

Downstream _____

Surface Area of Impoundment _____

Storage _____ acre feet

Drainage area above dam _____



Signature of Applicant _____



Stockwell Engineers

1621 South Minnesota Avenue • Sioux Falls, South Dakota 57105

Telephone (605) 338-6668

August 1, 1988

Mr. Jim Goodman
Dept. of Water & Natural Resources
Joe Foss Building
Pierre, South Dakota 57501



Re: Brandon Water Study
Project 1888

Dear Jim:

Enclosed for your information is well data and locations for the 5 wells currently used by the City of Brandon. As discussed with Dave Holman, it appears permit no. 1804-3 has been superseded by permit no. 4002-3. Therefore, we need an opinion on the data of priority and amount of water claimed.

Please furnish a response to our office at your earliest convenience.

Very Truly Yours,

STOCKWELL ENGINEERS, INC.

Steve W. Brockmueller

Steve W. Brockmueller, P.E.

Enclosures

pk

Location of wells - City of Brandon

- Well #1 Beginning at Center of Section 3, T101N, R43⁸W
of Fifth PM, Thence 1460 feet Northerly along
Quarter Section Line, Thence 600 feet Westerly
at right angles to said quarter section line/
- Well #2 Beginning at Center of Section 3, T101N, R43⁷W
of Fifth PM, Thence 1150 feet Northerly along
Quarter Section Line, Thence 600 feet Westerly
at right angles to said quarter section line.
- Well #3 1740 feet North and 430 feet east of S.W. corner
of Section 35, T102N, R48W of 5th P.M.
- Well #4 Beginning at Center of Section 3, T101N, R48W
of Fifth P.M. Thence 850 feet Northerly along
Quarter Section Line, Thence 600 feet Westerly at
right angles to said quarter section line.
- Well #5 Beginning at Center of Section 3, T101N OF Fifth
P.M., Thence 450 feet Northerly along Quarter
Section Line, Thence 600 feet Westerly at right
angles to said Quarter Section Line.



DATA ON WATER SUPPLY WELLS
CITY OF BRANDON, SOUTH DAKOTA
AUGUST 19, 1982

<u>NO.</u>	<u>LOCATION</u>	<u>DATE</u>	<u>DEPTH</u>	<u>DIAMETER</u>	<u>DRILLER</u>	<u>METHOD</u>	<u>CASING</u>	<u>SCREEN</u>	<u>GRAVEL PACK</u>	<u>GROUT</u>	<u>STATIC</u>	<u>PUMPING RATE</u>	<u>AVERAGE / DAY</u>
1	SOUTH OF CITY	1968	48'	10"	THORPE WELL COMPANY	ROTARY	STEEL - 10" 26' & PITLESS	S. STEEL 10" - 16'	33' - 4"	CONCRETE 15'	20' GAGE	170 GPM	80,000 GPD
2	SOUTH OF CITY	1971	50'	8"	MINNEHAHA WATERS, INC.	ROTARY	STEEL - 8" 31' & PITLESS	S. STEEL 8" - 12.5'	30' - 5"	CONCRETE 15'	20' GAGE	65 GPM	30,000 GPD
3	BRANDON PARK	1964	222'	12"	MINNEHAHA WATERS, INC.	ROTARY	STEEL - 12" 180'	S. STEEL 12" - 40'	40' - 3"	CONCRETE 180'	50'	200 GPM	EMERGENCY USE
4	SOUTH OF CITY	1976	52'	10"	THORPE WELL COMPANY	REVERSE ROTARY	STEEL - 10" 31' & PITLESS	S. STEEL 10" - 15'	32' - 4"	CONCRETE 20'	20' GAGE	190 GPM	90,000 GPD
⑤	SOUTH OF CITY	1980	56'	10"	SIOUX WELL DRILLING	ROTARY	STEEL - 10" 35' & PITLESS	S. STEEL 10" - 15'	32' - 4"	CONCRETE 20'	20' GAGE	220 GPM	100,000 GPD

- NOTES:
1. WELLS NUMBERED IN ACCORDANCE WITH WATER RIGHTS DESIGNATION.
 2. WELL NO. 3 (BRANDON PARK) USED ONLY AS REQUIRED TO MEET DEMAND
 3. SEE ATTACHED DATA ON WELLS.

South Dakota Department of
Water and Natural Resources
DIVISION OF GEOLOGICAL SURVEY

SCIENCE CENTER, USD
VERMILLION, SD 57069-2390
(605) 677-5227

August 25, 1989

Steve Brockmueller
Stockwell Engineers
1621 South Minnesota Avenue
Sioux Falls, SD 57105

REC'D 8/30/89	
RWS	JTD
SWB	PDK
REA	
REL	
JDB	
FILE	

Dear Steve:

I have completed a preliminary analysis of the aquifer test we conducted at Brandon in June. The following paragraphs summarize the results.

In 1989 the South Dakota Geological Survey (SDGS) and the United States Geological Survey (USGS) began a 3-year study of the Split Rock Creek aquifer (see attachments for areal extent of this aquifer) for the city of Sioux Falls to determine the feasibility of using this aquifer for a supplemental water supply. One aspect of this study is to conduct aquifer tests in various areas of the aquifer. The city of Brandon has a well completed in the Split Rock Creek aquifer and is interested in determining the capacity of this well and the general characteristics of the aquifer in the vicinity of Brandon. An aquifer test was conducted in the Split Rock Creek aquifer by the SDGS in June, 1989 using Brandon city well number 3.

Although several observation wells exist in a 0.5 to 2-mile radius of Brandon city well number 3, none were within several hundred feet of the well. In order to obtain information in close proximity to the well, the SDGS installed an observation well 101 feet north of the production well (Brandon city well number 3), and another well 589 feet south of the production well (see attachments for the locations of the production well and observation wells and the lithologic logs of the observation wells used for this aquifer test).

Beginning on June 26, 1989, a 72-hour aquifer test was conducted in the Split Rock Creek aquifer using Brandon city well number 3. This well is approximately 221 feet deep and has a submersible pump set at 120 feet below land surface. The well was pumped at an average rate of 258 gallons per minute (gpm) and the water was discharged into the city's storm drainage system. At the conclusion of the pumping phase of the test, recovery measurements in observation wells SRC-23, SRC-36, SRC-37, and the production well began and continued for about 26 hours. Analysis of the test data yields the following information:

1. The average transmissivity of the aquifer is 19,683 gallons per day per foot.
2. The average storativity of the aquifer is 2.6×10^{-4} .



3. The specific capacity of the production well is 10.2 gallons per minute per foot of drawdown. The static-water level in the production well was 53.50 feet below casing top just before pumping began. The pumping-water level was 78.95 feet below casing top after 72 hours of pumping. When corrected for barometric pressure changes, this calculates to 25.35 feet of drawdown. The production well is very efficient, as evidenced by the relatively small amount of drawdown while pumping at a rate of 258 gallons per minute.

As is expected, the observation wells with the greatest drawdown were the ones closest to the production well. Included in the attachments is a distance-drawdown graph showing the drawdown in the aquifer at various distances from the production well.

Water-level measurements during the recovery period of the test show that after about 26 hours of recovery, there was less than a foot of drawdown left in the production well. Thus, recovery was quite rapid in the production well.

Near the end of the pumping phase of the aquifer test, water samples were taken from the production well for gross alpha and inorganic chemical analysis. The gross alpha parameter is a sum of the total radioactivity from alpha emitters in the water. This includes radium 226 and uranium isotopes. The maximum contaminant level established by the Environmental Protection Agency (EPA) for gross alpha is 15 picocuries per liter (pCi/L). The sample taken from Brandon city well number 3 had a gross alpha value of 3.4 pCi/L. Thus, the gross alpha activity of this water is well below the maximum contaminant limit. This also means that the radium 226 activity must be less than or equal to 3.4 pCi/L. The EPA maximum contaminant level for Radium 226/228 is 5 pCi/L. A copy of the gross alpha analysis is included in the attachments.

Results of the inorganic chemical analysis are not complete at this writing, however, those parameters which are currently available are listed below. A copy of the complete analysis will be forwarded to you when it is complete.

Concentrations of chemical constituents from Brandon city well number 3
All values are in milligrams per liter (mg/L)

Parameter	Concentration	EPA Maximum contaminant level	EPA Recommended level
Total-dissolved solids	492	----	500
Sodium	37	----	----
Chloride	3.5	----	250
Sulfate	126	----	250
Potassium	6.7	----	----
Fluoride	0.62	2.4	----
pH	6.43	---	6.5-8.3

Steve Brockmueller
August 25, 1989
Page 3

Results of this aquifer test have yielded the following tentative conclusions regarding the potential of this area of the aquifer for use by the city of Brandon.

1. The city of Brandon wants to produce 400 gallons per minute from city well number 3. The specific capacity of this well is 10.2 gallons per minute per foot of drawdown and the static-water level in this well is about 54 feet below casing top. If a large enough capacity pump is installed in the well, it could produce 400 gallons per minute with a drawdown of about 40 feet, or a pumping-water level at about 94 feet below casing top. This is well above the top of the screen, which is at about 180 feet below ground surface.
2. According to the results obtained thus far, the water quality of the aquifer in this area is good. A gross alpha value of 3.4 pCi/L indicates that the radioactivity in this area is quite low and total-dissolved solids and sulfate concentrations are below the EPA recommended levels. Values for iron and manganese will be available soon, and I will furnish them to you then.

The final analysis and interpretations from this aquifer test will be included in the final report of the Split Rock Creek aquifer study. If you have any questions, please contact me. I am also sending this letter and attachments to Dennis Kleinvachter.

Sincerely,



Tim Cowman
Hydrologist

For the State Geologist

TCC:co
Enclosures



Water Study for City of Brandon



Stockwell Engineers, Inc.
Sioux Falls, South Dakota



Stockwell Engineers

1621 South Minnesota Avenue • Sioux Falls, South Dakota 57105
Telephone (605) 338-6668

September 6, 1988

Dennis Olson, Finance Officer
City of Brandon
304 Main Avenue
Brandon, South Dakota 57005

Re: Water Study, City of Brandon
Initial Submittal - Tasks 120 and 200
Project No. 1888

Dear Dennis:

Per our proposal of June 3, 1988, please find attached the Initial Submittal on Task 120: Wells and Task 200: Analyze Water Usage. As you will note, no recommendations are bound in the Initial Submittal for the following reasons:

1. The completion of other elements of the Water Study (storage, fire flow and distribution) may impact recommendations associated with wells and water usage.
2. A review is underway by the Dept. of Water and Natural Resources regarding Brandon's Water Right Permits. The results of that review may impact any recommendations offered now.

Although not part of the Initial Submittal, the following items would likely be considered in making recommendations to the City.

1. Confirm pumping levels and screen tops in wells 1, 4 and 5. modify pumping rate as necessary to submerge screen top.
2. Confirm pumping level and water quality of well no. 3. Consistent with findings, increase pumping rate of well no. 3.
3. Consider the redevelopment of Well No. 2 to improve specific capacity.
4. Consistent with final pumping rate of existing wells 1, 2, 3, 4 and 5; consider construction of additional well(s) to provide current peak day flow with the highest producing well out of service.

Providing a spare pump and motor for the highest producing well may be an acceptable interim alternative.

Page Two
Dennis Olson
September 6, 1988

5. Modify Water Right Permits as necessary to gain withdrawal permit(s) providing:
 - (a) Priority date of January 25, 1971 for Wells 1, 2 and 3.
 - (b) Withdrawal rates equal to items 1, 2 and 3 above without exceeding total of 1.78 cfs.
 - (c) Future use from both the Big Sioux South and Split Rock Creek Aquifers in Sections 1, 2 and 3 of T101N, R48W and Sections 33, 34 and 36 T102N, R48W.
 - (d) Maintain total withdrawal, current and future, at 4.0 cfs.
6. With any modification of well pumping rate, insure motor size is consistent with pumping needs.
7. Select observation wells and initiate a regular program of water quality analysis to determine trends associated with nitrate levels in the Big Sioux Aquifer.
8. Continue to monitor water loss to determine trend.
9. Consistent with population growth and nitrate levels, construct additional wells in either aquifer such that peak day flows are provided with highest producing well out of service.

Per our previous discussions, the City has sent a letter to the East Dakota Water Development District indicating that the City of Brandon may submit an amendment request to be included in the 1988-89 State Water Plan for well development. A final decision will be dependent upon the review of your water right by DWNR and your findings/decisions regarding possible recommendations 1, 2, 3, and 4.

Very Truly Yours,

STOCKWELL ENGINEERS, INC.

Steve W. Brockmueller
Steve W. Brockmueller, P.E.

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110: Distribution - Not included initial submittal	
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Task 200: Analyze Water Usage	
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Task 100: System Evaluation ;

110 Distribution

The distribution system was not addressed under this initial submittal.

120 Wells

120.10 Existing Wells - Construction/Operation Data

The City of Brandon currently withdraws water from 5 different wells. Available construction/operation data on each well is presented in Table 120.1.

Based upon available data, the following observations are noted:

Although the specific capacity has generally remained the same on Wells 1, 4 and 5; pumping rates are exposing the screen top either individually or due to well interference.

Well No. 3 can be pumped harder considering the original specific capacity and static level without exposing the screen top.

Well No. 2's specific capacity is less than when originally constructed.

Reportedly the well pump motors remain sized to pump into the elevated as opposed to ground storage.

See Figure 120.1 for relative location of Wells 1, 2, 3, 4 and 5.

Table 120.1

Construction/Operation Data - Existing Wells

Brandon, South Dakota

Well No	Well Location	Year Built	Type of Rotary	Depth (ft)	Diam. (in)	SS Screen Length	Screen Top	Static Pumping	Original Pumping DD ¹ Rate	Static Pumping Sp. Cap ³	Current Pumping DD ¹ Rate ²	Current Pumping Sp. Cap ³	Aquifer ID ⁴		
1	south	1968	straight	48	10	16	26	16-45	29	7.2	20.5-39.5	19	170	8.9	BS
2	south	1971	straight	50	8	12.5	39	14-28	14	10.7	20.5-37.5	17	65	3.8	BS
3	park	1964	straight	222	12	40	180	49-58	9	44		200			SRC
4	south	1976	reverse	52	10	15	30	22-38	16	16.9	21-35	14	190	13.6	BS
5	south	1980	straight	56	10	15	28	20-36	16	15.9	22-39	17	220	12.9	BS

DD¹ - Drawdown in FeetRate² - Pumping rate in gallons per minuteSP Cap³ - Specific Capacity in gallons per minute/foot of drawdownAquifer ID⁴ - BS (Big Sioux) or SRC (Split Rock Creek)

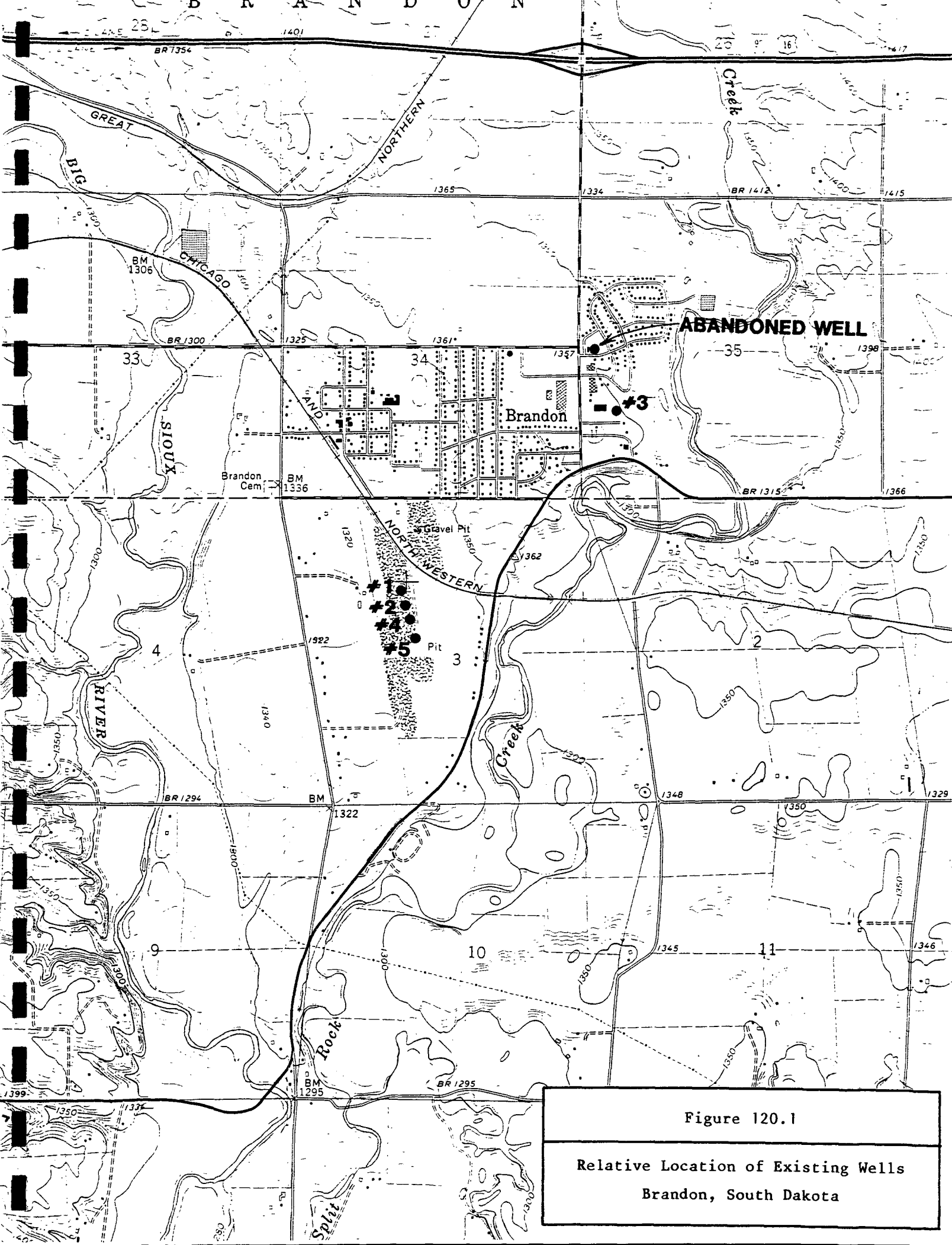


Figure 120.1

Relative Location of Existing Wells
Brandon, South Dakota

120.20 Existing Wells - Water Quality

Water quality data from the five wells is presented in Table 120.2. The following observations are noted:

The water quality of the two aquifers are very similar when comparing the composite sample(s) of the Big Sioux Wells with that of the Split Rock Creek Well.

The most noticeable difference is that associated with nitrate. The Big Sioux Wells have higher levels of nitrate which is expected considering their depth, farming practices, etc.

See Appendix No. 1 for copies of water quality (Chemical Analytical) data and Explanation of Chemical Analysis.

Table 120.2

Water Quality Data - Existing Wells

Brandon, South Dakota

Well No.	1	2	4	5	3	
Well Location	south	south	south	south	park	
Depth (ft)	48	50	52	56	222	
Aquifer ¹	BS	BS	BS	BS	SRC	
Date Sampled	2/86	composite sample		4/88	10/83	
Parameter - ppm ²					Suggested Limit	
Chloride	17.7			20.3	6.7	250
Iron	0.2			0.91	0.56	0.3
Manganese	0.28			0.17	0.21	0.05
Sulphate	100			66.6	122	250
Total Diss. Solid	479			398	496	500
Alkalinity - M	282			241		
Bicarbonate	344			294	390	
Calcium	91.8			86.9	9.9	
Magnesium	29.6			23.5	30	
Sodium	19.1			14.2	35	
Potassium	3.4			3.4	7.4	
Hardness	351			314	371	
Nitrate	3.7			4.5	0.1	10 ³
Fluoride	0.84			1	0.52	2.4 ³
Spec. Cond. umhos/cm	650			650	818	
pH	7.75			7.75		6.5 - 8.5
Lange Lie Index	0.26			0.26		

Aquifer ¹ - BS (Big Sioux) or SRC (Split Rock Creek)

Parameter ² - ppm (part per million) unless noted otherwise

Nitrate/Fluoride ³ - Maximum limit

120.30 Existing Wells - Water Right Permits

The City of Brandon has three (3) Water Right Permits numbered 4002-3, 4434-3 and 4885-3. A fourth permit 1804-3 was issued to the Brandon Water Company. Review of the issued permits yields the following observations:

1804-3 was issued to the Brandon Water Company on January 25, 1971 for 1.2 cubic feet per second (cfs) or 539 gallons per minute (gpm). Existing wells No. 1, 2 and 3 are included in the application with a beneficial use of supplying water to the Town of Brandon noted.

4002-3 was issued on November 1, 1977 to the City of Brandon for 1.5 cfs of 673 gpm and included existing wells 1, 2, 3 and 4. Also included was 4.0 cfs for future use.

The future use 4002-3 was reviewed on September 26, 1984 and extended for 7 years with a qualification that withdrawal was limited to the Big Sioux South Aquifer.

4434-3 was issued on October 9, 1977 for 0.34 cfs to the City of Brandon for irrigation of the golf course.

4885-3 was issued to the City of Brandon on June 23, 1982 for 0.28 cfs (125 gpm) from Well No. 5.

A summary of the municipal use permits are presented in table 120.3 along with a comparison of actual/existing use. the following discrepancies are noted:

Wells 1, 2 and 3 would seem to have two (2) different priority dates i.e. that associated with Permit 1804-3 and 4002-3.

Considering approved Permits 1804-3 and 4002-3, it would appear that the assigned flow to Well No. 4 is 0.3 cfs or 13.5 gpm.

Considering Permit 4885-3, Well No. 5 is permitted at 125 gpm.

Appendix No. 2 for a Well Location Legal description, copies of the referenced Water Right Permits, and copies of instructions for

Brandon, South Dakota

Water Right Permit					Actual Use			
Permit No	Well No	Well Location	Rate (gpm)		Well Location	Rate gpm	Total gpm **	
1804-3	1	south	1.2 cfs		south	170	120	
	2	south	or		south	65	435	130
	3	park	539 gpm		park	200		> 180
4002-3	1	south	1.5 cfs		south	170		
	2	south	or		south	65	625	> 200
	3	park	or		park	200		
	4	south	673 gpm		south	190		> 167 (in 3)
4885-3	5	south	0.28 cfs		south	220		> 210
			or					
			125 gpm					
Total			1.78 cfs or 799 gpm				845	

* Does not include approved Future Use

** Will vary due to limit imposed by aquifer characteristics (well interference) and hydraulic capacity of well line(s) and high service transmission main.

applications for water right permits with copies of forms for permit application.

130 Storage

Storage was not addressed in the initial submittal.

140 Treatment

Treatment was not addressed in the initial submittal.

Task 200: Analyze Water Usage

210 Current Water Production, Use and Loss.

Recent data was collected regarding annual water produced, annual water sold, annual population, and peak day flows. The data is summarized in Table 210.1. the following observations are offered:

A water loss of less than 10% would appear to be average or below average for a community the size of Brandon. The recent drop (24 to 7%) is noted for year 1986 to 1987. It is likely at least part of this reduction was attributed to metering of the school lawn sprinkling system during 1987.

Water use per day of between 90 and 100 gpcd is average for communities similar to Brandon without significant water based industry.

The ratio of peak day production to average day production normally ranges from 2.0 to 3.0. During the years 1985 through the present, peak day production has ranged from 260 to 312 gpcd which is within or only slightly higher than the expected range.

Producing Peak Day demands in 24 hours requires well capacity over 700 gpm. Producing the same amount in a recommended 20 hours requires well capacity of 840 gpm or all capacity currently available.

Without significant water base industry, separation of flow into various categories will not be of benefit.

Table 210.1

Water Usage Data

Brandon, South Dakota

Year	Produced (gal)	Sold (gal)	Loss %	Population	Produced per day per person (gpcd)	Peak Day (gal)	Peak Day Prod. per person
1981	94,368,100	80,870,040	14	2700	96	-	-
1982	86,278,300	74,008,520	14	2825	84	-	-
1983	82,789,110	79,680,940	4	2950	77	614,600	208
1984	90,524,520	76,422,310	16	3075	81	689,500	224
1985	106,170,000	86,036,000	19	3200	91	1,000,900	312
1986	107,964,000	82,224,000	24	3276	90	852,900	260
1987	118,699,000	109,819,000	7	3415	95	968,900	284
1988	-	-	-	3640	-	1,012,600 *	278
2010	-	-	-	6100 **	100 **	-	300 **

* Peak Day Flow of June 21, 1988.

** Future projections

220 Future Water Use Projection

Future water use will be estimated using the projected population for the year 2010 and average/peak day water use of 100/300 gpcd respectively as shown in Table 210.1.

For the year 2010, a population of between 5000 and 6100 is estimated by SECOG. Since this population projection does not specifically account for possible industrial growth, a population of 6100 will be used for the purpose of developing future water use estimates without additional consideration for industrial growth.

Noting the above, the following projections/estimates are presented for the year 2010.

A population equivalent to 6100 people is anticipated.

Average day flows can be anticipated to be equal to 100 gpcd or 610,000 gpd.

Peak day flows can be anticipated to be equal to 1,830,000 gpd or 1270 gpm/2.85 cfs (24 hour flow).

See Appendix No. 3 for SECOG Population Estimates.

230 Future Water Right Requirements

Based upon Future Water Use Projections of 1,830,000 gpd or 1270 gpm/2.85 cfs, existing and future Water Rights within the Big Sioux South Aquifer are sufficient in magnitude. Location of future use is limited to Section 3, T101N, R48W and Section 34, T102N, R48W and from the Big Sioux South Aquifer.

Based upon the geographical location of Brandon, existing wells, water quality and available drilling data, if Water Right modifications are required or desired the City may wish to consider the following:

The right to withdraw up to 4.0 cfs from the Big Sioux South Aquifer and/or Split Rock Creek Aquifer in Sections 33, 34 and 35 T102N, R48W and Sections 1, 2 and 3 T101N, R48W. See Figure 230.1.

See Appendix No. 4 for Drilling and Water Quality Data.

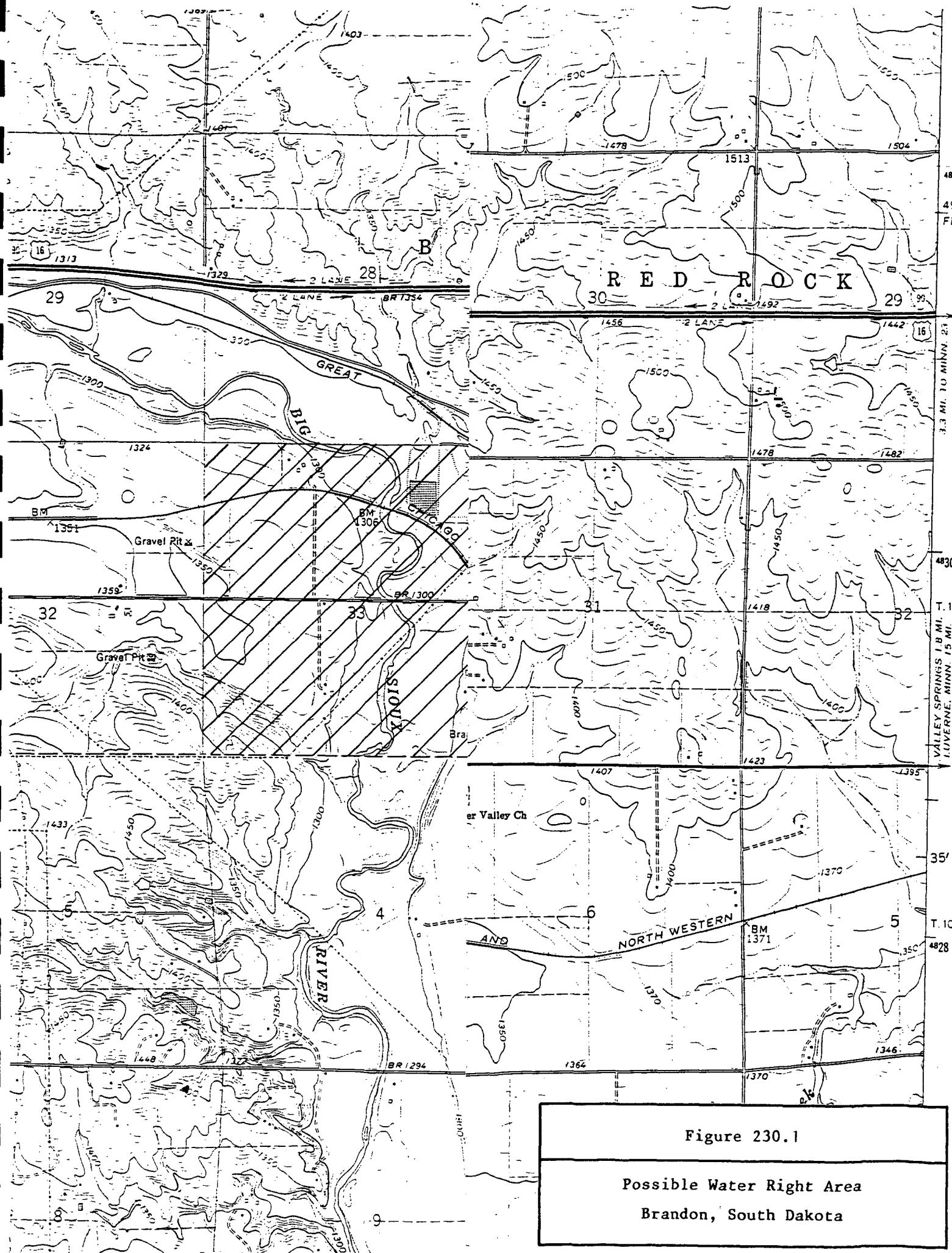


Figure 230.1

Possible Water Right Area
Brandon, South Dakota

APPENDIX NO. 1

WATER QUALITY/CHEMICAL ANALYTICAL DATA
AND
EXPLANATION OF CHEMICAL ANALYSIS

Water Study
for
City of Brandon

SOUTH DAKOTA DEPARTMENT OF WATER AND NATURAL RESOURCES

Office of Drinking Water

CHEMICAL ANALYTICAL DATA

0048

Water Supply: BrandonCity, County: BrandonSource Sampled: Well# 12, 4, 5 Depth _____

Date drilled _____ Other _____

Type of Sample: Raw _____ Treated _____ Composite ✓Treatment Process(s): Cl₂ + fluorideDate Collected: 2-20-86Collected By: Judene H

Report Mailed To: _____

Lat: _____ Long: _____

Comments: _____

Received By Lab: 2-21-86 1600 44

Report Sent By Lab: _____

Parameter	Maximum Limit	Results	Parameter	Suggested Limit	Results
Arsenic (As)	50 ug/l		✓ Chloride (Cl)	250 mg/l	17.7
Barium (Ba)	1000 ug/l		✓ Iron (Fe)	0.3 mg/l	0.20
Cadmium (Cd)	10 ug/l		✓ Manganese (Mn)	0.05 mg/l	0.28
Chromium (Cr)	50 ug/l		✓ Sulfate (SO ₄)	250 mg/l	100
Lead (Pb)	50 ug/l		✓ Tot.Diss.Solids (TDS)	500 mg/l	479
Mercury (Hg)	2 ug/l		✓ pH	6.5-8.5	7.34
✓ Nitrate (NO ₃) (as N)	10 mg/l	3.7	✓ Alkalinity-M (CaCO ₃)	mg/l	282
Selenium (Se)	10 ug/l		Alkalinity-P (CaCO ₃)	mg/l	0
Silver (Ag)	50 ug/l		✓ Bicarbonate (HCO ₃)	mg/l	344
✓ Fluoride (F)	2.4 mg/l	0.84	Carbonate (CO ₃)	mg/l	0
Gross alpha	15 pCi/l		✓ Spec. Cond. @ 25 °C	umhos/cm	719
Gross radium	pCi/l		✓ Calcium (Ca)	mg/l	91.8
Radium 226	5 pCi/l		✓ Magnesium (Mg)	mg/l	29.6
OTHER PARAMETERS			✓ Hardness (CaCO ₃) gpg: 20.5	mg/l	351
			✓ Langelier Index		-0.07
			✓ Sodium (Na)	mg/l	19.1
			✓ Potassium (K)	mg/l	3.4
			Field temperature	°F	°C
			Nitrite (NO ₂) (as N)	mg/l	
LAB COMMENTS: No No ₃			mg/l = milligrams/liter = parts/million (ppm)		
			ug/l = micrograms/liter = parts/billion (ppb)		
			gpg = grains per gallon		
			pCi/l = picocuries per liter		
ODW			860778		
Percentage of Error: 3.4 / 3.7			LAB NUMBER:		
WNR - 606R - 6/82					

2

SOUTH DAKOTA DEPARTMENT OF WATER AND NATURAL RESOURCES

Office of Drinking Water

CHEMICAL ANALYTICAL DATA

Water Supply: Brandon
 City, County: Brandon, Minnehaha
 Source Sampled: Well# 1, 2, 4, 5 Depth _____
 Date drilled _____ Other _____
 Type of Sample: Raw ☒ Treated ☒ Composite ☒
 Treatment Process(s): Chlorine, Fluoride

Date Collected: 4/28/88
 Collected By: Larsen
 Report Mailed To: _____
Survey

Lat: _____ Long: _____

Comments: _____

Received By Lab: 4/29/88
 Report Sent By Lab: _____

MAY 12 1988

Parameter	Maximum Limit	Results	Parameter	Suggested Limit	Results
Arsenic (As)	50 ug/l		/ Chloride (Cl)	250 mg/l	20.3
Barium (Ba)	1000 ug/l		/ Iron (Fe)	0.3 mg/l	0.91
Cadmium (Cd)	10 ug/l		/ Manganese (Mn)	0.05 mg/l	0.17
Chromium (Cr)	50 ug/l		/ Sulfate (SO ₄)	250 mg/l	66.6
Lead (Pb)	50 ug/l		/ Tot. Diss. Solids (TDS)	500 mg/l	398
Mercury (Hg)	2 ug/l		/ pH	6.5-8.5	7.75
/ Nitrate (NO ₃) (as N)	10 mg/l	4.5	/ Alkalinity-M (CaCO ₃)	mg/l	241
Selenium (Se)	10 ug/l		Alkalinity-P (CaCO ₃)	mg/l	0
Silver (Ag)	50 ug/l		/ Bicarbonate (HCO ₃)	mg/l	294
/ Fluoride (F)	2.4 mg/l	1.00	Carbonate (CO ₃)	mg/l	0
Gross alpha	15 pCi/l		/ Spec. Cond. @ 25 °C	umhos/cm	650
Gross radium	pCi/l		/ Calcium (Ca)	mg/l	86.9
Radium 226	5 pCi/l		/ Magnesium (Mg)	mg/l	23.5
OTHER PARAMETERS			/ Hardness (CaCO ₃) gpg:	18.3 mg/l	314
			/ Langelier Index		0.26
			/ Sodium (Na)	mg/l	14.2
			/ Potassium (K)	mg/l	3.4
			Field temperature	°F	°C
			Nitrite (NO ₂) (as N)	mg/l	

LAB COMMENTS: 2 L, metal

DDW

Percentage of Error: 1.3/4.0

WNR - 606R - 6/82

mg/l = milligrams/liter = parts/million (ppm)

ug/l = micrograms/liter = parts/billion (ppb)

gpg = grains per gallon

pCi/l = picocuries per liter

882021

LAB NUMBER:

Well ID	Location	million					
		Ca	Mg	K	Cl	F	HCO ₃
(1) MA-8QZ	101-47-6 CBBB98	35	—	<2	0.46	—	—
(2) Brandon City well	102-48-35 CBCA ⁷⁹	30	7.4	6.7	0.52	390	—
(3) MA-8QO	102-49-15 CBBB44	49	—	8	0.64	—	—
(4) MA-8QP	102-49-24 DDDA ²⁶	87	—	8	0.53	—	—
(5)	NSP-3 102-49-36 CDDB ⁴⁶	50	6.7	≤ 2	0.60	410	—
	NSP-3 102-49-36 CDDB ⁵⁰	53	5.8	3	0.59	407	—
(6)	NSP-4 102-49-36 CDBA ²⁸	44	4.8	≤ 2	0.53	373	—
(7)	Private 102-48-28 BBCL ⁰⁰	38	4.5	4.1	—	—	—
Sioux Falls well #46		48	46.2	5.6	29.0	0.23	307
EPA LIMITS					250 (7)	2.4 (8)	

(1): TDS - total dissolved calcium; Mg - magnesium;
K - potassium; Cl -

(7): EPA recommended limit

(8): EPA enforceable limit

This report and/or map is preliminary
has not been edited or reviewed for
conformity with State Geological Survey
standards or nomenclature.

EXPLANATION OF CHEMICAL ANALYSES

The following list of chemicals corresponds to the chemical analysis of your drinking water. The recommended limits were provided by the United States Public Health Service, Drinking Water Standards revised in 1962. The numbers in parenthesis following the element on the lab form prescribes the maximum contaminant levels as set forth by the Federal Drinking Water Standards placed into effect June 24, 1977.

SODIUM - Sodium may be of health significant to persons on a low-salt diet for medical reasons. The sodium content is increased when water is passed through a softener.

IRON AND MANGANESE - Iron and manganese are nuisance chemicals which cause troublesome stains and deposits on light colored clothes, on plumbing fixtures and in pipes. Iron causes yellow, red, or reddish-brown stains removed in a zeolite softener equipped with a special resin or by small treatment systems involving aeration, filtration, and chlorination. Manganese in excess of 0.05 mg/l will more than likely cause problems. Iron problems arise with levels greater than 0.3 mg/l.

NITRATE - Nitrate in excess of 10 mg/l (as N) is of major health significance to infants of six months age or less. High nitrate water should not be used for infant feeding or formulas. Nitrates cannot be removed or reduced by boiling (in fact nitrate content is increased by boiling) and cannot be completely removed by any presently-known public water supply treatment device.

SULFATE - Sulfate content should not exceed 250 mg/l. Water with a sulfate content in excess of 500 to 700 mg/l may have a bitter taste, and have a laxative effect on persons not adapted to the water. Sulfates may also contribute to odor problems.

CONDUCTIVITY - This measures the ability of water to conduct electric current, and is related to the type and amount of dissolved chemicals in the water. In general waters having a conductivity of less than 1000 micromhos may have slight hardness as well as taste and odor problems. Dependent upon the particular chemicals dissolved in the water, these problems may become more pronounced with increasing conductivity to the extent that levels greater than 3000 micromhos may make the water objectionable for human use.

HARDNESS - Hardness is the soap-consuming capacity of water, that is, the more soap required to produce a lather, the harder the water. Hard water also causes greasy rings on bathtubs and sinks, chemical deposits in pipes and faucets, greasy films on dishes or on hair after washing and poor laundry results.

The hardness of South Dakota waters may be rated as follows:

0.3 gpg	Soft water
4-10 gpg	Reasonably soft
11-25 gpg	Fairly hard, less than average for SD
26-50 gpg	Average hardness for SD
51-75 gpg	Very hard
Over 75 gpg	Extremely hard

ALKALINITY - Alkalinity is not considered to be detrimental to humans, but it is generally associated with hardness, high pH values and excessive dissolved solids, all of which may be undesirable. No recommended standard set by the U.S.P.H.S.

BICARBONATES - Excessive bicarbonates add to the salinity and total solids content of water, and at high temperature tends to form scale deposits on faucets. No recommended standard has been set for bicarbonates by the U.S.P.H.S.

CALCIUM - Calcium content is not a health hazard, but is disadvantageous household uses, such as washing, bathing, and laundering, and because it tends to cause incrustations on cooking utensils and water heaters. No recommended standard for calcium has been set by U.S.P.H.S.

CHLORIDES - Chlorides in drinking water are generally not harmful to human beings until high concentrations are reached, although chlorides may be injurious to some people suffering from diseases of heart or kidneys. Restrictions on chloride concentrations in drinking water are generally based on taste requirements rather than on health. The source of chlorides may be a more important factor than the quantity of chloride, in that any sudden increase in the chloride content should be suspected as a possible indication of pollution and should be investigated further. Chlorides should not exceed 250 mg/l.

MAGNESIUM - Magnesium is considered relatively non-toxic to man, and not a public health hazard because before toxic concentrations are reached in water, the taste becomes quite unpleasant. At high concentrations, magnesium salts have a laxative effect, particularly upon new users, although the human body can develop a tolerance to magnesium over a period of time. Recommended limit is 125 mg/l.

pH - The pH indicates the acidity of your drinking water. The pH scale is from 0 to 14 units with a value of 7 being neutral (equal amounts of acid and base) 0-6 being acid and 8-14 being basic. No recommended limits have been set for pH, although drinking water usually is between 7.0 -7.8.

POTASSIUM - In public drinking water supplies, potassium is an essential nutritional element, but in excessive quantities it acts as a laxative, and 1000 mg/l to 2000 mg/l is regarded at the extreme limit of potassium permissible in drinking water.

CARBONATE - Called temporary hardness because heating will remove it. When the water is heated, bicarbonates break down into carbonates that form solid particles which stick to the inside of pipes or a heated surface.

LANGELIER INDEX - This value indicates whether your water tends to be corrosive (-) or deposit (+) forming.

TURBIDITY - This value indicates the presence of suspended material such as clay, silt, and other material preventing the clear quality of water, Turbidity in excess of 5 units are usually detectable in a glass of water, and often objectionable.

SOLIDS (TOTAL) - This refers to the amount of total solid matter suspended and dissolved in water, Water with a high solids count generally are of poor drinking water quality. A limit of 500 mg/l for drinking water is recommended with 4000 mg/l as a maximum.

INORGANIC CHEMICALS

NITRATE: Farm manure, fertilizers and the leachate from septic tanks contribute nitrate to the aquifer. Nitrite is harmful, especially to children. Infant methemoglobinemia (blue babies), results when nitrate, which is converted to nitrite by nitrate-reducing bacteria is consumed by infants. Nitrite then converts hemoglobin, the blood pigment that carries oxygen from the lungs to the tissues, to methemoglobin. Because the altered pigment can no longer transport oxygen, the physiologic effect of methemoglobinemia is that of oxygen deprivation, or suffocation (cyanosis). Nitrate is a principal groundwater pollutant. Percolation rates of 7 in. per year leaching through soil profiles of more than 16 lb./acre $\text{NO}_3\text{-N}$ are estimated to produce conditions exceeding the 10 mg/l nitrate limit set under drinking water standards.

FLUORIDE: Large quantities of fluoride cause dental and skeletal fluorosis. On the other hand, small amounts of fluoride are beneficial, reducing dental caries, particularly among children. Drinking water standards provide limits between 1.4-2.4 mg/l for fluoride, depending upon environmental temperature. For South Dakota the maximum level has been set at 2.4 mg/l. Many groundwaters naturally contain greater concentrations and must be defluoridated.

APPENDIX NO. 2

WELL LOCATION LEGAL DESCRIPTION
AND
WATER RIGHT PERMITS

Water Study
for
City of Brandon

Location of wells - City of Brandon

Well #1	Begin of F Quar at r:	R43W along sterly line/
Well #2	Begin of F Quart at ri	R43W along sterly line.
Well #3	1740 of Se	corner.
Well #4	Beginning at Center of Section 3, T101N, R48W of Fifth P.M. Thence 850 feet Northerly along Quarter Section Line, Thence 600 feet Westerly at right angles to said quarter section line.	
Well #5	Beginning at Center of Section 3, T101N OF Fifth P.M., Thence 450 feet Northerly along Quarter Section Line, Thence 600 feet Westerly at right angles to said Quarter Section Line.	



Department of Water & Natural Resources

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

July 1, 1988

Steve W. Brockmueller
Stockwell Engineers
1621 S Minnesota Ave.
Sioux Falls SD 57105

Dear Mr. Brockmueller:

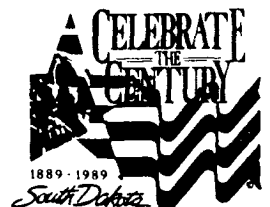
This letter is in response to your letter dated June 27, 1988 regarding water permits held by the City of Brandon. Enclosed are copies of Water Permit Nos. 4002-3, 4434-3, 4885-3 and 1804-3. The first three permits are held by the City of Brandon and the last permit is held by the Brandon Water Company.

Please contact me if you have any questions.

Sincerely,

Ron Duvall
Natural Resources Engineer
605 773-3352

enc.



Form 2 Application for Permit to Appropriative Water (Original (Include Approval and Permit))

Map No. 1210-3 Water Division No. 3 Big Sioux River
(Blanks to be filled in by the Engineer for the S. D. C.)

APPLICATION FOR PERMIT

To Appropriative Water within the State of South Dakota

(NOTE: Draw a line through items not applicable.)

1. Name of Applicant Brandon Water Company
Postoffice address Brandon State South Dakota
If a corporation show date and place of incorporation 1970 - South Dakota
2. Method of accomplishing work (contract, employment of others, or by direct labor) Contract
3. Name of diversion work Brandon Water Company Waterworks
4. Amount of water claimed (cubic feet per second) Present = 1.2 CFS; Future Use = Total of 2.2 C
5. Source of water supply Wells
6. Location of point of diversion (See Attached Sheet) Wells No. 1 & No. 2 located in
Section 3, T101N, R48W and Well No. 3 located in Section 35, T102N, R48W.
County Minnehaha

7. Annual period or periods during which water is to be used Continuous
8. Use to be made of water (irrigation, industrial, municipal, commercial, recreation, etc.) Domestic (Water Company)
9. For irrigation use: None Total number of acres to be irrigated None

List below each forty acre subdivision, or lot, or fraction thereof and show number of acres to be irrigated in each.

Land Description	No. Acres Irr.	Land Description	No. Acres Irr.

Attach sheet if more space is needed

10. Time required to complete construction of water supply system One (Present Use) years. Additional time required to complete application of water to the proposed beneficial use Indefinite years. (Future Withdrawal)
11. Choice of newspaper for Notice of Intent to Appropriative Water publication Suburban News, Garretson, S. D.
12. Principal Features of the Proposed Water Supply System.

A. Works proposed to divert water from its natural source.

Wells and pumping equipment

F. Works proposed to transport water to place of use.

Water transmission pipeline

C. Works proposed to apply water to beneficial use.

Water Distribution System and Elevated Storage Tank
Estimated Total Cost \$125,000.00

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water is proposed. Attach map (See instructions concerning preparation.)

STATE OF SOUTH DAKOTA

County of Minnehaha

I, Ivan Wyum, President the applicant, certify that I have read the foregoing application and have examined the matters therein stated are true and that I intend and am able to complete the necessary construction.

WATER RIGHT APPLICATION APPROVAL

The Water Resources Commission hereby approves Water Right Application No. 1804.3

BRANDON WATER CO.

BRANDON

(Applicant)

(Post Office Address)

SOUTH DAKOTA

(State)

With the following modifications:

The ~~proposed~~ well approved under this Permit is located near domestic wells which may obtain water from the same aquifer. The ~~proposed~~ well owner, under this Permit, shall control his ~~proposed~~ withdrawals so there is not a reduction of needed water supplies in existing domestic wells.

THIS PERMIT IS APPROVED FOR 1.2 CFS. PROPOSED FOR PRESENT DEVELOPMENT. FUTURE USE REQUESTS CAN NOT BE APPROVED FOR PRIVATE, NON-PROFIT WATER COMPANIES

Date of first receipt of application JANUARY 25 19 71

Date of return to applicant for correction, amendments or changes required = 19 =

Date of receipt of corrected application = 19 =

Approved MARCH 10 19 71 Recorded in Book 11 Page 252

WATER RIGHT PERMIT NO. 1804.3

The Water Resources Commission hereby grants and issues this Water Right Permit No. 1804.3 authorizing the construction of the water use system and the putting of water to beneficial use as stated in the Application and as modified in the Water Right Application approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is JANUARY 25 19 71

2. The equivalent of at least one-fifth of the work above specified is to be completed on or before SEPTEMBER 10 19 71

The whole of said work is to be completed on or before MARCH 10 19 72

3. The limit of time from or of of beneficial use of water appropriated in accordance herewith is MARCH 10 19 72

4. The water appropriated shall be used for the purpose of MUNICIPAL USE

6. The prior right of all persons who by compliance with the laws of the State of South Dakota have acquired a right to the use of water must not be injuriously affected by this appropriation.

7. The amount of the appropriation herein granted shall not exceed 1.20 cubic feet per second, neither shall it exceed the capacity of the above described water supply system, nor shall it exceed the amount of water needed for beneficial uses served, and if for the irrigation purposes said appropriation must be limited to not more than 3 acre feet per acre per year and be limited to not more than one-seventieth (1/70) of one cubic foot of water per second of time for each acre of land to which water is

actually and beneficially applied for irrigation on or before MARCH 10 19 72 and water to be used during the following described annual period CONTINUOUSLY

Witness my hand this 15TH day of MARCH 19 71

WATER RESOURCES COMMISSION

By

[Signature]
Chief Engineer, Executive Office

ITEM 6. LOCATION OF POINT OF DIVERSION

- Well No. 1 - Beginning at center of Section 3, T101N, R48W of Fifth P.M.,
thence 1460 feet northerly along quarter section line, thence
600 feet westerly at right angle to said quarter section line.
- Well No. 2 - Beginning at center of Section 3, T101N, R48W of Fifth P.M.,
thence 1150 feet northerly along quarter section line, thence
600 feet westerly at right angles to said quarter section line.
- Well No. 3 - 1740 feet north and 430 feet east of S.W. corner of Section 35,
T102N, R48W of 5th P.M.

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 1804-3

(1) WHEREAS, On the 25th day of January A. D. 1971
the Brandon Water Company
made Water Right Application No. 1804-3 for a permit to use 1.2 cubic feet per second of the water
of ground water
County of Minnehaha State of South Dakota for Municipal
purpose and
(2) WHEREAS, On the 15th day of March A. D. 1971
Permit No. 1804-3 with a date of priority of January 25, 1971
was issued to said applicant for the diversion of said water, and provided for the completion of construction of the water
supply system thereon described on or before the 10th day of March A. D. 1972 and for the
application to beneficial use of said water on or before the 10th day of March A. D. 1972

and:

(3) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota
relating to completion of the construction of the water supply system and is entitled to divert 1.2 cubic feet
per second of water for beneficial use and.

(4) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota
relating to the application of water to beneficial use of the following extent.

water is used for supplying municipal purposes in the Town of Brandon

(5) NOW, THEREFORE, by the virtue of the authority vested in us by the laws of the State of South Dakota, We hereby grant and confirm to _____ the Brandon Water Company _____ of _____ Brandon, S.D. _____ the holder _____ and owner _____ of said permit No. 1804-3 a water right, dating from January 25, 1971 _____ to use of 1.2 cubic feet per second of the waters of ground water _____ in the County of Mitchell and State of South Dakota, or so much thereof as may be necessary for the purposes hereinbelow mentioned, to be diverted at Well #1, 1460 ft. North and 600 ft. West of the Center, Section 3, T101N, R48W; Well #2, 1150 ft. North and 600 ft. West of the Center, Section 3, T101N, R48W; Standby well 1740 ft. north and 430 ft. east of the SW Corner, Section 35, T101N, R49W _____ and ~~understandings~~ conducted through the water company distribution system _____ for the purpose of municipal use

Subject to any limitations listed in Water Right Permit No. 1804-3 and subject to the laws of the State of South Dakota.

WITNESS, My hand and seal of our office at Pierre, South Dakota
this 12th day of June A. D.
Nineteen Hundred and Seventy-two

WATER RESOURCES COMMISSION

By:

Chief Engineer, Executive Officer J.V. CRINES

No. 4002-3
Map No. 3246-3 Water Division No. 3 BIG SIOUX RIVER
(Blank to be filled by the Engineer for the W. R. C.)



APPLICATION FOR PERMIT

To Appropriate Water within the State of South Dakota

(NOTE: Draw a line through items not applicable)

- Name of Applicant City of Brandon
Post-office address 304 Main State South Dakota
If a corporation show date and place of incorporation Municipal Corporation
Contract Contract
- Method of accomplishing work (contract, employment of others, or by direct labor) _____
- Name of diversion work City of Brandon
Present = 1.5 CFS Future = 4 CFS
- Amount of water claimed (cubic feet per second) _____
- Source of water supply Wells
- Location of point of diversion Existing Wells No. 1, 2 & 4 in Section 3, T101N, R48W & Well No. 3 in Section 35, T102N, R48W. Future use in Section 34, T102N, R48W; Section 3, T101N, R48W. County Minnehaha
- Annual period or periods during which water is to be used Continuous Municipal
- Use to be made of water. (irrigation, industrial, municipal, commercial, recreation, etc.) _____
- For irrigation use: Total number of acres to be irrigated _____
List below each forty acre subdivision, or lot, or fraction thereof and show number of acres to be irrigated in each.

Land Description	No. Acres Irr.	Land Description	No. Acres Irr.

Attach sheet if more space is needed

- Time required to complete construction of water supply system (Future Use) years. Additional time required to complete application of water to the proposed beneficial use Indefinite years.
- Choice of newspaper for Notice of Intent to Appropriate Water publication Brandon Valley Reporter
- Principal Features of the Proposed Water Supply System.
 - Works proposed to divert water from its natural source.
Wells and Pumping Equipment
 - Works proposed to transport water to place of use.
Water Transmission Pipeline
 - Works proposed to apply water to beneficial use.
Water Distribution System and Elevated Tank

Estimated Total Cost \$ _____

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map. (See instructions concerning preparation.)

STATE OF SOUTH DAKOTA

County of Minnehaha

I, Gene Johnson, Mayor the applicant, certify that I have read the foregoing application and have examined the attached map and that the matters therein stated are true and that I intend, and am able to complete the necessary construction

Signed

Gene Johnson

Subscribed and sworn to before me this 11 day of May 1977

W. R. C. E. Keeney

WATER RIGHT APPLICATION APPROVAL

The Water Resources Commission hereby approves Water Right Application No. 4002.3

CITY OF BRANDON
(Applicant)

(Post Office Address)

SOUTH DAKOTA 57021
(State)

With the following modifications:

AT SUCH TIME AS DEFINITE PLANS ARE MADE, SPECIFIC APPLICATIONS FOR ALL OR ANY PART OF THE WATER GRANTED UNDER THIS WITHDRAWAL MUST BE SUBMITTED PRIOR TO CONSTRUCTION OF THE FACILITIES.

Date of first receipt of application MAY 16 19 77
Date of return to applicant for correction, amendments or changes required _____ 19 ____
Date of receipt of corrected application SEPTEMBER 12 19 77
Approved OCTOBER 6 19 77 Recorded in Book 19 Page 103

WATER RIGHT PERMIT NO. 4002.3

The Water Resources Commission hereby grants and issues this Water Right Permit No. 4002.3 authorizing the construction of the water use system and the putting of water to beneficial use as stated in the Application and as modified in the Water Right Application approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is SEPTEMBER 12 19 77
2. The equivalent of at least one _____ of the work above specified is to be completed on or before ITEMS 2, 3 & 4 DO NOT APPLY, AS SPECIFIED
3. The whole of said work is to be completed on or before APPLICATIONS ARE TO BE SUBMITTED AS DEFINITE
4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is PLANS ARE MADE ON
5. The water appropriated shall be used for the purpose of MUNICIPAL USE

6. The prior right of all persons who by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be injuriously affected by this appropriation.

7. The amount of the appropriation herein granted shall not exceed 4.0 cubic feet per second; notwithstanding the above, the capacity of the above described water supply system shall not exceed the capacity of the water supply system as it is now used, and if for the irrigation purpose said appropriation must be limited to not more than the amount of water actually and beneficially applied for irrigation on or before _____ 19 ____ with water to be used during the following prescribed period _____

Witness my hand this 1ST day of NOVEMBER 19 77

WATER RESOURCES COMMISSION

John Hatch
Chief Engineer, Executive Officer

Certificate of Construction Issued _____ 19 ____

_____ 19 ____

 **Department of
Water & Natural Resources**

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-2021

Water Rights Division
605 773-3352

October 11, 1984

4002-3

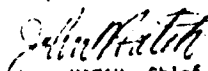
Edwin Gruhot, Mayor
304 Main
Brandon SD 57005

Dear Mayor Gruhot:

This letter is in regard to the motion passed by the Water Management Board September 26, 1984 after review of the City of Brandon's Future Use Permit No. 4002-3. The Board continued Permit No. 4002-3 and amended the Permit to add the qualification on the enclosed Attachment which should be placed with your Permit. Future Use Permit No. 4002-3 will be subject to review after seven years.

If you have any questions, please feel free to contact us.

Very truly yours,


JOHN HATCH, Chief Engineer
Water Rights Division

JH:ks

enclosure

cc: Eloise Stansons, Finance Officer

ATTACHMENT "A" TO FUTURE USE PERMIT NO. 4002-3
FOR CITY OF BRANDON

Future Use Permit No. 4002-3 was continued by action of the Water Management Board September 26, 1984 and amended to add the following qualifications:

- a) Permit No. 4002-3 to appropriate water for future use is subject to review by the Water Management Board as to accomplishment thereunder upon expiration of seven (7) years.
- b) This permit is approved for groundwater from the Big Sioux South Aquifer.

No. 4434-3Map No. 3664-3 Water Division No. 3 BIG SIOUX RIVER District
(Blanks to be Filled by the Engineer for the W. R. C.)

APPLICATION FOR PERMIT

To Appropriately Water within the State of South Dakota

(NOTE - Draw a line through items not applicable)

1. Name of Applicant City of Brandon
 Postoffice address Box 38 (304 Main Ave.) Brandon, State South Dakota
 If a corporation show date and place of incorporation Municipal Corporation
 2. Method of accomplishing work (contract, employment of others, or by direct labor) Contract
 3. Name of diversion work City of Brandon, Municipal Golf Course
 4. Amount of water claimed (cubic feet per second) Wells - 1x2 cfs. Supplemental - .43 MAX ALLOWABLE
 5. Source of water supply Wells, Supplemental - Split Rock Creek
 6. Location of point of diversion Wells, #1 - SW $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$ 35-102-48
#2 - SW $\frac{1}{4}$, NE $\frac{1}{4}$, SE $\frac{1}{4}$ 35-102-48
Supplemental - SE $\frac{1}{4}$, NE $\frac{1}{4}$, SW $\frac{1}{4}$ 35-102-48 County Minnehaha
 7. Annual period or periods during which water is to be used April 15 through November 15
 8. Use to be made of water, (irrigation, industrial, municipal, commercial, recreation, etc.) Irrigation
 9. For irrigation use, Total number of acres to be irrigated 30

List below each forty-acre subdivision, or lot, or fraction thereof and show number of acres to be irrigated in each

Land Description	No. Acres Irr.	Land Description	No. Acres Irr.
SW $\frac{1}{4}$, SE $\frac{1}{4}$ 35-102-48	18	SE $\frac{1}{4}$, SW $\frac{1}{4}$ 35-102-48	3
SE $\frac{1}{4}$, SE $\frac{1}{4}$ 35-102-48	1	NE $\frac{1}{4}$, SW $\frac{1}{4}$ 35-102-48	2
NE $\frac{1}{4}$, SE $\frac{1}{4}$ 35-102-48	2		
NW $\frac{1}{4}$, SE $\frac{1}{4}$ 35-102-48	4		

Attach sheet if more space is needed

10. Time required to complete construction of water supply system 1 years. Additional time required to complete application of water to the proposed beneficial use indefinite years.
 11. Name of newspaper for Notice of Intent to Appropriately Water publication Brandon Valley Reporter
 12. Principal Features of the Proposed Water Supply System
 A. Works proposed to divert water from its natural source
Pumps at Wells.
Portable pump at supplemental source.
 B. Works proposed to transport water to place of use
Underground water transmission lines to man made storage ponds
from wells and from supplemental source.
 C. Works proposed to apply water to beneficial use
Underground distribution system - Automatic sprinkler system.
High pressure pumps.

Estimated Total Cost \$ 91,000.00Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water is proposed. Attach map
(See instructions concerning preparation.)

STATE OF SOUTH DAKOTA

County of MinnehahaI, CEVIE A. JOHNSON, the applicant, certify that I have read the foregoing application and have examined the attached map and that the matters therein stated are true and that I intend and am able to complete the necessary constructionSigned CEVIE A. JOHNSONSubscribed and sworn to before me this 28th day of July, 1978Wallace E. Kienast 635-84
Notary Public (or other qualified officer)

WATER RIGHT APPLICATION APPROVAL

The Water Rights Commission hereby approves Water Right Application No. 4434-3CITY OF BRANDON

(Applicant)

Box 38 - 304 MAIN AVE,

(Post Office Address)

BRANDONSOUTH DAKOTA 57005

(State)

With the following modifications:

The irrigation well ^{ARE} approved under this Permit ~~is~~ located near domestic wells which may obtain water from the same aquifer. The irrigation well owner, under this Permit, shall control his irrigation withdrawals so there is not a reduction of needed water supplies in adequate domestic wells.

Low flows as needed for downstream domestic use, including livestock watering and prior water rights, must be by-passed.

Date of receipt of application JULY 25 19 79Date of return to applicant for correction, amendments or changes required AUGUST 1 19 79Date of receipt of corrected application SEPTEMBER 7 19 79Approved SEPTEMBER 27 19 79, Recorded in Book 21 Page 55WATER RIGHT PERMIT NO. 4434-3

The Water Rights Commission hereby grants and issues this Water Right Permit No. 4434-3 authorizing the construction of the water use system and the putting of water to beneficial use as stated in the Application and as modified in the Water Right Application approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is JULY 25 19 79
2. The equivalent of at least one-fifth of the work above specified is to be completed on or before MARCH 27 19 80
3. The whole of said work is to be completed on or before SEPTEMBER 27 19 80
4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is SEPTEMBER 27 19 80
5. The water appropriated shall be used for the purpose of IRRIGATION - MUNICIPAL GOLF COURSE

6. The prior right of all persons who, by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be injuriously affected by this appropriation.

7. The amount of the appropriation herein granted shall not exceed .43 cubic feet per second; neither shall it exceed the capacity of the above described water supply system, nor shall it exceed the amount of water needed for beneficial uses served, and if for the irrigation purposes said appropriation must be limited to not more than 3 acre feet per acre per year and be limited to not more than one-seventieth (1/70) of one cubic foot of water per second of time for each acre of land to which water is

actually and beneficially applied for irrigation on or before SEPTEMBER 27 19 79; said water to be used during the following described annual period: APRIL 15 THRU NOVEMBER 15

Witness my hand this 9th day of OCTOBER 19 79

WATER RIGHTS COMMISSION

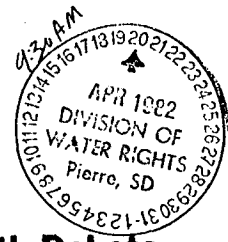
By:

John Hatch
Chief Engineer, Executive Officer

Certificate of Construction Issued _____ 19 _____

Water License Issued _____ 19 _____

No. 4885-3
 Map No. 4089-3 Water Division No. 3 BIG SIOUX RIVER District
 Above for Office Use 10176203



APPLICATION FOR PERMIT To Appropriate Water within the State of South Dakota

Check one of the following:

New ☐ Vested Right ☐ Future Use ☐Change in Diversion ☐ Additional Diversion ☒Change in Acreage ☐ Additional Acreage ☐

1. Name of Applicant City of Brandon Phone No. 582-6515
 Post Office Address Box 38 Brandon State S. Dakota 57005
 (Street, RR, or Box) (Town) (Zip Code)
 If a corporation show date and place of incorporation December 1, 1972
 2. Method of accomplishing work (contract, employment of others, or by direct labor) contract
 3. Name of diversion work City Well # 4 (Water Rights Number 5)
 4. Amount of water claimed (cubic feet per second) 125 gpm (.278 cfs)
 5. Source of water supply Ground Water
 6. Location of point of diversion Beginning at Center of Section 3, T101N, R.48W of Fifth P.M.;
Thence 450 ft. Northerly along quarter section line, thence 600 ft. Westerly at right
angles to said quarter section line. County Minnehaha
 7. Annual period or periods during which water is to be used Continuously
 8. Use to be made of water, (irrigation, industrial, municipal, commercial, recreation, etc.) Municipal
 9. For irrigation use, Total number of acres to be irrigated _____

List below each forty acre subdivision, or lot, or fraction thereof and show number of acres to be irrigated in each.

Land Description	No. Acres Irr.	Land Description	No. Acres Irr.

Attach sheet if more space is needed.

10. Time required to complete construction of water supply system completed years. Additional time required to complete application of water to the proposed beneficial use _____ years.
 11. Choice of county newspaper for publication of Notice of Intent to Appropriate Water Brandon Valley
Reporter
 12. Principal Features of the Proposed Water Supply System.

A. Works proposed to divert water from its natural source.

well pump and motor

B. Works proposed to transport water to place of use.

300 ft. of 6 in sched. 200 plastic to existing 6 in line to water treatment plant.

C. Works proposed to apply water to beneficial use.

approx. 830 service connections serving approx. 3000 people

Estimated Total Cost \$ 17,000

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

STATE OF SOUTH DAKOTA)
)ss.
 County of Minnehaha)

I, City of Brandon the applicant, certify that I have read the foregoing application and have examined the attached map and that the matters therein stated are true and that I intend, and am able to complete the necessary construction.

Signed Steve A. Johnson, MayorSubscribed and sworn to before me this 15th day of April 1982

Wallace E. Kienast
 Notary Public (or other qualified officer)

WATER RIGHT APPLICATION APPROVAL

The Water Management Board hereby approves Water Right Application No. 4885-3

CITY OF BRANDON
(Applicant)

Box 38
(Post Office Address)

SOUTH DAKOTA 57005
(State)

With the following qualifications.

The ~~irrigation~~ well approved under this Permit is located near domestic wells which may obtain water from the same aquifer. The ~~irrigation~~ well owner, under this Permit, shall control his ~~irrigation~~ withdrawals so there is not a reduction of needed water supplies in adequate domestic wells.

Date of first receipt of application April 20, 1982
Date of return to applicant for correction, amendments or changes required April 22, 1982
Date of receipt of corrected application April 26, 1982
Approved JUNE 10, 1982, Recorded in Book _____ Page _____

WATER RIGHT PERMIT NO. 4885-3

The Water Management Board hereby grants and issues this Water Right Permit No. 4885-3 authorizing the construction of the water use system and the putting of water to beneficial use as stated in the Application and as qualified in the Water Right Application approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is April 20, 1982
2. The equivalent of at least one-fifth of the work above specified is ~~to be~~ completed on or before 1982
3. The whole of said work is ~~to be~~ completed on or before 1982
4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is Completed
5. The water appropriated shall be used for the purpose of municipal use

6. The prior right of all persons who, by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be injuriously affected by this appropriation.

7. The amount of the appropriation herein granted shall not exceed 0.28 cubic feet per second; neither shall it exceed the capacity of the above described water supply system, nor shall it exceed the amount of water needed for beneficial uses served, and ~~if for irrigation purposes said appropriation must be limited to not more than 2 acre feet per acre per year and be limited to not more than one-seventieth (1/70) of one cubic foot of water per second of time for each acre of land to which water is actually and beneficially applied~~ USED for municipal use

~~for irrigation~~ on or before this date, 1982; said water to be used during the following described annual period: Continuously

Witness my hand this 23rd day of JUNE, 1982

THE WATER MANAGEMENT BOARD

By:

John H. Hata
Chief Engineer, Water Rights

Certificate of Construction Issued _____, 19____

Water License Issued _____, 19____

NON IRRIGATION

INSTRUCTIONS FOR APPLICATION FOR A WATER PERMIT AND/OR RIGHT

A completed application for a water permit and/or right must include the following:

1. TWO COMPLETED COPIES OF FORM 2, Application to Appropriate Water.
2. A Map, no smaller than 8"x11", showing:
 - a) The location of the diversion point (place where water is to be taken from) in relation to a government section corner or quarter corner by direction and distance.
 - b) If diversion is from a reservoir, the location of the high water line and lands under water, with the names of the owner's (if other than the applicant) and the capacity of the reservoir at maximum pool elevation.
 - c) If diversion is from a stream the location and name of the stream.
 - d) The map must be signed by one of the following: Registered Land Surveyor, Registered Professional Engineer or by any other government employee who normally prepares maps as part of his assigned duties (SCS, ASCS, etc.).
3. If diversion is from a well, dugout or storage dam, two completed copies of Form 2A must be submitted with Form 2. Also provide any supplemental plans or drawing for any storage reservoir. If diversion is from a well, a well log or driller's test log signed by a South Dakota licensed well driller MUST accompany the application. If the well is to be completed into a formation below the Greenhorn an estimate of the depth of the well, proposed construction of the well and formations encountered can be submitted in lieu of a test hole log. When the well is constructed, the drillers log of the completed well must be submitted to this office within 30 days of completion.
4. According to South Dakota Statutes the following filing fees are required for each application: Amount of water claimed (cfs or gpm) should be actual pump capacity.

*First 120 acre feet per year (75 gallons per minute) or portion thereof-----\$150.00
Second 120 acre feet per year (75 gallons per minute) or portion thereof----- 75.00
Each additional 120 acre feet per year (75 gallons per minute) or portion thereof-- 25.00
(120 acre feet per year = 75 gpm continuous use)

*To appropriate 0.10 cfs (45 gpm) or less, to change a diversion point or add a diversion point (on an existing permit) with no new appropriation of water = \$50.00

The filing fee for a future use permit application is 10% of the calculated fee for the amount of water applied for. If after the seven year review the permit is allowed to remain in effect, another 10% filing fee is required. When an application for part or all of the reserved water under a future use is received the applicable fees must be paid.

The forms, signed map, fees and any other pertinent information for filing a Water Permit Application should be submitted to: Water Rights Division, DWNR

Joe Foss Building
Pierre, SD 57501
(605) 773-3352

5. Notice of an application must be published in one local county newspaper for two successive weeks with second publication at least 20 days before the Water Management Board Meeting. Publication notice will be sent to the newspaper by Water Rights Division.

THE COST OF PUBLICATION WILL BE PAID BY THE APPLICANT.

6. Upon completion of the construction of the system and the application of water to beneficial use an inspection will be conducted. The fee for the inspection is \$50.00. After the inspection and payment of the fee a Water License will be issued. The issuance of the Water License is the final action for obtaining a water right.

Mail to: Water Rights Div.
DWR, Foss Bldg.
Pierre, SD 57501
(605) 773-3352

No. _____ Hydrologic Unit _____
Map No. _____ Basin _____
Newspaper _____

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

Check use of water: Industrial ☐ Commercial ☐ Municipal ☐ Other Common Distribution System ☐
Rural 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. _____

1. Name of Applicant _____ Phone No. _____

Post Office Address _____ State _____
(Street, RR or Box) (City) Zip Code

2. Amount of water claimed (c.f.s.) _____

3. Source of water supply _____

4. Location of point of diversion _____

_____ County _____

5. Counties where water will be used _____

6. Annual period during which water is to be used _____

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)

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 _____)

I, _____ 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 _____

Subscribed and sworn to before me this _____ day of _____ 19____

Supplemental Information

(type or print in ink)

1. Well Information - Proposed construction

- a) Drill Hole Diameter _____ Depth _____
- b) Casing Type _____ Diameter _____ Thickness _____
- c) Screen Type _____ Diameter _____ Thickness _____
- d) Gravel Pack Thickness _____ Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material _____
- f) Depth to Water (ground surface to water level) _____
- g) Distance to nearest existing domestic well:
- On applicants property _____ On property owned by others _____

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 _____

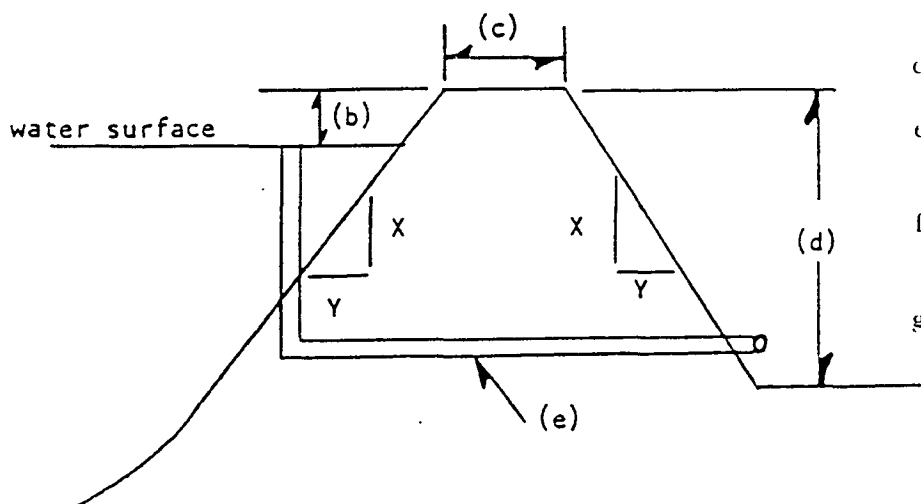
g) X & Y Slope
 Upstream _____

Downstream _____

Surface Area of Impoundment _____

Storage _____ acre feet

Drainage area above dam _____

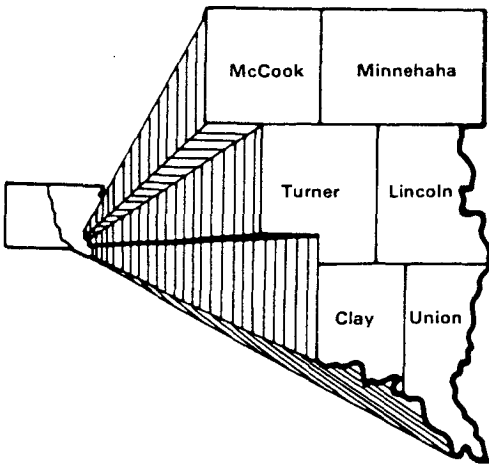


Signature of Applicant _____

APPENDIX NO. 3

POPULATION ESTIMATES

Water Study
for
City of Brandon



"A COUNCIL OF ELECTED OFFICIALS"

SOUTH EASTERN COUNCIL OF GOVERNMENTS

224 South Main Avenue
P.O. Box 843
Sioux Falls, South Dakota 57101-0843
605/339-6515

July 18, 1988

Steve Brockmueller, P.E.
Stockwell Engineers
1621 S. Minnesota Ave.
Sioux Falls, SD 57105

Dear Steve;

Enclosed are the population estimates for the Brandon Water Study. I decided to illustrate the growth of Brandon through a line graph based on the 1980 census using yearly building permits totals up to June 1988. If you need them in chart form please let me know. The population projections from 1990 to 2010 were calculated as a percentage of the county population based on past growth trends of Brandon. I hope you find these figures beneficial.

As far as projections for industrial development, I don't have actual figures on this, although, industrial development in the new park is a major objective for the City. There are currently 5 industries in the industrial park site with one completing construction this summer. This area does have an excellent chance for growth potential.

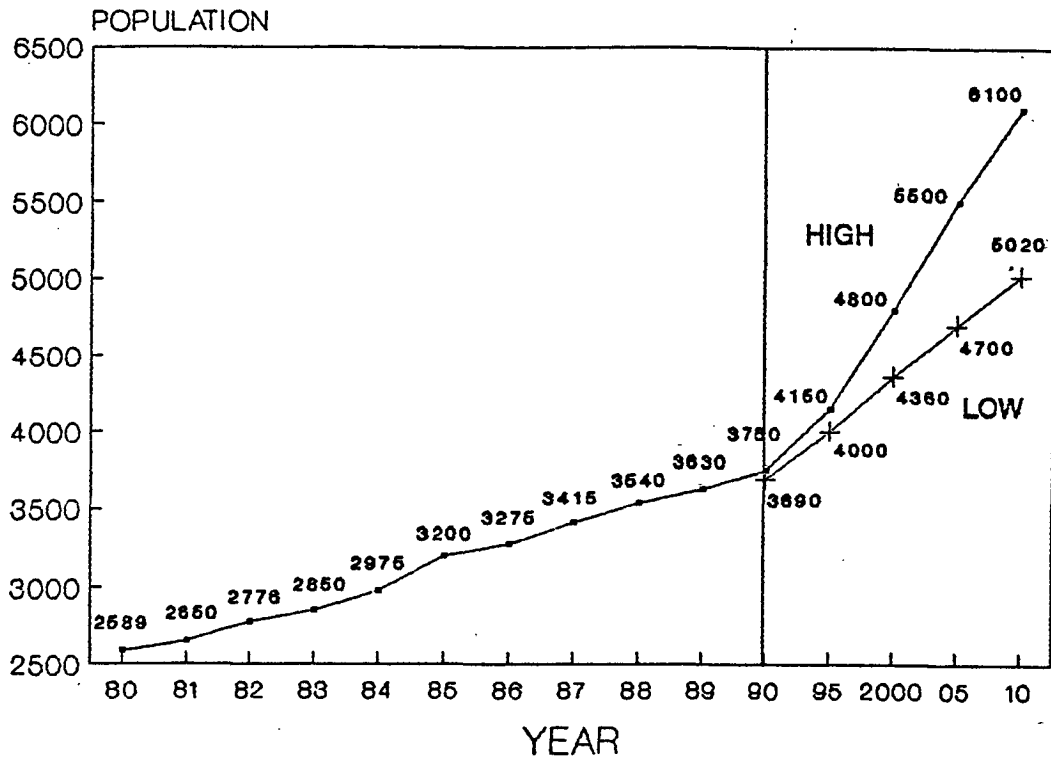
If you have any questions don't hesitate to call.

Sincerely,

Kevin Nissen

Kevin Nissen
Planner

BRANDON POPULATION ESTIMATES



SOURCE: U.S. CENSUS BUREAU
SDSU DATA CENTER (1982 & 1984)
SECOG POPULATION ESTIMATES BASED ON APRIL 1, 1980 TO
JUNE 1, 1988 BUILDING PERMITS

NOTE: Estimates are rounded numbers.

APPENDIX NO. 4

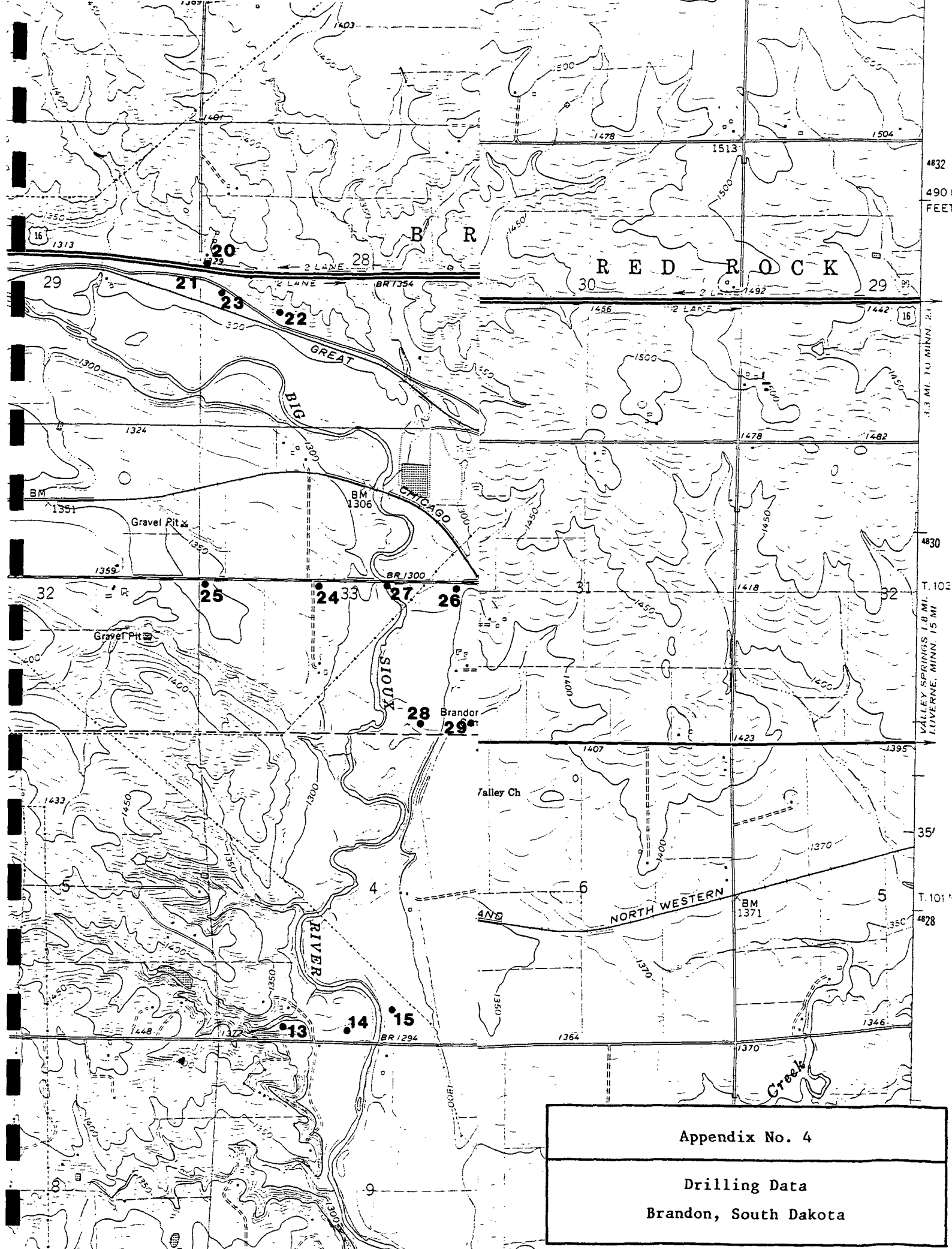
DRILLING AND WATER QUALITY DATA
FOR
THE SPLIT ROCK CREEK AND BIG SIOUX SOUTH AQUIFER

Water Study
for
City of Brandon

APPENDIX NO. 4 - PART 1

DRILLING DATA
FOR
BIG SIOUX SOUTH AQUIFER AND SPLIT ROCK CREEK AQUIFER

Water Study
for
City of Brandon



Appendix No. 4

Drilling Data

Brandon, South Dakota

* THIS LOG CONTAINS UNVERIFIED INFORMATION *

COUNTY: MINNEHAHA LOCATION: 101N-48W-01BABA
LEGAL LOCATION: NE NW NE NW SEC. 01, T. 101 N., R. 48 W.
LATITUDE: 43.3513 LONGITUDE: 96.3237
LAND OWNER: J. ASSID
PROJECT: PRIVATE WELL
DRILLING COMPANY: SIOUX WELL DRILLING
DRILLER: W. WAGNER DRILLER'S LOG: X
GEOLOGIST: GEOLOGIST'S LOG:
DATE DRILLED: 10-30-1984 DRILLING METHOD: ROTARY
GROUND SURFACE ELEVATION: 1355.00 T
TOTAL DRILL HOLE DEPTH: 230.0 TEST HOLE NUMBER:
WATER RIGHTS WELL: SDGS WELL NAME:
OTHER WELL NAME: PRIVATE
BASIN: BIG SIOUX AQUIFER:
MANAGEMENT UNIT:
SCREEN TYPE: STAINLESS STEEL SCREEN LENGTH: 10.0
CASING TYPE: PVC CASING DIAMETER: 5.0
CASING TOP ELEVATION:
CASING STICK-UP: TOTAL CASING AND SCREEN: 230.0
WELL MAINTENANCE DATE:
USGS HYDROLOGICAL UNIT CODE: 10170203
ELECTRIC LOG INFORMATION:
SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
NATURAL GAMMA: EXTRA:
SAMPLES:

0	-	2.0	TOPSOIL
2.0	-	14.0	CLAY, YELLOW
14.0	-	16.0	SAND
16.0	-	142.0	CLAY, GRAY
142.0	-	204.0	SILTSTONE, BLACK (SPLIT ROCK CREEK FORMATION)
204.0	-	218.0	SHALE (SPLIT ROCK CREEK FORMATION)
218.0	-	230.0	SANDSTONE (SPLIT ROCK CREEK FORMATION)

COUNTY: MINNEHAHA LOCATION: 101N-48W-12ABBB
 LEGAL LOCATION: NW NW NW NE SEC. 12, T. 101 N., R. 48 W.
 LATITUDE: 43.3422 LONGITUDE: 96.3222
 LAND OWNER:
 PROJECT: SIOUX FALLS-BRANDON STUDY
 DRILLING COMPANY: SDGS
 DRILLER: L. HELSETH
 GEOLOGIST: D. ILES
 DATE DRILLED: 12-16-1980
 GROUND SURFACE ELEVATION: 1341.00 T
 TOTAL DRILL HOLE DEPTH: 105.0
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL:
 NATURAL GAMMA:
 SAMPLES:

DRILLER'S LOG:
 GEOLOGIST'S LOG: X
 DRILLING METHOD: ROTARY
 TEST HOLE NUMBER: SFB-245

SINGLE POINT RESISTIVITY:
 EXTRA:

0	-	2.0	TOPSOIL, BLACK
2.0	-	8.0	CLAY, LIGHT-GRAY
8.0	-	30.0	SAND AND GRAVEL, MEDIUM SAND TO COARSE GRAVEL
30.0	-	40.0	CLAY, LIGHT- TO MEDIUM-GRAY
40.0	-	43.0	SAND AND GRAVEL, MEDIUM SAND TO COARSE GRAVEL
43.0	-	88.0	CLAY, GRAY; VERY STICKY, MUD COLLAR FORMED
88.0	-	97.0	SAND(?)
97.0	-	105.0	SILTSTONE(?); HARD, LOST CIRCULATION, ABANDONED HOLE (SPLIT ROCK CREEK FORMATION)

COUNTY: MINNEHAHA LOCATION: 101N-48W-01CCCD
 LEGAL LOCATION: SE SW SW SW SEC. 01, T. 101 N., R. 48 W.
 LATITUDE: 43.3422 LONGITUDE: 96.3250
 LAND OWNER:
 PROJECT: SE SD. DAK. UNIT STUDY
 DRILLING COMPANY: MERRIMAN DRILLING
 DRILLER: L. MERRIMAN DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 07-20-1984 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1338.00 T
 TOTAL DRILL HOLE DEPTH: 251.0 TEST HOLE NUMBER:
 WATER RIGHTS WELL: SDGS WELL NAME:
 OTHER WELL NAME: 2
 BASIN: BIG SIOUX AQUIFER:
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 10.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1340.00 T
 CASING STICK-UP: 2.00 TOTAL CASING AND SCREEN: 220.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY: X
 NATURAL GAMMA: X EXTRA:
 SAMPLES:

0	-	4.0	SAND, BROWN, MEDIUM, SILTY, CLAYEY; OXIDIZED
4.0	-	22.0	CLAY, BROWN, VERY SILTY; OXIDIZED, GREASY (LAKE CLAY?)
22.0	-	54.0	SAND, REDDISH-BROWN, COARSE; SOME FINE TO COARSE GRAVEL, WHITISH-BROWN CLAY FROM 48 TO 51 FEET, VERY GRAVELLY BELOW 51 FEET
54.0	-	75.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
75.0	-	77.0	QUARTZITE BOULDER, REDDISH-PINK; HARD
77.0	-	102.0	CLAY, GRAY, VERY SILTY; VERY HARD (SPLIT ROCK CREEK FORMATION?)
102.0	-	105.0	SAND, PINK AND WHITE AND GREEN, COARSE; CONTAINS LOW DENSITY FLAT, ROUNDED, GRAY STONES (SPLIT ROCK CREEK FORMATION)
105.0	-	163.0	SILTSTONE, BLACK; HARD, ALTERNATING LAYERS OF CEMENTED SILTS, SILTY CLAYS, AND GREASY SHALES (SPLIT ROCK CREEK FORMATION)
163.0	-	241.0	SAND, PINK AND WHITE, FINE TO MEDIUM; PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
241.0	-	250.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)

250.0 - 251.0 QUARTZITE, PINKISH-WHITE; VERY HARD, ONLY
A FEW INCHES WERE ACTUALLY PENETRATED

COUNTY: MINNEHAHA LOCATION: 101N-48W-01CCCD 2
 LEGAL LOCATION: SE SW SW SW SEC. 01, T. 101 N., R. 48 W.
 LATITUDE: 43.3423 LONGITUDE: 96.3251
 LAND OWNER:
 PROJECT: BIG SIOUX HYDRO STUDY
 DRILLING COMPANY: SDGS
 DRILLER: L. HELSETH DRILLER'S LOG: X
 GEOLOGIST: W. BRADFORD GEOLOGIST'S LOG:
 DATE DRILLED: 09-24-1984 DRILLING METHOD: AUGER
 GROUND SURFACE ELEVATION: 1340.00 T
 TOTAL DRILL HOLE DEPTH: 55.0 TEST HOLE NUMBER: R20-84-347
 WATER RIGHTS WELL: SDGS WELL NAME: R20-84-347
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER:
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, HM. SCREEN LENGTH: 10.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1343.00 T
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 58.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

PVC SLOTTED 45 TO 55 FEET FROM GROUND SURFACE.

0	-	7.0	CLAY, YELLOW, SILTY, SANDY (TILL)
7.0	-	24.0	CLAY, BROWNISH-GRAY (TILL)
24.0	-	52.0	SAND AND GRAVEL; SOME CLAY
52.0	-	55.0	CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

COUNTY: MINNEHAHA LOCATION: 101N-48W-02BCCB
 LEGAL LOCATION: NW SW SW NW SEC. 02, T. 101 N., R. 48 W.
 LATITUDE: 43.3455 LONGITUDE: 96.3405
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: D. IVERSON DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 09-09-1985 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1320.00 T
 TOTAL DRILL HOLE DEPTH: 110.0 TEST HOLE NUMBER: R20-85-179
 WATER RIGHTS WELL: SDGS WELL NAME: R20-85-179
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER:
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. AND HM. SCREEN LENGTH: 25.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1323.00 T
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 113.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY: X
 NATURAL GAMMA: X EXTRA:
 SAMPLES:

CASING SLOTTED 20 FEET ABOVE A 5-FOOT SANDPOINT.
 8 FEET OF BLANK CASING ON BOTTOM OF SANDPOINT.

0	-	1.0	CLAY, BLACK, SILTY (TOPSOIL)
1.0	-	3.0	CLAY, YELLOWISH-BROWN, SANDY
3.0	-	15.0	SAND, BROWN, MEDIUM; OXIDIZED
15.0	-	38.0	SAND, BROWN, MEDIUM TO COARSE; OXIDIZED, SOME GRAVEL
38.0	-	66.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
66.0	-	71.0	CLAY, DARK-GRAY; HARD
71.0	-	102.0	SAND, GRAY, MEDIUM TO COARSE; UNOXIDIZED, MUCH QUARTZ, CLAY LAYERS FROM 82 TO 86 FEET AND 90 TO 93 FEET
102.0	-	106.0	SHALE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
106.0	-	110.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)

COUNTY: MINNEHAHA LOCATION: 101N-48W-02CCCC
 LEGAL LOCATION: SW SW SW SEC. 02, T. 101 N., R. 48 W.
 LATITUDE: 43.3423 LONGITUDE: 96.3359
 LAND OWNER:
 PROJECT: SE SO. DAK. UNIT STUDY
 DRILLING COMPANY: MERRIMAN DRILLING
 DRILLER: L. MERRIMAN DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 07-24-1984 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1345.00 T
 TOTAL DRILL HOLE DEPTH: 379.0 TEST HOLE NUMBER:
 WATER RIGHTS WELL: MA-87H SDGS WELL NAME:
 OTHER WELL NAME: 3
 BASIN: BIG SIOUX AQUIFER:
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 10.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1347.00 T
 CASING STICK-UP: 2.00 TOTAL CASING AND SCREEN: 350.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY: X
 NATURAL GAMMA: X EXTRA:
 SAMPLES:

0	-	16.0	GRAVEL, REDDISH-BROWN, MEDIUM, SANDY, WELL-SORTED; ROUNDED, OXIDIZED
16.0	-	39.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
39.0	-	54.0	SAND, BROWN, MEDIUM TO COARSE; OXIDIZED
54.0	-	60.0	GRAVEL, BROWN, COARSE, COBBLY; OXIDIZED
60.0	-	109.0	CLAY, GRAY, SILTY, VERY SHALEY; GREASY (SPLIT ROCK CREEK FORMATION?)
109.0	-	139.0	SILTSTONE, BLACK; HARD, SOME CEMENTED SILT, SOME SILTY CLAYS, SOME GREASY SHALES (SPLIT ROCK CREEK FORMATION)
139.0	-	144.0	SHALE, BLACK; GREASY, HARD (SPLIT ROCK CREEK FORMATION)
144.0	-	169.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
169.0	-	178.0	SHALE, BLACK; GREASY, HARD (SPLIT ROCK CREEK FORMATION)
178.0	-	196.0	SAND, PINK AND WHITE, FINE TO MEDIUM, PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
196.0	-	205.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
205.0	-	225.0	SAND, PINK AND WHITE, FINE TO MEDIUM; PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
225.0	-	232.0	SHALE, BLACK; HARD, GREASY, SOME SILT

		(SPLIT ROCK CREEK FORMATION)
232.0 -	293.0	SAND, PINK AND WHITE, MEDIUM; PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
293.0 -	296.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
296.0 -	310.0	SAND, PINK AND WHITE, MEDIUM TO COARSE; PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
310.0 -	318.0	SILTSTONE, BLACK; HARD, SOME PINK AND BLACK SILTY CLAYS (SPLIT ROCK CREEK FORMATION)
318.0 -	378.0	SAND, PINK AND WHITE, MEDIUM TO COARSE; PARTIALLY CEMENTED, MOSTLY QUARTZ, SEVERAL SMALL BLACK SILTSTONE LAYERS (SPLIT ROCK CREEK FORMATION)
378.0 -	379.0	QUARTZITE, PINKISH-WHITE; VERY HARD, ONLY A FEW INCHES WERE ACTUALLY PENETRATED

COUNTY: MINNEHAHA LOCATION: 101N-48W-02CCCC 1
 LEGAL LOCATION: SW SW SW SW SEC. 02, T. 101 N., R. 48 W.
 LATITUDE: 43.3453 LONGITUDE: 96.3400
 LAND OWNER:
 PROJECT: BIG SIOUX HYDRO STUDY
 DRILLING COMPANY: SDGS
 DRILLER: L. HELSETH DRILLER'S LOG: X
 GEOLOGIST: W. BRADFORD GEOLOGIST'S LOG:
 DATE DRILLED: 09-24-1984 DRILLING METHOD: AUGER
 GROUND SURFACE ELEVATION: 1345.00 T
 TOTAL DRILL HOLE DEPTH: 55.0 TEST HOLE NUMBER: R20-84-348
 WATER RIGHTS WELL: SDGS WELL NAME: R20-84-348
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER:
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, HM. SCREEN LENGTH: 10.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1348.00 T
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 48.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

PVC SLOTTED 31 TO 41 FEET FROM GROUND SURFACE.

0	-	1.0	CLAY, YELLOW (TOPSOIL)
1.0	-	16.0	SAND, MEDIUM; SOME GRAVEL
16.0	-	38.0	CLAY, GRAY
38.0	-	55.0	SAND AND GRAVEL

COUNTY: MINNEHAHA LOCATION: 101N-48W-03AABA 2
 LEGAL LOCATION: NE NW NE NE SEC. 03, T. 101 N., R. 48 W.
 LATITUDE: 43.3514 LONGITUDE: 96.3428
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: C. SCHMIG
 GEOLOGIST: D. TOMHAVE
 DATE DRILLED: 05-01-1985
 GROUND SURFACE ELEVATION: 1352.00 T
 TOTAL DRILL HOLE DEPTH: 277.0
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL:
 NATURAL GAMMA: X
 SAMPLES:

DRILLER'S LOG:
 GEOLOGIST'S LOG: X
 DRILLING METHOD: ROTARY

TEST HOLE NUMBER: R2-85-17

SINGLE POINT RESISTIVITY: X
 EXTRA:

0	-	15.0	SAND AND GRAVEL, BROWN, COARSE SAND, FINE TO MEDIUM GRAVEL
15.0	-	24.0	CLAY, BROWN, SILTY, SANDY; OXIDIZED
24.0	-	35.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
35.0	-	60.0	GRAVEL, BROWN, MEDIUM TO COARSE, SANDY; OXIDIZED
60.0	-	64.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
64.0	-	68.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
68.0	-	69.0	ROCK, BLACK; MUCH QUARTZ
69.0	-	90.0	SAND, BROWN, FINE, SILTY; MUCH QUARTZ, NOT VERY MUCH SAMPLE RETURN
90.0	-	96.0	CLAY, GRAYISH-GREEN, VERY SILTY, SANDY
96.0	-	127.0	SAND, GREENISH-BROWN, FINE TO MEDIUM; MUCH QUARTZ, BECOMES COARSE WITH DEPTH
127.0	-	128.0	QUARTZITE BOULDER; VERY HARD
128.0	-	135.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
135.0	-	138.0	CLAY, GRAYISH-WHITE; HARD, GREASY (SPLIT ROCK CREEK FORMATION)
138.0	-	170.0	SILTSTONE, BLACK; HARD, SOME CEMENTED SILTS, SOME SILTY CLAY, SOME GREASY SHALE (SPLIT ROCK CREEK FORMATION)
170.0	-	206.0	SAND, PINKISH-RED, FINE; MOSTLY QUARTZ, PARTIALLY CEMENTED (SPLIT ROCK CREEK FORMATION)
206.0	-	210.0	CLAY, BLACK, VERY SILTY; HARD (SPLIT ROCK CREEK FORMATION)
210.0	-	230.0	SILT, BLACK, SANDY; HARD, CEMENTED (SPLIT ROCK CREEK FORMATION)
230.0	-	240.0	SHALE, BLACK; VERY HARD (SPLIT ROCK CREEK FORMATION)
240.0	-	250.0	SAND, PINKISH-RED, FINE TO MEDIUM; HARD,

250.0 -	254.0	CEMENTED (SPLIT ROCK CREEK FORMATION) SHAPE, BLACK; VERY VERY HARD (SPLIT ROCK CREEK FORMATION)
254.0 -	261.0	SAND, PINKISH-RED, FINE TO MEDIUM; MOSTLY QUARTZ, HARD, CEMENTED (SPLIT ROCK CREEK FORMATION)
261.0 -	272.0	SHAPE, BLACK; VERY HARD (SPLIT ROCK CREEK FORMATION)
272.0 -	276.0	CLAY, WHITE, SILTY, SANDY (SPLIT ROCK CREEK FORMATION)
276.0 -	277.0	QUARTZITE, PINK; VERY VERY HARD, ACTUALLY ONLY A FEW INCHES WERE PENETRATED (SIOUX QUARTZITE)

COUNTY: MINNEHAHA
 LEGAL LOCATION: NE NW NE NE SEC. 03, T. 101 N., R. 48 W.
 LATITUDE: 43.3514
 LOCATION: 101N-48W-03AABA 3
 LONGITUDE: 96.3428
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: R. GRAVHOLT
 GEOLOGIST: D. TOMHAVE
 DATE DRILLED: 05-02-1985
 GROUND SURFACE ELEVATION: 1352.00 T
 TOTAL DRILL HOLE DEPTH: 128.0
 WATER RIGHTS WELL:
 OTHER WELL NAME:
 BASIN: BIG SIOUX
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. AND HM.
 CASING TYPE: PVC
 CASING TOP ELEVATION: 1355.00 T
 CASING STICK-UP: 3.00
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL:
 NATURAL GAMMA:
 SAMPLES:

DRILLER'S LOG:
 GEOLOGIST'S LOG: X
 DRILLING METHOD: ROTARY
 TEST HOLE NUMBER: R2-85-18
 SDGS WELL NAME: R2-85-18
 AQUIFER: SPLIT ROCK CREEK
 SCREEN LENGTH: 15.0
 CASING DIAMETER: 2.0
 TOTAL CASING AND SCREEN: 132.0
 SINGLE POINT RESISTIVITY:
 EXTRA:

CASING SLOTTED 10 FEET ABOVE A 5-FOOT SCREEN.

0	-	16.0	SAND AND GRAVEL, BROWN, FINE TO MEDIUM GRAVEL, COARSE SAND; OXIDIZED
16.0	-	26.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
26.0	-	36.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
36.0	-	57.0	GRAVEL, BROWN, MEDIUM TO COARSE, SANDY; OXIDIZED, ROCK AT 55 FEET
57.0	-	66.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
66.0	-	70.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
70.0	-	92.0	SAND, BROWN, FINE, SILTY; OXIDIZED, SOME GRAVEL, ROCK AT 92 FEET
92.0	-	96.0	CLAY, GREENISH-GRAY, VERY SILTY, SANDY
96.0	-	128.0	SAND, GREENISH-GRAY, FINE TO MEDIUM; MUCH QUARTZ, SLIGHTLY CEMENTED, BECOMES COARSER WITH DEPTH, QUARTZITE BOULDER AT 128 FEET

COUNTY: MINNEHAHA LOCATION: 101N-48W-03AABA 4
LEGAL LOCATION: NE NW NE NE SEC. 03, T. 101 N., R. 48 W.
LATITUDE: 43.3514 LONGITUDE: 96.3428
LAND OWNER:
PROJECT: MINNEHAHA COUNTY STUDY
DRILLING COMPANY: SDGS
DRILLER: C. SCHMIG DRILLER'S LOG:
GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
DATE DRILLED: 05-02-1985 DRILLING METHOD: ROTARY
GROUND SURFACE ELEVATION: 1352.00 T
TOTAL DRILL HOLE DEPTH: 60.0 TEST HOLE NUMBER: R2-85-19
WATER RIGHTS WELL: SDGS WELL NAME: R2-85-19
OTHER WELL NAME:
BASIN: BIG SIOUX AQUIFER: BIG SIOUX
MANAGEMENT UNIT:
SCREEN TYPE: PVC, MFG. AND HM. SCREEN LENGTH: 15.0
CASING TYPE: PVC CASING DIAMETER: 2.0
CASING TOP ELEVATION: 1355.00 T
CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 63.0
WELL MAINTENANCE DATE:
USGS HYDROLOGICAL UNIT CODE: 10170203
ELECTRIC LOG INFORMATION:
SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
NATURAL GAMMA: EXTRA:
SAMPLES:

CASING SLOTTED 10 FEET ABOVE A 5-FOOT SCREEN.

0	-	15.0	SAND AND GRAVEL, BROWN, FINE TO MEDIUM GRAVEL, COARSE SAND; OXIDIZED
15.0	-	27.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
27.0	-	35.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
35.0	-	59.0	GRAVEL, BROWN, MEDIUM TO COARSE, SANDY; OXIDIZED
59.0	-	60.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)

 * THIS LOG CONTAINS UNVERIFIED INFORMATION *

COUNTY: MINNEHAHA
LEGAL LOCATION: SW NW NW SW SEC. 03, T. 101 N., R. 48 W.
LATITUDE: 43.3441
LAND OWNER: K. GUSE
PROJECT: DOMESTIC WELL
DRILLING COMPANY: SIOUX WELL DRILLING
DRILLER:
GEOLOGIST:
DATE DRILLED: 06-13-1983
GROUND SURFACE ELEVATION: 1325.00 T
TOTAL DRILL HOLE DEPTH: 43.0
WATER RIGHTS WELL:
OTHER WELL NAME: PRIVATE
BASIN: BIG SIOUX
MANAGEMENT UNIT:
SCREEN TYPE: PVC
CASING TYPE: PVC
CASING TOP ELEVATION:
CASING STICK-UP:
WELL MAINTENANCE DATE:
USGS HYDROLOGICAL UNIT CODE: 10170203
ELECTRIC LOG INFORMATION:
SPONTANEOUS POTENTIAL:
NATURAL GAMMA:
SAMPLES:

LOCATION: 101N-48W-03C8BC
LONGITUDE: 96.3518
DRILLER'S LOG: X
GEOLOGIST'S LOG:
DRILLING METHOD: ROTARY
TEST HOLE NUMBER:
SDGS WELL NAME:
AQUIFER:
SCREEN LENGTH:
CASING DIAMETER:
TOTAL CASING AND SCREEN:
SINGLE POINT RESISTIVITY:
EXTRA:

DEPTH TO WATER: 29 FEET.

0	-	1.0	TOPSOIL
1.0	-	8.0	CLAY, YELLOW
8.0	-	43.0	SAND

COUNTY: MINNEHAHA LOCATION: 101N-48W-04AAAA
 LEGAL LOCATION: NE NE NE NE SEC. 04, T. 101 N., R. 48 W.
 LATITUDE: 43.3513 LONGITUDE: 96.3530
 LAND OWNER:
 PROJECT: SIOUX FALLS-BRANDON STUDY
 DRILLING COMPANY: SDGS
 DRILLER: R. SNYDER
 GEOLOGIST: D. ILES
 DATE DRILLED: 06-26-1979
 GROUND SURFACE ELEVATION: 1333.00 T
 TOTAL DRILL HOLE DEPTH: 180.0
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: X
 NATURAL GAMMA:
 SAMPLES:

DRILLER'S LOG:
 GEOLOGIST'S LOG: X
 DRILLING METHOD: ROTARY
 TEST HOLE NUMBER: SFB-59
 SINGLE POINT RESISTIVITY: X
 EXTRA:

0	-	22.0	SAND AND GRAVEL, BROWN, COARSE SAND TO MEDIUM GRAVEL
22.0	-	36.0	CLAY, BROWN, SILTY, PEBBLY (TILL)
36.0	-	43.0	GRAVEL, COARSE; CEMENTED
43.0	-	51.0	CLAY, BROWN, GRAVELLY (TILL)
51.0	-	55.0	CLAY, GRAY, GRAVELLY (TILL)
55.0	-	66.0	SAND AND GRAVEL, MEDIUM SAND TO COARSE GRAVEL
66.0	-	74.0	CLAY, GRAY, SANDY, PEBBLY (TILL)
74.0	-	82.0	CLAY, GRAY, SILTY, SLIGHTLY PEBBLY
82.0	-	104.0	GRAVEL; COMPOSED MAINLY OF BLACK MATERIAL WITH A CLAY LAYER AT 94 FEET
104.0	-	114.0	CLAY, GRAY, SILTY, SLIGHTLY PEBBLY
114.0	-	115.0	GRAVEL, BLACK
115.0	-	130.0	CLAY, DARK-GRAY, SILTY; COMPACT (SPLIT ROCK CREEK FORMATION)
130.0	-	153.0	GRAVEL; COMPOSED MAINLY OF BLACK MATERIAL, WITH SOME CLAY (SPLIT ROCK CREEK FORMATION)
153.0	-	158.0	CLAY, GRAY, SILTY, PEBBLY, GRAVELLY; WITH SHALEY, COAL-LIKE STRINGERS (SPLIT ROCK CREEK FORMATION)
158.0	-	166.0	SAND, LIGHT-GRAY, TURNING PINKER WITH DEPTH, COARSE (SPLIT ROCK CREEK FORMATION)
166.0	-	168.0	SAND, PINK; SHALEY (SPLIT ROCK CREEK FORMATION)
168.0	-	173.0	SHALE(?), PINK (SPLIT ROCK CREEK FORMATION)
173.0	-	175.0	CLAY, GRAY, SILTY (SPLIT ROCK CREEK FORMATION)
175.0	-	177.0	SHALE(?), PINK; WITH LIGHT-PINKISH-GRAY SAND (SPLIT ROCK CREEK FORMATION)
177.0	-	180.0	QUARTZITE, PURPLISH-PINK; HARD (SIOUX QUARTZITE)

COUNTY: MINNEHAHA LOCATION: 101N-48W-04DDDD
 LEGAL LOCATION: SE SE SE SE SEC. 04, T. 101 N., R. 48 W.
 LATITUDE: 43.3422 LONGITUDE: 96.3518
 LAND OWNER:
 PROJECT: SIOUX FALLS-BRANDON STUDY
 DRILLING COMPANY: SDGS
 DRILLER: M. KOFFLER
 GEOLOGIST: D. ILES
 DATE DRILLED: 05-05-1980
 GROUND SURFACE ELEVATION: 1320.00 T
 TOTAL DRILL HOLE DEPTH: 121.0
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL:
 NATURAL GAMMA: X
 SAMPLES:

DRILLER'S LOG:
 GEOLOGIST'S LOG: X
 DRILLING METHOD: ROTARY
 TEST HOLE NUMBER: SFB-127
 SINGLE POINT RESISTIVITY: X
 EXTRA:

0	-	2.0	TOPSOIL, BLACK
2.0	-	10.0	GRAVEL, MEDIUM TO COARSE
10.0	-	40.0	CLAY, SILVER-GRAY, SLIGHTLY SANDY (TILL)
40.0	-	95.0	CLAY, GRAY-BLACK; VERY SHALEY, HARD (TILL?)
95.0	-	104.0	UNKNOWN; FAST DRILLING, NO DEFINITIVE SAMPLE, THE ELECTRIC LOG SHOWS THAT IT IS PROBABLY CLAY
104.0	-	118.0	SILTSTONE(?), BLACK, SANDY; HARD (SPLIT ROCK CREEK FORMATION)
118.0	-	120.0	CLAY OR SHALE (SPLIT ROCK CREEK FORMATION)
120.0	-	121.0	QUARTZITE, PINK (SIOUX QUARTZITE)

COUNTY: MINNEHAHA LOCATION: 102N-48W-27CDDD
 LEGAL LOCATION: SE SE SE SW SEC. 27, T. 102 N., R. 48 W.
 LATITUDE: 43.3607 LONGITUDE: 96.3455
 LAND OWNER:
 PROJECT: BIG SIOUX HYDRO STUDY
 DRILLING COMPANY: SDGS
 DRILLER: L. HELSETH DRILLER'S LOG: X
 GEOLOGIST: W. BRADFORD GEOLOGIST'S LOG:
 DATE DRILLED: 09-11-1984 DRILLING METHOD: AUGER
 GROUND SURFACE ELEVATION: 1363.00 T
 TOTAL DRILL HOLE DEPTH: 25.0 TEST HOLE NUMBER: R20-84-334
 WATER RIGHTS WELL: SDGS WELL NAME: R20-84-334
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER: BIG SIOUX
 MANAGEMENT UNIT: SOUTH
 SCREEN TYPE: PVC, HM. SCREEN LENGTH: 15.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1366.00 T
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 25.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

CASING SLOTTED FROM 7 TO 22 FEET.

0	-	2.0	CLAY, YELLOW
2.0	-	22.0	SAND, FINE TO MEDIUM
22.0	-	25.0	CLAY, GRAY, SHALEY

COUNTY: MINNEHAHA LOCATION: 102N-48W-33DCDD
 LEGAL LOCATION: SE SE SW SE SEC. 33, T. 102 N., R. 48 W.
 LATITUDE: 43.3517 LONGITUDE: 96.3550
 LAND OWNER:
 PROJECT:
 DRILLING COMPANY:
 DRILLER: VON HOLDT DRILLER'S LOG: X
 GEOLOGIST: F. STEECE GEOLOGIST'S LOG:
 DATE DRILLED: 00-00-1958 DRILLING METHOD:
 GROUND SURFACE ELEVATION: 1290.00 T
 TOTAL DRILL HOLE DEPTH: 54.0 TEST HOLE NUMBER:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

0	-	4.0	TOPSOIL
4.0	-	12.0	ALLUVIUM
12.0	-	19.0	SAND, MEDIUM TO COARSE; SATURATED AT 17 FEET
19.0	-	29.0	SAND AND GRAVEL, COARSE SAND, FINE GRAVEL
29.0	-	34.0	SAND, COARSE
34.0	-	36.0	SAND, MEDIUM
36.0	-	54.0	TILL

 * THIS LOG CONTAINS UNVERIFIED INFORMATION *

COUNTY: MINNEHAHA LOCATION: 102N-48W-33DDDC
 LEGAL LOCATION: SW SE SE SE SEC. 33, T. 102 N., R. 48 W.
 LATITUDE: 43.3517 LONGITUDE: 96.3532
 LAND OWNER: BRANDON CEMETARY
 PROJECT: DOMESTIC WELL
 DRILLING COMPANY: SIOUX WELL DRILLING
 DRILLER: DRILLER'S LOG:
 GEOLOGIST: GEOLOGIST'S LOG:
 DATE DRILLED: 05-23-1983 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1335.00 T
 TOTAL DRILL HOLE DEPTH: 49.0 TEST HOLE NUMBER:
 WATER RIGHTS WELL: SDGS WELL NAME:
 OTHER WELL NAME: PRIVATE
 BASIN: BIG SIOUX AQUIFER:
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC SCREEN LENGTH:
 CASING TYPE: PVC CASING DIAMETER:
 CASING TOP ELEVATION:
 CASING STICK-UP: TOTAL CASING AND SCREEN:
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

DEPTH TO WATER: 32 FEET.

0	-	1.0	TOPSOIL
1.0	-	8.0	CLAY, YELLOW
8.0	-	49.0	SAND

COUNTY: MINNEHAHA LOCATION: 102N-48W-34AAA
 LEGAL LOCATION: NE NE NE NE SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3605 LONGITUDE: 96.3420
 LAND OWNER:
 PROJECT: SIOUX FALLS-BRANDON STUDY
 DRILLING COMPANY: SDGS
 DRILLER: L. HELSETH
 GEOLOGIST: D. ILES
 DATE DRILLED: 12-10-1980
 GROUND SURFACE ELEVATION: 1332.00 T
 TOTAL DRILL HOLE DEPTH: 50.0
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

ABANDONED HOLE, LOSING WATER RAPIDLY AND WATER
 TRUCK WAS EMPTY, FREEZING CONDITIONS PROHIBITED
 CONTINUATION OF DRILLING.

0	-	3.0	TOPSOIL, BLACK
3.0	-	10.0	CLAY, YELLOW (TILL)
10.0	-	12.0	CLAY, GRAY (TILL)
12.0	-	17.0	SAND, COARSE
17.0	-	20.0	SAND, MEDIUM TO COARSE
20.0	-	41.0	GRAVEL, MEDIUM TO COARSE
41.0	-	45.0	CLAY, YELLOW
45.0	-	50.0	CLAY, GREEN (SPLIT ROCK CREEK FORMATION)

COUNTY: MINNEHAHA LOCATION: 102N-48W-34BBBB 2
 LEGAL LOCATION: NW NW NW NW SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3605 LONGITUDE: 96.3529
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: S. MITCHELL DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 08-14-1985 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1320.00 T
 TOTAL DRILL HOLE DEPTH: 76.0 TEST HOLE NUMBER: CO-85-100
 WATER RIGHTS WELL: MA-87E SDGS WELL NAME: CO-85-100
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER: SPLIT ROCK CREEK
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. AND HM. SCREEN LENGTH: 25.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1323.00 T
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 78.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

CASING SLOTTED 20 FEET ABOVE A 5-FOOT SANDPOINT.

0	-	3.0	CLAY, BLACK, SILTY (TOPSOIL)
3.0	-	8.0	CLAY, LIGHT-BROWN, SILTY, SANDY
8.0	-	26.0	CLAY, LIGHT-BROWN, SILTY, VERY SANDY, PEBBLY; OXIDIZED (TILL)
26.0	-	42.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
42.0	-	51.0	CLAY, DARK-GRAY, SILTY; NO PEBBLES
51.0	-	60.0	SAND, GRAY, FINE TO VERY COARSE; CONTAINS PIECES OF SPLIT ROCK CREEK FORMATION
60.0	-	68.0	CLAY, GREENISH-GRAY, SILTY
68.0	-	75.0	SAND, PINKISH-GRAY, MEDIUM TO COARSE; MOSTLY QUARTZ
75.0	-	76.0	QUARTZITE, PINK; VERY HARD, ACTUALLY ONLY A FEW INCHES WERE PENETRATED (SIOUX QUARTZITE)

COUNTY: MINNEHAHA LOCATION: 102N-48W-34BCCC
 LEGAL LOCATION: SW SW SW NW SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3550 LONGITUDE: 96.3528
 LAND OWNER:
 PROJECT:
 DRILLING COMPANY: SDGS
 DRILLER: M. JARRETT DRILLER'S LOG:
 GEOLOGIST: D. ILES GEOLOGIST'S LOG: X
 DATE DRILLED: 08-04-1981 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1322.00 T
 TOTAL DRILL HOLE DEPTH: 77.0 TEST HOLE NUMBER:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

0	-	7.0	CLAY, BROWN, SANDY, PEBBLY
7.0	-	32.0	SAND, FINE TO COARSE; WITH FINE TO COARSE GRAVEL WHICH OCCURS IN LAYERS IN THE SAND
32.0	-	47.0	CLAY, GRAY, SANDY, SILTY
47.0	-	61.0	SAND, FINE TO MEDIUM; COARSE AFTER 58 FEET
61.0	-	63.0	SANDSTONE, WHITE TO BLACK; CHERTY, HARD (SPLIT ROCK CREEK FORMATION)
63.0	-	71.0	CLAY, GRAY, SANDY (SPLIT ROCK CREEK FORMATION)
71.0	-	76.0	CLAY, GREEN, SILTY; WITH SAND LAYERS (SPLIT ROCK CREEK FORMATION)
76.0	-	77.0	QUARTZITE, PINK; HARD (SIOUX QUARTZITE)

COUNTY: MINNEHAHA LOCATION: 102N-48W-34BCCD
 LEGAL LOCATION: SE SW SW NW SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3550 LONGITUDE: 96.3524
 LAND OWNER:
 PROJECT:
 DRILLING COMPANY: SDGS
 DRILLER: M. JARRETT DRILLER'S LOG:
 GEOLOGIST: D. ILES GEOLOGIST'S LOG: X
 DATE DRILLED: 08-04-1981 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1330.00 T
 TOTAL DRILL HOLE DEPTH: 75.0 TEST HOLE NUMBER:
 WATER RIGHTS WELL: SDGS WELL NAME: 1
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER: BIG SIOUX(?)
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION:
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 76.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

BOTTOM OF WELL AT 73 FEET.

0	-	19.0	SAND AND GRAVEL, FINE TO COARSE SAND AND FINE GRAVEL
19.0	-	41.0	SAND AND GRAVEL, FINE TO COARSE
41.0	-	58.0	CLAY, GRAY, SILTY, SANDY
58.0	-	64.0	SAND, FINE TO MEDIUM
64.0	-	74.0	SAND, FINE TO COARSE
74.0	-	75.0	QUARTZITE, PINK; HARD, ONLY A FEW INCHES OF PENETRATION WERE ACTUALLY ACHIEVED (SIOUX QUARTZITE)

COUNTY: MINNEHAHA LOCATION: 102N-48W-34CABA
 LEGAL LOCATION: NE NW NE SW SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3540 LONGITUDE: 96.3503
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: R. GRAVHOLT DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 04-25-1985 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1345.00 T
 TOTAL DRILL HOLE DEPTH: 120.0 TEST HOLE NUMBER: R2-85-9
 WATER RIGHTS WELL: SDGS WELL NAME: R2-85-9
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER: SPLIT ROCK CREEK
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1348.00 T
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 122.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY: X
 NATURAL GAMMA: X EXTRA:
 SAMPLES:

0	-	1.0	CLAY, BLACK, SILTY (TOPSOIL)
1.0	-	12.0	SAND, BROWN, MEDIUM TO COARSE; OXIDIZED
12.0	-	37.0	GRAVEL, BROWN, MEDIUM TO VERY COARSE; OXIDIZED
37.0	-	49.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
49.0	-	60.0	GRAVEL, BROWN, COARSE TO VERY COARSE, COBBLY; OXIDIZED
60.0	-	82.0	CLAY, GRAY, VERY SILTY, SHALEY; UNOXIDIZED, GREASY (SPLIT ROCK CREEK FORMATION)
82.0	-	94.0	SAND, BROWN, MEDIUM TO COARSE; MUCH QUARTZ, SOME GRAVEL (SPLIT ROCK CREEK FORMATION)
94.0	-	108.0	CLAY, BROWN, SILTY (SPLIT ROCK CREEK FORMATION)
108.0	-	119.0	SAND, REDDISH-PINK, FINE; MOSTLY QUARTZ, PARTIALLY CEMENTED (SPLIT ROCK CREEK FORMATION)
119.0	-	120.0	QUARTZITE, PINK; VERY HARD, ACTUALLY ONLY A FEW INCHES WERE PENETRATED (SIOUX QUARTZITE)

COUNTY: MINNEHAHA LOCATION: 102N-48W-34CABA 2
 LEGAL LOCATION: NE NW NE SW SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3540 LONGITUDE: 96.3503
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: R. GRAVHOLT
 GEOLOGIST: D. TOMHAVE
 DATE DRILLED: 04-25-1985
 GROUND SURFACE ELEVATION: 1345.00 T
 TOTAL DRILL HOLE DEPTH: 96.0
 WATER RIGHTS WELL:
 OTHER WELL NAME:
 BASIN: BIG SIOUX
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG.
 CASING TYPE: PVC
 CASING TOP ELEVATION: 1349.00 T
 CASING STICK-UP: 4.00
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL:
 NATURAL GAMMA:
 SAMPLES:

DRILLER'S LOG:
 GEOLOGIST'S LOG: X
 DRILLING METHOD: ROTARY
 TEST HOLE NUMBER: R2-85-10
 SDGS WELL NAME: R2-85-10
 AQUIFER:
 SCREEN LENGTH: 5.0
 CASING DIAMETER: 2.0
 TOTAL CASING AND SCREEN: 98.0
 SINGLE POINT RESISTIVITY:
 EXTRA:

0	-	1.0	CLAY, BLACK, SILTY (TOPSOIL)
1.0	-	5.0	CLAY, BROWN, VERY SILTY
5.0	-	14.0	SAND, BROWN, MEDIUM TO COARSE; OXIDIZED
14.0	-	36.0	GRAVEL, BROWN, MEDIUM TO VERY COARSE; OXIDIZED
36.0	-	38.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
38.0	-	49.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
49.0	-	60.0	GRAVEL, BROWN, COARSE TO VERY COARSE, COBBLY; OXIDIZED
60.0	-	82.0	CLAY, GRAY, SHALEY, SILTY; UNOXIDIZED, GREASY (SPLIT ROCK CREEK FORMATION)
82.0	-	94.0	SAND, BROWN, COARSE; MUCH QUARTZ, SOME FINE GRAVEL (SPLIT ROCK CREEK FORMATION)
94.0	-	96.0	CLAY, BROWN, SILTY (SPLIT ROCK CREEK FORMATION)

COUNTY: MINNEHAHA LOCATION: 102N-48W-34CABA 3
 LEGAL LOCATION: NE NW NE SW SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3540 LONGITUDE: 96.3503
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: R. GRAVHOLT
 GEOLOGIST: D. TOMHAVE
 DATE DRILLED: 04-26-1985
 GROUND SURFACE ELEVATION: 1345.00 T
 TOTAL DRILL HOLE DEPTH: 60.0
 WATER RIGHTS WELL:
 OTHER WELL NAME:
 BASIN: BIG SIOUX
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG.
 CASING TYPE: PVC
 CASING TOP ELEVATION: 1347.00 T
 CASING STICK-UP: 2.00
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL:
 NATURAL GAMMA:
 SAMPLES:

DRILLER'S LOG:
 GEOLOGIST'S LOG: X
 DRILLING METHOD: ROTARY
 TEST HOLE NUMBER: R2-85-11
 SDGS WELL NAME: R2-85-11
 AQUIFER: BIG SIOUX
 SCREEN LENGTH: 5.0
 CASING DIAMETER: 2.0
 TOTAL CASING AND SCREEN: 38.0
 SINGLE POINT RESISTIVITY:
 EXTRA:

0	-	1.0	CLAY, BLACK, SILTY (TOPSOIL)
1.0	-	4.0	CLAY, BROWN, VERY SILTY
4.0	-	7.0	SAND, BROWN, MEDIUM TO COARSE; OXIDIZED
7.0	-	36.0	GRAVEL, BROWN, MEDIUM TO COARSE; OXIDIZED
36.0	-	49.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
49.0	-	60.0	GRAVEL, BROWN, COARSE TO VERY COARSE, COBBLY; OXIDIZED

COUNTY: MINNEHAHA LOCATION: 102N-48W-34CC
 LEGAL LOCATION: SW SW SEC. 34, T. 102 N., R. 48 W.
 LATITUDE: 43.3520 LONGITUDE: 96.3522
 LAND OWNER:
 PROJECT:
 DRILLING COMPANY:
 DRILLER: VON HOLDT DRILLER'S LOG: X
 GEOLOGIST: F. STEECE GEOLOGIST'S LOG:
 DATE DRILLED: 00-00-1958 DRILLING METHOD:
 GROUND SURFACE ELEVATION: 1318.00 T
 TOTAL DRILL HOLE DEPTH: 44.0 TEST HOLE NUMBER:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

0	-	2.0	TOPSOIL
2.0	-	4.0	SAND AND GRAVEL, COARSE SAND, FINE GRAVEL
4.0	-	9.0	SAND AND GRAVEL, MEDIUM SAND, COARSE GRAVEL
9.0	-	14.0	SAND AND GRAVEL, MEDIUM SAND, MEDIUM GRAVEL
14.0	-	19.0	SAND, COARSE
19.0	-	29.0	SAND, MEDIUM TO COARSE
29.0	-	33.0	SAND AND GRAVEL, COARSE SAND, FINE GRAVEL
33.0	-	39.0	TILL, TAN
39.0	-	44.0	TILL, GRAY

COUNTY: MINNEHAHA LOCATION: 102N-48W-35ABBB
 LEGAL LOCATION: NW NW NW NE SEC. 35, T. 102 N., R. 48 W.
 LATITUDE: 43.3606 LONGITUDE: 96.3343
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: M. THOMPSON DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 09-24-1985 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1305.00 T
 TOTAL DRILL HOLE DEPTH: 66.0 TEST HOLE NUMBER: CO-85-108
 WATER RIGHTS WELL: SDGS WELL NAME: CO-85-108
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER: SPLIT ROCK CREEK
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 10.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1308.00 T
 CASING STICK-UP: 3.00 TOTAL CASING AND SCREEN: 65.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

0	-	16.0	CLAY, BLACK, VERY SILTY, SANDY (ALLUVIUM)
16.0	-	24.0	GRAVEL, BROWN, MEDIUM TO COARSE; OXIDIZED
24.0	-	31.0	SAND, FINE TO MEDIUM; MOSTLY QUARTZ
31.0	-	35.0	SILTSTONE, YELLOWISH-WHITE; OXIDIZED (SPLIT ROCK CREEK FORMATION)
35.0	-	54.0	SILTSTONE, BLACK; VERY HARD (SPLIT ROCK CREEK FORMATION)
54.0	-	62.0	SAND, PINK, FINE; PARTIALLY CEMENTED (SPLIT ROCK CREEK FORMATION)
62.0	-	65.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
65.0	-	66.0	QUARTZITE, PINK; VERY HARD, ONLY A FEW INCHES WERE ACTUALLY PENETRATED (SIOUX QUARTZITE)

COUNTY: MINNEHAHA LOCATION: 102N-48W-35BBBB
 LEGAL LOCATION: NW NW NW, NW SEC. 35, T. 102 N., R. 48 W.
 LATITUDE: 43.3607 LONGITUDE: 96.3419
 LAND OWNER:
 PROJECT: BIG SIOUX HYDRO STUDY
 DRILLING COMPANY: SDGS
 DRILLER: L. HELSETH
 GEOLOGIST: W. BRADFORD
 DATE DRILLED: 09-11-1984
 GROUND SURFACE ELEVATION: 1330.00 T
 TOTAL DRILL HOLE DEPTH: 55.0
 WATER RIGHTS WELL:
 OTHER WELL NAME:
 BASIN: BIG SIOUX
 MANAGEMENT UNIT: SOUTH
 SCREEN TYPE: PVC, HM.
 CASING TYPE: PVC
 CASING TOP ELEVATION: 1333.00 T
 CASING STICK-UP: 3.00
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL:
 NATURAL GAMMA:
 SAMPLES:

DRILLER'S LOG: X
 GEOLOGIST'S LOG:
 DRILLING METHOD: AUGER
 TEST HOLE NUMBER: R20-84-333
 SDGS WELL NAME: R20-84-333
 AQUIFER: BIG SIOUX
 SCREEN LENGTH: 15.0
 CASING DIAMETER: 2.0
 TOTAL CASING AND SCREEN: 39.0
 SINGLE POINT RESISTIVITY:
 EXTRA:

CASING SLOTTED FROM 21 TO 36 FEET.

0	-	4.0	TOPSOIL, BLACK
4.0	-	7.0	CLAY, YELLOWISH-BROWN, SILTY, PEBBLY
7.0	-	9.0	SAND AND GRAVEL, MEDIUM TO COARSE
9.0	-	11.0	CLAY, BROWN, SHALEY
11.0	-	34.0	SAND AND GRAVEL, MEDIUM TO COARSE
34.0	-	55.0	CLAY, GRAY; HARD (TILL)

COUNTY: MINNEHAHA LOCATION: 102N-48W-35BCC
 LEGAL LOCATION: SW SW NW NW SEC. 35, T. 102 N., R. 48 W.
 LATITUDE: 43.3553 LONGITUDE: 96.3429
 LAND OWNER:
 PROJECT: MINNEHAHA COUNTY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: C. SCHMIG DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 04-29-1985 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1340.00 T
 TOTAL DRILL HOLE DEPTH: 215.0 TEST HOLE NUMBER: R2-85-12
 WATER RIGHTS WELL: SDGS WELL NAME: R2-85-12
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER: SPLIT ROCK CREEK
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. AND HM. SCREEN LENGTH: 15.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1342.00 T
 CASING STICK-UP: 2.00 TOTAL CASING AND SCREEN: 172.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY: X
 NATURAL GAMMA: X EXTRA:
 SAMPLES:

CASING SLOTTED 10 FEET ABOVE A 5-FOOT SCREEN.

0	-	12.0	CLAY, BROWN, VERY SILTY; GREASY, OXIDIZED (LAKE CLAY)
12.0	-	22.0	CLAY, GRAY, VERY SILTY; GREASY, UNOXIDIZED (LAKE CLAY)
22.0	-	36.0	SAND AND GRAVEL, BROWN, MEDIUM; OXIDIZED
36.0	-	42.0	CLAY, GRAY, SILTY, SANDY
42.0	-	50.0	SAND AND GRAVEL, MEDIUM TO COARSE GRAVEL; QUARTZITE BOULDER
50.0	-	99.0	CLAY, GRAY, VERY SILTY, SANDY; UNOXIDIZED (SPLIT ROCK CREEK FORMATION)
99.0	-	110.0	SAND, GRAY, FINE; MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
110.0	-	114.0	CLAY, GREEN AND GRAY, VERY SILTY, SANDY; GREASY (SPLIT ROCK CREEK FORMATION)
114.0	-	172.0	SAND, PINKISH-RED, FINE; MOSTLY QUARTZ, BECOMES CEMENTED WITH DEPTH (SPLIT ROCK CREEK FORMATION)
172.0	-	194.0	CLAY, DARK-GRAY TO BLACK, VERY SILTY; SOME LIGHT-GRAY SANDY CLAY, SOME BLACK GREASY SHALE, NONCALCAREOUS (SPLIT ROCK CREEK FORMATION)
194.0	-	214.0	SAND, PINKISH-RED, FINE; MOSTLY QUARTZ, VERY CEMENTED, SOME BROWN CLAY
214.0	-	215.0	QUARTZITE, PINK; VERY HARD, ACTUALLY ONLY A FEW INCHES WERE PENETRATED (SIOUX)

COUNTY: MINNEHAHA LOCATION: 102N-48W-35CDCC 1
 LEGAL LOCATION: SW SW SE SW SEC. 35, T. 102 N., R. 48 W.
 LATITUDE: 43.3515 LONGITUDE: 96.3400
 LAND OWNER:
 PROJECT: SIOUX FALLS-BRANDON STUDY
 DRILLING COMPANY: SDGS
 DRILLER: E. KOGLIN DRILLER'S LOG:
 GEOLOGIST: D. ILES GEOLOGIST'S LOG: X
 DATE DRILLED: 05-13-1980 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1304.00 T
 TOTAL DRILL HOLE DEPTH: 55.0 TEST HOLE NUMBER: SFB-136
 USGS HYDROLOGICAL UNIT CODE: 10170203
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

0	-	15.0	SAND, FINE TO MEDIUM; SOME GRAVEL
15.0	-	19.0	SAND AND GRAVEL, FINE SAND TO MEDIUM GRAVEL
19.0	-	49.0	CLAY, LIGHT-GRAY, SILTY, SANDY, PEBBLY
49.0	-	53.0	SILTSTONE, BLACK; VERY HARD (SPLIT ROCK CREEK FORMATION)
53.0	-	55.0	SILTSTONE, BLACK; SOFTER THAN INTERVAL FROM 49 TO 53 FEET BUT STILL HARD, LOST CIRCULATION AT 55 FEET (SPLIT ROCK CREEK FORMATION)

COUNTY: MINNEHAHA LOCATION: 102N-48W-35CDCC 2
 LEGAL LOCATION: SW SW SE SW SEC. 35, T. 102 N., R. 48 W.
 LATITUDE: 43.3516 LONGITUDE: 96.3400

LAND OWNER:

PROJECT: SIOUX FALLS-BRANDON STUDY

DRILLING COMPANY: SDGS

DRILLER: L. HELSETH

GEOLOGIST: D. ILES

DATE DRILLED: 12-11-1980

GROUND SURFACE ELEVATION: 1304.00 T

TOTAL DRILL HOLE DEPTH: 83.0

USGS HYDROLOGICAL UNIT CODE: 10170203

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL:

NATURAL GAMMA:

SAMPLES:

DRILLER'S LOG:

GEOLOGIST'S LOG: X

DRILLING METHOD: ROTARY

TEST HOLE NUMBER: SFB-244

SINGLE POINT RESISTIVITY:

EXTRA:

0	-	2.0	CLAY, BLACK
2.0	-	17.0	SAND AND GRAVEL, MEDIUM SAND TO COARSE GRAVEL
17.0	-	35.0	CLAY, GRAY
35.0	-	42.0	SAND, GRAY; MANY BLACK GRAINS
42.0	-	49.0	CLAY, GRAY (SPLIT ROCK CREEK FORMATION)
49.0	-	83.0	SILTSTONE, BLACK; HARD, LOST CIRCULATION, ABANDONED HOLE (SPLIT ROCK CREEK FORMATION)

APPENDIX NO. 4 - PART 2

WATER QUALITY DATA
FOR
BIG SIOUX SOUTH AQUIFER AND SPLIT ROCK CREEK AQUIFER

Water Study
for
City of Brandon

SAMPLE: 1(KSRC) LOCATION: 101N-47W-06CBBB
LEGAL LOCATION: NW NW NW SW SEC. 06, T. 101 N., R. 47 W.
LAT.: 43.3447 LONG.: 96.3153 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 07-02-1980
LAB: SDGS
PROJECT: SIOUX FALLS-BRANDON STUDY WATER RIGHTS WELL: MA-80Z
WATER ELEVATION: SDGS WELL (OR OTHER): SFB-128
GROUND SURFACE ELEV.: 1348.00 T WELL DEPTH: 222 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 47 FEET
CASING TYPE: PVC
PUMP: AIR-LIFT
AQUIFER: SPLIT ROCK CREEK BASIN: BIG SIOUX
MANAGEMENT UNIT:
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: X FILTERED: X HNO3: X SCREENED: X
H2SO4 OR FORMALIN TREATED: F
OTHER:

CA: 111 PPM XNA:
MG: 31 PPM SAR:
NA: 21 PPM ADJ SAR:
K: RSC:

SO4: 85 PPM CATIONS:
CL: < 2 PPM ANIONS:
HCO3: ALK-MO:
CO3: ALK-P:

FE: 0.06 PPM LI:
MN: 0.20 PPM SB:
NO3-N: < 1.00 PPM AL:
F: 0.39 PPM MO:

TDS: 380 PPM @ 180 C FIELD TDS:
PH: FIELD PH:
COND: 610 UMHOS @ 25 C FIELD COND:
HARDNESS: 404 PPM FIELD TEMP:

AG: SI:
AS: BE:
B: RB:
BA: CU:

CD: SR:
CR: NI:
HG: ZN:
PB: CS:
SE:

NOTES:

SAMPLE: 2(KSRC) LOCATION: 101N-47W-06CBBB
LEGAL LOCATION: NW NW NW SW SEC. 06, T. 101 N., R. 47 W.
LAT.: 43.3447 LONG.: 96.3153 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 11-20-1980
LAB: SDGS
PROJECT: SIOUX FALLS-BRANDON STUDY WATER RIGHTS WELL: MA-80Z
WATER ELEVATION: SDGS WELL (OR OTHER): SFB-128
GROUND SURFACE ELEV.: 1348.00 T WELL DEPTH: 222 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 48.6 FEET
CASING TYPE:
PUMP: AIR-LIFT
AQUIFER: SPLIT ROCK CREEK BASIN: BIG SIOUX
MANAGEMENT UNIT:
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: X FILTERED: X HNO3: X SCREENED: X
H2SO4 OR FORMALIN TREATED: F
OTHER:

CA:	98 PPM	%NA:
MG:	35 PPM	SAR:
NA:	30 PPM	ADJ SAR:
K:		RSC:

SO4:	115 PPM	CATIONS:
CL:	2 PPM	ANIONS:
HCO3:		ALK-MO:
CO3:		ALK-P:

FE:	0.23 PPM	LI:
MN:	0.20 PPM	SB:
NO3-N:	0.10 PPM	AL:
F:	0.46 PPM	MO:

TDS:	510 PPM @ 180 C	FIELD TDS:
PH:		FIELD PH:
COND:	730 UMHDS @ 25 C	FIELD COND:
HARDNESS:	388 PPM	FIELD TEMP:

AG:	SI:
AS:	BE:
B:	RB:
BA:	CU:

CD:	SR:
CR:	NI:
HG:	ZN:
PB:	CS:
SE:	

NOTES:

SAMPLE: W12C LOCATION: 101N-48W-03AAA
LEGAL LOCATION: NE NE NE SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3511 LONG.: 96.3422 COUNTY: MINNEHAHA
OWNER-CONTROLLER: L. ABRAHAMSON
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 05-00-1976
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): PRIVATE
GROUND SURFACE ELEV.: 1325.00 T WELL DEPTH: 83 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 50 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: DOMESTIC
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	70 PPM	%NA:	
MG:	21 PPM	SAR:	
NA:	35 PPM	ADJ SAR:	
K:	2.5 PPM	RSC:	
SO4:	50 PPM	CATIONS:	
CL:	7 PPM	ANIONS:	
HCO3:	390 PPM	ALK-MO:	320 PPM (AS CaCO3)
CO3:		ALK-P:	
FE:	1.50 PPM	LI:	
MN:	0.50 PPM	SB:	
NO3-N: (	0.50 PPM	AL:	
F:		MO:	
TDS:	620 PPM @ 180 C	FIELD TDS:	
PH:		FIELD PH:	
COND:		FIELD COND:	
HARDNESS:	260 PPM	FIELD TEMP:	
AG:		SI:	
AS:		BE:	
B:		RB:	
BA:		CU:	
CD:		SR:	
CR:		NI:	
HG:		ZN:	
PB:		CS:	
SE:			

NOTES:

SAMPLE: W12B LOCATION: 101N-48W-03AAA
LEGAL LOCATION: NE NE NE SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3511 LONG.: 96.3422 COUNTY: MINNEHAHA
OWNER-CONTROLLER: L. ABRAHAMSON
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 09-00-1977
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): PRIVATE
GROUND SURFACE ELEV.: 1325.00 T WELL DEPTH: 83 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 50 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: DOMESTIC
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	105 PPM	XNA:	
MG:	25 PPM	SAR:	
NA:	10 PPM	ADJ SAR:	
K:		RSC:	
SO4:	100 PPM	CATIONS:	
CL:	10 PPM	ANIONS:	
HCO3:	390 PPM	ALK-MO:	320 PPM (AS CaCO3)
CO3:		ALK-P:	
FE:	0.20 PPM	LI:	
MN:	0.30 PPM	SB:	
NO3-N:	2.50 PPM	AL:	
F:		MO:	
TDS:	510 PPM @ 180 C	FIELD TDS:	
PH:		FIELD PH:	
COND:		FIELD COND:	
HARDNESS:	365 PPM	FIELD TEMP:	
AG:		SI:	
AS:		BE:	
B:		RB:	
BA:		CU:	
CD:		SR:	
CR:		NI:	
HG:		ZN:	
PB:		CS:	
SE:			

NOTES:

SAMPLE: W12D LOCATION: 101N-48W-03AAA
LEGAL LOCATION: NE NE NE SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3511 LONG.: 96.3422 COUNTY: MINNEHAHA
OWNER-CONTROLLER: L. ABRAHAMSON
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 09-00-1977
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): PRIVATE
GROUND SURFACE ELEV.: 1325.00 T WELL DEPTH: 83 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 50 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: DOMESTIC
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: X FILTERED: HNO3: X SCREENED:
H2SO4 OR FORMALIN TREATED: F
OTHER:

CA: %NA:
MG: SAR:
NA: ADJ SAR:
K: RSC:

SO4: CATIONS:
CL: ANIONS:
HCO3: ALK-MO:
CO3: ALK-P:

FE: LI:
MN: SB:
NO3-N: (0.50 PPM AL:
F: MD:

TDS: FIELD TDS:
PH: FIELD PH:
COND: FIELD COND:
HARDNESS: FIELD TEMP:

AG: SI:
AS: BE:
B: RB:
BA: CU:

CD: SR:
CR: NI:
HG: ZN:
PB: CS:
SE:

NOTES:

SAMPLE: W24B LOCATION: 101N-48W-03ACB
LEGAL LOCATION: NW SW NE SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3506 LONG.: 96.3447 COUNTY: MINNEHAHA
OWNER-CONTROLLER: D. STEFFEN
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 00-00-1975
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): PRIVATE
GROUND SURFACE ELEV.: 1340.00 T WELL DEPTH: 65 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 61 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: DOMESTIC
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	140 PPM	%NA:	
MG:	20 PPM	SAR:	
NA:	90 PPM	ADJ SAR:	
K:		RSC:	
SO4:	20 PPM	CATIONS:	
CL:	10 PPM	ANIONS:	
HCO3:	280 PPM	ALK-MO:	230 PPM (AS CaCO3)
CO3:		ALK-P:	

FE:	<	0.05 PPM	LI:	
MN:	<	0.05 PPM	SB:	
NO3-N:		7.40 PPM	AL:	
F:			MD:	

TDS:	380 PPM @ 180 C	FIELD TDS:	
PH:		FIELD PH:	
COND:		FIELD COND:	
HARDNESS:	430 PPM	FIELD TEMP:	

AG:	SI:
AS:	BE:
B:	RB:
BA:	CU:

CD:	SR:
CR:	NI:
HG:	ZN:
PB:	CS:
SE:	

NOTES:

SAMPLE: W24C LOCATION: 101N-48W-03ACB
LEGAL LOCATION: NW SW NE SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3506 LONG.: 96.3447; COUNTY: MINNEHAHA
OWNER-CONTROLLER: D. STEFFEN
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 05-00-1976
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): PRIVATE
GROUND SURFACE ELEV.: 1340.00 T WELL DEPTH: 65 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 61 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: DOMESTIC
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	40 PPM	%NA:	
MG:	13 PPM	SAR:	
NA:	35 PPM	ADJ SAR:	
K:	1.0 PPM	RSC:	
SO4:	30 PPM	CATIONS:	
CL:	9 PPM	ANIONS:	
HCO3:	244 PPM	ALK-MO:	200 PPM (AS CaCO3)
CO3:		ALK-P:	

FE:	<	0.05 PPM	LI:
MN:	<	0.05 PPM	SB:
NO3-N:		4.00 PPM	AL:
F:			MO:

TDS:	395 PPM @ 180 C	FIELD TDS:
PH:		FIELD PH:
COND:		FIELD COND:
HARDNESS:	155 PPM	FIELD TEMP:

AG:	SI:
AS:	BE:
B:	RB:
BA:	CU:

CD:	SR:
CR:	NI:
HG:	ZN:
PB:	CS:
SE:	

NOTES:

SAMPLE: W24D LOCATION: 101N-48W-03ACB
LEGAL LOCATION: NW SW NE SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3506 LONG.: 96.3447 COUNTY: MINNEHAHA
OWNER-CONTROLLER: D. STEFFEN
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 09-00-1977
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): PRIVATE
GROUND SURFACE ELEV.: 1340.00 T WELL DEPTH: 65 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 61 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: DEMESTIC
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: X FILTERED: HNO3: X SCREENED:
H2SO4 OR FORMALIN TREATED: F
OTHER:

CA: XNA:
MG: SAR:
NA: ADJ SAR:
K: RSC:

SO4: CATIONS:
CL: ANIONS:
HCO3: ALK-MO:
CO3: ALK-P:

FE: LI:
MN: SB:
NO3-N: (0.50 PPM AL:
F: MO:

TDS: FIELD TDS:
PH: FIELD PH:
COND: FIELD COND:
HARDNESS: FIELD TEMP:

AG: SI:
AS: BE:
B: RB:
BA: CU:

CD: SR:
CR: NI:
HG: ZN:
PB: CS:
SE:

NOTES:

SAMPLE: W25B LOCATION: 101N-48W-03ACBC
LEGAL LOCATION: SW NW SW NE SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3458 LONG.: 96.3447 COUNTY: MINNEHAPA
OWNER-CONTROLLER: D. KECK
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 00-00-1975
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): PRIVATE
GROUND SURFACE ELEV.: 1330.00 T WELL DEPTH: 67 FEET
CASING TOP ELEVATION: DEPTH TO WATER:
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE:
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	150 PPM	XNA:	
MG:	< 10 PPM	SAR:	
NA:	190 PPM	ADJ SAR:	
K:		RSC:	
SO4:	20 PPM	CATIONS:	
CL:	15 PPM	ANIONS:	
HCO3:	305 PPM	ALK-MO:	250 PPM (AS CaCO3)
CO3:		ALK-P:	
FE:	< 0.05 PPM	LI:	
MN:	< 0.05 PPM	SR:	
NO3-N:	5.20 PPM	AL:	
F:		MO:	
TDS:	400 PPM @ 180 C	FIELD TDS:	
PH:		FIELD PH:	
COND:		FIELD COND:	
HARDNESS:	390 PPM	FIELD TEMP:	
AG:		SI:	
AS:		BE:	
B:		RB:	
BA:		CU:	
CD:		SR:	
CR:		NI:	
HG:		ZN:	
PB:		CS:	
SE:			

NOTES:

SAMPLE: W17B LOCATION: 101N-48W-03BDC
LEGAL LOCATION: SW SE NW SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3453 LONG.: 96.3500 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 00-00-1975
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 11
GROUND SURFACE ELEV.: 1310.00 T WELL DEPTH:
CASING TOP ELEVATION: 1311.77 I DEPTH TO WATER: 17 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA: 300 PPM
MG: 50 PPM
NA: 200 PPM
K:

%NA:
SAR:
ADJ SAR:
RSC:

SO4: 200 PPM
CL: 12 PPM
HCO3: 311 PPM
CO3:

CATIONS:
ANIONS:
ALK-MO: 255 PPM (AS CaCO3)
ALK-P:

FE: 23.00 PPM
MN: < 0.05 PPM
NO3-N: 15.00 PPM
F:

LI:
SB:
AL:
MO:

TDS: 1010 PPM @ 180 C FIELD TDS:
PH: FIELD PH:
COND: FIELD COND:
HARDNESS: 920 PPM FIELD TEMP:

AG:
AS:
B:
BA:

SI:
BE:
RB:
CU:

CD:
CR:
HG:
PB:
SE:

SR:
NI:
ZN:
CS:

NOTES:

SAMPLE: W17C LOCATION: 101N-48W-03BDC
LEGAL LOCATION: SW SE NW SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3453 LONG.: 96.3500 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 05-00-1976
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 11
GROUND SURFACE ELEV.: 1310.00 T WELL DEPTH:
CASING TOP ELEVATION: 1311.77 I DEPTH TO WATER: 17 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA: 95 PPM
MG: 22 PPM
NA: 18 PPM
K: 1.7 PPM

XNA:
SAR:
ADJ SAR:
RSC:

SO4: 52 PPM
CL: 18 PPM
HCO3: 305 PPM
CO3:

CATIONS:
ANIONS:
ALK-MO: 250 PPM (AS CaCO3)
ALK-P:

FE: < 0.05 PPM
MN: < 0.05 PPM
NO3-N: A 11.50 PPM
F:

LI:
SB:
AL:
MO:

TDS: 580 PPM @ 180 C
PH:
COND:
HARDNESS: 325 PPM

FIELD TDS:
FIELD PH:
FIELD COND:
FIELD TEMP:

AG:
AS:
B:
BA:

SI:
BE:
RB:
CU:

CD:
CR:
HG:
PB:
SE:

SR:
NI:
ZN:
CS:

NOTES:

SAMPLE: W17D LOCATION: 101N-48W-03BDC
LEGAL LOCATION: SW SE NW SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3453 LONG.: 96.3500 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 09-00-1977
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 11
GROUND SURFACE ELEV.: 1310.00 T WELL DEPTH:
CASING TOP ELEVATION: DEPTH TO WATER: 17 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA: XNA:
MG: SAR:
NA: ADJ SAR:
K: RSC:

SO4: CATIONS:
CL: ANIONS:
HCO3: ALK-MO:
CO3: ALK-P:

FE: LI:
MN: SB:
NO3-N: 24.00 PPM AL:
F: MD:

TDS: FIELD TDS:
PH: FIELD PH:
COND: FIELD COND:
HARDNESS: FIELD TEMP:

AG: SI:
AS: BE:
B: RB:
BA: CU:

CD: SR:
CR: NI:
HG: ZN:
PB: CS:
SE:

NOTES:

SAMPLE: W17E LOCATION: 101N-48W-03BDC
LEGAL LOCATION: SW SE NW SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3453 LONG.: 96.3500 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 03-00-1978
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 11
GROUND SURFACE ELEV.: 1310.00 T WELL DEPTH:
CASING TOP ELEVATION: DEPTH TO WATER: 17 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA: %NA:
MG: SAR:
NA: ADJ SAR:
K: RSC:

SO4: CATIONS:
CL: ANIONS:
HCO3: ALK-MO:
CO3: ALK-P:

FE: LI:
MN: SB:
NO3-N: 28.00 PPM AL:
F: MO:

TDS: FIELD TDS:
PH: FIELD PH:
COND: FIELD COND:
HARDNESS: FIELD TEMP:

AG: SI:
AS: BE:
B: RB:
BA: CU:

CD: SR:
CR: NI:
HG: ZN:
PB: CS:
SE:

NOTES:

SAMPLE: W10C LOCATION: 101N-48W-03CBBB
LEGAL LOCATION: NW NW NW SW SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3496 LONG.: 96.3516 COUNTY: MINNEHAHA
OWNER-CONTROLLER:
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 05-00-1976
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): SDGS
GROUND SURFACE ELEV.: 1331.00 T WELL DEPTH: 35 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 27 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE:
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	40 PPM	%NA:
MG:	19 PPM	SAR:
NA:	35 PPM	ADJ SAR:
K:	1.0 PPM	RSC:
SO4:	30 PPM	CATIONS:
CL:		ANIONS:
HCO3:	317 PPM	ALK-MO: 260 PPM (AS CaCO3)
CO3:		ALK-P:
FE:	10.05 PPM	LI:
MN:	0.05 PPM	SB:
NO3-N:	4.00 PPM	AL:
F:		MO:
TDS:	420 PPM @ 180 C	FIELD TDS:
PH:		FIELD PH:
COND:		FIELD COND:
HARDNESS:	175 PPM	FIELD TEMP:
AG:		SI:
AS:		BE:
B:		RB:
BA:		CU:
CD:		SR:
CR:		NI:
HG:		ZN:
PB:		CS:
SE:		

NOTES:

SAMPLE: 761297 LOCATION: 101N-48W-03BD
LEGAL LOCATION: SE NW SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3453 LONG.: 96.3457 COUNTY: MINNEHAHA
OWNER-CONTROLLER: BRANDON WATER CO.
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 04-12-1976
LAB: DEPARTMENT OF PUBLIC HEALTH
PROJECT: WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 2
GROUND SURFACE ELEV.: 1325.00 T WELL DEPTH: 50 FEET
CASING TOP ELEVATION: DEPTH TO WATER:
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: MUNICIPAL
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA: 109 PPM %NA:
MG: 40 PPM SAR:
NA: 30 PPM ADJ SAR:
K: 5.4 PPM RSC:

SO4: 177 PPM CATIONS:
CL: 7 PPM ANIONS:
HCO3: 377 PPM ALK-MD: 309 PPM (AS CaCO3)
CO3: ALK-P:

FE: 0.08 PPM LI:
MN: 0.97 PPM SB:
NO3-N: 0.68 PPM AL:
F: < 0.50 PPM MD:

TDS: 634 PPM @ 180 C FIELD TDS:
PH: 7.41 FIELD PH:
COND: FIELD COND:
HARDNESS: 436 PPM FIELD TEMP:

AG: SI:
AS: BE:
B: RB:
BA: CU:

CD: SR:
CR: NI:
HG: ZN:
PB: CS:
SE:

NOTES: TURBIDITY: 0.32 PPM.

SAMPLE: 761296 LOCATION: 101N-48W-03BD
LEGAL LOCATION: SE NW SEC. 03, T. 101 N., R. 48 W.
LAT.: 43.3455 LONG.: 96.3458 COUNTY: MINNEHAHA
OWNER-CONTROLLER: BRANDON WATER CO.
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 04-12-1976
LAB: DEPARTMENT OF PUBLIC HEALTH
PROJECT: WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 1
GROUND SURFACE ELEV.: 1325.00 T WELL DEPTH: 50 FEET
CASING TOP ELEVATION: DEPTH TO WATER:
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: MUNICIPAL
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	76 PPM	%NA:
MG:	24 PPM	SAR:
NA:	10 PPM	ADJ SAR:
K:	3.3 PPM	RSC:

SO4:	50 PPM	CATIONS:
CL:	10 PPM	ANIONS:
HCO3:	286 PPM	ALK-MO: 234 PPM (AS CaCO3)
CO3:		ALK-P:

FE:	0.04 PPM	LI:
MN:	0.03 PPM	SB:
NO3-N:	5.10 PPM	AL:
F:	0.50 PPM	MO:

TDS:	406 PPM @ 180 C	FIELD TDS:
PH:	7.55	FIELD PH:
COND:		FIELD COND:
HARDNESS:	287 PPM	FIELD TEMP:

AG:	SI:
AS:	BE:
B:	RB:
BA:	CU:

CD:	SR:
CR:	NI:
HG:	ZN:
PB:	CS:
SE:	

NOTES: TURBIDITY: 0.11 PPM.

SAMPLE: 9(BS-S) LOCATION: 102N-48W-33DABA
LEGAL LOCATION: NE NW NE SE SEC. 33, T. 102 N., R. 48 W.
LAT.: 43.3540 LONG.: 96.3543 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 08-05-1980
LAB: SDGS
PROJECT: SIOUX FALLS-BRANDON STUDY WATER RIGHTS WELL: MA-800
WATER ELEVATION: SDGS WELL (OR OTHER): SFB-225
GROUND SURFACE ELEV.: 1290.00 T WELL DEPTH: 42 FEET
CASING TOP ELEVATION: DEPTH TO WATER: 12.04 FEET
CASING TYPE: PVC
PUMP: AIR-LIFT
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: X FILTERED: X HNO3: X SCREENED: X
H2SO4 OR FORMALIN TREATED: F
OTHER:

CA:	106 PPM	%NA:
MG:	27 PPM	SAR:
NA:	32 PPM	ADJ SAR:
K:		RSC:

SO4:	90 PPM	CATIONS:
CL:	15 PPM	ANIONS:
HCO3:		ALK-MD:
CO3:		ALK-P:

FE:	0.30 PPM	LI:
MN:	0.42 PPM	SB:
NO3-N: (	0.10 PPM	AL:
F:	0.42 PPM	MD:

TDS:	416 PPM @ 180 C	FIELD TDS:
PH:		FIELD PH:
COND:	860 UMHDS @ 25 C	FIELD COND:
HARDNESS:	377 PPM	FIELD TEMP:

AG:	SI:
AS:	BE:
B:	RB:
BA:	CU:

CD:	SR:
CR:	NI:
HG:	ZN:
PB:	CS:
SE:	

NOTES:

SAMPLE: W4C LOCATION: 102N-48W-35CCCA
LEGAL LOCATION: NE SW SW SW SEC. 35, T. 102 N., R. 48 W.
LAT.: 43.3520 LONG.: 96.3310 COUNTY: MINNEHAHA
OWNER-CONTROLLER: SDGS
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 05-00-1976
LAB: SDGS
PROJECT: BRANDON CITY STUDY WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 6
GROUND SURFACE ELEV.: 1304.00 T WELL DEPTH:
CASING TOP ELEVATION: 1306.46 I DEPTH TO WATER: 11 FEET
CASING TYPE:
PUMP:
AQUIFER: BIG SIOUX BASIN: BIG SIOUX
MANAGEMENT UNIT: SOUTH
USAGE: OBSERVATION
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED:
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	80 PPM	%NA:	
MG:	28 PPM	SAR:	
NA:	50 PPM	ADJ SAR:	
K:	2.5 PPM	RSC:	
SO4:	80 PPM	CATIONS:	
CL:	7 PPM	ANIONS:	
HCO3:	414 PPM	ALK-MD:	340 PPM (AS CaCO3)
CO3:		ALK-P:	
FE:	(0.05 PPM	LI:	
MN:	0.50 PPM	SB:	
NO3-N:	(0.50 PPM	AL:	
F:		MD:	
TDS:	690 PPM @ 180 C	FIELD TDS:	
PH:		FIELD PH:	
COND:		FIELD COND:	
HARDNESS:	315 PPM	FIELD TEMP:	
AG:		SI:	
AS:		BE:	
B:		RB:	
BA:		CU:	
CD:		SR:	
CR:		NI:	
HG:		ZN:	
PB:		CS:	
SE:			

NOTES:

SAMPLE: 3(KSRC) LOCATION: 102N-48W-35C8CA
LEGAL LOCATION: NE SW NW SW SEC. 35, T. 102 N., R. 48 W.
LAT.: 43.3532 LONG.: 96.3412 COUNTY: MINNEHAHA
OWNER-CONTROLLER: CITY OF BRANDON
SAMPLE TYPE: GROUND WATER COLLECTION DATE: 03-23-1967
LAB: DEPARTMENT OF PUBLIC HEALTH
PROJECT: WATER RIGHTS WELL:
WATER ELEVATION: SDGS WELL (OR OTHER): 2
GROUND SURFACE ELEV.: 1351.00 T WELL DEPTH: 221 FEET
CASING TOP ELEVATION: DEPTH TO WATER:
CASING TYPE:
PUMP: SUBMERSIBLE
AQUIFER: SPLIT ROCK CREEK BASIN: BIG SIOUX
MANAGEMENT UNIT:
USAGE: MUNICIPAL
LAKE: STREAM:
OTHER:
WHERE COLLECTED:
CLEAN CONTAINER: FILTERED: HNO3: SCREENED: X
H2SO4 OR FORMALIN TREATED:
OTHER:

CA:	102 PPM	%NA:
MG:	31 PPM	SAR:
NA:	40 PPM	ADJ SAR:
K:	6.8 PPM	RSC:

SO4:	130 PPM	CATIONS:
CL:	2 PPM	ANIONS:
HCO3:	390 PPM	ALK-MO:
CO3:		ALK-P:

FE:	0.18 PPM	LI:
MN:	0.25 PPM	SB:
NO3-N:	0.25 PPM	AL:
F:	0.43 PPM	MO:

TDS:	559 PPM @ 180 C	FIELD TDS:
PH:		FIELD PH:
COND:	806 UMHOS @ 25 C	FIELD COND:
HARDNESS:	381 PPM	FIELD TEMP:

AG:	SI:
AS:	BE:
B:	RB:
BA:	CU:

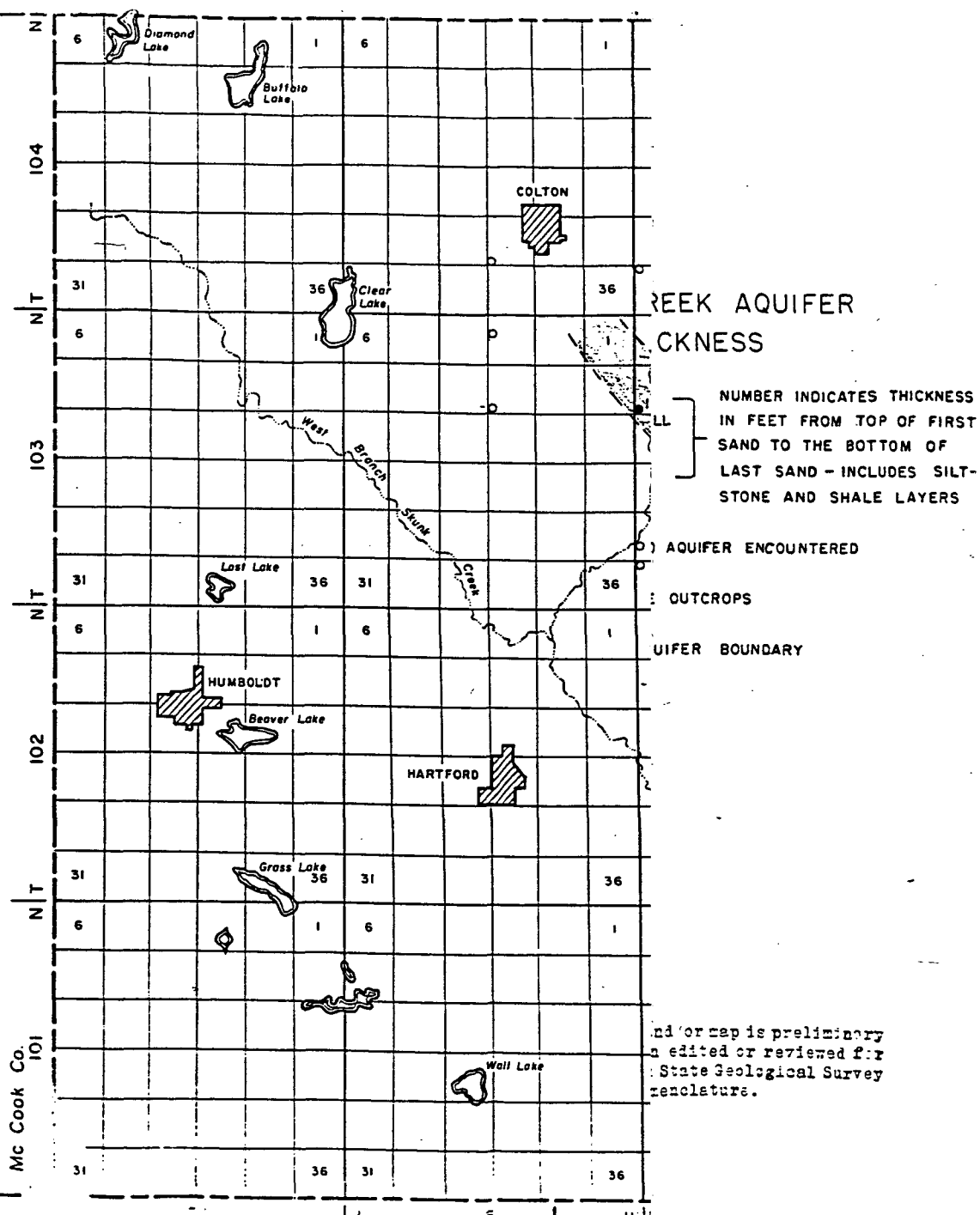
CD:	SR:
CR:	NI:
HG:	ZN:
PB:	CS:
SE:	

NOTES: FROM WELL DRILLED IN 1964.

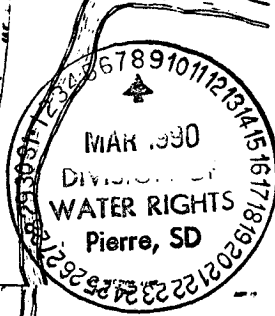
APPENDIX NO. 4 - PART 3

SPLIT ROCK CREEK AQUIFER THICKNESS

Water Study
for
City of Brandon



W1/4 COR. 35-102-48



ODE TRACT 1

BRANDON VALLEY SCHOOL

TRACT 1

Location of existing Well No. 3 in Brandon, South Dakota is 910'± south and 405'± east of W1/4 Corner, Section 35, R48W, T102N

**WELL LOCATION
EX. WEL NO. 3**

App. No. 5395-3

I hereby certify that this map was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of South Dakota.

Steve W. Brockmueller
Steve W. Brockmueller, P.E.

Reg. No. 4170

Date: March 9, 1989

Location Existing Well No. 3
Brandon, South Dakota
in
SW1/4 Section 35 R48W T102N



Stockwell Engineers, Inc.
Sioux Falls, South Dakota

LOGS OF OBSERVATION WELLS

LEGAL LOCATION and LOCATION

The logs are listed by smallest township number, then the smallest range number, the smallest section number, and then by quarter section: NE = A; NW = B; SW = C; SE = D. A comparison of **Legal Location and Location** is as follows. A **Legal Location** of SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 34, T. 110 N., R. 49 W., is the same as a **Location** of 110N-49W-34DDBC.

LATITUDE and LONGITUDE

The format is DD.MMSS where D is degrees, M is minutes, and S is seconds.

DRILLING COMPANY

SDGS is an abbreviation for South Dakota Geological Survey.

TOTAL DRILL HOLE DEPTH, SCREEN LENGTH, TOTAL CASING, AND SCREEN, and CASING STICK-UP

The numbers are presented in feet.

SCREEN TYPE and CASING TYPE

PVC is an abbreviation for polyvinyl chloride. MFG. is an abbreviation for manufactured and indicates a product that is commercially available. HM. is an abbreviation for homemade and indicates a hacksaw-slotted casing.

CASING DIAMETER

The numbers are presented in inches.

CASING TOP ELEVATION and GROUND SURFACE ELEVATION

The numbers are presented in feet above mean sea level. I - the elevation was determined using a surveying instrument. T - the elevation was estimated from 7½ minute series topographic map.

County: MINNEHAHA
 Legal Location: SW SW SW SW SEC. 02, T. 101 N., R. 48 W.
 Latitude: 43.3423
 Land Owner:
 Project: SE SO. DAK. UNIT STUDY
 Drilling Company: MERRIMAN DRILLING
 Driller: L. MERRIMAN
 Geologist: D. TOMHAVE
 Date Drilled: 07-24-1984
 Ground Surface Elevation: 1345.00 T
 Total Drill Hole Depth: 379.0
 Water Rights Well: MA-87H
 Other Well Name: 3
 Basin: BIG SIOUX
 Management Unit:
 Screen Type: PVC, MFG.
 Casing Type: PVC
 Casing Top Elevation: 1347.00 T
 Casing Stick-up: 2.00
 Well Maintenance Date:
 USGS Hydrological Unit Code: 10170203
 Electric Log Information:
 Spontaneous Potential:
 Natural Gamma: X
 Samples:

Location: 101N-48W-02CCCC

Longitude: 96.3359

Driller's Log:
 Geologist's Log: X
 Drilling Method: ROTARY

Test Hole Number:
 SDGS Well Name:

Aquifer:

Screen Length: 10.0
 Casing Diameter: 2.0

Total Casing and Screen: 350.0

Single Point Resistivity: X
 Extra:

0.0 -	16.0	GRAVEL, REDDISH-BROWN, MEDIUM, SANDY, WELL-SORTED; ROUNDED, OXIDIZED
16.0 -	39.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
39.0 -	54.0	SAND, BROWN, MEDIUM TO COARSE; OXIDIZED
54.0 -	60.0	GRAVEL, BROWN, COARSE, COBBLY; OXIDIZED
60.0 -	109.0	CLAY, GRAY, SILTY, VERY SHALEY; GREASY (SPLIT ROCK CREEK FORMATION?)
109.0 -	139.0	SILTSTONE, BLACK; HARD, SOME CEMENTED SILT, SOME SILTY CLAYS, SOME GREASY SHALES (SPLIT ROCK CREEK FORMATION)
139.0 -	144.0	SHALE, BLACK; GREASY, HARD (SPLIT ROCK CREEK FORMATION)
144.0 -	169.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
169.0 -	178.0	SHALE, BLACK; GREASY, HARD (SPLIT ROCK CREEK FORMATION)
178.0 -	196.0	SAND, PINK AND WHITE, FINE TO MEDIUM, PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
196.0 -	205.0	SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
205.0 -	225.0	SAND, PINK AND WHITE, FINE TO MEDIUM; PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
225.0 -	232.0	SHALE, BLACK; HARD, GREASY, SOME SILT (SPLIT ROCK CREEK FORMATION)
232.0 -	293.0	SAND, PINK AND WHITE, MEDIUM; PARTIALLY



CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
 293.0 - 296.0 SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
 296.0 - 310.0 SAND, PINK AND WHITE, MEDIUM TO COARSE; PARTIALLY CEMENTED, MOSTLY QUARTZ (SPLIT ROCK CREEK FORMATION)
 310.0 - 318.0 SILTSTONE, BLACK; HARD, SOME PINK AND BLACK SILTY CLAYS (SPLIT ROCK CREEK FORMATION)
 318.0 - 378.0 SAND, PINK AND WHITE, MEDIUM TO COARSE; PARTIALLY CEMENTED, MOSTLY QUARTZ, SEVERAL SMALL BLACK SILTSTONE LAYERS (SPLIT ROCK CREEK FORMATION)
 378.0 - 379.0 QUARTZITE, PINKISH-WHITE; VERY HARD, ONLY A FEW INCHES WERE ACTUALLY PENETRATED

* * * *

County: MINNEHAHA
 Legal Location: SW SW NW NW SEC. 35, T. 102 N., R. 48 W.
 Latitude: 43.3553
 Land Owner:
 Project: MINNEHAHA COUNTY STUDY
 Drilling Company: SDGS
 Driller: C. SCHMIG
 Geologist: D. TOMHAVE
 Date Drilled: 04-29-1985
 Ground Surface Elevation: 1340.00 T
 Total Drill Hole Depth: 215.0
 Water Rights Well:
 Other Well Name:
 Basin: BIG SIOUX
 Management Unit:
 Screen Type: PVC, MFG. AND HM.
 Casing Type: PVC
 Casing Top Elevation: 1342.00 T
 Casing Stick-up: 2.00
 Well Maintenance Date:
 USGS Hydrological Unit Code: 10170203
 Electric Log Information:
 Spontaneous Potential:
 Natural Gamma: X
 Samples:

Location: 102N-48W-35BBCC

Longitude: 96.3429

Driller's Log:
 Geologist's Log: X
 Drilling Method: ROTARY

Test Hole Number: R2-85-12
 SDGS Well Name: R2-85-12

Aquifer: SPLIT ROCK CREEK

Screen Length: 15.0
 Casing Diameter: 2.0

Total Casing and Screen: 172.0

Single Point Resistivity: X
 Extra:

CASING SLOTTED 10 FEET ABOVE A 5-FOOT SCREEN.

0.0 - 12.0 CLAY, BROWN, VERY SILTY; GREASY, OXIDIZED (LAKE CLAY)
 12.0 - 22.0 CLAY, GRAY, VERY SILTY; GREASY, UNOXIDIZED (LAKE CLAY)
 22.0 - 36.0 SAND AND GRAVEL, BROWN, MEDIUM; OXIDIZED
 36.0 - 42.0 CLAY, GRAY, SILTY, SANDY
 42.0 - 50.0 SAND AND GRAVEL, MEDIUM TO COARSE GRAVEL; QUARTZITE BOULDER



50.0 - 99.0 CLAY, GRAY, VERY SILTY, SANDY;
UNOXIDIZED (SPLIT ROCK CREEK FORMATION)
99.0 - 110.0 SAND, GRAY, FINE; MOSTLY QUARTZ
(SPLIT ROCK CREEK FORMATION)
110.0 - 114.0 CLAY, GREEN AND GRAY, VERY SILTY, SANDY;
GREASY (SPLIT ROCK CREEK FORMATION)
114.0 - 172.0 SAND, PINKISH-RED, FINE; MOSTLY QUARTZ,
BECOMES CEMENTED WITH DEPTH
(SPLIT ROCK CREEK FORMATION)
172.0 - 194.0 CLAY, DARK-GRAY TO BLACK, VERY SILTY;
SOME LIGHT-GRAY SANDY CLAY, SOME BLACK
GREASY SHALE, NONCALCAREOUS (SPLIT
ROCK CREEK FORMATION)
194.0 - 214.0 SAND, PINKISH-RED, FINE; MOSTLY QUARTZ,
VERY CEMENTED, SOME BROWN CLAY
214.0 - 215.0 QUARTZITE, PINK; VERY HARD, ACTUALLY ONLY
A FEW INCHES WERE PENETRATED (SIOUX
QUARTZITE)

* * * *

County: MINNEHAHA
Legal Location: SE SW NW SW SEC. 35, T. 102 N., R. 48 W.
Latitude: 43.3528
Land Owner:
Project: SPLIT ROCK CREEK AQUIFER
Drilling Company: SDGS
Driller: G. JENSEN
Geologist: D. TOMHAVE
Date Drilled: 06-19-1989
Ground Surface Elevation: 1351.00 T
Total Drill Hole Depth: 222.0
Water Rights Well:
Other Well Name: SRC-36
Basin: BIG SIOUX
Management Unit:
Screen Type: PVC, MFG.
Casing Type: PVC
Casing Top Elevation:
Casing Stick-up: 3.00
Well Maintenance Date:
USGS Hydrological Unit Code: 10170203
Electric Log Information:
Spontaneous Potential:
Natural Gamma:
Samples:

Location: 102N-48W-35CBCD

Longitude: 96.3409

Driller's Log: X
Geologist's Log:
Drilling Method: ROTARY

Test Hole Number: R3-35-89
SDGS Well Name: R3-35-89

Aquifer: SPLIT ROCK CREEK

Screen Length: 15.0
Casing Diameter: 2.0

Total Casing and Screen: 220.0

Single Point Resistivity:
Extra:

BENTONITE GROUT FROM 170 TO 0 FEET.

0.0 - 2.0 TOPSOIL, BLACK
2.0 - 12.0 SAND, FINE
12.0 - 25.0 CLAY, TAN, SILTY
25.0 - 52.0 SAND, MEDIUM AND COARSE
52.0 - 86.0 CLAY, GRAY, SANDY, PEBBLY (TILL)
86.0 - 92.0 SAND, MEDIUM



92.0 - 102.0 CLAY, GRAY, SILTY
 102.0 - 112.0 SAND, FINE
 112.0 - 135.0 SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
 135.0 - 150.0 SHALE, BLACK; SOFT (SPLIT ROCK CREEK FORMATION)
 150.0 - 219.0 SAND, FINE; CEMENTED (SPLIT ROCK CREEK FORMATION)
 219.0 - 222.0 CLAY, GRAY (SPLIT ROCK CREEK FORMATION)

* * * *

County: MINNEHAHA
 Legal Location: NW NE SW SW SEC. 35, T. 102 N., R. 48 W.
 Latitude: 43.3526
 Land Owner:
 Project: SPLIT ROCK CREEK AQUIFER
 Drilling Company: SDGS
 Driller: G. JENSEN
 Geologist: D. TOMHAVE
 Date Drilled: 06-20-1989
 Ground Surface Elevation: 1300.00 T
 Total Drill Hole Depth: 235.0
 Water Rights Well:
 Other Well Name: SRC-37
 Basin: BIG SIOUX
 Management Unit:
 Screen Type: PVC, MFG.
 Casing Type: PVC
 Casing Top Elevation:
 Casing Stick-up: 3.00
 Well Maintenance Date:
 USGS Hydrological Unit Code: 10170203
 Electric Log Information:
 Spontaneous Potential:
 Natural Gamma:
 Samples:

Location: 102N-48W-35CCAB

Longitude: 96.3403

Driller's Log:
 Geologist's Log: X
 Drilling Method: ROTARY

Test Hole Number: R3-36-89
 SDGS Well Name: R3-36-89

Aquifer: SPLIT ROCK CREEK

Screen Length: 20.0
 Casing Diameter: 2.0

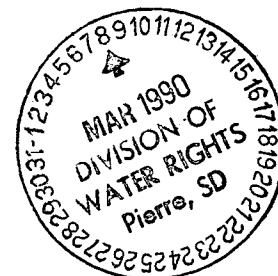
Total Casing and Screen: 226.0

Single Point Resistivity:
 Extra:

BENTONITE GROUT FROM 160 TO 0 FEET.

0.0 - 2.0 TOPSOIL
 2.0 - 38.0 SAND, FINE
 38.0 - 48.0 GRAVEL
 48.0 - 82.0 CLAY, GRAY, SANDY, PEBBLY (TILL)
 82.0 - 119.0 SAND, FINE AND COARSE
 119.0 - 145.0 SILTSTONE, BLACK; HARD (SPLIT ROCK CREEK FORMATION)
 145.0 - 164.0 SHALE, BLACK; SOFT (SPLIT ROCK CREEK FORMATION)
 164.0 - 228.0 SAND, FINE; CEMENTED (SPLIT ROCK CREEK FORMATION)
 228.0 - 235.0 CLAY, BLACK (SPLIT ROCK CREEK FORMATION)

* * * *



County: MINNEHAHA
Legal Location: NE NE SE SE SEC. 36, T. 102 N., R. 48 W.
Latitude: 43.3526
Land Owner:
Project: SE SO. DAK. UNIT STUDY
Drilling Company: MERRIMAN DRILLING
Driller: L. MERRIMAN
Geologist: D. TOMHAVE
Date Drilled: 08-21-1984
Ground Surface Elevation: 1385.00 T
Total Drill Hole Depth: 282.0
Water Rights Well: MA-87F
Other Well Name: 6
Basin: BIG SIOUX
Management Unit:
Screen Type: PVC, MFG.
Casing Type: PVC
Casing Top Elevation: 1387.00 T
Casing Stick-up: 2.00
Well Maintenance Date:
USGS Hydrological Unit Code: 10170203
Electric Log Information:
Spontaneous Potential:
Natural Gamma:

Location: 102N-48W-36DDAA

Longitude: 96.3155

Driller's Log:
Geologist's Log: X
Drilling Method: ROTARY

Test Hole Number:
SDGS Well Name:

Aquifer:

Screen Length: 5.0
Casing Diameter: 2.0

Total Casing and Screen: 285.0

Single Point Resistivity:
Extra:

Samples:

0.0 -	3.0	CLAY, BLACK, SILTY (TOPSOIL)
3.0 -	12.0	CLAY, LIGHT-BROWN, SILTY; OXIDIZED
12.0 -	15.0	SAND, BROWN, MEDIUM TO COARSE; OXIDIZED
15.0 -	21.0	CLAY, VERY LIGHT-BROWN TO WHITE, VERY SILTY (LAKE CLAY?)
21.0 -	25.0	CLAY, GRAY, VERY SILTY; GREASY (LAKE CLAY?)
25.0 -	30.0	SAND, REDDISH-BROWN, MEDIUM; OXIDIZED
30.0 -	125.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
125.0 -	127.0	QUARTZITE BOULDER, REDDISH-PINK; VERY HARD
127.0 -	138.0	CLAY, GRAY, SILTY (SPLIT ROCK CREEK FORMATION?)
138.0 -	210.0	SILTSTONE, BLACK; HARD, ALTERNATING LAYERS OF CEMENTED SILTS, SILTY CLAYS, AND GREASY SHALES (SPLIT ROCK CREEK FORMATION)
210.0 -	223.0	SAND, PINK AND WHITE, FINE TO MEDIUM, PARTIALLY CEMENTED, MOSTLY QUARTZ, SEVERAL BLACK SILTSTONE LAYERS, 211 TO 215 FEET, 218 TO 221 FEET (SPLIT ROCK CREEK FORMATION)
223.0 -	231.0	CLAY, PINK, VERY SILTY (SPLIT ROCK CREEK FORMATION)
231.0 -	235.0	SILTSTONE, BLACK; HARD, CEMENTED FROM 231 TO 232 FEET, SOFT AND SHALEY FROM



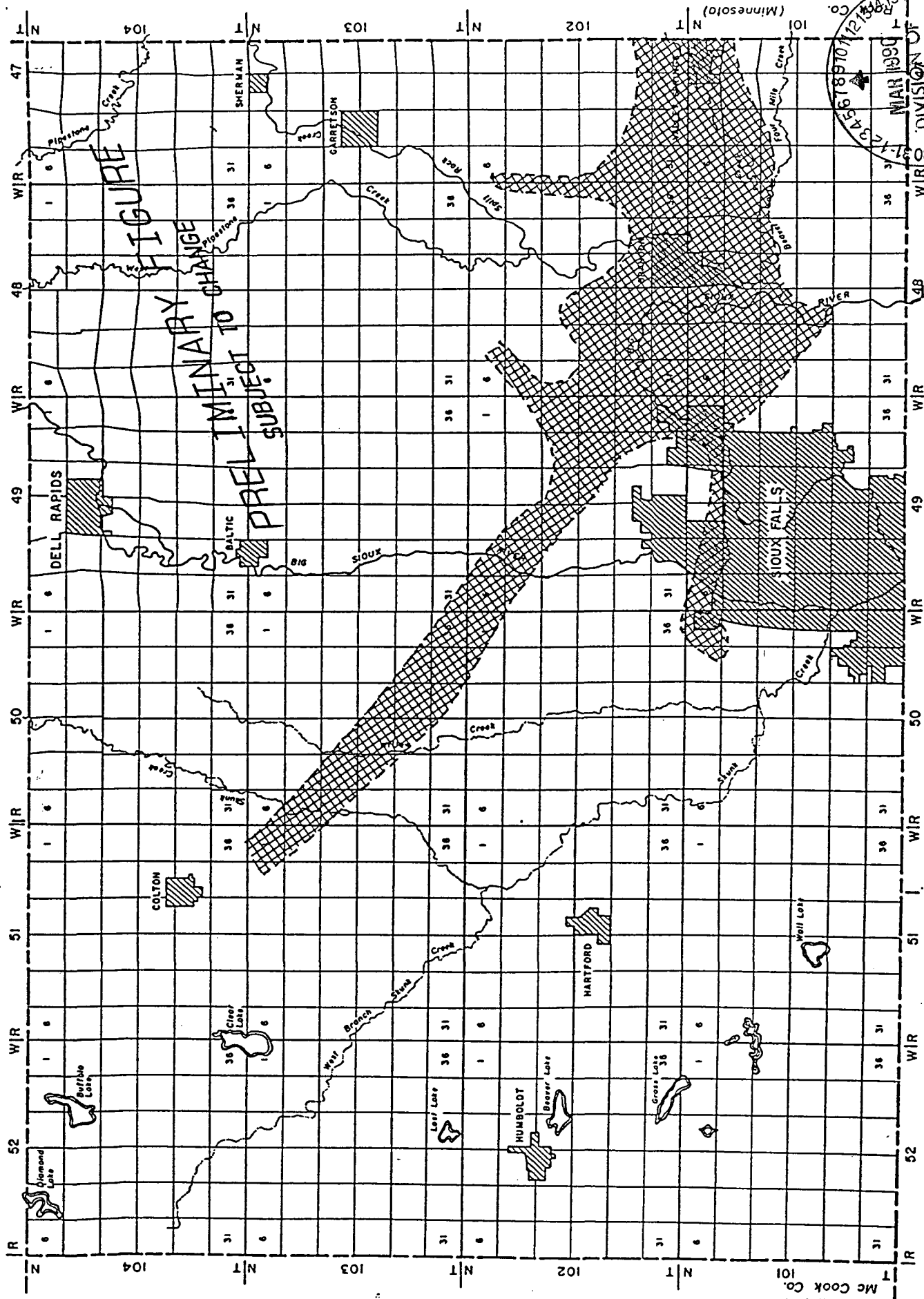
- 232 TO 235 FEET (SPLIT ROCK CREEK
FORMATION)
- 231.0 - 253.0 SAND, PINK AND WHITE, MEDIUM; PARTIALLY
CEMENTED, MOSTLY QUARTZ, HARD CLAYEY
BLACK SILTS FROM 238 TO 240 FEET AND
FROM 246 TO 247 FEET (SPLIT ROCK CREEK
FORMATION)
- 253.0 - 274.0 SILTSTONE, BLACK; HARD, SOME CEMENTED
SILT, SOME SILTY CLAYS, SOME GREASY
SHALES (SPLIT ROCK CREEK FORMATION)
- 274.0 - 281.0 SAND, PINK AND WHITE, COARSE; CEMENTED,
MOSTLY QUARTZ (SPLIT ROCK CREEK
FORMATION)
- 281.0 - 282.0 QUARTZITE, PINKISH-WHITE; VERY HARD,
ACTUALLY ONLY A FEW INCHES WERE
PENETRATED

* * * *

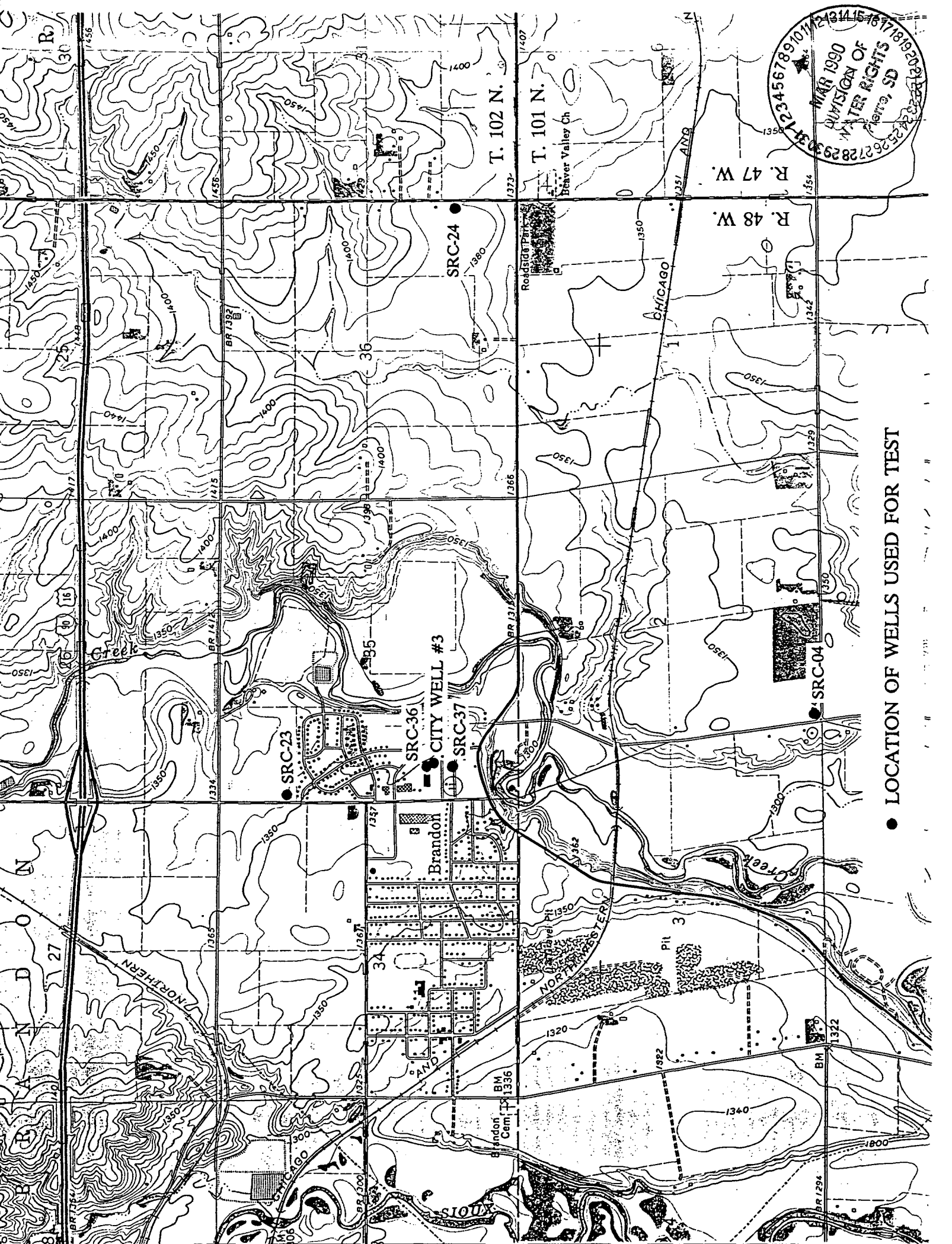


ATTACHMENTS



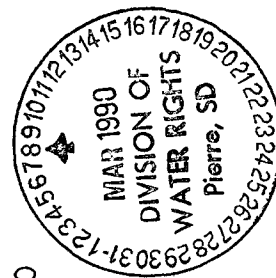
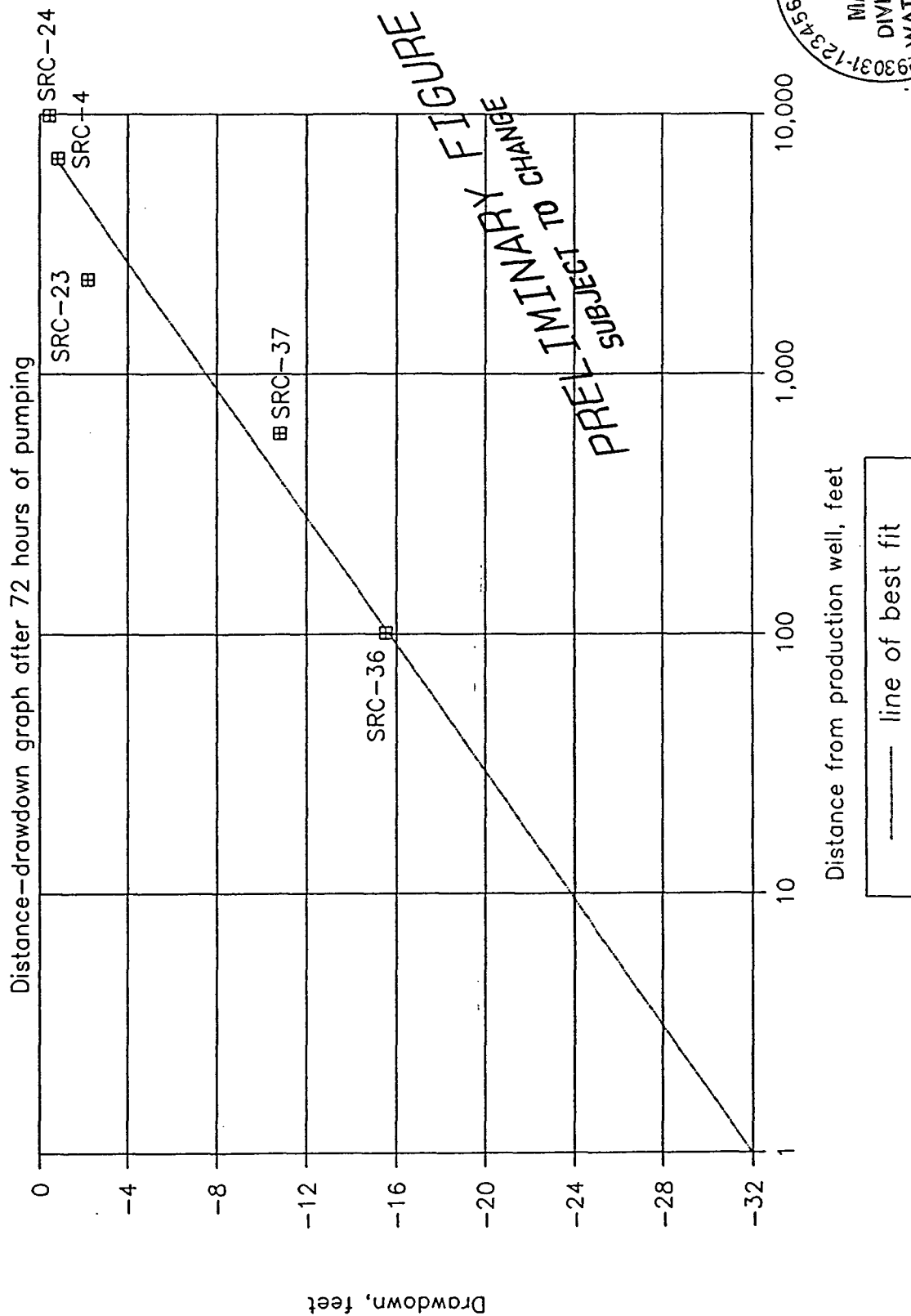


Areal extent of the Split Rock Creek aquifer



● LOCATION OF WELLS USED FOR TEST

Split Rock Creek Aquifer Test at Brandon



SOUTH DAKOTA DEPARTMENT OF WATER AND NATURAL RESOURCES

Office of Drinking Water

CHEMICAL ANALYTICAL DATA



Water Supply: for Brandon City
 City, County: Brandon, Minnehaha
 Source Sampled: Well# _____ Depth _____
 Date drilled _____ Other _____
 Type of Sample: Raw _____ Treated ☒ Composite _____
 Treatment Process(s): filtered (0.45 µm)

Date Collected: 06-28-89
 Collected By: Stan Pence
 Report Mailed To: Tim Cowman
S.D. Geological Survey
Science Center
Vermillion, SD 57069
 Lat: _____ Long: _____
 Comments: Brandon Pump House

Received By Lab: 6/30/89 JR
 Report Sent By Lab: JUL 19 1989 NS

Parameter	Maximum Limit	Results	Parameter	Suggested Limit	Results
Arsenic (As)	50 ug/l		Chloride (Cl)	250 mg/l	
Barium (Ba)	1000 ug/l		Iron (Fe)	0.3 mg/l	
Cadmium (Cd)	10 ug/l		Manganese (Mn)	0.05 mg/l	
Chromium (Cr)	50 ug/l		Sulfate (SO ₄)	250 mg/l	
Lead (Pb)	50 ug/l		Tot. Diss. Solids (TDS)	500 mg/l	
Mercury (Hg)	2 ug/l		pH	6.5-8.5	
Nitrate (NO ₃) (as N)	10 mg/l		Alkalinity-M (CaCO ₃)	mg/l	
Selenium (Se)	10 ug/l		Alkalinity-P (CaCO ₃)	mg/l	
Silver (Ag)	50 ug/l		Bicarbonate (HCO ₃)	mg/l	
Fluoride (F)	2.4 mg/l		Carbonate (CO ₃)	mg/l	
☒ Gross alpha	15 pCi/l	3.4 ± 3.3	Spec. Cond. @ °C	umhos/cm	
Gross radium	pCi/l		Calcium (Ca)	mg/l	
Radium 226	5 pCi/l		Magnesium (Mg)	mg/l	
OTHER PARAMETERS			Hardness (CaCO ₃) gpg	mg/l	
			Langelier Index		
			Sodium (Na)	mg/l	
			Potassium (K)	mg/l	
			Field temperature	°F	°C
			Nitrite (NO ₂) (as N)	mg/l	
LAB COMMENTS: STATE HEALTH LABORATORY			mg/l = milligrams/liter = parts/million (ppm)		
500 E. Capital			ug/l = micrograms/liter = parts/billion (ppb)		
PIERRE, SD 57501-5093			gpg = grains per gallon		
<u>Billed</u>			pCi/l = picocuries per liter		
Percentage of Error:			LAB NUMBER: <u>001013</u>		
WNR - 606R - 6/82					

LOG OF WELL NO. 3 - BUILT IN 1964

Well Drilled by Grimshaw Drilling Company, now known as
Minnehaha Waters. Data shown furnished by John Greenfield
of Minnehaha Waters.

DRILLERS LOG

0 - 57'	Sand (Medium to Fine)
57' - 92'	Clay (Soft)
92' - 98'	Sand (Grey)
98' - 104'	Clay (Soft)
104' - 108'	Sand (Fine)
108' - 121'	Clay
121' - 122'	Coal
122' - 125'	Rocky Shale (Soft)
125' - 150'	Black Quartzite
150' - 158'	Pink Quartzite
158' - 179'	Pink Quartzite (Partly Decomposed)
179' - 221'	Pink-White Sandstone (Rounded)
221'	Blue Shale

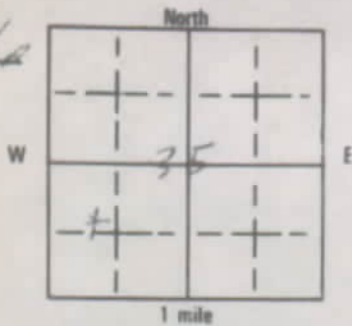
SOUTH DAKOTA WELL AND TEST HOLE PLUGGING REPORT

10-85

Location N 44th St Sec 35 Twp 122N Rg 48W

County Minnehaha

Please mark well location with an "X"



Well Owner

Name City of Brandon

Address City Hill, Brandon SD

Plugging completion Date 5-31-91

CHECK APPROPRIATE BOX

EXISTING WELL ☒

TEST HOLE ☐

Well depth 115'

Casing material STEEL

Casing size(s) 8"

Casing condition EXCELLENT COATED W/PAV

Hole depth _____

Hole size _____



Describe plugging procedure: Chlorinated well. Filled to 35' with clean washed pea rock - Tremied in cement grout to 5' below gravel where we had cut off casing, filled rest with top soil.

Describe grout or plugging material: _____

Type of non-slip plug: _____

This well or test hole was plugged under license # 111 And this report is true and accurate

Drilling firm Lacey Well Drilling

Signature of Licensed Representative James J. Lacey

Signature of Well Owner Donald H. Thompson, Mayor, City of Brandon

Date 6-6-91

IN A MANNER AND ON MICROFILM WHICH MEET THE REQUIREMENTS OF REPRODUCIBILITY OF DOCUMENTS (GPO) AND 10 04 02 FOR MICROGRAPHIC REPRODUCTIONS
25:1
4-6
6-9-92
DATE MICROFILMED
CERIAL OPERATOR SIGNATURE Walt Mcla

RECEIPT

Division of Water Rights

South Dakota Department of Water and Natural Resources

412133

Pierre, March 12, 1990

RECEIVED OF Clyt of Brandon, Box 95, Brandon, SD 57005-0095

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

Fee for Application for Permit No. <u>5395-3</u> to Appropriate Water, to construct works 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 Certified Copy of		
Fee for Print Copy of Map		
Fee for Certifying		
Fee for _____		
(Any Other Work Provided by Law)		
Total	250	00

By

Chief Engineer

John Hatch Kura



Stockwell Engineers, Inc.

211 East 14th Street • Suite 200 • Sioux Falls, South Dakota 57102
Telephone (605) 338-6668



March 5, 1990

Mr. John Hatch
Chief Engineer
Water Rights Division
South Dakota Department of Water and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501

Re: Water Permit Application
Brandon, South Dakota

Dear Mr. Hatch:

On the City's behalf, we are transmitting a copy of a water permit application to increase the amount of water claimed for the existing well no. 3 in Brandon, South Dakota. This well is currently permitted under Permit No. (3246-3) and 5296-3. The existing permits provide a total amount claimed of 0.89 cfs (400 gpm). The enclosed water permit application reflects an increase in amount of water claimed from 0.89 cfs (400 gpm) to 1.32 cfs (600 gpm).

The City of Brandon completed extensive well testing and rehabilitation of their wells in the Spring of 1989. The results of the well testing indicate a well capacity of 508 gpm not including well no. 3 which is covered in the enclosed permit application. The water study completed in the Fall of 1988 and submitted to your office with our letter dated 3/14/89 indicates the current peak day demand for the City of Brandon in 24 hours requires well capacity of 700 gpm. Producing the same amount of water in a recommended 20 hours requires well capacity of 840 gpm. Based upon this data, it is evident the existing permitted capacity for well no. 3 of 400 gpm would only provide the current peak day demand with no growth potential or significant reserve capacity. We are therefore enclosing the permit application to increase the capacity for well no. 3 to 600 gpm thereby providing capacity to meet the City's current peak demand with reserve capacity and growth potential.

Page Two
Mr. John Hatch
March 5, 1990

During the Summer of 1989, the South Dakota Geological Survey conducted a 72 hour pump test on well no. 3. This work was performed in conjunction with Split Rock Aquifer Study. During the test the well was pumped at 258 gpm. Total drawdown during the 72 hours of pumping was 25.35 feet for a specific capacity of 10.2 gpm per foot of drawdown. At an increased capacity of 600 gpm, the theoretical drawdown of the well is 59 feet. The static water level above the screen top is approximately 126 feet, therefore at a drawdown of 59 feet, the water level is still well above the top of the screen. A copy of the August 25, 1989 letter from the SDGS on the pumping tests is enclosed.

The existing pumping unit in well no. 3 is capable of pumping approximately 200 gpm against the system head. The City plans to install a new pumping unit in the well prior to this summer's heavy useage and therefore desires to install the 600 gpm pumping unit at this time. The enclosed permit application will provide the required permit capacity.

Very Truly Yours,

STOCKWELL ENGINEERS, INC.

Steve W. Brockmueller
Steve W. Brockmueller, P.E.

Enclosures

cc: Mr. Dennis Olson, City of Brandon



REPORT ON APPLICATION NO. 5395-3
CITY OF BRANDON
MARCH 28, 1990

This application proposes to appropriate additional water from an existing well (No. 3) 222 feet deep located in the NW 1/4 SW 1/4 of Section 35, T102N, R48W. Water Right No. 1804-3 authorizes an appropriation of 0.56 cfs from well No. 3 and Water Right No. 5296-3 authorizes the withdrawal to increase to 0.89 cfs from well No. 3. Application No. 5395-3 is to increase the withdrawal from well No. 3 to 1.32 cfs. The water is to be used by the City of Brandon for municipal purposes.

Aquifer - Split Rock Creek (SRKC)

The Split Rock Creek Aquifer consists of sandstones, claystones opaline sediments, cherts and sands with a total known thickness of as much as 300 feet (Hedges, 1982). The formation thickness is variable and thins or pinches out against the Sioux Quartzite in the subsurface. The Split Rock Creek Formation underlies approximately 69 square miles and contains approximately 99,400 acre-feet of recoverable water in Minnehaha County (Hedges, 1982). These are very conservative estimates and recent drilling for the Minnehaha County Study evaluates the lateral extent and thickness of the aquifer in the Brandon area (Lindgren, unpublished, 1985). The Split Rock Creek is under artesian conditions and may be hydraulically connected to a unnamed buried glacial aquifer, the Big Sioux South and the Sioux Quartzite.

The Division of Water Rights is presently monitoring 11 observation wells from the Split Rock Creek Aquifer east of Sioux Falls. Records from two of the wells indicate water levels respond to climatic changes, that is, rising during wet years and declining during dry years. These two wells have been measured since 1980. The other nine wells have been measure since March 1987. The water levels in the nine wells have dropped from 3 to 5 feet in the last three years (Water Rights, 1990).

Review of Existing Water Permits:

There are seven existing water permits withdrawing water from the Split Rock Creek aquifer. They are as follows:

561-3	Northern States Power Co.	1.77cfs	Industrial
742-3	Northern States Power Co.	0.33cfs	Industrial
1138-3	Town of Valley Springs	0.33cfs	Municipal
1809-3	City of Brandon	0.56cfs	municipal
2113-3	City of Valley Springs	0.33cfs	Municipal
4974A-3	Pinelake Hills Homeowners	0.06cfs	Suburan Housing
5276-3	Brandon Wood Preserving	0.10cfs	Industrial
5296-3	City of Brandon	0.33cfs	Municipal

Conclusions:

1. Water is available from the Split Rock Creek aquifer for appropriation for Water Permit Application No. 5395-3.
2. The aquifer is confined and under artesian conditions in the area of Application No. 5395-3. Fluctuations due to pumping are likely.
3. The Water Management Board denied Permit Application No. 5084-3 (future use for East Dakota Water Development District) for water from the Split Rock Creek Aquifer in this area. The reason for denial was based upon an insufficient documentation of the need for the water.



James A. Goodman, P.E.
Natural Resources Engr. IV

Bibliography

- Hedges, L.S., Etal., 1982 Evaluation of Ground Water Resources Eastern South Dakota and Upper Big Sioux River SD and Iowa for US Army Corps of Engineers, DWNR, SDGS, Vermillion SD
- Lindgren, 1985, Unpublished Data in Permit File 5084-3, SD DWNR, Div. of Water Rights, Joe Foss Bldg, Pierre SD 57501
- Water Rights, 1990, Records of Observation Wells Completed Into the Split Rock Creek Aquifer in Minnehaha County, SD DWNR, Div of Water Rights, Joe Foss Bldg, Pierre SD 57501.

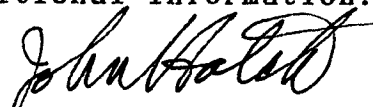
RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 5395-3, City of Brandon

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Water Permit Application No. 5395-3, City of Brandon, Box 95, Brandon SD 57005.

The Chief Engineer is recommending APPROVAL of Application No. 5395-3 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:

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.

See the attached report for additional information.



JOHN HATCH, Chief Engineer
April 5, 1990

Split Rock Creek

	Depth	8/6/80	3/24/87	3/22/88	4/5/89	3/13/90
MA80P A	192	108.8	104.5	105.1	105.5	105.9
MA80Z A	222	48.3	43.7	45.6	46.9	48.3
MA87A A	105			5.7	9.5	9.6
MA87B WT	213			156.9	157.1	156.7
MA87C A	173			118.3	120.4	122.2
MA87D A	239		67.2	68.4	69.3	70.5
MA87E A	78		13.7	15.3	16.9	18.8
MA87F A	285		78.7	80.5	82.6	83.2
MA87G A	485		50.2	52.7	53.5	54.9
MA87H A	350		41.2	42.9	44.3	45.8
MA87I A	176		29.5	31.0	32.4	33.9

Existing Permits

5276-3	Brandon Wood Preserving	0.1	Ind	102N48W27DD
5296-3	City of Brandon	0.33	Mun	102N48W35CB
5276-3	Brandon Wood Preserving	0.1	Ind	102N48W27DD
SRKC 561-3	Northern States Power Co.	1.77	Ind	102N48W32BC
SRKC 742-3	" " " "	0.33	Ind	102N48W31AA
SRKC 1138-3	Town of Valley Springs	0.33	Mun	101N47W03C
SRKC 2113-3	City of Valley Springs	0.33	Mun	101N47W03
SRKC 4974A-3	Pine Lake Hills Homeowners	0.06	SHD	101N48W18AD



 **Department of
Water & Natural Resources**

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

April 9, 1990

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

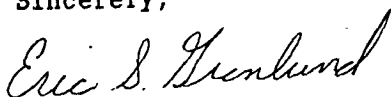
Dennis A. Kleinvachter, Mayor
City of Brandon
Box 95
Brandon, SD 57005

Dear Mr. Kleinvachter:

Water Permit Application No. 5395-3 for municipal 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 Brandon Challenger and the Argus Leader printed at Dell Rapids and Sioux Falls. For your information, a copy of the notice is enclosed. Copies of the report and the Chief Engineer's recommendation are also 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 Intent to Appropriate Water 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. We must receive Proof of Publication before the application can be considered by the Water Management Board.

Sincerely,



Eric S. Gronlund
Natural Resources Engineer
605 773-3352

enclosures



Department of Water & Natural Resources

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

April 9, 1990

Argus Leader
Box 5034
Sioux Falls, SD 57104

ATTN: Legal Publications:

Enclosed is a Notice of Hearing on Application No. 5395-3 to be published twice. Please publish the first notice on or before April 19, 1990 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 the City of Brandon, Box 95, Brandon, SD 57005.

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. The permit application cannot be considered by the Water Management Board until proof of publication has been received.

Sincerely,

Eric S. Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

TO: Eric S. 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 Water & Natural Resources

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

April 9, 1990

Brandon Challenger
Box 99
Dell Rapids, SD 57022

ATTN: Legal Publications:

Enclosed is a Notice of Hearing on Application No. 5395-3 to be published twice. Please publish the first notice on or before April 19, 1990 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 the City of Brandon, Box 95, Brandon, SD 57005.

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. The permit application cannot be considered by the Water Management Board until proof of publication has been received.

Sincerely,

Eric S. Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

TO: Eric S. 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

Instruction to Newspaper - Publish first Notice on or before April 12, 1990 with 2nd publication 7 days later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 5395-3 to Appropriate Water

Notice is given that the City of Brandon, Box 95, Brandon, SD 57005 has filed an application for a water permit to appropriate additional water from one existing well No. 3 (Split Rock Creek Aquifer) 222 feet deep located in the NW1/4 SW1/4 Section 35-T102N-R48W. Water Right Nos. 1804-3 and 5296-3 authorize an appropriation of 0.89 cubic feet of water per second (cfs) from well No. 3. This application is to increase the water appropriation from 0.89 cfs to 1.32 cfs from well No. 3. Water is to be used by the City of Brandon for municipal purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5395-3 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. This application will be considered by the Water Management Board in the Pelican Room, Ramkota Inn, Hwy 212, Watertown, SD on May 23, 1990 at 10:00 am. 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 interested person that intends to participate in the hearing before the Board by presenting evidence or cross-examining witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and Chief Engineer by May 11, 1990. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)". 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 legal counsel if legal counsel is obtained. The applicant need not file a petition. Contact the Water Rights Division to request information on this application or to assure access to the hearing by the handicapped.

This hearing is an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer. 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. The time of the hearing will also be automatically delayed for at least twenty days upon written request to the Chief Engineer from the applicant or a petitioner. The request for a delay must be received by May 11, 1990.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 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; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA, }

SS.

COUNTY OF MINNEHAHA }

M. DEVISH

being duly sworn, says: That the Argus Leader is, and during all the times hereinafter mentioned was, a daily legal newspaper as defined by SDCL 17-2-21, as amended published at Sioux Falls, Minnehaha County, South Dakota, by Sioux Falls Newspapers, Inc.; that affiant is and during all of said times, was an employee of the publisher of such newspaper and has personal knowledge of the facts stated in this affidavit; that the notice, order or advertisement, a printed copy of which is hereto attached, was published in said newspaper upon

Thursday, the 19 day of April, 1990,

Thursday, the 26 day of April, 1990,

_____, the _____ day of _____, 19____,

_____, the _____ day of _____, 19____,

_____, the _____ day of _____, 19____,

_____, the _____ day of _____, 19____,

_____, the _____ day of _____, 19____,

and that 77.08 was charged for publishing the same including a \$2.00 affidavit fee.

M. Devish

Subscribed and sworn to before me April 26, 1990.

Donay A. Buckley
Notary Public, South Dakota



NOTICE OF HEARING on Application No. 5395-3 to Appropriate Water

Notice is given that the City of Brandon, Box 95, Brandon, SD 57005 has filed an application for a water permit to appropriate additional water from one existing well No. 3 (Split Rock Creek Aquifer) 222 feet deep located in the NW1/4 SW1/4 Section 35-T102N-R48W, Water Right Nos. 1804-3 and 5296-3 authorize an appropriation of 0.89 cubic feet of water per second (cfs) from well No. 3. This application is to increase the water appropriation from 0.89 cfs to 1.32 cfs from well No. 3. Water is to be used by the City of Brandon for municipal purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5395-3 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. This application will be considered by the Water Management Board in the Pelican Room, Ramkota Inn, Hwy 212, Watertown, SD on May 23, 1990 at 10:00 am. 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 interested person that intends to participate in the hearing before the Board by presenting evidence or cross-examining witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and Chief Engineer by May 11, 1990. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E. Capitol, Pierre SD 57501 (605 773-3352)". 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 legal counsel if legal counsel is obtained. The applicant need not file a petition. Contact the Water Rights Division to request information on this application or to assure access to the hearing by the handicapped.

This hearing is an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer. 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. The time of the hearing will also be automatically delayed for at least twenty days upon written request to the Chief Engineer from the applicant or a petitioner. The request for a delay must be received by May 11, 1990.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 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; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

115

Apr. 19, 28, 1990

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
 County Minnehaha) ss.

I, Marie Kruger

certify that the attached printed Notice was taken
 from the Brandon Valley Challenger

A newspaper which during the whole time of publication of
 said notice herein after stated, has been and is printed and
 published in the Brandon Valley Challenger
City of Dell Rapids

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

April 18, 1990

April 25, 1990

Marie Kruger
 (Signature)
Legal Dept. Manager
 (Title)

4-25-90

(Date Signed)

Cost of Printing: \$ 37.33



Brandon/

NOTICE OF HEARING
On Application No. 5395-3
to Appropriate Water

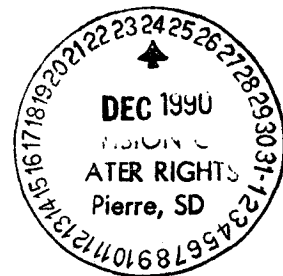
Notice is given that the City of Brandon, Box 95, Brandon, SD 57005 has filed an application for a water permit to appropriate additional water from one existing well No. 3 (Split Rock Creek Aquifer) 222 feet deep located in the NW1/4 SW1/4 Section 35-T102N-R48W. Water Right Nos. 1804-3 and 5296-3 authorize an appropriation of 0.89 cubic feet of water per second (cfs) from well No. 3. This application is to increase the water appropriation from 0.89 cfs to 1.32 cfs from well No. 3. Water is to be used by the City of Brandon for municipal purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5395-3 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. This application will be considered by the Water Management Board in the Pelican Room, Ramkota Inn, Hwy. 212, Watertown, SD on May 23, 1990 at 10:00 a.m. 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 interested person that intends to participate in the hearing before the Board by presenting evidence or cross-examining witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and Chief Engineer by May 11, 1990. The Chief Engineer's address is "Water Rights Division, Foss Building, 600 E. Capitol, Pierre, SD 57501 (605 773-3888)". 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 legal counsel if legal counsel is obtained. The applicant need not file a petition. Contact the Water Rights Division to request information on this application or to assure access to the hearing by the handicapped.

This hearing is an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer. 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. The time of the hearing will also be automatically delayed for at least twenty days upon written request to the Chief Engineer from the applicant or a petitioner. The request for a delay must be received by May 11, 1990.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 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; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.



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

Date 12-19-90

TO: Water Rights Division, DWNR
Joe Foss Building
Pierre SD 57501-3181

FROM: City of Brandon 304 Main Ave. Box 95 Brandon, SD 57005
name address city

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. L804-3,5296-3,5395-3

Water Permit No. 5395-3 states that the diversion system is to be constructed by 5-24-95, and that the water it put to beneficial use by 5-24-99.

The diversion system was completed on Aug 11, 1990.
Applying the water to beneficial use was completed on Aug 11, 1990.

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

Dennis A. Klemm Mayor
signature



Department of Water & Natural Resources

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

JUL 10 1990

Dennis A Kleinvachter, Mayor
City of Brandon
Box 95
Brandon SD 57005

Dear Mayor Kleinvachter:

Enclosed is Water Permit No. 5395-3 as approved by the Water Management Board authorizing you to construct your water diversion system and put the water to beneficial use, 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,

A handwritten signature in black ink, appearing to read "John Hatch". The signature is written in a cursive, flowing style.

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.

REPORT ON INSPECTION OF PERMIT NO. 5296-3 and 5395-3

DATE: 7-92

Other permit(s) associated with the project: License 1804-3

DIVERSION POINT LEGAL LOCATION: Well #1 - 1460' N and 600' W and well #2 - 1150' N and 600' W from the center of Section 3-T101N-R48W. Well #3 - 17⁵~~40~~' N and 430' E of the SW corner of Section 35-T102N-R48W.

WELL INFORMATION:

- 1) Well Drilling Firm: Well #1 - Thorpe Well Company; well #2 and #3 - Minnehaha Waters, Inc.
- 2) No. of Wells 3
- 3) Depth(s) well #1 - 48; well #2 - 50; well #3 - 222 feet
- 4) Well log is available Y
- 5) Comment: Well #1, 2 and 3 are licensed under 1804-3. Additional diversion for well #3 is permitted under 5296-3 and 5395-3.

Casing: Well #1

- 1) Diameter 10 inches
- 2) Length 32 feet
- 3) Type steel

Screen:

- 1) Type stainless steel
- 2) Length 16 feet
- 3) Static water level 20 feet

Pump:

- 1) Make
- 2) Model
- 3) Size
- 4) Capacity 170 (pumping rate) GPM

Motor:

- 1) Make Franklin
- 2) Model No.
- 3) Horsepower rating 20 hp

Casing: Well #2

- 1) Diameter 8 inches
- 2) Length 37.5 feet
- 3) Type steel

Screen:

- 1) Type stainless steel
- 2) Length 12.5 feet
- 3) Static water level 20 feet

Pump:

- 1) Make Ground Fos
- 2) Model SP-16-2
- 3) Size
- 4) Capacity 65 (pumping rate) GPM

Motor:

- 1) Make Franklin
- 2) Model No.
- 3) Horsepower rating 2 hp

Casing: Well #3

- 1) Diameter 12 inches
- 2) Length 182 feet
- 3) Type steel

Screen:

- 1) Type stainless steel
- 2) Length 40 feet
- 3) Static water level 50 feet

Pump:

- 1) Make Crown
- 2) Model 8L-600 FTD
- 3) Size
- 4) Capacity 625 (pumping rate) GPM

Motor:

- 1) Make Franklin
- 2) Model No.
- 3) Horsepower rating 75 hp

SYSTEM TYPE: Municipal water supply.

PERMIT QUALIFICATIONS AND REGULATIONS:

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

Permit No. 5296-3 and 5395-3
Big Sioux River - Water District

Report Of Examination Of Works And/Or Application of Water To Beneficial Use

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

I have this day made a thorough examination of the water use system constructed by the City of Brandon of P.O. Box 38, Brandon, SD 57005 holder of Permit Nos. 5296-3 and 5396-3 also License No. 1804-3, bearing the priority of March 22, 1989, March 8, 1990 and January 25, 1971 authorizing the diversion of an additional 0.33 and 0.43 (total authorized diversion for well #3 is 1.32 cfs) cu. ft. per second from well #3 of the waters of Split Rock Creek Aquifer for municipal purposes, in Minnehaha County. Under License 1804-3 wells #1, 2 and 3 are authorized for a combined diversion of 1.2 cfs. Well #1 and 2 for 0.64 cfs from the water of the Big Sioux - South Aquifer and well #3 for 0.56 cfs from the Split Rock Creek Aquifer.

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

A. Works used to divert the water:

Well #1 - 48 feet deep, 32 feet of 10 inch steel casing and 16 feet of stainless steel screen. The well has a pumping rate of 170 gpm and a 20 hp Franklin motor.

Well #2 - 50 feet deep, 37.5 feet of 8 inch steel casing and 12.5 feet of stainless steel screen. The well has a Ground Fos pump, model no. SP-16-2 with a pumping rate of 65 gpm and a 2 hp Franklin motor.

Well #3 - 222 feet deep, 182 feet of 12 inch steel casing and 40 feet of stainless steel screen. The well has a Crown pump, model no. 8L-600 FTD with a pumping rate of 625 gpm and a 75 hp Franklin motor.

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

Distribution system for Brandon's municipal water supply.

C. Works used to apply water to beneficial use:

Municipal water supply.

The system is in the following condition good. The point of diversion is located well #1 - 1460 feet N and 600 feet W and well #2 - 1150 feet N and 600 feet W from the center of Section 3-T101N-R48W and well #3 - 1750 feet N and 430 feet E of the SW corner of Section 35-T102N-R48W. The works are capable of diverting and conveying to the place of use 1.39 well #3 and 0.56 wells #1 and 2 cu. ft. per second of water which is to be used for a municipal water supply.

The license should be issued for 1.39 cfs from the Split Rock Creek Aquifer for well #3 and a combined 0.52 cfs from the Big Sioux Aquifer for wells #1 and 2.

Applicable permit qualifications have been complied with: X Yes No

Exceptions to compliance are: none

Date: 4-13-95

COMMENTS: This report is based on an inspection by Greg Johnston done in July 1992. The additional 0.07 cfs from well #3 is covered under new permit no. 5868-3. The additional diversion is from the waters of the Spilt Rock Creek Aquifer and has a priority date of June 8, 1995.



Lynn Beck
Natural Resources Engineer
DENR, Water Rights Division



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

April 17, 1995

Dennis Olson
Finance Officer
Brandon City Hall
P.O. Box 95
Brandon, SD 57005

Dear Mr. Olson:

This letter concerns the water permits held by the city of Brandon, the status of those permits, and information needed to license the permits. There are corrections and additions that require new applications. New applications are needed to get the city permitted for all of its water use.

Please find enclosed partially completed application forms, a map and instruction sheet. The application involves well number four with a diversion rate of 0.36 cubic feet per second (cfs), which is not authorized under any of the cities present permits. Also needing application is an additional diversion of 0.14 cfs from well number five. The waters applied for under this new application can come out of the future use permit 4002-3 and retain a priority date of September 12, 1977.

Future use permit 4002-3 reserves 902 acre feet of water in Section 34-T102N-R48W and Section 3-T101N-R48W. This new application would take 217 acre feet from the future use permit.

Application must also be made for an additional 0.07 cfs from city well number three. License 1804-3 and Permit Numbers 5296-3 and 5395-3 appropriate a combined 1.32 cfs (594 gpm) from well number three. The well has a maximum pumping rate of 1.39 cfs (625 gpm); an additional 0.07 cfs needs application. These waters come from the Split Rock Creek Aquifer and do not fall under Future Use Permit 4002-3.

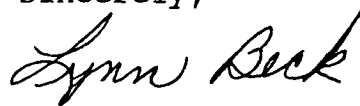
Below is a listing of the City of Brandon's water rights:

1. License 1804-3 appropriates 1.2 cubic feet of water per minute (cfs) from wells number 1, 2 and 3 with a priority date of January 25, 1971.
2. Future Use Permit No. 4002-3 reserves 902 acre feet of water from Section 34-T102N-R48W and Section 3-T101N-R48W with a priority date of September 12, 1977.
3. License 4434-3 appropriates 0.43 cfs (194 gpm) from two wells and 20.5 acre feet of storage used to irrigate the Municipal Golf Course.
4. Water Permit No. 4885-3 appropriates 0.28 cfs (126 gpm) from well number 5, with a priority date of April 20, 1982.
5. Water Permit No. 5296-3 appropriates an additional 0.33 cfs (150 gpm) for well number 3, with a priority date of March 22, 1989.
6. Water Permit No. 5395-3 appropriates an additional 0.43 cfs (194 gpm) from well number 3, with a priority date of March 8, 1990. A combined total of 1.32 cfs.
7. Water Permit No. 5507-3 appropriates 0.05 cfs (22.5 gpm) from a well at the Municipal Golf Course for the clubhouse with a priority date of January 28, 1991.

Once the Water Rights Division receives the applications, the licensing process can continue. If there is no opposition to the applications after they have been advertised, the permits can be licensed. After payment of the licensing and inspection fee, as per item number 7 on the instruction sheet, a Water License will be issued.

If you have any questions, please feel free to contact me.

Sincerely,



Lynn Beck
Natural Resources Engineer III
Water Rights Division, DENR
(605) 773-3352

encls

c Steve Brockmueller
Stockwell Engineers, Inc.
1621 S. Minnesota Ave.
Sioux Falls, SD 57105

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 5868-3

(1) The City of Brandon, PO Box 95, Brandon SD 57005 made Application No. 5868-3, June 8, 1995 for a water permit to appropriate an additional 0.07 cubic feet of water per second (cfs) from groundwater (one well), Minnehaha County, South Dakota for municipal use purposes. Permit No. 5868-3, with a priority date of June 8, 1995 was approved September 5, 1995 and issued to the applicant for diversion of water with construction of the described water supply system completed and the application to beneficial use of said water completed.

Water Permit No. 5868-3 increased the diversion rate of Well #3 authorized by Water Right No. 1804-3 and Water Permit Nos. 5296-3 and 5395-3 from 1.32 cfs to 1.39 cfs. Water Right No. 1804-3 and Water Permit Nos. 5296-3 and 5395-3, combined, appropriate 1.32 cfs from the City of Brandon's Well No. 3 (Split Rock Creek Aquifer) 22 feet deep located in the NW 1/4 SW 1/4 Section 35-T102N-R48W. Water Right No. 1804-3 also authorizes 0.64 cfs from Well Nos. 1 & 2 (Big Sioux -South Aquifer). The applicable portions of Water Right No. 1804-3 and Water Permit Nos. 5296-3 and 5395-3 have been incorporated into this license.

(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 1.39 cfs (Split Rock Creek Aquifer) and 0.52 cfs (Big Sioux South Aquifer) for beneficial use. The location of the diversion points are Well #1 - 1460 feet north and 600 feet west (NE 1/4 NW 1/4) and Well #2 - 1150 feet north and 600 feet west (SE 1/4 NW 1/4) both from the center of Section 3-T101N-R48W and Well #3 - 1750 feet north and 430 feet east (NW 1/4 SW 1/4) of the southwest corner of Section 35-T102N-R48W

(3) The applicant has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use.

(4) Pursuant to South Dakota Water Law 46-5-30.1 the City of Brandon, PO Box 95, Brandon SD 57005 the holder and/or owner of Incorporated Water Permit No. 5868-3 issued a license to appropriate water, the right to use 1.91 cubic feet of water per second from groundwater (three wells) from the location specified in (2) of this license for municipal use purposes. The priority dates are as follows: Well Nos. #1 & #2 - 0.52 cfs (January 25, 1971); Well #3 - 0.56 cfs (January 1, 1971); 0.33 cfs (March 22, 1989); 0.43 cfs (March 8, 1990); and 0.07 cfs (June 8, 1995). This license is subject to any limitations or qualifications listed in Incorporated Water Permit No. 5868-3 and subject to South Dakota State Law.



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

DEC 18 1995

date





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

DEC 18 1995

Dennis Olson, Finance Officer
City of Brandon
PO Box 95
Brandon SD 57005

Dear Mr. Olson:

Enclosed are Water Permit and Water License Nos. 5868-3 and 5869-3, as well as receipts assessed for the inspections and issuance of the licenses. Water License Nos. 5868-3 and 5869-3 are the final documents which complete the process of obtaining water rights.

The applicable portions of Water Right No. 1804-3 and Water Permit Nos. 5296-3 and 5395-3 have been incorporated into Water License No. 5868-3. The applicable portions of Water Right No. 4885-3 have been incorporated into Water License No. 5869-3.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the wells authorized by the above permits, 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 the City of Brandon uses 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.

Very truly yours,

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

enclosures