

Exh #1

WATER PERMIT NO. 2296-2

Phone: 394-4165

Name of Applicant: City of Rapid City

Post Office Address: 300 Sixth Street, Rapid City

Amount of Water Claimed: 2.85 Total Acres: _____

Source of Water Supply: Rapid Creek

Water to be used for: municipal County: Pennington

About _____ miles _____ of _____

PRIORITY Date Received: 11-23-93 Fee: _____ Remarks: Change in use

of a portion of irrigated land under South Side Ditch - Jundt property

Corrected Application Received: _____ Period of Annual Use: _____

WATER QUALITY APPROVAL RECEIVED: _____ APPROVED/CONDITIONAL (Circle one)

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

Diversion Point: _____

Land to be Irrigated: SW 1/4, SW 1/4 SE 1/4 Sec

28 and NW 1/4, W 1/2 NE 1/4, NW 1/4 SE 1/4 Sec

33; all in T1N-R9E

Well Log: Driller: _____ Licensed YES _____ NO _____

Depth of Well: _____ REMARKS: _____

Type of Map: topo PREPARED BY: Dan Bjerke Reviewed and the Number

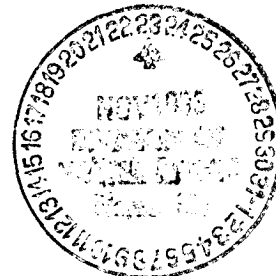
Assigned on: 11-23-93 By: Karen Schlaak

FORM 2: Application for uses other than irrigation

(type or print)

Mail to:
Water Rights Division
Joe Foss Building
523 E Capitol
Pierre SD 57501-3181
605 773-3352

No. 2296-2 Hydrologic Unit 10/20110
Basin Upper Cheyenne
Newspaper Rapid City Journal
(office use only)



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

Check use of water:

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

Type of Application: ☐ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
(check one) ☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____
☒ Amendment/Correction to Permit No. 2040-2

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

- Name of Applicant CITY OF RAPID CITY Phone 605-394-4165
Mailing Address 300 SIXTH STREET RAPID CITY State SD 57701
(Street, RR, or Box) (City) (Zip Code)
- Amount of water claimed 2.85 *CFS or _____ **GPM _____ ***AF _____
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet -- storage capacity of dam/dugout or annual use if applicable)
2.85 CFS NOT TO EXCEED 476.3 AF/YR OR 245.0 AF/YR AT ALTERNATE PACTOLA RESERVOIR DIVERSION
- Source of water supply RAPID CREEK (SEE ATTACHED EXHIBIT 1)
- Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) SEE ATTACHED EXHIBIT 2 FOR
LEGAL DESCRIPTIONS OF CITY OF RAPID CITY WATER TREATMENT PLANT, INFILTRATION GALLERIES
AND PACTOLA RESERVOIR DIVERSION POINTS County PENNINGTON
- County or counties where water will be used PENNINGTON COUNTY, SOUTH DAKOTA
- Annual period during which water is to be used APRIL 15 THROUGH NOVEMBER 1 (JANUARY 1 THROUGH
DECEMBER 31 FOR PACTOLA DIVERSION RELEASES FROM STORAGE)
- Give a description of the project. When available include any preliminary engineering report or other reports or
information that will help explain the project. (Attach sheet if more space is needed)
THE PROJECT IS DESCRIBED IN DETAIL IN THE ACCOMPANYING WRIGHT WATER ENGINEERS, INC.
REPORT (STROMER PROPERTY). THE PROJECT WILL DIVERT WATER FROM RAPID CREEK TO THE
CITY OF RAPID CITY WATER TREATMENT PLANT THROUGH THE EXISTING INFILTRATION STRUCTURE
ON RAPID CREEK, AND TO THE EXISTING INFILTRATION GALLERIES. THE PROJECT WILL ALSO,
IN THE ALTERNATIVE BUT NOT SIMULTANEOUSLY, DIVERT WATER FROM RAPID CREEK TO STORAGE
IN PACTOLA RESERVOIR.

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)

STATE OF SOUTH DAKOTA)

County of Pennington)^{ss}

I, Edward R. McLaughlin, Mayor, the applicant, certify that I have read this application, have examined the attached map
and that the matters stated are true and that I intend, and am able to complete the necessary construction.

Signed Ed McLaughlin
CITY OF RAPID CITY

Subscribed and sworn to before me this 19 day of November 1993

Ray J. Pippin
Notary Public

4-30-95

**SOUTH DAKOTA
WATER PERMIT NO. 2296-2**

Date of first receipt of application November 23, 1993.

The Water Management Board approved Water Permit Application No. 2296-2 on January 6, 1994 for the City of Rapid City, 300 Sixth St, Rapid City SD 57701 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. 2296-2 transfers the use of a portion of Rapid Creek natural flows historically used to irrigate 253.4 acres known as the Jundt property. The portion of Rapid creek natural flows to be transferred to the city is 2.85 cubic feet of water per second (cfs) with an annual volume limitation of 476.3 acre-feet, if diverted at the city's water treatment plant and infiltration galleries or 245 acre-feet, if stored in Pactola Reservoir. Historically, the 2.85 cfs has been used to irrigate approximately 253.4 acres located in the SW 1/4, SW 1/4 SE 1/4 Section 28 and the NW 1/4, W 1/2 NE 1/4, NW 1/4 SE 1/4, N 1/2 SW 1/4 Section 33; all in T1N-R9E also known as the Jundt property. The existing diversion point on Rapid Creek for South Side Ditch is located in the SE 1/4 NW 1/4 Section 15-T1N-R8E. This permit changes the diversion point for the 2.85 cfs to diversion points for use by the city to be located in the SE 1/4 NE 1/4 Section 3 (Rapid City Water Treatment Plant); SW 1/4 SW 1/4 Section 3 (Sioux Park Gallery); SE 1/4 NE 1/4 Section 9 (Meadowbrook Gallery); NW 1/4 SE 1/4 Section 8 (Jackson Springs Gallery); all in T1N-R7E or to allow storage in Pactola Reservoir. The location of the Pactola Reservoir diversion point is the NW 1/4 SW 1/4 Section 2-T1N-R5E and the reservoir impounds water in portions of the NW 1/4 SW 1/4 Section 2-T1N-R5E and the reservoir impounds water in portions of Sections 2, 3, 4, 5, 10, 11 of T1N-R5E and Sections 31, 32, 33, 34 of T2N-R5E. This permit does not authorize any new water appropriation from Rapid Creek.
2. The water appropriated shall be used for the purpose of meeting Rapid City's water needs and may not exceed the amount of water needed for beneficial use for municipal, industrial, commercial, common distribution system, rural water system, suburban housing and domestic purposes.
3. The water is to be used during the following described annual period: May 1 - September 30 for diversion from the Water Treatment Plant, Sioux Park Gallery, Meadowbrook Gallery and Jackson springs Gallery and January 1 - December 31 for Pactola Reservoir diversion releases from storage.
4. The date from which applicant may claim right is May 3, 1880.
5. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. That Permit No. 2296-2 is limited to a diversion rate of 2.85 cfs for a total annual volume of 245.0 acre-feet at Pactola Reservoir or a total annual volume of 476.3 acre-feet at Sioux Park Gallery (SW 1/4 SW 1/4 Section 3), Meadowbrook Gallery (SE 1/4 NE 1/4 Section 9), Jackson Springs Gallery (NW 1/4 SE 1/4 Section 8), and the Rapid City Water Treatment Plant (SE 1/4 NE 1/4 Section 3), all in T1N-R7E. Maximum monthly diversion volumes at Pactola or the diversion points within Rapid City are as follows:

(continued)

<u>Monthly</u>	<u>Monthly acre-feet at Pactola</u>	<u>Monthly acre-feet at diversion points within Rapid City</u>
May	35.2	68.4
June	50.5	98.1
July	52.1	101.4
August	61.0	118.6
September	46.2	89.8
October	0.0	0.0

Diversions during a month may be made at either Pactola Reservoir or at the diversion points within Rapid City, but not simultaneously at both Pactola and the Rapid City diversion points.

2. That approval of Permit No. 2296-2 authorizes diversions of only natural flow water by the City of Rapid City.
3. That the City of Rapid City report to the Chief Engineer annually the amount of water withdrawn each month at Pactola Reservoir or the diversion points within Rapid City.
4. That the Water Management Board is retaining jurisdiction of Permit No. 2296-2 in the event that additional information shows that changes need to be made in the monthly or total annual volumes authorized by Permit No. 2296-2.
5. Diversions under Permit No. 2296-2 may not interfere with existing water rights in effect prior to approval of No. 2296-2 or any domestic rights.
6. The amount of water with a May 3, 1880 priority date which may be appropriated under Vested Water Right No. 2040-2 is decreased by 2.85 cfs and the number of irrigated acres are decreased by 253.4 acres.

WATER MANAGEMENT BOARD

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

FEB 1 1994
date

EXHIBIT 1

LEGAL DESCRIPTION OF IRRIGATED LAND
AFFECTED BY APPLICATION

Described as approximately 253 acres more or less of land which lies under the South Side Ditch, all irrigation water rights, 142.5 miners inches and 45.5 shares of stock in the South Side Ditch Water Co. this land all lies appurtenant to the South Side Ditch, Sections 28 and 33, Township One (1) North, Range Nine (9) East, Black Hills Meridian, Pennington County, South Dakota, as shown on Plat Book #4, Page 5791, and recorded on October 1, 1976.



EXHIBIT 2

APPLICATION FOR PERMIT TO APPROPRIATE WATER WITHIN THE STATE OF SOUTH DAKOTA

4) LOCATION OF POINTS OF DIVERSION

City of Rapid City Water Treatment Plant:

North 71° 39' West, 1205 ft. from East 1/4 corner of Section Three (3), Township One (1) North, Range Seven (7) East of the Black Hills Meridian.

Sioux Park "Girl Scout" Gallery:

1270 ft. North 54° 05' East of Southwest corner of Section Three (3), Township One (1) North, Range Seven (7) East of the Black Hills Meridian.

Meadowbrook Gallery:

2032 ft. South 31° 41' West of Northeast corner of Section Nine (9), Township One (1) North, Range Seven (7) East of the Black Hills Meridian.

Jackson Springs Gallery:

2943 ft. North 58° 54' West of Southeast corner of Section Eight (8), Township One (1) North, Range Seven (7) East of the Black Hills Meridian.

Alternate Pactola Reservoir Diversion (Inlet to Service Spillway):

South 19° East, 3740 ft. of Northwest corner of Section Two (2), Township One (1) North, Range Five (5) East of the Black Hills Meridian.

Reservoir generally located in portions of Sections Two (2), Three (3), Four (4), Five (5), Ten (10) and Eleven (11), Township One (1) North, Range Five (5) East of the Black Hills Meridian, and portions of Sections Thirty-One (31), Thirty-Two (32), Thirty-Three (33) and Thirty-Four (34), Township One (1) North, Range Five (5) East of the Black Hills Meridian.

All of the above in Pennington County, South Dakota.



AAAAA

Wright Water Engineers, Inc.

DENVER OFFICE

2490 West 26th Ave., 100 A
Denver, Colorado 80211
(303) 480-1700



GLENWOOD SPRINGS OFFICE

1518 Colorado Avenue
P.O. Box 219
Glenwood Springs, Colorado 81602
(303) 945-7755
Denver Direct Line: 893-1608

10/28/93

Mark Rath:

Enclosed is the Dec. 15, 1992
letter report regarding engineering
completed by WWE for
Jundt property water rights
transfer as indicated in
our fax transmitted
10/28/93.

Talk to you soon.

Gary Shurt

RECEIPT

413962

Division of Water Rights

South Dakota Department of Environment and Natural Resources

Pierre, _____, December 9, 19 93

RECEIVED OF City of Rapid City, Rapid City, SD 57701

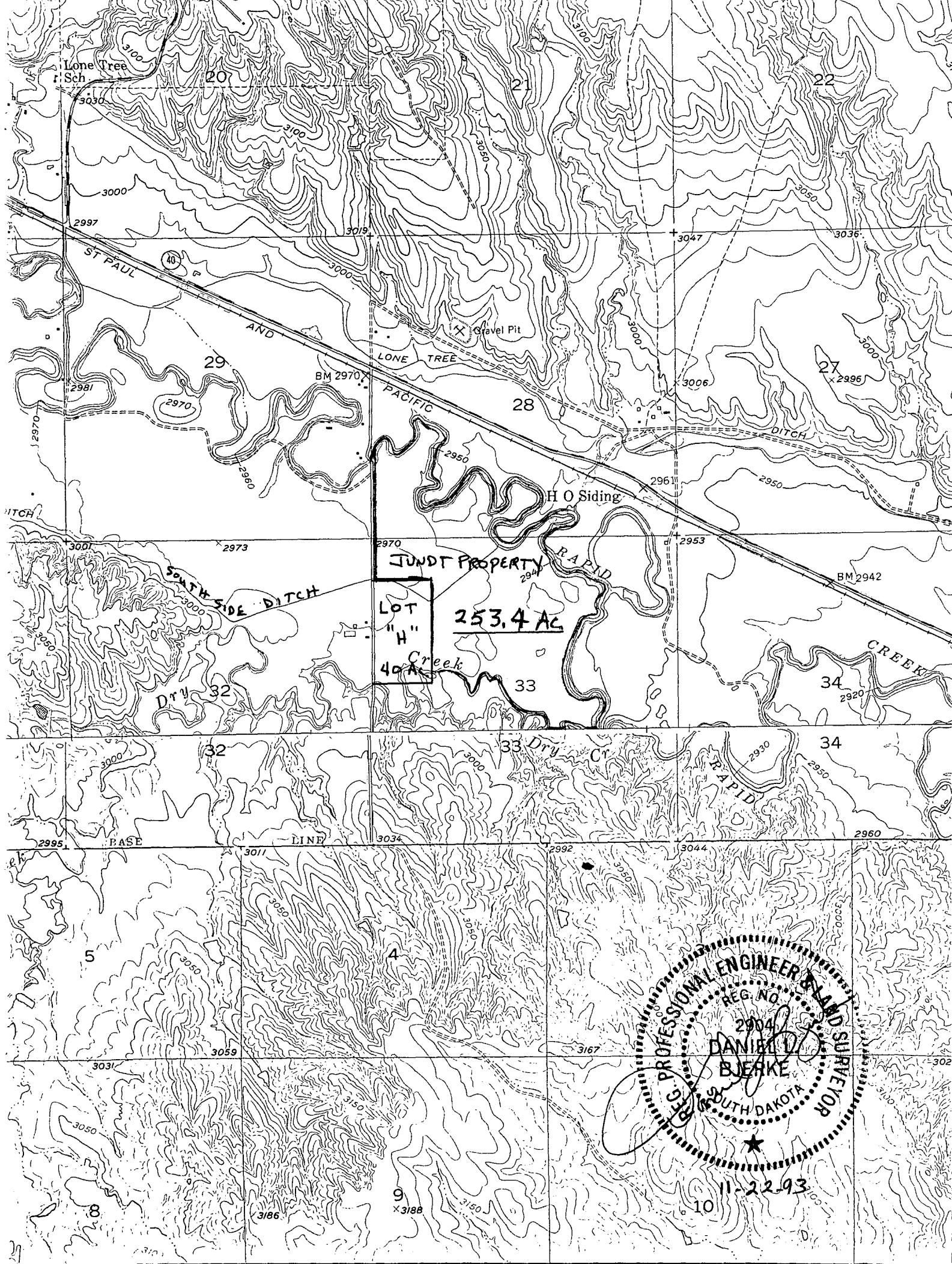
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use _____	50	00=
Fee for Application for Permit No. _____ to Appropriate Water, for Future Use _____		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____		
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		

(Any Other Work Provided by Law)	Total	50 00

By John Hatch
Chief Engineer







Wright Water Engineers, Inc.

DENVER OFFICE
2490 West 26th Ave., Suite 100 A
Denver, Colorado 80211
FAX (303) 480-1020
(303) 480-1700

GLENWOOD SPRINGS OFFICE
818 Colorado Avenue
P.O. Box 219
Glenwood Springs, Colorado 81602
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December 15, 1992

Mr. Daniel L. Bjerke, P.E./L.S.
Water/Wastewater Division Manager
City of Rapid City
300 Sixth Street
Rapid City, South Dakota 57701

Re: Jundt Property Water Rights Transfer

Dear Mr. Bjerke:

Wright Water Engineers, Inc. has determined the irrigated acreage under the South Side Ditch belonging to Donald D. Jundt and the amount of water that can be transferred to the Rapid City water treatment plant and infiltration galleries as it relates to information detailed in the engineering report prepared for the Stromer property dated March 1992.

These calculations are based upon a flood irrigation efficiency of 50 percent and a 9.8 percent seepage loss for the South Side Ditch.

The October 27, 1987 vested rights for license No. 2040-2 on the South Side Ditch indicates Don Jundt has 286 of irrigated land in the southwest portion of Section 28 and the central and northwest portion of Section 33, Township 1 North, Range 9 East of the Black Hills Meridian. Mr. Jundt in recent years has sold a 40 acre parcel of his property including approximately 32.6 acres of irrigable land and its accompanying water rights. Therefore, the total acres owned and irrigated by Mr. Jundt is presently 253.4 acres. A field inspection by Daniel L. Bjerke and Mr. Terry Rathbun on November 23, 1992 verified that 275 acres were irrigated excluding the 40-acre panel which was sold by Mr. Jundt. Therefore, the licensed acreage (286 acres) net the 32.6 acres of irrigated land sold by Jundt are used as the basis for the Jundt water rights acquisition.

On the basis of the field inspection, 150.4 acres of alfalfa and 103 acres of hay are presently irrigated on the Jundt property.

The consumptive use calculations in the attached Table A yield the following:

- a. To storage in Pactola Reservoir, the average year transferable amount would be:

$$(253.4 \text{ acres}) \times (0.967 \text{ acre-feet/acre}) = 245.0 \text{ acre-feet.}$$

The consumptive use calculations for average year hay and alfalfa are included in Tables A-1 and A-2.

- b. To the city WTP and infiltration galleries, the average year transferable amount would be:

$$(253.4 \text{ acres}) \times (1.933 \text{ acre-feet/acre} - 2.8 \text{ percent due to return flows from the Murphy and Cyclone ditches}) = 476.3 \text{ acre-feet (see attached Table B).}$$

The calculations to determine if a full irrigation supply was provided by the South Side Ditch to the Jundt property are based on 1,313 acres of presently irrigated land for the South Side Ditch as agreed to in the January 3, 1992 telephone conference with Del Brosz and Mark Rath. The 1,313 acres consists of 1,078 acres irrigated under the South Side Ditch priority and 235 acres irrigated under the Little Giant Ditch priority.

The monthly transferable amounts to Pactola Reservoir and the City's WTP and infiltration galleries are presented in Table C. Diversion at the alternate points of diversion at the water treatment plant, infiltration galleries and Pactola Reservoir will only take place during the permitted irrigation season for the South Side Ditch of April 15 to November 1; Table C, however, includes transferable amounts for May through September because no historic diversion by the South Side Ditch is recorded for April or October.

The rate of diversion for the transferable amount from the Jundt property is calculated by the following method:

$$\frac{253.4 \text{ acres}}{1,877 \text{ acres}} \times 23.4 \text{ cfs at the ditch headgate} \times (1.0 - 0.098) = 2.85 \text{ cfs}$$

where the 9.8 percent carriage loss would remain in the ditch, the 1,877 acres is the licensed acreage for the South Side Ditch, and the 23.4 cfs is the licensed diversion.

Mr. Daniel J. Bjerke
December 15, 1992
Page 3

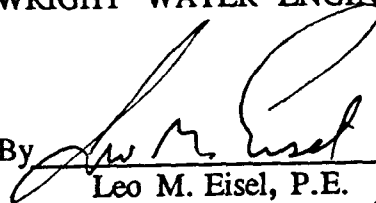
These transferable amounts and this rate of diversion insure that there will be no injury to downstream water rights and that depletions to Rapid Creek will not exceed historic depletions.

If you have any questions regarding these calculations, please do not hesitate to contact us.

Sincerely,

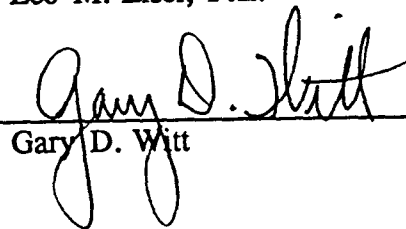
WRIGHT WATER ENGINEERS, INC.

By



Leo M. Eisel, P.E.

By



Gary D. Witt

LME/GDW:ard
901-046.040
(RAPIDC/JUNDTPRO.GDW)
cc: Bob Jackson

TABLE A

TRANSFERABLE AMOUNT FROM JUNDT PROPERTY PORTION OF SOUTH SIDE DITCH WATER RIGHTS (AVERAGE)

Q	R
MONTH	SOUTH SIDE WATER (AF)
MAY	404
JUN	580
JUL	599
AUG	701
SEP	531
TOTAL	2815

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MONTH	C.U. (IN)	PRECIP. (IN)	EFFECT. PRECIP. (IN)	PRECIP. ADJ. C.U. (IN)	EXCESS PRECIP. TO SOIL MOIST. DURING MONTH (IN)	SOIL MOIST. USED TO SATISFY ADJUST. C.U. (IN)	REMAIN. CROP REQUIR. (IN)	GROSS CROP NEEDS (IN)	FARM IRRIG. SUPPLY (IN)	EXCESS IRRIG. SOIL MOIST. CONTRIB. (IN)	ACCUM. SOIL MOIST. AFTER IRRIG. (IN)	ADDITIONAL WATER REQUIRED TO MEET C.U. NEEDS FROM SUBIRRIG. (IN)	DEEP PERC. (25.0%) (IN)	SURFACE WATER RETURN FLOW (25.0%) (IN)	CLAIMED IRRIG. C.U. FOR TRANSFER (IN)
NOV	0.00	0.53	0.37	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00
DEC	0.00	0.41	0.29	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00
JAN	0.00	0.50	0.35	0.00	0.35	0.00	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00	0.00
FEB	0.00	0.59	0.41	0.00	0.41	0.00	0.00	0.00	0.00	0.00	1.42	0.00	0.00	0.00	0.00
MAR	0.00	1.11	0.78	0.00	0.78	0.00	0.00	0.00	0.00	0.00	2.20	0.00	0.00	0.00	0.00
APR	0.24	2.11	0.15	0.09	0.00	0.09	0.00	0.00	0.00	0.00	2.11	0.00	0.00	0.00	0.00
MAY	3.66	2.58	1.76	1.92	0.00	1.92	0.00	0.00	3.33	1.87	1.85	0.00	0.83	0.83	1.87
JUN	5.35	3.29	2.40	2.95	0.00	1.85	1.10	2.19	4.78	1.29	1.29	0.00	1.20	1.20	2.38
JUL	7.34	1.87	1.62	5.72	0.00	1.29	4.43	8.85	4.94	0.00	0.00	1.96	1.23	1.23	2.47
AUG	6.26	1.55	1.28	4.98	0.00	0.00	4.98	9.96	5.78	0.00	0.00	2.09	1.44	1.44	2.88
SEP	3.51	1.10	0.79	2.72	0.00	0.00	2.72	5.44	4.38	0.00	0.00	0.53	1.09	1.09	2.19
OCT	1.37	0.75	0.29	1.08	0.00	0.00	1.08	2.16	0.00	0.00	0.00	1.08	0.00	0.00	0.00
TOTAL	27.75	16.39	10.49	19.46	2.20	5.16	14.30	26.61	23.21	2.96	10.91	5.66	5.80	5.80	11.60

AVERAGE CONDITIONS; CROP = 40.6% HAY, 59.4% ALFALFA
SOUTH SIDE DITCH AND LITTLE GIANT DITCH IRRIGATED ACREAGE (1989) = 1078 + 235 = 1313

9.8% SEEPAGE LOSS IN 1989

JUNDT IRRIGATED ACREAGE = 253.4

50% IRRIGATION EFFICIENCY USING FLOOD IRRIGATION

DEEP PERCOLATION IS ONE HALF OF IRRIGATION INEFFICIENCY (25.0%) PLUS EXCESS SOIL MOISTURE

OTHER HALF OF IRRIGATION INEFFICIENCY (25.0%) IS SURFACE WATER RETURN FLOW

PACT. = PACTOLA RESERVOIR

WTP = RAPID CITY WATER TREATMENT PLANT AND INFILTRATION GALLERIES

SOUTH SIDE DITCH AVERAGE MONTHLY DIVERSION IS FOR YEARS 1949-1979 DUE TO CONSISTENCY OF DATA

GROSS TRANSFERABLE AMOUNT FROM JUNDT PROPERTY UNDER SOUTH SIDE DITCH		
	(INCHES)	(FEET)
TO PACT.	11.60	0.97
TO WTP	23.21	1.93
		490.0

TABLE A **FOOTNOTES FOR JUNDT TRANSFERABLE AMOUNT**

Column A

Month

Column B

Gross consumptive use calculated by weighting 40.6 percent hay and 59.4 percent alfalfa results from the Blaney-Criddle method presented in Tables A-1 and A-2, respectively.

Column C

Total monthly precipitation taken from NOAA gage at Rapid City airport

Column D

Effective precipitation is precipitation available to meet crop consumptive use requirements

Nongrowing season: $0.7 \times C_i$

Growing season: Calculated by weighting 40.6 percent hay and 59.4 percent alfalfa results from the Blaney-Criddle regression presented in Tables A-1 and A-2, respectively.

Column E

Net consumptive use

Growing season: $B_i - D_i$

Nongrowing season: 0

Column F

Excess precipitation to soil moisture in storage

All months: if $D_i \geq B_i$, then $D_i - B_i$, else 0

Column G

Soil moisture used to satisfy adjusted consumptive use

TABLE A
FOOTNOTES FOR JUNDT TRANSFERABLE AMOUNT
(Continued)

All months: if $E_i = 0$, then 0, else if $L_{i-1} \geq E_i$, then E_i , else L_{i-1}

Column H

Remaining crop needs

All months: if $E_i \geq L_{i-1}$, then $E_i - L_{i-1}$, else 0

Column I

Gross crop needs accounting for farm irrigation inefficiencies

All months: $H/0.50$

Column J

Farm irrigation supply is prorated for the Jundt property as percentage of South Side water (9.8 percent South Side Ditch seepage loss and 1,313 total acres of land irrigated by South Side Ditch water rights).

November-April: $R = 0$

May-September: $R \times 0.902 \times 12/1,313$ (average year conditions)

October: $R = 0$

Column K

Excess irrigation soil moisture contribution

All months: if $J_i = 0$, then 0, else, if $J_i \leq I_i$, then 0, else $(J_i - I_i) \times 0.50$

TABLE A
FOOTNOTES FOR JUNDT TRANSFERABLE AMOUNT
(Continued)

Column L

Accumulative soil moisture storage after irrigation

All months: if $J_i - I_i < 0$, then 0 else,
 if $F_i = 0$ then $L_{i-1} - G_i + K_i$, else $L_{i-1} + F_i$

Column M

Additional water required to meet consumptive use needs from subirrigation

All months: if $L_i = 0$, then $(I_i - J_i) \times 0.50$, else 0

Column N

Deep percolation with flood irrigation

All months: if $L_i > 9.5$, then $L_i - 9.5 + (J_i \times 0.25)$, else $J_i \times 0.25$

Column O

Surface water return flow

All months: $J_i \times 0.25$

Column P

Claimed irrigation consumptive use for transfer from Jundt property

All months: if $J_i = 0$, then $P_i = 0$;
 if $E_i \leq 0.50 J_i$, then $P_i = E_i$;
 if $E_i > 0.50 J_i$, then $P_i = 0.50 J_i$

TABLE A
FOOTNOTES FOR JUNDT TRANSFERABLE AMOUNT
(Continued)

Column Q

Month during irrigation season

Column R

South Side diversions (AF)

GDW:ard

901-046.040

(RAPIDC/JUNDTF00.GDW)

TABLE A-1

TR-21 CONSUMPTIVE USE CALCULATIONS (AVERAGE) - HAY

LATITUDE: 44 N
 CROP: HAY
 YEAR: 49-54, 56-59, 63-68, 70-79
 STATION: RAPID CITY WSO AP
 IRR. APPL. IN.: 3.00
 LIMIT: 45 F MEAN TEMP
 f = 1.00067

MONTH	DAYS	TEMP	ADJ. TEMP.	% DAY	ADJ. DAY	CU FACTOR	CLIMATE COEFF.	GROWTH COEFF.	CU COEFF.	MONTH CU	MONTH PPT.	PPT. FACTOR	EFFECT. PPT.	ADJUSTED CU
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
JAN	--	--	--	6.48	0.00	0.0000	0.3000	0.49	0.1470	0.00	--	-0.12	0.00	0.00
FEB	--	--	--	6.57	0.00	0.0000	0.3000	0.57	0.1710	0.00	--	-0.12	0.00	0.00
MAR	--	--	--	8.29	0.00	0.0000	0.3000	0.73	0.2190	0.00	--	-0.12	0.00	0.00
APR	9	43.9	47.4	9.05	2.84	1.3466	0.5060	0.85	0.4301	0.58	0.63	0.38	0.38	0.20
MAY	31	55.4	55.4	10.25	10.25	5.6785	0.6444	0.90	0.5800	3.29	2.58	1.72	1.72	1.57
JUN	30	63.2	63.2	10.39	10.39	6.5665	0.7794	0.92	0.7170	4.71	3.29	2.31	2.31	2.40
JUL	31	72.3	72.3	10.49	10.49	7.5843	0.9368	0.92	0.8618	6.54	1.87	1.55	1.55	4.99
AUG	31	70.8	70.8	9.71	9.71	6.8747	0.9108	0.91	0.8289	5.70	1.55	1.24	1.24	4.46
SEP	30	60.5	60.5	8.41	8.41	5.0881	0.7327	0.87	0.6374	3.24	1.10	0.78	0.78	2.46
OCT	26	49.3	51.1	7.64	6.67	3.4062	0.5700	0.79	0.4503	1.53	0.63	0.40	0.40	1.13
NOV	--	--	--	6.50	0.00	0.0000	0.3000	0.67	0.2010	0.00	--	-0.12	0.00	0.00
DEC	--	--	--	6.22	0.00	0.0000	0.3000	0.55	0.1650	0.00	--	-0.12	0.00	0.00

SUM	188
-----	-----

INCHES	25.59	11.65	8.39	17.20
FEET	2.13	0.97	0.70	1.43

TABLE A-2

TR-21 CONSUMPTIVE USE CALCULATIONS (AVERAGE) - ALFALFA

LATITUDE: 44 N
 CROP: ALFALFA
 YEAR: 49-54, 56-59, 63-68, 70-79
 IRR. APPL. IN.: 3.00
 f = 1.00067
 STATION: RAPID CITY WSO AP
 LIMIT: 50 F MEAN TEMP

MONTH	DAYS	TEMP	ADJ. TEMP.	% DAY	ADJ. DAY	CU FACTOR	CLIMATE COEFF.	GROWTH COEFF.	CU COEFF.	MONTH CU	MONTH PPT.	PPT. FACTOR	EFFECT. PPT.	ADJUSTED CU
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
JAN	--	--	--	6.48	0.00	0.0000	0.3000	0.63	0.1890	0.00	--	-0.12	0.00	0.0000
FEB	--	--	--	6.57	0.00	0.0000	0.3000	0.73	0.2190	0.00	--	-0.12	0.00	0.0000
MAR	--	--	--	8.29	0.00	0.0000	0.3000	0.86	0.2580	0.00	--	-0.12	0.00	0.0000
APR	--	--	--	9.05	0.00	0.0000	0.3000	0.99	0.2970	0.00	--	-0.12	0.00	0.0000
MAY	31	55.4	55.4	10.25	10.25	5.6785	0.6444	1.08	0.6960	3.95	2.58	1.79	1.79	2.1636
JUN	30	63.2	63.2	10.39	10.39	6.5665	0.7794	1.13	0.8807	5.78	3.29	2.46	2.46	3.3270
JUL	31	72.3	72.3	10.49	10.49	7.5843	0.9368	1.11	1.0398	7.89	1.87	1.67	1.67	6.2193
AUG	31	70.8	70.8	9.71	9.71	6.8747	0.9108	1.06	0.9655	6.64	1.55	1.31	1.31	5.3295
SEP	30	60.5	60.5	8.41	8.41	5.0881	0.7327	0.99	0.7253	3.69	1.10	0.80	0.80	2.8892
OCT	15	49.3	55.1	7.64	3.92	2.1579	0.6392	0.91	0.5817	1.26	0.36	0.21	0.21	1.0491
NOV	--	--	--	6.50	0.00	0.0000	0.3000	0.78	0.2340	0.00	--	-0.12	0.00	0.0000
DEC	--	--	--	6.22	0.00	0.0000	0.3000	0.64	0.1920	0.00	--	-0.12	0.00	0.0000

SUM	168
-----	-----

INCHES	29.20	10.75	8.23	20.98
FEET	2.43		0.69	1.75

TABLE B

**TRANSFERABLE AMOUNTS FROM JUNDT PROPERTY
PORTION OF THE SOUTH SIDE DITCH WATER RIGHTS**

DIVERSION POINT	GROSS JUNDT TRANSFER (IN)	GROSS JUNDT TRANSFER AMOUNT (AF)	RETURN FLOW CONTRIBUTION (%)	RETURN FLOW CONTRIBUTION AMOUNT (AF)	NET TRANSFERABLE AMOUNT (AF)
AVERAGE TO WTP	23.2	490.0	2.8	13.7	476.3
AVERAGE TO PACTOLA	11.6	245.0	--	--	245.0

The return flow contribution is that portion of the Jundt property South Side Ditch water rights that is composed of return flows from upstream ditches which reach Rapid Creek upstream from the South Side Ditch point of diversion. These percentages and amounts are calculated in Appendix N.

TABLE C

MONTHLY TRANSFER SUMMARY JUNDT PROPERTY

MONTH	DIVERSION TO STORAGE IN PACTOLA RESERVOIR (AC.FT)*	DIVERSION AT THE RAPID CITY WTP AND INFILTRATION GALLERIES (AC.FT)**
MAY	35.2	68.4
JUNE	50.5	98.1
JULY	52.1	101.4
AUGUST	61.0	118.6
SEPTEMBER	46.2	89.8
OCTOBER	0.0	0.0
TOTAL	245.0	476.3

* Monthly amount transferable to storage in Pactola Reservoir:

Column P (Table A) x 253.4 acres x 1 foot/12 inches

** Monthly amount transferable to Rapid City WTP and infiltration galleries:

(Column J (Table A) x 253.4 acres x 1 foot/12 inches) -
2.8 percent return flows from Murphy and Cyclone
ditches (See attached Table B)

NOTE: All calculations based on 103 acres of hay and
150.4 acres of alfalfa.



CITY OF RAPID CITY

RAPID CITY, SOUTH DAKOTA 57701-2724

Public Works Department

300 Sixth Street

605-394-4165

FAX 605-394-6636

November 19, 1993

Mr. John Hatch, Chief Engineer
Water Rights Division
Department of Environment &
Natural Resources
523 East Capitol
Pierre, SD 57501



Re: Application for Permit to Appropriate Water

Dear Mr. Hatch:

Enclosed is an Application for Permit to Appropriate Water within the State of South Dakota for Don Jundt's property located in Rapid Valley in addition to engineering data from Wright Water Engineers, Inc. regarding Jundt's property. The \$50.00 application fee will be paid by Purchase Order No. 286129 and the check will be processed for payment the first week in December.

Thank you for your assistance in this transfer.

Sincerely,

Daniel L. Bjerke, P.E./L.S.
Public Works Engineering/Utilities Director

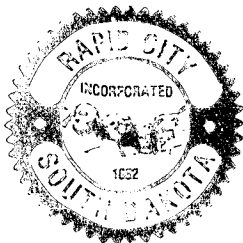
plh

pc Mayor Ed McLaughlin
Robert R. Jackson, City Attorney



EQUAL HOUSING
OPPORTUNITY

EQUAL OPPORTUNITY EMPLOYER



CITY OF RAPID CITY

RAPID CITY, SOUTH DAKOTA 57701-2724

Public Works Department

300 Sixth Street

605-394-4165

FAX 605-394-6636



November 23, 1993

Mr. Mark Rath
Water Resources Engineer
Water Rights Division
SD Dept. of Environment and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501

Re: Jundt Water Right Transfer

Dear Mr. Rath:

The City of Rapid City recently submitted an application to transfer water rights presently used on the Jundt property off the South Side Ditch in Rapid Valley to the City for municipal and industrial use.

The purchase agreement the City has with the Jundt's includes provision that allows the Jundts to purchase an exchange property near Chadron, Nebraska for income tax purposes. The property purchase in Nebraska is contingent on the water right transfer being approved by the Water Management Board during their proposed meeting date in March, 1994. Therefore, the City requests that the Jundt water right transfer be considered at the March, 1994 meeting or earlier if possible. We understand that any opponent to the transfer could ask for a delay and have advised the Jundts and the property seller in Nebraska of the same.

Any help you could provide us in completing the water right purchase transaction will be greatly appreciated.

Sincerely yours,
CITY OF RAPID CITY

Daniel L. Bjerke, PE/LS
Public Works Director of Engineering/Utilities



EQUAL HOUSING
OPPORTUNITY

EQUAL OPPORTUNITY EMPLOYER

Report on Water Permit Application No. 2296-2
City of Rapid City
November 29, 1993

Application No. 2296-2, City of Rapid City, proposes to transfer an annual volume of 476.3 acre-feet of water (ac-ft), if diverted at the city's water treatment plant or infiltration galleries, or 245.0 ac-ft, if stored in Pactola Reservoir. The maximum diversion rate proposed for this transfer is 2.85 cubic feet of water per second (cfs) from the natural flows of Rapid Creek. The transfer is from irrigation to City of Rapid City municipal use which includes industrial, commercial, common distribution system, rural water system, suburban housing, and domestic uses. Application No. 2296-2 proposes to transfer South Side Ditch Company stockholder/landowner's water which has been historically used to irrigate 253.4 acres located in the SW1/4 SE1/4, NW1/4 SW1/4 and S1/2 SW1/4 in Section 28 and NW1/4, W1/2 NE1/4, NW1/4 SE1/4 and N1/2 SW1/4 of Section 33 all in T1N-R9E also known as the Jundt property.

The source of water for the proposed transfer is from the natural flow of Rapid Creek, when available, through South Side ditch. Vested Water Right No. 2040-2, South Side Ditch, was validated for 23.40 cfs with a priority date of May 3, 1880. The existing diversion point for South Side ditch is located in the SE1/4 NW1/4 of Section 15 T1N-R8E. The locations of the diversion points for the proposed transfer are in the SE1/4 NE1/4 Section 3 (Rapid City Water Treatment Plant); SW1/4 SW1/4 Section 3 (Sioux Park Gallery); SE1/4 NE1/4 Section 9 (Meadowbrook Gallery); NW1/4 SE1/4 Section 8 (Jackson Springs Gallery); all in T1N-R7E and NW1/4 SW1/4 Section 2 T1N-R5E (Pactola Reservoir). Pactola Reservoir impounds water in portions of Sections 2, 3, 4, 5, 10, 11 of T1N-R5E and Sections 31, 32, 33, 34 of T2N-R5E. This application does not request any new water appropriation from Rapid Creek and the validated priority date of May 3, 1880 is to be retained by the city.

Review of Existing Water Rights

The water to be transferred has been appropriated under Vested Water Right No. 2040-2, South Side Ditch, with a priority date of May 3, 1880. The water right authorizes the irrigation of 253.4 acres of the Jundt property. There are 253.4 acres located in the S1/2 Section 28 and in Section 33 all in T1N-R9E which have been continually irrigated.

There are 72 existing water rights/permits appropriating 259.19 cfs from Rapid Creek between Pactola Reservoir and the confluence with the Cheyenne River. Of these, 14 water rights which appropriate approximately 28.37 cfs have priority dates which are senior to this proposed transfer. These are: Water Right No. 504-2, Cleghorn Springs Water Users, for 0.89 cfs; Water Right No. 2023-2, Leedy Ditch, for 1.00 cfs; Water Right Nos. 1727-2, 2239-2, 2240-2, 2241-2 and 2242-2 Rapid Valley Water Company (Murphy Ditch), for 16.20 cfs; Water Right No. 1101-2, Rapid

Valley Water Service Company, for 1.73 cfs; Water Right No. 653-2, Little Giant Ditch, for 6.27 cfs. The City of Rapid City holds five Water Right/Permit Nos. 0646-2, 1998-2, 2142-2, 2199-2 and 2201-2 for a total of 2.28 cfs.

Review of the Proposed Transfer

SDCL 46-5-34.1 states that no transfer can occur unless the transfer can be made without detriment to existing rights, or to individual domestic use rights. SDCL 46-5-34.1 also states "No person who has transferred an irrigation right pursuant to this section may acquire another irrigation right for the same land." SDCL 46-2A-12 allows a change in use "only if the change does not unlawfully impair existing rights and is for a beneficial use and in the public interest." Calculations using accepted scientific methods and available climatic and cropping data have been made to insure that adverse affects on existing water rights do not occur.

The volume of water which could be stored in Pactola Reservoir is 245.0 ac-ft annually. This volume of water is equal to the amount of water estimated to have been consumed annually by the crop. The amount of water which can be diverted at Rapid City water system intakes is 476.3 ac-ft annually. This volume of water includes the amount of water consumed by the crop plus the return water to Rapid Creek. Murphy and Cyclone Ditches contribute return water, which becomes natural flow water, to Rapid Creek upstream of the South Side Ditch head gate. The Jundt property has historically received a portion of this water as part of its natural flow. Because the source of this natural flow is located downstream of any of Rapid City's proposed diversion points, this water cannot be included in the volume of water transferred to the City's intakes. This extra water will be a benefit to downstream water rights.

The volume of water estimated to have been consumed by the crop is calculated on a monthly basis. For each month the maximum amount of water the crop would use is calculated. This is compared to the amount of water that is available for the crop's use based on historical ditch diversions and the total acreage irrigated annually from the ditch. A determination is made, on a monthly basis, whether maximum crop water usage or available water supply is the limiting factor. The lessor of these is used as the volume of water consumed by the crop for that particular month. Water which has been returned to Rapid Creek through irrigation would also be returned to Rapid Creek by Rapid City through their waste water treatment system. (Wright, 1992) If in the future the City of Rapid City stops returning effluent to Rapid Creek, then the diversion proposed by this application will need to be recalculated to reflect that condition.

Farm turnouts do not have measuring devices, so actual individual diversions from the ditch are unknown. Water in the ditch is shared by the users as needed. Based on actual past operations, the calculated diversion rate transfer is based on a pro rata

share of the total ditch diversion. The proposed diversion rate transfer is based on water beneficially used as described under SDCL 46-1-8.

The transferable diversion rate is based on the pro rata share of water which is decreased by the 9.8 percent carriage loss that is to remain in the ditch. This gives a transferable diversion rate of 2.85 cfs.

If this transfer is approved, the diversion rate and acreage authorized by the May 3, 1880 priority date of Water Right No. 2040-2 should be decreased by 2.85 cfs and 253.4 acres due to the transfer.

The water available for transfer is only from the natural flow in Rapid Creek and does not include stored water or stored water releases from the Deerfield - Pactola Reservoirs.

To insure that the transfer of the water can be made without detriment to existing water rights, the Water Management Board should monitor the management and operation of the proposed transfer.

Conclusions

1. SDCL 46-5-34.1 allows for the transfer of irrigation water rights apart from the land to municipal use when the transfer can be made without causing detriment to existing rights. SDCL 46-2A-12 allows a change in use "only if the change does not unlawfully impair existing rights and is for a beneficial use and in the public interest."
2. The water has been historically used to irrigate 253.4 acres.
3. The priority date of May 3, 1880 should be retained.
4. The diversion rate to be transferred is 2.85 cfs, and is based on the pro-rated share of the total ditch diversion rate.
5. The amount of water requested to be transferred, 476.3 ac-ft and 245.0 ac-ft is reasonable. The following table lists the monthly diversion associated with each volume:

Month	Diversion at Pactola (ac-ft)	Diversion at Intakes (ac-ft)
-----	-----	-----
May	35.2	68.4
June	50.5	98.1
July	52.1	101.4
Aug	61.0	118.6
Sept	46.2	89.8
Oct	0.0	0.0

6. If application No. 2296-2 is approved, the authorized diversion rate and acreage for the South Side Ditch Water Right No. 2040-2 under the May 3, 1880 priority date should be decreased by 2.85 cfs and 253.4 acres.
7. The Water Management Board should continue to monitor the management and operation of the transfer of the water right and of existing water rights.
8. Approval of Application No. 2296-2, only approves transfer of natural flow water and does not include any rights to stored irrigation water available under contract from Pactola Reservoir.
9. Because natural flow water has not been available for Vested Water Right No. 2040-2 during lower flow periods, approval of Application No. 2296-2 does not guarantee that natural flow water will be available for diversion or storage during low flow periods.
10. The effect of approving Application No. 2296-2 will be to retire the Jundt property from irrigation.
11. SDCL 46-5-34.1 states "No person who has transferred an irrigation right pursuant to this section may acquire another irrigation right for the same land."

Mark D. Rath 

Mark D. Rath
Natural Resources Engineer III

Approved by,

John Hated  _{for}

Delvin D. Brosz
Natural Resources Engineer IV

References

1. Wright Water Engineers, Inc. 1992. Engineering Report for Transfer of Stomer Property Portion of South Side Ditch Water Rights. Wright Water Engineers, Inc. Engineering Consultants, Denver, Colorado.
2. U.S. Bureau of Reclamation. 1990. Rapid Valley Water Management Study. U.S. Bureau of Reclamation, Belle Fourche Projects Office, Newell, South Dakota.
3. S.D. Department of Environment and Natural Resources. Division of Water Rights Records.

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2296-2, City of Rapid City

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Environment and Natural Resources concerning Water Permit Application No. 2296-2, City of Rapid City, c/o Dan Bjerke, 300 Sixth Street, Rapid City, SD 57701.

The Chief Engineer is recommending APPROVAL of Application No. 2296-2 because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) in the public interest with the following qualifications:

1. That Permit No. 2296-2 is limited to a diversion rate of 2.85 cfs for a total annual volume of 245.0 acre-feet at Pactola Reservoir or a total annual volume of 476.3 acre-feet at Sioux Park Gallery (SW 1/4 SW 1/4 Section 3), Meadowbrook Gallery (NW 1/4 NE 1/4 Section 9), Jackson Springs Gallery (NW 1/4 SE 1/4 Section 8) and the Rapid City Water Treatment Plant (SW 1/4 NE 1/4 Section 3; all in T1N-R7E. Maximum monthly diversion volumes at Pactola or the diversion points within Rapid City are as follows:

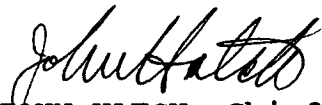
<u>Month</u>	<u>Monthly acre-feet at Pactola</u>	<u>Monthly acre-feet at diversion points within Rapid City</u>
May	35.2	68.4
June	50.5	98.1
July	52.1	101.4
August	61.0	118.6
September	46.2	89.8
October	0.0	0.0

Diversions during a month may be made at either Pactola Reservoir or at the diversion points within Rapid City, but not simultaneously at both Pactola and the Rapid City diversion points.

2. That approval of Permit No. 2296-2 authorizes diversions of only natural flow water by the City of Rapid City.
3. That the City of Rapid City report to the Chief Engineer annually the amount of water withdrawn each month at Pactola Reservoir or the diversion points within Rapid City.
4. That the Water Management Board is retaining jurisdiction of Permit No. 2296-2 in the event that additional information shows that changes need to be made in the monthly or total annual volumes authorized by Permit No. 2296-2.

5. Diversions under Permit No. 2296-2 may not interfere with existing water rights in effect prior to approval of No. 2296-2 or any domestic rights.
6. The amount of water with a May 3, 1880, priority date which may be appropriated under Vested Water Right No. 2040-2 is decreased by 2.85 cfs and the number of irrigated acres are decreased by 253.4 acres.

See report on application for additional information.


JOHN HATCH, Chief Engineer
December 3, 1993

REVISED RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2296-2, City of Rapid City

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Environment and Natural Resources concerning Water Permit Application No. 2296-2, City of Rapid City, c/o Dan Bjerke, 300 Sixth Street, Rapid City, SD 57701.

The Chief Engineer is recommending APPROVAL of Application No. 2296-2 because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) in the public interest with the following qualifications:

1. That Permit No. 2296-2 is limited to a diversion rate of 2.85 cfs for a total annual volume of 245.0 acre-feet at Pactola Reservoir or a total annual volume of 476.3 acre-feet at Sioux Park Gallery (SW 1/4 SW 1/4 Section 3), Meadowbrook Gallery (SE 1/4 NE 1/4 Section 9), Jackson Springs Gallery (NW 1/4 SE 1/4 Section 8) and the Rapid City Water Treatment Plant (SE 1/4 NE 1/4 Section 3; all in T1N-R7E. Maximum monthly diversion volumes at Pactola or the diversion points within Rapid City are as follows:

<u>Month</u>	<u>Monthly acre-feet at Pactola</u>	<u>Monthly acre-feet at diversion points within Rapid City</u>
May	35.2	68.4
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July	52.1	101.4
August	61.0	118.6
September	46.2	89.8
October	0.0	0.0

Diversions during a month may be made at either Pactola Reservoir or at the diversion points within Rapid City, but not simultaneously at both Pactola and the Rapid City diversion points.

2. That approval of Permit No. 2296-2 authorizes diversions of only natural flow water by the City of Rapid City.
3. That the City of Rapid City report to the Chief Engineer annually the amount of water withdrawn each month at Pactola Reservoir or the diversion points within Rapid City.
4. That the Water Management Board is retaining jurisdiction of Permit No. 2296-2 in the event that additional information shows that changes need to be made in the monthly or total annual volumes authorized by Permit No. 2296-2.
5. Diversions under Permit No. 2296-2 may not interfere with existing water rights in effect prior to approval of No. 2296-2 or any domestic rights.

6. The amount of water with a May 3, 1880, priority date which may be appropriated under Vested Water Right No. 2040-2 is decreased by 2.85 cfs and the number of irrigated acres are decreased by 253.4 acres.

See report on application for additional information.

A handwritten signature in cursive script, appearing to read "John Hatch".

JOHN HATCH, Chief Engineer
January 4, 1994



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

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

December 3, 1993

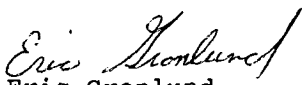
Dan Bjerke, Public Works Director
City of Rapid City
300 6th Street
Rapid City, SD 57701

Dear Mr. Bjerke:

Water Permit Application No. 2296-2 for municipal use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of the Rapid City Journal printed at Rapid City, SD (Ph # 394-8300). For your information, a copy of the notice, the recommendation of the Chief Engineer and a report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspaper to authorize publication of your Notice of Hearing and to arrange for payment. Early contact with the paper can eliminate delays. The publisher has been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. The newspaper has 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.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

December 3, 1993

Rapid City Journal
PO Box 450
Rapid City, SD 57709-0450

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 2296-2 to be published twice. Please publish the first notice on December 9, 1993, with the second publication 7 days later.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you make the first publication. Please BILL the APPLICANT for the cost of publication. The APPLICANT is City of Rapid City, 300 6th Street, Rapid City, SD 57701 (Ph # 394-4165).

A copy of BOTH publications must be SENT to the WATER RIGHTS DIVISION. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. No action may be taken on the permit application until proof of publication has been received.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

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

No. _____

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to Appropriate Water by Application No. _____ which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper

Instruction to Newspaper - Publish first Notice on December 9, 1993, with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 2296-2 to Transfer Use

Notice is given that the City of Rapid City, 300 6th Street, Rapid City, SD 57501 has filed Water Permit Application No. 2296-2 pursuant to 46-5-34.1 to transfer the use of a portion of Rapid Creek natural flows appropriated for irrigation use by South Side Ditch to City of Rapid City municipal use, which includes industrial, commercial, common distribution system, rural water system, suburban housing, and domestic uses.

Water Permit No. 2296-2 is to transfer the use of a portion of Rapid Creek natural flows historically used to irrigate 253.4 acres known as the Jundt property. The portion of Rapid Creek natural flows to be transferred to the city is 2.85 cubic feet of water per second (cfs) with an annual volume limitation of 476.3 acre-feet, if diverted at the city's water treatment plant and infiltration galleries or 245 acre-feet, if stored in Pactola Reservoir. Historically, the 2.85 cfs has been used to irrigate approximately 253.4 acres located in the SW 1/4, SW 1/4 SE 1/4 Section 28 and the NW 1/4, W 1/2 NE 1/4, NW 1/4 SE 1/4, N 1/2 SW 1/4 Section 33; all in T1N-R9E also known as the Jundt property. The existing diversion point on Rapid Creek for South Side Ditch is located in the SE 1/4 NW 1/4 Section 15-T1N-R8E. This application is to change the diversion point for 2.85 cfs to diversion points for use by the city to be located in the SE 1/4 NE 1/4 Section 3 (Rapid City Water Treatment Plant); SW 1/4 SW 1/4 Section 3 (Sioux Park Gallery); SE 1/4 NE 1/4 Section 9 (Meadowbrook Gallery); NW 1/4 SE 1/4 Section 8 (Jackson Springs Gallery); all in T1N-R7E or to allow storage in Pactola Reservoir. The location of the Pactola Reservoir diversion points is the NW 1/4 SW 1/4 Section 2-T1N-R5E and the Reservoir impounds water in portions of Sections 2, 3, 4, 5, 10, 11 of T1N-R5E and Sections 31, 32, 33, 34 of T2N-R5E. This application does not authorize any new water appropriations from Rapid Creek and the claimed priority date of May 3, 1880, for use of 2.85 cfs is to be retained by the city.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2296-2 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.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, 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 December 27, 1993. 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.

The Water Management Board will consider this application at 1:30 p.m., January 6, 1994, Seventy-six Gold Rush Room, Holiday Inn of the Northern Black Hills, I-90 & Exit 14, Spearfish, SD. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing. The January 6, 1994, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any interested person opposing the application. The request for an automatic delay must be filed by December 27, 1993.

Any hearing will be an adversary proceeding. Any person filing a petition 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. Contact Eric Gronlund by December 27, 1993, at the above Water Rights Division address to request copies of information pertaining to this application, to assure access to the hearing by the handicapped or to obtain an interpreter for the hearing impaired.

This 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-20, 46-2A-21; 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; and Board Rules ARSD 74:02:01 thru 74:02:01:15. Robert E. Roberts, Secretary, Department of Environment and Natural Resources.

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
) ss
 County of Pennington)

I, Helena M. Bauer

certify that the attached printed Notice was
 taken from the Rapid City Journal

printed and published in Rapid City

County of Pennington and State of

South Dakota. The notice was published in
 the newspaper on the following two dates:

December 9, 1993

Dec 16, 1993

Cost of Printing: 13 9/16 inch @ 5.10 per inch

run 2 times total cost \$138.36

Helena M. Bauer
 (Signature)

December 16, 1993
 (Title)

Bookkeeper
 (Date Signed)



Dec. 9, 16 L2129

**NOTICE OF HEARING
 ON APPLICATION NO. 2296-2
 TO TRANSFER USE**

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Water Permit No. 2296-2 is to transfer the use of a portion of Rapid Creek natural flows historically used to irrigate 253.4 acres known as the Jundt property. The portion of Rapid Creek natural flows to be transferred to the city is 2.85 cubic feet of water per second (cfs) with an annual volume limitation of 476.3 acre-feet, if diverted at the city's water treatment plant and infiltration galleries or 245 acre-feet, if stored in Pactola Reservoir. Historically, the 2.85 cfs has been used to irrigate approximately 253.4 acres located in the SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 28 and the NW $\frac{1}{4}$, W $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$ Section 33; all in T1N-R9E also known as the Jundt property. The existing diversion point on Rapid Creek for South Side Ditch is located in the SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 15, T1N, R8E. This application is to change the diversion point for 2.85 cfs to diversion points for use by the city to be located in the SE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 3 (Rapid City Water Treatment Plant); SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 3 (Sioux Park Gallery); SE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 9 (Meadowbrook Gallery); NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 8 (Jackson Springs Gallery); all in T1N-R7E or to allow storage in Pactola Reservoir. The location of the Pactola Reservoir diversion points is the NW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 2, T1N-R5E and the Reservoir impounds water in portions of Sections 2, 3, 4, 5, 10, 11 of T1N-R5E and Sections 31, 32, 33, 34 of T2N-R5E. This application does not authorize any new water appropriations from Rapid Creek and the claimed priority date of May 3, 1880, for use of 2.85 cfs is to be retained by the city.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2296-2 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.

Any person interested in opposing or supporting this application must file a written petition with BOTH the applicant and Chief Engineer. The applicant must also file a petition if opposed to the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Division, 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 December 27, 1993. 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.

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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-20, 46-2A-21; 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; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

Robert E. Roberts
 Secretary
 Department of Environment
 and Natural Resources



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

December 6, 1993

Dear :

Enclosed is a copy of the Notice of Hearing for Water Permit Application No. 2296-2 for the City of Rapid City. The application proposes to transfer the use of a portion of Rapid Creek natural flows appropriated for irrigation use by South Side Ditch for use by the city. The Notice of Hearing is scheduled to be published in the Rapid City Journal for two consecutive weeks.

A copy of the notice, report and recommendation on Application No. 2296-2 is being sent to you because of your previous interest in Rapid City's water permit applications to transfer use.

If you have any questions regarding the application , please feel free to contact Mark Rath or myself at 773-3352.

Sincerely,

Eric Gronlund
Water Rights Division

Enclosure



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

December 7, 1993

Dear :

Enclosed please find a copy of the Notice of Hearing, report and recommendation on Water Permit Application No. 2296-2 for the City of Rapid City. These enclosures were inadvertently omitted from the letter sent to you on December 6, 1993.

I apologize for any inconvenience this may have caused.

Sincerely,

Jaci R. Konop
Water Rights Division
(605)773-3352

Encl.

(Water Permit Application No. 2296-2)

THE ATTACHED LETTER WAS SENT TO THE FOLLOWING:

Joseph Butler, Attorney
Bangs, McCullen, Butler, Foye & Simmons
PO Box 2670
Rapid City, SD 57709-2670

Bruce Laymon, Project Manager
Bureau of Reclamation
PO Box 226
Newell, SD 57760

Jerry Hammerquist
Rapid Valley Water Conservancy District
Box 26
Caputa, SD 57725

Mary McMasters and Harry Morris
~~RR 5 Box 480~~ 116-225 S. Burton Rd.
~~Rapid City, SD 57701~~
Belle, MT 59750-9777
Rapid Valley Water Company, Inc.
Rt 2 Box 160
Rapid City, SD 57701

Keith Ham, President
St. Germain Ditch
HCR 36 Box 34
Caputa, SD 57725

Jerry Marsh
Marsh Hereford Ranch
HCR 36 Box 35
Caputa, SD 57725

Walter Jones, Secretary
Lone Tree Water Company
RR 2 Box 4970
Rapid City, SD 57701

Don Jundt
South Side Ditch
Rt 2 Box 4920A
Rapid City, SD 57701

Michael M. Hickey, Attorney
818 St. Joseph Street
PO Box 2670
Rapid City, SD 57709-2670

Charles Johnson
Hawthorne Ditch Company
1500 East 27th Street
Rapid City, SD 57701

David Lamb
RR 2 Box 223
Rapid City, SD 57701

Melvin Brassfield
Box 24
Caputa, SD 57725

A. Carl Ham
Ham Ranch, Inc.
HCR 36 Box 34
Caputa, SD 57725

Robert Dustman
Dustman Ranch Partnership
Box 53
Caputa, SD 57725

Water Rights Division - DENR

Conversation or File Documentation

Name of Person: Wayne Anderson, President South Side Ditch Co.

File No. 2040-2 and 2296-2

Address: Rapid City, SD County: Pennington

Date: 12/8/1993 Telephone: 393-0382

RE: Water Permit Application No. 2296-2

Comments:

I called Wayne Anderson concerning the ditch maintenance report for both Little Giant and South Side ditches. He said he would be sending them in.

Mr. Anderson indicated he called the office on December 3, 1993 about irrigated acreage from South Side Ditch concerning the proposed water right transfer of the Jundt property to the City of Rapid City. He said the report for the transfer listed 286 acres irrigated in Sections 28 and 33; T1N-R9E, but the report listed 275 acres irrigated based on Dan Bjerke and Terry Rathbuns inspection. I told him the report also stated that a 40 acre parcel of which approximately 32 irrigated acres were excluded. I told him this indicated that approximately 307 total acres were being irrigated which is more than is authorized by Water Right No. 2040-2. I told him the Division had not been aware of this condition. I told him to include these acres for irrigation either a vested water right claim or water permit application would need to be filed to include these acres. Mr. Anderson requested a letter stating this.

Mr. Anderson asked if it were permissible for the City of Rapid City to make the inspection for the water right transfer. I told him that the Division does not physically check the land irrigated when other water right transfers are filed with us. I told him that if he believes there is a discrepancy with the land irrigated he should bring the matter up before the Water Management Board at which time the City of Rapid City would also be available to testify on their inspection.

I told Mr. Anderson that I spoke with MDU concerning damaging Little Giant Ditch. I told him MDU indicated they would repair any leakage they caused. Mr. Anderson wanted a letter concerning this.



Mark D Rath
Natural Resources Engineer



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

December 8, 1993

Wayne Anderson
South Side Ditch
PO Box 648
Rapid City, SD 57709

Dear Mr. Anderson:

This letter is in regard to our December 8, 1993 telephone discussion concerning irrigation of the Jundt property by the South Side Ditch water right. There are 286 acres located in Sections 28 and 33 all in T1N-R9E authorized for irrigation by Water Right No. 2040-2. Additional acres located in Sections 28 and 33 irrigated by the South Side Ditch water right are not authorized. Either a vested water right claim or a water permit application would need to be filed to include any additional acres.

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

Sincerely,

Mark D Rath
Natural Resources Engineer
Division of Water Rights
(605) 773-3352



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

FEB 1 1994

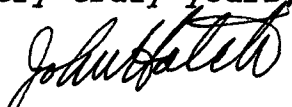
Dan Bjerke
Public Works Director
City of Rapid City
300 6th Street
Rapid City, SD 57701

Dear Mr. Bjerke:

Enclosed is Water Permit No. 2296-2 authorizing the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Also enclosed is Receipt No. 413962 in the amount of \$50.00 which you paid for the application fee.

Very truly yours,


JOHN HATCH, Chief Engineer
Water Rights Division
(605) 773-3352

Enclosures



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

November 5, 1998

Daniel L Bjerke
City of Rapid City
300 6th St
Rapid City SD 57701-2724

Dear Mr. Bjerke:

The investigation of the City of Rapid City's water use systems was conducted on September 9, 1998, by Mark Rath, staff engineer. The investigation included the extent of application of water to beneficial use, as developed under each permit. The final water right documents, the Water Licenses, can now be issued. Below is a list of the permits that were investigated.

Permit No.	amount	source	
2136-2	0.78 cfs	Rapid Creek	Sioux Park
2138-2	12.38 cfs	Rapid Creek	Water Treatment Plant
* 2274-2	0.78 cfs	Rapid Creek	Water Treatment Plant
2156-2	1.11 cfs	Madison Formation	SW ¼ SE ¼ Sec 16-T1N-R7E
transfer the use of a portion of Rapid Creek flows			formerly known as
2142-2	0.62 cfs	Murphy Ditch	Tyler property
2199-2	0.05 cfs	Murphy Ditch	Pelle property
2201-2	0.13 cfs	Murphy Ditch	Long property
2217-2	0.33 cfs	South Side Ditch	Keller property
2218-2	2.16 cfs	South Side Ditch	Stromer property
2234-2	0.79 cfs	South Side Ditch	Eisenbraun property
2249-2	1.19 cfs	South Side Ditch	Weber property
2296-2	2.85 cfs	South Side Ditch	Jundt property
2316-2	0.81 cfs	Murphy Ditch	Morris property
2317-2	0.84 cfs	Hawthorne Ditch	Morris property
2360-2	0.37 cfs	South Side Ditch	Soetaert property
2397-2	0.59 cfs	South Side Ditch	Eisenbraun property
2399-2	0.75 cfs	Murphy & Little Giant Ditch	Wileman property

* license fee already submitted

Statutes require that we charge \$50.00 fee for the investigation and issuance of the each Water License. Upon receipt of the \$800.00 fee (16 permits x \$50) we will process the Water Licenses.

Please sent fee to: Dept. of Environment & Natural Resources, Water Rights Program, 523 E. Capitol, Pierre, SD 57501-3181. If you have questions, please contact us.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

№ 415961

Pierre, December 9, 1998

RECEIVED OF City of Rapid City, 300 6th St., Rapid City, SD 57701-2724
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct
and to put water to beneficial use _____

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. 2296-2

Fee for Filing Transfer Form _____

Fee for Filing Extension Request _____

Fee for _____

(Any Other Work Provided by Law)

Total

50 00

50 00

By _____
Chief Engineer

John Hatch 

Permit No. 2296-2
Cheyenne River - Water District

Report Of Examination Of Works

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

On, **September 9, 1998**, I made a thorough examination of the water use system constructed by **City of Rapid City of 300 6th St, Rapid City SD** holder of Permit No. **2296-2**, bearing the priority of **May 3, 1880** authorizing the diversion of **2.85** cu. ft. per second and an annual appropriation of **476.3** acre-feet if taken at Rapid City's municipal diversion points or **245.0** acre-feet if stored in Pactola Reservoir of the natural flow waters of **surface water from Rapid Creek** for **municipal, industrial, commercial, common distribution system, rural water system, suburban housing, and domestic purposes**, in **Pennington** County.

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

A. Works used to divert the water:

Pumps at the water treatment plant, Jackson Springs Gallery Sioux (aka Girl Scout) Gallery, Meadowbrook Gallery and storage in Pactola Reservoir.

The system is in the following condition **good**. The points of diversion are located **in the SE1/4 NE1/4 Section 3 (Rapid City Water Treatment Plant); SW1/4 SW1/4 Section 3 (Sioux Park Gallery); SE1/4 NE1/4 Section 9 (Meadowbrook Gallery); NW1/4 SE1/4 Section 8 (Jackson Springs Gallery); all in T1N-R7E and NW1/4 SW1/4 Section 2 T1N-R5E (Pactola Reservoir). Pactola Reservoir impounds water in portions of Sections 2, 3, 4, 5, 10, 11 of T1N-R5E and Sections 31, 32, 33, 34 of T2N-R5E.** The permit holder is entitled to divert and convey to the place of use **2.85** cu. ft. per second of water and an annual appropriation of **476.3** acre-feet if taken at Rapid City's municipal diversion points or **245.0** acre-feet if stored in Pactola Reservoir which is to be used for **municipal, industrial, commercial, common distribution system, rural water system, suburban housing, and domestic purposes**. Water has been put to beneficial use to the maximum extent and the license should be issued for **2.85** cfs and an annual appropriation of **476.3** acre-feet if taken at Rapid City's municipal diversion points or **245.0** acre-feet if stored in Pactola Reservoir

Applicable permit qualifications have been complied with: **yes**

Exceptions to compliance are: **none**



Mark D. Rath
Natural Resources Engineer
DENR, Water Rights Program

9/29/98

Date

REPORT ON INSPECTION OF PERMIT NO. 2296-2

DATE OF INSPECTION: September 9, 1998

Contact Person & Address: John Wagner, 300 6th St, Rapid City SD 57701

DIVERSION POINT LEGAL LOCATIONS: are in the SE1/4 NE1/4 Section 3 (Rapid City Water Treatment Plant); SW1/4 SW1/4 Section 3 (Sioux Park a.k.a. Girl Scout Gallery); SE1/4 NE1/4 Section 9 (Meadowbrook Gallery); NW1/4 SE1/4 Section 8 (Jackson Springs Gallery); all in T1N-R7E and NW1/4 SW1/4 Section 2 T1N-R5E (Pactola Reservoir). Pactola Reservoir impounds water in portions of Sections 2, 3, 4, 5, 10, 11 of T1N-R5E and Sections 31, 32, 33, 34 of T2N-R5E.

WATER SUPPLY Source: Rapid Creek

WATER TREATMENT PLANT

Pump\ Motor:

- | | |
|---------------------------------------|-----------------------------------|
| 1) Pump Make <u>Peerless</u> | 2) Model <u>258595</u> |
| 3) Capacity <u>5600</u> GPM | 4) Motor Make <u>GE</u> |
| 5) Model No. <u>5K405DP7011B FR2G</u> | 6) Horsepower rating <u>75</u> hp |

- | | |
|----------------------------------|------------------------------------|
| 1) Pump Make <u>Layne Bowler</u> | 2) Model <u>14MSL</u> |
| 3) Capacity <u>2780</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>326UP</u> | 6) Horsepower rating <u>30</u> hp |

- | | |
|-------------------------------|------------------------------------|
| 1) Pump Make <u>Vertiline</u> | 2) Model <u>27908</u> |
| 3) Capacity <u>5560</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>445UPY</u> | 6) Horsepower rating <u>60</u> hp |

- | | |
|----------------------------------|-----------------------------------|
| 1) Pump Make <u>Layne Bowler</u> | 2) Model <u>85522</u> |
| 3) Capacity <u>5875</u> GPM | 4) Motor Make <u>Louis Allis</u> |
| 5) Model No. <u>COG5B</u> | 6) Horsepower rating <u>60</u> hp |

- | | |
|-------------------------------|------------------------------------|
| 1) Pump Make <u>Vertiline</u> | 2) Model <u>27989</u> |
| 3) Capacity <u>8000</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>CFU</u> | 6) Horsepower rating <u>100</u> hp |

SIOUX PARK (a.k.a. Girl Scout) GALLERY

Pump\ Motor:

- | | |
|---------------------------------|------------------------------------|
| 1) Pump Make <u>Worthington</u> | 2) Model <u>12H13501</u> |
| 3) Capacity <u>1400</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>324UP</u> | 6) Horsepower rating <u>25</u> hp |

- | | |
|---------------------------------|------------------------------------|
| 1) Pump Make <u>Worthington</u> | 2) Model <u>12H13501</u> |
| 3) Capacity <u>1400</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>324UP</u> | 6) Horsepower rating <u>25</u> hp |

MEADOWBROOK GALLERY

Pump\ Motor:

- | | |
|---------------------------------|------------------------------------|
| 1) Pump Make <u>Worthington</u> | 2) Model <u>10QHA0</u> |
| 3) Capacity <u>1525</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>2743715</u> | 6) Horsepower rating <u>15</u> hp |

- | | |
|---------------------------------|------------------------------------|
| 1) Pump Make <u>Worthington</u> | 2) Model <u>10QHA0</u> |
| 3) Capacity <u>1475</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>2745675</u> | 6) Horsepower rating <u>15</u> hp |

- | | |
|---------------------------------|------------------------------------|
| 1) Pump Make <u>Worthington</u> | 2) Model <u>10QHA0</u> |
| 3) Capacity <u>1525</u> GPM | 4) Motor Make <u>US Electrical</u> |
| 5) Model No. <u>2744261</u> | 6) Horsepower rating <u>15</u> hp |

JACKSON SPRINGS GALLERY

Pump\ Motor:

- | | |
|-------------------------------------|-----------------------------------|
| 1) Pump Make <u>Fairbanks-Morse</u> | 2) Model <u>T4B242990A</u> |
| 3) Capacity <u>1390</u> GPM | 4) Motor Make <u>GE</u> |
| 5) Model No. <u>5K6258XH1A</u> | 6) Horsepower rating <u>75</u> hp |

Pump\ Motor:

- | | |
|-------------------------------------|------------------------------------|
| 1) Pump Make <u>Fairbanks-Morse</u> | 2) Model <u>T4B242992A</u> |
| 3) Capacity <u>2085</u> GPM | 4) Motor Make <u>GE</u> |
| 5) Model No. <u>5K6268XH1A</u> | 6) Horsepower rating <u>125</u> hp |

Pump\ Motor:

- | | |
|-------------------------------------|------------------------------------|
| 1) Pump Make <u>Fairbanks-Morse</u> | 2) Model <u>T4B242991A</u> |
| 3) Capacity <u>2085</u> GPM | 4) Motor Make <u>GE</u> |
| 5) Model No. <u>5K6258XH1A</u> | 6) Horsepower rating <u>125</u> hp |

PACTOLA RESERVOIR : This is a US Bureau of Reclamation dam with 55, 972 acre-feet of active storage

DISTRIBUTION LINES OR CANALS:

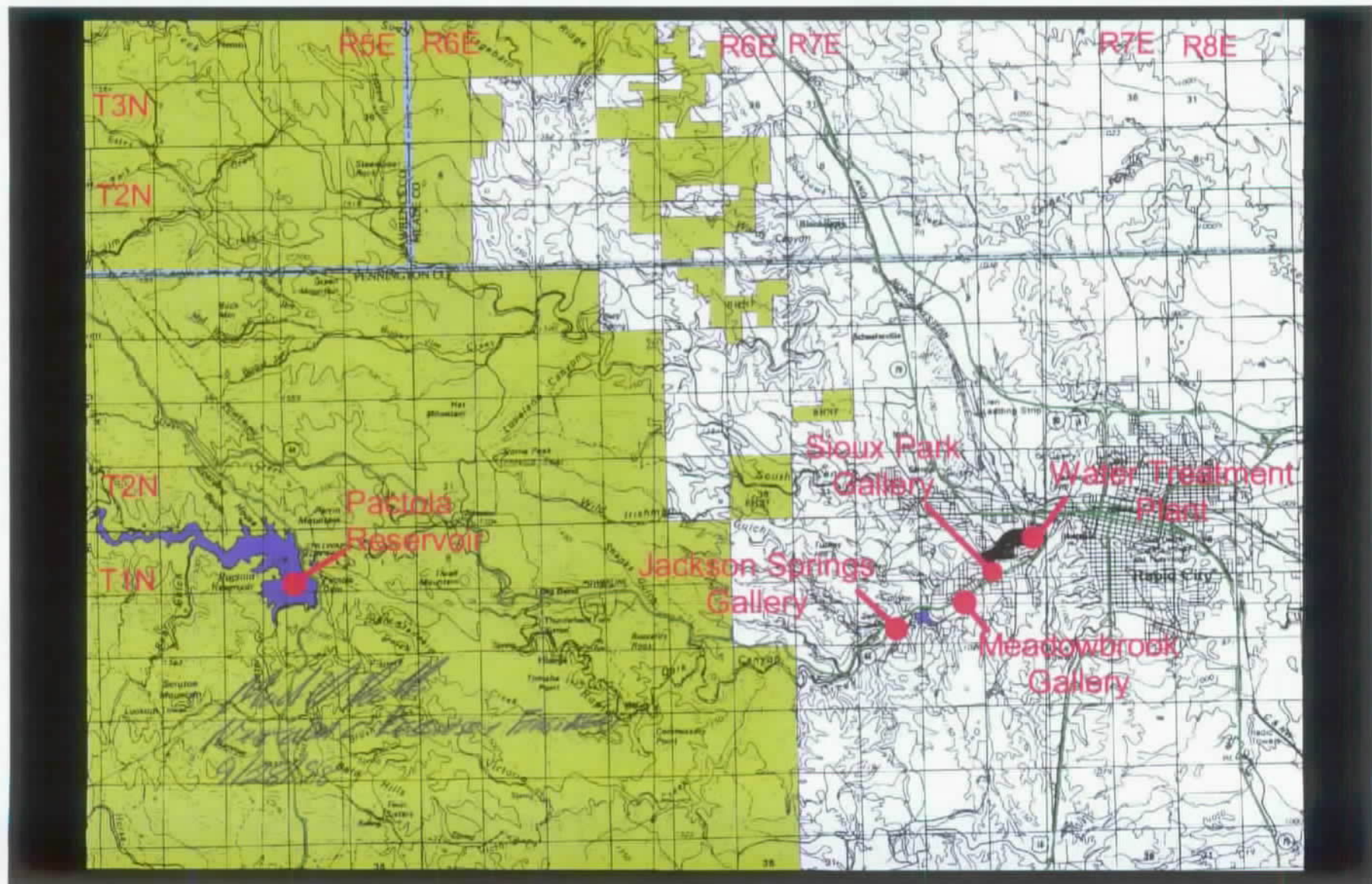
Municipal distribution system

PERMIT QUALIFICATIONS AND REGULATIONS:

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

COMMENTS: #

Area Map for Pactola Reservoir to Rapid City



STATE OF SOUTH DAKOTA

WATER LICENSE NO. 2296-2

(1) The City of Rapid City, 300 6th St, Rapid City SD 57701 made Application No. 2296-2, November 23, 1993 for a water permit to divert 2.85 cubic feet of water per second (cfs) from Rapid Creek with an annual volume limitation of 476.3 acre-feet, if diverted at the city's water treatment plant and infiltration galleries or 245.0 acre-feet, if stored in Pactola Reservoir, Pennington County, South Dakota for municipal, industrial, commercial, common distribution system, rural water system, suburban housing and domestic purposes. Permit No. 2296-2, with a priority date of May 3, 1880 (established by South Side Ditch) was approved January 6, 1994 and issued to the City of Rapid City for diversion of water with construction of the described water supply system and the application to beneficial use of said water completed.

(2) It is certified that the City of Rapid City has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 2.85 cfs from Rapid Creek with an annual volume limitation of 476.3 acre-feet, if diverted at the city's water treatment plant and infiltration galleries or 245.0 acre-feet, if stored in Pactola Reservoir for beneficial use. The location of the diversion points are: SE ¼ NE ¼ Section 3 (Rapid City Water Treatment Plant); SW ¼ SW ¼ Section 3 (Sioux Park Gallery); SE ¼ NE ¼ Section 9 (Meadowbrook Gallery); NW ¼ SE ¼ Section 8 (Jackson Springs Gallery); all in T1N-R7E and NW ¼ SW ¼ Section 2-T1N-R5E (Pactola Reservoir). Pactola Reservoir impounds water in portions of Sections 2, 3, 4, 5, 10, 11 of T1N-R5E and Sections 31, 32, 33, 34 of T2N-R5E.

(3) The City of Rapid City 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 Rapid City, 300 6th St, Rapid City SD 57701 the holder and/or owner of Water Right No. 2296-2 is issued a license to appropriate water, the right to use 2.85 cfs from Rapid Creek with an annual volume limitation of 476.3 acre-feet, if diverted at the city's water treatment plant and infiltration galleries or 245.0 acre-feet, if stored in Pactola Reservoir with a priority date of May 3, 1880 (established by South Side Ditch) from the locations specified in (2) of this license for municipal, industrial, commercial, common distribution system, rural water system, suburban housing and domestic purposes. This license is subject to any limitations or qualifications listed in Water Right No. 2296-2 and subject to South Dakota State Law.


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

JAN 15 1999

date





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

JAN 15 1999

Daniel L Bjerke
City of Rapid City
300 6th St
Rapid City SD 57701-2724

Dear Mr. Bjerke:

Enclosed are the Water Licenses and receipts for the investigation and issuance of the water licenses. These water licenses are the final document which complete the process of obtaining a water right.

As long as the City of Rapid City uses the water beneficially, as stated in the water licenses, State Water Law provides that the City has a continuing right to use the water.

Very truly yours,

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

ks

enclosures



2296-2

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

September 30, 2005

INTERNAL MEMORANDUM

TO: Garland Erbele, Chief Engineer
DENR Water Rights Program

FROM: Donald E. Stroup *Donald E. Stroup*
Natural Resources Project Engineer
DENR Water Rights Program

SUBJECT: Rapid City – Rapid Valley Water Rights Transfers

A total of 16.75 cubic feet per second (cfs) of water has been transferred from Rapid Valley irrigation ditches to Rapid City, SD. The amounts of flow transferred and acres retired by ditch are:

<u>Ditch</u>	<u>Flow (cfs)</u>	<u>Acres</u>
Murphy	4.12	325
Little Giant	0.99	26
South Side	10.80	1001.8
Hawthorne	0.84	46

The locations of the land retired from irrigation are shown on the Rapid City-Rapid Valley Water Rights Transfers Map. Following is a list summarizing the water transfers from Rapid Valley irrigators to Rapid City:

- 2399-2: Retired 52-acres and 0.75-cfs of Wileman property from future irrigation, 26-acres and 0.33-cfs from Murphy Ditch and 26-acres and 0.42-cfs from Little Giant Ditch. Land located in the NE¼ Section 24 T1N R8E and water via Murphy Ditch at the same location.
- 2316-2: Retired 64-acres and 0.81-cfs of Morris property from future irrigation via Murphy Ditch. Land located in the SE¼ Section 9 T1N R8E and water via Murphy Ditch at the same location.
- 2201-1: Retired 10-acres and 0.13-cfs of Long property from future irrigation via Murphy Ditch. Land located in the center of Section 14 T1N R8E and water via Murphy Ditch at the same location.
- 2199-2: Retired 4-acres and 0.05-cfs of Pelle property from future irrigation via Murphy Ditch. Land located in the NW¼ Section 19 T1N R9E and water via Murphy Ditch at the same location.
- 2142-2: Retired 49-acres and 0.62-cfs of Tyler property from future irrigation via Murphy Ditch. Land located in the NW¼ and SW¼ Section 19 T1N R9E and water via Murphy Ditch at the same location.

- 2469-2** Retired 27-acres and 0.34-cfs of Murphy property from future irrigation via Murphy Ditch. Land located in the NW¼ and SW¼ Section 14 T1N R8E and water via Murphy Ditch at the same location.
- 2512-2** Retired 145-acres and 1.84-cfs of Schroeder property from future irrigation via Murphy Ditch. Land located in Section 19 T1N R9E and water via Murphy Ditch at the same location.
- 2513-2** Retired 74.9-acres and 0.84-cfs of Steen property from future irrigation via South Side Ditch. Land located in the NE¼ Section 25, and SW¼ and SE¼ Section 24 T1N R8E and water via South Side Ditch in Section 25 T1N R8E. The turnout for the supplying lateral has a turn screw gate that is functional.
- 2234-2** Retired 70-acres and 0.79-cfs of Eisenbraun property from future irrigation via South Side Ditch. Land located in the NE¼ Section 26 T1N R8E and water via South Side Ditch at the same location. The turnout for the supplying lateral is into a buried pipeline capped with a plastic bucket.
- 2411-2** Retired 3.6-acres and 0.04-cfs of Eisenbraun property from future irrigation via South Side Ditch. Land located in the NE¼ Section 26 T1N R8E and water via South Side Ditch at the same location. The turnout for the supplying lateral is into a buried pipeline capped with a plastic bucket.
- 2397-2** Retired 59.3-acres and 0.59-cfs of Eisenbraun property from future irrigation via South Side Ditch. Land located in the NE¼ Section 26 T1N R8E and water via South Side Ditch at the same location. The turnout for the supplying lateral is into a buried pipeline capped with a plastic bucket.
- 2468-2** Retired 34.8-acres and 0.57-cfs of Howie property from future irrigation via Little Giant Ditch water delivered via Murphy Ditch. Land located in the SW¼ Section 19 and NW¼ Section 30 T1N R9E and water via Murphy Ditch in the NE¼ Section 19 T1N R9E. The turnout for the supplying lateral is blocked by a silted-in board.
- 2249-2** Retired 105.5-acres and 1.19-cfs of Weber property from future irrigation via South Side Ditch. Land located in the NW¼ and SW¼ Section 30 T1N R9E and water via South Side Ditch in the SW¼ Section 30 T1N R9E.
- 2296-2** Retired 253.4-acres and 2.85-cfs of Jundt property from future irrigation via South Side Ditch. Land located in Section 33 T1N R9E and water via South Side Ditch in the NE¼ Section 33 T1N R9E. The turnout for the supplying lateral is not blocked and ditch and lateral do not appear to be maintained.
- 2360-2** Retired 32.6-acres and 0.37-cfs of Soetaert property from future irrigation via South Side Ditch. Land located in the E½ Section 33 T1N R9E and water via South Side Ditch in the NE¼ Section 33 T1N R9E. The turnout for the supplying lateral is not blocked and ditch and lateral do not appear to be maintained.
- 2415-2** Retired 146-acres and 1.64-cfs of Howie property from future irrigation via South Side Ditch. Land located in the NE¼ and SE¼ Section 32 T1N R9E and water via South Side Ditch in the NE¼ Section 32 T1N R9E. The turnout for the supplying lateral is not blocked and ditch and lateral do not appear to be maintained.

- 2217-2** Retired 29.2-acres and 0.33-cfs of Keller property from future irrigation via South Side Ditch. Land located in the SE¼ Section 29 T1N R9E and water via South Side Ditch in the NE¼ Section 32 T1N R9E. The turnout for the supplying lateral is not blocked and ditch and lateral do not appear to be maintained.
- 2218-2** Retired 192.5-acres and 2.16-cfs of Stromer property from future irrigation via South Side Ditch. Land located in the NW¼, SW¼ , and SE¼ of Section 29 T1N R9E and water via South Side Ditch in the SW¼ Section 29 T1N R9E. The turnout for the supplying lateral is not blocked and ditch and lateral do not appear to be maintained.
- 2317-2** Retired 46-acres and 0.84-cfs of Morris property from future irrigation via Hawthorne Ditch. Land located in the center of Section 9 T1N R8E and water via Hawthorne Ditch in the NE¼ Section 9 T1N R8E. Hawthorne Ditch is now piped underground through the area where the turnout for the supplying lateral was and the new Elk Vale Road by-pass, a school, and Western Electric have been constructed where the lateral previous ran. There is no evidence of a lateral at the location.

cc: Individual Files

2296-2

ADVANCED ENGINEERING AND SURVEYING, INC.

3421 West Main Street

RAPID CITY, SOUTH DAKOTA 57702

605.718.8825 FAX 605.718.8837

FACSIMILE TRANSMITTAL SHEET

TO:

KEN BUTLER

FROM:

IAN PATTERSON

COMPANY:

DENR

DATE:

01/18/2010

~~TRANSMISSION EMAIL~~

TOTAL NO. OF PAGES INCLUDING COVER:

33

PHONE NUMBER:

(605) 713-3352

SENDER'S REFERENCE NUMBER:

09-064

RE:

EDGEMONT H₂O ^{WELL} DECASSING

YOUR REFERENCE NUMBER:

☒ URGENT

☒ FOR REVIEW

☐ PLEASE COMMENT

☒ PLEASE REPLY

☐ PLEASE RECYCLE

NOTES/COMMENTS:

Some additional information for you. I should be in the office all week between 8 & 12 and 1 & 5. Call me w/any questions/concerns.

(605) 718-8825 OFFICE

(605) 430-7400 CELL

- Ian Patterson

Ian-advancedeng@rushmore.com

EDGEMONT CITY WELL # 2

EDGEMONT, S.D.

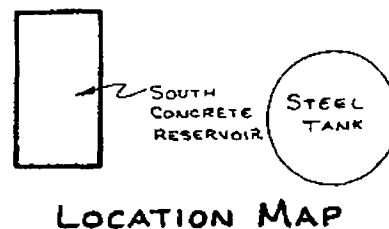
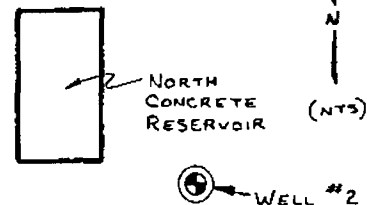
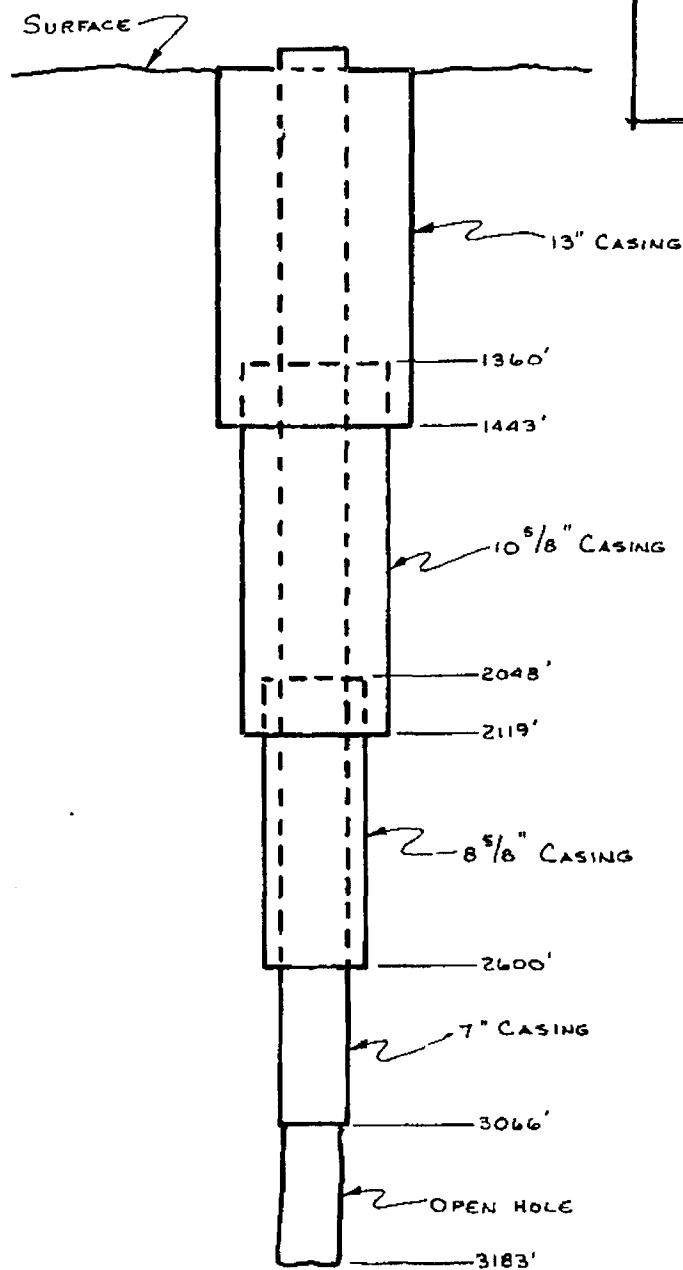
DRILLED: MAY-OCTOBER 1936

INITIAL FLOW: UNKNOWN

FLOW WHEN CLEANED IN 1958: 240 gpm

FLOW DECEMBER 1990: ± 150 gpm

SKETCH PREPARED FROM BEST INFORMATION AVAILABLE
FROM FILE





(C O P Y)

(C O P Y)

LOG OF EDGE MONT DEEP WATER WELL

H. 2. 340. H. 6.

Drilled by Contractor, Ernest Hall

Started May 12, 1936 and completed October 23, 1936.

	0 Ft.	to	28 Ft.	Total
Sand, gravel and boulders			28	28
Dark Shale	28		117	89
Gray and buff color shale	117		285	168
Dark Shale	285		475	190
Gray Sand (300 ft. of water)	475		485	10
Gray Shale	485		530	45
Gray Sand (carrying water)	530		542	12
Sandy Shale	542		580	38
Blue Shale	580		590	10
Gray Shale	590		600	10
Gray Sand (carrying water)	600		609	9
White Shale	609		618	9
Pink Shale	618		640	22
Gray sandy Shale	640		740	100
Sand	740		743	3
Gray sandy Shale	743		760	17
Sand (carrying water)	760		765	5
Gray sandy Shale	765		840	75
Hard gray Lime	840		850	10
Blue Shale	850		855	5
Black Shale	855		880	25
White sticky Shale	880		895	15
White sticky Shale	895		933	38
Hard Lime	933		935	2
White Shale	935		945	10
Red Rock	945		958	13
Lime	958		968	10
Black Shale	968		978	10
Red Shale	978		980	2
Gray Shale	980		1037	57
Pink and White Shale	1037		1040	3
Blue Shale	1040		1044	4
Dark Shale	1044		1060	16
Blue Shale	1060		1127	67
Lime	1127		1130	3
Gray Shale	1130		1149	19
Blue Shale	1149		1152	3
Red Rock	1152		1175	23
Gray Shale	1175		1192	17
Red Rock	1192		1223	31
Pink Shale	1223		1235	12
Blue Shale	1235		1240	5
Gray sandy Shale	1240		1270	30
Sand	1270		1272	2
Blue Shale	1272		1375	103
Sand (soft) (carrying water)	1375		1400	25
Hard Sand	1400		1417	17
Red Rock	1417		1792	375
Hard Gray Lime	1792		1820	28
Lavender colored Shale	1820		1865	45
Red Rock	1865		1895	30
Hard sandy Lime	1895		1965	70
Red Lime	1965		1992	27
Red water Sand (filled hole full)	1992		1995	3
Hard Red Lime	1995		2050	55
Hard Gray Lime	2050		2090	40
Red Sand	2090		2112	22
	2112		2232	120

EDGEHOMT DEEP WATER WELL (cont'd.)

(C O P Y)

Gray Sand	2355	2358	3
Red Shale	2358	2400	42
Red Lime	2400	2415	15
Red Shale and shells	2415	2440	25
Red Shale	2440	2465	25
Lime Shell	2465	2468	3
Sand	2468	2495	27
Blue Shale	2495	2500	5
Lime	2500	2505	5
Red Rock	2505	2512	7
Gray Sand	2512	2522	10
Dark Sand (carrying sulphur water)	2522	2540	18
Black Lime	2540	2600	60
Gray Lime	2600	2650	50
Water Sand (hole full)	2650	2660	10
Gray Lime	2660	2690	30
Gray Water Sand	2690	2700	10
Gray Lime	2700	2720	20
Blue Shale	2720	2755	35
Gray Lime	2755	2755	10
Red Rock	2755	2775	20
Gray Lime	2775	2780	5
Red Rock	2780	2795	15
Gray Lime	2795	2800	5
Red Rock	2800	2855	55
Lime	2855	2860	5
Red Rock	2860	2885	25
Dark Red Lime	2885	2890	5
Red Rock	2890	3003	113
Lime	3003	3005	2
Red Rock and Shells	3005	3040	35
Sandy Red Rock	3040	3056	16
Red Lime	3056	3062	6
Red Sand	3062	3075	13
Dark Red Lime (show of water)	3075	3089	14
Dark Red and Gray Lime	3089	3152	63
Red Sand (water started flowing)	3152	3158	6
Red Sand	3158	3165	7
Gray Lime	3165	3183	18

Well is cased with the following pipe:

13" O.D. to 1443' cemented with 40 sacks

10 5/8" O.D. to 2119' unscrewed at 1360'

8 5/8" O.D. to 2600' unscrewed at 2046', cemented with 55 sacks

7" O.D. to 3066' cemented with 275 sacks

SHOT OFF - PRESSURE - 37"

No screen

CASED at 3066 - ann. l. of 3140

ASK THE MAN



FROM LAYNE **LAYNE-MINNESOTA CO.**

3147 CALIFORNIA ST. N. E. • MINNEAPOLIS 18, MINN. • STERLING 1-9553
AFFILIATES • LAYNE & BOWLER, INC. • GENERAL FILTER COMPANY

April 30, 1958

City of Edgemont
Edgemont,
South Dakota

Gentlemen:

We have your letter requesting information regarding our findings during the cleaning of your well. Our driller also requested me to give you this report. I regret the delay in giving you the desired information.

In the cleaning of your well we found the following:

0-600' Cutting black cuttings, heavy incrustation, hard drilling
600-900' Heavy cutting - not as hard as above.
At 900' bad spot - heavy cutting and hard
900-1900' Incrustation spotty - cutting easier than above.
1900-2900' Very light incrustation - spotty cutting.
2900-3066' Heavier incrustation and harder cutting than above -
Heavy incrustation at bottom end of casing.
3066-3100' Heavy cutting - black with red sand - water red
3100-3183' Red sand cutting.

Cuttings flowed from the hole as cut loose. Bottom of hole was clean.

The artesian flow of the well was as follows:

Before cleaning 160 gpm
After Cleaning Casing 231 gpm
After Cleaning Casing and Open Hole 240 gpm.

It would appear that the points of heavy incrustation are as follows:

1. The point at which the water enters the casing. There would be a cooling effect at this point causing some deposition of mineral from the water.

WATER WELLS • PUMPS • WATER TREATMENT



WORLD'S LARGEST WATER DEVELOPERS

LAYNE-MINNESOTA CO.

PAGE NO. 2

City of Edgemont

April 30, 1958

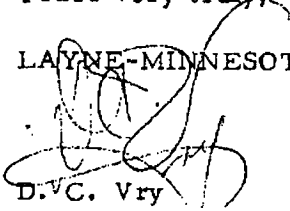
2. The incrustation becomes progressively greater as the water progresses up the casing. Probably as the water progresses up the casing it is cooled slightly. As this cooling takes place a certain amount of the mineral content of the water deposits out on the casing.

It would appear that the face of the formation was relatively clean. The loss in artesian flow from the well was due, in all probability to the friction loss in the pipe, or in other words due to the pressure required to force the water up through the incrustated casing. By cleaning the casing and removing this incrustation we reduced the friction loss and as a result more water could flow from the formation at the same artesian pressure.

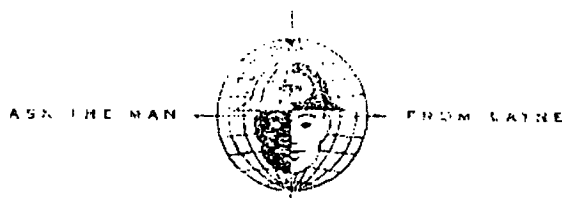
We hope this is the information you desire. If we can furnish additional information, please feel free to call on us.

Yours very truly,

LAYNE-MINNESOTA CO.


D.V.C. Vry
Chief Engineer

DCV:dj



EDGEMONT CITY WELL #4

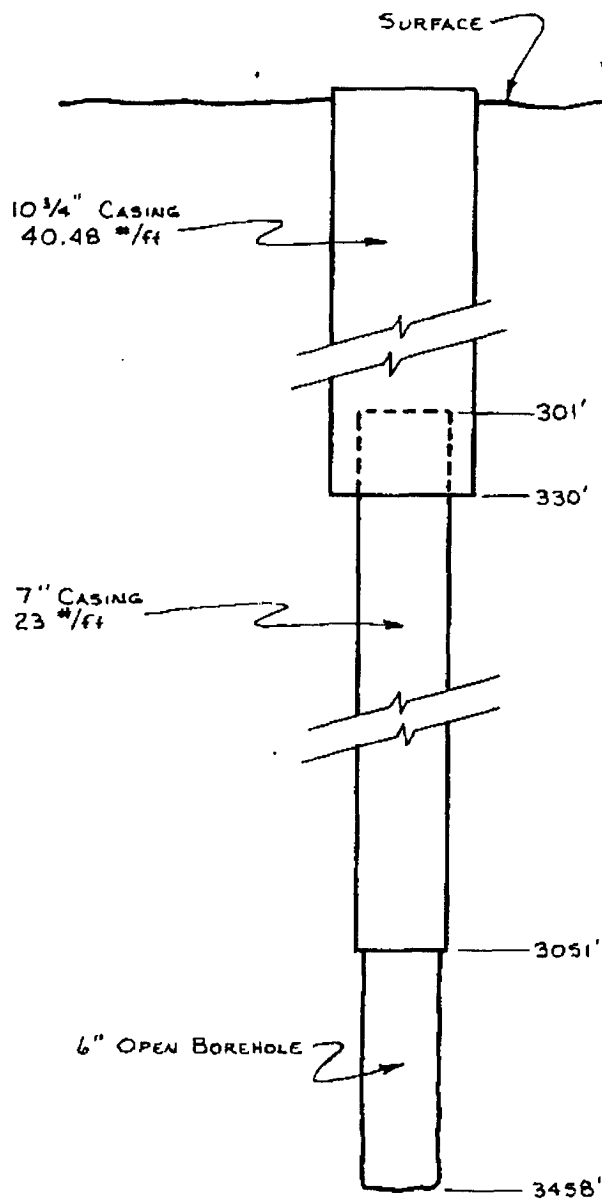
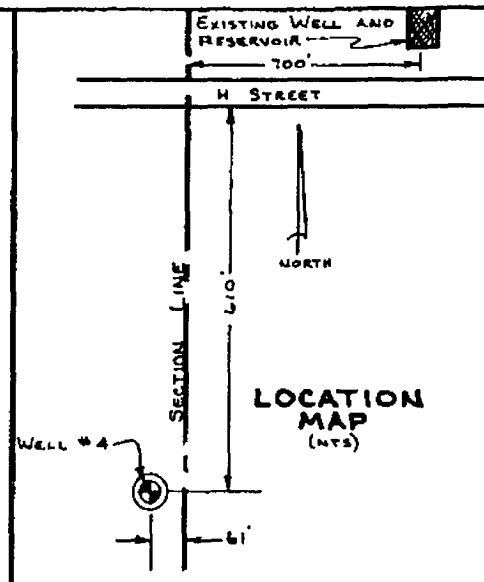
EDGEMONT, S.D.

DRILLED: JUNE 1962

INITIAL FLOW: 275 gpm

FLOW DECEMBER 1990: ± 150 gpm

SKETCH PREPARED FROM BEST INFORMATION AVAILABLE
FROM FILE.





CONSTRUCTION REPORT
EDGEMONT CITY WELL NO. 4
EDGEMONT, SOUTH DAKOTA

THE EDGEMONT CITY WELL NO. 4 WAS CONSTRUCTED BY HUBBARD DRILLING COMPANY OF LANDER, WYOMING, IN 1962. THE WELL LOCATION IS APPROXIMATELY 670 FEET SOUTH AND 61 FEET WEST OF THE EAST 1/4 CORNER OF S2, T9S, R2E, BHM, AND IS IN THE NE1/4 SE1/4 OF SAID SECTION 2.

THE WELL WAS STARTED ON THE 6th OF JUNE AND COMPLETED ON THE 26th OF JUNE. AS SHOWN ON THE ATTACHED "AS CONSTRUCTED" DRAWING, THE TOTAL DEPTH IS 3,458 FEET WITH A SIX-INCH OPEN BORE HOLE IN THE PAHASAPA LIMESTONE FROM 3,051 TO 3,458.

A 15-INCH HOLE WAS DRILLED TO 335 FEET AND A 10 $\frac{1}{2}$ -INCH, 40.48-POUND CASING WAS SET AND CEMENTED TO A DEPTH OF 330 FEET. THE CONTRACT CALLED FOR A 13 $\frac{1}{2}$ -INCH HOLE FOR THIS PART OF THE WELL BUT THE CONTRACTOR PREFERRED TO DRILL A 15-INCH HOLE FOR THE SAME PRICE. TWO HUNDRED AND FIFTY 94-POUND BAGS OF PORTLAND CEMENT WERE USED IN CEMENTING THIS SURFACE. THE CEMENT GROUT WAS PUMPED DOWN THE CASING AND RETURNED TO THE SURFACE BETWEEN THE CASING AND WALLS OF THE DRILL HOLE. A GOOD RETURN TO THE SURFACE WAS EVIDENT AND SAMPLES WERE TAKEN OF THE "RETURN." ONE OF THE SAMPLES IS ENCLOSED WITH THIS REPORT. TWO HUNDRED SACKS OF OLD CEMENT THAT THE CONTRACTOR HAD ON HAND WERE REJECTED AS UNFIT AND THE CONTRACTOR PURCHASED 250 SACKS OF NEW CEMENT FOR THE CEMENT JOB.

AFTER THE SAMPLES TAKEN FROM THE RETURN CEMENT HAD HARDENED, THE CONTRACTOR WAS ALLOWED TO RESUME DRILLING WITH A 9-5/8" BIT. THE 9-5/8" HOLE WAS DRILLED TO 3,050 REACHING THAT DEPTH ON THE 22ND OF JUNE.

SCHLUMBERGER WELL SURVEYING CORPORATION FROM NEWCASTLE, WYOMING, RAN A LATEROLOG AND A SONIC LOG TO 3,050 ON THE MORNING OF 23 JUNE. THEIR CREW FOREMAN WAS MR. CLAUDE CULVER. THE ORIGINAL REPRODUCIBLE NEGATIVES OF THESE LOGS ARE ON PERMANENT FILE IN THE GEOLOGICAL DEPARTMENT AT THE SOUTH DAKOTA SCHOOL OF MINES. PRINTS OF THE LOGS ARE INCLUDED WITH THIS REPORT. THE LOGS INDICATED THAT THE HOLE WAS INTO THE TOP OF THE PAHASAPA LIMESTONE AND THAT THE FORMATION AT 3,050 WAS SOLID AND WOULD BE A SUITABLE LEVEL TO CASE AND CEMENT TO.

BECAUSE THE DRILLER HAD LOST CIRCULATION AT ABOUT 2,100 AND AT ABOUT 3,000 IT WAS THOUGHT ADVISABLE TO SET CEMENT BASKETS AT ABOUT 2,900 AND AT ABOUT 1,900 AND TO USE A LIGHTER GROUT FOR CEMENTING. BOTH OF THESE PRECAUTIONS WOULD REDUCE THE POSSIBILITY OF LOSING THE CEMENT GROUT INTO THE FORMATION. THE BASKETS WERE SET ON CASING COLLARS AT ACTUAL DEPTHS OF 2,912 AND 1,862. ALSO, TWENTY CENTRALIZERS WERE INSTALLED ON THE 7-INCH O.D. 23-POUND CASING AT APPROXIMATELY 150 FEET APART.

THE CEMENTING MIXTURE USED CONSISTED OF 50 PER CENT POZOMIX AND 50 PER CENT PORTLAND CEMENT WITH 6 PER CENT BENTONITE ADDED AND A

QUARTER OF A POUND OF CELLULOSE FLAKES PER BAG. THE WEIGHT OF THIS MIXTURE WAS 12.5 POUNDS PER GALLON COMPARED TO 15.2 POUNDS PER GALLON FOR STRAIGHT PORTLAND CEMENT GROUT. THE THEORETICAL VOLUME OF THE ANNULAR SPACE TO BE CEMENTED WAS CALCULATED AT 703 CUBIC FEET. THE ACTUAL AMOUNT OF SLURRY USED WAS 880 CUBIC FEET OF THE ABOVE DESCRIBED MIXTURE PLUS 59 CUBIC FEET OF STRAIGHT PORTLAND CEMENT SLURRY THAT WAS PUMPED IN LAST TO PROVIDE A HARDER CEMENT AT THE BASE OF THE CASING. THIS TOTAL VOLUME OF 939 CUBIC FEET WOULD PROVIDE A 34 PER CENT SAFETY FACTOR.

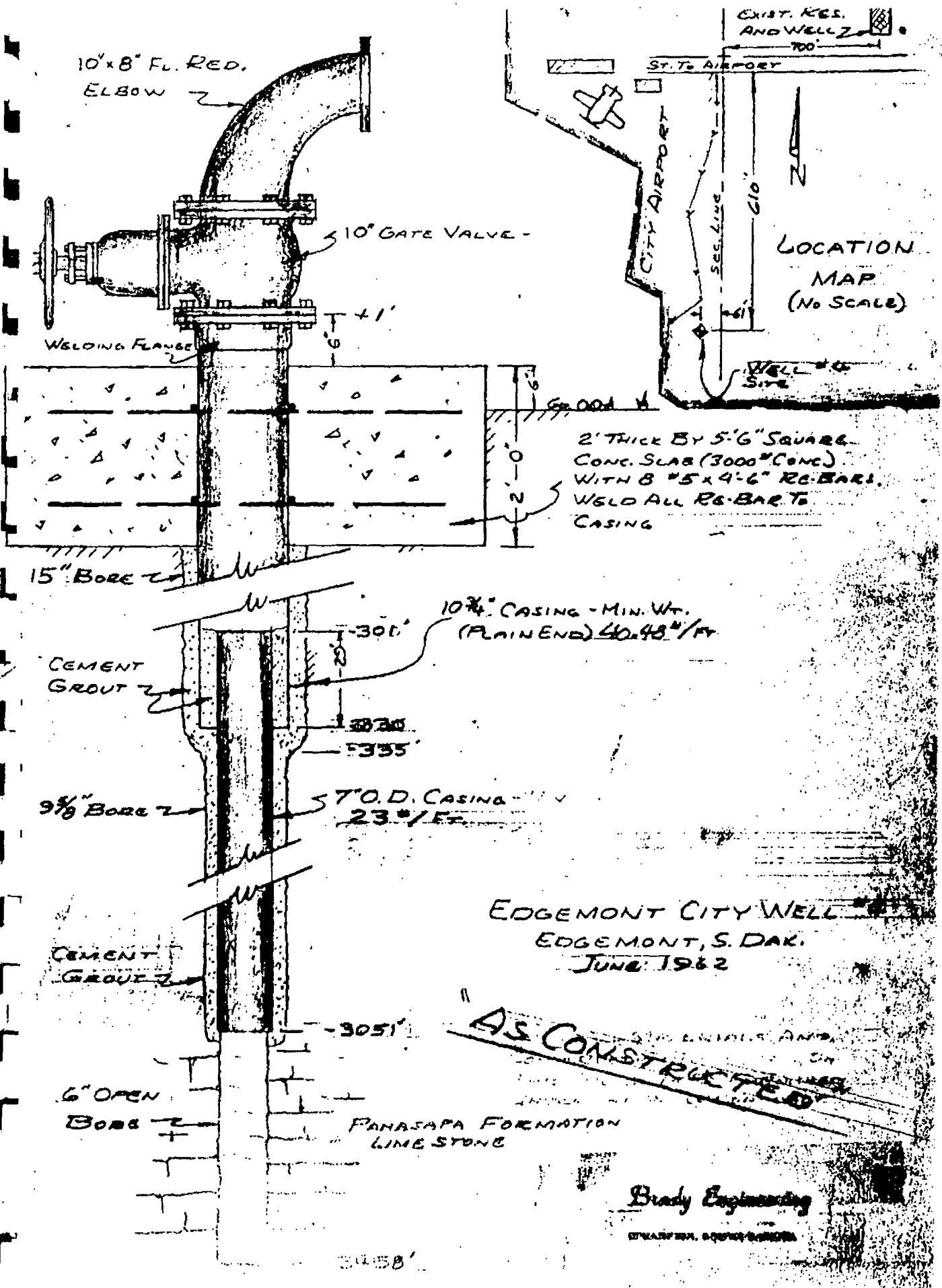
THE 7-INCH O.D. CASING WITH THE CENTRALIZERS AND CEMENT BASKETS WAS RUN IN WITH NO DIFFICULTY TO 3,050 FEET. A FLOAT SHOE WAS INSTALLED ON THE BOTTOM OF THE CASING AND A FLOAT COLLAR ONE CASING LENGTH (33.83 FEET) ABOVE. THE CASING WAS LOWERED ON DRILL PIPE WITH A BACK OFF COLLAR AT 301 FEET.

BEFORE PUMPING IN THE CEMENT MIXTURE THE DRILLING MUD WAS CIRCULATED UP AROUND THE CASING TO INSURE THAT THE HOLE WAS OPEN. HALLIBURTON OF NEWCASTLE MIXED AND PUMPED IN THE CEMENT MIXTURE COMPLETING THE JOB AT 4:30 A.M. ON 24 JUNE. THERE WAS NOT A DEFINITE RETURN OF CEMENT TO THE SURFACE SO A TEMPERATURE SURVEY WAS RUN BY SCHLUMBERGER WELL SURVEYING CORPORATION TO DETERMINE THE LOCATION OF THE TOP OF THE CEMENT. THE LOG WAS RUN AT 4:00 P.M. ON THE 24th OF JUNE. A COPY OF THE TEMPERATURE LOG IS ENCLOSED.

THERE WAS A DIFFERENCE OF OPINION AS TO THE INTERPRETATION OF THE TEMPERATURE SURVEY; MR. CAMPER OF SCHLUMBERGER ESTIMATED THE TOP OF THE CEMENT AT 1,000 FEET BUT HALLIBURTON'S FIELD ENGINEER READ IT AT 300, WHICH WOULD BE AT THE TOP OF THE 7-INCH CASING WHERE IT SHOULD BE. TO CHECK THE SEAL BETWEEN THE 7-INCH CASING AND THE 10-INCH CASING, THE CONTRACTOR SEALED THE TOP OF THE 10-INCH CASING AND APPLIED PRESSURE TO THE INSIDE OF THE CASING TO OVER 500 POUNDS PER SQUARE INCH WITH NO LOSS IN PRESSURE. THIS WAS ACCEPTED AS AN ADEQUATE CHECK OF THE SEAL BETWEEN THE TWO CASINGS.

AFTER THE CEMENT HAD SET, THE CONTRACTOR CONTINUED DRILLING INTO THE PAHASAPA WITH A 6-INCH BIT TO A FINAL DEPTH OF 3,458 FEET. THE WELL STARTED FLOWING AND THE FLOW WAS MEASURED AT APPROXIMATELY 225 GPM. ON THE 11th OF OCTOBER, 1962, AFTER THE TRANSMISSION LINE TO THE RESERVOIR WAS COMPLETED, THE FLOW INTO THE RESERVOIR WAS MORE ACCURATELY MEASURED AT 275 GPM.

DRILLING SAMPLES WERE TAKEN THROUGHOUT CONSTRUCTION OF THE WELL AND ARE ON PERMANENT FILE IN THE GEOLOGICAL DEPARTMENT OF THE SCHOOL OF MINES AT RAPID CITY. A GENERAL GEOLOGIST LOG OF THE FORMATIONS BASED ON THE DRILLING SAMPLES IS INCLUDED WITH THIS REPORT.



RAILROAD WELL - EDGE MONT, S.D.

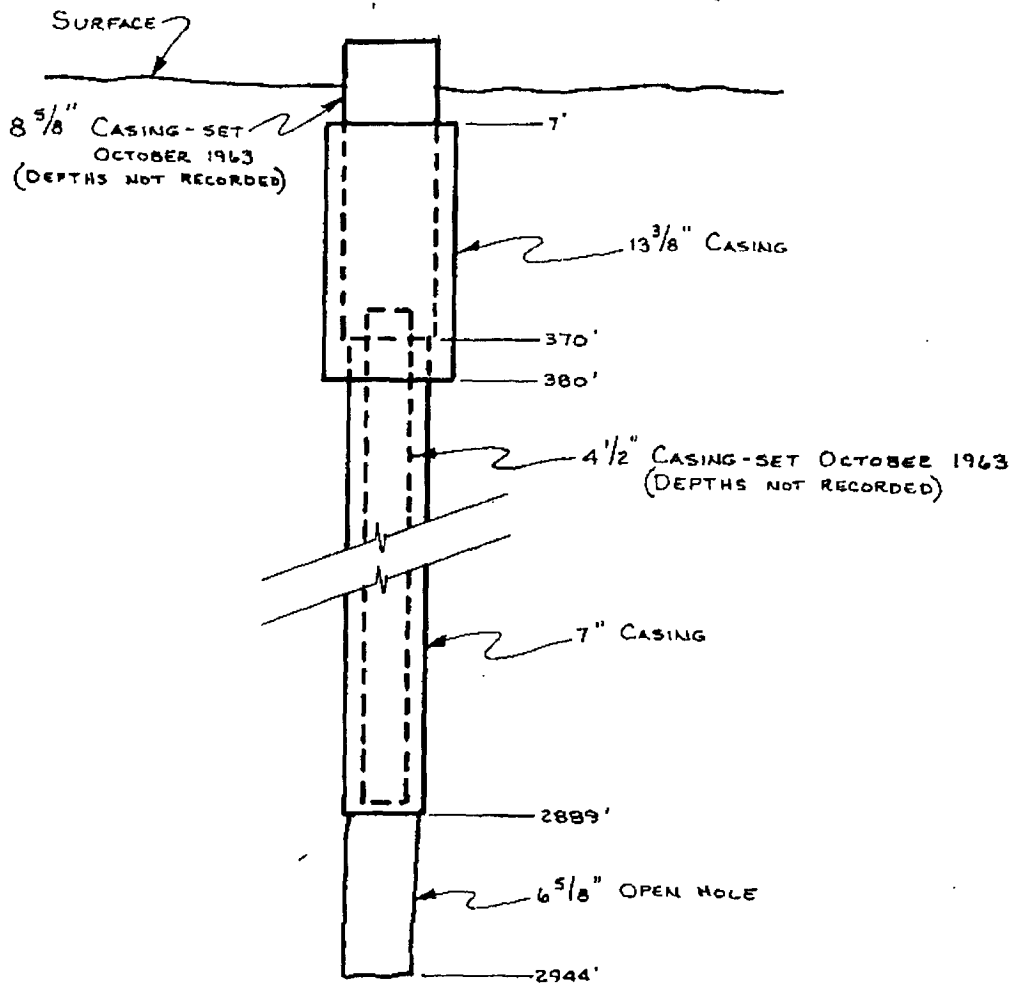
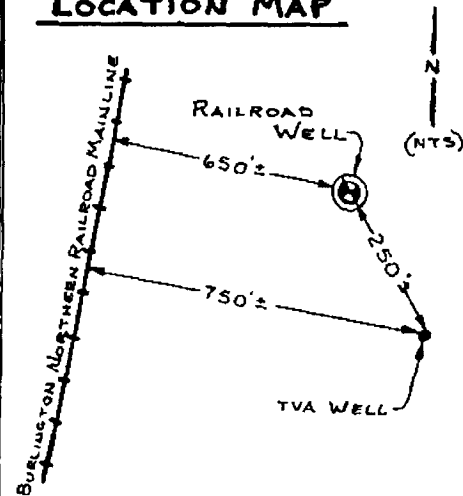
DRILLED: JANUARY - FEBRUARY 1946

INITIAL FLOW: 1000 gpm

FLOW JANUARY 1991: ± 250 gpm

SKETCH PREPARED FROM BEST INFORMATION AVAILABLE
FROM FILE.

LOCATION MAP





WOODWARD CLYDE-SHERARD AND ASSOCIATES

CONSULTING SOIL ENGINEERS AND GEOLOGISTS

1401 WEST PASADENA AVENUE
DENVER 23, COLORADO

ENGINEERING GEOLOGIC REPORT
C. B. & Q. RAILROAD WATER WELL NO. 2
EDGEMONT, SOUTH DAKOTA

RECEIVED

MINES DEVELOPMENT CO., INC.
EDGEMONT, SOUTH DAKOTA

NOV 17 1961

Route to:
Office
Supt.
D. H.
Denver OTHER.....

Prepared for

Susquehanna-Western Inc.,
Attn: Mr. Robert Dean,
777 Grant Street,
Denver, Colorado.

Job No. 5208.

November 15th, 1961.

SCOPE

In August of 1961, the C. E. & Q. Railroad water supply well at Edgemont, South Dakota, developed an artesian flow on the outside of the casing at the surface of the ground. Concurrently, the flow through the casing diminished considerably. Since this water supply is the main source of mill water for the Mines Development Inc. mill, and the owners, the Susquehanna-Western Inc., are considering the outright purchase of the well, they are anxious to know the cause of this particular well failure. They also desire to know if and how the well can be repaired, should it be repaired, and what might the cost be. The undersigned was authorized by Mr. Robert Dean, of Susquehanna-Western, to examine the well and all available engineering data, and to prepare a report covering the above questions as far as possible. The following paragraphs constitute that report.

BASIC DATA

The C. E. & Q. water well No. 2 is located in the NE/4 of Section 1, Township 9 South, Range 2 East, in Edgemont, South Dakota. It was completed in February, 1946, flowing approximately 1,000 gpm, and had an initial shut-in pressure of 110 psi. At present, the well flows approximately 240 gpm through the casing, and 70 to 80 gpm at the surface outside of the casing. The outside flow has created a crater outside of the concrete well base, approximately 8 feet deep, and of 10 to 12 feet width. It is possible that the leak may exceed 70-80 gpm, but that part of it is not reaching the surface but is going out into the gravel above 89 feet.

A sketch of the present condition of the well is attached. This sketch was developed from some of the original drilling data, plus discussions with M.D.I. and C. E. & Q. people who have made investigations of the well.

The pertinent points brought out by the recent railroad investigations, and by the undersigned, are discussed below.

- (1) The top 45 feet of the well is 7" steel casing extending down inside of 13-3/8" casing to a depth of 45 feet. The top of the 13-3/8" casing is approximately 7 feet below the ground surface, and is embedded a few inches (assumed) in the base of a large concrete block which extends to the surface of the ground. The 7" casing extends from inside the 13-3/8" casing upward through the concrete block and about 2 feet above the top of the concrete block, where a discharge valve is connected.
- (2) The railroad dewatered the crater around the well to a depth of 9 feet and observed that there was no leak at the base of the concrete block, but that the water was coming up through the gravel layers from below.
- (3) The Schlumberger Well Surveying Corporation was engaged to make a caliper log, a spontaneous potential log, and a collar location survey, in order to try to locate the point of leakage. By means of their report letter, and in conversations with the railroad people, the Schlumberger engineers submitted the following facts and opinions:
 - (a) The casing is badly encrusted, particularly near the top of the 7" casing.
 - (b) The top two joints of 7" casing are probably badly eroded.
 - (c) The cement sheath behind the 13-3/8" casing has been damaged, probably due to water knock.
 - (d) The leakage is believed to be through corroded holes in the top two joints of 7" casing, and the remedial work could be best done by setting a packer below these two joints. (They believe

the leakage is between 375 and 410 feet below ground level.)

(e) Because of encrustation build-up, the Schlumberger crew was unable to run their 2-7/8" diameter logging probe or caliper deeper than about 525 feet below ground level, so no spontaneous potential or caliper measurements were made below that depth. A 1 1/2" diameter magnetic collar locator passed easily down the casing to a depth of 2839 (ground level), but found the remaining, uncased, portion of the hole (2839-2944) apparently filled with rock debris or pipe scale.

- (4) A study of the drilling history of the well shows that when the 13-3/8" casing was cemented, the seal was pressure tested and found to be tight. However, the cementing of the 7" casing ran into difficulties and had to be done in four stages, using a large amount of cement (over 1,000 sacks). From the cementing records, it is apparent that the quality of the cement seal from about 950 feet depth up to the top of the 7" casing is very questionable.
- (5) Geologically speaking, the well is producing from the top of the Madison limestone formation. Above the Madison formation, but assumed to be sealed off, are water-bearing sands at 2500-2600 (3rd Leo Sand); 1859-1889 (Converse Sand); 839-1219 (Sundance Sand); 684-579 (Lakota Sand); and 239-459 (Dakota Sand). Shallow river gravel exists from the surface to 39 feet depth.
- (6) A quick check of the water from inside the well casing and from the leak outside the well show a moderate difference in pH value and a 4-grain (63 ppm) difference in hardness.
- (7) Costs of repairing the well, submitted by the Layne-Minnesota Company, and by Olds and Wrather, of Casper, Wyoming, range from \$15,936.00 to \$47,550.00, depending on the methods and materials used. No guarantee is given by any contractor that the repair

would be successful, or even that the well would not be damaged beyond repair while being worked on.

- (9) The cost of drilling an entirely new well would, in our opinion, be less than \$40,000.00.

CONCLUSIONS

Based on the above information, we have reached the following conclusions:

- (1) The actual point at which the casing is leaking is not known. It could be anywhere from 10 feet below the ground surface to the bottom of the well. However, because the well history shows that there was no problem in cementing the 13-3/8" casing from bottom to top, and it was carefully pressure tested, it is our opinion that the leak is below the bottom of the 13-3/8" (380 GL). (If a leak exists in the 13-3/8" casing, it would most likely exist at or above 39 feet where the gravel lies on the bedrock.) We also believe the cement seal on the 7" casing was satisfactory up to at least 950 feet. In addition, a leak between 339 and 950 feet would have to bring Sundance formation water with it since it would originate opposite this formation. The Sundance water is very salty (7,000 ppm) and, if present, should be noticeable in the leakage water. Since it does not show up, it can be assumed that the leak is above 339. A leak above 339 would have to pass through the Lakota and Dakota formations, but mixing with water from these formations would be difficult to detect. The moderate differences between the two waters described above could be due to this mixing underground.

From the above, we are of the opinion that the leak is most likely between 380 and 339 and, as a second choice, between 10 feet and 39 feet. We do not believe the Senlumberger survey conclusions can be given much weight since the survey did not go below 525 feet. If it had, there could have been any number of similar log indications of possible points of leakage at greater depths.

- (2) The well is now 16 years old, and in our opinion there has been much corrosion and deterioration, especially where the casing has not been protected by a sound cement sheath. There are probably many small holes in the casing, rather than a single leak. We believe most of these holes will be above 950 but some could also exist deeper than this.
- (3) The most proper method, in our opinion, to stop all casing leaks and repair the well so that it will have a long life is to install a new casing (5" O.D. maximum) to the full cased depth of the well (2389) and pump a new concrete sheath around the outside of the new casing from bottom to top. Anything less than this could allow a recurrence of the present situation. Judging by the difficulties of the original cement job, it could still be difficult to properly

cement this well in repairing it.

- (4) The six essential steps in the above type of repair would be:
- (a) Move in and set up.
 - (b) Ream entire hole to 2889 to original inside diameter of the 7" casing.
 - (c) Set drillable plug at approximately 2385 to temporarily shut off flow from producing formation.
 - (d) Run approximately 2385 feet of 5" O.D. casing.
 - (e) Pump cement down 5" casing and up around outside until it surfaces. Part of this cement should go out into the formation at the point of the leak. It is even possible that a great deal of cement could go out into the formation this way. There is no way of knowing beforehand what will happen during this step. It is even possible that one might repair the leak of Madison water from the casing, but still have a leak to the surface from the upper aquifers such as the Dakota and Lakota sands along the now established path of water movement.
 - (f) Drill out plug and clean hole to original bottom.
- (5) The above steps are essentially those outlined by the Layne-Minnesota Company in their proposal:

Phase 1, first 3 steps	\$7,056.00
Phase 3, Alt. 2, All 5 steps	\$25,080.00
	<u>\$32,136.00</u>

Or, in the Olds & Wrather proposal:

Alternate 1, with all 4 steps but extending the new casing to 2889 and using more cement	(quoted)	\$28,000.00
1735 ft. additional 5" casing	(estimated)	\$3,250.00
300 extra sacks cement	(estimated)	\$600.00
Additional labor	(estimated)	\$1,900.00
		<u>\$32,550.00</u>

RECOMMENDATIONS

Recognizing the gamble and expense involved in repairing a 16-year-old well, and the possibility of complete failure or ruin of the well, we are of the opinion that firm bids should be obtained on the cost of drilling a new well. If the cost of drilling a new well is within

\$10,000.00 of the cost of repairing the old well, the new well should be drilled and the old well returned to the railroad for repair or plugging and abandoning.

Your legal counsel can advise you on South Dakota laws related to responsibility for plugging and abandoning old wells and as to the requirements for minimum spacing distance if a new well is to be drilled.

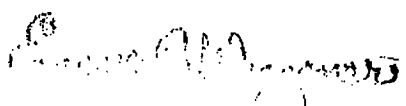
As a standby or stop-gap measure, to use the old well until a new one is drilled or the decision is made to repair the old well, a line shaft turbine pump could be installed and the well pumped continuously. By keeping the pumping level in the well at a depth below 89 feet, the leak from the casing to the surface would be checked. This method would, in our opinion, produce an additional 100 to 150 gpm above the present flowing capacity, but would definitely be a temporary measure. A pump of 500 gpm capacity against 150 feet discharge head should be sufficient.

EEW:v

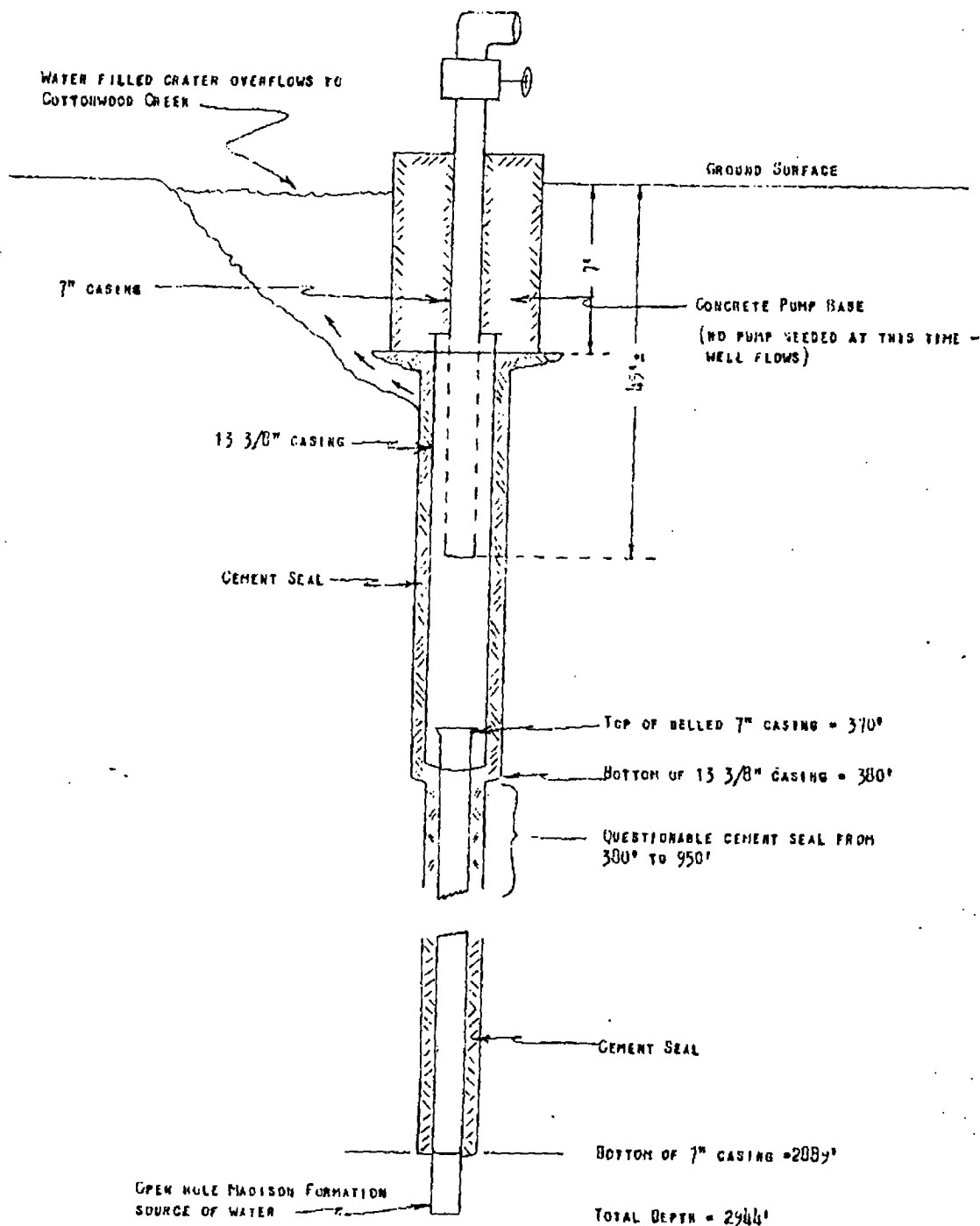
(3 copies sent)

c.c. Mines Development Inc.
Attn: Mr. Harold Webb
Edgemont, South Dakota.

By


E. L. Waggoner



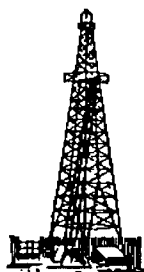


BASED ON DRILLING HISTORY PLUS INFORMATION
FROM RAILROAD COMPANY PERSONNEL.

APPROXIMATE SKETCH OF C. O. & Q. WATER WELL No. 2
EDGEHUNT, SOUTH DAKOTA

BAKER

DRILLING



OSAGE, WYOMING

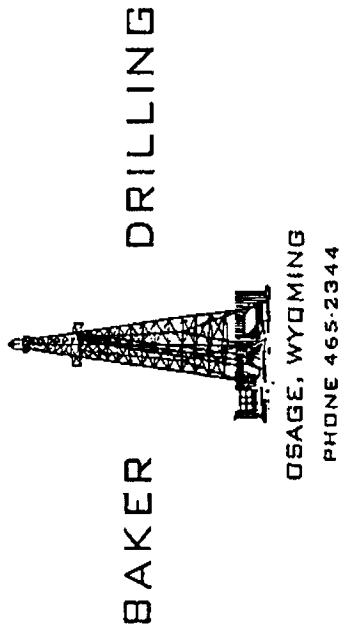
PHONE 465-2344

Oct. 3, 1963

EDGEMONT WATER WELL-C B & Q

(Recasing)

- July 12, 1963-2:30-6:30pm-3 men 1 pickup taking valves off well head and cutting main line.
- July 13-7am-12:00noon 1:30pm-4:30pm-Rigging up over well-1 crew.
- July 14-Sunday-Off.
- July 15-10am-12:30am 1:30-6am-10:00-12:30 picked up kelley bit and scraper scraped 7" joint in top of well picked up 7" packer and set in top joint to see if 7" was loose, it was not. 1:30-2:00-drilling rat hole 2:00-3:00 running in hole with 6 1/8" bit and casing scraper hit top of 7" at 368' KB 3:00-5:30- scraping casing on to 512' encountered no trouble getting in 7"
- July 16-8:30am-11:30-12:30-5:30pm 8:30-9:30 in hole with packer 9:25am-set packer-water shut off 9:30-11:30 cleaning celler and cutting off 13 3/8" pipe ~~xxxxxxx~~ breaking cement off of 7" on top of 13 3/8" pipe in celler 1:35 3:00pm releaded packer out of hole and back in with bit and scraper 3:00-5:00pm scraped from 512' to 812' 5:00-5:30 out of hole shut down.
- July 17-8am-12:00 1:00-5:00pm scraped casing from 812' to 2207'
- July 18-3:00-7:30pm Hauled in small string of drill pipe scraping casing bad place at 2872' hit bottom at 2837' fell through bridge at 2890'-92 bottom again
- July 19-9-12:00 1:00-3:00 9:00-12:00- changed liners and heads in mud pump unloaded casing 1:00-8:00 cleaned scraped casing made round trip to lay down scraper and back to bottom with bit.
- July 20-7:30-12:00 1:00-5:30 7:30-9:00 trying to drill to bottom 9:00-10:00-rigging lay down line 10:00-12:00 laying down drill pipe 1:00-2:30-laying down drill pipe 2:30-5:30 running 4 1/2" long string 1300'
- July 21-8am-3pm-finished running 4 1/2" and 8 5/8" and cemented
- July 22-Setting on cement and standby
- July 23-ran cement log 9:00-12:30 2:00-4:00
- July 24-8am-12:00noon 1:00-4:00 8:00-noon nippling up and putting valve on well head 1:00-4:00 going in hole with 3 7/8" bit swedge is squeezed in at 8 5/8 4 1/2" changeover drill pipe tool joints are too big to pass laid down drill pipe
- July 25-10am-12noon- 1:00-10:00pm Finished picking up small drill pipe drilled cement out of 4 1/2" and part of packer Pressure would build up coming out of hole



Edgemont Water Well-C B & Q (Con't) pg. 2

July 26, 1963-7am-6pm-Out of hole to check bit back to bottom to drill shoe and drilled on to bottom apparently packer gave way on cement job as the bore hole was full of cement to bottom

July 27- Off

July 28- 8Hrs tearing down and moving off location.

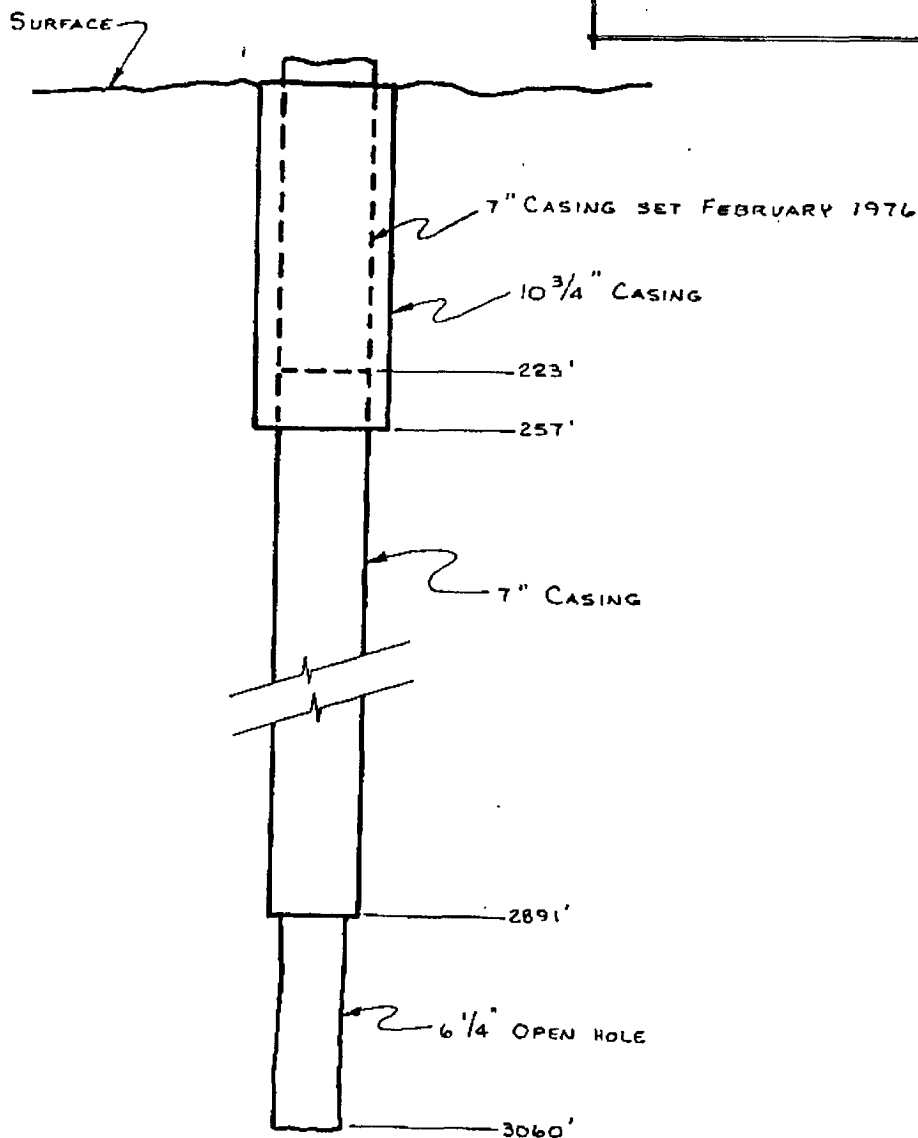
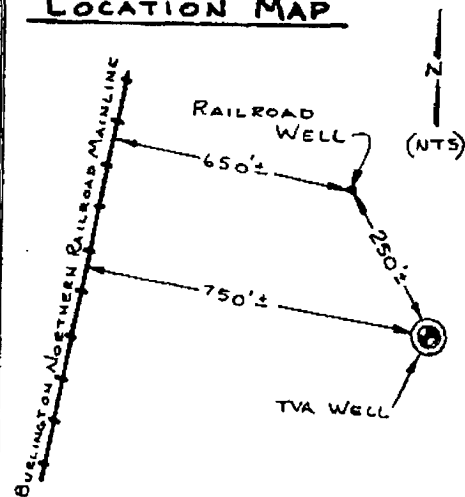
TVA WELL - EDMONT, S.D.

DRILLED: APRIL - MAY 1962

INITIAL FLOW: 450 gpm

SKETCH PREPARED FROM BEST INFORMATION
AVAILABLE FROM FILE.

LOCATION MAP

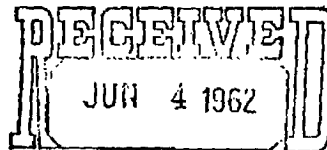




TVA well

WOODWARD-CLYDE-SHERARD AND ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
1605 WEST PASADENA AVENUE
DENVER 25, COLORADO
TELEPHONE 4-1000
CABLE 5-1000

ENGINEERING GEOLOGIC REPORT
MINES DEVELOPMENT INC.
EDGEMONT WATER WELL NO. 1
EDGEMONT, SOUTH DAKOTA



EDGEMONT, SOUTH DAKOTA

Prepared for

Mines Development Inc.
Attn: Mr. Robert Dean
777 Grant Street
Denver, Colorado.

Job No. 5527-5208

May 29th, 1962.

SCOPE

The following report describes a well which was constructed at the Mines Development Inc. mill under our supervision by the E. E. Hubbard Drilling Company, of Lander, Wyoming. In addition to the general description of the well construction, the well completion chart showing the formations penetrated and the well construction is enclosed and Appendix I contains the drilling history. Also, electrical and gamma ray-neutron logs are included.

DATA SUMMARY

Total Depth:	3,060'
Date Drilled:	April-May, 1962.
Casing:	10-3/4" O.D. 32-pounds per ft. 0'-257' 7" O.D. 23-pounds per ft. 223'-2891'
Casing Overlap:	34'
Seal:	10-3/4" O.D. casing cemented from 0'-257'; 7" O.D. casing cemented from 223'-2891'
Open Hole in Madison formation:	2891'-3060'
Producing formation:	Madison limestone
Yield:	Flowing 450 gpm
Shut-In Pressure:	86 psi

DRILLING AND COMPLETION

The first step was to drill a hole for the surface casing and set and cement 257 feet of surface casing. After the cement had set, a blowout preventor was installed on top of the 10-3/4 inch O.D. surface casing for control if flowing water under high pressure should be encountered during drilling. Drilling was then renewed. For the next portion of the well, an 8-3/4 inch diameter hole was drilled to a depth of 2,891 feet, and electric logs and radio-activity logs were run in this hole to assist in evaluation of the formations.

After the logs were run, 7 inch O.D. casing was set in the hole from a depth of 223 to 2891 feet, with an overlap of 34 feet into the 10-3/4 inch casing. The top of this casing was equipped with a left-hand thread for 7 inch O.D. pipe, and with a funnel-like guide leading into the pipe, so that 7 inch O.D. casing can be extended up to the surface if it is ever desired in the future. The annular space between the casing and the hole was sealed with cement from the bottom of the hole upward to the top of the 7 inch O.D. casing, using 300 sacks of neat cement.

When the cement behind the 7 inch casing had set, a 6-1/4 inch diameter hole was drilled into the Madison formation. At first, this hole was drilled to a depth of 3014 feet. The limestone which was penetrated was firm and drilling fluid was lost in the formation at only one point in a zone approximately 8 inches thick at a depth of 2894 feet.

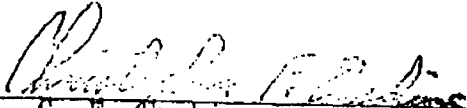
At a depth of 3014 feet, the drilling mud was displaced by clear water, and the well was swabbed in order to develop it and better appraise its water producing capabilities. After this development, the well flowed 190 gpm and had a shut-in pressure of 81 psi. This volume was not adequate for the mill operations, and it was decided to drill the well approximately 50 feet deeper in an attempt to increase the flow.

The well was deepened to a total depth of 3,060 feet, and re-tested. At this depth, it flowed 450 gpm with a shut-in pressure of 86 psi. The volume is more than adequate for the mill operation and the well has been completed at this depth. Because the formation encountered below the 7 inch casing was firm and showed no signs of caving, it was decided to leave the bottom portion of the hole uncased.

CONCLUSION

In our opinion, the Hubbard Drilling Company did a good, conscientious job of constructing the water well, and it should give many years of good service. Because the producing portion of the well is uncased, it will be possible to deepen the well, if this should ever be desired in the future. It has been a pleasure to supervise construction of this well for you, and if we can be of further service, please do not hesitate to call on us.

By

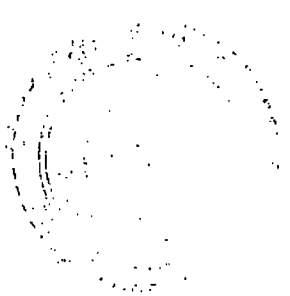

C. F. Erskine

Reviewed by


E. B. Waggoner

CFE:v

(3 copies sent)



APPENDIX IDRILLING HISTORY FOR MINES DEVELOPMENT INC.
EDGEMONT, S.D. WATER WELL NO. 1

April 10th, 1962: Rigging up and preparing to drill.
 April 11th, 1962: Drilling 13-3/4 inch hole for surface casing.
 April 12th, 1962: Set 10-3/4 inch O.D. casing to a depth of 257 feet and cement with 120 sacks of cement. Good cement return at surface.
 April 13th, 1962 - Waiting for cement to set. Install blowout preventor.
 April 14th, 1962: Start drilling at 4 p.m. and drill to 425 feet.
 April 14th, 1962: Drill to 1,025 feet.
 April 15th, 1962: Drill to 1,535 feet.
 April 16th, 1962: Drill to 1,781 feet.
 April 17th, 1962: Drill to 1,978 feet.
 April 18th, 1962: Drill to 2,104 feet.
 April 19th, 1962: Drill to 2,211 feet.
 April 20th, 1962: Drill to 2,306 feet.
 April 21st, 1962: Drill to 2,384 feet.
 April 22nd, 1962: Drill to 2,469 feet.
 April 23rd, 1962: Drill to 2,551 feet.
 April 24th, 1962: Drill to 2,660 feet.
 April 25th, 1962: Drill to 2,725 feet.
 April 26th, 1962: Drill to 2,810 feet.
 April 27th, 1962: Drill to 2,874 feet.
 April 28th, 1962: Drill to 2,891 feet. Condition hole and prepare to run 7 inch O.D. casing.
 April 29th, 1962: Set 2,668 feet of 7 inch O.D. casing and cement. There was no cement return, and, after allowing the cement to set for 12 hours, a temperature survey was run to locate the cement. This survey showed that the cementing pressure had been great enough to break down the formation around the 10-3/4 inch O.D. casing, and that cement had been forced up around this casing to within 58 feet of the ground surface. A cement plug was encountered at a depth of 222 1/2 feet, or 6 inches above the 7 inch O.D. casing, which indicated that the overlap between the 7 inch O.D. and the 10-3/4 inch O.D. casing was cemented. The cement which was forced behind the 10-3/4 inch O.D. casing under high pressure should provide a better than normal cement job for this portion of the well.
 April 30th, 1962:

May 1st, 1962 - Waiting for cement to set.
 May 2nd, 1962: Start drilling 6-1/4 inch diameter hole at approximately 8 p.m.
 May 2nd, 1962: 10:45 a.m. drill to 3,001 feet.
 May 3rd, 1962: 11 a.m. drilled to 3,014 feet, displaced mud and swabbed well. Well flowing 190 gpm. 5:30 p.m. well shut in for four hours, and developed 81 psi shut-in pressure. Well open and flowing
 May 4th, 1962:

APPENDIX I (cont.)

May 5th, 1962: 190 gpm again.
Well deepened to 3,060 feet and swabbed. Flowing
450 gpm.

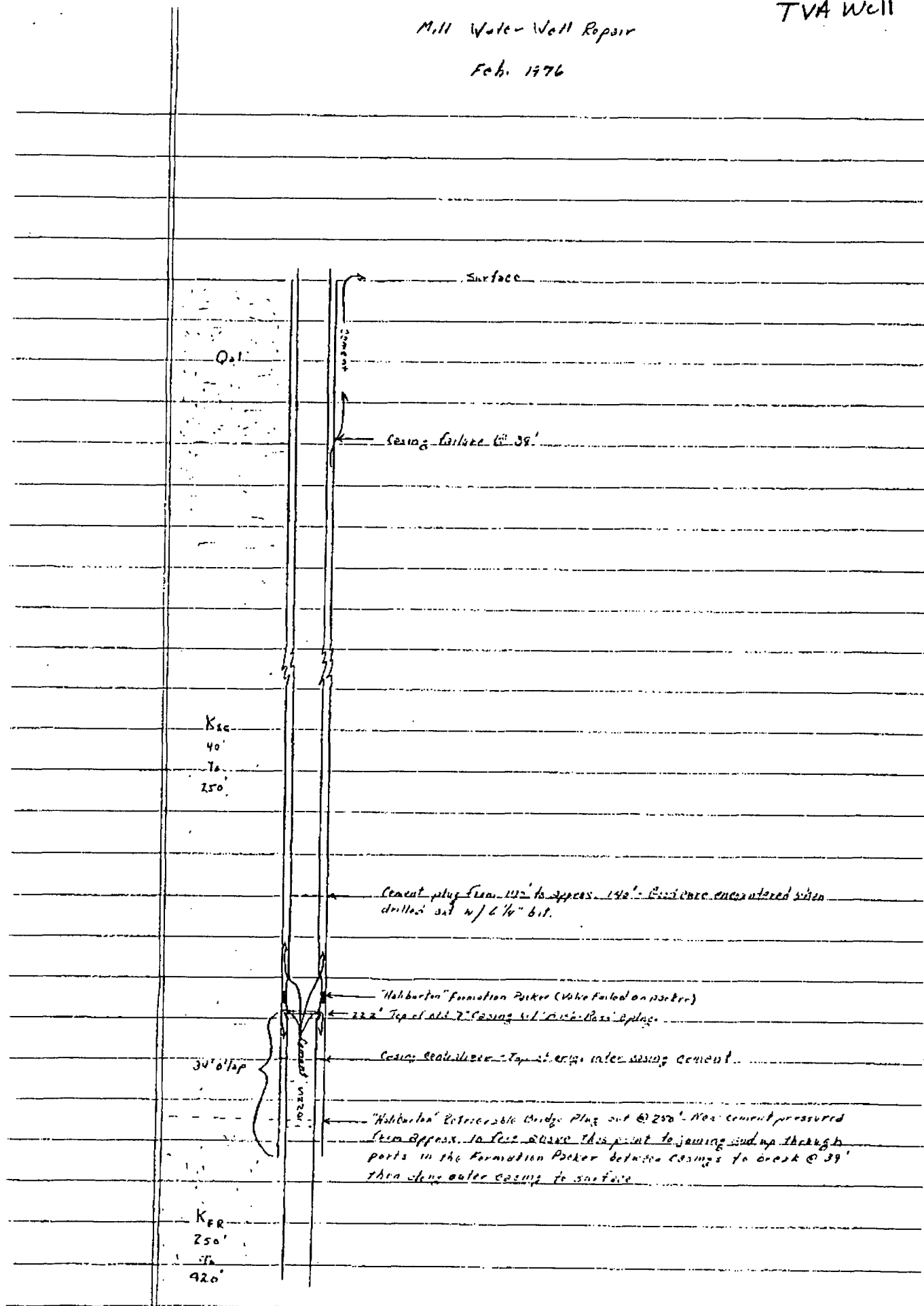
May 6th, 1962: Well shut in for four hours and developed 86 psi
shut-in pressure. Again flowed 450 gpm when re-
opened.

Well completed.

Mill Water Well Repair

Feb. 1976

TVA Well



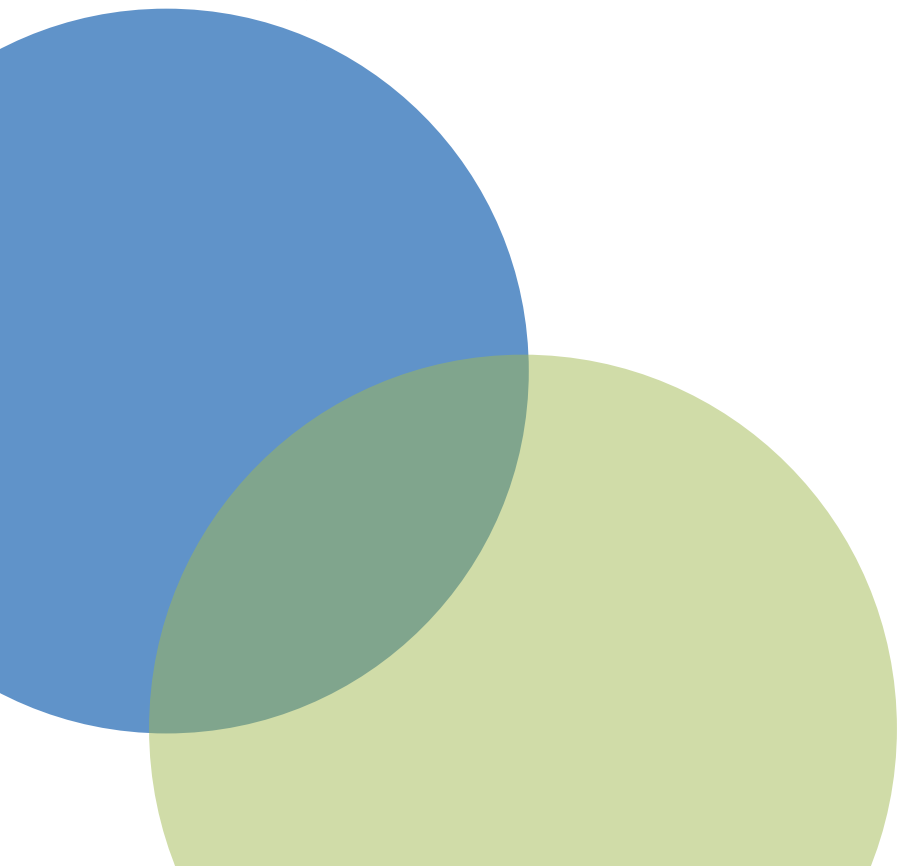
DOCUMENTATION OF
IRRIGATION DIVERSION POINT ABANDONMENT
FOR CITY OF RAPID CITY
PROJECT NO. 12-2034, CIP NO. 50922

Topical Report RSI-2317

prepared for

City of Rapid City
Public Works Department
Water Division
300 6th Street
Rapid City, SD 57701

January 2016



DOCUMENTATION OF
IRRIGATION DIVERSION POINT ABANDONMENT
FOR CITY OF RAPID CITY
PROJECT NO. 12-2034, CIP NO. 50922

Topical Report RSI-2317

by

Peter P. Rausch
Curtis D. Anderson
Adam J. Rutz
Jared K. Oswald

RESPEC
3824 Jet Drive
Rapid City, South Dakota 57703

prepared for

City of Rapid City
Public Works Department
Water Division
300 6th Street
Rapid City, SD 57701

January 2016

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1.0 BACKGROUND

The City of Rapid City has obtained the water permits from several irrigators served by Rapid Creek in the Rapid Valley area. According to the South Dakota Department of Environment and Natural Resources (SD DENR) Water Rights Division, the holder of a transferred permit shall permanently render inoperable the structural means of diverting water to land that is no longer subject to the water permit. The City of Rapid City has record of transfers and has now completed abandonment of the aforementioned diversion structures. The abandonment of the structures was performed by the City of Rapid City and reviewed by SD DENR personnel. This report documents the permits transferred, the diversion points associated with those permits, and the abandonment of those diversion points.

2.0 DATA SOURCES

Six sources were used to identify the diversion structures (turnouts) to be disabled. The first is the South Dakota Water Rights Program online permit database that is operated by the SD DENR [2012]. This database includes water rights documentation for each of the Rapid Valley irrigation ditches, identifies all permit transfers, and has documentation for individual water rights permits.

The second source is the Rapid Valley Water Management Study, which was completed in 1990 by the U.S. Bureau of Reclamation for ditches that have storage in Deerfield Reservoir, including the South Side, Cyclone, Little Giant, and Hawthorne irrigation ditches [U.S. Bureau of Reclamation, 1990]. The Murphy Ditch was excluded from the Rapid Valley Water Management Study because its water right is for natural Rapid Creek flows and, therefore, contractually has no storage in Deerfield Reservoir managed by the Bureau of Reclamation. The documentation from the study includes photographs of irrigation turnouts; associated notes; and irrigation ditch maps with turnout locations, photograph locations, and irrigated acreages.

The third source is an undocumented study conducted by the City of Rapid City in 2008. This study includes photographs of irrigation turnouts, associated notes, and maps that include data pertinent to water rights transferred to the city. The last three sources include parcel delineation and owner information from RapidMap [City of Rapid City and Pennington County, 2014], field investigations, and direct communication with irrigation ditch personnel and landowners.

Searches were conducted within the SD DENR Water Rights Program database to identify the water rights transferred to the City of Rapid City. Permit documentation associated with these transfers was downloaded. The water rights flow rate, acreage, location, previous owner, and approval date were identified for each transfer and this information is provided in Table 2-1.

By combining the information from Table 2-1 with the data from the RapidMap geodatabase, the parcels associated with each transfer were identified. Then, structure location maps from the Rapid Valley Water Management Study were used to identify the locations of turnouts requiring disablement. These locations were field-verified with help from ditch personnel and were recorded with Global Positioning System (GPS). Verified structure locations were digitized with ArcGIS mapping software.

Table 2-1. Information for Water Rights Transferred to the City of Rapid City

Permit No.	Ditch(s)	Previous Owner	Acres	Flow (cfs) ^(a)	Section	Township	Range	Quarter	Transfer Date
2655-2	Cyclone	Lamb	58	0.83	22	1N	8E	SW NW, NW NW	12/1/2010
2317-2	Hawthorne	Morris	46	0.84	9	1N	8E	SW NE, SE NW, NE SW, NW SE	5/1/1996
2399-2	Little Giant and Murphy	Wileman	52	0.75	24	1N	8E	E NE	5/7/1998
2468-2	Little Giant via Murphy	Howie	34.8	0.57	19; 30	1N	9E	W SW; NW NW	12/5/2001
2142-2	Murphy	Tyler	49	0.62	19	1N	9E	W NW, NW SW	5/1/1991
2199-2	Murphy	Pelle	4	0.05	19	1N	9E	NW NW	5/7/1992
2201-2	Murphy	Long	10	0.13	14	1N	8E	C	5/7/1992
2316-2	Murphy	Morris	64	0.81	9	1N	8E	W SE	5/1/1996
2469-2	Murphy	Murphy	27	0.34	14	1N	8E	S NW, N SW	12/5/2001
2512-2	Murphy	Schroeder	145	1.84	19	1N	9E	E NW, NE SW, SW SE, N SE, S NE	12/3/2003
2217-2	South Side	Keller	29.2	0.33	29	1N	9E	SE SE	7/22/1992
2218-2	South Side	Stromer	192.5	2.16	29	1N	9E	SW	7/22/1992
2234-2	South Side	Eisenbraun	70	0.79	26	1N	8E	E NE	5/1/1996
2249-2	South Side	Weber	105.5	1.19	30	1N	9E	E NW, NW SW, E SW	5/5/1993
2296-2	South Side	Jundt	253.4	2.85	28; 33	1N	9E	SW, SW SE; NW, W NE, NW SE, N SW	1/6/1994
2360-2	South Side	Soetaert	32.6	0.37	33	1N	9E	W NW	7/10/1996
2397-2	South Side	Eisenbraun	59.3	0.59	26	1N	8E	W NE	2/25/1998
2411-2	South Side	Eisenbraun	3.6	0.04	26	1N	8E	N NE	10/1/1998
2415-2	South Side	Howie	146	1.64	32	1N	9E	NE, N SE	12/2/1998
2513-2	South Side	Steen	74.9	0.84	24; 25	1N	8E	W SE; SW NE	12/3/2003

(a) cfs = cubic feet per second

3.0 IRRIGATION DITCH SUMMARIES

The information gathered for turnouts to parcels with water rights transferred from irrigation use to the City of Rapid City is described by permit number in the following sections. The information includes each turnout location, access, and disablement information. All maps can be found in Appendix A.

All references to compacted backfill or compacted embankment were completed according to City of Rapid City Specifications Section 14-Embankment. Rapid City Specifications are located at www.rcgov.org under Departments – Public Works – Engineering Services – Standard Specifications & Details 2007.

3.1 CYCLONE DITCH

A single Cyclone Ditch water right has been transferred to the City of Rapid City with a single associated turnout. Table 3-1 describes the turnout location and Figure A-1 maps the vicinity. The following section describes the turnout details.

Table 3-1. Cyclone Ditch Turnout Information

Turnout	Longitude	Latitude	Adjacent Landowner
2655-2	-103.151	44.034	David Lamb

3.1.1 Permit 2655-2

This permit is for 58 acres and 0.85 cubic feet per second (cfs) transferred from Mr. David Lamb.

3.1.1.1 Turnout

The single turnout for this permit was an open ditch cut through the bank of Cyclone Ditch. Water was directed down the turnout ditch by boarding up a steel flume immediately downstream in the Cyclone Ditch.

3.1.1.2 Access

The turnout was located adjacent to property owned by the Rapid City Area School District No. 51-4 (PIN 3822100004). Direct access to the site is along an over 1-mile, two-track road that runs through fields on property owned by Mr. David Lamb. It is accessible by a private driveway at 4555 Reservoir Road, south of East Highway 44.

3.1.1.3 Disablement

The flume has been removed, the turnout ditch filled, and the ditch reshaped by the landowner as illustrated in Figure 3-1.



Figure 3-1. The Turnout Ditch (Left Arrow) and Former Location of Flume (Right Arrow) Associated With Permit 2655-2. Cyclone Ditch Runs From Foreground to Background Through Large Concrete Pipe.

3.2 HAWTHORNE DITCH

A single Hawthorne Ditch water right has been transferred to the City of Rapid City with a single associated turnout. Table 3-2 provides the turnout location and Figure A-2 maps the vicinity. The following section describes the turnout details.

Table 3-2. Hawthorne Ditch Turnout Information

Turnout	Longitude	Latitude	Current Landowner
2317-2	-103.162	44.064	N/A

3.2.1 Permit 2317-2

This permit is for 46 acres and 0.84 cfs transferred from Mr. Morris.

3.2.1.1 Turnout

The supplying lateral and turnout for this permit no longer exist. An internal memorandum of SD DENR dated September 30, 2005, states “Hawthorne Ditch is now piped underground through the area where the turnout for the supplying lateral was and the new Elk Vale Road bypass, a school, and (the West River Electric Association building) have been constructed where the lateral previously ran. There is no evidence of a lateral at the location” [Stroup, 2005]. This statement was field-verified.

3.2.1.2 Access

The approximate, former location of the turnout is along East Highway 44 near the Elk Vale Road bypass.

3.2.1.3 Disablement

The turnout was previously disabled.

3.3 MURPHY DITCH

Eight Murphy Ditch water rights have been transferred to the City of Rapid City, and 11 associated turnout locations are described in Table 3-3 in order from upstream to downstream. Two vicinity maps of the turnouts are illustrated by Figures A-3 and A-4. The following sections describe each of the Murphy Ditch turnout locations by permit. The ditch has a 20-foot easement on either side for access and maintenance.

Table 3-3. Murphy Ditch Turnout Information

Turnout	Longitude	Latitude	Adjacent Landowner
2316-2	-103.158	44.059	Yasmeen Dream
2469-2 A	-103.128	44.049	Dennis Murphy
2469-2 B	-103.127	44.049	Dennis Murphy
2201-2	-103.121	44.047	Ramona Buchholz
2399-2 A	-103.097	44.038	Michelle Minnerath
2399-2 B	-103.091	44.037	Penn. Co. ROW
2468-2	-103.091	44.031	SD DOT
2142-2 and 2199-2	-103.089	44.037	Randall Albers or Melvin Ross
2512-2 A	-103.083	44.035	Rapid City
2512-2 B	-103.077	44.034	Rapid City
2512-2 C	-103.070	44.031	Rapid City ROW

3.3.1 Permit 2316-2

This permit is for 64 acres and 0.81 cfs transferred from Mr. Morris.

3.3.1.1 Turnout

A single turnout was associated with this permit. A wooden flume within the Murphy Ditch was used to check water up to a 12-inch-diameter corrugated metal pipe (CMP). The flume throat was 8 feet long, 4 feet 8 inches wide, and 4 feet 2 inches tall. The CMP was sedimented in and remained in segments. Figure 3-2 is a photograph of the flume and Figure 3-3 is a photograph of the CMP opening.



Figure 3-2. Wooden Flume Used as a Check for Permit 2316-2.



Figure 3-3. Opening to 12-Inch-Diameter Corrugated Metal Pipe Turnout for Permit 2316-2.

3.3.1.2 Access

The flume and pipe were adjacent to property owned by Yasmeen Dream that is accessible from Lytle Lane off of East Highway 44.

3.3.1.3 Disablement

The following are the procedures the City of Rapid City used in disabling the Permit 2316-2 turnout:

- Removed the wooden flume and all associated concrete from Murphy Ditch
- Removed the upstream CMP section from the ditch embankment
- Backfilled with compacted embankment material where items were removed
- Reshaped the ditch banks through the project area to match the cross section of existing banks outside of the project area

Figure 3-4 and Figure 3-5 document removal of the turnout.



Figure 3-4. Removal of Turnout associated with Permit 2316-2. Date 3/20/2014



Figure 3-5. Removal of Turnout associated with Permit 2316-2. Date 3/20/2014

3.3.2 Permit 2469-2

This permit is for 27 acres and 0.34 cfs transferred from Ms. Arlene Murphy.

3.3.2.1 Turnouts

Two turnouts were associated with this permit, and they were located at either end of an inverted siphon through which the Murphy Ditch passes. Both turnouts were approximately 10-inch-diameter plastic pipes through the ditch bank. The upstream pipe (Turnout A) was mostly buried and is shown in Figure 3-6. The downstream pipe (Turnout B) was exposed, as illustrated in Figure 3-7.



Figure 3-6. Pipe Turnout A for Permit 2469-2.

3.3.2.2 Access

Both turnouts were adjacent to property owned by Dennis Murphy (PIN 3814105010), and the sites are accessible from a private driveway at 5670 East Highway 44. Direct access to both turnouts was through fields along a two-track path. Access to the Turnout B site requires crossing an existing drainage or can alternatively be accessed by a two-track path off the end of Springfield Road.



Figure 3-7. Pipe Turnout B for Permit 2469-2.

3.3.2.3 *Disablement*

The following are the procedures the City of Rapid City used in disabling the Permit 2469-2 turnouts

- Removed both pipe turnouts from the ditch embankment
- Backfilled with compacted embankment material to match the existing bank cross section

Figures 3-8 and Figure 3-9 document removal of the turnouts.



Figure 3-8. Removal of Turnout A Associated With Permit 2469-2. Date 4/22/2014



Figure 3-9. Removal of Turnout B Associated With Permit 2469-2. Date 4/22/2014.

3.3.3 Permit 2201-2

This permit is for 10 acres and 0.13 cfs transferred from Mr. Long.

3.3.3.1 Turnout

The old turnout ditch for this permit was identified, but the turnout had been removed. No evidence of a turnout could be identified on the ditch side of the bank, as illustrated in Figure 3-10. The remains of wooden structures, possibly related to the turnout, were found nearby, as shown in Figure 3-11.

3.3.3.2 Access

The site is adjacent to property owned by Ms. Ramona Buchholz (PIN 3814326004) and is located directly west of Apple Tree Road. It is accessible from East Highway 44.

3.3.3.3 Disablement

The structure was previously disabled.



Figure 3-10. Photograph Taken From in the Murphy Ditch Running Right to Left (Bank in Foreground Is Likely Former Turnout Location for Permit 2201-2).



Figure 3-11. Wooden Remains Found Near the Site for Permit 2201-2.

3.3.4 Permit 2399-2

This permit is for 52 acres and 0.75 cfs transferred from Mr. Wesley Wileman.

3.3.4.1 *Turnouts*

Two turnout locations were associated with this permit. Turnout A had been removed but was not properly backfilled, as illustrated in Figure 3-12. A meeting on site with Mr. Jeep Williams, watermaster for Murphy Ditch, in April 2014 verified that the backfill at that site has been repaired since the photograph was taken. Turnout B was a 12-inch steel canal gate, as shown in Figure 3-13.

3.3.4.2 *Access*

The Turnout A site is adjacent to property owned by Ms. Michelle Minnerath (PIN 3824200002) and is north of Morris Lane. Direct access to the location is through a field with no defined path. Turnout B was located in the west ditch of Radar Hill Road.



Figure 3-12. Backfill Material at the Former Location of Turnout A for Permit 2399-2. This area has since had material added to the bank.



Figure 3-13. Turnout B for Permit 2399-2 (The 12-Inch Steel Canal Gate was Located on the Far Bank Adjacent to the Concrete Culvert, and Murphy Ditch Runs Right to Left).

3.3.4.3 *Disablement*

The following are the procedures the City of Rapid City used in disabling the Permit 2399-2 turnouts:

- Turnout A was previously disabled
- Turnout B
 - Removed the canal gate from Murphy Ditch
 - Removed a portion of the pipe from the ditch bank and backfilled with compacted embankment material to match the existing bank cross section

Figure 3-14 and Figure 3-15 document removal of Turnout B.



Figure 3-14. Removal of Turnout B for Permit 2399-2 Located on Murphy Ditch on Radar Road.
Date 4/22/2014



Figure 3-15. Removal of Turnout B for Permit 2399-2 Located on Murphy Ditch on Radar Road.
Date 4/22/2014

3.3.5 Permit 2468-2

This permit is for 34.8 acres and 0.57 cfs transferred from Mr. Gordon Howie.

3.3.5.1 *Turnouts*

A single turnout for this permit was once located on a lateral ditch. The turnout ditch was identified, as shown in Figure 3-16, but no turnout structure exists.



Figure 3-16. Disabled Turnout Ditch for Permit 2468-2 Running From the Foreground to the Background Along the East Side of Radar Hill Road (The Lateral Ditch Is in the Left Foreground, Turning Left at the Visible Tree Root).

3.3.5.2 *Access*

The site is located on property owned by the South Dakota Department of Transportation (SD DOT) on the east side of Radar Hill Road, south of East Highway 44 (PIN 3824427001).

3.3.5.3 *Disablement*

The structure was previously disabled.

3.3.6 Permits 2142-2 and 2199-2

Permit 2142-2 is for 49 acres and 0.62 cfs transferred from Mr. Tyler. Permit 2199-2 is for 4 acres and 0.05 cfs transferred from Mr. Pelle.

3.3.6.1 Turnout

A single turnout location was used for these two permits. Upon inspection, the turnout ditch was identified and a short, disconnected segment of a 12-inch-diameter CMP was found lying in the ditch at the site, but an existing turnout structure was not evident. The concrete check structure for the turnout has been removed and sits on the ditch bank at the location illustrated in Figure 3-17.



Figure 3-17. Former Location of the Turnout for Permits 2142-2 and 2199-2 (The Concrete Check Structure and a Disconnected Corrugated Metal Pipe Segment Sit on the Far Bank, and Murphy Ditch Flows Right to Left).

3.3.6.2 Access

The site is adjacent to property owned by Mr. Randall Albers (PIN 3919100002) along Morris Lane. Direct access to the site is through the Albers property or the neighboring property owned by Melvin Ross (PIN 391900001), or from the top side of the Murphy Ditch through Mr. Jerry Olson's property.

3.3.6.3 Disablement

The structure was previously disabled and no further action was required, as per a meeting with SD DENR personnel in April 2014.

3.3.7 Permit 2512-2

This permit is for 145 acres and 1.84 cfs transferred from Ms. Marilyn Schroeder.

3.3.7.1 Turnouts

Three turnouts were associated with this permit. Turnout A was a 10-inch-diameter plastic pipe through the ditch bank but was capped and buried, as shown in Figure 3-18. Turnout B was a clay pipe 12-inches in diameter and 20 feet long through the ditch bank. The downstream end of this pipe was previously buried. Figure 3-19 is a photograph of a plywood headgate used for Turnout B. Turnout C was a 24-inch steel canal gate secured in a concrete junction box, as shown in Figure 3-20. The junction box is on a lateral ditch and is shared with an identical gate for a separate, active permit.



Figure 3-18. Pipe Used for Turnout A of Permit 2512-2 (Red Arrow).

3.3.7.2 Access

Turnouts A and B were located adjacent to property owned by the City of Rapid City (PIN 3919200001). Turnout C was located in the west right-of-way for Airport Road.

3.3.7.3 Disablement

The following are the procedures the City of Rapid City used in disabling the Permit 2512-2 turnouts:

- Turnout A was previously disabled and no further action was required per discussion with the Murphy Ditch watermaster and SD DENR personnel in April 2014.
- Turnout B was previously disabled and no further action was required per discussion with the Murphy Ditch watermaster and SD DENR personnel in April 2014.

- Turnout C

- Removed the canal gate and disabled the pipe with a Class M-5 concrete plug.

Figure 3-21 and Figure 3-22 document disablement of the Turnout C structure.



Figure 3-19. Plywood Headgate for Turnout B of Permit 2512-2.



Figure 3-20. Junction Box With 24-Inch Canal Gate for Turnout C of Permit 2512-2 (Turnout C Shown With Red Arrow, Leading South).



Figure 3-21. Removal of Turnout C for Permit 2512-2 Located on Murphy Ditch on the East Side of Airport Road. Date 4/22/2014



Figure 3-22. Removal of Turnout C for Permit 2512-2 Located on Murphy Ditch on the East Side of Airport Road Going South to the Airport. Date 4/22/2014.

3.4 SOUTH SIDE DITCH

Ten South Side Ditch water rights have been transferred to the City of Rapid City, and 13 associated turnout locations were identified by using maps from the Rapid Valley Water Management Study [U.S. Bureau of Reclamation, 1990] and field investigations. The locations are described in Table 3-4 from upstream to downstream. Two vicinity maps of the turnouts are provided by Figures A-5 and A-6.

Table 3-4. South Side Ditch Turnout Information

Turnout	Longitude	Latitude	Adjacent Landowner
2234-2, 2397-2 & 2411-2	-103.115	44.017	Reinhold Eisenbraun (south) Randy Christensen (north)
2513-2	-103.100	44.018	City of Rapid City
2249-2 A	-103.095	44.017	City of Rapid City
2249-2 B	-103.091	44.015	City of Rapid City
2249-2 C	-103.091	44.015	City of Rapid City
2249-2 D	-103.084	44.011	City of Rapid City
2218-2	-103.071	44.010	Merlin Stromer
2415-2 A	-103.065	44.008	Matt Bowen
2415-2 B	-103.061	44.006	Matt Bowen
2415-2 C	-103.059	44.006	Matt Bowen
2415-2 D	-103.056	44.006	Matt Bowen
2217-2	-103.056	44.011	Leonard V. Keller Trust
2296-2 and 2360-2	-103.05	44.007	Donald Jundt

3.4.1 Permits 2234-2, 2397-2, and 2411-2

Permit 2234-2 is for 70 acres and 0.79 cfs, Permit 2397-2 is for 59.3 acres and 0.59 cfs, and Permit 2411-2 is for 3.6 acres and 0.04 cfs, all transferred from Mr. Reinhold Eisenbraun.

3.4.1.1 Turnouts

One turnout structure could be found in the described vicinity of these permits, located in Section 26, 1N 8E. The ditch was walked for approximately 1/2 mile to the west and the only turnout found is shown in Figure 3-23.

3.4.1.2 Access

The turnout for Permit 2234-2 is accessed off of Highway 44 by turning south on Anderson Rd. and continuing south past Southside Dr. approximately 3/8 mile to South Side Ditch. The site is approximately 1/4 mile west. The land north of the ditch, including the structure, is owned by Mr. Randy Christensen, and the land south of the ditch is owned by Mr. Eisenbraun.

3.4.1.3 Disablement

The structure was previously disabled, and no further action was required by SD DENR personnel.



Figure 3-23. Turnout for Permit 2234-2. Note the headwall sticking out of the snow just upstream from the culvert crossing on the left or north side of the ditch (red arrow). The ditch behind the headwall has been filled in.

3.4.2 Permit 2513-2

This permit is for 74.9 acres and 0.84 cfs transferred from Mr. Steen.

3.4.2.1 Turnouts

One turnout was associated with Permit 2513-2. The turnout was located straight south of the Rapid City Water Treatment Plant near the middle of section 25 on South Side Ditch. The turnout inlet structure was concrete with a 15-inch canal gate and PVC pipe going under the north bank to a weir box. On the north side of the weir box, 15-inch PVC pipe ran from the box to a vertical PVC air vent and then continued north. Figures 3-24, 3-25, and 3-26 show the structures associated with Permit 2513-2.



Figure 3-24. Inlet Structure, Weir Box, and Air Vent Associated With Turnout 2513-2.



Figure 3-25. Inlet Structure, Weir Box, and Air Vent Associated With Turnout 2513-2.



Figure 3-26. Inside the Weir Box for Turnout 2513-2. Note center wall weir and PVC pipe exiting the box.

3.4.2.2 Access

The site is located on land owned by the City of Rapid City and occupied by Mr. Bud Steen. The site may be accessed by turning off Highway 44 on Anderson Rd., then turning east on Southside Dr. to the treatment plant, then south on Redemption Road at the west edge of the treatment plant. At South Side Ditch, the site is located just east of the road.

3.4.2.3 Disablement

The following are the procedures the City of Rapid City used in disabling the turnout associated with Permit 2513-2:

- Cut existing turnout pipe 5 feet north from air vent
- Removed the air vent, inlet structure, and appurtenances.
- Backfilled with compacted embankment material

Figure 3-27 documents disablement of the structure.



Figure 3-27. Removal of Turnout for Permit 2513-2. Headgate removed, measurement box filled with dirt and pipeline air vent removed. Date: 10/29/2015

3.4.3 Permit 2249-2

This permit is for 105.5 acres and 1.19 cfs transferred from Mr. Weber.

3.4.3.1 *Turnouts*

Four turnouts were associated with Permit 2249-2. Turnout A was located 1,500 feet downstream from the Permit 2513-2 turnout site and consisted of a steel-framed headgate and concrete headwall. The structure is shown in Figure 3-28.

Turnout B was located upstream from a culvert crossing, shown in Figure 3-29. This culvert was used as a check structure for Turnout B and is located just west of the line between Section 25, 1N 8E and Section 30, 1N 9E. Figure 3-30 shows the outlet end of the Turnout B pipe.

Turnout C consisted of a wooden structure on the north bank of South Side Ditch, just upstream from a second culvert crossing, shown in Figure 3-31. The Turnout C site is shown in Figure 3-32 and located just east of the line between Section 25, 1N 8E and Section 30, 1N 9E.

Turnout D was located in the SW1/4 of Section 30 T1N R9E and consisted of a steel frame canal gate and division box. The gate is shown in Figure 3-33 and the division box is shown in Figure 3-34.



Figure 3-28. Turnout A structure Associated with Permit 2249-2.



Figure 3-29. Culvert Crossing Used as a Check for Turnout B Associated with Permit 2249-2.



Figure 3-30. Outlet end of Turnout B pipe (Red Arrow). (Looking South, Towards South Side Ditch).



Figure 3-31. Second Culvert Crossing, Used as Check for Turnout C Associated With Permit 2249-2.



Figure 3-32. Wooden Structure (Red Arrow) for Turnout C Associated With Permit 2249-2. This structure is immediately upstream of the culvert crossing in Figure 3-31, on the north bank.



Figure 3-33. Metal Framed Canal Gate of Turnout D Associated With Permit 2249-2.



Figure 3-34. Turnout D Division Box Associated With Permit 2249-2. Date 10/30/2015.

3.4.3.2 Access

The turnout sites may be accessed by turning south from Highway 44 on Anderson Rd., then east on Southside Dr. to the treatment plant. The sites are adjacent to property owned by the City of Rapid City, southeast from the treatment plant.

3.4.3.3 Disablement

The following are the procedures the City of Rapid City used in disabling turnouts A, B, C, and D associated with Permit 2249-2:

- Turnout A
 - Removed turnout head gate
 - Placed concrete plug in turnout pipe
 - Filled turnout ditch with compacted material
- Turnout B
 - Removed pipe and structure
 - Backfilled with compacted embankment material to match existing ditch cross section
- Turnout C
 - Removed the wooden structure
 - Backfilled with compacted embankment material to match existing ditch cross section
- Turnout B
 - Removed the steel framed canal gate and structure
 - Backfilled with compacted embankment material to match the existing ditch cross section

Figures 3-35 through Figure 3-40 document the disablement of these four turnouts.



Figure 3-35. Turnout A Associated with Permit 2249-2. Headgate removed, turnout pipe filled with concrete, and outlet filled in. Date 10/29/2015



Figure 3-36. Turnout B Associated with Permit 2249-2. The old turnout structure has been removed. Date 10/29/2015.



Figure 3-37. Turnout C Associated With Permit 2249-2. Removed turnout structure. Date 10/29/2015.



Figure 3-38. Turnout D Associated With Permit 2249-2, removed by the City. Date 10/30/2015



Figure 3-39. Turnout D Associated With Permit 2249-2. Turnout being backfilled. Date 10/30/2015.



Figure 3-40. Turnout D Associated With Permit 2249-2. Photo of the division box being removed and backfilled by the City. Date 10/30/2015.

3.4.4 Permit 2218-2

This permit is for 192.5 acres and 2.16 cfs transferred from Mr. Merlin Stromer.

3.4.4.1 *Turnouts*

One turnout was associated with Permit 2218-2. The turnout consisted of a pipe inlet, a metal valve well, and an air vent immediately downstream of the valve well, shown in Figure 3-41.

3.4.4.2 *Access*

The turnout site for Permit 2218-2 is located turning south on Airport Road from Highway 44 and travelling about 0.7 miles to the driveway into Mr. Merlin Stromer's property, then another 0.3 miles south through the Stromer property to South Side Ditch.

3.4.4.3 *Disablement*

A discussion with Mr. Merlin Stromer in April of 2014 was that after Mr. Stromer sold his water rights to the city, he hired a contractor to disable the turnout. No water can be or has been delivered through the turnout since the water right transfer. Discussion with SD DENR was that this would satisfy abandonment requirements and the turnout would not be disturbed since it has been disabled.



Figure 3-41. Turnout for Permit 2218-2. This turnout has been disabled and will not be disturbed.

3.4.5 Permit 2415-2

This permit is for 146 acres and 1.64 cfs transferred from Mr. Gordon Howie.

3.4.5.1 Turnouts

Four turnouts were associated with Permit 2415-2, designated Turnout A through Turnout D (upstream to downstream on the South Side Ditch). Turnout A consisted of a gate structure composed of timber and is shown in Figure 3-42. A wooden flume was used as a check structure for Turnout A, located approximately 35 feet downstream and shown in Figure 3-43.

Turnout B was also a gate structure composed of timbers. As shown in Figure 3-44, a wooden flume was located next to Turnout B (Turnout B indicated by red arrow) and was used as a check structure.

Turnout C consisted of a wooden gate structure supported by concrete abutments. Figure 3-45 displays Turnout C (red arrow) along with a wooden weir check structure located downstream from Turnout C. The ditch from Turnout C led to a 24-inch-diameter concrete pipe that was used to convey diverted water, shown in Figure 3-46.

Turnout D consisted of a concrete flume/check structure, shown in Figure 3-47. The structure included outlets on both the north and south walls, with timbers used to convey diverted water from the structure. Figures 3-48 and 3-49 show the north and south outlets, respectively.



Figure 3-42. Turnout A for Permit 2415-2. The turnout is composed of timber.



Figure 3-43. Wooden Flume Used as a Check for Turnout A of Permit 2415-2.



Figure 3-44. Turnout B (Red Arrow) and the Flume Associated with Permit 2415-2.



Figure 3-45. Turnout C (Red Arrow) and the Wooden Weir Associated With Permit 2415-2.



Figure 3-46. Turnout C and the 24-Inch-Diameter Concrete Pipe (Red Arrow) Associated With Permit 2415-2.



Figure 3-47. Concrete Flume/Check Structure for Turnout D Associated With Permit 2415-2 (Looking Downstream).



Figure 3-48. North Flume/Check Structure Wall and Outlet for Turnout D Associated With Permit 2415-2.



Figure 3-49. South Flume/Check Structure Wall and Outlet for Turnout D Associated With Permit 2415-2.

3.4.5.2 Access

Turnouts A through D are adjacent to property owned by Mr. Matt Bowen (PINs 3932100003 and 3932200001). The sites are accessed by travelling approximately 1/2 mile south on Bradsky Road from Highway 44 to a private drive just north of the South Side Ditch crossing.

- The Turnout A and Turnout B sites are accessed by travelling west on the private drive for approximately 1/2 mile from Bradsky Road, crossing South Side Ditch, then leaving the private drive and following South Side Ditch along its south bank.
- The Turnout C and Turnout D sites are accessed from the private drive on the north bank of South Side Ditch, approximately 1/2 mile and 1/4 mile west of Bradsky Road, respectively.

3.4.5.3 Disablement

The following are the procedures the City of Rapid City used in disabling the four turnouts associated with Permit 2415-2.

- Turnout A
 - o Removed the timber turnout and the wooden flume structure
 - o Backfilled with compacted embankment material to match existing ditch cross section

- Turnout B
 - o Removed the timber turnout and the wooden flume structure
 - o Backfilled with compacted embankment material to match existing ditch cross section
- Turnout C
 - o Removed the wooden gate turnout structure, concrete abutments, and wooden weir check structure from South Side Ditch
 - o Backfilled ditch banks with compacted embankment material to match existing ditch cross section
 - o Backfilled existing turnout ditch from South Side Ditch to existing concrete pipe with compacted material to match existing adjacent grade
- Turnout D
 - o Removed the concrete inlets and wooden turnouts from the north and south banks.
 - o Backfilled with compacted embankment material to match existing ditch cross section.

Figures 3-50 through 3-57 document the disablement of the structures associated with the four turnouts.



Figure 3-50. Removal of Turnout A associated with Permit 2415-2. Date 7/30/2015



Figure 3-51. Turnout A Wooden Flume Structure Associated With Permit 2415-2, removed. Date 7/30/2015



Figure 3-52. Turnout B Associated With Permit 2415-2. Timber Turnout Removed. Date 7/30/2015.



Figure 3-53. Turnout B Associated With Permit 2415-2. Wooden Flume Structure Removed. Date 7/30/2015.



Figure 3-54. Turnout C Associated With Permit 2415-2 Timber Gate Turnout Structure, Concrete Abutments, and Timber Weir Check Structure Removed. Date 7/30/2015.



Figure 3-55. Turnout C Associated With Permit 2415-2. Turnout ditch filled in. Date 7/30/2015.



Figure 3-56. Turnout D Associated With Permit 2415-2. Headgate removed and concrete plug put in place for south turnout. Date 7/30/2015



Figure 3-57. Turnout D Associated With Permit 2415-2. Headgate removed and concrete plug put in place for north turnout. Date 7/30/2015.

3.4.6 Permit 2217-2

This permit is for 29.2 acres and 0.33 cfs transferred from Mr. Leonard Keller.

3.4.6.1 *Turnouts*

No turnouts associated with this permit were located.

3.4.6.2 *Access*

The site is along Back Country Trail off of Bradsky Road.

3.4.6.3 *Disablement*

This turnout was previously disabled.

3.4.7 Permit 2296-2 and Permit 2360-2

Permit 2296-2 is for 253.4 acres and 2.85 cfs transferred from Mr. Donald Jundt. Permit 2360-2 is for 32.6 acres and 0.37 cfs transferred from Mr. Soetaert.

3.4.7.1 Turnouts

The turnout structure associated with transferred Permit 2296-2 and transferred Permit 2360-2, shown in Figure 3-58, also serves the active Permit 2526-2 for 0.71 cfs currently serving 50 acres of irrigated land owned by Mr. Donald Jundt. The turnout will not be disabled.



Figure 3-58. Turnout Associated With Permit 2296-2 and Permit 2360-2, Currently Serving an Active Permit for 50 Acres Irrigated by Mr. Donald Jundt.

3.4.7.2 Access

The turnout for Permit 2296-2 and Permit 2360-2 is located approximately 1/2 mile south of Highway 44 on the east side of Bradsky Road at the South Side Ditch. All associated structures are on property owned by Mr. Donald Jundt.

3.4.7.3 Disablement

No disablement was required.

4.0 PERMITS AND REGULATIONS

4.1 CLEAN WATER ACT SECTION 404 PERMIT

According to the U.S. Army Corps of Engineers [2007]:

“Under Section 404(f)(1)(C) of the CWA (see also 33 CFR 323.4(a)(3) and 40 CFR 232.3(c)(3)), discharges of dredged or fill material associated with construction or maintenance of irrigation ditches, or the maintenance (but not construction) of drainage ditches, are not prohibited by or otherwise subject to regulation under Section 404 of the CWA (i.e., these activities are exempt from the need to obtain a Section 404 Permit from the Department of the Army (DA)). Discharges of dredged or fill material associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant to and functionally related to irrigation ditches are included in the exemption for irrigation ditches.”

A 404 Permit was not required.

4.2 CLEAN WATER ACT SECTION 402 PERMIT

According to the South Dakota Department of Environment and Natural Resources [2010] Section 2.2.2:

“Storm water discharges from operators disturbing less than one acre that are part of a larger common plan of development or sale that, combined, disturb one or more acres.”

The combination of ground area disturbed by the combination of all disablements associated with this project did not exceed 1 acre.

A 402 Permit was not required.

4.3 FLOODPLAIN DEVELOPMENT PERMITS

After reviewing both the Pennington County and Rapid City Flood Insurance Rate Maps, it was determined that none of the disablement sites lie within the 100-year floodplain.

Floodplain permits were not required.

4.4 HISTORIC PRESERVATION

As required by State Preservation Law (South Dakota Codified Law (SDCL) 1-19A-11.1), the Office of History was given notice and an opportunity to investigate and comment on this proposed project. The Office of History concluded that the irrigation ditches in Rapid Valley are listed on neither the State nor the National Register of Historic Places. Additionally, because federal funding will not be used for this proposed project, Section 106 of the National Historic Preservation Act did not apply.

5.0 REFERENCES

City of Rapid City and Pennington County, 2012. *RapidMap*, retrieved September 19, 2012, from <http://www.rcgov.org/GIS/rapidmap.html>

South Dakota Department of Environment and Natural Resources, 2012. *South Dakota Water Rights*, retrieved September 19, 2012, from <http://denr.sd.gov/des/wr/dbwrsearch.aspx>

South Dakota Department of Environment and Natural Resources, 2010. *General Permit for Storm Water Discharges Associated With Construction Activities*, prepared by the South Dakota Department of Environment and Natural Resources, Pierre, SD.

Stroup, D. E., 2005. *Rapid City – Rapid Valley Water Rights Transfers*, internal memorandum from D. E. Stroup, South Dakota Department of Environment and Natural Resources, Water Rights Program, Pierre, SD, to G. Eberle, South Dakota Department of Environment and Natural Resources, Water Rights Program, Pierre, SD, September 30.

U.S. Army Corps of Engineers, 1990. *Exemptions for Construction or Maintenance of Irrigation Ditches and Maintenance of Drainage Ditches under Section 404 of Clean Water Act*, Regulatory Guidance Letter, prepared by U.S. Army Corps of Engineers, Washington, DC, July 4.

U.S. Bureau of Reclamation, 1990. *Rapid Valley Water Management Study*, prepared by U.S. Bureau of Reclamation, Newell, South Dakota.

APPENDIX A

TURNOUT VICINITY MAPS

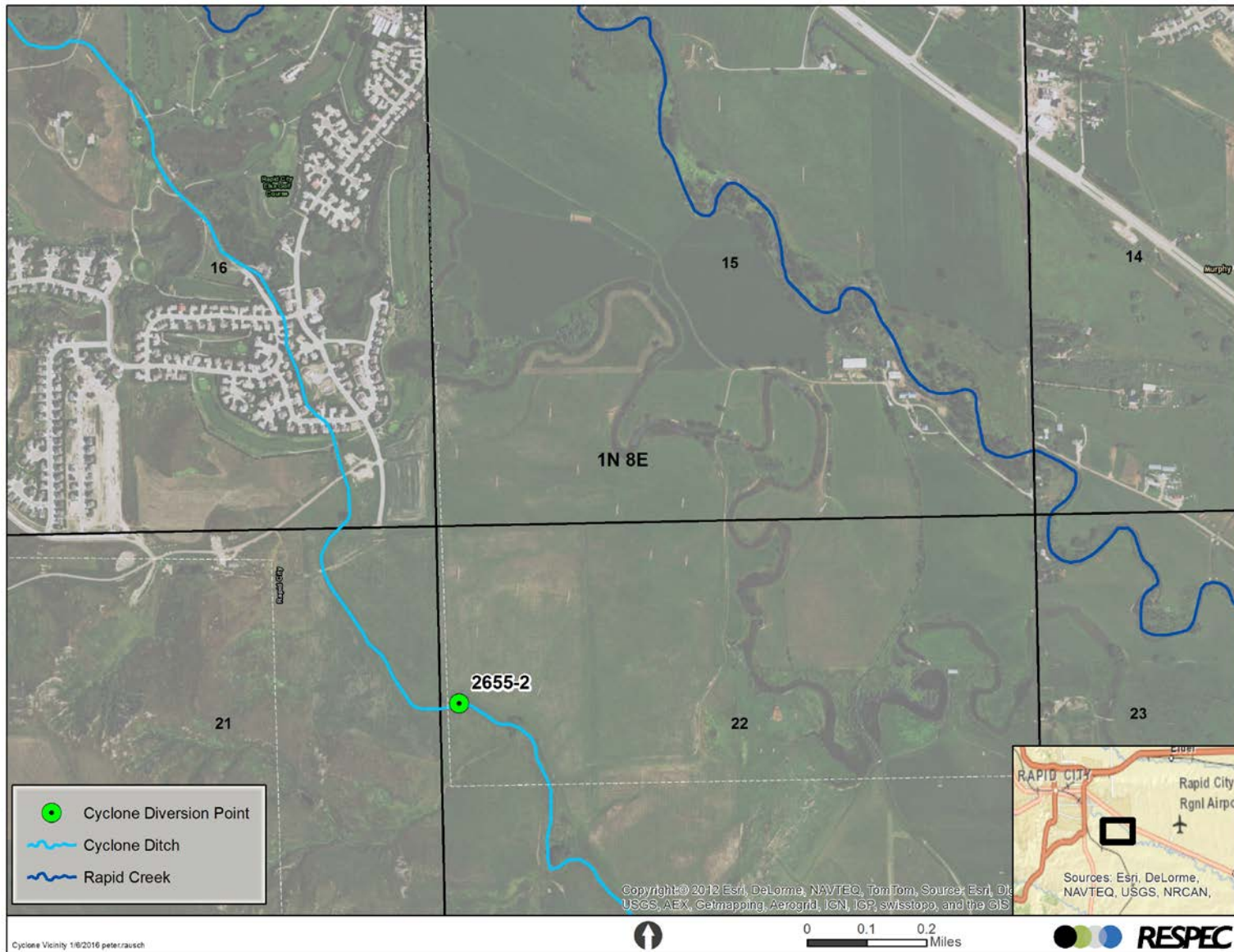


Figure A-1. Cyclone Ditch Turnout Vicinity Map.



Figure A-2. Hawthorne Ditch Turnout Vicinity Map.

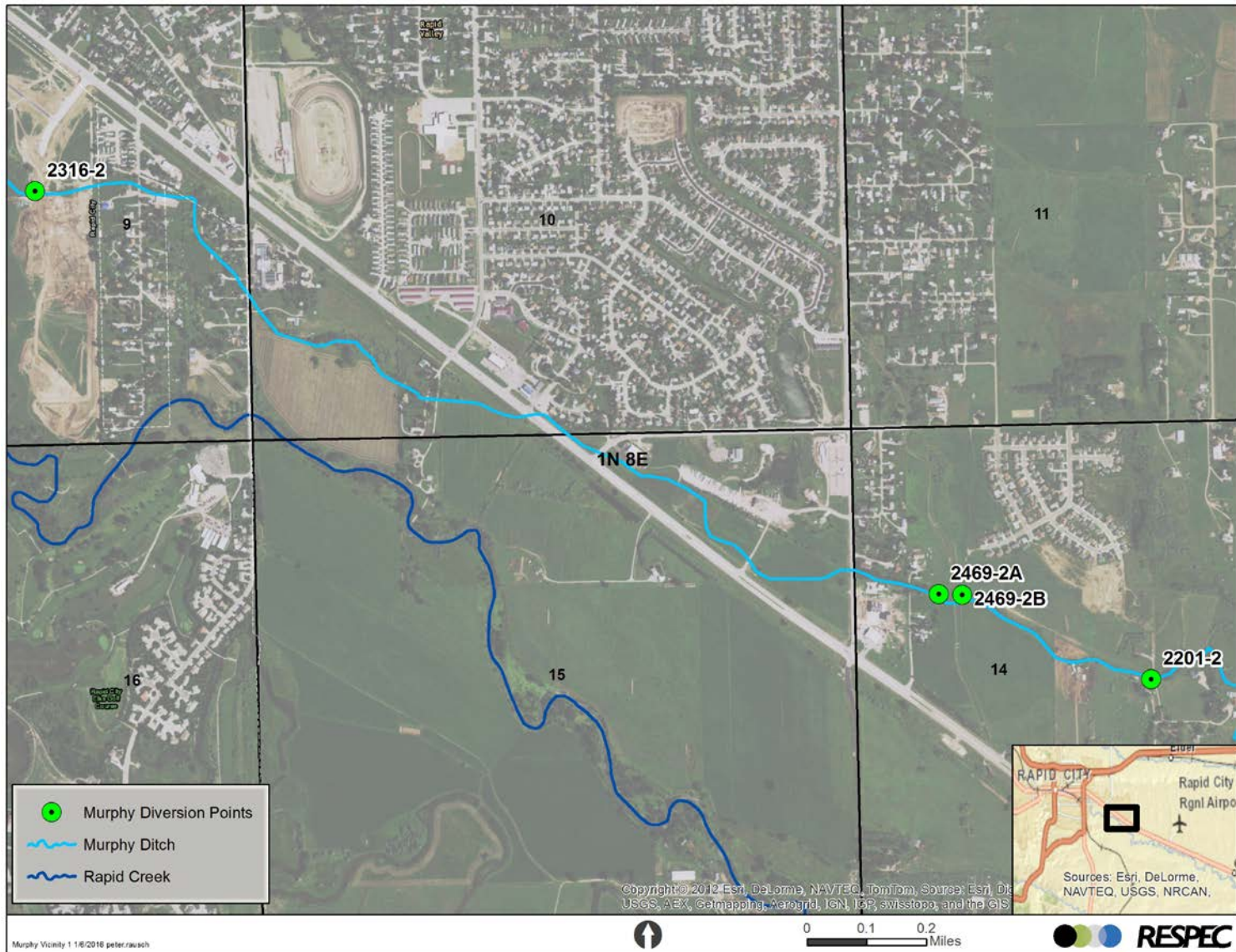


Figure A-3. Murphy Ditch Turnout Vicinity Map (1 of 2).

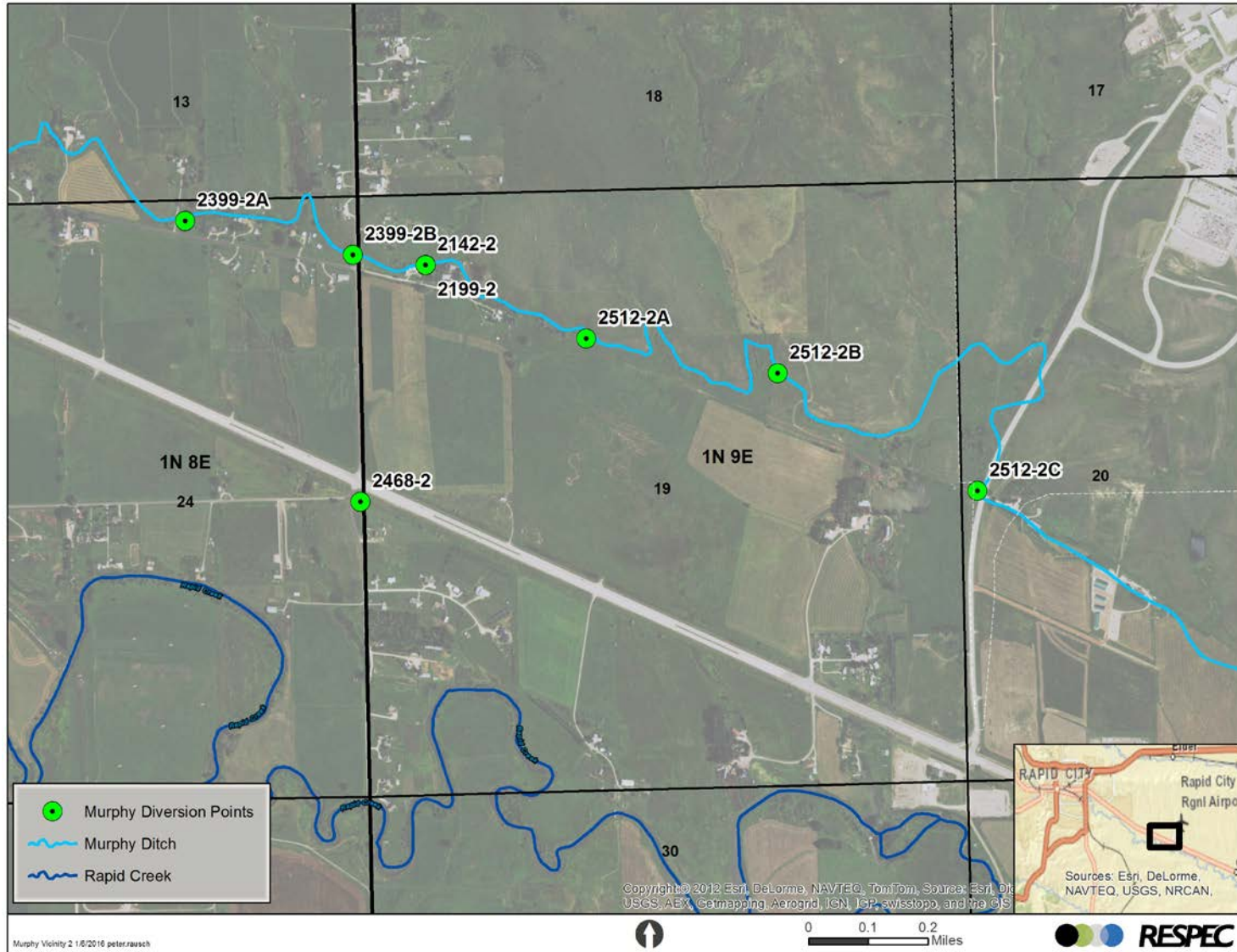


Figure A-4. Murphy Ditch Turnout Vicinity Map (2 of 2).

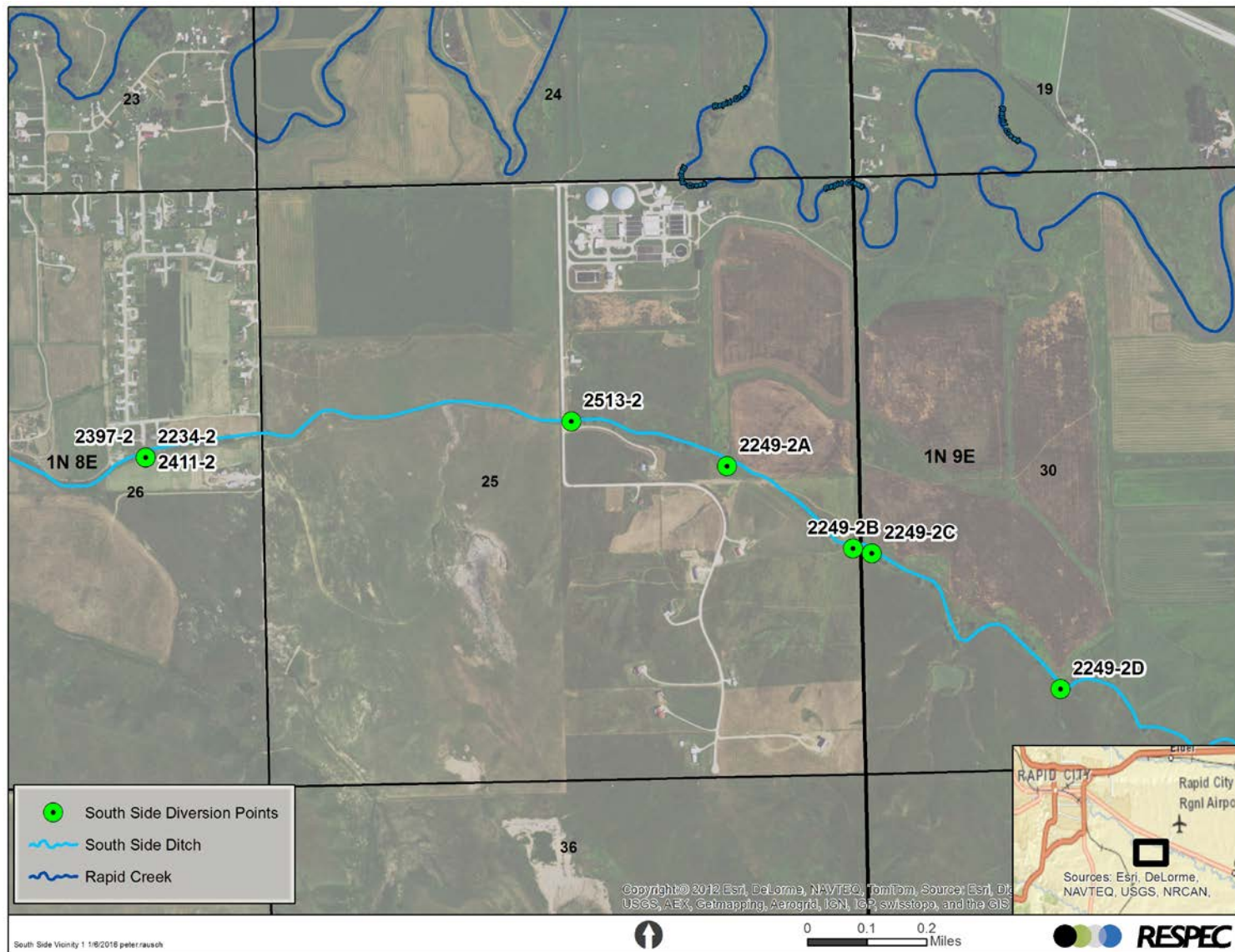


Figure A-5. South Side Ditch Turnout Vicinity Map (1 of 2).

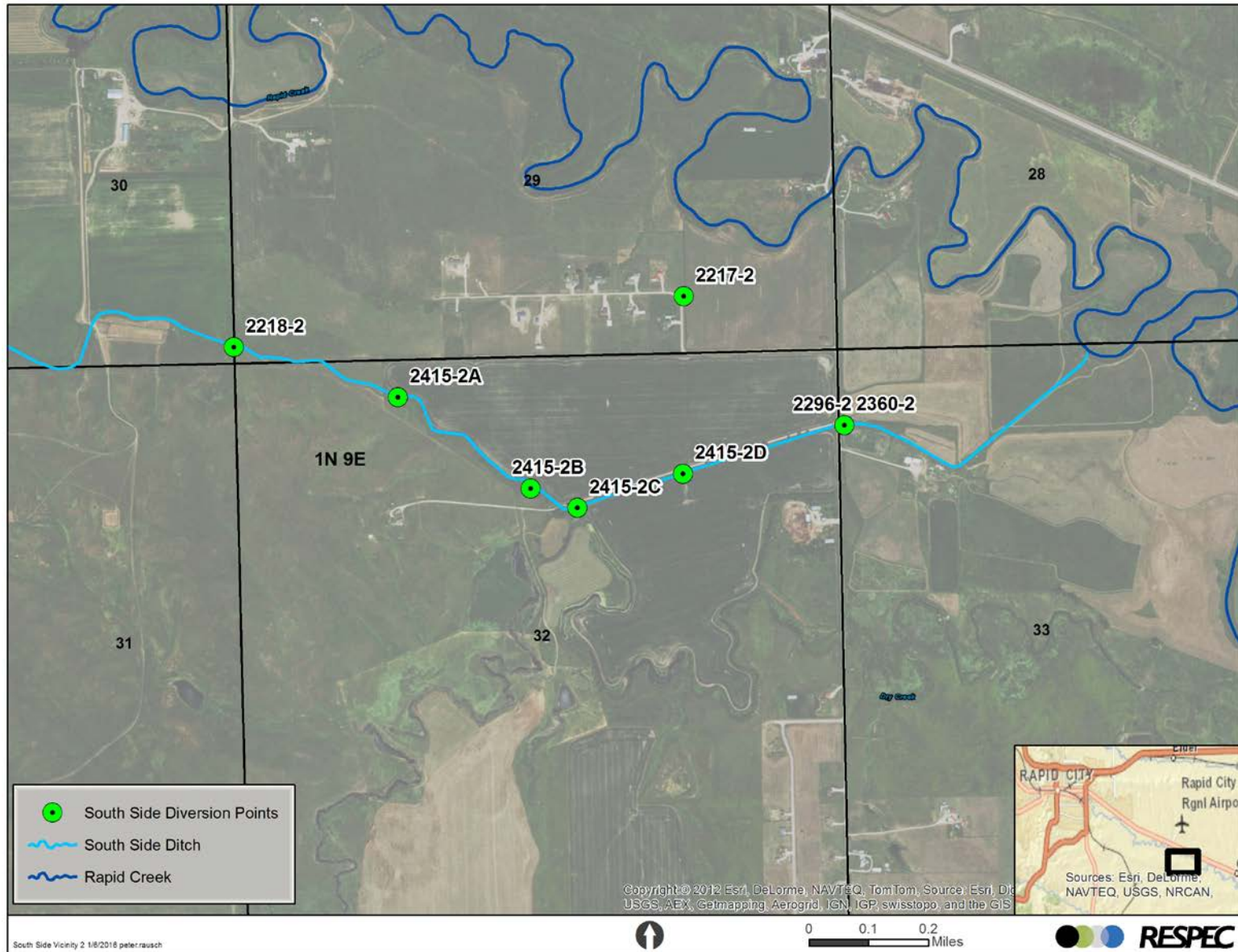


Figure A-6. South Side Ditch Turnout Vicinity Map (2 of 2)