

WATER PERMIT NO. 7170-3

Name of Applicant: **City of Sioux Falls**

Address: **224 W 9th St, Sioux Falls SD 57117**

Phone: **605 373-6940**

Amount of Water Claimed: **4.33 cfs (2,988 AF)**

Total Acres: **NA**

Source of Water Supply: **groundwater (horizontal collector well)**

Water to be used for: **municipal**

County: **Minnehaha and Lincoln**

Type of Waste Disposal System: **NA**

Location: **Sioux Falls well field**

PRIORITY

Date Received: **12-2-09**

Application/License Fee: **\$300**

Corrected Application Received:

Period of Annual Use: **January 1 – December 31**

Remarks: **Transfer diversion authority of 0.78 cfs (418 AF) from 6214-3 and transfer diversion authority of 3.55 cfs (2,570 AF) from 1306-3**

Diversion Point: **SW ¼ NE ¼ Sec 5-T102N-R49W**

Land to be Irrigated: **NA**

Depth of Well: **42.4 feet deep**

Well Driller: **Geotek Engineering**

Remarks:

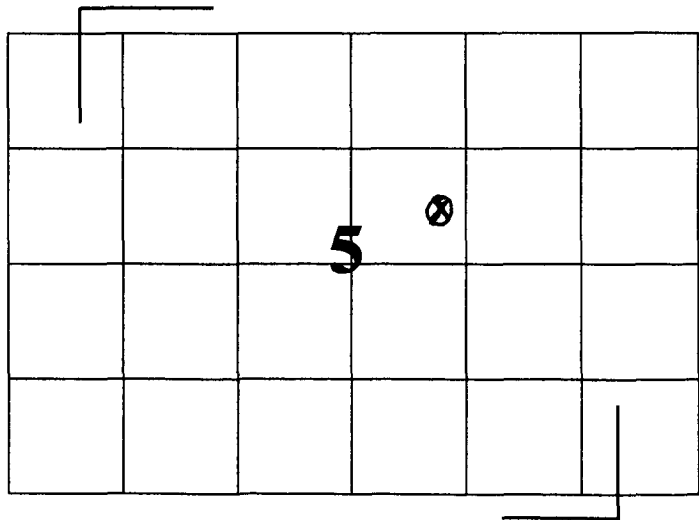
Type of Map: **aerial**

Prepared by: **Jeffrey C Dunn, PE**

Reviewed and the Number Assigned on: **12-3-09**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	No. <u>7170-3</u> (office use only) Hydrologic Unit <u>10170203</u>
	Basin <u>Sioux River</u>
	Newspaper <u>Argus Leader P.O. Box 5034</u>
	<u>Sioux Valley News P.O. Box 255</u> <u>Sioux Falls 57217</u>

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605-331-2200

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

Check use(s) of water:

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

Type of Application: (check one)
☐ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____
☒ Amendment/Correction to Permit No. 6214-3

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

See item No. 7 below

- Name of Applicant City of Sioux Falls Phone (605) 373-6940
(check one) ☒ Owner ☐ Tenant lessee
Mailing Address 224 W 9th St Sioux Falls State SD 57117-7402
(Street, RR, or Box and City) (Zip Code)
- Amount of water claimed 4.33 *CFS or 1943 **GPM 2988 ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam dugout or annual use if applicable
- Source of water supply Big Sioux Aquifer
- Location of point of diversion (example - 3 wells in SW 1/4 NE 1/4 section 12-T104N-R53W) County Minnehaha
One well in SW 1/4 NE 1/4 of Section 5, Township 102N, Range 49W
- County or counties where water will be used Minnehaha and Lincoln
- Annual period during which water is to be used January 1 through December 31
- Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

Horizontal collector well approximately 100 feet west of existing vertical well. Transfer existing diversion authority of 0.78 cfs and 418 AF from vertical well to horizontal collector well. Also transfer diversion authority from WR 1306-3 of 3.55 cfs and 2570 AF to WR 6214-3 to maximize horizontal well potential

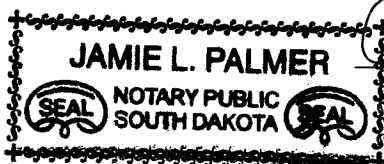
STATE OF SOUTH DAKOTA)
County of Minnehaha) SS

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, Grog Anderson, 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 Grog Anderson

Subscribed and sworn to before me this 24th day of November 20 09



Notary Public signature
Jamie L. Palmer
My Commission Expires May 15, 2013

SOUTH DAKOTA
WATER PERMIT NO. 7170-3

Date of first receipt of application December 2, 2009.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 7170-3 to the City of Sioux Falls, 224 W 9th St, Sioux Falls SD 57117 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. 7170-3 amends Water Right Nos. 6214-3 and 1306-3 by transferring existing diversion authority. Water Right No. 6214-3 authorized 0.78 cubic feet of water per second (cfs) (418 acre-feet) from a vertical well (Well #69) completed into the Big Sioux:Sioux Falls Aquifer (42 feet deep) located in SW 1/4 NE 1/4 Section 5-T102N-R49W. The city is authorized to transfer the entire diversion authority held under Water Right No. 6214-3 to a horizontal collector well (42.4 feet deep) located approximately 100 feet west of the existing vertical well. To maximize the horizontal collector well potential, the city is also authorized to transfer a portion of the diversion authority under Water Right No. 1306-3. Water Right No. 1306-3 authorizes 6.2 cfs (4,488 acre-feet) from wells located in the NW 1/4 Section 9-T101N-R49W. This permit transfers 3.55 cfs (2,570 acre-feet) of the diversion authority authorized by Water Right No. 1306-3 to the horizontal collector well. This permit transfers diversion authority totaling 4.33 cfs (2,988 acre-feet) of existing water rights to the new horizontal collector well. No additional water is being appropriated by this permit.
2. The water appropriated shall be used for the purpose of supplying water for municipal use and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 7170-3 is March 22, 2010.
5. The dates from which applicant may claim right are: September 8, 1966 (3.55 cfs – 2,570 acre-feet) established by Water Right No. 1306-3 and April 8, 1957 (0.78 cfs – 418 acre-feet) established by Water Right No. 6214-3.
6. One-fifth of the construction is to be completed on or before September 22, 2012.
7. All construction is to be completed on or before March 22, 2015.
8. Water is to be put to beneficial use on or before March 22, 2019.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. If the development and pumping of Sioux Falls Management Unit of the Big Sioux Aquifer authorized by this permit results in adverse impairment of adequate domestic wells or adequate wells having prior water rights, reduction of withdrawals or mitigation may be necessary. SDCL 46-1-5(1), in giving preference to domestic use over appropriative rights does so without regard to 1) whether lowered groundwater levels are due to drought, 2) the location of the domestic wells in the aquifer, or 3) the thickness of the water bearing sands and gravel; subject to compliance with minimum requirements for adequate wells as defined by Board Well Construction Standards, Chapter 74:02:04.

(continued)

2. Water Permit No. 7170-3 authorizes a total annual diversion of 2,988 acre feet annually (418 ac-ft/annually established by Water Right 6214-3 and 2,570 ac-ft/annually established by Water Right No. 1306-3).
3. The City of Sioux Falls shall plug existing Vertical Well No. 69 in accordance with Water Management Board Rules, Chapter 74:02:04 within thirty days of the new Collector Well No. 69 being brought on-line.
4. The City of Sioux Falls shall report to the Chief Engineer annually the amount of water withdrawn from the Sioux Falls Management Unit of the Big Sioux Aquifer.

WATER MANAGEMENT BOARD

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

OCT 05 2010

date



(type or print in ink)

1. Well Information - Proposed Construction

- a) Drill Hole Diameter 19 feet Depth 42.4 feet
- b) Casing Type concrete Diameter 16 feet Thickness 18 inches
- c) Screen Type 304 SS Diameter 12 inches Thickness 0.13 inches
- d) Gravel Pack Natural Length of Gravel Pack not applicable
- e) Depth to Top of Water Bearing Material 11 feet
- f) Depth to Water (ground surface to water level) 15 feet
- g) Distance to nearest existing domestic well:
- On applicants property _____ On property owned by others 2500 feet

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

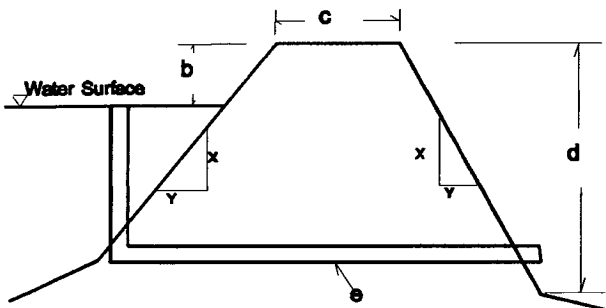
3. Dugout Information

- 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:



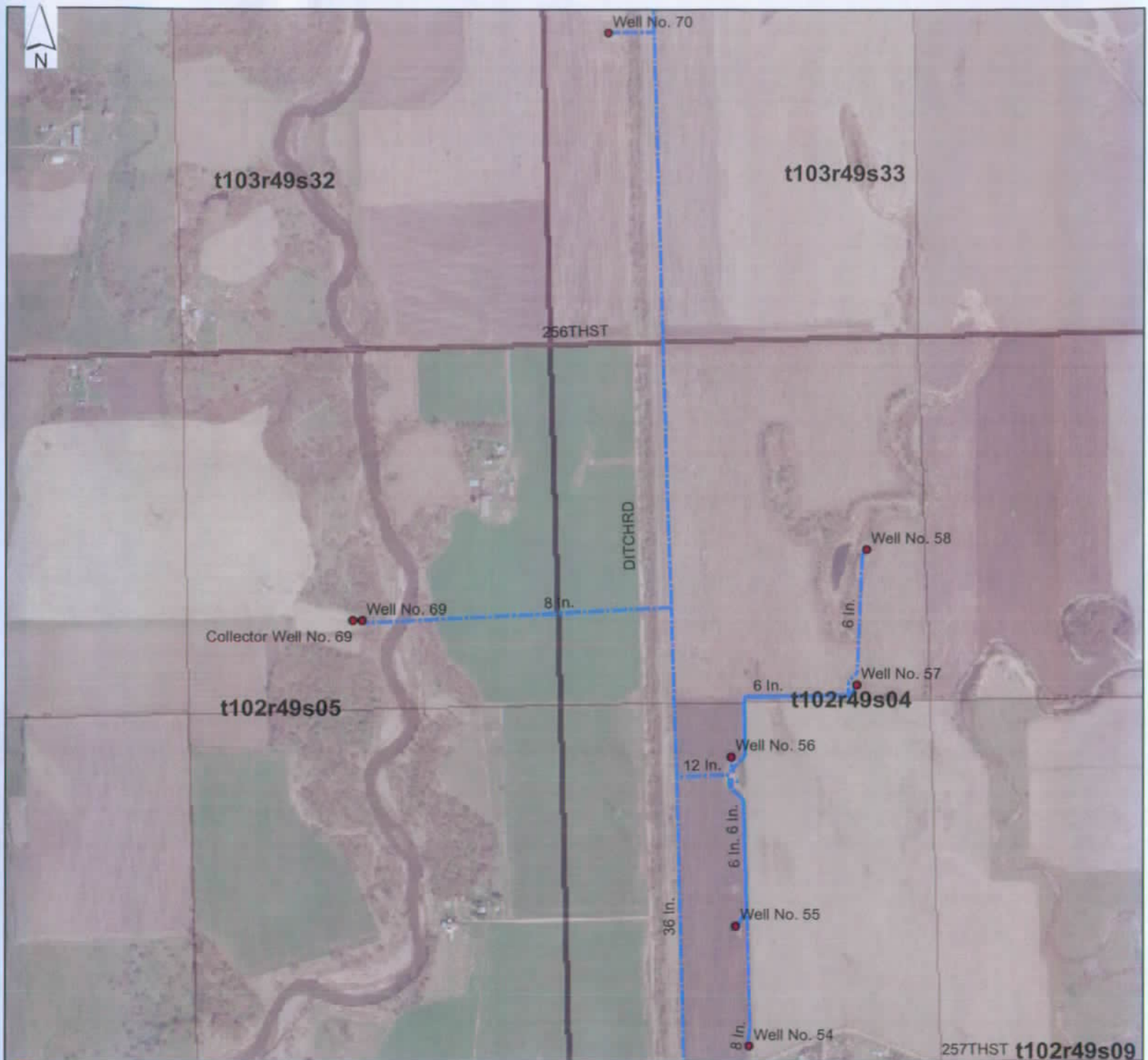
- b) Freeboard _____
- c) Crest Width _____
Crest Length _____
- d) Height _____
- e) Primary Outlet Capacity _____
If pipe, diameter _____
- f) Secondary Spillway Capacity _____
Spillway Width _____
- g) X & Y Slope _____
Upstream _____
Downstream _____
- h) Surface Area of Impoundment _____
- i) Storage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

Water Rights - Well 69

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0 500 1,000 2,000 3,000 4,000 Feet

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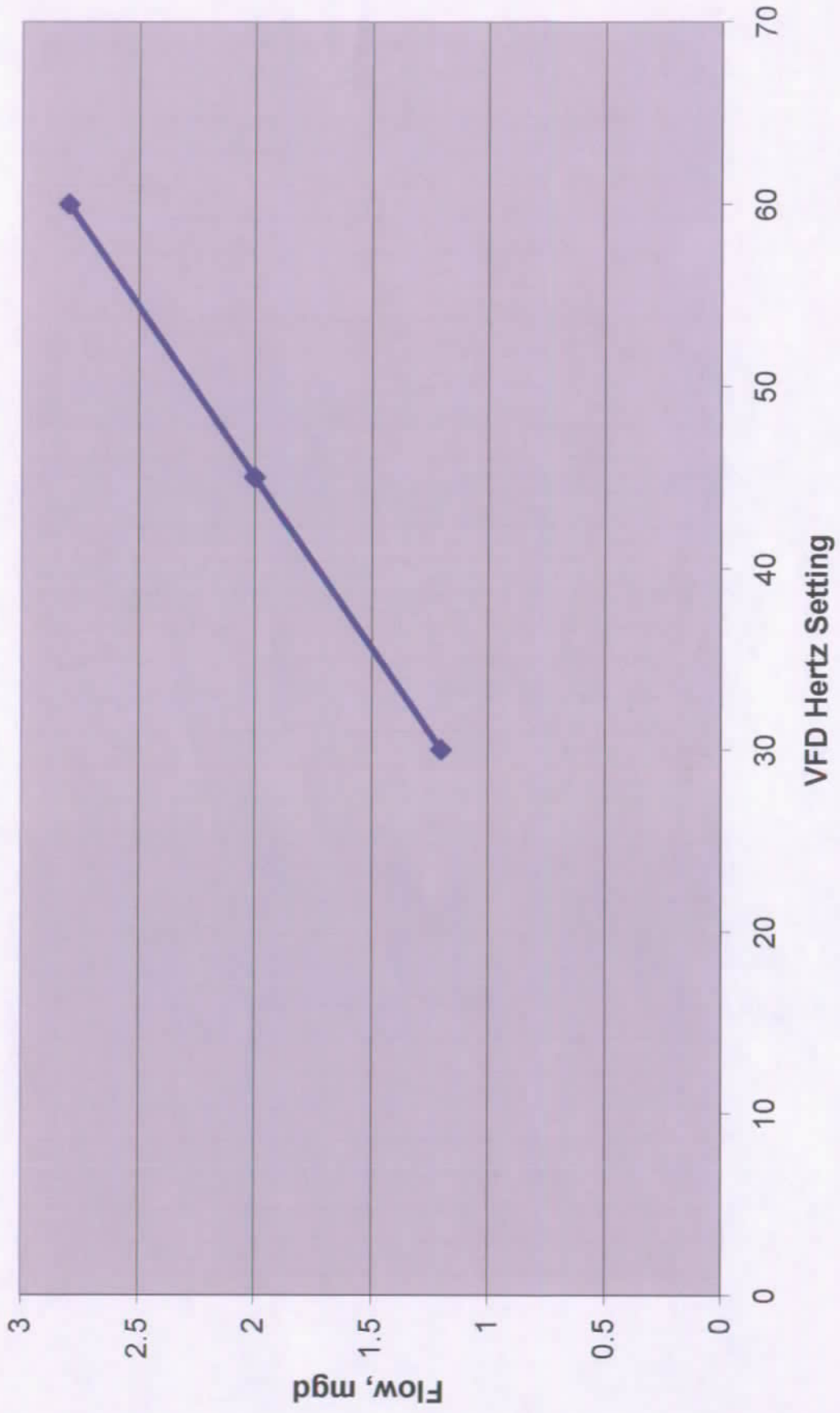
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11-2-09

Well 69 Flow Performance

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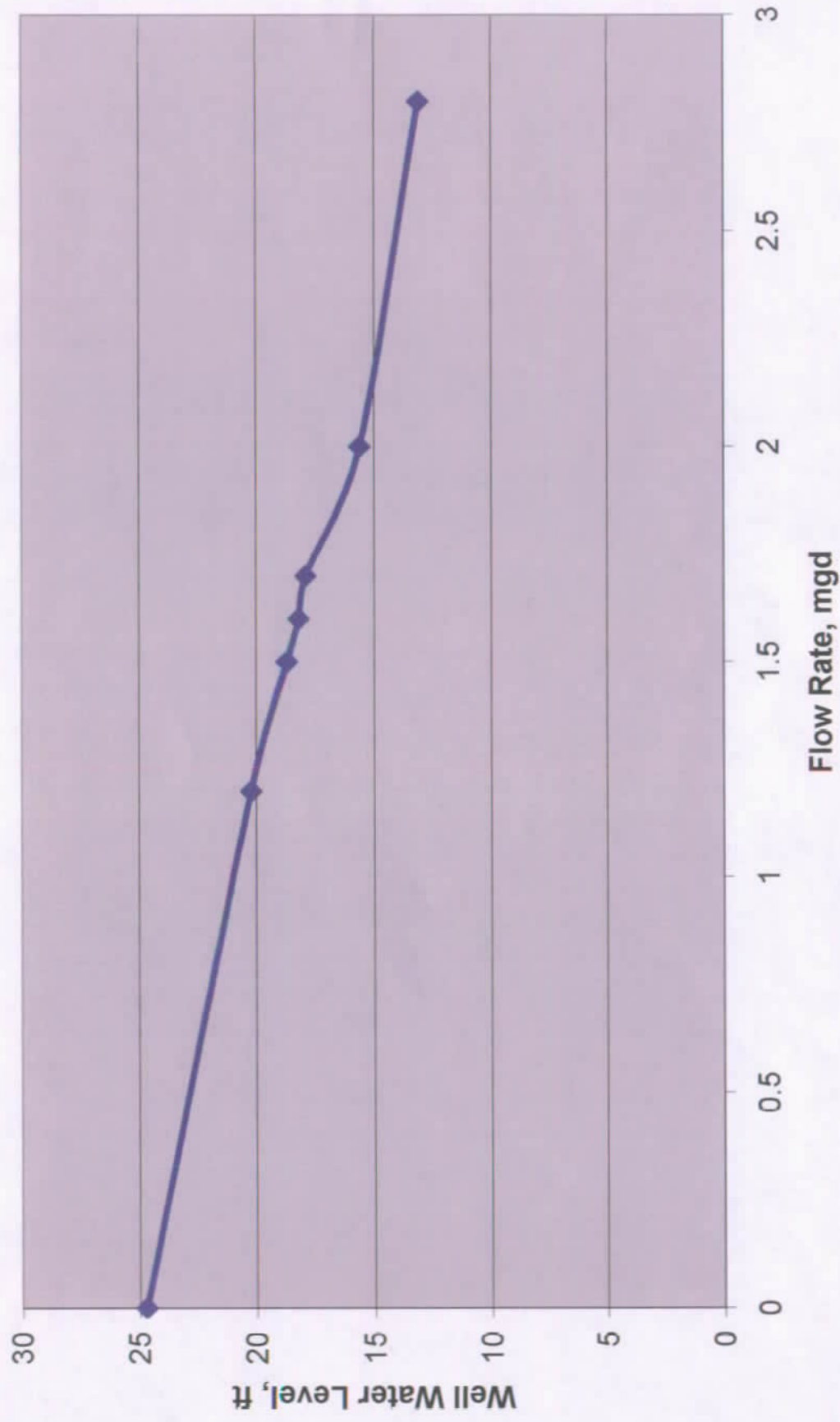


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Well 69 Water Level versus Flow Rate



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**GEOTEK ENGINEERING
& TESTING SERVICES, INC.**
909 E. 50th Street North
Sioux Falls, SD 57104
605-335-5512 Fax 605-335-0773
www.geotekeng.com

GEOTECHNICAL TEST BORING LOG

GEOTEK # 08-781

Ground Elev = 1440.5

BORING NO. 1 (1 of 2)PROJECT Well #69, Sioux Falls, SD

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS				
					NO.	TYPE	WC	D	LL	PL	QU
	<u>LEAN CLAY</u> : black, moist, (CL)	TOPSOIL			1	FA					
4 1/2	<u>SAND</u> : poorly graded fine grained, brown, moist to waterbearing, loose to very loose, (SP)	COARSE ALLUVIUM	5		2	SPT					
			3		3	SPT					
9 1/2	<u>SAND</u> : with gravel, poorly graded fine to coarse grained, brown, waterbearing, (SP)	COARSE ALLUVIUM			4	SS					
					5	SS					
					6	SS					
WATER LEVEL MEASUREMENTS						START	7-10-08	COMPLETE	7-10-08 11:24 am		
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD					
7-10-08	11:25 am	--	--	--	8	Rotary Mud Drilling					
--	--	--	--	--	--						
--	--	--	--	--	--						
--	--	--	--	--	--	CREW CHIEF Gordy Hawkey					

GEOTECHNICAL TEST BORING 08-781.GPJ GEOTEKENG.GDT 7/23/08



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& TESTING SERVICES, INC.
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GEOTEK # 08-781

BORING NO. 1 (2 of 2)

PROJECT Well #69, Sioux Falls, SD

DEPTH in FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE		LABORATORY TESTS					
					NO.	TYPE	WC	D	LL	PL	QU	
	SAND: with gravel, poorly graded fine to coarse grained, brown, waterbearing, (SP) (Continued from previous page)	COARSE ALLUVIUM										
						7	SS					
						8	SS					
						9	SS					
39½	LEAN CLAY WITH SAND: a little gravel, dark gray, moist, (CL)	TILL				10	SS					
41	Bottom of borehole at 41 feet.											
WATER LEVEL MEASUREMENTS					START	7-10-08	COMPLETE	7-10-08 11:24 am				
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	WATER LEVEL	METHOD Rotary Mud Drilling						
7-10-08	11:25 am	--	--	--	8							
--	--	--	--	--	--							
--	--	--	--	--	--							
--	--	--	--	--	--	CREW CHIEF Gordy Hawkey						

GEOTECHNICAL TEST BORING 08-781.GPJ GEOTEKENG.GDT 7/23/08

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WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date 12/2, 20 09

RECEIVED OF City of Sioux Falls PO Box 7402 Sioux Falls SD 57717

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

Fee for Application for Permit No. <u>7170-3</u> to Appropriate Water, to construct and to put water to beneficial use	100	00
Fee for Application for Permit No. _____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>7170-3</u>	200	00
Fee for Filing Transfer Form _____		
Fee for _____		
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____		
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____		
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____		
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____		
(Any Other Work Provided by Law)	TOTAL	300 00

No. 04256

By

Michael Erbe
Chief Engineer

5.0 SUMMARY AND RECOMMENDATIONS

John Reynolds & Sons, Inc. under contract to the City of Sioux Falls, South Dakota, has completed the caisson and lateral installation and performance testing of Collector Well No. 69, which is to provide the City with up to 2.0 MGD of water. The new collector was constructed with a 16-foot ID concrete caisson that is 42.4 feet deep (from top of the caisson to the top of the final floor). The collector is equipped with four (4) 12-inch ID stainless steel (type 304) wire-wrapped laterals. The laterals range in length from 150 to 200 feet, for a total lineal footage of 700 feet and a total of 660 feet of screen. Screen open area is 889 square feet, equating to an entrance velocity of 0.5 ft/min at the target yield of 2.0 MGD, assuming 50% blockage of the screen slots. The average approach velocity at the outside of the natural gravel pack would be approximately 0.06 ft/min and the average in-line velocity will be 1.0 ft/sec at the target yield.

Reynolds conducted performance testing of the new collector well to determine the installed capacity. This testing was comprised of an 8-hour multiple-rate step test and a 3-day constant-rate test on the new collector well. During the testing, water level and pumping data and other information were collected at pertinent intervals to evaluate the efficiency and productivity of the new collector well.

The multiple-rate test was successfully completed on June 4, 2009; during which the well was pumped at increasing rates of 775, 983, 1225 and 1538 gpm. The drawdowns in the collector well at the end of the steps ranged from 2.83 feet at 775 gpm to 5.96 feet at the highest rate of 1538 gpm.

The constant-rate test was successfully completed from June 5 through June 8, 2009 at an average pumping rate of 1380 gpm, with recovery monitored until June 10. During the test, the estimated maximum drawdown in the collector was about 7.54 feet, for a specific capacity of 183 gpm/ft. Projecting the trend drawdown from the end of the constant-rate test for the 17 days estimated to reach equilibrium would have resulted in 2 feet of additional drawdown, equating to a specific capacity of 145 gpm/ft.

Sand content measurements were made during the performance testing periods. All of the measured sand content values from the water produced during the performance testing were below the specified limit of 2 ppm.

The results of the testing of the new collector well are very favorable for production capacity. The new collector well should provide the city with an efficient, dependable source of water. Analysis of the testing results for Collector Well No. 69 indicates that the collector in its current condition could be capable of yielding in excess of 2.0 MGD under the assumed conditions.

Given the inherent water quality (elevated iron and manganese), routine maintenance of the laterals will be required. It is recommended that once the well becomes operational, a record keeping program be initiated to collect such essential data as: (1) Pumping rates, (2) Pumping levels in the collector well and monitoring well (Vertical Well No. 69), (3) Static water level elevations in the collector well and monitoring well, (4) Water temperature of the pumped water and (5) Water levels for the Big Sioux River. Initially this information should be collected every two weeks and reviewed on a quarterly basis by a person experienced in the analysis and evaluation of this type of operational data. It is anticipated that following the initial 6-month period the monitoring interval can be increased to once a month. This program will provide current and accurate determination of the operating trends of the collector enabling the tracking of the efficiency and yield potential of the well. This will allow future maintenance requirements to be easily assessed and scheduled at opportune times in order to minimize downtime and maximize benefit.

City of Sioux Falls



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Administration/GIS

224 West Ninth Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8600 F: 367-4605

Engineering/Real Estate

224 West Ninth Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8601 F: 367-4310

Environmental

1203 North Western Avenue
Sioux Falls, SD 57104-1201
T: 605-367-8276 F: 367-4886

Fleet Management

1000 East Chambers Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-7170 F: 367-7421

Household Hazardous Waste Facility

1015 East Chambers Street
Sioux Falls, SD 57104-7200
T: 605-367-8695 F: 367-4993

Landfill

224 West Ninth Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8162 F: 526-3371

Light

2000 North Minnesota Avenue
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-7006 F: 367-8306

Street

1000 East Chambers Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8255 F: 367-7010

Utility Billing

1201 North Western Avenue
P.O. Box 7401
Sioux Falls, SD 57117-7401
T: 605-367-8131 F: 367-7341

Utility Maintenance

668 West Algonquin Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-7020 F: 367-7883

Water Purification

2100 North Minnesota Avenue
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-7025 F: 367-8475

Water Reclamation

4500 North Sycamore Avenue
Sioux Falls, SD 57104-9612
T: 605-367-8188 F: 367-8484

November 24, 2009

Mr. Eric Gronlund
Water Rights Program, DENR
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Dear Mr. Gronlund

Enclosed is the application to amend the appropriation of water for the City of Sioux Falls well No. 69. Vertical well No. 69 appropriates 0.78 cfs with an annual volume limit of 418 acre feet of water based on Water License No. 6214-3 issued June 20, 2003. The City has recently completed a project to replace this vertical well with a horizontal collector well 100 feet to the west.

The City is requesting to transfer the existing diversion authority of 0.78 cfs and 418 AF to this new horizontal collector well. The City is also requesting to transfer 3.55 cfs and 2570 AF of the diversion authority granted under permit No. 1306-3 to permit No. 6214-3. The City requests this transfer to maximize the horizontal well potential. The total diversion authority under permit No. 6214-3 will then be 4.33 cfs and 2988 AF. Pumping tests show that the new well No. 69 can produce up to 4.33 cfs. When the transfer is complete, the City will plug the old vertical well 69.

Granting the partial diversion authority from permit No. 1306-3 will leave a total of 2.65 cfs and 1919 AC remaining on permit No. 1306-3. It is the intent of the City to request a transfer of the remaining diversionary authority to a new well that will be constructed in 2010. The current well under permit No. 1306-3 will be removed in the near future when the dikes of the diversion channel are raised on the north side of Sioux Falls.

If you have any questions, please contact me at 605-373-6940. Thank you for your attention to this matter.

Sincerely

Greg Anderson
Water Superintendent

A handwritten signature of Greg Anderson in black ink.

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City of Sioux Falls



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224 West Ninth Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8601 F: 367-4310

Environmental

1203 North Western Avenue
Sioux Falls, SD 57104-1201
T: 605-367-8276 F: 367-4886

Fleet Management

1000 East Chambers Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8240 F: 367-8239

GIS

132 North Dakota Avenue
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8651 F: 367-8113

Household Hazardous Waste Facility/Sustainability

1015 East Chambers Street
Sioux Falls, SD 57104-7200
T: 605-367-8695 F: 367-4993

Landfill

224 West Ninth Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8162 F: 367-8167

Light

2000 North Minnesota Avenue
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-373-6979 F: 373-6974

Street

1000 East Chambers Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8255 F: 367-7010

Utility Billing

1201 North Western Avenue
P.O. Box 7401
Sioux Falls, SD 57117-7401
T: 605-367-8131 F: 367-7341

Utility Maintenance

668 West Algonquin Street
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-367-8810 F: 367-7883

Water Purification

2100 North Minnesota Avenue
P.O. Box 7402
Sioux Falls, SD 57117-7402
T: 605-373-6940 F: 373-6941

Water Reclamation

4500 North Sycamore Avenue
Sioux Falls, SD 57104-9612
T: 605-367-8188 F: 367-8484

July 12, 2010

Mr. Eric Gronlund
PMB 2020
Water Rights Program
523 E. Capitol
Pierre, SD 57501

Dear Mr. Gronlund:

I would like to inform you that the City of Sioux Falls Water Purification Plant maintenance staff has completed the plugging of the old vertical Well 69 in accordance with the stipulation in Water Right 7170-3 for the new horizontal collector well 69. This well was located north of Sioux Falls (N43° 40' 07.7526" Latitude; W96° 44' 11.6467" Longitude).

The vertical well was originally installed in 2000 under Water Right 6214-3. The 12-inch steel casing well was 42 feet deep, with an approximate depth to water of 11 feet, and was in good condition.

The plugging procedure included filling the 12-inch steel casing with clean pea rock to a depth of 7 feet below grade. Approximately 3½ feet of Portland cement was then added on top of the pea rock. The casing was then broken off at approximately 3 feet below grade. The hole was then filled with red gravel to match the current grade level.

If you have any comments or questions about the plugging of this well please call me at 605-373-6944. Thank you

Sincerely,

Greg Anderson
Water Superintendent
City of Sioux Falls

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**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 7170-3, City of Sioux Falls**

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. 7170-3, City of Sioux Falls, c/o Greg Anderson, Water Superintendent, 224 W 9th Street, Sioux Falls SD 57117.

The Chief Engineer is recommending APPROVAL of Application No. 7170-3 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. If the development and pumping of Sioux Falls Management Unit of the Big Sioux Aquifer authorized by this permit results in adverse impairment of adequate domestic wells or adequate wells having prior water rights, reduction of withdrawals or mitigation may be necessary. SDCL 46-1-5(1), in giving preference to domestic use over appropriative rights does so without regard to 1) whether lowered groundwater levels are due to drought, 2) the location of the domestic wells in the aquifer, or 3) the thickness of the water bearing sands and gravel; subject to compliance with minimum requirements for adequate wells as defined by Board Well Construction Standards, Chapter 74:02:04.
2. Water Permit No. 7170-3 authorizes a total annual diversion of 2,988 acre feet annually (418 ac-ft/annually established by Water Right 6214-3 and 2,570 ac-ft/annually established by Water Right No. 1306-3).
3. The city of Sioux Falls shall plug existing Vertical Well No. 69 in accordance with Water Management Board Rules, Chapter 74:02:04 within thirty days of the new Collector Well No. 69 being brought on-line.
4. The City of Sioux Falls shall report to the Chief Engineer annually the amount of water withdrawn from the Sioux Falls Management Unit of the Big Sioux Aquifer.

See report on application for additional information.

Garland Erbele, Chief Engineer
February 22, 2010

NOTE: If groundwater withdrawals reduce flows in the Big Sioux River, more stringent limits to the city's discharge permits for the waste water treatment plant discharge to the Big Sioux River may be required. The current limits (concentration) to the city's discharge permits are established based on historic river flows.

This application does not request the transfer of the entire amount of water appropriated by Water Right No. 1306-3. If Application No. 7170-3 is approved, 1,918 acre feet of water annually at a maximum diversion rate of 2.65 cfs remains authorized by Water Right No. 1306-3.

WATER PERMIT APPLICATION NO. 7170-3
CITY OF SIOUX FALLS
DECEMBER 16, 2009

Water Permit Application No. 7170-3 proposes to amend Water Right Nos. 6214-3 and 1306-3 by transferring the water rights' existing diversion authority to a new diversion point. Water Right No. 6214-3 authorizes diversion of 418 acre-feet annually at a maximum rate of 0.78 cubic feet of water per second (cfs) from a well (Well #69) completed into the Sioux Falls management unit of the Big Sioux aquifer. The existing well is 42 feet deep, located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 5, T102N-R49W. This permit application proposes to transfer the entire diversion authority held under Water Right No. 6214-3 to a horizontal collector well (42.4 feet deep) located approximately 100 feet west of the existing vertical well. This application also proposes to transfer the diversion authority for 2,570 acre-feet annually at a maximum diversion rate of 3.55 cfs from Water Right No. 1306-3 to the new horizontal collector well. Water Right No. 1306-3 authorizes diversion of 4,488 acre-feet annually at a maximum diversion rate of 6.20 cfs from wells located in the NW $\frac{1}{4}$ Section 9, T101N-R49W. This application, if approved, will transfer the diversion authority for 2,988 acre-feet annually at a maximum rate of 4.33 cfs (2,988 acre-feet annually) for municipal use by the city. No additional water is being appropriated by this application.

AQUIFER: Big Sioux: Sioux Falls

GEOLOGY AND AQUIFER CHARACTERISTICS:

The Sioux Falls Management Unit of the Big Sioux Aquifer is an alluvium mantled, glacial outwash deposit, which consists of silt, fine to coarse sand, and gravel. The management unit underlies approximately 22,900 acres in Minnehaha County and contains an estimated 103,050 acre-feet of recoverable water in storage in the county (Hedges, 1982). The aquifer is restricted to the Big Sioux Alluvial Valley, and is bounded both to the north (near Dell Rapids) and on the south (Sioux Falls) by the relatively impermeable Sioux Quartzite. The aquifer is predominately under unconfined conditions. The direction of water movement in the aquifer is generally to the south and towards the Big Sioux River (Lindgren, 1992). The aquifer attains a maximum thickness of approximately 48 feet. The test hole log included with this application indicates the sand and gravel is approximately 27 feet thick at the site proposed by this application.

The DENR-Water Rights Program monitors 13 observation wells completed into the Big Sioux: Sioux Falls. Three of these observation wells are located within approximately one and three-fourths of a mile from the well site proposed by this application. Hydrographs for these wells are shown in figures 1-3.

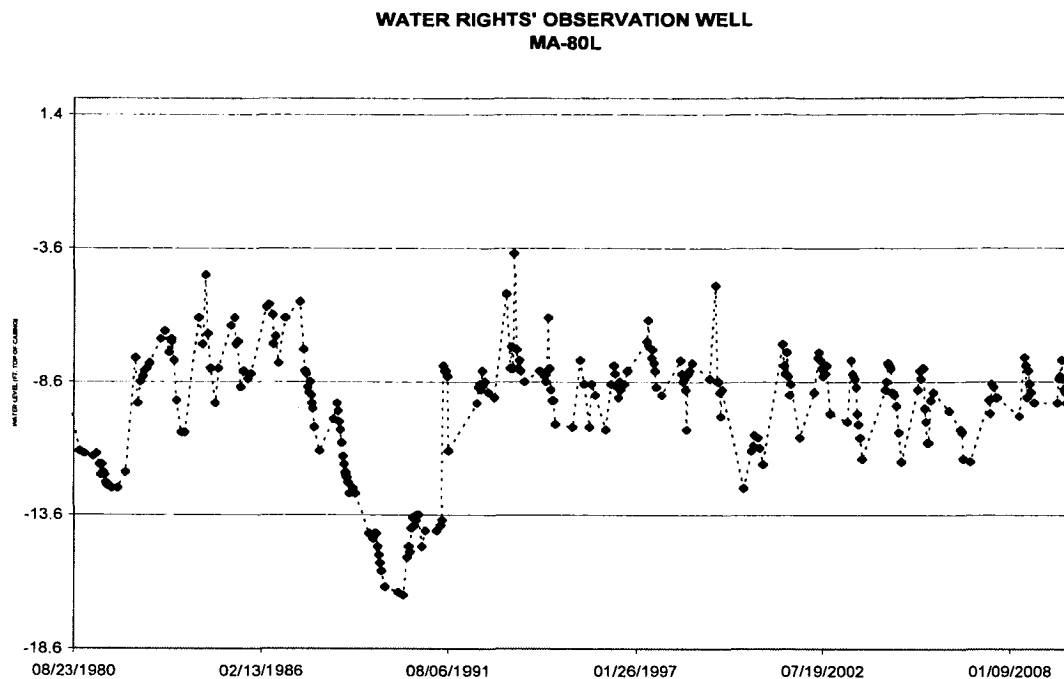


Figure 1. DENR-Water Rights Program observation well located approximately 0.8 miles southeast of the well site proposed by Application No. 7170-3

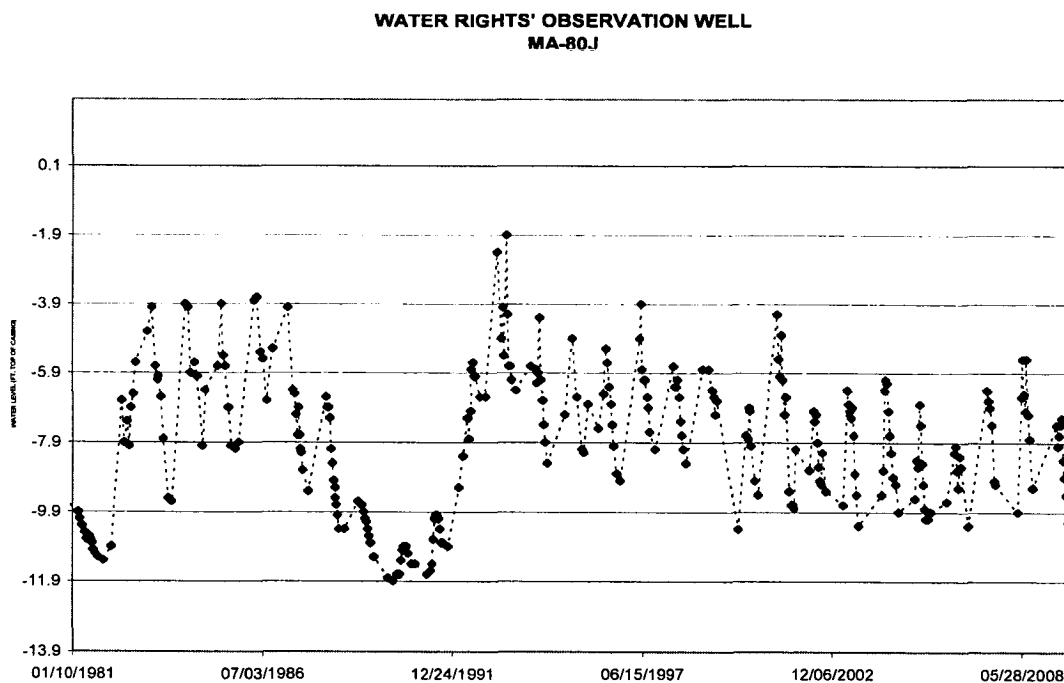


Figure 2. DENR-Water Rights Program observation well located approximately 1.4 miles southeast of the well site proposed by Application No. 7170-3

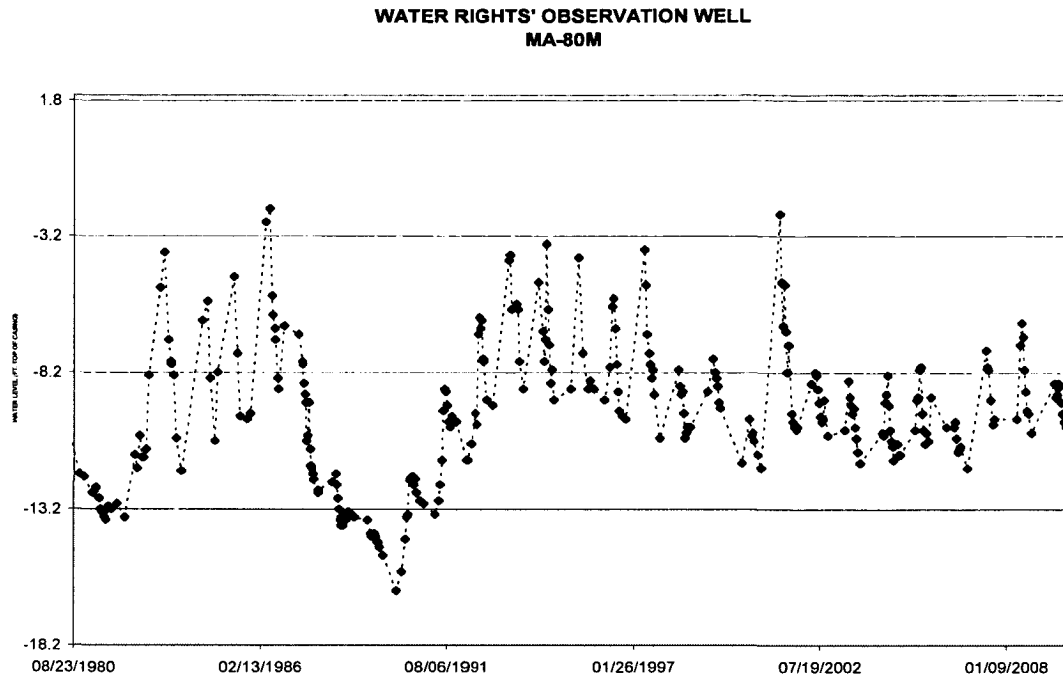


Figure 3. DENR-Water Rights Program observation well located approximately 1.75 miles south-southwest of the well site proposed by Application No. 7170-3

The observation well hydrographs show that the highest annual water level generally occurs around April- June, and the lowest annual water level generally occurs around August - October. The decline of water levels during the summer months is due to increased evapotranspiration, reduced recharge, and increased pumpage. Water levels rise during the late winter and spring due to reduced pumping and recharge, if available. The hydrographs show that the water level of the aquifer fluctuates rapidly in response to recharge. The response to withdrawals is less obvious and tends to be represented by a slow gradual decline.

AMENDMENT OF PERMIT OR LICENSE

SDCL 46-2A-12 allows that an amendment of an existing permit or license may be granted for a change in point of diversion (e.g. Water Right No. 6214-3) or to add a diversion point (e.g. Water Right No 1306-3) only if the change does not unlawfully impair existing rights and is for a beneficial use and in the public interest.

REVIEW OF EXISTING WATER RIGHTS

Big Sioux aquifer:

The Big Sioux aquifer extends from Grant County to Union County. There have been 906 applications made for appropriations from the entire Big Sioux aquifer in South Dakota. The status of those applications is shown in Table 1.

STATUS	NO. OF APPLICATIONS
Licensed	511
Permit	91
Cancelled	116
Incorporated	151
Future Use	30
Withdrawn	7

Table 1. Water Right Applications from the Big Sioux aquifer in South Dakota

Almost all of the appropriations contain the standard “domestic well qualification” which requires the owner of the permit to control his withdrawals so there is not a reduction of needed water supplies in domestic wells or wells with prior water rights.

Throughout the history of development of the Big Sioux aquifer, there have been 63 permit applications approved with qualifications additional to the domestic well qualifications; they are shown in Table 2.

QUALIFICATION	WATER RIGHT/PERMIT NO(S).
The wells approved under this permit shall be spaced so that there is at least 660' between wells	2888-3, 2918-3, 2927-3, 3204-3, 3208-3, 3216-3, 3237-3, 3240-3, 3293-3, 3361-3, 3385-3, 3437-3, 3563-3, 3619-3, 3921-3, 3951-3, 3969-3, 4088-3, 4109-3, 4180-3, 4332-3, 4338-3, 4347-3, 4362-3, 4363-3, 4364-3, 4373-3, 4388-3, 4395-3, 5252-3, 5450-3
The wells approved under this permit shall be spaced so that there is at least 660' between wells and shall be located at least 660' from the Sioux River	3217-3, 3450-3, 3489-3, 4329-3, 5668-3
The well approved under this permit shall be located at least 660 feet from the Sioux River	2906a-3, 2906b-3, 3749-3, 4087-3, 4330-3, 5158-3* (*)Water Permit No. 5158-3 was approved with the condition that the well be spaced at least 660 feet from the Big Sioux River. The qualification was not met (i.e. the well was constructed 543 feet from the river) but a Water License was issued.
The well shall be spaced at least 660 feet from Indian Creek	5271-3
The well shall be a minimum of 1,320 feet from the Big Sioux River	7135-3, 7160-3
Wells shall be spaced at least 500 feet apart and at least 500 feet from other wells and at least 500 feet from the Sioux River	5233-3
Withdrawal is whenever 30 cfs of water or more is flowing in the Big Sioux River past your diversion point	1350-3
Permit is approved allowing withdrawals whenever 50 cfs of water or more is flowing in the Big Sioux river past your diversion point	2527-3
Low flows of Medary Creek as needed for domestic use must be by-passed	2406-3
Low flows of Split Rock Creek as needed for downstream domestic use must be by-passed	4434-3
The State Water Resources Commission remarked that City water supply shortages from this aquifer in the past are considered due to improperly spacing of wells considering their capacity, spacing of wells proposed in applications 395-3, 396-3 and 397-3 is considered adequate but the minimum that should be allowed. While need is not expected, the City shall, and City officials have agreed, pay special attention to domestic water supplies near the City well field, including these three new wells, and shall settle with each domestic well owner any adverse effects upon such domestic water supplies."	395-3,396-3,397-3
The State Water Resources Commission remarked that "This well is located in an area where the natural characteristics of the aquifer may limit the long-term capacity of the well to less than the amount of water requested or granted in this permit to appropriate Water. In granting this Permit to Appropriate Water, the Water Resources Commission believes that the water supply available will be sufficiently beneficial to the applicant for him to justify his financial investment.	611-3
"whenever in the opinion of the Water Resources Commission, then existing domestic water supplies are adversely affected by installation of the vitally needed City wells, the City at its expense will deepen or otherwise rehabilitate existing domestic wells to assure domestic users of a water supply equivalent to that which they could have expected had not the City's wells been constructed"	FU 448-3
"If development and pumping of the well authorized by [this permit] results in impairment of adequate domestic wells or adequate wells having prior water rights, reduction of withdrawals or mitigation may be necessary. SDCL 46-1-5(1), in giving preference to domestic use over appropriative rights does so without regard to whether lowered groundwater levels are due to drought, the location of the domestic wells in the aquifer, or thickness of the water bearing sands and gravel; subject to compliance with minimum requirements for adequate wells as defined by Board Well Construction Standards, Chapter 74:02:04"	FU 5523-3, 5556-3, 5710-3, 5716-3, 5805-3, Temp Water Permit 5966-3, Temp Water Permit 5967-3, Temp Water Permit 6008-3

Table 2. Qualifications on Big Sioux Aquifer Water Rights/Permits in South Dakota

Sioux Falls management unit:

There are a total of 66 groundwater appropriations from Sioux Falls management unit of the Big Sioux aquifer, including 56 Water Rights, two Water Permits, three Temporary Use Water Permits pursuant to SDCL 46-5-39 and five Future Use Permits. 19 of these appropriations are not held by the City of Sioux Falls, they are shown in Table 3.

PERMIT NO	NAME	STATUS	USE	CFS	ACRES
6008-3	HERMAN BRENDE	TPE	IRR	1.00	69.00
4880-3	HENRY CARLSON	LC	GEO	0.06	NA
4620-3	CLIMATE SYSTEMS INC	LC	GEO	0.40	1.25
6612-3	DEAN FOODS/LAND O LAKES MILK	LC	IRR	0.03	0.30
5556-3	ELMWOOD GOLF COURSE	LC	IRR	2.13	238.00
4843-3	KOA KAMPGROUNDS OF SIOUX FALLS	LC	COM	0.15	NA
6162-3	LINCOLN COUNTY RWS	LC	RWS	1.63	NA
656-3	CLARENCE MACHMILLER	LC	IRR	1.14	80.00
5019-3	MIDWEST LAWN CARE CORP	LC	COM	0.23	NA
4838-3	MINNEHAHA COMM WATER CORP	FU	RWS	NA	NA
4838A-3	MINNEHAHA COMM WATER CORP	FU	RWS	NA	NA
5716-3	MINNEHAHA COMM WATER CORP	FU	RWS	NA	NA
6164-3	MINNEHAHA COMM WATER CORP	LC	RWS	9.08	NA
6719-3	SD AIR NATIONAL GUARD	PE	GEO	0.17	NA
5681-3	ST MICHAEL CEMETERY	LC	COM	0.06	0.00
1270-3*	R C SWEETMAN	LC	IRR	1.66	116.00
4034-3*	E M SWEETMAN	LC	IRR	4.57	327.00
5966-3	MICHAEL G WILLIAMS	TPE	IRR	1.56	118.50
5967-3	MICHAEL G WILLIAMS	TPE	IRR	1.50	105.30
TPE= Temporary Use Water Permit, LC= Water Right, FU= Future Use Permit, PE=Water Permit, NA= Not Applicable					
* Water Rights 1270-3 and 4034-3 were originally issued as Temporary Use Water Permits					

Table 3. Appropriations from the Sioux Falls Management Unit not held by the City of Sioux Falls

The well proposed by this application is located on the west side of the Big Sioux River and all of the appropriations listed in table 3 are located on the east side of the river with the exception of Water Right No. 4620-3 and Water Right No. 5019-3, which are located over seven miles from the well site proposed by Application No. 7170-3. The location of the Big Sioux River in relation to this well site and existing wells, and the distance between wells will minimize the effects of this proposed pumping on existing users. Impacts on existing users should not be adverse.

SURFACE WATER/GROUNDWATER INTERACTION

The well site proposed by this application is located approximately 200 feet from the Big Sioux River. Since the river and the aquifer are hydrologically connected, pumping a well at this site will capture flows from the river. The effect the well withdrawals will have on stream flow is dependent upon a number of factors (i.e. river stage versus groundwater levels, riverbed infiltration rates, etc.) and is consequently quite variable.

The conjunctive nature of the river and the aquifer can be viewed as either a benefit or a detriment depending on perspective. The relationship between the Big Sioux River and the Big Sioux aquifer is neither an absolute asset nor an absolute obstacle.

The report of an investigation to determine ground water availability to meet Sioux Falls' needs that was carried out by the SD Geological Survey and the U.S. Geological Survey, states:

“Considerable additional water supplies can be developed in the area of the present [Sioux Falls] well field if consideration is given to the proper spacing of wells and their location with reference to the river and the drainage ditch. No additional large-capacity wells should be located closer than 1,000 feet from existing wells, except that wells near the river could be located somewhat nearer to existing wells because they would derive much of their water by recharge from the river.” (Rothrock and Otton, 1947)

In other words, from Rothrock and Otton's perspective, (i.e. availability of water to supply the City of Sioux Falls), the river/aquifer connection and the possibility of capturing surface water was viewed as an asset.

In a report of an investigation of a controversial area near the Big Sioux River in Codington and Grant Counties, the potentially detrimental nature of the hydraulically connected river and aquifer was recognized. Water Rights' Staff reported to the Water Rights Commission that:

“There have been many [sic] questions and complaints concerning the Big Sioux River. The Water Rights Commission has adopted a river and well spacing policy which requires that future high capacity wells into a water table aquifer be located at least 660 feet from a river. This policy was adopted all along the Big Sioux River. This helps to diminish the effect of high capacity well pumping upon the river.” (Goodman, 1978)

The diminishment of the effects of groundwater withdrawal to river flows was presumably significant with regard to protecting downstream users (both domestic and appropriative).

At one point the Water Rights Commission, after hearing Water Rights Staff testimony that the Big Sioux River and ground water in the area constitute the same source of water actually transferred the priority date of a Sioux River right (Water Right No.600-3) to a groundwater permit (No. 2906-3). The request for the source change from surface water to ground water was a reaction to shut-off orders issued in 1976 to irrigators diverting from the

Big Sioux River near Bruce, SD, while irrigators diverting from the Big Sioux aquifer where not shut off.

The groundwater/surface water exchange between the River and the aquifer is not at a one-for-one ratio, (i.e. a well diverting near the Big Sioux River will capture only a percentage of its total withdrawals from the river). Many Water Rights/Permits appropriating water from the Big Sioux River contain "low flow bypasses" to protect prior appropriations and domestic users. There have been over 100 Water Permit Applications approved with wells located within approximately 1,000 feet of the Big Sioux River. Barring a small number of exceptions (see table 2), permits to appropriate groundwater have typically not been conditioned with any recognition of the connection between the river and the aquifer, and groundwater appropriations generally do not contain qualifications that protect prior surface water appropriations.

Since the mean monthly average flows of the Big Sioux River for the period of 1971-2008 range from 114-1960 cfs ("Monthly mean Discharge of the Big Sioux River at North Cliff Ave.") the capture of river flows by any individual well for the most part will be imperceptible. The combination of a number of "small captures" however, could actually produce a measurable impact on river flows.

Due to concern about the ability of the Big Sioux aquifer to provide sufficient water for the City of Sioux Falls if faced with another drought similar to the one that occurred in 1976-77, a digital model was developed by the U.S. Geological Survey to simulate potential effects on the aquifer. The steady-state simulation under average recharge and streamflow conditions for 1970-1979, showed that at a pumping rate of 25 Mgal/d, 23 cfs recharged the aquifer from the river.

The City of Sioux Falls is currently capable of pumping 37.7 Mgal/d (Anderson). The streamflow of the Big Sioux River at the Dell Rapids stream-gaging station was less than 23 cubic feet per second from June 1976 to March 1977. (Koch, 1983). Obviously, pumping the City's wellfield at maximum capacity could dry up the Big Sioux River under low flow conditions.

The Sioux Falls Wastewater treatment plant discharges 15-20 MGD (23-31 cfs) to the Big Sioux River (Buscher) downstream of their well field thus mitigating the affects of river capture on downstream domestic use and water rights/permits.

There are only two water rights diverting water from the Big Sioux River between the Sioux Falls Well Field and the Sioux Falls Wastewater treatment plant that do not belong to the city. They are US31-3 and US386-3 held by USDA. The status of the US withdrawals is unknown but they have likely been abandoned.

It may be possible during extended dry periods for pumping from the Sioux Falls management unit to cause low-flow or no-flow conditions in a short stretch of the Big Sioux River up stream of the wastewater treatment plant. Low-flow or no-flow conditions should not result in impairment of existing water rights; however it may raise concerns under a

“public interest” criteria. The City of Sioux Falls’ waste water treatment plant discharges to Big Sioux River through a surface water discharge permit. The limits (concentration) of the permit are established based on historic river flows. If groundwater withdrawals reduce flows in the Big Sioux River, more stringent limits to the discharge permits may be required by DENR-Surface Water Quality program to reflect new flow conditions.

At this time, groundwater permits appropriating water from the Sioux Falls management unit belonging to the City of Sioux Falls do not need to contain conditions to protect flows in the Big Sioux River because of the mitigating affects of the City’s discharge from the wastewater treatment plant.

SDCL 46-6-27

This application indicates that this proposed well will replace “Well No. 69” that was constructed under the authority of Water Right No. 6214-3. SDCL 46-6-27 requires that:

“If the owner of an existing well drills a replacement well and if the owner has no plan to use the existing well, the existing well is considered abandoned. The well owner shall plug the abandoned well within thirty days after the new well is ready for use”

CONCLUSIONS:

1. This application proposes a change in point of diversion for the well authorized by Water Right No. 6214-3 and to add a diversion point to Water Right No 1306-3.
2. This permit application does not propose any additional appropriation.
3. Water Right No. 6214-3 puts water to beneficial use that was appropriated by Future Use Permit No. 448-3 and has a priority date of April 8, 1957.
4. Water Right No. 1306-3 has a priority date of September 8, 1966.
5. If approved, the priority dates of the originating Water Rights should be reflected in Water Permit No. 7170-3. Therefore 418 ac-ft/yr with a diversion rate of 2.65 cfs should have an April 8, 1957 priority date and 2,570 ac-ft/yr with a diversion rate of 3.55 cfs should have a September 8, 1966 priority date.
6. If Permit Application No. 7170-3 is approved, 1,918 ac-ft/yr at a maximum diversion rate of 2.65 cfs remains authorized by Water Right No. 1306-3, for wells located in the NW¼ Section 9, T101N-R49W.
7. Amendments to Water Right Nos. 6214-3 and 1306-3 as proposed by this application will not adversely impact existing water rights.
8. The amount of stream flow captured by a well along the Big Sioux River is not at a one-for-one ratio to the amount pumped.

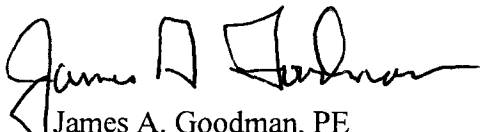
9. If authorized by Water Right No. 6214-3, "Well No. 69" will no longer be used; it must be plugged in accordance with the SD Well Construction Standards.
10. This application does not need to be held to the same standard as the surface water diversions regarding low flow bypasses of the Big Sioux River since the City of Sioux Falls mitigates the impacts of groundwater withdrawals with discharge from their wastewater treatment plant.
11. If groundwater withdrawals reduce flows in the Big Sioux River, more stringent limits to the discharge permits may be required by DENR-Surface Water Quality program to reflect new flow conditions.
12. If approved this permit should contain the same qualifications as Future Use Permit No. 448-3 and Water Rights issued since the Water Management Board's declaratory ruling hearing regarding impairment. The qualification reads:

"If development and pumping of the well authorized by [this permit] results in impairment of adequate domestic wells or adequate wells having prior water rights, reduction of withdrawals or mitigation may be necessary. SDCL 46-1-5(1), in giving preference to domestic use over appropriative rights does so without regard to whether lowered groundwater levels are due to drought, the location of the domestic wells in the aquifer, or thickness of the water bearing sands and gravel; subject to compliance with minimum requirements for adequate wells as defined by Board Well Construction Standards, Chapter 74:02:04".



Ken Buhler
Natural Resources Engineer

Approved by



James A. Goodman, PE
Natural Resources Engineer

REFERENCES:

- Anderson, Gregory. Water Superintendent, City of Sioux Falls. Personal interview. 04 Jan. 2010
- Buscher, Kelli. Natural Resources Engineering Director, SD DENR. Personal interview. 20 Jan. 2010
- Goodman, J.A., 1978, Report on Area of Controversy in Codington and Grant Counties, March 20, 1978: SD Water Rights Program report to the Water Rights Commission
- Koch, N.C., 1983, Evaluation of the Response of the Big Sioux Aquifer to Extreme Drought Conditions in Minnehaha County, South Dakota: U.S. Geological Survey Water-Resources Investigations Report 83-4234, 10 p.
- Rothrock, E.P., Otton, E.G., 1947, Ground Water Resources of the Sioux Falls Area, South Dakota, Part I- Description: SD Geological Survey Report of Investigations No. 56, 70 p.
- “Monthly mean Discharge of the Big Sioux River at North Cliff Ave.” USGS Surface-Water Monthly Statistics. 14 January 2010 <http://waterdata.usgs.gov/sd/nwis/>.
- Water Rights, 2010a, Observation Well Files, SD DENR-Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 2010b, Water Right/Permit Files, SD DENR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

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WATER RIGHTS
PROGRAM

City Of Sioux Falls

338

PO # 149920

Customer Number:

078011

Invoice Number:

1256841

AFFIDAVIT OF PUBLICATION-

Argus Leader
AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA

COUNTY OF MINNEHAHA } ss

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

Thursday, the 4 day of March 2010,
Thursday, the 11 day of March 2010,
_____, the _____ day of _____, 2010,
_____, the _____ day of _____, 2010,
_____, the _____ day of _____, 2010,
_____, the _____ day of _____, 2010,
_____, the _____ day of _____, 2010,
_____, the _____ day of _____, 2010,

and that \$110.55 was charged for publishing the same

Linda Schulte
Subscribed and sworn to before me

3/15/2010

J. Zimmerman

Notary Public, South Dakota

My Commission expires December 22, 2015

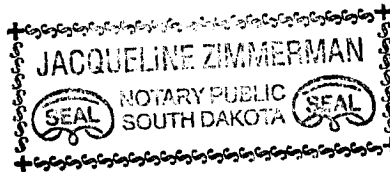
NOTICE OF APPLICATION
NO. 7170-3 to Appropriate
Water

Notice is given that the City of Sioux Falls, c/o Greg Anderson, Water Superintendent, 224 W 9th St, Sioux Falls SD 57117 has filed an application for a water permit to amend Water Right Nos. 6214-3 and 1306-3 by transferring existing diversion authority. Water

Right No. 6214-3 authorized petition. Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer's recommendation. 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 deep) located approximately 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 March 22, 2010. The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Steven M. Pinner, Secretary, Department of Environment and Natural Resources.

Published twice at the total approximate cost of \$110.55: 1256841 Mar. 4 & 11, 2010

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 7170-3 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



Affidavit of Publication

STATE OF SOUTH DAKOTA
COUNTY OF LINCOLN

ANDY WILCOX

being first duly sworn on his oath says; that the Sioux Valley News is a legal weekly newspaper of general circulation as required by South Dakota Code of Nineteen Hundred Thirty-Nine, and any acts amendatory thereto, printed and published by the Sioux Valley News, Inc., in Canton, in said county and State, and has been such legal newspaper during the time hereinafter mentioned; that he is and during all of said time was publisher of said newspaper and has personal knowledge of the facts stated in this affidavit; that the advertisement headed:

Notice of Application NO. 7170-3

a printed copy of which is hereto attached, was printed and published in said newspaper for TWO successive week(s) upon the following dates, to-wit:

March 4, 2010
March 11, 2010

that the full amount of the fees charged for publishing the same to-wit: the sum of \$57.83 insures solely to the benefit of the publishers of said newspaper; that no agreement or understanding for any division of this sum has been made with any other person; and that no part of said sum has been agreed to be paid to any person whomsoever.

Subscribed and sworn to before me this 11th day of
March, 2010.

Notary Public, South Dakota



My Commission Expires
12/9/2014

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WATER RIGHTS
PROGRAM

OK

NOTICE OF APPLICATION NO. 7170-3

Notice of Application No. 7170-3 to Appropriate Water

Notice is given that the City of Sioux Falls, c/o Greg Anderson, Water Superintendent, 224 W. 9th Street, Sioux Falls, South Dakota 57117 has filed an application for a water permit to amend Water Right Nos. 6214-3 and 1306-3 by transferring existing diversion authority. Water Right No. 6214-3 authorized 0.78 cubic feet of water per second (cfs) (418 acre-feet) from a vertical well (Well #69) completed into the Big Sioux: Sioux Falls Aquifer (42 feet deep) located in SW 1/4 NE 1/4 Section 5-T102N-R49W. The city is requested to transfer the entire diversion authority held under Water Rights No. 6214-3 to a horizontal collector well (42.4

feet deep) located approximately 100 feet west of the existing vertical well. To maximize the horizontal collector well potential, the city is also requesting to transfer a portion of the diversion authority under Water Rights No. 1306-3. Water Right No. 1306-3 authorizes 6.2 cfs (4,488 acre-feet) from wells located in the NW 1/4 Section 9-T101N-R49W.

This application proposes to transfer 3.55 cfs (2,570 acre-feet) of the diversion authority authorized by Water Rights No. 1306-3 to the horizontal collector well. This application, if approved, will transfer diversion authority totaling 4.33 cfs (2,988 acre-feet) of existing water rights to the new horizontal collector well. No additional water is being appropriated by this application.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 7170-3 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, South Dakota 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 March 22, 2010.

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

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

Published in the Sioux Valley News
on March 4 and 11, 2010 at the total
approximate cost of \$57.83.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

February 22, 2010

Argus Leader
PO Box 5034
Sioux Falls SD 57117

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 7170-3 to Appropriate Water to be published twice. Please publish the first notice on March 4, 2010 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is City of Sioux Falls, c/o Greg Anderson, 224 W 9th St., Sioux Falls SD 57117 (Ph # 605-373-6940).

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

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

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

No. 7170-3

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

Date _____

We are in receipt of your letter of February 22, 2010 enclosing Notice to Appropriate Water by Application No. 7170-3 which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

February 22, 2010

Sioux Valley News
PO Box 255
Canton SD 57013

ATTENTION: Legal Public Notice

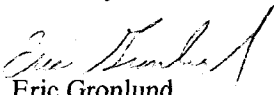
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Joe Foss Building
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**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

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

February 22, 2010

City of Sioux Falls
c/o Greg Anderson
224 W 9th St
Sioux Falls SD 57117

Dear Mr. Anderson:

Water Permit Application No. 7170-3 for municipal use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Publisher of the Argus Leader printed at Sioux Falls SD (Ph # 605-331-2200) and the Sioux Valley News printed at Canton SD (Ph # 605-764-2000). 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 paper 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
eric.gronlund@state.sd.us

enclosures

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

Instruction to Newspaper - Publish first Notice on March 4, 2010 with the second publication 7 days later. The applicant is responsible for payment. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352 or email: Karen.schlaak@state.sd.us.

NOTICE OF APPLICATION NO. 7170-3 to Appropriate Water

Notice is given that the City of Sioux Falls, c/o Greg Anderson, Water Superintendent, 224 W 9th St, Sioux Falls SD 57117 has filed an application for a water permit to amend Water Right Nos. 6214-3 and 1306-3 by transferring existing diversion authority. Water Right No. 6214-3 authorized 0.78 cubic feet of water per second (cfs) (418 acre-feet) from a vertical well (Well #69) completed into the Big Sioux:Sioux Falls Aquifer (42 feet deep) located in SW ¼ NE ¼ Section 5-T102N-R49W. The city is requesting to transfer the entire diversion authority held under Water Right No. 6214-3 to a horizontal collector well (42.4 feet deep) located approximately 100 feet west of the existing vertical well. To maximize the horizontal collector well potential, the city is also requesting to transfer a portion of the diversion authority under Water Right No. 1306-3. Water Right No. 1306-3 authorizes 6.2 cfs (4,488 acre-feet) from wells located in the NW ¼ Section 9-T101N-R49W. This application proposes to transfer 3.55 cfs (2,570 acre-feet) of the diversion authority authorized by Water Right No. 1306-3 to the horizontal collector well. This application, if approved, will transfer diversion authority totaling 4.33 cfs (2,988 acre-feet) of existing water rights to the new horizontal collector well. No additional water is being appropriated by this application.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 7170-3 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 March 22, 2010.

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

Published twice at the total approximate cost of _____.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

OCT 05 2010

City of Sioux Falls
c/o Greg Anderson
224 W 9th St
Sioux Falls SD 57117

Dear Mr. Anderson:

Enclosed is Water Permit No. 7170-3 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, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SW ¼ NE ¼ Sec 5 Twp 102N Rg 49W

Well Owner: City of Sioux Falls, SD

Business Name: Water Department

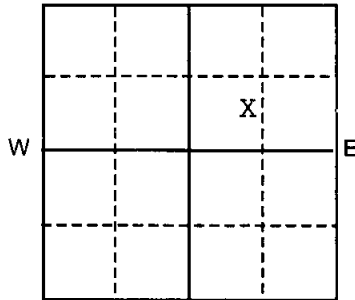
Address: 224 West 9th Street

City, State, Zip: Sioux Falls, SD 57117

County Minnehaha

North

Please mark well location with an "X"

Well Completion Date
10 June 2009

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?
1200 ft. from Farm to NE (identify source)

PROPOSED USE:

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

METHOD OF DRILLING:

Caisson Sinking; Vertical

Lateral Projection: horizontal

CASING DATA:

☐ Steel ☐ Plastic ☒ Other
 If other describe Concrete Caisson; 16' x 19'

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
12,370 LB/FT	228 IN	0 FT	45.5 FT	228.0 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
		Lb/gal	Ft	Ft
		Lb/gal	Ft	Ft

 Describe grouting procedure

SCREEN:

☐ Perforated pipe ☒ Manufactured
 Diameter 12.75 Inches Length 600.0 Feet
 Material 304 St. Steel; 0.03" slot to
 Slot Size 0.15" Set From 39 Feet to 38 Feet

Other information 4 laterals installed; 2-200' 2-150' OAL; 10' blank pipe, each

WAS A PACKER OR SEAL USED? ☐ Yes ☒ No

If so, what material?

Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☒ Yes, How? CA Hypochlorite☐ No, Why Not?Lab to which water quality sample sent for analysis
Energy Lab; Rapid
City, SD

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Lean Clay, top soil	0	4.5
Brn Sand, poorly graded, loose	4.5	9.5
Brn Sand, w/Gravel; fine to coarse	9.5	39.5
Lean Clay	39.5	45

STATIC WATER LEVEL 15.5' FEET

If flowing: closed in pressure PSI

GPM flow 1380 through 8" Inch pipe

Controlled by ☒ Valve ☐ Reducers ☐ Other

Reduced flow rate GPM

Can well be completely shut in?

WELL TEST DATA:

☒ Pumped Describe: Temporary submersible pump installed; pumped to Water treatment plant
☐ Bailed
☐ Other

Pumping Level Below Land Surface

21.9 Ft. After 24 Hrs. pumped 1380 GPM

23 Ft. After 72 Hrs. pumped 1380 GPM

If pump installed, pump rate: 1390 GPM

 REMARKS This is Sioux Falls well 69.
 A Horizontal collector well; 16' ID x 19' OD. 4 Horizontal laterals installed over 180 deg; NE to SW, near the bottom of the well shaft

This well was drilled under license # 716 and this report is true and accurate.

Ranney Collector Wells;

Drilling firm: John Reynolds & Sons

Signature of License Representative:

Signature of Well Owner or Equitable Property Holder:

Date:

SD EForm - 1311LD V1

Form 10

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

MAIL TO: PMB 2020
DENR - Water Rights Program
523 E Capitol Ave
Pierre, SD 57501-3182
ph. (605) 773-3352

Date 10-12-2010FROM: Greg Anderson
(name)224 W 9th Street
(address)Sioux Falls SD 57117 605-373-6944
(city) (state) (zip) (phone)

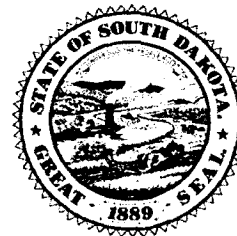
I have completed the construction of the water use system and I have put the water to beneficial use to the maximum extent it is going to be used.

Water Permit No. 7170-3 states that the water use system is to be constructed by
March 22, 2015, and water is to be put to beneficial use by March 22, 2019
(date) (date)

The water use system was completed on September 28, 2009
(date)

Applying the water to beneficial use was completed on September 30, 2009
(date)

You may schedule an investigation so that the water license may be issued.



Permit No. 7170-3
Big Sioux River - Water District

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

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

I have this day, **October 17, 2013**, made a thorough examination of the water use system constructed by **City of Sioux Falls** of **224 West 9th Street, Sioux Falls, SD 57104** holder of Permit No. **7170-3**, bearing the priority of **September 8, 1966 (established by Water Right No. 1306-3) for 2,570 ac-ft with a diversion rate of 3.55** cu. ft. per second and **April 8, 1957 (established by Water Right No. 6214-3) for 418 ac-ft with a diversion rate of 0.78** cu. ft. per second for a combined **2,988 ac-ft and 4.33-cfs** of the waters of **Sioux Falls Management Unit of the Big Sioux Aquifer** for **municipal** purposes, in **Minnehaha and Lincoln** County.

Inspection contact & relationship to permit holder, if applicable: **Greg Anderson – Sioux Falls Water Superintendent**
605.367.8600

A. Works used to divert the water:

Well Information: Horizontal Collector Well #69

- 1) Well Drilling Firm:
- 2) No. of Wells 1
- 3) Depth(s) 45 feet
- 4) Well log is available yes
- 5) Comment: **completed June 10, 2009**

Casing:

- 1) Diameter 19 feet OD and 16 feet ID
- 2) Length 45.2 feet
- 3) Type **reinforced concrete caissons**

Screen: 4 – laterals installed, 12" ID ranging in length from 150' to 200'.

- 1) Type **304 stainless steel**
- 2) Length 660 feet
- 3) Static water level 15.5 feet

Pump:

- 1) Make **Christensen**
- 2) Model
- 3) Size
- 4) Capacity 1943 GPM

Motor:

- 1) Make **US Motors**
- 2) Model No. **BF 66**
- 3) Horsepower rating 100 hp

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

- 1) Type pvc 2) Size 10 inches 3) Length 2230 feet from well to existing water main
1) Type ductile iron 2) Size 36 inches 3) Length _____ feet existing water main

C. Works used to apply water to beneficial use:

Water is transported to the City's Purification Plant for treatment and use for municipal purposes.

D. Compliance with Permit Requirements:

- 1) Permit qualifications being abided by yes
2) Exceptions to compliance are: none

The system is in good condition with the point of diversion located as follows: SW¼ NE¼ Section 5-T102N-R49W (43.66879653, -96.73680975). The works are capable of diverting and conveying to the place of use 4.33 cu. ft. per second of water up to 2,988 acre-feet of water annually which is to be used for municipal purposes. Water has been put to beneficial use to the maximum extent as follows:

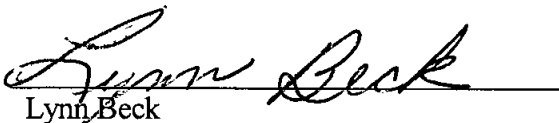
Water supply for the City of Sioux Falls

The license should be issued for 4.33 cfs and 2,988 acre-feet annually.

All structures, wells and lands on map yes

Comments or other permit(s) associated with the project:

This water right is for no additional water but rather transfers a portion of the appropriation from 1306-3 and all of the appropriation from 6214-3.

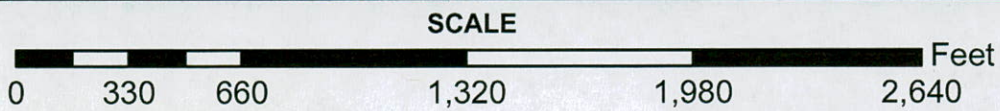


Lynn Beck
Natural Resources Engineer III
DENR, Water Rights Program

Date report completed: December 20, 2013



WATER LICENSE NO. 7170-3
CITY OF SIOUX FALLS
December 11, 2013



Lynn Beck

Lynn Beck
Natural Resources Engineer III
SD DENR - Water Rights Program



South Dakota

Department of Environment
& Natural Resources

Protecting SD's Tomorrow... Today



DEPARTMENT OF ENVIRONMENT
and NATURAL RESOURCES

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



7170-3

APR 25 2014

Greg Anderson, Water Superintendent
City of Sioux Falls
224 W 9th St
Sioux Falls SD 57104

Dear Mr. Anderson:

Enclosed is Water License No. 7170-3. This is the final water right document completing your process of obtaining a Water Right. Included with your license is a map prepared by the staff engineer who conducted the field investigation.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the well authorized by Water Right No. 7170-3, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

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

Sincerely,

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

enclosures

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 7170-3

(1) The City of Sioux Falls, 224 W 9th St., Sioux Falls SD 57117 made Application No. 7170-3, December 2, 2009 for a water permit to amend Water Right Nos. 1306-3 and 6214-3 by transferring existing diversion authority. Water Permit No. 7170-3 transferred diversion authority totaling 4.33 cubic feet of water per second (2,988 acre feet) of water from the existing water rights to a new horizontal collector well. No additional water was appropriated. The collector well, located in Minnehaha County South Dakota and in the Big Sioux - Sioux Falls Aquifer is used for municipal purposes.

Permit No. 7170-3 carrying priority dates of September 8, 1966 (established under Water Right No. 1306-3, for 3.55 cfs and 2,570 acre feet of water) and April 8, 1957 (established under Water Right No. 6214-3, for 0.78 cfs and 418 acre feet of water) was approved March 22, 2010 and issued to the city for diversion of water with construction of the described water supply system to be completed on or before March 22, 2015 and for the application to beneficial use of said water on or before March 22, 2019.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the water supply system and is entitled to divert 4.33 cubic feet of water per second (2,988 acre feet annually) for beneficial use.

The location of the diversion point is 1,420 feet west and 1,970 feet south of the NE corner of Section 5, T102N, R49W (SW ¼ NE ¼).

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

(4) Pursuant to South Dakota Water Law 46-5-30.1 the City of Sioux Falls, 224 W 9th St., Sioux Falls SD 57117 the holder and/or owner of Water Right No. 7170-3 is issued a license to appropriate water, the right to use 4.33 cubic feet of water per second (2,988 acre feet annually) from ground water (one horizontal collector well into the Big Sioux - Sioux Falls Aquifer) with priority dates of September 8, 1966 and April 8, 1957 from the location specified in (2) of this license for municipal purposes.

This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Right No. 7170-3 and subject to the following qualifications:

- If the development and pumping of the Sioux Falls Management Unit of the Big Sioux Aquifer authorized by this permit results in adverse impairment of adequate domestic wells or adequate wells having prior water rights, reduction of withdrawals or mitigation may be necessary. SDCL 46-1-5(1) in giving preference to domestic use over appropriative rights does so without regard to 1) whether lowered groundwater levels are due to drought, 2) the location of the domestic wells in the aquifer, or 3) the thickness of the water bearing sands and gravel; subject to compliance with minimum requirements for adequate wells as defined by Board Well Construction Standards, Chapter 74:02:04.
- Water Permit No. 7170-3 authorizes a total annual diversion of 2,988 acre feet annually (418 ac/ft annually established by Water Right No. 6214-3 and 2,570 ac/ft annually established under Water Right No. 1306-3).

continued

Page 2

Water License No. 7170-3

City of Sioux Falls

- The City of Sioux Falls shall plug existing Vertical Well No. 69 in accordance with Water Management Board Rules, Chapter 74:02:04 within thirty days of the new Collector Well No. 69 being brought on-line.
- The City of Sioux Falls shall report to the Chief Engineer annually the amount of water withdrawn from the Sioux Falls Management Unit of the Big Sioux Aquifer.



Jeanne Goodman, Chief Engineer

Water Rights Program

Department of Environment and Natural Resources

APR 25 2014

date

