

WATER PERMIT NO. 2631-2

Name of Applicant: City of Box Elder

Address: 520 N Ellsworth Rd, Suite 9C, Box Elder SD 57719

Phone: 605 923-1408

Amount of Water Claimed: 1 cfs (725 AF)

Total Acres: NA

Source of Water Supply: groundwater (one well)

Water to be used for: municipal

County: Pennington, Meade

Type of Waste Disposal System:

Location: north of Box Elder

PRIORITY Date Received: 4-16-08

Application/License Fee: \$375

Corrected Application Received: 5-23-08

Period of Annual Use: January 1 – December 31

Remarks:

Diversion Point: SW ¼ SW ¼ Sec 33-T3N-R9E

Land to be Irrigated:

Depth of Well: approximately 5000 feet deep

Well Driller:

Remarks:

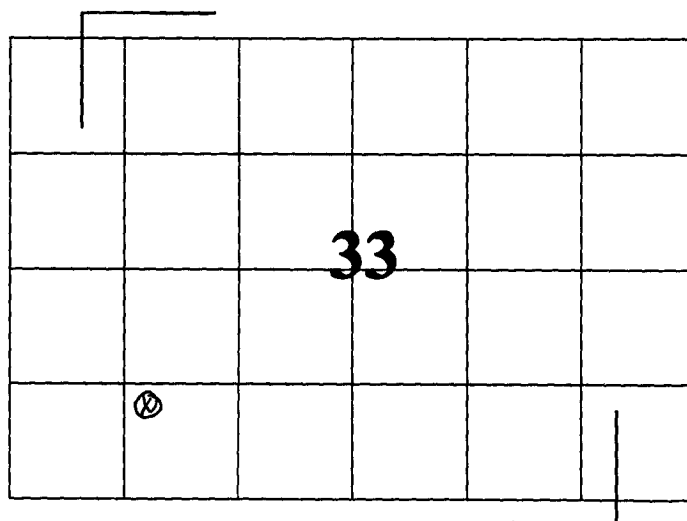
Type of Map: plat

Prepared by: Raymond T Bettmeng, PE

Reviewed and the Number Assigned on: 5-27-08

By: Karen Schlaak

Notice of Hearing - date to intervene: _____



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

Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	No. <u>2631-2</u> (office use only)	Hydrologic Unit <u>10120111</u>
	Basin <u>Upper Cheyenne</u>	
	Newspaper <u>Rapid City Journal P.O. Box 450</u>	
	<u>605-394-8300</u>	

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MAY 23 2008

WATER RIGHTS
PROGRAM

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

Check use(s) of water:

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

Type of Application: ☒ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation

(check one)

☐ Place to Beneficial Use Water Reserved by Future Use Permit No. Well 7

☐ Amendment/Correction to Permit No. _____

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)

N/A

- Name of Applicant City of Box Elder Phone 605-923-1408
(check one) ☐ Owner ☐ Tenant/lessee
- Mailing Address 520 N. Ellsworth Road, Suite 9C; Box Elder State SD 57719
(Street, RR, or Box and City) (Zip Code)
- Amount of water claimed 1.0 *CFS or 450 **GPM 435 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable
- Source of water supply Madison Aquifer
- Location of point of diversion (example 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) County Meade
1 well in SW 1/4 of SW 1/4, Section 33-T3N R9E BHM
- County or counties where water will be used Pennington, Meade
- Annual period during which water is to be used January 1 through December 31
- Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

The project consists of constructing an approximately 5,000 feet deep well and pump house with electrical controls and chemical feed system to tie into the municipal water of the City of Box Elder.

STATE OF SOUTH DAKOTA) SS

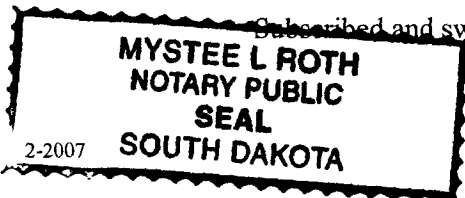
County of Pennington)

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

I, Al Todd 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.

Applicant's signature Al Todd

Subscribed and sworn to before me this 21st day of May 202008



Mystee L Roth

Notary Public signature

My commission expires
March 9, 2013

SOUTH DAKOTA WATER PERMIT NO. 2631-2

Date of first receipt of application April 16, 2008.

Date of return to applicant for corrections, amendments or changes April 16, 2008.

Date of receipt of corrected application May 23, 2008.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2631-2 to the City of Box Elder, 520 N Ellsworth Rd, Ste 9C, Box Elder SD 57719 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. 2631-2 appropriates 435 acre feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second (cfs) from one well to be completed into the Madison Aquifer (approximately 5,000 feet deep) located in SW 1/4 SW 1/4 Section 33-T3N-R9E.
2. The water appropriated shall be used for the purpose of municipal use and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 2631-2 is August 25, 2008.
5. The date from which applicant may claim right is April 16, 2008.
6. One-fifth of the construction is to be completed on or before February 25, 2010.
7. All construction is to be completed on or before August 25, 2013.
8. Water is to be put to beneficial use on or before August 25, 2017.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2631-2 is issued for a 20-year term. Pursuant to SDCL 46-2A-21, the 20-year term may be deleted at any time during the 20-year period or following its expiration. If the 20-year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2631-2 may also be cancelled for nonconstruction, forfeiture, abandonment, or three permit violations pursuant to SDCL 46-1-12, 46-5-37, 46-5-37.1 and ARSD 74:02:01:37.
2. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
3. The City of Box Elder shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

WATER MANAGEMENT BOARD

By: Garland Erbele
Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

OCT 30 2008

date



Form 2A SUPPLEMENTAL INFORMATION

(Complete applicable portions only)

(type or print in ink)

1. Well Information – Proposed Construction

- a) Drill Hole Diameter 20", 14-3/4", 9-1/2", 6-1/4" Depth 40', 1600', 4525', 4825'
- b) Casing Type Steel Diameter 16", 10-3/4", 7" Thickness 62.6 lb/ft, 41.9 lb/ft, 23 lb/ft
- c) Screen Type None Diameter _____ Thickness _____
- d) Gravel Pack None Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material Approximately 4,500 feet
- f) Depth to Water (ground surface to water level) Madison Aquifer, approximately 750 feet
- g) Distance to nearest existing domestic well:
- On applicants property Greater 5 miles On property owned by others Greater 5 miles
Unknown

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field) None
- b) System Capacity (gallons) _____ Year Constructed _____
- c) Connected to the City of _____ Sanitary System _____

3. Dugout Information

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

4. Water Storage Dams

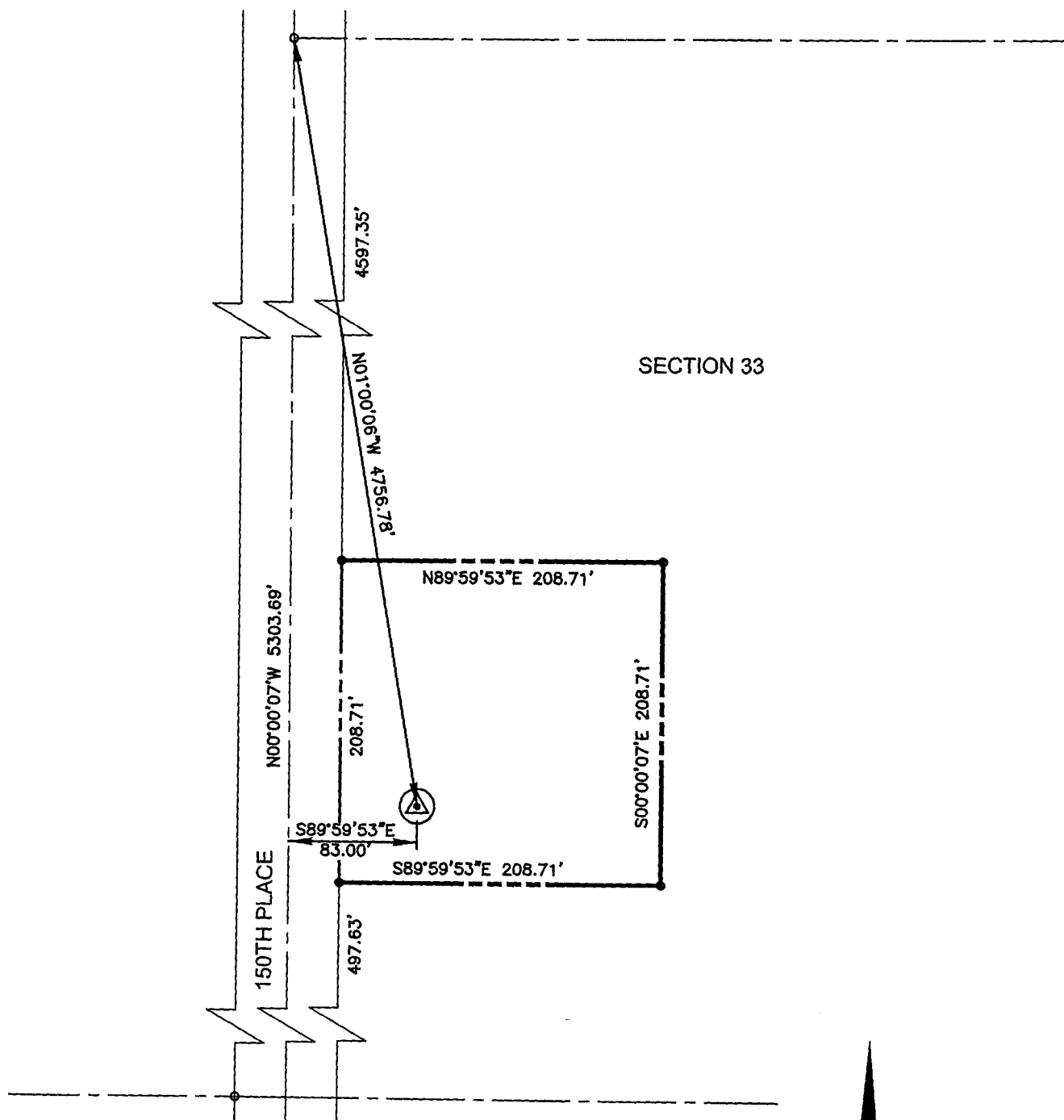
If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

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

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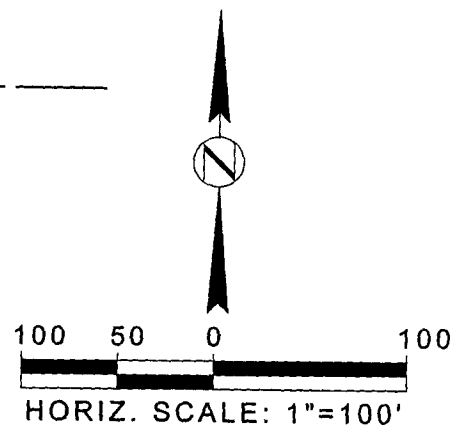
- b) Freeboard _____
- c) Crest Width _____
Crest Height _____
- d) Height _____
- e) Primary Outlet Capacity _____
If pipe, diameter _____
- f) Secondary Spillway Capacity _____
Spillway Width _____
- g) X & Y Slope _____
Upstream _____
Downstream _____
- h) Surface Area of Impoundment _____
- i) Storage _____ Acre Feet
- j) Drainage Area Above Dam _____ Acre

EXHIBIT A



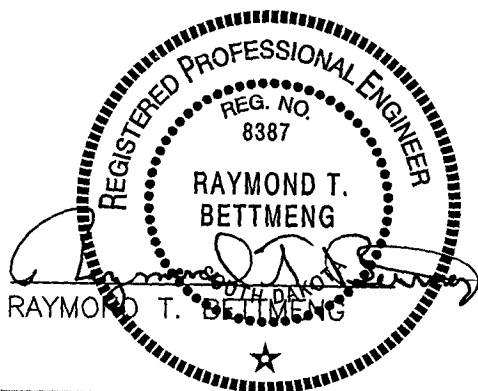
⊙ = PROPOSED WELL LOCATION

• = FOUND PROPERTY CORNER



I RAYMOND T. BETTMENG, AT THE DIRECTION OF THE CITY OF BOX ELDER I HAVE PREPARED FROM RECORD DOCUMENTS AND FROM A FIELD SURVEY THE WELL LOCATION SHOWN HEREON.

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PROGRAM



5/13/08
DATE

FOURFRONT
DESIGN INC.

517 7th street rapid city sd 57701
ph: 605.342.9470 fax: 605.342.2377
www.4front.biz

ARCHITECTURE ENGINEERING
GIS SURVEYING

PROPOSED MADISON WELL #7
BOX ELDER, SOUTH DAKOTA

LOCATED IN THE SW 1/4 SW 1/4 SECTION 33, T3N, R9E, B.H.M.

JOB NUMBER: 08.1425.001

MEADE COUNTY, SD

DATE: 05/07/08

SHEET TITLE:

SHEET

EXHIBIT A
WELL LOCATION

1 OF 1

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 4/16, 20 08

RECEIVED OF City of Box Elder 520 N Ellsworth RD # 9C Box Elder SD 57719

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

Fee for Application for Permit No. <u>2631-3</u> to Appropriate Water, to construct and to put water to beneficial use	325	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. <u>2631-3</u>	50	00
Fee for Filing Transfer Form _____		
Fee for _____		
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____		
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____		
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____		
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____		
(Any Other Work Provided by Law)	TOTAL	375 00

No.

03024

By

Harold Schulz

Chief Engineer



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

April 16, 2008

Al Todd, Public Works Director
520 N Ellsworth Rd
Ste 9C
Box Elder SD 57719

Dear Mr. Todd:

Thank you for submitting the *Applications for a Permit to Appropriate Water* for municipal use by the City of Box Elder. In order to complete the applications, the following is required for each application.

- A map (aerial photo) showing the proposed location of the well in relation to a government section corner or quarter corner by direction and distance is required.
- 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 a part of his assigned duties (i.e. local NRCS office).
- Please complete the enclosed Form 2A's, Supplemental Information regarding the Well Information – Proposed Construction for each well. We are requesting estimates of the proposed construction.
- We have received the check for \$700.00. The application/license fee for each application is \$375.00. Please submit an additional \$50.00.

If you have any questions, please contact me.

Sincerely,

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

enclosure

2631-2 & 2632-2

Water Rights Program - DENR Conversation File Documentation

NAME OF PERSON OR FILE: Water Permit Application Nos. 2631-2 & 2632-2, Box Elder

ADDRESS: COUNTY: Meade County

DATE: June 17, 2008 TELEPHONE:

RE: phone conversation with Al Todd, Public Works Director

COMMENTS:

Mr. Todd returned my call. I explained that for Application Nos. 2631-2 and 2632-2 the city requested an appropriation of 1.0 cfs with an annual volume of 725 acre feet of water. I explained that a direct conversion of a 1.0 cfs continuous diversion equates to 724 acre feet of water annually. I further stated that generally the volume allowed is not a 100 percent conversion of the diversion rate. This is because no community pumps their wells continuously for an entire year. Mr. Todd agreed and said that winter water supply needs are much less than summer needs. I explained that Water Rights commonly considers a 60% conversion factor which in this case would amount to 435 acre feet of water annually for each application. Mr. Todd agreed and requested that I amend each application accordingly.

NAME: Eric Handberg



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2631-2, City of Box Elder**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 2631-2, City of Box Elder, c/o Al Todd, Public Works Director, 520 N Ellsworth Rd, Suite 9C, Box Elder SD 57719.

The Chief Engineer is recommending APPROVAL of Application No. 2631-2 for a 20-year term pursuant to SDCL 46-1-14 and 46-2A-20 because 1) although evidence is not available to justify issuing this permit without a 20 year term limitation, there is reasonable probability that there is unappropriated water available, 2) the proposed diversion can be developed with out unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2631-2 is issued for a 20-year term. Pursuant to SDCL 46-2A-21, the 20-year term may be deleted at any time during the 20-year period or following its expiration. If the 20-year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2631-2 may also be cancelled for nonconstruction, forfeiture, abandonment, or three permit violations pursuant to SDCL 46-1-12, 46-5-37, 46-5-37.1 and ARSD 74:02:01:37.
2. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
3. The City of Box Elder shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

See report on application for additional information.

Garland Erbele, Chief Engineer
July 15, 2008

REPORT FOR
WATER PERMIT APPLICATION NO. 2631-2
and
WATER PERMIT APPLICATION NO. 2632-2
CITY OF BOX ELDER
JUNE 17, 2008

Water Permit Application No. 2631-2 proposes to appropriate 435 acre-feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second (cfs) from one well approximately 5,000 feet deep, to be completed into the Madison aquifer. The well is to be located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 33, T3N-R9E, Pennington County. The water will be used for municipal use.

Water Permit Application No. 2632-2 proposes to appropriate 435 acre-feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second (cfs) from one well, approximately 4,244 feet deep, to be completed into the Madison aquifer. The well is to be located in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 27, T2N-R8E, Pennington County. The water will be used for municipal use.

Water Source: Madison aquifer (MDSN)

Geology and Aquifer Characteristics:

The Madison aquifer is a major regional aquifer that underlies parts of Montana, North Dakota, South Dakota, Wyoming and Canada. The Madison aquifer is contained within the Madison Limestone which in general is a massive limestone and dolomite. The upper portion of the Madison Limestone is karstic with caves, solution collapse and enlarged conduits resulting in extensive secondary permeability; and the lower portion and the underlying Englewood Formation form a lower confining zone (Strobel and others, 1999). The aquifer contains an estimated 644,827,200 acre-feet of recoverable water in storage in South Dakota alone (Allen and others, 1985). The Madison is generally considered an excellent aquifer in terms of its potential to supply good quality water to relatively productive wells, especially near the outcrop (recharge area). The site proposed for Well #7, (SW $\frac{1}{4}$ Section 33, T3N-R9E) by Application Number 2631-2, is located about 15 miles east of the Madison outcrop. The site proposed for Well #10, (NW $\frac{1}{4}$ Section 27, T2N-R8E) by Application Number 2632-2, is located about 10 miles east of the Madison recharge area. The top of the Madison is expected to be 4,500 feet below ground surface near the proposed Well No. 7 site and is estimated to be around 3,800 feet below grade near the proposed site for Well No. 10 (Carter and Redden, 1999a). Estimates of the thickness of the Madison in this area range from approximately 400-500 feet thick (Allen and others, 1985) to approximately 550 feet thick (Carter and Redden, 1999a) (Carter and Redden, 1999b). The Madison is under confined conditions at both of these proposed well sites. The static water level of Well No. 7 is predicted to be around 750 feet below grade; and the static water level of Well No. 10 should be around 300 feet below grade (Strobel and others, 2000).

Water Availability:

Water Budget:

Recharge to the Madison aquifer occurs through streamflow losses and direct infiltration of precipitation at the outcrop area. Recharge to the Madison aquifer in South Dakota has been estimated to range from 140,000 to 400,000 acre-feet per year (Woodward Clyde, 1981).

Woodward-Clyde however, defined the Madison aquifer as everything between the Precambrian and the Cretaceous Shales. As part of the Black Hills Hydrology Study, the average annual recharge to the Madison aquifer from 1931-1998 was estimated to be approximately 137,000 ac-ft/yr (Carter and others, 2001a).

There are currently a total of 162 appropriations plus one deferred application from the Madison aquifer in South Dakota. These appropriations include: seven future use permits that reserve 11,074.8 acre-feet of water per year (ac-ft/yr); 133 water permits/rights for non-irrigation purposes appropriating a total of 99.02 cfs (Water Rights, 2008d); and 22 water permits/rights appropriating 7,713.36 ac-ft/yr for irrigation use (Water Rights, 2008a). If it is assumed that the future use permits can be fully developed; the non-irrigation appropriations will be used at 60 percent of full time usage at their maximum diversion rate; and irrigation appropriations will use their full appropriation, the maximum (worst case scenario) amount of water that could theoretically be used with current appropriations is approximately 61,800 ac-ft/yr. If the deferred permit is approved (1,600 ac-ft/yr), the total maximum (worst case) use would be approximately 63,400 ac-ft/yr.

The actual water usage from the Madison aquifer is expected to be considerably less than this “worst case” estimate. Withdrawals from wells completed into the Madison aquifer were estimated to average 12,309 acre-feet annually from 1987-1996 (Carter and others, 2001b). The theoretical maximum amount of water that could be diverted utilizing 1996 appropriations can be estimated by considering that from 1997 to present there have been 79 appropriations approved from the Madison aquifer in South Dakota. These appropriations include: irrigation water rights/permits for 1,086 ac-ft/yr; water rights/permits for non-irrigation use (including permits/rights to put 22.88 cfs to beneficial use that was reserved in Rapid City’s Future Use Permit No. 2086-2) totaling 59.05 cfs, hence a net gain of 36.17 cfs (59.05 – 22.88); and five future use permits, appropriating 5,716 acre-feet annually. Applying the same “worst case scenario” criteria established above, the theoretical maximum amount of water that could be diverted under 1996 appropriations could be calculated using the following formula.

1996 THEORETICAL MAXIMUM =

$$(I_T - I_{(1997\text{-}Present)}) + ((NI_T - NI_{(1997\text{-}Present)}) * 60\% * 724 \text{ ac-ft/yr/cfs}) + (FU_T - FU_{(1997\text{-}Present)})$$

Where I_T = Total Irrigation appropriation (ac-ft/yr)

$I_{(1997\text{-}Present)}$ = Irrigation appropriation made from 1997 to present (ac-ft/yr)

NI_T = Total Non-Irrigation appropriation (cfs)

$NI_{(1997\text{-}Present)}$ = Non-Irrigation appropriation made from 1997 to present (cfs)

FU_T = Total Future Use appropriation (ac-ft/yr)

$FU_{(1997\text{-}Present)}$ = Future Use appropriation made from 1997 to present (ac-ft/yr)

Therefore 1996 THEORETICAL MAXIMUM =

$$(7,713.36 - 1,086) + ((99.02 - 36.17) * .60 * 724) + (11,074.8 - 5,716) = 39,288 \text{ ac-ft/yr}$$

If well withdrawals were estimated to average 12,309 ac-ft/yr in 1996 with a “theoretical maximum” of 39,288 ac-ft/yr, an estimate for 2008 well withdrawals would be 19,864 ac-ft/yr with a 63,402 ac-ft/yr “theoretical maximum”.

It is clear following an examination of reported water use compared with appropriations (see table 1 below), that using the “theoretical maximum” to consider water usage is an extremely conservative value.

MADISON AQUIFER USER	2007 APPROPRIATION	2007 USE REPORTED	% OF APPROPRIATION USED IN 2007
Irrigation	7,713.36 ac-ft/yr	1,245 ac-ft	16
Rapid City	23.72 cfs	9,210 ac-ft	53
Spearfish	14.145 cfs	2,086 ac-ft	20
Countryside Homeowners Assoc	.334 cfs	48 ac-ft	20
Valley View Land Co., LLC	0.5 cfs	15 ac-ft	4
Black Hawk Water User district	2.23 cfs	439 ac-ft	27
Colonial Pine Hills Sanitary District (existing appropriations)	0.99 cfs	145 ac-ft	20.37

Table 1. Reported Water Use Compared to Appropriation for Selected Madison aquifer users (Water Rights, 2008b)

A simple water balance comparing the estimated average annual recharge and the “theoretical maximum” withdrawal by wells shows that unappropriated water is available from the Madison aquifer. A water budget is not intended to suggest that all of the water that is in storage in the Madison or that all of the recharge is available for these appropriations, merely to demonstrate that in general, the Madison aquifer is an immense resource that is relatively untapped.

Observation Well Data:

The Water Rights Program monitors 26 observation wells completed into the Madison aquifer in the Black Hills Area (Water Rights, 2008c). Long-term water level declines are not apparent from any of these observation wells. Observation well data suggest that at the existing level of development, natural influences dominate the water levels of the aquifer and the effects of pumping as yet are not obvious. The nearest Water Rights’ observation well completed into the Madison aquifer is six miles from proposed well No. 10 and over 12 miles from proposed well No. 7.

Effect on Existing Water Rights:

Wells, including domestic wells, completed into aquifers shallower than the Madison aquifer (i.e. Alluvium, Inyan Kara aquifer, Sundance aquifer, Minnekahta aquifer and Minnelusa aquifer) are not expected to be affected by this proposed appropriation since the lower Minnelusa aquifer is a confining bed that isolates the Madison hydraulically from shallower aquifers.

Except for other water rights/permits held by the City of Box Elder, there are no water rights/permits appropriating water from the Madison aquifer within two miles of either of the wells proposed Application No. 2631-2 or Application No. 2632-2. The Madison aquifer well site proposed by Water Permit Nos. 1807-1 and 1875-1 for the 28th Bomb Wing is

located about two and one-half miles southwest of the well site proposed by Application Number 2631-2 and approximately four miles from the well site proposed by Application Number 2632-2. The well that supplies Water Right 2124-2, the City of Rapid City, is located approximately four and one-quarter miles west of the well site proposed by Application Number 2631-2 and approximately ten miles from the well site proposed by Application Number 2632-2. A future use area designated by Rapid City's Future Use Permit No. 2086-2, is literally located across the road from the well site proposed by Water Permit Application No. 2632-2.

Pursuant to SDCL 46-2A-9, a permit to appropriate water can only be issued if there is reasonable probability that the proposed diversion can be developed without unlawful impairment of existing rights. Approval of a permit that would authorize the construction of a well in an area reserved by Future Use Permit No. 2086-2 could involve considering impacts to an *existing well* that may have been constructed under Water Permit No. 2632-2, even though the Future Use Permit has the senior priority date. However, once completed, any well constructed to use water that had been reserved by Future Use Permit No. 2086-2 would have the senior priority date and a well completed to supply Water Permit No. 2632-2 may need to control its withdrawals to protect the senior water right.

Since the Madison is under artesian conditions in this area, drawdown from pumping a well may extend over a fairly large area. The distance between the well to be used to supply this appropriation and existing appropriations is great enough to minimize well interference that may result from these appropriations. At this time, it is not practical to attempt to quantify the specific affect this well may have on existing wells since aquifer characteristics have not been determined for this area, and the aquifer characteristics of the Madison can vary considerably within a short distance.

Although the impact of this appropriation cannot be quantified precisely, it is still possible to address whether this appropriation can be made without adversely affecting existing water rights, including domestic wells.

Water Management Board rules 74:02:04 and 74:02:05, which were promulgated pursuant to SDCL 46-6-6.1, provide for the regulation of large capacity wells to the degree necessary to maintain an adequate depth of water for a prior appropriator in wells that have the ability to produce water **independent of artesian head pressure**. Simply put, the pump placement in a prior appropriator's well is not necessarily protected.

If the water levels in the Madison aquifer were to decline, owners of existing wells bear the responsibility of lowering the pump inlet in the well to the top of the aquifer, if necessary. Increased lift would decrease the pump discharge; or require a larger pump or a different type of a pump to maintain the same output.

An increase in operating expenses that may result from interference between wells is not necessarily an adverse impact. The Water Management Board considered this situation in the matter of Water Permit Application 2313-2, Coca-Cola Bottling Company of the Black Hills (Water Rights, 1995). The Board adopted findings of fact and conclusions of law that basically state that if the increased cost or decreased production is considered an adverse impact, it could be in conflict with SDCL 46-1-4, which requires South Dakota's water resources to be put to beneficial use to the fullest extent of which they are capable.

TERM LIMITATION:

SDCL 46-2A-20 requires that "... no water permit for construction of works to withdraw water from the Madison formation in Butte, Fall River, Custer, Lawrence, Meade and Pennington counties may be issued for a term of more than twenty years, unless the water management board determines, based upon the evidence presented at the hearing that:

(1) Sufficient information is available to determine whether any significant adverse hydrologic effects on the supply of water in the Madison formation would result if the proposed withdrawal were approved; and

(2) The information, whether provided by the applicant or by other means, show that there is a reasonable probability that issuance of the proposed permit would not have a significant adverse effect on nearby Madison formation wells and springs."

Evidence is not available to justify issuing these permits without a term limitation of 20 years.

Conclusions:

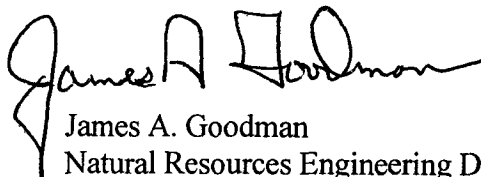
1. The Madison aquifer is a viable aquifer in this area.
2. This diversions proposed by these application will not adversely impair existing water rights.
3. Information is not available to justify issuing these permits without a term limitation of 20 years.



Ken Buhler

Natural Resources Engineering Specialist

Approved by



James A. Goodman

Natural Resources Engineering Director

References:

Allen, J.C., Iles, D.L., and Petres, A.K., 1985, Analysis of Groundwater and Streamflow Data Western Dakotas Region of South Dakota, Tasks 3A.B.C. and 4A.B.: Groundwater Resource Inventory: South Dakota Department of Water and Natural Resources

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RECEIVED

AUG 15 2008

WATER RIGHTS
PROGRAM**PROOF OF PUBLICATION**STATE OF SOUTH DAKOTA)
County of Meade) SSI, Pam Buhlercertify that the attached printed Notice was
takenfrom the Meade County
Times Tribuneprinted and published in SturgisCounty of Meade andstate of South Dakota. The notice was
published

in the newspaper on the following two dates:

August 6, 2008August 13, 2008Cost of Printing \$53.62Pam Buhler
(Signature)office manager / Notary
(Title)Aug. 13, 2008
(Date Signed)**PUBLIC NOTICE**NOTICE OF APPLICATION NOS.
2631-2 and 2632-2 to Appropriate
WaterNotice is given that the City of Box
Elder, c/o Al Todd, Public Works
Director, 520 N Ellsworth Rd, Suite 9C,
Box Elder SD 57719 has filed the fol-
lowing applications for a water permit.Application No. 2631-2 proposes to
appropriate 435 acre feet of water
annually at a maximum diversion rate
of 1.0 cubic feet of water per second
(cfs) from one well to be completed
into the Madison Aquifer (approximate-
ly 5,000 feet deep) located in SW
1/4 SW 1/4 Section 33-T3N-R9E for
municipal use.Application No. 2632-2 proposes to
appropriate 435 acre feet of water
annually at a maximum diversion rate
of 1.0 cubic feet of water per second
(cfs) from one well to be completed
into the Madison Aquifer (approximate-
ly 4,244 feet deep) located in the NW
1/4 NW 1/4 Section 27-T2N-R8E for
municipal use.Pursuant to SDCL 46-2A-2, the
Chief Engineer recommends
APPROVAL of Application Nos. 2631-
2 and 2632-2 for a 20-year term pur-
suant to SDCL 46-1-14 and 46-2A-20
because 1) although evidence is not
available to justify issuing this permit
without a 20 year term limitation, there
is reasonable probability that there is
unappropriated water available, 2) the
proposed diversion can be developed
with out unlawful impairment of exist-
ing rights, 3) the proposed use is a
beneficial use and 4) it is in the public
interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on
these applications, as recommended,
unless a petition is filed opposing the
applications or the applicant files a
petition contesting the Chief
Engineer's recommendations. If a
petition opposing the applications or
contesting the recommendations is
filed, then a hearing will be scheduled
and the Water Management Board will
consider these applications. Notice of
the hearing will be given to the appli-
cant and any person filing a petition.Any person interested in opposing or
supporting these applications or rec-
ommendations must file a written peti-
tion with BOTH the applicant and Chief
Engineer. The applicant must file a
petition if contesting the Chief
Engineer's recommendations. The
Chief Engineer's address is "Water
Rights Program, Foss Building, 523 E
Capitol, Pierre SD 57501 (605 773-
3352)" and the applicant's mailing
address is given above. A petition filed
by either an interested person or the
applicant must be filed by August 25,
2008.The petition may be informal, but
must include a statement describing
the petitioner's interest in the applica-
tions, the petitioner's reasons for
opposing or supporting the applica-
tions, and the signature and mailing
address of the petitioner or the peti-
tioner's legal counsel, if legal counsel
is obtained. Contact Eric Gronlund at
the above Water Rights Program
address to request copies of informa-
tion pertaining to this application.Steven M. Pirner
SecretaryDepartment of Environment and
Natural Resources
Meade County Times-Tribune
Publ. Aug. 6 & 13, 2008

Form 8

RECEIVED

AUG - 1 2008

PROOF OF PUBLICATION

WATER RIGHTS
PROGRAM

STATE OF SOUTH DAKOTA)
) SS
County of Pennington)

I, Patricia K. Van Patten

certify that the attached printed Notice was
taken

from the Rapid City Journal

printed and published in Rapid City

County of Pennington and

state of South Dakota. The notice was
published

in the newspaper on the following two dates:

July 24, 2008

July 31, 2008

Cost of Printing One hundred thirty-one
dollars and eight cents (\$131.08)

Patricia K. Van Patten
(Signature)

Legal Advertising Rep.
(Title)

07/31/08
(Date Signed)

July 24, 31 L20244609

NOTICE OF
APPLICATION
NOS. 2631-2 AND 2632-2
TO APPROPRIATE
WATER

Notice is given that the City of Box Elder, c/o Al Todd, Public Works Director, 520 N. Ellsworth Rd., Suite 9C, Box Elder, SD 57719, has filed the following applications for a water permit.

Application No. 2631-2 proposes to appropriate 435 acre feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second (cfs) from one well to be completed into the Madison Aquifer (approximately 5,000 feet deep) located in SW1/4SW1/4 Section 33, T3N-R9E, for municipal use.

Application No. 2632-2 proposes to appropriate 435 acre feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second (cfs) from one well to be completed into the Madison Aquifer (approximately 5,000 feet deep) located in NW1/4NW1/4 Section 27, T2N-R8E, for municipal use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application Nos. 2631-2 and 2632-2 for a 20-year term pursuant to SDCL 46-1-14 and 46-2A-20 because 1) although evidence is not available to justify issuing this permit with a 20 year term limitation, there is reasonable probability that there is unappropriated water available, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on these applications, as recommended, unless a petition is filed opposing the applications or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the applications or contesting the recommendations is filed, then a hearing will be scheduled and the Water Management Board will consider these applications. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting these applications or recommendations must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendations. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E. Capitol, Pierre, SD 57501 (605-773-3352)," and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by August 10, 2008.

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 applications, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to these applications. Steven M. Pirner, Secretary Department of Environment and Natural Resources



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

July 28, 2008

Meade Co Times-Tribune
PO Box 69
Sturgis SD 57785

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application Nos. 2631-2 and 2632-2 to Appropriate Water to be published twice. Please publish the first notice on August 6, 2008 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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 City of Box Elder, c/o Al Todd, 520 N Ellsworth Rd, Suite 9C, Box Elder SD 57719 (Ph # 605-923-1408).

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

Nos. 2631-2 & 2632-2

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

Date _____

We are in receipt of your letter of July 28, 2008 enclosing Notice to Appropriate Water by Application Nos. 2631-2 & 2632-2 which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

July 16, 2008

Rapid City Journal
PO Box 450
Rapid City SD 57709

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application Nos. 2631-2 and 2632-2 to Appropriate Water to be published twice. Please publish the first notice on July 24, 2008 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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 City of Box Elder, c/o Al Todd, 520 N Ellsworth Rd, Suite 9C, Box Elder SD 57719 (Ph # 605-923-1408).

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Sincerely,


Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

Nos. 2631-2 & 2632-2

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

Date _____

We are in receipt of your letter of July 16, 2008 enclosing Notice to Appropriate Water by Application Nos. 2631-2 & 2632-2 which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

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

July 16, 2008

City of Box Elder
c/o Al Todd
520 N Ellsworth Rd # 9C
Box Elder SD 57719

Dear Mr. Todd:

Water Permit Application Nos. 2631-2 & 2632-2 for municipal use have been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Publisher of the Rapid City Journal printed at Rapid City SD (Ph #605-394-8300). You will need to contact the newspaper and authorize publication of this notice. For your information, a copy of the notice, the recommendations of the Chief Engineer and reports on the applications are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspaper to authorize publication of your Notice and to arrange for payment. Early contact with the paper can eliminate delays. Upon receiving authorization, the publisher has been instructed to publish your notice once each week for two consecutive weeks. The newspaper has also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Eric Gronlund
Natural Resources Engineer
(605) 773-3352

cc: Fourfront Design, Ray Betmeng PE, 517 7th St., Rapid City SD 57701

enclosures

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

Instruction to Newspaper - Publish first Notice on August 6, 2008 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NOS. 2631-2 and 2632-2 to Appropriate Water

Notice is given that the City of Box Elder, c/o Al Todd, Public Works Director, 520 N Ellsworth Rd, Suite 9C, Box Elder SD 57719 has filed the following applications for a water permit.

Application No. 2631-2 proposes to appropriate 435 acre feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second (cfs) from one well to be completed into the Madison Aquifer (approximately 5,000 feet deep) located in SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 33-T3N-R9E for municipal use.

Application No. 2632-2 proposes to appropriate 435 acre feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second (cfs) from one well to be completed into the Madison Aquifer (approximately 4,244 feet deep) located in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 27-T2N-R8E for municipal use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application Nos. 2631-2 and 2632-2 for a 20-year term pursuant to SDCL 46-1-14 and 46-2A-20 because 1) although evidence is not available to justify issuing this permit without a 20 year term limitation, there is reasonable probability that there is unappropriated water available, 2) the proposed diversion can be developed with out unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on these applications, as recommended, unless a petition is filed opposing the applications or the applicant files a petition contesting the Chief Engineer's recommendations. If a petition opposing the applications or contesting the recommendations is filed, then a hearing will be scheduled and the Water Management Board will consider these applications. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting these applications or recommendations must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendations. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by August 25, 2008.

The petition may be informal, but must include a statement describing the petitioner's interest in the applications, the petitioner's reasons for opposing or supporting the applications, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

OCT 8 0 2008

City of Box Elder
Al Todd
520 N Ellsworth Rd Ste 9-C
Box Elder SD 57719

Dear Mr. Todd:

Enclosed are Water Permit Nos. 2631-2 and 2632-2 authorizing construction of your water diversion systems and beneficial use of the water, not exceeding the limits as specified in the Water Permits.

Form 10's, *Notice of Completion of Works and Application of Water to Beneficial Use*, are enclosed. Please return the completed forms after you have finished the systems and have put the water to beneficial use. An investigation can then be scheduled so the water licenses may be issued, thus completing the acquisition of a water right.

An informational sheet ? *Common Water Right Questions?* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

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

enclosures

[illegible]

Please return White Copy to DENR Water Rights

523 E. Capitol Ave., Pierre SD 57501

~~RECEIVED~~

NOV 28 2012

WATER RIGHTS
PROGRAM

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NOV 28 2012

**WATER RIGHTS
PROGRAM**

Geological Well Report

Ghere Well (Madison Well No. 7)

for

City of Box Elder

Well Data

Well Name:	Ghere Well (Madison Well No. 7)
Location:	SW/4 SW/4 section 33 T3N R9E
Elevation:	GL 3301' KB 3311"
Owner:	City of Box Elder, SD
Drilling Contractor:	Rapid Drilling 22478 Bennett Road Rapid City, SD 57701
Drilling Fluid Supplier:	Mountain Mud Gillette, WY
Mud SystemType:	Gypsum & Bentonite
Cementing Company:	M & S Oil Well Cementing Co., Inc. Gillette, WY
Geological Supervision:	Dennis V. Johnson, WY Professional Geologist PG 1500 P. O. Box 405 Rapid City, SD 57709
Well Logging (Final logs not run) (intermmEDIATE log)	L & J Wireline 2521 Elm St. Rapid City, SD
Surface conductor:	16" set 40' from GL, 24" borehole
Casing:	10 3/4" set at 1840' from GL, 13 1/4" borehole 7" set at 4445' +/- from GL, top at 1,777' +/- from GL, 9 7/8" borehole, Est. casing set 13' +/- into Madison
Total depth	Driller: 4575'
Status:	Waiting on orders

Box Elder Ghere Well (Madison Well No. 7)

Deviation Surveys 7 7/8" pilot hole

<u>Depth</u>	<u>Dev. In Deg.</u>
96'	0.9
150'	0.0
242'	0.5
300'	0.0
430'	0.5
550'	1.0
615'	1.0
709'	1.0
720'	0.5
835'	1.0-
894'	0.5
989'	1.0
1019'	1.0
1050'	0.0
1082'	0.0
1113'	0.5
1144'	0.0
1176'	1.0
1203'	0.0
1237'	0.0
1270'	0.0
1302'	0.0
1333'	0.0
1364'	0.0
1427'	1.0
1458'	1.0
1490'	0.25
1553'	0.25
1584'	0.75
1646'	0.75
1708'	0.5
1770'	0.75
1833'	0.75

Box Elder Ghere Well (Madison Well No. 7)

Deviation surveys (confirmation) 13 3/4" reamed hole

Depth	Dev. In Deg.
133'	0.75
248'	0.25
373'	0.5
589'	0.0
714'	0.75
963'	0.25
1119'	0.0
1273'	0.75
1393'	0.75
1583'	0.0
1614'	0.0
1738'	1.0
1832'	0.5

Box Elder Ghere Well (Madison Well No. 7)

Cementing Data for 16" surface conductor pipe

Bored a 24" hole from surface through approximately 26' of cobbles and gravel, approximately 6' of light colored clay, then grey shale to 40'.

Set 16" conductor pipe and aligned to vertical.

Cemented conductor pipe with a total of 90 sacks of neat cement.

Cementing Data for 10 3/4" casing

Drilled 7 7/8" pilot hole to 1855' below ground level, ran numerous deviation surveys while drilling to maintain straight hole.

Reamed 7 7/8" hole to 13 3/4" with hole opener and ran confirmation deviation surveys to confirm well bore straightness.

Ran 46 joints of 10 3/4" casing, tagged bottom at 1840' +, lifted off bottom 1', called M&S Oil Well Cementing Co., Inc. to location, cemented 10 3/4" casing to surface with 290 sacks of lead lite cement and 50 sacks of tail cement. Had 3 bbls of cement returned to surface, approximately 6 sacks of lead cement slurry. Let cement set for 72 hours plus before cutting casing and prepare new flow line to drill ahead with 9 7/8" well bore.

Cementing Data for 7" casing

Drilling depth driller 4450' Logger depth 4455'
9 7/8" borehole

10 3/4" casing in hole @ 1840' from ground level

Ran 2668' of 7" casing, 33 centralizers, tagged bottom, picked up 1', pumped cement as follows: M&S Oil Well Cementing Co., Inc.

265 sks (146 bbls) lead cement, wt. 11.1, yield 3.1
125 sks (28.9 bbls) neat tail cement, wt. 15.8, yield 1.30

Displaced with 117.1 bbls

Checked float to make sure it was holding, set casing and backed off 7", raised drill pipe 1', circulated well bore from top of 7" casing, recovered 3 bbls + of cement, cement column to top of 7" casing.

Top of 7" casing est. 1787' from KB **Note:** 7" LHT collar looking up

Formation Tops

KB elevation 3311'

<u>Formation</u>	<u>Log Depth</u>	<u>Subsea Depth</u>
Newcastle (Muddy)	2227'	+ 1084'
Inyan Kara (Fall River) (Lakota)	2483'	+ 828'
Morrison	2835'	+ 476'
Sundance	3003'	+ 308'
Spearfish	3236'	+ 75'
Minnekahta Ls	3665'	- 354'
Opeche	3713'	- 402'
Minnelusa	3837'	- 526'
Red Shale Mkr ?	4290'	- 979'
Madison	4442'	- 1131'
TD (driller)	4575'	- 1264'

Sample Descriptions (samples were not lagged)

0-25	cobbles & gravel
25-35	brn-yel clay
35-42	sh, gry
42-100	sh, lt gry
100-200	sh, lt gry, blk, m hd, some ls brn, m-xln
200-300	sh, lt gry, blk, AA, some bentonitic
300-400	sh, lt gry to gry, blk to ang, AA
400-600	sh, lt gry, bentonitic, blk to ang
600-650	sh, lt gry, gry-wht, some v bentonitic, some fossil frag
650-710	sh, gry to lt gry, blk, some pyrite
710-850	sh, gry, blk to more platy in part
850-1015	sh, gry to grn-gry, ang to blk, some bentonitic
1015-1130	sh, dk gry, wht specks, ang, v calc
1130-1190	sh, gry to dk gry, wht specks, AA, calc
1190-1230	sh, gry to some dk gry, less specked, ang to more platy, pyritic
1230-1300	sh, lt gry to gry, blk, some silty, some bentonitic, some pyritid
1300-1400	sh, lt gry to gry, blk to ang, some bentonitic
1230-1300	sh, lt gry to gry, blk, some silty, some bentonitic, some pyritid
1300-1400	sh, lt gry to gry, blk to ang, some bentonitic
1400-1515	sh, gry to blk, clac in part, some Ls, tan to brn, m-xln, some pyrite, some dolomitic, v silty in part
1515-1560	sh, gry to dk gry, ang to blk, some silty, little to no pyrite
1560-1650	sh, gry to lt gry, mostly blk to ang, some Ls, gry tan, md hd
1650-1850	sh, gry, to dk gry, AA
1850-2070	Sh, dk gry, ang to blk, hd, sl calc
2070-2120	Sh, dk gry to blk, ang to fissile, hd, sl clac AA
2120-2170	Sh, gry to dk gry, more bentonitic, softer TA, mostly blk to ang

2170-2220	Sh, dk gry to blk, platy to fissile, m hd, pyritic
2220-2270	Sh, dk gry AA, Siltstone, wht to gry, sl calc cementing, no vis por
2270-2320	Sh, gry to dk gry, ang to blk, m hd
2320-2370	Sh, gry to dk gry, AA, some silty, m hd
2370-2450	Sh, gry, ang to blk, silty in part AA
2450-2500	Sh, blk, dk gry, v platy to fissile, m hd, some siltstone, gry
2500-2550	Ss, wht to gry, cl to frosted gr, ang to sub rnd, mostly fg, ? por, Sh, blk AA
2550-2600	Sh, blk, blk, hd, some rd-org, Ss, wht, AA
2600-2650	Ss, wht to tan, fg to mg, ang to sub rnd, mostly frosted, some clr, ? por, some pyrite, Sh, AA
2650-2700	Sh, dk gry, ang, hd, Silts, wht, vfg, no vis por
2700-2750	Sh, gry to blk, some rd-org, some bentonite, Silts, AA, some Ss, gry to wht, AA
2750-2800	Sh, blk to gry, wht-gry, bentonitic, some pyrite
2800-2850	Ss, wht, to tan, f to mg, sub rnd, Dol, tan to lt brn, m-xln, Sh, grn, blk, waxy
2850-2900	Sh, blk, m soft, bentonite, wht to tan, soft, some Ss, wht, AA
2900-2950	Sh, grn-gry, some more tan-brn, bentonitic, soft to waxy, some Ss, wht, AA
2950-3000	Sh, grn-gry, waxy to bentonitic, AA
3000-3050	Ss, f to mg, wht to gry, poorly sorted, clr to frosted gr, clac cem, Sh, dk gry, AA
3050-3100	Ss, Silts, gry to wht, calc cem, no vis por
3100-3150	Sh, gry to lt gry, v calc, some limey, silty in part
3150-3200	Sh, dk gry to gry, Silts, gry to gry-wht, v calc, AA
3200-3250	Missing
3250-3300	Silts, rd-org, also gry-wht, glauc, some fg SS, gry-wht, sl calc
3300-3350	Silts, rd-org, AA, still fg SS, gry-wht, sl calc, AA
3350-3400	Silts, rd-org, some gry-org, AA, some gyp, much less calc, TA
3400-3450	Silts, vfg SS, gry-wht, some gyp, Sh, gry to lt gry, sl clac
3450-3500	Silts & vfg SS, AA, lt gry to rd-org, Anhy, clr to wht, gyp, Sn, lt gry, AA
3500-3550	Sh, rd-org, Silts, rd-org, interbedded with gyp

3550-3600 Sh, silty, org to salmon, some gyp, sl calc
 3600-3650 Silts, rd-org, hd, v anhy, Sh, AA
 3650-3700 Ls & Dol, wht, sl pnk, sl mg, mostly m-xln,
 3700-3750 Ls, wht to pnk, AA, Sh, rd-org, silty, hd, blk
 3750-3775 Sh, rd-org, some fg SS, frosted, some Ls, AA, some gry Dol, mi-xln
 3775-3785 Sh, rd-org, AA, Anhy wht- buff to amber, some clac.
 3785-3795 Sh, rd-org to salmon, AA, Anhy, clr to wht and amber, sl calc, AA
 3795-3805 Sh, rd-org, AA, Anhy, AA
 3805-3815 Sh, rd-org, AA, some SS, mg, clr to frosted, some more amber, sub-rnd, Anhy, AA
 3815-3825 Anhy, clr to amber, AA, Ls, wht, m-xln, dolomitic, no por, SS, vfg, gry-org, no por
 3825-3840 SS, mg, clr to frosted, amber, sub-rnd, Ls, wht to lt org, m-xln, dolomitic, AA, Sh, rd-org, AA
 3840-3855 SS, mostly, mg, poorly sorted, sub-rnd to sub-ang, Dol, wht, m-xln, no por
 3855-3865 SS, rd-org to clr to frosted, AA, poorly sorted, some clac cementing
 3865-3875 SS, rd-org, clr to frosted, AA, Dol, wht to pnk-wht, m-xln, no por
 3875-3885 Anhy, wht to amber, some SS, AA
 3885-3895 Anhy, wht to pnk-wht, sl dolomitic in part, some Silts, rd-org
 3895-3910 Dol, wht to pnk-wht, m-xln to sl m-gr, no por
 3910-3920 Dol, wht to pnk-wht, m-xln, AA, some SS, rd-org, poorly sorted, titely cemented, ? por
 3920-3930 SS, rd-org, poorly sorted, mostly fg to mg, titely cemented, AA, some Dol, pnk-wht, AA
 3930-3950 Anhy, clr to wht, pnk-wht, dolomitic
 3950-3960 Dol, wht to anmber, Anhyritic, Anhy, wht pnk-wht, AA
 3960-3970 Dol, wht to pnk-wht, some gry-wht, m-xln, v anhy, no por
 3870-3980 Dol, amber to wht, some sl sandy, mostly m-xln, anhydritic, AA
 3980-3990 Dol, amber to wht, m-xln to some mg, SS, clr to frosted g, vfg in part, no vis por
 3990-4000 SS, clr to frosted, mg, mostly loose gr, prob fr por, Dol, AA
 4020-4030 Dol, tan to wht, m-xln, sine xln, no vis por, Sh, rd-org, ang
 4030-4040 Anhy, wht to amber, sl dolomitic in part, Dol, gry to wht, v anhydritic
 4040-4050 Anhy, wht to pink, some v dolomitic, m-xln, AA, scattered mg SS, clr

4050-4060 Anhy, wht to pink, dolomitic in part, AA

4060-4070 Dol, clr to wht, v anhydritic, xln to sl g, ? clr SS gr in part

4070-4080 Dol, clr to wht, sandy in part, m-xln in part, SS, clr to frosted, mostly well rnd

4080-4090 SS, clr to wht, sl calc, Dol, wht to pink-wht, m-xln to xln

4090-4100 Anhy, wht to amber, some dolomitic

4100-4110 SS, clr to frosted mostly mg, well cemented, ? por, Dol, wht to amber, v anhydritic in part

4110-4120 Dol, pnk to wht, anhydritic, mostly mo-xln, SS, clr to frosted, sub rnd, mostly loose gr, prob f por

4120-4130 Missing sample

4130-4140 Anhy, pik to wht, sl dolomitic, sl gr in part

4140-4150 Silt, rd-org, interbedded wht anhydritic dol

4150-4160 Dol, wht to wht-org, m-xln, no por, wht anhydritic dol, some blk v ang Sh, hd

4160-4170 Dol, wht, AA, v anhydritic, sandy in part, no vis por

4170-4180 Dol, wht to lavender, less anhydritic TA, m-xln, no por

4180-4190 Dol, wht, pnk-org, some sl grn-wht, mostly m-xln, some sl more gr

4190-4200 Dol, pnk-wht to gry-wht, sandy in part, prob f por, anhydritic in part

4200-4210 Dol, wht to mottled pnk-wht, gr to mx-ln, ? por

4210-4220 Sh, blk,, dk maroon, waxy in part, platty to fissils, Dol, wht, AA

4220-4230 SH, red-brn, dk maroon, dk gry, Dol, wht to amber, mostly m-xln

4230-4240 Dol, wht ti gry-wht, some gr, mostly m-xln, Sh, dk gry to maroon, AA

4240-4250 Dol, wht, sandy, friable ?, ? f por, some Sh, AA

4259-4260 Dol, wht to gry-wht, sandy, AA, friable, ? por

4260-4270 Dol, wht to gry-wht, v sandy AA,

4270-4280 Dol, wht to gry-wht, AA, v sandy, some m-xln, interbedded Sh, dk gry to blk, soft

4280-4290 Dol, wht to buff, sandy in part, m-xln in part, Sh, maroon to red-brn, waxy, some dk gry to blk

4290-4300 Dol, gry-wht, more m-xln TA, some pnk-wht, anhydritic, m-xln

4300-4310 Dol, gry to dk gry, wht, some gr to sandy, some m-xln, ? por, some Sh, red-brn to blk

4310-4320 Dol, buff-wht to gry-brn, m-xln to some mg to sandy, no vis por, anhydritic in part

4320-4330	Dol, wht to salt & pepper gry, mg, some more gr to sandy, some m-xln and anhydritic	
4330-4340	Dol, wht to gry wht, sl mottled in part, m-xln to mg, some Sh, red-brn to dk gry	
4340-4350	Dol, gry-wht to wht, some more brn-wht, gr to mg, some sandy, some m-xln, Sh, AA	
4350-4360	Dol, gry-wht, mg to gr, sandy in part, some m-xln, AA, some Sh, gry to dk gry	
4360-4370	Dol, gry-wht, wht, mg to x-ln, less sandy TA, Sh, small pieces, dk gry to blk	
4370-4380	Dol, buff to gry-wht, m-xln to gr, some sandy, ? por, some blk Sh, AA	
4380-4390	Dol, wht to gry-wht, gr to sandy, some m-xln, some blk Sh, AA	
4390-4400	Dol, wht to gry-wht, sandy in part, AA, some m-xln, ? cherty in part, no vis por	
4400-4410	Dol, gry-wht to salt & pepper, sandy in part, gr to m-xln, more buff wht, Sh, dk gry to blk	
4410-4420	Dol, gry to gry-wht, v sandy, calc sand, tite, no por, some Sh, blk, AA	
4420-4430	Dol, gry to wht, mostly gr to sandy, some m-xln, some cherty looking, some with blk interbedded Sh	
4430-4440	Dol, gry-wht, some more buff, mostly mg to gr, AA, some m-xln, no vis por, some Sh, blk, AA	
4440-4450	Ls, buff to cream, m-xln, cherty ? in part, v dolomitic, no vis por	Madison fm
4450-4465	Ls, buff to wht, some tan, dolomitic, some anhy	
4465-4470	Ls, wht to tan, mostly m-xln, no vis por, much cement in sample	
4470-4480	Ls, wht to tan, mostly m-xln, some sl gr, poor sample	
4480-4490	Dol, Anhy, wht, dense, clr to wht, AA	
4490-4500	Ls, Dol, wht to tan-brn, mostly m-xln, no vis por, much dk gry sh	
4500-4510	Ls, buff to wht, sl gr, some more xln, ? por	
4510-4520	Ls, wht to buff, mostly xln to m-xln, dolomitic in part	
4520-4530	Ls, wht to buff, xln to frag, ? por	
4530-4540	Ls, wht to buff, AA,	
4540-4550	Ls, buff to wht, some grn-wht, m-xln, AA	
4550-4560	Ls, pnk-org to wht, sl more gr TA, xln, ? por	
4560-4570	Ls, mostly wht, some sl pnk-wht, moslty m-xln, some loose Ss gr, amber to frosted, well rnd	
4570-4575	Lost circulation no sample	

Pump Test Data

Static level at time zero 310psi est. depth below GL 826'

	<u>Depth below GL</u>	<u>PSI reading</u>	<u>Time/min.</u>	
Step test 1	1035	220	5	
	1082	200	10	
40 HZ	1107	189	15	160 gpm ave.
	1128	180	20	
	1130	179	25	
	1128	180	30	
Step test 2	1198	150	35	
	1221	140	40	
43.3 HZ	1244	130	45	175 gpm ave.
	1246	129	50	
	1248	128	55	
	1255	125	60	
Step test 3	1337	90	65	
	1365	78	70	
46.6 HZ	1379	72	75	207 gpm ave.
	1388	68	80	
	1393	66	85	
	1397	64	90	
Step test 4	1456	39	95	
	1520	19	100	
50 HZ	1541	10	105	232 gpm ave.
	1546	8	110	
	1550	6	115	
	1550	6	120	

Shut down test pumping after 19 hrs. (produced @ 175 gpm for 17 hrs. stabilized) 49.7HZ

Returned to static level of 826' below GL in 75 min.

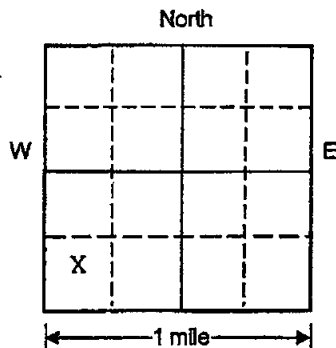
2631-2

SOUTH DAKOTA WELL REHABILITATION REPORT

11-02

Location SW 1/4 SW 1/4 Sec 33 Twp 3 Rg 9

County

MeadePlease mark well
location with
an "X"

Rehabilitation Completion Date _____

PROPOSED USE:

☐ Domestic ☒ Municipal ☐ Stock
☐ Irrigation ☐ Industrial

Well owner:

Name City of Box ElderAddress 520 N Ellsworth RdCity, State, Zip Box Elder, SD 57719Describe original construction if possible.
(Attach original log if available)

RECEIVED

FEB - 4 2014

WATER RIGHTS
PROGRAM

Description of condition of well before rehabilitation:

Well drilled into top of Madison Formation where circulation was lost.
Well produced insufficient water for City.

Description of rehabilitation work completed:

Cleanout existing open hole, drill thru Madison section. Install mill
slotted liner to hold open hole section open. Airlift, pump test
and install permanent pump equipment.

Recasing information: Material steel - 15.5# Diameter 5 1/2" Inches Depth _____ FeetDescribe screen or perforations mill slot 0.125 Screen Location From _____ To _____
From _____ To _____Grout: ☐ YES Describe grouting procedure and grout☒ NOWell Test Data: Specific capacity attached Static water level attached

If a flowing well GPM _____ Shut in _____ PSI

This well rehabilitation was completed under license # 604 and this report is true and accurate.Drilling firm: Weston Engineering, Inc.

Signature of Licensed Representative: _____

Signature of Well Owner: _____

Date: 1-29-14



1050 N. 3rd Street, Suite E
Laramie, Wyoming 82072
(307) 745-6118 phone • (307) 745-6408 fax
e-mail: laramieoffice@westonengineering.com

December 20, 2013

Dream Design International, Inc.
528 Kansas Street, Suite 4
Rapid City, SD 57701

ATTN: Mr. Terry Cash, P.E.

RE: Box Elder, SD Ghere (#7) Well – Construction and Pump Testing

Dear Mr. Cash:

Weston Engineering, Inc. (WESTON) has completed construction and conducted the pump testing of the Ghere Well and this letter summarizes the results of the well construction and testing program.

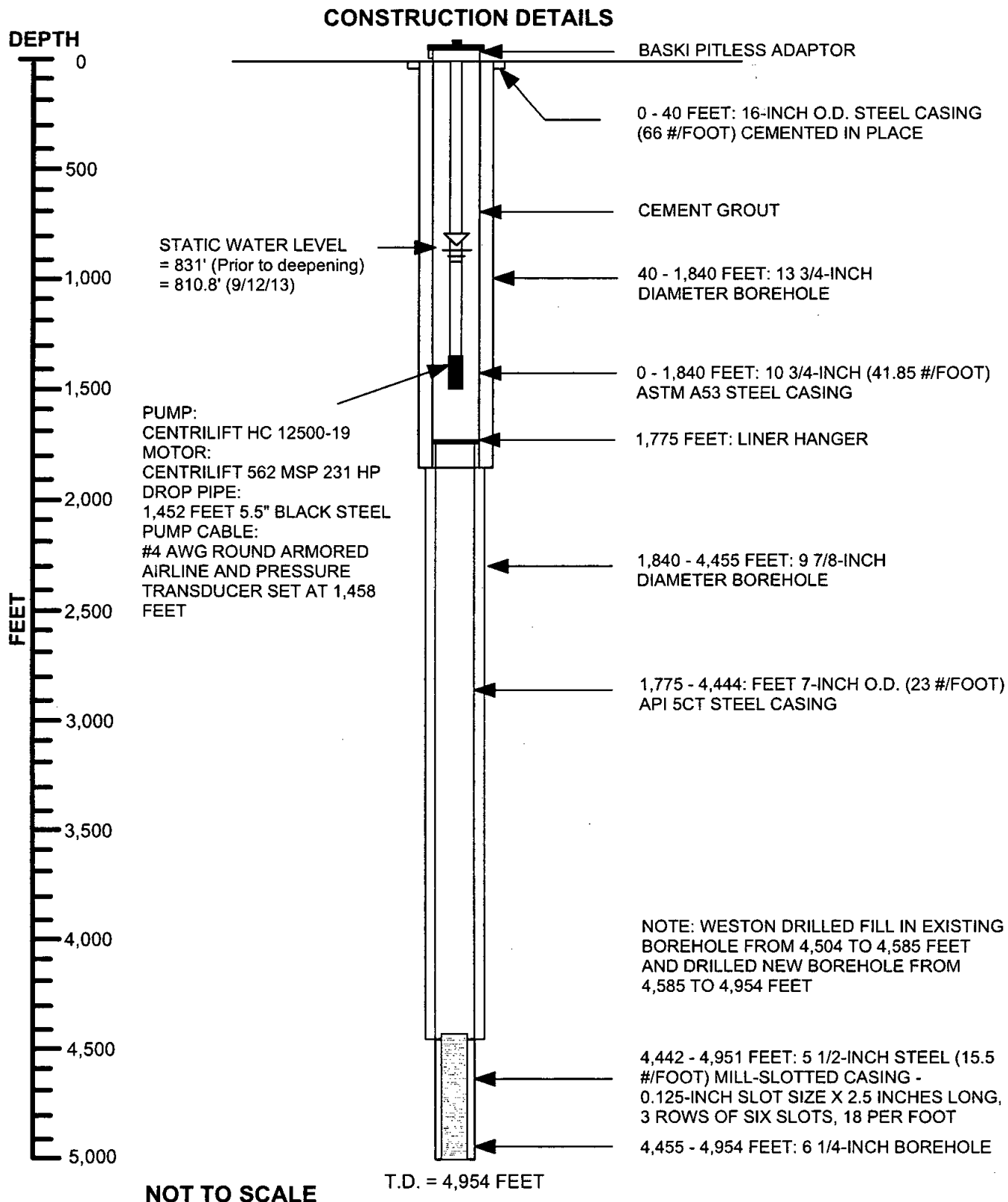
Well Construction

Well construction details are shown on the as-built diagram provided on Figure 1.

Step-Rate Test

Following well drilling, construction, and development, a step-rate pump test of the Ghere Well was conducted on September 12, 2013. A 231 horsepower submersible pump was installed with the intake set at a depth of 1,468 feet and a Dynotek pressure transducer was strapped to the pump column and set to a depth of 1,458 feet. A Dynotek datalogger was connected to the transducer to automatically collect and record the water level in the well during testing. Successively stepped-up pumping rates were controlled through a Centrilift VFD, and pumping rates were monitored using a 3 inch totalizing in-line flow meter. Pumping rates were held constant for 60 minutes for each step to overcome the effects of casing storage. The critical time (t_c), which is defined as the time after which all water pumped from the well is derived from the aquifer, was estimated for the Ghere Well to be 26 minutes, using the formula developed by Shafer (1978). Drawdown prior to t_c is affected by the withdrawal of water from the casing and is not useful for determining aquifer parameters. Discharge rates for the step-rate test were 100, 200, 300, and 400 gallons per minute (gpm).

Figure 2 summarizes the results of the step-rate test. Drawdown data for step-rate tests in an ideal, 100 percent efficient well plots as a straight line with a slope of one on a log-log plot. A line with a slope of one has been drawn on Figure 2. The log-log plot of drawdown versus discharge for the various step rates shows a slight deviation from linearity at higher pumping rates. The specific capacity of the well at the end of the 100 gpm step was 2.63 gpm per foot of drawdown and the specific capacity of the well at the end of the 400 gpm step was 1.57 gpm per foot of drawdown. This deviation on Figure 2 and the decrease in the specific capacity is the result of higher friction loss as water moves through the fractured Madison Limestone at higher velocities at the increased pumping rates.



**BOX ELDER GHERE WELL
STEP-RATE TEST SUMMARY
SEPTEMBER 13, 2013**

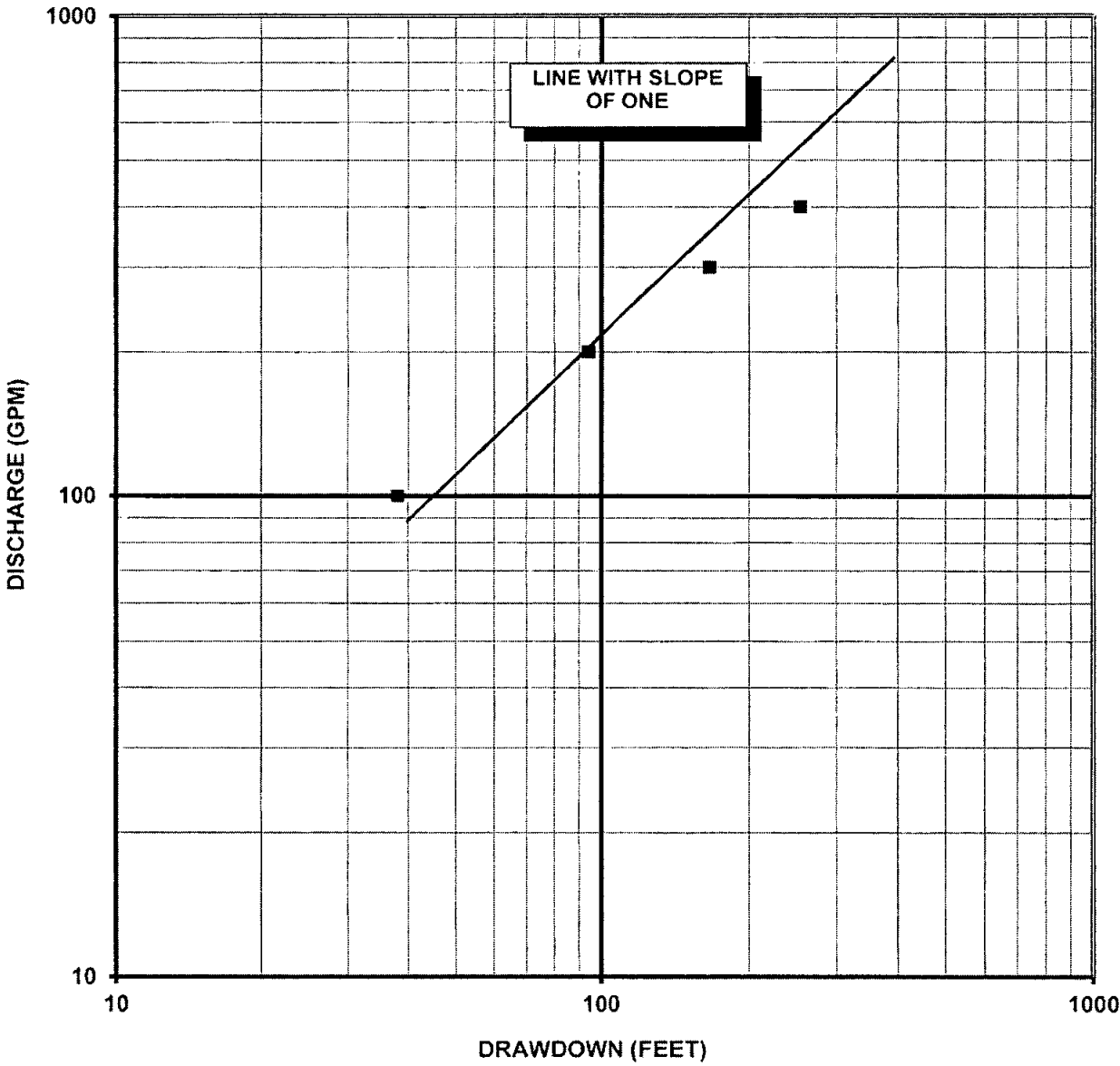


FIGURE 2

Step-Rate Test Recovery

The step-rate test was ended after the 400 gpm step and the well was allowed to recover. The well recovered to within 40 feet of the pre-test water level 5 minutes after the pump was turned off. After 13 hours of recovery the water level in the well was 4 feet above the pre-test water level. The water level was higher because of thermal expansion of the water as cooler, more dense water present in the well before the test was replaced with warmer, less dense water during the pump test.

Constant-Rate Test

The pumping rate used for the 68-hour constant-rate pump test was determined from the results of the step-test and was selected to maximize stress on the aquifer. The selected long-term pumping rate was 425 gpm. Figure 3 illustrates the results of the constant-rate test using the semi-logarithmic method developed by Cooper and Jacob (1946). Analysis of the data depicted in Figure 3 indicates the following, as represented by the slope of the time-drawdown plot of data collected from the well during the constant-rate test:

- Early-time drawdown data (less than 130 minutes) were influenced by the effects of casing storage and is characterized by a steep drawdown;
- Between 130 and 1,300 minutes the rate of drawdown stabilized. Minor adjustments were made to the pumping rate to maintain a yield of 425 gpm. The effective transmissivity during this time period was 18,700 gallons per day per foot (gpd/ft);
- From 1,300 minutes to the end of the test the rate of drawdown is slightly greater and the effective aquifer transmissivity is 5,900 gpd/ft;
- The maximum drawdown near the end of the test was approximately 275 feet; and
- A straight-line extension of the drawdown data indicates that the well is capable of producing 425 gpm for extended periods of time.

Constant-Rate Test Recovery

At the conclusion of the constant-rate test on September 16, 2013, recovery data were collected from the Ghare Well for 36 days. Figure 4 is a plot of the recovery data, using the method developed by Cooper and Jacob (1946). The plot displays the residual drawdown versus the ratio of the time since the pump test was initiated (T) versus time since the pump was turned off (T'). Increasing time since the pump was turned off plots to the left of the figure. The well recovered to the pre-test level 6 minutes (T/T' value of 639) after the pump was turned off and the plot shows that rapid recovery. The transmissivity value calculated from the early-time recovery data is 490 gpd/ft which is significantly lower than the late-time transmissivity calculated from the drawdown data. The low recovery transmissivity value is not representative of aquifer conditions, but is the result of the fast recovery. The water level rose to 53 feet above the pre-test level approximately 2 hours (T/T' value of 32) after the test was ended. The excess recovery is attributed to the effects of water temperature. Because the late-time data is strongly affected by the effects of temperature, a late-time transmissivity cannot be calculated. The water level in the well slowly dropped as the water in the casing cooled.

Conclusions

Pump testing of the Ghare Well reveal that the well is capable of yielding 425 gpm. The well quickly recovered at the conclusion of pump testing which indicates that no negative hydraulic boundaries were encountered by the cone of depression.

BOX ELDER GHERE WELL
CONSTANT - RATE PUMP TEST
SEPTEMBER 13 - 16, 2013

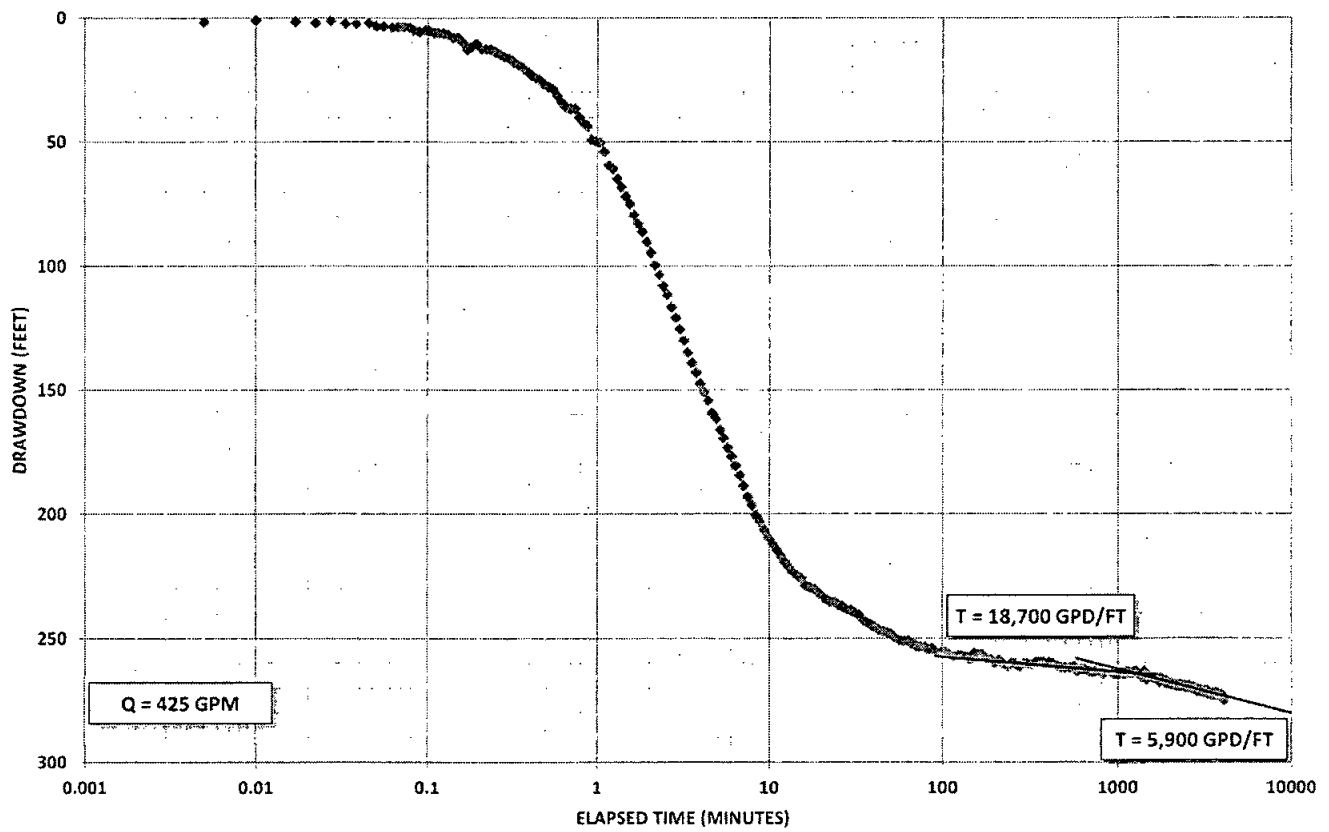


FIGURE 3

BOX ELDER GHERE WELL
CONSTANT - RATE PUMP TEST RECOVERY
SEPTEMBER 16, 2013

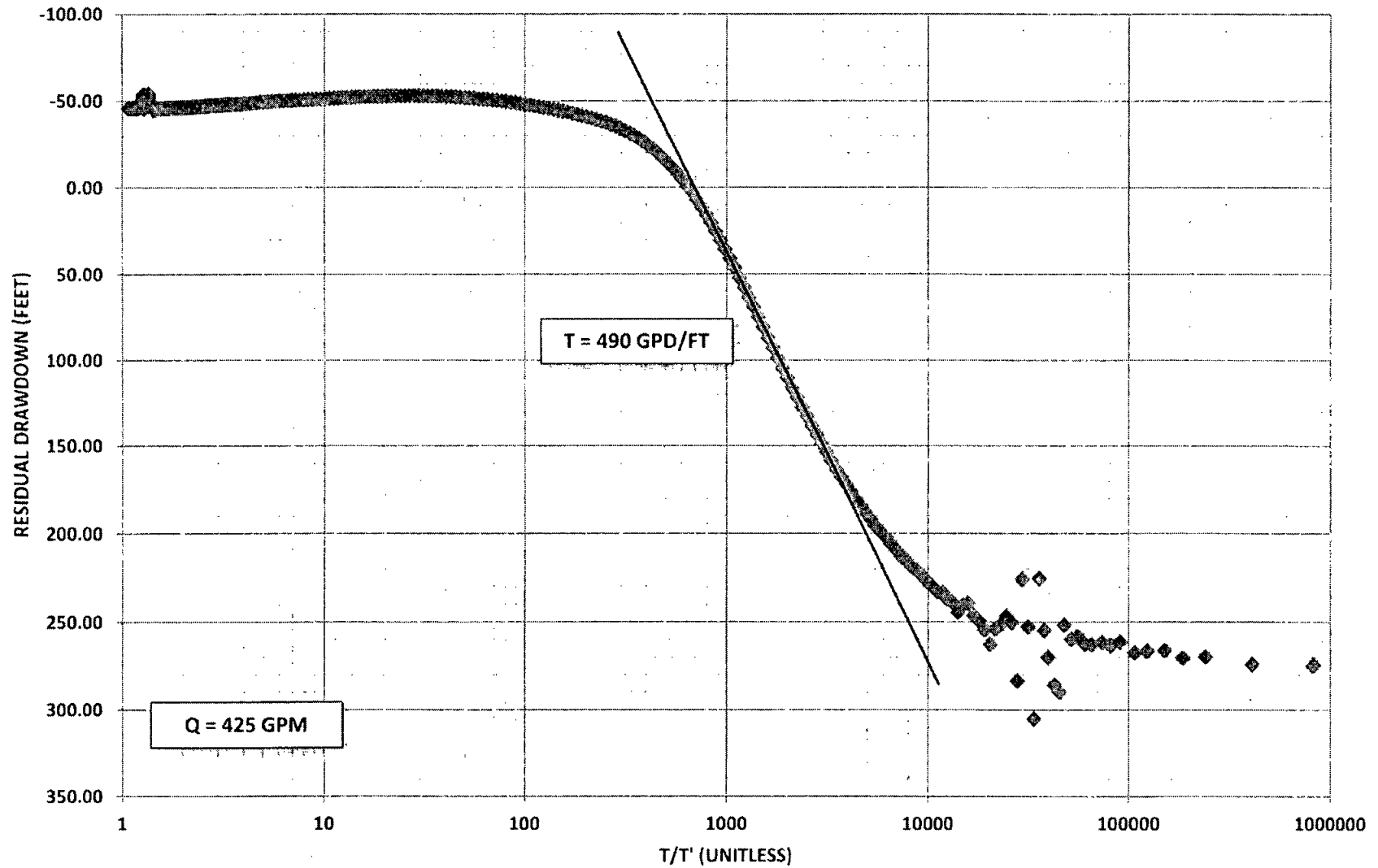
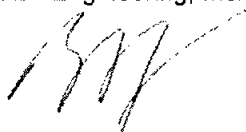


FIGURE 4

Thank you for the opportunity to submit the results of our pump test analysis. If you have any questions or if we can be of further assistance please do not hesitate to contact us.

Respectfully Submitted,

Ben J. Jordan
Weston Engineering, Inc.



References Cited

Cooper, H.H., Jr., and C.E. Jacob, 1946, A Generalized Graphical Method of Evaluating Formation Constants and Summarizing Well Field History; Trans. American Geophysics Union, 27, 8pp.

Schafer, D.C., 1978, Casing Storage Can Affect Pumping Test Data; Johnson Driller's Journal, January/February, Johnson Division, UOP Inc., St. Paul, MN.



6/13/2019

Mr. Eric Gronlund
SDDENR – Water Rights Program
523 E. Capitol Ave.
Pierre, SD 57501-3182

Dear Mr. Gronlund,

Recently the City of Box Elder, through Black Hills Council of Local Governments, submitted a Drinking Water Facilities Funding Application for the proposed "Well #10 Project". This application will be heard by the SD Board of Water and Natural Resources on June 28, 2019.

As noted in the Facility Plan Amendment, the location of the new well is currently proposed to be within the SW1/4 of Section 8, Township 2 North, Range 9 East, BHM, Box Elder, Meade County, South Dakota, USA. Please see attached Exhibit A. It is anticipated that this new well will be a Madison Limestone well approximately 4,500 feet deep. We are estimating the new well will be able to produce 400 to 450 gpm. The new well will have a dedicated 8" water main that extends to the Ghere Reservoir.

The existing Ghere Well (#2631-2) was completed in the fall of 2013. It was determined about the same time that the well had elevated levels of radium, iron, and manganese. Since that time the City has done several studies on the Ghere Well and it is anticipated that time may allow the levels of radium to be reduced.

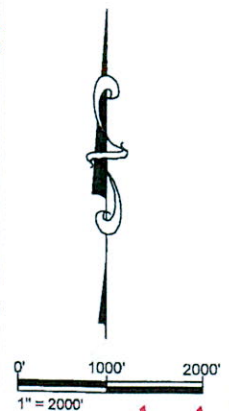
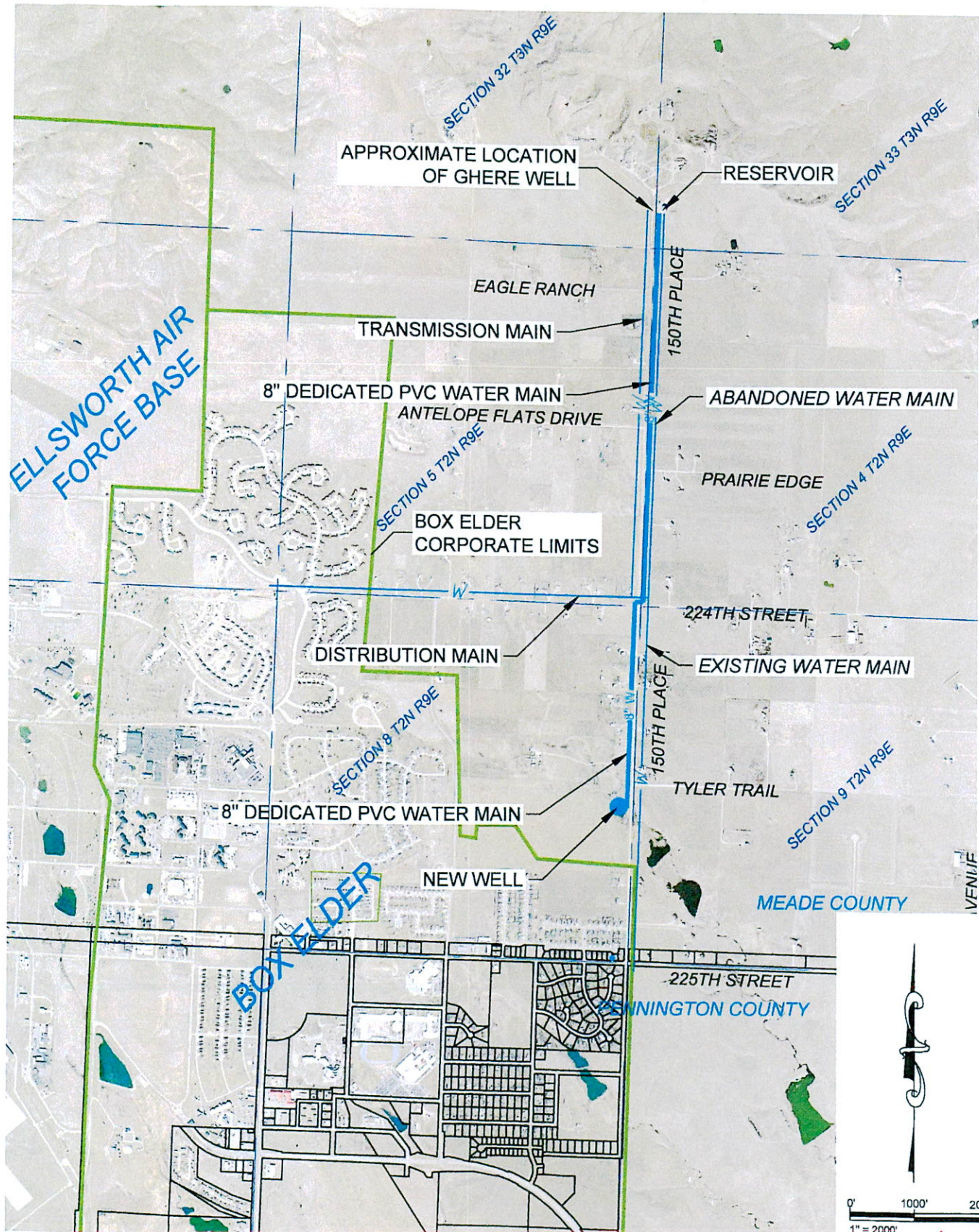
Therefore, it is the City's intent to drill the new well and temporarily take the Ghere Well offline. As both wells are or will be Madison Limestone wells, volume of domestic usage would be similar. With this letter the City is requesting an additional point of diversion for the water rights noted in Permit #2631-2 for the Ghere Well. Exhibit A shows the existing Ghere Well in relation to the proposed new well location.

Sincerely,
City of Box Elder

A handwritten signature in cursive script that reads "Bob Kaufman".

Bob Kaufman, Public Works Director

cc: Michael Towey, KTM Design Solutions, Inc.
enc: Exhibit A



628 1/2 Sixth Street
 Rapid City, SD 57701
 [p] 605.791.5866
 [f] 605.791.5863
 [e] engineer@ktmsd.com

CIVIL ENGINEERING | LAND PLANNING | CONSTRUCTION ADMINISTRATION
 www.ktmsolutions.com

EXHIBIT "A"
 PROPOSED NEW WELL
 WATER RIGHTS LETTER
 BOX ELDER, SOUTH DAKOTA
 06-10-2019

**PRELIMINARY
 FOR REVIEW ONLY**

Additional Diversion Point

Water Permit No. 2631-2

City of Box Elder

June 18, 2019

Water Permit No. 2631-2 appropriates 435 acre-feet annually at a maximum instantaneous diversion rate of 1.0 cubic feet of water per second from one well to be completed into the Madison aquifer (approximately 5,000 feet deep) located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 33-T3N-R9E, BHM, for municipal use in Pennington and Meade counties. The staff report to the Chief Engineer on Application No. 2631-2 was written June 16, 2008 by Ken Buhler. That report reviewed availability of water based on a hydrologic budget and observation well data, existing rights, and the term limitations required for Madison aquifer permits and concluded there was a reasonable probability of water availability without impairment of existing rights. This water permit was approved based on Chief Engineer's recommendation after public notice occurred and no petitions to intervene were filed by the August 25, 2008 deadline. The permit was issued and in the process of developing the permit, the City of Box Elder found production issues as well as elevated levels of radium, iron, and manganese. The city requested this additional diversion point in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 8-T2N-R9E.

Applicable South Dakota Codified Law (SDCL)

Pursuant to SDCL 46-5-13.1, the location of a diversion point may be changed or additional diversion points may be licensed without application or publication provided the additional diversion point is completed into the same water source, no additional water is appropriated, and the change or addition of a diversion point does not increase the potential for interference with existing diversions.

Source of Water

The original well drilled was completed to a depth of 4,954 feet and the geologist on site determined that the top of the Madison aquifer in that location was 1,131 feet below sea level (SD Water Rights, 2019a). A contour map of the Madison surface corroborates that finding, indicating the top of the Madison aquifer is approximately 1,200 feet below sea level at the location of the old well and the proposed location for a new well (Carter & Redden, 1999). A well has not been completed for the additional diversion point so as the applicant develops this request for an additional diversion point, they must ensure the new well is completed into the Madison aquifer.

Amount of Water Diverted

The City of Box Elder did not request additional withdrawals or a higher diversion rate. Water Permit No. 2631-2 is limited to a diversion rate of 1.0 cfs (450 gallons per minute). Therefore if this request for an additional diversion point is developed, the applicant must ensure the

Water Permit No. 2631-2 Additional Diversion Point

withdrawal rate from the two wells never exceeds 1.0 cfs at any given time and the total annual withdrawal does not exceed 435 acre-feet.

Review of Existing Diversions

Water Permit Nos. 1807-1 and 1875-1 for the 28th Bomb Wing were canceled since the report was first written for Application No. 2631-2, so they no longer are the nearest water rights/permits (SD Water Rights, 2019b). The nearest appropriative user to the proposed new diversion point that is withdrawing from the Madison aquifer is Water Right No. 1830-2A, located approximately 2.7 miles south of the proposed new well, and is held by the City of Box Elder (SD Water Rights, 2019b). The nearest appropriative users to the proposed new diversion point that is not held by the City of Box Elder are Water Right No. 1832-2, located approximately 9.3 miles west of the proposed well (SD Water Rights, 2019b). The first diversion point for Water Permit No. 2631-2 is 9.5 miles from the diversion point for Water Right No. 1832-2. Because the second diversion point is 0.2 miles closer and the maximum instantaneous diversion rate will not change, the new diversion point will not significantly impact Water Right No. 1832-2 more than the first diversion point would have.

Some Madison aquifer wells are on file with the DENR located between 2 and 2.6 miles southwest of the proposed well in Section 13-T2N-R8E (2 wells) and Section 18-T2N-R9E (1 well), but they are not domestic wells and there are no Madison aquifer water rights for those legal descriptions, so they are not protected by South Dakota law (SD Water Rights, 2019c). Two of those wells were drilled in 1942 and one was drilled in 1900, so they are not likely in use due to their age (Mathiowetz, 2019). Given the likelihood that those wells are not in use, the fact that they are not domestic wells, and the fact that there are no water rights into the Madison aquifer for those wells, impacts to those wells will not be considered.

The nearest domestic well on file with the DENR in the Madison aquifer is approximately 10.8 miles west of the proposed additional well (SD Water Rights, 2019c). This well would be impacted by the additional diversion point even less than the nearest appropriative wells.

Conclusions

1. The additional well does not seek to appropriate additional water.
2. The additional well will be completed into the Madison aquifer.
3. Given the distance from domestic and existing water rights, the potential for interference has not increased significantly.
4. The authorization of the additional well shall include that the total diversion rate shall not exceed 1.0 cfs.

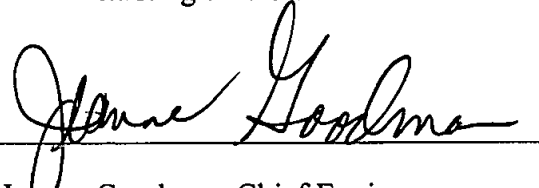
Recommended Action

Based on the above criteria, it is recommended that the additional diversion point location be authorized under Water Permit No. 2631-2.



Kim Drennon, Natural Resources Engineer
Water Rights Program

The Chief Engineer makes a finding pursuant SDCL 46-5-13.1 and ARSD 74:02:01:14.01 that:
The additional diversion point does not increase the potential for adverse effects to existing diversions.



Jeanne Goodman, Chief Engineer
Water Rights Program

References

Carter, J. M. & Redden, J. A., 1999. *Altitude of the Top of the Madison Limestone in the Black Hills Area, South Dakota; Hydrologic Investigations Atlas HA-744-D*, Rapid City, South Dakota: South Dakota Geological Survey.

Mathiowetz, A., 2019. *Personal Communication* [Interview] (19 June 2019).

SD Water Rights, 2019a. *File for Water Permit No. 2631-2*, Joe Foss Bldg., Pierre, South Dakota: SD DENR Water Rights Program.

SD Water Rights, 2019b. *Water Right/Permit File Database*, Joe Foss Bldg., Pierre, South Dakota: SD DENR Water Rights Program.

SD Water Rights, 2019c. *Well Completion Reports Database*, Joe Foss Bldg., Pierre, South Dakota: SD DENR Water Rights Program.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

June 21, 2019

Bob Kaufman
Public Works Director
City of Box Elder
420 Villa Drive
Box Elder, SD 57719

Mr. Kaufman:

Water Permit No. 2631-2 appropriates 435 acre-feet annually at a maximum instantaneous diversion rate of 1.0 cubic feet of water per second (cfs) from one well completed into the Madison aquifer (approximately 5,000 feet deep) located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 33-T3N-R9E, BHM, for municipal use in Meade and Pennington Counties.

The City of Box Elder requested authorization to complete one additional well in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 8-T2N-R9E. The basis for the request to drill one additional well is to supply the 1.0 cfs diversion rate authorized by Permit No. 2631-2.

Upon review of the request and pursuant to SDCL 46-5-13.1, the one additional well location is authorized without application or publication of a notice of hearing pursuant to SDCL 46-2A-4. No increase in the authorized diversion rate of 1.0 cfs (450 gpm) from the Madison aquifer is authorized. If the total diversion rate increases above 1.0 cfs, a new water use permit will need to be obtained.

If you have any questions, please contact Eric Gronlund at (605) 773-3352.

Sincerely,


Jeanne Goodman, Chief Engineer
Water Rights Program

Water Rights Program - DENR
Conversation File Documentation

NAME OF PERSON OR FILE: Bob Kaufman
Public Works Director
City of Box Elder

ADDRESS: 420 Villa Drive, Box Elder, SD 57719

COUNTY: Pennington County

DATE: May 5, 2017 TELEPHONE: (605) 390-6114

RE: Licensing of Water Permit No. 2577A-2, 2631-2, 2632-2

COMMENTS: I met with Bob Kaufman May 4, 2017 to complete the licensing inspections for the above permits.

The well authorized under permit #2577A-2 is completed and in service and will be submitted for licensing.

The well authorized under permit #2632-2 has not been drilled. I reviewed the date construction was to be completed (8/25/13) had expired and the date the water was to be put to beneficial use (8/25/2017) will soon expire and that #2632-2 would be submitted for cancellation. If this well was to be eventually constructed it would require a new application and new priority date.

The well authorized under #2631-2 was drilled in 2012 by Rapid Drilling. It was then rehabilitated in 2014 by Weston Engineering and then additional rehabilitation and a temporary 6 gpm pump installation was completed by Water Drilling Resources in 2016. The well has very poor water quality (hardness, radium) due to suspected intermingling of the Minnelusa and Madison aquifers which occurred prior to the most recent rehabilitation effort. The well is pumped and tested intermittently to determine if water quality can be improved. Water is pumped to a holding pond rather than discharging to surface waters. Kaufman doubts the water quality will ever improve sufficiently to put the well into municipal service.

NAME: Steven Quissell, Water Rights Inspector





DENR
SOUTH DAKOTA

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

June 10, 2020

2631-2

2632-2

Bob Kaufman, Public Works Director
City of Box Elder
420 Villa Drive
Box Elder SD 57719

Dear Mr. Kaufman:

I am writing regarding Water Permit Nos. 2631-2 and 2632-2 for the City of Box Elder.

In 2017, Steve Quissell with our program spoke with you regarding the wells authorized under the above two permits. His file documentation indicated **Well #7 (2631-2)** authorized a well in the SW ¼ Section 33, T3N, R9E. At that time, the water quality was not the best and you indicated it may not improve sufficiently to put the well into municipal service. In 2019, an additional well was authorized under this permit and was to be located in the NE ¼ SE ¼ Section 8, T2N, R9E.

Well #10 (2632-2) to be drilled in the NW ¼ Section 27, T2N, R8E had not been drilled when Steve was there in May 2017. The date for completion of works under Permit No. 2632-2 expired in August 2017. The permit should have been scheduled for cancellation after the August 2017 date, however for some reason was not.

To update the City's permits, the additional well authorized in 2019 under Water Permit No. 2631-2 will need to be looked at and the permit licensed for what was developed.

Water Permit No. 2632-2 will be scheduled for cancellation consideration at an upcoming meeting. You will be notified of the time, date and place of the hearing once it is scheduled.

I have enclosed copies of the water permits discussed above. If you have any questions, please let us know.

Sincerely,

Genny McMath
DENR - Water Rights Program
605 773-3352
Genny.mcmath@state.sd.us

enclosures