

MEMORANDUM

TO: Water Right File 63-33073

FROM: Daniel Nelson – Staff Hydrologist

DATE: September 8, 2014

SUBJECT: Licensing Review of Water Right 63-33073

This field exam was performed by Certified Field Examiner Scott King of SPF Engineering. Mr. King found that 225.4 acres were irrigated within the 236 acre permissible place of use described in the permit. Mr. King recommended that 13.1 acres of the 225.4 acres are completely covered by this water rights, and the diversion rate for the remaining 212.3 acres licensed under water rights 63-3469, 63-7154, 63-7247, and 63-11602 was increased to allow a full inch or 0.02 cfs per acre. Mr. King's recommended that this right be licensed for 1.88 cfs and 59 acre-feet to irrigate 225.4 acres in a 236 acre permissible place of use.

I agree with acres and locations of the points of diversion determined by the field examiner. However, I did have some questions on the diversion rates and volumes for this water right. I also had questions on the combined limitations Mr. King recommended. I contact Mr. King on these issues, and I believe the issues were resolved in an August 13, 2014 email received from Mr. King.

Mr. King originally recommended a diversion volume of 63 acre-feet of water. This diversion volume was incorrect. Mr. King corrected the diversion volume to 59 acre-feet in an email dated August 13, 2014.

Mr. King originally determined that the system capacity was 5.91 cfs. This amount was determined by using an existing measurement on Well #1 of 2.44 cfs, which was done on an open discharge system. Well #2 was measured by the examiner at 1.18 cfs. and Well #3 was measured at 2.11 cfs by the examiner for a total capacity of 5.91 cfs. I questioned Mr. King asking if well #1 was still an open discharge well or if it was now tied directly into the mainline. Mr. King confirmed that Well #1 was now tied directly into the mainline, so he adjusted the diversion rate using a theoretical calculation. The adjusted diversion rate was 1.83 cfs. Please see calculations for the adjusted diversion rate in the email dated August 13, 2014.

Whereas the capacity of the system cannot supply for the full diversion rate for all of the water rights diverted from these wells, Mr. King recommended that water rights 63-33073 and 63- 33705 be licensed for their full rate of diversion with a condition that limits the rate of diversion when all of the rights are combined together. I agree with Mr. King's assessment, since the water would be rotated from field to field depending on cropping patterns. The owner should have the flexibility to divert the full capacity of the system if they haying one field or have harvested a field at the end of the season.

Mr. King found that only 225.4 acres of the 236 acres were irrigated under this water right. Mr. King requested a permissible place of use, since the 236 acres is described as the permissible place of use under water rights 63-3469, 63-7154, 63-7247, and 63-11602 per water right transfer 73899. In a similar water right, 63-12447, this type of request was denied because the permissible place of use hadn't been established during the development period of the water right. Review of the aerial photography available to the Department suggests that only the 225.4 acres were irrigated from 2006 to 2013, so it doesn't appear as though the permissible place of use was established during the development period. I contacted Mr. King and informed him that we couldn't do the permissible place of use, but he could file a water right transfer after the permit is licensed to create the permissible place of use if his client chooses.

The following conditions should be included in the licensing of this permit:

X35 - Rights 63-3469, 63-7154, 63-7247, 63-11602, and 63-33703 when combined shall not exceed a total diversion rate of 4.51 cfs, a total annual maximum diversion volume of 1014.3 af at the field headgate, and the irrigation of 225.4 acres.

X35 - Rights 63-3469, 63-7154, 63-7247, 63-11602, 63-33703, and 63-33075 when combined shall not exceed a total diversion rate of 5.12 cfs, a total annual maximum diversion volume of 1306.8 af at the field headgate, and the irrigation of 290.4 acres.

I removed condition 26A and 004 at licensing, since they were not necessary. I also removed the combined condition on the permit that does not include the permit, since it doesn't address this specific water right. It does speak to the overlapping water rights, but shouldn't be included on this license.

There is no Boise Kuna Irrigation District water on this property. This property is above the canal.

Nelson, Dan

From: Nelson, Dan
Sent: Tuesday, September 02, 2014 10:35 AM
To: 'Scott King'
Subject: RE: Water Rights 63-33073 and 63-33075

I will use the theoretical. It works for me.

Thanks Scott.

Dan

From: Scott King [mailto:SKing@spfwater.com]
Sent: Tuesday, September 02, 2014 10:32 AM
To: Nelson, Dan
Subject: RE: Water Rights 63-33073 and 63-33075

Hi Dan,
I hope you had a good Labor Day weekend.

I don't plan to return for a measurement unless you need it. If the theoretical is reasonable, please use it.

Thank you for letting me know.

Scott

From: Nelson, Dan [mailto:Dan.Nelson@idwr.idaho.gov]
Sent: Tuesday, September 02, 2014 10:31 AM
To: Scott King
Subject: RE: Water Rights 63-33073 and 63-33075

Hello Scott,

I just got back into the office, and I my initial look at the theoretical that you calculated seems reasonable. We can use the re-adjusted theoretical or we can use a measurement if you plan to go back out. Either one will work.

The remainder of the information should work as verification that you are aware of the changes. I just needed to let you know before I changed things.

It will take me awhile to get back to this file, but I will try to get to it this week. If I need anything further, I will let you know.

Thank you

Daniel Nelson
Staff Hydrologist
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

From: Scott King [<mailto:SKing@spfwater.com>]
Sent: Thursday, August 14, 2014 10:39 AM
To: Nelson, Dan
Subject: RE: Water Rights 63-33073 and 63-33075

Sounds good. Thanks.

From: Nelson, Dan [<mailto:Dan.Nelson@idwr.idaho.gov>]
Sent: Thursday, August 14, 2014 10:40 AM
To: Scott King
Subject: Re: Water Rights 63-33073 and 63-33075

Hi Scott,

I

Will be out of the office until 9/2/2014.

I wanted to let you know before I left town. I will get in touch with you when I get back. Dan

Sent from my iPhone

On Aug 13, 2014, at 4:54 PM, "Scott King" <SKing@spfwater.com> wrote:

Dan,
I meant to attach these documents.
Scott

From: Scott King
Sent: Wednesday, August 13, 2014 4:10 PM
To: Dan Nelson (Dan.Nelson@idwr.idaho.gov)
Subject: RE: Water Rights 63-33073 and 63-33075

Dan,
You are correct that Well #1 now discharges directly into the mainline. We were relying on the prior discharge measurement and did not measure it during my exam visit. I will need to go out and measure this one and report back to you. As an alternate, we could use a theoretical capacity. Here's my thoughts:

- 1) The driller's report from 1962 lists a test delivery of 3000 gpm with 47 feet of drawdown for a specific capacity of 63.8 gpm/ft drawdown. Static water level was 187 ft, so pumping level was 234 ft. Theoretical using 70% efficiency and 100 hp motor with a 234 ft plus 5% of 234 for friction losses and 1 psi discharge pressure (open discharge) yields 2.49 cfs, which closely matches the 2.5 cfs measured in the earlier exams.
- 2) At 820 gpm, drawdown would be about 13 feet ($820 / 63.8$), for a pumping level of 200 ft ($187 + 13$). Add 5% of 200 for friction losses (10 ft) and discharge pressure of 55 psi (estimate based on observation at Pump 3). Theoretical flow at these conditions is 1.83 cfs.

63-33075

My volume calculation is in error. $65 \times 4.5 = 292.5$ as you identified.

63-33073

The recommendation section of 63 af is in error. The volume for 13.1 acres is 59 af as you show.

Does this clarify adequately?

Thanks,
Scott

From: Nelson, Dan [<mailto:Dan.Nelson@idwr.idaho.gov>]
Sent: Monday, August 11, 2014 9:19 AM
To: Scott King
Subject: Water Rights 63-33073 and 63-33075

Hello Scott.

I have started working through your field exams for water rights 63-33073 and 63-33075, and I am a bit confused with how the system operates.

On previous exams, Well #1 diverted into a pond and then was re-lifted by pumps into a sprinkler system. There does seem to be a small pond west of Well #2, but I couldn't tell from your system description if this is still the case, or if Well #1 discharges directly into the mainlines now. All of the previous measurements were done on an open discharge system, so if the system changed, then we would need to attain a measurement with the well under pressure. I would appreciate it if you could clear this up for me.

When I looked at the numbers, I found some things that didn't add up.

On water right 63-33075 - You recommended a volume of 262.5 af. When I do the calculations 65 acres X 4.5 af/ac I come up with 292.5 af. Was this an error or was there some sort of adjustment made?

On water right 63-33073 - You show a volume for the additional 13.1 acres of 59 af. That matched my calculations, but in the recommendation section you recommended 63 af. Was this an error or was there some sort of adjustment? Also in your calculations for the combined limit for 63-3469, 63-7154, 63-7247, 63-11602, and 63-33075 you came up with 1014.4 af. This matches the existing combined use of 955.4 plus the 59 af under 63-33073.

When water rights 63-3469, 63-7154, 63-7247, 63-11602, 63-33073, and 63-33075 are combined I calculated a maximum diversion rate of 5.81 cfs $[(225.4 \text{ acres} + 65 \text{ acre}) \times 0.02 \text{ cfs/ac} = 5.808]$, 1307 af $[(225.4 \text{ acres} + 65 \text{ acre}) \times 4.5 \text{ af/ac} = 1306.8]$, and 290.4 acres.

Daniel Nelson
Staff Hydrologist
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

<Well 1 Drillers Report.PDF>

<Thornton Open Discharge.pdf>

<Thornton Current.pdf>

Estimated Pumping Rate Computer

Flow Analysis Performed by: S. King

Date: 8/14/2014

Page 1 of 2

Record ID		Measured Flow:	
Water Right No.		Designed Flow:	
Name Thornton		HP/Eff Flow: 1.83 cfs	
pod Well #1		Sprinkler Flow:	
year: Current Conditions (pressurized discharge)		Pivot/System Flow:	
Flow Measurement: gpm =			
Curve/Pump Design: gpm =			
Horsepower / Efficiency Method			
Horsepower	100 hp		
PWL	210 ft		
Disch Psi	55 psi		
PUMP Eff Estimate	70%		
TDH	337 ft		
OHP	70 hp		
Flow	822 gpm	=	1.83 cfs
System Method:			
No Lines		Nozzle Equation: $Q = C \cdot A \cdot \sqrt{2 \cdot g \cdot h} / \sqrt{1 - r^4}$	
Birds per line		C=	1.00 Nozzle coefficient; typical 0.97 to 1.00
Ttl no nozzles	0	r=	0.0000 ft Nozzle radius
Nozzle size		A=	0.00000 ft ² Nozzle area
Nozzle pressure		h=	0 ft Head
Flow per nozzle	0.00 gpm	g=	32.2 ft/sec ² Gravitational constant
Sprinkler Flow	0 gpm	Q=	0.000 cfs Flow per nozzle
Percent Leaks	%	=	0.000 gpm Flow per nozzle
Total Flow	0 gpm		
Pivot / System rating gpm =			

Comments / Data Supplied:

Estimated Pumping Rate Computer

Flow Analysis Performed by: S. King

Date: 8/14/2014

Page 1 of 2

Record ID		Measured Flow:	
Water Right No.		Designed Flow:	
Name Thornton		HP/Eff Flow:	2.49 cfs <<--Max
pod Well #1		Sprinkler Flow:	
year: Open Discharge		Pivot/System Flow:	
Flow Measurement: gpm =			
Curve/Pump Design: gpm =			
Horsepower / Efficiency Method			
Horsepower	100 hp		
PWL	245.7 ft		
Disch Psi	1 psi		
PUMP Eff Estimate	70%		
TDH	248 ft		
OHP	70 hp		
Flow	1118 gpm	=	2.49 cfs
System Method:			
No Lines		Nozzle Equation: $Q=C*A*\sqrt{2*g*h} / \sqrt{1-r^4}$	
Birds per line		C=	1.00 Nozzle coefficient; typical 0.97 to 1.00
Ttl no nozzles	0	r=	0.0000 ft Nozzle radius
Nozzle size	in	A=	0.00000 ft^2 Nozzle area
Nozzle pressure	psi	h=	0 ft Head
Flow per nozzle	0.00 gpm	g=	32.2 ft/sec^2 Gravitational constant
Sprinkler Flow	0 gpm	Q=	0.000 cfs Flow per nozzle
Percent Leaks	%	=	0.000 gpm Flow per nozzle
Total Flow	0 gpm		
Pivot / System rating gpm =			

Comments / Data Supplied:

RECEIVED
JUN 10 1961

4.063
5-63-3.170

WELL LOG AND REPORT OF THE STATE RECLAMATION ENGINEER OF IDAHO

Department of Reclamation

36322

Permit No. 9-25169 Well No. _____ County _____

Owner Russel Cowe

Address Boise, Idaho

Driller Russel Cowe

Address Boise, Idaho

Well location NE 1/4 SE 1/4 Sec. 35, T. 2 N, R. 1 W

Size of drilled hole 16

Locate well in section

NW 1/4	NE 1/4
SW 1/4	SE 1/4

Total depth of well 447

Give depth to standing water from the ground 187 Water temp. _____ °Fahr.

On "Pumping Test" delivery was 3000 g.p.m. or _____ c.f.s. Drawdown was 47 feet.

Size of pump and motor used to make test 10"

Length of time of test 12 hours _____ minutes.

If flowing well, give flow _____ c.f.s. or _____ g.p.m. and of shut off pressure _____

If flowing well, described control works _____

(TYPE AND SIZE OF VALVE, ETC.)

Water will be used for irrigation Weight of casing per lineal foot 64

Thickness of casing .025 Casing material steel

(STEEL, CONCRETE, WOOD, ETC.)

Diameter, length and location of casing 16" 243 ft 247 ft. 10" perforated

(CASING 12" IN DIAMETER OR LESS, GIVE INSIDE DIAMETER;
CASING OVER 12" IN DIAMETER, GIVE OUTSIDE DIAMETER)

CASING RECORD

Diam. Casing	From Feet	To Feet	Length	Remarks—seals, grouting, etc.
16"	0	243	243	
10	240	447	207	perforated

Number and size of perforations 1 by 5 located 240 feet to 447 feet from ground
16 perforations per ft.

Date of commencement of well Oct. 1961 Date of completion of well Oct 1962

WELL LOG

[illegible]

WELL DRILLER'S STATEMENT

This well was drilled under my supervision and the above information is complete, true and correct to the best of my knowledge and belief.

Signed _____

By _____

Dated _____, 19____.

License No. 65

Nelson, Dan

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Nelson, Dan

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To: 'Scott King'
Subject: RE: Water Rights 63-33073 and 63-33075

Scott,

I sent this before I was completely done. If you could clear up these issues, I would really appreciate it. I am planning to be out of the office between August 14, 2014 and September 2, 2014. I am going to try to take care of some issues while I am gone, but I can't guarantee anything. I wanted to let you know that there might be a delay in finalizing these exams.

Thank you for your time and effort.

Daniel Nelson
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Fax (208) 287-6700 (attn: Dan Nelson)

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