

After reviewing Bryce Center's notes and information from the City of Rigby I found the following

Before transfer:

in 1958 (claimed - no EOP yet) wells 1 & 2 were enlarged

25-4009 & 25-10496 well 1 went from 2.8 cfs to 5.35
25-4009 & 25-10496 well 2 went from 1.45 to 2.8
25-4101 North 3rd well 3 for 2.45 cfs

This gives us an old capacity of 10.6 cfs

All the above rights (except 4009 - already located there) have been transferred to 2 wells

Rigby's well # 3 in SWNW sec. 18 is capable of 4.57 cfs
well # 1 in SE SW sec. 18 capable of 4.67

old capacity (including 25-10496)

5.35

2.8

2.45

10.6

current capacity

4.55

4.67

9.22

City of Rigby AS claim field investigation

4N 39E 18

Well_3

Well_1

Well_2

4N 39E 19

Locations confirmed
by Public Works Director

Doug Nelson 3 March 04

Bac

GPS locations from
WMIS per Terry
Klipfel - see WM10
copies

Bac 3/2/04

**Field Exam Summary - City of Rigby Municipal Wells
Claims A25-04009, A25-04010, A25-04011, A25-10496**

3 March 2004

(Only page 1 is included with paper files A25-04010 through A25-10496; the complete summary is included in paper file A25-04009.)

Bryce Contor
Water Resources Field Services

General Comments

The City of Rigby has four beneficial-use claims for municipal use from wells, and this summary report refers to all four claims. Claims A25-07051, A25-07288 and A25-10688 have separate summary reports in their own files. Except as noted all copies, data, and correspondence are included in paper file A25-04009.

Paper file A25-04009 includes the full site data copied from IDWR Water Measurement Program files, as well as excerpts from a 1995 engineering study by Forsgren Perkins Associates. The engineering study copies were provided by the city.

On 3 March 2004 I met with the Public Works Director Doug Nelson and the City Attorney Steve Clark. I was unsure how the legal principle of water rights for the future needs of "Growing Cities" applies to beneficial use rights, so I have described the history of development of water use and capacity without making specific proposals for water right elements. Currently I have limited data for historical use and capacity but Public Works Director Nelson is looking for more information, which may aid in making a recommendation. Attorney Clark is anticipating that the water-rights review will include consideration of the "growing cities" legal principle.

Ownership

City of Rigby.

POD

The attached engineering report documents four original wells under an "old" naming system. These include a well in the basement of the City Hall, a well just west of the City Hall, a well on the north end of town near the Harwood School, and a well on the south side of town near the armory. The first three of these wells appear to be the wells described in the various affidavits supporting the priority dates. Doug Nelson referred to another well since abandoned. This fifth well may have been connected to the city water system at one time, but not

The diversion rate available to the city after the adjudication will be whatever is decreed for these claims, plus 2.51 cfs from Well #2 under license 25-07523. Even after the adjudication, the total volume available to the city will not be clear because the license does not specify a volume.

Water Use

Municipal

List of Photos

CityofRigby_Municipal1.jpg

Well house, Well #1, looking north.

CityofRigby_Municipal2.jpg

Well house, abandoned well at Harwood Elementary School, looking west.

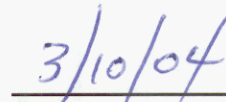
CityofRigby_Municipal3.jpg

Well house, Well #3, looking north.

Low-quality photocopies of additional photos from the IDWR Water Measurement Program files are included in paper file A25-04009.



Bryce A. Contor



Date

well may have been connected to the city water system at one time, but not during his tenure. The license for the armory well has a priority date of 1989.

Currently three wells are in use, renumbered "Well #1," "Well #2," and "Well #3." Well #1 is the well west of the City Hall referred to in the affidavits (formerly "Well #1"). Well #2 is the well on the south side of the city near the armory (formerly "Well #4") and is covered under post-AJ license 25-07523. Well #3 is a new well drilled pursuant to transfer 4791, west of the original well near the Harwood School.

The original well near Harwood School has been filled with concrete per IDWR requirements (formerly "Well #3"). The well in the basement of the City Hall still exists but is no longer used (formerly "Well #2"). I believe the fifth well referred to has also been filled, per DEQ requirements.

The current well numbering scheme is reflected on the GIS layout with a handwritten date of 3/2/04. The GPS locations are from the WMIS database and the numbering scheme is from the attached Water Measurement Program files. Doug Nelson confirmed the locations and the numbering scheme. GPS locations ("old" IDTM, based on datum NAD27) are:

- Well #1 287,935 N 668003.3 E
- Well #2 287,428 N 667948.9 E
- Well #3 288,583 N 667,704.7 E

For the rights included on transfer 4791 (A25-04010, A25-04011, A25-10496) I propose recommending the two PODs authorized by the transfer:

Well #1	SW NE SW Section 18, T 4N R 39E
Well #3	SW NW Section 18, T 4N R 39E

Claim A25-04009 is not included on the transfer. Its priority date indicates it refers to Well #1, the second well drilled. I propose recommending the claimed legal description (4N 39E 18 SW NE SW), which is the location of Well #1.

POU

The attached map provided by the city (following the engineer's report in paper file A25-04009) shows the projected "area of impact" of the city through year 2015. This is the service area requested by the city under the "growing cities" doctrine and corresponds to the design capacity of the current system. The dotted lines on the map show the 1995 city limits, which represent current conditions except for a few small annexations. Because I don't know how the

Year	County Pop.	City Pop. (Calculated)	Volume (acre feet/year)
2003	19781	3086	799

As with diversion rate, this can be approached under the "growing cities" assumption. In that case, each right should be recommended with the annual volume that should have been adequate up until the time of subsequent system upgrade. It can also be approached under a "need at time of development" assumption. This assumption is that since beneficial use rights were developed without permits, they are valid for the annual volume actually needed at the time of development. Table 6 shows the possible annual volume that could be recommended for each right, under each theory. As with diversion rates, as much volume as possible is assigned to the older rights, and the junior rights reflect only the incremental diversion volume suggested by the data. Columns "Growing Cities Vol. (acre ft/year)" and "Need at Time of Devel. Volume (acre ft/year)" are the columns that would be used for recommendations.

Table 6
Possible Water-right Diversion Volumes

Right	Priority	Growing Cities Vol. (acre ft/year)	Cum. Growing Cities vol.	Need at Time of Devel. Volume (acre feet per year)	Cum. Need at Time of Devel. Volume (acre ft/year)
A25-04010	12/31/1920	424	424	382	382
A25-04009	12/31/1947	3	427	42	424
A25-10496	3/1/1958 ^{note 8}	121	548	2	426
A25-04011	12/31/1961	120	668	1	427

Summary

Depending on the interpretation of the intersection of the "growing cities" doctrine and the nature of "beneficial use" claims, I have calculated possible diversion rates and volumes to be recommended. My calculations and assumptions should be superceded by any data the city is able to provide before the recommendations are prepared.

"growing cities" doctrine intersects with "beneficial use" claims I told Mr. Clark that IDWR would probably review this with assistant attorneys general before making a recommendation. I also suggested that the city contact IDWR regarding "place of use" before making further expansions of the city distribution system.

Overlap

The city owns canal shares, which it delivers for lawn and garden irrigation to part of the city. Apparently there are also private canal shareholders within the city. Claim A25-10688 and license 25-07523 also overlap these four rights.

Conflict

None noted.

Priority

Affidavits in the files confirm the historical existence of wells corresponding to claims A25-04009, A25-04010 and A25-04011. Evidence supports:

Original Well #2 (currently unused)	12/31/1920
Original Well #1 (currently well #1)	12/31/1947
Original Well #3 (filled with concrete)	12/31/1961
Enlargement of Capacity, original Well #2 and Well #1 (claim A25-10496)	no evidence

b) Diversion Volume

I don't remember if diversion volume is specified for municipal recommendations. If it is, required diversion volume can be calculated in three different ways:

- The USGS RASA report "Water Use on the Snake River Plain, Idaho and Eastern Oregon" (selected pages included in paper file A25-04009) suggests 231 gallons/day/person for municipal use. This translates to 0.259 acre feet per person per year.
- The IDWR Water Measurement Program data suggest current annual diversion volume is about 494 acre feet/year for Well #3, 29 acre feet/year for Well #2, and fire-fighting use only for Well #1. Using the 2000 census of 2998 people, this suggests a volume of 0.17 acre feet per person per year. If the Water Measurement Program data are incomplete, this volume will be misleadingly low.
- Using the 2000 census ratio of 2.71 persons per household for Rigby and the IDWR Field Examiner's Handbook value of 0.6 acre feet per household per year gives a value of 0.22 acre feet per person per year. This does not consider additional municipal uses such as businesses, parks, and schools.

Because of the possibility of omissions in the last two methods, I propose using the USGS estimate of 0.259 acre feet per person per year. Using that volume and the population estimates of Table 2, I calculated required annual diversion volumes. The results are listed in Table 5:

Table 5:
Calculated Required Diversion Volumes
For City of Rigby

Year	County Pop.	City Pop. (Calculated)	Volume (acre feet/year)
1920	9441	1473	382
1930	9171	1431	371
1940	10762	1679	435
1950	10495	1637	424
1960	11672	1821	427
1970	11619	1812	469
1980	15304	2387	618
1990	16543	2581	668
2000	19223	2998	776

Quantity

a) Diversion Rate

In paper file A25-10496 is a copy of an undated report of a pumping test of 2000 gallons per minute for original Well #3. This confirms *well* capacity but not necessarily *pumping plant* capacity. There is no other evidence of original capacities of the wells, nor is there evidence for the claimed increase in diversion capacity represented by claim A25-10496.

The engineer's report (page 2-3) documents current capacity of:

Well #1	2,100 gallons per minute (4.67 cfs)
Well #2	1,150 gallons per minute (2.56 cfs)
Well #3	2,050 gallons per minute (4.57 cfs)
Total	5,300 gallons per minute (11.81 cfs)

The report (page 2-1) indicates a design discharge pressure of 50-55 psi. IDWR water measurement program data indicate the following:

Well #1	150 hp ¹	dynamic lift 138 feet	discharge to pressurized system
Well #2	100 hp	unknown ²	
Well #3	125 hp	dynamic lift 220 feet	discharge to tank ³

I calculated theoretical capacities using an assumed efficiency of 70%, assumed friction loss of 15 feet, pressure lift = 2.31 x psi, and the formula:

$$\text{GPM} = (\text{water horsepower})(3960)/(\text{Total Dynamic Head}).$$

Results are given in Table 1:

¹ The paper files have a photo pasted over what appears to be the motor data field notes, and the WMIS database is blank. However, WMIS lists 150 hp for a well known as the "fire well," and Well #1 is also listed as the "fire well" on the paper reports from the IDWR Water Measurement program.

² One of the IDWR Water Measurement paper-file reports lists "Deep well 500" for pumping lift, but I believe this actually refers to the depth of the well. I assume the same lift as Well #1 for calculations, which is a more generous assumption than assuming the same lift as Well #3.

³ The discharge tank appears to be about 12 feet tall, I assume the average water level the pump is pushing against is 6 feet. I assume it is a non-pressurized tank.

Table 3
Diversion Rates Applying "Growing Cities" Doctrine

Right	Priority	Recommend CFS ⁶	Cum. Calc. CFS	Claim CFS ⁷	Cum. Claim CFS
A25-04010	12/31/1920	1.45	3.99	1.45	1.45
A25-04009	12/31/1947	2.80	4.43	2.80	4.25
A25-10496	3/1/1958 ^{note 8}	1.11	5.36 ^{note 9}	3.90	8.15
A25-04011	12/31/1961	0.92	6.28	2.45	10.60

If it is found that beneficial use rights can only be established for the need that existed at the time of establishment, and using the least generous diversion rates, the results in Table 4 could be suggested. As before, column "Recommend CFS" is the quantity that I would propose for each priority date:

Table 4
Diversion Rates Based on
Need at Time of Development

Right	Priority	Recommend CFS	Cum. Calc CFS	Claim CFS	Cum Claim CFS
A25-04009	12/31/1920	1.45	2.32	1.45	1.45
A25-04010	12/31/1947	1.13	2.58	2.80	4.25
A25-10496	3/1/1958 ^{note 8}	0.15	2.73	3.90	8.15
A25-04011	12/31/1961	0.14	2.87	2.45	10.60

Even under the more generous assumptions of Table 3, the total diversion rate available would be 6.28 cfs under the adjudication recommendations plus 2.51 cfs from the license, or 8.79 cfs. This is less than the engineer's report of current capacity and the projected needs for year 2015. It approximately matches my theoretical calculations.

A third alternative would be to recommend a total 9.30 cfs in the adjudication. In combination with the license, that would mean the full current capacity of 11.81 cfs is authorized. This implies an assumption that the pre-March-1963 capacity was 9.30 cfs, or that the "growing cities" doctrine trumps the permit requirement.

⁶ Incremental CFS associated with this priority date.

⁷ Claimed diversion rates are from transfer 4791, as a stated purpose of the transfer was to "clarify claim amount."

⁸ Claimed date; no evidence of priority in file.

⁹ Half the required capacity indicated by 1990 census is added to 1958 upgrade, half to 1961 new well.

Table 1: Current Capacity
(Theoretical Calculations)

Well	Motor hp	Water hp	Lift	Friction	Press. (psi x 2.31)	TDH	GPM
1	150	105	138	15	116	269	1546
2	100	70	138 ⁴	15	116	269	1030
3	125 ^{note 5}	87.5	220	15	6 ^{note 3}	241	1438

These calculations suggest a current capacity of about 4,014 gallons per minute or 8.94 cfs.

The required diversion rate can be calculated in two different ways:

- The pages of the report that I received do not document the design population, but Mr. Nelson tells me it is 7,500 people and corresponds to the year 2,015. Based on this population and the capacity according to the engineering report, the per-person diversion requirement is (11.81 cfs/7,500 persons = 0.001575 cfs/person).
- The IDWR field examiner's handbook suggests 0.33 cfs for each 50 households served. The US Census Bureau website gives Rigby's year-2000 population as 2998, with 1107 housing units. This gives a relationship of 2.71 persons/household. Applying this relationship to the handbook value gives (0.33 / (50 x 2.71) = 0.002435 cfs/person).

The Census website does not give city populations for other years besides 2000, but it gives total Jefferson County population. In 2000, Rigby's population was (2,998/19,223 = 15.6 %) of the county population. Table 2 lists the required diversion rates calculated from these values:

⁴ Assumed from Well #1.

⁵ There are booster pumps in the Well #3 facility but they pressurize water from the tank and do not affect the available HP or TDH for the well pump itself. The Well #3 facility can deliver more than this rate to the water mains but I have calculated the rate of extraction from the aquifer.

Table 2:
Calculated Required Diversion Rates
For City of Rigby (cfs)

Year	County Pop.	City Pop. (Calculated)	Rate 1 0.001575	Rate 2 0.002435
1920	9441	1473	2.32	3.59
1930	9171	1431	2.25	3.48
1940	10762	1679	2.64	4.09
1950	10495	1637	2.58	3.99
1960	11672	1821	2.87	4.43
1970	11619	1812	2.85	4.41
1980	15304	2387	3.76	5.81
1990	16543	2581	4.07	6.28
2000	19223	2998	4.72	7.30
2003	19781	3086	4.86	7.51

Absent evidence of motor and pump sizes, this table could be used to assign diversion rates to the various priority dates. Under a liberal interpretation of the "growing cities" doctrine, one could assert that the well developed in 1920 must have had a capacity to serve a 1947 population, because the system was not upgraded until then. Likewise, the 1947 and 1920 wells in combination must have had adequate capacity for about a 1960 population, corresponding to the increase in capacity of the first two wells and the drilling of the well near the Harwood School. That upgrade and new well appear to have served until about 1989 when the Armory Well was drilled, so the 1961 capacity must have been adequate for the 1989 population.

Under that reasoning and using the most generous per-person diversion rates, the results in Table 3 could be suggested. Both the claim and the calculated requirements limit the column "Recommend CFS". It represents the additional cfs proposed for each priority date listed: