

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 85-15343

Exam Date: 10/3/2012

1. Current Owner: MARK B FAGAN
2430 GRELLE AVE
LEWISTON ID 83501
(208)750-1168 or (208)413-2019

2. Accompanied by: Permit holder

3. **SOURCE**

GROUND WATER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: NONE (no overlaps found)
2. Other water rights with the same point of diversion: NONE

C. DIVERSION AND DELIVERY SYSTEM1. **LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER SW1/4SE1/4 Sec. 13, Twp 35N, Rge 05W, B.M. NEZ PERCE County

Method of Determination: GPS

2.

PLACE OF USE: DOMESTIC

Twp Rge Sec	NE				NW				SW				SE				Totals
35N 05W 13	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
															X		

PLACE OF USE: IRRIGATION

Twp Rge Sec	NE				NW				SW				SE				Totals
35N 05W 13	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
															2.5		2.5

Total Acres: 2.5

Method of Determination: Permit holder

3. ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
☒ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
☒ Aerial Photo Attached (required for irrigation of 10+ acres).
☒ Photo of Diversion and System Attached

4.

<u>Well or Diversion</u> <u>ID No.*</u>	<u>Motor Make</u>	<u>Hp</u>	<u>Motor Serial No.</u>	<u>Pump Make</u>	<u>Pump Serial No. or Discharge</u> <u>Size</u>
D0005783	Unknown	3			2"

D. FLOW MEASUREMENTS

1.

<u>Measurement</u> <u>Equipment</u>	<u>Type</u>	<u>Make</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Size</u>	<u>Calib. Date</u>
Bucket and stopwatch and Pressure gage						

2. Measurements:

1. Bucket and stopwatch discharging into a 40 gallon storage tank. We connected a ¾" hose to a hydrant and ran the 50' hose to the storage tank.

2. A pressure gage was placed at the hydrant where the bucket and stopwatch was conducted.

3. Sprinkler system estimate based on configuration

4. Pressure information will be input into horsepower equation

5. Pipe flows when estimated at 5 fps

E. FLOW CALCULATIONS

Measured Method:

1. The bucket and stopwatch measurement resulted in 20 gpm. This result is going to be on the low side because of size restrictions of the hose and hydrant. This test will be considered moot and theoretical measurements will be used to find the diversion rate.

2. During the measurement above, the pressure moved from 45 psi and stabilized at 52 psi. The permit holder told me that he has the system designed to run between 65 and 45 psi.

3. The sprinkler system that was in place consisted of 14 sprinklers running at once through 1/8" nozzles. According to sprinkler system discharge from Rainbird, the nozzles will do 3.03 gpm each or ~42 gpm total when the system is running at 45 psi. I would expect that the pressure would be reduced down the line. When the system is running at 35 psi, the nozzles can put out 2.68 gpm or 38 gpm total. My figures put the system's range in between **0.08 to 0.10 cfs**

4. Horsepower of the pump on the system = 3

Lift according to the well driller's report = 120'

Pressure = 45 (using the lower end of the range since more water will be diverted when the pump kicks on)

Efficiency = 70% in accordance with IDWR standard

$$8.8 \times 3 \times 0.7 / 120 + (2.31 \times 45) = 18.48/223.95 = 0.08 \text{ cfs}$$

5. The conveyance system consists of 2" hand lines. When correctly designed at 5 fps a 2" pipe can accommodate 0.11 cfs $Q=5\pi r^2 \rightarrow Q = 5 \times 3.1416 \times 0.0833^2 = 0.11 \text{ cfs}$

Conclusion: It appears that irrigation system has the capacity of ~0.10 cfs; however, the horsepower equation suggests that the well has a capacity of 0.08 cfs. When the horsepower is calculated using a different efficiency of 85% instead of 70%, I see that the well can produce 0.10 cfs. Because the efficiency is simply estimated and other calculations estimate a higher diversion rate, I believe that the permit holder should be given the benefit of the doubt and license this right for the permitted rate of 0.10 cfs total (0.06 for irrigation and 0.04 for domestic).

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 2.5 \times 4 = 10 \text{ af}$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = 0.06 \times 294 \times 1.9835 = 40 \text{ af}$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} = \underline{10 \text{ afa}}$$

2. Volume Calculations for Other Uses: Domestic use consists of standard in-house use = 0.6 afa

G. NARRATIVE/REMARKS/COMMENTS

The permit holder told me that after he got his permit he tried to grow alfalfa. He said that he was only able to get one cutting and determined that it wasn't worth his while to continue growing the hay after the first year or two. Even though it had been since the development period that the permit holder irrigated >0.5 acre; he had developed the irrigation system and completed beneficial use during that time and is therefore entitled to a license with irrigation use. Irrigation district water is not available and hasn't been used at the POU. The development period is from 2001 to 2006. Unfortunately, there isn't great aerial photography during this time; 2004 appears to have been taken in the spring and 2006 shows that everything but the lawn is dry and SPOT imagery from 2002-03 is also inconclusive. Mr. Fagan told me which fields he irrigated and based on the sprinkler system located at the POU, I believe there is sufficient evidence to license this right with 2.5 acres of irrigation.

The domestic use includes the home and the shop. The domestic use that is occurring at the home and shop is for a couple people under standard conditions. The department standard for domestic use is 0.6 afa.

Note that the permit holder didn't submit a fee with his proof statement but realized that his license can include irrigation since it was developed. He submitted the appropriate fee (\$75 including late fee).

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
DOMESTIC	01/01 to 12/31	0.040 CFS	0.6 af
IRRIGATION	02/15 to 11/30	0.060 CFS	10 af
<u>Totals:</u>		0.100 CFS	10.6 afa

2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☒ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

I. AUTHENTICATION

Field Examiner's Name Cheryl Palmer Date 11-12-12

Reviewer _____ Date _____

2004

2004 NAIP Imagery



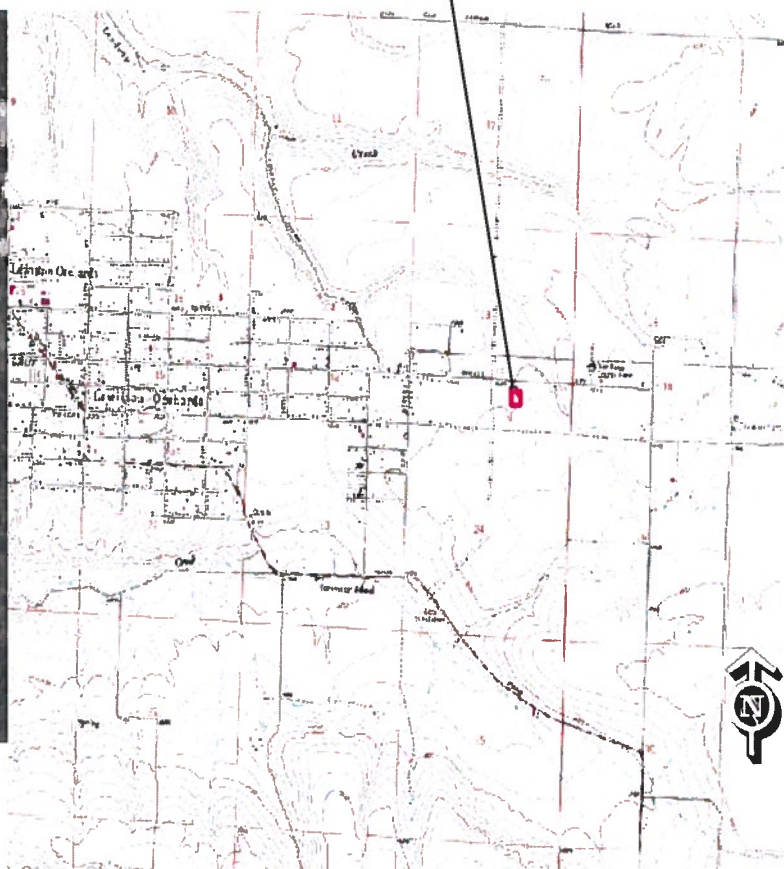
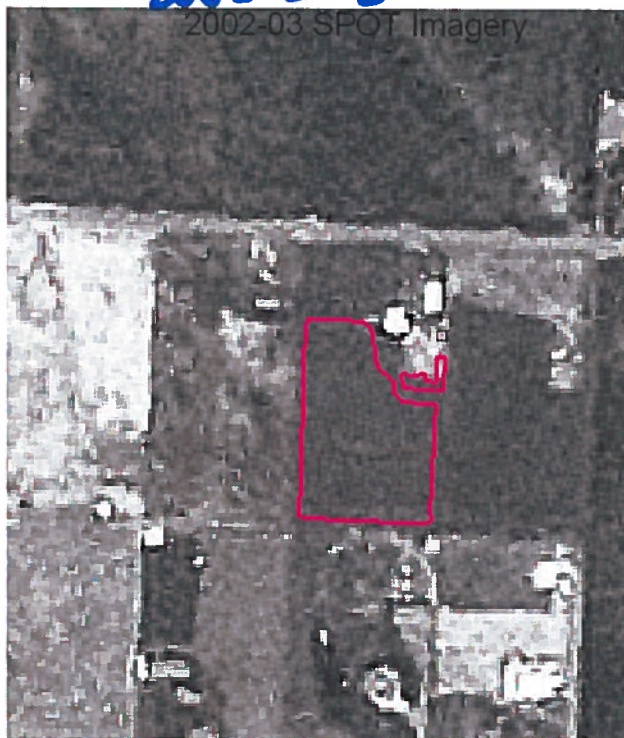
2006

2006 NAIP Imagery

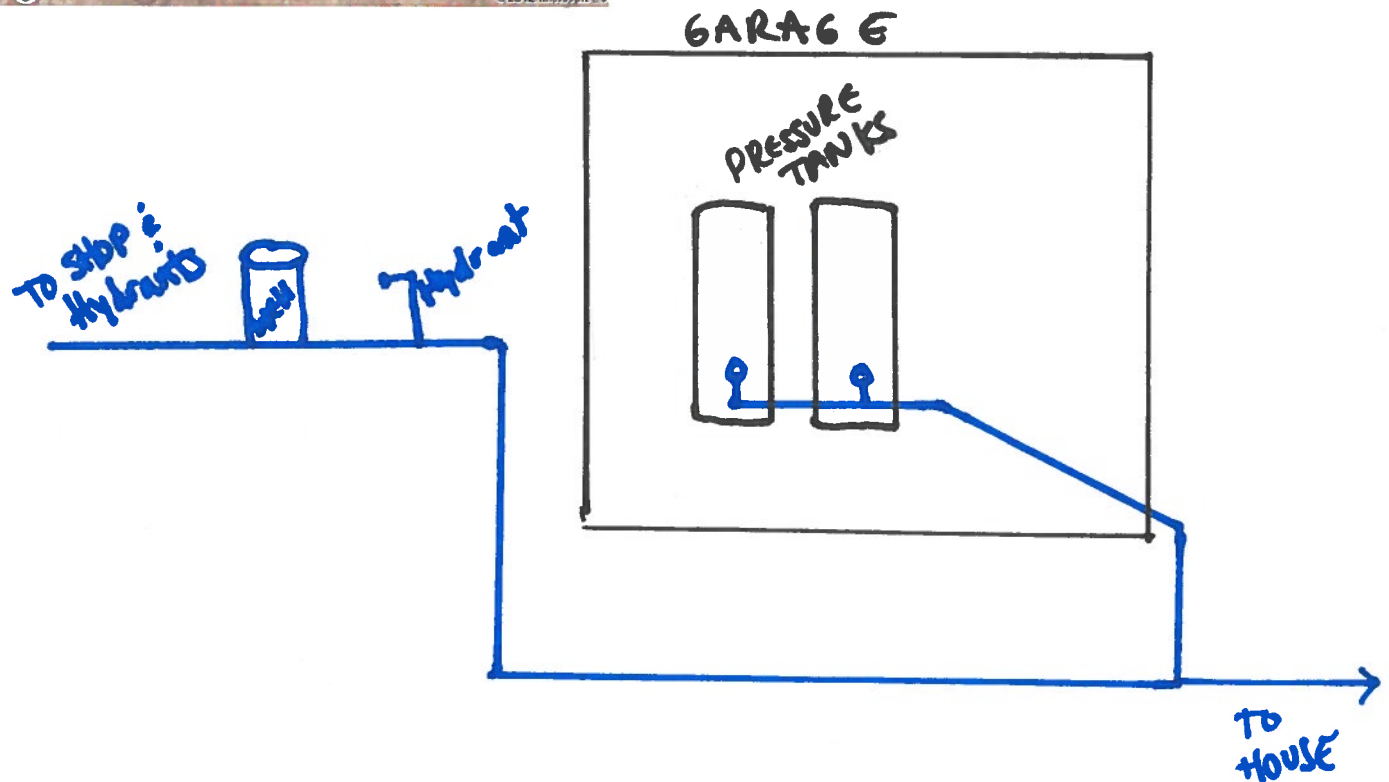


2002-2003

2002-03 SPOT Imagery



Delivery System





Well D0005783



Looking east direction
on north side of the
garage. This hydrant
and hose were used
in physical measurement.



Inside garage, 2 pressure tanks and automatic sprinkler controls.



Looking south at the house.



Hydrant in the barn.



Looking south
towards ground
that used to be
irrigated.



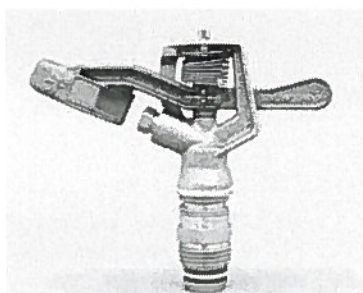
Rainbirds w/ 1/8" nozzles



Looking westerly
towards POV



Shop



20JH

1/2" 13mm Full Circle, Brass Impact Sprinkler

Bearing: 1/2" Male NPT, Brass

Trajectory Angle: 23°

Operating Range: 35-60 psi 2.4-4.1 bars

Flow Rate: 2.05-4.7 GPM 0.47-1.24 m³/h

Radius: 38-44 ft. 11.6-13.4 meters

One 1/8" Female NPT Nozzle Port

Features

- Durable brass die-cast arm
- Stainless steel springs and fulcrum pin
- Chemically resistant Teflon™ washers
- Two-year warranty

Benefits

- Spoon drive arm runs on larger nozzles and higher pressures
- Corrosion and grit resistant
- Built to last

U.S. STANDARD DATA | METRIC DATA

PERFORMANCE DATA

20JH

STRAIGHT BORE NOZZLE (SBN-1)*

(Stream Height: 6 ft.)

PSI (at Nozzle)	NOZZLE SIZE US STANDARD							
	7/64"		1/8"		9/64"		5/32"	
	Rad.	GPM	Rad.	GPM	Rad.	GPM	Rad.	GPM
35	38	2.05	38	2.68	39	3.39	39	4.19
40	38	2.19	39	2.86	40	3.62	39	4.47
45	39	2.32	39	3.03	40	3.84	40	4.73
50	39	2.45	39	3.20	40	4.05	40	5.00
55	39	2.57	40	3.35	40	4.24	40	5.23
60	39	2.68	40	3.50	41	4.43	41	5.47

STRAIGHT BORE NOZZLE WITH VANE (SBN-1V)*

(Stream Height: 7 ft.)

PSI (at Nozzle)	NOZZLE SIZE US STANDARD							
	1/8"		9/64"		5/32"			
	Rad.	GPM	Rad.	GPM	Rad.	GPM	Rad.	GPM
35	39	2.68	41	3.39	42	4.19		
40	40	2.86	41	3.62	42	4.47		
45	40	3.03	42	3.84	42	4.73		
50	41	3.20	42	4.05	43	5.00		
55	41	3.35	43	4.24	43	5.23		
60	41	3.50	43	4.43	44	5.47		

STRAIGHT BORE NOZZLE (SBN-1)*

(Stream Height: 1.8m)

BARS (at Nozzle)	NOZZLE SIZE METRIC											
	2.78 mm (7/64")			3.18 mm (1/8")			3.57 mm (9/64")			3.97 mm (5/32")		
	Rad. (m)	Flow (lps)	Flow (m³/h)	Rad. (m)	Flow (lps)	Flow (m³/h)	Rad. (m)	Flow (lps)	Flow (m³/h)	Rad. (m)	Flow (lps)	Flow (m³/h)
2.4	11.6	0.13	0.47	11.7	0.17	0.61	12.0	0.21	0.77	12.0	0.26	0.95
2.5	11.6	0.13	0.47	11.8	0.17	0.62	12.1	0.22	0.78	12.0	0.27	0.97
3.0	11.8	0.14	0.52	12.0	0.19	0.68	12.2	0.24	0.86	12.1	0.29	1.06
3.5	11.9	0.16	0.56	12.1	0.20	0.73	12.3	0.26	0.93	12.3	0.32	1.14
4.0	12.0	0.17	0.60	12.2	0.22	0.78	12.4	0.27	0.99	12.4	0.34	1.22
4.1	12.0	0.17	0.61	12.2	0.22	0.79	12.5	0.28	1.01	12.5	0.35	1.24

STRAIGHT BORE NOZZLE WITH VANE (SBN-1V)*

(Stream Height: 2.1m)

BARS (at Nozzle)	NOZZLE SIZE METRIC											
	3.18 mm (1/8")			3.57 mm (9/64")			3.97 mm (5/32")					
	Rad. (m)	Flow (lps)	Flow (m³/h)	Rad. (m)	Flow (lps)	Flow (m³/h)	Rad. (m)	Flow (lps)	Flow (m³/h)	Rad. (m)	Flow (lps)	Flow (m³/h)
2.4	12.0	0.17	0.61	12.5	0.21	0.77	12.8	0.26	0.95			
2.5	12.1	0.17	0.62	12.5	0.22	0.78	12.8	0.27	0.97			
3.0	12.3	0.19	0.68	12.8	0.24	0.86	13.0	0.29	1.06			
3.5	12.5	0.20	0.73	13.0	0.26	0.93	13.1	0.32	1.14			
4.0	12.5	0.22	0.78	13.2	0.27	0.99	13.3	0.34	1.22			
4.1	12.5	0.22	0.79	13.3	0.28	1.01	13.4	0.35	1.24			

* Available without Nozzle or Assembled with either a 7/64" (07) or 1/8" (08) Straight Bore Nozzle. All other Nozzles must be purchased separately. See Chart below.

Part Numbers and Ordering Information

Sprinkler Only	
Sprinkler without Nozzle	A05840
Assembled Sprinkler/Nozzle Factory Combination	
Sprinkler with Nozzle SBN-1 7/64"	A0584107
Sprinkler with Nozzle SBN-1 1/8"	A0584108

Nozzle Only			XX = Nozzle Size			
U.S. Standard			7/64"	1/8"	9/64"	5/32"
Metric			2.78 mm	3.18 mm	3.57 mm	3.97 mm
Brass Straight Bore Nozzle	SBN-1	105780-XX	07	08	09	10
Brass Straight Bore Nozzle with Vane	SBN-1-V	106160-XX	—	08	09	10

Bold nozzle size numbers denote the most common nozzle choices.