WATER PERMIT NO. 2629-2

Name of Applicant: **Fall River Water Users District**

Address: **PO Bopx 321, Oral SD 57766** Phone: **605 424-7648**

Amount of Water Claimed: **724 AF** Total Acres: **NA**

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

Water to be used for: **rural water system use** County: **Fall River & Custer**

Type of Waste Disposal System:

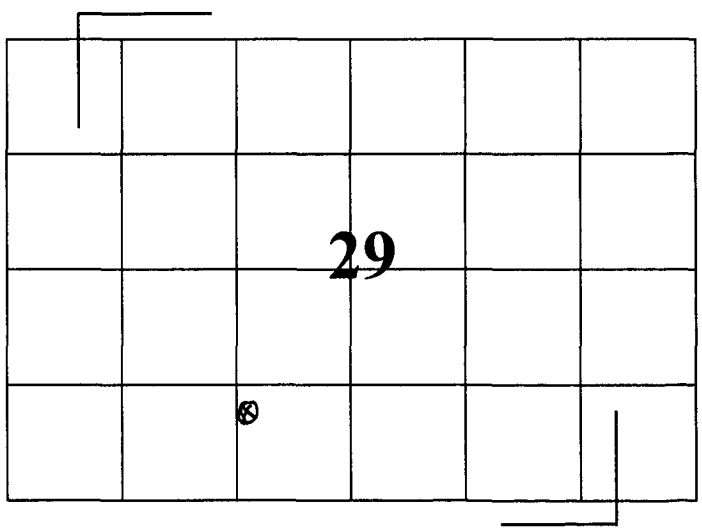
Location:

PRIORITY Date Received: **3-5-08** Application/License Fee: **$400**

Corrected Application Received: **3-13-08** Period of Annual Use: **January 1 – December 31**

Remarks: **Withdraws from Future Use Permit No. 2560B-2**

Diversion Point: **SE ¼ SW ¼ Sec 29-T7S-R6E**



Land to be Irrigated: **NA**

Depth of Well: **Madison Formation**

Well Driller:

Remarks:

Type of Map: **plat**

Prepared by: **Allen D Foster, PE**

Reviewed and the Number Assigned on: **3-18-08** By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

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

Mail to: Water Rights Program, Joe Foss Building, 523 E. Capitol, Pierre, SD 57501-3181, (605) 773-3352	(office use only) No. 2629-2 Hydrologic Unit 10120109
	Basin Upper Cheyenne
	Newspaper Hot Springs Star PO Box 100 57749 605-745-4170
	Custer Co. Chronicle PO Box 551 57730 605-673-2217

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

Check use(s) of water:

- [ ] Municipal
- [x] Rural Water System
- [ ] Domestic (over 18 gpm)
- [ ] Suburban Housing
- [ ] Commercial
- [ ] Industrial
- [ ] Recreational
- [ ] Fish & Wildlife
- [ ] Other
- [ ] Institutional
- [ ] Geothermal Heat

Type of Application: (check one)

- [ ] **New**
- [ ] **Vested Right** (Use predates Mar 2, 1955)
- [ ] **Future Use Reservation**
- [x] **Place to Beneficial Use Water Reserved by Future Use Permit No.** 2560B-2
- [ ] **Amendment/Correction to Permit No.** _____

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

1. Name of Applicant Fall River Water Users District Phone (605) 424-7648
   (check one) [ ] Owner [ ] Tenant/lessee
   Mailing Address PO Box 321 Oral State SD 57766
   (Street, RR, or Box and City) (Zip Code)
2. Amount of water claimed 1.0 *CFS or 450 **GPM 724 ***AF
   (*Cubic Feet per Second) (**Gallons per Minute) (***Acre Feet - storage capacity of dam/dugout or annual use if applicable)
3. Source of water supply Madison Formation Deep Well
4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) County Fall River
   SE 1/4 SW 1/4 Section 29 - T7S - R6E Fall River County
5. County or counties where water will be used Fall River County, Custer County
6. Annual period during which water is to be used All Year Jan 1 - Dec 31
7. 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)
   To construct and put together water reserved by Future Use Permit #2560B2 for domestic use and several rural hookups and bulk use in Oelrichs and potentially Buffalo Gap, SD

STATE OF SOUTH DAKOTA)
County of Fall River) SS

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

I, Dave Kunkler, Chairman, 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 Dave Kunkler, Chairman

Subscribed and sworn to before me this 26 day of February 20 08

Marla J. Peters
Notary Public signature

2-2007

SOUTH DAKOTA
WATER PERMIT NO. 2629-2

Date of first receipt of application March 5, 2008.
Date of return to applicant for corrections, amendments or changes March 5, 2008.
Date of receipt of corrected application March 13, 2008.

The Water Management Board approved Water Permit No. 2629-2 on May 7, 2009 for Fall River Water Users District, c/o Steve Harper, PO Box 321, Oral SD 57766 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. 2629-2 places to beneficial use 724 acre-feet of water annually at the diversion rate of 1.0 cubic feet of water per second from one well to be completed into the Madison Aquifer(approximately 2,200 feet deep) located in the SE ¼ SW ¼ Section 29-T7S-R6E (Fall River County). A portion of this water was appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2, and 2560B-2. The water will be used to supply the Fall River Water Users District which serves users in Fall River and Custer Counties.

2. The water appropriated shall be used for the purpose of rural water system 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 dates from which applicant may claim right are May 16, 2005 (350 acre feet of water) and March 5, 2008 (374 acre-feet of water).

5. One-fifth of the construction is to be completed on or before November 7, 2011.

6. All construction is to be completed on or before May 7, 2014.

7. Water is to be put to beneficial use on or before May 7, 2018.

8. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2629-2 is issued for a 20-year term. Pursuant to SDCL 46-2A-21, the 20-year term may be deleted at any time during the 20-year period or following its expiration. If the 20–year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2629-2 may also be cancelled for nonconstruction, forfeiture, abandonment, or three permit violations pursuant to SDCL 46-1-12, 46-5-37, 46-5-37.1 and ARSD 74:02:01:37.

2. The well approved under this Permit will be located near domestic wells, other wells which may obtain water from the same aquifer, as well as being in the vicinity of the Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs and Hot Springs that have the same Madison Aquifer as their source. 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, or a significant reduction in water flows from Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs and Hot Springs.

(continued)

3. The well authorized by Permit No. 2629-2 shall be constructed by a licensed well drilling and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.

4. Fall River Water Users District shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

WATER MANAGEMENT BOARD

By: Garland Erbele

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

AUG 0 5 2009
date

Form 2A **Supplemental Information**
(Complete applicable portions only)

(type or print in ink)

1. Well Information - Proposed Construction

a) Drill Hole Diameter 17½", 12¼", 8¾"-5⅞" Depth 40', 1000', 960', 400'

b) Casing Type STEEL Diameter 13⅜", 9⅝", 6⅝" Thickness STANDARD

c) Screen Type OPEN HOLE Diameter 5⅞" Thickness _____

d) Gravel Pack _____ Length of Gravel Pack _____

e) Depth to Top of Water Bearing Material 2000'±

f) Depth to Water (ground surface to water level) POTENTIOMETRIC SURFACE ESTIMATED TO BE 100' to 200' ABOVE GROUND.

g) Distance to nearest existing domestic well:

On applicants property UNKNOWN On property owned by others UNKNOWN

2. Wastewater Disposal System Information

a) Type of System (i.e. septic tank, drain field) _____

b) System Capacity (gallons) _____ Year Constructed _____

c) Connected to the City of _____ Sanitary System

3. Dugout Information

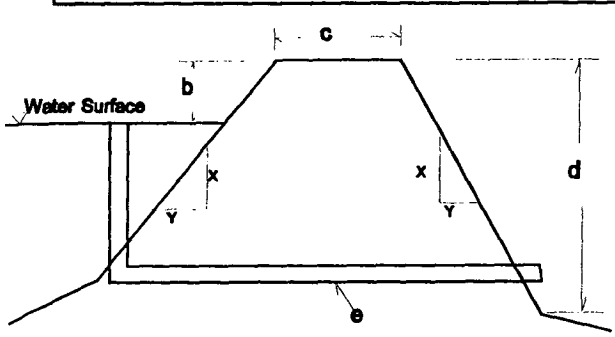
a) Surface Dimensions _____ Depth _____

b) Depth to water (ground surface to water level) _____

4. Water Storage Dams

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

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



b) Freeboard _____

c) Crest Width _____

Crest Length _____

d) Height _____

e) Primary Outlet Capacity _____

If pipe, diameter _____

f) Secondary Spillway Capacity _____

Spillway Width _____

g) X & Y Slope _____

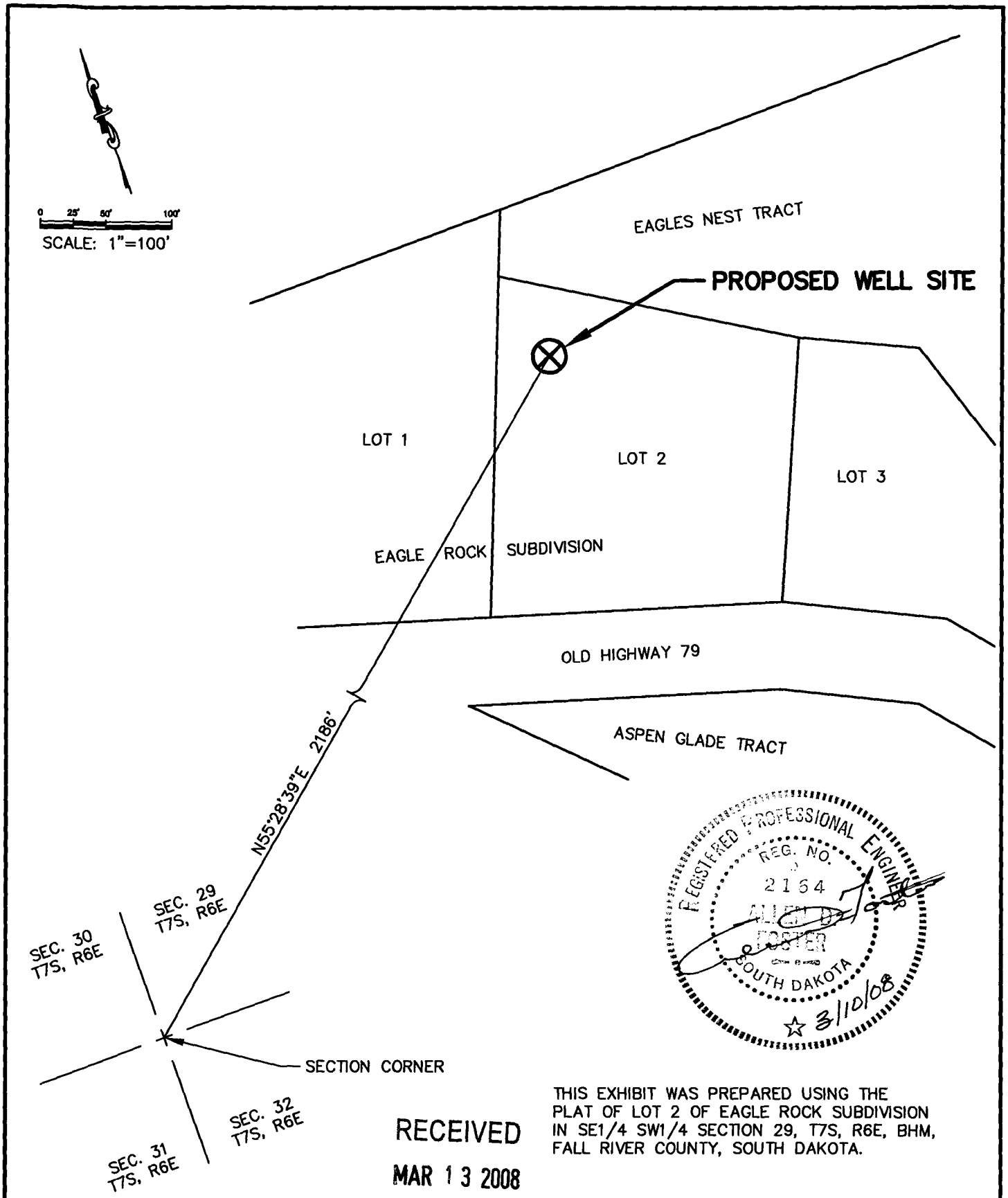
Upstream _____

Downstream _____

h) Surface Area of Impoundment _____

i) Storage _____ Acre Feet

j) Drainage Area Above Dam _____ Acres



THIS EXHIBIT WAS PREPARED USING THE PLAT OF LOT 2 OF EAGLE ROCK SUBDIVISION IN SE1/4 SW1/4 SECTION 29, T7S, R6E, BHM, FALL RIVER COUNTY, SOUTH DAKOTA.

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MAR 13 2008
WATER RIGHTS PROGRAM

LOT 2 OF EAGLE ROCK SUBDIVISION
FALL RIVER COUNTY, SD

MARCH 2008

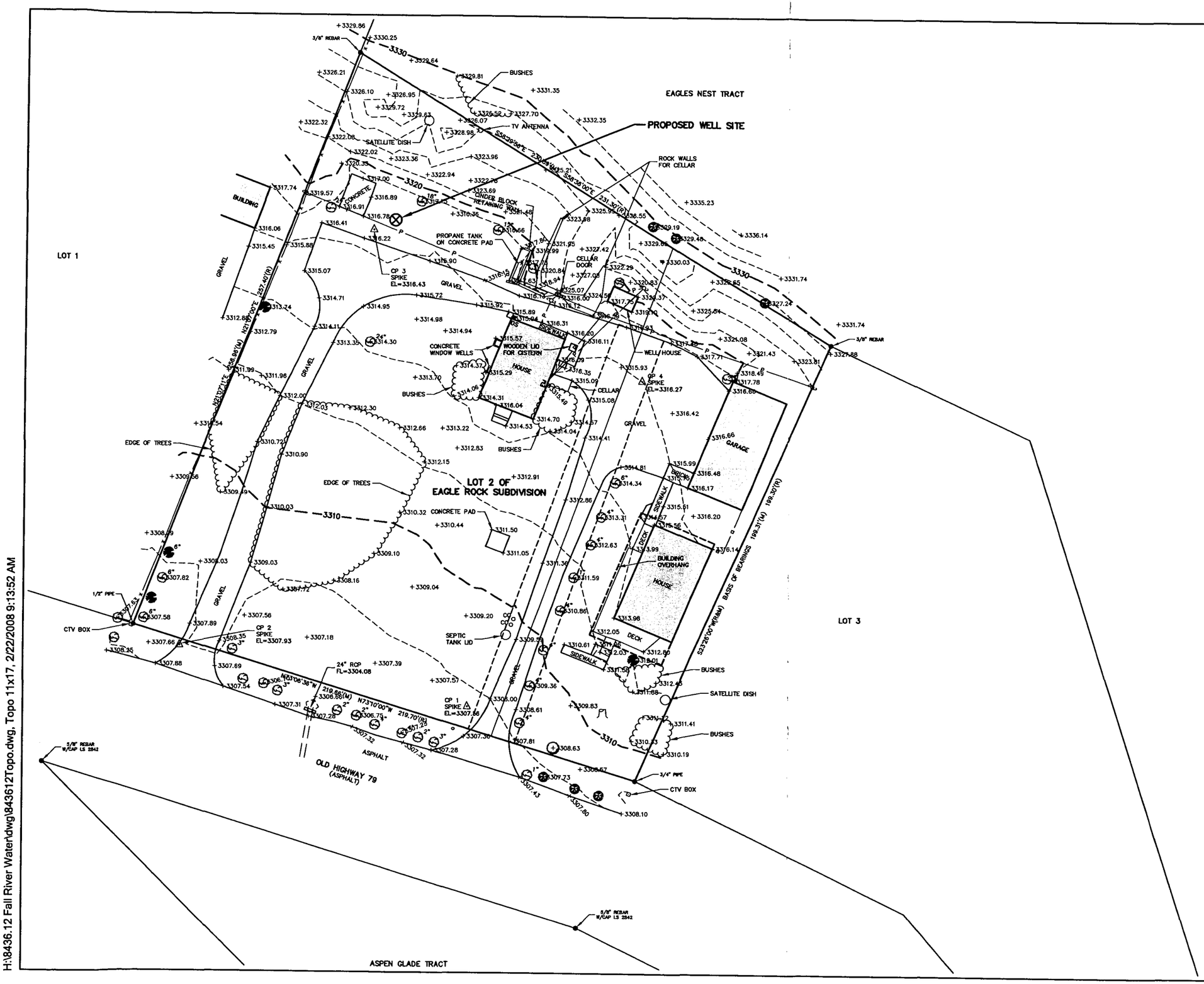
Sheet Title: WATER RIGHT LOCATION

Location: SE1/4 SW1/4 SECTION 29 T7S, R6E, BHM

Surveyed By: FMG
Date: AUGUST 2007
Designed By: ____
Drawn By: KJS
Checked By: ADF
File Number: 8436.12

F M G, Inc.
3700 Sturgis Road
Rapid City, SD 57702-0317
(605) 342-4105 FAX (605) 342-4222
www.fmgengineering.com

Sheet Number: 1
Total Sheets: 1



LEGEND

△ CP 1	SURVEY CONTROL POINT
●	FOUND SURVEY MONUMENT
+3313.70	SPOT ELEVATION
○ CO	CLEAN OUT
	POWER POLE
EM	ELECTRIC METER
DS	DOWN SPOUT
	TREE (DECIDUOUS)
	TREE (CONIFEROUS)
	BUSH (DECIDUOUS)
	BUSH (EVERGREEN)
—x—x—x—	WIRE FENCE
—□—□—□—	WOOD FENCE
—P—	OVERHEAD POWER LINE
	CONTOUR (1')
3310	CONTOUR (5')

NOTE REGARDING UTILITIES
UNLESS OTHERWISE NOTED, UTILITY LOCATIONS SHOWN ARE BASED ON FIELD MARKED LOCATIONS PROVIDED BY SOUTH DAKOTA ONE CALL, AND WHERE POSSIBLE, FIELD MEASUREMENTS. EXISTENCE AND LOCATION OF ACTUAL UTILITIES MAY VARY FROM THAT SHOWN. CONTRACTOR MUST VERIFY LOCATION OF ALL UTILITIES BEFORE EXCAVATION.

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WATER RIGHTS
PROGRAM

FMG, Inc.
3700 Sturgis Road
Rapid City, SD 57702-0317
(605) 342-4105 FAX (605) 342-4222

File Number:	8436.12
Location:	SE1/4 SW1/4 SECTION 29 T7S, R6E, BHM
Surveyed By:	JP/KS/TF
Date:	AUGUST 2007
Designed By:	
Drawn By:	JP/KJS
Checked By:	ADF

SEPTEMBER 2007

LOT 2 OF EAGLE ROCK SUBDIVISION
FALL RIVER COUNTY, SD

Revision / Date

Sheet Name:
TOPOGRAPHIC MAP

Sheet Number:
1 of 1

H:\8436.12 Fall River Water\dwg\843612Topo.dwg, Topo 11x17, 2/22/2008 9:13:52 AM

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 3/5, 20 08

RECEIVED OF Fall River Water Users District PO Box 321 Oral SD 57766

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

Fee for Application for Permit No. 2629-2 to Appropriate Water, to construct and to put water to beneficial use	325	00
Fee for Application for Permit No. ____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. ____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. 2629-2	50	00
Fee for Filing Transfer Form ____		
Fee for ____		
Fee for Issuing New Well Driller's License No. ____ for C.Y. ____		
Fee for Renewal of Well Driller's License No ____ for C.Y. ____		
Fee for Issuing Well Pump Installer's License No. ____ for C.Y. ____		
Fee for Renewal of Well Pump Installer's License No. ____ for C.Y. ____		
(Any Other Work Provided by Law) TOTAL	375	00

No. 3[illegible]9

By [signature]
Chief Engineer

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 3/13, 20 08

RECEIVED OF FALL RIVER Water Users Dist PO BOX 321 Oral SD 57766

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

Fee for Application for Permit No. 2629-2 to Appropriate Water, to construct and to put water to beneficial use	25	00
Fee for Application for Permit No. _____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____		
Fee for Filing Transfer Form _____		
Fee for _____		
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	25	00

No. 3017

By [signature]
Chief Engineer

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

RECEIVED
MAR 13 2008
WATER RIGHTS PROGRAM

March 5, 2008

Fall River Water Users District
Marla Peters
PO Box 321
Oral SD 57766

Dear Ms. Peters:

Thank you for submitting the *Application for a Permit to Appropriate Water* for rural water system use. In order to complete the application the following is required.

- Enclosed is the map submitted with the application. The map needs to reference a government section corner or quarter corner by direction or distance.
- The map must be signed by one of the following: Registered Land Surveyor, Registered Professional Engineer or by any other government employee who normally prepares maps as a part of his assigned duties (i.e. local NRCS office).
- We have received the $375.00 application filing fee. Based on the 724 acre-feet claimed, an additional $25.00 is required.

If you have any questions, please contact me.

Sincerely,

Karen Schlaak

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

enclosure

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 2629-2, Fall River Water Users District

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 2629-2, Fall River Water Users District, c/o Marla Peters, PO Box 321, Oral SD 57766.

The Chief Engineer is recommending APPROVAL of Application No. 2629-2 for a 20 year term because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) it is in the public interest with the following qualifications:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2629-2 is issued for a 20-year term. Pursuant to SDCL 46-2A-21, the 20-year term may be deleted at any time during the 20-year period or following its expiration. If the 20–year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2629-2 may also be cancelled for nonconstruction, forfeiture, abandonment, or three permit violations pursuant to SDCL 46-1-12, 46-5-37, 46-5-37.1 and ARSD 74:02:01:37.

2. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

3. The well approved under this Permit shall be valved and the flow reduced to the amount needed or to a minimum when not being used. If this well is abandoned or the Permit cancelled, the well must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04.

4. Fall River Water Users District shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

See report on application for additional information.

Garland Erbele, Chief Engineer
June 12, 2008

WATER PEMIT APPLICATION NO. 2629-2
FALL RIVER WATER USERS DISTRICT
MAY 13, 2008

Water Permit Application No. 2629-2 proposes to construct works and place to beneficial use 724 acre-feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second from one well that is to be completed into the Madison aquifer (approximately 2,200 feet deep). This water was appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2. The water will be used to supply the Fall River Water Users District which serves users in Fall River and Custer Counties.

AQUIER: Madison aquifer (MDSN)

GENERAL:
The Madison aquifer occurs within the Madison Limestone which is a fine to medium crystalline, cavernous limestone and dolomite. The Madison is laterally extensive underlying much of the Western United States. Fall River and Custer Counties are near the south eastern limit of the Madison; in fact, the Madison probably does not exist twenty miles south east of this proposed well site. (Allen and others, 1985). The Madison is estimated to be around 300 feet thick in this area (Allen and others, 1985). Geologically, the ground surface at this well site is mapped as alluvium overlying the Inyan Kara Group (Walcott, 1967). The site is situated on or very near the base of a syncline associated with the Dudley Anticline (Walcott, 1967). The top of the Madison limestone is expected to be between 1,950 and 2,000 feet below ground surface at the site proposed by this application (Carter and Redden, 1999). A Madison well in this area is expected to flow and have shut-in pressure of around 50 psi (Strobel and others, 2000).

The well site proposed by Water Permit Application No. 2629-2 is within one-half mile of a Madison aquifer well site previously permitted for Fall River Water User District (Water Permit No. 2418-2). Water Permit No. 2418-2 was cancelled March 2, 2006, for non-construction.

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."

This report will summarize a review of Water Permit Application No. 2629-2 in respect to the four criteria established by SDCL 46-2A-9.

WATER AVAILABILITY:
This application proposes to place to beneficial use water that has been reserved by a future use permit. The availability of unappropriated water from the Madison aquifer for this proposed appropriation was addressed in the approval of Future use Permit Nos. 2560-2, 2560A-2, and 2560B-2 (Water Rights, 2005), (Water Rights, 2007a), and (Water Rights, 2007b) and is therefore not an issue.

REVIEW OF EXISING WATER RIGHTS:
In addition to a number of domestic wells in the area (Water Rights, 2008b), there are 22 Water Rights/Permits appropriating groundwater within approximately five and one-half miles of the well site proposed by this application. The groundwater appropriations are from: (a) the Quaternary alluvium, (b) the Pierre Shale, (c) the Inyan Kara aquifer, (d) The Unkpapa aquifer, (e) the Minnekahta aquifer, (f) the Minnelusa aquifer, and (g) the Madison aquifer (Water Rights, 2008a). The Madison aquifer can be considered hydologically separate from the other aquifers in the area; therefore wells supplied by aquifers other than the Madison are not expected to be impacted by withdrawals from a well completed into the Madison aquifer. The nearest appropriative right supplied by a well completed into the Madison aquifer, Water Permit No. 2615-2, Fall River Water User District, is located approximately five and one-half miles northeast of this proposed well site. The next nearest Madison aquifer well supplying appropriative rights (Water Right No. 2302-2 and Water Permit No. 2546-2, both for Ebon Streeter), is located approximately nine miles northeast of this proposed well site. Deferred Water Permit Application No. 2585-2, Southern Black Hills Water is also located approximately nine miles northeast of this proposed well site. Given the distance this planned well site is from existing Madison aquifer wells and the relatively modest diversion rate proposed by this application, adverse impacts are not anticipated.

BENEFICIAL USE:
The Water Management Board is on record as considering rural water system use of water a beneficial use.

PUBLIC INTEREST ISSUES:
A potential obstacle to development of the Madison aquifer concerns the possibility of affecting discharge from springs that may originate from the Madison aquifer. The water at a number of springs in the southern Black Hills area contains geochemical and isotopic characteristics of the Madison aquifer (Whalen, 1994). These springs are classified as Type 2 springs by Rahn and Gries (1973), meaning "The springs do not dry up and serve as points of permanent discharge from the carbonate aquifer" (Rahn and Gries, 1973). A decline of the potentiometric surface in the vicinity of the springs could decrease spring discharge.

When considering Future Use Permit No. 2560-2, the Water Management Board accounted for the principle that SD Water Law does not protect artesian head pressure as a means of diversion by determining that well interference resulting in decreased discharge from "artesian" springs probably could not be considered an adverse impact. The Board recognized that "public interest" concerns existed if decreased base flows in area streams could result from well interference. Approval of Future Use Permit No. 2560-2, which reserves the water that is to be put to beneficial use by this water permit, included the following qualification:

> "At such time as definite plans are made to construct works and put the water reserved by this permit to beneficial use, specific application for all or any part of the reserved water must be submitted and approved prior to construction of facilities pursuant to SDCL 46-5-38.1 with particular attention given to the flows of Beaver Spring, Cascade Springs and Hot Springs."

Subsequently, when considering the deferral of Water Permit Application No. 2585-2, Southern Black Hills Water System, the Water Management Board adopted a conclusion of law (No. 11) which states in part "The only protection South Dakota law provides when considering an application for an underground water permit for flow from an artesian spring is under the public interest criteria." (Water Rights, 20007c).

The well site proposed by this application is located approximately eight and one-half miles southwest of Beaver Creek Springs and approximately seven and three-fourths miles northeast of Cascade Springs. Considering the distances involved, and the relatively modest diversion rate proposed by this application, interference with the flows from these two springs is not likely to be measurable on the spring discharge and therefore should not be an issue.

There are several large springs in the city of Hot Springs, a number of them discharge water that appears to have originated, at least in part, from the Madison aquifer. The springs in Hot Springs are about three and one-quarter miles northwest of this proposed well site. There are two appropriations to directly utilize the discharge of springs: Water Permit No. 2392-2, Wendell Ray Schwarz Trust; and Vested Water Right No. 2392-2, Evans Plunge, Inc. Water Permit No. 2392-2, Wendell Ray Schwarz Trust, authorizes the beneficial use (commercial recreational and domestic uses) of water from a spring know as Minnekahta Springs. The source of Minnekahta Springs may be water that originates in the Madison aquifer (SD Geological Survey) (Whalen, 1994). Vested Water Right No. 2001-2, Evans Plunge, Inc., appropriates discharge from Evans Plunge Spring for commercial and recreational purposes. The source of Evans Plunge Spring has been estimated to be mostly Madison aquifer water (Whalen, 1994).

The base flow of the Fall River (20-30 cfs) originates from the discharge of the springs near the city of Hot Springs (Naus and others, 2001). In addition to domestic uses of Fall River, there are six Water Rights/Permits appropriating water from the river. The City Hot Springs also has four appropriations (Water Right Nos. 511-2, 1878-2, 2151-2 and 2431-2) from the alluvium along Fall River. The alluvial aquifer is hydraulically connected to Fall River therefore could be impacted by decreased flows in the River.

The withdrawals proposed by this application are not likely to impact the discharge of the springs at Hot Springs or the flow of Fall River due to distance and the modest rate proposed by this application. However, this well site is located only about 300 feet from Fall River. Since Fall River and this proposed well would have a common source, (e.g. the Madison aquifer) confusion can be expected. It is important to recognize that there is over 1,950 feet of overburden separating the Madison aquifer from Fall River at this well site.

TERM LIMITATION:

SDCL 46-2A-20 requires that:

> "... no water permit for construction of works to withdraw water from the Madison formation in Butte, Fall River, Custer, Lawrence, Meade and Pennington counties may be issued for a term of more than twenty years, unless the water management board determines, based upon the evidence presented at the hearing that:
>
> (1) Sufficient information is available to determine whether any significant adverse hydrologic effects on the supply of water in the Madison formation would result if the proposed withdrawal were approved; and
>
> (2) The information, whether provided by the applicant or by other means, show that there is a reasonable probability that issuance of the proposed permit would not have a significant adverse effect on nearby Madison formation wells and springs."

Evidence is not available to justify issuing this permit without a term limitation of 20 years.

CONCLUSIONS:

1. Water Permit Application No. 2629-2 does not propose any additional appropriation from the Madison aquifer.

2. Well interference is not expected to be adverse due to the distance between appropriations and the relatively modest diversion rate proposed.

3. The discharge of area springs is not expected to be affected due to the distance between appropriations and the relatively modest diversion rate proposed.

4. This application proposes to appropriate 724 ac-ft/yr of water at a diversion rate of 1.0 cfs. The actual volume pumped will be less than 724 ac-ft/yr since it is not realistic to assume pumping at 100% of the authorized rate full time.

5. A Madison aquifer well at this proposed well site is expected to flow. The well should be valved and the flow reduced to the amount needed or to a minimum when not being used.

6. Information is not available to justify issuing this permit without a term limitation of 20 years.

Ken Buhler
Natural Resources Engineering Specialist

Approved by

James A. Goodman, P.E.
Natural Resources Engineering Director

REFERENCES:

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

Carter, J.M., and Redden, J.A., 1999, 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

Naus, C.A., Driscoll, D.G., and Carter, J.M., 2001, Geochemistry of the Madison and Minnelusa Aquifers in the Black Hills Area, South Dakota: U.S. Geological Survey Water-Resources Investigations Report 01-4129, 118 p.

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RECEIVED
JUL - 7 2008
WATER RIGHTS PROGRAM

Affidavit of Publication

State of South Dakota)
)ss.
County of Custer)

Charles W. Najacht of said county, being duly sworn, on oath says that he is publisher of the Custer County Chronicle, a weekly newspaper printed and published in Custer City, said County of Custer and has full and personal knowledge of all the facts herein stated; that said newspaper is a legal newspaper and has a bona-fide circulation of at least two hundred copies weekly, and has been published within said County for fifty-two successive weeks next prior to the publication of the notice herein, mentioned, and was and is printed wholly or in part in an office maintained at said place of publication: that the

Fall River Water Users
Notice of Application

a printed copy of which, taken from the paper in which the same was published, is attached to this sheet, and is made a part of this Affidavit, was published in said newspaper at least once each week for 2 successive week(s), on which said newspaper was regularly published, to wit:

June 25, 2008; July 2, 2008;
____, ____; ____, ____;
____, ____; ____, ____;
____, ____; ____, ____;
____, ____; ____, ____;

the full amount of the fees for the publication of the annexed notice is $ 40.84.

Charles W. Najacht

Subscribed and sworn to me before this 2
of July, 2008;

Norma Najacht
NOTARY PUBLIC

MY COMMISSION EXPIRES: May 5, 2012

NORMA NAJACHT
NOTARY PUBLIC
SOUTH DAKOTA
SEAL SEAL

NOTICE OF APPLICATION

NO. 2629-2 TO APPROPRIATE WATER

Notice is given that Fall River Water Users District, c/o Marla Peters, PO Box 321, Oral SD 57766 has filed an application for a water permit to construct and place to beneficial use 724 acre-feet of water annually at the diversion rate of 1.0 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,200 feet deep) located in SE.1/4 SW 1/4 Section 29-T7S-R6E (Fall River County). This water was appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2. The water will be used to supply the Fall River Water Users District which serves users in Fall River and Custer Counties.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2629-2 because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. 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 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 July 14, 2008.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the 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. Pimer, Secretary, Department of Environment and Natural Resources.

#180, 6/26, 7/2

AFFIDAVIT OF PUBLICATION

State of South Dakota)
) ss.
County of Fall River)

Brett Nachtigall of Hot Springs, Fall River County, South Dakota, being duly sworn, upon oath says that he is the publisher of the Hot Springs Star, as a legal newspaper, as defined in SDCL 17-2-2.1 through 17-2-2.4 inclusive, and is published at Hot Springs, county and state aforesaid; that the advertisement headed –

#282 - Notice

a true printed copy thereof is hereunto annexed, was published in the said Hot Springs Star, in the regular and entire issue of said paper,

for two

successive issues, beginning with the

issue dated

June 24, 2008

and ending with the issue dated

July 1, 2008

That the full amount of the fee charged for the publication of said notice is

$ 47.00, and that no aggreement or understanding, for the division thereof, has been made with any other person, and that no part thereof has been agreed to be paid to any person whomsoever, that the whole amount insures to the benefit of the publishers of said newspaper.

Subscribed and sworn to before me

this 1 day of July

20 08.

Notary Public

My Commission Expires
June 4, 2009

RECEIVED
JUL 11 2008
WATER RIGHTS PROGRAM

NOTICE OF APPLICATION NO. 2629-2 TO APPROPRIATE WATER

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Steven M. Pirner, Secretary
Department of Environment and Natural Resources.

Jun. 24, Jul. 1

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 13, 2008

Custer County Chronicle
PO Box 551
Custer SD 57730

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 2629-2 to Appropriate Water to be published twice. Please publish the first notice on June 25, 2008 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is Fall River Water Users District, c/o Marla Peters, PO Box 321, Oral SD 57766 (Ph # 605-424-7648).

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----------

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

No. 2629-2

Date_____

We are in receipt of your letter of June 13, 2008 enclosing Notice to Appropriate Water by Application No. 2629-2 which was first published in our issue of_____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

_____ _____
Name Newspaper

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 13, 2008

Hot Spring Star
PO Box 100
Hot Springs SD

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 2629-2 to Appropriate Water to be published twice. Please publish the first notice on June 24, 2008 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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Natural Resources Engineer
605 773-3352

enclosures

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

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

No. 2629-2

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We are in receipt of your letter of June 13, 2008 enclosing Notice to Appropriate Water by Application No. 2629-2 which was first published in our issue of_____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

_____ _____
Name Newspaper

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

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

June 13, 2008

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Dear Ms. Peters:

Water Permit Application No. 2629-2 for rural water system 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 Hot Springs Star printed at Hot Springs SD (Ph # 605-745-4170) and the Custer County Chronicle printed at Custer SD (Ph # 605-673-2217). You will need to contact the newspapers 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 newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization, the publishers have been instructed to publish your notice once each week for two consecutive weeks. The newspapers have 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

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 June 24, 2008 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 2629-2 to Appropriate Water

Notice is given that Fall River Water Users District, c/o Marla Peters, PO Box 321, Oral SD 57766 has filed an application for a water permit to construct and place to beneficial use 724 acre-feet of water annually at the diversion rate of 1.0 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,200 feet deep) located in SE ¼ SW ¼ Section 29-T7S-R6E (Fall River County). This water was appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2. The water will be used to supply the Fall River Water Users District which serves users in Fall River and Custer Counties.

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DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 13, 2008

Southern Black Hills Water System
c/o Don Peterson
27819 Hidden Valley Road
Oral SD 57766

Dear Mr. Peterson:

Please find enclosed the report, recommendation and public notice for Water Permit Application No. 2629-2 filed by Fall River Water Users District. This is an application to construct and place to beneficial use water reserved by the District's future use permit.

This is being sent to keep the District informed regarding water permitting in this area.

Sincerely,

Eric Gronlund
Water Rights Program, DENR
605 773-3352

enclosures

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

June 13, 2008

Charles Pettee, Chief
Water Rights Branch
National Park Service
1201 Oakridge Drive, Sutie 250
Fort Collins CO 80525-5596

Peter Fahmy
Water Rights Branch
National Park Service
1201 Oakridge Drive, Sutie 250
Fort Collins CO 80525-5596

Gentleman

Please find enclosed the report, recommendation and public notice for Water Permit Application No. 2629-2 filed by Fall River Water Users District in South Dakota. This is an application to construct and place to beneficial use water reserved by the District's future use permit.

This is being sent to keep the Park Service apprised of water permitting in this area.

Sincerely,

Eric Gronlund
Water Rights Program, DENR
605 773-3352

enclosures

RECEIVED

JUL - 9 2008

WATER RIGHTS PROGRAM

To Chief Engineer "Water Rights Program, Foss Building, 523 E. Capital, Pierre,SD 57501

Subject on notice of application No. 2629-2 to appropriate water. Fall River Water Users District is

requesting a permit to drill into the Madison Aquifer located in SE1/4 SW1/4 Section 29-T7S-R6E (Fall River County). We feel this matter needs to be looked into further because of many reasons. Fall River Water Users District already is under a contract with Hot Springs to recieve water until August 2022. They have not even used to full capacity amount under contract. Which is up to 750,000 gallons per day. The concern of our group is if they are requesting to drill and pump 1.0 cubic feet of water per second, which equates to approximately 475 gallons per minute. They also can still be given larger amounts from the City of Hot Springs under the existing contract. These figures need to be checked into more closely before this permit is given. Due to the fact we have also had Southern Black Hills Water System trying to obtain water off of the same area of aquifer towards the north expansion to Custer. They are looking for a source of up to 300,000 gallons from the city per day and have found some sources possiable close to the recharge area for Hot Springs.

Not only has Wind Cave Park had many concerns about the amount of water that keeps being requested by these private companies, but the people who care about the Fall River, who are concerned it will cause depletion of it. The temperature of the water is much higher than most streams and rivers, so as it condences it has less oxygen which will cause loss of aquatic life forms. This also needs to be looked into. Taking for example the fact that Spring Creek has lost flow and had high amounts of pollutants created from over development of the upper Madison aquifer by Spearfish.

One other point that is upsetting is the fact that the Fall River Water Users made a choice not to help recharge the planes at the airport during the Alabaugh Fire. Which could have helped to control it quicker. Explaning they were concerned about the people they needed to provide water to may cause damage to the pipes. Even though in the contracted agreement with the city, that the city would be responsible for maintenance of the meter pit and after 7000 gallons of water the city would pay for water being used at the airport.

Knowing all the lawsuits going on with rural water systems we feel the state has an obligation to the people to make sure that no damage happens to the aquifers by taking too much off the sources in areas, and making sure that all questions and studies have been done to protect the people and eviroment from over use of water.

We oppose this without further study and explanation to the people signing this who have groundwater wells below this sight and the preservation of Fall River in Fall River County.

Susan Henderson 11507 Hwy 471, Edgemont SD 57735
Georgia Sample 13126 Eagle Rock Rd Hot Springs SD 57747
Richard Jensen & Jacki Lockwood
27635 Scenic Rd Hot Springs
John M. Mullin
Paulette Hindschert 13101 Wild Turkey Lane Hot Springs
Tom Hindschert 13101 Wild Turkey Lane Hot Springs SD
Sylvia L. Jensen 13223 Fall River Rd, Hot Springs, SD

RECEIVED

JUL - 9 2008

WATER RIGHTS PROGRAM

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We oppose this without further study and explanation to the people signing this who have groundwater wells below this sight and the preservation of Fall River in Fall River County.

Brenda Ornache 13024 Fall RiVER Rd, Hot Springs, SD 57747
Audrey Estes 27660 Scenic Rd Hot Springs, SD 57747
Elton L. Unriker 13095 Wild Turkey Ln Hot Springs, SD 57747
Jack Lockwood - Richard Jensen
27635 Scenic Road Hot Springs SD
27631 Scenic Rd. Hot Springs SD
Cindy Powell 27627 Garden Dr. Hot Springs SD
27679 Hwy 385 Hot Springs, SD 57747

To Steve Pirner. Secretary Department of Enviroment and Natural Resources,

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7456568
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Audrey L Estes 27660 Scenic Road Hot Springs S.D. 57747
Eldon L. Umiker 13095 Wild Turkey Ln Hot Springs, SD 57747
Lindy Powell 27627 Garden Dr. Hot Springs
[illegible] Tonner 27679 Hwy 385 Hot Springs SD

RECEIVED

JUL - 8 2008

DEPT. OF ENVIRONMENT AND
NATURAL RESOURCES,
SECRETARY'S OFFICE

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Subject on notice of application No. 2629-2 to appropriate water. Fall River Water Users District is
requesting a permit to drill into the Madison Aquifer located in SE1/4 SW1/4 Section 29-T7S-R6E (Fall River County). We feel this matter needs to be looked into further because of many reasons. Fall River Water Users District already is under a contract with Hot Springs to recieve water until August 2022. They have not even used to full capacity amount under contract. Which is up to 750,000 gallons per day. The concern of our group is if they are requesting to drill and pump 1.0 cubic feet of water per second, which equates to approximately 475 gallons per minute. They also can still be given larger amounts from the City of Hot Springs under the existing contract. These figures need to be checked into more closely before this permit is given. Due to the fact we have also had Southern Black Hills Water System trying to obtain water off of the same area of aquifer towards the north expansion to Custer. They are looking for a source of up to 300,000 gallons from the city per day and have found some sources possiable close to the recharge area for Hot Springs.

Not only has Wind Cave Park had many concerns about the amount of water that keeps being requested by these private companies, but the people who care about the Fall River, who are concerned it will cause depletion of it. The temperature of the water is much higher than most streams and rivers, so as it condences it has less oxygen which will cause loss of aquatic life forms. This also needs to be looked into. Taking for example the fact that Spring Creek has lost flow and had high amounts of pollutants created from over development of the upper Madison aquifer by Spearfish.

One other point that is upsetting is the fact that the Fall River Water Users made a choice not to help recharge the planes at the airport during the Alabaugh Fire. Which could have helped to control it quicker. Explaning they were concerned about the people they needed to provide water to may cause damage to the pipes. Even though in the contracted agreement with the city, that the city would be responsible for maintenance of the meter pit and after 7000 gallons of water the city would pay for water being used at the airport.

Knowing all the lawsuits going on with rural water systems we feel the state has an obligation to the people to make sure that no damage happens to the aquifers by taking too much off the sources in areas, and making sure that all questions and studies have been done to protect the people and eviroment from over use of water.

We oppose this without further study and explanation to the people signing this who have groundwater wells below this sight and the preservation of Fall River in Fall River County.

Richard Jensen Jackie Jackson
27635 Scenic Road - Hot Springs

27631 Scenic Rd.

27679 Hwy 385 Hot Springs SD

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

October 22, 2008

NOTICE

TO: Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766
And Parties of Record (see attached list)

FROM: Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Notice of Hearing on Water Permit Application No. 2629-2, Fall River Water Users District

Petitions signed by thirteen citizens were submitted in opposition to Water Permit Application No. 2629-2 filed by Fall River Water Users District. The petitions were filed in response to the Notice of Application to appropriate water published in the Hot Springs Star printed in Hot Springs SD and the Custer County Chronicle printed in Custer SD. This notice schedules a hearing before the Water Management Board to consider this application.

Application No. 2629-2 proposes to construct and place to beneficial use 724 acre-feet of water annually at the diversion rate of 1.0 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,200 feet deep) located in SE ¼ SW ¼ Section 29-T7S-R6E (Fall River County). This water was appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2. The water will be used to supply the Fall River Water Users District which serves users in Fall River and Custer Counties.

The Water Management Board will conduct a hearing to consider Application No. 2629-2 at 8:30 AM (Central Time) on Wednesday, December 10, 2008 at the Pierre Chamber of Commerce, 800 West Dakota Avenue, Pierre SD. Future notice will be provided to all parties if there are changes to the hearing time. Pursuant to SDCL 46-2-9, 46-2-11, and 46-2A-23, the Board has legal authority and jurisdiction to conduct this hearing.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2629-2 for a 20 year term because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) it is in the public interest. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1)

approve, 2) approve with qualifications, 3) defer, or 4) deny the application based on the evidence presented at the public hearing. This evidentiary hearing is petitioner's opportunity to bring forth their concerns with this application.

The December 10, 2008, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any party of record opposing the application. The request for an automatic delay must be filed by November 28, 2008.

This hearing may be an adversarial proceeding. Any party of record and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

Enclosed is a copy of the report, recommendation and petitions in the matter of Water Permit Application No. 2629-2. State law directs the Chief Engineer to provide Water Management Board members with a copy of all pleadings including petitions for each proceeding. This same information will be sent to the Board members in advance of the hearing. In addition, enclosed are two documents intended to acquaint parties with the hearing process entitled "Procedure for Hearings before the Water Management Board" and "Summary of South Dakota Water Laws and Rules". You are encouraged to review these documents prior to the hearing.

The application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-23; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31, 46-6-3, 46-6-3.1; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

Questions regarding the hearing process may be directed to Eric Gronlund, Water Rights Program at (605) 773-3352. In addition, please notify the Department of Environment and Natural Resources at least 48 hours before the hearing if you have a disability for which special arrangements must be made at the hearing.

c: Diane Best, Assistant Attorney General

NOTE: Since this matter does not involve a monetary controversy in excess of $2,500.00 or termination of a property right in accordance with SDCL 1-26-18.3, the Chief Engineer has determined this contested case need not be referred to the Office of Hearing Examiners. If any party disagrees with this determination, the Chief Engineer shall be notified by November 28, 2008.

Parties of Record
Water Permit Application No. 2629-2, Fall River Water Users District

Applicant

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Petitioners

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Eldon Umiker
13095 Wild Turkey Lane
Hot Springs SD 57747

John Imberi
27631 Scenic Road
Hot Springs SD 57747

Laura Inman
27679 Hwy 385
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Rd
Hot Springs SD 57747

Sylvia Fossen
13223 Fall River Road
Hot Springs SD 57747

Audrey Estes
27660 Senic Road
Hot Springs SD 57747

Jacki Lockwood & Richard Jensen
27635 Scenic Road
Hot Springs SD 5747

Cindy Powell
27627 Garden Drive
Hot Springs SD 57747

Susan Henderson
11507 Hwy 471
Edgemont SD 57735

Tom and Paulette Hinderscheit
13101 Wild Turkey Lane
Hot Springs SD 57747

CERTIFICATION

I hereby certify that on October 22, 2008, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated October 22, 2008, regarding hearing for Water Right Permit Application No. 2629-2, as addressed below and on the attached parties of record list:

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

A copy of the above described Notice was sent Inter-office to:

Diane Best, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson

Gail Jacobson
Water Rights Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 23rd day of October 2008.

Karen Schlaak

Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

December 2, 2008

NOTICE

TO: Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766
And Parties of Record (see attached list)

FROM: for Garland Erbele, Chief Engineer Eric Gerlach
Water Rights Program

SUBJECT: Automatic Delay of Hearing on Water Permit Application No. 2629-2, Fall River Water Users District

A petition to intervene signed by thirteen citizens was submitted in response to the public notice in the Hot Springs Star and Custer County Chronicle for Water Permit Application No. 2629-2 filed by Fall River Water Users District. The evidentiary hearing before the Water Management Board in the matter of Water Permit Application No. 2629-2 was scheduled for December 10, 2008 in Pierre. In response to the October 22nd notice scheduling a hearing, Interveners Georgia Sample and Brenda Gamache have invoked the provision of SDCL 46-2A-5 which provides that any party who has intervened has an opportunity to delay the hearing for at least twenty days. A copy of their request is enclosed. Therefore, the evidentiary hearing on Application No. 2629-2 is automatically delayed pursuant to SDCL 46-2A-4 and 46-2A-5 and will not be held on December 10, 2008.

In addition to the request for delay, Interveners Sample and Gamache also requested a change in venue and referral to the Office of Hearing Examiners. These matters will need to be addressed prior to any evidentiary hearing.

The Board is holding its regularly scheduled meeting on December 9 – 11, 2008 for other water management matters. Accordingly, the requests for change in venue and referral to Office of Hearing Examiners will be considered by the Board at 8:30 AM (Central Time), December 10, 2008 at the Pierre Chamber of Commerce, 800 West Dakota Avenue, Pierre SD. This hearing will be limited to these and any other motions or scheduling items. Failure to participate in this motion hearing will ***not*** forfeit the right to participate at the evidentiary hearing in March.

The evidentiary hearing to consider Application Nos. 2629-2 is tentatively scheduled for the March 11 - 12, 2009, Water Management Board meeting to be held in Pierre. Future notice of the time and place of the hearing for Application No. 2629-2 will be provided to all parties of record.

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

enclosure

c: Diane Best, Assistant Attorney General

Parties of Record
Water Permit Application No. 2629-2, Fall River Water Users District

Applicant

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Petitioners

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Eldon Umiker
13095 Wild Turkey Lane
Hot Springs SD 57747

John Imberi
27631 Scenic Road
Hot Springs SD 57747

Laura Inman
27679 Hwy 385
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Rd
Hot Springs SD 57747

Sylvia Fossen
13223 Fall River Road
Hot Springs SD 57747

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Cindy Powell
27627 Garden Drive
Hot Springs SD 57747

Susan Henderson
11507 Hwy 471
Edgemont SD 57735

Tom and Paulette Hinderscheit
13101 Wild Turkey Lane
Hot Springs SD 57747

CERTIFICATION

I hereby certify that on December 2, 2008, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated December 2, 2008, regarding automatic delay of the hearing for Water Right Permit Application No. 2629-2, as addressed below and on the attached parties of record list:

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

A copy of the above described Notice was sent Inter-office to:

Diane Best, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson
Gail Jacobson
Water Rights Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 2nd day of December, 2008.

Karen Schlaak
Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

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November 28, 2008

DENR
Attn: Garland Erbele - Chief Engineer
Water Rights Program
PMB 2020
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

Re: Notice of Hearing on Water Permit application No. 2629-2 Fall River Water Users District

Subject: Scheduled hearing - December 10, 2008

Petitioners request a delay of Scheduled Hearing to consider Application No. 2629-2 at 8:30AM (Central Time) on Wednesday, December 10, 2008 at the Pierre Chamber of Commerce.

Petitioners respectfully request a change of venue of this proposed meeting to Hot Springs Area Chamber of Commerce, 801 S. 6th Street, Hot Springs, SD.

Petitioners request DENR make public their recommendation for the preferred Wellhead Delineation Method and reasoning supporting the recommendation, as well as the disadvantage of preferred method.

Petitioners request this matter be allowed to be referred to the Office of Hearing Examiners.

Petitioners request from Fall River Water Users District to be made public the proposed site development: ie, holding tank, chemical treatment, pressure tank and electrical requirements.

This request is being sent per phone conversation with Eric Gronlund 11/24/08 at approximately 2:00 pm this letter is postmarked on 11/2808 in accordance with DENR Water Management Board Procedure.

Respectfully,

Brenda Gamache
13024 Fall River Road
Hot Springs, SD 57747

Georgia Sample
13124 Eagle Rock Road
Hot Springs, SD 57747

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BANGS McCULLEN
LAW FIRM

Reply to Rapid City Office

Writer's e-mail address: mhickey@bangsmccullen.com

December 22, 2008

Ms. Diane Best
Department of Environment and National Resources
Water Rights Program
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3182

Re: *In the Matter of the Application of Fall River Water Users District No. 2629-2*

Dear Diane:

Please find enclosed our proposed Order. If the same meets with your approval, please present it to Mr. Hoyt for signing and filing.

By copy of this letter, copies have been sent to all parties of record, which is intended as service by mail upon them.

If you have any questions or comments, please advise. Thank you.

Sincerely,

BANG, McCULLEN, BUTLER,
FOYE & SIMMONS, L.L.P.

Michael M. Hickey

mmh:bah
Enclosures
cc/encl: Garland Erbele, Brenda Gamache, Georgia Sample, Audrey Estes, Eldon Umiker, Jacki Lockwood & Richard Jensen, John Imberi, Cindy Powell, Laura Inman, Susan Henderson, Tom and Paulette Hinderscheit, Sylvia Fossen, Marla Peters

RAPID CITY
Thomas H. Foye
Thomas H. Simmons
Charles G. Miller
Alan R. Nelson
Steven J. Hickey
Michael M. Hickey
Terry L. Pawelski
Kent Schlimgen
Daniel F. Duffy
Jeffrey G. Hurd
John M. Fitzgerald
Jerry G. Wollmergaard
Steven R. Nelson
Gregory J. Erlandson
Eric J. Picker
Riley J. Wilson
Sarah L. Baron Houy
J. Chad A. Williams
Kristin M. Taggart

SIOUX FALLS
John P. Mullen
Brian K. Kirby
Victoria M. Duehr
Patrick J. Kriegh
Thomas J. Von Wald
Brian R. Schumacher

Attorneys also admitted in Nebraska, North Dakota, Iowa, Minnesota and Missouri

RAPID CITY
First Western Gateway
905 West Boulevard
Suite 400
P.O. Box 2670
Rapid City, South Dakota
57709-2670
P (605) 343-1040
F (605) 343-1503

SIOUX FALLS
Sioux Center Building
101 N. 63th Street
Suite 200
P.O. Box 88200
Sioux Falls, South Dakota
57109-8200
P (605) 336-6800
F (605) 336-6809

RECEIVED
DEC 23 2008
WATER RIGHTS PROGRAM

STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	))))	**ORDER**

On the 10th day of December, 2008, the above matter came on for hearing before the Water Management Board concerning motions by Petitioners Brenda Gamache and Georgia Sample to refer this proceeding to the Office of Hearing Examiners, to change the venue of the hearing on this application to the Hot Springs Area Chamber of Commerce and to require the Water Users District to make public certain information concerning the development of the proposed well site. At the time of the hearing, the Water Management Board considered the written and oral arguments of the applicant, the Chief Engineer, and the petitioners and being fully advised hereby

ORDERED that Petitioners' motion to refer this matter to the Office of Hearing Examiners is hereby denied, and it is further

ORDERED that Petitioners' motion to change venue to Hot Springs is hereby denied; and it is further

ORDERED that Petitioners' request for discovery is pre-mature but that the Applicant, Fall River Water Users District, shall respond to any proper discovery requests submitted by the Petitioners in accordance with the rules applicable to proceedings before the Water Management Board.

Dated this ___ day of _____, 2008, nunc pro tunc December 10, 2008.

SOUTH DAKOTA WATER MANAGEMENT BOARD

BY:_____
Everett Hoyt, Chairman

CERTIFICATE OF SERVICE

The undersigned hereby certifies that he served a copy of this legal document upon the persons herein next designated, all on the date below shown, by depositing copies thereof in the United States mail at Rapid City, South Dakota, postage prepaid, in an envelope addressed to said addressee, to wit:

Garland Erbele, Chief Engineer
Water Rights Program
Joe Foss Building
523 East Capitol
Pierre, SD 57501

Brenda Gamache
13024 Fall River Road
Hot Springs, SD 57747

Georgia Sample
13126 Eagle Rock Road
Hot Springs, SD 57747

Audrey Estes
27660 Scenic Road
Hot Springs, SD 57747

Eldon Umiker
13095 Wild Turkey Lane
Hot Springs, SD 57747

Jacki Lockwood & Richard Jensen
27635 Scenic Road
Hot Springs, SD 57747

John Imberi
27631 Scenic Road
Hot Springs, SD 57747

Cindy Powell
27627 Garden Drive
Hot Springs, SD 57747

Laura Inman
27679 Hwy 385
Hot Springs, SD 57747

Susan Henderson
11507 Hwy 471
Edgemont, SD 57735

Tom and Paulette Hinderscheit
13101 Wild Turkey Lane
Hot Springs, SD 57747

Sylvia Fossen
13223 Fall River Road
Hot Springs, SD 57747

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral, SD 57766

which are the last addresses of the addressees known to the subscriber.

Dated this 22nd day of December, 2008.

MICHAEL M. HICKEY

CERTIFICATE OF SERVICE

The undersigned hereby certifies that he served a copy of this legal document upon the persons herein next designated, all on the date below shown, by depositing copies thereof in the United States mail at Rapid City, South Dakota, postage prepaid, in an envelope addressed to said addressee, to wit:

Garland Erbele, Chief Engineer
Water Rights Program
Joe Foss Building
523 East Capitol
Pierre, SD 57501

Brenda Gamache
13024 Fall River Road
Hot Springs, SD 57747

Georgia Sample
13126 Eagle Rock Road
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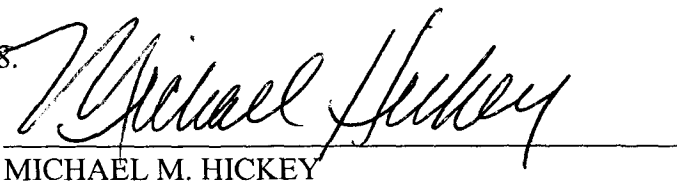
Hot Springs, SD 57747

Sylvia Fossen
13223 Fall River Road
Hot Springs, SD 57747

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral, SD 57766

which are the last addresses of the addressees known to the subscriber.

Dated this 22nd day of December, 2008.



MICHAEL M. HICKEY

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

December 23, 2009

Everett Hoyt, Chairman
Water Management Board
4422 Carriage Hills Drive
Rapid City SD 57702

Dear Chairman Hoyt:

Michael Hickey, counsel for Fall River Water Users District, drafted the enclosed order concerning motions brought before the Board on December 10th in the matter of Water Permit Application No. 2629-2. The submittal was accompanied by a certificate of service to parties of record.

Diane Best, counsel for DENR, has reviewed the order and finds it acceptable. Please review the order and if it is satisfactory, I ask that you sign and return to DENR in the self address stamped envelope that is provided. DENR will then serve the signed order on parties along with scheduling Application No. 2629-2 for the March hearing.

Have a Great Holiday!

Eric Gronlund
Water Rights Program, DENR
605 773-3352

enclosure

c: Jeff Hallem, Assistant Attorney General

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STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	))))	**ORDER**

On the 10th day of December, 2008, the above matter came on for hearing before the Water Management Board concerning motions by Petitioners Brenda Gamache and Georgia Sample to refer this proceeding to the Office of Hearing Examiners, to change the venue of the hearing on this application to the Hot Springs Area Chamber of Commerce and to require the Water Users District to make public certain information concerning the development of the proposed well site. At the time of the hearing, the Water Management Board considered the written and oral arguments of the applicant, the Chief Engineer, and the petitioners and being fully advised hereby

ORDERED that Petitioners' motion to refer this matter to the Office of Hearing Examiners is hereby denied, and it is further

ORDERED that Petitioners' motion to change venue to Hot Springs is hereby denied; and it is further

ORDERED that Petitioners' request for discovery is pre-mature but that the Applicant, Fall River Water Users District, shall respond to any proper discovery requests submitted by the Petitioners in accordance with the rules applicable to proceedings before the Water Management Board.

Dated this ___ day of _____, 2008, nunc pro tunc December 10, 2008.

SOUTH DAKOTA WATER MANAGEMENT BOARD

BY:_____
Everett Hoyt, Chairman

Fall River Water Users District
PO Box 321
Oral, SD 57766
Phone: 424-7648
Fax: 424-7748

December 5,2008

Water Management Board
Pierre Chamber of Commerce
800 West Dakota Ave
Pierre, SD 57501

Dear Sirs:

On Dec. 1, 2008 Fall River Water User District was notified that the hearing for the appropriation of water permit #2626-2 is being delayed from the scheduled December 10, 2008 date by request of petitioners Brenda Gamache and Georgia Sample. It is further noted that the petitioners request a change of venue and that the hearing be referred to the Office of Hearing Examiners.

The FRWUD Board of Directors, respectfully request that the Water Management Board deny the request for the following reasons:

1. The Water Management Board and DENR have the responsibility and expertise to evaluate this and all other water appropriations.
2. The FRWUD Board feels that to refer this hearing to the office of Hearing Examiners would be discriminatory to the constituents of the FRWUD, as other such water appropriation hearings have not been referred to the Office of Hearing Examiners.
3. The petitioners do not state any personal damages that will occur to them by the granting of appropriation #2629-2 to Fall River Water Users District.

FRWUD Directors have attempted many times to negotiate a new fair, long term, secure, cost effective source of water contract from the city of Hot Springs. Hot Springs feels that in a new contract they should be able to continue to raise the cost of water each year and to drastically reduce or even terminate FRWUD water at will. Because of the uncooperative feelings by many of the citizens of Hot Springs about negotiating a fair, long term, secure, contract; the FRWUD Board feels it would be discriminatory to change the venue for the proposed hearing to Hot Springs. FRWUD is requesting water application permit #2629-2 to provide a long term, secure, cost effective source of water for the hundreds of constituents served by Fall River Water Users District.

The Board of Directors of FRWUD, therefore, respectfully request that the Water Management Board deny the request for the change in venue and referral to the Office of Hearing Examiners.

Respectfully,

Dave Dunbar
Chairman of the Board, Fall River Water Users District

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Everett E. Hoyt

4422 Carriage Hills Drive
Rapid City, South Dakota 57702
E-mail: evhoyt@rap.midco.net
Home: 605-343-2707 Cell: 605-430-2150
FAX: 605-341-3606

December 31, 2008

Mr. Eric Gronlund
SD DENR
523 East Capitol Avenue
Pierre, SD 57501

Re: Order in 2629-2

Dear Eric,

You will find enclosed an executed Order in Docket 2629-2 relating to the Motion by Intervenors Gamache and Sample. This draft of the Order has been edited by Jeff Hallem and myself to more completely reflect the action by the Water Management Board during proceedings on December 10, 2008. Please provide service of the Order on the parties, counsel, and intervenors in Docket 2629-2.

Sincerely yours,

EH

Encl: Order in Docket 2629-2

and Happy New Year!

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

January 2, 2009

NOTICE

TO: Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766
And Parties of Record (see attached list)

FROM: Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Water Permit Application No. 2629-2, Fall River Water Users District

At their December 10, 2008, the Water Management Board conducted a motions hearing on issues raised by Petitioners' Gamache and Sample in their November 28, 2008 request for delay of the December 10th evidentiary hearing. Enclosed is the Board's order denying the Petitioner's motion to refer this matter to the Office of Hearing Examiner and to change the venue to Hot Springs. The order also sets forth that Petitioner's request for certain information is pre-mature but that the Fall River Water Users District and the Department of Environment and Natural Resources (DENR) shall respond to any proper discovery requests submitted by Petitioners.

The evidentiary hearing on Water Permit Application No. 2629-2 will be conducted at 1:30 PM (Central Time), March 11, 2009 in the Floyd Matthew Training Center, Joe Foss Building, 523 East Capitol Avenue, Pierre SD. The agenda time is an estimate and may be delayed due to the prior agenda item. Future notice will be provided to all parties if there are changes to the hearing time. Pursuant to SDCL 46-2-9, 46-2-11, and 46-2A-23, the Board has legal authority and jurisdiction to conduct this hearing.

Applicable provisions of the public notice published in the Hot Spring Star and Custer County Chronicle and the notices dated October 22nd and December 2, 2008 will still apply. This hearing may be an adversarial proceeding. Any party of record and/or the applicant have the right to be represented by a lawyer and may present evidence or cross-examine witnesses according to SDCL 1-26. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

Please contact Eric Gronlund at (605) 773-3352, if you have any questions regarding the hearing process. Please notify the Department of Environment and Natural Resources at least 48 hours before the hearing if you have a disability for which special arrangements must be made at the hearing.

c: Diane Best, Assistant Attorney General
Jeff Hallem, Assistant Attorney General

Parties of Record
Water Permit Application No. 2629-2, Fall River Water Users District

Applicant

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Michael M. Hickey
Bangs McCullen Law Firm
PO Box 2670
Rapid City SD 57709-2670

Petitioners

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Eldon Umiker
13095 Wild Turkey Lane
Hot Springs SD 57747

John Imberi
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Hot Springs SD 57747

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Audrey Estes
27660 Senic Road
Hot Springs SD 57747

Jacki Lockwood & Richard Jensen
27635 Scenic Road
Hot Springs SD 5747

Cindy Powell
27627 Garden Drive
Hot Springs SD 57747

Susan Henderson
11507 Hwy 471
Edgemont SD 57735

Tom and Paulette Hinderscheit
13101 Wild Turkey Lane
Hot Springs SD 57747

CERTIFICATION

I hereby certify that on January 2, 2009, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated January 2, 2009, 2008, regarding the hearing for Water Right Permit Application No. 2629-2, as addressed below and on the attached parties of record list:

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Michael M. Hickey
Bangs McCullen Law Firm
PO Box 2670
Rapid City SD 57709-2670

Diane Best
Attorney General's Office
300 N. Dakota Avenue, Suite 403
Sioux Falls SD 57104-6032

A copy of the above described Notice was sent Inter-office to:

Jeff Hallem, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson 1/2/09
Gail Jacobson
Water Rights Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 5th day of January, 2009.

Karen Schlaak
Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICAION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	))))	ORDER

On the 10th day of December, 2008, the above matter came on for hearing before the Water Management Board concerning written motions by Intervenors Brenda Gamache and Georgia Sample to delay the hearing on the Application scheduled for December 10, 2009; to refer the proceeding to the Office of Hearing Examiners; to change the venue of the hearing on the Application to the Hot Springs Area Chamber of Commerce; and to require the Applicant and Department of Environment and Natural Resources to make public certain information concerning the development of the proposed well site. Intervenors did not appear in person or by counsel at the hearing to support their motions and did not offer affidavits or written briefs in support of their motions. Applicant appeared by counsel at the hearing and offered argument in opposition to the motions. At the time of the hearing, the Water Management Board considered the written and oral arguments of the Applicant, the Chief Engineer, and the Intervenors, and being fully advised it is hereby

ORDERED that Intervenors' motion to delay the hearing on the Application is granted, and the hearing on the Application will be held during the next scheduled meeting of the Board on March 11, 2009; and it is further

ORDERED that Intervenors' motion to refer this matter to the Office of Hearing Examiners is hereby denied; and it is further

ORDERED that Intervenors' motion to change venue to Hot Springs is hereby denied; and it is further

ORDERED that Intervenors' two motions requesting that certain information be made public are premature, vague and ambiguous, and are therefore denied at this time without prejudice, but that the Department of Environment and Natural Resources and Applicant Fall River Water Users District shall respond to any proper discovery request submitted by Intervenors in accordance with the rules applicable to proceedings before the Water Management Board.

Dated this 30th day of December, 2008, nunc pro tunc December 10, 2008.

SOUTH DAKOTA WATER MANAGEMENT BOARD

BY: Everett E. Hoyt

Everett Hoyt, Chairman

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

February 26, 2009

NOTICE

TO: Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766
And Parties of Record (see attached list)

FROM: Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Revised Recommendation for Water Permit Application No. 2629-2, Fall River Water Users District

Water Permit Application No. 2629-2 proposes to construct and place to beneficial use 724 acre-feet of water annually at the diversion rate of 1.0 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,200 feet deep) located in SE ¼ SW ¼ Section 29-T7S-R6E (Fall River County). A portion of the water was appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2. The water will be used to supply the Fall River Water Users District which serves users in Fall River and Custer Counties.

Enclosed is a revised report and recommendation in the matter of Water Permit Application No. 2629-2. The recommendation has been revised to set forth the priority dates that will be assigned to permit if approved.

The evidentiary hearing on Water Permit Application No. 2629-2 will be conducted at 1:30 PM (Central Time), March 11, 2009 in the Floyd Matthew Training Center, Joe Foss Building, 523 East Capitol Avenue, Pierre SD. The agenda time is an estimate and may be delayed due to the prior agenda item. Future notice will be provided to all parties if there are changes to the hearing time.

Applicable provisions of the public notice published in the Hot Spring Star and Custer County Chronicle and the notices dated October 22nd, 2008, December 2, 2008 and January 2, 2009 will still apply.

Please contact Eric Gronlund at (605) 773-3352, if you have any questions regarding the revised recommendation or hearing process.

c: Diane Best, Assistant Attorney General
Jeff Hallem, Assistant Attorney General

Parties of Record
Water Permit Application No. 2629-2, Fall River Water Users District

Applicant

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Michael M. Hickey
Bangs McCullen Law Firm
PO Box 2670
Rapid City SD 57709-2670

Petitioners

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Eldon Umiker
13095 Wild Turkey Lane
Hot Springs SD 57747

John Imberi
27631 Scenic Road
Hot Springs SD 57747

Laura Inman
27679 Hwy 385
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Rd
Hot Springs SD 57747

Sylvia Fossen
13223 Fall River Road
Hot Springs SD 57747

Audrey Estes
27660 Senic Road
Hot Springs SD 57747

Jacki Lockwood & Richard Jensen
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Cindy Powell
27627 Garden Drive
Hot Springs SD 57747

Susan Henderson
11507 Hwy 471
Edgemont SD 57735

Tom and Paulette Hinderscheit
13101 Wild Turkey Lane
Hot Springs SD 57747

CERTIFICATION

I hereby certify that on February 26, 2009, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated February 26, 2009, regarding the revised report and recommendation for Water Right Permit Application No. 2629-2, as addressed below and on the attached parties of record list:

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Michael M. Hickey
Bangs McCullen Law Firm
PO Box 2670
Rapid City SD 57709-2670

Diane Best
Attorney General's Office
300 N. Dakota Avenue, Suite 403
Sioux Falls SD 57104-6032

A copy of the above described Notice was sent Inter-office to:

Jeff Hallem, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson

Gail Jacobson
Water Rights Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 26th day of February, 2009.

Karen Schlaak

Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
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PIERRE, SOUTH DAKOTA 57501-3182
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REVISED RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 2629-2, Fall River Water Users District

Pursuant to SDCL 46-2A-2, the following is the revised recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 2629-2, Fall River Water Users District, c/o Marla Peters, PO Box 321, Oral SD 57766.

The Chief Engineer is recommending APPROVAL of Application No. 2629-2 with assigned priority dates of May 16, 2005 (350 acre feet of water) and March 5, 2008 (374 acre-feet of water) and with a 20 year term because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2629-2 is issued for a 20-year term. Pursuant to SDCL 46-2A-21, the 20-year term may be deleted at any time during the 20-year period or following its expiration. If the 20–year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2629-2 may also be cancelled for nonconstruction, forfeiture, abandonment, or three permit violations pursuant to SDCL 46-1-12, 46-5-37, 46-5-37.1 and ARSD 74:02:01:37.

2. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

3. The well approved under this Permit shall be valved and the flow reduced to the amount needed or to a minimum when not being used. If this well is abandoned or the Permit cancelled, the well must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04.

4. Fall River Water Users District shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

See report on application for additional information.

Garland Erbele

Garland Erbele, Chief Engineer
February 26, 2009

NOTE: The first 350 acre feet of water constructed and placed to beneficial use fully develops the water appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2.

REVISED REPORT FOR
WATER PEMIT APPLICATION NO. 2629-2
FALL RIVER WATER USERS DISTRICT
FEBRUARY 25, 2009

Water Permit Application No. 2629-2 proposes to construct works and place to beneficial use 724 acre-feet of water annually at a maximum diversion rate of 1.0 cubic feet of water per second from one well that is to be completed into the Madison aquifer (approximately 2,200 feet deep). The well is to be located in the SE¼ SE¼ Section 29, T7S-R6E. A portion of the water (350 acre-feet annually) was appropriated and reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2. The water will be used to supply the Fall River Water Users District which serves users in Fall River and Custer Counties.

AQUIER: Madison aquifer (MDSN)

GENERAL:
The Madison aquifer occurs within the Madison Limestone which is a fine to medium crystalline, cavernous limestone and dolomite. The Madison is laterally extensive underlying much of the Western United States. Fall River and Custer Counties are near the south eastern limit of the Madison; in fact, the Madison probably does not exist twenty miles south east of this proposed well site. (Allen and others, 1985). The Madison is estimated to be around 300 feet thick in this area (Allen and others, 1985). Geologically, the ground surface at this well site is mapped as alluvium overlying the Inyan Kara Group (Wolcott, 1967). The site is situated on or very near the base of a syncline associated with the Dudley Anticline (Wolcott, 1967). The top of the Madison limestone is expected to be between 1,950 and 2,000 feet below ground surface at the site proposed by this application (Carter and Redden, 1999). A Madison well in this area is expected to flow and have shut-in pressure of around 50 psi (Strobel and others, 2000).

The well site proposed by Water Permit Application No. 2629-2 is within one-half mile of a Madison aquifer well site previously permitted for Fall River Water User District (Water Permit No. 2418-2). Water Permit No. 2418-2 was cancelled March 2, 2006, for non-construction.

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."

This report will summarize a review of Water Permit Application No. 2629-2 in respect to the four criteria established by SDCL 46-2A-9.

WATER AVAILABILITY:
This application proposes to place to beneficial use 350 acre-feet annually, water that has been reserved by future use permits. The availability of unappropriated water from the Madison aquifer for this portion of the appropriation was addressed in the approval of Future use Permit Nos. 2560-2, 2560A-2, and 2560B-2 (Water Rights, 2005), (Water Rights, 2007a), and (Water Rights, 2007b) and is therefore not an issue.

The probability of unappropriated water available for a new 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.

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 common 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 167 appropriations plus one deferred application from the Madison aquifer in South Dakota. These appropriations include: seven future use permits that currently reserve 11,074.8 acre-feet of water per year (ac-ft/yr); 134 water permits/rights for non-irrigation purposes appropriating a total of 97.81 cfs (Water Rights, 2009b); and 27 water permits/rights appropriating 7,713.36 ac-ft/yr for irrigation use [Water Permit No. 1858-1 appropriates water for both irrigation and commercial use] (Water Rights, 2009b). If it is assumed that the future use permits can be fully developed; the non-

irrigation appropriations will be used at 60 percent of full time usage at their maximum diversion rate; and irrigation appropriations will use their full appropriation, the maximum (worst case scenario) amount of water that could theoretically be used with current appropriations is approximately 61,300 ac-ft/yr. If the deferred permit is approved (1,600 ac-ft/yr), the total maximum (worst case) use would be approximately 62,900 ac-ft/yr.

The actual water usage from the Madison aquifer is expected to be considerably less than this "worst case" estimate. Withdrawals from wells completed into the Madison aquifer where estimated to average 12,309 acre-feet annually from 1987-1996 (Carter and others, 2001b). Well withdrawals from the Madison aquifer for 2008 is estimated to be less than 20,000 ac-ft/yr (Water Rights, 2008).

This application proposes to appropriate 724 acre-feet of water annually, which represents full time pumping at 1.0 cfs. In reality, actual water use associated with a maximum diversion rate of 1.0 cfs is around 434 acre-feet/yr (60% usage which is reasonable (Water Rights, 2008a)). It is likely that a second water permit application for an increased diversion rate or for an additional well would be necessary to pump the entire volume of water that would be appropriated if this application is approved.

This application proposes to appropriate an additional 374 acre-feet of water annually from the Madison aquifer. A simple water balance comparing the estimated average annual recharge and the "theoretical maximum" withdrawal by wells shows that unappropriated water is available from the Madison aquifer to satisfy this additional appropriation.

A water budget is not intended to suggest that all of the water that is in storage in the Madison or that all of the recharge to the aquifer is available for this appropriation, merely to demonstrate that in general the Madison aquifer is an immense resource that is relatively untapped.

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 water enters this subarea through groundwater inflow from the subareas located to the west and northwest (47.7 cfs), streamflow recharge (4.4 cfs) and from precipitation recharge (6.1 cfs). The balanced subarea budget assumed that the outflow from the subarea was through artesian springflow (44.3 cfs average), groundwater outflow (12 cfs), or well withdrawals (1.8 cfs average) (Carter and others, 2001b). The estimates used for well withdrawals from the area further demonstrate that the Madison aquifer is relatively untapped in this area even on a farily 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, either natural discharge that occurs as artesian springflow or groundwater outflow must decrease, or more groundwater flow will have to come in from another area. Groundwater enters this subarea from the west and northwest and exits the area to the east and northeast (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, a new dynamic equilibrium would be established in this area with unmeasurable impacts to the amount of water in storage or the artesian springflow.

Observation Well Data:

The Water Rights Program monitors 26 observation wells completed into the Madison aquifer in the Black Hills area (Water Rights, 2009a). The nearest Madison observation well- FR-95A is located approximately three and three fourths miles northwest of the well site proposed by Water Permit Application No. 2629-2. The hydrograph for the observation well are shown in figure 1.

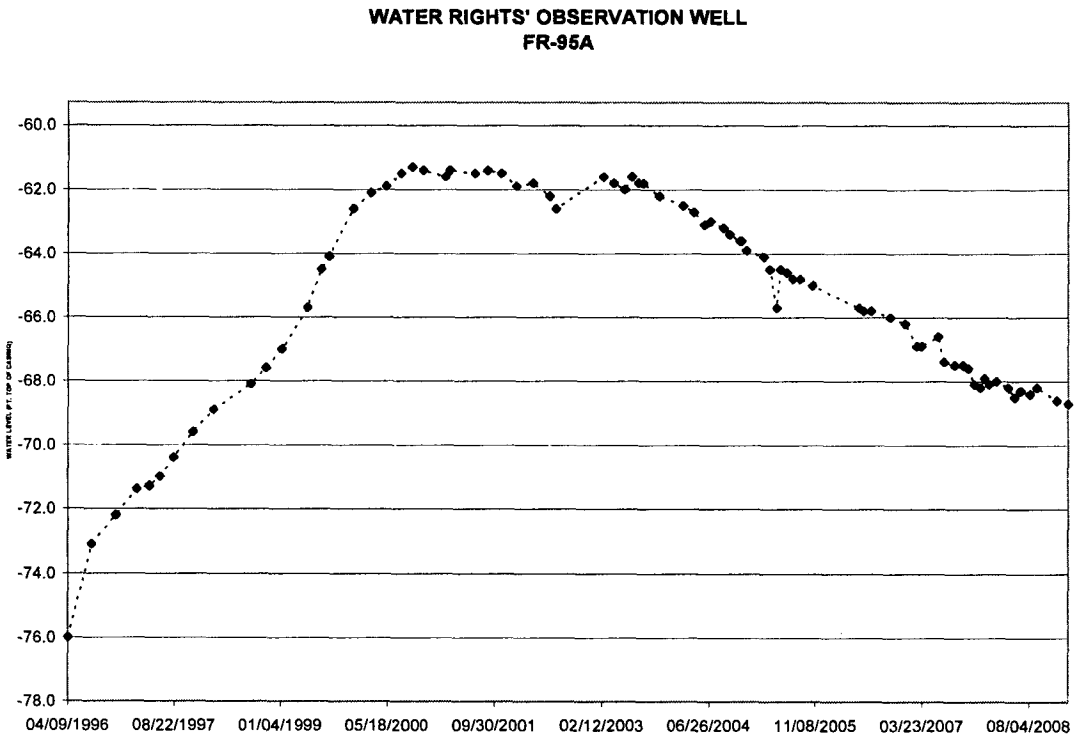

Figure 1. Hydrograph of Water Rights Observation Well FR-95A which is located approximately 3.75 miles northwest of the well site proposed by application No. 2629-2

The hydrograph shows the potentiometric surface rose during the late 1990's in response to wet climatic conditions. The water level has decreased since about 2003 in response to less recharge.

A comparison of this hydrograph with data from Water Rights' Observation wells completed into the Madison aquifer that have longer periods of record, suggest the hydrograph is representative of climatic conditions instead of pumping from the aquifer. Long-term water level declines are not apparent from the hydrographs of wells with longer periods of record. The observation well data verifies that unappropriated water is available from the Madison aquifer.

REVIEW OF EXISING WATER RIGHTS:
In addition to a number of domestic wells in the area (Water Rights, 2009c), there are 22 Water Rights/Permits appropriating groundwater within approximately five and one-half miles of the well site proposed by this application. The groundwater appropriations are from: (a) the Quaternary alluvium, (b) the Pierre Shale, (c) the Inyan Kara aquifer, (d) The Unkpapa aquifer, (e) the Minnekahta aquifer, (f) the Minnelusa aquifer, and (g) the Madison aquifer (Water Rights, 2009b). The Madison aquifer can be considered hydologically separate from the other aquifers in the area; therefore wells supplied by aquifers other than the Madison are not expected to be impacted by withdrawals from a well completed into the Madison aquifer. The nearest appropriative right supplied by a well completed into the Madison aquifer, Water Permit No. 2615-2, Fall River Water User District, is located approximately five and one-half miles northeast of this proposed well site. The next nearest Madison aquifer well supplying appropriative rights (Water Right No. 2302-2, Water Permit No. 2546-2 and Water Permit No. 2634-2, all for Ebon Streeter), is located approximately nine miles northeast of this proposed well site. Deferred Water Permit Application No. 2585-2, Southern Black Hills Water is also located approximately nine miles northeast of this proposed well site. Given the distance this planned well site is from existing Madison aquifer wells and the relatively modest diversion rate proposed by this application, adverse impacts are not anticipated.

BENEFICIAL USE:
The Water Management Board is on record as considering rural water system use of water a beneficial use.

PUBLIC INTEREST ISSUES:
A potential obstacle to development of the Madison aquifer concerns the possibility of affecting discharge from springs that may originate from the Madison aquifer. The water at a number of springs in the southern Black Hills area contains geochemical and isotopic characteristics of the Madison aquifer (Whalen, 1994). These springs are classified as Type 2 springs by Rahn and Gries (1973), meaning "The springs do not dry up and serve as points of permanent discharge from the carbonate aquifer" (Rahn and Gries, 1973). A decline of the potentiometric surface in the vicinity of the springs could decrease spring discharge.

When considering Future Use Permit No. 2560-2, the Water Management Board accounted for the principle that SD Water Law does not protect artesian head pressure as a means of diversion by determining that well interference resulting in decreased discharge from "artesian" springs probably could not be considered an adverse impact. The Board recognized that "public interest" concerns existed if decreased base flows in area streams could result from well interference. Approval of Future Use Permit No. 2560-2, which reserves the water that is to be put to beneficial use by this water permit, included the following qualification:

> "At such time as definite plans are made to construct works and put the water reserved by this permit to beneficial use, specific application for all or any part of the reserved water must be submitted and approved prior to construction of facilities pursuant to SDCL 46-5-38.1 with particular

> attention given to the flows of Beaver Spring, Cascade Springs and Hot Springs."

Subsequently, when considering the deferral of Water Permit Application No. 2585-2, Southern Black Hills Water System, the Water Management Board adopted a conclusion of law (No. 11) which states in part "The only protection South Dakota law provides when considering an application for an underground water permit for flow from an artesian spring is under the public interest criteria." (Water Rights, 2007c).

The well site proposed by this application is located approximately eight and one-half miles southwest of Beaver Creek Springs and approximately seven and three-fourths miles northeast of Cascade Springs. Considering the distances involved, and the relatively modest diversion rate proposed by this application, interference with the flows from these two springs is not likely to be measurable on the spring discharge and therefore should not be an issue.

There are several large springs in the city of Hot Springs, a number of them discharge water that appears to have originated, at least in part, from the Madison aquifer. The springs in Hot Springs are about three and one-quarter miles northwest of this proposed well site. There are two appropriations to directly utilize the discharge of springs: Water Permit No. 2392-2, Wendell Ray Schwarz Trust; and Vested Water Right No. 2392-2, Evans Plunge, Inc. Water Permit No. 2392-2, Wendell Ray Schwarz Trust, authorizes the beneficial use (commercial recreational and domestic uses) of water from a spring know as Minnekahta Springs. The source of Minnekahta Springs may be water that originates in the Madison aquifer (SD Geological Survey) (Whalen, 1994). Vested Water Right No. 2001-2, Evans Plunge, Inc., appropriates discharge from Evans Plunge Spring for commercial and recreational purposes. The source of Evans Plunge Spring has been estimated to be mostly Madison aquifer water (Whalen, 1994).

The base flow of the Fall River (20-30 cfs) originates from the discharge of the springs near the city of Hot Springs (Naus and others, 2001). In addition to domestic uses of Fall River, there are six Water Rights/Permits appropriating water from the river. The City Hot Springs also has four appropriations (Water Right Nos. 511-2, 1878-2, 2151-2 and 2431-2) from the alluvium along Fall River. The alluvial aquifer is hydraulically connected to Fall River therefore could be impacted by decreased flows in the River.

The withdrawals proposed by this application are not likely to impact the discharge of the springs at Hot Springs or the flow of Fall River due to distance and the modest rate proposed by this application. However, this well site is located only about 300 feet from Fall River. Since Fall River and this proposed well would have a common source, (e.g. the Madison aquifer) confusion can be expected. It is important to recognize that there is over 1,950 feet of overburden separating the Madison aquifer from Fall River at this well site.

TERM LIMITATION:

SDCL 46-2A-20 requires that:

> "... no water permit for construction of works to withdraw water from the Madison formation in Butte, Fall River, Custer, Lawrence, Meade and

Pennington counties may be issued for a term of more than twenty years, unless the water management board determines, based upon the evidence presented at the hearing that:

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

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

Evidence is not available to justify issuing this permit without a term limitation of 20 years.

CONCLUSIONS:

1. The Madison is a viable aquifer in this area and unappropriated water is available.

2. This application proposes to appropriate 724 acre-feet annually at a maximum diversion rate of 1.0 cfs. Development of this permit would probably result in an annual withdrawal of no more than 434 acre-feet annually with an average diversion rate of around 0.6 cfs.

3. The first 350 ac-ft/yr developed through this permit, if approved, is water which was reserved with future use permits. The future use permits should be considered fully developed if 350 ac-ft/yr or greater is placed to beneficial use.

4. Well interference is not expected to be adverse do to the distance between appropriations and the relatively modest diversion rate proposed.

5. The discharge of area springs is not expected to be affected do to the distance between appropriations and the relatively modest diversion rate proposed.

6. A Madison aquifer well at this proposed well site is expected to flow. The well should be valved and the flow reduced to the amount needed or to a minimum when not being used.

7. Information is not available to justify issuing this permit without a term limitation of 20 years.

Ken Buhler
Natural Resources Engineering Specialist

Approved by

James A. Goodman, P.E.
Natural Resources Engineering Director

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DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

March 4, 2009

NOTICE

TO: Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766
And Parties of Record (see attached list)

Robert Peplinski, Chairman
Southern Black Hills Water System
HC 56 Box 53
Oral SD 57766

FROM: Garland Erbele, Chief Engineer
Water Rights Program

SUBJECT: Resolution by Southern Black Hills Water System in Support of Water Permit Application No. 2629-2, Fall River Water Users District

The Water Rights Program received a resolution from Southern Black Hills Water System supporting Water Permit Application No. 2629-2 filed by Fall River Water User District. The resolution is enclosed. The resolution is also being sent to Water Management Board members.

The resolution was submitted after the July 14, 2008 date to petition to intervene in the hearing process. Therefore, the Water Management Board will need to consider whether to grant petitioner status to Southern Black Hills Water System. This Board decision will occur just prior to the Board conducting the evidentiary hearing on the District's application scheduled for March 11, 2009.

The hearing on Water Permit Application No. 2629-2 will be conducted at 1:30 PM (Central Time), March 11, 2009 in the Floyd Matthew Training Center, Joe Foss Building, 523 East Capitol Avenue, Pierre SD. The agenda time is an estimate and may be delayed due to the prior agenda item.

Please contact Eric Gronlund at (605) 773-3352, if you have any questions regarding the hearing.

enclosure

c: Diane Best, Assistant Attorney General
Jeff Hallem, Assistant Attorney General

Parties of Record
Water Permit Application No. 2629-2, Fall River Water Users District

Applicant

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Michael M. Hickey
Bangs McCullen Law Firm
PO Box 2670
Rapid City SD 57709-2670

Petitioners

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Eldon Umiker
13095 Wild Turkey Lane
Hot Springs SD 57747

John Imberi
27631 Scenic Road
Hot Springs SD 57747

Laura Inman
27679 Hwy 385
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Rd
Hot Springs SD 57747

Sylvia Fossen
13223 Fall River Road
Hot Springs SD 57747

Audrey Estes
27660 Senic Road
Hot Springs SD 57747

Jacki Lockwood & Richard Jensen
27635 Scenic Road
Hot Springs SD 5747

Cindy Powell
27627 Garden Drive
Hot Springs SD 57747

Susan Henderson
11507 Hwy 471
Edgemont SD 57735

Tom and Paulette Hinderscheit
13101 Wild Turkey Lane
Hot Springs SD 57747

CERTIFICATION

I hereby certify that on March 4, 2009, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated March 4, 2009, regarding the resolution from Southern Black Hills Water System for Water Right Permit Application No. 2629-2, as addressed below and on the attached parties of record list:

Fall River Water Users District
c/o Marla Peters
PO Box 321
Oral SD 57766

Michael M. Hickey
Bangs McCullen Law Firm
PO Box 2670
Rapid City SD 57709-2670

Diane Best
Attorney General's Office
300 N. Dakota Avenue, Suite 403
Sioux Falls SD 57104-6032

Robert Peplinski, Chairman
Southern Black Hills Water System
HC 56 Box 53
Oral SD 57766

A copy of the above described Notice was sent Inter-office to:

Jeff Hallem, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson

Gail Jacobson
Water Rights Program, DENR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 4th day of March, 2009.

Karen Schlaak

Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

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WATER RIGHTS PROGRAM

Resolution 2009-01

Fall River Water User District
Water Permit Application

WHEREAS: there are many residents residing in Southwestern South Dakota who are in need of a good, dependable, and affordable source of water for domestic use, and;

WHEREAS: the Fall River Water User District was organized and constructed to provide the residents of eastern Fall River County with a safe, dependable source of water for domestic and livestock use, and;

WHEREAS: the Fall River Water User District board of directors have established a long range plan to meet the water needs of customers in their North Expansion Project.

BE IT RESOLVED: that the Southern Black Hills Water System, Inc., board of directors supports the Fall River Water User District Water Permit Application No. 2629-2, and urges the State of South Dakota Water Management Board to approve this permit.

BE IT FURTHER RESOLVED: that the State of South Dakota continue its support of regional water systems constructed and/or in the developmental stages, as they strive to meet consumer needs of receiving quality, affordable drinking water now and in the future.

Board Approved: February 26, 2009

Signed: _____

Robert Peplinski, Chairman
Southern Black Hills Water System, Inc.

received via email 3/11/09

Department of Environment & Natural Resources
PMB 2020
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3182

Re: Water Permit Application No. 2629-2 Fall River Water Users District

To the Dept of Environment & Natural Resources and its Board,

I am a Petitioner against the approval of the above stated Water Permit Application No. 2629-2 Fall River Water Users District. I have several concerns regarding the Operation of the Fall River Water Users District and Environmental Issues regarding the proposed site.

I would like to see an Environmental Impact Study done of the area that is in question. This I think would be very beneficial to all concerned and to avoid possible retractions and avoidable expenses later on to all whom are involved.

This is a Residential Neighborhood, there are 5 homes with Septic systems within a very close proximity of the proposed well site.

There is an area also within close proximity that was an Oil Refinery Site and to my knowledge there is still a large amount of this Oil sludge in the ground.

The proposed site is very close to Fall River, to risky for contamination. There also are several downstream Irrigators from the Cheyenne River which the Fall River runs into.

This area of the proposed water permit application also is full of Fractured Flagstone Rock Formations that would allow seepage to happen very quickly and in turn would contaminate other Residential Wells and the Fall River. This is another reason why I feel there should be a full Environmental Impact Study. This is just not a good site to have a public well drilled any deeper in fear of the factors that could happen. There are plenty of better Options that Fall River Water Users could look into. There are maps that show where the best possible sites are with the closest proximities to the Madison Aquifer and show water diversion rates. Why they have not looked into those I don't know. If they would have, it would have saved them thousands of dollars here recently.

The Fall River Water Users District was offered a well site that has already been drilled and they declined. This well that was offered to them is not in a residential area and would not someday possibly affect other residential wells already in place, The Fall River and water supplies to the Irrigators down stream from the proposed water site.

I am a existing User of Fall River Water Users District on the current Water Line. They have not as yet fulfilled their commitments to do an upgrade on the existing water line. Which was supposed to be a new pump station off of Hwy 79. I have been paying extra on my water bill that goes toward a fund for those improvements that we were told should have been done last year and have not been done.

Fall River Water Users District is in the process of drilling another well that is also supposed to supply Future water users in the Fall River and Custer Counties area which so far have not hit the recommended water diversion rate, this well project is going to cost thousands and who will make up that cost ? This is a great example of the needs of an Environmental Impact study being done prior to any well drilling.

Fall River Water Users District to my knowledge still may not have a Licensed Operator. How can a permit be issued to any company without that type of certification. Have they hired a Manager yet ? They have been without a Manager for 2 months the last I knew. There has been lots of controversy within the Fall River Water Users District and a large turnover rate of employees. I would like to see Fall River Water Users District concentrate on keeping the existing line in operation and taking care of the current users it now has before the expense level of all these new wells puts the existing company into financial jeopardy. When they get all the quirks taken care and the existing line running up to par, then look onto venturing for more revenue from more wells and more users as allows. Why risk a Residential Neighborhood, their Current Wells , Irrigation Users downstream, The Fall River and Residents that live downstream to take a chance at getting water when there are other Options available.

There is also another water company, Southern Hills Water Company in this area that is also going to be pumping water to Residents and Ranchers. I am not against new wells and new water projects, I am a current Fall River Water User and am very Thankful for it but there should be more Control and Stipulations and research done on proposed well sites before they are drilled and Permits Issued to help limit and control our most valuable Natural Resource, "Water".

Thank You For Your Time
Sincerely,

Laura L. Inman
27679 Hwy 385
Hot Springs, SD 57747
605-745-6365

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

March 18, 2009

NOTICE

TO: Michael M. Hickey
Attorney at Law
PO Box 2670
Rapid City SD 57709

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Road
Hot Springs SD 57747

FROM: Garland Erbele, Chief Engineer
Water Rights Program, DENR

SUBJECT: Preparation of Findings of Fact, Conclusions of Law and Final Decision

The Water Management Board directed Michael Hickey, counsel for Fall River Water Users District, to prepare written proposed Findings of Fact, Conclusions of Law and a Final Decision in the matter of Water Permit Application No. 2629-2. The Board will consider adoption of Findings, Conclusions and Final Decision approving Water Permit No. 2629-2 at 8:45 AM, on May 7, 2009, in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol Avenue, Pierre SD. Future notice will be provided if there is a change in the meeting date or location.

The Board requested that a copy of the proposed Findings, Conclusions and Final Decision be mailed to each Board member and parties by April 16, 2009. Written objections or comments in support of the proposed Findings, Conclusions and Final Decision, or alternative Findings, Conclusions and Final Decision are to be mailed to each Board member, the Board attorney (mailing list enclosed) and parties by April 27, 2009.

At the Board's discretion, oral arguments by parties who timely filed written comments in opposition of the proposed Findings, Conclusions and Final Decision, or alternative Findings, Conclusions and Final Decision may be made on May 7, 2009. The evidentiary hearing was completed on March 11, 2009. No additional testimony will be received.

Enclosure

c: Jeff Hallem, Assistant Attorney General
Diane Best, Assistant Attorney General, 300 N. Dakota Ave., Suite 403, Sioux Falls SD 57104-6032
Laura Inman, 27679 Hwy 385, Hot Springs SD 57747

CERTIFICATION

I hereby certify that on March 18, 2009, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated March 18, 2009, regarding preparation of Findings of Fact, Conclusions of Law and Final Decision in the matter of Application No. 2629-2 addressed as stated below:

Michael M. Hickey
Attorney at Law
PO Box 2670
Rapid City SD 57709

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Road
Hot Springs SD 57747

Diane Best
Assistant Attorney General
300 N. Dakota Avenue, Suite 403
Sioux Falls SD 57104

Laura Inman
27679 Hwy 385
Hot Springs SD 57747

A copy of the above described Notice was sent Inter-office to:

Jeff Hallem, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson
Water Right Program

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 18th day of March, 2009.

Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

April 13, 2009

NOTICE

TO: Michael M. Hickey
Attorney at Law
PO Box 2670
Rapid City SD 57709

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Road
Hot Springs SD 57747

FROM: Garland Erbele, Chief Engineer
Water Rights Program, DENR

SUBJECT: Hearing Time for Consideration of Findings of Fact, Conclusions of Law and Final Decision

Due to changes in the agenda, the Water Management Board will now consider adoption of Findings, Conclusions and Final Decision approving Water Permit No. 2629-2 at 10:15 AM (Central Time), on May 7, 2009, in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol Avenue, Pierre SD.

Applicable provisions of the notice date March 18, 2009 still apply.

c: Jeff Hallem, Assistant Attorney General
Diane Best, Assistant Attorney General, 300 N. Dakota Ave., Suite 403, Sioux Falls SD 57104-6032
Laura Inman, 27679 Hwy 385, Hot Springs SD 57747

CERTIFICATION

I hereby certify that on April 13, 2009, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated April 13, 2009, regarding hearing time to consider Findings of Fact, Conclusions of Law and Final Decision in the matter of Application No. 2629-2 addressed as stated below:

Michael M. Hickey
Attorney at Law
PO Box 2670
Rapid City SD 57709

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Georgia Sample
13126 Eagle Rock Road
Hot Springs SD 57747

Diane Best
Assistant Attorney General
300 N. Dakota Avenue, Suite 403
Sioux Falls SD 57104

Laura Inman
27679 Hwy 385
Hot Springs SD 57747

A copy of the above described Notice was sent Inter-office to:

Jeff Hallem, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson
Gail Jacobson
Water Right Program

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 13th day of April, 2009.

Karen Schlaak
Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

RAPID CITY
Thomas H. Foye
Thomas E. Simmons
Charles L. Riter
Allen G. Nelson
James P. Hurley
Michael M. Hickey
Terry L. Hofer
Rod Schlauger
Daniel F. Duffy
Jeffrey G. Hurd
John H. Raforth
Terry G. Westergaard
Steven R. Nolan
Gregory J. Erlandson
Eric J. Pickar
Riley J. Wilson
Sarah E. Baron Houy
Chad A. Williams
Kirsten M. Taggart

SIOUX FALLS
John P. Mullen
Brian K. Kirby
Victoria M. Duehr
Patrick J. Knecht
Thomas J. Von Wald
Brian R. Schumacher

Attorneys also admitted in Nebraska, North Dakota, Iowa, Minnesota and Missouri

BANGS McCULLEN
LAW FIRM

Reply to Rapid City Office

Writer's e-mail address: mhickey@bangsmccullen.com

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APR 17 2009
WATER RIGHTS PROGRAM

April 16, 2009

Mr. Garland Erbele, Chief Engineer
Department of Environment and National Resources
Water Rights Program
Joe Foss Building
523 East Capitol Avenue
Pierre, SD 57501-3182

Re: ***In the Matter of the Application of Fall River Water Users District No. 2629-2***

Dear Mr. Erbele:

Pursuant to your Notice dated March 28, 2009, please find enclosed *Applicant's Proposed Findings of Fact, Conclusions of Law and Final Decision* filed on behalf of Fall River Water Users District in the above-referenced matter.

By copy of this letter, copies have been sent to all Board members and parties of record, which is intended as service by mail upon them.

If you have any questions or comments, please advise. Thank you.

Sincerely,

BANG, McCULLEN, BUTLER,
FOYE & SIMMONS, L.L.P.

Michael M. Hickey

mmh:bah
Enclosures
cc/encl: Brenda Gamache, Georgia Sample, Francis Brink, Leo Holzbauer, Rodney Freeman, Jr., Bernita Loucks, Everett Hoyt, Tim Bjork, Jim Hutmacher, Jeff Hallem, Diane Best

RAPID CITY
First Western Gateway
333 West Boulevard
Suite 400
P.O. Box 2670
Rapid City, South Dakota
57709-2670
P. (605) 343-1040
F. (605) 343-1503

SIOUX FALLS
Doral Centre Building
101 W. 69th Street
Suite 200
P.O. Box 88208
Sioux Falls, South Dakota
57109-8208
P. (605) 339-6800
F. (605) 339-6801

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WATER RIGHTS PROGRAM

STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	))))	**APPLICANT'S PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW AND FINAL DECISION**

1. A hearing was held in the above entitled matter on March 11, 2009, before the Water Management Board (hereinafter "Board"). The Board has considered the evidence presented and the arguments of the parties.

2. This is an application to appropriate seven hundred twenty-four (724) acre-feet of water annually at a maximum diversion rate of one (1) cubic foot per second. The water will come from the Madison aquifer.

3. Three hundred fifty (350) acre-feet of water applied for comes from future use permits numbered #2560-2, #2560A-2 and #2560B-2 held by the Fall River Water Users District. The remaining portion of three hundred seventy-four (374) acre-feet is new water.

4. Fall River Water Users District (hereinafter the "District") is a water users district which was formed and operates under the provisions of SDCL Chapter 46A-9.

5. The District currently supplies water to farmers and ranchers in Fall River and Custer counties, and it also supplies municipal water to the community of Oelrichs.

6. The District is currently involved in an expansion plan to provide water to additional users in Fall River County.

7. The Madison aquifer occurs in the Madison limestone and extends laterally over most of the western United States.

8. The proposed well site is located between Maverick Junction and the City of Hot Springs, approximately 1.8 miles from Hot Springs.

9. At this location it is estimated that the Madison aquifer is approximately three hundred (300) feet thick, with the top of the formation at approximately two thousand (2,000) feet below the surface.

10. At this location it is reasonably anticipated that the well will be a flowing well with about fifty (50) pounds of shut in pressure.

11. It is estimated that the Madison aquifer recharges at the rate of between one hundred forty thousand (140,000) and four hundred thousand (400,000) acre-feet of water per year.

12. There is available water in the Madison aquifer to supply the amount requested by this permit. There are currently a total of 167 appropriations plus 1 deferred application from the Madison aquifer in South Dakota. These appropriations include 7 future use permits that reserve eleven thousand (11,000) acre-feet of water per year. There are 134 water permits that are appropriating water for non-irrigation purposes at 97.81 cubic feet of water per second. There are 27 water rights that appropriate approximately seven thousand seven hundred (7,700) acre-feet of water per year for irrigation.

13. Based upon the testimony of Mr. Buhler, it is reasonably assumed that if the future use permits can be fully developed, the non-irrigation appropriations will be used at 60% of full time usage at their maximum diversion rights and irrigation appropriation will use their full appropriation. Therefore the maximum amount of water that could theoretically be used under the current appropriations and future use reservations are approximately sixty-two thousand nine hundred (62,900) acre-feet of water a year. In all likelihood water pumping would be less than twenty

thousand (20,000) acre-feet of water a year from the Madison aquifer. The amount of recharge to the Madison aquifer greatly exceeds the amount of withdrawal.

14. A localized hydrologic budget also establishes that water is available in this area as water comes into this area from the west and the northwest and in the amount of approximately 47.2 cfs. Additionally the Madison aquifer receives recharge from stream flow losses in the amount of 4.4 cfs and recharge from precipitation of 6.1 cfs.

15. According to the Black Hills Hydro Study, the sub area where the well is being proposed loses 44.3 cubic feet per second in springs, 12 cubic feet per second leaving underground, and 1.8 cubic feet per second from pumping from wells.

16. A very subtle change in the water level in the sub area of the well will induce more water to come in from adjacent areas and it would take a huge change in the water level to decrease the spring discharge or well discharge.

17. Water would flow in from adjacent areas before there would be a decrease in spring flows.

18. DENR has observation wells in the area. The nearest well is about 3 ¾ miles away. These monitoring wells show that the water level has about 15 feet of fluctuation in the area. The water level is higher now than it was in 1996 . This data suggests that this well responds well to recharge and certainly suggests that withdrawals of water are not exceeding recharge in this area.

19. Based on the evidence presented, it is clear that water is available for this appropriation.

20. The well proposed by the District can be developed without any unlawful impairment of existing rights.

21. Within a 5 ½ mile radius of the proposed well, there are 22 water rights or permits that appropriate water from numerous aquifers.

22. The Madison aquifer is hydraulically separate from the other aquifers in the area so that wells being supplied from aquifers other than the Madison would not be impacted by withdrawals from the Madison.

23. The nearest Madison aquifer well belongs to Fall River and is located 5 ½ miles from the proposed well. The next closest well is the Streeter well which is located approximately 9 miles northeast of the proposed well.

24. Given the distance between the proposed well and the existing Madison wells and the amount of division being contemplated, there is no likelihood of adverse impact on existing water users.

25. Water used in a rural water system constitutes a beneficial use of water within the meaning of South Dakota law.

26. There are springs in the general area some of which may draw water from the Madison, but given the distances between the well site and these springs and the low diversion rate for the well in question, it is highly unlikely that any draw downs from this well could have a measurable impact on any discharges from springs.

27. The Board has previously stated that there are public interest concerns if there is a decrease in base flows in area springs because of well interference. Consequently, the future use permit 2560-2 contained a qualification that at such time as definite plans are made to construct works and put the water to beneficial use, the District shall obtain approval from the Board and that it must give particular attention to the flows in Beaver Springs, Cascade Springs and Hot Springs.

28. The proposed well is located approximately 8 ½ miles southeast of Beaver Creek Spring, 7 ¾ miles northeast of Cascade Springs and Hot Springs is approximately 3 ¼ miles northwest. With the distances involved and the relatively modest diversion rate it is unlikely that there will be any interference in these springs due to this well.

29. The proposed well is located approximately three hundred (300) feet from Fall River but it is not believed that there will be any interference to Fall River because of the vertical distance of approximately one thousand nine hundred seventy (1,970) feet between ground surface and the top of the Madison aquifer which is made up of confining layers that will prevent interference between the well and Fall River.

30. The Chief Engineer has concluded that there is unappropriated water available at the proposed well site from the Madison aquifer. The Chief Engineer's report states that the proposed appropriation should not adversely affect existing water rights including domestic wells and the appropriation should not affect the discharge of any springs in the area.

31. A well completed in the Madison aquifer in this area is going to flow (artesian pressure) and since the well in question is going to be valved and flow reduced to only the amount needed with a twenty (20) year term limit, the Chief Engineer has recommended approval of this permit with qualifications in that the District shall control its withdrawals so there is not a reduction in either water supplied to domestic wells or other adequate wells.

32. The District's well must be valved and controlled and the District must submit a water use summary to the chief engineer.

33. The District's proposed well must be drilled in accordance with the well constructions adopted by the Board which provides for an impermeable barrier between the well

casing and the well bore from the top of the Madison aquifer to ground surface so that there will not be any connection between the well and the upper formations or water from Fall River.

34. The concerns raised by Ms. Gamache and Ms. Sample about the cone of depression and possible contamination from an old oil refinery were not justified as explained by Ken Buhler, who stated that since there was not a connection between the surface of the ground and the District's proposed Madison well, no contamination was possible.

35. Mr. Buhler testified that he had consulted with the South Dakota Groundwater Quality Program who determined that appropriate remedial action had been taken and that no further action was necessary concerning any contamination from the old oil refinery.

36. The evidence established that there would not be any draw down on existing shallower domestic wells or existing septic systems caused by the Madison well proposed by the District.

37. The evidence established that during the drilling process there should not be any impact on existing wells because of the procedures used by the well driller and the use of surface casing.

38. There exists reasonable probability that there is unappropriated water available for the District's proposed use under this permit.

39. The proposed diversion can be developed without unlawful impairment of existing rights.

40 The proposed use in the permit is a beneficial use within the meaning of South Dakota law.

41. The expert testimony of Ken Buhler is accepted as being credible and supported by the facts herein.

42. To the extent that any of these Findings of Fact are determined to be Conclusions of Law, they should be deemed Conclusions of Law.

Based upon the forgoing the Board hereby makes and enters its:

CONCLUSIONS OF LAW

1. The Board has jurisdiction over the subject matter and parties to this action.

2. The Board conducted a hearing on this application for appropriation of water under the authority of SDCL Ch. 46-2 and Ch. 46-2A.

3. Any individual who signed a petition to participate in the hearing before the Board, but did not attend the hearing have waived their right to receive further notices and other materials pertaining to the hearing in accordance with the provisions of ARSD 74:02:01:12.02.

4. Unappropriated water is available for the District's application.

5. The District is a water users district organized and operating under the provisions of SDCL Ch. 46A-9.

6. The proposed diversion can be developed without unlawful impairment of existing rights to other permit holders.

7. The proposed application is a beneficial use and a public benefit.

8. The Board is not required to maintain artesian head pressure when considering the location and capacity of a large capacity well.

9. SDCL 46-2A-20 sets forth that no permit may be issued in the area designated by the application unless there is evidence presented at a hearing that establishes both 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) information, whether provided by the applicant or by other means, show that there is a reasonable probability that the issuance of the proposed permit would not have a significant adverse effect on nearby Madison formation wells and springs. The District has not asked the Board to approve the permit for longer than twenty (20) years. Therefore, the permit will be issued for twenty (20) years and any impacts can be reviewed at the end of the twenty (20) year period.

10. The Board has the ability to cancel or amend a permit at the end of the twenty (20) year period.

11. The Board has concluded that it is in the public interest to protect Madison springs which may be significantly affected by the District's proposed well, but there was no evidence presented at the time of the hearing to establish the likely existence of any such significant effect.

12. The granting of the permit is in the public's interest if the District controls its withdrawals from the well so there is not a significant adverse effect on the water flow from Beaver Creek Springs, Cascade Springs, Evans Plunge Springs, Minnekahta Springs and Hot Springs.

13. To the extent that any of these Conclusions of Law are determined to be Findings of Fact, they should be deemed Findings of Fact.

Based upon the forgoing Findings of Fact and Conclusions of Law the Board hereby makes and enters its:

FINAL DECISION

The Board hereby authorizes the permit conditioned upon the following:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2629-2 is issued for a twenty (20) year term. Pursuant to 46-2A-21, the twenty (20) year term may be deleted at any time during the twenty (20) year period following its expiration. If the twenty (20) year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty (20) years. Permit No. 2629-2 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 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 its withdrawals so there is not a reduction of needed water supplied in adequate domestic wells, in adequate wells having prior water rights, or on Cascade Springs, Beaver Creek Springs, Evans Plunge Springs, Minnekahta Springs and Hot Springs.

3. The well authorized by Permit No. 2629-2 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.

4. The Water Right Holder shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

Dated this ___ day of _____, 2009.

SOUTH DAKOTA WATER MANAGEMENT BOARD

BY:_____
Everett Hoyt, Chairman

RECEIVED
APR 17 2009
WATER RIGHTS
PROGRAM

CERTIFICATE OF SERVICE

The undersigned hereby certifies that he served a copy of this legal document upon the persons herein next designated, all on the date below shown, by depositing copies thereof in the United States mail at Rapid City, South Dakota, postage prepaid, in envelopes addressed to said addressees, to wit:

Garland Erbele, Chief Engineer
Water Rights Program
Joe Foss Building
523 East Capitol Avenue
Pierre, SD 57501-3181

Brenda Gamache
13024 Fall River Road
Hot Springs, SD 57747

Georgia Sample
13126 Eagle Rock Road
Hot Springs, SD 57747

Francis E. Brink
1214 South Wells Street
Aberdeen, SD 57401

Leo Holzbauer
PO Box 877
Wagner, SD 57380

Rodney Freeman, Jr.
PO Box 176
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Bernita Loucks
219 42nd Street
Rapid City, SD 57702

Everett Hoyt
4422 Carriage Hills Drive
Rapid City, SD 57702

Tim Bjork
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Pierre, SD 57501

Jim Hutmacher
802 East 7th Street
Oacoma, SD 57365

Jeff Hallem, Assistant Attorney General
Natural Resources Section
Office of Attorney General
George S. Mickelson Criminal Justice Center
1302 E. Hwy 14, Suite 1
Pierre, SD 57501

Diane Best, Assistant Attorney General
Office of Attorney General
Natural Resources Section
300 N. Dakota Avenue, #403
Sioux Falls, SD 57105

which are the last addresses of the addressees known to the subscriber.

Dated this 16th day of April, 2009.

MICHAEL M. HICKEY

STATE OF SOUTH DAKOTA

OFFICE OF ATTORNEY GENERAL
1302 East Highway 14, Suite 1
Pierre, South Dakota 57501-8501
Phone (605) 773-3215
Fax (605) 773-4106
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LARRY LONG
ATTORNEY GENERAL

CHARLES D. McGUIGAN
CHIEF DEPUTY ATTORNEY GENERAL

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May 1, 2009

Diane Best
Assistant Attorney General
300 N. Dakota Ave., #403
Sioux Falls, SD 57104

Michael M. Hickey
Attorney at Law
P.O. Box 2670
Rapid City, SD 57709-2670

Georgia Sample
13126 Eagle Rock Road
Hot Springs, SD 57747

Brenda Gamache
13024 Fall River Road
Hot Springs, SD 57747

Garland Erberle, Chief Engineer
DENR Water Rights Program
Joe Foss Building
523 E. Capitol Avenue
Pierre, SD 57501

Re: *In the Matter of the Application of Fall River Water Users District Application No. 2629-2*

Dear Counsel, Petitioners and Chief Engineer Erberle:

Enclosed please find the proposed Water Management Board's Rulings on Applicant's Proposed Findings of Fact, Conclusions of Law, and Final Decision; and proposed Findings of Fact, Conclusions of Law, and Final Decision in the above referenced matter that I have prepared consistent with the directions given by the Water Management Board during the March 11, 2009, hearing. The Board's consideration of the proposals is currently scheduled for the morning of May 7, 2009, at its meeting at the Floyd Matthews Training Center, Joe Foss Building, 523 E. Capitol Avenue, Pierre, South Dakota.

The original Certificate of Service and the documents set forth above are being filed with Chief Engineer Erberle.

Very truly yours,

Jeffrey P. Hallem
Assistant Attorney General

JPH:jkp

Enclosures

cc: Water Management Board Members (w/enc.)

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STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	))))	FINDINGS OF FACT, CONCLUSIONS OF LAW AND FINAL DECISION

1. A hearing was held in the above entitled matter on March 11, 2009, before the Water Management Board (hereinafter "Board"). The Board has considered the evidence presented and the arguments of the parties.

2. This is an application to appropriate seven hundred twenty-four (724) acre-feet of water annually at a maximum diversion rate of one (1) cubic foot per second. The water will come from the Madison aquifer.

3. Three hundred fifty (350) acre-feet of water applied for comes from future use permits numbered #2560-2, #2560A-2 and #2560B-2 held by the Fall River Water Users District. The remaining portion of three hundred seventy-four (374) acre-feet is new water.

4. Fall River Water Users District (hereinafter the "District") is a water users district which was formed and operates under the provisions of SDCL Chapter 46A-9.

5. The District currently supplies water to farmers and ranchers in Fall River and Custer counties, and it also supplies municipal water to the community of Oelrichs.

6. The District is currently involved in an expansion plan to provide water to additional users in Fall River County.

7. The Madison aquifer occurs in the Madison limestone and extends laterally over most of the western United States.

8. The proposed well site is located between Maverick Junction and the City of Hot Springs, approximately 1.8 miles from Hot Springs.

9. At this location it is estimated that the Madison aquifer is approximately three hundred (300) feet thick, with the top of the formation at approximately two thousand (2,000) feet below the surface.

10. At this location it is reasonably anticipated that the well will be a flowing well with about fifty (50) pounds of shut in pressure.

11. It is estimated that the Madison aquifer recharges at the rate of between one hundred forty thousand (140,000) and four hundred thousand (400,000) acre-feet of water per year.

12. There is available water in the Madison aquifer to supply the amount requested by this permit. There are currently a total of 167 appropriations plus 1 deferred application from the Madison aquifer in South Dakota. These appropriations include 7 future use permits that reserve eleven thousand (11,000) acre-feet of water per year. There are 134 water permits that are appropriating water for non-irrigation purposes at 97.81 cubic feet of water per second. There are 27 water rights that appropriate approximately seven thousand seven hundred (7,700) acre-feet of water per year for irrigation.

13. Based upon the testimony of Mr. Buhler, it is reasonably assumed that if the future use permits can be fully developed, the non-irrigation appropriations will be used at 60% of full time usage at their maximum diversion

rights and irrigation appropriation will use their full appropriation. Therefore the maximum amount of water that could theoretically be used under the current appropriations and future use reservations are approximately sixty-two thousand nine hundred (62,900) acre-feet of water a year. In all likelihood water pumping would be less than twenty thousand (20,000) acre-feet of water a year from the Madison aquifer. The amount of recharge to the Madison aquifer greatly exceeds the amount of withdrawal.

14. A localized hydrologic budget also establishes that water is available in this area as water comes into this area from the west and the northwest and in the amount of approximately 47.2 cfs. Additionally the Madison aquifer receives recharge from stream flow losses in the amount of 4.4 cfs and recharge from precipitation of 6.1 cfs.

15. According to the Black Hills Hydro Study, the sub area where the well is being proposed loses 44.3 cubic feet per second in springs, 12 cubic feet per second leaving underground, and 1.8 cubic feet per second from pumping from wells.

16. A very subtle change in the water level in the sub area of the well will induce more water to come in from adjacent areas and it would take a huge change in the water level to decrease the spring discharge or well discharge.

17. Water would flow in from adjacent areas before there would be a decrease in spring flows.

18. DENR has observation wells in the area. The nearest well is about 3 ¾ miles away. These monitoring wells show that the water level has about 15

feet of fluctuation in the area. The water level is higher now than it was in 1996. This data suggests that this well responds well to recharge and certainly suggests that withdrawals of water are not exceeding recharge in this area.

19. Based on the evidence presented, it is clear that water is available for this appropriation.

20. The well proposed by the District can be developed without any unlawful impairment of existing rights.

21. Within a 5 ½ mile radius of the proposed well, there are 22 water rights or permits that appropriate water from numerous aquifers.

22. The Madison aquifer is hydraulically separate from the other aquifers in the area so that wells being supplied from aquifers other than the Madison would not be impacted by withdrawals from the Madison.

23. The nearest Madison aquifer well belongs to Fall River and is located 5 ½ miles from the proposed well. The next closest well is the Streeter well which is located approximately 9 miles northeast of the proposed well.

24. Given the distance between the proposed well and the existing Madison wells and the amount of division being contemplated, there is no likelihood of adverse impact on existing water users.

25. Water used in a rural water system constitutes a beneficial use of water within the meaning of South Dakota law.

26. There are springs in the general area some of which may draw water from the Madison, but given the distances between the well site and these springs and the low diversion rate for the well in question, it is highly unlikely that any

draw downs from this well could have a measurable impact on any discharges from springs.

27. The Board has previously stated that there are public interest concerns if there is a decrease in base flows in area springs because of well interference. Consequently, the future use permit 2560-2 contained a qualification that at such time as definite plans are made to construct works and put the water to beneficial use, the District shall obtain approval from the Board and that it must give particular attention to the flows in Beaver Springs, Cascade Springs and Hot Springs.

28. The proposed well is located approximately 8 ½ miles southeast of Beaver Creek Spring, 7 ¾ miles northeast of Cascade Springs and Hot Springs is approximately 3 ¼ miles northwest. With the distances involved and the relatively modest diversion rate it is unlikely that there will be any interference in these springs due to this well.

29. The proposed well is located approximately three hundred (300) feet from Fall River but it is not believed that there will be any interference to Fall River because of the vertical distance of approximately one thousand nine hundred seventy (1,970) feet between ground surface and the top of the Madison aquifer which is made up of confining layers that will prevent interference between the well and Fall River.

30. The Chief Engineer has concluded that there is unappropriated water available at the proposed well site from the Madison aquifer. The Chief Engineer's report states that the proposed appropriation should not adversely

affect existing water rights including domestic wells and the appropriation should not affect the discharge of any springs in the area.

31. A well completed in the Madison aquifer in this area is going to flow (artesian pressure) and since the well in question is going to be valved and flow reduced to only the amount needed with a twenty (20) year term limit, the Chief Engineer has recommended approval of this permit with qualifications in that the District shall control its withdrawals so there is not a reduction in either water supplied to domestic wells or other adequate wells.

32. The District's well must be valved and controlled and the District must submit a water use summary to the chief engineer.

33. The District's proposed well must be drilled in accordance with the well constructions adopted by the Board which provides for an impermeable barrier between the well casing and the well bore from the top of the Madison aquifer to ground surface so that there will not be any connection between the well and the upper formations or water from Fall River.

34. The concerns raised by Ms. Gamache and Ms. Sample about the cone of depression and possible contamination from an old oil refinery were not justified as explained by Ken Buhler, who stated that since there was not a connection between the surface of the ground and the District's proposed Madison well, no contamination was possible.

35. Mr. Buhler testified that he had consulted with the South Dakota Groundwater Quality Program who determined that appropriate remedial action

had been taken and that no further action was necessary concerning any contamination from the old oil refinery.

36. The evidence established that there would not be any draw down on existing shallower domestic wells or existing septic systems caused by the Madison well proposed by the District.

37. The evidence established that during the drilling process there should not be any impact on existing wells because of the procedures used by the well driller and the use of surface casing.

38. There exists reasonable probability that there is unappropriated water available for the District's proposed use under this permit.

39. The proposed diversion can be developed without unlawful impairment of existing rights.

40 The proposed use in the permit is a beneficial use within the meaning of South Dakota law.

41. The expert testimony of Ken Buhler is accepted as being credible and supported by the facts herein.

42. To the extent that any of these Findings of Fact are determined to be Conclusions of Law, they should be deemed Conclusions of Law.

Based upon the forgoing the Board hereby makes and enters its:

CONCLUSIONS OF LAW

The Board has jurisdiction over the subject matter and parties to this action.

1. The Board conducted a hearing on this application for appropriation of water under the authority of SDCL Ch. 46-2 and Ch. 46-2A.

2. Any individual who signed a petition to participate in the hearing before the Board, but did not attend the hearing have waived their right to receive further notices and other materials pertaining to the hearing in accordance with the provisions of ARSD 74:02:01:12.02.

3. Unappropriated water is available for the District's application.

4. The District is a water users district organized and operating under the provisions of SDCL Ch. 46A-9.

5. The proposed diversion can be developed without unlawful impairment of existing rights to other permit holders.

6. The proposed application is a beneficial use and a public benefit.

7. The Board is not required to maintain artesian head pressure when considering the location and capacity of a large capacity well.

8. SDCL 46-2A-20 sets forth that no permit may be issued in the area designated by the application unless there is evidence presented at a hearing that establishes both 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) information, whether provided by the applicant or by other means, show that there is a reasonable probability that the issuance of the proposed permit would not have a significant adverse effect on nearby Madison formation wells and springs. The District has not asked the Board to approve the permit for longer than twenty (20) years. Further, an evidentiary basis to issue the permit for longer than 20 years was not provided. Therefore, the permit will be issued for

twenty (20) years and any impacts can be reviewed at the end of the twenty (20) year period.

9. The Board has the ability to cancel or amend a permit at the end of the twenty (20) year period.

11. In order to issue a water permit, the Board must conclude its issuance is in the public interest. The Board may deny an application or condition a permit to protect the public interest. The Board concludes that it is in the public interest to protect springs with flows whose source is the Madison aquifer from significant adverse effects arising from Applicant's proposed well operations. Though not probable, such effects are possible. Further, protection of these springs from the long-term effects of Applicant's well operations is consistent with SDCL 46-2A-20, and the Board's acceptance of Applicant's proposed Conclusion of Law No. 9 as modified.

12. The granting of the permit is in the public's interest if the District controls its withdrawals from the well so there is not a significant adverse effect on the water flow from Beaver Creek Springs, Cascade Springs, Evan's Plunge Springs, Minnekahta Springs and Hot Springs.

13. To the extent that any of these Conclusions of Law are determined to be Findings of Fact, they should be deemed Findings of Fact.

Based upon the forgoing Findings of Fact and Conclusions of Law the Board hereby makes and enters its:

FINAL DECISION

The Board hereby authorizes the permit conditioned upon the following:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2629-2 is issued for a twenty (20) year term. Pursuant to 46-2A-21, the twenty (20) year term may be deleted at any time during the twenty (20) year period following its expiration. If the twenty (20) year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty (20) years. Permit No. 2629-2 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 ARSD 74:02:01:37.

2. The well approved under this permit will be located near domestic wells, other wells which may obtain water from the same aquifer, as well as being in the vicinity of the Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs, and Hot Springs that have the same Madison Aquifer as their source. The well owner, under this permit, shall control its withdrawals so that there is not a reduction of needed water supplied in adequate domestic wells or in adequate wells having prior rights, or a significant reduction in water flows from Cascade Springs, Beaver Creek Springs, Evans Plunge Springs, Minnekahta Springs, and Hot Springs.

3. The well authorized by Permit No. 2629-2 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter

74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.

4. The Water Right Holder shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

Dated this ___ day of _____, 2009.

SOUTH DAKOTA WATER MANAGEMENT BOARD

_____

Everett Hoyt, Chairman

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STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	)))))	WATER MANAGEMENT BOARD'S RULINGS ON APPLICANT'S PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW AND FINAL DECISION

Pursuant to the directions of the Water Management Board, Applicant Fall River Water Users District (hereinafter referred to as "Applicant") prepared and submitted proposed Findings of Fact, Conclusions of Law, and Final Decision in the above-entitled matter. The South Dakota Department of Environment and Natural Resources Water Rights Program (hereinafter referred to as "DENR") submitted DENR Response to Proposed Findings of Fact, Conclusions of Law, and Final Decision in which DENR urged the adoption of Applicant's proposals and made no objections or proposed alternatives. Petitioners Brenda Gamache and Georgia Sample were afforded time to submit objections or proposals to Applicant's submission, but no objections or proposals were submitted. The Board, based upon a review of the submissions received, the administrative record, and having orally entered its decision, hereby makes the following rulings:

A. Applicant's proposed Findings of Fact Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, and 42 are accepted by the Board as consistent with the administrative record and the Board's oral ruling.

B. Applicant's proposed Conclusions of Law Nos. 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, and 13 are accepted by the Board as consistent with the administrative record, South Dakota law, and the Board's oral decision.

C. Applicant's proposed Conclusion of Law No. 9 is substantially accepted by the Board, but is revised as set forth below to more fully reflect the administrative record, South Dakota law, and the Board's oral decision. At the end of the second sentence, insert the following sentence:

> Further, an evidentiary basis to issue the permit for longer than 20 years was not provided.

D. Applicant's proposed Conclusion of Law No. 11 is rejected as not fully consistent with the Board's oral decision. In its stead, the Board adopts the following:

> 11. In order to issue a water permit, the Board must conclude its issuance is in the public interest. The Board may deny an application or condition a permit to protect the public interest. The Board concludes that it is in the public interest to protect springs with flows whose source is the Madison aquifer from significant adverse effects arising from Applicant's proposed well operations. Though not probable, such effects are possible. Further, protection of these springs from the long-term effects of Applicant's well operations is consistent with SDCL 46-2A-20 and the Board's acceptance of Applicant's proposed Conclusion of Law No. 9 as modified.

E. Applicant's proposed Final Decision is substantially accepted by the Board with the modification of qualification number two as set forth below to be more consistent with the Board's oral decision.

> 2. The well approved under this permit will be located near domestic wells, other wells which may obtain water from the same aquifer, as well as being in the vicinity of the Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs, and Hot Springs that have the same Madison Aquifer as their

source. The well owner, under this permit, shall control its withdrawals so that there is not a reduction of needed water supplied in adequate domestic wells or in adequate wells having prior rights, or a significant reduction in water flows from Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs, and Hot Springs.

The Board attorney is directed to prepare Findings of Fact, Conclusions of Law, and Final Decision consistent with the above rulings to be executed by the Chairman of the Board or designee without further motion or hearing.

Dated this _____ day of May, 2009.

SOUTH DAKOTA WATER MANAGEMENT BOARD

_____

Everett Hoyt, Chairman

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STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	))))	CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of Applicant's Proposed Findings of Fact, Conclusions of Law and Final Decision, and proposed Water Management Board's Rulings on Applicant's Proposed Findings of Fact, Conclusions of Law, and Final Decision were served upon each of the following by enclosing the same in envelopes with first class postage, prepaid and affixed thereto, and depositing said envelopes in the United States mail, at Pierre, South Dakota, on this 1 day of May, 2009:

Tim Bjork, Vice-Chairman
112 W. Oak Street
Pierre, SD 57501

Rodney Freeman, Jr.
P.O. Box 176
Huron, SD 57350-0176

Leo Holzbauer
P.O. Box 877
Wagner, SD 57380

James Hutmacher
802 E. Seventh Street
Oacoma, SD 57365

Francis E. Brink
1214 S. Wells Street
Aberdeen, SD 57401

Everett Hoyt, Chairman
4422 Carriage Hills Dr.
Rapid City, SD 57702

Bernita Loucks, Secretary
219 42nd Street
Rapid City, SD 57702

Brenda Gamache
13024 Fall River Road
Hot Springs, SD 57747

Georgia Sample
13126 Eagle Rock Road
Hot Springs, SD 57747

Michael M. Hickey
Bangs McCullen Law Firm
P.O. Box 2670
Rapid City, SD 57709-2670

Diane Best
Assistant Attorney General
300 N. Dakota Ave., #403
Sioux Falls, SD 57104

and the original was sent on the same date by interoffice mail to:

Garland Erbele, Chief Engineer
DENR Water Rights Program
Joe Foss Building
523 E. Capitol
Pierre, SD 57501-3181

Jeffrey P. Hallem
Assistant Attorney General
1302 East Highway 14, Suite 1
Pierre, SD 57501-8501
Telephone: (605) 773-3215

Pld JPH Water Management Board 4-30-09 Fall River Water Users COS (jkp)

Gronlund, Eric

From: Hallem, Jeff
Sent: Thursday, May 07, 2009 1:55 PM
To: Gronlund, Eric
Subject: New address Georgia Sample

Georgia A. Sample
13124 Eagle Rock RD
Hot Springs SD 57747-7235

Jeffrey P. Hallem
Assistant Attorney General
Office of the Attorney General
1302 E. Hwy. 14, Suite 1
Pierre, SD 57501-8501
Telephone: (605) 773-3215
Facsimile: (605) 773-4106
Jeff.Hallem@state.sd.us

Confidentiality Notice

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DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

May 11, 2009

NOTICE

TO: Michael M. Hickey
Attorney at Law
PO Box 2670
Rapid City SD 57709

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Georgia Sample
13124 Eagle Rock Road
Hot Springs SD 57747-7235

FROM: Garland Erbele, Chief Engineer
Water Rights Program, DENR

SUBJECT: Adoption of Finding of Fact, Conclusion of Law and Final Decision in the matter of Water Permit Application No. 2629-2

This is to notify you that the Water Management Board rulings and the Final Decision, including Findings of Fact and Conclusions of Law, were adopted May 7, 2009, by the Water Management Board in the matter of Water Permit No. 2629-2, Fall River Water Users District. A copy of the Board rulings and signed Findings of Fact, Conclusions of Law and Final Decision are enclosed.

South Dakota statutes provide that decisions of the Board may be appealed to the Courts. Notice of appeal of the Board's decision must be filed within thirty days of this notice and be in accordance with procedures established in SDCL 1-26-31.

Enclosures

c: Jeff Hallem, Assistant Attorney General
Diane Best, Assistant Attorney General, 300 N. Dakota Ave., Suite 403, Sioux Falls SD

CERTIFICATION

I hereby certify that on May 11, 2009, I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated May 11, 2009, regarding adoption of the Water Management Board's Ruling and Findings of Fact, Conclusions of Law and Final Decision in the matter of Application No. 2629-2 addressed as stated below:

Michael M. Hickey
Attorney at Law
PO Box 2670
Rapid City SD 57709

Brenda Gamache
13024 Fall River Road
Hot Springs SD 57747

Georgia Sample
13124 Eagle Rock Road
Hot Springs SD 57747-7235

Diane Best
Assistant Attorney General
300 N. Dakota Avenue, Suite 403
Sioux Falls SD 57104

A copy of the above described Notice was sent Inter-office to:

Jeff Hallem, Assistant Attorney General, 1302 E. Hwy 14, Suite 1, Pierre SD 57501-8501

Gail Jacobson
Water Right Program

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 11th day of May, 2009.

Karen Schlaak
Notary Public
My Commission expires April 1, 2013

SEAL KAREN SCHLAAK NOTARY PUBLIC State of South Dakota SEAL

STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	)))))	WATER MANAGEMENT BOARD'S RULINGS ON APPLICANT'S PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW AND FINAL DECISION

Pursuant to the directions of the Water Management Board, Applicant Fall River Water Users District (hereinafter referred to as "Applicant") prepared and submitted proposed Findings of Fact, Conclusions of Law, and Final Decision in the above-entitled matter. The South Dakota Department of Environment and Natural Resources Water Rights Program (hereinafter referred to as "DENR") submitted DENR Response to Proposed Findings of Fact, Conclusions of Law, and Final Decision in which DENR urged the adoption of Applicant's proposals and made no objections or proposed alternatives. Petitioners Brenda Gamache and Georgia Sample were afforded time to submit objections or proposals to Applicant's submission, but no objections or proposals were submitted. The Board, based upon a review of the submissions received, the administrative record, and having orally entered its decision, hereby makes the following rulings:

A. Applicant's proposed Findings of Fact Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, and 42 are accepted by the Board as consistent with the administrative record and the Board's oral ruling.

B. Applicant's proposed Conclusions of Law Nos. 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, and 13 are accepted by the Board as consistent with the administrative record, South Dakota law, and the Board's oral decision.

C. Applicant's proposed Conclusion of Law No. 9 is substantially accepted by the Board, but is revised as set forth below to more fully reflect the administrative record, South Dakota law, and the Board's oral decision. At the end of the second sentence, insert the following sentence:

> Further, an evidentiary basis to issue the permit for longer than 20 years was not provided.

D. Applicant's proposed Conclusion of Law No. 11 is rejected as not fully consistent with the Board's oral decision. In its stead, the Board adopts the following:

> 11. In order to issue a water permit, the Board must conclude its issuance is in the public interest. The Board may deny an application or condition a permit to protect the public interest. The Board concludes that it is in the public interest to protect springs with flows whose source is the Madison aquifer from significant adverse effects arising from Applicant's proposed well operations. Though not probable, such effects are possible. Further, protection of these springs from the long-term effects of Applicant's well operations is consistent with SDCL 46-2A-20 and the Board's acceptance of Applicant's proposed Conclusion of Law No. 9 as modified.

E. Applicant's proposed Final Decision is substantially accepted by the Board with the modification of qualification number two as set forth below to be more consistent with the Board's oral decision.

> 2. The well approved under this permit will be located near domestic wells, other wells which may obtain water from the same aquifer, as well as being in the vicinity of the Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs, and Hot Springs that have the same Madison Aquifer as their

source. The well owner, under this permit, shall control its withdrawals so that there is not a reduction of needed water supplied in adequate domestic wells or in adequate wells having prior rights, or a significant reduction in water flows from Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs, and Hot Springs.

The Board attorney is directed to prepare Findings of Fact, Conclusions of Law, and Final Decision consistent with the above rulings to be executed by the Chairman of the Board or designee without further motion or hearing.

Dated this 7 day of May, 2009.

SOUTH DAKOTA WATER MANAGEMENT BOARD

Everett Hoyt, Chairman

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STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE APPLICATION OF FALL RIVER WATER USERS DISTRICT, APPLICATION NO. 2629-2	))))	FINDINGS OF FACT, CONCLUSIONS OF LAW AND FINAL DECISION

1. A hearing was held in the above entitled matter on March 11, 2009, before the Water Management Board (hereinafter "Board"). The Board has considered the evidence presented and the arguments of the parties.

2. This is an application to appropriate seven hundred twenty-four (724) acre-feet of water annually at a maximum diversion rate of one (1) cubic foot per second. The water will come from the Madison aquifer.

3. Three hundred fifty (350) acre-feet of water applied for comes from future use permits numbered #2560-2, #2560A-2 and #2560B-2 held by the Fall River Water Users District. The remaining portion of three hundred seventy-four (374) acre-feet is new water.

4. Fall River Water Users District (hereinafter the "District") is a water users district which was formed and operates under the provisions of SDCL Chapter 46A-9.

5. The District currently supplies water to farmers and ranchers in Fall River and Custer counties, and it also supplies municipal water to the community of Oelrichs.

6. The District is currently involved in an expansion plan to provide water to additional users in Fall River County.

7. The Madison aquifer occurs in the Madison limestone and extends laterally over most of the western United States.

8. The proposed well site is located between Maverick Junction and the City of Hot Springs, approximately 1.8 miles from Hot Springs.

9. At this location it is estimated that the Madison aquifer is approximately three hundred (300) feet thick, with the top of the formation at approximately two thousand (2,000) feet below the surface.

10. At this location it is reasonably anticipated that the well will be a flowing well with about fifty (50) pounds of shut in pressure.

11. It is estimated that the Madison aquifer recharges at the rate of between one hundred forty thousand (140,000) and four hundred thousand (400,000) acre-feet of water per year.

12. There is available water in the Madison aquifer to supply the amount requested by this permit. There are currently a total of 167 appropriations plus 1 deferred application from the Madison aquifer in South Dakota. These appropriations include 7 future use permits that reserve eleven thousand (11,000) acre-feet of water per year. There are 134 water permits that are appropriating water for non-irrigation purposes at 97.81 cubic feet of water per second. There are 27 water rights that appropriate approximately seven thousand seven hundred (7,700) acre-feet of water per year for irrigation.

13. Based upon the testimony of Mr. Buhler, it is reasonably assumed that if the future use permits can be fully developed, the non-irrigation appropriations will be used at 60% of full time usage at their maximum diversion

rights and irrigation appropriation will use their full appropriation. Therefore the maximum amount of water that could theoretically be used under the current appropriations and future use reservations are approximately sixty-two thousand nine hundred (62,900) acre-feet of water a year. In all likelihood water pumping would be less than twenty thousand (20,000) acre-feet of water a year from the Madison aquifer. The amount of recharge to the Madison aquifer greatly exceeds the amount of withdrawal.

14. A localized hydrologic budget also establishes that water is available in this area as water comes into this area from the west and the northwest and in the amount of approximately 47.7 cfs. Additionally the Madison aquifer receives recharge from stream flow losses in the amount of 4.4 cfs and recharge from precipitation of 6.1 cfs.

15. According to the Black Hills Hydro Study, the sub area where the well is being proposed loses 44.3 cubic feet per second in springs, 12 cubic feet per second leaving underground, and 1.8 cubic feet per second from pumping from wells.

16. A very subtle change in the water level in the sub area of the well will induce more water to come in from adjacent areas and it would take a huge change in the water level to decrease the spring discharge or well discharge.

17. Water would flow in from adjacent areas before there would be a decrease in spring flows.

18. DENR has observation wells in the area. The nearest well is about 3 ¾ miles away. These monitoring wells show that the water level has about 15

feet of fluctuation in the area. The water level is higher now than it was in 1996. This data suggests that this well responds well to recharge and certainly suggests that withdrawals of water are not exceeding recharge in this area.

19. Based on the evidence presented, it is clear that water is available for this appropriation.

20. The well proposed by the District can be developed without any unlawful impairment of existing rights.

21. Within a 5 ½ mile radius of the proposed well, there are 22 water rights or permits that appropriate water from numerous aquifers.

22. The Madison aquifer is hydraulically separate from the other aquifers in the area so that wells being supplied from aquifers other than the Madison would not be impacted by withdrawals from the Madison.

23. The nearest Madison aquifer well belongs to Fall River and is located 5 ½ miles from the proposed well. The next closest well is the Streeter well which is located approximately 9 miles northeast of the proposed well.

24. Given the distance between the proposed well and the existing Madison wells and the amount of diversion being contemplated, there is no likelihood of adverse impact on existing water users.

25. Water used in a rural water system constitutes a beneficial use of water within the meaning of South Dakota law.

26. There are springs in the general area some of which may draw water from the Madison, but given the distances between the well site and these springs and the low diversion rate for the well in question, it is highly unlikely that any

draw downs from this well could have a measurable impact on any discharges from springs.

27. The Board has previously stated that there are public interest concerns if there is a decrease in base flows in area springs because of well interference. Consequently, the future use permit 2560-2 contained a qualification that at such time as definite plans are made to construct works and put the water to beneficial use, the District shall obtain approval from the Board and that it must give particular attention to the flows in Beaver Springs, Cascade Springs and Hot Springs.

28. The proposed well is located approximately 8 ½ miles southeast of Beaver Creek Spring, 7 ¾ miles northeast of Cascade Springs and Hot Springs is approximately 3 ¼ miles northwest. With the distances involved and the relatively modest diversion rate it is unlikely that there will be any interference in these springs due to this well.

29. The proposed well is located approximately three hundred (300) feet from Fall River but it is not believed that there will be any interference to Fall River because of the vertical distance of approximately one thousand nine hundred seventy (1,970) feet between ground surface and the top of the Madison aquifer which is made up of confining layers that will prevent interference between the well and Fall River.

30. The Chief Engineer has concluded that there is unappropriated water available at the proposed well site from the Madison aquifer. The Chief Engineer's report states that the proposed appropriation should not adversely

affect existing water rights including domestic wells and the appropriation should not affect the discharge of any springs in the area.

31. A well completed in the Madison aquifer in this area is going to flow (artesian pressure) and since the well in question is going to be valved and flow reduced to only the amount needed with a twenty (20) year term limit, the Chief Engineer has recommended approval of this permit with qualifications in that the District shall control its withdrawals so there is not a reduction in either water supplied to domestic wells or other adequate wells.

32. The District's well must be valved and controlled and the District must submit a water use summary to the chief engineer.

33. The District's proposed well must be drilled in accordance with the well constructions adopted by the Board which provides for an impermeable barrier between the well casing and the well bore from the top of the Madison aquifer to ground surface so that there will not be any connection between the well and the upper formations or water from Fall River.

34. The concerns raised by Ms. Gamache and Ms. Sample about the cone of depression and possible contamination from an old oil refinery were not justified as explained by Ken Buhler, who stated that since there was not a connection between the surface of the ground and the District's proposed Madison well, no contamination was possible.

35. Mr. Buhler testified that he had consulted with the South Dakota Groundwater Quality Program who determined that appropriate remedial action

had been taken and that no further action was necessary concerning any contamination from the old oil refinery.

36. The evidence established that there would not be any draw down on existing shallower domestic wells or existing septic systems caused by the Madison well proposed by the District.

37. The evidence established that during the drilling process there should not be any impact on existing wells because of the procedures used by the well driller and the use of surface casing.

38. There exists reasonable probability that there is unappropriated water available for the District's proposed use under this permit.

39. The proposed diversion can be developed without unlawful impairment of existing rights.

40 The proposed use in the permit is a beneficial use within the meaning of South Dakota law.

41. The expert testimony of Ken Buhler is accepted as being credible and supported by the facts herein.

42. To the extent that any of these Findings of Fact are determined to be Conclusions of Law, they should be deemed Conclusions of Law.

Based upon the forgoing the Board hereby makes and enters its:

CONCLUSIONS OF LAW

1. The Board has jurisdiction over the subject matter and parties to this action.

2. The Board conducted a hearing on this application for appropriation of water under the authority of SDCL Ch. 46-2 and Ch. 46-2A.

3. Any individuals who signed a petition to participate in the hearing before the Board, but did not attend the hearing have waived their right to receive further notices and other materials pertaining to the hearing in accordance with the provisions of ARSD 74:02:01:12.02.

4. Unappropriated water is available for the District's application.

5. The District is a water users district organized and operating under the provisions of SDCL Ch. 46A-9.

6. The proposed diversion can be developed without unlawful impairment of existing rights to other permit holders.

7. The proposed application is a beneficial use and a public benefit.

8. The Board is not required to maintain artesian head pressure when considering the location and capacity of a large capacity well.

9. SDCL 46-2A-20 sets forth that no permit may be issued in the area designated by the application unless there is evidence presented at a hearing that establishes both 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) information, whether provided by the applicant or by other means, show that there is a reasonable probability that the issuance of the proposed permit would not have a significant adverse effect on nearby Madison formation wells and springs. The District has not asked the Board to approve the permit for longer

than twenty (20) years. Further, an evidentiary basis to issue the permit for longer than 20 years was not provided. Therefore, the permit will be issued for twenty (20) years and any impacts can be reviewed at the end of the twenty (20) year period.

10. The Board has the ability to cancel or amend a permit at the end of the twenty (20) year period.

11. In order to issue a water permit, the Board must conclude its issuance is in the public interest. The Board may deny an application or condition a permit to protect the public interest. The Board concludes that it is in the public interest to protect springs with flows whose source is the Madison aquifer from significant adverse effects arising from Applicant's proposed well operations. Though not probable, such effects are possible. Further, protection of these springs from the long-term effects of Applicant's well operations is consistent with SDCL 46-2A-20, and the Board's acceptance of Applicant's proposed Conclusion of Law No. 9 as modified.

12. The granting of the permit is in the public's interest if the District controls its withdrawals from the well so there is not a significant adverse effect on the water flow from Beaver Creek Springs, Cascade Springs, Evan's Plunge Springs, Minnekahta Springs and Hot Springs.

13. To the extent that any of these Conclusions of Law are determined to be Findings of Fact, they should be deemed Findings of Fact.

Based upon the forgoing Findings of Fact and Conclusions of Law the Board hereby makes and enters its:

FINAL DECISION

The Board hereby authorizes the permit conditioned upon the following:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2629-2 is issued for a twenty (20) year term. Pursuant to 46-2A-21, the twenty (20) year term may be deleted at any time during the twenty (20) year period following its expiration. If the twenty (20) year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty (20) years. Permit No. 2629-2 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 ARSD 74:02:01:37.

2. The well approved under this permit will be located near domestic wells, other wells which may obtain water from the same aquifer, as well as being in the vicinity of the Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs, and Hot Springs that have the same Madison Aquifer as their source. The well owner, under this permit, shall control its withdrawals so that there is not a reduction of needed water supplied in adequate domestic wells or in adequate wells having prior rights, or a significant reduction in water flows from Cascade Springs, Beaver Creek Springs, Evans Plunge Springs, Minnekahta Springs, and Hot Springs.

3. The well authorized by Permit No. 2629-2 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter

74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.

4. The Water Right Holder shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer.

Dated this 7 day of MAY, 2009.

SOUTH DAKOTA WATER MANAGEMENT BOARD

Tim Bjork, Vice-Chairman

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

AUG 0 5 2009

Fall River Water Users District
c/o Steve Harper
PO Box 321
Oral SD 57766

Dear Mr. Harper:

Enclosed is Water Permit No. 2629-2 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

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.

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

Sincerely,

Garland Erbele

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

enclosures

2629-2

Wester-Wetstein & Associates, Inc.
Consultants in Engineering and Hydrogeology
605 Plaza Court (82070)
P.O. Box 2202
Laramie, Wyoming 82073-2202

Larry Wester, P.E.
John Wetstein, P.E., P.G.

Telephone
(307) 742-9220
Fax (307) 742-0316

May 31, 2012

Rural Development
U.S, Department of Agriculture
414 East Stumer Road
Rapid City, SD 57701

RECEIVED
JUN - 4 2012
WATER RIGHTS
PROGRAM

Attn: Ms. Pamela K. Smith

Re: Fall River Water User's District South Well Project, Job No. 152.004, Plans and Specifications for the Well

Dear Ms. Smith:

Transmitted herewith are four (4) bound copies of the plans and specifications for the new South Well for the Fall River Water User's District and one electronic copy. We thank you in advance for your early review of these documents. If you have any questions, please do not hesitate to contact me.

Respectfully submitted,

Wester-Wetstein & Associates, Inc.

Larry Wester

Larry Wester

Enclosure

Cc: Fall River Water User's District w/Bound Document
Tim Barritt w/Bound Document
Ken Buhler, South Dakota DNR w/Bound Document

RECEIVED
JUN - 4 2012
WATER RIGHTS
PROGRAM

Contract Documents and Technical Specifications for

SOUTH MADISON WELL PROJECT

PROJECT NO. 152.004

FALL RIVER WATER USERS DISTRICT
ORAL, SOUTH DAKOTA

JUNE 2012

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

605 Plaza Court
P.O. Box 2202
Laramie, WY 82073
(307) 742-9220

CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

PREPARED FOR

SOUTH MADISON WELL PROJECT

PROJECT NO. 152.004

PREPARED FOR:

FALL RIVER WATER USERS DISTRICT
ORAL, SD

Keith Neugebauer, General Manager

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 3847
LARRY K. WESTER
SOUTH DAKOTA
5/31/2012

PREPARED BY

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

605 Plaza Court
P.O. Box 2202
Laramie, WY 82073
(307) 742-8220

June 2012

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FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Contract Documents

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Advertisement and Invitation for Bids

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

SECTION 00020
ADVERTISEMENT AND INVITATION FOR BIDS

FALL RIVER WATER USERS DISTRICT
27600 W. Oral Road, P.O. Box 321
ORAL, SD 57766

SEPARATE SEALED BIDS FOR THE DRILLING, CONSTRUCTION, DEVELOPMENT, AND TESTING OF A MADISON WATER SUPPLY WELL IDENTIFIED AS

South Madison Well Project
152.004

WILL BE RECEIVED BY THE FALL RIVER WATER USERS DISTRICT, 27600 ORAL ROAD, ORAL, SD UNTIL THE FOLLOWING TIME AND DATE, AND THEN PUBLICLY OPENED AND READ ALOUD:

2:00 P.M. MST, June XX, 2012

THE CONTRACT DOCUMENTS MAY BE EXAMINED AT THE FOLLOWING LOCATIONS:

FALL RIVER WATER USERS DISTRICT, 27600 ORAL ROAD, ORAL, SD 57766

WESTER-WETSTEIN & ASSOCIATES, 605 PLAZA COURT, LARAMIE, WY 82070

CONSTRUCTION INDUSTRY CENTER, P.O. BOX 1227 PLANT STREET, RAPID CITY, SD 57702

COPIES OF THE CONTRACT DOCUMENTS MAY BE OBTAINED AT THE OFFICE OF THE ENGINEER, WESTER-WETSTEIN AND ASSOCIATES LOCATED AT 605 PLAZA COURT, P.O. BOX 2202 LARAMIE, WYOMING 82073 UPON PAYMENT OF A NON-REFUNDABLE FEE OF $75.00.

A PRE-BID MEETING IS SCHEDULED FOR **1:00 P.M** ON THE **XX** OF JUNE, 2012 AT THE OFFICE OF THE FALL RIVER WATER USERS DISTRICT, BIDDERS ARE ***ENCOURAGED*** TO ATTEND AND PARTICIPATE IN THE CONFERENCE.

THE BIDDER IS ENCOURAGED TO MEET DISADVANTAGED BUSINESS REQUIREMENTS BUT NOT REQUIRED.

BID MUST BE ACCOMPANIED BY BID SECURITY MADE PAYABLE TO OWNER IN AN AMOUNT OF 5 % OF BIDDER'S MAXIMUM BID PRICE AND IN THE FORM OF A CERTIFIED CHECK, CASHIER'S CHECK, OR BANK MONEY ORDER, OR BID BOND IN THE AMOUNT OF 10 %.

THE FALL RIVER WATER USERS DISTRICT RESERVES THE RIGHT TO REJECT ANY AND ALL BIDS.

PUBLISH: JUNE, XX 2012, JUNE, XX 2012, JUNE XX 2012

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Instruction to Bidders

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

SECTION 00200

Instructions to Bidders

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ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. Issuing Office--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement for Bids may be obtained from the Issuing Office. The fee is non-refundable and will not be returned.

2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.02 of the General Conditions has been identified and established in paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.06 of the General Conditions has been identified and established in paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract

Documents to be within the scope of the Work appear in paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is responsibility of each Bidder before submitting a Bid to:

A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. Become familiar with and satisfy Bidder as to all Federal, State, and local Laws and Regulations that may affect cost, progress, or performance of the Work;

D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions;

E. Obtain and carefully study (or accept consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 A Pre-Bid conference will be held at the time and place stated in the advertisement for bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easement for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than five days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 % of Bidder's maximum Bid price and in the form of a certified check, cashier's check, or bank money order, or Bid bond (EJCDC No. C-430, 2007 Edition) in the amount of 10 % issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom OWNER believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 -LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or "or-equal" item. Request for Engineer's clarification of materials and equipment considered "or-equal" prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest responsible Bidder that proposes to use acceptable Subcontractors,

Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner and Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 6.06.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid From. A Bid price shall be indicated for each *{section, Bid item, alternative, adjustment unit price item, and unit price item}* listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. If required by State where work is to be performed, the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporation business address and state of incorporation shall be provided on the Bid Form.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The business address of the partnership shall be provided on the Bid Form.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be provided on the Bid Form.

13.06 A Bid by an individual shall show the Bidder's name and business address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid form. The business address of the joint venture must be provided on the Bid Form.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers and dates of which shall be filled in on the Bid form.

13.10 The postal and email addresses and telephone number for communication regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state or locality where the Project is located or Bidder shall covenant in writing to obtain such qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARSION OF BIDS

14.01 Unit Price

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

B. The total of all bid prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

14.02 Allowances

A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 11.02.B of the General Conditions.

ARTICLE 15 - SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and the Bid bond form. The unbound copy of the Bid Form is to be completed and submitted with all the attachments outlined in Article 7 of the Bid Form.

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid. A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid or negotiated, that Bidder will be disqualified from further bidding on the Work. This provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder's errors in judgment in preparing the Bid.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, at its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 - EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price and other factors considered. If detailed in the bid form, factors such as discounts, transportation costs, and life cycle costs may be used to determine which bidder, if any, is to offered the award.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 30 days thereafter,

Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

21.02 This Contract is expected to be funded in part with funds provided by the United States Department of Agriculture, Rural Utilities Service (RUS). Refer to Supplementary General Conditions for Federal Requirements.

21.03 Concurrence by RUS in the award of the Contract is required before the Contract is effective.

ARTICLE 22 – SALES AND USE TAX

22.01 The Contractor must pay all State Sales and Use Tax on materials and equipment to be incorporated in the Work.

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Qualifications

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

STATEMENT OF QUALIFICATIONS

The Bidder shall furnish the following information. Failure to comply with this requirement will render the Bid non-responsive and may cause its rejection. Additional sheets shall be attached as required.

(1) CONTRACTOR'S name and address:

(2) CONTRACTOR'S telephone number:

(3) Number of years as a contractor in construction work of this type:

(4) Names and titles of all officers of CONTRACTOR'S firm:

(5) Wyoming water well drillers license number _____

(6) Name, address, and telephone number of surety company and agent who will provide the required bonds and insurance on the Contract:

Bonds: _____

_____

_____

Insurance: _____

_____

_____

(7) ATTACH TO THIS Bid the experience resume of the person who will be designated chief construction superintendent or on-site construction manager.

(8) List three projects completed as of recent date involving work of similar type and complexity:

Project No. 1: _____
Well Diameter and Depth: _____
Pump Capacity (gpm): _____
Contract Price: _____
Owner's Name: _____
Owner's Address: _____
Owner=s Representative: _____
Owner's Representative's Telephone Number: _____

Project No. 2: _____
Well Diameter and Depth: _____
Pump Capacity (gpm): _____
Contract Price: _____
Owner's Name: _____
Owner's Address: _____
Owner=s Representative: _____
Owner's Representative's Telephone Number: _____

Project No. 3: _____
Well Diameter and Depth: _____
Pump Capacity (gpm): _____
Contract Price: _____
Owner's Name: _____
Owner's Address: _____
Owner=s Representative: _____
Owner's Representative's Telephone Number: _____

(9) Type and model of drill rig proposed to be used on this project:

(10) Load capacity, horsepower, year of manufacture, and year of purchase of proposed drilling rig:

(11) Type, model, and capacity of mud pumps proposed to be used on this project:

(12) Capacity of mud tanks if they are to be used on this project:

(13) Diameter and weight of drill pipe:

LIST OF SUBCONTRACTORS

The Bidder shall list below the name and business address of each subcontractor who will perform work under this Bid, and shall also list the portion of work which will be done by such subcontractor. After the opening of Bids, no changes or substitutes will be allowed except as otherwise provided by law. The listing of more than one subcontractor for each item of work to be performed with the words "and/or" will not be permitted. Failure to comply with this requirement will render the Bid non-responsive and will cause its rejection.

SUBCONTRACTOR'S NAME AND ADDRESS	PERCENT OF WORK TO BE PERFORMED	TOTAL CONTRACT
1.		
2.		
3.		
4.		
5.		
6.		

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Bid Form

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

SECTION 00300

BID FORM

Project Identification: Fall River Water User's District South Madison Well Project

Contract Identification and Number: South Madison Well Project – Project No. 152.004

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Fall River Water Users District
c/o Wester-Wetstein and Associates, Inc.
605 Plaza Court
P.O. Box 2202
Laramie, Wyoming 82073

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the price, and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 The Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty (60) days after the day of the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents:

A. The Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents and the following Addenda, receipt of all which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

B. The Bidder has visited the Site, and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Law and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in SC-4.06 as containing reliable "technical data."

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site related reports and drawings identified in the Bidding Documents; with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance, of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Biddings Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

J. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 – BIDDERS CERTIFICATION

4.01 Bidder further represents that:

A. This bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and Open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. " coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following prices(s):

UNIT PRICE SCHEDULE
FALL RIVER WATER USERS DISTRICT – SOUTH WELL PROJECT

ITEM NO.	PAY ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
1	Mobilization and Demobilization	LS	1	$ _____	$ _____
2	Contract Bonds	LS	1	$ _____	$ _____
3	Project Identification Sign	LS	1	$ _____	$ _____
4	Flushing Hydrant	EA	1	$ _____	$ _____

ITEM NO.	PAY ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
5	Drill For, Furnish, Install and Cement Surface Casing	LF	50	$	$
6	Drill 12¼-inch Min. Diameter Borehole	LF	560	$	$
7	Drill 8¾-inch Min. Diameter Borehole	LF	1,430	$	$
8	Conduct Geophysical Survey of 12¼-inch and 8¾-inch Min. Diameter Boreholes	LS	1	$	$
9	Furnish and Install 7-inch O.D., 23 lb., J- or K-55 Casing	LF	1.440	$	$
10	Furnish and Install Threaded Cross-Over Joint Adapter from 9⅝-inch to 7-inch casing	EA	1	$	$
11	Furnish and Install 9⅝-Inch O.D., 36 lb., J- or K-55 Casing	LF	602	$	$
12	Cement 9⅝-Inch O.D. and 7-Inch O.D., Casing	LS	1	$	$
13	Furnish and Install 10-Inch Gate Valve and Well Head Assembly	LS	1	$	$
14	Drill 6¼-Inch Diameter Borehole	LF	300	$	$
15	Conduct Geophysical Survey of 6¼-Inch Diameter Borehole	LS	1	$	$
16	Rig Time	HR	16	$	$
17	Air Development Time	HR	16	$	$
18	Standby Time	HR	12	$	$
19	Furnish, Install and Remove Test Pump and Equipment	LS	1	$	$
20	Conduct Pumping Test	HR	78	$	$

BASE BID TOTAL = $
(Items 1-20 Inclusive)

Unit Price work has been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with paragraph 14.07 of the Gneral Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damage.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this bid:

A. Required Bid Security in the form of Bid Bond (EJCDC No. C-430), Certified Check, Cashier's Check, or Bank or Money Order (circle type of security provided);

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. List of Project References;

E. Evidence of authority to do business in the state or jurisdiction of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

F. Required Bidder Qualification Statement with Supporting Data; and

G. If Bid amount exceeds $10,000, signed Certification Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in paragraph 18.10 of the General Conditions;

H. If Bid amount exceeds $25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions (AD-1048);

I. If Bid amount exceeds $100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants, and Loans.

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with the initial capitol letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed):_____

By:_____(SEAL)
(Individual's Signature)

Doing business as:_____

A Partnership

Partnership Name:_____(SEAL)

By:_____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed):_____

A Corporation

Corporation Name:_____(SEAL)

State of Incorporation:_____

Type (General Business, Professional, Service, Limited Liability):_____

By:_____
(Signature – attach evidence of authority to sign)

Name (typed or printed):_____

Title:_____
(CORPORATE SEAL)

Attest:_____
(Signature of Corporate Secretary)

Date of Qualification to do business in South Dakota is ____/____/_____

A Joint Venture

Name of Joint Venture:

_____

First Joint Venture Name:

_____(SEAL)

By: _____

(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed):

_____

Title: _____

Second Joint Venture Name:

_____(SEAL)

By: _____

(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed):

_____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is party to the venture should be in the manner indicated above.)

Bidder's Business address:_____

_____

Business Phone No.:_____

Business Fax No.:_____

Business E-Mail Address:_____

State Contractors license No:_____(if applicable)

Employer's Tax ID No.:_____

Phone and Fax Numbers, and Address for receipt of official communications, if different from Business contact information.

_____

_____

_____

9.02 Bid submitted on _____, 20___.

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Bid Bond

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
Fall River Water Users District
C/O Keith Neugebauer
P.O. Box 321
Oral, SD 57766

BID
Bid Due Date:
Description *(Project Name and Include Location)*:
South Madison Well Project, Fall River County, South Dakota

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Agreement

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

SUGGESTED FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE) FUNDING AGENCY EDITION

THIS AGREEMENT is by and between Fall River Water Users District ("Owner") and

_____ ("Contractor").

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Drilling, construction, development, and testing of the South Madison Well – an approximately 2,340 feet deep well completed in the Madison Formation and installation of a fire hydrant for a water supply source during drilling operations.

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

South Madison Well Project, Project No. 152.004

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Wester-Wetstein and Associates (Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion and Final Payment*

A. The Work will be substantially completed within XX days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within XX days after the date when the Contract Times commence to run.

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4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $500.00 for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $500.00 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, 5.01.B, and 5.01.C below:

A. For all Work other than Unit Price Work, a Lump Sum of:

_____ ($_____)
(words) (figure)

All specific cash allowances are included in the above price and have been computed in accordance with paragraph 11.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.B:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

C. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 15th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

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1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

   a. 95 percent of Work completed (with the balance being retainage); and

   b. 100 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions.

6.03 *Final Payment*

A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate (not less than 4.0% per the State of South Dakota).

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

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F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 6, inclusive).
2. Performance bond (pages 1 to 3, inclusive).
3. Payment bond (pages 1 to 3, inclusive).
4. Other bonds (pages ____ to ___ , inclusive).
   a. _____ (pages _____ to _____, inclusive).
   b. _____ (pages _____ to _____, inclusive).
   c. _____ (pages _____ to _____, inclusive).
5. General Conditions (pages 1 to 49, inclusive).
6. Supplementary Conditions (pages 1 to 8, inclusive).
7. Specifications as listed in the table of contents of the Project Manual.
8. Drawings consisting of _____ sheets with each sheet bearing the following general title: _____.
9. Addenda (numbers _____ to _____, inclusive).
10. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid (pages 1 to 7, inclusive).
    b. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive).

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c. _____.

11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

    a. Notice to Proceed (pages ____ to ___ _, inclusive).

    b. Work Change Directives.

    c. Change Order(s).

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

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IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in four copies. One counterpart each has been delivered to Owner, Contractor, Engineer, and Agency. All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf.

NOTE(S) TO USER

See I-21 and correlate procedures for format and signing between the two documents.

This Agreement is dated _____. This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER:

Fall River Water Users District

By: _____

Title: _____

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

Wester-Wetstein and Associates, Inc.

605 Plaza Court, P.O. Box 2202

Laramie, WY 82073-2202

CONTRACTOR

_____

By: _____

Title: _____

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

_____

_____

_____

Agent for service of process:

_____

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Agency Concurrence:

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency: Rural Utility Service

Date: _____

By: _____

Title: _____

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FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Payment and Performance Bonds

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
Fall River Water Users District
c/o Keith Neugebauer
P.O. Box 321
Oral, SD 57766

CONTRACT
Effective Date of Agreement:
Amount:
Description *(Name and Location)*: South Madison Well Project, Fall River County, South Dakota

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators,

successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

   2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

   2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

   4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

   4.2 Claimants who do not have a direct contract with Contractor:
      1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
      2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
      3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

   6.1 Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

   6.2 Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated

to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*)
Surety Agency or Broker:
Owner's Representative (*Engineer or other*): Wester-Wetstein and Associates, Inc., 605 Plaza Court, P.O. Box 2202, Laramie WY, 82073-2202, 307-742-9220

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
Fall River Water Users District
c/o Keith Neugebauer
P.O. Box 321
Oral, SD 57766

CONTRACT
Effective Date of Agreement:
Amount:
Description (*Name and Location*): South Madison Well Project, Fall River County, South Dakota

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   - 2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   - 2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   - 2.3 Owner has agreed to pay the Balance of the Contract Price to:
     1. Surety in accordance with the terms of the Contract; or
     2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   - 3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   - 3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   - 3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   - 3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
     1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
     2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*)
Surety Agency or Broker:
Owner's Representative (*Engineer or other party*): Wester-Wetstein and Associates, 605 Plaza Court, P.O. Box 2202, Laramie WY, 82073-2202, 307-742-9220

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Project Forms

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

Notice of Award

Date: _____

Project: South Madison Well Project	
Owner: Fall River Water Users District	Owner's Contract No.:
Contract: South Madison Well Project	Engineer's Project No.: 152.004
Bidder:	
Bidder's Address: *[send Notice of Award Certified Mail, Return Receipt Requested]*	

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for South Madison Well Project.

Drilling, construction, development and testing of Madison water supply well.

The Contract Price of your Contract is _____ Dollars ($_____).

[Insert appropriate data if unit prices are used. Change language for cost-plus contracts.]

Six copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

Seven sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner three fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), General Conditions (Paragraph 5.01), and Supplementary Conditions (Paragraph SC-5.01).
3. Other conditions precedent:

   _____

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

_____
Owner

By:_____
Authorized Signature

_____
Title

Copy to Engineer

Notice to Proceed

Date: _____

Project: South Madison Well Project	
Owner: Fall River Water Users District	Owner's Contract No.:
Contract: South Madison Well Project	Engineer's Project No.:152.004
Contractor:	
Contractor's Address: *[send Certified Mail, Return Receipt Requested]*	

You are notified that the Contract Times under the above Contract will commence to run on_____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is_____, and the date of readiness for final payment is _____ [(or) the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds and loss payees) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must:

_____ *[add other requirements]*.

_____ _____
Owner
Given by:

_____ _____
Authorized Signature

_____ _____
Title

_____ _____
Date

Copy to Engineer

Contractor's Application for Payment No. _____

	Application Period:	Application Date:
To (Owner): Fall River Water Users District	From (Contractor):	Via (Engineer): Wester-Wetstein and Associates
Project: South Madison Well Project	Contract: South Madison Well Project	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: 152.004

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. **ORIGINAL CONTRACT PRICE** ..... $ _____
2. **Net change by Change Orders** ..... $ _____
3. **Current Contract Price (Line 1 ± 2)** ..... $ _____
4. **TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)** ..... $ _____
5. **RETAINAGE:**
   - a. **10% X _____ Work Completed** ..... $ _____
   - b. **10% X _____ Stored Material** ..... $ _____
   - c. **Total Retainage (Line 5a + Line 5b)** ..... $ _____
6. **AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)** ..... $ _____
7. **LESS PREVIOUS PAYMENTS (Line 6 from prior Application)** ..... $ _____
8. **AMOUNT DUE THIS APPLICATION** ..... $ _____
9. **BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)** ..... $ _____

Contractor's Certification

The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

Endorsed by the Construction Specifications Institute.

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[redacted]gres[redacted]tun[redacted] [redacted]rac[redacted]s A[redacted]cati[redacted]

For (contract): North Well House Project	Application Number:
Application Period:	Application Date:

A			B	Work Completed		E	F		G
Item				C	D				
Specification Section No.	Description	Qunatity	Scheduled Value	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F) B	Balance to Finish (B - F)
Totals									

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Stored Material Summary

Contractor's Application

For (contract): North Well House Project	Application Number:
Application Period:	Application Date:

A	B	C	D		E		F		G
			Stored Previously		Stored this Month		Incorporated in Work		
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)	Materials Remaining in Storage ($) (D + E - F)
		Totals							

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Field Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project: South Madison Well	Owner: Fall River Water Users District	Owner's Contract No.:
Contract: South Madison Well Project		Date of Contract:
Contractor:		Engineer's Project No.: 152.004

Attention:
You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.04.A, for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference:

_____ _____
(Specification Section(s)) (Drawing(s) / Detail(s))

Description: _____

Attachments: _____

Engineer:

Receipt Acknowledged by Contractor:	Date:

Copy to Owner

Work Change Directive

No. _____

Date of Issuance: _____ Effective Date: _____

Project: South Madison Well	Owner: Fall River Water Users District	Owner's Contract No.:
Contract: South Madison Well Project		Date of Contract:
Contractor:		Engineer's Project No.: 152.004

Contractor is directed to proceed promptly with the following change(s):

Item No.	Description

Attachments (list documents supporting change):

_____

_____

Purpose for Work Change Directive:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

- ☐ Nonagreement on pricing of proposed change.
- ☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price $ _____ (increase/decrease) Contract Time _____ (increase/decrease) days

Recommended for Approval by Engineer:	Date
Authorized for Owner by:	Date
Received for Contractor by:	Date
Received by Funding Agency (if applicable):	Date:

Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project: South Madison Well	Owner: Fall River Water Users District	Owner's Contract No.:
Contract: South Madison Well Project		Date of Contract:
Contractor:		Engineer's Project No.:152.004

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

_____

_____

Attachments (list documents supporting change):

_____

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: $_____	Original Contract Times: ☐ Working days ☐ Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: $_____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable):

_____ Date: _____

Change Order

Instructions

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

Certificate of Substantial Completion

Project: South Madison Well Project	
Owner: Fall River Water Users District	Owner's Contract No.:
Contract: South Madison Well Project	Engineer's Project No.:152.004

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

_____

_____

_____

_____

_____
Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

_____

_____

_____

Contractor's Amended Responsibilities:

_____

_____

_____

_____

The following documents are attached to and made part of this Certificate:

_____

_____

_____

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

CERTIFICATE OF FINAL COMPLETION

Project: South Madison Well Project

Project No.: 152.004

Date of Contract: _____

Owner: Fall River Water Users District

Contactor: _____

Engineer: Wester-Wetstein and Associates

This Certificate of Final Completion applies to:

- ☐ All Work under the Contract Documents:
- ☐ The following specified portions:

_____

_____

_____

_____
Date of Final Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be complete in accordance with the Contract Documents.

The project will be advertised according to W.S. 16-6-166, and the Affidavit on Behalf of the Contractor is attached to and made part of this Certificate

Executed by Contractor	Date
Wester-Wetstein & Associates	Date
Executed by Owner	Date

AFFIDAVIT ON BEHALF OF CONTRACTOR

STATE OF: South Dakota _____ CITY:_____

COUNTY: Fall River _____ DATE:_____

I certify to the best of my knowledge and belief that all work has been performed and materials supplied in strict accordance with the terms and conditions of the correspondence contract documents between the Fall River Water Users District, the Owner, and _____, the Contractor, dated_____.for the South Madison Well Project.

And further declare that all bills, for materials, supplies, utilities and for all other things furnished or caused to be furnished by the above named contractor and used in the execution of the above contract have been fully paid, and that there are no unpaid claims or demands of State Agencies, sub-contractors, material men, mechanics, laborers or any other resulting from or arising out of any work done or ordered to be done by said contractor under the above identified contact.

In consideration of the prior and final payments made and all payments made for authorized changes, the contractor releases and forever discharges the Owner from any and all obligations and liabilities arising by virtue of said contract and authorized changes between the parties hereto, either verbal or in writing, and any and all claims and demands of every find and character whatsoever against the Owner, arising out of or in any way relating to said contract and authorized changes.

This statement is made for the purpose of inducing the Owner to make FINAL PAYMENT under the terms of the contract, relying on the truth and statements contained therein.

_____ _____
Contactor Date

_____
Address

_____
City

_____
State

_____
Zip Code

_____
Signed by

_____
Title

Subscribed and sworn to before me this ___ day of _____, 20__.

_____
Notary Public

My Commission Expires: _____

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Rural Development Forms

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

USDA
Form RD 400-6
(Rev.12-09)

Form Approved
OMB No. 0575-0018

COMPLIANCE STATEMENT

This statement relates to a proposed contract with FALL RIVER WATER USERS DISTRICT

_____,
(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I ☐ have, ☐ have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

☐ If the proposed contract is for $50,000 or more: or ☐ If the proposed nonconstruction contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. I ☐ have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, ☐ I have, ☐ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Form AD-1048 (1/92)

U. S. DEPARTMENT OF AGRICULTURE

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, *Federal Register* (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE.)

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

ORGANIZATION NAME	*PR/AWARD NUMBER OR PROJECT NAME*
	Fall River Water Users District's South Madison Well Project Project No. 152.004
NAME(S) AND TITLE(S) OF AUTHORIZED REPRESENTATIVE	
SIGNATURE(S)	*DATE*

INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

DATE _____

_____
(Signature of Bidder or Prospective Contractor)

_____
Address (including Zip Code)

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____ _____
(name) (date)

_____
(title)

oOo

DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OMB
0348-0046

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action:

☐ a. contract
b. grant
c. cooperative agreement
d. loan
e. loan guarantee
f. loan insurance

2. Status of Federal Action

☐ a. bid/offer/application
b. initial award
c. post-award

3. Report Type:

☐ a. *initial filing*
b. material change

For Material Change Only:
Year _____ Quarter _____

date of last report _____

4. Name and Address of Reporting Entity:

☐ Prime ☐ Subawardee
Tier _____, *if known:*

Congressional District, *if known:*

5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime:

Congressional District, *if known:*

6. Federal Department/Agency:

7. Federal Program Name/Description:

CFDA Number, *if applicable:* _____

8. Federal Action Number, *if known:*

9. Award Amount, *if known:*

$

10. a. Name and Address of Lobbying Entity
(if individual, last name, first name, MI):

b. Individuals Performing Services *(including address of different from No. 10a.)*
(last name, first name, MI):

(attach Continuation Sheet(s) SF-LLL-A, if necessary)

11. Amount of Payment *(check all that apply)* :

$ _____ ☐ actual ☐ planned

12. Form of Payment *(check all that apply)*:

☐ a. cash
☐ b. in-kind; specify: nature _____
value _____

13. Type of Payment *(check all that apply)*:

☐ a. retainer
☐ b. one-time fee
☐ c. commission
☐ d. contingent fee
☐ e. deferred
☐ f. other; specify: _____

14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted, for Payment indicated in Item 11.:

(attach Continuation Sheet(s) SF-LLL-A, if necessary)

15. Continuation Sheet(s) SF-LLL-A attached: ☐ Yes ☐ No

16. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Signature: _____

Print Name: _____

Title: _____

Telephone No.: _____ **Date:** _____

Federal Use Only:

Authorized for Local Reproduction
Standard Form - LLL

EF

EXHIBIT GC-A

Certificate of Owner's Attorney

I, the undersigned, _____, the duly authorized and acting legal representativ_____, do hereby certify as follows:

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

_____

Date: _____

AGENCY CONCURRENCE

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

By:_____Date_____

Type Name:_____

USDA
Form RD 1924-16
(Rev. 2-87)

RECORD OF PRE-CONSTRUCTION CONFERENCE

DATE:

NAME OF ASSOCIATION FALL RIVER WATER USERS DISTRICT	ADDRESS *(Including Zip Code and Telephone)* 27600 W. ORAL ROAD, P.O. BOX 321 ORAL, SD 57766 PHONE: (605) 424-7648
NAME OF CONSULTING ENGINEER (FIRM) WESTER-WETSTEIN & ASSOCIATES, INC.	ADDRESS *(Including Zip Code and Telephone)* P.O. BOX 2202 LARAMIE, WY 82073 PHONE: (307) 742-9229
NAME OF CONTRACTOR (FIRM)	ADDRESS *(Including Zip Code and Telephone)*

LOCATION OF CONFERENCE

SUBJECTS TO BE DISCUSSED

1. Identification of Official Representatives of Association, Architect, Engineer, Contractor and Agency:

ASSOCIATION: _____ ARCHITECT/ENGINEER _____

HEADQUARTERS: _____ HEADQUARTERS: _____

CONTRACTOR: _____ AGENCY: _____

HEADQUARTERS: _____ HEADQUARTERS: _____

2. Responsibilities of Consulting Architect/Engineer: *(Does not "supervise" the contractor's employees, equipment or operations.)*

3. Responsibilities of Association's: *(Actual contracting Organization.)*

4. Responsibilities of Agency Representative: *(Must see that approval conditions are observed and represents the Government's interests.)*

5. Responsibilities of Contractor: *(Review contract terms.)*

6. Responsibilities of Any Other Agency Contributing to the Project:

7. General Discussion of Contract:
   A. Alternative Specifications: *(Does everyone understand the alternatives applicable to the contract as awarded?)*

   B. Initiative Construction: *(Notice to Proceed.)*

C. Completion Time for Contract. *(Does everyone understand contract requirements and methods of Computing?)*

D. Liquidated Damages:

E. Requests for Extension of Contract Time:

F. Procedures for Making Partial Payments:

G. Guarantee on Completed Works: *(Materials, Installed Equipment, Workmanship, Etc.)*

H. Other Requirements of the Contract and Specifications which Deserve Special Discussions by All Parties.

8. Contractor's Schedule:
   A. Analyze Work Schedule in Sufficient Detail to Enable Conslting Engineer to Plan His Operations: *(Consideration must be given to needs of Association and the planned operations of other contractors.)*

   B. Equipment to be Used by Contractor:

   c. Contractor's Plans for Delivering Materials to Project Site: *(Protection and Storage of Materials.)*

9. Sub-Contracts: *(Review and approval of proposed Sub-Contractors and their work schedules.)*

10. Status of Meterials Furnished by Association:
    A. Schedule for Future Deliveries:

B. Procedures to be Adopted by Contractor in Accounting for and Storing Such Materials:

11. Change Orders: *(Detailed explanation of procedure to be followed and clearance which must be obtained before changes are implemented.)*

12. Staking of Work: *(Clearly Define responsibilities of Architect/Engineer and Contractor. Line and Grade must be furnished by Architect.)*

13. Project Inspection:
A. Functions of Consulting Architect/Engineer. Including Records and Reports:

B. Responsibilities of Owner:

C. Responsibilities of Agency:

D. Safety and Sanitary Regulations:

14. Final Acceptance of Work: *(Include requirements for tests and cleanup of project site.)*

15. Labor Requirements:
A. Equal Employment Opportunity Requirements:

B. Davis-Bacon Act:

C. Other Federal Requirements:

D. State and Local Requirements:

E. Union Agreements:

F. Reprots Required:

16 Equal Employment Provisions of Contract:

17. Rights-of-Way and Easements:
A. Explain any Portion of Project Not Available to Contractor:

B. Contractors Responsibilities During Work Covered by Contract:

C. Coordination With Railroads, Highway Departments and Other Organizations:

18. Placement of Project Signs and Posters:

19. Handling Disputes:

NOTED AND CONCURRED WITH, *But understood not to be a modification of any existing contracts or agreements:*

(Signatures of Members of Governing Board of Association)

(Chairman)

(Board Member)

(Board Member)

(Contractor Representative)

(Contractor Representative)

(Contractor Representative)

(Consulting Architect/Engineer Representative)

(Agency Representative)

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

General Conditions

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*—The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

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14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*—See Paragraph 11.01 for definition.

17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*—The individual or entity named as such in the Agreement.

20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*—Sections of Division 1 of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*—Polychlorinated biphenyls.

31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

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32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

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48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

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c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

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2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably

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may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

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b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

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ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

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3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

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1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

   a. reviewing and checking all such information and data;

   b. locating all Underground Facilities shown or indicated in the Contract Documents;

   c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

   d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such

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"technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

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C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

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4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

   a. Such insurance shall remain in effect for two years after final payment.

   b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

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B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss,

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the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

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6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for

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approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

3) it has a proven record of performance and availability of responsive service.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

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3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

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C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the

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Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such

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owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

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E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

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B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

   a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

   b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

   c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

   d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

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1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

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B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

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2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

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8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

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ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

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9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

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D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

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10.04 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part;

2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the

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change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

   c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

   d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

   e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

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f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

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B. *Cash Allowances:*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

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1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not

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be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

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C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is

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not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such

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acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens

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and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

   d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

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e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

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14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

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1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

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B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

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15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

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17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Supplementary Conditions

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. C-700, 2007 Edition) and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

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SC-6.10	***Taxes***	***5***
SC-7.02.A.1	***Coordination***	***6***
SC-9.03.A.	**Project Representative**	**6**
SC-14.02.A.3	**Retainage**	**6**
SC-14.02.A.4	**Applications for Payment**	**6**
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SC-18	**Federal Requirements**	**7**

SC-1.01.A.2.Add the following new Paragraph after Paragraph 1.01.A.1:

The Project is financed in whole or in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices; therefore, the Agency for these documents is USDA Rural Development *{add other funding sources and modify when necessary.}*

SC-1.01.A.3.Add the following language to the end of Paragraph 1.01.A.3:

The Application for Payment form to be used on this Project is EJCDC No. C-620. The Agency must approve all Applications for Payment before payment is made.

SC 1.01.A.9.Add the following language to the end of Paragraph 1.01.A.9:

The Change Order form to be used on this Project is EJCDC No. C-941. Agency approval is required before Change Orders are effective.

SC-1.01.A.19. Add the following language to the end of Paragraph 1.01.A.19:

The Engineer's Consultant on this project is MKK Consulting Engineers, Inc., 7600 E. Orchard Road, Suite 250S, Greenwood Village, CO 80111-2518.

SC-4.02. Add the following new paragraphs immediately after Paragraph 4.02.B:

D. In the preparation of Drawings and Specifications, Engineer relied upon the following drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilitates) which are at or contiguous to the Site:

North Area Expansion, Sheet T1.

E. Copies of reports and drawings itemized in SC-4.02.C and SC-4.02.D that are not included with Bidding Documents may be examined at the office of Wester-Wetstein and Associates, Inc., 605 Plaza Court, Laramie, Wyoming during regular business hours. These reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which the Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer in the preparation of the Drawings and Specifications.

SC-4.06. Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

A. No reports or drawings of Hazardous Environmental Conditions at or contiguous to the Site are known to the Owner or Engineer.

B. Not used.

SC-5.04. Add the following new paragraph immediately after Paragraph 5.04.B:

C. The limits of liability for insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

a.State: Statutory
b.Applicable Federal
(e.g., Longshoremen's) Statutory
c.Employer's Liability *{$ 500,000}*

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor.

   a. General Aggregate *{$2,000,000}*
   b. Products – Completed Operations Aggregate *{$1,000,000}*
   c. Personal and Advertising Injury *{$1,000,000}*
   d. Each Occurrence (Bodily Injury and Property Damage) {$1,000,000}
   e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.
   f. Excess or Umbrella Liability
      1) General Aggregate $5,000,000
      2) Each Occurrence *$ 5,000,000*

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

   a. Bodily Injury:
   Each Person *{$1,000,000}*
   Each Accident *{$1,000,000}*
   b. Property Damage:
   Each Accident *{$1,000,000}*
   c. Combined Single Limit of *{$1,000,000}*

4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

   a. Bodily Injury:
   Each Person *{$2,000,000}*
   Each Accident *{$2,000,000}*
   b. Property Damage:
   Each Accident *{$2,000,000}*
   Annual Aggregate *{$2,000,000}*

SC-6.05.C. Amend the paragraph by making two subparagraphs under the title C. Engineer's Evaluation. The paragraph text is retitled, 6.05.C.2 After Effective Date of Agreement. A new paragraph is added before this paragraph to read as follows:

1. During Bidding. The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed substitute or "or-equal" item. Request for Engineer's clarification of materials and equipment considered "or-equal" prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder

and

has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of Paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves and proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

SC-6.10. Add a new paragraph immediately after Paragraph 6.10.A:

B. Owner is not exempt from payment of sales and compensatory use taxes of the South Dakota and of cities and counties thereof on all materials to be incorporated in the Work.

SC-7.02.A.1. Delete paragraphs 7.02.A.1-3 in their entirety and insert the following:

1. The General Contractor shall have the authority and be responsible for coordination of the activities among the other prime contractors and subcontractors on the Site to ensure a safe, efficient working environment. This authority covers scheduling delivery of materials, storage of materials, sequencing of construction involving different crafts, resolving interface issues between crafts, scheduling testing, and all other aspects of the Work that do not impact the design or function of the Work.

SC-9.03.A. Add the following language at the end of paragraph 9.03.A:

The Engineer will provide Resident Project Representative services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-500, 2008 Edition, as amended and executed for this specific Project.

SC-14.02.A.3. Add the following language at the end of paragraph 14.02.A.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-14.02.A.4. Add the following new Paragraph after Paragraph 14.02.A.3:

The Application for Payment form to be used on this Project is EJCDC No. C-620. The Agency must approve all Applications for Payment before payment is made.

SC-14.02.C.1. Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due ten days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-18 Add a new Article 18, "Federal Requirements," after Article 17.

SC-18.01 Add the following language at the beginning of Article 18 with the title "Agency Not a Party."

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

SC-18.02 Add the following language after Article 18.01.A with the title "Contract Approval."

A. Owner and Contractor will furnish Owner's attorney such evidence as required to that Owner's

attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

SC 18.03 Add the following language after Article 18.02.B with the title "Conflict of Interest."

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

SC-18.04 Add the following language after Article 18.03.A with the title "Gratuities."

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may also pursue other rights or remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

SC-18.05 Add the following language after Article 18.04.B with the title "Audit and Access to Records."

A. Owner, Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Engineer which are pertinent to the Agreement, for the purpose of making audits, examinations, excerpts, and transcriptions. Engineer shall maintain all required records for three years after final payment is made and all other pending matters are closed.

SC-18.06 Add the following language after Article 18.05.A with the title "Small, Minority and Women's Businesses."

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

SC-18.07 Add the following after Article 18.06.A with the title "Anti-Kickback."

C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

SC-18.11 Add the following after Article 18.10.C with the title "Restrictions on Lobbying."

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up the Owner. Necessary certification and disclosure forms shall be provided by Owner.

SC-18.12 Add the following after Article 18.11.A with the title "Environmental Requirements."

When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:

A. Wetlands – When disposing of excess, spoil, and other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

B. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.

C. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).

D. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

E. Mitigation Measures – If the project had an Environmental Report, Environmental Assessment, or Environmental Impact Statement to meet the requirements of the National Environmental Policy Act, compliance with the mitigation measures, if any, in that document are hereby included as a condition of this contract. *{These mitigation measures are as follows: Insert mitigation measures, if any.}*

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

Technical Specifications

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

DIVISION 1
General Requirements

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Apply for, obtain, and pay for permits required to perform the work.

B. Comply with applicable codes and regulations of authorities having jurisdiction.

C. Field-verify dimensions indicated on drawings before fabricating or ordering materials. Do not scale drawings.

D. Notify OWNER of existing conditions differing from those indicated on the drawings. Verify the existence and location of underground utilities along the route of proposed work. Omission of an existing utility location on the Drawings is not to be considered as its nonexistence. Inclusion of existing utility locations on the Drawings is not to be considered as its definite location. Do not remove or alter existing utilities without prior written approval.

E. The Contract Documents are intended to provide the basis for proper completion of the work suitable for the intended use of OWNER. Anything not expressly set forth but which is reasonably implied or necessary for proper performance of the project shall be included.

F. Portions of the Contract Documents are written in the imperative mode. Except where specifically intended otherwise, the subject of all imperative statements is CONTRACTOR. For example, "Furnish..." means "CONTRACTOR shall furnish...", "Provide..." means "CONTRACTOR shall provide...".

1.02 ***LIMITS OF CONSTRUCTION***

A. The work on this Project shall be limited to the area to be developed, unless specifically shown otherwise on the Drawings, for staging, storage of equipment and materials, construction, and clean-up operations. No waste areas are indicated, as it will be the responsibility of the CONTRACTOR to obtain the same.

Access to lands outside the limits as shown on the Drawings will be permitted only upon the submission from the CONTRACTOR to the ENGINEER of a copy of the written agreement between the CONTRACTOR and the landowner(s) permitting the CONTRACTOR access to the private land(s). No additional compensation will be made for repairs or restoration outside the limits shown on the Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01340- SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL

A. Wherever submittals are required hereunder, all such submittals by the CONTRACTOR shall be submitted to the ENGINEER.

1.2 SHOP DRAWINGS

A. Wherever called for in the Contract Documents, or where required by the ENGINEER, the CONTRACTOR shall furnish to the ENGINEER for review, 5 copies, of each shop drawing submittal. The term Shop Drawings as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items.

B. All Shop Drawing submittals shall be accompanied by the ENGINEER's COVER PAGE. A copy of the form is shown at the end of this section. Any submittal not accompanied by such a form, or where all applicable items on the form are not competed, will be returned for resubmittal.

C. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the ENGINEER.

D. Except as may otherwise be indicated herein, the ENGINEER will return 2 copies of the submittals to the CONTRACTOR with its comments noted, within 20 calendar days following their receipt by the ENGINEER. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the ENGINEER by the second submission of a submittal item.

E. If copies of a submittal are returned to the CONTRACTOR marked NO EXCEPTIONS TAKEN, formal revision and resubmission of said submittal will not be required.

F. If copies of a submittal are returned to the CONTRACTOR marked MAKE CORRECTIONS NOTED, formal revision and resubmission of said submittal will not be required.

G. If a submittal is returned to the CONTRACTOR marked AMEND-RESUBMIT, the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.

H. If a submittal is returned to the CONTRACTOR marked REJECTED-RESUBMIT, the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.

I. All CONTRACTOR shop drawing submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR, prior to submission to the ENGINEER. Each submittal shall be dated, signed, and certified by the CONTRACTOR, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the ENGINEER of any CONTRACTOR submittals will be made for any items which have not been so certified by the CONTRACTOR. All non-certified submittals will be returned to the CONTRACTOR without action taken by the ENGINEER, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.

J. The ENGINEER's review of CONTRACTOR shop drawing submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors in CONTRACTOR submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

K. At the time of each submission, call to the attention of the ENGINEER on the COVER PAGE any deviations from the requirements of the Contract Documents. If changes are made on resubmitted shop drawings, such changes shall be clearly explained on the COVER PAGE accompanying the resubmitted shop drawing.

1.3 CONTRACTOR'S SCHEDULE

A. The CONTRACTOR's construction schedule shall be prepared and submitted to the ENGINEER in accordance with the following:

1. Project Overview Bar Chart: The overview bar chart shall indicate the major components of the project work and the sequence relations between major components and subdivisions of major components. The overview bar chart shall indicate the relationships and time frames in which the various components of the WORK will be made substantially complete and placed into service in order to meet the project milestones. Sufficient detail shall be included for the identification of subdivisions of major components into such activities as (1) excavation, (2) pipe laying, (3) well drilling, (4) completion of all concrete, (5) major mechanical work, (6) major electrical work, (7) instrumentation and control work, and (8) other important work for each major facility within the overall project scope. Planned durations and start dates shall be indicated for each work item subdivision.

1.4 OWNER'S MANUAL

A. The CONTRACTOR shall submit technical operation and maintenance information for each item of mechanical, electrical and instrumentation equipment in an organized manner in the OWNER'S MANUAL. The OWNER'S MANUAL shall be written so that it can be used and understood by the OWNER's operation and maintenance staff. CONTRACTOR shall provide 5 copies of the OWNER'S MANUAL.

1.5 RECORD DRAWINGS

A. The CONTRACTOR shall keep and maintain, at the job site, one record set of Drawings. On these, all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction shall be marked. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings.

B. Upon substantial completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of record drawings to the ENGINEER for transmittal to the OWNER, conforming to the construction records of the CONTRACTOR. This set of drawings shall consist of corrected drawings showing the reported location of the WORK.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION

COVER PAGE
For Attachment to Submittals

Project: _____

Submittal No.: _____ Description: _____

_____

Specification Section: _____ Date: _____

TO FACILITATE THE ASSUMPTION OF RESPONSIBILITY BY THE CONTRACTOR, EACH SUBMITTAL BY THE CONTRACTOR SHALL CONTAIN AS A COVER PAGE THERETO, THE FOLLOWING LEGEND. THIS COVER PAGE SHALL BE SIGNED OR INITIALED BY A REPRESENTATIVE OF THE CONTRACTOR PREVIOUSLY DESIGNATED BY THE CONTRACTOR TO THE ENGINEER AND OWNER, IN WRITING, FOR SUCH PURPOSE.

A. This submittal is made under the provisions of Specification Section 01300, Submittals. CONTRACTOR makes and express warranty to the OWNER, by express affirmation, that if installed into the project, the work which forms the basis of this submittal will conform to the design requirements of the Agreement, as that design has been contractually agreed to and which is the basis of the bargain between the parties thereto.

B. It is the purpose of this submittal to describe the goods proposed for use by the CONTRACTOR and to demonstrate conformance of that description to the Agreement requirement.

C. To the extent necessary, the CONTRACTOR by making this submittal warrants that the whole of the goods shall conform to the submittal.

D. At the time of this submission, the CONTRACTOR acknowledges that he is aware that the purpose of this submission is to induce the ENGINEER and OWNER to authorize the use of this work for purposes of Contract compliance by the CONTRACTOR, and, further that the ENGINEER and OWNER, in doing so, rely upon the skill, judgment and integrity of the CONTRACTOR as to the compliance of this submitted work to the requirements of the Agreement.

The CONTRACTOR hereby notifies the OWNER that the following features are not in conformance with the Contract Documents and nevertheless asks for approval thereof:

1. _____
2. _____
3. _____
4. _____
5. _____

_____
Contractor's Representative

SECTION 01580 – PROJECT IDENTIFICATION SIGN

PART 1 – GENERAL

1.01 DESCRIPTION

This Section provides for all labor, material and equipment required to furnish, install, maintain, and remove the project identification sign. The location of the project identification sign shall be as directed by the Owner.

1.02 SUBMITTALS

None Required.

PART 2 – PRODUCTS

2.01 GENERAL

The Contractor shall erect a sign constructed of 4' x 8' x ¾" exterior plywood (A-B) and shall be supported by and bolted to two (2) 4" x 4" posts with the bottom of the sign at a point about two (2) feet above the ground line and maintained in good condition until project completion.

The sign will be edged, painted and lettered as shown on the accompanying diagram showing a temporary construction sign for Rural Development Projects.

2.02 POSTS

Posts shall be breakaway type, at least 4-inch by 4-inch nominal dimensions or at least 4-inch diameter douglas fir or western larch. Rough-sawn posts or peeled and seasoned timber is acceptable. Posts larger than 6-inch by 6-inch shall not be used.

Breakaway holes of the sizes shown below shall be drilled in the posts 6-inches above finished grade and 18-inches above finished grade on each post. The post size shall be measured at the breakaway hole location.

Post Size	Number of Holes	Hole Diameter In Inches
4" Diameter	None	None
5" Diameter	None	None
6" Diameter	2	½
4" x 4"	None	None
4" x 6"	None	None
6" x 6"	3	½

2.03 COATINGS

The primer, paint and stain shall meet the requirements shown on Table No. 1.

Table 1- Primer, Paint and Stain Requirements

Type	Federal Specification (Latest Edition)
Primer, Wood, Exterior	TT-P-25
Primer, Metal	TT-P-86 or TT-P-615
Enamel, Alkyd, Semi-Gloss	TT-E-529, Class A
Enamel, Alkyd, Gloss	TT-E-489
Stain, Oil; Wood, Semi-Transparent Exterior	TT-S-708

PART 3 – EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. Construction: The sign shall be lettered as shown.

The sign shall be securely bolted to firmly set posts. The top of the sign shall be level, and the posts and sign face shall be vertical. Sign shall be installed at the location directed by the Engineer. Posts shall not extend above the top of the sign panel. The sign panel and posts shall be removed after completion of all project construction and become the property of the Contractor.

B. Painting: The primer coat and first coat of white paint may be applied by brushing, rolling, or spraying. The finish coat of white paint shall be brushed or sprayed. Each coat must be completely dry before the following coat is applied. The finish coat shall be semigloss finish, free of brush marks, blisters, wrinkles or blemishes. The sign letters shall be clear, sharp, or uniform width, free of cracking, scaling, pitting, blistering or discoloring and shall conform to ASA D6 Standards Exhibit A.

The sign shall be repainted at the start of each construction season. The repainting shall consist of a finish coat free of brush marks, blisters, wrinkles or blemishes and lettering that is clear, sharp, or uniform width, free of cracking, scaling, pitting, blisters or discoloring.

PART 4 – METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.01 METHOD OF MEASUREMENTS

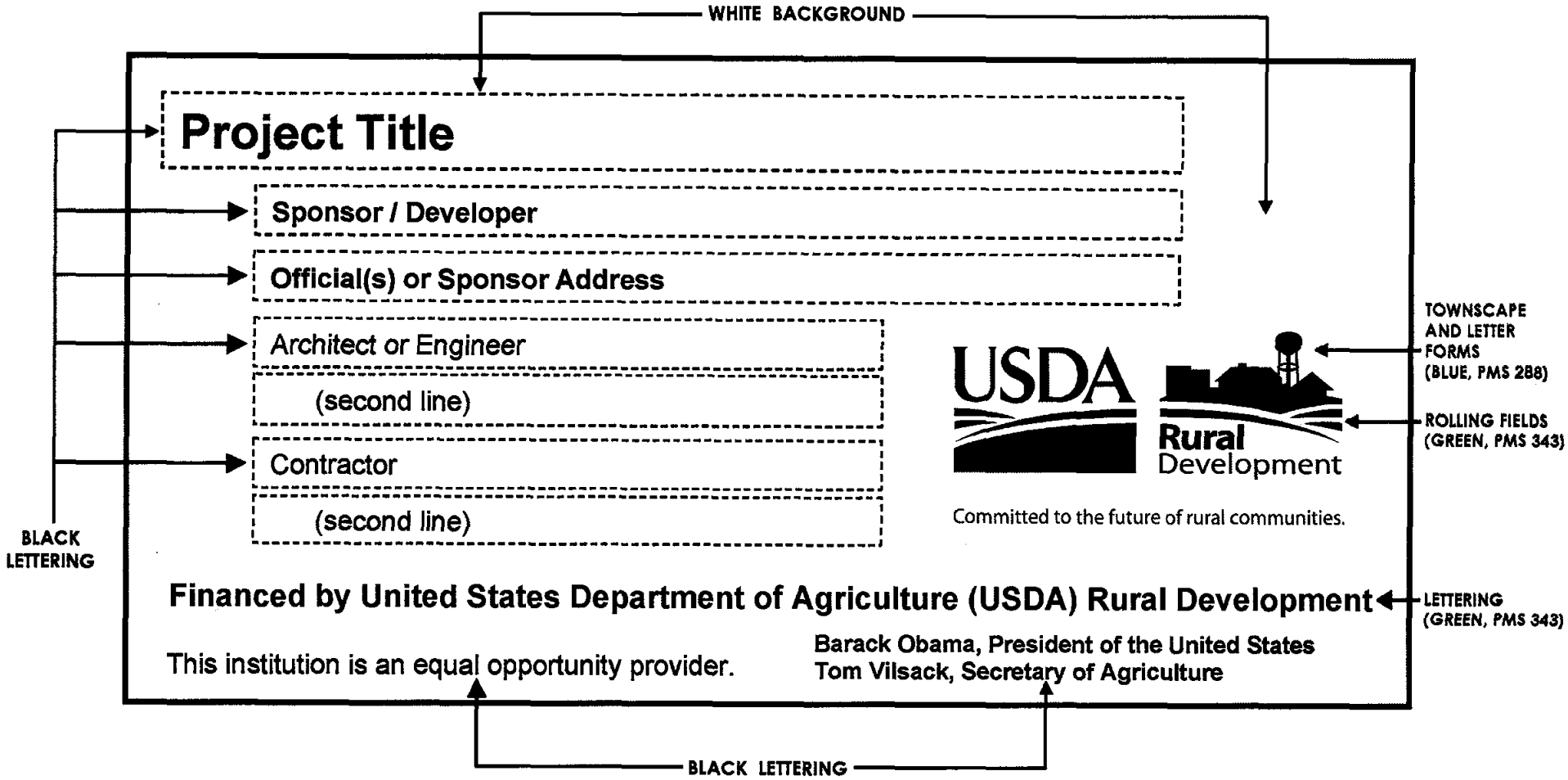
A. Measurement of project identification sign (Item 3, Bid Schedule; Lump Sum) shall be lump sum.

4.02 BASIS OF PAYMENT

A. Payment shall be on a lump sum basis for the item, which price shall include, furnishing, installation, maintenance, repair, and final removal of the project sign (when directed), surface restoration, and all work necessary or incidental for completion of the item unless otherwise specified.

END OF SECTION

TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS



SIGN DIMENSIONS: 1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x ¾")
PLYWOOD PANEL (APA RATED A-B GRADE–EXTERIOR)

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

DIVISION 2
Site Work

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

SECTION 02220 - TRENCH EXCAVATION

PART 1 - GENERAL

1.01 SUMMARY

A. This section consists of excavation and trenching for pipelines, handling and storage of materials and preparation of subgrade, pumping and dewatering as necessary, and dressing and surface restoration cleanup of the site.

PART 2 PRODUCTS (NOT USE)

PART 3 EXECUTION

3.01 CONSTRUCTION

A. During excavation, materials suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Excavated material shall be piled on one side of the trench only, to permit ready access to existing fire alarm boxes, fire hydrants, valves, manholes and other appurtenances. Surface drainage of adjoining areas shall be unobstructed.

B. All excavated materials not required or suitable for backfill shall be removed from the site and disposed of in a manner and/or by methods acceptable to jurisdictional government agencies. The Engineer may require certification of proper disposal procedures.

C. Grading shall be done as may be necessary to prevent surface water from flowing into excavations, and any other water accumulating therein shall be promptly removed. Under no circumstances shall water be permitted to rise in unbackfilled trenches until after the pipe has been placed, tested and covered to final grade with backfill. Any pipe having its alignment or grade changed as a result of a flooded trench shall be relayed at no additional cost to the OWNER.

D. Adequate provisions shall be made for maintaining the flow of sewers, drains and water courses encountered during construction. Culverts, ditches, fences, crosswalks and structures which are disturbed by this construction shall be satisfactorily restored to their original condition upon completion of the work.

3.02 SITE CONDITIONS

A. CONTRACTOR'S SAFETY RESPONSIBILITIES

1. The CONTRACTOR shall be responsible for enforcing safety and maintaining safe working conditions in all trenching, shoring, and blasting operations to conform to OSHA regulations.

2. The CONTRACTOR shall employ qualified, properly trained personnel to design shoring, perform safety inspections of the trenches, and supervise the handling of explosives and other operations involving safety procedures, as prescribed by OSHA.

3.03 TRAFFIC CONTROL AND WARNING DEVICES

A. The CONTRACTOR shall plan and construct the project in such a manner as to minimize the interruption of the use of roads, highways, streets and sidewalks involved and shall provide for emergency access to adjacent property and fire hydrant access at all times.

B. THE CONTRACTOR is responsible for providing and maintaining adequate barricades of high visibility design, flares, lanterns, signs, flaggers and prewarning devices to alert the public, motorists and pedestrians of hazardous conditions in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways published by the U.S. Department of Transportation. Work shall also be done in accordance with the Manual on Uniform Traffic Control Devices for Work Zone Areas.

C. The Contractor shall submit his traffic control plan to the local government officer having authority

3.04 STRUCTURES

A. The CONTRACTOR shall exercise every precaution to prevent damage to existing buildings or structures in the vicinity of his work. In the event of such damages, he shall repair them to the satisfaction of the OWNER of the damaged structure and at no cost to the OWNER.

3.05 OVERHEAD UTILITIES

A. The CONTRACTOR shall use extreme caution to avoid a conflict, contact or damage to overhead utilities, such as power lines, street lights, telephone lines, television lines, poles or other appurtenances during the course of construction of this Project.

3.06 SURVEY MARKERS AND MONUMENTS

A. The CONTRACTOR shall use every care and precaution to protect and not disturb any survey marker or monuments, such as those that might be located at lot or block corners, property pins, intersection of street monuments or addition line demarcation. Such protection shall include marking with flagged high lath and close supervision. No monuments shall be disturbed without prior approval of the OWNER and ENGINEER. Any survey marker or monument that is disturbed or destroyed by the CONTRACTOR without approval during the construction of this Project shall be replaced at no cost to the OWNER by a licensed land surveyor.

3.07 CLEANUP

A. As work progresses, that portion of the work completed shall be cleared of debris and brought to the finished grade. Upon completion of the work, the entire site shall be cleared of all debris and ground surfaces shall be finished to smooth, uniform slopes and shall present a neat and workmanlike appearance. All rocks brought to the ground surface by excavation or backfilling operations shall be removed.

B. At all times during construction, the CONTRACTOR shall be responsible for dust control as directed by the ENGINEER.

3.0 TRENCH EXCAVATION

A. Trench excavation shall be performed in accordance with minimum requirements of Wyoming State OSHA Regulations.

3.09 PREPARATION

A. PROTECTION OF EXISTING PROPERTIES

1. Prior to beginning construction, the CONTRACTOR must fulfill and meet the requirements of Wyoming Statutes 37-12-301 through 37-12-304 relating to public utilities; providing definitions; providing that notice of intended excavation be given to public utilities with underground facilities located in the area of proposed excavation; and providing for exceptions.

2. Existing utilities which will intersect with the new pipelines or structures will be relocated by the CONTRACTOR.

3. Existing water or sewer services from the mains to private property which interfere with trenching operations may be cut and replaced at the CONTRACTOR's expense. The use of such services shall in no case be interrupted for more than four (4) hours, unless temporary service is provided.

4. Existing water mains and water services shall be protected at all times during construction operations.

3.10 PRIVATELY OWNED UTILITIES

A. Gas mains, underground electrical and telephone cables, telephone poles, light poles, etc., required to be moved to make way for new construction will be moved by others. The CONTRACTOR shall assure that all necessary arrangements are made with the appropriate utility OWNER(s) prior to beginning work in the affected area, and he shall assure that all required work is coordinated with the appropriate utility OWNER(s) as work progresses.

3.11 EXPLORATORY EXCAVATION

A. Location of buried utilities that might interfere with alignment or grade shall be verified by exploratory excavation prior to construction. If any existing utility interferes with the work in either alignment or grade and has to be moved, such work shall be done by the CONTRACTOR.

3.12 SHORING, SHEETING AND BRACING

A. The CONTRACTOR shall do all shoring, bracing and tight sheeting required to prevent caving and to protect his workmen, in accordance with Occupational Safety and Health Regulation Requirements, and to protect adjacent property and structures.

3.13 DEWATERING

A. Where ground water is encountered in excavation, it shall be removed to avoid interfering with pipe laying and other construction operations.

B. Discharge from dewatering operations shall be directed to approved natural drainages or storm sewers as appropriate.

C. Discharge from dewatering operations shall be in accordance with regulatory requirements.

3.14 GENERAL EXCAVATION OPERATIONS

A. The CONTRACTOR shall excavate as necessary at the locations shown on the drawings, staked in the field or otherwise specified for the installation of pipelines.

B. The CONTRACTOR shall take precautions and protect all adjoining private and public property and facilities, including underground and overhead utilities, curbs, sidewalks, driveways, structures, and fences. Any disturbed or damaged facilities will be suitably restored or replaced by the Contractor.

C. Crossings under sidewalks or curbs may be made by tunneling only if approved by ENGINEER. If the CONTRACTOR elects to remove a portion of the sidewalk or curb, he must use a concrete saw for making neat joints corresponding to existing joints, compact the backfill as specified, and pour a new concrete sidewalk or curb section.

D. EXCAVATION FOR APPURTENANCES

Excavations for manholes, hydrants, structures and other appurtenances shall be sufficient to leave clearance adequate for proper compactive effort on all sides. The depth, provisions for removing water, and other applicable portions of these specifications shall apply to excavation for appurtenances.

3.15 TRENCH DIMENSIONS

A. Trench dimensions shall be as specified below:

1. Trench width FROM the trench bottom to a point one foot (305 mm) above the top of the pipe shall be no less than the outside diameter of the pipe plus (12) twelve inches (300 mm), but not more than twenty-four (24) inches (610 mm) plus the pipe outside diameter. The width of the trench from the bottom of the trench to the existing ground surface shall be adequate to allow proper compactive effort along both sides of the pipe.

   a. Depth of Trench. Trench depth shall be as required for the invert grade or pipe bury shown on the plans. Care shall be taken not to excavate below the required depth.

   b. When soft or unstable material or rock is encountered at the subgrade which will not uniformly support the pipe, such material shall be excavated to an additional depth as necessary and backfilled with Type 2 Bedding Material.

2. TRENCH BOTTOM

   a. The bottom of the trenches shall be accurately graded to the line and grade shown on the drawings. Bedding material shall provide uniform bearing and support for each section of the pipe at every point along its entire length. Bell holes and depressions for joints shall be dug after the trench bedding has been graded, and shall be only of such length, depth and width as required for properly making the particular type joint. Unauthorized overdepths shall be backfilled with bedding material at the CONTRACTOR's expense.

3.16 TIME OF OPEN TRENCHES

A. The CONTRACTOR will be required to conduct his work so that trenches will remain open a minimum possible time.

B. No trench excavating shall begin until approved compaction equipment is at the site where the excavating is to take place. All backfill and compacting shall be completed in all trenching and structural excavations within a maximum distance of 200 feet (153 m) behind the end of newly installed pipe and the maximum distance between the newly installed pipe and the excavator shall be 200 feet (61 m). For each work group consisting of trench excavator, a pipelaying crew, and a backfilling and compacting crew, the maximum allowable open ditch at any time will be 400 feet (122 m).

C. Certain conditions may necessitate the closing of certain sections of trench prior to daily, weekend or holiday shutdown.

3.17 EQUIPMENT

A. The use of trench digging machinery will be permitted except in places where its operation will cause damage to existing structures or features, in which case hand methods shall be employed.

B. Any equipment on tracks, which is to be used on pavement, shall be equipped with suitable pads to prevent damage to the pavement. All pavement damaged during construction by the CONTRACTOR's equipment shall be restored to its original condition by the CONTRACTOR

-END OF SECTION-

SECTION 02225 - TRENCH BACKFILL

PART 1 GENERAL

1.01 SUMMARY

A. This section consists of handling and storage of materials to be used for fill and backfill; backfill; and final grading.

PART 2 PRODUCTS

2.01 MATERIALS

A. PIPE BEDDING MATERIAL

1. Type 1 Bedding material around the pipe from six (6) inches (150 mm) under the pipe to twelve (12) (300 mm) inches over the pipe shall consist of select course grained soils (over 50% retained on a No. 200 Sieve 75 ìm)) and less than 5% fines such as gravel, sand, or silty sand meeting unified soil classification requirements as per ASTM designation D-2487 *for type GW, GP, GM, GC, SW, SP, SM & SC, or as specifically* approved by the engineer. Bedding material shall not consist of fine soil (less than 50% retained on a No. 200 sieve 75 ìm)) such as silt, clay & organic soils meeting requirements for soil types ML, CH, & PT. Bedding material shall be free from clods, frozen material, or stones larger than 3/4 inch (19 mm) in their maximum dimension. Where wet or otherwise unstable conditions exist, the material in this zone shall be free draining, non-plastic material. Where suitable material is available in the material excavated from the trench, the CONTRACTOR may procure the select material by screening, sifting or manually sorting the material removed from the trench in a manner approved by the ENGINEER.

2. Type 2 Pipe Bedding is required for foundation in over-excavated trenches and shall consist of the bedding material from six (6) inches (150 mm) under the pipe and below. The bedding material shall consist of sand, sandy gravel, compacted rock or gravel having a maximum size of 1 ½ inches (38 mm), uniformly graded and having a maximum plasticity of six (6) as determined by AASHTO Methods T-89 and T-90.

B. CEMENT TREATED FILL

Cement treated fill, when specified, shall meet the following criteria:

INGREDIENTS	LBS/C.Y.
CEMENT (0.45 SACK)	42 lbs (19 kg)
WATER (39 GALLONS)	325 lbs (147.4 kg)
COARSE AGGREGATE (SIZE NO. 57)	1700 lbs (771.1 kg)
SAND (ASTM C-33)	1845 lbs (837 kg)

The maximum desired 28 day strength is from 30 to 60 psi. (207 kPa to 414 kPa) Other cement treated fill designs may be submitted to the Engineer for review and approval.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. COMMON AND SELECT BACKFILL

1. All trenches shall be backfilled immediately after grade, alignment and jointing of the pipe has been inspected and approved. Leakage tests, pressure tests or tests for alignment and grade shall be performed after backfill. If any test fails, the CONTRACTOR shall be responsible for work required to correct the defects.

2. After the select pipe bedding material has been placed and compacted as specified above, the remainder of the trench backfilling shall be done. All backfill material shall be free from cinders, ashes, refuse, organic and frozen material, boulders, or other materials that are unsuitable. From one (1) foot (300 mm) above the top of the pipe to six (6) inches (150 mm) below the ground surface, or to the subgrade elevation for streets or paved surfaces, material containing stones up to four (4) inches (100 mm) in the greatest dimension may be used.

3. Trench backfill from the top of the pipe bedding material to ground surface or to the subgrade of street surfacing is separated into two classifications. Type A trench backfill refers to compacted backfill in streets, paved areas, or alleys. Type B backfill is designated for fields, borrow pits, unimproved streets or other unsurfaced areas where special compaction of the trench backfill is not required. Locations of the types of backfill required shall be as shown on the plans.

4. Where shown on the plans, the CONTRACTOR shall provide embankment over the pipe above the original ground surface to a height which will satisfy the minimum depth of cover requirements. Such embankment shall be constructed to the cross section shown on the plans.

B. TYPE A TRENCH BACKFILL

1. Materials used for bedding and backfill shall be carefully deposited in depth layers suitable to the equipment used for compaction, wetted to 3% below to 2% above optimum moisture content, and compacted to at least 96% of maximum density as determined by AASHTO T-99 (Standard Proctor).

2. Compaction by flooding will not be permitted.

3. If the backfilled trench has not been tested at required intervals during backfilling, the CONTRACTOR shall provide excavation equipment to dig compaction test holes through each layer of backfill. Compaction tests shall be required for each one foot layer of backfill at linear intervals not to exceed 200 feet (61 m) whether tests are performed during backfilling or via test holes. Should tests fail, the CONTRACTOR shall remove all trench backfill above the failed lift and rework to passing compaction the area of deficiency. ENGINEER shall determine the area of deficiency. In no case shall it extend into areas of known acceptable compaction. All work required to bring the failed test area into spec shall be at the

CONTRACTORS expense. Passing backfill tests only assures the OWNER that the minimum acceptable level of testing was achieved. The passing tests do not relieve the CONTRACTOR of his responsibility to compact the entire trench and does not relieve his guarantee of the trench as identified in this specification.

4. For graveled streets AND ALLEYS the backfill shall be completed by blading the stripped gravel back over the trench.

5. Each service line shall be backfilled and compacted to the same requirements as the main line
trench. Each service must have at least one passing compaction test.

C. TYPE B TRENCH BACKFILL

1. Materials used for Type B Trench Backfill shall not require special compaction. The material shall be compacted in layers to achieve a density approximately equal to the density of the existing soil.

2. The CONTRACTOR may be required to mound excess earth over the top of the trench so that a depression will not be formed after the trench settles. In cultivated areas, the stripped topsoil shall be placed uniformly over the backfilled trench. The topsoil shall not be compacted but shall be graded to provide a smooth surface conforming to the adjoining ground surfaces.

3.02 COMPACTION

A. Bedding material under and around the pipe to twelve (12) (300 mm) inches above the top of the pipe shall be distributed by hand in maximum layers of six (6) (150 mm) inches and thoroughly compacted by tamping. Special care shall be taken to assure complete compaction under the haunches of the pipe.

B. Backfill material shall be placed in the trench for its full width on each side simultaneously. Compaction of pipe bedding shall be in accordance with this specification.

C. Cement treated fill may be used for backfill used at the option of the contractor. Provided it meets or exceeds the requirements set forth, no specific compaction will be required.

D. Cement treated fill may be used at the option of the CONTRACTOR provided it meets the requirements of the ENGINEER. ENGINEER may require certification of mix design and batching ingredients.

3.03 TESTING

A. Field density testing of compacted fill will be run at all levels. These tests will be performed by a reputable testing firm at the discretion of the engineer and hired and approved by the owner. The contractor shall provide necessary equipment to dig test holes. The contractor shall be responsible for correction of any areas failing compaction tests, and the expense of such correction shall be borne by the contractor.

3.04 TRENCH GUARANTEE

A. The CONTRACTOR shall, for a period of one (1) year after completion and final acceptance of the work, repair any trench settlement which may occur and shall make suitable repairs to any pavement, sidewalks or other structures which may become damaged as a result of backfill settlement.

B. If the CONTRACTOR elects to perform such repairs by subcontract with the OWNER or with others, he shall furnish the OWNER and the ENGINEER a copy of such subcontract or authorization as evidence of his faithful intention to perform the work.

-END OF SECTION-

SECTION 02645 – FIRE HYDRANTS

PART 1 – GENERAL

1.01 SUMMARY

A. This section consists of installation of fire hydrants together with related appurtenances, complete.

1.02 REFERENCES

AWWA C-502: STANDARD FOR DRY BARREL FIRE HYDRANTS

PART 2 – PRODUCTS

A. DRY-BARREL FIRE HYDRANTS

1. Fire hydrants shall conform to standard for dry barrel fire hydrants, AWWA C-502, and modifications herein specified.

2. Hydrants shall be furnished with 5" (125 mm) minimum valve openings, one pumper connection and two 2 1/2" (63 mm) hose connections. Hose nozzle threads, pumper nozzle threads, operating nut, and opening direction shall match existing hydrant. All cap screws and T-bolts below finish grade shall be stainless steel.

3. Hydrants shall be of the "Compression" or "Toggle Joint" type with safety flange and safety stem coupling above the ground line so that they can be repaired without shutting off the water. Hydrants shall be of the dry top design with two or more "O" rings sealing the water from the operating mechanism. The portion of the hydrant above the ground line shall be painted in accordance with the OWNER's standards. Hydrants shall be furnished for six-foot cover unless specified otherwise in the Special Provisions. Hydrants installed behind curbs typically require an additional six inches (150 mm) height. CONTRACTOR should take this into consideration.

PART 3 – EXECUTION

3.01 INSTALLATION

A. All hydrants shall stand plumb with the pumper nozzle facing the street. Hydrant shall be set with the ground line at the location indicated by the hydrant manufacturer. Hydrants shall be installed such that they have drainage away from them at the surface. Proper boot lengths shall be used to avoid hydrants installed in holes or depression.

B. Drainage shall be provided at the base of the hydrant by placing clean gravel under and around the base of the hydrant. Sufficient gravel shall be used to provide a minimum of one foot (300 mm) on all sides from the base of the hydrant to the point at least 6" (150 mm) above the drain opening. Hydrant shall be braced against unexcavated earth at the end of the trench with concrete backing as detailed on the plans. Hydrants shall be furnished with auxiliary gate valves as specified above. Hydrant installation shall be in accordance with Detail No. 4

PART 4 – METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.01 METHOD OF MEASUREMENTS

A. Measurement of fire hydrants (Item 4, Bid Schedule; Each) shall be made by numerical count each.

4.02 BASIS OF PAYMENT

A. Payment for this item will be made at the Contract Unit Price bid each; which price shall include furnishing and installing the stainless steel tapping sleeve, fire hydrant and auxiliary gate valve and box, all additional excavation, backfill, and special compaction required for the installation, thrust and anchor blocking, drain gravel, and all other work necessary or incidental for completion of the item.

SECTION 02665 - WATER DISTRIBUTION AND TRANSMISSION SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. This section consists of construction of Water Mains, including fittings, water valves, water services, water service piping, tapping the main, corporation stops, curb stops, and other appurtenances normally used for water supply and distribution systems, including furnishing and installing pipe, water valves, and fittings, construction of thrust blocking, testing, cleaning and disinfection of mains and other related work.

1.02 REFERENCES

A. AWWA C-110 (A21.10-87): Standard for Ductile-Iron and Gray-Iron Fittings, 3" (75 mm) through 48" (1200 mm), for Water and Other Liquids.

B. AWWA C-500; Gate Valves for Water and Sewerage Systems.

D. AWWA C-509; Resilient-Seated Gate Valves for Water and Sewerage Systems.

E. AWWA C-550; Protective Interior Coatings for Valves and Hydrants.

F. AWWA C-900; PVC Pressure Pipe, 4" (100 mm) Through 12" (300 mm), For Water.

G. AWWA C-907; Polyvinyl Chloride (PVC) Pressure Fittings for Water - 4 In. (100 mm) Through 8 In. (200 mm).

I. ANSI/AWWA C-906-90 Polyethylene Pressure Pipe 4 inches (100 mm) through 63 inches (1575 mm).

J. AWWA C-909; Molecular Oriented Polyvinyl Chloride (PVCO) Pressure Pipe (4 inch Through 12 inch (100 mm through 300 mm))

K. AWWA C 105: Polyethylene encasement for ductile-iron pipe systems.

1.03 QUALITY ASSURANCE

A. When required by ENGINEER, CONTRACTOR shall furnish certification by the manufacturer of the pipe to be furnished on this project, certifying that the pipe and fittings comply with the applicable specifications. REQUIRED CERTIFICATION SHALL ACCOMPANY EACH DELIVERY OF MATERIAL.

B. All pipe shall be clearly marked with type, class and/or thickness as applicable. Lettering shall be legible and permanent under normal conditions of handling and storage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. PIPE

1. Pipe used in water main construction shall be:

a. Class 200 PVC Pipe in accordance with AWWA Standard C900.

2. POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

   a. PVC pipe for the water mains shall meet the requirements of AWWA Specification C-900, "Polyvinyl Chloride Pressure Pipe", made to ductile iron O.D.'s for "Push-On" joints. Pipe joints shall be with an elastomeric gasket or joint. Pipe class shall be as specified in the Special Provisions.

3. Polyethylene (PE) Pressure Pipe and Fittings shall meet the requirements of ANSI/AWWA C906-90 Polyethylene (PE Pressure Pipe and Fittings, 4 inches (100 mm) through 63 inches (1575 mm), for water distribution.

4. Molecular Oriented Polyvinyl Chloride (PVCO) Pressure Pipe for water mains shall meet the requirements of ANSI/AWWA C-909.

B. FITTINGS AND COUPLINGS

1. Cast iron or ductile iron fittings used for water mains shall be Class 250 conforming to AWWA C-110, Gray-Iron and Ductile Irons Fittings for Water and Other Liquids. ***Class 350 fittings conforming to AWWA C-153, Ductile Iron Compact Fittings may be substituted.*** Joints for Ductile Iron and PVC Pipe shall be mechanical joint or "Push-On" joints conforming to AWWA C-111. The interior of the fitting shall have a cement mortar lining conforming to AWWA C-104. ***Cement mortar lining shall be NSF approved for potable water service. Cement manufacturer shall certify that hazardous waste has not been burned at the cement plant where the cement was manufactured.*** The outside surface of the fitting shall receive ***a liquid epoxy coating 16 MDFT (mils dry film thickness) in accordance with AWWA C-210. Minimum surface preparation shall be near white blast (SSPC 10) for external surfaces. Fusion bonded epoxy coating in accordance with AWWA C116 (8 mils minimum) may be substituted for liquid epoxy coating and cement mortar lining. Fusion bonded epoxy shall be NSF 61 approved for potable water service. Mechanical joint glands shall receive the same surface preparation and coating as the fitting.*** Couplings for making connections to existing pipelines and ~~fire~~ ***blowoff*** hydrants shall be Smith-Blair Type 413, Type 433, Type 435, or Dresser Style 62, Style 153, Style 162, mechanical-joint connecting pieces and mechanical-joint sleeves, or an approved equal. ***Couplings shall be coated inside and out with 8 MDFT of fusion bonded epoxy in accordance with AWWA C116. Bolts and nuts shall be Series 300 stainless steel.***

2. PVC fittings may be used for water mains 4 inches through **12** inches in diameter and shall conform to AWWA C-907 or an approved equal. **The PVC fittings shall be pressure class 200.**

3. ***All bolts, nuts and washers on fittings and couplings shall be Series 300 stainless steel***

4. ***Flanged coupling adapters for PVC pipe 4-inch through 12-inch diameter shall be EBAA Iron Series 2100 flange adapters for PVC pipe or approved equal.***

5. ***Mechanical Joint Restraint Glands: Mechanical joint restraint glands shall be EBAA Iron Series 2000 or approved equivalent.***

C. AIR RELIEF VALVES, BLOW OFFS, FLUSHING HYDRANTS

1. These shall be of the same material as the main installation and shall meet pressure and flow requirements equal to or exceeding the main installation or as required by the manufacturer.

2. Flushing Hydrants shall be furnished with 2.5" NST bronze outlet. Hydrants shall be non-freezing, self draining type with 6 feet cover. Hydrants shall be furnished with 2" connection and non-turning operating rod. All working parts shall be bronze to bronze design. Hydrants shall be serviceable from above grade with no digging. Hydrants shall be lockable to prevent unauthorized use.

D. GATE VALVES

1. Gate valves shall be iron body, bronze mounted, double disc gate valves with non-rising stems with design, construction and pressure rating conforming to AWWA C-500, with modifications specified herein.

2. Stem seals shall be double "o" ring seals designed so that the seal above the stem collar can be replaced with the valve under pressure in full open position.

3. Gate valves for underground installation shall have a two-inch square wrench nut for key operation. All valves shall open counterclockwise unless indicated otherwise in the special provisions.

E. RESILIENT SEATED GATE VALVES

1. Resilient Seated Gate Valves shall be iron body, with non-rising stems with design, construction, and pressure rating conforming to AWWA C509, standard for Resilient Seated Gate Valves with modifications specified herein. **Resilient Seated Gate Valves, sizes 2" through 12" shall be Mueller A-2360 or ENGINEER approved equal.**

2. Waterway shall be smooth and shall have no depressions or cavities in seat area where foreign material can lodge and prevent closure or sealing.

3. Stem seals shall be double "O" ring seals designed so that the seal above the stem collar can be replaced with the valve under pressure in full open position.

4. Resilient Seated Gate Valves for underground installation shall have two-inch (50 mm) square wrench nut for key operation. All valves shall open counterclockwise unless indicated otherwise in the special provisions.

5. The Resilient Seated Gate Valves' interior parts and surfaces shall be coated in accordance with AWWA C550.

F. VALVE BOXES

1. Valve boxes shall be cast iron, 5 1/4" (130 mm) diameter adjustable valve boxes. Valve boxes shall be of the screw type and of sufficient length for the pipe bury

as specified. The cast iron cover of the valve box shall have an arrow indicating the direction of opening and the word "Water" stamped thereon.

G. TAPPING SLEEVES

1. The tapping sleeve body and neck shall be made of heavy 18-8 Type 304 stainless steel. The flange shall be 18-8 Type 304 stainless steel, AWWA C207 Class D (ANSI 150# drilling) and recessed to accommodate tapping valves. The bolts shall be 18-8 type 304 stainless steel with NC threads and epoxy coated. The nuts shall be 304 stainless steel, fluoropolymer coated to prevent galling. One 304 stainless steel and one nylon washer to be provided with each bolt. A ¾" test outlet and plug shall be provided to allow hydrostatic testing of the seal prior to making the tap. The top half gasket shall be one-piece with a molded outlet ring to ensure effective sealing. It shall be NSF 61 Nitrile (Buna N) compounded. The gasket shall have a temperature range of -20°F to +180°F. The gasket shall have bridge plates made of heavy 302 stainless steel. The bridge plates shall be recessed and bonded into the gasket. All welded stainless steel surface areas shall be fully passivated for maximum corrosion protection. The tapping sleeve shall be NSF 61 listed and meet applicable AWWA C223 standards.

2. The tapping sleeve shall be a Smith-Blair, Inc. style 665 or approved equal.

H. GALVANIC ANODES

1. Magnesium Anode

a. High-Potential Magnesium Composition for buried soil applications shall be:

ELEMENT	CONTENT
Aluminum (Al)	0.010% maximum
Manganese (Mn)	0.500% to 1.300%
Zinc (Zn)	0.002% maximum
Silicon (Si)	0.002% maximum
Copper (Cu)	0.020% maximum
Nickel (Ni)	0.001% maximum
Iron (Fe)	0.030% maximum
Total Others	0.050% each or 0.300% maximum, total
Magnesium (Mg)	Remainder

b. Prepackaged Magnesium Anode Dimensions:

BARE ANODE SIZE	17 POUND ANODE
Bare Anode Nominal Dimensions	3 inches by 25 inches long minimum
Packaged Weight	42 pounds minimum
Nominal Package Size	6 inch diameter by 29 inches long minimum

3. Acceptable High Potential Magnesium Anodes: Dow Galvomag, Magcorp (formerly Amax) Maxmag, or approved equal.

2. Prepackaged Galvanic Anode General Requirements:

1. Anode Wire: Supply each anode with No. 12 AWG stranded copper wire with THWN insulation, 10 feet long minimum. Provide longer anode leads as required for test stations. Lead wire shall be coiled and bound.

2. Wire-to-Anode Connection: Manufacturer's standard. The anode connection shall be stronger than the wire. Connection of lead wire to anode shall be electrically insulated with manufacturer's standard insulation.

3. Prepackaged Anode Backfill: Backfill shall have a grain size so that 100 percent is capable of passing through a 20-mesh screen and 50-percent will be retained by a 100-mesh screen. The backfill mixture shall be thoroughly mixed and firmly packaged around the galvanic anode within the cloth bag or cardboard tube by means of adequate vibration. The complete packaged galvanic anode shall weigh a minimum of 2.0 times the bare anode weight. The quantity of backfill shall be sufficient to cover all surfaces of the anode to a depth of 1-inch.

4. Packaging and Shipping: Provide electrode packaged in a plastic or heavy paper bag of sufficient thickness to protect the anode, wire, backfill, and cloth bag during normal shipping and handling.

5. Prepackaged Galvanic Anode Backfill Composition:

ELEMENT	CONTENT
Ground Hydrated Gypsum	75 Percent
Powdered Bentonite	20 Percent
Anhydrous Sodium Sulfate	5 Percent

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. GENERAL

1. Pipe shall be installed in accordance with the manufacturer's recommendations for installing the type of pipe used unless otherwise noted in the Special Provisions. CONTRACTOR shall provide all tools and equipment including any special tools designed for installing each particular type of pipe used.

B. DEWATERING OF TRENCH

1. Where water is encountered in the trench, it shall be removed during pipelaying operations and the trench so maintained until the ends of the pipe are sealed and provisions are made to prevent floating of the pipe.

C. RESPONSIBILITY FOR MATERIAL

1. CONTRACTOR shall be responsible for all material furnished by him and shall replace at his own expense all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all materials and labor required for the placement of installed material discovered damaged or defective prior to the final acceptance of the work, or during the guarantee period.

2. CONTRACTOR shall be responsible for the safe and proper storage of material furnished by him or to him and accepted by him, and intended for the work, until it has been incorporated in the completed project. The interior of all pipe and other accessories shall be kept free from dirt and foreign matter at all times.

D. HANDLING OF PIPE

1. All pipe furnished by CONTRACTOR shall be delivered and distributed at the site by CONTRACTOR. Pipe, fittings, specials, valves and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

2. In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

3. Pipe shall be so handled that the coating and lining will not be damaged. If, however, any part of the coating or lining is damaged, the repair shall be made by CONTRACTOR at his expense in a manner satisfactory to ENGINEER.

E. LAYING OF PIPE

1. Before installation, the pipe and pipe coating shall be inspected for defects. Any damage to pipe coatings shall be repaired AS RECOMMENDED BY THE PIPE MANUFACTURER before laying the pipe.

2. All pipe shall be laid and maintained to the required lines and grades with fittings and valves at the required locations.

3. Grade and alignment on ungraded streets will be given from hubs set parallel to the line of the pipe, and on graded streets the grade and alignment shall be taken from established points on the existing curbs or sidewalks, when directed by ENGINEER. Trenches for the pipe shall be opened in accordance with the lines and grades given or to the standard depth of cover provided on the Drawings and/or in the Special Provisions. CONTRACTOR shall transfer lines and grades to the pipe from marks set by ENGINEER or from existing concrete curbs or sidewalks as an incidental part of his work.

4. Wherever obstructions not shown on the plans are encountered during the progress of the work and interfere to such an extent that an alteration in the plan is required, ENGINEER shall have the authority to change the plans and order a deviation from the line and grade or arrange with the owners of the structures for the removal, relocation and reconstruction of the obstructions. If the change in plans results in a change in the amount of work by CONTRACTOR, such altered work shall be done on the basis of payment to CONTRACTOR for extra work or credit to the OWNER for less work.

5. Proper implements, tools and facilities satisfactory to ENGINEER shall be provided and used by CONTRACTOR for the safe and convenient prosecution of the work. All pipe, fittings and valves shall be carefully lowered into the trench piece by piece by means of a derrick, ropes or other suitable tools or equipment, in such a manner as to prevent damage to pipe materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped into the trench.

6. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other means approved by ENGINEER.

7. Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints. If the pipe is shown curved on the plans and no special fittings are shown, CONTRACTOR can assume that the curves can be made by deflection of the joints with standard lengths of pipe. If shorter lengths are required, the plan will indicate maximum lengths that can be used.

8. Where field conditions require deflection or curves not anticipated by the plans, ENGINEER will determine the methods to be used. No additional payment will be made for laying pipe on curves as shown on the plans, nor for field changes involving standard lengths of pipe deflected at the joints. When fittings not shown

on the plans are required to meet field conditions, additional payment will be made for fittings.

9. Maximum deflections at pipe joints for various types of pipe shall not exceed the applicable material and joint specifications of AWWA nor shall they exceed the recommendations of the pipe manufacturer. When rubber gasketed pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment. Trenches shall be made wide on curves for this purpose.

10. Reaction or thrust blocking shall be applied at all tees, plugs, caps and at bends deflecting 11 ¼ degrees or more, or movement shall be prevented by attaching suitable metal rods or straps as approved by ENGINEER. Reaction blocking shall be concrete having a compressive strength of not less than 2,000 pounds per square inch (13,800 kPa) at 28 days. Blocking shall be placed between solid ground and the fitting to be anchored; the area of bearing on the pipe and on the ground shall be as shown on Standard Drawing 02665-03. The blocking shall be so placed that the pipe and fitting joints will be accessible for repair.

11. The cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or coating and so as to leave a smooth end at right angles to the axis of the pipe. The flame cutting of pipe by means of an oxyacetylene torch shall not be allowed.

12. The pipe shall be installed with a minimum of 6.0' of cover from final grade.

13. Warning tape shall be buried twenty-four inches (24") above the top of the pipe unless specified otherwise.

14. Tracer wire shall be installed on all pipes. The wire shall be located above the pipe as shown on the plans. The tracer wire shall be insulated and brought to the surface and terminated in flush mounted test station box at all fire hydrants or convenient location approved by ENGINEER. Tracer wire shall be attached to the top of the pipe by tape or plastic nylon ties as required to keep wire in place during backfilling.

15. Polyethylene encasement shall be installed as per AWWA C-105 on all fire hydrants, ductile iron pipe and fittings; valve boxes and curb stop boxes. Overlaps shall be secured to top of pipe by the use of adhesive tape, plastic string or other material capable of holding the polyethylene encasement in place until backfilling operations are complete.

F. SEPARATION OF WATER MAINS AND SEWERS

1. PARALLEL INSTALLATION

a. NORMAL CONDITIONS - Water mains shall be laid at least ten (10) (3 meters) feet horizontally from any sanitary sewer, storm sewer, or manhole, whenever possible. The distance shall be measured edge-to-edge.

b. UNUSUAL CONDITIONS - When local conditions prevent a horizontal separation of ten (10) feet (3 meters), a water main may be laid closer to a sanitary sewer, storm sewer, or manhole, provided that:

1) The bottom of the water main is at least eighteen (18) inches (450 mm) above the top of the sanitary or storm sewer; or

2) The trench backfill consists of cement treated backfill in accordance with Section 02225. Cement treated backfill must bear on undisturbed soil.

3) Where eighteen (18) inches (450 mm) vertical separation as noted above cannot be obtained, the sewer shall be:

a) Constructed of materials and with joints that are equivalent to water main standards of construction and tested for water tightness by sewerline methods per Section 02700; or

b) Placed in a separate casing pipe.

2. CROSSING

a. NORMAL CONDITIONS - Water mains crossing sanitary sewers, sanitary sewer service lines, or storm sewers shall be laid above to provide a vertical separation of at least eighteen (18) inches (450 mm) whenever possible. The distance shall be measured from the top of the sewer pipe to the bottom of the water pipe.

b. UNUSUAL CONDITIONS - When local conditions prevent a vertical separation of at least eighteen (18) inches (450 mm) as noted above, the following construction shall be used:

1) The sanitary sewer or storm sewer shall be constructed of materials and with joints that are equivalent to water main standards of construction and shall be tested for water tightness by sewer line methods as per Section 02700; or

2) The sanitary sewer, storm sewer or water main shall be placed in a separate casing pipe; or

3) The length of the sewer line constructed to water main standards or the casing pipe shall extend a minimum of nine (9) feet (2.75 meters) each side of the crossing.

4) Water mains passing under sewer lines shall in addition to the above requirements, be protected by providing adequate structural support for the sewer line. Soil structural support shall consists of cement treated backfill in accordance with Section 02225. Cement treated backfill must bear on undisturbed soil.

3.02 SETTING VALVES AND VALVE BOXES

A. Gate valves shall be set and jointed to the pipe in the manner specified for pipe laying and jointing. Valves shall be set with operating nut vertical. Valve boxes shall be centered and plumb over the operating nut and shall be set so that no shock or stress will be transmitted to the valve.

B. Resilient Seated Gate Valves shall be set and jointed to the pipe in the manner specified for pipe laying and jointing. Valves shall be set with operating nut vertical. Valve boxes

shall be centered and plumb over the operating nut and shall be set so that no shock or stress will be transmitted to the valve.

C. Valve boxes shall be centered and plumb over the operating nut of the valve. Tops of valve boxes shall be set flush with the ground surface or street surfacing unless otherwise directed by ENGINEER.

3.03 VALVE THRUST BLOCKS

A. All valves to be installed which call for thrust blocks and anchor rods shall be installed in accordance with the Contract Drawings.

3.04 PIPE JOINTING

A. RUBBER GASKET "PUSH-ON" JOINTS

1. Jointing of pipe and fittings with a rubber gasket "push-on" joint shall be as recommended by the manufacturer. The rubber gasket and gasket seat inside the bell shall be wiped clean with a cloth. A thin film of lubricant, furnished with the pipe, shall be applied to the inside surface of the gasket. The plain end of the adjoining pipe shall be wiped clean and inserted into the bell a sufficient distance to make contact with the gasket. The plain end shall then be forced "home" by the use of a crow bar, fork tool, or jack assembly. - 8 of 10

B. MECHANICAL JOINTS

1. The inside of the bell and the outside of the spigot of the mechanical joint fittings shall be brushed thoroughly with a wire brush to remove all loose rust or other foreign material just prior to assembly. The cleaned surfaces shall be brushed with soapy water just prior to slipping the gasket over the spigot end and into the bell.

2. The spigot end of the pipe or fitting shall be accurately centered in the bell before jointing is begun. After the gasket is in place the gland shall be brought up toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. Bolts shall be partially tightened alternately around the socket maintaining approximately equal tension until the final tension is reached.

3. The normal range of bolt torques to be applied to the cast iron bolts in the joints shall be as follows:

BOLT SIZE	RANGE OF TORQUE	
(inch)	(ft. lb.)	(N.M.)
5/8 (16 mm)	40 - 60	(54-81)
3/4 (19 mm)	60 - 90	(81-122)
1 (25 mm)	70 - 100	(95-136)
1-1/4 (31.5 mm)	90 - 120	(81-163)

The above torque loads may be applied with torque measuring or indicating wrenches, or they may be applied using regular socket wrenches, and checked to torque wrenches.

4. If effective sealing is not attained at the maximum torque indicated above, the joint shall be disassembled and reassembled after thorough cleaning.

Overstressing of bolts to compensate for poor installation practice will not be permitted.

C. CONNECTIONS TO EXISTING MAINS

1. All connections to water mains in use shall be made by CONTRACTOR unless otherwise pro-vided in the Special Provisions. CONTRACTOR shall furnish the special, as shown on the plans, and all other material required. He shall make all necessary excavations to assure gradual transition between the new and existing water main, and he shall perform all necessary backfilling.

2. Where the connection of new work to old requires interruption of service and notification of customers affected, the superintendent of the utility, ENGINEER and CONTRACTOR shall mutually agree upon a date for connections which will allow ample time to assemble labor and materials, and to notify all customers affected.

3.05 CATHODIC PROTECTION

A. PVC PIPE AND POLYETHYLENE PIPE REQUIREMENTS

1. Ductile iron fittings shall receive 8 mil minimum polyethylene encasement and a 17-pound galvanic anode. Anodes will be connected directly to fitting by cad welding.

2. Buried nuts, washers, and bolts shall be Series 316 stainless steel.

C. VALVE REQUIREMENTS

1. Valves shall be internally and externally fusion bonded epoxy coated (AWWA C 550).

SECTION 02670 – HYDROSTATIC TESTING

PART 1 – GENERAL

1.01 SUMMARY

A. This section consists of testing of water main and related appurtenances.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 HYDROSTATIC TESTING OF WATER MAINS

A. PVC, GRAY AND DUCTILE CAST IRON PIPE

1. PRESSURE TEST

After the pipe has been laid, all newly laid pipe or any valved section hereof shall be subjected to a hydrostatic pressure of at least 1.5 X the working pressure at the point of testing, or a minimum of 125 psi (862.5 kPa), whichever is greater. Hydrostatic testing shall include all service line connections from the point of connection to the curb stop.

a. Test Pressure Restrictions - Test pressures shall:

1) Not be less than 1.25 X the working pressure at the highest point along the test section.

2) Not exceed pipe or thrust restraint design pressures.

3) Be of at least two-hour duration.

4) Not vary by more than + 5 psi (34.5 kPa).

5) Not exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants.

6) Not exceed the rated pressure of the valves if resilient-seated butterfly valves are used.

b. Pressurization

1) Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the OWNER.

c. Air Removal

Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the CONTRACTOR shall install

corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged, or left in place at the discretion of the OWNER.

d. Examination

1) All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the OWNER.

2. LEAKAGE TEST: A leakage test be conducted concurrently with the pressure test.

a. Leakage Defined

1) Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within five (5) psi (34.5 kPa) of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

b. Allowable Leakage

1) No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

in which L is the allowable leakage, in gallons per hour; S is the length of pipeline tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge. Additional provisions pertaining to closed, metal-seated valves per AWWA C-600 may be included at the ENGINEER's discretion

TABLE 1

Allowable Leakage per 1000 Couplings

***Average Test Pressure at Lowest Points in Line – psi**

Pipe Diameter Inches	Leakage – gal/hr.								
	50	75	100	125	150	175	200	225	250
4	0.71	0.87	1.00	1.12	1.23	1.32	1.42	1.51	1.58
6	1.06	1.29	1.51	1.68	1.84	1.98	2.12	2.25	2.37
8	1.42	1.72	2.00	2.24	2.45	2.64	2.84	3.00	3.16
10	1.77	2.15	2.50	2.79	3.07	3.40	3.54	3.75	3.95
12	2.12	2.58	3.00	3.35	3.68	3.96	4.24	4.52	4.74
14	2.48	3.01	3.50	3.91	4.28	4.62	4.96	5.26	5.50
16	2.83	3.44	4.01	4.47	4.89	5.27	5.68	6.00	6.32
18	3.18	3.87	4.52	5.02	5.52	5.93	6.37	6.75	7.11
20	3.54	4.30	5.00	5.58	6.12	6.58	7.08	7.51	7.90
21	3.73	4.54	5.24	5.88	6.40	6.92	7.42	7.86	8.28
24	4.24	5.16	6.00	6.69	7.34	7.91	8.50	9.01	9.47
27	4.77	5.83	6.74	7.56	8.23	8.90	9.54	10.12	10.66
30	5.30	6.45	7.51	8.37	9.18	9.88	10.62	11.26	11.84
33	5.83	7.13	8.24	9.25	10.06	10.88	11.67	12.36	13.02
36	6.37	7.75	9.01	10.07	11.02	11.88	12.74	13.50	14.22
39	6.88	8.42	9.74	10.83	11.90	12.96	13.79	14.61	15.40
42	7.42	9.08	10.48	11.78	12.82	13.85	14.86	15.74	16.58

*The data is based on 150 psi and represents a leakage of approximately 30 gpd per mile of pipe per inch of pipe diameter for pipe in 13-ft. lengths.

- END OF SECTION -

SECTION 02675 - DISINFECTION

PART 1 GENERAL

1.01 SUMMARY

A. This section consists of essential procedures for disinfecting new and repaired water mains.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.02 DISINFECTING WATER MAINS

A. BASIC PROCEDURE: The basic procedure comprises:

1. Preventing contaminating materials from entering the water mains during construction or repair and removing by flushing materials that may have entered the water main.

2. Disinfecting any residual contamination that may remain.

3. Determining the bacteriologic quality by laboratory test after disinfection.

B. Supplementary Information:

1. Disinfection shall be in accordance with AWWA Standard Specification C651.

2. Flushing of heavily chlorinated water shall be done at the locations approved by the Engineer. The CONTRACTOR shall provide temporary piping and erosion control.

3. The form of chlorine and method of application shall be the CONTRACTOR's choice.

4. Each sample site shall be tested for an acceptable level of free chlorine concentration (50 mg/l minimum) and for bacteriological quality. Bacteriological quality testing shall take place after the heavily chlorinated water has been flushed from the pipeline. Bacteriological quality testing shall consist of two consecutive sets of samples taken at least 24 hours apart.

5. The Contractor shall have the samples tested at an approved laboratory. The contractor shall deliver copies of the lab reports to the Engineer.

6. Disposal of chlorinated water shall meet applicable regulatory requirements.

7. Both permanent and temporary waterlines must be disinfected in conformance with AWWA C651.

C. PREVENTIVE MEASURES DURING CONSTRUCTION

1. KEEPING PIPE CLEAN AND DRY

a. Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. When pipelaying is not in progress, as, for example, at the close of the day's work, all openings in the pipeline shall be closed by watertight plugs. Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry. Note: Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipelaying, the less the delay.

b. If dirt that, in the opinion of the OWNER's engineer or job superintendent, will not be removed by the flushing operation (Item D, PRELIMINARY FLUSHING) enters the pipe, the interior of the pipe shall be cleaned and swabbed as necessary, with a five percent (5%) hypochlorite disinfecting solution.

2. PACKING MATERIAL AND JOINTS

a. No contaminated material or any material capable of supporting prolific growth of micro-organisms shall be used for sealing joints. Packing material shall be handled in such a manner as to avoid contamination.

b. Yarning or packing material for cast iron pipe shall consist of molded or tubular rubber rings, ropes of asbestos or treated paper. Materials such as jute or hemp shall not be used.

c. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in enclosed containers and shall be kept clean.

D. PRELIMINARY FLUSHING: The main shall be flushed prior to disinfection, except when the tablet method is used (Item F, METHODS OF CHLORINE APPLICATION, Paragraph (3)). The sites and velocities of flushing shall be as approved.

Note 1: The flushing velocity shall not be less than 2.5 ft/sec (0.75m/sec). The rate of flow required to produce this velocity in various diameters is shown in Table 2. No site for flushing should be chosen unless it has been determined that drainage is adequate at that site.

Note 2: Flushing is no substitute for preventive measures taken before and during pipelaying (Item C, PREVENTIVE MEASURES DURING CONSTRUCTION). Certain contaminants, especially in caked deposits, resist flushing at any velocity. Furthermore, with diameters of 16 inches or more, even the minimum flushing velocity of 2.5 ft/sec is sometimes difficult to achieve.

TABLE 2
Required Openings to Flush Pipelines* (40 psi Residual Pressure)
Hydrant Outlet Nozzles

Pipe Size In	Pipe Size mm	Flow required to produce 2.5 fps (0.75m/sec) Velocity gpm	Flow required to produce 2.5 fps (0.75m/sec) Velocity (liters/minute)	Orifice Size In	Orifice Size mm	Number	Size In	Size mm
4	100	100	378.5	15/16	23.8	1	2 ½	63
6	150	220	832.7	1 3/8	35	1	2 ½	63
8	200	390	1476.2	1 7/8	47.5	1	2 ½	63
10	250	610	2308.9	2 5/16	58.7	1	2 ½	63
12	300	880	3330.8	2 13/16	71.4	1	2 ½	63
14	350	1,200	4542	3 ¼	82.5	2	2 ½	63
16	400	1,565	5923.5	3 5/8	92	2	2 ½	63
18	450	1,980	7494.3	4 3/16	106.4	2	2 ½	63

* With 40 (276 kPa) psi residual pressure, a 2-1/2" (63 mm) hydrant outlet nozzle will discharge approximately 1,000 gpm and a 4-1/2" (113 mm) hydrant nozzle will discharge approximately 2,500 gpm.

E. FORM OF CHLORINE FOR DISINFECTION: The most common forms of chlorine used in the disinfecting solutions are liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules, sodium hypochlorite solutions, and calcium hypochlorite tablets.

1. Liquid Chlorine: Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is properly trained and equipped to handle any emergency that may arise. Introduction of chlorine gas directly from the supply cylinder is unsafe and shall not be permitted.

   Note: The preferred equipment consists of a solution feed chlorinator in combination with a booster pump for injecting the chlorine-gas water mixture into the main to be disinfected. Direct feed chlorinators are not recommended because their use is limited to situations where the water pressure is lower than the chlorine cylinder pressure.

2. Hypochlorites

   a. Calcium Hypochlorite

      1) Calcium hypochlorite contains 65 PERCENT (65%) available chlorine by weight. It is either granular or tabular in form. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water (Item F, METHODS OF CHLORINE APPLICATION, Para. (3)). Calcium hypochlorite is packaged in containers of various types and sizes ranging from small plastic bottles to 100-pound drums.

      2) A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

b. Sodium Hypochlorite

1) Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine. It is packaged in liquid form in glass, rubber, or plastic containers ranging in size from one-quart bottles to five-gallon carboys. It may also be purchased in bulk for delivery by tank truck.

2) The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

c. Application

The hypochlorite solutions shall be applied to the water main with a gasoline or electrically-powered chemical feed pump designed for feeding chlorine solutions. For small applications the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

F. METHODS OF CHLORINE APPLICATION

1. Continuous Feed Method

a. This method is suitable for general application.

1) Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/l available chlorine. To assure that this concentration is maintained, the chlorine residual should be measured at regular intervals. Note: In the absence of a meter, the rate may be determined either by placing a pitot gage at the discharge or by measuring the time to fill a container of known volume.

2) Table 3 below gives the amount of chlorine residual required for each 100 feet of pipe of various diameters. Solutions of one percent (1%) chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately one pound (.454 kg) of calcium hypochlorite in 8.5 gallons (32.2 liters) of water.

b. During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying

the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water shall contain no less than 10 mg/l chlorine throughout the length of the main.

TABLE 3
Chlorine required to produce 50mg/l concentration in 100 feet of pipe - by diameter

Pipe Size		100 percent Chlorine		1 percent Chlorine solutions	
In.	mm.	lb.	kg.	gallons	liters
4	100	0.027	0.012	0.33	1.25
6	150	0.061	0.028	0.73	2.76
8	200	0.108	0.049	1.30	4.92
10	250	1.170	0.077	2.04	7.72
12	300	0.240	0.109	2.88	10.90

2. Slug Method

This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.

a. Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate (Item F, METHODS OF CHLORINE APPLICATION, Paragraph (1), Note) into the newly-laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at no less than 300 mg/l. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least three (3) hours. The application shall be checked at a tap near the upstream end of the line by chlorine residual measurements.

b. As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated so as to disinfect appurtenances.

3. Tablet Method: Tablet disinfection is a requirement for short extensions (up to 500 feet (152.5 m)) and smaller diameter mains (up to 12 inches (300 mm)). Because the preliminary flushing step must be eliminated, this method shall be used only when scrupulous cleanliness has been exercised. It shall not be used if trench water or foreign material has entered the main or if the water is below 5°C (41°F).

a. Placement of Tablets

1) Tablets are placed in each section of pipe and also in hydrants, hydrant branches, and other appurtenances. They shall be attached by an adhesive, except for the tablets placed in hydrants and in the joints between the pipe sections. All the tablets within the main must be at the top of the main. If the

tablets are fastened before the pipe section is placed in the trench, their position should be marked on the section to assure that there will be no rotation. In placing tablets in joints, they are either crushed and placed on the inside annular space, or, if the type of assembly does not permit, they are rubbed like chalk on the butt ends of the sections to coat them with calcium hypochlorite.

2) The adhesive may be Permatex No. 1 (a product of the Permatex Company, Brooklyn, New York, and Kansas City, Kansas) or any alternative approved by the ENGINEER. There shall be no adhesive on the tablet except on the broad side next to the surface to which the tablet is attached.

b. Filling and Contact

1) When installation has been completed, the main shall be filled with water at a velocity of less than one-foot/second (0.305m/second). This water shall remain in the pipe for at least 24 hours.

2) Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water.

TABLE 4
Number of Hypochlorite tablets of 5-G
Required for dose of 50 mg/l*

Length of section		Diameter of pipe in inches and (millimeters)					
Feet	meters	2 (50)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)
13 or less	4 m or less	1	1	2	2	3	5
18	5.5	1	1	2	3	5	6
20	6	1	1	2	3	5	7
30	9.2	1	2	3	5	7	10
40	12.2	1	2	4	6	9	14

*Based on 3-3/4 g available chlorine per tablet.

G. FINAL FLUSHING: After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than one mg/l. Points of discharge of heavily chlorinated water shall be shown on drawings or as approved. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline.

H. BACTERIOLOGIC TESTS

1. After final flushing, and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriologic quality and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least one sample shall be collected from chlorinated supplies where a chlorine residual is maintained throughout the new main. At least two samples shall be collected at least 24 hours apart. Note: In the case of extremely long mains, it is desirable that samples be collected the length of the line as well as at its end.

2. Samples for bacteriologic analysis shall be collected in sterile bottles treated with sodium thiosulfate. No hose or fire hydrant shall be used in collection of samples. A suggested sampling tap consists of a standard corporation cock installed in the main with a copper tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use.

I. REPETITION OF PROCEDURE: If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. The tablet method cannot be used in these subsequent disinfections. When the samples are satisfactory, the main may be placed in service.

J. PROCEDURE AFTER CUTTING INTO OR REPAIRING EXISTING MAINS: The procedures outlined in this section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

1. Trench "Treatment": When an old line is opened, either by accident or by design, the excavation will likely be wet and badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

2. Main Disinfection

a. Swabbing and Flushing

The following procedure is considered as a minimum that may be used.

b. Swabbing with Hypochlorite Solution: The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a five percent (5%) hypochlorite solution before they are installed.

c. Flushing: Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.

d. Slug Method: Where practicable, in addition to the procedures of Paragraph (b), SWABBING WITH HYPOCHLORITE SOLUTION, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in Item F, METHODS OF CHLORINE APPLICATION, Paragraph (2), SLUG METHOD, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as one-half hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.

3. Sampling: Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.

- END OF SECTION -

SECTION 02700 – WELL DRILLING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish all materials, labor, plant, equipment, tools, supplies, transportation, and appurtenances for the drilling, construction, development, and testing of one well to be completed with an open-hole design as specified herein and in accordance with the requirements of the CONTRACT DOCUMENTS.

B. Approximate depths of drilling and well casings are to be used for the purpose of price estimation only. Exact depths and lengths will be determined by the ENGINEER over the course of construction using geologic and geophysical logs of the boreholes.

C. WORK requirements are summarized below. Each item is discussed in subsequent sections of the Specifications.

1. Mobilization to and demobilization from the WORK site.
2. Drill for, furnish, install and cement approximately 50 feet of permanent surface casing.
3. Drill approximately 560 feet of 12¼-inch diameter borehole to an approximate depth of 610 feet below ground surface.
4. Drill approximately 1,430 feet of 8¾-inch diameter borehole to an approximate total depth of 2,040 feet below ground surface.
5. Conduct a geophysical survey of the 12¼-inch and 8¾-inch diameter boreholes.
6. Furnish and install approximately 602 feet of 9⅝-inch O.D. 36 lb/ft J-or K-55 steel casing.
7. Furnish and install a threaded cross-over joint adapter from 9⅝-inch casing to 7-inch casing.
8. Furnish and install approximately 1,440 feet of 7-inch O.D. 23 lb/ft J-or K-55 steel casing.
9. Pressure cement 9⅝-inch O.D. and 7-inch O.D. steel casing in place to surface.
10. Drill approximately 300 feet of 6¼-inch diameter borehole to a total depth of 2,340 feet below ground surface.
11. Conduct a geophysical survey of the 6¼-inch diameter borehole.

12. Allow standby time for delays specifically imposed by the ENGINEER.

13. Allow rig time for well development and miscellaneous activities not specified.

14. Develop the well for approximately 16 hours by air-lifting techniques if necessary.

15. Furnish and install pump testing equipment.

16. Perform final cleanup and reclamation procedures at the WORK site.

1.02 BEGINNING AND COMPLETION OF WORK

The CONTRACTOR shall begin WORK within 30 calendar days following the date of the Notice to Proceed from the ENGINEER. All WORK by the CONTRACTOR shall be completed within 75 days after receipt date of the Notice to Proceed.

1.03 SERVICES FURNISHED BY THE OWNER

The OWNER will provide land and rights-of-way for the WORK specified in this contract. All required permits for construction will be supplied by the OWNER. Provisions for access to the WORK site will be provided by the OWNER. The CONTRACTOR shall not enter on or occupy with laborers, tools, equipment, or material any ground outside the property and rights-of-way provided by the OWNER unless stated otherwise by the OWNER. Other contractors, employees, or agents of the OWNER/ENGINEER may enter the WORK site and premises used by the CONTRACTOR for business purposes. Water may be obtained from the Fall River Water User's District from the hydrant to be installed in this contract. The securing and hauling of drilling water will be the responsibility of the CONTRACTOR. If the CONTRACTOR chooses to water from another source, the source of drilling water shall be approved by the ENGINEER.

1.04 SERVICES FURNISHED BY THE ENGINEER

The ENGINEER will assist in well testing, evaluation of drilling characteristics, sample examination, and geophysical log interpretation, and will advise the CONTRACTOR on the final design placement of well casings. The ENGINEER will obtain permits from the state and federal agencies required to construct the project. Obtaining any local permits or licenses required of the CONTRACTOR such as drilling, blasting, etc., will be the responsibility of the CONTRACTOR.

1.05 WORK SITE

The proposed Fall River Water User's District South Madison well site is located in the SE¼, SW¼, Section 29, T7S, R6E, on Lot 2 of the Eagle Rock Subdivision. The WORK site can be accessed by driving southeast from Hot Springs on Highway 18 about 1.8 miles or west, approximately 2.34 miles from the junction of Hwy 18 and Hwy 79 (see Figure 1). The actual well location can be moved within the lot site to best accommodate the rig and equipment used to drill the well.

1.06 DRILLING AND WELL CONDITIONS

A. Very few wells have been drilled in the area. Lithologic units anticipated to be encountered include shales, siltstones, mudstones/claystones, sandstones, and gypsum in the upper formations, with the Madison Formation being primarily comprised of dolomites and limestones. It is anticipated that the full sedimentary section from the Cretaceous Lakota Formation through the Mississippian Madison Formation will be penetrated.

B. It is the CONTRACTOR's responsibility to become informed about local conditions affecting this WORK. Neither the information contained in these specifications, nor gleaned from the OWNER, ENGINEER, or their agents, shall act to relieve the CONTRACTOR from any responsibility set forth in the contract.

1.07 CONTRACT DOCUMENTS

A. The form and detail of the various features of the WORK are illustrated on the following drawings accompanying and made part of the CONTRACT DOCUMENTS:

Figure 1 - Location Map
Figure 2 - Proposed Well Design
Figure 3 – Well Head Configuration
Figure 4 – Fire Hydrant Detail

1.08 WATER, POWER AND SITE IMPROVEMENTS

A. The CONTRACTOR shall be responsible for obtaining water for drilling and construction purposes required by the project as mentioned in paragraph 1.03. All water used for this purpose shall be from a source approved by the ENGINEER. Costs for water conveyance facilities or transportation to the WORK site shall be borne by the CONTRACTOR. This includes all necessary piping and components, but only at such locations and in a manner approved by the ENGINEER. Conveying and hauling drilling water will be the responsibility of the CONTRACTOR. Before final acceptance of the well, all temporary connections and piping installed by the CONTRACTOR shall be removed in a manner satisfactory to the ENGINEER.

B. The CONTRACTOR shall provide, at his own expense, all power required for his operations under the contract.

C. Preparation of the drill site and excavation of mud pits shall be the responsibility of the CONTRACTOR. Site grading, excavation, backfilling of mud pits and site reclamation shall be considered a part of mobilization and demobilization. The CONTRACTOR shall be responsible for protecting life, livestock, and property from excavated mud pits and shall backfill them as soon as drilling and testing operations are complete.

1.09 WORKING HOURS

The CONTRACTOR shall work on this project in a steady and diligent manner. The CONTRACTOR shall, during all work periods, provide an adequate crew of suitably qualified personnel to prevent unnecessary delays in project completion.

1.10 SANITATION

The CONTRACTOR shall provide chemical toilets at the WORK site. The toilets shall conform to applicable State and Federal requirements. The cost for these sanitary facilities shall be borne by the CONTRACTOR.

1.11 NOISE CONTROL

To minimize the disturbance to nearby residents, all equipment and machinery used in the performance of this WORK shall be fitted with adequate mufflers and shall be located, operated, and maintained to minimize noise.

1.12 FINAL CLEANUP

A. The CONTRACTOR shall thoroughly clean the sites after completion of the drilling, well construction, and test pumping operations. All excess drilling fluids, debris, and other materials used during these operations shall be removed and properly disposed of by the CONTRACTOR. Following testing operations, all excavations shall be filled, compacted, graded, and the site reclaimed and reseeded to a condition equal to or better than its condition at the commencement of WORK, as approved by the ENGINEER.

B. The CONTRACTOR shall promptly remove his equipment, temporary facilities, and materials, and leave the site in a condition acceptable to the ENGINEER. The CONTRACTOR shall repair any damage to property or facilities caused by his operations prior to final acceptance of the WORK by the ENGINEER.

PART 2 -- PRODUCTS

2.01 DRILLING FLUIDS

A. Material: The selection of drilling fluids shall be the option of the CONTRACTOR, with the approval of the ENGINEER. Fresh water from a source approved by the ENGINEER shall be used as a base for drilling fluids whether used alone or in combination with drilling fluid additives. The drilling fluid may consist of water mixed with high-grade bentonite or other ENGINEER-approved materials. If there should be a conflict between the drilling fluid requirements for ease of drilling and drilling fluid requirements for aquifer protection, then the ruling requirements shall be those for aquifer protection. The drilling fluid shall possess characteristics required to: (1) prevent caving as drilling progresses; (2) permit recovery of representative drill cutting samples; (3) maintain the structural

integrity of the borehole during casing installation; and (4) control adverse formation pressure or flowing conditions that may jeopardize the borehole.

B. Lost Circulation: Micaceous flakes or cellophane are the only materials to be used for regaining circulation, in the event that lost circulation conditions are encountered.

2.02 CASING MATERIALS

A. The surface casing shall meet API specifications, and shall have a wall thickness of not less than 0.250-inches. The surface casing shall be of adequate size, strength, and wall thickness to facilitate subsequent drilling.

B. The well shall be constructed of steel casing. The upper stage of the well shall be cased with 9⅝-inch O.D., 0.352-inch minimum wall thickness, 36 lb/ft casing meeting API J-or K55 standards. The second stage of the well shall be cased with 7-inch O.D., 0.317-inch minimum wall thickness, 23 lb/ft casing meeting API J- or K-55 standards. The casing shall be new. Rusted casing will not be accepted. The casing shall be joined with full penetration welds made by properly qualified operators or threaded and coupled.

C. Centralizers: At least twelve Centralizers of adequate strength to center the casing in the borehole shall be used in the installation of the casing and shall be spaced a maximum of 300 feet apart. **A sample of the centralizers shall be shown to the engineer for approval prior to ordering.**

2.03 CEMENTING MATERIALS

A. Cement Seal: The surface casing and the bottom 400 feet of the 7-inch O.D. casing shall be cemented in place with Type G or H cement. The remainder may be cemented in place with light cement approved by the ENGINEER. All cement shall contain 0.25 pounds of Flocele or ENGINEER-approved equivalent per sack of cement used to create the seal and three (3) percent calcium chloride. The CONTRACTOR shall allow for at least 60 percent overrun on cement to compensate for washout zones in the borehole. In the event more than 60 percent excess is required to completely cement the casings in place, then the CONTRACTOR shall be paid for the excess at CONTRACTOR's additional invoice cost plus 15 percent for handling.

2.04 GEOPHYSICAL LOGS

A cement bond log shall be conducted after allowing the cement to adequately cure. This can be conducted before drilling the 6¼-inch diameter borehole, or in conjunction with the geophysical logging after drilling the 6¼-inch diameter borehole. Geophysical logging suites shall consist of an Induction Electrical log including both Spontaneous Potential and Resistivity logs, and a Compensated Density log including Gamma Ray, Bulk Density and Caliper logs. The CONTRACTOR shall provide three copies of the field logs and 15 copies of the final geophysical logs to the ENGINEER at the completion of the WORK along with reproducible originals.

PART 3 -- EXECUTION

3.01 MOBILIZATION AND DEMOBILIZATION

Upon receiving the Notice to Proceed, the CONTRACTOR shall move in all tools, equipment, and supplies necessary for the WORK, and upon completion of the WORK, shall remove all such items from the premises promptly and leave the site in a clean, reclaimed and orderly fashion.

3.02 BOREHOLE DRILLING

A. The CONTRACTOR shall:

1. Drill a borehole of adequate diameter to a depth of approximately 50 feet to properly install and cement the surface casing in place.

2. Drill a 12¼-inch minimum diameter borehole to a depth of approximately 610 feet feet below ground level (BGL) using rotary techniques.

3. Drill an 8¾-inch minimum diameter borehole an additional 1,430 feet to a depth of approximately 2,040 feet BGL using rotary techniques.

4 Drill an additional 300 feet of 6¼-inch borehole to a total depth of 2,340 feet after cementing the 9⅝-inch and 7-inch O.D. casing back to the surface.

B. The drilling fluid properties shall be maintained in such a manner so as to ensure the structural integrity of the borehole, to maintain control of the well during flowing conditions, and to circulate drill cuttings representative of the strata penetrated to the ground surface. If proper control of the drilling fluid properties is not maintained, the CONTRACTOR may be required to retain or employ an experienced and qualified mud engineer on the job during all drilling operations to supervise and maintain the drilling fluid characteristics. Retainer fees or compensation for the mud engineer shall be the sole responsibility of the CONTRACTOR. The bottom 300 feet of the well in the Madison Formation shall be drilled with chlorinated water.

C. The CONTRACTOR shall sample the drill cuttings as directed by the ENGINEER, at a minimum of 10-foot intervals and at every formation change. Each sample shall be stored in insect- and mildew-proof oil well sand sample bags. Each sample bag shall be labeled with depth interval, date, time, well name, and location.

Sample bags containing the drill cuttings shall be stored in wooden crates or cardboard equivalent in a clean, dry area near the well. All samples are to be submitted to the ENGINEER.

D. The CONTRACTOR shall maintain a daily drilling log of each well. Information that shall be listed on the drilling log includes: (1) drilling fluids and additives, including quantity of materials used; (2) drilling fluid properties, including weight and viscosity; (3) type and

diameter of bits used for drilling and total footage for each bit; (4) any remarks or comments concerning the drilling characteristics of the borehole; (5) the depth at which water level stands in the well at the beginning of each shift; and (6) the nature and extent of all other work performed including the exact time spent on each item of work. **A geolograph shall be operational at all times during drilling operations. If the geolograph should become inoperable at any time during drilling, drilling shall cease until the geolograph is again in operation.** The forms shall be kept on-site for inspection by the OWNER or ENGINEER. Copies of all logs and the geolograph record shall be furnished to the ENGINEER following completion of all operations. Geolograph records will be made available to the ENGINEER at all times during the drilling operations.

E. The CONTRACTOR shall immediately notify the ENGINEER in the event of lost circulation. The CONTRACTOR shall immediately implement remedial measures to regain circulation using lost circulation materials listed in Paragraph 2.01B. The CONTRACTOR shall maintain $5,000 worth of lost circulation materials on site. If after working for four hours to re-establish circulation the loss of circulation is not overcome, then all additional work to regain circulation, including any footage gained, shall be paid at the hourly rig time rate. All lost circulation materials and mud used in attempting to restore circulation shall be paid at invoice cost plus 15 percent for handling.

F. All drilling fluids shall be disposed of in accordance with State and Federal regulations. Method and place of disposal shall be approved by the ENGINEER. Costs incurred in connection with the disposal of drilling fluids and developed water shall be borne by the CONTRACTOR.

3.03 PLUMBNESS AND ALIGNMENT

A. The CONTRACTOR shall construct the well sufficiently straight and plumb to permit the free installation of a pump in the well. The borehole shall be drilled to a depth designated by the ENGINEER of approximately 2,330 feet BGL with a total deviation not to exceed one degree per 150 feet in the upper 1,000 feet and not to exceed seven degrees overall. It shall be the responsibility of the CONTRACTOR to see that the well is being constructed straight and plumb within these limits at all times. The CONTRACTOR shall have a deviation survey tool on site and shall monitor the deviation of the hole as necessary during the course of drilling the well. Any indications of inadequate plumbness or alignment during drilling or casing operations shall be cause to require measurement of plumbness and alignment by a method acceptable to the ENGINEER. No payment shall be made for tests of alignment; any such tests shall be included in the costs bid for other items in this contract.

B. If the well is of unacceptable plumbness and alignment, the CONTRACTOR shall undertake remedial measures. Any alignment work required by the CONTRACTOR in re-drilling or straightening the well shall be at his sole expense. If the well is deemed unacceptable following remedial measures, then as much casing as can be removed from the well shall be salvaged by the CONTRACTOR. The well shall be abandoned in accordance with paragraph 3.07A of this document at the CONTRACTOR's expense. All repeated work, additional materials, labor, and equipment required to drill and construct the replacement well, satisfying the Plumbness and Alignment specifications outlined in

Section 3.03A above, shall be furnished at the expense of the CONTRACTOR, and no claim for additional compensation shall be made or allowed except as specifically provided within these CONTRACT DOCUMENTS.

3.04 GEOPHYSICAL LOGS

A. The CONTRACTOR shall secure the services of a qualified geophysical logging firm to survey the well and conduct the cement bond log. The CONTRACTOR shall assist the representatives of the geophysical service company as necessary to successfully complete logging operations, including: (1) access to the borehole; (2) installation and removal of logging equipment; and (3) reporting the type of drilling fluids and associated properties.

3.05 INSTALLATION OF WELL CASING

A. Well Casing. The CONTRACTOR shall install approximately 600 feet of 9⅝-inch O.D. 36 lb/ft steel casing in the 12¼-inch diameter borehole swedged to 1,440 feet of 7-inch O.D., 23 lb/ft steel casing following drilling the 8¾-inch diameter borehole. All couplings used shall be made up power-tight in accordance with manufacturer's recommendations. Any welding of the well casing shall be performed by properly qualified operators following the manufacturer's recommendations.

B. Cement Seal. The installed 9⅝-inch O.D. casing and 7-inch O.D. casing shall be suspended in the borehole and cemented in place by pressure circulation of cement grout from bottom to top. Cementing shall be performed by an ENGINEER-approved cementing service company. The cement used shall conform to the specifications of paragraph 2.03A above. The cement shall be allowed to cure a minimum of 18 hours, or more if directed by the cementing subcontractor, before further drilling proceeds.

C. Centralizers shall be secured to the casings to prevent significant movement up and down the casing during installation. All welding shall be done by a qualified operator. The cost of these centrilizers and their installation shall be included in the unit price bid for the 9⅝-inch and 7-inch casing.

D. If a casing string cannot be positioned according to the final well design furnished by the ENGINEER, then the CONTRACTOR shall remove the casing from the borehole and undertake remedial measures. Failed casing due to collapse or breakage associated with installation, removal, or other construction activity prior to well completion shall be withdrawn and replaced at the CONTRACTOR's expense. If remedial measures are insufficient to permit well construction in accordance with the final well design, the CONTRACTOR shall construct another well immediately adjacent to the original location in accordance with these CONTRACT DOCUMENTS. The problem borehole shall be abandoned and sealed in accordance with paragraph 3.07A of this document at the sole expense of the CONTRACTOR. All repeated work, additional materials, labor, and equipment required to rehabilitate or reconstruct the well prior to well completion shall be furnished at the expense of the CONTRACTOR, and no claim for additional compensation shall be made or allowed except as specifically provided within these CONTRACT DOCUMENTS.

3.06 WELL HEAD CONSTRUCTION

The CONTRACTOR shall extend the well casing a minimum of 18 inches above the ground surface and install a fully opening 10-inch gate valve rated to withstand 200 psi *prior to drilling out the Madison Formation with fresh water.* A ½-inch tap, nipple and ½-valve shall be installed on the 9⅝-inch casing below the 10-inch gate valve to monitor shut-in pressure (see Figure 3). All above ground metal shall be painted with a brightly colored rust-resistant paint. No payment shall be made for this item; it shall be included in the unit price bid to furnish and install the 9⅝-inch O.D. casing.

3.07 PLUGGING AND ABANDONMENT

A. Any well or borehole, which is to be plugged and abandoned, shall meet the following specifications:

1. All portions of the well or borehole shall be filled with cement grout circulated up from the bottom of the hole. The services of a cementing service company shall not be required for this procedure if the CONTRACTOR can demonstrate competence in producing the desired result.

2. All equipment, appurtenances, and casings shall be either removed from the well or cut off at a depth greater than six feet below ground.

B. In the event that the CONTRACTOR fails to complete a well to the designed depth, or should he abandon a well because of loss of his tools or equipment downhole, or for any other cause related to deficiencies in his equipment or performance, the CONTRACTOR shall plug and abandon the well in accordance with paragraph 3.07A of this document after removing as much casing as can be salvaged. All plugging and abandonment work shall be done at the sole expense of the CONTRACTOR. All salvaged materials furnished by the CONTRACTOR shall remain his property.

3.08 AIR DEVELOPMENT

A. The well shall be developed by air lifting techniques if necessary. If in the opinion of the ENGINEER the need for air development is not warranted, air lifting procedures shall not be performed. The compressor used for air development shall be capable of delivering 950 cubic feet per minute (cfm) at a pressure of 350 pounds per square inch (psi). For purposes of air development, the contractor shall have sufficient tubing or drill stem to reach a depth of 950 feet. The tubing or drill stem shall be sized to maximize the air lift from the well. It is anticipated that air development will take place in a staged manner, and thus may include considerable addition and subtraction of pipe.

B. Air development may last 16 or more hours and may be conducted intermittently to allow the well to recover and maximize the effect of air development.

3.09 PROTECTION OF WATER QUALITY

The CONTRACTOR shall take all necessary precautions to prevent contamination of the water in the well by the introduction of any foreign substance, including contaminated

water, gasoline, oil, etc., and shall conform to all laws applicable to the protection of water quality. Facilities, equipment, and materials for disposing of the water produced during the development and testing of the well shall be provided by the CONTRACTOR. It is anticipated that clear water can be disposed of in the vicinity of the well site.

3.10 TEST PUMPING

Following completion of development operations, the aquifer tapped by the wells shall be allowed to recover for at least 48 hours, or as determined by the ENGINEER prior to starting the pumping tests. Anticipated methods of aquifer testing for each well include:

1. A step-test lasting approximately 6 hours, which will consist of pumping the well at various rates from approximately 75 gallons per minute (gpm) to the maximum capability of the pump or well.

2. The well will be allowed to recover overnight or for an adequate period of time as determined by the ENGINEER.

3. A constant-rate pumping test lasting 72 hours.

4. A constant-rate recovery test lasting approximately 72 hours.

The test pump shall be of the submersible type. In order to ensure that the design pumping rate of 500 gpm can be exceeded, the test pump shall be capable of delivering 500 gpm from a pumping depth of 650 feet. The CONTRACTOR shall furnish and install all necessary equipment for testing including a discharge valve to control flow, orifices for accurately measuring the discharge from the well, two air lines for measuring the pumping water level during testing operations, a convenient means to apply compressed air to the air lines, and a 300 psi Bourdon-tube pressure gage with 2 psi or finer gradations and an accuracy of ±0.5 percent. The CONTRACTOR shall also install an ENGINEER supplied transducer and wire on the drop pipe to the top of the pump if so directed.

The CONTRACTOR shall be responsible for providing power for the test pump. If a generator is used for power, the CONTRACTOR shall provide a means for safe refueling during operations to prevent even brief shutdowns, if such is necessary in the testing procedures used. Power shutdowns before the end of the testing procedure in excess of one (1) percent of the total time anticipated for this testing procedure will require the CONTRACTOR to allow the water level to recover to pre-pumping conditions and initiate the test again. Therefore, it is recommended that the CONTRACTOR maintain a backup generator or prime mover on site.

3.11 WELL DISINFECTION

The well shall be disinfected by a solution of high-test calcium hypochlorite or sodium hypochlorite sufficient to establish a concentration of at least 50 ppm throughout the well bore during the drilling of the 6¼-inch hole. The CONTRACTOR shall apply this solution by a method which will insure 24 hours of contact for the entire length of well casing. No

payment shall be made for this item; the cost for disinfection shall be included in the unit price bid to furnish and install the testing equipment.

3.12 FINAL CLEANUP

After completion of all WORK associated with this contract, the CONTRACTOR shall clean up the WORK site and any property used by his operations to the satisfaction of the ENGINEER. The CONTRACTOR shall remove and dispose of all excess materials resulting from his work, and shall repair, replace, or restore all property of any type or nature which has been moved, damaged, or altered in any way by his operations, to the satisfaction of the ENGINEER. All landscape, roadway, and adjoining surfaces shall be returned to their original condition and appearance by the CONTRACTOR as soon as is reasonably feasible.

PART 4 -- MEASUREMENT AND PAYMENT

4.01 SCOPE

A. The quantities of work or material stated in unit price items of the Bid are supplied only to give an indication of the general scope of the WORK; the ENGINEER does not expressly or by implication agree that the actual amount of work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit price item of the WORK by an amount up to and including 30 percent of that Bid item, without a change in the unit price, and shall include the right to delete any Bid item in its entirety. Some bid items may be reduced substantially depending on the conditions encountered. These items are noted in this section. Payment for materials and labor will be based on actual quantities furnished, installed, or constructed in accordance with the prices bid for unit price items. Lump sum items will not change to reflect actual quantities or services rendered, unless those items are completely deleted from the project.

B. The ENGINEER may terminate WORK on the project at any point if, in the ENGINEER's judgement, the OWNER's best interests are not served by continuation. Conditions which may lead to project termination include, but are not limited to, indications of low groundwater development potential as determined during drilling, geophysical logging and well testing. In such an event, the CONTRACTOR shall be paid for the value of WORK completed at that time on the basis of the Total Bid Price, modified in accordance with the unit price and lump sum items listed on the Bid Schedule. In addition, if well construction is terminated by decision of the ENGINEER, the CONTRACTOR may be required to properly abandon the well. Materials used in abandonment shall be paid at invoice cost plus 15 percent to cover handling. Payment for rig time shall be at the bid unit price.

4.02 MOBILIZATION/DEMOBILIZATION (ITEM 1, BID SCHEDULE; LUMP SUM ITEM)

Measurement for payment for mobilization/demobilization to the work site will be based upon completion of the WORK as a lump sum unit. The lump sum price listed on the Bid Schedule shall be full compensation for the moving in of rigs, pumps, equipment, power, labor, fuel, tools, excavation and backfill of the mud pits, and incidentals necessary to do

the WORK, and moving out of all such equipment, materials, tools, and incidentals and final site cleanup and reclamation upon completion of the WORK. For purposes of partial payment, the mobilization portion of this bid item shall be considered as 60% of the total lump sum; demobilization shall be considered as 40% of the total lump sum. The total price bid for this item may not exceed fifteen percent of the total bid price of the contract.

4.03 DRILL FOR, FURNISH, INSTALL AND CEMENT SURFACE CASING (ITEM 5, BID SCHEDULE; PRICE BASED ON LINEAR MEASUREMENT)

Measurement and payment for drilling for, furnishing, and installing the permanent surface casing will be based upon the number of linear feet of such materials actually installed in the borehole in accordance with these CONTRACT DOCUMENTS. Payment for the surface casing shall constitute full compensation for materials, transportation, labor, fuel, equipment, threading, welding materials, and incidentals necessary to drill for, furnish, install and cement the surface casing at the specified site, including any necessary site work, removal of temporary surface casings, hole plugging or other actions necessary to properly install permanent surface casings in accordance with these CONTRACT DOCUMENTS.

4.04 DRILL 12¼-INCH (MIN.) AND 8¾-INCH DIAMETER BOREHOLES (ITEMS 6 AND 7, BID SCHEDULE; PRICE BASED ON LINEAR MEASUREMENT)

A. Measurement for payment for drilling the 12¼-inch and 8¾-inch diameter bore holes will be based upon the vertical linear footage actually drilled in accordance with these Contract Documents. Payment for drilling these boreholes shall be full compensation for rigs, fuel, bits, labor, drilling fluids, and incidentals necessary to drill the holes in accordance with these Contract Documents.

B. No payment shall be made for tests of borehole alignment; it shall be the responsibility of the CONTRACTOR to ensure that the holes remain within plumbness and alignment specifications.

C. No payment shall be made for drilling fluid materials used during normal drilling operations. All such costs shall be considered subsidiary to the unit prices listed on the Bid Schedules.

D. Payment for drilling fluid materials used in regaining drilling fluid circulation in zones of lost circulation shall be paid at invoice cost plus 15 percent for handling.

E. No payment shall be made for time or expenses incurred in the recovery or replacement of tools or equipment lost during the drilling phase or any other phase of the WORK.

F. No payment shall be made for time, materials, or labor costs incurred during remedial measures operations in the event a well is of unacceptable plumbness and alignment.

G. No payment shall be made for time, materials, or labor costs incurred in abandoning a well in the event the well is of unacceptable plumbness and alignment following remedial measures, if lost tools or equipment cannot be recovered from the borehole or if the casing cannot be properly positioned. The costs incurred for construction of the

abandoned well shall be applied to construction of a replacement well. No additional payment above the contract price shall be made for construction of a replacement well.

H. No payment shall be made for footage drilled during the time period used to regain drilling fluid circulation in the event of lost circulation, during which time the hourly rig time rate is being applied.

4.05 CONDUCT GEOPHYSICAL LOGGING OF 12¼-INCH AND 8¾-INCH DIAMETER BOREHOLES (ITEM 8, BID SCHEDULE; LUMP SUM ITEM)

A. Measurement and payment for measuring geophysical properties of the boreholes will be based upon completion of the entire WORK as a lump sum unit in accordance with the requirements of the Contract Documents. Payment for furnishing the geophysical logs will be made at the lump sum unit price listed on the Bid Schedule for furnishing all tools, labor, rigs, equipment, materials, and incidentals necessary to produce the geophysical logs in accordance with these Contract Documents.

B. No separate payment shall be made for time associated with geophysical logging.

4.06 FURNISH AND INSTALL 7-INCH O.D., 23-lb., API J- or K-55 CASING (ITEM 9, BID SCHEDULE; PRICE BASED ON LINEAR MEASUREMENT)

Measurement for payment for the 7-inch O.D. steel casing will be based upon the number of linear feet of such pipe actually installed in the borehole in accordance with these Contract Documents. The length shall be measured as joined and installed in the well and shall not be the number of linear feet purchased by the CONTRACTOR. Payment for the 7-inch O.D. steel casing shall constitute full compensation for materials, transportation, labor, fuel, equipment, threading, welding materials, and incidentals necessary to furnish and install the well casings.

4.07 FURNISH AND INSTALL THREADED CROSS-OVER JOINT ADAPTER FROM 9⅝-INCH TO 7-INCH CASING (ITEM 10, BID SCHEDULE; PRICE BASED ON NUMERICAL COUNT EACH)

Measurement for payment for the 9⅝-inch O.D. by 7-inch O.D. steel casing threaded cross-over joint adapter will be based upon the numerical number account of each cross-over adapter actually installed in the borehole in accordance with these Contract Documents. Payment for the cross-over adapter shall constitute full compensation for materials, transportation, labor, fuel, equipment, threading, welding materials, and incidentals necessary to furnish and install the well casing adapter.

4.08 FURNISH AND INSTALL 9⅝-INCH O.D., 36-lb., API J- or K-55 CASING (ITEM 11, BID SCHEDULE; PRICE BASED ON LINEAR MEASUREMENT)

Measurement for payment for the 9⅝-inch O.D. steel casing will be based upon the number of linear feet of such pipe actually installed in the borehole in accordance with these Contract Documents. The length shall be measured as joined and installed in the well and shall not be the number of linear feet purchased by the CONTRACTOR. Payment for the 9⅝-inch O.D. steel casing shall constitute full compensation for

materials, transportation, labor, fuel, equipment, threading, welding materials, and incidentals necessary to furnish and install the well casings.

4.09 FURNISH AND INSTALL CEMENT SEAL FOR 9⅝-INCH O.D. AND 7-INCH O.D. CASINGS (ITEM 12, BID SCHEDULE; LUMP SUM ITEM)

A. Measurement and payment for furnishing and installing the cement seal will be based upon completion of the entire WORK as a unit, all in accordance with the requirements of these Contract Documents. Payment for furnishing and installing the cement seal will be made at the lump sum unit price listed on the Bid Schedule, which price shall constitute full compensation for furnishing all tools, rigs, equipment, labor, materials, cement, and incidentals necessary to construct the cement seal at the specified site in accordance with the Contract Documents.

B. Payment for cement beyond the 60 percent excess required to completely cement the 9⅝-inch O.D. and 7-inch casings in place will be paid at invoice cost plus 15 percent for handling.

4.10 FURNISH AND INSTALL WELL HEAD ASSEMBLY (ITEM 13, BID SCHEDULE, LUMP SUM ITEM)

A. Measurement for payment for the installation of the well head assembly will be based upon completion of the entire WORK as a lump sum unit, all in accordance with the requirements of these Contract Documents. Payment for furnishing and installing the well head will be made a the lump sum price listed in the Bid Schedule, which shall constitute full compensation for furnishing all tools, rigs, flanges, valves, fabrication costs, labor, materials, welding, transportation, and incidentals necessary to construct and install the well head assembly in accordance with the Contract Documents.

4.11 DRILL 6¼-INCH DIAMETER BOREHOLE (ITEM 14, BID SCHEDULE; PRICES BASED ON LINEAR MEASUREMENT)

A. Measurement for payment for drilling the 6¼-inch diameter borehole will be based upon the number of vertical linear footage actually drilled in accordance with these Contract Documents. Payment for drilling the 6¼-inch borehole shall be full compensation for rigs, fuel, bits, labor, drilling fluids, and incidentals necessary to drill the hole in accordance with these Contract Documents.

B. No payment shall be made for tests of borehole alignment; it shall be the responsibility of the CONTRACTOR to ensure that the hole remains within plumbness and alignment specifications.

C. No payment shall be made for drilling fluid materials used during normal drilling operations. All such costs shall be considered subsidiary to the unit prices listed on the Bid Schedules.

D. In the event a cavern or large fracture system is encountered in the Madison Formation and severe lost circulation conditions occur or the desired flow is encountered, drilling may be terminated at that point.

E. No payment shall be made for time or expenses incurred in the recovery or replacement of tools or equipment lost during the drilling phase or any other phase of the WORK.

F. No payment shall be made for time, materials, or labor costs incurred during remedial measures operations in the event the well is of unacceptable plumbness and alignment.

G. No payment shall be made for time, materials, or labor costs incurred in abandoning the well in the event the well is of unacceptable plumbness and alignment following remedial measures, or if lost tools or equipment cannot be recovered from the borehole. The costs incurred for construction of an abandoned well shall be applied to construction of a replacement well. No additional payment above the contract price shall be made for construction of a replacement well.

H. No payment shall be made for footage drilled during the time period used to regain drilling fluid circulation in the event of lost circulation, during which time the hourly rig time rate is being applied.

I. It is anticipated during the drilling of the lower portion of the well caverns may be encountered in the Madison Formation. If adequate water is encountered, drilling may be terminated. The unit price bid for the 6¼-inch diameter borehole shall not be subject to change unless the estimated number of linear feet increases by more than 30%.

4.12 CONDUCT GEOPHYSICAL LOGGING OF 6¼-INCH DIAMETER BOREHOLE (ITEM 15, BID SCHEDULE; LUMP SUM ITEM)

A. Measurement and payment for measuring geophysical properties of the borehole will be based upon completion of the entire WORK as a lump sum unit in accordance with the requirements of the Contract Documents. Payment for furnishing the geophysical logs will be made at the lump sum unit price listed on the Bid Schedule for furnishing all tools, labor, rigs, equipment, materials, and incidentals necessary to produce the geophysical logs in accordance with these Contract Documents.

B. No separate payment shall be made for time associated with geophysical logging.

4.13 RIG TIME (ITEM 16, BID SCHEDULE; PRICE BASED UPON TIME, HOURS)

A. Measurement and payment for rig time for additional drilling (beyond that stipulated in Section 4.01 A), or other miscellaneous activities, as directed by the ENGINEER not otherwise covered in these Contract Documents will be based on the actual number of hours of work done at the unit price listed in the Bid Schedule.

B. If this item is used in overcoming lost circulation conditions, measurement and payment for rig time will be based on the actual number of hours of work done under lost circulation conditions after dedicating four hours of working time to reestablish drilling fluid circulation, at the unit price listed in the Bid Schedule.

4.14 AIR DEVELOPMENT (ITEM 17, BID SCHEDULE; PRICE BASED UPON TIME, HOURS)

A. Measurement for payment for air development will be based on the actual number of hours of air lifting. Payment will be made at the unit price listed in the Bid Schedule. Payment for air development shall be full compensation for rigs, compressors, equipment rental, labor, fuel and incidentals.

B. Payment for time spent changing the location of drill stem or tubing within the well during air development operations will be made at the rig time unit price listed on the Bid Schedule, but will not include set-up time or time spent initially entering or exiting the well. Time spent changing the depth of the pipe to perform the air lifting operations will be paid at the rig time hourly rate.

C. No payment shall be made for equipment acquisition, set-up, or installation, or for recovery periods required by the ENGINEER to ensure thorough well development.

4.15 STANDBY TIME (ITEM 18, BID SCHEDULE; PRICE BASED UPON TIME, HOURS)

Measurement and payment for standby time will be based on the actual number of hours required by the ENGINEER for such delays during the course of the project, and will be made at the unit price listed on the Bid Schedules, but will not include waiting on cement to cure after cementing the casings in place, recovery periods during air development, between pumping tests, or delays required for acquisition of well casing, or other materials. The unit price shall not be subject to change regardless of the number of hours.

4.16 FURNISH, INSTALL AND REMOVE TEST PUMPING EQUIPMENT (ITEM 19, BID SCHEDULE; LUMP SUM ITEM)

A. Measurement and payment for furnishing, installing and removing test pumping equipment will be based upon completion of the entire WORK as a lump sum unit, all in accordance with the requirements of the Contract Documents. Payment for furnishing, installing, and removing the testing equipment will be made at the lump sum price listed on the Bid Schedule, which price shall constitute full compensation for all work, including installation of valves, orifices, hoses, temporary piping, and associated appurtenances.

B. No separate payment shall be made for equipment acquisition, set-up, or installation, or for materials to disinfect the well as specified in Paragraph 3.10.

4.17 CONDUCT PUMPING TEST (ITEM 20, BID SCHEDULE; PRICE BASED UPON TIME, HOURS)

A. Measurement and payment for test pumping will be based on the actual number of hours of pumping operations. Payment will be made at the unit price listed on the Bid Schedule and shall be full compensation for equipment, generators, fuel, manpower, power, and incidentals necessary to conduct the test pumping.

B. No payment shall be made for standby time during the recovery periods between tests or for time spent transporting or maintaining equipment. All such costs for time and maintenance materials shall be considered subsidiary to the unit price listed on the Bid Schedule

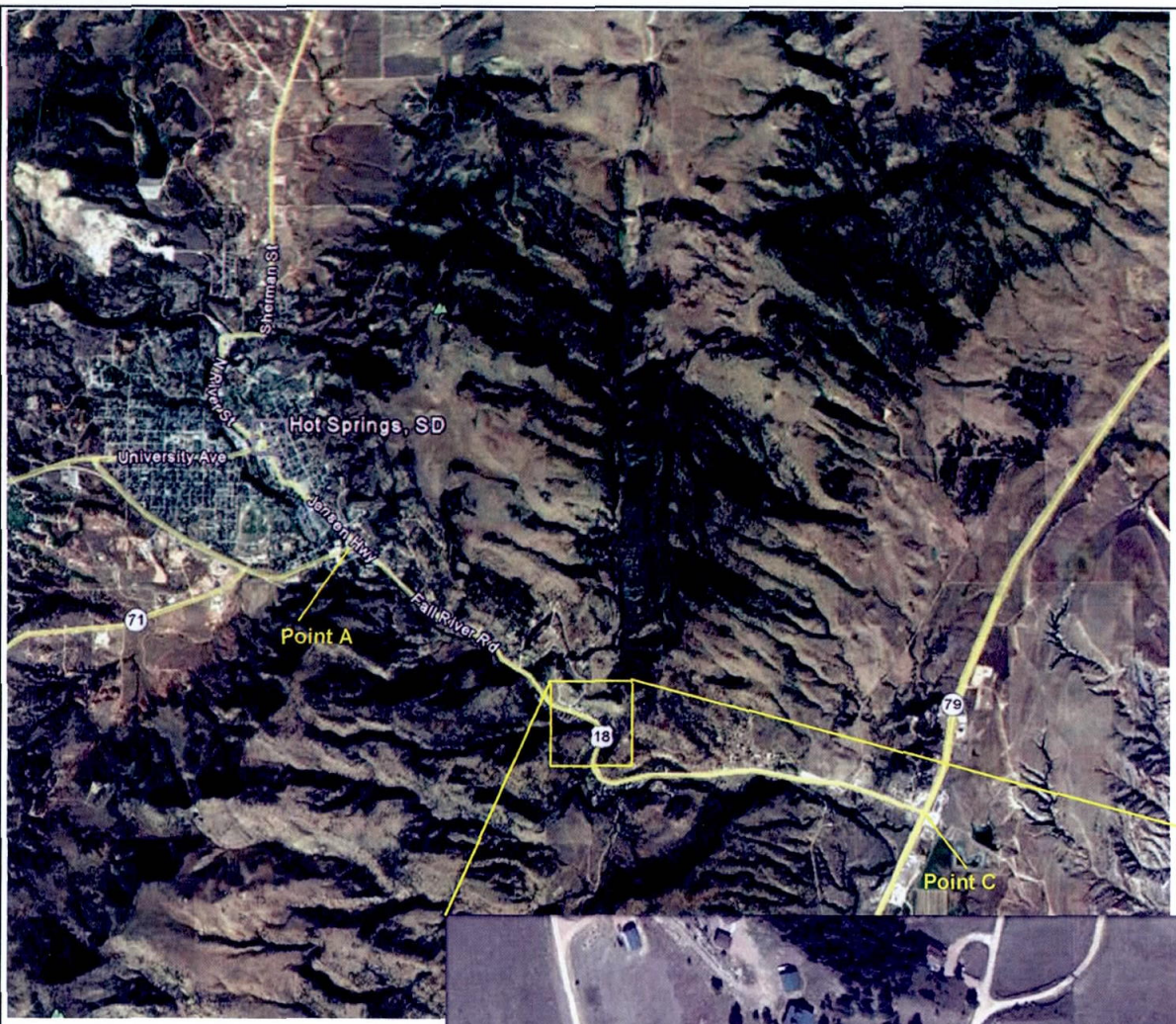
C. No payment shall be made for time, equipment, or materials used in a test aborted due to power failure or malfunction of pumping equipment.

D. The unit price shall not be subject to change by increases or decreases in the estimated number of hours by more than 30 percent.

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL PROJECT

DRAWINGS

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology



Point A
(Intersection of Hwy 385 and Hwy 18)

Point B
(Lane to South Madison Well Site)

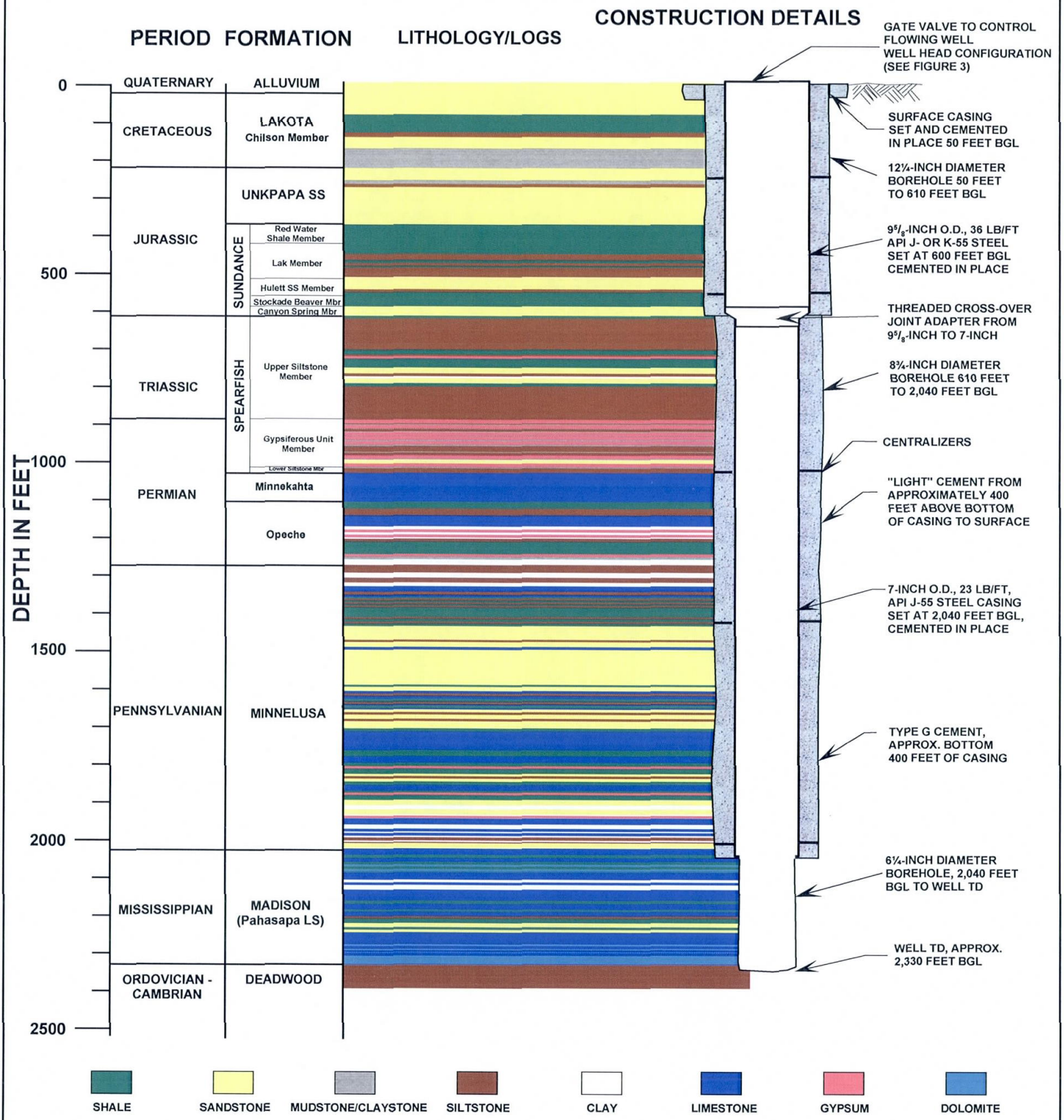
Point C
(Intersection of Hwy 18 and Hwy 79)

Distances

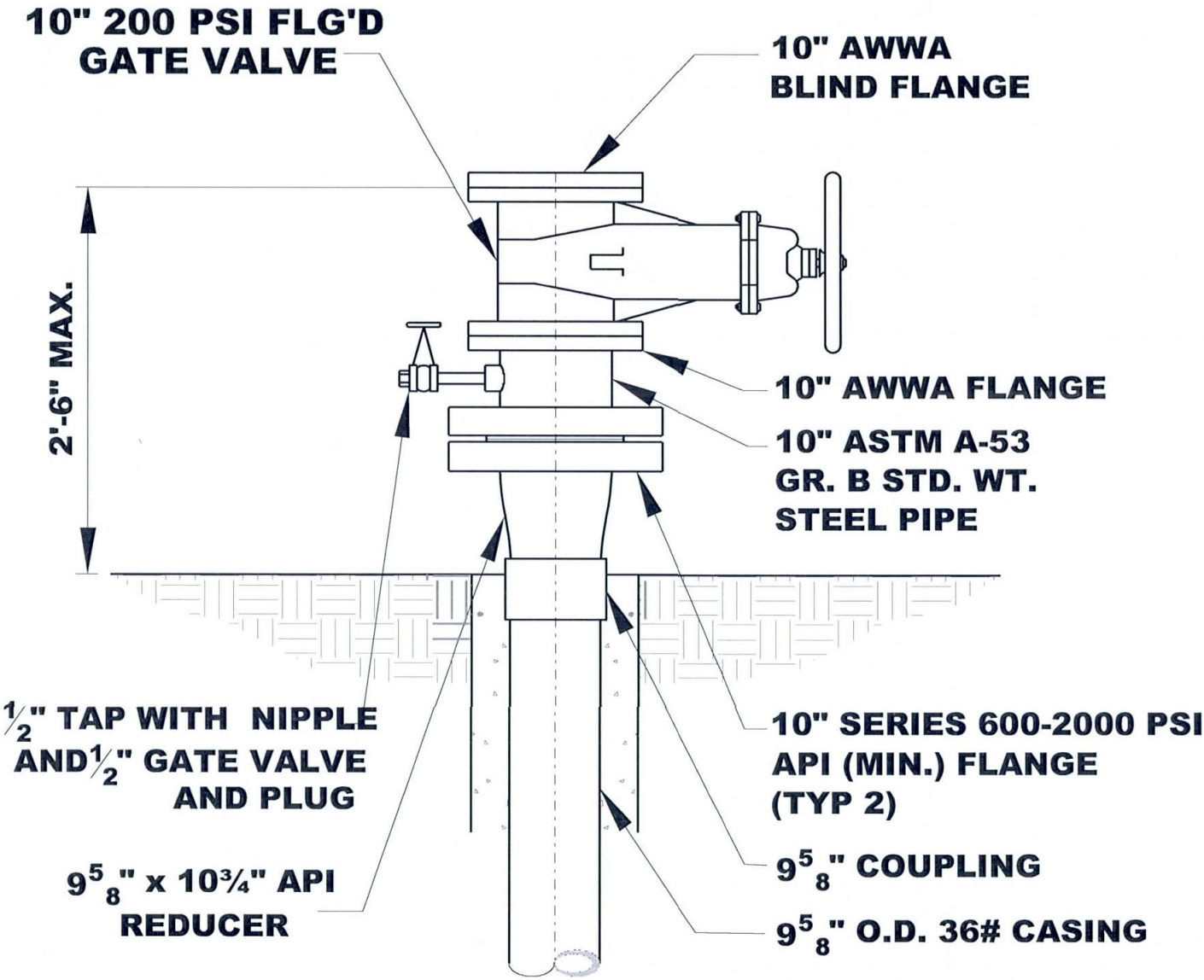
Point A to Point B: 1.8 Miles

Point C to Point B: 2.34 Miles

DESIGNED: JHW	DATE: JUNE 2012	Wester Wetstein & Associates Consultants in Engineering & Hydrogeology	605 Plaza Court P.O. Box 2202 Laramie, WY 82073 (307) 742-9220	FALL RIVER WATER USERS DISTRICT SOUTH MADISON WELL WELL LOCATION	FIGURE 1
DRAWN: JHW	JOB NO. 152.004				
CK'D LKW	SCALE: AS SHOWN				

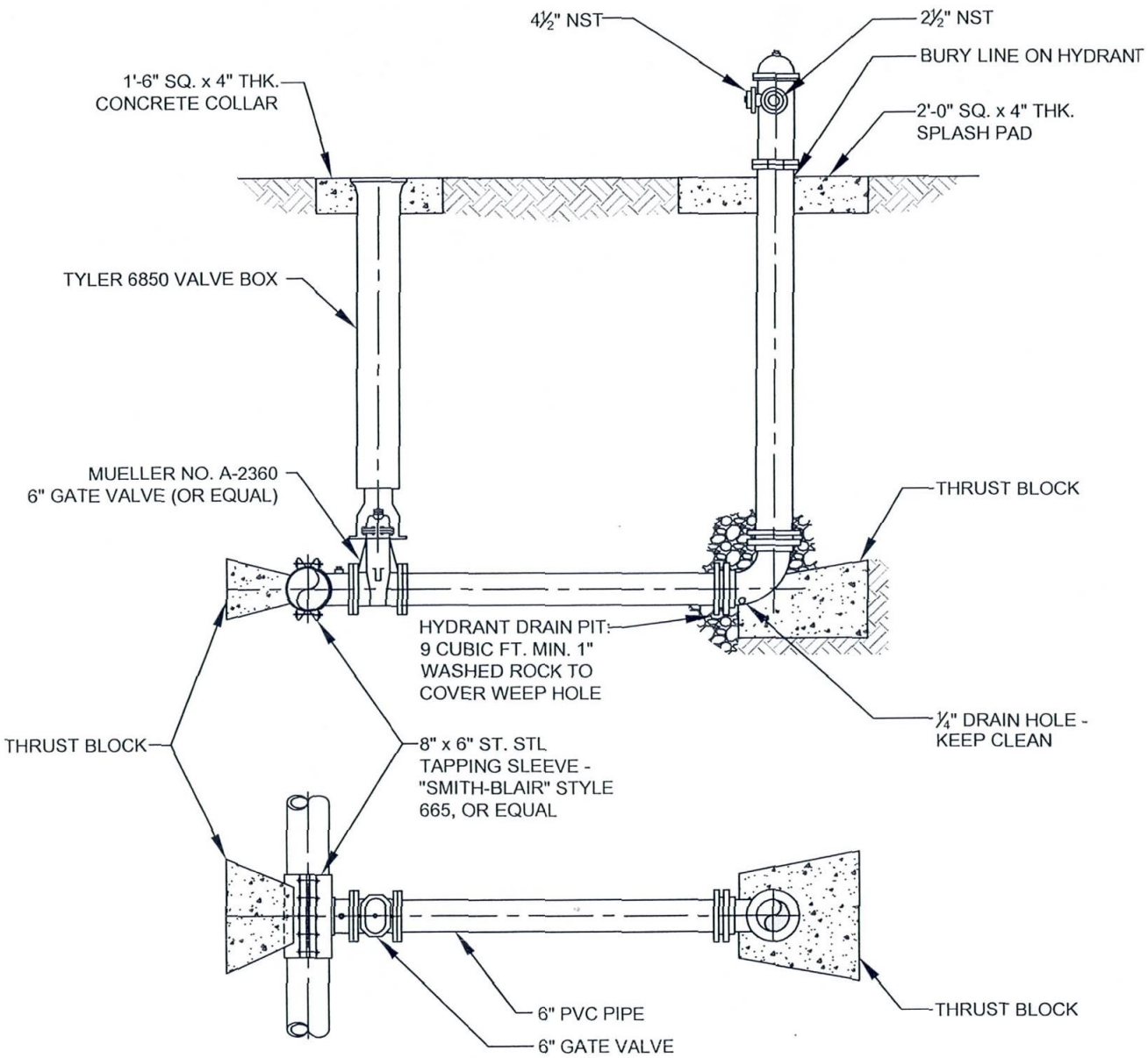


DESIGNED: JHW	DATE: JUNE 2012	Wester Wetstein & Associates Consultants in Engineering & Hydrogeology	605 Plaza Court P.O. Box 2202 Laramie, WY 82073 (307) 742-9220	FALL RIVER WATER USERS DISTRICT SOUTH MADISON WELL WELL DESIGN	FIGURE 2
DRAWN: JHW	JOB NO. 152.004				
CK'D LKW	SCALE: AS SHOWN				



NOTE:FITTINGS TO BE WELDED OR THREADED

DESIGNED: JHW	DATE: JUNE 2012	Wester Wetstein & Associates Consultants in Engineering & Hydrogeology	605 Plaza Court P.O. Box 2202 Laramie, WY 82073 (307) 742-9220	FALL RIVER WATER USERS DISTRICT SOUTH MADISON WELL WELL HEAD CONFIGURATION	FIGURE 3
DRAWN: JHW	JOB NO. 152.004				
CK'D LKW	SCALE: AS SHOWN				



FIRE HYDRANT INSTALLATION DETAIL

NO SCALE

NOTES:

1) WRAP FITTINGS AND VALVE WITH 8 MIL. POLYETHYLENE IN ACCORDANCE WITH AWWA C105-72.

2) THE 6" PIPE CONNECTION FROM THE WATER MAIN TO THE HYDRANT WILL BE DIRECT. VERTICAL OR HORIZONTAL OFFSETS USING ELBOWS IS NOT ALLOWED.

3) HYDRANT SHALL BE "MUELLER" SUPER CENTURION 250 (5¼" BARREL), OR AS SPECIFIED.

4) PROVIDE 6 FOOT UNOBSTRUCTED AREA AROUND HYDRANT.

DESIGNED: JHW	DATE: MAY, 2012	Wester Wetstein & Associates Consultants in Engineering & Hydrogeology	605 Plaza Court P.O. Box 2202 Laramie, WY 82073 (307) 742-9220	FALL RIVER WATER USERS DISTRICT SOUTH MADISON WELL FIRE HYDRANT INSTALLATION DETAIL	FIGURE 4
DRAWN: DKM	JOB NO.: 152.004				
CH'D: LKW	SCALE: AS SHOWN				

DESIGNED: JHW	DATE: JUNE 2012	Wester Wetstein & Associates Consultants in Engineering & Hydrogeology	605 Plaza Court P.O. Box 2202 Laramie, WY 82073 (307) 742-9220	FALL RIVER WATER USERS DISTRICT SOUTH MADISON WELL FIRE HYDRANT LOCATION	FIGURE 5
DRAWN: JHW	JOB NO. 152.004				
CK'D LKW	SCALE: AS SHOWN				

Wester-Wetstein & Associates, Inc.
Consultants in Engineering and Hydrogeology
605 Plaza Court (82070)
P.O. Box 2202
Laramie, Wyoming 82073-2202

Larry Wester, P.E.
John Wetstein, P.E., P.G.

Telephone
(307) 742-9220
Fax (307) 742-0316

RECEIVED
APR 2 8 2014
WATER RIGHTS
PROGRAM

April 23, 2014

South Dakota Department of Environment
and Natural Resources
Water Rights Program
Ground Water Section
PMB 2020
523 East Capitol Avenue
Pierre, South Dakota 57501

Attn: Mr. Ken Buhler

RE: Fall River South Madison Well
Permit No. 2629-2
Well Summary Report

Dear Mr. Buhler:

Please find enclosed a copy of the final report which summarizes the drilling, construction, development, stimulation and testing of the South Madison Well.

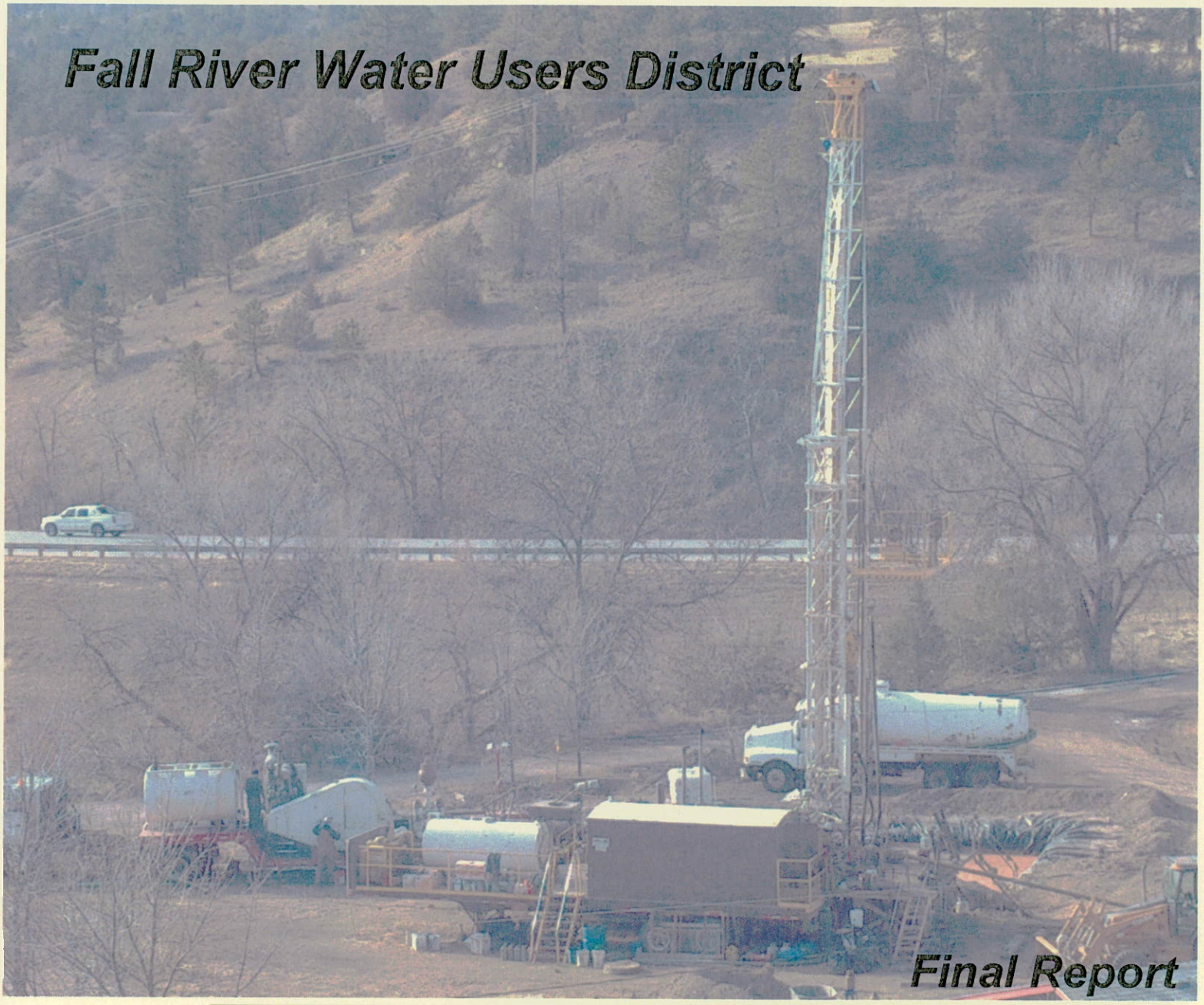
If you have any questions on the report please do not hesitate to call.

Respectfully submitted,
Wester-Wetstein & Associates, Inc.

John Wetstein

Enc.

cc: Keith Neugebauer - FRWUD
Tim Barritt



SOUTH MADISON WELL

Drilling, Construction, Development, Stimulation and Testing

April 2014

RECEIVED
APR 2 8 2014
WATER RIGHTS
PROGRAM

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

SOUTH MADISON WELL PROJECT

WELL DRILLING, CONSTRUCTION, DEVELOPMENT AND TESTING SUMMARY

Submitted To:

Fall River Water Users District
27600 West Oral Road
P.O. Box 321
Oral, SD 57766

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 3847
LARRY K. WESTER
SOUTH DAKOTA
4/15/2014

Prepared By:

Wester Wetstein & Associates
Consultants in Engineering & Hydrogeology

605 Plaza Court
P.O. Box 2202
Laramie, WY 82073
(307) 742-9220

April 2014

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SECTION 1
Introduction

1.1 Background

The Fall River Water Users District (FRWUD) was started in 2000 after the Fall River Water Users Association was disbanded. The two entities were formed to provide water to the region for both domestic and livestock use after a drought period in the 1990s forced some residents to haul water. The original service was comprised of three water storage tanks, two booster stations, six pressure reducing stations, and approximately 272 miles of water main ranging from 1.5-inch to 8-inch diameter.

Development in the area has expanded the FRWUD's service area and the District has begun the annexation process to add in the potential for up to 400 more single family residences. The growth includes the area of Buffalo Gap, a town north of the original District boundary. This pending growth will result in an increase peak day water usage from 485,200-GPD to 747,800-GPD which is over 55% if the anticipated growth is realized (FMG, 2009).

The FRWUD currently utilizes water from the City of Hot Springs. Existing infrastructure is incapable of delivering the full allotment of water designated in the contract without substantial upgrade of existing facilities, which are currently underway. This prompted the FRWUD to explore alternative water sources and resulted in the drilling of the O'Brian No. 2 Well located along Highway 79 approximately 3 miles southwest of Buffalo Gap. The location of the O'Brian No. 2 Well is shown in Figure 1-1.

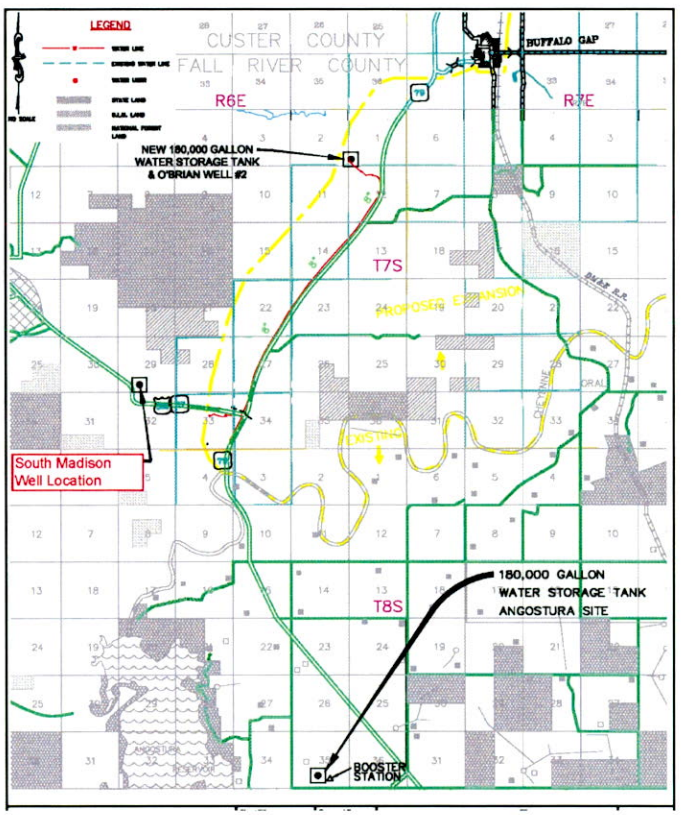


FIGURE 1-1
Modified from FMG (2007)

Production from the newly drilled O'Brian No. 2 Well is less than originally anticipated even following a second attempt to perforate, acidize, and re-develop the well. A substantial amount of money has been spent on the drilling and development effort of the well.

The purpose of the FRWUD South Madison Well Project was to: 1) evaluate the geology in the area; 2) determine the best site for an exploration well; 3) drill and test the South Madison well; 4) evaluate the well's potential to service the community; and 5) design the improvements required to tie in the South Madison well into the existing system. This report

describes the hydrogeologic investigation and summarizes the drilling, construction, development and testing of the FRWUD South Madison Well.

1.2 Project Need

The FRWUD intends to incorporate and expand its service area. This effort has the potential to increase average annual water usage from 253,880-GPD (176-GPM) to 402,280-GPD (280-GPM) which is an increase of over 58%. Peak Day usage will increase from 485,200-GPD (337-GPM) to 747,800-GPD (520-GPM). Currently, the District acquires water from the City of Hot Springs (CoHS). The agreement is for up to 600,000-GPD with the ability to go up to 750,000-GPD at 150% premium of the City's rate. Actual delivery of water from the CoHS is limited by infrastructure to about 500,000-GPD. Modification and improvements are required to existing infrastructure to attain the full 750,000-GPD (FMG, 2009). These improvements are currently being constructed.

1.3 Fall River Water Users District Area

The existing Fall River Water Users District lies in the foothills of the Black Hills and extends to the adjacent prairies on the east and south. The majority of the land is rangeland with some dryland farming and irrigated farmland. The irrigated farmland is located in the Oral area and is part of the Angostura Irrigation project. Elevations range from over 3,800-ft above sea level in the southwest corner of the district to about 2,000-ft above sea level in the northeast corners of the District. The eastern portion of the project has some steep and rough terrain and is mostly Buffalo Gap National Grasslands (FMG, 2007).

The Fall River Water Users District Boundaries are shown in Figure 1-2.

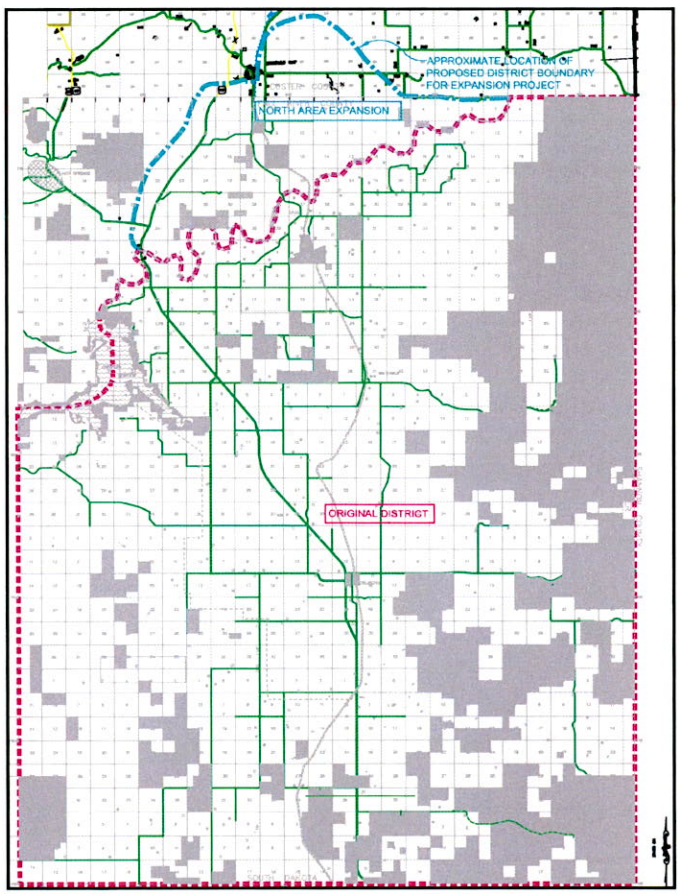


FIGURE 1-2
Modified from FMG (2009)

Population

Population projections have been revisited numerous times and will not be re-evaluated for the purposes of this report. The service population is estimated at 360 people with the possibility of an additional 920 people if the expected growth is realized. This will bring the total service population up to approximately 1,300 people (FMG, 2007). Estimates do not appear to have a timeline associated with them. It seems they are based on the ability to fill the existing real estate that is part of the annexation and the population of Buffalo Gap.

1.4 Livestock

The FRWUD system continues to serve both domestic and livestock needs of the area. Previous reports indicate that approximately 2,000 head of livestock are watered and estimates usage at 15-GPD per head for a total demand of 30,000-GPD (FMG, 2007).

1.5 Geology

This section consists of excerpts from a previous report prepared for the FRWUD which summarizes findings with respect to the feasibility of developing a groundwater source from a Madison Formation Well on Lot 2 of the Eagle Rock Subdivision. The conclusions of this report are based upon a study of previous geologic work in the area which was generated by the United States Geological Survey (USGS) and the South Dakota School of Mines and Technology and from well records on file with the South Dakota Department of Environment and Natural Resources. Based upon our review, the well site selected in Lot 2 (SE¼, SW¼ of Section 29, Township 7 South, Range 6 East) appeared favorable for developing a successful Madison well for the Fall River Water Users District. Due to the generally tight intrinsic permeability (primary permeability) associated with the limestone sediment of which the Madison is comprised, Madison Formation wells which yield large volumes of water are typically located in areas with well-developed secondary permeability features (fractures or karst systems). The proposed location of the Fall River District well is situated between two small structural folds (Dudley Anticline and a paralleling synclinal fold). The deformation of the sedimentary beds during the formation of these structural features may have sufficiently fractured the brittle sedimentary units enough to provide the secondary permeability features necessary to result in a Madison well that meets the District's needs.

1.5.1 Area Geology

The South Madison well location is situated on the southeast face of the Black Hills where the regional dip of the sedimentary sections is approximately 5° to 10° to the southeast. Superimposed upon this gentle dip are the two smaller folds, generally north – south trending: the Dudley Anticline and an associated parallel synclinal fold. The proposed well is situated on the west-southwest limb of the southerly plunging nose of the anticline. This limb dips back to the west at approximately 5°. Figure 1-3 is modified from the USGS report by Wolcott (1967) and is a portion of the surface geology map of the Hot Springs Quadrangle. The location of the South Madison Well and this location's relationship to small fold features are shown on this figure.

The South Madison well spudded in a Quaternary Alluvium section associated with the recent deposits from the Fall River. The thickness of the alluvium is approximately 20 to 30 feet. The alluvium was comprised of reddish brown very fine to fine sands with greyish brown, calcified river bank plant and soil sediment. The calcified plant material contained numerous pipes and vugs where the soil surrounding the plant shoots had calcified and after the plant material had decomposed left an open void. This material caused lost circulation problems for the Driller.

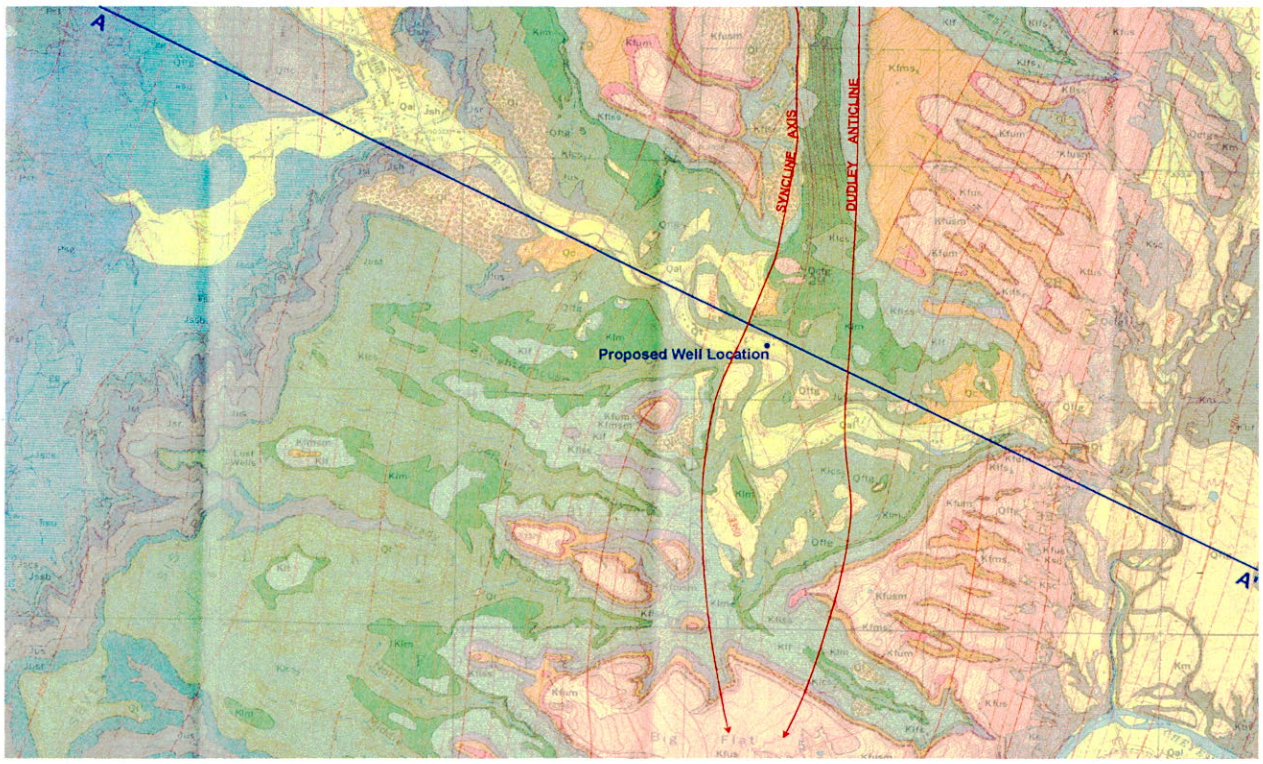


FIGURE 1-3
Modified from Wolcott (1967)

Underlying the alluvium is the Chilson Member of the Lakota Formation which is comprised primarily of mudstone and sandstones (Wolcott, 1967). The South Madison well penetrated the entire sedimentary section from the lower Cretaceous Lakota Formation (Chilson Member) through the Mississippian Madison Formation.

A cross-section (Figure 1-4) was developed using the data presented in Figure 1-3, the surface elevations from the USGS Hot Springs topographic map and the limited well data in the area. The location of this cross-section is shown in Figure 1-3. As shown in this cross-section and described earlier, the South Madison well penetrated the west limb of the Dudley Anticline, just to the east of the fold axis of

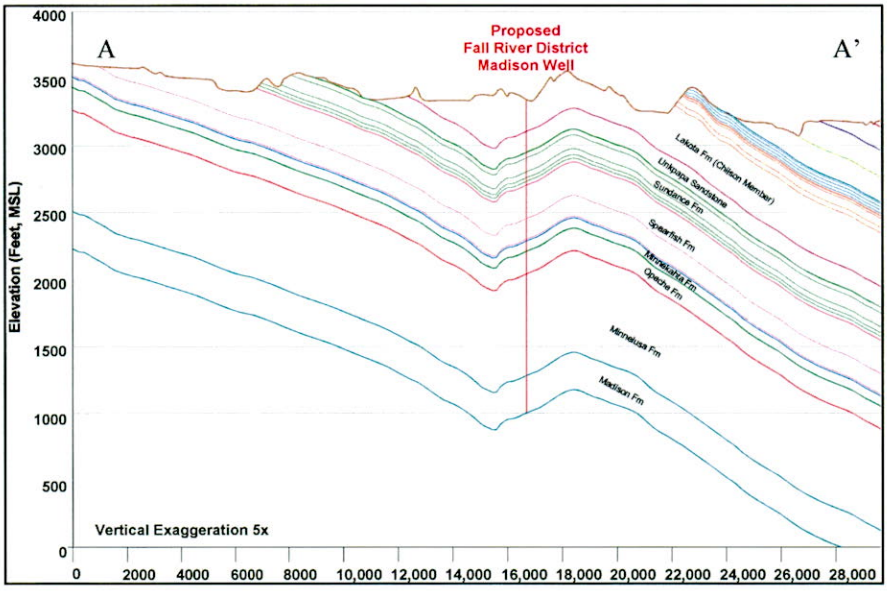


FIGURE 1-4

the syncline. Although the ideal location for the well would have been to locate it at the apex of the Dudley Anticline where the fracturing would be more prevalent, and the formation would be in tension allowing the fractures to remain open, it was surmised that the South Madison well location would still encounter some secondary permeability fracturing caused by the breaking up of the brittle formations as they were folded and wrinkled forming the superimposed structures along the southwest limb of the Black Hills.

Generally, it is believed that a well completed in a syncline will not encounter a well-developed fracture system because it is hypothesized that the compressional forces acting upon the formation will, over time, close the fractures which resulted during formation of the synclinal fold. However, we have been associated with several wells, located in very similar structural positions as that of the Fall River District well that have been successful. These include wells drilled for the City of Gillette, Wyoming and for the community of Hyattville, Wyoming. These wells all are capable of producing well over 100 gpm.

1.5.2 Hydrologic Setting

The inherent intercrystalline primary permeability of the Madison Limestone is very small; the large secondary permeabilities of the Madison in most areas are associated with fractures and joints caused by tectonic activity (i.e. folding and faulting). The secondary permeability is usually further enhanced by solution development of these fracture and joint systems. Because of this highly varied permeability pattern, production from the Madison Limestone aquifer ranges from a low of less than 5 gpm to over 10,000 gpm. This variation in the Madison aquifer has been recently demonstrated by the two wells drilled for the Fall River Water Users District. Their first well, the O'Brian No. 2 Well, has a sustained production potential of less than 50 gpm. A constant rate test completed in April, 2010 was performed for a 24-hour period at 36-GPM. Following this test, a well enhancement program was conducted on the O'Brian well, which consisted of perforating the top of the Madison Formation, re-acidizing, redeveloping, and retesting the well. These efforts did increase production, but not nearly as much as was desired. Testing concluded that the well would now be capable of producing 50-GPM with the well drawing down to 1,160-FT below grade (static water level is 100-FT below grade) at the end of a 70-day pumping period. This equates to a specific capacity of approximately 0.047 gpm per foot of drawdown. A review of the structural setting of this well shows it to be located in the gentle dipping east slope of the Black Hills where the likelihood of encountering fractures is very limited.

In comparison, the South Madison well is capable of producing over 450 gpm and has an associated specific capacity of approximately 0.91 gpm per foot of drawdown. City of Gillette, Wyoming wells located near Keyhole Reservoir that are completed in a well-developed fracture system are capable of producing over 1,500 gpm and have a specific capacity of 100 gpm per foot of drawdown.

It was interpreted that the South Madison Well penetrated the entire section of the Madison Formation and the underlying Englewood and Whitewood Formations before terminating in the Ordovician Deadwood Formation. Previous geologic investigations in the Black Hills area (Carter, et. al, 2003) have indicated that the Whitewood is not present in the southern Black Hills area. However, based on the drill cuttings it appears to be present in the South Madison well area. No attempt was made during the aquifer test to isolate and test separately the production and aquifer characteristics of the Madison, Englewood or Whitewood Formations.

Recharge to the Madison Aquifer occurs primarily by direct infiltration of precipitation on areas of outcrop. Additional recharge is generated by streams along the eastern flank of the

Black Hills that cross the outcropped Paloezoic rocks. In zones of intense fracturing where confining layers have been breached, recharge may also occur through upward or downward migration of water from underlying/overlying formations.

1.6 Groundwater Rights

The Water Management Board of the South Dakota Department of Environment and Natural Resources approved Water Permit No. 2629-2 for the drilling and construction of the water system and placing the South Madison well water to beneficial use on May 7, 2009. This permit (No. 2629-2) places to beneficial use 724 acre-feet of water at a discharge rate of 1.0 cubic feet per second (448.8 gpm) a portion of which was reserved by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2.

During the South Dakota DNR review of the permit application, it was stated that the nearest appropriated Madison water well was located approximately 5½ miles away from the South Madison Well. It was determined that, based on the distance separating the South Madison Well from the other Madison Aquifer wells in the area and the requested rate of diversion, that adverse impacts to the aquifer would not be anticipated. It was further noted that the discharge of area springs would not be impacted due to their distance from the South Madison Well.

SECTION 2

Well Drilling, Construction, and Development

2.1 Introduction

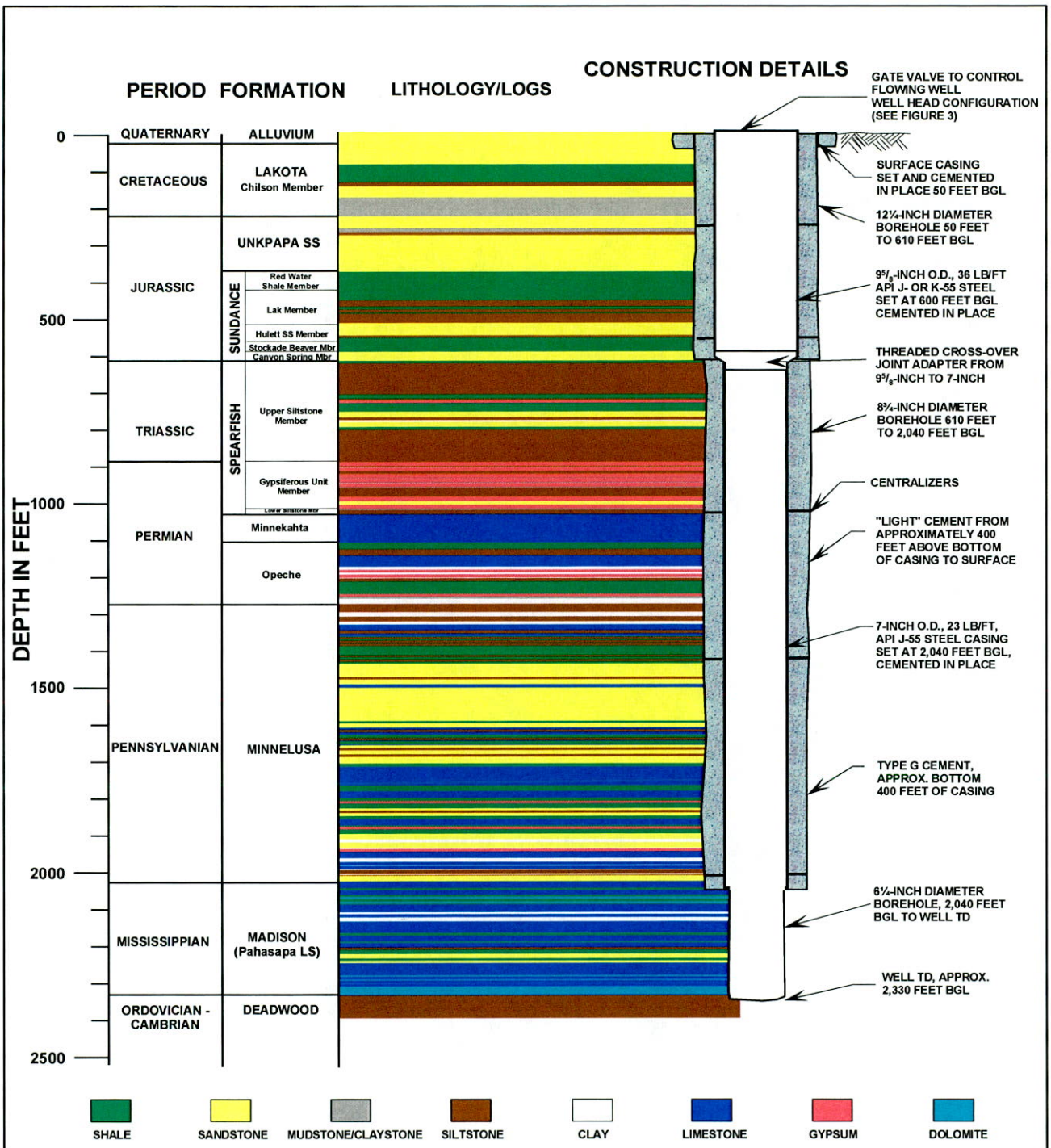
Design for the South Madison Well began in May of 2012, and bids were opened on July 26, 2012. One bid was received from Weston Engineering out of Upton, Wyoming. Because Weston's bid was within 6% of the engineer's estimate for this project and due to the District's desire to drill and tie the well into their system before next summer's high demand period, Weston was awarded the bid. The contract allowed for 90 days to complete the drilling and testing of the well (75 days for substantial completion). The Notice to Proceed was issued to the drilling contractor on September 28, 2012. However, due to scheduling conflicts to conduct the pre-construction conference (USDA – Rural Development requires this conference to be held prior to issuing the Notice to Proceed) Weston Engineering mobilized to another well location and drilled this well prior to mobilizing to the South Madison Well site. Weather problems held up Weston's mobilization from this previous well location, and they were not able to mobilize to the South Madison well site until November 12, 2012. Drilling and construction of the South Madison Well was completed on January 6, 2013 to a total depth of 2,448 feet below ground level (bgl).

This section describes the drilling, construction and development of the South Madison Well.

2.2 Design

Because the anticipated maximum day demand for water in the FRWUD is anticipated to reach 520 gpm (FMG 2009), the well was designed to accommodate the appropriate diameter submersible pump and motor to produce this quantity by utilizing a 9⅝-inch diameter casing design. The well was designed to be cased with 9⅝-inch casing from the surface to a depth of 600 feet below ground level (bgl) to serve as the pump chamber. A cross-over joint adapter was to be placed at this depth to transition from the 9⅝-inch casing to the 7-inch casing which was designed to extend to the top of the Madison Formation at an anticipated depth of 2,040 feet bgl. By using 7-inch casing, drilling of the open-hole section in the Madison Formation could be conducted with a 6¼-inch bit. The 6¼-inch bit is one of the smallest bits with journal bearings that can hold up to the drilling of the hard Paleozoic formations. The 9⅝-inch casing, 7-inch casing and the 6¼-inch bits are also very common and readily available in this area because they are standard sizes for the oil field industry.

Figure 2-1 shows the design for the FRWUD South Madison Well. The well design consists of an open-hole completion in the Madison Formation from an approximate depth of 2,040 feet to 2,330 feet below ground level with a 600 feet deep pump chamber section.



DATE: JUNE 2012	Wester Wetstein & Associates Consultants in Engineering & Hydrogeology 605 Plaza Court P.O. Box 2202 Laramie, WY 82073 (307) 742-9220	FALL RIVER WATER USERS DISTRICT	FIGURE 2-1
JOB NO. 152.004		SOUTH MADISON WELL	
SCALE: AS SHOWN		WELL DESIGN	

The drilling program was to consist of drilling for and setting approximately 50 feet of surface casing. After the surface casing had been set and cemented in place, a 12¼-inch diameter borehole was to be advanced to a depth of 600 feet bgl and then an 8¾-inch diameter borehole was to be drilled to the top of the Madison Formation and to penetrate approximately 10-feet into the Madison Formation. After drilling the 12¼-inch and 8¾-inch boreholes, a series of geophysical logs were to be run to verify the top of the Madison Formation. At the conclusion of the logging runs, approximately 2,042 feet of casing consisting of 602 feet of 9⅝-inch O.D. API J- or K-55, 36 lb/ft casing and 1,440 feet of 7-inch O.D., API J- or K-55, 23 lb/ft casing, connected using a threaded cross-over joint adapter from 9⅝-inch to 7-inch was to be run in and set and cemented in place from approximately 2,040 feet below ground level to approximately 2 feet above the land surface. Once the cement had sufficiently cured, a 6¼-inch borehole would be advanced through the Madison Formation. It was anticipated that the well would flow and there would be a shut in pressure between 65 and 70 psi. Therefore, a 10-inch valve was to be installed at the surface to control the flow once the well was drilled (See Figure 2-2).

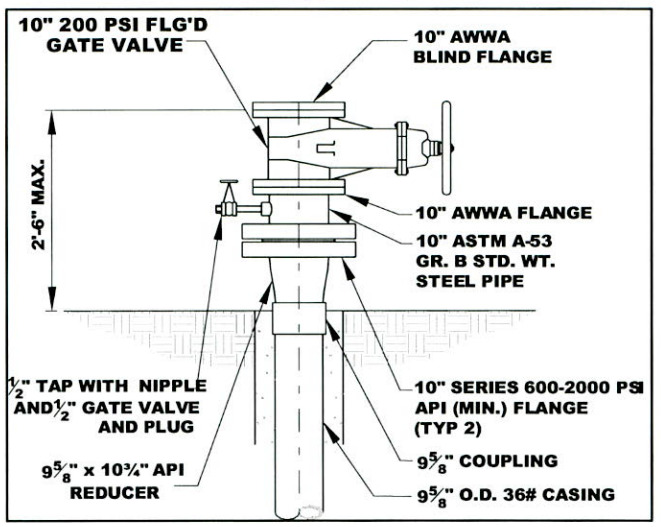


FIGURE 2-2

2.3 Permitting

The Fall River Water Users District applied for a Permit to Appropriate Water within the State of South Dakota on March 5, 2008 (Permit No. 2629-2). Because of filed opposition to the water permit application, a hearing before the Water Management Board was required. This hearing was held on March 11, 2009. Based on the findings of this hearing, the Water Management Board rulings and the Final Decision, including Findings of Fact and Conclusions of Law were adopted on May 7, 2009. Permit No. 2629-2 is an appropriation for 724 acre-feet at a maximum diversion rate of one cubic foot per second (cfs) from the Madison Aquifer. Three hundred and fifty acre-feet of this water comes from future use permit numbers 2560-2, 2560A-2 and 2560B-2, the remaining 374 acre-feet is new water associated with this permit.

In addition to the Permit to Appropriate Water, a Notice of Intent & Certificate of Applicant Form to Receive Coverage Under the General Permit for Temporary Discharges and Temporary Water Use Permit was submitted to the South Dakota Department of Environment and Natural Resources to allow the discharge of the produced water during development and well testing procedures. This application was granted and permit number SDG 070976 was assigned for coverage under the general permit for temporary discharges.

2.4 Well Construction

Site preparation began on November 12, 2012 and was completed on November 15, 2012. The contractor had trouble maintaining fluid in the mud pits due to the porous sediment. A review of the material excavated from the pit area shows it to be a grayish-brown, calcified river bank plant and soil sediment containing numerous pipes and vugs where the soil

surrounding the plant shoots has calcified and the plant has decomposed leaving an open void. Figure 2-3 is a picture of this calcified sediment material. To remedy the fluid loss, the contractor lined the mud pits with an HDPE liner.

FIGURE 2-3

Following rigging up, digging and lining the mud pits, the contractor drilled approximately 31 feet of 17½-inch diameter borehole and set 32 feet of 16-inch diameter surface casing. After allowing the cement to cure for more than two days, the contractor nippled up the discharge piping, picked up the bottom-hole assembly and drilled out the cement and beneath the surface casing. The bottom-hole assembly consisted of a 14¾-inch diameter long tooth rock bit, bit sub, bell joint and eight (8) 6-inch drill collars. The drill pipe was 4½-inch diameter, 16.6 lb/ft drill pipe.

Drilling of the 14¾-inch borehole was initiated on November 19, 2012. The contractor continued to drill the 14¾-inch diameter borehole for two more days, to November 21, 2012, but was only able to advance the borehole in this time period to a depth of 114 feet below the kelly bushing (KB). The formation encountered at these depths was very hard sandstone. After returning from the Thanksgiving holiday break, the contractor tripped out the 14¾-inch diameter bit and exchanged it for a 8¾-inch diameter long tooth rock bit. This smaller diameter borehole was advanced to a depth of 469 feet KB from November 26, 2012 to November 28, 2012. At this depth the drilling rate picked up and the contractor tripped out the smaller bit and replaced it with the 14¾-inch diameter bit. The 8¾-inch diameter borehole was reamed to 14¾-inch diameter and then the 14¾-inch diameter borehole was drilled from 469 feet to 603 feet KB from November 28, 2012 to December 4, 2012. On December 4th and 5th, 2012, the contractor picked up and ran in 605 feet of 10¾-inch diameter, 40 lb/ft steel thread and couple casing. This casing was slightly larger than what had been specified, but the contractor chose to install this casing without an increase to the contract cost. After placing the casing to a depth of 603 feet KB, the cementing subcontractor (Basic Services) was mobilized to the site and pressure grouted the 10¾-inch diameter casing in place. There were good returns to the surface during the cementing procedure, however, no good cement shows were witnessed. After allowing the cement to cure for approximately 18 hours, the top of the cement was tagged at a depth of 32 feet bgl. The contractor mixed up 40 sacks of cement and tremmied this cement into the annular space between the borehole and the 10¾-inch casing to cement it in place from 32 feet bgl to approximately 8 feet bgl.

The contractor then picked up a 9½-inch diameter bit and drilled out the cement and float shoe and advanced the 9½-inch diameter borehole from 603 feet KB to 904 feet KB. It required approximately 4 days to drill from 603 feet to 904 feet KB, so the contractor exchanged the 9½-inch diameter bit for an 8¾-inch diameter button bit on December 12, 2012. The remainder of the 8¾-inch diameter borehole from 904 feet KB to 2,107 feet KB was drilled from December 12, 2012 to December 21, 2012.

Geophysical logs were run at this depth (2,107 feet KB) to verify that the Madison Formation had been encountered. A review of the log trace indicated that the Madison Formation top appeared to be at a depth of 2,094 feet and, therefore, drilling of the 8¾-inch diameter borehole was terminated and the contractor began preparing to install the 7-inch casing.

On December 21 and 22, 2012 , 1,526 feet of 7-inch, 23 lb/ft, J-55 steel casing was set and cemented in place in the 8¾-inch and 9½-inch borehole. The casing was landed without any problems at a depth of 2,104 feet KB and was suspended from a liner/hanger at a depth of 578 feet KB. A total of eight (8) centralizers were spaced along the length of the 7-inch casing. After the casing was landed, the cementing subcontractor (Basic Services) rigged up and the 7-inch casing was cemented in place. The contractor then turned the drill pipe off of the 7-inch liner and circulated the top of the cement to surface. Returns of clabbered mud with streaks of cement were visible at the surface but no pure cement was circulated to the surface. The volume of cement used was 30% excess over the volume calculated after reviewing the caliper log. The volume of cement ordered (with 30% excess above the calculated annular space volume) was 140 sacks of "Light" (XLite 12) cement with 12% Gel, 3% $CaCl_2$, 2% Sodium Methisilicate and ½ lb/sack of flocele (slurry volume – 3.11 cubic feet per sack of cement (cu.ft/sk)) and 150 sacks of type "G" cement with 3% $CaCl_2$ and ½ lb/sack of flocele (1.15 cu.ft./sk). The contractor returned to the well site after the Christmas holiday on December 27, 2012 and attempted to run a cement bond log to determine the quality of the cement job and to determine if the cement reached to the top of the 7-inch casing. The logging subcontractor (Goodwell) could only lower the logging tool to a depth of 1,380 feet KB. The logging tool was encountering cement left inside the casing. It was determined that the cementing contractor had failed to fully displace the cement from inside the casing. A review of the cement bond log shows that there is good cement bond from the 1,380 foot to 910 foot KB with 80% or better coverage. There is a 40-foot section within this reach from the 1,030 foot to 990 foot KB where the cement bond decreases and it ranges from approximately 50% to 30%. The cement bond becomes significantly poorer from 910 feet KB to the top of the 7-inch casing at the 600 foot depth. From the 910 foot KB depth to the 720 foot KB depth the cement bond decreases on an approximate linear trend from an 80% bond to just over 10%. From the 720 foot depth to the top of the 7-inch casing the bond fluctuates between no bond and 10%. Because of the good cement bond from the bottom of the 7-inch casing to a depth of 910 KB, the Madison Aquifer has been successfully sealed from the overlying formations. It was decided not to perforate and squeeze cement in behind the 7-inch casing to better bond the upper 300 feet of the casing because it was felt that due to the cement that is present behind the casing that it would be difficult to squeeze additional cement in behind the casing.

Because of the excessive amount of cement inside the 7-inch casing, it required 2 days of drilling to reach the bottom of the 7-inch casing. A 6⅛-inch borehole was advanced from the 2,104 feet KB (bottom of 7-inch casing) to the final total depth of the well at a depth of 2,453 feet KB from December 30, 2012 to January 4, 2013 (no work was done on January 1 and 2 of 2013 – Holiday). The 6⅛-inch borehole was drilled using a fresh-water drilling fluid. After

removing the drill pipe, the well was flowing approximately 72 gpm (flow measured using V-Notch weir).

Deviation surveys were performed regularly during the drilling of the 8¾-inch borehole from the surface to approximately 1,200 feet KB. Borehole deviations ranged from less than ¼ degree to 1½ degrees. The records of the borehole deviation surveys are contained in Appendix D to this report.

Open-hole geophysical logs were run on the 6⅛-inch diameter borehole on January 5, 2013 by Goodwell, Inc. out of Upton, Wyoming. Two logging runs were made - the first was an SP and electric log (16" and 64") and the second was a gamma, caliper and neutron log. Copies of these logs are contained in the pocket at the back of this report. A review of this second set of open-hole geophysical logs showed that there was a variation in the gamma log signature between that recorded after drilling the 8¾-inch borehole that recorded on the lower open-hole section of the well. Based on the results from the January 5, 2013 geophysical logs, the top of the Madison is at a depth of 2,114 feet KB and not 2,094 feet KB as indicated by the first set of logs. There is also a thick section of shale present in the upper Madison from approximately 2,136 feet KB to 2,176 feet KB. The following is taken from a Wester-Wetstein & Associates, memorandum dated February 11, 2013 prepared to describe the methodology in determining the placement of the 7-inch casing.

We have prepared this memorandum to better describe our reasoning for the placement of the casing and the subsequent problems due to the exposed shale section in the lower portion of the well. With an open-hole completion, the ideal design is to penetrate the target aquifer, in this case the Madison Formation, approximately 10 to 15 feet so that a good geophysical log signature can be recorded and yet a significant portion of the potentially productive aquifer is not sealed off behind casing. In a flowing well condition, this becomes a little more critical in that if you penetrate too far into the formation and it begins to flow an excessive amount there is the potential to lose the rig due to saturation of the ground around the rig. The surface casing is designed to prevent this, but it is possible for the formations to be configured such that the flow is able to circumvent the surface casing and saturate the surrounding ground.

Because the Minnelusa/Madison contact is a noncomformable contact (the Madison Formation was exposed and being eroded when the Minnelusa was being deposited) the thickness of both the Minnelusa and Madison Formations will vary from location to location. Based on thicknesses from the O'Brian well and a cross-section developed from the surface geology in the area, we had an estimated depth to the top of the formations. The projected geologic tops were all within 30 feet of the encountered formation tops in the South Madison Well and so when we reached near the depth of the projected depth of the top of the Madison Formation we stopped drilling and circulated a sample up from the bottom of the well to review the cuttings at this depth. These circulation samples started at 2,010 feet. We then drilled five to ten foot intervals and circulated up another sample. This procedure was repeated from 2,010 feet to 2,107 feet. Although the sample descriptions for the lower section of the upper borehole still contained some sandstone and shale cuttings (descriptions on following page), there was enough buff colored limestone cuttings present to indicate that we were drilling a limestone section. The shale and sandstone was estimated to be residual cuttings remaining in the borehole from a shallower section.

2,086 Circ. Sample Mostly red to maroonish red, soft to mod. hard shale w/ ≈ 5% yellowish brown shale A.A. w/ trace of chert (pink) and buff to lt. greenish gray shale (non-calc.) w/ minor amount of red SS as above.

2,097 Circ. Sample Red to maroon variegated shale w/ yellowish brown and green shales w/ gray to drk gray sltly fissile soft shale w/ brown to lt. tan aphanitic L.S. w/ soft red clay.

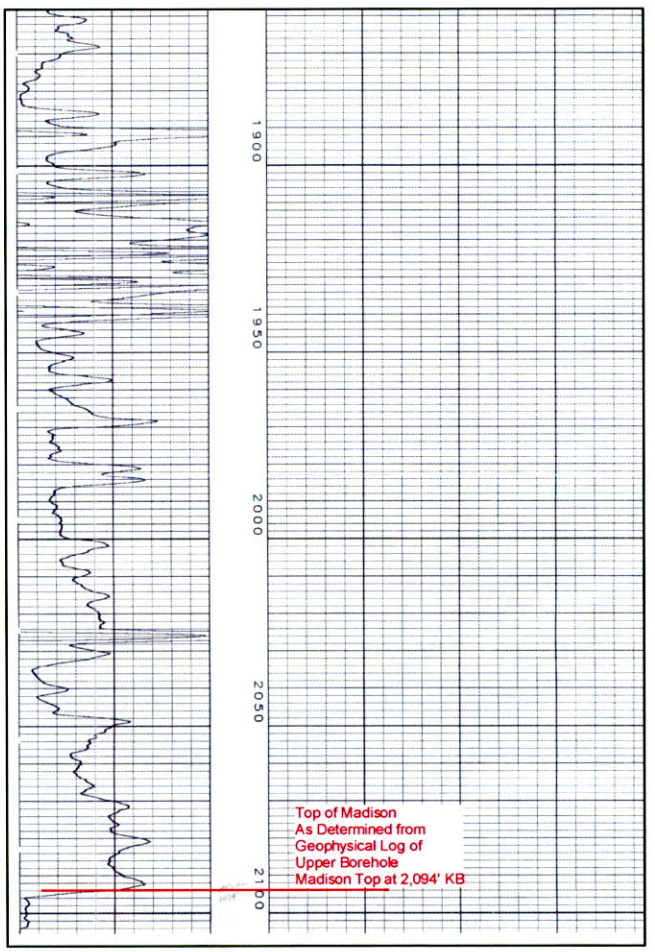
2,107 Circ. Sample White, mod. indurated, v. fine, round grained sandstone w/ some very light green SS w/ shales & limestone as above.

At the 2,107 foot depth we decided to terminate the drilling and run the geophysical logs to verify the lithology. Our original projected depth for the top of the Madison was approximately 2,030 feet, therefore, at the 2,107 foot depth, the depth would be approximately 80 feet deeper than our original projected Madison top depth.

Adjacent is a figure of the gamma ray log for the upper section of the borehole. The sharp kick to the left on the gamma ray trace is a typical limestone signature. At this point we felt that we had stopped drilling approximately 13 feet into the Madison (estimated top of Madison at 2,094 feet KB).

After drilling out the cement left inside the casing (after cementing the 7-inch casing in place) the initial 30 feet of cuttings were predominantly limestone and shale. The shale at this point was not too concerning because the upper portion of the Madison typically has shale in erosional voids in the limestone matrix. The description of the upper 30 feet of open-hole section of the well from 2,100 feet to 2,130 feet is as follows: Lt. tan to white, aphanitic to v. fine textured LS w/red, silty shale.

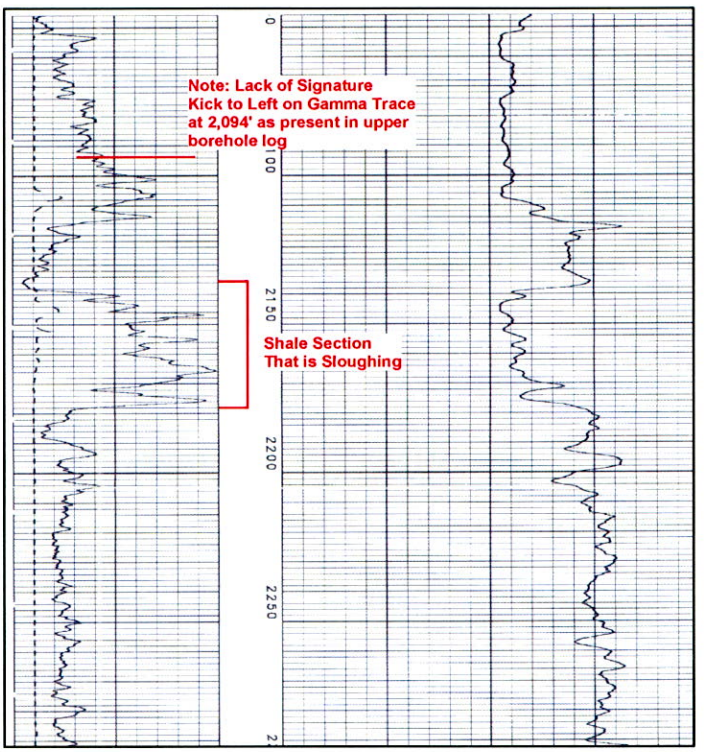
The thickness of shale present below a depth of 2,130 feet, however, was not anticipated. The figure on the following page is the geophysical log from the lower section (open-hole section) of the well. As shown in this log, the gamma ray trace does not display the sharp kick to the left as is present in the upper log shown on this page.



Gamma Ray Log – Upper Borehole

The geophysical logging subcontractor was having trouble with his recording instruments when the upper borehole was logged (prior to setting casing), but after swapping out a bad instrument panel he indicated that the instrument was logging correctly. The reason for the difference between the two logs is at this point still unknown. But as you can see, if the

geophysical log signature in the lower borehole log would have been recorded during the logging of the upper borehole, there would have been no indication that the top of the Madison had been encountered at the 2,094 foot depth as was indicated in upper geophysical log and we would have continued to drill. Although, based upon the 30 foot section of limestone from 2,108 feet to 2,138 feet, it is likely that we still would have left the shale section exposed as we probably would have stopped drilling somewhere in that 30 foot section of limestone; again, trying to save as much productive aquifer as possible and negating the potential of having a large flowing well get away from us.



Geophysical Log – Lower Borehole

2.5 Well Development

Well development began on January 5, 2013 and consisted of only an air development program. After rigging down the geophysical logger, the contractor tripped in approximately 690 feet (21 joints) of 3½-inch drill pipe and began air development of the well. The well will discharge for approximately 3 minutes and then would require approximately 45 seconds to recover. Flow measured on a weir placed downstream of the driller's mud pits shows that when blowing the water rises to 0.5' on the weir (200 gpm) and then slowly falls off to 0.45' (154 gpm) when the well is recovering for an average flow of approximately 180 gpm. The discharged water was effectively clear after one hour of development. The water has a slight greenish tint to it. Air development efforts consisted of continuous lifting efforts where the well would discharge water (blow) for approximately 1½-minutes and then would require a recovery time of 45 seconds and also surging efforts where the water column was lifted to a point of unload and then the air supply was shut off allowing the column of water to fall back. The well was air developed for a total of eight hours from January 5 to January 6, 2013. At the end of these development efforts, the produced water was clean and clear with only two to six small shale chips present in the ½ gallon sample jar.

SECTION 3
Acid Stimulation

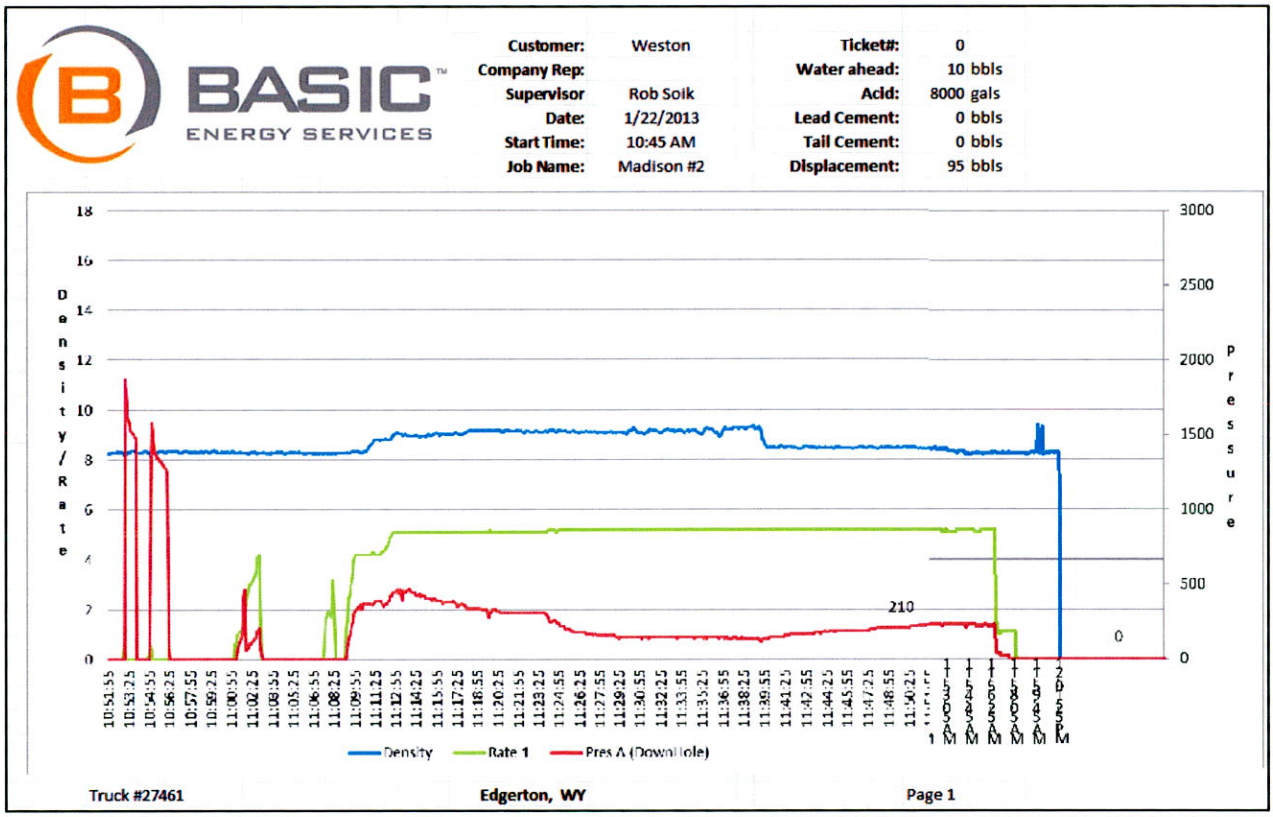
3.1 Acid Stimulation Procedure

The rate of discharge observed during the air development efforts indicated that the South Madison well would not be capable of producing the desired peak period demand of 500 gpm. Approval from the Fall River Water Users District and the funding agency (USDA Rural Development) was sought and approval granted to amend the contract with Weston Engineers to acid frack the well. On January 18, 2013 a packer was set at the bottom of the 7-inch casing and on January 22, 2013 the wellhead was rigged up for the acid stimulation procedure. Basic Services arrived on site on January 22, 2013 and pumped in 8,000 gallons of 20% hydrochloric acid (HCL) with 10 barrels (bbls) of water placed ahead of the acid and 95 bbls of water pumped to displace the acid. The acid was pumped at a rate of 5 barrels per minute (BPM) with an initial pressure build-up to 470 psi. When the acid hit the Madison Formation the pressure dropped to 140 psi where it remained until the acid was displaced after which the pressure increased to 220 psi and the well was shut in. Figure 3-1 is a plot of the acid stimulation procedure as recorded by Basic Services. The well was left shut-in for 24 hours.

Acid Stimulation of South Madison Well, January 22, 2013

After 24 hours, the 10-inch valve was opened and the contractor began flowing back the displacement water and formation water/acid to the mud pits. The initial measured total dissolved solids were over 42,000 ppm. The discharged acid and formation water was blended with water from the Fall River Water Users District's water supply system to raise the pH and decrease the total dissolved solids (TDS) concentration prior to being released from the mud pits. After one day of flowing back the TDS of the discharged water had reduced to 5,000 ppm. The discharged acid/formation water was blended with FRWUD water during the initial two days of flow back at which time blending was discontinued and the well was allowed to flow back for an additional four days.

On January 28, 2013, the contractor released and retrieved the packer. Water was flowing from the well at a rate of approximately 210 gpm with a pH of 7.21 and a TDS of 960 ppm. The well was shut-in and allowed to recover prior to conducting the aquifer tests.



Acid Stimulation Plot – Fall River Water Users District South Madison Well. **FIGURE 3-1**

SECTION 4
Well Rehabilitation and Lining

4.1 Introduction

At the conclusion of the initial step test (discussed in Section 5 of this Report), the well was allowed to flow so that the wellhead would not freeze prior to the contractor installing the test pump and performing the remainder of the required well and aquifer tests. The initial step test was concluded on January 30, 2013 and on February 4, 2013 the operator for the Fall River Water Users District noticed that the well was only producing approximately 20 gpm (down from 210 gpm) and that the discharged water was a dark red color. The flow meter was removed and it was noted that the meter was not plugged; therefore, it was determined that there was a downhole obstruction causing the reduced flow and reddish discharge. The remainder of this section describes the work to rehabilitate the well and the placement of a steel liner to prevent an obstruction of the well from reoccurring.

4.2 Rehabilitaiton

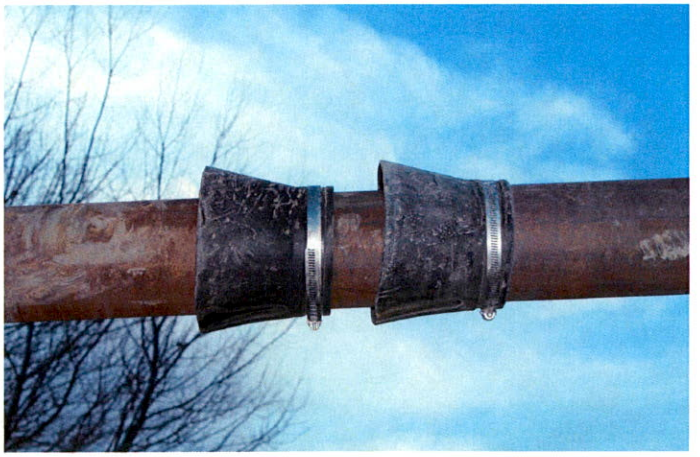
Rehabilitation efforts were conducted using the drilling rig which had not been rigged down or moved from the well site. On February 5, 2013 the contractor ran 3½-inch drill pipe with a 6¼-inch drill bit into the well down to a depth of 2,138 feet where they encountered an obstruction. Based on the color of the discharged water (red) it was surmised that a section of a thick shale section had sloughed off into and was plugging the well. The depth of the obstruction, 2,138 feet KB verified this assumption as the geophysical logs and drill cutting logs verified that a thick shale section is located at a depth from 2,136 feet KB to 2,176 feet KB.

The contractor initially tried to clear the obstruction using air, however, this was unsuccessful. The mud pump was next connected to the drill pipe assembly and the contractor began circulating and reaming to clear the obstruction. The obstruction, an approximately 3 foot thick shale plug, was cleared by a depth of 2,148 feet. The contractor continued to circulate and clear the borehole to the total depth of the well. The contractor cleared a considerable amount of limestone debris from the lower section of the borehole. At the conclusion of these efforts, the well had recovered and was flowing over 200 gpm. The well was left flowing from February 7, 2013 to February 11, 2013.

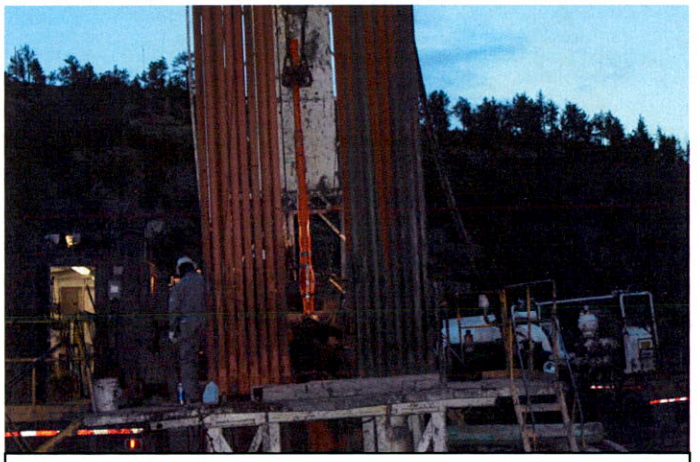
4.3 Lining

On February 12, 2013 an attempt was made to downhole video the well in order to determine a gauge section of the borehole where a shale basket could be placed to seal the lower section of the steel liner. Prior to running the video survey the contractor tripped back to the bottom of the well without encountering any obstructions. They found three feet of fill on the bottom of the well. The downhole video survey was unsuccessful. The camera could only be lowered to a depth of 2,138 feet where it would lay over on its side on a ledge just above the shale section.

In order to determine the gauge hole depth, Goodwell, Inc. from Upton, Wyoming was mobilized back to the site to run a caliper log on the open hole section of the borehole. This survey was performed on February 13, 2013. The caliper log was reviewed in the field and from this log a section of the borehole where there was a sufficient length of borehole at or near gauge diameter was selected for the placement of the shale baskets to seal the bottom of the liner. After completing the caliper log, Goodwell was rigged down and the contractor prepared to run in 100 feet of 4½-inch steel casing. Turntec, from Casper, Wyoming arrived on site with the liner hanger (HANGER--EH-L--5.000" 18# P-110 x 7.000" 23# Mechanical Single Cone Liner Hanger--8-Rnd LT&C Pin Down) with a cross-over fitting to go from the 5-inch hanger to the 4½-inch 10.5 lb N-80 steel liner (Crossover--5.000" 18# LT&C Box x 4.500" 10.5# LT&C Pin). The contractor picked up a 5-inch by 7-inch setting adapter, the liner-hanger, the cross-over fitting and 100 feet of 4½-inch, 10.5 lb, N-80 steel liner with two shale baskets and one centralizer located near the lower section of the liner and lowered this assembly into the well. The liner-hanger was set at a depth of 2,090 feet inside of the 7-inch casing and the bottom of the liner with the two shale baskets was set at a depth of 2,196 feet, KB. One shale basket is set at 2,193 feet, the centralizer is at 2,191 feet and the second shale basket is at 2,188 feet KB. The liner with the shale baskets extends approximately 20 feet below the bottom of the thick shale section.



Shale Baskets on Bottom of 4½-inch Steel Liner



Installing Liner-Hanger in the Well

The liner was placed on February 13, 2013. Immediately after setting the liner the well was still flowing a red color (Figure 4-1), however, after one day of flowing the well was flowing clear water (Figure 4-2).

Construction of the South Madison Well is summarized in Table 4-1, and an as-built diagram of the well is shown in Figure 4-3. Several Appendices provide additional information as well. Appendix B is a detailed well history, Appendix C shows penetration rates throughout the stratigraphic sequence, Appendix D is a bit record and deviation record, and Appendix E is a lithologic description of the material encountered.

FIGURE 4-1

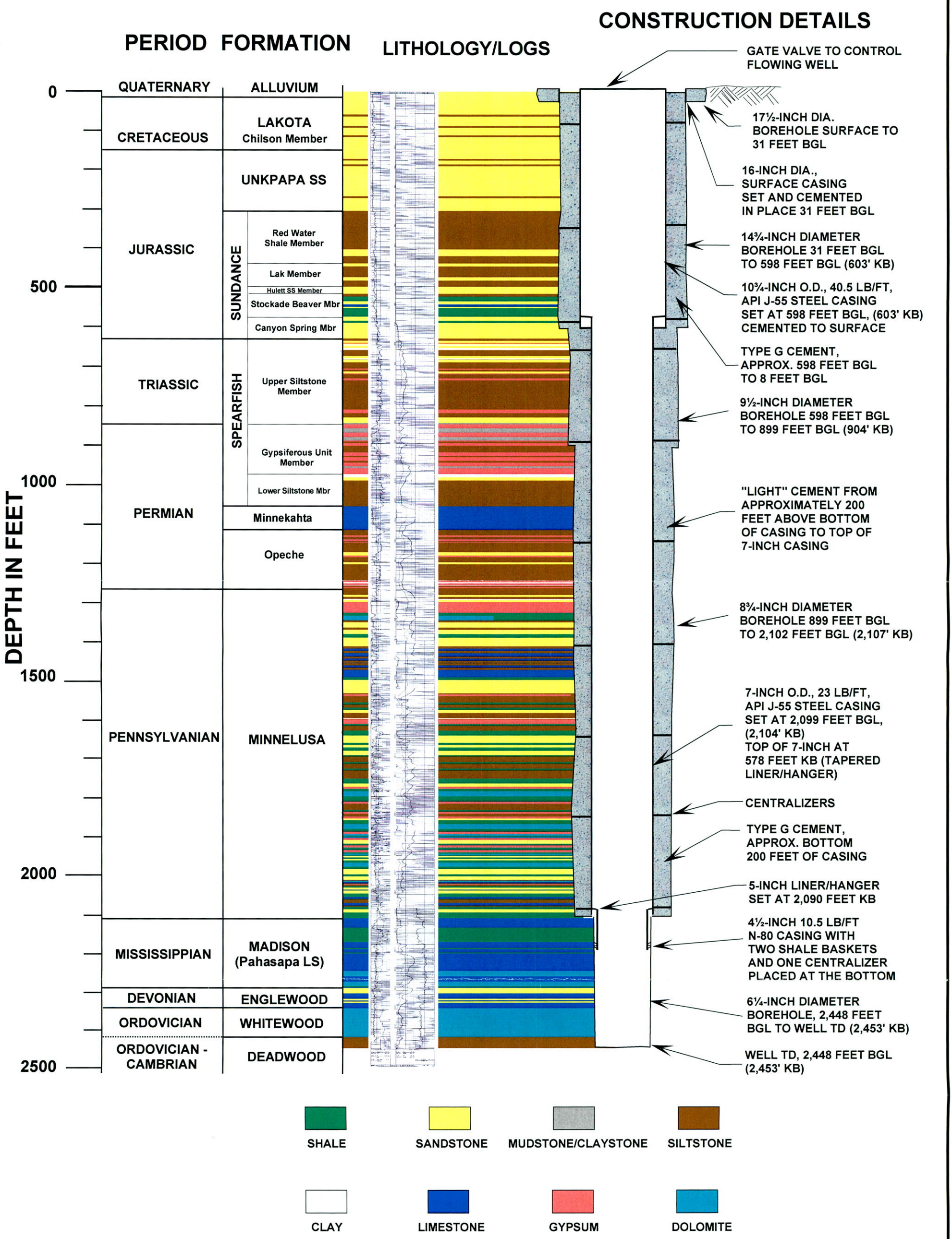
FIGURE 4-2

TABLE 4-1

South Madison Well Summary

Owner:	Fall River Water Users District
DNR Permit Number:	2629-2
Location:	Lot 2 Eagle Rock Subd., SE¼, SW¼, Section 29, T7S, R6E
Surface Elevation:	3,310 feet MSL
Total Depth:	2,448 feet BGL
Formations Tops (GL):	Surface Alluvium 20' Chilson Member, Lakota Fm 149' Unkpapa Sandstone 305' Redwater Member, Sundance Fm. 439' Lak Member, Sundance Fm. 496' Hulett Sandstone Member, Sundance Fm. 515' Stockade Beaver Member, Sundance Fm. 575' Canyon Spring Member, Sundance Fm. 629' Spearfish Fm. 1,057' Minnekahta Fm. 1,115' Opeche Fm. 1,265' Minnelusa Fm. 2,109' Madison (Pahasapa LS) 2,291' Englewood Fm. 2,345' Whitewood Fm. 2,417' Deadwood Fm.
Hole Diameter (GL):	0 - 31 ft = 17½-inch 31 - 598 ft = 14¾-inch 598 - 899 ft = 9½-inch 899 – 2,102 ft = 8¾-inch 2,102 – 2,448 ft = 6¼-inch
Casing (GL):	0 - 31 ft = 16-inch O.D. 65 lb/ft, API J-55 steel +2 – 598 ft = 10¾-inch O.D. 40.5 lb/ft, API J-55 steel 578 – 2,099 ft = 7-inch O.D. 23 lb/ft, API J-55 steel casing 2,090 - 2,196 = 4½-inch O.D. 10.5 lb/ft, N-80 steel casing
Drilling and Completion Dates:	November 12, 2012 to January 4, 2013
Testing Dates:	January 30, 2013 February 25 – 28, 2013
Drilling Contractor:	Weston Engineering, Wyoming Equipment: Failing 2500A
Cementing Contractor:	Basic Services, Gillette, Wyoming
Geophysical Logging Contractor:	Goodwell, Inc. - Upton, Wyoming
Acid Stimulation Contractor:	Basic Services, Gillette, Wyoming

WELL NAME:	FALL RIVER DISTRICT MADISON WELL	OWNER:	FALL RIVER DISTRICT
ELEVATION (FEET MSL):	Approx. 3,320 Feet	PERMIT NO:	
LOCATION:	SE1/4, SW1/4, Sec. 5, T50N, R66W	TOTAL DEPTH:	2,448 FEET (BGL)



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FALL RIVER WATER USER'S DISTRICT

SOUTH MADISON WELL AS-BUILT DIAGRAM FIGURE 4-3

SECTION 5
Well and Aquifer Testing

5.1 Introduction

The first aquifer test was a step test which was performed by allowing the well to flow at discharge rates of 50, 100, 150 and 200 gallons per minute. This test was performed on January 30, 2013. The discharge rate was measured using a 2-inch propeller flow meter manufactured by Cameron with a digital read out display. Subsequent to conducting the second step test (pump installed) the shale section sloughed in and had to be cleared and the liner installed (Refer to Section 4 of this report). The second phase of the step test was conducted on February 25, 2013 with discharge rates of 300, 400 and 500 gpm. The well was allowed to recover for several days and then a 24-hour constant rate drawdown test was conducted on February 27 – 28, 2013. Each of these tests is described in more detail below and the test data are contained in Appendix G.

5.2 Step Tests

Two step tests were conducted on the South Madison Well in order to estimate the efficiency of the well and to determine a sustainable discharge for the constant rate test to follow. The well was flowed at successivley stepped up rates, 50 gpm, 100 gpm, 150 gpm and 200 gpm for a duration of 30 minutes at each step. The flow was measured using a two-inch propeller flowmeter manufactured by Cameron with a remote digital readout panel. Drawdown was recorded using a pressure gage attached to a ½-inch port tapped into the side of the 10¾-inch steel casing. The initial shut-in pressure at the start of the test was 75 psi. A plot of the drawdown data recorded during this step test is shown in Figure 5-1. As can be seen from the plot, the drawdown had stabilized within the 30 minute steps during the first two steps but it was still slightly increasing in the final two steps. The length of the steps were required to be a little longer in duration to allow the stabilization of the drawdown in the well at these two higher rates of discharge.

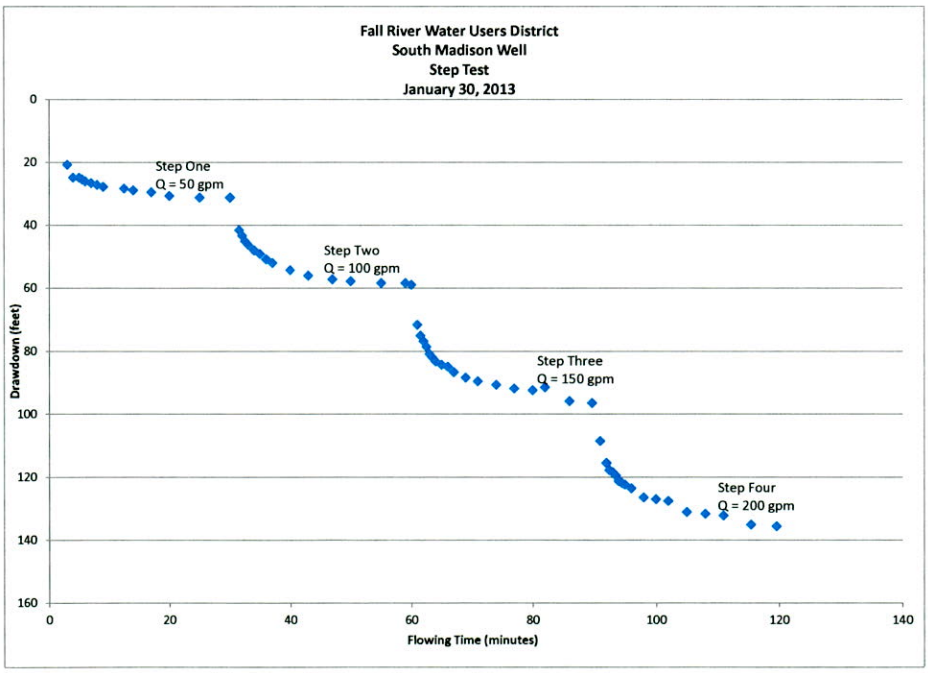

FIGURE 5-1

The second phase of step testing was conducted on

February 25, 2013. This test was conducted at stepped discharge rates of 300, 400 and 500 gpm. In order to achieve these production rates, the contractor installed a Berkley 7T-450 submersible pump with a Franklin 100 Hp motor. The pump was set at a depth of 530 feet using 4½-inch drill pipe. Two airlines were attached to the drill pipe and were terminated at the top of the pump assembly at a depth of 523 feet. Drawdown was measured using the airline and pressure gage and the discharge was measured using a 6" x 5" orifice weir. The first two steps (300 and 400 gpm) were run for 35 and 45 minutes, respectively. The final step (500 gpm) was run for just over 5 hours. Based on the results of the step tests, it was determined that the constant rate drawdown test could be conducted at a discharge rate of 500 gpm. The final step of the step test was conducted for the longer period of time to get a more accurate projection of the anticipated pumping level during the constant rate test. A plot of the drawdown date recorded during this second step test is shown in Figure 5-2.

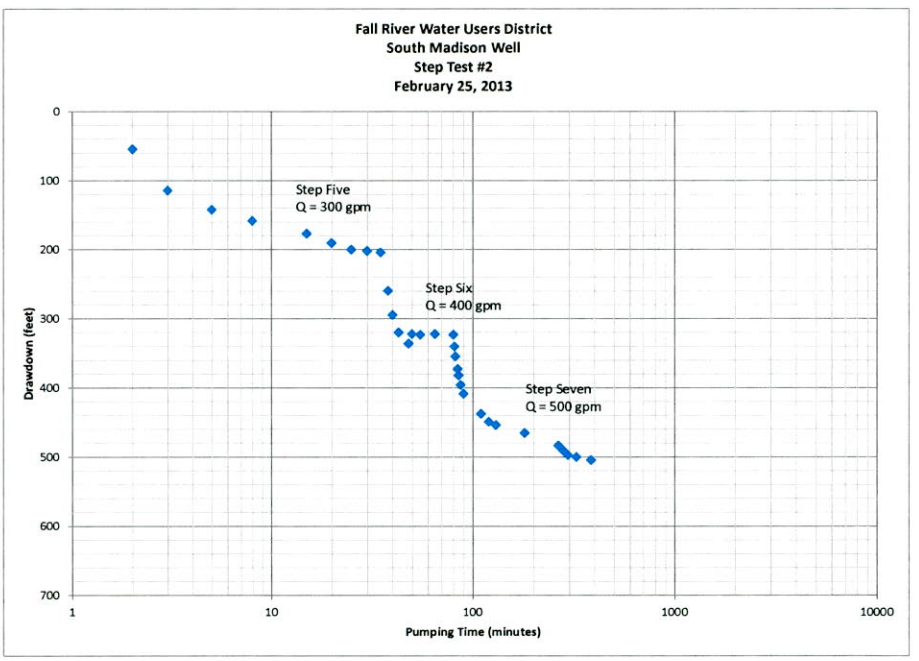

FIGURE 5-2

The specific capacities of the well at these rates were then calculated and are shown in Table 5-1. Specific capacity is simply the discharge per unit drawdown in a well at a given flow rate over a given duration. As can be seen in Table 5-1, the specific capacity of the FRWUD South Madison well was fairly consistent with a specific capacity of approximately 1.5 to 1.7 gallons per minute per foot of drawdown from 50 gpm to 300 gpm. As the discharge rate increased over the last two steps there was a noticeable decrease in the specific capacity. This is a result of an increase in both laminar and turbulent head loss as the flow rate is increased. This decline in specific capacity is graphically illustrated in Figure 5-3. In this plot the discharge is plotted versus the drawdown at each of the steps tested, and the resultant curve is compared to a line with a slope of one - this line representing a well with 100% efficiency. As the chart demonstrates, the South Madison Well, at discharge rates of greater than 400 gpm operates below maximum efficiency. This inefficiency is a result of the head loss introduced by the water traveling through the small fractures and fissures in the formation to the well bore. In an open-hole completion such as the South Madison Well, this inefficiency is not a function of well design, but is inherent to the flow of water through the formation

TABLE 5-1
Fall River Water Users District – South Madison Well
Specific Capacities

Discharge (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)
50	31.2	1.6
100	58.9	1.7
150	96.4	1.56
200	135.7	1.47
300	202.1	1.48
400	322.2	1.24
500	437.8	1.14

From the step test data, it was determined that the constant rate test could be performed with a discharge rate of 500 gpm and still have adequate water above the pump intake at the end of the test period. The second phase of the step test was concluded on February 25, 2013. The constant rate test was conducted on February 27 and 28, 2013. In order to prevent the wellhead from freezing, after a short recovery period of 26 minutes, the well was allowed to flow approximately 5 to 20 gpm into the mud pit at the conclusion of the step test on February 25, 2013. The well was shut in for several hours just before the initiation of the long-term constant rate test.

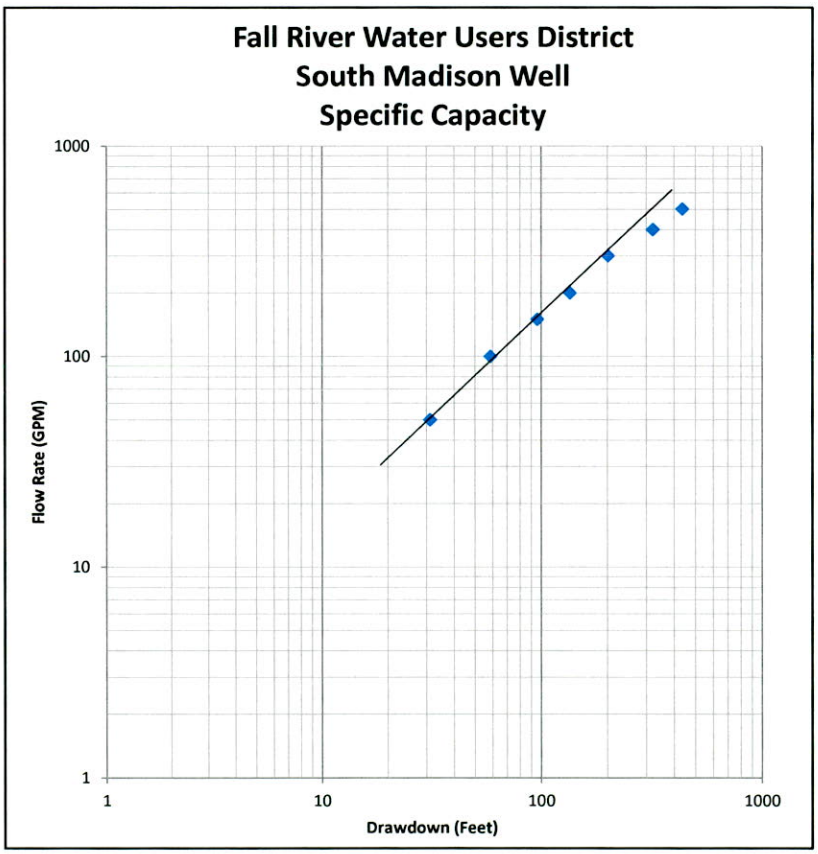

FIGURE 5-3

5.3 Constant-Rate Drawdown Test

Discharge during the constant rate test was maintained at 500 gpm. The same pumping equipment and monitoring equipment used during the second phase of the step test was used to conduct and monitor the constant rate test. This equipment included the Berkley 7T-450 submersible pump with 100 Hp motor set at a depth of 530 feet using 4½-inch drill pipe with two airlines set to a depth of 523 feet. The pumping level/drawdown was monitored using the airlines with oxygen bottles, regulator and a pressure gauge. The flow rate was measured using the 6" x 5" orifice weir. Figure 5-4 is a semi-logarithmic plot of

the drawdown data. Using the Jacob and Lohman (1952) method of analysis, a transmissivity value of 3,770 gpd/ft was calculated from the constant rate drawdown test. At approximately 300 minutes into the test there is a noticeable decline in the measured water level. It was finally determined that the pressure was declining due to a decrease in the air temperature. The contractor had replaced the airline from the oxygen tank regulator to the pressure gage with a 30-foot section of hose. This hose allowed the sealed air to cool as it lay exposed on the ground to the point where there was a superimposed level of decline upon the decline in the water due to the pumping of the well. After it was determined that this was the cause for the increased drawdown, the pressure gage readings were only taken after first purging the airline with additional oxygen.

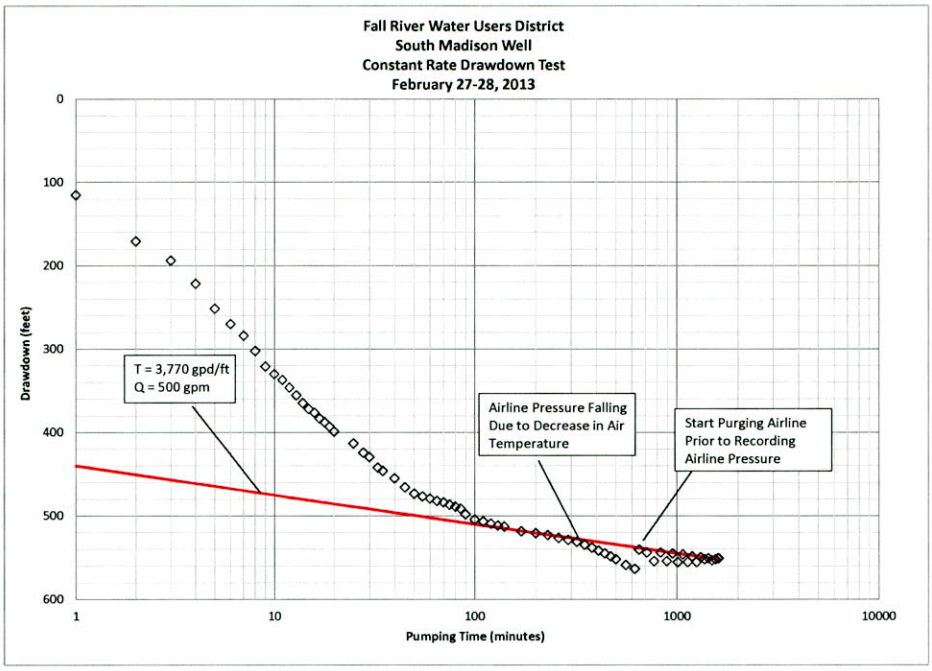

FIGURE 5-4

5.4 Constant Rate Recovery Test

Recovery data was collected for nearly 19 hours after the pumping was stopped. At the end of this time period the well had recovered to within 99% of its static water pressure. These data are listed in Appendix G and shown graphically in Figure 5-5. Theoretically the results should be very similar to the time-drawdown plot in the constant rate pumping test, however, the constant rate pumping test data is subject to small changes in pumping rates. The recovery data should show more accuracy because the residual drawdown measurements are not affected by slight changes in the pumping rate. The residual drawdown is plotted against time since pumping started (t) divided by time since pumping stopped (t'). With this type of plot the early recovery data is shown on the right side of the plot while latter data is shown on the left side of the plot. The recovery test data was plotted (Figure 5-5) and analyzed using the same method used in the pumping test analysis. The analysis indicated a transmissivity value of 4,475 gpd/ft, which is slightly higher than the transmissivity from the time vs. drawdown plot. The transmissivity calculated for the recovery data is probably more accurate due to the fact that the recovery data does not have the error induced by small pumping rate changes and would give a clearer representation of transmissivity values in the aquifer.

5.5 Summary

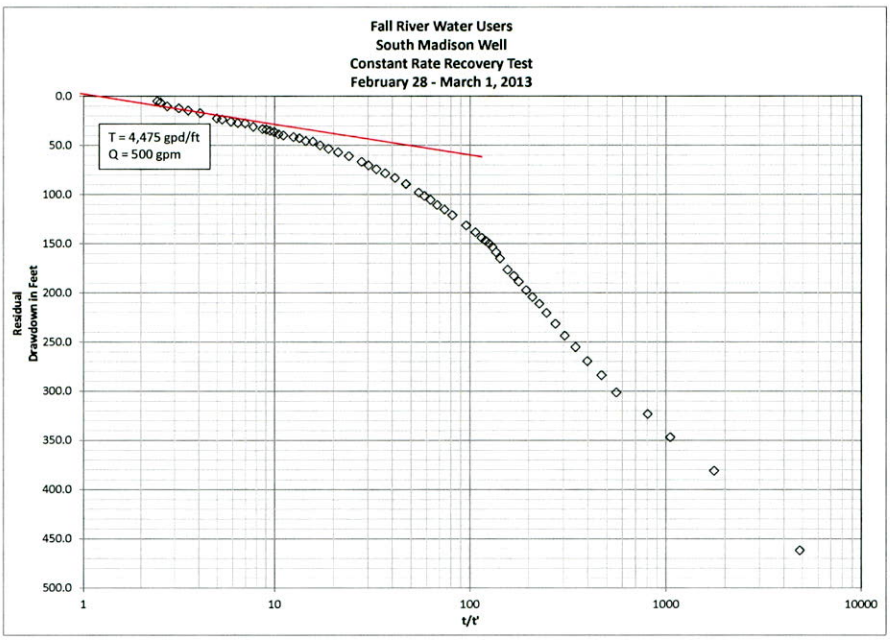

FIGURE 5-5

Based on the results of the constant rate drawdown and recovery tests performed, the South Madison Well will be capable of meeting the projected demands for the Fall River Water Users District. The apparent transmissivity in the South Madison Well area is approximately 4,000 gpd/ft. At the drawdown rate shown in Figure 5-4, the South Madison Well could pump continuously at 500 gpm for the entire peak demand period without exhausting the available drawdown in the well. The available drawdown is the liner/hanger depth of 578 feet below ground level plus the shut-in pressure of the well (approximately 79 psi or 182.5 feet) for a total available drawdown of 760.5 feet.

SECTION 6
Water Quality

6.1 Water Quality

A water sample was taken near the conclusion of the long term constant drawdown test and submitted to an EPA-certified laboratory for analysis. The result of this analysis is compared to EPA primary and secondary drinking water standards in Table 6-1. In addition, the temperature, conductivity and pH of the water were monitored throughout each of the aquifer tests performed. The laboratory analyses are presented in Appendix F.

As shown in Table 6-1, the quality of the water from the South Madison Well is very good. The water is very hard (hard water has a hardness between 150 and 300 mg/l $CaCO_3$ – the South Madison Well has a hardness of 325 mg/l as $CaCO_3$). The water is within all the primary and secondary EPA standards with the exception of the Total Dissolved Solids (TDS) which is just slight over the Secondary Drinking Water Standard of 500 mg/l at 556 mg/l. The lab analysis also shows that the tests for total coliform and e-coli coliform were negative.

Temperature, conductivity and pH were monitored during the long term constant drawdown test. These data are tabulated in Appendix G. The water temperature remained fairly constant at 30°C (86°F) throughout the constant rate test. The conductivity and the pH of the discharged water remains fairly constant over the length of aquifer test. The pH ranged from 7.3 to 7.84 while the conductivity ranged from 975 to 905 micromhos per centimeter. The field recorded conductivity and pH values are in close agreement with the laboratory results (pH of 7.8 and conductivity of 902 micromhos/cm).

TABLE 6-1

Water Samples Comparison with EPA Drinking Water Standards
South Madison Well

Parameters (mg/l except or as noted)	EPA Maximum Contaminant Level	South Madison Well 2/28/13
Primary EPA Parameters		
Regulated VOC's	Various	ND
Synthetic Organic Chemicals	Various	ND
Pesticides/Herbicides	Various	ND
Antimony	0.006	ND
Asbestos	*	NA
Arsenic	0.01	0.006
Barium	2.00	ND
Beryllium	0.004	ND
Cadmium	0.005	ND
Chromium	0.10	ND
Copper	1.30[a]	ND
Cyanide	0.20	ND
Fluoride	4.00	0.7
Lead	0.015[a]	ND
Mercury	0.002	ND
Nickel	0.10	ND
Nitrite (as N)	10.00	ND
Nitrate + Nitrite (as N)	10.00	0.3
Selenium	0.05	0.005
Thallium	0.002	ND
Radionuclides		
Uranium	0.03	NA
Radium 226, pCi/l	5.0[b]	1.3
Radium 228, pCi/l	--[b]	-0.09
Gross alpha, pCi/l	15.00	16.9

Parameters (mg/l except or as noted)	EPA Maximum Contaminant Level	South Madison Well 2/28/13
Gross beta, pCi/l	--[b]	3.3
Radon pCi/l	NS	NA
--		
Secondary EPA Parameters		
Acidity (mg/l as $CaCO_3$)	NS	ND
Alkalinity (mg/l as $CaCO_3$)	NS	210
Bicarbonate	NS	256
Boron	NS	0.2
Calcium	NS	77
Carbonate	NS	ND
Chloride	250.00	99
Color (color units)	15	ND
Conductivity (µmhos/cm @ 25°C)	NS	902
Corrosivity (Langlier Index)	0	0.53
Foaming Agents	0.5	NA
Hardness as $CaCO_3$	NS	325
Iron	0.30	0.2
Manganese	0.05	ND
Magnesium	NS	32
Odor	3 TON	NOO
pH (units)	6.5-8.5	7.8
Potassium	NS	7
Sodium	250.00	59
Fluoride	2.00	0.7
Sulfate	250.00	142
Temperature (°F)	NS	NA
Total Dissolved Solids	500.00	556
Silica	NS	16.1

Parameters (mg/l except or as noted)	EPA Maximum Contaminant Level	South Madison Well 2/28/13
Silver	0.10	ND
Zinc	5.00	ND
Turbidity (NTU)	<5.0	1.1
Microbiological		
Total Coliforms	**	Absent
E-Coli Coliforms	NS	Absent
Iron Bacteria (CFU/ml)	NS	500
Bacteria – Sulfate Reducing	NS	NA

* 7 million fibers/liter longer than 10 μmeter

[a] Action Level MCL - Sample with contaminant in greater quantity than this as measured in the 90th percentile of all samples at the customer's tap will trigger treatment technique requirements to be implemented

[b] The regulation states that the total radium (radium 226 + radium 228) cannot exceed 5.0 pCi/L, alpha particle activity can not exceed 15 pCi/L and the uranium MCL is 0.03 mg/L. The MCL for beta activity is stated such that the beta activity cannot produce an annual dose to the total human body or to any internal organ greater than 4 millirem/year

** no more than one sample per month can test positive if fewer than 40 samples are analyzed per month - populations serving less than 1000 people require only one sample per month

NA Not Analyzed

ND Not Detected

NS No Standard

Fall River Water Users District
South Madison Well Report

Appendix A
References

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

APPENDIX A

REFERENCES

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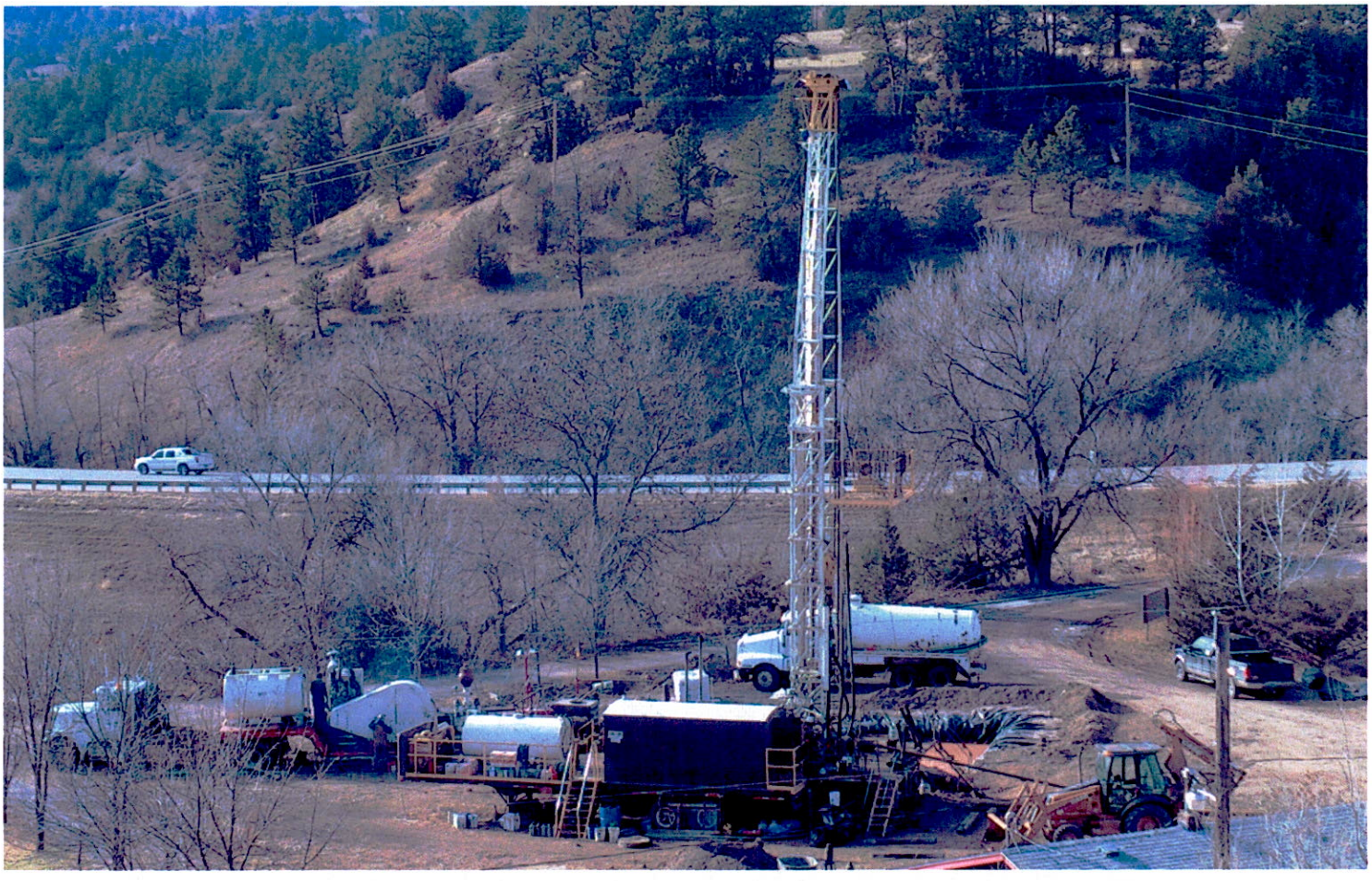
FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL REPORT



APPENDIX B
WELL HISTORY

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

APPENDIX B

WELL HISTORY
FALL RIVER SOUTH MADISON GROUNDWATER PROJECT
(Fall River Paleozoic Well)

Contractor:	Weston Engineering P.O. Box 260 Upton, WY 82730
Drill Rig:	Failing 2500A Mud Pumps – Emsco D375 Duplex Pumps (7¼ x 14) Drill Pipe 4½-inch, 16.6 lb/ft Drill Collars 6-inch KB is 5 feet above ground level
November 12, 2012	Contractor mobilized to sight and began rigging up digging mud pits.
November 13, 2012	Continued mobilizing to project site and digging mud pits.
November 14, 2012	Began filling mud pits. Having trouble maintaining fluid in pits. The pit is dug into a porous sediment which is taking on the reserve pit water.
November 15, 2012	The contractor lined the mud pits with an HDPE liner, refilled the pits and rigged up to begin drilling the 17½-inch diameter borehole for the surface casing.
November 16, 2012	Contractor (Weston Engineering) drilled a 17½-inch diameter borehole from the surface to a depth of 31 feet below ground level (bgl). At this point they were through the surface alluvium which was approximately 25 feet thick and drilling into a very hard consolidated formation. It was decided to discontinue drilling the 17½-inch diameter borehole at this depth and set and cement in place the 16-inch diameter surface casing. Sixty (60) feet of surface casing was set and cemented in place.
November 17-18, 2012	Waiting on cement (W.O.C.) seal of surface casing to set.
November 19, 2012	Contractor cut off extra footage of surface casing (28 feet so that 32 feet was set in place), nippled-up wellhead discharge piping and picked up bottom hole assembly, drilled out cement

	plug and began drilling 14¾-inch diameter borehole from 31 feet to 70 feet KB. Drilling is very hard.
November 20, 2012	Continued drilling 14¾-inch diameter borehole from 70 to 101 feet KB. Drilling in very hard sandstone.
November 21, 2012	Continued drilling 14¾-inch diameter borehole from 101 to 114 feet KB. Drilled until about 2:00 P.M. and then shut down for the Thanksgiving Holiday.
November 21-25, 2012	Shutdown for Thanksgiving Holiday.
November 26, 2012	Contractor returned to site after the holiday. Tripped out of the hole to change the bottom hole assembly – exchanged the worn 14¾-inch bit for a smaller, 8¾-inch diameter bit and continued drilling from 114 to 210 feet KB.
November 27, 2012	Continued drilling 8¾-inch borehole from 210 to 407 feet KB.
November 28, 2012	Drilled 8¾-inch borehole from 407 to 469 feet KB. Trip out 8¾-inch bottom hole assembly and pick up 14¾-inch bottom hole assembly and begin reaming the 8¾-inch borehole to a 14¾-inch diameter. Reamed borehole from 114 to 181 feet KB.
November 29, 2012	Continued reaming 8¾-inch borehole to a 14¾-inch diameter borehole from 181 to 319 feet KB.
November 30, 2012	Continued reaming 8¾-inch borehole from 319 to 454feet KB and then shut down drilling operations for the weekend.
December 3, 2012	Continued reaming 8¾-inch borehole from 454 to 469 feet KB, then drilled 14¾-inch diameter borehole from 469 feet to 516 feet KB.
December 4, 2012	Continued drilling 14¾-inch diameter borehole from 516 to 603 feet KB. Trip out and stand drill pipe and lay down 14¾-inch diameter drill bit, bit sub and stabilizer. Pick up and run in 605 feet of 10¾-inch diameter, 40 lb/ft steel thread and couple casing.
December 5, 2012	Continued running in 10¾-inch diameter steel casing. Set casing at a depth of 603 feet KB. Mobilize cementing subcontractor to site. Rig up cementers (*Basic Services*) and cement 10¾-inch diameter steel casing in the well. Good returns during the cementing run but no show of cement

returning to surface. The cement column pressure at the end of the cementing run was 300 psi, therefore the top of the cement should be close to the surface. Shut down and wait on cement.

December 6, 2012 — Rig down cementing head and cut off 16-inch surface casing. Tag top of cement at 32 feet bgl and mixed 40 sacks of cement and tremmied the cement to 8 feet bgl. Nippled up 9½-inch bit, tagged cement at 590 feet KB and drilled out cement and the float shoe to a depth of 603 feet KB.

December 7, 2012 — Continued to drill 9½-inch borehole from 603 to 790 feet KB. Driller indicated that it feels and acts like they are pushing a chunk of the aluminum float shoe in front of the bit and this is slowing down the drilling. A survey was run at a depth of 585 feet KB and was found to have a deviation of 1°. Tripped out of the hole and shut down for the weekend.

December 10, 2012 — Contractor returned to the well location, thawed out and started up the equipment. Tripped the same bit into the casing and tripped in to the bottom of the 10¾-inch casing. Kellyed up to start circulating and, if necessary, ream the borehole down to the bottom depth of 790 feet KB, however, the mud pump was froze up and this had to be thawed out before they could continue tripping into the borehole. Before tripping in past the casing depth, the Contractor mixed mud (35 sacks of bentonite) to bring the viscosity of the drilling fluid up between 32 and 34. After conditioning the drilling mud, the Contractor continued to drill the 9½-inch borehole from 790 feet to 844 feet KB.

December 11, 2012 — Due to slow penetration rates, it was decided to trip out the long tooth rock bit and replace it with a 9½-inch button bit. After tripping out and replacing the bit, the drilling fluid was conditioned by adding more bentonite mud to bring the viscosity back to between 32 and 34. The Contractor then tripped back into the borehole with the re-conditioned button bit (no problems tripping in or out) and continued to drill the 9½-inch diameter borehole from 844 feet to 904 feet KB. The gypsum beds in the Spearfish Formation are drilling very choppy.

December 12, 2012 — Again due to slow penetration rates, the Contractor tripped out of the borehole after reaching the depth of 904 feet KB and replaced the 9½-inch button bit with an 8¾-inch diameter re-conditioned button bit. Trip back into the borehole and continue

to drill an 8¾-inch diameter borehole from 904 feet to 1,020 feet KB. A deviation survey was ran at 895 feet KB which indicated the deviation of the well at this depth was 1½°. It was noted by the night tower crew that the well was making a little bit of water, filled the mud pits by 2 inches in a 5 hour period.

December 13, 2012 — Continue drilling 8¾-inch borehole from 1,020 feet to 1,076 feet KB. Driller is having trouble with the bit and thinks that it might need to be replaced. Trip out of the borehole to look at the bit. The driller wants to replace the bit but there are no additional 8¾-inch bits on site. Shut down for 2 hours and wait on bits to arrive. Three additional button bits were brought to the site. Trip back into borehole with new re-conditioned 8¾-inch button bit and continue drilling 8¾-inch borehole from 1,076 feet to 1,104 feet KB.

December 14, 2012 — Continue drilling 8¾-inch borehole from 1,104 feet to 1,222 feet KB. Shut down for 20 minutes to work on the mud pump (hydraulic seal). After repairing the mud pump, continue drilling the 8¾-inch borehole from 1,222 feet to 1,296 feet KB. A deviation survey was conducted at a depth of 1,209 feet KB. The deviation of the well at 1,209 feet KB was ¾°. A drilling break was noted at 1,253 feet KB – possible top of Minnelusa Formation.

December 15, 2012 — Continue drilling 8¾-inch borehole from 1,296 feet to 1,450 feet KB.

December 16, 2012 — Continue drilling 8¾-inch borehole from 1,450 feet to 1,621 feet KB.

December 17, 2012 — Continue drilling 8¾-inch borehole from 1,621 feet to 1,736 feet KB. Trip out of borehole and change bits. After tripping out of borehole, change bits (replace with another re-conditioned 8¾-inch diameter button bit) and begin tripping back into borehole.

December 18, 2012 — Continue tripping into borehole with replaced bit. After tripping to bottom, continue drilling 8¾-inch borehole from 1,736 feet to 1,868 feet KB.

December 19, 2012 — Continue drilling 8¾-inch borehole from 1,868 feet to 2,047 feet KB. The motor on the shale-shaker had a short and so the cuttings are no longer being separated by the shale shaker and are now going directly into the mud pit. At a depth of 2,010 feet, the Contractor was informed to circulate up a "Bottoms

Up" sample as the top of the Madison was anticipated to be encountered near this depth. Drilling was advanced after the 2,010 foot depth by drilling 5 foot increments and then shutting down to circulate up a "Bottoms Up" sample. The Madison Formation top was not encountered.

December 20, 2012

Continue to drill in 5 foot increments and circulate up a "Bottoms Up" sample. Drill from 2,047 feet to 2,055 feet. The Madison was not encountered and the Contractor ran out of 4½-inch diameter drill pipe on location. Stop drilling and circulated on bottom while waiting for more drill pipe to be mobilized to the drill site. Circulate on bottom for approximately 4½ hours until three more joints of drill pipe arrive on site. Continue drilling from 2,055 feet to 2,086 feet in 10 foot increments, circulating up a "Bottoms Up" sample after each 10 foot increment. The driller encountered problems at a depth of approximately 2,070 feet where the bit is hanging up when it is being lowered or raised out of the borehole. The lower hole is also sloughing in and the connection at 2,086 feet could not be made due to the fill in the bottom. The Contractor attempted to remove the fill using polymer sweeps, but these were unsuccessful in removing the fill and preventing the borehole from continuing to slough-in. The Contractor stopped drilling at the 2,086 foot depth and started to mix bentonite and soda ash into the drilling fluid to condition the drilling fluid so that it would prevent the borehole from sloughing. The Contractor ran out of bentonite gel mix on site and had to drive to Gillette, Wyoming to retrieve additional bags of gel. With the drilling gel on site, the Contractor could only build a viscosity of about 30.

December 21, 2012

Continue to circulate on bottom. The delivery of bentonite gel arrived at approximately 1:00 A.M. and the contractor continued to mix the bentonite gel into the drilling fluid. Once a viscosity of 34 was attained they were able to clear and maintain the bottom of the borehole so the connection and 2,086 feet was made and the Contractor continued to drill the 8¾-inch diameter borehole from 2,086 feet to 2,097 feet KB. The top of the Madison Formation was thought to have been encountered at a depth of 2,094 feet KB so the Contractor was directed to drill to a depth of 2,107 feet KB to ensure that the borehole had penetrated the Madison and so that the formation top signature would be visible in the geophysical logs. After drilling to a depth of 2,107 feet KB, the Contractor circulated on bottom while waiting on the geophysical logger to arrive on site. Circulated on bottom from approximately 11:00 A.M. to

	12:35 P.M. and then started to trip out to run the geophysical logs. Logger on site at 3:00 P.M. and the Contractor finished tripping out of the borehole at 3:10 P.M. Rig up geophysical logging subcontractor's equipment and run the geophysical logs. Finish the logging runs at 9:15 P.M. The geophysical logging subcontractor (Goodwell out of Upton, Wyoming) had trouble with his equipment and had to restart the gamma ray logging tool back at bottom four times and could not run the neutron log. Rigged down the geophysical logger and began preparing to run the 7-inch, 23 lb/ft, J-55 steel casing. Cut the one joint of 7-inch casing and weld the cement float shoe to the steel casing and begin installing the 7-inch steel casing in the 9½- and 8¾-inch borehole.
December 22, 2012	Continue installing 7-inch steel casing. Land the 7-inch casing at a depth of approximately 2,104 feet KB (2,099 feet bgl) at 5:00 A.M. Cementers, (Basic Services) on site at 8:00 A.M. Rig up cementers and cement 7-inch casing in place. Turn drill pipe off of the 7-inch liner and circulate the top of the cement to surface. Returns of clabbered mud with streaks of cement visible but no pure cement was circulated to the surface. The volume of cement used was 30% excess over the volume calculated after reviewing the caliper log. Rig down cementers and shut down waiting on the cement to cure (WOC) and for the Christmas holiday.
December 23-26, 2012	WOC and holiday
December 27, 2012	Contractor returned to well site. Goodwell, Inc. mobilized to the site and ran the cement bond log. Logging tool would only go to 1,380 feet KB where it encountered cement in the casing. After rigging down the geophysical logger, the Contractor laid down the 4½-inch drill pipe and picked up 3½-inch drill pipe and bottom hole assembly with 6⅛-inch diameter long tooth rock bit and began drilling out the approximately 727 feet of cement fill in the lower section of the 7-inch casing.
December 28, 2012	Continue drilling out cement in 7-inch casing. Lower half of cement fill is very hard drilling. After the cement was drilled out, the Contractor tripped out to replace the long tooth rock bit with a 6⅛-inch diameter button bit.
December 29, 2012	Continue to trip in with button bit. Had to continually thaw breaks on the rig.

December 30, 2012	Begin drilling 6⅛-inch diameter borehole from 2,107 feet KB to 2,144. Drilling is slow due to freezing circulation lines. The mud pump had to be replaced due to a burned out clutch. The Contractor mobilized a replacement mud pump to the site.
December 31, 2012	Contractor continued drilling the 6⅛-inch diameter borehole from 2,144 feet KB to 2,189 feet KB. Due to the cold weather and the freezing equipment, the Contractor decided to shut down operations and wait on the weather to warm.
January 1 – 2, 2013	No work – Holiday and cold weather.
January 3, 2013	Contractor returned to the well location. Unthawed and started the equipment. Tripped back into the borehole from the bottom of the 7-inch casing to 2,189 feet KB and continued drilling 6⅛-inch diameter from 2,189 feet KB to 2,295 feet KB.
January 4, 2013	Contractor continued drilling the 6⅛-inch diameter borehole from 2,295 feet KB to 2,453 feet KB. Lithology typical of the Deadwood Formation was observed in the drill cuttings from this depth and drilling of the 6⅛-inch diameter borehole was terminated at this depth (Well TD – 2,453 feet KB, 2,448 feet bgl). Trip out of well – stand 3½-inch and 4½-inch drill pipe and lay down collars and bit assembly. Wait on geophysical loggers (Goodwell). Goodwell had to rewire tool head and could not be on site until January 5, 2013. Well is flowing at approximately 72 gpm (flow measured using V-Notch weir). The temperature of the water is 83° F with a conductivity of 1,000 µmho/cm and a pH of 7.5. The Contractor attempted to shut-in the well but they could not close the 10-inch valve (damaged during drilling or drill cuttings binding the gate).
January 5, 2013	Contractor started to lay down the drill pipe but only laid down about 10 joints before the geophysical loggers (Goodwell) showed up on site at 9:00 A.M. Rig up loggers and log the bottom of the borehole (open hole section). Two logging runs were made. The first was an SP and electric log (16" and 64") and the second was a gamma, caliper and neutron log. The logging runs were completed an 11:00 A.M. and their equipment rigged down and they were off site by 11:30 A.M. Trip in 21 joints of 3½-inch drill pipe and wait on compressor to arrive. Jerry Hunt delivered the compressor at 2:30 P.M. Unload and position compressor and nipple up air hose. Due to lack of air hose the kelly had to be nippled up to the 3½-inch drill pipe being used as eductor piping. Diesel engine on

compressor was difficult to start. Compressor started at 5:00 P.M. and begin air lifting from a depth of approximately 690 feet KB. Initial unload at 280 psi and blew for approximately 3 minutes. The well requires approximately 45 seconds to build back up and blow again. Never blows steady. Blows when build up to 150 psi and blows for approximately 1½-minutes and then builds up for 45 seconds and blows again at 150 psi for 1½ minutes. Flow measured on weir shows that when blowing the water rises to 0.5' on the weir (200 gpm) and then slowly falls off to 0.45' (154 gpm) when the well is recovering for an average flow of approximately 180 gpm. The water is effectively clear after 1 hour of development. The water has a slight greenish tint to it. Air develop steady until approximately 7:05 P.M. when the compressor diesel quit due to icing and plugging of the fuel filters. The filters were cleaned and re-installed and the compressor engine started again and air development continued from 7:15 P.M. to 7:39 P.M. when the fuel filters again plugged and the engine quit. Fuel filters were again cleaned and re-installed and the compressor again started and air development continued from 8:01 P.M. to 8:24 P.M. when the engine again quit due to the plugged fuel filters. Terminate air development for the day and wait on new fuel filters. Each time the well unloaded after these shut downs it would unload at 280 psi and blow for approximately 3 minutes. The well required approximately 12¼ minutes to recover and begin flowing when air development was stopped.

January 6, 2013

Contractor is waiting on delivery of fuel filters for compressor engine. While waiting they laid down all but 6 joints of the 3½-inch drill pipe and were loading up miscellaneous equipment onto their trailers and cleaning up the drill site area. The well which was left flowing over night was flowing at 47.5 gpm at 8:30 A.M. The temperature was 82.4° F; the conductivity was 975 µmho/cm and a pH of 7.49. Ron arrived on site with the replacement fuel filters at 10:30 A.M. These were installed and air development was started at 10:50 A.M. The well was unloaded at a pressure of 280 psi like yesterday and the air development conditions remained steady with a blow at 150 psi for 1½-minutes and a recovery time of 45 seconds. The well was surged by lifting the water column to a point of unload and then shutting off the air and letting the column fall back. This was done twice and then the well unloaded. This did dirty the water a little but returned to clear less than 5 minutes later and was removing less than a ¼ of a teaspoon in a half gallon sample. Continued to air develop to 12:50 P.M. and then shut

	off the compressor and ran in 4 joints of 3½-inch drill pipe to a depth of approximately 810 feet KB. The compressor could not lift the water from this depth (engine would quit when pressure would reach approximately 300 psi). Tripped out two joints of pipe and tried air developing again. The compressor was again unable to lift the water from this depth so two more joints of drill pipe were removed and air development was continued from 2:30 P.M. to 5:30 P.M. At the end of the 3 hour development the produced water was clean and clear with only two to 6 small shale chips present in the ½ gallon sample jar. Well development was terminated at this point. The well required 14 minutes to flow back after the conclusion of the air development. The contractor tripped out and laid down the drill pipe and laid down the remainder of the drill pipe that was standing on the floor.
January 6 – 17, 2013	Waiting on approval for acid stimulation
January 18, 2013	Contractor returned to site and installed and set packer for the acid stimulation procedure
January 21, 2013	Contractor on site rigging up well head for acid stimulation
January 22, 2013	Basic Services on site to perform acid stimulation. Pumped in 8,000 gallons of 20% HCL with 10 bbls of water placed ahead of acid and the acid displaced with 95 bbls and then shut in for 24 hours. Acid pumped in at a rate of approximately 5 BPM. Initial pressure build up to 470 psi and then when the acid reached the Madison Formation it dropped off to 140 psi and remained there until the displacement water was pumped in and the pressure rose back up to 220 psi and then was shut in.
January 23, 2013	Begin flowing back displacement water and formation water/acid. Initial TDS was over 42,000 ppm.
January 24, 2013	Continue to flow back spent acid. TDS has dropped to just over 5,000 ppm.
January 25-27, 2013	Continue to flow back spent acid and high TDS water.
January 28, 2013	Contractor returned to site and released and pulled the packer. Water is flowing at approximately 210 gpm with a pH of 7.21 and a TDS of 960 ppm. Well was shut in to allow to recovery prior to initiating flow tests.

January 30, 2013	Initiate step test by allowing the well to flow at the following discharge rates, 50 gpm, 100 gpm, 150 gpm and 200 gpm. Measure recovery for a very short period and then opened the well up to allow it to flow until the Contractor was ready to install the test pump and continue the well testing program.
February 4, 2013	Owner noticed that the well was only flowing approximately 20 gpm and the flow was a dark red color. The flow meter was removed to see if the meter was plugged with small shale pieces. The flowmeter was clean and therefore it was ascertained that the cause for the reduced flow was a downhole obstruction.
February 5, 2013	Contractor arrived back on site and ran the 3½-inch drill pipe down to a depth of 2,138 feet where they encountered an obstruction in the well.
February 6-7, 2013	Contractor first attempted to clear the obstruction using air. This was unsuccessful and so the mud pumps which had been moved off site (in the Town of Hot Springs) was remobilized to the well location and the Contracotor nippled up a 6¼-inch diameter drill bit and circulated and reamed the obstruction (approximately three feet thick shale plug) from 2,138 feet to 2,148 feet. The Contractor continued to clear the borehole to the well TD. They cleaned a considerable amount of limestone debris from the lower section of the borehole. The flow in the well recovered and was flowing over 200 gpm and was allowed to flow.
February 11, 2013	The Contractor returned to the well location and tripped back into the well and was able to go to the bottom of the well. They encountered approximately 3 feet of fill in the bottom of the well.
February 12, 2013	The Contractor rigged up their downhole video camera and attempted to video survey the lower open hole section of the well in order to determine a gauge section of the well bore where they could seat a shale basket at the bottom of the liner section to be installed across the thick exposed shale section. The downhole camera could not be lowered beyond the 2,138 foot depth. It would lay over on its side on the ledge just above the shale section.
February 13, 2013	The Contractor mobilized Goodwell to the well site to perform a caliper log of the open borehole section in order to select the

location for the lower section of the liner with the shale basket to be set. After completing the Caliper log, Goodwell was rigged down and the Contractor prepared to run in 100 feet of 4½-inch steel casing. Turntec arrived on site with the liner hanger (HANGER--EH-L--5.000" 18# P-110 x 7.000" 23# Mechanical Single Cone Liner Hanger--8-Rnd LT&C Pin Down) with a cross-over fitting to go from the 5-inch hanger to the 4½-inch 10.5 lb N-80 steel liner (Crossover--5.000" 18# LT&C Box x 4.500" 10.5# LT&C Pin). The contractor picked up the 5-inch by 7-inch setting adapter, liner-hanger, cross-over fitting and 100 feet of 4½-inch, 10.5 lb, N-80 steel liner with two shale baskets and one centralizer located near the lower section of the liner. The liner-hanger was set at a depth of 2,090 feet inside of the 7-inch casing and the bottom of the liner with the two shale baskets was set at a depth of 2,196 feet, KB. One shale basket is set at 2,193 feet, the centralizer is at 2,191 feet and the second shale basket is at 2,188 feet. After setting the liner the flow was still a red color but it was starting to clear.

February 14, 2013 — Well is flowing clear water. Waiting on Contractor to bring in the test pump to complete the testing program.

February 25, 2013 — Contractor installed a Berkley 7T450 submersible pump with a 100 Hp Franklin motor at a depth of 530 feet (top of pump assembly at 523 feet) using 4½-inch drill pipe. Two airlines were attached to the drill pipe with the bottom of the airline at 523 feet. The static (shut-in) pressure on the airline gage was 287.5 psi. After installing the pump the second phase of the step test was run with discharge rates of 300 gpm, 400 gpm and 500 gpm. Discharge was measured using a 6" x 5" orifice weir.

February 27-28, 2013 — 24-hour constant rate discharge test conducted at a rate of 500 gpm. The equipment used during the step test on February 25, 2013 was used for this constant rate test. At the end of the test a water sample was collected and turned over to Mr. Keith Neugebauer with the FRWUD who delivered it to Energy Labs in Rapid City, SD. Recovery data was collected for 6.8 hours following the termination of the drawdown test.

Fall River Water Users District
South Madison Well Report

Appendix C
Penetration Rates

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

Appendix C

Fall River Water Users District

Fall River South Madison Well

Penetration Rates

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
31	36	10:56 AM	12:05 PM	5	69	13.80	14¾" Long Tooth Rock Bit
36	39	12:05 PM	12:53 PM	3	48	16.00	Bit No. 2
39	40	12:53 PM	1:00 AM	1	7	7.00	
40	50	1:00 AM	2:45 AM	10	105	10.50	
50	52	2:45 AM	3:02 AM	2	17	8.50	
52	53	3:02 AM	3:21 AM	1	19	19.00	
53	54	3:21 AM	3:56 AM	1	35	35.00	
54	55	3:56 AM	4:15 AM	1	19	19.00	
55	56	4:15 AM	5:05 AM	1	50	50.00	
56	58	5:05 AM	6:23 AM	2	78	39.00	
58	59	6:23 AM	7:35 AM	1	72	72.00	
59	60	7:35 AM	8:19 AM	1	44	44.00	
60	61	8:19 AM	8:20 AM	1	1	1.00	
61	62	8:20 AM	8:34 AM	1	14	14.00	
62	63	---	9:00 AM	1	---	---	
63	65	9:00 AM	9:38 AM	2	38	19.00	
65	66	9:38 AM	9:45 AM	1	7	7.00	
66	69	9:45 AM	10:25 AM	3	40	13.33	
69	70	10:25 AM	10:48 AM	1	23	23.00	
70	72	10:48 AM	11:07 AM	2	19	9.50	
72	73	11:07 AM	11:21 AM	1	14	14.00	
73	74	11:21 AM	12:00 PM	1	39	39.00	
74	76	12:00 PM	12:27 PM	2	27	13.50	
76	77	12:27 PM	1:49 AM	1	82	82.00	
77	78	1:49 AM	2:12 AM	1	23	23.00	
78	80	2:12 AM	2:36 AM	2	24	12.00	
80	81	2:36 AM	2:39 AM	1	3	3.00	
81	83	2:39 AM	3:43 AM	2	64	32.00	
83	84	3:43 AM	3:55 AM	1	12	12.00	
84	86	3:55 AM	4:07 AM	2	12	6.00	
86	88	4:07 AM	4:36 AM	2	29	14.50	
88	89	4:36 AM	4:55 AM	1	19	19.00	
89	90	4:55 AM	5:27 AM	1	32	32.00	
90	91	5:27 AM	6:03 AM	1	36	36.00	
91	93	---	8:13 AM	2	---	---	
93	96	8:13 AM	9:44 AM	3	91	30.33	
96	100	9:44 AM	10:56 AM	4	72	18.00	
100	102	10:56 AM	12:20 PM	2	84	42.00	
102	104	12:20 PM	12:54 PM	2	34	17.00	
104	105	12:54 PM	1:47 AM	1	53	53.00	
105	106	1:47 AM	1:59 AM	1	12	12.00	
106	110	1:59 AM	2:10 AM	4	11	2.75	
110	112	2:10 AM	2:16 AM	2	6	3.00	
112	113	2:16 AM	6:53 AM	1	277	277.00	
113	114	6:53 AM	7:36 AM	1	43	43.00	
114	121	1:23 AM	1:29 AM	7	6	0.86	8¾" Long Tooth Rock Bit
121	122	---	1:56 AM	1	---	---	Bit No. 3
122	130	1:56 AM	2:11 AM	8	15	1.88	
130	135	2:11 AM	2:28 AM	5	17	3.40	
135	136	2:28 AM	2:35 AM	1	7	7.00	
136	138	2:35 AM	2:44 AM	2	9	4.50	

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
138	140	2:44 AM	2:49 AM	2	5	2.50
140	146	2:49 AM	3:08 AM	6	19	3.17
146	150	3:08 AM	3:26 AM	4	18	4.50
150	152	3:26 AM	3:36 AM	2	10	5.00
152	153	---	4:10 AM	1	---	---
153	155	4:10 AM	4:30 AM	2	20	10.00
155	160	4:30 AM	5:00 AM	5	30	6.00
160	170	5:00 AM	6:00 AM	10	60	6.00
170	177	6:00 AM	6:47 AM	7	47	6.71
177	179	6:47 AM	7:03 AM	2	16	8.00
179	180	7:03 AM	7:12 AM	1	9	9.00
180	181	7:12 AM	7:18 AM	1	6	6.00
181	182	---	8:05 AM	1	---	---
182	183	8:05 AM	8:13 AM	1	8	8.00
183	188	8:13 AM	8:43 AM	5	30	6.00
188	189	8:43 AM	8:55 AM	1	12	12.00
189	190	8:55 AM	8:59 AM	1	4	4.00
190	191	8:59 AM	9:03 AM	1	4	4.00
191	200	9:03 AM	10:37 AM	9	94	10.44
200	210	10:37 AM	12:00 PM	10	83	8.30
210	211	---	12:44 PM	1	---	---
211	220	12:44 PM	2:46 AM	9	122	13.56
220	230	2:46 AM	4:42 AM	10	116	11.60
230	231	4:42 AM	4:54 AM	1	12	12.00
231	232	4:54 AM	5:12 AM	1	18	18.00
232	239	5:12 AM	6:05 AM	7	53	7.57
239	240	---	6:50 AM	1	---	---
240	255	6:50 AM	8:33 AM	15	103	6.87
255	256	8:33 AM	8:40 AM	1	7	7.00
256	257	8:40 AM	8:57 AM	1	17	17.00
257	260	8:57 AM	9:15 AM	3	18	6.00
260	266	9:15 AM	9:59 AM	6	44	7.33
266	269	9:59 AM	10:11 AM	3	12	4.00
269	270	---	10:42 AM	1	---	---
270	280	10:42 AM	11:30 AM	10	48	4.80
280	290	11:30 AM	12:22 PM	10	52	5.20
290	300	12:22 PM	12:58 PM	10	36	3.60
300	301	12:58 PM	1:03 AM	1	5	5.00
301	302	---	1:27 AM	1	---	---
302	310	1:27 AM	1:52 AM	8	25	3.13
310	320	1:52 AM	2:53 AM	10	61	6.10
320	330	2:53 AM	3:32 AM	10	39	3.90
330	332	3:32 AM	3:42 AM	2	10	5.00
332	365	3:42 AM	6:58 AM	33	196	5.94
365	370	6:58 AM	7:22 AM	5	24	4.80
370	374	7:22 AM	8:01 AM	4	39	9.75
374	380	8:01 AM	8:19 AM	6	18	3.00
380	387	8:19 AM	8:47 AM	7	28	4.00
387	388	8:47 AM	8:55 AM	1	8	8.00
388	389	8:55 AM	9:10 AM	1	15	15.00
389	390	9:10 AM	9:25 AM	1	15	15.00
390	391	9:25 AM	9:40 AM	1	15	15.00
391	392	9:40 AM	9:49 AM	1	9	9.00
392	393	9:49 AM	9:56 AM	1	7	7.00
393	396	9:56 AM	10:27 AM	3	31	10.33
396	397	---	11:07 AM	1	---	---

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
397	400	11:07 AM	11:22 AM	3	15	5.00
400	410	11:22 AM	12:21 PM	10	59	5.90
410	418	12:21 PM	1:12 AM	8	51	6.38
418	419	1:12 AM	1:21 AM	1	9	9.00
419	420	1:21 AM	1:33 AM	1	12	12.00
420	427	1:33 AM	2:24 AM	7	51	7.29
427	459	2:24 AM	4:22 AM	32	118	3.69
459	460	4:22 AM	6:42 AM	1	140	140.00
460	461	6:42 AM	7:38 AM	1	56	56.00
461	469	7:38 AM	8:00 AM	8	22	2.75
114	115	---	12:45 PM	1	---	---
115	116	12:45 PM	1:10 AM	1	25	25.00
116	117	1:10 AM	1:19 AM	1	9	9.00
117	118	1:19 AM	1:25 AM	1	6	6.00
118	119	1:25 AM	1:36 AM	1	11	11.00
119	120	1:36 AM	1:43 AM	1	7	7.00
120	123	1:43 AM	2:06 AM	3	23	7.67
123	125	2:06 AM	2:28 AM	2	22	11.00
125	126	2:28 AM	2:45 AM	1	17	17.00
126	127	2:45 AM	3:05 AM	1	20	20.00
127	129	3:05 AM	4:02 AM	2	57	28.50
129	130	4:02 AM	4:20 AM	1	18	18.00
130	133	4:20 AM	5:07 AM	3	47	15.67
133	136	5:07 AM	5:37 AM	3	30	10.00
136	137	5:37 AM	6:13 AM	1	36	36.00
137	139	6:13 AM	6:29 AM	2	16	8.00
139	140	6:29 AM	6:34 AM	1	5	5.00
140	142	6:34 AM	6:48 AM	2	14	7.00
142	143	6:48 AM	7:11 AM	1	23	23.00
143	146	7:11 AM	7:39 AM	3	28	9.33
146	150	7:39 AM	8:01 AM	4	22	5.50
150	152	8:01 AM	8:25 AM	2	24	12.00
152	154	8:25 AM	8:46 AM	2	21	10.50
154	159	8:46 AM	9:11 AM	5	25	5.00
159	160	---	9:46 AM	1	---	---
160	163	9:46 AM	10:11 AM	3	25	8.33
163	169	10:11 AM	10:48 AM	6	37	6.17
169	170	10:48 AM	10:50 AM	1	2	2.00
170	171	10:50 AM	10:53 AM	1	3	3.00
171	174	10:53 AM	11:10 AM	3	17	5.67
174	177	11:10 AM	11:26 AM	3	16	5.33
177	179	11:26 AM	11:45 AM	2	19	9.50
179	180	11:45 AM	11:55 AM	1	10	10.00
180	190	11:55 AM	1:29 AM	10	94	9.40
190	191	---	3:17 AM	1	---	---
191	193	3:17 AM	3:38 AM	2	21	10.50
193	194	3:38 AM	4:24 AM	1	46	46.00
194	200	4:24 AM	5:39 AM	6	75	12.50
200	205	5:39 AM	6:35 AM	5	56	11.20
204	206	6:41 AM	6:49 AM	2	8	4.00
205	204	6:35 AM	6:41 AM	-1	6	-6.00
206	210	6:49 AM	7:22 AM	4	33	8.25
210	211	7:22 AM	7:33 AM	1	11	11.00
211	212	7:33 AM	7:50 AM	1	17	17.00
212	213	7:50 AM	8:42 AM	1	52	52.00
213	215	8:42 AM	8:53 AM	2	11	5.50

Ream 8¾" to 14¾" Diameter Borehole (Long Tooth Rock Bit) Bit No. 2

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
215	216	8:53 AM	8:59 AM	1	6	6.00
216	217	8:59 AM	9:10 AM	1	11	11.00
217	218	9:10 AM	9:46 AM	1	36	36.00
218	220	9:46 AM	10:11 AM	2	25	12.50
220	221	10:11 AM	10:20 AM	1	9	9.00
221	223	10:20 AM	10:34 AM	2	14	7.00
223	226	10:34 AM	10:49 AM	3	15	5.00
226	227	---	11:30 AM	1	---	---
227	230	11:30 AM	11:50 AM	3	20	6.67
230	238	11:50 AM	12:46 PM	8	56	7.00
238	239	12:46 PM	12:53 PM	1	7	7.00
239	240	---	1:19 AM	1	---	---
240	241	1:19 AM	1:32 AM	1	13	13.00
241	242	1:32 AM	1:48 AM	1	16	16.00
242	243	1:48 AM	1:55 AM	1	7	7.00
243	244	1:55 AM	2:39 AM	1	44	44.00
244	250	2:39 AM	3:23 AM	6	44	7.33
250	256	3:23 AM	4:15 AM	6	52	8.67
256	257	4:15 AM	5:22 AM	1	67	67.00
257	260	5:22 AM	5:53 AM	3	31	10.33
260	262	5:53 AM	6:09 AM	2	16	8.00
262	267	6:09 AM	6:39 AM	5	30	6.00
267	268	6:39 AM	6:54 AM	1	15	15.00
268	269	6:54 AM	7:22 AM	1	28	28.00
269	270	7:22 AM	7:33 AM	1	11	11.00
270	274	7:33 AM	7:52 AM	4	19	4.75
274	275	7:52 AM	8:01 AM	1	9	9.00
275	280	8:01 AM	8:30 AM	5	29	5.80
280	290	8:30 AM	9:12 AM	10	42	4.20
290	291	9:12 AM	9:15 AM	1	3	3.00
291	299	9:15 AM	9:32 AM	8	17	2.13
299	300	---	9:55 AM	1	---	---
300	301	9:55 AM	9:57 AM	1	2	2.00
301	303	9:57 AM	10:12 AM	2	10	5.00
303	304	10:12 AM	10:23 AM	1	11	11.00
304	308	10:23 AM	10:43 AM	4	20	5.00
308	309	10:43 AM	10:46 AM	1	3	3.00
309	310	10:46 AM	10:49 AM	1	3	3.00
310	319	10:49 AM	12:00 PM	9	71	7.89
319	320	12:00 PM	12:16 PM	1	16	16.00
320	328	12:16 PM	1:57 AM	8	101	12.63
328	329	1:57 AM	2:05 AM	1	8	8.00
329	330	2:05 AM	2:26 AM	1	21	21.00
330	331	2:26 AM	2:38 AM	1	12	12.00
331	332	---	3:08 AM	1	10	10.00
332	334	3:08 AM	3:35 AM	2	27	13.50
334	335	3:35 AM	3:49 AM	1	14	14.00
335	337	3:49 AM	4:03 AM	2	14	7.00
337	338	4:03 AM	4:11 AM	1	8	8.00
338	339	4:11 AM	4:16 AM	1	5	5.00
339	340	4:16 AM	4:20 AM	1	4	4.00
340	344	4:20 AM	4:40 AM	4	20	5.00
344	345	4:40 AM	4:49 AM	1	9	9.00
345	347	4:49 AM	5:38 AM	2	49	24.50
347	348	5:38 AM	5:43 AM	1	5	5.00
348	349	5:43 AM	5:48 AM	1	5	5.00

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
349	350	5:48 AM	5:57 AM	1	9	9.00
350	351	5:57 AM	6:02 AM	1	5	5.00
351	352	6:02 AM	6:12 AM	1	10	10.00
352	356	6:12 AM	6:38 AM	4	26	6.50
356	360	6:38 AM	6:56 AM	4	18	4.50
360	365	6:56 AM	7:38 AM	5	42	8.40
365	368	7:38 AM	7:56 AM	3	18	6.00
368	369	7:56 AM	8:14 AM	1	18	18.00
369	370	8:14 AM	8:21 AM	1	7	7.00
370	371	8:21 AM	8:31 AM	1	10	10.00
371	372	8:31 AM	8:33 AM	1	2	2.00
372	375	8:33 AM	8:55 AM	3	22	7.33
375	376	---	9:06 AM	1	5	5.00
376	377	9:06 AM	9:11 AM	1	5	5.00
377	378	9:11 AM	9:19 AM	1	8	8.00
378	379	9:19 AM	9:29 AM	1	10	10.00
379	380	9:29 AM	9:33 AM	1	4	4.00
380	382	9:33 AM	9:43 AM	2	10	5.00
382	383	9:43 AM	9:59 AM	1	16	16.00
383	385	9:59 AM	10:16 AM	2	17	8.50
385	386	---	10:39 AM	1	18	18.00
386	389	10:39 AM	11:07 AM	3	28	9.33
389	390	11:07 AM	11:26 AM	1	19	19.00
390	399	11:26 AM	1:21 AM	9	115	12.78
399	400	---	3:02 AM	1	---	---
400	401	3:02 AM	3:56 AM	1	54	54.00
401	403	3:56 AM	4:26 AM	2	30	15.00
403	404	---	4:57 AM	1	12	12.00
404	405	4:57 AM	5:08 AM	1	11	11.00
405	410	5:08 AM	5:33 AM	5	25	5.00
410	413	5:33 AM	6:12 AM	3	39	13.00
413	414	6:12 AM	6:37 AM	1	25	25.00
414	415	6:37 AM	7:54 AM	1	77	77.00
415	416	7:54 AM	8:10 AM	1	16	16.00
416	419	8:10 AM	8:52 AM	3	42	14.00
419	420	8:52 AM	9:13 AM	1	21	21.00
420	430	9:13 AM	11:55 AM	10	162	16.20
430	432	11:55 AM	12:45 PM	2	50	25.00
432	434	12:45 PM	1:12 AM	2	27	13.50
434	436	1:12 AM	1:33 AM	2	21	10.50
436	437	---	2:05 AM	1	---	---
437	439	2:05 AM	2:22 AM	2	17	8.50
439	440	2:22 AM	2:36 AM	1	14	14.00
440	444	2:36 AM	3:33 AM	4	57	14.25
444	445	3:33 AM	3:41 AM	1	8	8.00
445	450	3:41 AM	5:34 AM	5	113	22.60
450	451	5:34 AM	5:50 AM	1	16	16.00
451	453	5:50 AM	6:16 AM	2	26	13.00
453	454	6:16 AM	6:44 AM	1	28	28.00
454	455	6:44 AM	11:06 AM	1	262	262.00
455	456	11:06 AM	11:42 AM	1	36	36.00
456	460	11:42 AM	12:19 PM	4	37	9.25
460	467	12:19 PM	1:16 AM	7	57	8.14
467	468	---	1:55 AM	1	---	---
468	470	1:55 AM	2:15 AM	2	20	10.00
470	474	2:15 AM	3:09 AM	4	54	13.50

14¾" Diameter Borehole
Long Tooth Rock Bit

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
474	475	3:09 AM	3:48 AM	1	39	39.00	Bit No. 2
475	480	3:48 AM	4:35 AM	5	47	9.40	
480	482	4:35 AM	4:51 AM	2	16	8.00	
482	483	4:51 AM	5:03 AM	1	12	12.00	
483	487	5:03 AM	5:33 AM	4	30	7.50	
487	489	5:33 AM	5:55 AM	2	22	11.00	
489	490	5:55 AM	6:12 AM	1	17	17.00	
490	497	6:12 AM	7:30 AM	7	78	11.14	
497	498	---	8:11 AM	1	26	26.00	
498	500	8:11 AM	8:43 AM	2	32	16.00	
500	501	8:43 AM	8:59 AM	1	16	16.00	
501	505	8:59 AM	9:38 AM	4	39	9.75	
505	507	9:38 AM	10:05 AM	2	27	13.50	
507	509	10:05 AM	10:19 AM	2	14	7.00	
509	510	10:19 AM	10:32 AM	1	13	13.00	
510	512	10:32 AM	10:51 AM	2	19	9.50	
512	517	10:51 AM	12:07 PM	5	76	15.20	
517	518	12:07 PM	12:28 PM	1	21	21.00	
518	520	12:28 PM	12:53 PM	2	25	12.50	
520	526	12:53 PM	2:46 AM	6	113	18.83	
526	529	3:26 AM	3:56 AM	3	30	10.00	
529	530	3:56 AM	4:01 AM	1	5	5.00	
530	535	4:01 AM	4:30 AM	5	29	5.80	
535	539	4:30 AM	5:17 AM	4	47	11.75	
539	540	5:17 AM	5:35 AM	1	18	18.00	
540	545	5:35 AM	6:38 AM	5	63	12.60	
545	549	6:38 AM	8:05 AM	4	87	21.75	
549	550	8:05 AM	8:15 AM	1	10	10.00	
550	557	8:15 AM	9:22 AM	7	67	9.57	
557	558	---	9:52 AM	1	15	15.00	
558	559	9:52 AM	10:11 AM	1	19	19.00	
559	560	10:11 AM	10:47 AM	1	36	36.00	
560	564	10:47 AM	11:22 AM	4	35	8.75	
564	566	11:22 AM	11:57 AM	2	35	17.50	
566	567	11:57 AM	12:15 PM	1	18	18.00	
567	568	12:15 PM	1:11 AM	1	56	56.00	
568	569	1:11 AM	1:47 AM	1	36	36.00	
569	570	1:47 AM	1:59 AM	1	12	12.00	
570	575	1:59 AM	2:38 AM	5	39	7.80	
575	576	2:38 AM	2:49 AM	1	11	11.00	
576	577	2:49 AM	3:03 AM	1	14	14.00	
577	580	3:03 AM	3:38 AM	3	35	11.67	
580	581	3:38 AM	3:50 AM	1	12	12.00	
581	586	3:50 AM	5:41 AM	5	111	22.20	
586	588	5:41 AM	6:08 AM	2	27	13.50	
588	589	6:08 AM	6:31 AM	1	23	23.00	
589	590	6:31 AM	6:42 AM	1	11	11.00	
590	591	---	7:48 AM	1	5	5.00	
591	592	7:48 AM	7:54 AM	1	6	6.00	
592	593	7:54 AM	8:08 AM	1	14	14.00	
593	595	8:08 AM	8:16 AM	2	8	4.00	
595	596	8:16 AM	8:24 AM	1	8	8.00	
596	600	8:24 AM	9:58 AM	4	94	23.50	
600	603	9:58 AM	11:27 AM	3	89	29.67	
603	604	---	6:12 AM	1	5	5.00	9½" Diameter Long Tooth Rock Bit
604	605	6:12 AM	6:47 AM	1	35	35.00	Bit No. 4

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
605	610	6:47 AM	7:07 AM	5	20	4.00
610	611	7:07 AM	7:11 AM	1	4	4.00
611	612	7:11 AM	7:26 AM	1	15	15.00
612	613	7:26 AM	8:03 AM	1	37	37.00
613	620	8:03 AM	8:38 AM	7	35	5.00
620	629	8:38 AM	9:14 AM	9	36	4.00
629	630	9:14 AM	9:17 AM	1	3	3.00
630	640	9:17 AM	9:45 AM	10	28	2.80
640	646	9:45 AM	10:04 AM	6	19	3.17
646	647	10:04 AM	10:52 AM	1	48	48.00
647	650	10:52 AM	11:09 AM	3	17	5.67
650	653	11:09 AM	11:30 AM	3	21	7.00
653	656	11:30 AM	12:04 PM	3	34	11.33
656	660	12:04 PM	12:27 PM	4	23	5.75
660	662	12:27 PM	12:37 PM	2	10	5.00
662	663	12:37 PM	12:45 PM	1	8	8.00
663	666	12:45 PM	1:01 AM	3	16	5.33
666	667	1:01 AM	1:11 AM	1	10	10.00
667	670	1:11 AM	1:30 AM	3	19	6.33
670	675	1:30 AM	2:14 AM	5	44	8.80
675	676	2:14 AM	2:19 AM	1	5	5.00
676	677	2:19 AM	2:30 AM	1	11	11.00
677	678	2:30 AM	3:10 AM	1	40	40.00
678	680	3:10 AM	3:26 AM	2	16	8.00
680	682	3:26 AM	3:42 AM	2	16	8.00
682	683	3:42 AM	3:48 AM	1	6	6.00
683	686	3:48 AM	4:00 AM	3	12	4.00
686	690	4:00 AM	4:24 AM	4	24	6.00
690	691	4:24 AM	4:28 AM	1	4	4.00
691	692	4:28 AM	4:46 AM	1	18	18.00
692	694	4:46 AM	4:54 AM	2	8	4.00
694	700	4:54 AM	5:25 AM	6	31	5.17
700	703	5:25 AM	5:40 AM	3	15	5.00
703	706	5:40 AM	6:11 AM	3	31	10.33
706	710	6:11 AM	6:46 AM	4	35	8.75
710	711	6:46 AM	6:56 AM	1	10	10.00
711	712	6:56 AM	7:35 AM	1	39	39.00
712	714	7:35 AM	7:50 AM	2	15	7.50
714	715	7:50 AM	8:03 AM	1	13	13.00
715	720	8:03 AM	8:38 AM	5	35	7.00
720	730	8:38 AM	9:48 AM	10	70	7.00
730	731	9:48 AM	9:57 AM	1	9	9.00
731	734	9:57 AM	10:14 AM	3	17	5.67
734	740	10:14 AM	11:03 AM	6	49	8.17
740	742	11:03 AM	11:18 AM	2	15	7.50
742	743	11:18 AM	11:52 AM	1	34	34.00
743	750	11:52 AM	12:36 PM	7	44	6.29
750	752	12:36 PM	12:43 PM	2	7	3.50
752	760	12:43 PM	1:31 AM	8	48	6.00
760	763	1:31 AM	1:53 AM	3	22	7.33
763	765	1:53 AM	2:05 AM	2	12	6.00
765	770	2:05 AM	2:45 AM	5	40	8.00
770	773	2:45 AM	3:05 AM	3	20	6.67
773	774	3:05 AM	3:41 AM	1	36	36.00
774	780	3:41 AM	4:10 AM	6	29	4.83
780	782	4:10 AM	4:28 AM	2	18	9.00

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
782	784	4:28 AM	4:47 AM	2	19	9.50
784	785	4:47 AM	4:55 AM	1	8	8.00
785	790	4:55 AM	5:25 AM	5	30	6.00
603	604	---	6:12 AM	1	5	5.00
604	605	6:12 AM	6:47 AM	1	35	35.00
605	610	6:47 AM	7:07 AM	5	20	4.00
610	611	7:07 AM	7:11 AM	1	4	4.00
611	612	7:11 AM	7:26 AM	1	15	15.00
612	613	7:26 AM	8:03 AM	1	37	37.00
613	620	8:03 AM	8:38 AM	7	35	5.00
620	629	8:38 AM	9:14 AM	9	36	4.00
629	630	9:14 AM	9:17 AM	1	3	3.00
630	640	9:17 AM	9:45 AM	10	28	2.80
640	646	9:45 AM	10:04 AM	6	19	3.17
646	647	10:04 AM	10:52 AM	1	48	48.00
647	650	10:52 AM	11:09 AM	3	17	5.67
650	653	11:09 AM	11:30 AM	3	21	7.00
653	656	11:30 AM	12:04 PM	3	34	11.33
656	660	12:04 PM	12:27 PM	4	23	5.75
660	662	12:27 PM	12:37 PM	2	10	5.00
662	663	12:37 PM	12:45 PM	1	8	8.00
663	666	12:45 PM	1:01 AM	3	16	5.33
666	667	1:01 AM	1:11 AM	1	10	10.00
667	670	1:11 AM	1:30 AM	3	19	6.33
670	675	1:30 AM	2:14 AM	5	44	8.80
675	676	2:14 AM	2:19 AM	1	5	5.00
676	677	2:19 AM	2:30 AM	1	11	11.00
677	678	2:30 AM	3:10 AM	1	40	40.00
678	680	3:10 AM	3:26 AM	2	16	8.00
680	682	3:26 AM	3:42 AM	2	16	8.00
682	683	3:42 AM	3:48 AM	1	6	6.00
683	686	3:48 AM	4:00 AM	3	12	4.00
686	690	4:00 AM	4:24 AM	4	24	6.00
690	691	4:24 AM	4:28 AM	1	4	4.00
691	692	4:28 AM	4:46 AM	1	18	18.00
692	694	4:46 AM	4:54 AM	2	8	4.00
694	700	4:54 AM	5:25 AM	6	31	5.17
700	703	5:25 AM	5:40 AM	3	15	5.00
703	706	5:40 AM	6:11 AM	3	31	10.33
706	710	6:11 AM	6:46 AM	4	35	8.75
710	711	6:46 AM	6:56 AM	1	10	10.00
711	712	6:56 AM	7:35 AM	1	39	39.00
712	714	7:35 AM	7:50 AM	2	15	7.50
714	715	7:50 AM	8:03 AM	1	13	13.00
715	720	8:03 AM	8:38 AM	5	35	7.00
720	730	8:38 AM	9:48 AM	10	70	7.00
730	731	9:48 AM	9:57 AM	1	9	9.00
731	734	9:57 AM	10:14 AM	3	17	5.67
734	740	10:14 AM	11:03 AM	6	49	8.17
740	742	11:03 AM	11:18 AM	2	15	7.50
742	743	11:18 AM	11:52 AM	1	34	34.00
743	750	11:52 AM	12:36 PM	7	44	6.29
750	752	12:36 PM	12:43 PM	2	7	3.50
752	760	12:43 PM	1:31 AM	8	48	6.00
760	763	1:31 AM	1:53 AM	3	22	7.33
763	765	1:53 AM	2:05 AM	2	12	6.00

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
765	770	2:05 AM	2:45 AM	5	40	8.00	
770	773	2:45 AM	3:05 AM	3	20	6.67	
773	774	3:05 AM	3:41 AM	1	36	36.00	
774	780	3:41 AM	4:10 AM	6	29	4.83	
780	782	4:10 AM	4:28 AM	2	18	9.00	
782	784	4:28 AM	4:47 AM	2	19	9.50	
784	785	4:47 AM	4:55 AM	1	8	8.00	
785	790	4:55 AM	5:25 AM	5	30	6.00	
790	794	5:41 AM	6:04 AM	4	23	5.75	
794	795	6:04 AM	6:15 AM	1	11	11.00	
795	799	6:15 AM	6:53 AM	4	38	9.50	
799	800	6:53 AM	7:05 AM	1	12	12.00	
800	804	7:05 AM	8:19 AM	4	74	18.50	
804	805	8:19 AM	---	1	---	---	
805	806	8:59 AM	9:10 AM	1	11	11.00	
806	810	9:10 AM	9:36 AM	4	26	6.50	
810	814	9:36 AM	10:00 AM	4	24	6.00	
814	820	10:00 AM	11:08 AM	6	68	11.33	
820	823	11:08 AM	11:57 AM	3	49	16.33	
823	830	11:57 AM	1:19 AM	7	82	11.71	
830	835	1:19 AM	2:31 AM	5	72	14.40	
835	836	2:31 AM	---	1	---	---	
836	840	3:13 AM	3:51 AM	4	38	9.50	
840	844	3:51 AM	4:34 AM	4	43	10.75	
844	845	4:34 AM	4:57 AM	1	23	23.00	
845	846	4:57 AM	5:06 AM	1	9	9.00	
846	847	5:06 AM	8:14 AM	1	188	188.00	9½" Diameter Button Bit
847	848	8:14 AM	8:32 AM	1	18	18.00	Bit No. 5
848	849	8:32 AM	11:21 AM	1	169	169.00	
849	850	11:21 AM	11:24 AM	1	3	3.00	
850	860	11:24 AM	12:05 PM	10	41	4.10	
860	865	12:05 PM	1:05 AM	5	60	12.00	
865	868	1:05 AM	1:31 AM	3	26	8.67	
868	869	1:31 AM	---	1	---	---	
869	870	2:31 AM	2:32 AM	1	1	1.00	
870	871	2:32 AM	2:34 AM	1	2	2.00	
871	872	2:34 AM	2:42 AM	1	8	8.00	
872	876	2:42 AM	3:01 AM	4	19	4.75	
876	877	3:01 AM	3:10 AM	1	9	9.00	
877	879	3:10 AM	3:17 AM	2	7	3.50	
879	880	3:17 AM	3:28 AM	1	11	11.00	
880	888	3:28 AM	5:03 AM	8	95	11.88	
888	889	5:03 AM	5:07 AM	1	4	4.00	
889	890	5:07 AM	5:45 AM	1	38	38.00	
890	891	5:45 AM	6:22 AM	1	37	37.00	
891	892	6:22 AM	7:20 AM	1	58	58.00	
892	896	7:20 AM	7:58 AM	4	38	9.50	
896	897	7:58 AM	8:52 AM	1	54	54.00	
897	898	8:52 AM	9:04 AM	1	12	12.00	
898	899	9:04 AM	9:21 AM	1	17	17.00	
899	900	9:21 AM	---	1	---	---	
900	902	10:26 AM	10:50 AM	2	24	12.00	
902	903	10:50 AM	11:11 AM	1	21	21.00	
903	904	11:11 AM	11:52 AM	1	41	41.00	
904	905	11:52 AM	12:17 PM	1	25	25.00	8¾" Diameter Button Bit
905	910	3:17 PM	5:26 PM	5	129	25.80	Bit No. 6

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
910	911	5:26 PM	5:27 PM	1	1	1.00
911	920	5:27 PM	6:51 PM	9	84	9.33
920	929	6:51 PM	8:13 PM	9	82	9.11
929	930	8:13 PM	12:00 AM	1	---	---
930	931	9:41 PM	9:58 PM	1	17	17.00
931	936	9:58 PM	10:38 PM	5	40	8.00
936	940	10:38 PM	11:03 PM	4	25	6.25
940	950	11:03 PM	12:00 AM	10	---	---
950	957	12:00 AM	1:09 AM	7	69	9.86
957	958	1:09 AM	12:00 AM	1	---	---
958	960	1:30 AM	1:45 AM	2	15	7.50
960	965	1:45 AM	2:19 AM	5	34	6.80
965	970	2:19 AM	3:04 AM	5	45	9.00
970	974	3:04 AM	3:35 AM	4	31	7.75
974	975	3:35 AM	3:47 AM	1	12	12.00
975	977	3:47 AM	4:06 AM	2	19	9.50
977	978	4:06 AM	4:11 AM	1	5	5.00
978	979	4:11 AM	12:00 AM	1	---	---
979	980	4:42 AM	4:54 AM	1	12	12.00
980	983	4:54 AM	5:25 AM	3	31	10.33
983	984	5:25 AM	5:40 AM	1	15	15.00
984	989	5:40 AM	6:35 AM	5	55	11.00
989	990	6:35 AM	12:00 AM	1	---	---
990	995	7:02 AM	7:59 AM	5	57	11.40
995	1000	7:59 AM	8:49 AM	5	50	10.00
1000	1006	8:49 AM	9:33 AM	6	44	7.33
1006	1007	9:33 AM	12:00 AM	1	---	---
1007	1010	9:51 AM	10:24 AM	3	33	11.00
1010	1016	10:24 AM	11:25 AM	6	61	10.17
1016	1020	11:25 AM	11:55 AM	4	30	7.50
1020	1021	11:55 AM	12:02 PM	1	7	7.00
1021	1022	12:02 PM	12:00 AM	1	---	---
1022	1026	12:32 PM	1:05 PM	4	33	8.25
1026	1030	1:05 PM	1:51 PM	4	46	11.50
1030	1034	1:51 PM	2:46 PM	4	55	13.75
1034	1035	2:46 PM	2:56 PM	1	10	10.00
1035	1036	2:56 PM	---	1	---	---
1036	1039	3:15 PM	4:07 PM	3	52	17.33
1039	1040	4:07 PM	4:17 PM	1	10	10.00
1040	1050	4:17 PM	6:24 PM	10	127	12.70
1050	1051	6:24 PM	6:33 PM	1	9	9.00
1051	1052	6:33 PM	---	1	---	---
1052	1054	7:30 PM	7:52 PM	2	22	11.00
1054	1055	7:52 PM	8:03 PM	1	11	11.00
1055	1060	8:03 PM	8:46 PM	5	43	8.60
1060	1061	8:46 PM	8:56 PM	1	10	10.00
1061	1062	8:56 PM	9:08 PM	1	12	12.00
1062	1065	9:08 PM	10:07 PM	3	59	19.67
1065	1069	10:07 PM	11:08 PM	4	61	15.25
1065	1070	11:08 PM	---	5	---	---
1070	1071	12:23 AM	12:32 AM	1	9	9.00
1071	1072	12:32 AM	---	1	---	---
1072	1076	12:55 AM	1:39 AM	4	44	11.00
1076	1077	1:39 AM	---	1	---	---
1077	1078	5:58 AM	6:13 AM	1	15	15.00
1078	1080	6:13 AM	6:36 AM	2	23	11.50

8¾" Diameter Button Bit
Bit No. 7

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
1080	1082	6:36 AM	7:14 AM	2	38	19.00
1082	1083	7:14 AM	---	1	---	---
1083	1084	8:39 AM	8:58 AM	1	19	19.00
1084	1085	8:58 AM	---	1	---	---
1085	1088	9:33 AM	10:19 AM	3	46	15.33
1088	1090	10:19 AM	10:34 AM	2	15	7.50
1090	1095	10:34 AM	11:15 AM	5	41	8.20
1095	1100	11:15 AM	11:40 AM	5	25	5.00
1100	1110	11:40 AM	12:28 PM	10	48	4.80
1110	1111	12:28 PM	12:34 PM	1	6	6.00
1111	1115	12:34 PM	1:21 PM	4	47	11.75
1115	1116	1:21 PM	---	1	---	---
1116	1118	1:52 PM	2:13 PM	2	21	10.50
1118	1119	2:13 PM	2:35 PM	1	22	22.00
1119	1120	2:35 PM	2:49 PM	1	14	14.00
1120	1121	2:49 PM	2:57 PM	1	8	8.00
1121	1130	2:57 PM	3:46 PM	9	49	5.44
1130	1131	3:46 PM	---	1	---	---
1131	1132	4:01 PM	4:08 PM	1	7	7.00
1132	1133	4:08 PM	4:16 PM	1	8	8.00
1133	1135	4:16 PM	4:24 PM	2	8	4.00
1135	1136	4:24 PM	---	1	---	---
1136	1138	4:44 PM	4:54 PM	2	10	5.00
1138	1139	4:54 PM	5:02 PM	1	8	8.00
1139	1140	5:02 PM	5:10 PM	1	8	8.00
1140	1147	5:10 PM	5:32 PM	7	22	3.14
1147	1148	5:32 PM	---	1	---	---
1148	1150	5:55 PM	6:01 PM	2	6	3.00
1150	1160	6:01 PM	6:51 PM	10	50	5.00
1160	1170	6:51 PM	7:48 PM	10	57	5.70
1170	1171	7:48 PM	8:06 PM	1	18	18.00
1171	1174	8:06 PM	8:20 PM	3	14	4.67
1174	1178	8:20 PM	8:57 PM	4	37	9.25
1178	1179	9:15 PM	9:21 PM	1	6	6.00
1179	1180	9:21 PM	9:28 PM	1	7	7.00
1180	1190	9:28 PM	10:27 PM	10	59	5.90
1190	1195	10:27 PM	10:57 PM	5	30	6.00
1195	1196	10:57 PM	11:00 PM	1	3	3.00
1196	1199	11:00 PM	11:18 PM	3	18	6.00
1199	1200	11:18 PM	11:26 PM	1	8	8.00
1200	1201	11:26 PM	11:31 PM	1	5	5.00
1201	1206	11:31 PM	11:44 PM	5	13	2.60
1206	1210	11:44 PM	12:03 AM	4	19	4.75
1210	1211	12:03 AM	12:11 AM	1	8	8.00
1211	1212	12:11 AM	---	1	---	---
1212	1213	12:33 AM	12:41 AM	1	8	8.00
1213	1220	12:41 AM	1:31 AM	7	50	7.14
1220	1223	1:31 AM	1:53 AM	3	22	7.33
1223	1224	1:53 AM	2:03 AM	1	10	10.00
1224	1225	2:03 AM	2:42 AM	1	13	13.00
1225	1227	2:42 AM	2:55 AM	2	13	6.50
1227	1230	2:55 AM	3:39 AM	3	44	14.67
1230	1231	3:39 AM	3:49 AM	1	10	10.00
1231	1240	3:49 AM	5:02 AM	9	73	8.11
1240	1242	5:02 AM	5:13 AM	2	11	5.50
1242	1243	5:13 AM	5:30 AM	1	17	17.00

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)
1243	1244	5:30 AM	5:38 AM	1	8	8.00
1244	1245	5:38 AM	---	1	---	---
1245	1250	6:14 AM	6:48 AM	5	34	6.80
1250	1253	6:48 AM	7:06 AM	3	18	6.00
1253	1255	7:06 AM	7:10 AM	2	4	2.00
1255	1259	7:10 AM	7:30 AM	4	20	5.00
1259	1260	7:30 AM	7:31 AM	1	1	1.00
1260	1262	7:31 AM	7:36 AM	2	5	2.50
1262	1265	7:36 AM	7:55 AM	3	19	6.33
1265	1266	7:55 AM	8:05 AM	1	10	10.00
1266	1270	8:05 AM	8:33 AM	4	28	7.00
1270	1275	8:33 AM	8:58 AM	5	25	5.00
1275	1276	8:58 AM	9:19 AM	1	4	4.00
1276	1277	9:19 AM	9:28 AM	1	9	9.00
1277	1280	9:28 AM	9:49 AM	3	21	7.00
1280	1290	9:49 AM	11:06 AM	10	77	7.70
1290	1292	11:06 AM	11:22 AM	2	16	8.00
1292	1293	11:22 AM	11:28 AM	1	6	6.00
1293	1300	11:28 AM	12:44 PM	7	76	10.86
1300	1302	12:44 PM	1:00 PM	2	16	8.00
1302	1307	1:00 PM	1:33 PM	5	33	6.60
1307	1308	1:33 PM	1:59 PM	1	8	8.00
1308	1310	1:59 PM	2:12 PM	2	13	6.50
1310	1320	2:12 PM	3:16 PM	10	64	6.40
1320	1330	3:16 PM	4:15 PM	10	59	5.90
1330	1331	4:15 PM	4:27 PM	1	8	8.00
1331	1334	4:27 PM	4:51 PM	3	24	8.00
1334	1335	4:51 PM	5:00 PM	1	9	9.00
1335	1336	5:00 PM	5:15 PM	1	15	15.00
1336	1337	5:15 PM	5:35 PM	1	20	20.00
1337	1339	5:35 PM	6:10 PM	2	35	17.50
1339	1340	6:10 PM	6:45 PM	1	14	14.00
1340	1343	6:45 PM	7:28 PM	3	43	14.33
1343	1347	7:28 PM	7:57 PM	4	29	7.25
1347	1350	7:57 PM	8:19 PM	3	22	7.33
1350	1354	8:19 PM	8:47 PM	4	28	7.00
1354	1357	8:47 PM	9:35 PM	3	48	16.00
1357	1360	9:35 PM	10:09 PM	3	34	11.33
1360	1369	10:09 PM	11:22 PM	9	73	8.11
1369	1370	11:22 PM	11:36 PM	1	14	14.00
1370	1372	11:36 PM	11:59 PM	2	23	11.50
1372	1373	11:59 PM	---	1	?	?
1373	1374	12:35 AM		1	10	10.00
1374	1375	12:35 AM	1:00 AM	1	25	25.00
1375	1380	1:00 AM	1:30 AM	5	30	6.00
1380	1382	1:30 AM	1:43 AM	2	13	6.50
1382	1383	1:43 AM	1:54 AM	1	11	11.00
1383	1384	1:54 AM	2:02 AM	1	8	8.00
1384	1385	2:02 AM	3:06 AM	1	14	14.00
1385	1387	3:06 AM	3:24 AM	2	18	9.00
1387	1388	3:24 AM	3:42 AM	1	18	18.00
1388	1389	3:42 AM	3:55 AM	1	13	13.00
1389	1390	3:55 AM	4:08 AM	1	13	13.00
1390	1397	4:08 AM	5:20 AM	7	72	10.29
1397	1400	5:20 AM	5:37 AM	3	17	5.67
1400	1404	5:37 AM	6:02 AM	4	25	6.25

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
1404	1405	6:02 AM	---	1	---	---	
1405	1408	6:23 AM	6:41 AM	3	18	6.00	
1408	1409	6:41 AM	6:53 AM	1	12	12.00	
1409	1410	6:53 AM	7:00 AM	1	7	7.00	
1410	1413	7:00 AM	7:18 AM	3	18	6.00	
1413	1414	7:18 AM	7:28 AM	1	10	10.00	
1414	1415	7:28 AM	7:34 AM	1	6	6.00	
1415	1416	7:34 AM	7:36 AM	1	2	2.00	
1416	1419	7:36 AM	7:50 AM	3	14	4.67	
1419	1420	7:50 AM	8:00 AM	1	10	10.00	
1420	1421	8:00 AM	8:24 AM	1	24	24.00	Change geolograph paper
1421	1424	8:24 AM	8:40 AM	3	16	5.33	
1424	1426	8:40 AM	8:57 AM	2	17	8.50	
1426	1430	8:57 AM	9:14 AM	4	17	4.25	
1430	1432	9:14 AM	9:28 AM	2	14	7.00	
1432	1435	9:28 AM	10:03 AM	3	35	11.67	
1435	1436	10:03 AM	10:34 AM	1	11	11.00	Connection
1436	1439	10:34 AM	10:54 AM	3	20	6.67	
1439	1440	10:54 AM	10:57 AM	1	3	3.00	
1440	1441	10:57 AM	11:04 AM	1	7	7.00	
1441	1442	11:04 AM	11:11 AM	1	7	7.00	
1442	1446	11:11 AM	11:31 AM	4	20	5.00	
1446	1450	11:31 AM	11:58 AM	4	27	6.75	
1450	1458	11:58 AM	12:40 PM	8	42	5.25	
1458	1459	12:40 PM	1:49 PM	1	---	---	Adjust geolograph time
1459	1460	1:49 PM	2:03 PM	1	14	14.00	
1460	1462	2:03 PM	2:27 PM	2	24	12.00	
1462	1463	2:27 PM	2:51 PM	1	6	6.00	Connection
1463	1470	2:51 PM	3:27 PM	7	36	5.14	
1470	1476	3:27 PM	4:08 PM	6	41	6.83	
1476	1480	4:08 PM	4:26 PM	4	18	4.50	
1480	1490	4:26 PM	5:20 PM	10	54	5.40	
1490	1493	5:20 PM	5:41 PM	3	21	7.00	
1493	1494	5:41 PM	6:04 PM	1	3	3.00	Connection
1494	1500	6:04 PM	6:37 PM	6	33	5.50	
1500	1504	6:37 PM	7:25 PM	4	48	12.00	
1504	1505	7:25 PM	7:43 PM	1	18	18.00	Time adjust
1505	1506	7:43 PM	7:55 PM	1	12	12.00	
1506	1510	7:55 PM	8:32 PM	4	37	9.25	
1510	1511	8:32 PM	8:43 PM	1	11	11.00	
1511	1520	8:43 PM	9:28 PM	9	45	5.00	
1520	1524	9:28 PM	9:54 PM	4	26	6.50	
1524	1525	9:54 PM	---	1	---	---	Connection
1525	1530	10:19 PM	10:53 PM	5	34	6.80	
1530	1540	10:53 PM	12:08 AM	10	75	7.50	
1540	1541	12:08 AM	12:13 AM	1	5	5.00	
1541	1544	12:13 AM	12:45 AM	3	32	10.67	
1544	1548	12:45 AM	1:13 AM	4	28	7.00	
1548	1550	1:13 AM	1:35 AM	2	22	11.00	
1550	1556	1:35 AM	2:48 AM	6	73	12.17	
1556	1557	2:48 AM	---	1	---	---	Connection
1557	1558	3:13 AM	3:20 AM	1	7	7.00	
1558	1560	3:20 AM	3:45 AM	2	25	12.50	
1560	1567	3:45 AM	4:44 AM	7	59	8.43	
1567	1568	4:44 AM	4:57 AM	1	13	13.00	
1568	1570	4:57 AM	5:08 AM	2	11	5.50	

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
1570	1575	5:08 AM	5:56 AM	5	48	9.60	
1575	1580	5:56 AM	6:18 AM	5	22	4.40	
1580	1588	6:18 AM	6:59 AM	8	41	5.125	
1588	1589	6:59 AM	7:22 AM	1	5	5.00	Connection
1589	1590	7:22 AM	7:32 AM	1	10	10.00	
1590	1593	7:22 AM	8:17 AM	3	55	18.33	
1593	1595	8:17 AM	8:31 AM	2	14	7.00	
1595	1596	8:31 AM	8:41 AM	1	10	10.00	
1596	1599	8:41 AM	9:05 AM	3	24	8.00	
1599	1600	9:05 AM	9:18 AM	1	13	13.00	
1600	1601	9:18 AM	9:28 AM	1	10	10.00	
1601	1610	9:28 AM	10:16 AM	9	48	5.33	
1610	1616	10:16 AM	10:50 AM	6	34	5.67	
1616	1619	10:50 AM	11:23 AM	3	33	11.00	
1619	1620	11:23 AM	11:55 AM	1	13	13.00	Connection
1620	1622	11:55 AM	12:07 PM	2	12	6.00	
1622	1627	12:07 PM	1:14 PM	5	67	13.40	
1627	1628	1:14 PM	1:19 PM	1	5	5.00	
1628	1629	1:19 PM	1:30 PM	1	11	11.00	
1629	1630	1:30 PM	1:38 PM	1	8	8.00	
1630	1631	1:38 PM	1:41 PM	1	3	3.00	
1631	1633	1:41 PM	1:58 PM	2	17	8.50	
1633	1640	1:58 PM	2:19 PM	7	21	3.00	
1640	1644	2:19 PM	2:34 PM	4	15	3.75	
1644	1645	2:34 PM	2:50 PM	1	16	16.00	
1645	1650	2:50 PM	3:35 PM	5	45	9.00	
1650	1651	3:35 PM	---	1	---	---	Connection
1651	1652	3:54 PM	3:57 PM	1	3	3.00	
1652	1654	3:57 PM	4:17 PM	2	20	10.00	
1654	1660	4:17 PM	4:54 PM	6	37	6.17	
1660	1663	4:54 PM	5:12 PM	3	18	6.00	
1663	1665	5:12 PM	5:31 PM	2	19	9.50	
1665	1670	5:31 PM	6:23 PM	5	52	10.40	
1670	1679	6:23 PM	7:33 PM	9	70	7.78	
1679	1680	7:33 PM	8:07 PM	1	34	34.00	
1680	1681	8:07 PM	8:31 PM	1	12	12.00	Connection
1681	1682	8:31 PM	8:46 PM	1	15	15.00	
1682	1686	8:46 PM	9:33 PM	4	47	11.75	
1686	1690	9:33 PM	10:00 PM	4	27	6.75	
1690	1692	10:00 PM	10:12 PM	2	12	6.00	
1692	1694	10:12 PM	10:42 PM	2	30	15.00	
1694	1697	10:42 PM	11:04 PM	3	22	7.33	
1697	1700	11:04 PM	11:44 PM	3	40	13.33	
1700	1701	11:44 PM	11:58 PM	1	14	14.00	
1701	1705	11:58 PM	12:27 AM	4	29	7.25	
1705	1708	12:27 AM	1:12 AM	3	45	15.00	
1708	1709	1:12 AM	1:21 AM	1	9	9.00	
1709	1710	1:21 AM	1:25 AM	1	4	4.00	
1710	1711	1:25 AM	1:35 AM	1	10	10.00	
1711	1712	1:35 AM	2:04 AM	1	15	15.00	Connection
1712	1718	2:04 AM	3:06 AM	6	62	10.33	
1718	1720	3:06 AM	3:16 AM	2	10	5.00	
1720	1724	3:16 AM	3:43 AM	4	27	6.75	
1724	1726	3:43 AM	4:02 AM	2	19	9.50	
1726	1730	4:02 AM	4:27 AM	4	25	6.25	
1730	1734	4:27 AM	5:03 AM	4	36	9.00	

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
1734	1735	5:03 AM	5:13 AM	1	10	10.00	
1735	1736	5:13 AM	5:35 AM	1	22	22.00	
1736	1737	---	11:56 AM	1	---	---	8¾" Diameter Button Bit
1737	1740	11:51 AM	12:42 PM	3	51	17.00	Bit No. 8
1740	1742	12:42 PM	1:10 PM	2	28	14.00	
1742	1743	1:10 PM	1:50 PM	1	18	18.00	Connection
1743	1750	1:50 PM	2:29 PM	7	39	5.57	
1750	1756	2:29 PM	3:06 PM	6	37	6.17	
1756	1759	3:06 PM	3:41 PM	3	35	11.67	
1759	1760	3:41 PM	3:48 PM	1	7	7.00	
1760	1762	3:48 PM	4:17 PM	2	29	14.50	
1762	1763	4:17 PM	4:25 PM	1	8	8.00	
1763	1765	4:25 PM	4:49 PM	2	24	12.00	
1765	1766	4:49 PM	5:08 PM	1	19	19.00	
1766	1767	5:08 PM	5:18 PM	1	10	10.00	
1767	1768	5:18 PM	5:36 PM	1	18	18.00	
1768	1769	5:36 PM	6:00 PM	1	24	24.00	
1769	1770	6:00 PM	6:14 PM	1	14	14.00	
1770	1772	6:14 PM	6:46 PM	2	32	16.00	
1772	1773	6:46 PM	7:14 PM	1	---	---	Connection
1773	1774	7:14 PM	7:26 PM	1	12	12.00	
1774	1775	7:26 PM	7:28 PM	1	2	2.00	
1775	1776	7:28 PM	8:08 PM	1	30	30.00	Adjust time, change paper
1776	1780	8:08 PM	8:51 PM	4	43	10.75	
1780	1783	8:51 PM	9:10 PM	3	19	6.33	
1783	1785	9:10 PM	9:28 PM	2	18	9.00	
1785	1790	9:28 PM	9:52 PM	5	24	4.80	
1790	1794	9:52 PM	10:11 PM	4	19	4.75	
1794	1795	10:11 PM	10:19 PM	1	8	8.00	
1795	1796	10:19 PM	10:35 PM	1	16	16.00	
1796	1799	10:35 PM	11:09 PM	3	34	11.33	
1799	1800	11:09 PM	11:17 PM	1	8	8.00	
1800	1801	11:17 PM	11:25 PM	1	8	8.00	
1801	1802	11:25 PM	---	1	---	---	Connection
1802	1810	11:44 PM	12:51 AM	8	67	8.375	
1810	1820	12:51 AM	2:33 AM	10	102	10.20	
1820	1830	2:33 AM	4:30 AM	10	117	11.70	
1830	1833	4:30 AM	5:11 AM	3	41	13.67	
1833	1834	5:11 AM	---	1	---	---	Connection
1834	1835	5:34 AM	5:48 AM	1	14	14.00	
1835	1838	5:48 AM	6:18 AM	3	30	10.00	
1838	1840	6:18 AM	6:30 AM	2	12	6.00	
1840	1845	6:30 AM	7:28 AM	5	58	11.60	
1845	1846	7:28 AM	7:32 AM	1	4	4.00	
1846	1847	7:32 AM	7:50 AM	1	18	18.00	
1847	1848	7:50 AM	7:55 AM	1	5	5.00	
1848	1850	7:55 AM	8:05 AM	2	10	5.00	
1850	1853	8:05 AM	8:38 AM	3	33	11.00	
1853	1854	8:38 AM	8:42 AM	1	4	4.00	
1854	1860	8:42 AM	9:54 AM	6	72	12.00	
1860	1866	9:54 AM	11:23 AM	6	89	14.83	
1866	1867	11:23 AM	11:53 AM	1	22	22.00	Connection
1867	1870	11:53 AM	12:17 PM	3	24	8.00	
1870	1875	12:17 PM	12:51 PM	5	34	6.80	
1875	1880	12:51 PM	1:15 PM	5	24	4.80	
1880	1884	1:15 PM	1:32 PM	4	17	4.25	

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
1884	1886	1:32 PM	1:44 PM	2	12	6.00	
1886	1890	1:44 PM	2:25 PM	4	41	10.25	
1890	1898	2:25 PM	3:47 PM	8	82	10.25	
1898	1899	3:47 PM	4:12 PM	1	7	7.00	Connection
1899	1900	4:12 PM	4:20 PM	1	8	8.00	
1900	1910	4:20 PM	6:14 PM	10	114	11.40	
1910	1912	6:14 PM	6:28 PM	2	14	7.00	
1912	1920	6:28 PM	7:51 PM	8	83	10.375	
1920	1921	7:51 PM	8:00 PM	1	9	9.00	
1921	1922	8:00 PM	8:04 PM	1	4	4.00	
1922	1923	8:04 PM	8:18 PM	1	14	14.00	
1923	1925	8:18 PM	8:27 PM	2	9	4.50	
1925	1928	8:27 PM	8:49 PM	3	22	7.33	
1928	1930	8:49 PM	9:08 PM	2	19	9.50	
1930	1931	9:08 PM	9:23 PM	1	15	15.00	
1931	1932	9:23 PM	---	1	---	---	Connection
1932	1933	9:38 PM	9:44 PM	1	6	6.00	
1933	1934	9:44 PM	9:58 PM	1	14	14.00	
1934	1935	9:58 PM	10:03 PM	1	5	5.00	
1935	1936	10:03 PM	10:15 PM	1	12	12.00	
1936	1938	10:15 PM	10:33 PM	2	18	9.00	
1938	1939	10:33 PM	10:38 PM	1	5	5.00	
1939	1940	10:38 PM	10:46 PM	1	8	8.00	
1940	1944	10:46 PM	11:16 PM	4	30	7.50	
1944	1950	11:16 PM	11:52 PM	6	36	6.00	
1950	1951	11:52 PM	11:58 PM	1	6	6.00	
1951	1953	11:58 PM	12:05 AM	2	7	3.50	
1953	1956	12:05 AM	12:27 AM	3	22	7.33	
1956	1957	12:27 AM	12:37 AM	1	10	10.00	
1957	1960	12:37 AM	12:53 AM	3	16	5.33	
1960	1961	12:53 AM	1:03 AM	1	10	10.00	
1961	1962	1:03 AM	1:08 AM	1	5	5.00	
1962	1963	1:08 AM	---	1	---	---	Connection
1963	1969	1:34 AM	1:55 AM	6	21	3.50	
1969	1970	1:55 AM	2:03 AM	1	8	8.00	
1970	1980	2:03 AM	2:56 AM	10	53	5.30	
1980	1987	2:56 AM	3:38 AM	7	42	6.00	
1987	1988	3:38 AM	3:40 AM	1	2	2.00	
1988	1990	3:40 AM	4:00 AM	2	20	10.00	
1990	1994	4:00 AM	4:16 AM	4	16	4.00	
1994	1995	4:16 AM	---	1	---	---	Connection
1995	1998	4:44 AM	5:00 AM	3	16	5.33	
1998	2000	5:00 AM	5:10 AM	2	10	5.00	
2000	2005	5:10 AM	5:37 AM	5	27	5.40	
2005	2010	5:37 AM	6:13 AM	5	36	7.20	
2010	2011	6:13 AM	---	1	---	---	Circ sample
2011	2015	6:36 AM	7:02 AM	4	26	6.50	
2015	2020	7:02 AM	7:54 AM	5	52	10.40	
2020	2024	8:15 AM	8:47 AM	4	32	8.00	
2024	2030	9:15 AM	9:52 AM	6	37	6.17	
2030	2035	10:02 AM	10:31 AM	5	29	5.80	
2035	2036	10:35 AM	10:48 AM	1	13	13.00	
2036	2037	10:48 AM	10:53 AM	1	5	5.00	
2037	2040	10:53 AM	11:31 AM	3	38	12.67	
2040	2041	11:31 AM	---	1	---	---	Circ
2041	2045	11:58 AM	12:18 PM	4	20	5.00	

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
2045	2046	12:18 PM	---	1	---	---	Circ
2046	2050	12:43 PM	1:04 PM	4	21	5.25	
2050	2051	1:04 PM	---	1	---	---	Circ
2051	2056	1:21 PM	1:41 PM	5	20	4.00	
2056	2061	6:00 PM	6:20 PM	5	20	4.00	Circ
2061	2062	6:20 PM	---	1	---	---	Circ
2062	2066	6:36 PM	6:55 PM	4	19	4.75	
2066	2067	6:55 PM	---	1	---	---	Circ
2067	2070	7:23 PM	7:29 PM	3	6	2.00	
2070	2071	7:29 PM	7:37 PM	1	8	8.00	
2071	2072	7:37 PM	---	1	---	---	Circ
2072	2076	8:22 PM	8:36 PM	4	14	3.50	
2076	2077	8:36 PM	---	1	---	---	Circ
2077	2081	9:46 PM	10:01 PM	4	15	3.75	
2081	2086	10:32 PM	10:52 PM	5	20	4.00	Circ
2086	2087	---	---	1	---	---	Circ mix mun
2087	2090	8:22 PM	8:42 PM	3	20	6.67	
2090	2094	8:42 PM	9:00 PM	4	18	4.50	
2094	2097	9:00 PM	9:26 PM	3	26	8.67	
2097	2098	9:26 PM	---	1	---	---	
2098	2100	9:59 PM	10:14 PM	2	15	7.50	
2100	2105	10:14 PM	10:47 PM	5	33	6.60	
2105	2107	10:47 PM	11:06 PM	2	19	9.50	
2107	2108	9:59 PM	10:11 PM	1	12	12.00	6¼" Diameter Button Bit
2108	2109	10:11 PM	10:43 PM	1	16	16.00	Bit No. 10
2109	2110	10:43 PM	10:48 PM	1	5	5.00	
2110	2120	10:48 PM	11:40 PM	10	52	5.20	
2120	2130	11:40 PM	12:33 AM	10	53	5.30	
2130	2140	12:33 AM	1:21 AM	10	48	4.80	
2140	2143	1:21 AM	1:35 AM	3	14	4.67	
2143	2144	1:35 AM	---	1	---	---	
2144	2146	2:25 AM	2:40 AM	2	15	7.50	
2146	2150	2:40 AM	3:00 AM	4	20	5.00	
2150	2153	3:00 AM	3:14 AM	3	14	4.67	
2153	2160	3:14 AM	3:41 AM	7	27	3.86	
2160	2163	3:41 AM	3:53 AM	3	12	4.00	
2163	2164	3:53 AM	---	1	---	---	
2164	2165	4:38 AM	4:43 AM	1	5	5.00	
2165	2170	4:43 AM	5:02 AM	5	19	3.80	
2170	2171	5:02 AM	5:06 AM	1	4	4.00	
2171	2180	5:06 AM	6:09 AM	9	63	7.00	
2180	2185	6:09 AM	6:50 AM	5	41	8.20	
2185	2189	6:50 AM	7:15 AM	4	25	6.25	
2189	2190	---	---	1	---	---	
2190	2200	2:37 PM	3:16 PM	10	39	3.90	
2200	2210	3:16 PM	3:52 PM	10	36	3.60	
2210	2220	3:52 PM	4:31 PM	10	39	3.90	
2220	2230	4:31 PM	5:42 PM	10	43	4.30	Connection
2230	2240	5:42 PM	6:26 PM	10	44	4.40	
2240	2250	6:26 PM	7:18 PM	10	52	5.20	
2250	2252	7:18 PM	7:27 PM	2	9	4.50	
2252	2253	7:27 PM	---	1	---	---	Connection
2253	2254	7:59 PM	8:12 PM	1	---	---	Geolograph?
2254	2260	8:12 PM	8:31 PM	6	19	3.17	
2260	2264	8:31 PM	8:43 PM	4	12	3.00	
2264	2268	8:43 PM	9:01 PM	4	18	4.50	

Top	Bottom	Start Time	End Time	Footage	Time (min.)	Penetration Rate (min/ft)	
2268	2269	9:01 PM	9:11 PM	1	10	10.00	
2269	2270	9:11 PM	9:15 PM	1	4	4.00	
2270	2280	9:15 PM	9:50 PM	10	35	3.50	
2280	2281	9:50 PM	---	1	---	---	Connection
2281	2290	10:20 PM	10:57 PM	9	37	4.11	
2290	2295	10:57 PM	11:18 PM	5	21	4.20	
2295	2296	11:18 PM	---	1	---	---	Work on pump
2296	2300	12:51 AM	1:09 AM	4	18	4.50	
2300	2306	1:09 AM	1:35 AM	6	26	4.33	
2306	2310	1:35 AM	1:46 AM	4	11	2.75	
2310	2311	1:46 AM	---	1	---	---	
2311	2320	2:01 AM	2:29 AM	9	28	3.11	
2320	2326	2:29 AM	3:01 AM	6	32	5.33	
2326	2330	3:01 AM	3:19 AM	4	18	4.50	
2330	2333	3:19 AM	3:31 AM	3	12	4.00	
2333	2340	3:31 AM	3:51 AM	7	20	2.86	
2340	2344	3:51 AM	4:00 AM	4	9	2.25	
2344	2345	4:00 AM	---	1	---	---	Connection
2345	2347	4:15 AM	4:20 AM	2	5	2.50	
2347	2348	4:20 AM	4:31 AM	1	11	11.00	
2348	2350	4:31 AM	4:42 AM	2	11	5.50	
2350	2357	4:42 AM	5:01 AM	7	19	2.71	
2357	2360	5:01 AM	5:15 AM	3	14	4.67	
2360	2362	5:15 AM	5:23 AM	2	8	4.00	
2362	2363	5:23 AM	5:30 AM	1	7	7.00	
2363	2370	5:30 AM	5:48 AM	7	18	2.57	
2370	2373	5:48 AM	5:59 AM	3	11	3.67	
2373	2377	5:59 AM	6:10 AM	4	11	2.75	
2377	2378	6:10 AM	---	1	---	---	Connection
2378	2380	6:31 AM	6:34 AM	2	3	1.50	
2380	2382	6:34 AM	6:38 AM	2	4	2.00	
2382	2390	6:38 AM	7:03 AM	8	25	3.125	
2390	2392	7:03 AM	7:10 AM	2	7	3.50	
2392	2400	7:10 AM	7:25 AM	8	15	1.875	
2400	2409	7:25 AM	7:45 AM	9	20	2.22	
2409	2410	7:45 AM	---	1	---	---	Connection
2410	2420	8:19 AM	8:45 AM	10	26	2.60	
2420	2430	8:45 AM	9:20 AM	10	35	3.50	
2430	2440	9:20 AM	10:10 AM	10	50	5.00	
2440	2441	10:10 AM	---	1	---	---	Connection
2441	2448	10:36 AM	11:18 AM	7	42	6.00	

Fall River Water Users District
South Madison Well Report

Appendix D
Bit Record
Borehole Deviation Record

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

APPENDIX D

BIT RECORD
FALL RIVER WATER DISTRICT

SOUTH MADISION WELL

Bit No.	Size	Type	Depth In	Depth Out	New/Used	Footage
1	17½-inch	Long Tooth Rock Bit	Surface	31 feet	Used	31
2	14¾ - inch	Long Tooth Rock Bit	31 feet	114 feet	Used	83
3	8¾ - inch	Long Tooth Rock Bit	114 feet	469 feet	Used	355
2	14¾ - inch	Long Tooth Rock Bit	114 feet	603 feet	Used	489
4	9½-inch	Long Tooth Rock Bit	603 feet	846 feet	Re-Conditioned	243
5	9½-inch	Button Bit	846 feet	904 feet	Re-Conditioned	58
6	8¾-inch	Button Bit	904 feet	1,076 feet	Re-Conditioned	172
7	8¾-inch	Button Bit	1,076 feet	1,736 feet	Re-Conditioned	660
8	8¾-inch	Button Bit	1,736 feet	2,107 feet	Re-Conditioned	371
9	6⅛-inch	Long Tooth Rock Bit	2,107 feet	2,107 feet	Used	[1]0
10	6⅛-inch	Button Bit	2,107 feet	2,453 feet	Re-Conditioned	346

[1] Bit used to drill out cement in casing

BOREHOLE DEVIATION RECORD
FALL RIVER WATER DISTRICT

SOUTH MADISION WELL

Borehole Depth (feet - KB)	Degree Deviation
200	<¼°
585	1°
895	1½°
1,209	¾°

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL REPORT

APPENDIX E
LITHOLOGY

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

APPENDIX E
FALL RIVER WATER USERS DISTRICT
FALL RIVER SOUTH MADISON WELL
LITHOLOGY LOG

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
12/3/12	0 – 30	S.S./Calcified river bank debris	Reddish brown w/ some salmon colored, v. fine – fine mod. indurated, round, sands w/ greyish brown, calcified river bank plant and soil sediment. Numerous pipes & vugs where the soil surrounding the plant shoots has calcified & the plant has decomposed leaving an open void. This material caused lost circulation problems for the Driller. Also grey, well indurated salt & pepper textured, v. fine, sub-round sandstone w/ yellowish brown chert and trace of purple siltstone.
	30 – 60	Sand	Salmon colored, loose, v. fine to fine, sub-angular quartz sand w/ grey, well indurated, salt & pepper textured, v. fine, sub-round sands, both are non-calcareous.
	60 – 90	Sand	Salmon colored, loose A.A., v. fine grained sub-round to round.
	90–120	Sand	Brownish-gray, soft-loose, v. fine to fine, sub-round to round sands, sltly calc. w/ some iron staining.
	120-150	Sand	Reddish brown to grayish red, soft to loose, well sorted, fine grained, sub-ang. to sub-round, quartz sand, sltly glauconitic w/ 5 to 15% gray to bluish gray, soft v. fine to silt size sandstone.
	150-180	Sand	Salmon colored, loose, well sorted fine, sub-round, qtz sands w/ trace of round med. grained sands, sltly glauconitic w/ 15% mafic mat'l.
	180-210	Sand	A.A., slightly darker – pinkish gray w/ trace of gray & purple soft siltsone w/ < 3% lt. tan calcite chips.
	210-240	Sand	Same as 150 to 180 sample.
	240-270	Sand	A.A.

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
	270-300	Sand	Grayish orange pink (5 yr 7/2), loose, well sorted fine grained, rounded, quartz sands non-calc.
12/3/12	300-330	Sand	Grayish brown salt & pepper textured, loose, well sorted, fine, sub-ang. to round, quartz sands, trace glauconitic w/ sands A.A.
	330-360	Siltstone	Black to drk grey, mod. ind. Siltstone w/ sands A.A. w/ < 5% brown calcite chips.
	360-390	Siltstone/S.S.	Siltstone A.A. w/ 25 to 50% gray, lt gray & tan mod. indurated, fine to v. fine, sub-ang. to sub-round, sands, w/ trace of salmon colored sands and trace of greenish gray, soft white w/ calcite chips A.A.
	390-420	SS/Siltstone	A.A. w/ siltstone decreasing, SS is predominantly gray, salt & pepper textured sands are mostly loose.
	420-450	SS	Gray to tannish gray, loose to mod. ind. well sorted, fine, sub-ang. to sub-round quartz sands, sltly glauconitic w/ < 3% siltstone A.A.
	450-480	SS	Reddish-drk gray, loose to mod. ind. SS fine grained, sub-ang. to sub-round, quartz sands A.A., hematite staining w/ gray siltstone A.A. (15 to 25%).
	480-510	SS	A.A. w/ increasing amount of pink to salmon colored SS.
	510-520	Mudstone	Lt. gray to greenish gray, soft, non-calc. w/ abundant reddish brown to salmon sltly hematite stained SS A.A. w/ trace of buff calcite.
	520-550	Mudstone/LS	Mudstone A.A. w/ tan, fossiliferous LS (small tubes) w/ black carbonaceous shale to poor coal flecks (≈ 5%).
	550-580	Mudstone/Claystone	Gray to greenish gray, soft, non-calc. w/ reddish brown to & greenish gray v. fine mod. cemented, sub-ang. SS w/ 15% tan fossilferous LS as above.
	580-610	Mudstone/Claystone	A.A. w/ SS A.A. plus trace of yellow SS and siltstone, sand are v. fine to fine sub-round to round w/ minor amount < 3% med. Size round to well-rounded qtz sands.
	610-640	Sandstone	Lt. gray, v. fine to fine, sub-ang. quartz sands w/ trace of hematite staining w/ trace of white

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
			gypsum w/ occasional satin spar w/ 3 to 5% reddish brown SS A.A.
	640-670	Siltstone	Red to reddish brown w/ trace of gypsum A.A. w/ trace of mudstone A.A.
	670-700	Siltstone	A.A. w/ 3% gray to greenish/bluish gray A.A. claystone w/ gypsum (trace A.A.) w/ trace of lt. gray, v. fine, mod. cemented SS.
12/3/12	700-730	Siltstone	Red to reddish brown, mod. hard to hard w/ reddish brown, v. fine, sub-round SS w/ trace of white gypsum and satin spar.
	730-760	Siltstone	A.A. w/ trace of green to greenish gray soft mudstone w/ gypsum/satin spar A.A.
	760-790	Siltstone	A.A. w/ 15% green to greenish gray mudstone A.A. w/ trace of satin spar A.A.
	790-820	Siltstone	Reddish-brown siltstone w/ 5% green mudstone A.A. w/ 3% white quartz v. fine round sands w/ white gypsum A.A.
	820-850	Siltstone	Reddish brown – A.A. w/ just a trace of green mudstone & gypsum and < 3% reddish brown to orange v. fine SS.
	850-880	Gypsum	White to lt. grayish tan, crystalline w/ 5 – 15% red siltstone A.A. w/ trace of green mudstone A.A.
	880-890	Gypsum	A.A. w/ 5% siltstone A.A.
	890-940	Siltstone	Reddish-brown, mod. hard w/ 3% white gypsum and satin spar cuttings w/ 3% lt. green mudstone (non-calc.), sltly variegated.
	940-970	Siltstone	Reddish brown predominantly w/ some (5%) maroonish tan siltstone, trace of lt. green mudstone A.A. w/ trace of gypsum A.A.
	970-980	Siltstone	Reddish brown w/ greenish gray siltstone, sltly variegated w/ maroonish tan to brownish pink siltstone. Minor amount of v. fine round SS w/ < 3% gypsum (satin spar).
	980-990	Siltstone	Drk reddish brown siltstone w/ trace of lt. grayish tan gypsum.
	990-1000	Siltstone	A.A. w/ trace of lt. tan to buff siltstone (non-calc.) w/ trace of gypsum A.A. & trace of lt. green mudstone.

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
	1000-1010	Siltstone	Drk reddish brown w/ trace of lt. gray gypsum.
	1010-1050	Siltstone	A.A.
	1050-1060	Siltstone	A.A.
	1062 ft.		Minnekahta
	1060-1070	Limestone	Pinkish brown, aphanitic, LS w/ < 3% red siltstone A.A. w/ trace of lt. green, non-calc. mudstone sltly variegated red & green siltstone also.
12/3/12	1070-1080	Limestone	A.A.
	1080-1090	L.S.	Reddish brown, aphanitic L.S. w/ 15% pinkish brown L.S. A.A. w/ trace of lt. green shale/mudstone A.A.
	1090-1100	L.S.	Pinkish brown & lt. tan to buff aphanitic L.S.
	1100-1110	L.S.	Reddish brown and grayish tan, v. fine grained dolomitic L.S. w/ trace of reddish brown siltstone.
	1110-1130	Siltstone	Drk reddish brown, mod. hard, non-calc. siltstone w/ < 3% brick red siltstone.
	1130-1140	Gypsum	Pinkish white to white, fine grained, sugary textured gypsum w/ 15% siltstone A.A.
	1140-1150	Siltstone/Gypsum	Reddish brown (brick red) siltstone A.A. w/ gypsum A.A. (some satin spar) w/ trace of lt. green siltstone (very sltly variegated red/green).
	1150-1160	Siltstone	Brick red siltstone A.A. w/ 3% gypsum A.A. & trace of lt. green siltstone A.A.
	1160-1170	Siltstone	A.A. w/ trace of gypsum A.A.
	1170-1180	Siltstone	Drk reddish brown to maroon, mod. hard to soft siltstone w/ trace of white to gray gypsum.
	1180-1190	Siltstone	A.A. w/ trace of satin spar gypsum & trace lt. green to sltly variegated green/maroon siltstone.
	1190-1200	Sandstone	Orangish brown, fine grained, sub-round to round quartz sandstone, mod. to poorly

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
			indurated non-calcareous w/ 25% siltstone (drk reddish brown) A.A. w/ trace of satin spar gypsum A.A.
	1200-1210	Siltstone	Drk reddish brown siltstone A.A.
	1210-1220	Siltstone	A.A.
	1220-1230	Siltstone	A.A. w/ trace of orangish red, v. fine, sub-round to round SS.
	1230-1240	Siltstone	A.A. w/ trace of white (satin spar) gypsum very sltly variegated w/ lt. green siltstone.
	1240-1250	Siltstone/Sandstone	Siltstone A.A. w/ orangish red, v. fine sub-round to round sandstone, non-calc. w/ trace of gypsum and lt. green siltstone A.A.
12/3/12	1250-1260	Siltstone	Drk reddish brown A.A. w/ ≈ 3% SS A.A. w/ trace of gypsum & lt. green siltstone A.A. w/ trace of drk grayish green, soft, silty claystone, sltly plastic, calcareous.
	1253 (?)		Minnelusa
	1260-1270	Siltstone	Drk reddish brown A.A. w/ < 3% satin spar gypsum A.A. w/ trace of drk grayish green non-calc. siltstone, well to mod. indurated w/ trace of lt. green siltstone A.A.
	1270-1280	Sandstone	Orangish red, v. fine, round quartz SS w/ siltstone A.A. w/ trace of lt. green siltstone A.A. w/ < 3% gypsum (satin spar) w/ trace of lt. gray to white w/ black striations limestone plus white to pinkish tan v. fine grained silty sandstone.
	1280-1290	Siltstone	Drk reddish siltstone A.A. w/ < 3% SS A.A. w/ trace of green siltstone, v. sltly calc. w/ trace of satin spar A.A.
	1290-1300	Siltstone	Drk reddish brown A.A. w/ 3 to 5% satin spar gypsum w/ ≈ 25% orangish-red, v. fine, round grained sandstone A.A.
	1300-1330	Gypsum	Lt. gray w/ large crystals w/ 25% siltstone A.A. w/ trace of lt. green blocky shale.
	1330-1360	Dolomite	Lt. brownish gray, fine grained w/ 5% drk red siltstone A.A. w/ 5% gypsum A.A. w/ trace of lt.

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
			green shale.
12/17/12	1360-1390	Sandstone	Gray to lt. brownish gray, silty, v. fine, sub-round to round SS w/ 15% maroon to reddish brown siltstone w/ trace of white gypsum.
	1390-1420	Sandstone/siltstone	Sandstone, gray to lt. brownish gray A.A. and white, v. fine, sub-round to round quartz SS w/ reddish brown siltstone A.A. w/ trace of pinkish white gypsum and trace of L.S. on calcite chip.
	1420-1450	LS/siltstone	Brownish gray, fine textured L.S. w/ red to maroon siltstone A.A. w/ 3% greenish gray, soft shale (non-calc.) w/ trace of gypsum A.A.
	1450-1480	Siltstone	Brick red to maroon, sandy siltstone w/ trace of gypsum (satin spar) w/ < 3% of the greenish gray shale A.A. w/ trace of white v. fine to fine grain, sub-round to round SS.
	1480-1520	Siltstone	Brick red siltstone A.A. w/ trace of white gypsum & trace of lt. green shale A.A.
	1520-1540	Siltstone	Grayish black, v. hard, non-calc. w/ 25% red siltstone A.A. w/ trace of satin spar gypsum.
12/17/12	1540-1570	Siltstone	A.A. w/ some anhydrite.
	1570-1600	Siltstone	A.A. – 50% red & 50% blackish gray A.A. w/ gypsum and anhydrite (trace).
	1600-1630	Siltstone	Drk reddish brown, sandy siltstone A.A. w/ 25% to 40% white to grayish tan gypsum.
	1630-1660	Shale	Greenish gray, silty, non-calc., mod. hard shale w/ 15% red siltstone A.A. w/ trace of gypsum A.A.
	1660-1690	Shale/SS	Greenish gray silty shale A.A. w/ green to greenish gray, v. fine, mod. indurated, sub-round to round SS w/ trace of white gypsum and 5% red siltstone A.A.
12/18/12	1690-1720	Shale	Greenish gray shale and red siltstone A.A. w/ trace of tan to white, v. fine to fine, round sandstone w/ trace of gypsum.
	1720-1750	Siltstone	Brick red to reddish brown w/ lt. green, gray tan & white sandstone A.A. w/ < 3% gypsum w/ 25% greenish gray shale A.A. w/ trace of brown aphanitic dolomite.

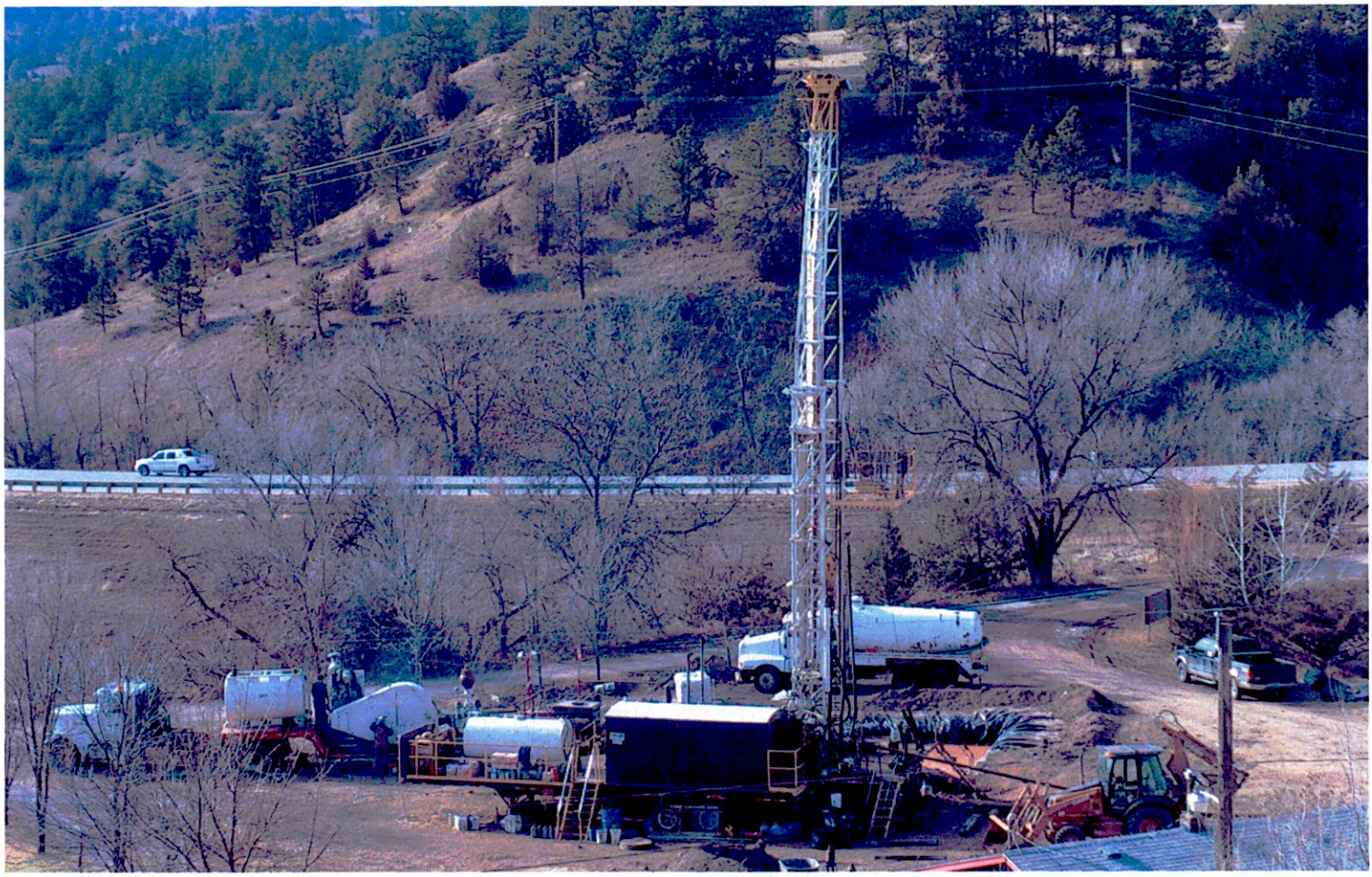
DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
	1750-1780	Sandstone	Greenish gray to tan, v. fine to fine, sub-round to round grained, mod. indurated SS w/ 15% red siltstone A.A. plus < 3%of gypsum.
	1780-1810	Dolomite	Brown, v. fine textured, some thin black striations w/ 5% red siltstone A.A. and 5% greenish gray shale w/ trace of gypsum.
	1810-1840	Shale	Greenish gray, blocky, non-calc. shale w/ 15% red siltstone A.A. w/ trace of pinkish red to white, v. fine, sub-round to round grained SS w/ trace of gypsum.
	1840-1870	Dolomite	Brown, v. fine textured, w/ 25 to 40% red soft siltstone, ≈ 5%drk gray shale and trace of white gypsum (large cuttings).
	1870-1900	Dolomite	Greenish brown, v. fine textured A.A. w/ 3 to 5% red siltstone A.A. w/ < 3% drk gray shale A.A. w/ 3% soft white gypsum & gypsum crystals.
	1900-1930	Shale	Drk gray to black & drk greenish gray, sltly fissile, calcareous soft shale w/ 5 to 15% red siltstone A.A. w/ 3 to 5% tan, fine textured dolomite w/ trace of orangish red, fine grained SS plus trace of white to pink gypsum and trace of yellowish green shale.
	1930-1960	Dolomite/SS	Brown to tan fine textured dolomite w/ 25% drk gray to black shale A.A. w/ 5 to 15% red siltstone w/ tan to white v. fine, round grained sandstone w/ trace of green & bluish gray SS.
12/19/12	1960	Sandstone	Sample at 1960 is predominantly tan to buff fine to f. fine SS as above w/ 40% red siltstone A.A. w/ less gray shale (< 5%) w/ some dolomite A.A. and trace of gypsum, SS is calcarous.
	1960-1970	Sandstone	Tan to buff/white A.A. w/ 40% red siltstone and greenish gray shales A.A. w/ trace of white gypsum and yellowish green shale.
	1970-1980	Sandstone	A.A.
	1980-1990	Sandstone	Tan to buff/white SS as above w/ lt. greenish gray and purple shale and SS w/ trace of pinkish white gypsum w/ 3% red siltstone A.A. & trace of green, purple and bluish gray SS, v. fine, round grained A.A.

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
	1990-2000	Sandstone	A.A., sand is very sltly to non-calcareous.
	2000-2010 2010 bottoms up	Sandstone	Purplish to maroonish white, v. fine, round grained silty calc. SS w/ tan to buff SS A.A. w/ < 3% greenish gray shales w/ trace of white chalky limestone (not a strong effervescence) w/ trace of red and lt. green variegated siltstone/mudstone.
	2015 circ	Sandstone/dolomite	Lt. tan to lt. greenish gray, v. fine SS A.A. w/ grayish brown, fine textured, dolomite w/ 3% each a reddish brown siltstone, and drk greenish gray shale.
	2020 circ	Sandstone/dolomite	Brownish gray to tan, v. fine SS A.A. w/ brownish to greenish brown-gray fine textured dolomite w/ 3 – 5% greenish gray shale and < 3% greenish gray sandstone, v.fine, round grained SS.
	2024 circ	Sandstone	Lt. greenish gray and maroonish purple v. fine, round grained SS w/ greenish gray shale (15%) and < 3% red siltstone sltly variegated red/green siltstone.
12/19/12	2030 circ	Siltstone	Red siltstone or silty shale A.A. w/ 15% greenish gray shale A.A. w/ lt. greenish gray SS A.A. w/ 3% yellow to orangish yellow chert w/ trace of soft lt. green shale and moderate amount of white to buff limestone chips.
	2035 circ	Shale	Red silty shale A.A. w/ 15% greenish gray shale A.A. w/ white to tannish brown v. fine SS and white to buff and lt. pink aphanitic LS chips w/ trace of anhydrite.
	2040 circ	Sandstone	White v. fine, round grained w/ tan to white sucrosic dolomite w/ 25% red and greenish gray shales A.A. w/ trace of anhydrite w/ soft white L.S. chips.
	2045 circ	Sandstone/LS	White SS A.A. w/ tan to lt. brown & white fine textured L.S. w/ 40% red shale A.A. w/ < 3% greenish gray shale A.A. w/ trace to < 3% lt. green, soft shale.
	2050 circ	Shale	Red, silty shale w/ < 3% drk greenish gray shale w/ white and salmon colored, aphanitic to v. fine textured L.S. w/ trace of anhydrite and minor amount of SS A.A. w/ trace of lt.

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
			green SS.
	2055 circ	Siltstone/claystone	Lt. reddish brown soft siltstone and claystone w/ yellowish brown, soft, non-calc. siltstone w/ ≈ 3% white to lt. grayish white L.S. w/ trace of drk gray shale A.A.
	2060 circ	Siltstone	Lt. reddish brown and yellowish brown siltstone A.A. w/ 3% lt. brown to white aphanitic limestone w/ trace of drk gray shale A.A. and lt. green soft whale (non-calc.).
	2066 circ	Shale	Red to reddish brown and maroon silty shale w/ yellowish brown siltstone A.A., sltly variegated w/ < 3% white to tan fine textured L.S. w/ trace of white v. fine grained SS w/ < 3% drk greenish gray shale A.A.
12/20/12	2071 circ	Shale	Red & purplish maroon shale A.A. w/ yellow brown shale & siltstone A.A. w/ < 3% white, v. fine, round grained SS w/ ≈ 3% white to lt. brown fine textured L.S. w/ < 3% drk gray shale, shale and siltstone is sltly variegated.
	2076 circ	Shale	Shale A.A. w/ only trace of SS.
	2081 circ	Shale	Red & maroon w/ yellowish brown silty shale A.A. w/ 3 – 15% white and maroon, v. fine, sub-round to round SS w/ < 3% tan L.S. w/ < 3% drk greenish gray shale A.A.
	2086 circ	Shale	Mostly red to maroonish red, soft to mod. hard shale w/ ≈ 5% yellowish brown shale A.A. w/ trace of chert (pink) and buff to lt. greenish gray shale (non-calc.) w/ minor amount of red SS A.A.
	2097 circ	Shale	Red to maroon variegated w/ yellowish brown and green shales w/ gray to drk gray sltly fissile soft shale w/ brown to lt. tan aphanitic L.S. w/ soft red clay.
12/20/12	2097-2107	Sandstone	White, mod. indurated, v. fine, round grained w/ some very light green SS w/ shales & LS A.A.
1/5/2013	2100-2130	Limestone/shale	Lt. tan to white, aphanitic to v. fine textured LS w/red, silty shale.
	2130-2160	Shale	Red silty shale A.A. w/ grayish green, v. fine grained, sltly mafic SS, mod. indurated w/

DATE	DEPTH	MAJOR LITHOLOGY	DESCRIPTION
			white calc. siltstone & lt. greenish gray shale w/ 3% LS A.A.
	2160-2190	Limestone	White, Lt. tan to buff c olored, aphanitic to v. sltly sucrosic textured w/ < 3% red w/ trace of lt. green shale A.A.
	2190-2220	Limestone	White to lt. tan, L.S. as above w/ 3 to 5% shales A.A.
	2220-2250	Limestone	Lt. tan aphanitic LS w/ white, v. fine to sucrosic textured LS w/ red shales A.A. w/ trace of green, v. fine grained mafic SS.
	2250-2280	Dolomite	White, sucrosic, soft dolomite w/ > 40% lt. tan LS as above w/ 3% shale A.A. Cuttings are very small.
	2280-2310	Dolomite	A.A. w/ 3 to 5% tan LS A.A. w/ 5 to 15% red shale A.A.
	2310-2330	Sandstone	Salmon colored, v. fine, round mod. cemented, non-calc. w/ white dolomite & lt. tan LS (3%) as above.
	2330-2360	SS/LS	Salmon to pink SS A.A w/ tan to lt. brown aphanitic LS w/ trace of white dolomite A.A.
	2360-2390	Dolomite	Tan, very dolomitic dolomite w/ 15% lt. pink to lt. salmon, v. fine to sucrosic textured dolomite.
	2390-2420	Dolomite	Lt. tan, sucrosic to fine textured w/ 15% brick red, hard siltstone w/ trace of greenish gray argillaceous sand, v. fine w/ minor amount of light pink dolomite A.A.
	2420-2450	Siltstone	Red, v. hard siltstone w/ minor amount of red to lt. pink, v. fine, round SS w/ trace of lt. whitish green mudstone (sltly variegated) w/ tan to lt. tan dolomite (40%).

FALL RIVER WATER USERS DISTRICT
SOUTH MADISON WELL REPORT



APPENDIX F
WATER QUALITY

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Wester-Wetstein and Associates
Project: FRWUD South Madison Well
Lab ID: C13030036-001
Client Sample ID: FRWUD S. Madison Well

Report Date: 03/29/13
Collection Date: 02/28/13 11:45
DateReceived: 03/01/13
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Iron Related	500	CFU/ml		1.0		IRB-BART	03/01/13 11:10 / mkf
MAJOR IONS							
Acidity, Total as CaCO3	ND	mg/L		5		A2310 B	03/05/13 08:09 / jba
Alkalinity, Total as CaCO3	210	mg/L		1		A2320 B	03/01/13 16:26 / wc
Carbonate as CO3	ND	mg/L		1		A2320 B	03/01/13 16:26 / wc
Bicarbonate as HCO3	256	mg/L		1		A2320 B	03/01/13 16:26 / wc
Calcium	77	mg/L		1		E200.7	03/06/13 14:49 / eli-b
Chloride	99	mg/L		1		E300.0	03/01/13 01:37 / eli-r
Fluoride	0.7	mg/L		0.1		E300.0	03/01/13 01:37 / eli-r
Magnesium	32	mg/L		1		E200.7	03/06/13 14:49 / eli-b
Nitrogen, Nitrate+Nitrite as N	0.3	mg/L		0.1	10	E353.2	03/04/13 11:03 / lr
Nitrogen, Nitrite as N	ND	mg/L		0.1		E300.0	03/01/13 01:37 / eli-r
Potassium	7	mg/L		1		E200.7	03/06/13 14:49 / eli-b
Silica	16.1	mg/L		0.2		E200.7	03/06/13 14:49 / eli-b
Sodium	59	mg/L		1		E200.7	03/06/13 14:49 / eli-b
Sulfate	142	mg/L		1		E300.0	03/01/13 01:37 / eli-r
NON-METALS							
Cyanide, Total	ND	mg/L		0.005	0.2	Kelada-01	03/07/13 13:02 / eli-b
PHYSICAL PROPERTIES							
Color	ND	c.u.		5.0		A2120 B	03/01/13 11:30 / ab
Conductivity @ 25 C	902	umhos/cm		5		A2510 B	03/05/13 10:39 / eli-r
Hardness as CaCO3	325	mg/L		1		A2340 B	03/06/13 14:49 / sdw
Odor	NOO	T.O.N.		1		A2150 B	03/01/13 11:30 / ab
pH	7.80	su		0.01		A4500-H B	03/05/13 10:03 / eli-r
Solids, Total Dissolved TDS @ 180 C	556	mg/L		10		A2540 C	03/06/13 13:58 / eli-r
Turbidity	1.1	NTU		0.1		A2130 B	03/01/13 12:00 / ab
Corrosivity	0.53	unitless				A2330 B	03/25/13 11:50 / sdw
MBAS, calculated as LAS, MW 342	< 1.0	mg/L		1.0		A5540 C	03/01/13 11:45 / wc
- Color measured at pH 7.71.							
- NOO = No odor observed.							
METALS - TOTAL							
Aluminum	ND	mg/L		0.1	0.2	E200.8	03/06/13 12:35 / eli-b
Antimony	ND	mg/L		0.001	0.006	E200.8	03/06/13 12:35 / eli-b
Arsenic	0.006	mg/L		0.001	0.01	E200.8	03/06/13 12:35 / eli-b
Barium	ND	mg/L		0.1	2	E200.8	03/06/13 12:35 / eli-b
Beryllium	ND	mg/L		0.001	0.004	E200.8	03/06/13 12:35 / eli-b
Boron	0.2	mg/L		0.1		E200.7	03/06/13 15:11 / eli-b
Cadmium	ND	mg/L		0.001	0.005	E200.8	03/06/13 12:35 / eli-b
Chromium	ND	mg/L		0.05	0.1	E200.8	03/06/13 12:35 / eli-b
Copper	ND	mg/L		0.01	1.3	E200.8	03/06/13 12:35 / eli-b
Iron	0.20	mg/L		0.03	0.3	E200.7	03/06/13 15:11 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Wester-Wetstein and Associates
Project: FRWUD South Madison Well
Lab ID: C13030036-001
Client Sample ID: FRWUD S. Madison Well

Report Date: 03/29/13
Collection Date: 02/28/13 11:45
DateReceived: 03/01/13
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Lead	ND	mg/L		0.001	0.015	E200.8	03/06/13 12:35 / eli-b
Manganese	ND	mg/L		0.01	0.05	E200.8	03/06/13 12:35 / eli-b
Mercury	ND	mg/L		0.0001	0.002	E245.1	03/06/13 13:55 / eli-b
Nickel	ND	mg/L		0.05		E200.8	03/06/13 12:35 / eli-b
Selenium	0.005	mg/L		0.001	0.05	E200.8	03/06/13 12:35 / eli-b
Silver	ND	mg/L		0.01	0.1	E200.8	03/06/13 12:35 / eli-b
Thallium	ND	mg/L		0.0004	0.002	E200.8	03/06/13 12:35 / eli-b
Uranium	0.0054	mg/L		0.0003	0.03	E200.8	03/06/13 12:35 / eli-b
Zinc	ND	mg/L		0.01	5	E200.8	03/06/13 12:35 / eli-b
RADIONUCLIDES - TOTAL							
Gross Alpha	16.9	pCi/L	*		15	E900.0	03/15/13 10:10 / lbb
Gross Alpha precision (±)	3.4	pCi/L				E900.0	03/15/13 10:10 / lbb
Gross Alpha MDC	2.6	pCi/L				E900.0	03/15/13 10:10 / lbb
Gross Beta	3.3	pCi/L	U		50	E900.0	03/15/13 10:10 / lbb
Gross Beta precision (±)	4.4	pCi/L				E900.0	03/15/13 10:10 / lbb
Gross Beta MDC	4.4	pCi/L				E900.0	03/15/13 10:10 / lbb
Radium 226	1.3	pCi/L				E903.0	03/27/13 14:05 / trs
Radium 226 precision (±)	0.2	pCi/L				E903.0	03/27/13 14:05 / trs
Radium 226 MDC	0.09	pCi/L				E903.0	03/27/13 14:05 / trs
Radium 228	-0.09	pCi/L	U			RA-05	03/19/13 15:04 / plj
Radium 228 precision (±)	0.8	pCi/L				RA-05	03/19/13 15:04 / plj
Radium 228 MDC	0.9	pCi/L				RA-05	03/19/13 15:04 / plj
Radium 226 + Radium 228	1.8	pCi/L			5	A7500-RA	03/28/13 10:37 / res
Radium 226 + Radium 228 precision (±)	0.9	pCi/L				A7500-RA	03/28/13 10:37 / res
Radium 226 + Radium 228 MDC	0.9	pCi/L				A7500-RA	03/28/13 10:37 / res
- See case narrative regarding combined Ra226+Ra228 calculation.							
DATA QUALITY							
A/C Balance (± 5)	-3.84	%				A1030 E	03/25/13 11:50 / sdw
Anions	9.98	meq/L				A1030 E	03/25/13 11:50 / sdw
Cations	9.24	meq/L				A1030 E	03/25/13 11:50 / sdw
Solids, Total Dissolved Calculated	560	mg/L				A1030 E	03/25/13 11:50 / sdw
TDS Balance (0.80 - 1.20)	0.990					A1030 E	03/25/13 11:50 / sdw
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,1,1-Trichloroethane	ND	ug/L		0.50	200	E524.2	03/04/13 17:41 / jk
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,1,2-Trichloroethane	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk
1,1-Dichloroethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,1-Dichloroethene	ND	ug/L		0.50	7	E524.2	03/04/13 17:41 / jk
1,1-Dichloropropene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,2,3-Trichlorobenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,2,3-Trichloropropane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
* - The result exceeds the MCL.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Wester-Wetstein and Associates
Project: FRWUD South Madison Well
Lab ID: C13030036-001
Client Sample ID: FRWUD S. Madison Well

Report Date: 03/29/13
Collection Date: 02/28/13 11:45
DateReceived: 03/01/13
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
1,2,4-Trichlorobenzene	ND	ug/L		0.50	70	E524.2	03/04/13 17:41 / jk
1,2,4-Trimethylbenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,2-Dibromo-3-chloropropane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,2-Dibromoethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,2-Dichlorobenzene	ND	ug/L		0.50	600	E524.2	03/04/13 17:41 / jk
1,2-Dichloroethane	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk
1,2-Dichloropropane	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk
1,3,5-Trimethylbenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,3-Dichlorobenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,3-Dichloropropane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
1,4-Dichlorobenzene	ND	ug/L		0.50	75	E524.2	03/04/13 17:41 / jk
2,2-Dichloropropane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
2-Chlorotoluene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
4-Chlorotoluene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Benzene	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk
Bromobenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Bromochloromethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Bromodichloromethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Bromoform	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Bromomethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Carbon tetrachloride	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk
Chlorobenzene	ND	ug/L		0.50	100	E524.2	03/04/13 17:41 / jk
Chlorodibromomethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Chloroethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Chloroform	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Chloromethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
cis-1,2-Dichloroethene	ND	ug/L		0.50	70	E524.2	03/04/13 17:41 / jk
cis-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Dibromomethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Dichlorodifluoromethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Ethylbenzene	ND	ug/L		0.50	700	E524.2	03/04/13 17:41 / jk
Hexachlorobutadiene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Isopropylbenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
m+p-Xylenes	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Methyl tert-butyl ether (MTBE)	ND	ug/L		2.0		E524.2	03/04/13 17:41 / jk
Methylene chloride	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk
Naphthalene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
n-Butylbenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
n-Propylbenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
o-Xylene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
p-Isopropyltoluene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
sec-Butylbenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Styrene	ND	ug/L		0.50	100	E524.2	03/04/13 17:41 / jk
tert-Butylbenzene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Tetrachloroethene	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Wester-Wetstein and Associates
Project: FRWUD South Madison Well
Lab ID: C13030036-001
Client Sample ID: FRWUD S. Madison Well

Report Date: 03/29/13
Collection Date: 02/28/13 11:45
DateReceived: 03/01/13
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
VOLATILE ORGANIC COMPOUNDS							
Toluene	ND	ug/L		0.50	1000	E524.2	03/04/13 17:41 / jk
trans-1,2-Dichloroethene	ND	ug/L		0.50	100	E524.2	03/04/13 17:41 / jk
trans-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Trichloroethene	ND	ug/L		0.50	5	E524.2	03/04/13 17:41 / jk
Trichlorofluoromethane	ND	ug/L		0.50		E524.2	03/04/13 17:41 / jk
Vinyl chloride	ND	ug/L		0.50	2	E524.2	03/04/13 17:41 / jk
Xylenes, Total	ND	ug/L		0.50	10000	E524.2	03/04/13 17:41 / jk
Trihalomethanes, Total	ND	ug/L		0.50	80	E524.2	03/04/13 17:41 / jk
Surr: Dibromofluoromethane	91.0	%REC		70-130		E524.2	03/04/13 17:41 / jk
Surr: p-Bromofluorobenzene	111	%REC		70-130		E524.2	03/04/13 17:41 / jk
Surr: Toluene-d8	102	%REC		70-130		E524.2	03/04/13 17:41 / jk
SYNTHETIC ORGANIC COMPOUNDS - PESTICIDES							
1,2-Dibromo-3-chloropropane	ND	ug/L		0.020	0.2	E504.1	03/12/13 03:01 / dw
1,2-Dibromoethane	ND	ug/L		0.010	0.05	E504.1	03/12/13 03:01 / dw
1,2,3-Trichloropropane	ND	ug/L		0.050		E504.1	03/12/13 03:01 / dw
Surr: 1,1,1,2-Tetrachloroethane	115	%REC		63-130		E504.1	03/12/13 03:01 / dw
SYNTHETIC ORGANIC COMPOUNDS - HERBICIDES							
2,4-D	ND	ug/L		1.0	70	E515.1	03/11/13 21:59 / eli-b
2,4-DB	ND	ug/L		2.5		E515.1	03/11/13 21:59 / eli-b
Dalapon	ND	ug/L		2.5	200	E515.1	03/11/13 21:59 / eli-b
Dicamba	ND	ug/L		0.25		E515.1	03/11/13 21:59 / eli-b
Dichlorprop	ND	ug/L		1.0		E515.1	03/11/13 21:59 / eli-b
Dinoseb	ND	ug/L		1.0	7	E515.1	03/11/13 21:59 / eli-b
Pentachlorophenol	ND	ug/L		0.040	1	E515.1	03/11/13 21:59 / eli-b
Picloram	ND	ug/L		0.50	500	E515.1	03/11/13 21:59 / eli-b
2,4,5-TP (Silvex)	ND	ug/L		0.20	50	E515.1	03/11/13 21:59 / eli-b
Surr: DCAA	81.0	%REC		70-130		E515.1	03/11/13 21:59 / eli-b
SEMI-VOLATILE ORGANIC COMPOUNDS							
Alachlor	ND	ug/L		0.10	2	E525.2	03/07/13 04:18 / eli-b
Aldrin	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Aroclor 1016	ND	ug/L		0.080		E525.2	03/07/13 04:18 / eli-b
Aroclor 1221	ND	ug/L		2.0		E525.2	03/07/13 04:18 / eli-b
Aroclor 1232	ND	ug/L		0.50		E525.2	03/07/13 04:18 / eli-b
Aroclor 1242	ND	ug/L		0.30		E525.2	03/07/13 04:18 / eli-b
Aroclor 1248	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Aroclor 1254	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Aroclor 1260	ND	ug/L		0.20		E525.2	03/07/13 04:18 / eli-b
Atrazine	ND	ug/L		0.10	3	E525.2	03/07/13 04:18 / eli-b
Benzo(a)pyrene	ND	ug/L		0.10	0.2	E525.2	03/07/13 04:18 / eli-b
bis(2-ethylhexyl)Adipate	ND	ug/L		0.50	400	E525.2	03/07/13 04:18 / eli-b
bis(2-ethylhexyl)Phthalate	ND	ug/L		2.0	6	E525.2	03/07/13 04:18 / eli-b

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

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Wester-Wetstein and Associates
Project: FRWUD South Madison Well
Lab ID: C13030036-001
Client Sample ID: FRWUD S. Madison Well

Report Date: 03/29/13
Collection Date: 02/28/13 11:45
DateReceived: 03/01/13
Matrix: Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
SEMI-VOLATILE ORGANIC COMPOUNDS							
Butachlor	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Chlordane	ND	ug/L		1.0	2	E525.2	03/07/13 04:18 / eli-b
Dieldrin	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Endrin	ND	ug/L		0.10	2	E525.2	03/07/13 04:18 / eli-b
gamma-BHC (Lindane)	ND	ug/L		0.10	0.2	E525.2	03/07/13 04:18 / eli-b
Heptachlor	ND	ug/L		0.10	0.4	E525.2	03/07/13 04:18 / eli-b
Heptachlor epoxide	ND	ug/L		0.10	0.2	E525.2	03/07/13 04:18 / eli-b
Hexachlorobenzene	ND	ug/L		0.10	1	E525.2	03/07/13 04:18 / eli-b
Hexachlorocyclopentadiene	ND	ug/L		0.10	50	E525.2	03/07/13 04:18 / eli-b
Methoxychlor	ND	ug/L		0.10	40	E525.2	03/07/13 04:18 / eli-b
Metolachlor	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Metribuzin	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Propachlor	ND	ug/L		0.10		E525.2	03/07/13 04:18 / eli-b
Simazine	ND	ug/L		0.10	4	E525.2	03/07/13 04:18 / eli-b
Toxaphene	ND	ug/L		2.0	3	E525.2	03/07/13 04:18 / eli-b
Surr: 1,3-Dimethyl-2-nitrobenzene	96.0	%REC		70-130		E525.2	03/07/13 04:18 / eli-b
Surr: Perylene-d12	80.0	%REC		70-130		E525.2	03/07/13 04:18 / eli-b
Surr: Pyrene-d10	121	%REC		70-130		E525.2	03/07/13 04:18 / eli-b
Surr: Triphenylphosphate	97.0	%REC		70-130		E525.2	03/07/13 04:18 / eli-b

Note: The federal MCL for total PCB's is 0.5 ug/L as Decachlorobiphenyl (DCB). PCB screening at the reporting limits given for the individual Aroclors meets or exceeds federal and state requirements for "Total PCB" monitoring if Aroclors are not detected.

SYNTHETIC ORGANIC COMPOUNDS - PESTICIDES, CARBAMATES							
Aldicarb	ND	ug/L		0.50	3	E531.1	03/07/13 23:14 / cns
Aldicarb sulfone	ND	ug/L		0.50	2	E531.1	03/07/13 23:14 / cns
Aldicarb sulfoxide	ND	ug/L		0.50	4	E531.1	03/07/13 23:14 / cns
Carbaryl	ND	ug/L		0.50		E531.1	03/07/13 23:14 / cns
Carbofuran	ND	ug/L		0.50	40	E531.1	03/07/13 23:14 / cns
3-Hydroxycarbofuran	ND	ug/L		0.50		E531.1	03/07/13 23:14 / cns
Methiocarb	ND	ug/L		0.50		E531.1	03/07/13 23:14 / cns
Methomyl	ND	ug/L		0.50		E531.1	03/07/13 23:14 / cns
Oxamyl	ND	ug/L		0.50	200	E531.1	03/07/13 23:14 / cns
Baygon	ND	ug/L		0.50		E531.1	03/07/13 23:14 / cns
Surr: BDMC	96.0	%REC		70-130		E531.1	03/07/13 23:14 / cns

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

Client: Wester-Wetstein and Associates
Project: FRWUD South Madison Well
Client Sample ID: FRWUD S. Madison Well
Sampled By: John Wetstein
Lab ID: C13030036-001B

Report Date: 03/29/13
Collection Date: 02/28/13 11:45
Received Date: 03/01/13 09:30
Matrix: Drinking Water

Analyses	Result	Units	Safe/Unsafe	Qualifier	Method	Analysis Date / By
MICROBIOLOGICAL						
Bacteria, Total Coliform	Absent	P/A	SAFE		A9223 B	02/28/13 15:05 / eli-r
Bacteria, E-Coli Coliform	Absent	P/A			A9223 B	02/28/13 15:05 / eli-r

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.

Fall River Water Users District
South Madison Well Report

Appendix G
Aquifer Test Data

Wester Wetstein & Associates
Consultants in Engineering and Hydrogeology

Fall River South Madison Well Step Test
Tested by Larry Wester and Tim Barritt
Date: 30-Jan-13

Flow Montored with: Haliburton Flow Meter

Time	Elapsed Time in Minutes During Step	Pressure PSI	Drawdown Feet	Flowrate GPM	Comments
1:14		75	0		Static
1:20					Start at 50 GPM, Meter = 12295.3
1:23	3	66	20.79	51.2	Very Difficult to Adjust Weird Water Hammer
1:23:30	3.5			50.9	
1:24	4	64.25	24.83	50.5	
1:25	5	64.25	24.83	50.26	
1:25:30	5.5	64	25.41	49.93	
1:26	6	63.75	25.99	50.26	
1:27	7	63.5	26.57	50.26	
1:28	8	63.25	27.14	49.93	
1:29	9	63	27.72	49.61	pH=6.76, TDS=1451
1:32:30	12.5	62.75	28.30	49.61	
1:34	14	62.5	28.88	49.61	
1:37	17	62.25	29.45	49.28	
1:40	20	61.75	30.61	49.28	
1:45	25	61.5	31.19	48.96	
1:50	30	61.5	31.19		Adjusted to 100 gpm, Meter =13765.4
1:51:30	1.5	57	41.58		
1:52	2	56.25	43.31	99.22	
1:52:30	2.5	55.5	45.05		
1:53	3	55	46.20	97.9	
1:54	4	54.25	47.93	98.9	
1:55	5	53.75	49.09	98.25	Adjusted Up
1:56	6	53	50.82	103.44	
1:57	7	52.5	51.98	102.79	
2:00	10	51.5	54.29	101.82	
2:03	13	50.75	56.02	101.17	Water Cloudy
2:07	17	50.25	57.17	101.84	pH=6.6, TDS=1435
2:10	20	50	57.75	100.2	
2:15	25	49.75	58.33	99.87	A Bit of Gas
2:19	29	49.75	58.33		
2:20	30	49.5	58.91	100.85	Adjusted Flow to 150 GPM, Meter =16767
2:21	1	44	71.61	151.46	
2:21:30	1.5	42.5	75.08	148.19	Adjusted Up
2:22	2	41.75	76.81	148.52	Adjusted Up
2:22:30	2.5	41	78.54	152.73	
2:23	3	40	80.85	151.76	
2:23:30	3.5	39.5	82.01	150.46	

2:24	4	39	83.16	149.16	
2:25	5	38.5	84.32	149.16	Reddish color
2:26	6	38.25	84.89	147.86	Adjusted Up
2:27	7	37.5	86.63	152.08	
2:29	9	36.75	88.36	151.11	Clearing a Bit
2:31	11	36.25	89.51	150.13	
2:34	14	35.75	90.67	149.16	
2:37	17	35.25	91.82	148.19	
2:40	20	35	92.40	147.88	Adjusted Up
2:42	22	35.4	91.48	153.38	Red Tinge
2:44	24			152.08	pH=6.65, TDS=1602
2:46	26	33.5	95.87	151.43	
2:49:40	29.66	33.25	96.44	151.12	
2:50	0				Adjusted Flow to 200 GPM, Meter=21256
2:51	1	28	108.57	195.8	
2:52	2	25	115.50	202.02	
2:52:30	2.5	24	117.81	199.13	
2:53	3	23.75	118.39	197.15	
2:53:30	3.5	23.25	119.54	196	Adjusted Up
2:54	4	22.5	121.28	201.69	
2:54:30	4.5	22.25	121.85	198.78	
2:55	5	22	122.43	198.01	
2:56	6	21.5	123.59	198.45	Adjusted Up
2:58	8	20.25	126.47	200.4	
3:00	10	20	127.05	197.48	
3:02	12	19.75	127.63	198.51	Adjusted Up
3:03	13			202.67	
3:05	15	18.25	131.09	199.75	
3:08	18	18	131.67	198.45	
3:11	21	17.75	132.25	197.48	Adjusted Up
3:12	22			202.99	
3:14	24				pH=6.91, TDS=1258
3:15:30	25.5	16.5	135.14	199.75	
3:19:30	29.66	16.25	135.71	198.45	Final Meter Reading 27237.9

Fall River South Madison Well Step Test
Tested by Larry Wester and Tim Barritt
Date: 25-Feb-13

Flow Montored with: Haliburton Flow Meter

Pumping Steps at 300, 400 and 500 gpm (Initial Shut-in Pressure at 287.5 psi - Airline at 523')

12:35:00	0	250	86.63	Start Step 1 at 300 GPM
12:37:00	2	264	54.29	
12:38:00	3	238	114.35	
12:40:00	5	226	142.07	
12:43:00	8	219	158.24	

Time	Elapsed Time in Minutes During Step	Pressure PSI	Drawdown Feet	Flowrate GPM	Comments
12:50:00	15	211	176.72		
12:55:00	20	205	190.58		
13:00:00	25	201	199.82		
13:05:00	30	200	202.13		
13:10:00	35	199	204.44		
13:10:00					Start Step 2 at 400 GPM
13:13:00	3	175	259.88		
13:15:00	5	160	294.53		
13:18:00	8	149	319.94		
13:23:00	13	142	336.11		
13:25:00	15	148	322.25		
13:30:00	20	147.5	323.40		
13:40:00	30	148	322.25		
13:55:00	45	147.5	323.40		
13:55:00					Start Step 3 at 500 GPM
13:56:00	1	140	340.73		
13:57:00	2	134	354.59		
13:59:00	4	126	373.07		
14:00:00	5	122	382.31		
14:02:00	7	116	396.17		
14:05:00	10	110.5	408.87		
14:25:00	30	98	437.75		
14:35:00	40	93	449.30		
14:45:00	50	91	453.92		
15:35:00	100	86	465.47		
17:00:00	185	78	483.95		
17:15:00	200	75	490.88		Released vacuum between casing and drop pipe
17:30:00	215	72	497.81		
18:00:00	245	71	500.12		
19:00:00	305	69	504.74		

RECOVERY

Time	Elapsed Time in Munutes	Pressure PSI	Residual Drawdown Feet	
3:20:00				Shut In
3:20:14	0.233	29	106.26	
3:20:19	0.317	30	103.95	
3:20:22	0.367	32	99.33	
3:20:28	0.467	34	94.71	
3:20:32	0.533	36	90.09	
3:20:39	0.65	38	85.47	
3:20:45	0.75	40	80.85	
3:20:55	0.917	42	76.23	

Time	Elapsed Time in Munutes	Pressure PSI	Residual Drawdown Feet
3:21:07	1.117	44	71.61
3:21:13	1.217	45	69.3
3:21:20	1.333	46	66.99
3:21:28	1.467	47	64.68
3:21:38	1.633	48	62.37
3:21:47	1.783	49	60.06
3:21:57	1.95	50	57.75
3:22:11	2.183	51	55.44
3:22:24	2.4	52	53.13
3:22:37	2.617	53	50.82
3:22:54	2.9	54	48.51
3:23:10	3.167	55	46.2
3:23:32	3.533	56	43.89
3:23:57	3.95	57	41.58
3:24:24	4.4	58	39.27
3:24:56	4.933	59	36.96
3:25:31	5.517	60	34.65
3:26:18	6.3	61	32.34
3:27:13	7.217	62	30.03
3:28:13	8.217	63	27.72
3:29:54	9.54	64	25.41
3:11:15	11.25	65	23.1
3:12:51	12.85	66	20.79
3:15:12	15.2	67	18.48
3:17:44	17.733	68	16.17
3:21:43	21.717	69	13.86
3:26:02	26.033	70	11.55

Fall River South Madison Well
Constant Rate Drawdown Test

Date:	February 27 - 28, 2013
Tested By:	Wester-Wetstein & Associates, Inc.
Supervised By:	John Wetstein and Tim Barritt
Pumping Equipment:	Berkley 7T-450 Pump
	100 Hp Submersible Motor
Pump Set Depth:	530 Feet
Monitoring Equipment:	6" x 5" Orifice Weir
	Airline and Pressure Gage
SWL	294.0 PSI
Air Line Set	523.0 Feet
Rate:	500.0 GPM

DATE	TIME	ELAPSED Time	GAGE	MANOMETER INCHES	FLOWRATE IN GPM	DRAWDOWN	REMARKS
02/27/13	10:30:00	0.00	294	0	0		
02/27/13	10:40:00	0.00	294	0	0		Open Valve
02/27/13	10:41:00	1.00	244	6	300	115.5	
02/27/13	10:42:00	2.00	220	16.5	500	170.9	Pump on 45 HZ
02/27/13	10:43:00	3.00	210	16	495	194.0	
02/27/13	10:44:00	4.00	198	16	495	221.8	Adj. Up 46 HZ
02/27/13	10:45:00	5.00	185	16	495	251.8	Adj. Up 47 HZ
02/27/13	10:46:00	6.00	177	16	495	270.3	Adj. Up 48 HZ
02/27/13	10:47:00	7.00	171	16.5	500	284.1	Adj. Up 49 HZ
02/27/13	10:48:00	8.00	163	16	495	302.6	Adj. Up 50 HZ Cleaning Up
02/27/13	10:49:00	9.00	155	16.5	500	321.1	Clearing up
02/27/13	10:50:00	10.00	151	16.5	500	330.3	
02/27/13	10:51:00	11.00	148	16	495	337.3	Adj. Up 51 HZ
02/27/13	10:52:00	12.00	144	16.5	500	346.5	
02/27/13	10:53:00	13.00	140	16	495	355.7	Adj. Up 52 HZ
02/27/13	10:54:00	14.00	136	16.5	500	365.0	
02/27/13	10:55:00	15.00	133	16.5	500	371.9	
02/27/13	10:56:00	16.00	131	16.5-	500	376.5	
02/27/13	10:57:00	17.00	128	16	495	383.5	Adj. Up 53 HZ
02/27/13	10:58:00	18.00	126	16.5	500	388.1	
02/27/13	10:59:00	19.00	123.75	16.5	500	393.3	
02/27/13	11:00:00	20.00	121.25	16.5-	500	399.1	
02/27/13	11:05:00	25.00	115	16+	495	413.5	
02/27/13	11:08:00	28.00	110.25	16	495	424.5	
02/27/13	11:10:00	30.00	108			429.7	Adj. Up 54 HZ Clean
02/27/13	11:13:00	33.00	102.5	16.5	500	442.4	
02/27/13	11:15:00	35.00	100.75	16.5	500	446.4	C=975, T=30.1C, pH= 7.3, TDS=675
02/27/13	11:20:00	40.00	97	16	495	455.1	Adj. 52 HZ
02/27/13	11:25:00	45.00	92.25	16.5	500	466.0	
02/27/13	11:30:00	50.00	89	16.5	500	473.6	Clean
02/27/13	11:35:00	55.00	87.5	16.5-	500	477.0	
02/27/13	11:40:00	60.00	86.5	16.5-	500	479.3	C=931, T=30.1C, pH= 7.8
02/27/13	11:45:00	65.00	85.25	16.5-	500	482.2	
02/27/13	11:50:00	70.00	84.5	16.5-	500	483.9	
02/27/13	11:55:00	75.00	83.25	16+	495	486.8	

DATE	TIME	ELAPSED Time	GAGE	MANOMETER INCHES	FLOWRATE IN GPM	DRAWDOWN	REMARKS
02/27/13	12:00:00	80.00	82.25	16-	495	489.1	Adj. Up 57 HZ
02/27/13	12:05:00	85.00	81.25	16.5+	500	491.5	
02/27/13	12:10:00	90.00	78.25	16.5+	500	498.4	C=924, T=30.0, pH=7.84
02/27/13	12:20:00	100.00	75.5	16.5+	500	504.7	
02/27/13	12:30:00	110.00	74.5	16.5+	500	507.0	
02/27/13	12:40:00	120.00	73.5	16.5+	500	509.4	
02/27/13	12:50:00	130.00	72.5	16+	495	511.7	
02/27/13	13:00:00	140.00	72	16+	495	512.8	
02/27/13	13:30:00	170.00	69.5	16+	495	518.6	
02/27/13	14:00:00	200.00	68.5	16.5	500	520.9	C=931, T=30.1C, pH= 7.4
02/27/13	14:30:00	230.00	67.5	16.5	500	523.2	
02/27/13	15:00:00	260.00	66	16.5	500	526.7	
02/27/13	15:30:00	290.00	65	16.5	500	529.0	
02/27/13	16:00:00	320.00	64	16.5	500	531.3	
02/27/13	16:30:00	350.00	62.5	16.5	500	534.8	
02/27/13	17:00:00	380.00	61	16.5	500	538.2	
02/27/13	17:30:00	410.00	59.5	16.5	500	541.7	
02/27/13	18:00:00	440.00	58	16.5	500	545.2	
02/27/13	18:30:00	470.00	56.5	16.5	500	548.6	
02/27/13	19:00:00	500.00	55	16.5	500	552.1	
02/27/13	20:00:00	560.00	52	16.5	500	559.0	
02/27/13	21:00:00	620.00	50	16.5	500	563.6	
02/27/13	21:30:00	650.00	60	16.5	500	540.5	Purge Air Line
02/27/13	22:00:00	710.00	58.5	16.5	500	544.0	
02/27/13	23:00:00	770.00	54	16.5	500	554.4	
02/28/13	0:00:00	830.00	58.5	16.5	500	544.0	Purge Air Line
02/28/13	1:00:00	890.00	54	16.5	500	554.4	
02/28/13	2:00:00	950.00	58	16.5	500	545.2	Purge Air Line
02/28/13	3:00:00	1010.00	53.5	16.5	500	555.6	
02/28/13	4:00:00	1070.00	57.5	16.5	500	546.3	Purge Air Line
02/28/13	5:00:00	1130.00	53.5	16.5	500	555.6	
02/28/13	6:00:00	1190.00	56.5	16.5	500	548.6	Purge Air Line
02/28/13	7:00:00	1250.00	53.5	16.5	500	555.6	
02/28/13	8:00:00	1310.00	56	16.5	500	549.8	Purge Air Line (Wait 5 Minutes to Read)
02/28/13	9:00:00	1370.00	55	16.5	500	552.1	
02/28/13	10:00:00	1430.00	55.5	16.5	500	550.9	Purge Air Line (Wait 20 Minutes to Read)
02/28/13	11:00:00	1490.00	54.5	16.5	500	553.2	
02/28/13	12:00:00	1550.00	55	16.5	500	552.1	Purge Air Line (Wait 20 Minutes to Read)
02/28/13	12:45:00	1595.00	55.5	16.5	500	550.9	C=905, T=29.9C, pH= 7.47
02/28/13	13:00:00	1610.00	55.5	16.5	500	550.9	

Fall River South Madison Well
Constant Rate Drawdown Test

Date:	February 28, 2013
Tested By:	Wester-Wetstein & Associates, Inc.
Supervised By:	John Wetstein and Tim Barritt
Pumping Equipment:	Berkley 7T-450 Pump
	100 Hp Submersible Motor
Pump Set Depth:	530 Feet
Monitoring Equipment:	6" x 5" Orifice Weir
	Airline and Pressure Gage
SWL	294.0 PSI
Air Line Set	523.0 Feet
Static per Air Line	-156.0 Feet
Rate:	500.0 GPM

TIME	Recovery Time (Minutes) (t')	Test Time (Minutes) (t)	t/t'	GAGE	Residual Drawdown (Feet)	REMARKS
13:00:00	0.00	1610	0.00	55.5	550.8	Start Recovery Test
13:00:20	0.33	1610.33	4831.00	94	461.9	
13:00:55	0.92	1610.92	1757.36	129	381.0	
13:01:32	1.53	1611.53	1051.00	143.75	346.9	
13:02:00	2.00	1612.00	806.00	154	323.3	
13:02:53	2.88	1612.88	559.38	163.5	301.3	
13:03:26	3.43	1613.43	469.93	171	284.0	
13:04:03	4.05	1614.05	398.53	177.25	269.6	
13:04:40	4.67	1614.67	346.00	183.5	255.1	
13:05:17	5.28	1615.28	305.73	188.5	243.6	
13:05:54	5.90	1615.90	273.88	193.75	231.4	
13:06:34	6.57	1616.57	246.18	198.5	220.5	
13:07:09	7.15	1617.15	226.17	202.5	211.2	
13:07:45	7.75	1617.75	208.74	205.5	204.3	
13:08:20	8.33	1618.33	194.20	208.5	197.4	
13:09:07	9.12	1619.12	177.60	212.25	188.7	
13:09:40	9.67	1619.67	167.55	214.75	182.9	
13:10:25	10.42	1620.42	155.56	217.5	176.6	
13:11:22	11.37	1621.37	142.64	222.5	165.0	
13:11:55	11.92	1621.92	136.10	225.25	158.7	
13:12:27	12.45	1622.45	130.32	227.5	153.5	
13:12:56	12.93	1622.93	125.48	229	150.0	
13:13:28	13.47	1623.47	120.55	230.25	147.1	
13:14:08	14.13	1624.13	114.92	231.5	144.2	
13:15:13	15.22	1625.22	106.81	234	138.5	
13:17:00	17.00	1627.00	95.71	237	131.5	
13:20:00	20.00	1630.00	81.50	241.5	121.1	
13:22:00	22.00	1632.00	74.18	244	115.4	
13:24:00	24.00	1634.00	68.08	246	110.7	
13:26:00	26.00	1636.00	62.92	248.25	105.5	
13:28:00	28.00	1638.00	58.50	250	101.5	
13:30:00	30.00	1640.00	54.67	251.5	98.0	
13:35:00	35.00	1645.00	47.00	255.25	89.4	

TIME	Recovery Time (Minutes) (t')	Test Time (Minutes) (t)	t/t'	GAGE	Residual Drawdown (Feet)	REMARKS
13:40:00	40.00	1650.00	41.25	258	83.0	
13:45:00	45.00	1655.00	36.78	260	78.4	
13:50:00	50.00	1660.00	33.20	261.75	74.4	
13:55:00	55.00	1665.00	30.27	263.5	70.3	
14:00:00	60.00	1670.00	27.83	265	66.9	
14:10:00	70.00	1680.00	24.00	267.5	61.1	
14:20:00	80.00	1690.00	21.13	269.25	57.0	
14:30:00	90.00	1700.00	18.89	270.75	53.6	
14:40:00	100.00	1710.00	17.10	272.25	50.1	
14:50:00	110.00	1720.00	15.64	59.25	19.1	Place Weston Gage on Casing Port
15:00:00	120.00	1730.00	14.42	59.5	18.6	
15:10:00	130.00	1740.00	13.38	60.75	15.7	
15:20:00	140.00	1750.00	12.50	61.25	14.5	
15:40:00	160.00	1770.00	11.06	62	12.8	
15:50:00	170.00	1780.00	10.47	67	11.6	Replace Weston Gage with Wester-
16:00:00	180.00	1790.00	9.94	68	9.3	Wetstein Gage (4.5 psi difference between
16:10:00	190.00	1800.00	9.47	68.5	8.2	two gages) Weston's is 4.5 psi lower
16:20:00	200.00	1810.00	9.05	69	7.0	
16:30:00	210.00	1820.00	8.67	69.25	6.4	
17:00:00	240.00	1850.00	7.71	70.25	4.1	
17:30:00	270.00	1880.00	6.96	71.75	0.7	
18:00:00	300.00	1910.00	6.37	72	0.1	
18:30:00	330.00	1940.00	5.88	72.5	-1.1	
19:15:00	375.00	1985.00	5.29	73.5	-3.4	
19:45:00	405.00	2015.00	4.98	74	-4.5	
21:45:00	525.00	2135.00	4.07	76.25	-9.7	
23:38:00	638.00	2248.00	3.52	77.5	-12.6	
1:30:00	750.00	2360.00	3.15	78.5	-14.9	
4:25:00	925.00	2535.00	2.74	79.25	-16.7	
6:37:00	1057.00	2667.00	2.52	81	-20.7	
7:47:00	1127.00	2737.00	2.43	81.5	-21.9	End Recovery Test

RECEIVED
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WATER RIGHTS PROGRAM

Goodwell Incorporated

GAMMA RAY 3-ARM CALIPER

SP-16"-64" NEUTRON

FILING NO.

COMPANY WESTON ENGINEERING
WELL FWR USERS 2
FIELD FALL RIVER
COUNTY FALL RIVERSTATE SD

API SER. NO.

LOCATION:SE/SW

SEC 29 TWP 7S RGE 6E

OTHER SERVICES

PERMANENT DATUM ELEVATION K. B. 5'

LOG MEAS. FROM KB FT. ABOVE PERM DATUM D. F.

DRILLING MEASURED FROM KB G. L.

DATE	12/22/2012	01/05/2013	
RUN NO. DIV	1	2	
TYPE LOG	G-SP 16-64	SP 16-64	
DEPTH-DRILLER	2107'	2453'	2453'
DEPTH-LOGGER	2105'	2452'	2542'
BTM LOGGED INTERVAL	2104'	2451'	2451'
TOP LOGGED INTERVAL	583'	2075'	2075'
TYPE FLUID IN HOLE	WATER	WATER	WATER
SALINTY			
DENSITY			
LEVEL			
MAX. REC. TEMP. DEG F.			
OPERATING RIG TIME			
RECORDED BY	R. KELLEY	J BULLARD	J BULLARD
WITNESSED BY	J. HUNT	J WETSTEIN	J WETSTEIN

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	14.75	0	603'	10.75		0	603'
2	9.5	603	904'	7		578'	2104'
3	8.75	904'	2107'	7		578'	2104'
4	6.125	2104'	2453'				

EQUIPMENT DATA

SP

RUN NO.
TOOL MODEL NO.
DIAMETER
DETECTOR MODEL NO.
TYPE
LENGTH
DISTANCE TO N. SOURCE

RESISTIVITY

RUN NO.
LOG TYPE
TOOL MODEL NO.
DIAMETER
DETECTOR MODEL NO.
TYPE
LENGTH
SOURCE MODEL NO.

GENERAL

SERIAL NO.
SPACING
TYPE
STRENGTH
HOIST TRUCK NO.
INSTRUMENT TRUCK NO.
TOOL SERIAL NO.

LOGGING DATA

SP

GENERAL

RUN NO. | DEPTHS FROM | DEPTHS TO | SPEED FT/MIN | T. C. SEC. | SENS. SETTINGS | ZERO L OR R | API SP UNITS PER LOG DIV

RESISTIVITY

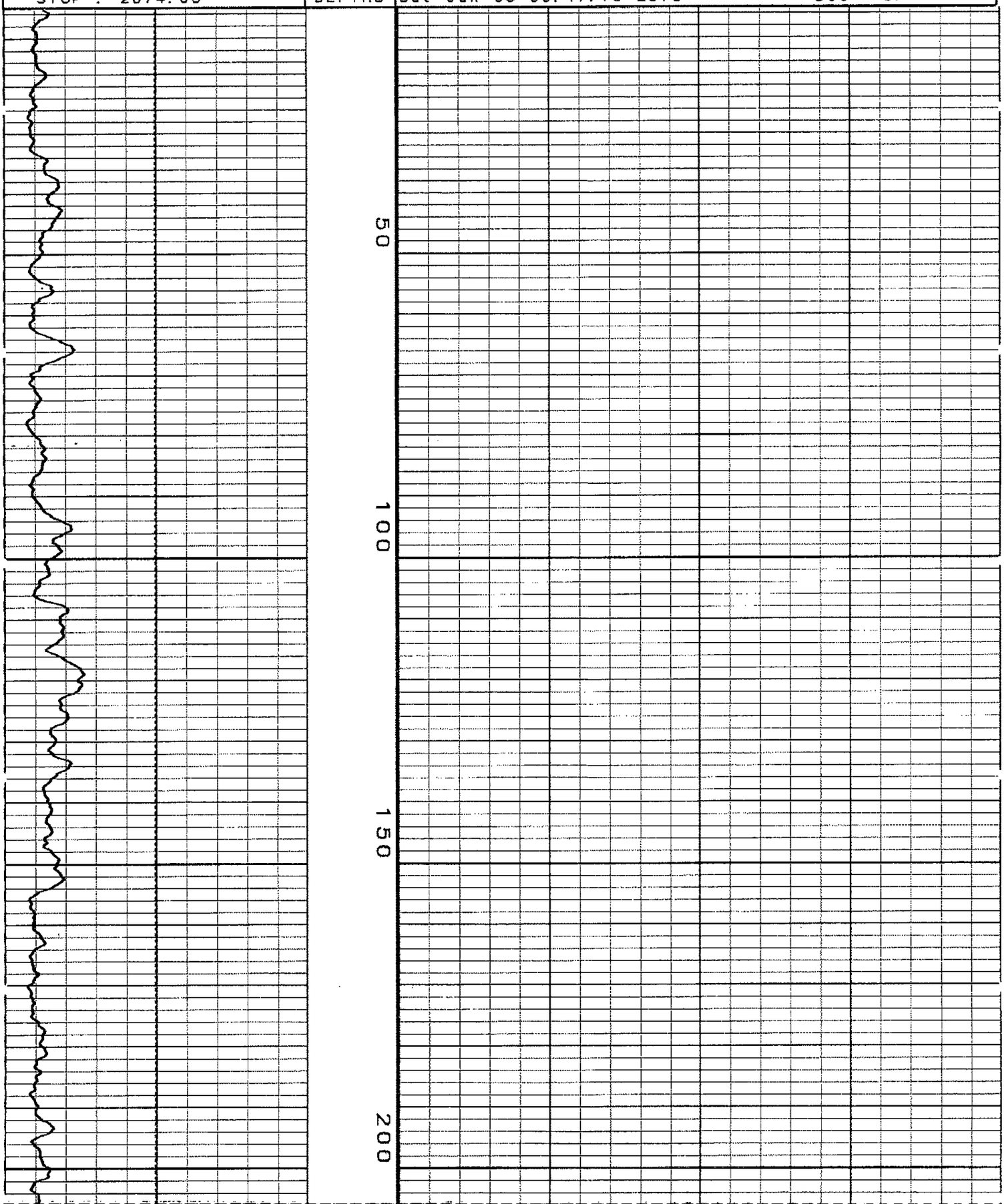
T. C. SEC. | SENS. SETTINGS | ZERO L OR R | API RES UNTS PER LOG DIV

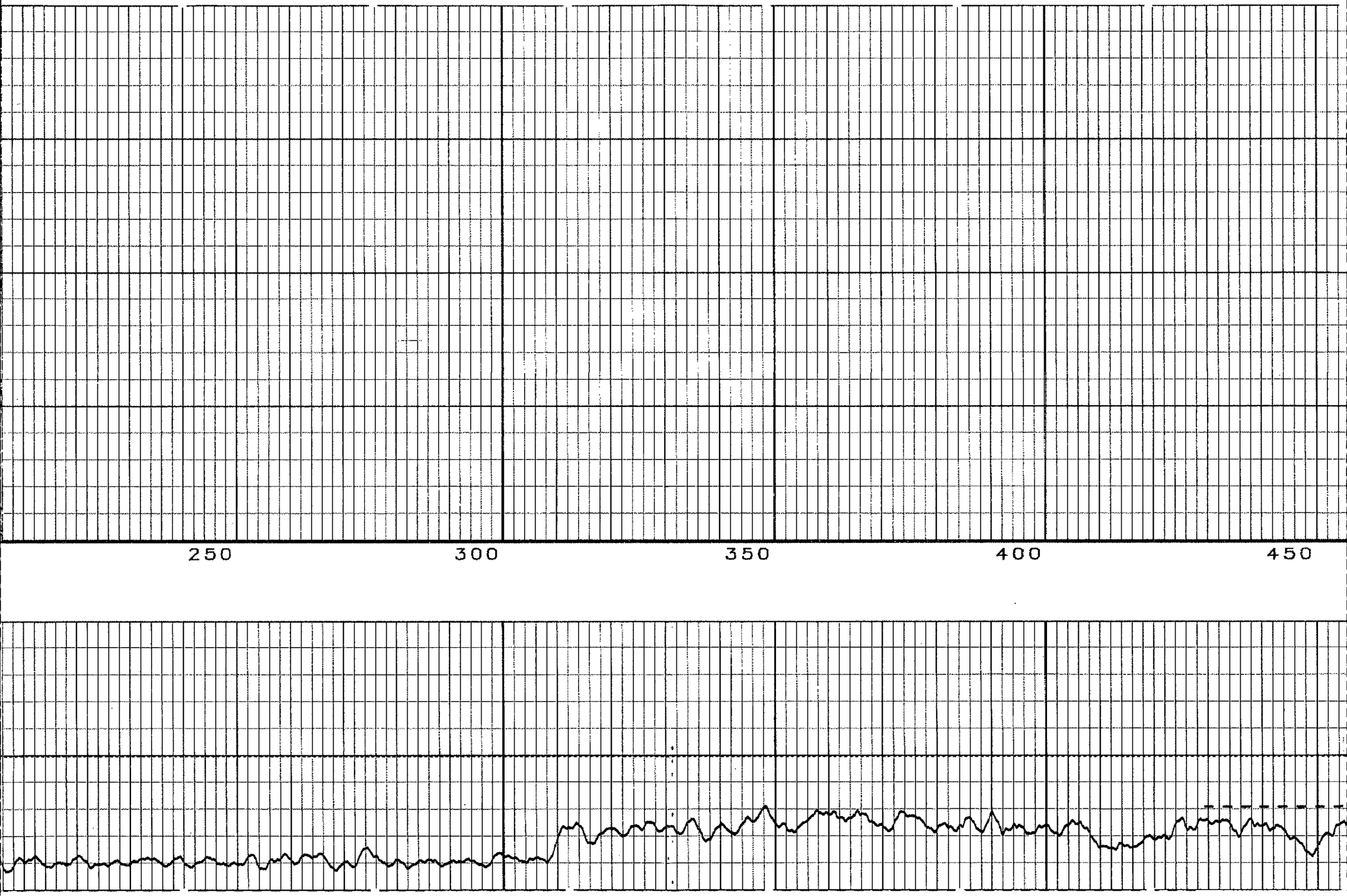
REFERENCE LITERATURE :

REMARKS

CHART SCALING			CHART SCALING		
0.00	GAMMA RAY	120.00	0.00	16"	100.00
120.00	CPS	240.00	100.00	OHMS	200.00
-200.00	SP	200.00	0.00	64"	100.00
	MVS		100.00	OHMS	200.00
0.00	CALIPER	10.00	0.00	NEUTRON	500.00
	INCHES			xPOROSITY	

STOP : 2074.65 | DEPTHS | Sat Jan 05 09:47:19 2013 | LOG UP

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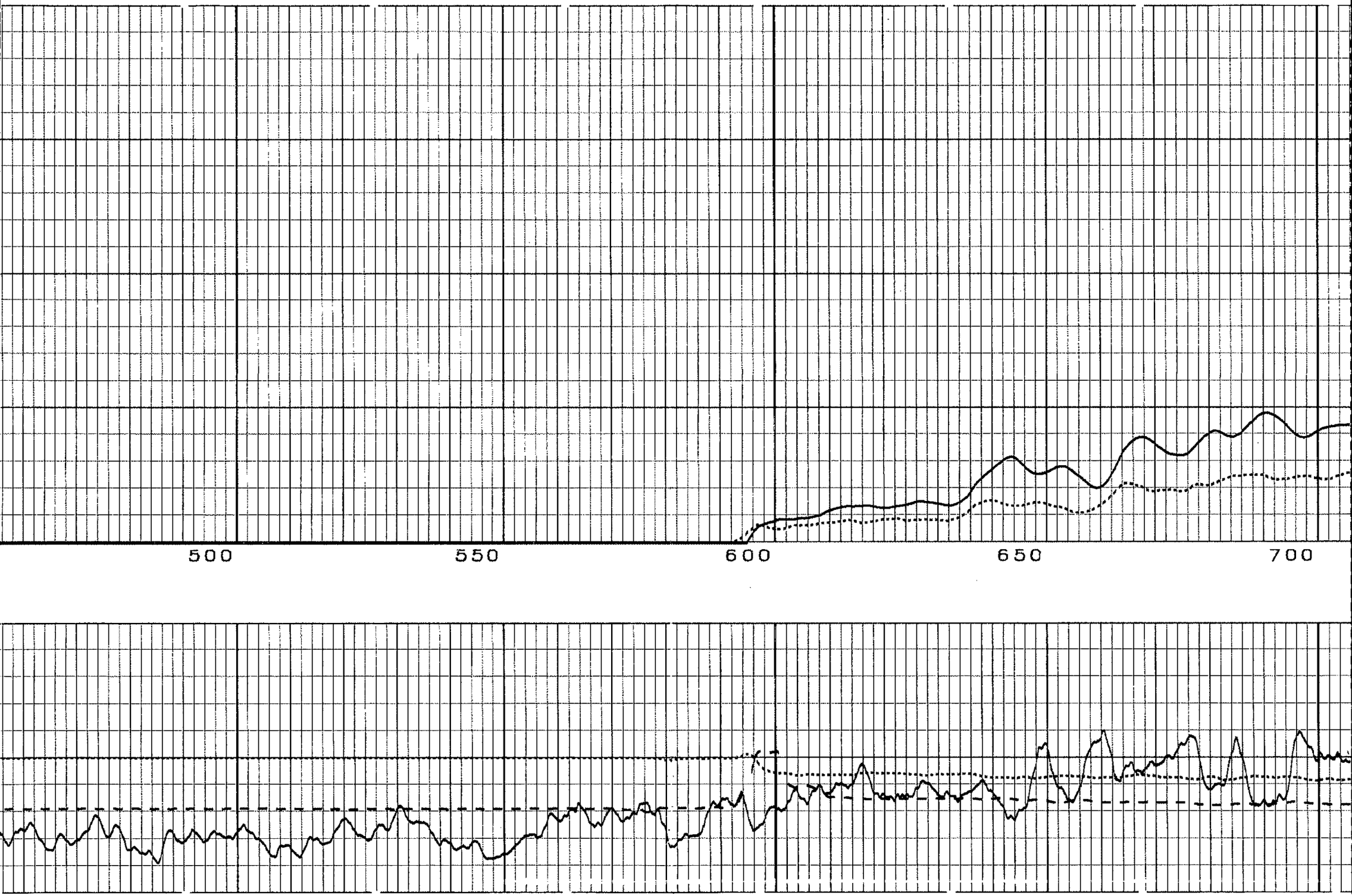
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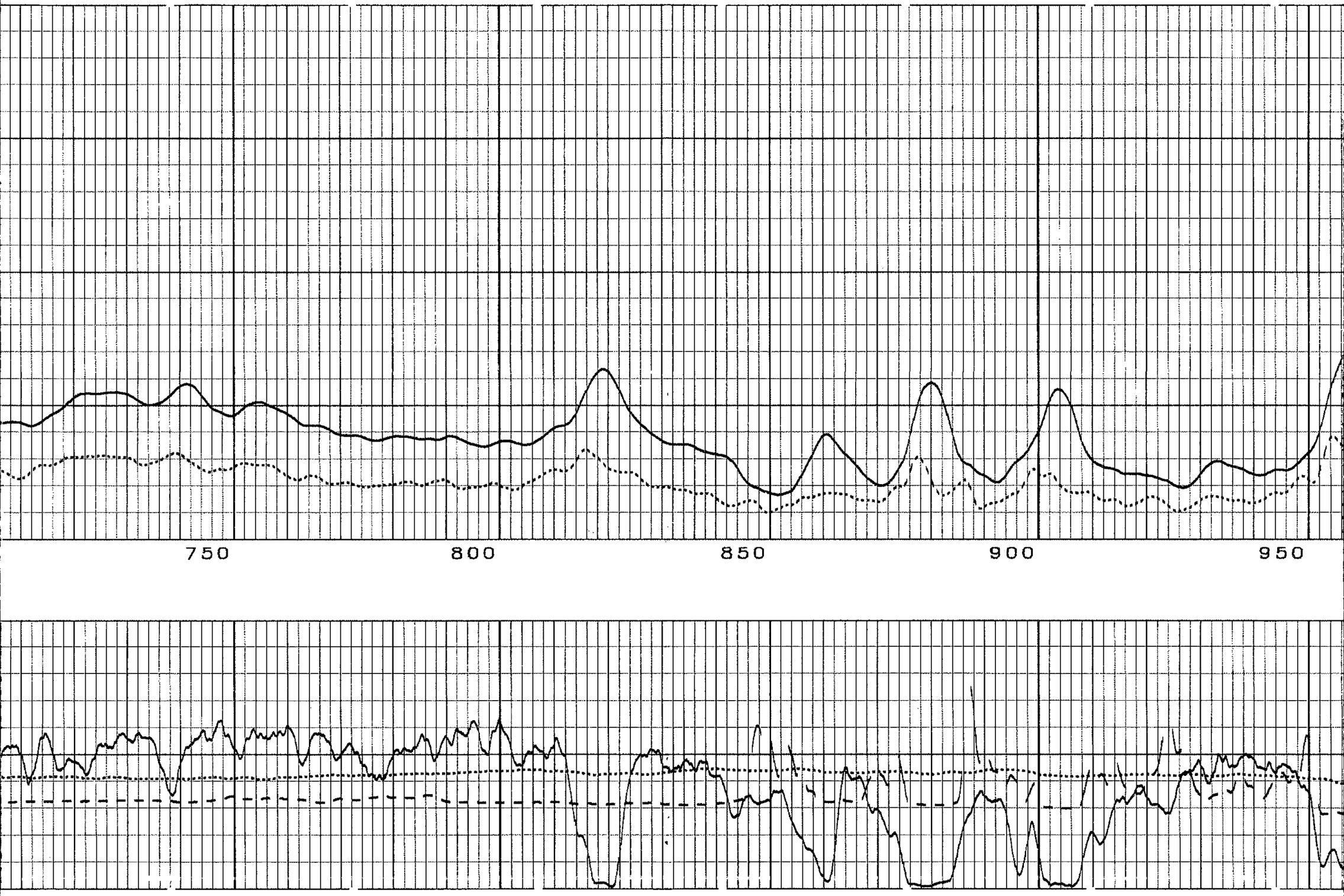
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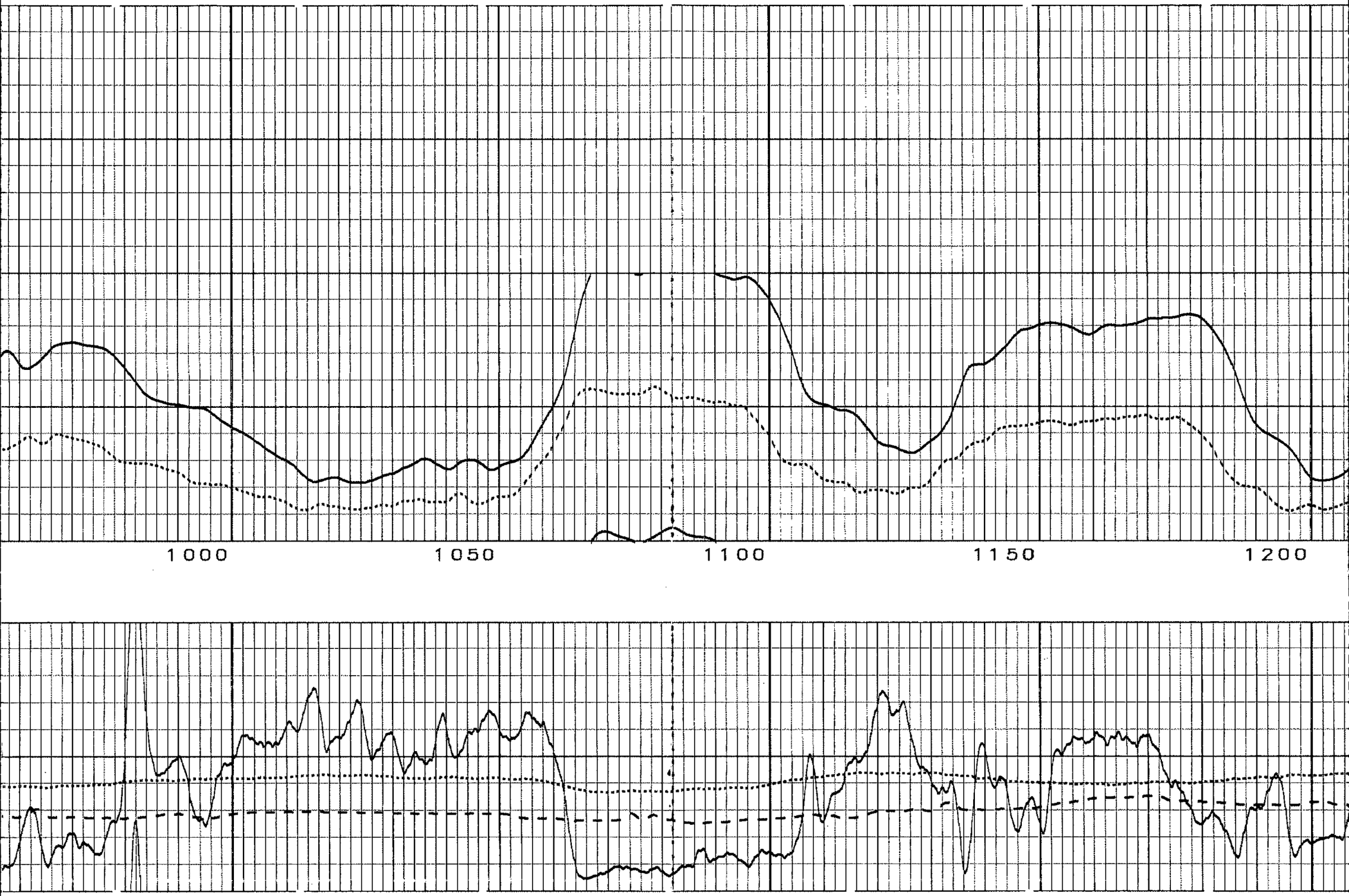
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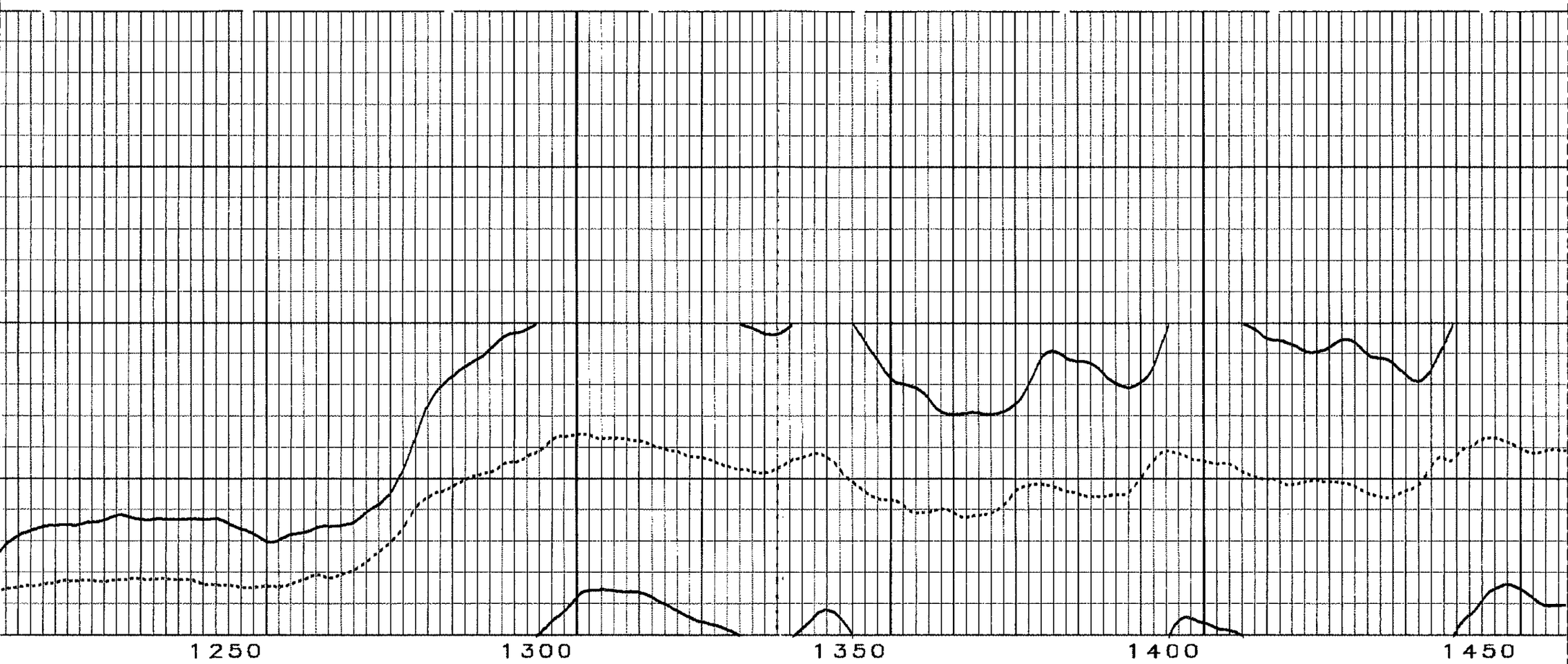
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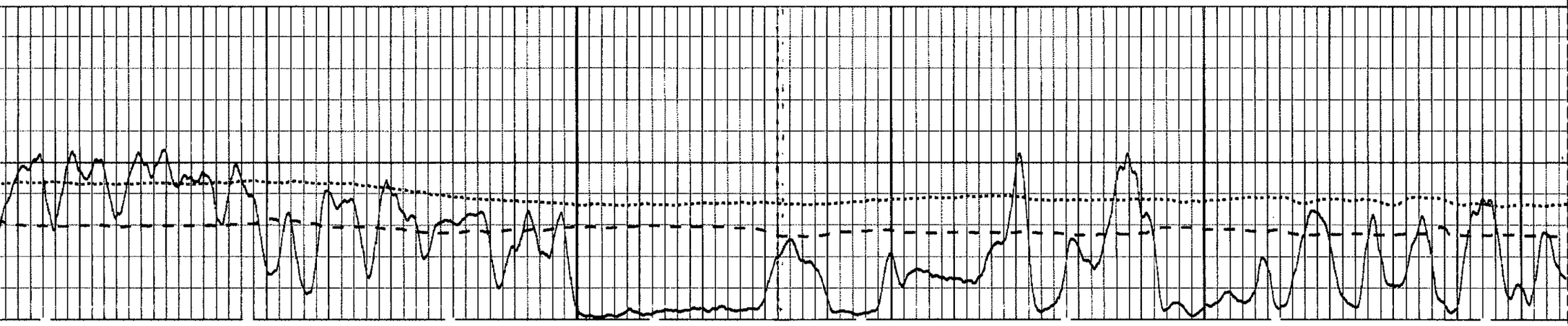

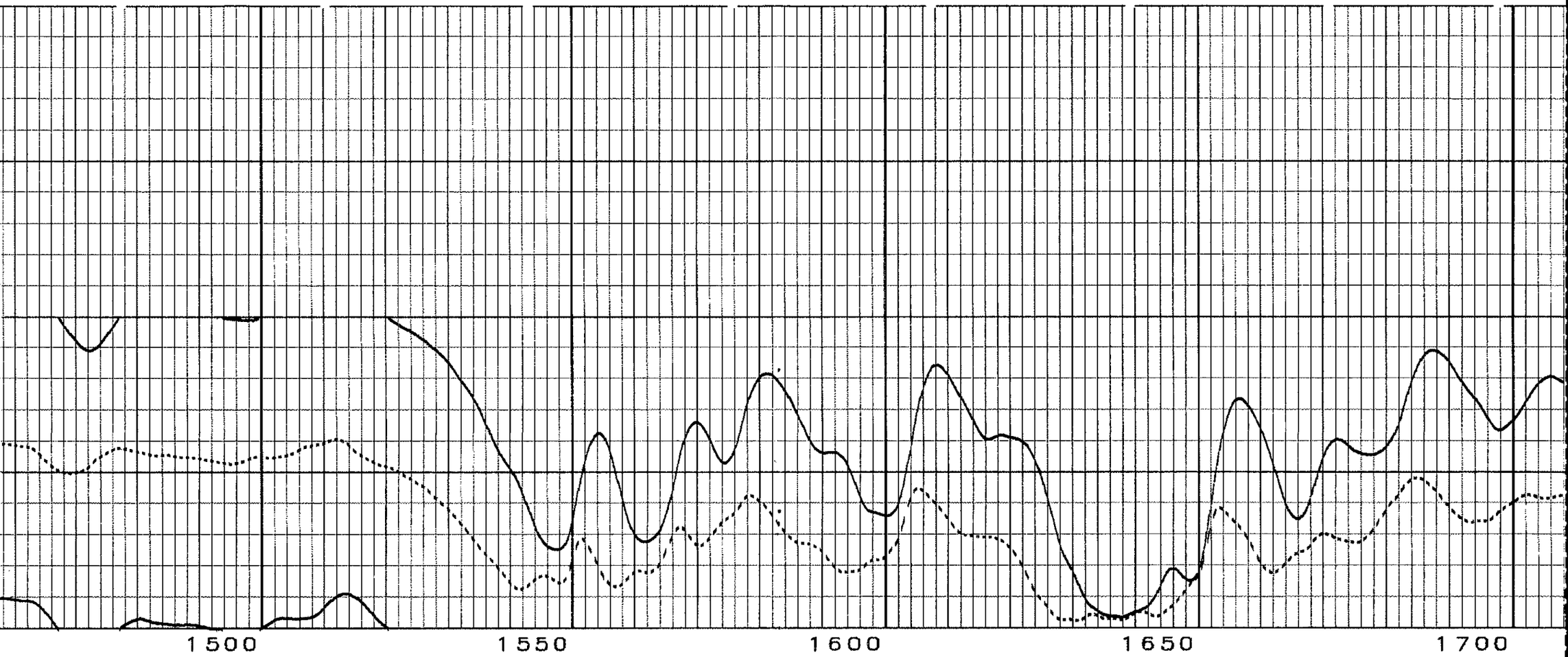
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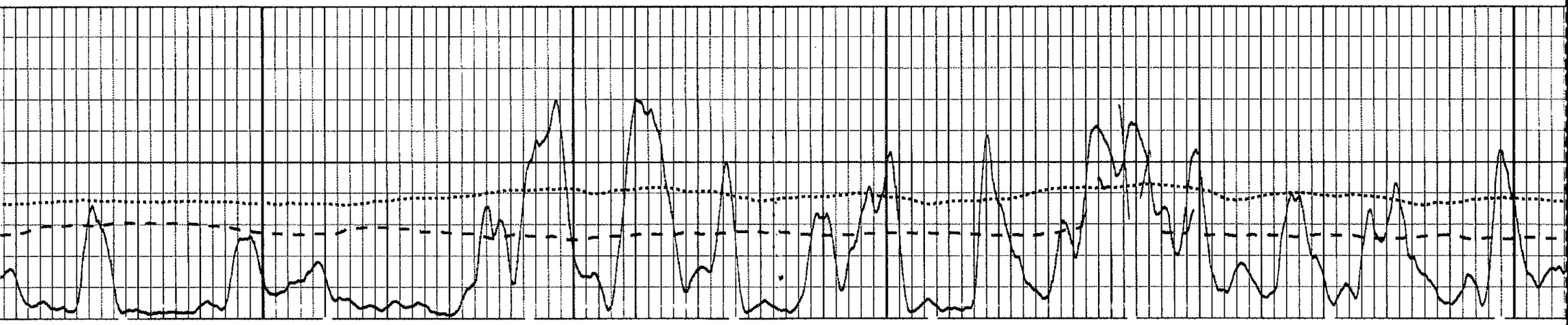

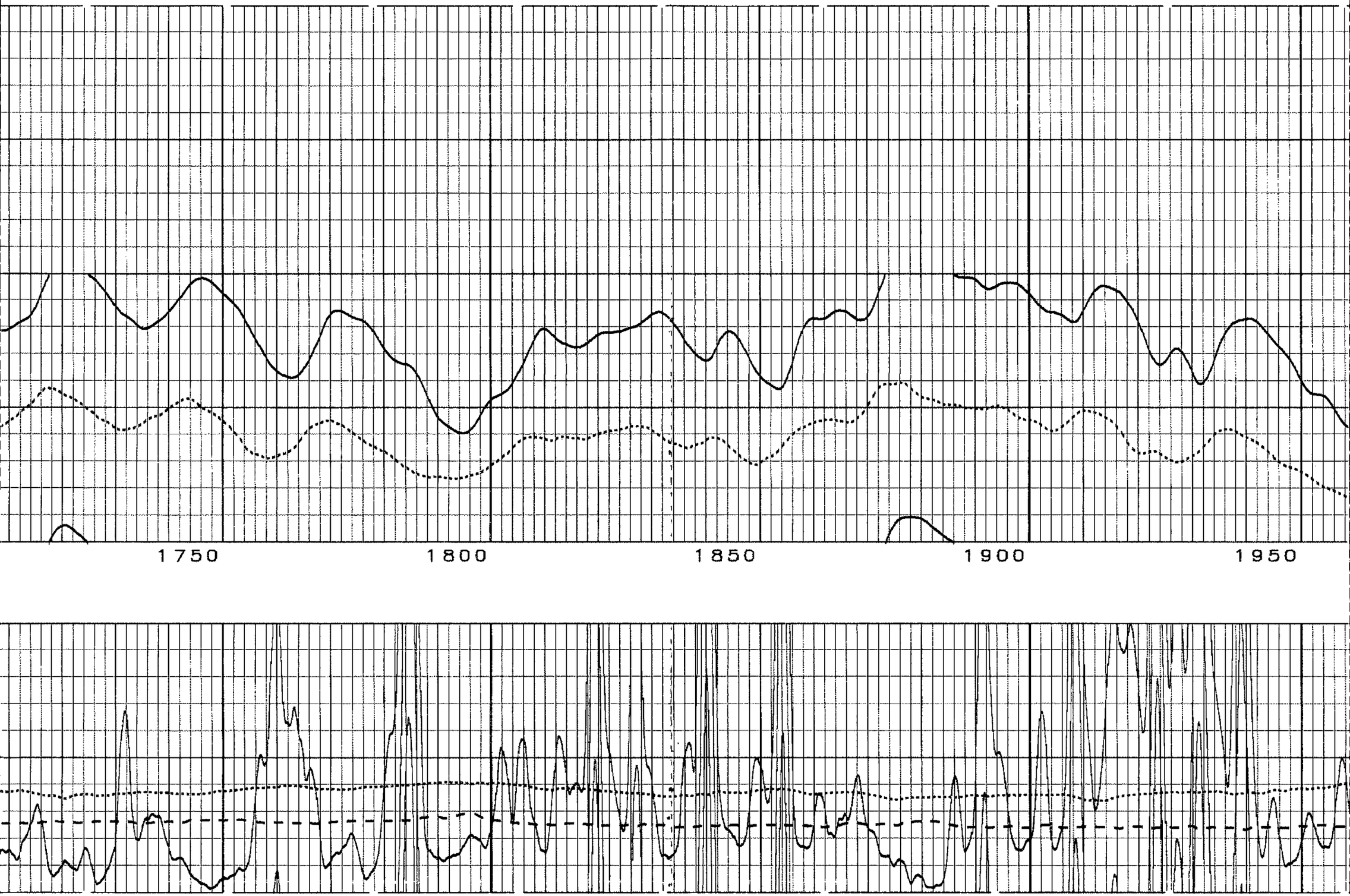
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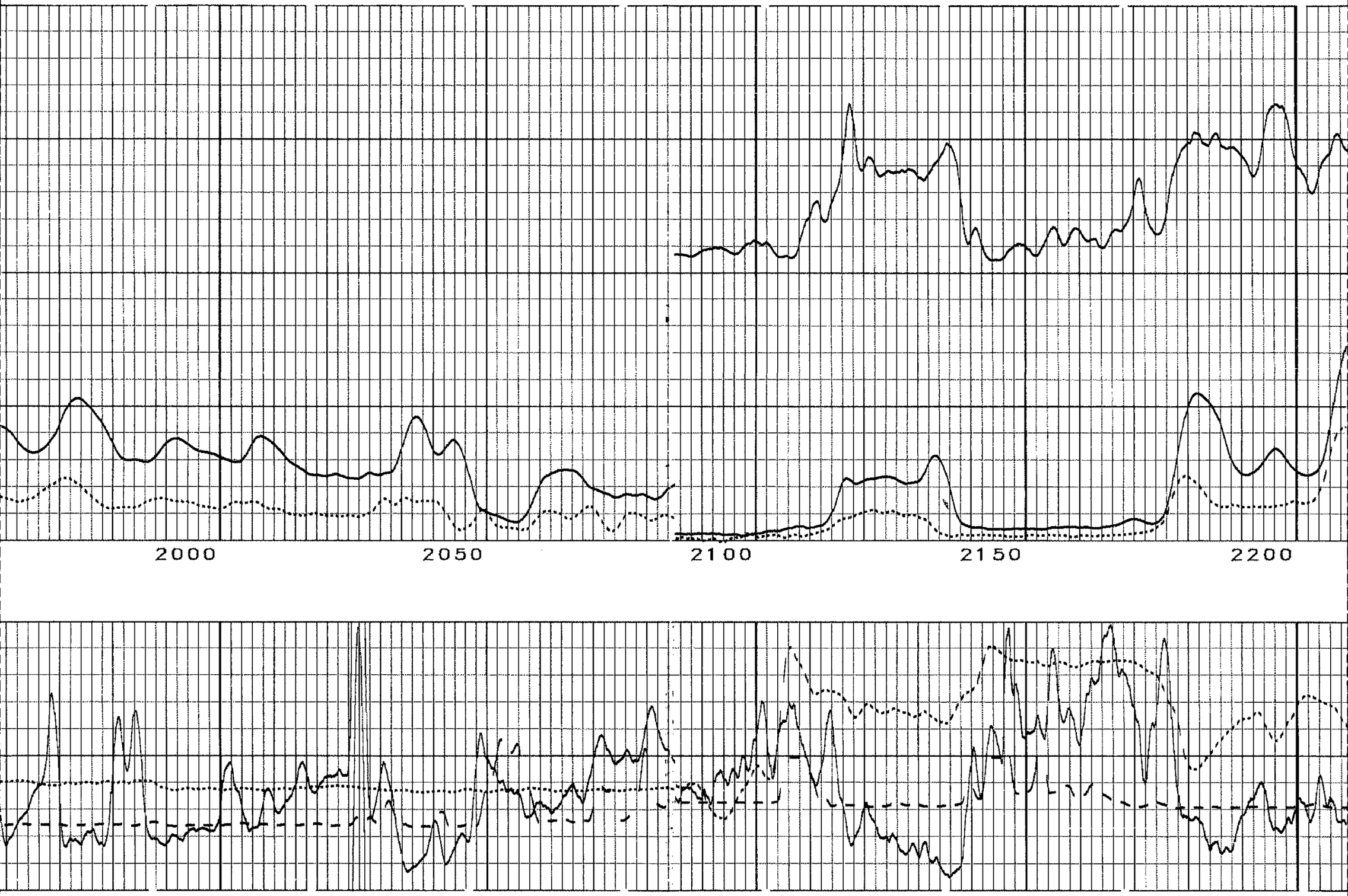
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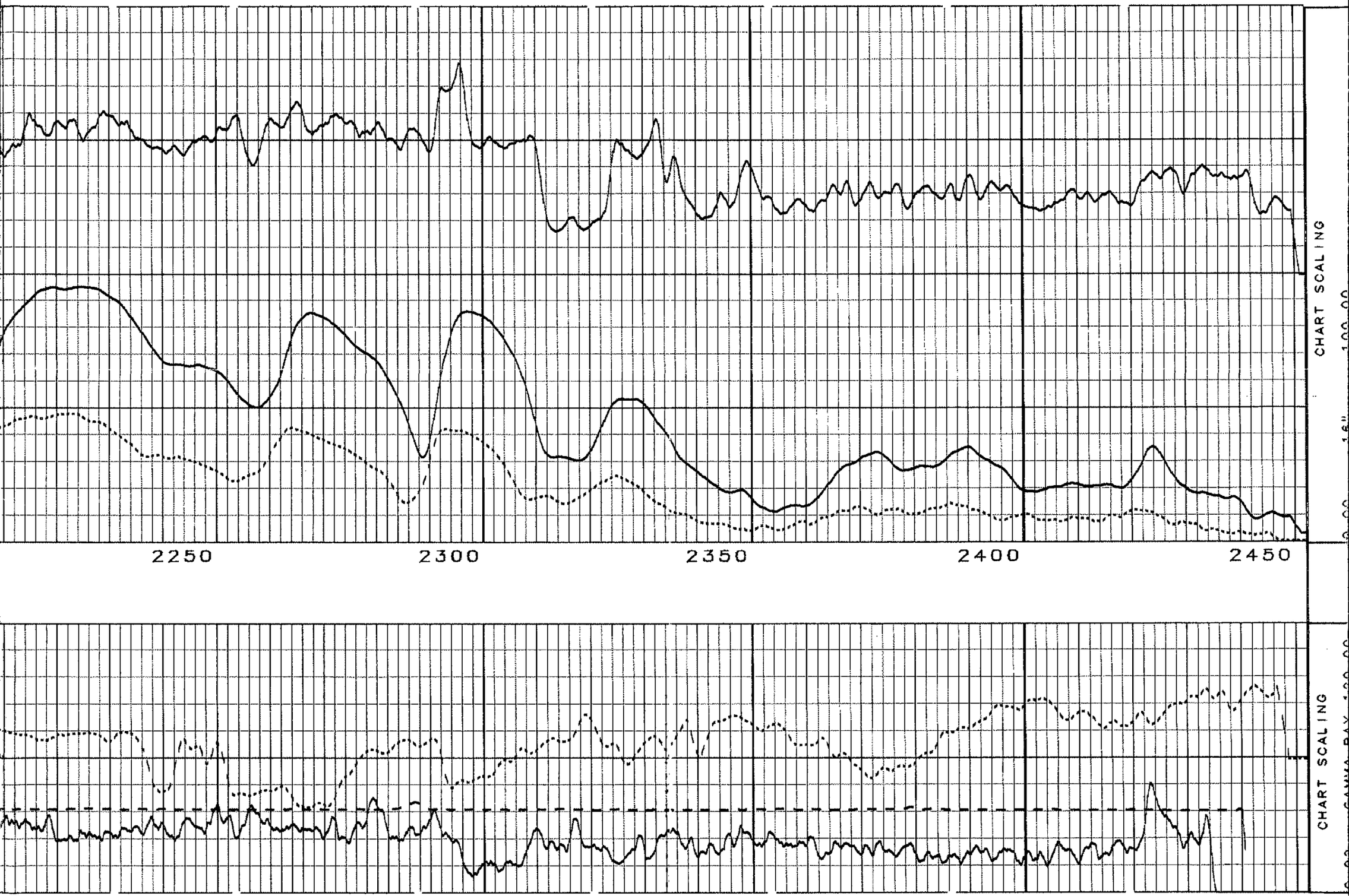
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2400
2450
CHART SCALING
CHART SCALING

0.00	GAMMA RAY	120.00		0.00						
120.00	CPS	240.00		100.00	OHMS	200.00				
-200.00	SP	200.00		0.00	64"	100.00				
	MVS			100.00	OHMS	200.00				
0.00	CALIPER	10.00					0.00	NEUTRON	500.00	
	INCHES							%POROSITY		
START DEPTH: 2452.35			DEPTHS	Sat Jan 05 09:35:02 2013				LOG UP		

Goodwell Incorporated
Logging and Perforating

CEMENT BOND LOG
GAMMA RAY
CCL

Company WESTON ENGINEERING
Well FWR USERS 2
Field FALL RIVER
County FALL RIVER
State SD

Company WESTON ENGINEERING
Well FWR USERS 2
Field FALL RIVER
County FALL RIVER
State SD

Location: API # :

SE\SW

SEC 29 TWP 7S RGE 6E

Other Services

Elevation

Permanent Datum Elevation
Log Measured From KB
Drilling Measured From KB

K.B. 5'
D.F.
G.L.

Date	12/27/2012		
Run Number	1		
Depth Driller	2107'		
Depth Logger	1380'		
Bottom Logged Interval	1378'		
Top Log Interval	4'		
Open Hole Size			
Type Fluid	WATER		
Density / Viscosity			
Max. Recorded Temp.			
Estimated Cement Top			
Time Well Ready			
Time Logger on Bottom			
Equipment Number			
Location			
Recorded By	R KELLEY		
Witnessed By	T BARRIT		

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
1							
2							

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String				
Liner				

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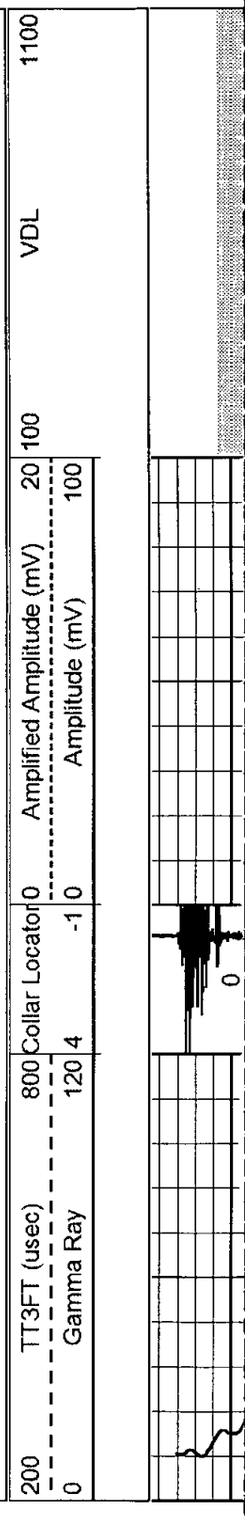
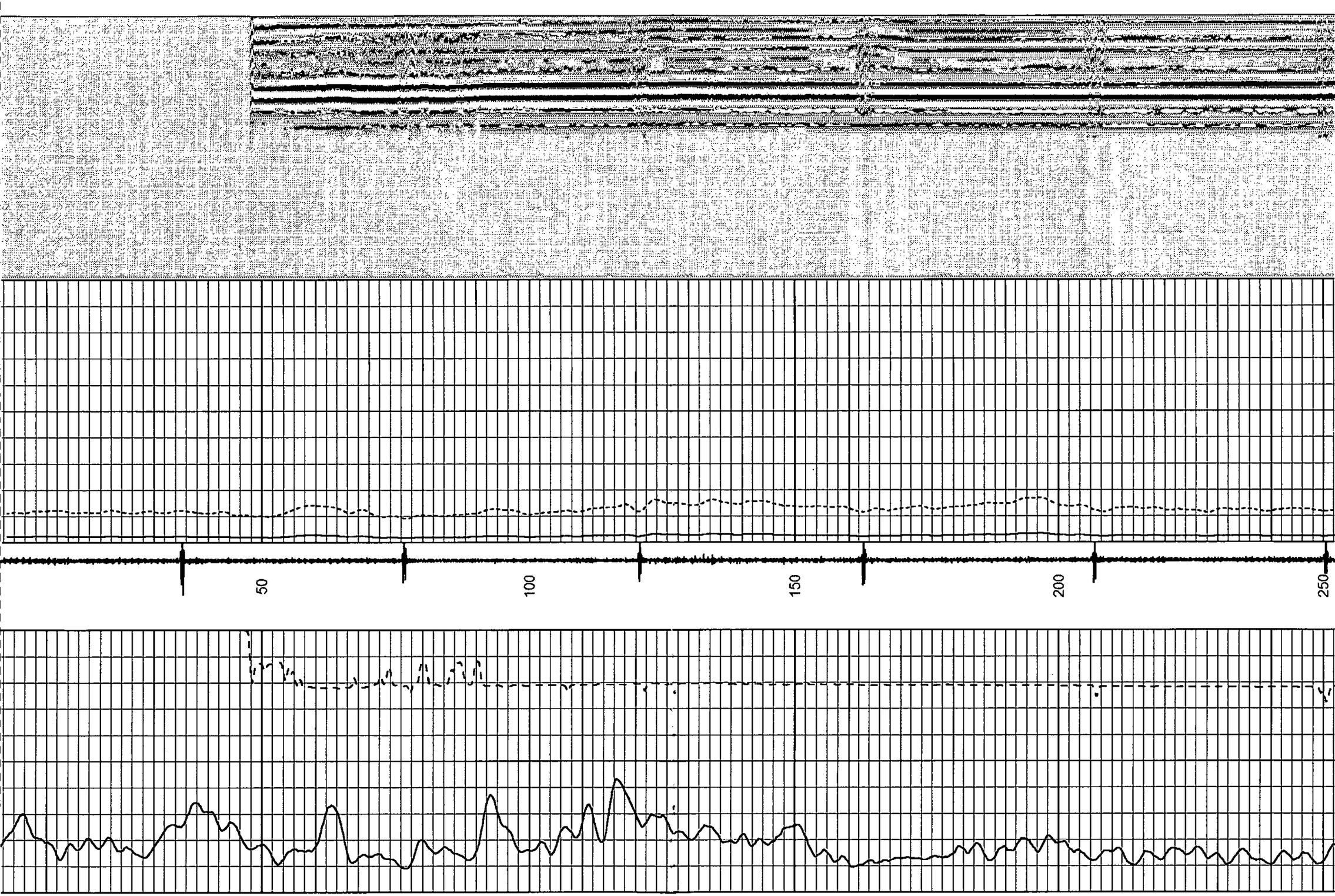
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Database File: f:\frw2_cbl.db
Dataset Pathname: pass1
Presentation Format: scbl_sr
Dataset Creation: Thu Dec 27 11:20:31 2012 by Log Std Casedhole 10081
Charted by: Depth in Feet scaled 1:240

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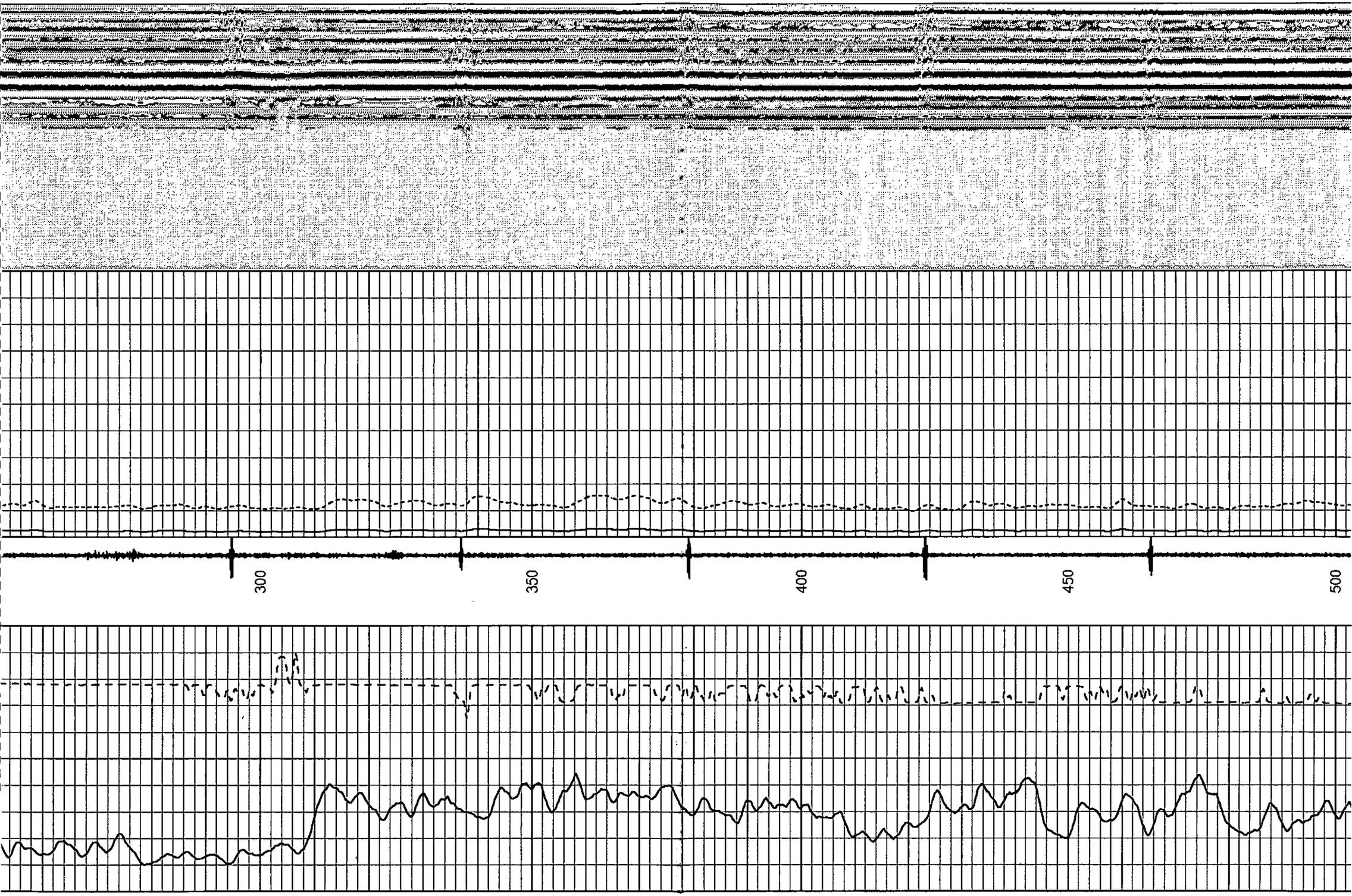
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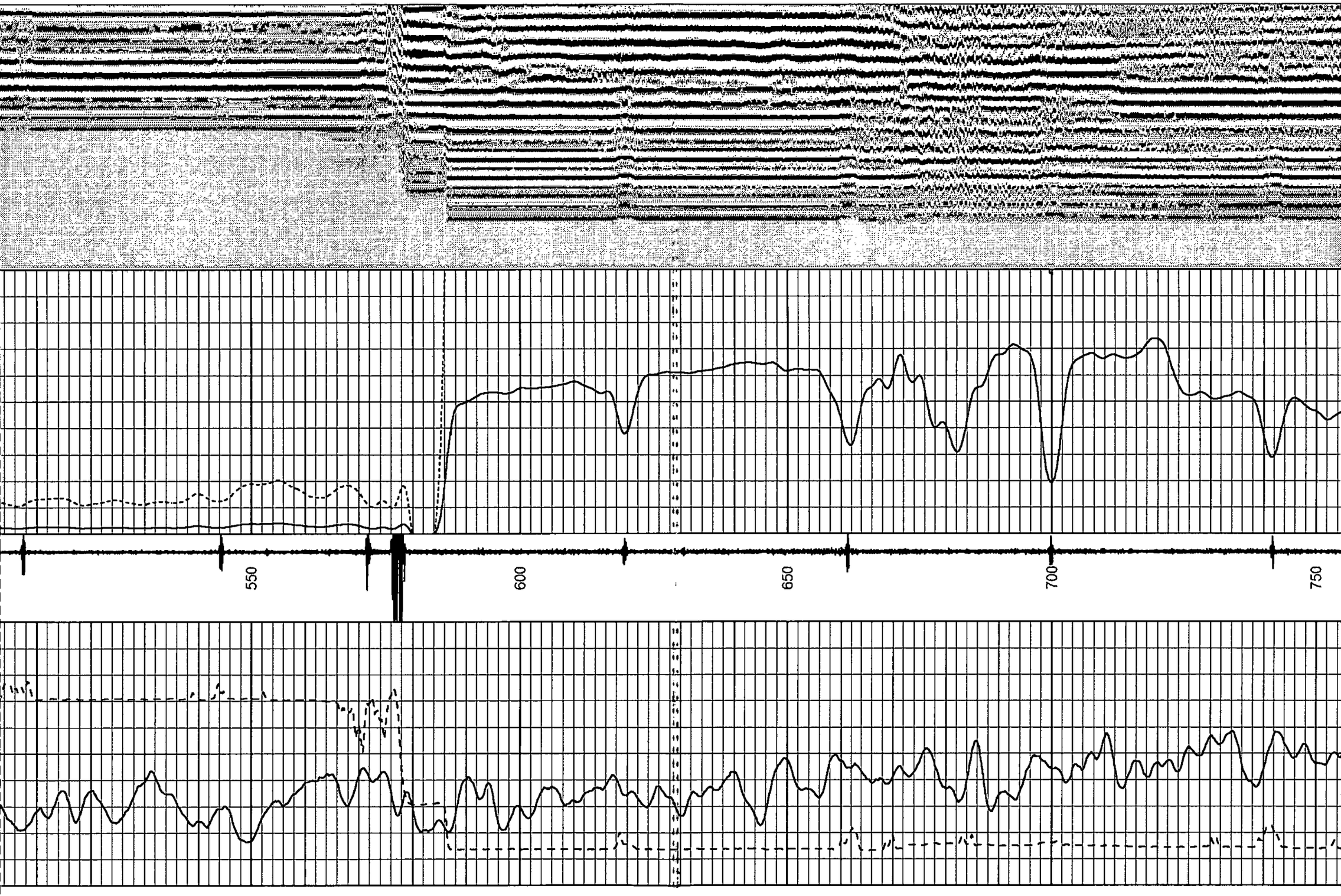
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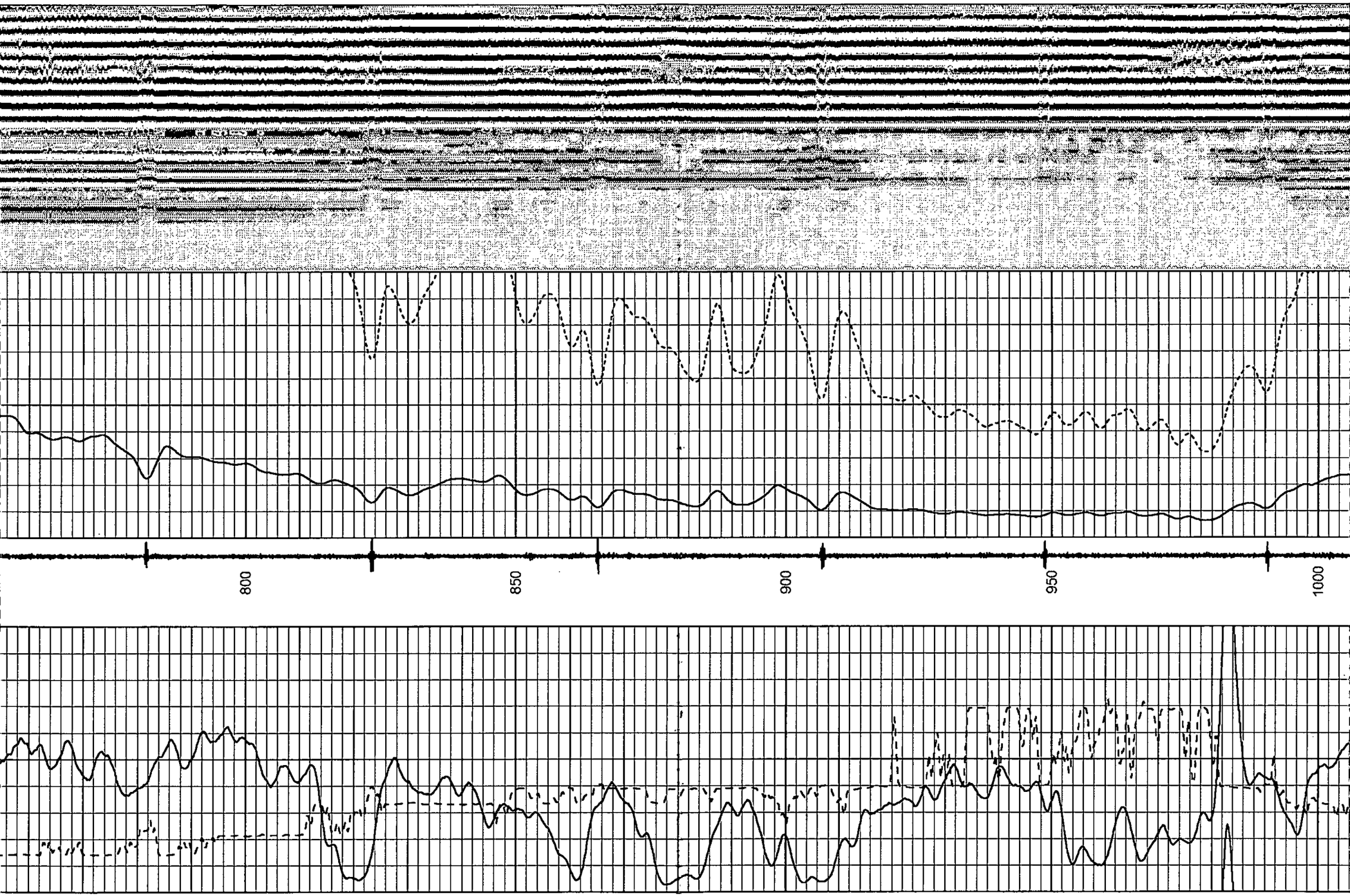
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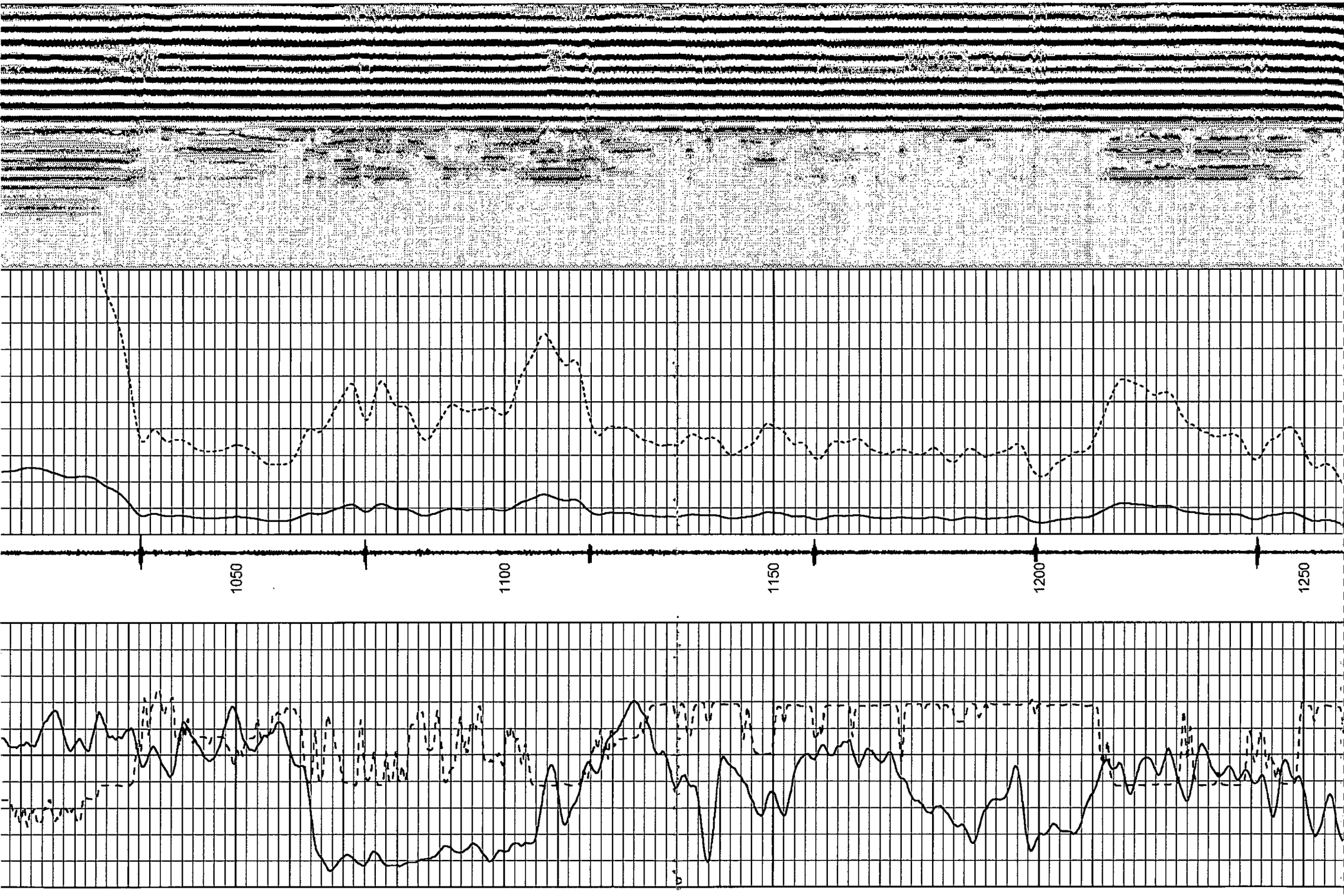
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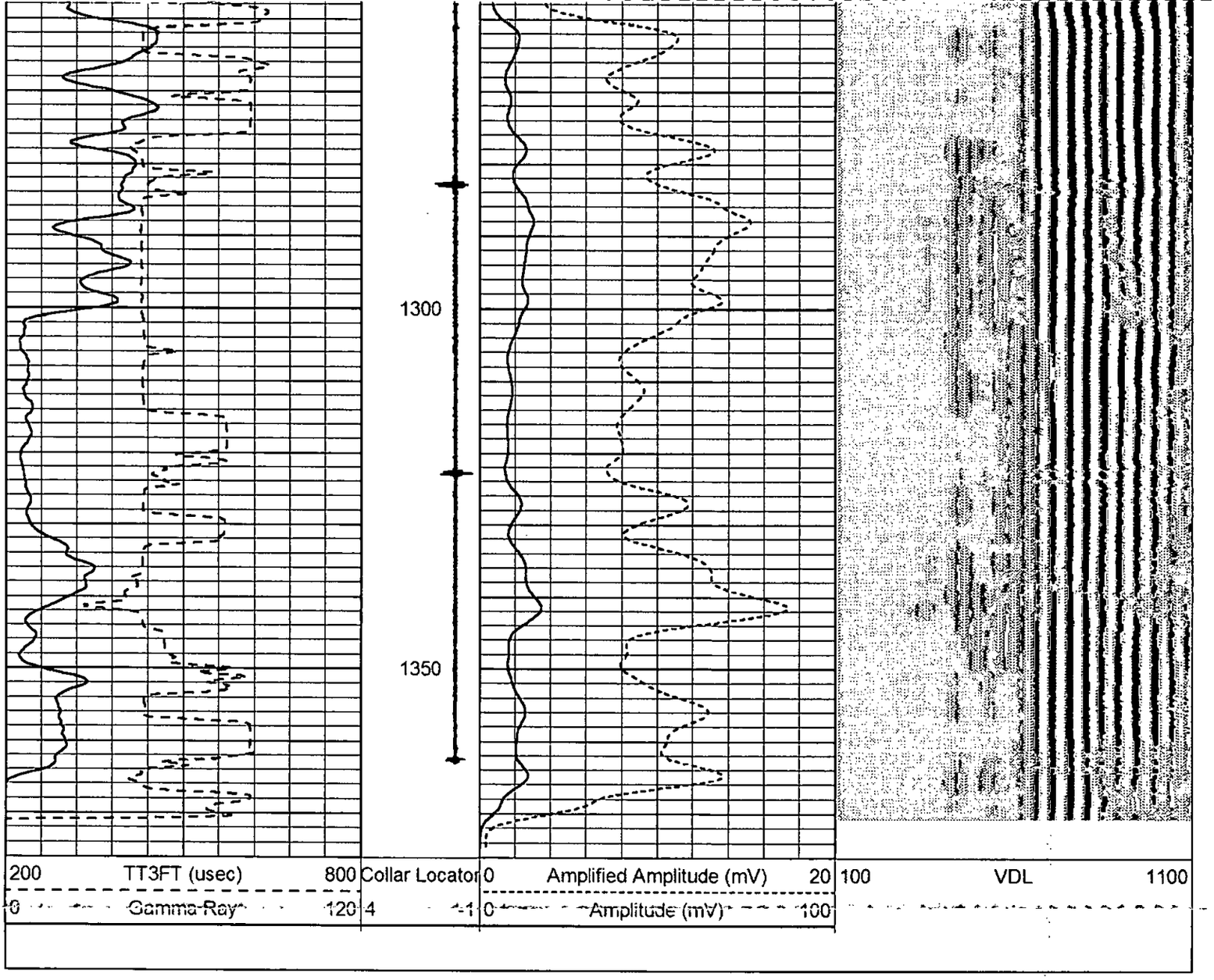
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2629-2

Form 10

RECEIVED
JUL 17 2014
WATER RIGHTS PROGRAM

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

Date 4/16/14

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

FROM: Fall River Water Users District
(name)
PO Box 321
(address)
Oral SD 57766 (605) 424-7648
(city, state, zip) (phone)

I have completed the construction of the water use system and I have put the water to beneficial use to the maximum extent it is going to be used.

Water Permit No. 2629-2 states that the water use system is to be constructed by May 7, 2014 (date), and water is to be put to beneficial use by May 7 2018 (date).

The water use system was completed on January 17, 2014 (date).

Applying the water to beneficial use was completed on January 17, 2014 (date).

You may schedule an investigation so that the water license may be issued.

Keith Neugebauer
(signature)

7-98

DEPARTMENT OF ENVIRONMENT and NATURAL RESOURCES

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

July 18, 2014

2629-2

Kevin Neugebauer
Fall River Water Users District
PO Box 321
Oral SD 57766 0321

Dear Mr. Neugebauer:

I am writing to acknowledge receipt of the "Notice of Completion of Works" form that you sent in to let us know the water use system authorized under Water Permit No. 2629-2 has been completed.

The system is now ready for inspection. Inspections are done on a county-by-county basis as staff time permits. You have done everything you need to do and the intervening time between the completion of the project and the staff inspection has no bearing on the water permit.

Someone from our office will contact you prior to the inspection to set up a time that is convenient for you. If you have any questions, please contact me.

Sincerely,

Genny McMath
Water Rights Program
(605) 773-3352
email: genny.mcmath@state.sd.us

Form 12

Report of Examination of Works and/or Application of Water to Beneficial Use For Permit No. 2629-2

I have this day, **February 1, 2016**, made a thorough examination of the water use system constructed by **Fall River Water Users District, P.O. Box 321, Oral, SD** of Permit No. **#2629-2**, bearing the priorities of **5/16/2005** authorizing **350 acre feet of water** and **3/5/2008** authorizing **374 acre feet** at the diversion rate of **1.0** cu. ft. per second of water from 1 well for **Rural Water System** purposes, in **Fall River** County.

Inspection contact & relationship to permit holder, if applicable:	**Keith Neugebauer, District Manager** **605-424-7648**

A. Works used to divert the water:

Well Information: from **Wester Wetstein and Associates report of April 2014**

Surface Elevation:	3,310 feet MSL
Total Depth:	2,448 feet BGL
Formations Tops (GL):	Surface Alluvium 20' Chilson Member, Lakota Fm 149' Unkpapa Sandstone 305' Redwater Member, Sundance Fm. 439' Lak Member, Sundance Fm. 496' Hulett Sandstone Member, Sundance Fm. 515' Stockade Beaver Member, Sundance Fm. 575' Canyon Spring Member, Sundance Fm. 629' Spearfish Fm. 1,057' Minnekahta Fm. 1,115' Opeche Fm. 1,265' Minnelusa Fm. 2,109' Madison (Pahasapa LS) 2,291' Englewood Fm. 2,345' Whitewood Fm. 2,417' Deadwood Fm.
Hole Diameter (GL):	0 - 31 ft = 17½-inch 31 - 598 ft = 14¾-inch 598 - 899 ft = 9½-inch 899 – 2,102 ft = 8¾-inch 2,102 – 2,448 ft = 6¼-inch
Casing (GL):	0 - 31 ft = 16-inch O.D. 65 lb/ft, API J-55 steel +2 – 598 ft = 10¾-inch O.D. 40.5 lb/ft, API J-55 steel 578 – 2,099 ft = 7-inch O.D. 23 lb/ft, API J-55 steel casing 2,090 - 2,196 = 4½-inch O.D. 10.5 lb/ft, N-80 steel casing
Drilling and Completion Dates:	November 12, 2012 to January 4, 2013
Testing Dates:	January 30, 2013 February 25 – 28, 2013
Drilling Contractor:	Weston Engineering, Wyoming Equipment: Failing 2500A
Cementing Contractor:	Basic Services, Gillette, Wyoming
Geophysical Logging Contractor:	Goodwell, Inc. - Upton, Wyoming
Acid Stimulation Contractor:	Basic Services, Gillette, Wyoming

Screen:

1) Type **N/A**
2) Length **N/A** feet
3) Static water level: 75 psi closed-in pressure at well completion
   200+ gpm free flow volume at well completion

Pumps: Two pumps are utilized depending on system demands. During off-season winter demands a Vertical multistage centrifugal pump is used to boost the free flow volume. During peak summer demand periods a submersible well pump is used.

1) Type **submersible**	Type **multistage centrifugal**
2) Make **Franklin**	Make **Grundfos**
3) Model **475SR75F86-0886**	Model **CR45-2-1**
4) Size **8"**	
5) Capacity **325** GPM	Capacity **152** GPM
6) Horsepower rating **100** hp	Horsepower rating **15** hp

The submersible pump has a 75 hp pump end coupled with a 100 hp motor. This wells production has decreased since the initial step tests were made in 2013. Further acid stimulation may be required. The 325 gpm rate is a metered flow rate and the current capacity of the well.

B. Works used to transport water to place of use: This well is designated the South Madison Well and satisfies flow demands on the southern portion of the Fall River Water Users system with the excess delivered to a storage reservoir. The system is isolated from the northern portion via a manually controlled valve.

C. Works used to apply water to beneficial use:

Fall River Water Users District rural water system

D. Compliance with Permit Requirements:

1) Permit qualifications being abided by **Yes**

The well was completed and put to beneficial use January 17, 2014.

2) Exceptions to compliance are: **none**

E. Condition and Location:

1. The system is in **good** condition with the point of diversion located as follows:
   SE ¼ SW ¼ S 29, T7S, R6E (1,848 ft. east and 1,168 ft. north of the SW corner), N 43.407564° W 103.434469°

2. The works are capable of diverting and conveying to the place of use **.72** cu. ft. per second (325 gpm) of water which is to be used for **rural water system use** and the license should be issued for **.72 cfs**.

3. All structures, wells and lands on map – **No, only the well location is shown, all of the other water system details are available in other documents.**

F. Comments or other permit(s) associated with the project:

Permit No. 2629-2 placed to beneficial use 724 acre-feet of water annually. A portion of this water (350 acre-feet) was appropriated and reserved by future use Permit Nos. 2560-2, 2560A-2, and 2560B-2.

The well has capacity (@ 325 gpm) to put to beneficial use 524 acre-feet.
Fall River Water Users 2015 annual reported usage: 287 acre-feet
2014 annual reported usage: 280 acre-feet
2013 annual reported usage: 202 acre-feet

Steven Quissell
Water Rights Inspector
DENR, Water Rights Program

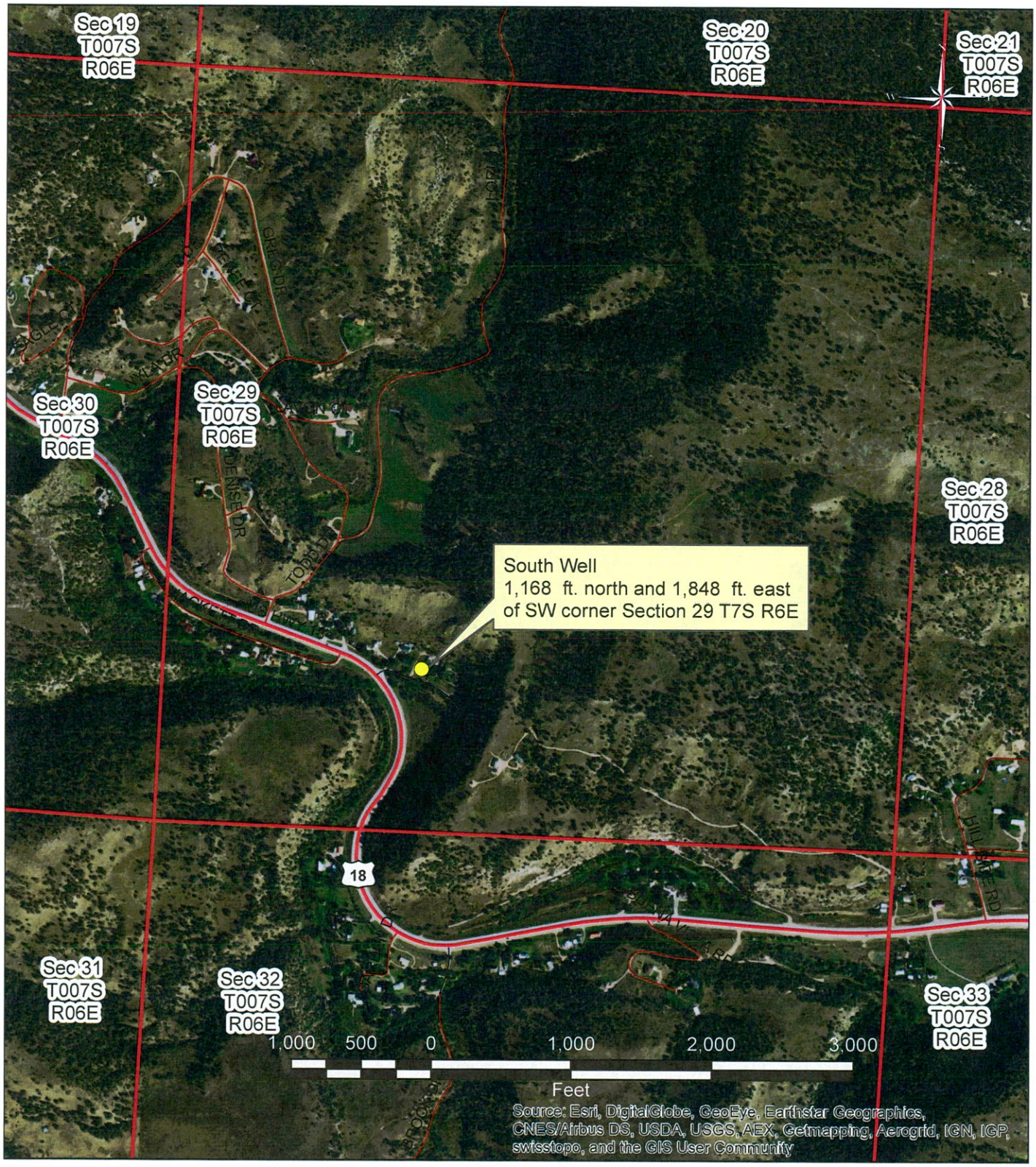
Date report completed: **February 3, 2016**

10 ¾" well casing with submersible pump piping doubling back to pump house. Side outlet for flushing

View of back side of well casing showing piping to centrifugal booster used when well is free flowing.

Centrifugal booster pump on left, chlorination tank in center, manifold from submersible on right, water meter in foreground.

Water Right #2629-2
Fall River Water Users District
2/1/2016



Steven Quissell
Water Rights Inspector
DENR Water Rights Program

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

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

denr.sd.gov

MAR 2 3 2016

2615-2
2629-2

Fall River Water Users District
c/o Keith Neugebauer, District Mgr
PO Box 321
Oral SD 57766

Dear Mr. Neugebauer:

Enclosed are Water License Nos. 2615-2 and 2629-2. These are the final water right documents completing the process of obtaining a Water Right. Also, included with each licenses is a map prepared by the staff engineer who conducted the investigation.

The inspection of No. 2615-2 found the permit was not developed to its fullest extent. Subsequently, an acre-foot volume of water reverts back to Future Use Permit No. 2560-2. All future use permits are subject to a seven year review by the Water Management Board. You will soon be notified by letter what is required for this review.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the wells authorized by Water Right Nos. 2615-2 and 2629-2, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

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

Sincerely,

Jeanne Goodman

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

enclosures

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 2629-2

(1) Fall River Water Users District, c/o Keith Neugebauer, District Manager, PO Box 321, Oral SD 57766 made Application No. 2629-2, March 5, 2008 for a water permit to divert 1.0 cubic feet of water per second (724 acre-feet annually) from one well (Madison Aquifer), Fall River County, South Dakota for rural water system use purposes. Permit No. 2629-2, with priority dates of May 16, 2005 (established by Future Use Permit Nos. 2560-2, 2560A-2 and 2560B-2) and March 5, 2008 was approved May 7, 2009 and issued to the applicants for diversion of water with construction of the described water supply system to be completed on or before May 7, 2014 and for the application to beneficial use of water on or before May 7, 2018.

(2) The water supply system has been completed and water applied to beneficial use in accordance with South Dakota State Law. Pursuant to South Dakota Codified Law 46-5-30.1, the holder and/or owner of Water Right No. 2629-2 is issued a license, bearing priority dates of May 16, 2005 (350 acre-feet annually) and March 5, 2008 (174 acre-feet annually) to appropriate 0.72 cubic feet of water per second (524 acre-feet annually) from one well (Madison Aquifer) for rural water system use.

The diversion point is located: 1,848 feet east and 1,168 feet north of the SW corner of Section 29-T7S-R6E (SE 1/4 SW 1/4). The district serves users in Fall River and Custer Counties.

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit No. 2629-2 including the following qualifications:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2629-2 is issued for a 20-year term. Pursuant to SDCL 46-2A-21, the 20-year term may be deleted at any time during the 20-year period or following its expiration. If the 20–year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2629-2 may also be cancelled for nonconstruction, forfeiture, abandonment, or three permit violations pursuant to SDCL 46-1-12, 46-5-37, 46-5-37.1 and ARSD 74:02:01:37.

2. The well approved under this Permit will be located near domestic wells, other wells which may obtain water from the same aquifer, as well as being in the vicinity of the Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs and Hot Springs that have the same Madison Aquifer as their source. 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, or a significant reduction in water flows from Cascade Springs, Beaver Creek Springs, Evan's Plunge Springs, Minnekahta Springs and Hot Springs.

3. The well authorized by Permit No. 2629-2 shall be constructed by a licensed well drilling and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28. ***The well was drilled by Weston Engineering in 2009. Information included with Report of Examination of Works on file with the Water Rights Program.***

4. Fall River Water Users District shall report to the Chief Engineer annually the amount of water withdrawn from the Madison Aquifer. ***This information has been submitted to DENR yearly.***

Jeanne Goodman

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

MAR 2 3 2016
date

File No. 2560-2
2615-2
2629-2

Water Rights Program - File Documentation

NAME: Fall River Water Users District

ADDRESS: Oral SD

DATE: 3-16-16 **COUNTY:** Fall River

RE: Water Remaining in Future Use Permit No. 2560-2

COMMENTS:

Future Use Permit No. 2560-2	authorized 750 acre-feet	Priority date: 5-16-05
Permit No. 2615-2	authorized 400 acre-feet	Priority date: 5-16-05
Future Use Permit No. 2560-2	350 acre-feet remaining	

Permit No. 2629-2	authorized 350 acre-feet authorized 374 acre-feet	Priority date: 5-16-05 Priority date: 3-5-08
Future Use Permit No. 2560-2	-0- remaining	

Water Right No. 2615-3	licensed for 42 acre-feet 400 AF – 42 AF = 358 AF reverting back to future use	Priority date of 5-16-05
Water Right No. 2629-2	licensed for 350 acre-feet licensed for 174 acre-feet	Priority date of 5-16-05 Priority date of 3-5-08
Future Use Permit No. 2560-2	358 acre-feet remaining	

Future Use Permit No. 2560-2 should be scheduled for the 7 year review by the Water Management Board.

Karen Schlaak

Karen Schlaak
Water Rights Program