

WATER PERMIT NO. 1911-1

Name of Applicant: **City of Sturgis**

Address: **1040 2nd St, Sturgis SD 57785** Phone: **605 347-4425**

Amount of Water Claimed: **0.89 cfs** Total Acres: **NA**

Source of Water Supply: **groundwater (one well)**

Water to be used for: **municipal** County: **Meade**

Type of Waste Disposal System:

Location:

PRIORITY Date Received: **3-18-10** Application/License Fee: **\$1350**

Corrected Application Received: Period of Annual Use: **January 1 – December 31**

Remarks: **Requesting to transfer diversion authority authorized by No. 441A-1 and appropriate an additional 0.89 cfs from a new well**

Diversion Point: **NE ¼ SE ¼ Sec 16-T5N-R5E**

Land to be Irrigated: **NA**

Depth of Well: **1023 feet deep**

Well Driller:

Remarks:

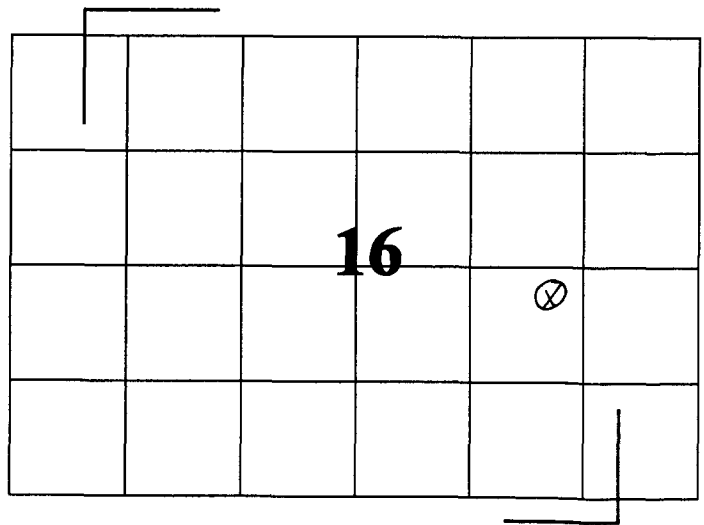
Type of Map: **aerial**

Prepared by: **Theodore F Schultz, PE**

Reviewed and the Number Assigned on: **3-18-09**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



SD EForm - 1585LD V3

FORM 2: Application for uses other than irrigation
(type or print)Mail to:
PMB 2020
DENR - Water Rights
523 E Capitol Ave
Pierre, SD 57501-3182
ph. (605) 773-3352

No.	1911-1	(office use only) Hydrologic Unit	10120202
Basin	Belle Fourche River		
Newspaper	Meade Times-Tribune 1022 Main St. 605-347-2503 Sturgis 57785		

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MAR 18 2010
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:
(check one)

☒ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____
☐ Amendment/Correction to Permit No. _____

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

The City of Sturgis requests to transfer the existing 400 GPM (645 AF) claimed with Permit No. 441A-1 and appropriate an additional 400 GPM (645 AF) with this application.

- Name of Applicant City of Sturgis Water Department Phone 605-347-4425
(check one) ☒ Owner ☐ Tenant/lessee
Mailing Address 1040 2nd Street Sturgis SD 57785
(Address) (City) (State) (Zip Code)
- Amount of water claimed 0.89 *CFS or 400 **GPM 645 ***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 (groundwater)
- Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) County Meade
1 Well Located on Lot 1 in the NE1/4SE1/4 of Section 16, T5N, R5E, BHM, Meade County, South Dakota
- County or counties where water will be used Meade
- Annual period during which water is to be used All Year
- 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)
See attached preliminary engineering report by CETEC Engineering Services, Inc. Location map and schematic well profile are attached.

STATE OF SOUTH DAKOTA)
County of Meade) SS

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

I, Erie Tibbetts, 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 Erie TibbettsSubscribed and sworn to before me this 8th day of March 2010

BEVERLY J. JOHNSON
NOTARY PUBLIC

My Commission Expires 8/22/2013

Beverly J. Johnson
Notary Public signature

SOUTH DAKOTA
WATER PERMIT NO. 1911-1

Date of first receipt of application March 18, 2010.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 1911-1 to Sturgis Water Company, 1040 2nd St, Suite 103, Sturgis SD 57785 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. 1911-1 authorizes changing the location of the diversion point, transfers diversion authority and appropriates additional water. Water Right No. 441A-1 appropriates 0.89 cubic feet of water per second (cfs) (645 acre-feet annually) from one well completed Madison Aquifer located in NE 1/4 SE 1/4 Section 16-T5N-R5E. This permit authorizes to: 1) construct a replacement well for Water Right No. 441A-1 to be completed into the Madison Aquifer (1,023 feet deep) located in the NE 1/4 SE 1/4 Section 16-T5N-R5E; 2) transfer the diversion authority of 0.89 cfs (645 acre-feet annually) authorized by No. 441A-1 to the new well and; 3) appropriate an additional 0.89 cfs (128 acre-feet annually) from the new well. This permit authorizes a total of 773 acre-feet of water annually at a maximum diversion rate of 1.78 cfs from this well.
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. 1911-1 is June 14, 2010.
5. The date from which applicant may claim right is March 18, 2010 (128 acre-feet annually).
6. One-fifth of the construction is to be completed on or before December 14, 2012.
7. All construction is to be completed on or before June 14, 2015.
8. Water is to be put to beneficial use on or before June 14, 2019.
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. 1911-1 is issued for a twenty year term. Pursuant to SDCL 46-2A-21, the twenty year term may be deleted at any time during the twenty year period or following its expiration. If the twenty 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. 1911-1 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.

(continued)

3. Water Right No. 441A-1 and Water Permit No. 1911-1 authorizes a total combined annual diversion of 773 acre feet of water.
4. The Sturgis Water Company shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer as authorized by Water Right No. 441A-1 and Water Permit No. 1911-1.

WATER MANAGEMENT BOARD

By: Garland Erbele

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

AUG 09 2010
date



Form 2A **Supplemental Information**

(Complete applicable portions only)

(type or print in ink)

1. Well Information – Proposed Construction

- a) Drill Hole Diameter 17-1/2 " Depth 1,023'
- b) Casing Type Steel S 55 Diameter 13-3/8" O.D. Thickness _____
- c) Screen Type None Diameter _____ Thickness _____
- d) Gravel Pack None Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material 797'
- f) Depth to Water (ground surface to water level) 565'
- g) Distance to nearest existing domestic well:
- On applicant's property 2,554' (Well 3) On property owned by others _____

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field) Central Sewer System.
- b) System Capacity (gallons) _____ Year Constructed _____
- c) Connected to the City of Sturgis Sanitary System

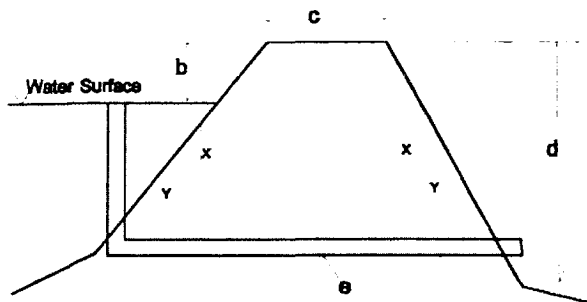
3. Dugout Information

- a) Surface Dimensions N/A Depth _____
- b) Depth to water (ground surface to water level) _____

4. Water Storage Dams N/A

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:



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



EXISTING
CITY LIMITS

1 OF 1

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 3/17, 20 10

RECEIVED OF City of Sturgis 1040 2nd St # 103 Sturgis SD 57785

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

Fee for Application for Permit No. <u>1911-1</u> to Appropriate Water, to construct and to put water to beneficial use	1150	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>1911-1</u>	200	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	1350 00

No. 04510

By [Signature]
Chief Engineer

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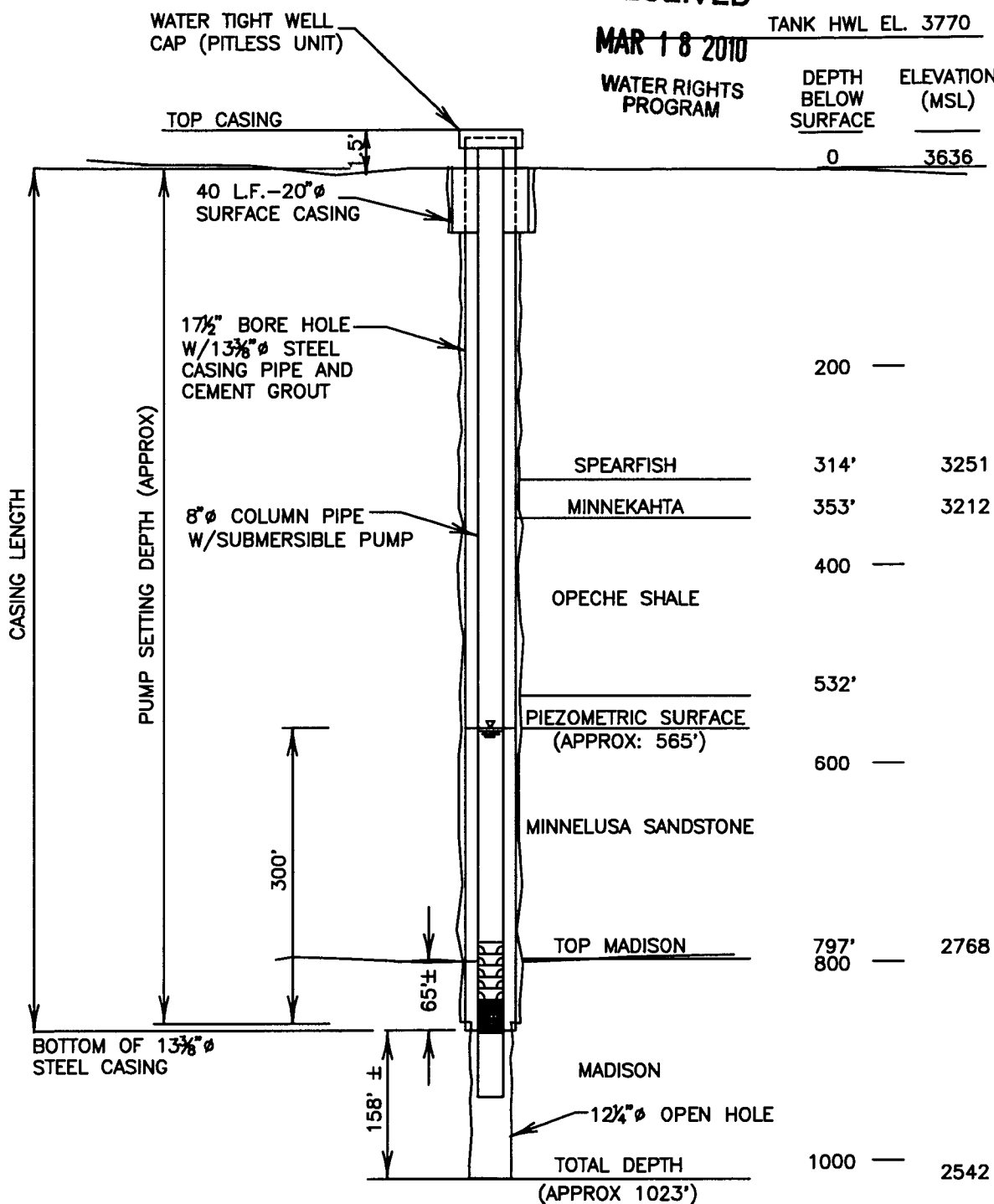
MAR 18 2010

TANK HWL EL. 3770

WATER RIGHTS
PROGRAM

DEPTH
BELOW
SURFACE

ELEVATION
(MSL)



NOTE: Preliminary
sizes and depths

SCHEMATIC WELL DESIGN
NEW STURGIS MADISON WELL 1
STURGIS WATER DEPARTMENT
STURGIS, SOUTH DAKOTA

cetec

March 06, 2010 7:15:12 a.m.
Drawing: WELL 1 SCHEMATIC DESIGNING (DWG) (\\V:\MAN-DATA\CECTEC\PROJECTS & PROPOSALS\00101000 STURGIS M&B CONTRACT\STURGIS WELL 1 WATER RIGHTS PROGRAM\)



Letter of Transmittal

TO: City of Sturgis Water Department
1040 Second Street, Suite 102
Sturgis, SD 57785-1552

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MAR 18 2010
WATER RIGHTS
PROGRAM

DATE:	3-5-2009	JOB NO:	09190.00
ATTENTION:	Eric Tibbetts		
RE:	Sturgis Madison Well 1		

WE ARE ☐ SENDING
☒ HAND DELIVERING

☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change Order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Water Permit Application
1			Application Instructions
1			Revised Engineering Report
1			Draft Construction Specifications

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Reviewed ☐ Revise and resubmit
☒ For your use ☐ Rejected ☐ Resubmit _____ copies for approval
☐ As requested ☐ Make corrections noted ☐ Return _____ corrected prints
☐ For review and comment ☐ Other _____

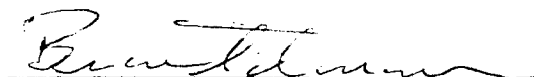
REMARKS

Eric,

Please sign the enclosed Permit Application, Form 2. The Filing Fee for an additional 400 GPM is \$1,350. Please send payment in this amount made payable to the Department of Environment and Natural Resources, Water Rights Program and mail it, and all of the enclosed information to PMB 2020 Department of Environment and Natural Resources, Water Rights Program, 523 East Capital Ave, Pierre, SD 57501-3182.

Thanks,

File


Brian Tideman P.E.

SECTION 02580

WATER WELL CONSTRUCTION

PART 1 - GENERAL

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**WATER RIGHTS
PROGRAM**

1.1 Description

- A. Furnish all labor, material, transportation, tools, supplies, equipment and appurtenances for drilling and construction of water supply well described herein. Work shall include, but is not necessarily limited to drilling, steel pipe casing, grouting the casing, geophysical logging, well development and test pumping, and water quality testing.

1.2 Additional Requirements and Standards Specified Elsewhere

- A. AWWA Standard for Water Wells, A100- 97 or current edition.
- B. Recommended Standards for Water Works (Ten States Standards) – 1997 or current edition.
- C. American Petroleum Institute Standards (API)
- D. ARSD 74:02:04 Well Construction Standards (State of South Dakota).

1.3 Related Work Specified Elsewhere

- A. Site Excavation and Grading: Section 02223.
- B. Erosion Control, Seeding and Sodding: Section 02900.

1.4 Submittals

- A. Product Data.
 - 1. Steel pipe casing data, mill certification and dimensions of pipe casing material.
 - 2. Casing centralizers.
 - 3. Mix design(s) of grout for casing cementing.
- B. Construction Plan and Contractor Information
 - 1. Provide a detailed written construction plan, sequence and schedule for the work. Include planned procedures and construction methods such as formation sampling, water quality sampling, grouting, drilling, pump testing, well development, etc.
 - 2. Submit South Dakota Well Driller license number.
 - 3. Submit names of subcontractors proposed to be employed in connection with the project.

1.5 Job Conditions

- A. Anticipated Formation Log.
 - 1. The well is to be constructed into Madison Limestone Formation for domestic use. The plans illustrate the anticipated strata of geological formations to be encountered, but this information is considered to be approximate. Actual subsurface conditions may vary from conditions shown and described herein.
 - 2. Owner and Engineer do not warrant subsurface conditions. The schematic well profile is based on data from United States Geological Survey publications. The final well construction profile is dependent upon site conditions found upon construction. The Contractor is advised that care must be taken during construction to analyze and interpret data collected during drilling.
 - 3. The Contractor shall complete and record all geophysical logging of the well including all physical and fluid conditions of the formations encountered and shall submit to the chief engineer per SDCL 46-6-11.
- B. Well Site.
 - 1. The proposed well is located on Lot 1 in the NE1/4SE1/4 of Section 16, T5N, R5E, BHM, Meade County, South Dakota. Refer to location map included at the end of these specifications.

2. The Owner desires to develop the maximum production from the Madison Formation at the proposed site. The permit information for this well is located in Appendix A.
 3. Confine all drilling operations, materials storage, equipment storage and disturbance of any nature to designated areas of the Owner's property at the well site. Contractor will be required to install silt fence, filter socks, wattles, etc. as necessary to limit disturbance to the area shown on the plans.
- C. Driller's Qualifications.
1. The Contractor will be required to demonstrate that he has the proper equipment, personnel and experience on work of a similar nature.
 2. Statements of qualifications, including description of plant and equipment, listing of previous projects, and experience of personnel to be employed on this project may be required before the Contract is executed.
 3. The Contractor will be required to provide documentation showing the ability to properly complete the type of public drinking water well specified.
 4. The driller must be a licensed well driller in South Dakota under the requirements of SDCL 46-6-9.
 5. The driller shall conform with well construction standards as set forth in South Dakota Administrative Rules Chapter 74:02:04.
- D. Well Yield.
1. The objective of this construction is to obtain a reliable yield of approximately 800 gpm with a drawdown of 250' or less at maximum pumping rate. The Owner intends to develop the well to the maximum sustainable production rate.
- E. Working Days and Hours.
1. The Contractor may, at his own discretion, conduct drilling operations continuously, 24 hours per day.
 2. Drilling and other well construction activities may be conducted without restriction on all days suitable for well construction, including weekends and holidays.

1.6 Measurement and Payment

A. Mobilization.

The Contractor will be paid the lump sum amount bid as full compensation for mobilizing drilling equipment to the jobsite, setting up, and removing the equipment and restoring the site at the completion of the job. Costs for construction phase permits shall be included in the mobilization item. Payment for mobilization in the amount of 50% will be made upon initial mobilization and drilling at the site. The remaining 50% of the mobilization payment will be made upon substantial completion of the well, performance of test pumping, and satisfactory restoration of the site.

B. Borehole.

Borehole will be measured by the linear foot of the diameter called for in the Bid Schedule and paid for at the contract unit price per linear foot. If the Contractor elects to construct the well using one or more reaming operations, there will be no additional or separate payment for reaming to the required hold diameter.

C. Geophysical Logging.

Electronic geophysical logging will not be measured directly. Payment will be made at the contract price per each logging operation for all specified logging work, excluding cement bond logging. It is intended that each authorized logging operation will be paid for under this item. See Paragraph H for cement bond logging payment conditions.

D. Steel Pipe Casing.

Steel casing will be measured by the linear foot installed in place, and will be paid for at the contract unit price for the sizes set forth in the bid schedule. Payment will include compensation for fittings, couplings, centralizers, collars, packers and other incidentals.

E. Set Up For Grouting.

Mobilization costs and set up time for equipment used in the initial grouting procedure will be paid for at the lump sum contract unit price. Only one payment will be made for "Set-up For Grouting".

F. Set-Up For Second-Stage Grouting.

If a second-stage grouting operation is necessary to complete grouting of the entire casing, the set-up time and equipment for the additional grouting will be paid for under the item "Set-up For Second-Stage Grouting". If more than 2 grouting operations are required, the third and all subsequent grouting operations will be paid for at the same rate as the "Set-up For Second-Stage Grouting" item.

G. Grouting.

Grouting of the casing will be measured by the cubic foot of grout mixture actually furnished and successfully placed. Payment will be at the contract price per cubic foot.

H. Cement Bond Logging.

Bond logging to verify complete cementing of the annular space around the casings will be paid for on a per-each basis under the item "Cement Bond Log". In the event that a second stage cementing process is needed to complete the cementing of the casing, an additional bond log or logs shall be completed with payment at the contract unit price per each for "Cement Bond Log".

I. Set Up For Well Development.

Mobilization costs and set up time for air compressor equipment and other equipment used in the well development procedure will be paid for at the contract lump sum price.

J. Well Development.

Well development will be measured by the hour from the time of the start of the air development work to the stop time. Payment will be at the contract unit price per hour. The Owner reserves the right to increase or decrease the development time by up to 50% without changing the Contract unit prices.

K. Video Logging.

Internal CCTV video of the completed well will be part of the basis of a lump sum price for "Video Logging".

L. Set Up for Test Pumping.

Mobilization costs and set up for furnishing the test pump, power supply system, installing and removing pump testing equipment, drop pipe and ancillary equipment and services will be at the contract lump sum price.

M. Test Pumping.

Test pumping will be measured by the hour from the time of pump test start to stop time. Payment will be at the contract unit price per hour. The Owner reserves the right to increase or decrease the development time by up to 50% without changing the Contract unit price.

N. Standby Time.

Standby time necessary for the Owner and Engineer to evaluate logging results or to assess well conditions found upon drilling will be paid for at the contract unit price per hour. Standby time will be only authorized by the Engineer.

O. Well Disinfection.

No measurements will be made for the disinfection process. Payment will be made at the contract lump sum price for well disinfection, and will be taken to be full compensation for all labor and materials used in the disinfection process.

P. Water Quality Testing.

Water quality testing will be paid for at the contract lump sum unit price for the testing specified.

PART 2 - PRODUCTS

2.1 Well Casing

- A. Steel Casing Pipe Standards: New steel casing pipe equipped with a guide shoe meeting AWWA Standard A-100, ASTM or API specifications for water well construction.
- B. Casing Pipe: American Petroleum Institute (API) Grade J or K 55 (Prime), 13 $\frac{3}{8}$ " O.D., 54.5 lb./ft. per API 5 CT.
- C. Couplings: Threaded, API short.
- D. Casing Centralizers: API welded standard bow centralizers composed of compatible material to the casing, Engineer approved.

2.2 Grout

- A. Mix Proportions.
 - 1. API Spec. 10 Type G Portland Cement. The Engineer may authorize the use of Type III cement for site mixed grout.
 - 2. Water: Not more than 6 gal. per cubic foot of mixture.
- B. Modifications to Grout Mixture: Grout mixture set forth as standard for bidding purposes. Contractor may propose modification. Changes must be approved by the Engineer.
- C. Grout used for surface tremie operations, where permitted by the Engineer, may be neat cement grout without aggregate or filler.

2.3 Drilling Fluid

- A. Type: Fresh water based mud.
- B. Additives: Limited to those approved by AWWA Specification A 100.3.3.2.
- C. Properties:
 - 1. Fluid density: 70-85 pcf.
 - 2. Viscosity: 32-40 sec.; Marsh Funnel.
 - 3. Filtration: 3/22 in. at max. 20 cc water loss; Filter Press.
 - 4. Sand content: 2-4% by volume.
 - 5. Test Procedures: API RP 13 B.
- D. Modifications to Drilling Fluid: Fluid mixture set forth as standard for bidding purposes. Changes must be approved by the Engineer.

PART 3 - EXECUTION

3.1 Description

- A. The proposed well will consist of the following:
 - 1. A 20" surface casing shall be installed to approximately 40' below the surface. The surface casing shall be cut off below ground at a depth of 8' after completion of the 13 $\frac{3}{8}$ " casing installation. The 17- $\frac{1}{2}$ " diameter borehole shall extend from the surface to approximately 862' depth below the surface. The well shall be cased with steel casing per plans and specifications. A 12- $\frac{1}{4}$ " diameter borehole shall be drilled from the termination of the steel casing at 862' through the Madison Formation to a depth of approximately 1,023'. An uncased and unscreened open hole completion into the Madison aquifer is proposed. It is intended that the 12- $\frac{1}{4}$ " bore hole penetrate the entire thickness of the Madison formation.
 - 2. The borehole may be constructed using pilot bores followed by one or more reaming operations to provide for the specified bore hold diameter.
 - 3. The annular space between the casing and the borehole shall be filled with cement grout for the entire length of the casing.
 - 4. The Contractor shall clean the well of cuttings, drilling fluid and sand.
 - 5. The well shall be air developed using surge and scouring techniques.

6. The Contractor shall install test pump equipment, perform test pumping and remove the test equipment at completion of work.
7. Refer to the schematic drawing of well profile on the drawings. Depths and lengths are subject to modification at the time of construction based on conditions encountered during drilling. The Contractor should anticipate variable conditions and/or drilling depths.

3.2 Construction Sequence

- A. The Contractor shall furnish a detailed sequence of construction and schedule to the Engineer for review. The Contractor shall construct the well generally in accordance with the following sequence of operations:
 1. Drill surface casing borehole and set surface casing. Construct 17-½" borehole from the surface to the depth of the Madison Formation water bearing strata.
 2. Geophysical logging (IES) as described in paragraph 3.4 of these specifications shall be performed on the borehole.
 3. The Engineer will evaluate logging information and determine that the Madison limestone has been penetrated. It is anticipated that circulation of drilling fluid by the Contractor may be necessary during the evaluation period, but the exact procedures will be at the discretion of the Contractor. Cost for this work shall be paid under the bid item for Standby Time. The Engineer will employ a qualified geotechnical representative to assist in evaluating conditions at or near the initial penetration into the Madison formation.
 4. After geological examination of the logs by the Contractor and Engineer, and if favorable conditions are determined to exist, the Contractor will be authorized to proceed with completion of the well along with specific instructions regarding casing setting depth.
 5. After authorization, the casing will then be set and cemented in-place. The 12-¼" open borehole will then be advanced to the total depth of the Madison Formation. Geophysical logging will be performed in the Madison aquifer with payment as set forth in Section 1.6.C. on the open borehole.
 6. The Contractor will then perform well development, specific capacity determination, pump testing and disinfection of the well. The approximate depth of the test pump setting shall be determined by dividing the specific capacity in the maximum desired yield and adding at least 50' to maintain inlet submergence below the maximum anticipated drawdown.
 7. The pump testing data shall include: test pump capacity-head characteristics, static water level, depth of test pump setting, time of start and stop of each cycle. The Contractor shall also provide the pumping rate, pumping water level, drawdown and water recovery rate and levels.
 8. Water sample collection and testing will be completed near the end of the pump testing.
 9. The permanent pump selection and setting is not a part of this project. Furnishing and installing the pitless unit is not a part of this project.

3.3 Construction Methods

- A. Drilling method: Air rotary or hydraulic rotary method.
- B. Borehole Construction:
 1. Borehole diameter set forth in this specification shall be within ±½" of the specified diameter, unless special permission of the Engineer is obtained for borehole diameter outside of this range.
 2. A permanent surface casing shall be installed at the beginning of drilling operations to prevent surface caving around the borehole. The surface casing shall be from the existing surface to a depth of approximately 40' with 20" nominal diameter. The weight of the surface casing is at the discretion of the Contractor, but must be adequate to achieve the desired results. The surface casing shall be cut off below ground at a depth of at least 8 feet after drilling work is completed.
- C. Circulation of Drilling Fluid.
 1. Circulation of drilling fluid shall be continuous (24 hours a day) during the drilling process.
 2. In the event that circulation of fluids is lost due to fluid leakage into subsurface strata, or for any other reason, the Contractor will be required to restore circulation entirely by his own methods and at his own expense. The Owner will not consider restoration of lost circulation as Extra Work.

D. Well Casing Installation.

1. Casing installation techniques shall be at the discretion of the Contractor, provided that the casing is properly centered, plumb, joints securely made, and installation does not adversely affect the integrity, shape or strength of the casing as described elsewhere in these specifications.
2. Casing centralizers shall be installed at approximate intervals and at the top and bottom of the casing section. The casing shall be designed to create a minimum obstruction in the annulus and to allow the grout to completely surround the casing. Centralizers may not be spaced more than 80' apart.

E. Grouting of Casing.

1. The well casing of the hard rock well shall be pressure grouted with cement grout from the bottom of the casing to the ground surface.
2. Grouting of the casing shall insure a complete seal of the annular space of the entire casing.
3. The grouting method employed shall be at the discretion of the Contractor, but unless otherwise approved, shall be of a type where the grout is introduced at the bottom of the annular space and forced under pressure to the surface.
4. All well construction operations shall cease for 24 hours after cementing of the casing. A longer cure period may be ordered by the Engineer based on sample testing results.
5. Grouting methods to be employed shall be approved in advance by the Engineer.
6. If it is not possible to obtain a complete grout seal of the casing in one continuous operation, the Contractor shall implement multiple-stage grouting procedures.
7. A cement bond log shall be performed to locate the top of the prior stage cement level, the casing shall be perforated using jet charges or another approved technique, and the cementing process repeated until a satisfactory return of cement to the surface has been achieved.
8. The Engineer may authorize use of tremie pipe cementing procedures near the surface.

F. Well Development

1. The well shall be developed and cleaned of all cuttings and drilling fluid.
2. Development shall be by air lifting/surging in a manner which will ensure that no debris is left in the well and that maximum yield is obtained.
3. Development methods will be subject to approval of the Engineer.
4. Disposal of well development materials and pump testing water shall be the responsibility of the Contractor. The Contractor is advised to visit the site to determine the methods of disposal in a lawful manner. The Contractor is responsible for acquiring permits necessary for the construction. As a minimum, the Contractor shall obtain a permit from DENR for Temporary Discharge of Water Associated with Construction Activities.

G. Well Disinfection.

1. The well shall be disinfected to remove any bacterial contamination of the interior of the well. Disinfection shall be performed after completion of test pumping of the completed well, but before removing test pump equipment.
2. Disinfection of the completed well shall be performed after test pumping by any of the four methods described in AWWA Specification A 100-97 or most current edition. The chlorine concentration achieved within the well shall be not less than 100 ppm, and the duration of disinfection shall be not less than 8 hours.
3. Completely flush chlorine solution from the well at the completion of the disinfection period and dispose of chlorinated water in an approved lawful manner.

3.4 Samples and Records

A. Driller's Log.

1. Maintain a driller's log of information pertinent to the well construction and progress of work. The driller's log shall be a chronological account of drilling times, penetration rates, quantities and types of materials used, additives and chemicals used, significant events during drilling, problems encountered and similar information.
2. The Contractor's equipment shall be capable of providing continuous recording of the rate of penetration.
3. Copy this log and furnish to the Engineer at the completion of the work.

- B. Formation Log.
 - 1. Maintain a formation log in which the location of the top and bottom of each stratum penetrated is recorded, along with the driller's description and interpretation of each formation.
 - 2. Copy this log and furnish to the Engineer at the completion of the work.
 - 3. Furnish information to the State Geologist as required by SDCL 46-6-11.
- C. Materials Log.
 - 1. The Contractor shall keep a record of the assembled order, number, type, size, lengths and couplings of the individual casing lengths, and other items placed in the well.
 - 2. The Contractor shall maintain records of all certificates or invoices for all materials delivered to the job.
 - 3. Make this information available to the Engineer upon request.
- D. Formation Samples.
 - 1. The Contractor shall collect and save for the Engineer samples of cuttings from all formations encountered.
 - 2. Samples shall be placed in approved bags or containers, and plainly labeled with the depth at which the sample was taken.
 - 3. The contractor shall provide records as required under SDCL 46-6-11 and Administrative Rule 74:02:04:65.

3.5 Geophysical Logging.

- A. Logging Required.
 - 1. Electronic Logging.
 - a. Log the completed 17-½" bore hole using natural gamma ray and self-potential resistivity methods.
 - b. Log the 10⅝" open bore hole in the aquifer using gamma ray-neutron and self-potential resistivity.
 - 2. Caliper Trace.
 - a. Conduct a caliper trace of the 17-½" bore hole and the 10⅝" open hole in the aquifer.
- B. Quality Control.
 - 1. Logging shall be done only by an approved and experienced well logging company or by the State Geological Survey.
 - 2. Logging records shall be prepared by the logging firm in a standard format with all relevant data included, and shall be furnished to the Engineer in not less than five copies.
- C. Geophysical logging will be paid for under the contract item "Geophysical Logging" on a per-each basis. Each authorized mobilization of the logging subcontractor and completion of electronic logging of the bore hole will be paid for under this item.

3.6 Bond Logging

- A. Conduct a bond log on the completed 13⅝" O.D. casing after cementing to assure that there are no voids between the casing and the borehole.
- B. Conduct a bond log on the casing in the event that a single stage cementing operation is not successful, and it is necessary to locate the cement level for a supplemental cementing stage.
- C. Bond logging will be paid for under the item "Bond Logging" per each logging operation. Subsequent bond logs, if needed, will be paid for on the same basis as the original bond log.

3.7 Plumbness and Alignment

- A. General.
 - 1. The completed well shall be constructed round, plumb and true to line as defined herein.
 - 2. Tests for plumbness and alignment, if required, shall be made after completion of the well in accordance with AWWA standards.

- B. Tolerances.
 - 1. Plumbness.
 - a. No specific tolerance for plumbness is required for this project unless difficulty is encountered with the alignment test set forth hereinafter.
 - 2. Alignment.
 - a. The alignment must be satisfactory for successful placement and operation of the test pumping equipment.
 - b. If alignment is unsatisfactory, the Contractor shall perform a cylindrical plummet test for determination of actual drift and alignment in accordance with AWWA A100, Appendix C.
 - c. The Contractor will be responsible for corrective measures necessary to assure satisfactory pump installation.

3.8 Test Pumping

- A. General.
 - 1. The Contractor shall conduct test pumping of the completed well and furnish all equipment and facilities needed for the test pumping work.
 - 2. The Contractor's responsibilities include furnishing and setting a submersible test pump, drop pipe, power cable and pump controller, electrical power supply (generator), flow measuring and well level drawdown measuring equipment.
 - 3. The Contractor shall conduct the test pumping, maintain records and remove all equipment at the completion of the test period.
- B. Test Pump.
 - 1. Submersible well pump, new or used, with electric motor driver.
 - 2. Performance: Flow range up to 800 gpm at up to 800' TDH.
 - 3. 6" or 8" discharge.
 - 4. Suitable for installation within 13 $\frac{3}{8}$ " o.d. casing.
- C. Accessories.
 - 1. 8" column pipe.
 - 2. Submersible pump cable and controller.
 - 3. Check valve in column pipe.
 - 4. Discharge head and pipe suitable for pumping to ground surface at appropriate Engineer-approved location.
 - 5. Flow meter or weir box assembly with $\pm 5\%$ accuracy over entire flow range.
 - 6. Throttling valve or speed control to adjust flow rate.
 - 7. Air line pressure source and gauge assembly for water level measurement in the well.
- D. Electrical Power Source.
 - 1. The Contractor shall arrange and pay for construction power for test pumping.
 - 2. Contractor may furnish portable generating equipment with capacity to operate the test pump over the specified range of flows and head in lieu of utility power.
 - 3. Petroleum fuel supplies shall be satisfactorily managed and contained at the site. Secondary containment is required for fuel tanks.
- E. Step Testing.
 - 1. Initiate pumping and record time of day, flow rate and drawdown and total pumping head at increments as approved by the Engineer.
 - 2. Increase pump rate and continue recording flow drawdown and time under general direction of the Engineer.
 - 3. Provide qualified personnel continuously on-site during pump test operations and continue data collection until directed by the Engineer to cease test pumping and remove test equipment.
 - 4. Measure and record water temperature during test pumping at periodic intervals as approved by the Engineer.
 - 5. Collect water quality samples per Section 3.8 of this specification prior to cessation of test pumping activities.

3.9 Video Logging

- A. Perform CCTV video inspection of the completed well, including casing interior and open hole in the aquifer.
- B. Video shall be completed after well development and test pumping.
- C. Provide electronic record of the video inspection to the Engineer.

3.10 Acid Treatment

- A. Hydrochloric acid treatment of the well may be required if, in the opinion of the Engineer, the well yield is inadequate for production at the rate needed.
- B. Acid treatment is not a part of the work scope, and no bid item is included for acid treatment.
- C. If acid treatment is determined to be necessary, a change order will be prepared to establish scope of work and payment conditions.

3.11 Water Analysis

- A. Contractor shall sample and submit sample for water quality analysis per 74:02:04:63.
- B. Analysis shall be performed by the DENR health laboratory or an approved private laboratory.
- C. Water quality result shall be submitted to the Owner, Engineer and DENR Office of Drinking Water.
- D. The analysis shall include all parameters required by 74:02:04:63 including nitrate, coliform bacteria, sodium, conductivity and sulfate; plus shall include analysis for total dissolved solids, fluoride, chloride, iron, manganese, pH, alkalinity, bicarbonate, calcium, hardness and Langlier Index.

3.12 Permits

- A. The Contractor shall make application to DENR for permits: Surface water discharge from the construction site and for discharge of well water during well development and pump testing activities.
- B. Costs associated with construction-phase permitting shall be borne by the Contractor, with costs absorbed into the contract item for "Mobilization".

3.13 Site Restoration

- A. General.
 - 1. Pump drilling fluids from mud pits and dispose of by hauling from the site and dispose of lawfully.
 - 2. Backfill mud pits with native excavated material and compact to preconstruction conditions.
 - 3. Grade the entire work site to a neat, free draining condition and to the elevations which existed prior to construction.
 - 4. Remove all excess material and construction debris and leave the site clean.
- B. Comply with Specifications 02223 and 02900 regarding topsoiling, finish grading and seeding work.
- C. Conform with site details and notes included on the design drawings.

*** END OF SECTION ***

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**City of Sturgis Water Company
Preliminary Engineering Report
for
Municipal Water Well Installation**



Submitted to:

PMB 2020
DENR – Water Rights
523 E. Capitol Ave
Pierre, SD 57501

Submitted by:

cetec

ENGINEERING & CONSULTING

1560 Concourse Drive ☎ 605.341.7800
Rapid City, SD ☎ 605.341.7864
57703

www.cetecengineering.com

February 22, 2010

**City of Sturgis Water Company
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**1560 Concourse Drive
Rapid City, South Dakota
57703**

February 22, 2010

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1. Project Planning Area

The City of Sturgis is a community with aging infrastructure. In order to continue to effectively serve existing demand, the Sturgis Water Department proposes to improve its aging water distribution system through a series of rehabilitation and upgrade projects. Many of the existing wells and distribution components have reached the end of their useful life and are in need of complete replacement or major rehabilitation. The goal of the project is to address the needs of the system. One component that will help to meet the project goals is to replace Well 1.

1.1 Location

The City of Sturgis is located within western Meade County along the northern foothills of the Black Hills. Figure 1 shows the existing City limits. All of the water system components included within the system review are located within City limits. Water system component locations are shown in Figure 2. All of the proposed projects are located within Sections 4, 5, 9, 10, 15, 16 and 21, T5N, R5E, BHM, Meade County, South Dakota. Well 1 is located on Lot 1 within the NE1/4, SE1/4 of Section 16.

1.2 Environmental Resources Present

An environmental report (ER) has been written for the proposed project and should be reviewed for detailed environmental references. The ER did not discover any major environmental issues associated with the proposed project. Mitigation measures for potential environmental related issues have been provided in the ER.

1.3 Growth Areas and Population Trends

The City of Sturgis has shown a slight decline in population over the past 10 years. The 2000 US Census was reviewed as a part of the ER and should be reviewed for further details. Based on the US Census Bureau, both Meade County and Sturgis have slightly declined in population since 2000. However, despite the decline in the local population of Sturgis, the surrounding areas including the Black Hills and northern foothills continue to show signs of growth and expansion. In order to maintain itself as a desirable destination for incoming residents and businesses, the City of Sturgis needs to ensure that it can meet the needs of its existing population base now, so that it can provide for expansion later. Annexation of areas surrounding and adjacent to the City of Sturgis is possible. Expansion of City water system infrastructure requires that the existing water system be improved to support existing and future demands.

February 05, 2010 2:29:06 p.m.
Drawing: FIGURE 1 PROPOSED ANNEXATION AREAS.DWG (FOX) (\\MAIN-DATA\\CETEC\\PROJECTS & PROPOSALS\\09161.00 2009 STURGIS WATER SYSTEM INVESTIGATION\\DRAWINGS\\STURGIS FIGURES\\ANNEXATION FIGURES\\)

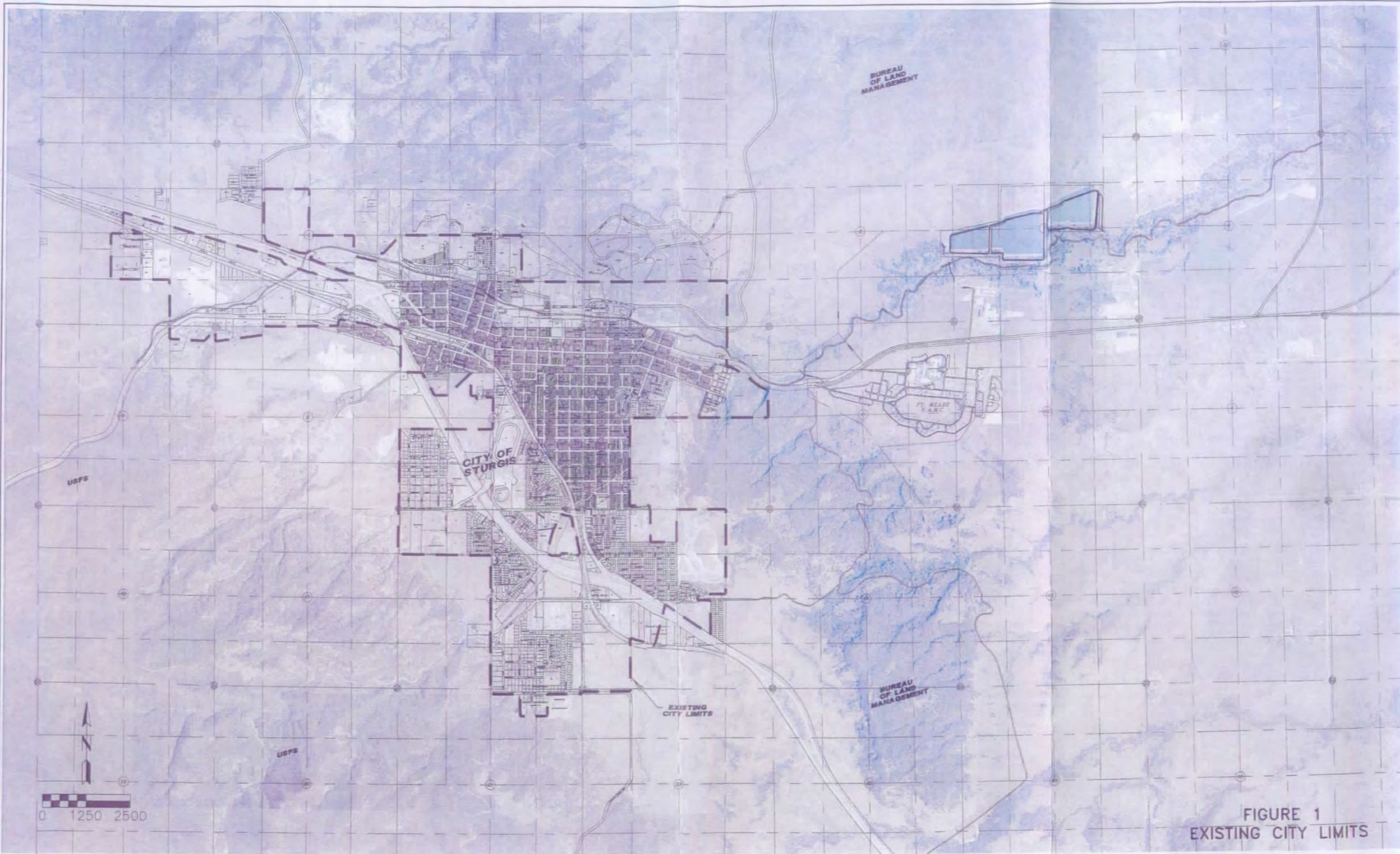


FIGURE 1
EXISTING CITY LIMITS

cetec
ENGINEERING SERVICES, INC.

1560 Concourse Drive
Rapid City, SD 57702
Phone: (605) 341-7800
Fax: (605) 341-7864
www.cetecengineering.com

2. Existing Facilities

The City of Sturgis is a community with aging infrastructure. Many of the existing wells and distribution components have reached the end of their useful life and are in need of complete replacement or major rehabilitation. There are also safety concerns associated with existing maintenance methods that can be resolved with system replacements. A complete analysis of the entire water system was completed by CETEC Engineering in 2009. A summary of the analysis as it pertains to Well 1 is provided below.

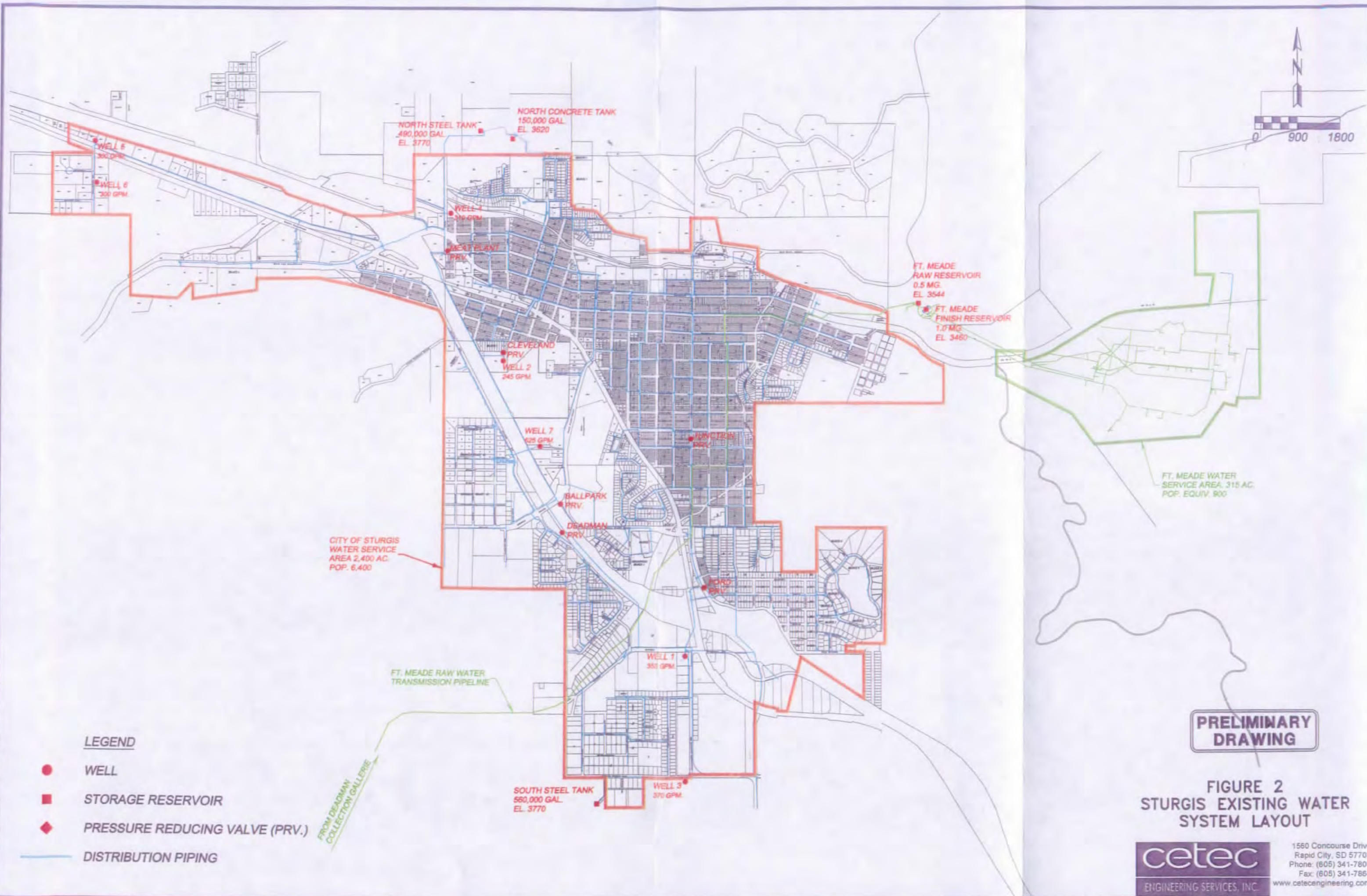
2.1 Existing Facilities and Current Conditions

2.1.1 Water System

A. Overview of Existing system

Figure 2 shows the existing City water system major components. The municipal water system provides potable water to approximately 2,869 residential and 365 commercial services. Almost all users are within the City limits, but there are a few services to residential and commercial properties outside the City. The supply source is groundwater from the Madison limestone and Minnelusa sandstone aquifers at depths of 500 feet to 1,500 feet below the surface. Seven wells with submersible pumps deliver water directly to the distribution system. Water storage is provided by three ground-level tanks at elevations which pressurize the distribution system. The distribution system is a network of 4-inch to 12-inch diameter cast iron, ductile iron and PVC mains. Six pressure-regulating (PRV) stations are located within the system to reduce system pressure to acceptable levels in the lower elevations of the City.

The following observations and inventory was recorded during the water system site visit and operator interviews.



WELLS

1. Well 1 (1948)



- City Shop Well – 350 gpm (Summer operation only) / Permitted for 400 gpm into the Madison Well (1,100' depth)
- Liner placed across portion of open hole. Pump setting in liner
- Building condition very poor
- Air problem encountered. Air bubble complaints from customers.
- No pitless adapter
- Hach turbidimeter to shut down well upon high solids
- Last well operated, worst condition
- Proposed Upgrades / Repairs, etc.
 - Possible new well location at the Shop site to replace this well
 - Automatic flush valve
 - Possible downsizing of pump to reduce cavitation
 - Pitless adapter
 - Repair / replace entire structure
 - Move fluoride pump from Mechanical Room to separate Chemical Room
- Additional Notes: Well is 61 years old. Significant improvements needed, but well casing condition does not justify the cost of upgrades.

B. Water Quality

The Madison and Minnelusa aquifers are widely used for domestic water supply in foothill areas at the eastern edge of the Black Hills. The water quality is generally very good, and requires no treatment other than chlorine disinfection and fluoridation as required by State drinking water standards. The Minnelusa and Madison formation wells can produce fine particles from the rock formation at start-up or high pumping rates. Flushing cycles and limited pumping rates are included in system controls to minimize these problems and reliably produce clean water. The water quality in Sturgis is in compliance with all physical and chemical parameters regulated by the Federal Safe Drinking Water Act and South Dakota Drinking Water Standards.

C. Supply Sources

Figure 2 shows the locations of the seven existing City wells. The numbering sequence indicates the sequence in which the wells were constructed and placed into service. Well 1 dates from the 1948 and Well 7 was constructed in 2003-

2004. The current pumping rates, age, conditions, and recommendations are shown below.

<u>Well Condition Summary</u>				
<u>Well No.</u>	<u>Typical Pumping Rate</u>	<u>Current Well Age</u>	<u>Water Quality Issues</u>	<u>Recommendations</u>
1	350 gpm	61 years	Yes	Replace
2	245 gpm	59 years	Yes	Replace
3	370 gpm	42 years	No	Upgrade / Replace
4	310 gpm	27 years	Yes	Sand Upgrades
5	300 gpm	22 years	No	Minor Upgrades
6	300 gpm	7 years	No	Minor Upgrades
7	625 gpm	6 years	No	Add booster pump and minor upgrades
	2,500 gpm	Average: 32 years		

The typical well casing and well house infrastructure has a life expectancy of 50 to 60 years for well of this type. Well 1 has had a partial casing liner installed and currently experiences air cavitation problems. The planning life expectancy for the City of Sturgis is set at 60 years. Wells 1 through 4 do not have pitless adapters for pump maintenance. This causes extreme difficulty and additional costs for pump work. The well houses are similar arrangements for Wells 1 through 4, and improvements are recommended.

Well maintenance costs and records were reviewed for the past nine years to review the number of well service calls and costs. The City contracted with Weston Engineering to perform repairs and maintenance on the existing wells within the Sturgis Water System. The City Water Department spent approximately \$363,000 over 61 invoices to make repairs. Typical service visits appear to be in the range of three to nine times per year. The costs were not necessarily for new improvements, but for repairs to keep the wells operational. It is not unusual for the City of Sturgis to have one or two wells out of service at any one time throughout a calendar year.

The problem for the Sturgis Water System lies in the months of July and August when demand is highest and wells are required to keep up with peak-day demand. Based on the age and condition of Wells 1, 2, 3, and 4 and the heavy reliance on Well 7, it is recommended that the City provide an adequate safety factor on well supplies for the system. The system records show that from 2002 through 2008, the water system typically produced between 300 MG/year and 378 MG/year. The approximate water loss currently ranges from 12 percent to 18 percent, which falls within the typical 10-to-15 percent range for a system of this type and size. The climate conditions and water loss leaks are unexpected events and the City should plan for such events by providing an adequate safety factor for the system.

The City water demand and available water supply is reviewed in the following tables. The Supply Situations below identify different scenarios for existing and future possible conditions. The rate of new well construction will be dependent on the operational ability of existing wells and the rate of system expansion to serve additional water customers. Wells 1-4 are older wells with operating issues

and water quality problems. The ability of the wells to provide adequate supply must be evaluated on an annual basis or more frequently. The operating time shown ranges from 12 to 24 hours and will be dependent upon actual available supply and required water demand. The average day conditions are typically found from November to April with peak month and peak day conditions found in August each year. The summer months of June, July, August and September require the highest demand and the peak day is typically in August during extreme heat and high rally attendance.

Although continuous pumping is not recommended long term, the theoretical current maximum daily water production rate, with 24 hours of continuous pumping, is as follows:

Maximum Daily Water Production

$$2,500 \text{ gpm} \times 24 \text{ hours/day} \times 60 \text{ min./hr.} = 3,600,000 \text{ gal./day}$$

The tables below show the expected water production under a variety of well combinations that could be used throughout the year to meet average day to peak day conditions during present conditions.

a. Total City Water Demands

	<u>Existing City Demand</u>	<u>Existing w/ Existing Annex</u>	<u>Ultimate w/Future Annex.</u>
Average Day	1.0	1.1	1.87 MGD
Peak Month	2.2	2.5	4.2 MGD
Peak Day	2.75	3.42	6.17 MGD

b. Supply Situation 1: All existing wells running. Assumes existing wells are operational.

<u>Well No.</u>	<u>(gpm) Pumping Rate</u>	<u>(gallons) 24 hr. Production</u>	<u>(gallons) 20 hr. Production</u>	<u>(gallons) 16 hr. Production</u>	<u>(gallons) 12 hr. Production</u>
1	350	504,000	420,000	336,000	252,000
2	245	352,800	294,000	235,200	176,400
3	370	532,800	444,000	355,200	266,400
4	310	446,400	372,000	297,600	223,200
5	300	432,000	360,000	288,000	216,000
6	300	432,000	360,000	288,000	216,000
7	<u>625</u>	<u>900,000</u>	<u>750,000</u>	<u>600,000</u>	<u>450,000</u>
	2500	3,600,000	3,000,000	2,400,000	1,800,000

c. Supply Situation 2: Wells 5, 6 and 7 running. Wells 1, 2, 3 and 4 Off.

<u>Well No.</u>	<u>Pumping Rate</u>	<u>24 hr. Production</u>	<u>20 hr. Production</u>	<u>16 hr. Production</u>	<u>12 hr. Production</u>
5	300	432,000	360,000	288,000	216,000
6	300	432,000	360,000	288,000	216,000
7	<u>625</u>	<u>900,000</u>	<u>750,000</u>	<u>600,000</u>	<u>450,000</u>
	1225	1,764,000	1,470,000	1,176,000	882,000

3. Need for Project

The primary need for the proposed Well 1 project is the deterioration of the existing well casing. Other factors include the need for additional and reliable supply.

3.1 System Capacity

The existing system capacity is dependent on the capabilities of the wells and the amount of storage available. The adequacy of the system's capacity depends on the water system demands. Additionally, older, undersized water mains are not adequate for providing the needed system demand.

3.1.1 Water Demand

Water demand in residential and commercial areas is affected by several factors including climate, population density, geography, etc. More water is used in warm, dry climates than in humid climates for bathing, lawn watering, air conditioning, etc. Water use is also influenced by the economic status of customers, and the per-capita use of water is much lower in poor areas than in wealthy areas.

Water demands vary with the type of development and demand is not a constant rate per square mile or acre. Residential water demands are not a constant rate per capita. They vary with the type of house and the houses with large lawns typically use more water on a per-capita basis than multi-family dwellings.

Water consumption changes with the seasons, the days of the week, and hours of the day, and fluctuations are greater in small systems than in large communities. Variations in water consumption are normally expressed as ratios to the average day demand and these ratios are called peaking factors or coefficients. There are three historical water demand rates involved in water supply design. These water demand factors are:

- Average Daily Demand: the average of the total amount of water used each day during a one-year period.
- Peak Daily Demand: the maximum total amount of water used during any 24-hour period in a three-year period.
- Peak Hourly Demand: the maximum amount of water used in any single hour, of any day, in a three-year period.

Water supply design is normally based on peak day demands plus fire flow requirements. At a minimum, the source of supply should be capable of meeting the peak-day system demand and storage should not be relied upon for shortfalls in supply. The AWWA recommends supply safety factors between 1.25 and 2.0 for peak day. Demand near peak day may occur over several consecutive days and this must be considered by the system planner/designer. It is common for systems to provide a source of supply that meets peak day demands with additional supply for peak hour demand coming from storage. Consideration must also be given to water demand during emergencies or when ground water wells are out of service. In most cases, water supply is designed to meet peak-day demands with one of its larger wells out of service.

Water System Supply

Water use records for the period 2003-2005 were compiled and are presented in Figure 3. The water production indicated in the graph is the sum of all well sources. The well flow meter outputs are recorded daily, thus the annual peak-day use rates shown are actual measured flows. The water production records from 2007 and 2008 were reviewed and peak day and peak month usage was lower than 2006 due to high precipitation and lower temperatures. The water data from 2006 will be utilized as the peak day scenario for the system.

Calculated water use demands based upon the 3-year average from 2003-2005 are presented following in the table. Partial data from 2006 is also included in the table.

Sturgis Water Demand Patterns (2003-2006)

Average Day Use (Annual)	981,557 gpd
Peak Month (7/06)	2,198,000 gpd
Peak Day *(07-19-06)	2,753,000 gpd
Average Day per Capita**	153 gpcd
Ratio of Peak Day to Average Day	2.80
Ratio of Peak Month to Average Day	2.24

* Historical peak day is based upon well production records.

** Per Capita Demand includes commercial and Rally uses.

The ratio of maximum water production capacity to peak-day usage is as follows:

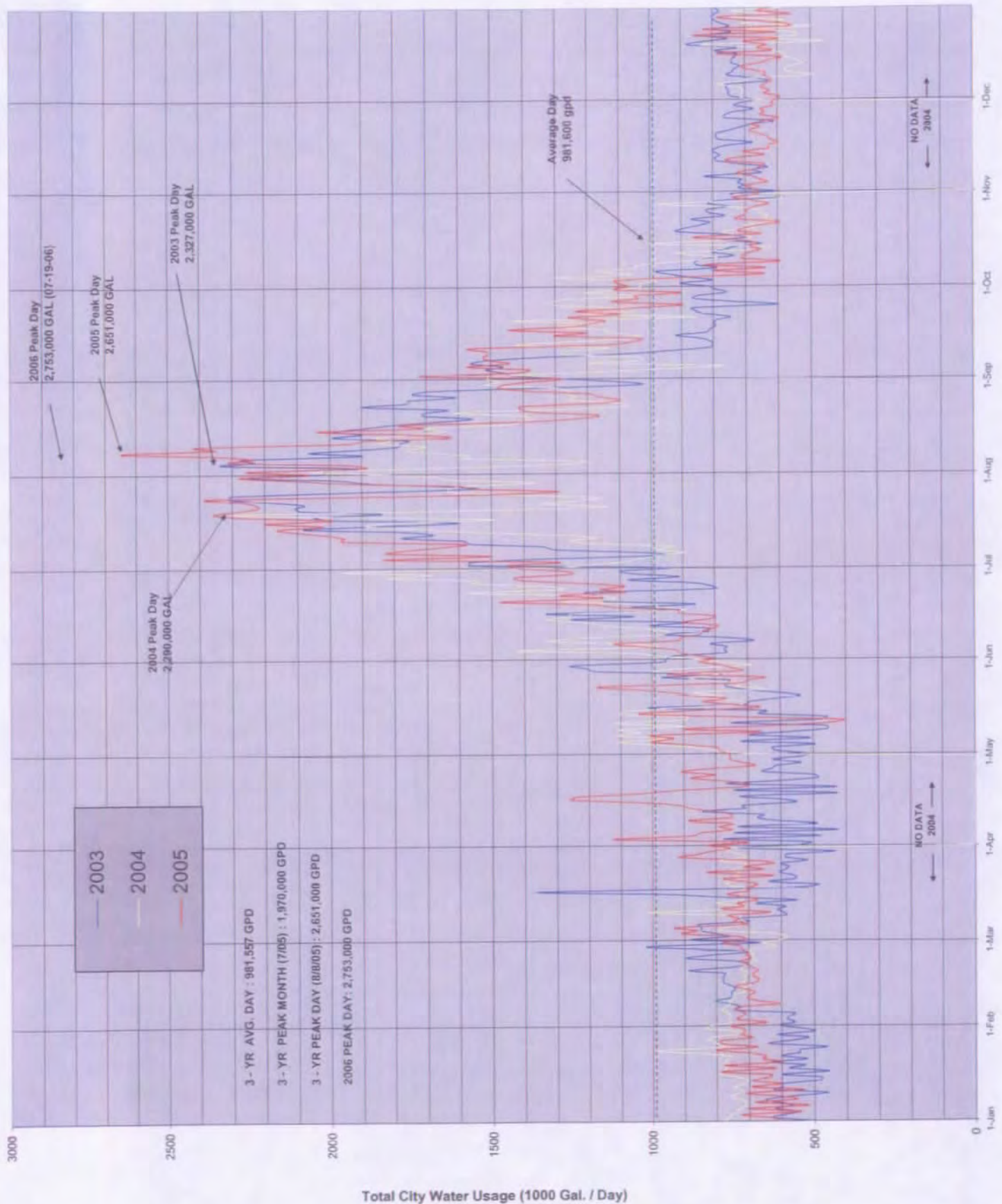


Figure 3 City of Sturgis Water Usage

Production Safety Factor (All Wells "On")

$$\frac{\text{Maximum Production}}{\text{Peak Day Use}} = \frac{3.6 \text{ MGD}}{2.753 \text{ MGD}} = 1.31$$

Water production capacity must be equal to or greater than peak-day demand to avoid depleting fire reserves and emergency storage. American Water Works Association (AWWA) references recommend that public systems have the capacity to meet peak-day demand with one principal source of supply out of service. The average Sturgis well produces about 350 gpm, or approximately 500,000 gpd. The safety factor with one average well out of service is as follows:

Production Safety Factor (One Average Well Off)

$$\frac{\text{Maximum Production (less 350 gpm)}}{\text{Peak Day Use}} = \frac{3.1 \text{ MGD}}{2.753 \text{ MGD}} = 1.12$$

If the largest City source (Well 7 at 625 gpm) is off line, the safety factor is as follows:

Production Safety Factor (Well 7 Off)

$$\frac{\text{Maximum Production}}{\text{Peak Day Use}} = \frac{2.70 \text{ MGD}}{2.753 \text{ MGD}} = 0.98$$

The City water supply is adequate for peak-day needs with all production sources in service. A failure of two supply sources during a peak-use period could result in depletion of emergency reserves and potentially loss of service to some customers.

3.2 Growth

Growth within the City of Sturgis has not been a factor in the need for additional water supply over the past several years. The population has decreased slightly from 2000, according to projections by the US Census Bureau.

Despite the recent decline in population within the City of Sturgis, several opportunities exist that could require the City of Sturgis water system to grow and expand. Possible annexation of several areas surrounding the City could promote residential and commercial growth. Additionally, service to Fort Meade could become a need for system growth.

In order to prepare for these opportunities, the City of Sturgis needs to ensure that its water system is capable of servicing its current population with the system currently in place. This will provide greater flexibility in the future for expanding service to a greater population base.

4. Alternatives Considered

Alternatives were considered for all recommend projects. These alternatives as they pertain to Well 1 are discussed below.

4.1 Well Repairs / Replacement

The average age of the seven wells in Sturgis is 32 years. Due to the extreme importance of all supply sources within Sturgis, especially during peak demand months, several alternatives that would increase supply or protect and improve current situations were reviewed and are as follow:

Summary of Needs

Well 1 is the oldest well in Sturgis at 61 years. The quality of the well casing has diminished to the point that repair would be costly, if not infeasible. Well 1 has high turbidity and solids in the water. Also, air cavitation bubbles cause customer complaints and the well house is in need of repair. Overall, Well 1 has met its useful life.

A positive attribute of Well 1 is the location. Well 1 is located on the same property as the City Water Department shop. The site is large enough for drilling a new well and constructing a new well house. Well 1 also has the third highest production rate of all the City wells.

Well 2 is the second oldest well at 59 years. This well is capable of producing as much as 350 gpm, which would be the third highest volume of the City wells, but the water becomes red above 245 gpm. The Well 2 site is also problematic due to power lines, steep access terrain and no pitless adapter. Well pump removal must occur through the roof which requires the lowering of nearby power lines. The existing site is large enough for a new well but access may remain an issue due to existing grades.

Well 3 is also an old well, but water production is still good. The well house is also in poor condition. Well 3 produces 370 gpm, making it the second highest producer of the City wells. Additionally, this well has adequate space for expansion and is located in a good area for servicing the south portion of the City. Well 3 is located near the south steel tank, which provides good hydraulic conditions.

Wells 4, 5 and 6 are similar wells. Each provides reliable production. The structures protecting the well piping are in need of minor repairs to add insulation, repair leaks in the roof, and to move fluoride pumps from the mechanical room to the chemical room. Well 4 and 5 are in need of automatic flush valves that will properly flush well water prior to supplying the distribution line. Well 4 has a sand separator that is nearly 30 years old and is in need of replacement, and Well 4 also needs a pitless adapter for allowing direct access to the well during maintenance or repairs.

Well 7 is the newest well in the Sturgis system. The well and well house are in good condition. Well 7 is capable of producing 550 to 625 gpm under current conditions. Based on well reports, this well is capable of producing as much as 1,100 gpm. It is possible to increase production with the addition of a booster pump.

Well 7 is in need of minor repairs including moving the fluoride pump from the mechanical room to the fluoride chemical room and replacing the existing meter, which is no longer functioning properly.

Alternatives Considered

Goals for improvements to supply capacity were developed based on maximizing production, securing supply reliability and limiting construction costs.

Wells 1 and 2 have reached the end of their useful lives. Both wells are needed to meet peak-day demands, so the supply provided by these wells must be maintained or replaced. Well 1 is capable of producing a high volume of water and is at a good location. Well 2 produces low-quality water at high production rates, and access to the location is difficult.

Well 1

One alternative for improving the situation at Well 1 involves repairing the existing structure and using Well 1 until the casing fails. This alternative does not secure system supply reliability and creates a situation where the eventual replacement of the well is not addressed.

A second alternative would be to drill a new well at Site 1, but continue to use the existing well house and piping. This alternative improves system supply, but does not protect the piping and chemical feed components that are needed for supplying quality water.

A third alternative would include drilling a new well at another location. This alternative would secure supply, but the volume is unknown. Additionally, the water distribution system infrastructure may not be in place at a new location, which would require new water main construction.

A final alternative involves drilling a new well at the same location and constructing a new well house structure to protect the system piping. This alternative provides direct connection to the existing distribution system, utilizes a known aquifer with a known production rate and improves system supply reliability.

The existing site is also large enough for adding a generator that will provide a second well with power during electrical outages. Currently, only one of the City Wells (Well 7) has a backup power supply. The central location of Well 1 provides the ability to easily access the well during power outages.

Making no improvements at Well 1 will not improve the City's supply reliability or address the failing well and well house.

5. Selection of an Alternative

The alternatives provided in the previous section were reviewed based on cost, site issues, land availability, project need and other factors. Results of this review are summarized within this section.

5.1 Well Repairs / Replacements

Well Repairs / Replacements Alternatives Comparison

Well	Description	Advantages	Disadvantages
1	Replace well house only	Protects piping and chemical feed equipment.	- Does not address supply reliability needs. - Does not address issues with well casing.
	Replace well and well house at current site	- Provides reliable water source. - Uses developed site and infrastructure. - Protects chemical feed and internal piping.	Cost
	Replace well and well house at new site	- Provides reliable water source. - Protects chemical feed and internal piping.	- Most costly. - Land must be found. - New distribution infrastructure.
	Replace well only on existing site	- Reliable water source. - Uses existing developed site.	Does not provide protection to deteriorating mechanical piping.
	No Action	No cost	- Does not address aging well and piping. - Does not provide system supply reliability. - Does not address water quality issues.

6. Proposed Project – Recommended Alternative

Based on the alternatives considered, recommendations for the most necessary and appropriate projects were determined. Complete replacement of Well 1 was one of the recommendations. A description of the recommended Well 1 project is provided below.

6.1 Project Design

6.1.1 Water Supply Projects

The City water system is in need of additional supply in order to meet peak-day demand requirements with an adequate safety factor when one or two sources are out of service. The existing supply sources are aging, and some of the sources have reached the point where they are no longer reliable, specifically, Wells 1 and 2. Well 1 is over 60 years old. The casing can no longer be repaired and the well house is in very poor condition. The site is large and currently used for the Water Department shop. There is adequate area for drilling a new well and replacing the existing well house. Existing distribution infrastructure is in good condition. It is recommended that a new well and well house be constructed at this location to provide an additional reliable source for the City water system.

7. Conclusions and Recommendations

The City of Sturgis water system is in need of rehabilitation. The existing well age averages 31 years. The pressure-reducing valves are 40 years old and the SCADA control software is 12 years old. Upgrades, including general system repairs and complete system replacements, are recommended. Several alternatives were reviewed and have been presented. The recommended alternative for replacement of Well 1 is provided below.

7.1 System Supply Recommendations

Engineering analysis of the water system supply indicated that in the event that two wells are out of service, the City system would be unable to safely meet peak demands.

Well 1 is in need of complete replacement. Well 1 is located in an ideal location for drilling a new well. Based on the information available, it is recommended that Well 1 be completely replaced. No work is recommended at Well 2. Replacement of Well 1 will provide adequate volume of additional supply to reliably meet peak demands and is the most economical means for doing so. Additional improvements at Well 1 shall include a new well house, mechanical piping and generator.

The proposed project will benefit the existing City system by providing reliable supply, accessibility for maintenance and enhanced capabilities for monitoring and quickly responding to supply-related problems.

Schlaak, Karen

From: Gronlund, Eric
Sent: Monday, March 01, 2010 2:23 PM
To: Schlaak, Karen
Subject: FW: Sturgis Well 1

We will be getting in an application from the city of Sturgis. It is to transfer the diversion authority under 441A-1 and appropriate an additional 400 gpm (645 ac-ft). The consultant knows they need a map and the fee.

-----Original Message-----

From: Brian Tideman [mailto:BrianT@cetecengineering.com]
Sent: Friday, February 26, 2010 5:30 PM
To: Gronlund, Eric
Subject: RE: Sturgis Well 1

Eric, thank you for all of the help. I finally got around to finishing Form 2 and have attached a draft for your review. Could you take a look at it and let me know what I need to change. I was a little confused on how to handle the transfer and new appropriation on the same application.

Thanks,

Brian Tideman, P.E.
CETEC Engineering Services, Inc.
605-341-7800 Phone

From: Eric.Gronlund@state.sd.us [mailto:Eric.Gronlund@state.sd.us]
Sent: Wednesday, February 17, 2010 10:55 AM
To: Brian Tideman
Subject: RE: Sturgis Well 1

Brian - Both of these wells are coded on WR database as being completed into the Madison Formation and that is what I based my previous analysis on. I took some additional time to look at the history on each of these wells and found out some things that may complicate matters. In fact, Ken Buhler who is an expert on ground water resources in the hills (Madison, Minnelusa Formations) looked at the well construction for each well. First, here's what we found and then included is a discussion how permitting should proceed.

Well No. 1 has a total depth of 1100 feet. The Minnelusa is encountered at 425 feet and the Madison at 925 feet. Our understanding is that casings is set to 600 feet so it appears the well encounters both aquifers. Mr. Buhler opinion without benefit of a water quality analysis is that the Minnelusa is the primary source. However, given the construction of the well, Water Rights does not dispute that Madison water may be a component.

Well No. 2 originally was a Minnelusa well that was deepened to the Madison at a depth of 1073 feet. At this location the top of the Minnelusa is 585 feet and the top of the Madison is 1035 feet. So the deepening effort just went 38 feet into the Madison. It is our understanding that this well has had continuing problems with the bottom of the hole filling in. This well is receiving its water from the Minnelusa Formation.

So the question comes down to the water source for the proposed well.

Well No. 1 (WR 441A-1)

Currently, there is uncertainty regarding the dual source of Well No. 1. However, Water Rights will likely concede to calling it a Madison well if that is the intended source for the city's new well. Under that scenario, the city may apply to transfer the 400 gpm from Well No. 1 and appropriate an additional 600

03/17/2010

gpm. This may all be done on one application. There is one catch and hopefully I explain it in an understandable manner. DENR now quantifies new applications on a volume basis as well as a diversion rate. In the old days they were just assigned a maximum/peak diversion rate which is converted directly to a volume on a 100% basis (ie. 400 gpm equates to 645 acre feet annually). Even though it is unrealistic that any community continuously diverts but that what we are required to do. This new application will need to include under Item No. 2 - the additional diversion rate (600 gpm) and on the right side an annual acre feet of water intended to be diverted. If the annual volume will not exceed 645 ac-ft of water then this application is for additional diversion authority without additional volume. If the annual volume will exceed 645 ac-ft of water then the application should reflect the incremental increase above 645 ac-ft.

Well No. 2 (WR 441B-1)

It is Water Rights position that this is a Minnelusa well. Therefore the city can not transfer its diversion authority to the proposed new well (assuming that the new well is completed into the Madison Formation).

Finally, I think a cover letter accompanying the application may be in order to explain that 400 gpm authorized under 441A-1 is being transferred and an additional 600 gpm of diversion authority is being requested.

The application will also need proposed well construction, map showing new well location referencing a section corner and signed by a PE and the appropriate filing fee.

Brian - please feel free to contact me if we need to talk this through.

Eric Gronlund
Water Rights Program, DENR
605 773-3352
eric.gronlund@state.sd.us

-----Original Message-----

From: Brian Tideman [mailto:BrianT@cetecengineering.com]
Sent: Thursday, February 11, 2010 11:16 AM
To: Gronlund, Eric
Subject: RE: Sturgis Well 1

Sorry for all the questions. I spoke with Ted this morning and ran these options by him. He feels that we should apply for 1,000 gpm at Well 1, so we will need to submit a completely new Water Rights application. We do plan to transfer the existing 400 gpm at Well 1 to the new well. Is there anything special that I need to address in the application to do this?

Thanks again,

Brian Tideman, P.E.
CETEC Engineering Services, Inc.
605-341-7800 Phone

From: Eric.Gronlund@state.sd.us [mailto:Eric.Gronlund@state.sd.us]
Sent: Thursday, February 11, 2010 9:47 AM
To: Brian Tideman
Subject: RE: Sturgis Well 1

Brian -

Question No. 1 - use the Application for a Water Right Permit for Nonirrigation uses since this is basically a technical amendment to the vested right. Ultimately if approved the priority date established by No. 441A-1 will be retained.

Question No. 2 - it is likely the same procedure under SDCL 46-5-13.1 can be used to change the well

location for Well No. 2 to this new well. This is assuming that the old No. 2 is abandoned and will not longer be in use. I also assume that this decision will not be made until the new well No. 1 is drilled and you find out what kind of production you get.

Eric

-----Original Message-----

From: Brian Tideman [mailto:BrianT@cetecengineering.com]

Sent: Thursday, February 11, 2010 9:19 AM

To: Gronlund, Eric

Subject: RE: Sturgis Well 1

Eric,

Thank you for your help. 441A-1 is the correct Water Right. 441B-1 is for the existing Well 2 also located within the City system.

Just for my information, could you answer the following questions?

1. If we decide to submit an application that reflects that we are simply drilling a new well on the same site and that flow and aquifer will not change, do I submit the Application for a Vested Water Right Permit for Nonirrigation Uses, or do I submit the Application for a Water Right Permit for Nonirrigation uses? The existing water right is vested so does the new water right need to be vested.
2. Well 2 covered by Water Right 441B-1 is in poor shape as well but replacing it was not planned at this time. Assuming that the new well at Well 1 could produce as much as 600 gpm, is it possible to divert the total flow of 0.89 cfs covered by the Well 1 Water Right and the 0.51 cfs covered by the Well 2 Water Right all to the new Well 1 Water Right? I'm just asking at this point for my own information.

Thanks again for your help.

Brian Tideman, P.E.

CETEC Engineering Services, Inc.

605-341-7800 Phone

From: Eric.Gronlund@state.sd.us [mailto:Eric.Gronlund@state.sd.us]

Sent: Tuesday, February 09, 2010 1:13 PM

To: Brian Tideman

Subject: RE: Sturgis Well 1

Brian - I am not exactly sure what water right is associated with the city's designation as Well No. 1. I am assuming it is Water Right No. 441A-1 (pdf file attached). This is somewhat of a "different duck" in that the original 441-1 had one well that qualified for vested status while the other well did not. Therefore the water right was split into an A & B number.

SD codified law 46-5-13.1 (see below) allows for a change of diversion point without public notice if it is from the same water source, no additional water is appropriated and the Chief Engineer can make a finding that the change does not increase the potential for interference with existing diversions. DENR interprets this to be "adverse" interference. The general procedure is to file a standard application form, include a map showing the location of the new well, and provide proposed well construction. The application should reflect that the request for the change is being made pursuant to SDCL 46-5-13.1. No fee need be submitted with this request at the time of filing.

Upon receiving a request for a change of diversion point, DENR reviews it for the purpose of determining whether the change has the potential to interfere with existing diversions. If that finding can be made, the Chief Engineer issue written authorization for the change. If he can not make that finding, we contact the water right holder to instruct them of the need to process the request through

the more formal water permitting process including public notice and to request an application filing fee. In addition, the Chief Engineer has discretion to require the more formal application process if he feel there are public interest or policy considerations or past controversy in the area.

If the request is for more than the 0.89 cfs authorized by No. 441A-1 (assuming this is water right for the well in question) or not into the Madison Aquifer, then a new water right application will need to be filed. So under Item No. 2 on the application, the answer to the amount of water claimed needs to be "no additional" and the proposed well information should reflect a depth associated with the Madison or a new permit will be necessary.

Generally, upon receiving a request DENR processes it in about 2 weeks. If the decision is that the more formal process must be followed you'd be looking at about three months assuming no on petitions during the public notice process.

I hope this information is helpful. Please let me know if you have questions.

Eric Gronlund
Water Rights Program, DENR
605 773-3352
eric.gronlund@state.sd.us

46-5-13.1. Change of location of diversion point. The location of a point of diversion may be changed or additional points of diversion may be approved if the new or additional point of diversion is from the same source of water, no additional water is appropriated, and, if the water use is for irrigation, no new land is to be irrigated. The change in location of diversion points may be allowed without application or publication pursuant to § 46-2A-4, if the chief engineer is contacted and makes a finding that the change does not increase the potential for interference with existing diversions.

-----Original Message-----

From: Brian Tideman [mailto:BrianT@cetecengineering.com]
Sent: Tuesday, February 09, 2010 12:37 PM
To: Gronlund, Eric
Subject: FW: Sturgis Well 1

Eric,

Per my previous email to Ken, I am working with the City of Sturgis on a project that would provide a new well on the same property as the existing well #1. What steps do I need to take to transfer the water rights to the new well? What is the timing of doing this and do you have any additional information that I should know or be looking into?

Thanks,

Brian Tideman, P.E.
CETEC Engineering Services, Inc.
605-341-7800 Phone

From: Ken.Buhler@state.sd.us [mailto:Ken.Buhler@state.sd.us]
Sent: Tuesday, February 02, 2010 7:58 AM
To: Brian Tideman
Cc: Eric.Gronlund@state.sd.us
Subject: RE: Sturgis Well 1

Brian:

Either of us can help you out, but this is probably more in line with Eric's expertise.

Let me know if you need anything.

Ken Buhler
Natural Resources Engineering Specialist
SD DENR-Water Rights Program
(605)773-3352

-----Original Message-----

From: Brian Tideman [mailto:BrianT@cetecengineering.com]

Sent: Monday, February 01, 2010 6:01 PM

To: Buhler, Ken

Subject: Sturgis Well 1

Ken,

We are working for the City of Sturgis on a project that would abandon their current Well No. 1 and drill a new well 1 on the same property. Do I need to be in contact with you regarding the transfer of water rights or is that Eric Gronlund?

Thanks,

Brian Tideman, P.E.
CETEC Engineering Services, Inc.
1560 Concourse Drive
Rapid City, SD 57703
605-341-7800 Phone
605-341-7864 Fax
Website: www.cetecengineering.com

Gronlund, Eric

From: Brian Tideman [BrianT@cetecengineering.com]
Sent: Friday, March 19, 2010 11:05 AM
To: Gronlund, Eric
Subject: RE: city of Sturgis application

Sorry, I will get the signed drawing mailed ASAP.

We would like to maintain Well 1 as a monitoring well if possible. Is that feasible?

Thanks,

Brian Tideman, P.E.
CETEC Engineering Services, Inc.
605-341-7800 Phone

From: Eric.Gronlund@state.sd.us [mailto:Eric.Gronlund@state.sd.us]
Sent: Thursday, March 18, 2010 1:58 PM
To: Brian Tideman
Subject: city of Sturgis application

Brian - Water Rights received the Sturgis application to transfer diversion authority under No. 441A-1 and appropriate additional water.

The map accompanying the application shows the location of the wells. The map has Ted's seal affixed but is not actually signed. There is a requirement that the map be signed. Please have Ted sign the map where his seal is affixed and send to me. I contacted you instead of the city thinking this would expedite getting the application complete.

Finally, I may have missed it in the engineering report - will the existing well No. 1 be abandoned and plugged or maintained for standby/emergency purposes.

Eric Gronlund
Water Rights Program, DENR
523 E. Capitol Avenue
Pierre SD 57501
Phone: (605) 773-3352
Fax: (605) 773-4068
Email: eric.gronlund@state.sd.us
Web: www.denr.sd.gov



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
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**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 1911-1, Sturgis Water Company**

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. 1911-1, Sturgis Water Company, c/o Eric Tibbetts, 1040 2nd Street, Suite 102, Sturgis SD 57785.

The Chief Engineer is recommending APPROVAL of Application No. 1911-1 for a 20 year term pursuant to SDCL 46-1-14 and 46-2A-20 based on the term established under Water Permit No. 1789-1 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 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) it is in the public interest with the following qualifications:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 1911-1 is issued for a twenty year term. Pursuant to SDCL 46-2A-21, the twenty year term may be deleted at any time during the twenty year period or following its expiration. If the twenty 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. 1910-1 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. Water Right No. 441A-1 and Water Permit No. 1911-1 authorizes a total combined annual diversion of 773 acre feet of water.
4. The Sturgis Water Company shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer as authorized by Water Right No. 441A-1 and Water Permit No. 1911-1.

See report on application for additional information.

Garland Erbele, Chief Engineer
May 18, 2010

WATER PERMIT APPLICATION NO.1911-1
STURGIS WATER COMPANY
APRIL 26, 2010

Water Permit Application No. 1911-1 proposes to authorize the construction of a replacement for the well authorized by Water Right No. 441A-1 and appropriate an additional 645 acre-feet of water annually with a diversion rate of 0.89 cubic feet of water per second (cfs) from the proposed well. Water Right No. 441A-1 appropriates 0.89 cubic feet of water per second (645 acre-feet annually) from a well 1,010 feet deep that was completed in 1948 into the Madison aquifer. The well authorized by Water Right No. 441A-1 is located in the NE¼ SE¼ Section 15, T5N-R5E. This application proposes to complete a well into the Madison aquifer, approximately 1,023 feet deep, about 130 feet southwest of the existing well (still in NE¼ SE¼ Section 15, T5N-R5E). If this application is approved, the appropriation from this replacement well will total 1,290 acre-feet annually at a maximum diversion rate of 1.78 cfs. The water will be used for municipal purposes.

WATER RIGHT NO. 441A-1 WELL CONSTRUCTION

The well that this application proposes to replace was constructed in 1948. Based on the available information, the probable geology at the original well site is shown in table 1.

Interval (feet below land surface datum)	Formation
0-314	Spearfish Formation
314-353	Minnekahta Limestone
353-532	Opeche Shale
532-1,000?	Minnelusa Formation
1,000?-TD	Madison Limestone

Table 1. Probable geology at site of 1948 well

The well was originally cased to a depth of 532 feet below land surface datum (lsd) and was completed "open hole" from 532 feet below lsd to total depth. According to a rehabilitation report filed for the well, it "caved in at 700' from surface-shut off water (yield dropped off)" (Water Rights, 2010c) sometime prior to 1985. The well was rehabilitated in 1985 when a liner was placed in the well from 679 feet below lsd to 975 feet below lsd and an 8-inch diameter open hole was drilled to 1,023 feet below lsd. The liner was perforated from 732-884 and from 954-971 feet below lsd. Obviously, the well is open to produce from both the Minnelusa and Madison aquifers. However, assuming the yield declined because the productive portion of the well was filled in, it can be concluded that the well produced primarily from the lower Minnelusa Formation or the upper Madison Limestone. Since the lower Minnelusa Formation more closely fits hydrologically with the Madison aquifer than with the upper portion of the Minnelusa Formation (considered the Minnelusa aquifer), from a Water Rights' perspective, the source aquifer for Sturgis well No. 1 can be considered the Madison aquifer. The current SD Well Construction Standards prohibit new wells from producing water from more than one aquifer and the replacement well must be constructed to produce only from the Madison aquifer.

AQUIFER: Madison aquifer (MDSN)

GEOLOGY AND AQUIFER CHARACTERISTICS:

The Madison aquifer occurs within the Mississippian aged Madison Limestone which is locally known as the Pahasapa Limestone. The Madison Limestone is a massive limestone and dolomite with relatively low primary permeability and porosity. Extensive secondary porosity and permeability occur within the Madison in the form of fractures and solution openings. The upper portion of the Madison Limestone in particular is karstic with caves, solution collapse features and enlarged conduits. The average porosity of the Madison is estimated to be 11% and the effective porosity from which recoverable water can be obtained by wells is assumed to be 5% (Rahn, 1979). A number of high yield wells have been developed in the Madison aquifer where these enhanced porosity and permeability features are favorable. The Madison Limestone is estimated to be about 500 feet thick in this area (Carter and Redden, 1999a, and Carter and Redden, 1999b). 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 well this application proposes to use is located about one and one-quarter miles northeast of the Madison outcrop (Strobel and others, 2000). The lower portion of the Madison is typically tighter and together with the underlying Englewood Formation form a lower confining zone (Strobel and others, 1999). The Minnelusa Formation unconformably overlies the Madison aquifer and acts as an upper confining layer.

The potentiometric surface of the Madison aquifer is lower in the Sturgis area than the surrounding areas. It does not appear that the lower water levels represent a cone of depression from pumping since increased development has not been apparent on the water levels. The anomalously low water level is probably the result of geologic controls involving the Whitewood Anticline and a Tertiary aged intrusive south of Sturgis.

SDCL 46-2A-9

Pursuant to SDCL 46-2A-9, a permit to appropriate water may be issued only if there is reasonable probability that there is unappropriated water available for the applicant's proposed use, that the proposed diversion can be developed without unlawful impairment of existing rights and that the proposed use is a beneficial use and in the public interest.

WATER AVAILABILITY:

The probability of unappropriated water available for appropriation can be evaluated by considering SDCL 46-6-3.1 which requires that:

“No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source.”

Although this statute contains two exceptions which could apply to this application, namely exceptions for water distribution systems and for groundwater from formations older than or stratigraphically lower than the Greenhorn Formation; the principle of withdrawals not

exceeding recharge is a reasonable benchmark to define water availability and will be employed below.

Water Balance:

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).

The high cost of Madison wells, except very near the outcrop, and the availability of groundwater from shallower sources, has limited domestic development from the aquifer. Carter and others, (2001b) estimate “Self-supply Domestic” and “Livestock Watering” only account for approximately 2.25% of the water use from the Madison aquifer. In general, well withdrawals from the Madison are for uses which require water rights/permits. The majority of the water rights/permits from the aquifer are from Butte, Lawrence, Meade, Pennington and Fall River Counties. The Madison supplies water for irrigation, geothermal, industrial, and commercial use. However, by far the major use of the aquifer is for water distribution systems (suburban housing development and municipal use). The cities of Spearfish, Belle Fourche, Sturgis, Rapid City, Box Elder, and Edgemont all depend on water from wells completed into the Madison aquifer.

There are currently a total of 163 appropriations plus one deferred application from the Madison aquifer in South Dakota. These appropriations include: seven future use permits; 131 water rights/permits for non-irrigation uses; 25 water rights/permits for irrigation (Water Rights, 2010b) Withdrawals from wells completed into the Madison aquifer where estimated to average 12,309 acre-feet annually from 1987-1996 (Carter and others, 2001b). Well withdrawals from the Madison aquifer for 2008 are estimated to be less than 20,000 ac-ft/yr (Water Rights, 2008).

A simple water balance comparing the estimated average annual recharge and the potential withdrawal by existing wells and current appropriations shows that unappropriated water is available from the Madison aquifer to satisfy additional appropriations.

Localized Hydrologic Budget:

Carter and others (2001b) developed a hydrologic budget for the Madison and Minnelusa aquifers combined, for a subarea that includes the well site proposed by this application. The hydrologic budget for this subarea balanced from 1987-1996, by estimating that the outflow from the subarea was primarily through groundwater flowing out of the subarea with a much smaller amount leaving the subarea through well withdrawals (Carter and others, 2001b). Carter and others (2001b) assumed that no water leaves this subarea through artesian springflow. The estimated well withdrawal from the subarea from both the Madison and Minnelusa aquifers was estimated to average 3.7 cfs for 1987-1996. This fairly low

combined diversion rate further demonstrates that the Madison aquifer is relatively untapped in this area even on a fairly localized scale.

Obviously, if a new hydrologic budget is to balance for this subarea (i.e. a new condition of dynamic equilibrium), with an increase of well withdrawals, groundwater outflow must decrease, or more groundwater flow will have to come in from another area. Groundwater enters this subarea from the northwest and exits the area to the east (Carter and others, 2001b). It can be assumed that with a very subtle change in the hydraulic gradient at either the inflow zone or the outflow zone, a new dynamic equilibrium would be established in this area with virtually immeasurable impacts to the amount of water in storage.

Observation Well Data:

The Water Rights Program monitors 26 observation wells completed into the Madison aquifer in the Black Hills area (Water Rights, 2010a). This well site is located within about eight miles of four Water Rights' Observations Wells completed into the Madison aquifer. Observation Well MD-86A is located approximately 0.9 miles south-southeast of this site, Observation Well LA-90A is located approximately three miles northwest of this site, Observation Well LA-96D is located approximately 4.8 miles west-southwest of this well site, and MD-90A is located approximately eight miles southeast of this well site. The Madison is under unconfined conditions at LA-96D and under confined conditions at the other three wells cited. Hydrographs for the wells show the aquifer's response to climatic conditions and clearly demonstrate the system is recharged, (see figures 2-5).

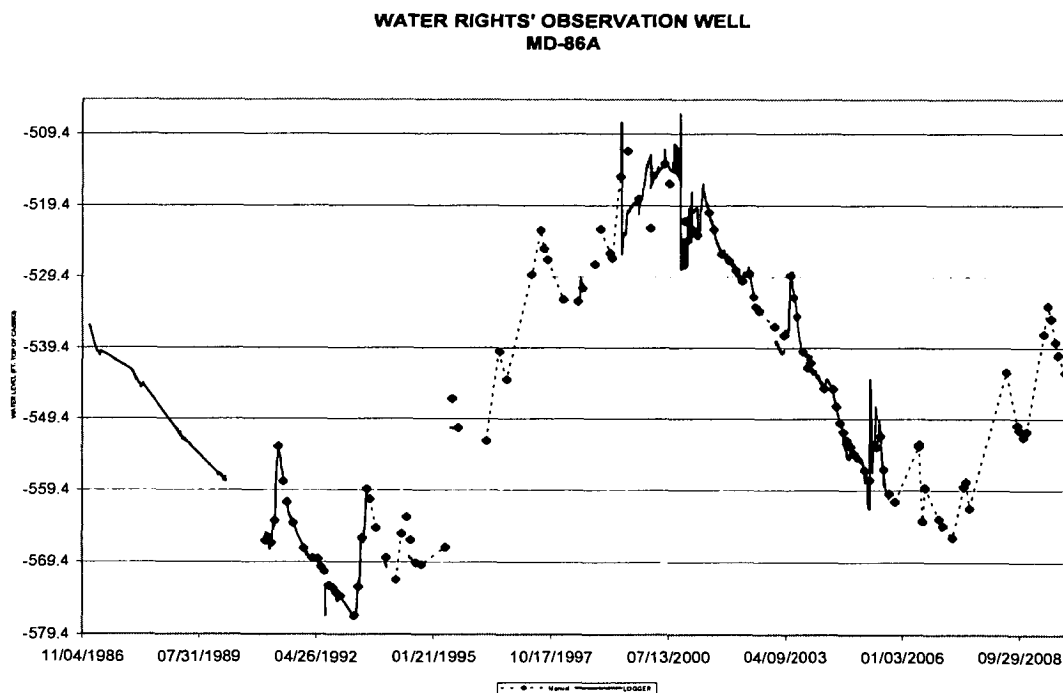


Figure 2. Hydrograph of Water Rights' Observation well located approximately 0.9 miles south-southeast of the 1911-1

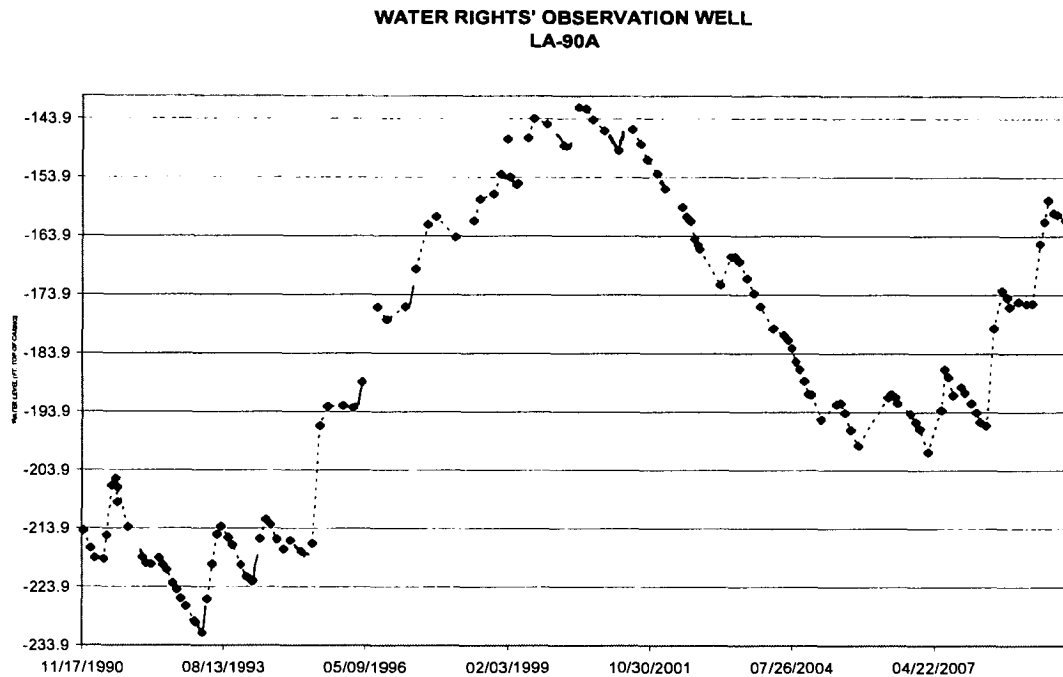


Figure 3. Hydrograph of Water Rights' Observation well located approximately three miles northwest of the 1911-1

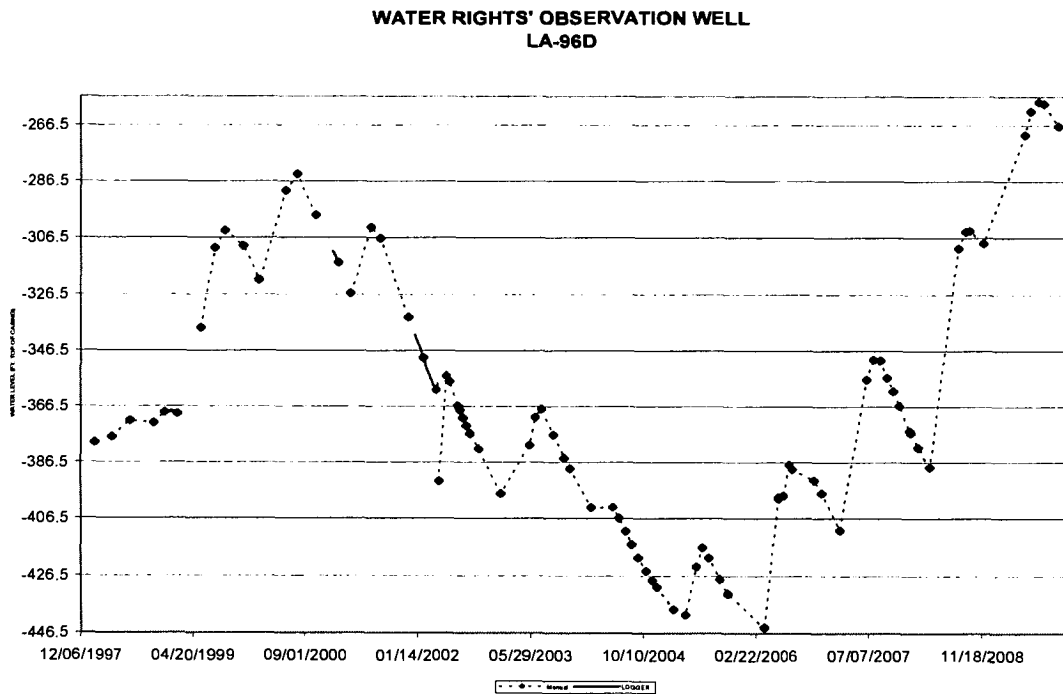


Figure 4. Hydrograph of Water Rights' Observation well located approximately 4.8 miles west-southwest of the 1911-1

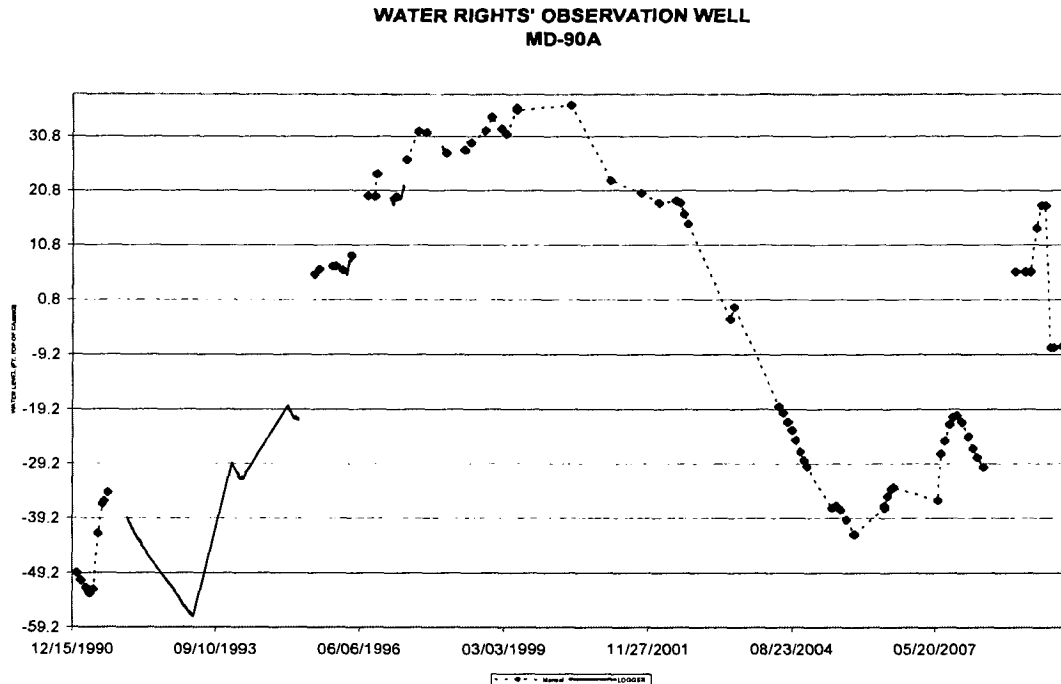


Figure 5. Hydrograph of Water Rights' Observation well located approximately eight miles southeast of the 1911-1

The hydrographs show the potentiometric surface measured at these sites rose during the late 1990's and the late 2000's in response to wet climatic conditions. The water levels decreased in the early 2000's in response to less recharge.

A comparison of these hydrographs with data from other Water Rights' Observation wells completed into the Madison aquifer, suggest the fluctuations shown in figures 2-5 are representative of climatic conditions instead of pumping from the aquifer. The observation well data verifies that for the period of record, withdrawals have not exceeded recharge and unappropriated water is available from the Madison aquifer.

AFFECTS ON EXISTING RIGHTS:

Water rights/permits supplied by aquifers that are either higher or lower than the Madison are not expected to be affected by Madison aquifer withdrawals since the lower Minnelusa serves as an upper confining unit and the bottom portion of the Madison and the Englewood Formation act as a lower aquitard. There are only two existing Water Rights that are not held by the City of Sturgis, within approximately three miles of the well site proposed by Water Permit Application No. 1911-1. They are shown in table 2.

Water Right No.	Name	Use	Appropriation	Distance from 1911-1
1635-1	Black Hills Nat'l Cemetery	Institutional/Irrigation	.82 cfs/54.5 acres	2.4 miles
1684-1	Mike Ringer	Commercial	0.022 cfs	0.5 miles

Table 2. Madison appropriations held by others within three miles of 1911-1

Since the Madison is under artesian conditions in this area, drawdown from pumping a well may extend over a fairly large area. At this time, it is not practical to attempt to quantify the specific affect this well may have on area 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 (Greene, 1993).

The Madison is under artesian conditions at the Ringer well and the cemetery wells with approximately 200 feet of artesian pressure at both locations. The small amount of drawdown that may occur at the existing wells will be insignificant when compared to the seasonal/climatic fluctuations documented by the observation wells. In other words, wells that can consistently deliver sufficient water for the well owner's needs with the natural fluctuation documented by the observation wells will not be affected by this proposed withdrawal.

Wells supplying existing Water Rights/Permits and domestic uses are protected from adverse impacts per Water Management Board rules 74:02:04 and 74:02:05, which were promulgated pursuant to SDCL 46-6-6.1. These rules 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 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.

It should be noted however, that well interference (drawdown) measured at Water Rights' observation wells located near high capacity municipal wells in Spearfish, Sturgis and Rapid City has never been significant (i.e. drawdown of only a few feet or tens of feet) (Water Rights, 2010a).

Given the distance between the well that is to supply this appropriation and existing Madison wells well interference is not expected to be adverse.

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."

Pursuant to SCL 46-2A-21, "at the end of the twenty-year limitation, the board may cancel a permit or amend the permit with a new term limitation of up to twenty years, if the board is unable to make a finding after notice and hearing that sufficient information is available to delete the term."

Although the criteria for approval of a water permit established by SDCL 46-2A-9 are met, (i.e., there is a reasonable probability that unappropriated water is available for the applicant's proposed use, and this proposed diversion can be developed without unlawful impairment of existing rights); evidence is not available to justify issuing this permit without a term limitation of 20 years.

BENEFICIAL USE:

SDCL 46-1-6(3) defines beneficial use as:

"any use of water within or outside the state, that is reasonable and useful and beneficial to the appropriator, and at the same time is consistent with the interests of the public of this state in the best utilization of water supplies"

When considering the interests of the public and the best utilization of water supplies, the beneficial use of this proposed appropriation may be questioned.

Neither the volume of water associated with this application (645 ac-ft/yr) nor the total annual volume proposed from this well (1,290 ac-ft/yr), can be reasonably achieved at the diversion rates proposed (0.89 cfs and 1.78 cfs, respectively). It simply is not practical to divert water at the maximum permitted rate continuously. Approval of an appropriation with the rate and volume applied for by this application would be akin to granting a "future use reservation" for a volume of water which will require additional appropriations in the future to place the entire allocation of water to beneficial use. This application is not an application for a Future Use Permit pursuant SDCL 46-5-38 and SDCL 46-5-38.1 and differs from a Future Use Permit in that if approved, the appropriation would not be subject to board review every seven years; and new appropriations to place reserved water to beneficial use would have new priority dates.

The "reservation" of water proposed by this application's call for a volume of water that cannot be reasonably obtained at the given diversion rate may keep water from being applied to maximum beneficial use as required by SDCL 46-1-4.

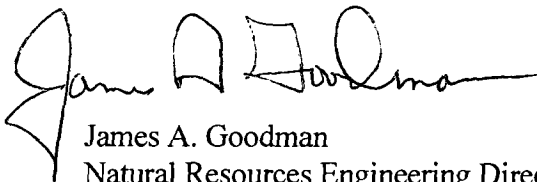
The Water Management Board's policy for quantifying a volume of actual future use permits based on their diversion rate has been to assume a pumping duration equal to 60% of continuous pumping. In the case of Application No. 1911-1, it may be appropriate to limit the volume of the appropriation to 387 ac-ft/yr. The Board may choose to limit the total appropriation from this well to 773 ac-ft/yr.

CONCLUSIONS:

1. The Madison aquifer is a major regional aquifer and a viable source of water for this proposed appropriation.
2. This application proposes to appropriate 645 acre-feet annually at a maximum diversion rate of 0.89 cfs.
3. There is a reasonable probability that unappropriated water is available in the Madison aquifer to supply this appropriation.
4. Exceptions included in SDCL-46-6-3.1 would allow average annual withdrawals from the Madison to exceed average annual recharge for this proposed municipal use.
5. There is a reasonable probability this appropriation can be made without adversely impacting existing water rights including domestic users.
6. Information is not available to justify issuing these permits without a term limitation of 20 years.
7. Following notice and a public hearing, the Water Management Board can cancel this permit or amend it with a new term limitation after twenty years.
8. It is not likely that annual volume this application proposes to appropriate can be obtained with the diversion rate proposed.
9. There may be public interest and beneficial use issues to be considered if this application is approved for the full volume of water requested.



Ken Buhler
Natural Resources Engineering Specialist
Approved by



James A. Goodman
Natural Resources Engineering Director

REFERENCES:

- Carter, J.M., Driscoll, D.G., and Hamade, G.R., 2001a, Estimated Recharge to the Madison and Minnelusa Aquifers in the Black Hills Area, South Dakota and Wyoming, Water Years 1931-98: U.S. Geological Survey Water-Resources Investigations Report 00-4278, 66 p
- Carter, J.M., Driscoll, D.G., Hamade, G.R., and Jarrell, G.J., 2001b, Hydrologic Budgets for the Madison and Minnelusa Aquifers, Black Hills of South Dakota and Wyoming, Water Years 1987-1996: Water-Resources Investigations Report 01-4119, U.S. Department of the Interior, U.S. Geological Survey, Rapid City, SD
- Carter, J.M., Redden, J.A., 1999a, Altitude of the Top of the Madison Limestone in the Black Hills Area, South Dakota: U.S. Geological Survey Hydrologic Investigations Atlas HA-744-D, 2 sheets, scale 1:100,000
- Carter, J.M., Redden, J.A., 1999b, Altitude of the Top of the Deadwood Formation in the Black Hills Area, South Dakota: U.S. Geological Survey Hydrologic Investigations Atlas HA-744-E, 2 sheets, scale 1:100,000
- Greene, E.A., 1993, Hydraulic Properties of the Madison Aquifer System in the Western Rapid City Area, South Dakota: U.S. Geological Survey Water-Resources Investigations Report 93-4008, 56 p.
- Rahn, P.H., 1979, Ground Water Resources of Western South Dakota: U.S. Army Corps of Engineers, SDSM&T Project #2533
- Strobel, M.L., Jarrell, G.J., Sawyer, J.F., Schleicher, J.R., and Fahrenbach, M.D., 1999, Distribution of Hydrogeologic Units in the Black Hills Area, South Dakota: U.S. Geological Survey Hydrologic Investigations Atlas HA-743, 3 sheets, scale 1:100,000
- Strobel, M.L., Galloway, J.M., Hamade, G.R., Jarrell, G.J., 2000, Potentiometric Surface of the Madison Aquifer in the Black Hills Area, South Dakota: U.S. Geological Survey Hydrologic Investigations Atlas HA-745-D, 2 sheets, scale 1:100,000
- Water Rights Program, 1995, Findings of Fact, Conclusions of Law and Final Decision in the Matter of Water Permit Application No. 2313-2, Coca-Cola Bottling Company of The Black Hills, SD DENR-Water Rights Program, Joe Foss Building, Pierre, SD 57501
- Water Rights Program, 2008, "Report for Water Permit Application No. 2631-2", Unpublished Report in Water Permit No. 2631-2, SD DENR-Water Rights Program, Joe Foss Building, Pierre, SD 57501

Water Rights Program, 2010a, Observation Well Files, DENR-Water Rights Program, Joe Foss Building, Pierre, SD 57501

Water Rights Program, 2010b, Water Permit/Right Files, DENR-Water Rights Program, Joe Foss Building, Pierre, SD 57501

Water Rights Program, 2010c, Well Completion Report Files, DENR-Water Rights Program, Joe Foss Building, Pierre, SD 57501

Woodward Clyde Consultants, 1981, Well Field Hydrology Technical Report, for the ETSI Coal Slurry Pipeline Project, U.S. Dept. of the Interior, Bureau of Land Management

RECEIVED

JUN 03 2010

Form 8

WATER RIGHTS
PROGRAM

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County of Meade) SS
I, Samela Beehler

certify that the attached printed Notice was
taken

from the Meade County Times

printed and published in Sturgis
County of Meade and

state of South Dakota. The notice was
published

in the newspaper on the following two dates:

5/26/2010

6/2/2010

Cost of Printing \$52.79

Samela Beehler
(Signature)

Office Manager / Legal Ad Rep
(Title)

6/2/2010
(Date Signed)

NOTICE OF APPLICATION

NO. 1911-1 to

Appropriate Water

Notice is given that Sturgis Water Department, c/o Eric Tibbetts, 1040 2nd St, Sturgis SD 57785 has filed an application for a water permit to change the location of the diversion point, transfer diversion authority and appropriate additional water. Water Right No. 441A-1 appropriates 0.89 cubic feet of water per second (cfs) (645 acre-feet annually) from one well to be completed Madison Aquifer located in NE 1/4 SE 1/4 Section 16-T5N-R5E. This application proposes to: 1) construct a replacement well for Water Right No. 441A-1 to be completed into the Madison Aquifer (1,023 feet deep) located in the NE 1/4 SE 1/4 Section 16-T5N-R5E; 2) transfer the diversion authority of 0.89 cfs (645 acre-feet annually) authorized by No. 441A-1 to the new well and; 3) appropriate an additional 0.89 cfs (645 acre-feet annually) from the new well. This application, if approved, will authorize a total diversion rate of 1.78 cfs for municipal use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 1911-1 for a combined annual diversion volume of 773 acre feet of water and a 20 year term limit on the additional water because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on this application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and

Petitions don't

the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 14, 2010.

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

/s/ Steven M. Pirner, Secretary
Department of Environment and Natural Resources
Published twice at the total approximate cost of \$52.79.

**Published Wed., May 26
and Wed., June 2, 2010
Meade County Times Tribune**



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

May 19, 2010

Meade County Times & Tribune
1022 Main St
Sturgis SD 57785

ATTENTION: Legal Public Notice

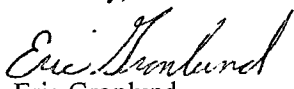
Enclosed is a Notice on Application No. 1911-1 to Appropriate Water to be published twice. Please publish the first notice on May 26, 2010 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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 Sturgis Water Department, c/o Eric Tibbetts, 1040 2nd St., Sturgis SD 57785 (Ph # 605-347-4425).

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-----

No. 1911-1

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

Date _____

We are in receipt of your letter of May 19, 2010 enclosing Notice to Appropriate Water by Application No. 1911-1 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
denr.sd.gov

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

May 19, 2010

City of Sturgis Water Department
Eric Tibbetts
1040 2nd St
Sturgis SD 57785

Dear Mr. Tibbetts:

Water Permit Application No. 1911-1 for municipal use has 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 Meade County Times & Tribune printed at Sturgis SD (Ph # 605-347-2503). You will need to contact the newspaper and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above 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
eric.gronlund@state.sd.us

enclosures

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

Instruction to Newspaper - Publish first Notice on May 26, 2010 with the second publication 7 days later. The applicant is responsible for payment. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352 or email: Karen.schlaak@state.sd.us.

NOTICE OF APPLICATION NO. 1911-1 to Appropriate Water

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Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 14, 2010.

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

Published twice at the total approximate cost of _____.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

AUG 09 2010

Sturgis Water Company
c/o Eric Tibbetts
1040 2nd St, Suite 103
Sturgis SD 57785

Dear Mr. Tibbetts:

Enclosed is Water Permit No. 1911-1 and Reissued Water License No. 441A-1 authorizing the replacement well for the city's water diversion system and beneficial use of the water, not exceeding the limits as specified in the permit.

A Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

Sincerely,

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

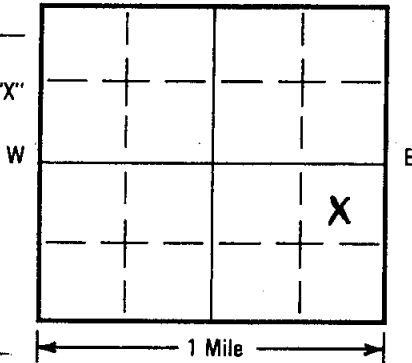
enclosures

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec 16 Twp 5 Rg 5County MEADE North

Please mark well location with an "X"



Well Completion Date

OCTOBER 2012

LOCATION:

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

PROPOSED USE:

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

METHOD OF DRILLING:

FLUID ROTARYCASING DATA: ☒ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
<u>40</u> LB/FT	<u>16</u> IN	<u>0</u> FT	<u>40</u> FT	<u>20</u> IN
<u>40.50</u> LB/FT	<u>10 3/4</u> IN	<u>0</u> FT	<u>930</u> FT	<u>14 3/4</u> IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
<u>Type G</u>	<u>1723</u> cu/ft	<u>15.08</u> lb./gal	<u>0</u> ft	<u>940</u> ft
_____	_____	_____ lb./gal	_____ ft	_____ ft

Describe grouting procedure POSITIVE DISPLACEMENT FROM 940'-560', 1" TREMIED FROM SURFACE TO 560'SCREEN: ☐ Perforated pipe ☐ Manufactured N/A

Diameter _____ IN Length _____ FEET

Material _____

Slot Size _____ Set From _____ Feet to _____ Feet

Other information _____

WAS A PACKER OR SEAL USED? ☐ YES ☒ NO

If so, what material? _____

Describe packer(s) and location? _____

DISINFECTION: Was well disinfected upon completion?

☒ YES, How: LIQUID & TABLET
☐ NO, Why Not? CL2 to 100ppm

Laboratory sent to for water quality analysis

ENERGY LABS - RAPID CITYWell Owner: STURGIS WATER COMPANY

Business Name: _____

Address: 1040 2ND ST SUITE 103
STURGIS SD

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
<u>SPEARISH</u>	<u>0</u>	<u>305</u>
<u>MINNEKATA</u>	<u>305</u>	<u>340</u>
<u>OPECHE</u>	<u>340</u>	<u>506</u>
<u>MINNELUSA</u>	<u>506</u>	<u>890</u>
<u>MADISON</u>	<u>890</u>	<u>1460</u>

STATIC WATER LEVEL 505 Feet

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other _____

Reduced Flowrate _____ GPM

Can well be completely shut in? _____

WELL TEST DATA:

☒ Pumped Describe: TESTED WITH 125hp
☐ Bailed RAN STEP TEST @ 24hr
☐ Other CONSTANT RATE TEST

Pumping Level Below Land Surface

810 ft. After 24 Hrs. pumped 400 GPM

_____ ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate _____ GPM

REMARKS

RECEIVED
OCT 29 2012
WATER RIGHTS PROGRAM

This well was drilled under license # 698

And this report is true and accurate.

Drilling firm WATER SYSTEM DRILLING INC.

Signature of License Representative:

Scott A. Heimer

Signature of Well Owner or Equitable Property Holder:

Dale O. Olson (City of Sturgis)Date: 10-26-12

October 26, 2012

Water Rights Program
South Dakota Department of Environment and Natural Resources
PMB 2020, Joe Foss Building
523 East Capitol
Pierre, SD 57501

RECEIVED
OCT 29 2012
WATER RIGHTS
PROGRAM

**Re: Sturgis Water System Improvements – Phase 2
Sturgis Municipal Utility Board, Sturgis, South Dakota
Well No. 1 Completion Report and Water Analysis**

Water Rights Program,

On behalf of the City of Sturgis, we are providing one copy of the Sturgis Water System Improvements – Phase 2, Well No. 1 Completion and Water Analysis Reports. Please reference Permit No. SDG070977. The attached documents are for your records.

Please let me know if you have any questions.

Sincerely,
CETEC Engineering Services, Inc.



Brook B. Stromer, P.E.
Project Manager

Cc: Rick Bush, City of Sturgis
Dale Olson, City of Sturgis

1560 Concourse Drive
Rapid City, SD 57703

www.cetecengineering.com

GAMMA RAY
NEUTRON CCL

COMPANY WATER SYSTEMS
WELL STURGIS #1
FIELD STURGIS
COUNTY MEADE STATE SD

LOCATION:

OTHER SERVICES

SEC	TWP	RGE
-----	-----	-----

PERMANENT DATUM G. L.

ELEVATION

K. B.

LOG MEAS. FROM K. B.

5 FT. ABOVE PERM DATUM

D. F.

DRILLING MEASURED FROM K. B.

G. L.

DATE	08-20-2012
------	------------

RUN NO.	DIV	ONE
---------	-----	-----

TYPE LOG	G/R
----------	-----

DEPTH-DRILLER	146
---------------	-----

DEPTH-LOGGER	146
--------------	-----

BTM LOGGED INTERVAL 145

TOP LOGGED INTERVAL 11'

TYPE FLUID IN HOLE	WATER
--------------------	-------

SALINITY	
----------	--

DENSITY	
-------------------------	--

LEVEL	498
-------	-----

MAX. REC. TEMP. DEG F.	
------------------------	--

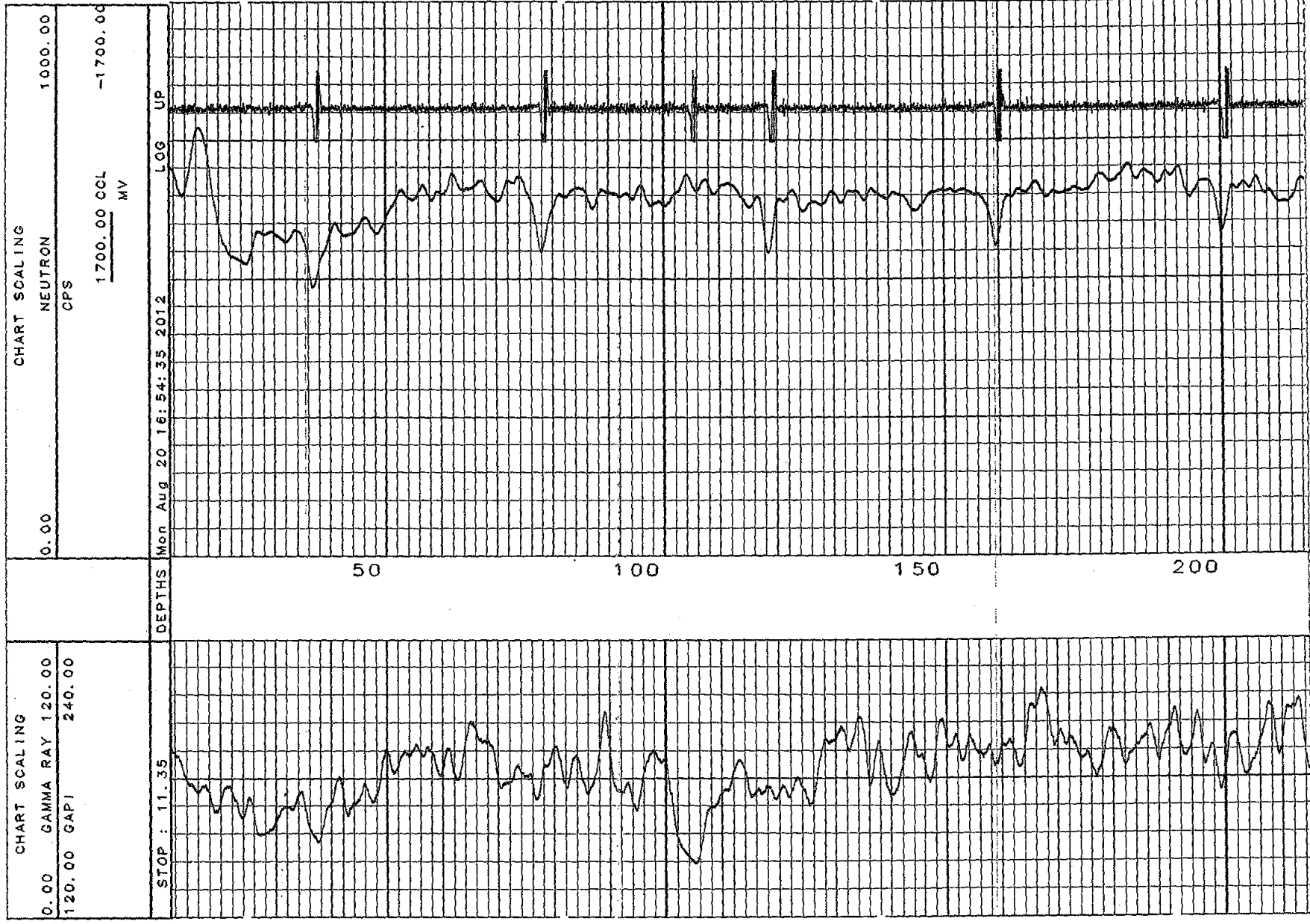
OPERATING RIG TIME	
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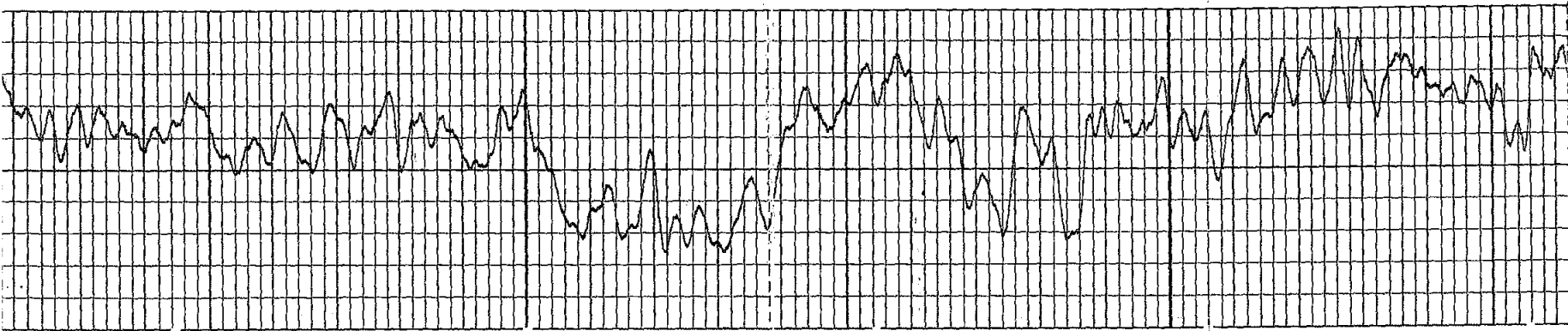
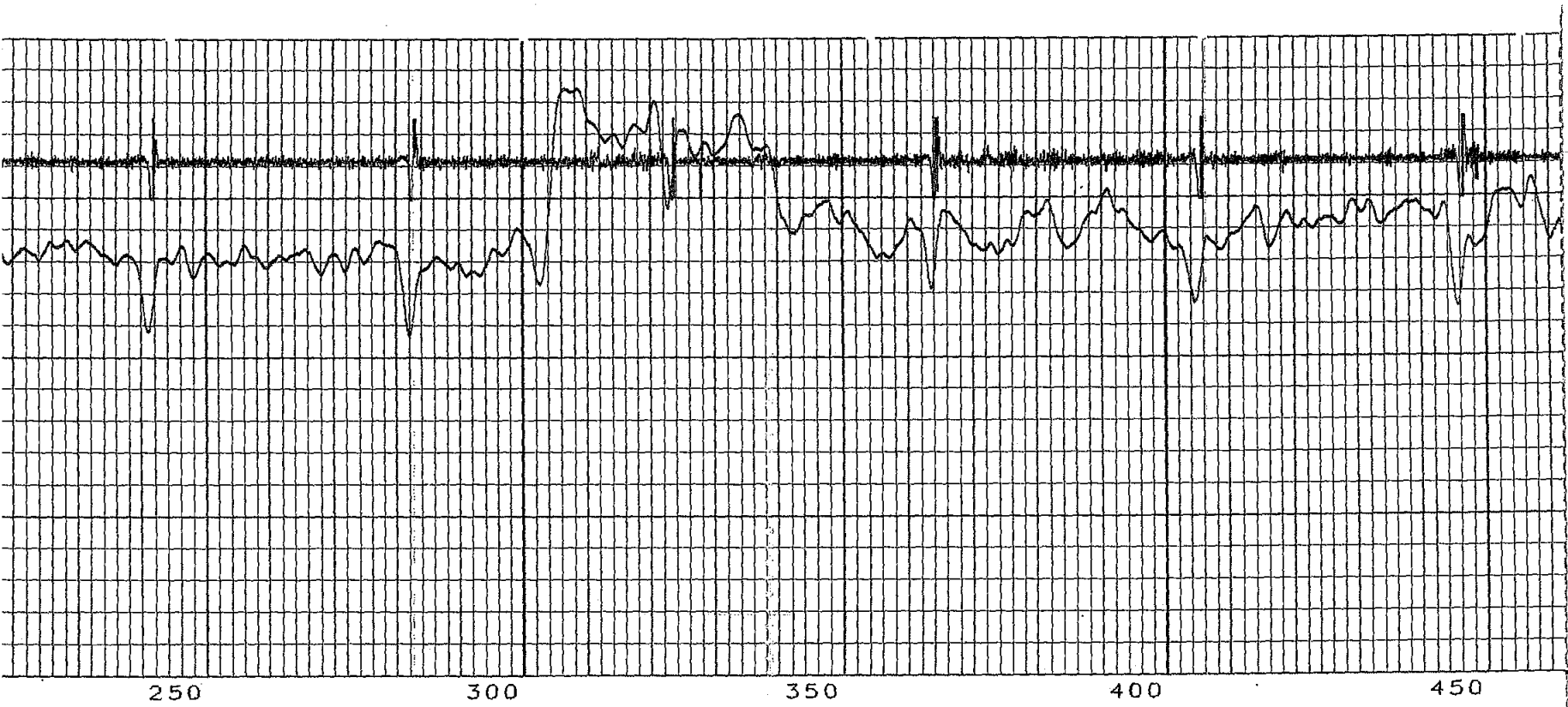
RECORDED BY	R. C.
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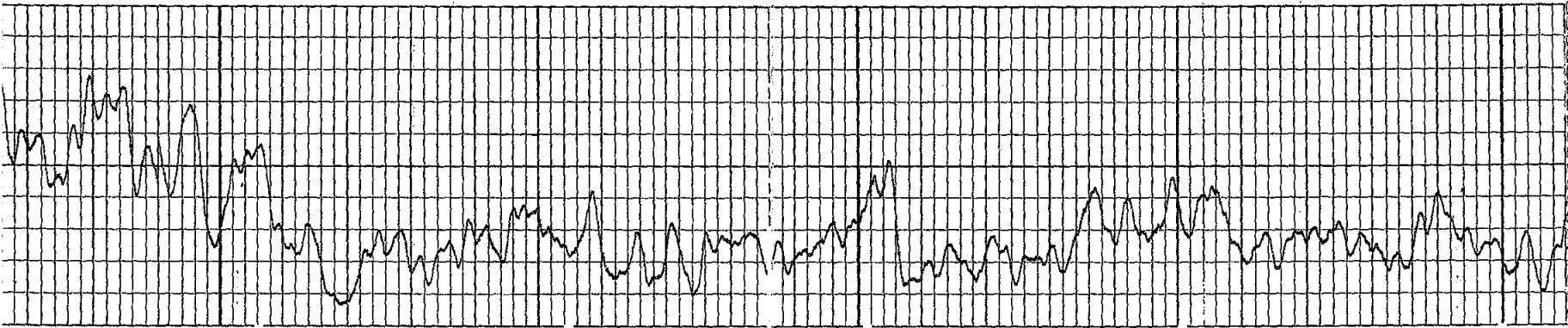
WITNESSED BY

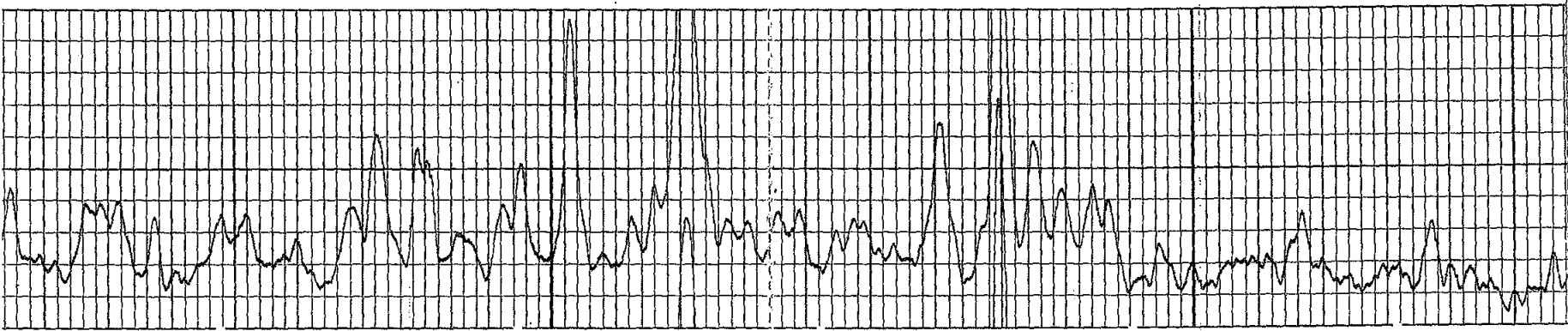
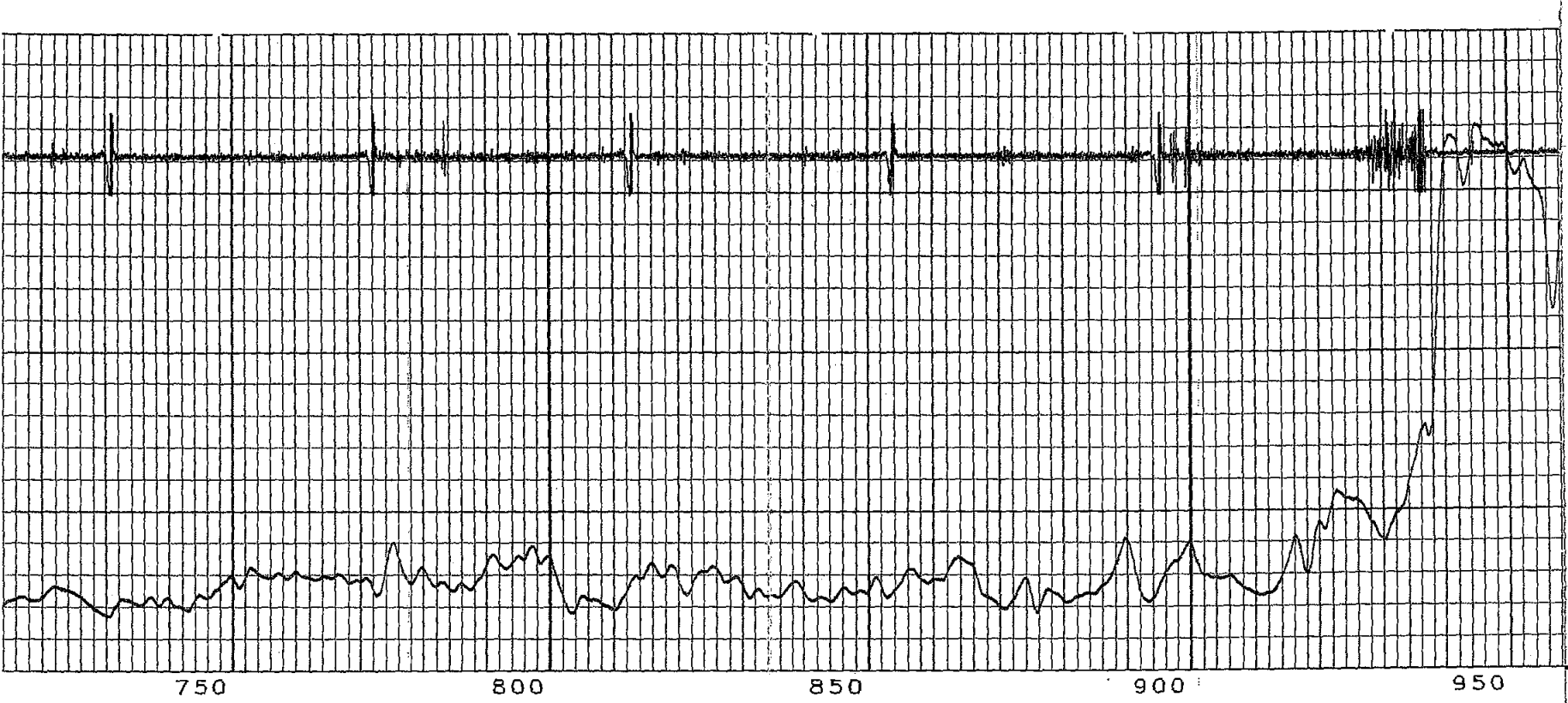
RUN		BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO	

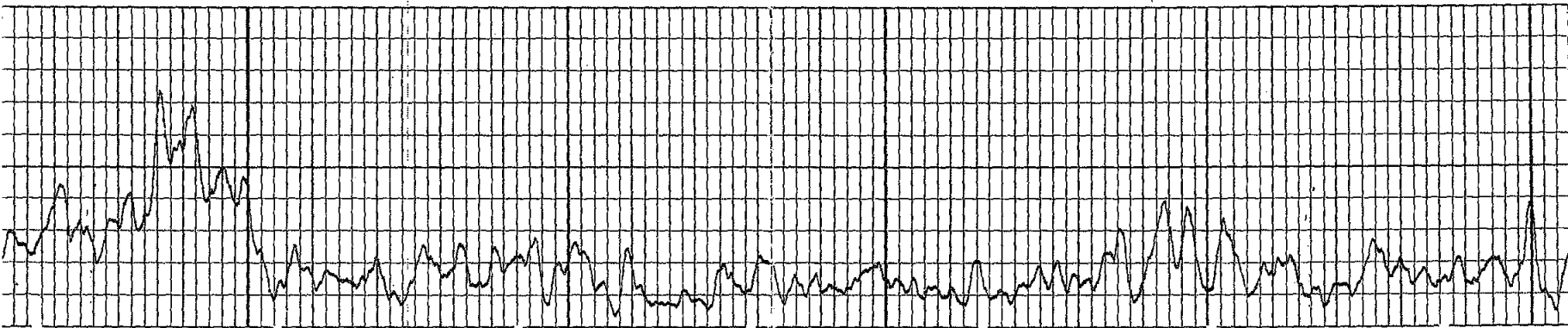
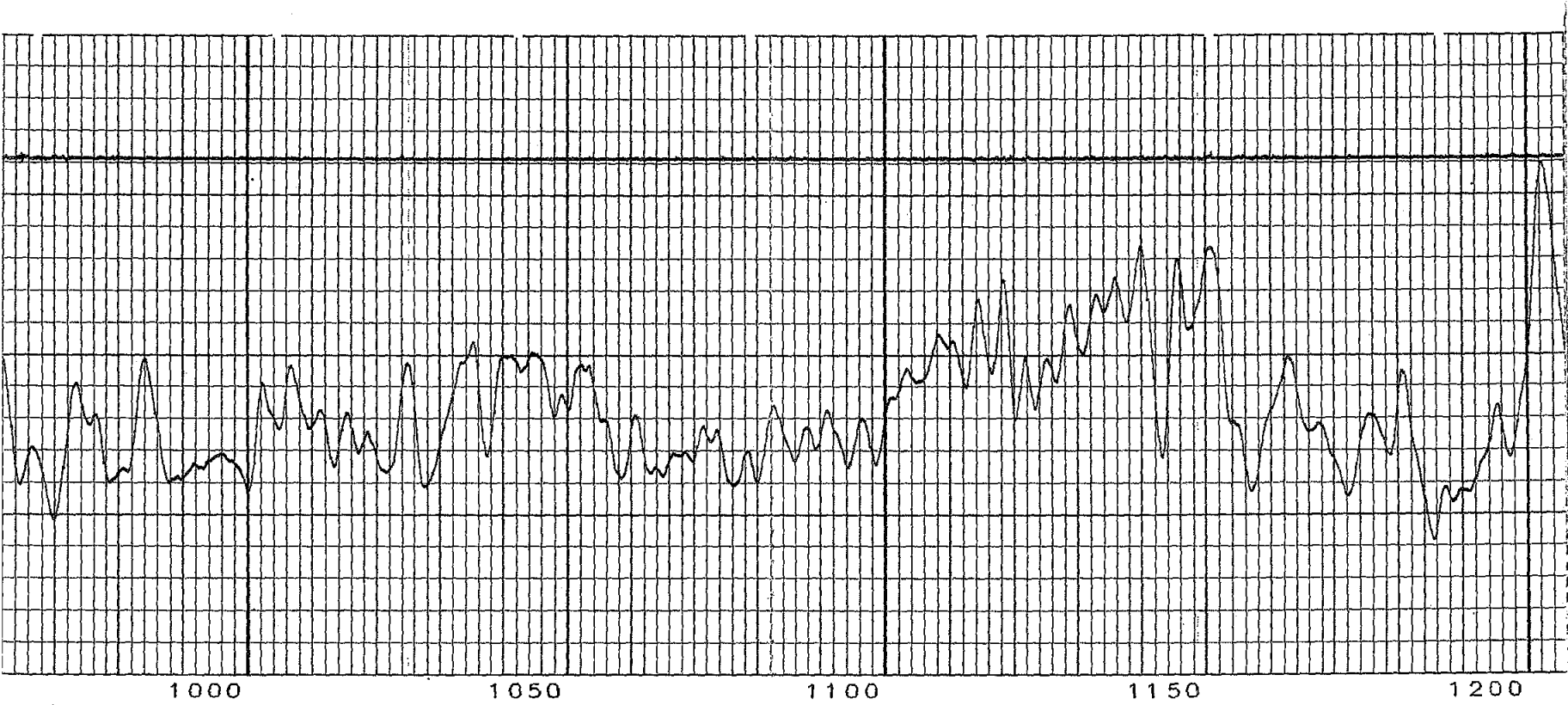
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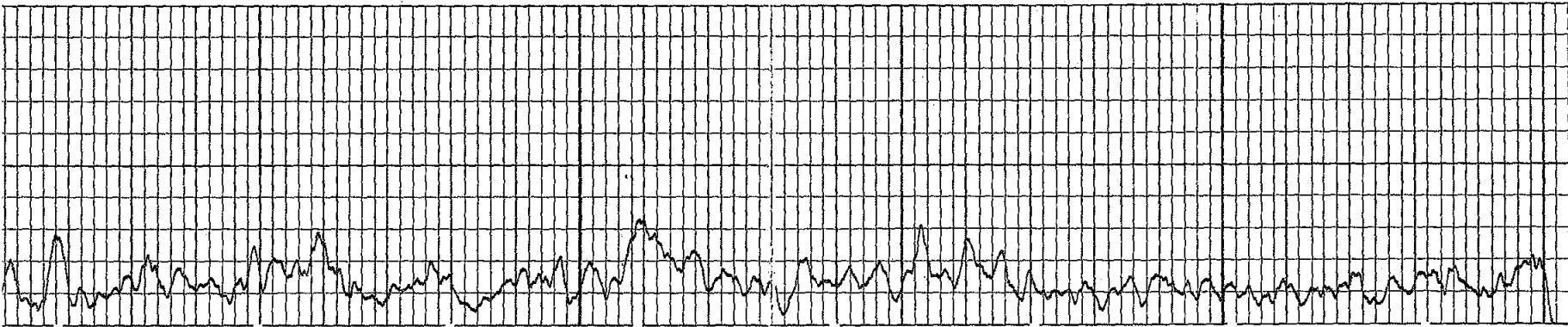
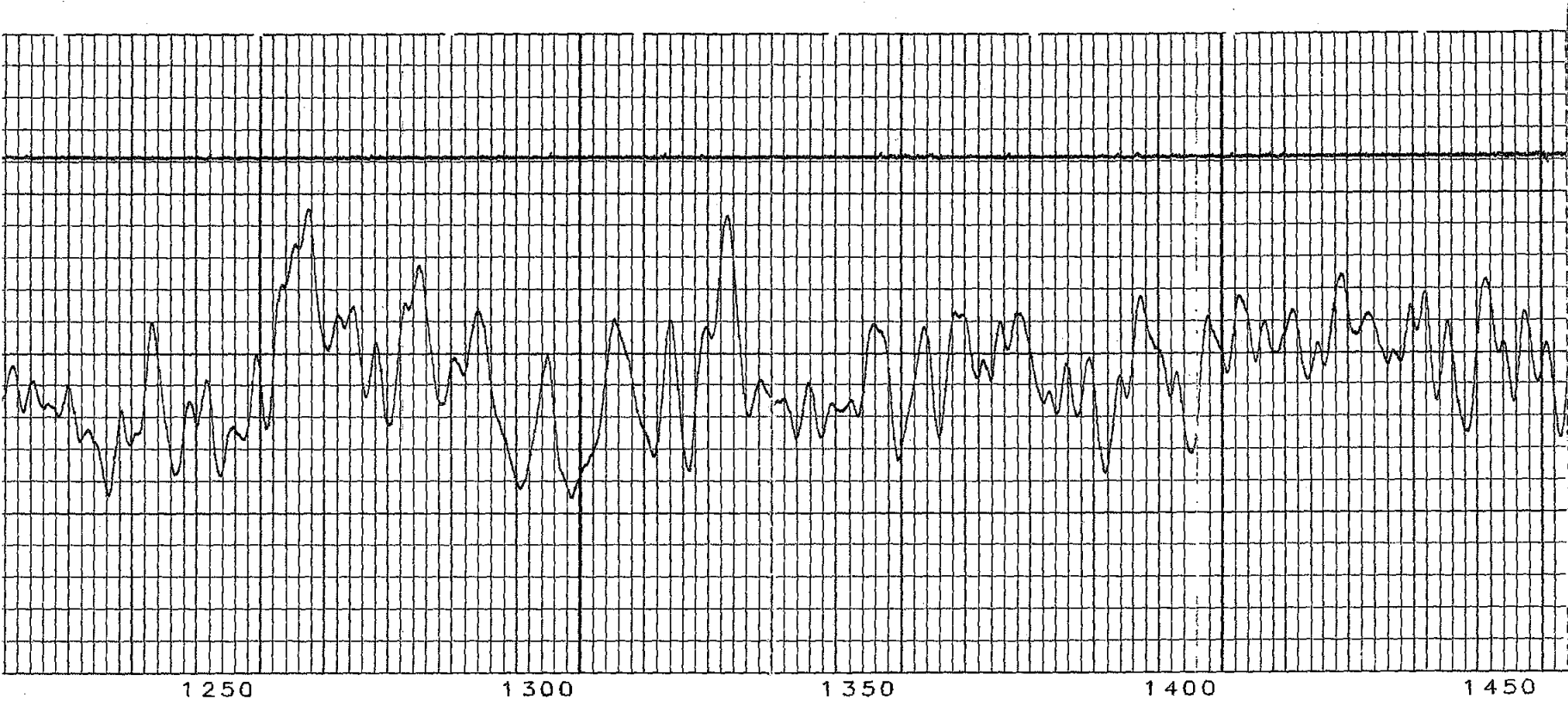


CHART SCALING		CHART SCALING	
0.00	GAMMA RAY	0.00	NEUTRON
120.00	GAPI		CPS
		1700.00	CCL
			MV
			-1700.00
START DEPTH: 1450.75		DEPTHS Mon Aug 20 16:20:11 2012	
		LOG UP	

ANALYTICAL SUMMARY REPORT

October 09, 2012

Water Systems Drilling Inc
 PO Box 368
 Gillette, WY 82717-0368

RECEIVED
 OCT 29 2012
 WATER RIGHTS
 PROGRAM

Workorder No.: R12090320

Project Name: Sturgis #1 Well

Energy Laboratories Inc. Rapid City SD received the following 1 sample for Water Systems Drilling Inc on 9/21/2012 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
R12090320-001	Sturgis #1 Well	09/21/12 7:45	09/21/12	Drinking Water	Metals by ICP/ICPMS, Drinking Water Alkalinity Bacteria, Private Water Supply Conductivity Hardness Anions by Ion Chromatography Langelier Index pH Solids, Total Dissolved

Thank you for submitting your samples to Energy Laboratories, Inc. - Rapid City. The following pages contain the results of your sample analysis.

The samples were analyzed in accordance with the methods specified on the analytical reports. All analyses were accompanied by applicable quality assurance samples throughout the test. Where applicable, the results of these quality assurance samples will be included with your analytical data.

If you have any questions regarding the analyses performed or the results of these analyses, please feel free to call Linda Larson at (888)672-1225, (605)342-1225 or llarson@energylab.com.

Sincerely,

Jennifer Hartman
 Inorganic Analyst/Supervisor
 Energy Laboratories, Inc.
 Rapid City, SD

Report Approved By:

Jennifer Hartman
 Supervisor

Digitally signed by
 Jennifer Hartman
 Date: 2012.10.09 09:53:50 -06:00

CLIENT: Water Systems Drilling Inc
Project: Sturgis #1 Well
Sample Delivery Group: R12090320

Report Date: 10/09/12

CASE NARRATIVE

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.

LABORATORY ANALYTICAL REPORT

Prepared by Rapid City, SD Branch

CLIENT: Water Systems Drilling Inc**Project:** Sturgis #1 Well**Report Date:** 10/09/12**Lab ID:** R12090320-001 **Matrix:** DRINKING WATER**Collection Date:** 09/21/12 07:45**Client Sample ID:** Sturgis #1 Well**Received Date:** 09/21/12 08:30**Sampled By:** Scott Hiemer

Analyses	Result	Units	Safe/Unsafe	Qualifier	Method	Analysis Date / By
MICROBIOLOGICAL						
Bacteria, Total Coliform	Absent	P/A	SAFE		A9223 B	09/21/12 17:35 / tb
Bacteria, E-Coli Coliform	Absent	P/A			A9223 B	09/21/12 17:35 / tb

Comments: The notation "SAFE" indicates that the water was bacteriologically SAFE when sampled.

The notation "UNSAFE" indicates that the water was bacteriologically UNSAFE when sampled.

Method Reference: E - EPA / MCAWW Methodology A - Standard Methods 19th Ed.

LABORATORY ANALYTICAL REPORT

Prepared by Rapid City, SD Branch

Client: Water Systems Drilling Inc
Project: Sturgis #1 Well
Client Sample ID: Sturgis #1 Well
Location:
Samp FRQ/Type:
Lab ID: R12090320-001

Report Date: 10/09/12
Collection Date: 09/21/12 07:45
Date Received: 09/21/12
Matrix: Drinking Water
Sampled By: Scott Hiemer

Analyses	Result	Units	RL	Qualifier	Method	Analysis Date / By
PHYSICAL PARAMETERS						
Conductivity @ 25 C	1080	umhos/cm	5.0		A2510 B	09/24/12 17:16 / tb
pH	7.21	su	0.01		A4500-H B	09/28/12 14:37 / tb
Solids, Total Dissolved TDS @ 180 C	960	mg/L	10		A2540 C	09/27/12 09:23 / jmh
Alkalinity, Total as CaCO3	212	mg/L	5		A2320 B	09/28/12 13:37 / ch
Carbonate as CO3	ND	mg/L	5		A2320 B	09/28/12 13:37 / ch
Bicarbonate as HCO3	258	mg/L	5		A2320 B	09/28/12 13:37 / ch
INORGANIC PARAMETERS						
Hardness as CaCO3	580	mg/L	1		A2340 B	09/28/12 10:31 / ADM
Chloride	214	mg/L	5	D	E300.0	09/26/12 00:35 / tb
Fluoride	0.6	mg/L	0.1		E300.0	09/21/12 21:27 / jmh
Sulfate	43	mg/L	1		E300.0	09/21/12 21:27 / jmh
PHYSICAL PROPERTIES						
Langelier Index	0.20				A203	10/08/12 / jmh
NUTRIENT PARAMETERS						
Nitrogen, Nitrate as N	0.4	mg/L	0.1		E300.0	09/21/12 21:27 / jmh
Nitrogen, Nitrite as N	ND	mg/L	0.1		E300.0	09/21/12 21:27 / jmh
DRINKING WATER METALS ANALYSES						
Calcium	161	mg/L	1		E200.7	09/27/12 22:25 / eli-b
Iron	0.74	mg/L	0.03		E200.7	09/27/12 22:25 / eli-b
Magnesium	43	mg/L	1		E200.7	09/27/12 22:25 / eli-b
Manganese	0.05	mg/L	0.01		E200.7	09/27/12 22:25 / eli-b
Sodium	3	mg/L	1		E200.7	09/27/12 22:25 / eli-b

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. Visit our web site at www.energylab.com for additional information, downloadable fee schedule, terms, and links.

Permit Nos. 1911-1
Upper Cheyenne River - Water District

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

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

I have on this day, 9/15/2015, made a thorough examination of the water use system constructed by City of Sturgis, 1040 Harley-Davidson Way, Suite 103, Sturgis SD 57785 holder of Permit No. 1911-1 bearing the priority date of March 18, 2010. Water Permit No. 1911-1 is authorized to: 1) construct a replacement well for Water Right No. 441A-1; 2) transfer the diversion authority of 0.89 cfs (645 acre-feet annually) authorized by No 441A-1 to the new well and; 3) appropriate an additional 0.89 cfs (129 acre-feet annually) from the new well. Water Permit No. 1911-1 plus the diversion authority from Water Right No. 441A-1 authorizes a total diversion rate of 1.78 cfs (773 acre-feet annually) from one well (Madison Aquifer) for Municipal purposes, in Meade County.

Inspection contact and relationship to
permit holder, if applicable:

Gene Stock,
Parks & Cemetery Director

A. Works used to divert the water:

Grundfos submersible pump - 750 gpm capacity (1.67 cfs).

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

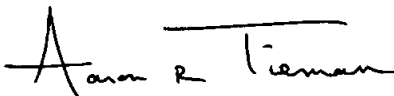
Municipal distribution lines & storage reservoirs.

The system is in the following condition good. The point of diversion (well) for Permit No. 1911-1 is located specifically at Lat/Lon – N44.393879/W-103.509746 which is the approximately 2435 feet north and 155 feet west of the SE corner of Section 16, T5N-R5E. The works are capable of diverting 1.67 cfs which is to be used for municipal purposes. The license should be issued for 1.67 cfs.

All structures, wells and lands on map Y

Exceptions to compliance are: none.

Comments: During this licensing process, all the applicable portions of Water Right No. 441A-1 will be incorporated into Water Permit No. 1911-1. During the inspection, the permit holder indicated that the original well #1 authorized by 441A-1 had been plugged. A review of the well database verified the well has been plugged according the SD Well Construction Standards by Weston Engineering, Inc. on December 14, 2012.



Aaron Tieman
Natural Resources Engineer II

DENR, Water Rights Program
Date report completed: September 28, 2015

FIELD INVESTIGATION REPORT FOR PERMIT NO. 1911-1

DATE OF INVESTIGATION:	September 15, 2015
NAME & ADDRESS OF PERMIT HOLDER	City of Sturgis 1040 Harley-Davidson Way, Suite 103 Sturgis, SD 57785
INVESTIGATION CONTACT/ RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE	Gene Stock, Parks & Cemetery Director
DIVERSION POINT LEGAL LOCATION	NE¼ SE¼ Section 16, T5N-R5E
WATER SUPPLY SOURCE	Groundwater, Madison Aquifer

Other permit(s) associated with the project: **Water Right No. 441A-1**

WELL INFORMATION:

- 1) Well Drilling Firm: **Water Systems Drilling, Inc.**
- 2) Number of Wells: **One**
- 3) Depth(s): **1460** feet
- 4) Well log available: **yes**

Casing:

- 1) Diameter: **10¾** inches **16** inches
- 2) Length: **938** feet **40** feet
- 3) Type: **Steel** **Steel**

Screen:

- 1) Type: **Open hole**
- 2) Length: **N/A** feet
- 3) Static water level: **505** feet

Pump:

- 1) Make: **Grundfos**
- 2) Model: **unknown**
- 3) Capacity: **800** gpm

Motor:

- 1) Make: **Franklin**
- 2) Model: **unknown**
- 3) Horsepower rating: **125** hp

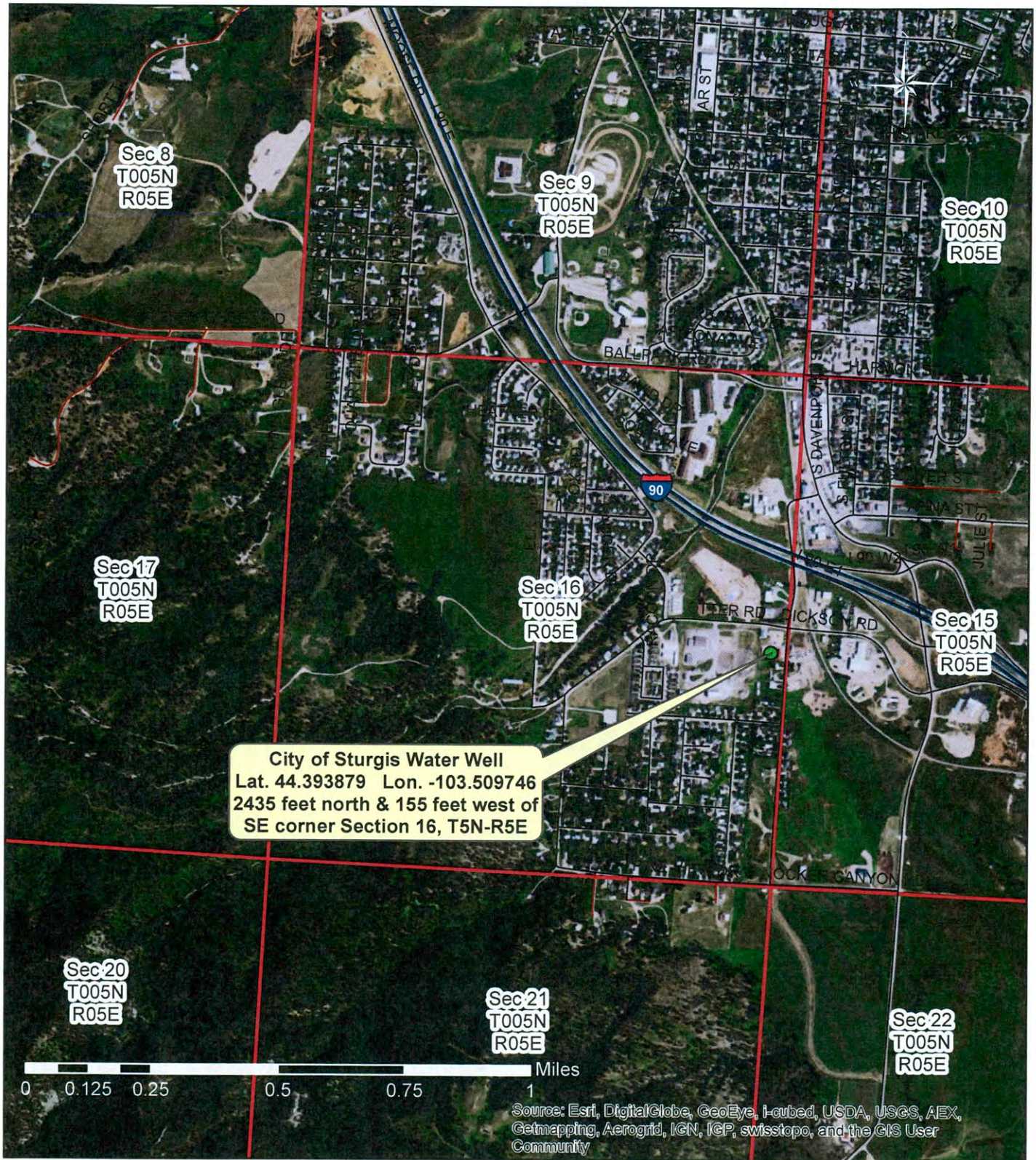
DISTRIBUTION LINES OR CANALS:

- 1) Type: **Municipal distribution lines.**

PERMIT QUALIFICATIONS:

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

Water Right 1911-1
City of Sturgis
September 28, 2015



Aaron R. Tieman

Aaron Tieman
Natural Resources Engineer II
DENR Water Rights Program



1911-1



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

NOV 09 2015

1911-1
441A-1

Dale Olson
Sturgis Water Company
1040 Harley Davidson Way Ste 103
Sturgis SD 57785

Dear Mr. Olson:

Enclosed is Water License No. 1911-1. This is the final water right document completing your process of obtaining a Water Right. Included with your license is a map prepared by the staff engineer who conducted the field investigation.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the well authorized by Water Right No. 1911-1, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

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

Sincerely,

Jeanne Goodman, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

Note: The applicable portions of Vested Water Right No. 441A-1 have been incorporated into Water License No. 1911-1. The respective priority dates were retained.

**STATE OF SOUTH DAKOTA
WATER LICENSE NO. 1911-1**

(1) Sturgis Water Company, 1040 Harley Davidson Way, Suite 103, Sturgis SD 57785 made Application No. 1911-1, March 18, 2010 for a water permit to 1) construct a replacement well for Vested Water Right No. 441A-1; 2) transfer diversion authority of 0.89 cubic feet of water per second (645 acre feet annually) to a new well and 3) to appropriate an additional 0.89 cfs (128 acre feet annually) from the new well. Water Permit No. 1911-1 authorizes a total of 773 acre feet of water annually at a maximum diversion rate of 1.78 cfs from ground water (one well – Madison Aquifer) to be used for municipal purposes in Meade County, South Dakota. Permit No. 1911-1, with a priority date of March 18, 2010 (128 acre feet annually) was approved June 14, 2010 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before June 14, 2015 and for the application to beneficial use of said water on or before June 14, 2019.

Vested Water Right No. 441A-1, with a priority date of January 1, 1948 authorizes 0.89 cfs (645 acre feet annually) from one well. The original well was plugged by Weston Engineering Inc. in 2012. The applicable portions of Vested Water Right No. 441A-1 are being incorporated into Water License No. 1911-1. The inspection of the water use system found the well capable of 750 gallons per minute or 1.67 cfs. A priority date of January 1, 1948 is retained for 0.89 cfs (645 acre feet annually) with the remaining 0.78 cfs (128 acre feet annually) retaining a March 18, 2010 priority date.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 1.67 cubic feet of water per second for beneficial use.

The location of the diversion point is approximately 2,435 feet north and 155 feet west of the SE corner of Section 16, T5N, R5E (NE ¼ SE ¼)

(3) The permit holder 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 Sturgis Water Company, 1040 Harley Davidson Way, Suite 103, Sturgis SD 57785 the holder and/or owner of Water Right No. 1911-1 is issued a license to appropriate water, the right to use 1.67 cubic feet of water per second (773 acre feet) from ground water (one well – Madison Aquifer) with priority dates of January 1, 1948 (0.89 cfs, 645 acre feet annually) and March 18, 2010 (0.78 cfs, 128 acre feet annually) from the location specified in (2) of this license for municipal purposes.

This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Right No. 1911-1 and subject to the following qualifications:

- In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 1911-1 is issued for a twenty year term. Pursuant to SDCL 46-2A-21, the twenty year term may be deleted at any time during the twenty year period or following its expiration. If the twenty 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. 1911-1 may also be cancelled for non-construction, forfeiture, abandonment or three permit violations pursuant to SDCL 46-1-12, 46-5-37, 46-5-37.1, and Board Rule ARSD 74:02:01:37.

Water License No. 1911-1

- The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights
- Vested Water Right No. 441A-1 and Water Permit No. 1911-1 authorize a total combined annual diversion of 773 acre feet of water.
- The Sturgis Water Company shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer as authorized under Incorporated Water Right No. 1911-1.



Jeanne Goodman, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

NOV 09 2015

date

