

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 2-10416

Exam Date: 9/24/2012

1. Current Owner: GEM IRRIGATION DISTRICT
PO BOX 67
HOMEDALE ID 83628
(208)337-5107
2. Accompanied by: Ron Keister (Gem ID), John Eells (Gem ID)
Phone No: (208) 337-3505
Address: PO Box 67, Homedale, Idaho 83628
Relationship to Permit Holder: Manager, Ditch Rider
3. **SOURCE** **TRIBUTARY**
SNAKE RIVER COLUMBIA RIVER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: 2-64, 2-65, 2-10416, 57-2118, 57-2177, 57-4104, 57-10854, 57-10901, 57-10912 and 57-10913
2. Other water rights with the same point of diversion: : 2-64, 2-65

C. DIVERSION AND DELIVERY SYSTEM**1. LOCATION OF POINT(S) OF DIVERSION:**

SNAKE RIVER NW1/4SE1/4 Sec. 32, Twp 04N, Rge 05W, B.M. OWYHEE County

2. ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
- ☒ Aerial Photo Attached (required for irrigation of 10+ acres).
- ☒ Photo of Diversion and System Attached

3.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
1-S	Fairbanks-Morse	200	A505 KZKUY	Floway	14.06"
Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
2-N	Fairbanks-Morse	200	A505 KZKUY	Floway	14.06"

*Code to correspond with No. on map and aerial photo

Method of Determination: GPS on site visit. Tag number A0016995.

2. Place Of Use

IRRIGATION within CANYON,OWYHEE Counties

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
02N	04W	2										X							0.0
02N	04W	2											X L1						0.0
02N	04W	3	X																0.0
02N	04W	3		X L3	X L4		X L2	X L1	X	X	X	X	X	X	X L5	X	X	X	0.0
02N	04W	4	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	X	X	X	X	X	0.0
02N	04W	5	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	X	X	X	X	X	0.0
02N	04W	6	X L1	X L2	X	X	X L3	X L4	X L5	X	X	X L6	X L7	X	X	X	X	X	0.0
02N	04W	7	X	X	X	X	X	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	0.0
02N	04W	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	04W	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	04W	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	0.0
02N	04W	11															X		0.0
02N	04W	11					X L1	X	X	X L2	X L3	X	X L4	X L4					0.0
02N	04W	14					X L1												0.0
02N	04W	15						X	X										0.0
02N	04W	16	X	X	X	X	X	X	X	X		X							0.0
02N	04W	17	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	04W	18	X	X	X	X	X	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	0.0
02N	04W	19	X	X	X	X									X	X			0.0
02N	04W	20					X	X	X			X							0.0
02N	05W	1	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	2	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	3	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	4	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	5	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	6	X L1	X L2	X	X	X L3								X			X	0.0

02N	05W	8	X	X	X	X	X			X					X	X	X	X	0.0
02N	05W	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		0.0
02N	05W	14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
02N	05W	21	X	X															0.0
02N	05W	22	X	X	X	X	X	X	X	X	X				X	X	X	X	0.0
02N	05W	23	X	X	X	X	X	X	X	X		X	X						0.0
02N	05W	24						X	X										0.0
03N	04W	17									X			X			X		0.0
03N	04W	17										X	X	X			X		0.0
03N	04W	18									X		X	X	X	X			0.0
03N	04W	18									X		X	X	X	X	X	X	0.0
03N	04W	19	X	X	X	X	X	L1	L2	X	X	X	L3	L4	X	X	X	X	0.0
03N	04W	20	X			X													0.0
03N	04W	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	04W	21							X		X	X		X			X		0.0
03N	04W	21							X		X	X	X	X			X		0.0
03N	04W	27						X	X			X		X					0.0
03N	04W	27						X	X			X	X	X					0.0
03N	04W	28	X	X															0.0
03N	04W	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	04W	29	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	04W	30	X	X	X	X	X	L1	L2			X	L3	L4			X	X	0.0
03N	04W	31	X	X	X	X	X	L1	L2			X	L3	L4			X	X	0.0
03N	04W	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	04W	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	04W	34					X			X	X			X			X		0.0

[illegible]

								L1	L2			L3	L4						
03N	05W	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
								L1	L2			L7	L4						
03N	05W	32	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	05W	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	05W	34	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	05W	35	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	05W	36	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	06W	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
			L1	L2			L3	L4											
03N	06W	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
			L1	L2			L3	L4	L5			L6	L7						
03N	06W	11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
								L1	L2			L3	L4						
03N	06W	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	06W	13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
03N	06W	14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
								L1	L2			L3	L4						
03N	06W	23	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
			L1	L2			L3	L4	L5			L6	L7						
03N	06W	24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
			L1	L2		L5	L3	L4							L6			L7	
03N	06W	25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
			L1			L2									L3			L4	
03N	06W	26	X	X	X	X	X	X	X	X					X	X		X	0.0
								L1	L2										
03N	06W	36	X	X	X	X	X	X	X	X					X	X	X	X	0.0
			L1			L2									L3			L4	
04N	05W	19			X	X			X	X									0.0
04N	05W	19			X	X			X	X	X	X	X	X	X	X	X	X	0.0
					L6	L5			L8	L7		L9	L10						
04N	05W	20										X	X						0.0
												L3							
04N	05W	20										X	X						0.0
												L4							
04N	05W	29					X			X	X			X					0.0
04N	05W	29					X	X	X	X	X	X	X	X	X				0.0
							L8	L8	L7	L7	L6	L6	L5	L5					
04N	05W	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
							L1	L2				L3	L4						
04N	05W	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
							L1	L2				L3	L4						
04N	05W	32			X		X									X			0.0
04N	05W	32			X		X	X	X	X	X	X	X	X		X	X	X	0.0
					L6		L7			L6					L5			L4	
04N	05W	33											X						0.0
												L3							

04N	06W	14										X	X L8	X			X		0.0
04N	06W	23	X	X L2															0.0
04N	06W	23	X L1	X	X	X	X	X L3	X L4	X	X	X L5	X L6	X	X	X	X	X	0.0
04N	06W	24			X L6	X	X	X		X L5									0.0
04N	06W	24			X L7	X L5	X L4	X L4	X	X	X	X	X	X	X	X	X	X	0.0
04N	06W	25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0
04N	06W	26	X	X	X	X	X	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	0.0
04N	06W	35	X	X	X	X	X	X L1	X L2	X	X	X L3	X L4	X	X	X	X	X	0.0
04N	06W	36	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0.0

Right Acre Limit: 2,108.4

POU Total Acres: 22,603.0

Method of Determination: Service area associated with Gem irrigation District rights.

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
SonTek		FlowTracker				

2. Measurements: 20.65 cfs

E. FLOW CALCULATIONS

_____ Additional Computation Sheets Attached

Measured Method: Measured flow in lower canal from pumping station and return flow from canal. Subtracted measured flow from Basin 57 diversions into canal.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: N/A

$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$ _____

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

$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$ _____

2. Volume Calculations for Other Uses: No annual volume limitation required.

G. NARRATIVE/REMARKS/COMMENTS

First field exam was done 9/24/2012. Measurements with a polysonic or Fuji could not be made on outflow pipes from pumps due to sediment in pipes. Two 200 hp pumps supply water from Snake River to 2 14" pipes manifolded at pumphouse. Single 16" pipeline discharges into a lower canal where measurements were made. Canal upstream of pipeline discharge is entirely from Succor Creek water. Pipeline flow was measured downstream of pipeline discharge box. Return flow upstream of discharge box was also measured. Finally, canal flow of Succor Creek water was measured upstream of discharge box approximately 1/4 mile. Pump flow was determined by adding canal flow below discharge box and return flow and subtracting Succor Creek canal flow. All measurements were done with a SonTek FlowTracker.

A second field exam was requested by Gem Irrigation District and carried out 10/24/2012. A similar method was used and 17 cfs was calculated. The higher of the two measurements is used in this license.

See Dan Nelson's of 12/11/2013 for comparison of these measurements to historic diversion rates.

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>
IRRIGATION	03/01 to 11/15	20.650 CFS	
<u>Totals:</u>		20.650 CFS	

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

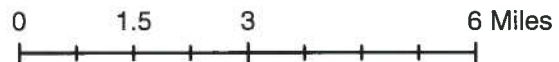
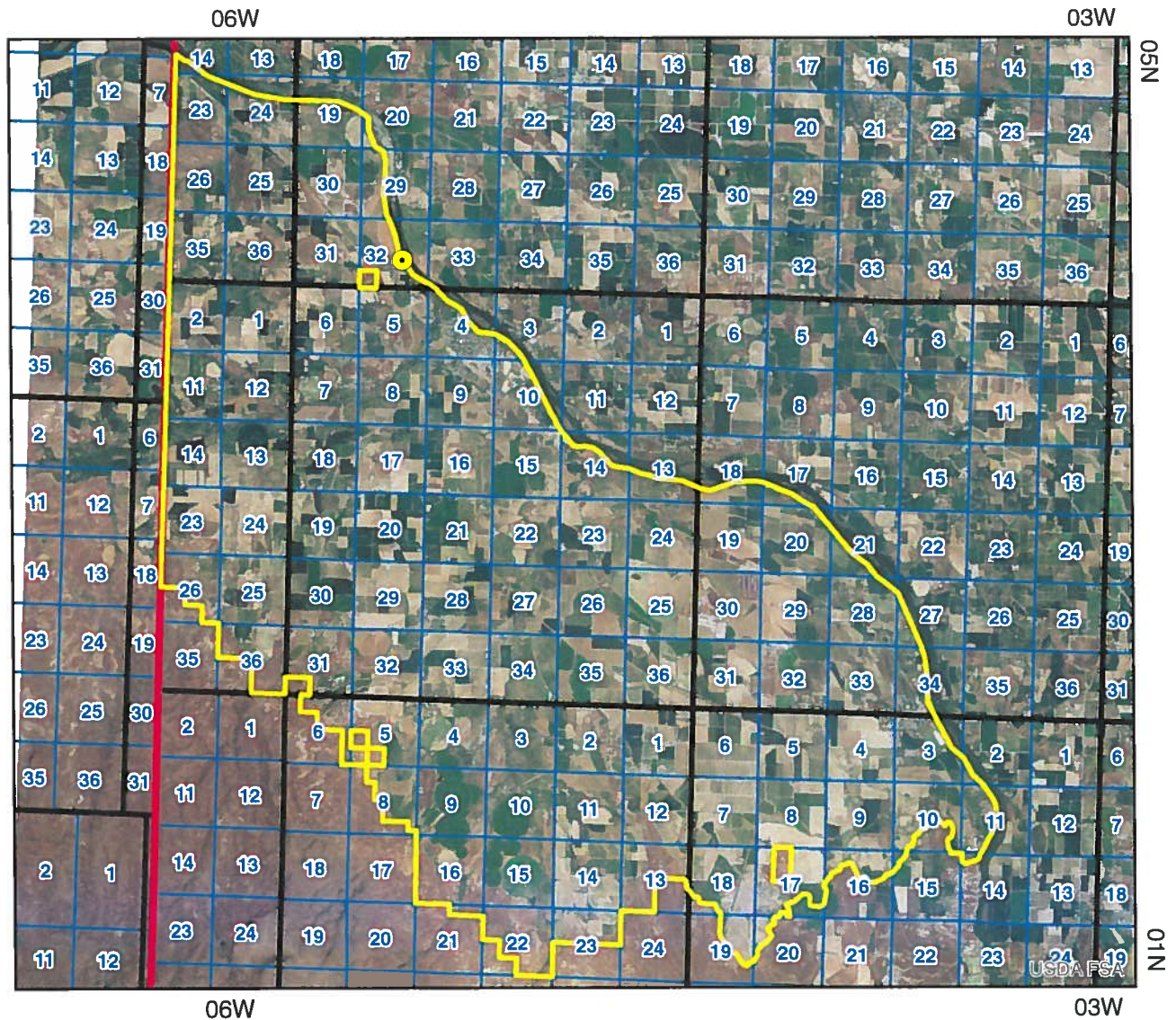
Field Examiner's Name  Date 1/2/2014
 Reviewer  Date 1-2-14

Gem Irrigation District

Field Exam Map for Water Right License

2-10416

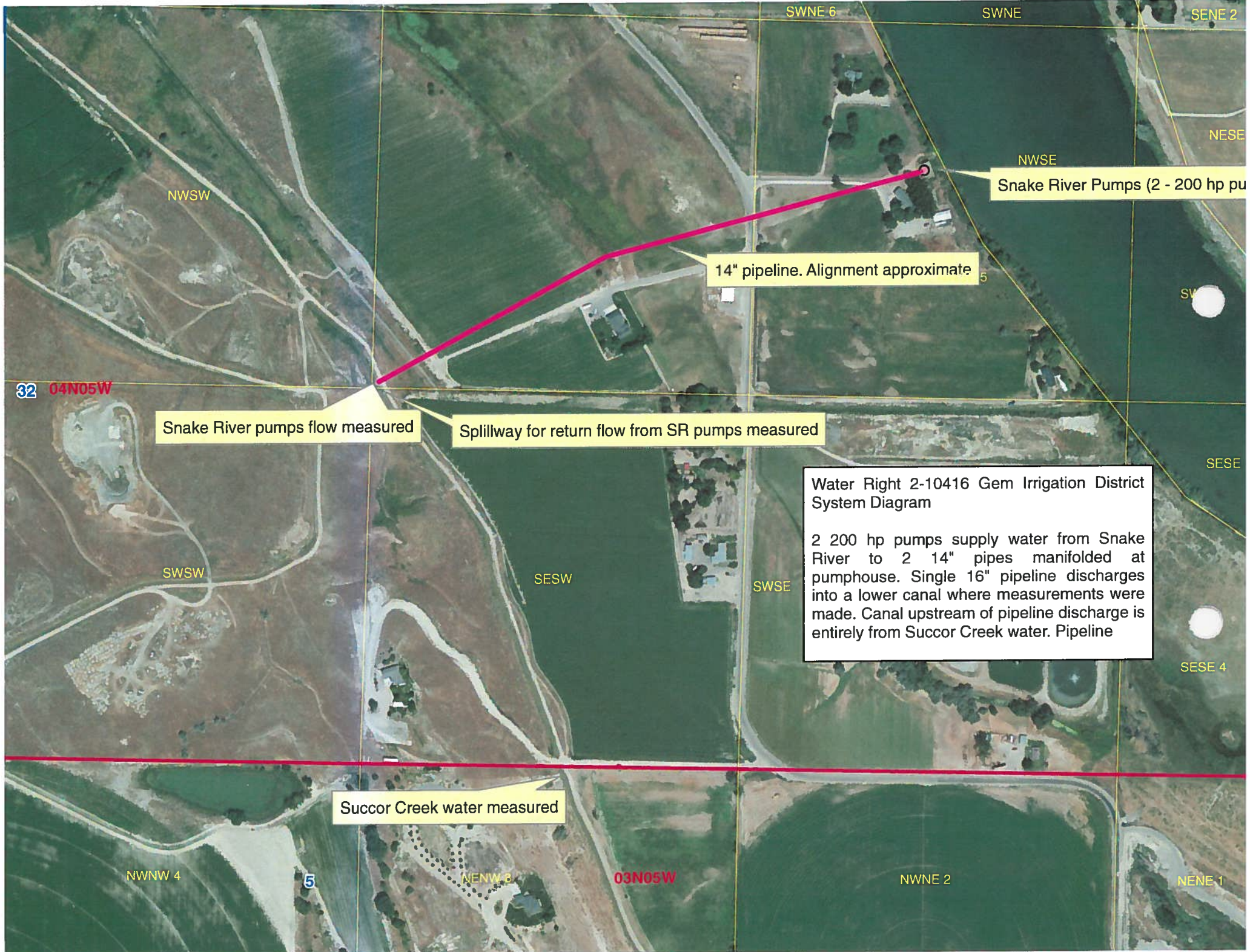
This map depicts the IRRIGATION place of use boundary for this water right at the time of field exam and is attached to the exam document solely for illustrative purposes.



- Point of Diversion
- Place Of Use Boundary
- Townships
- PLS Sections

2011 Imagery





Combined flow rate review

Water Right	water right diversion rate	combined limit	Total Rate Cumulative	Comments
02-64	306.00	306.00	306.00	
02-65	50.00	50.00	356.00	
2-10416	20.65	20.65	376.65	
57-10854	30.00	30.00	406.65	
57-10912*	19.72	0.00	406.65	57-10854 when combined with 57-10912 is limited to 30 cfs
57-10913	19.72	20.00	426.65	
57-4104*	20.00	0.00	426.65	57-4104 when combined with 57-10913 are limited to 20 cfs
57-2118	8.00	8.00	434.65	No combined rate limit
57-2177	6.25	6.25	440.90	No combined rate limit
57-10901	1.60	1.60	442.50	No combined rate limit
TOTAL RATE ALLOWED			442.50	

* See Comments for combined limitations .

Combined Acreage Review

water right	water right acreage limit	combined limit	Total Rate Cumulative	Comments
02-64	22603.00	22603.00	22603.00	
02-65	22603.00	0.00	22603.00	
2-10416	2108.40	0.00	22603.00	
57-10901		0.00	22603.00	
57-10854		0.00	22603.00	
57-10912*		0.00	22603.00	
57-10913		0.00	22603.00	
57-4104*	2794.00	0.00	22603.00	
57-2177			22603.00	
57-2118			22603.00	
TOTAL ACRES ALLOWED			22603.00	

57-02118, 57-02177 & 57-04104 is limited to the combined total of 2794.1 acres. 2-64, 2-65, 57-2118, 57-2177, 57-4104, 57-10854, 57-10901, 57-10912, and 57-10913 are limited to the irrigation of a combined total of 22,603 acres. 57-10912, 57-10913, 57-2118, 57-2177 limited to 1680.7 acres. 57-2118, 57-2177, 57-4104, 57-10854, 57-10912 & 57-10913 limited to 3761.8 acres

Total Rate	Divided by total acres	Equals rate per acre
442.50	22603.00	0.019577047

MEMORANDUM

TO: File 2-10416

FROM: Daniel Nelson – Staff Hydrologist

DATE: December 11, 2013

SUBJECT: Historic Water Use

This permit was filed during the Snake River Basin Adjudication (SRBA). It appears from the records, that this permit was filed to ensure that a second point of diversion near Homedale could be re-established and included in the SRBA decrees for water rights 2-64 and 2-65. Water right decrees 2-64 and 2-65 were decreed with two points of diversion. The main point of diversion is near Marsing, and the other is the Homedale diversion mentioned above. Water right permit 2-10416 was filed for just the Homedale diversion.

Water rights 2-64 and 2-65 allow a diversion rate of 356 cfs, which raises the question of whether or not the system on the whole can produce enough water to cover the 356 cfs from the decree and the 20.65 cfs that was measured from the Homedale pumping plant during the field exam. After speaking with the Gem Irrigation District representatives, we were supplied with a pump efficiency test done by Idaho Power staff on the Marsing pumping plant on October 9, 1996. This test shows a total diversion capacity of 364.33 cfs. However, this test was done on well before the permit had been filed. A letter in the SRBA information on 2-64 and 2-65 stated that the Gem Irrigation District's board was not sure that the Marsing pumping plant could pump the full 356 cfs any more. The SRBA letter was also dated prior to the filing of permit 2-10416.

Since there was reason to believe that Marsing pumping plant could no longer produce the full 356 cfs, we needed a way to confirm or dispute the system capacity of the Marsing pumping plant, before we could license water right permit 2-10416 for additional water. Gem Irrigation District made several attempts to supply us with measurement information concerning the Marsing pumping plant, but none of the measurement information they sent had measurements of the total capacity of Marsing pumping plant. The Marsing pumping plant delivers water to 3 canals, and they could only supply information on one or two of the canals at a given time.

The 1996 Idaho Power tests provided information showing the total Kilowatts (KW) of the Marsing pumping plant. KW can be equated to input horsepower (IHP), which also equates to the amount of water that can be pumped at a known location. The 1996 Idaho Power test shows that the 364.33 cfs could be diverted using 6,796.2 KW. Taking these numbers, this system produces approximately 0.053607899 cfs per KW ($364.33 \text{ cfs} / 6796.2 \text{ KW} = 0.053607899 \text{ cfs/KW}$).

Gem Irrigation District sent us power records for August of 2011. These records show a Billing KW of $(58.11 + 4.4 + 4.5) \times 100$ multiplier = 6701 total KW. By using the cfs per KW number above, we can determine what the maximum capacity diverted in August of 2011. There was 6,701 KW demand in August of 2011, so at one point the Marsing pumping plant diverted 359 cfs $(6701 \times 0.053637899)$.

This exercise concludes that the Marsing pumping plant can still produce the full 356 cfs decreed under water right decrees 2-64 and 2-65, and that the total rate measured of at the Homedale pumping plant of 20.65 cfs can be applied to water right permit 2-10416. The total amount that can be diverted from the Snake River under the Gem Irrigation District water rights should be limited to 376.6 cfs.

[illegible]

A1-A2-A3-A4 = 193.74
B-1-B2-B3 = 107.07
C-1-C2 = 63.52
364.33 CFS

	meter
Pump #	W-W eff%
A1	71.0%
A2	68.5%
A3	71.4%
A4	84.4%
A1,A2	69.4%
A1,A2,A3	65.6%
A1,A2,A3,A	70.7%
B1	44.5%
B2	57.7%
B3	43.9%
B1,B2,B3	47.5%
C1	42.1%
C2	67.6%
C1,C2	48.2%

MEMORANDUM

TO: File 02-10416

FROM: Daniel Nelson – Staff Hydologist

DATE: September 25, 2012

SUBJECT: Measurement of Flow Through Spill Way

Water Right 02-10416 Measurement Diagram

The water for water right 02-10416 from the Snake River is diverted through 2-200 Hp pumps to one of two ditches. A measurement was not possible at the pumping plant. The water pumped from the river was too dirty to allow a proper measurement.

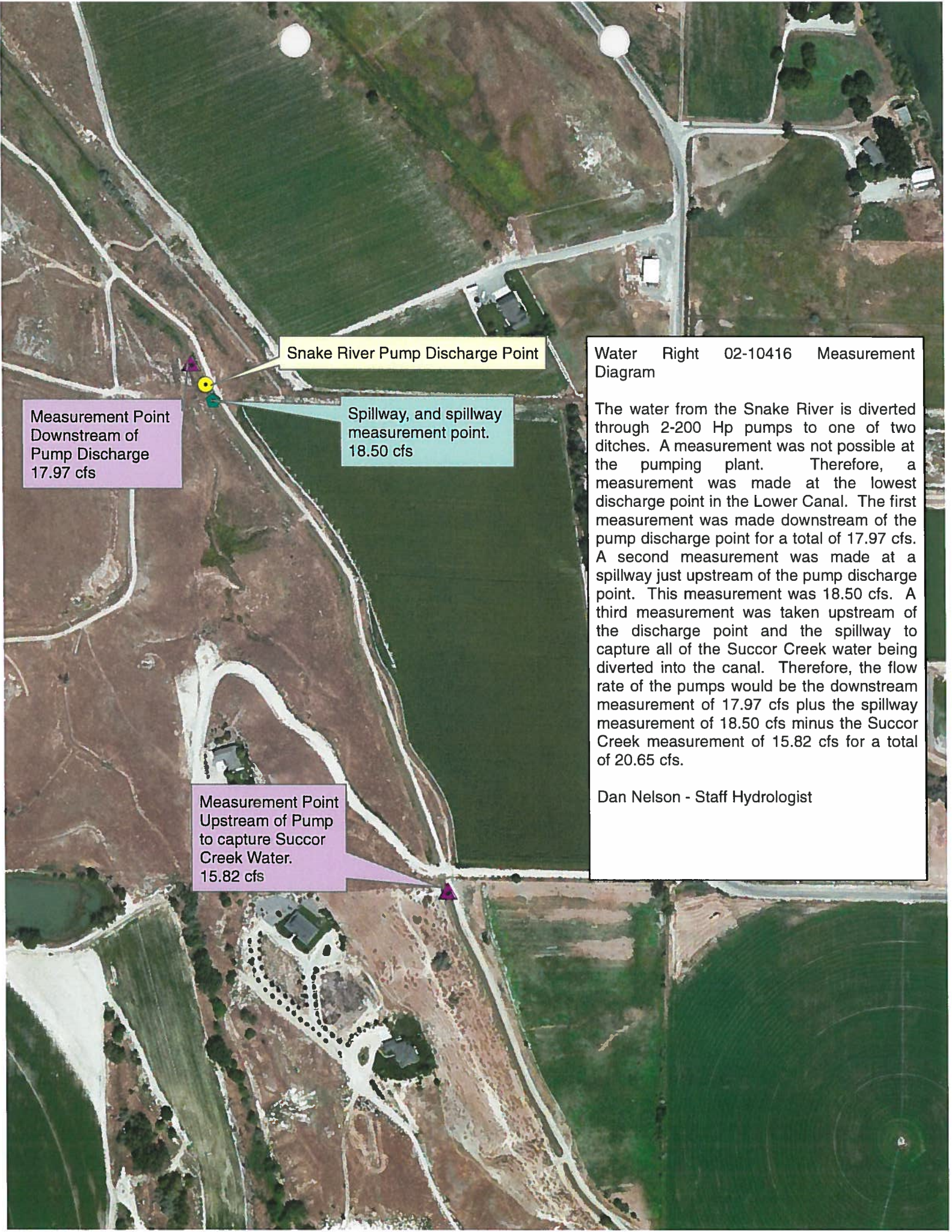
Therefore, a measurement was made at the lowest discharge point in the Lower Canal. The first measurement was made downstream of the pump discharge point. This measurement showed a flow rate on the canal of 17.97 cfs.

The canal has a spillway just upstream of the pump discharge point. This spillway regulates the water being run down the canal to prevent overtopping the canal below. The spillway measurement was 18.50 cfs.

Water from Succor Creek supplies a portion of the water in the canal. Succor Creek water was being diverted into the canal at the time of the flow measurement, so a third measurement was necessary to account for the Succor Creek water. This measurement was taken approximately ¼ mile upstream of the pump diversion point. The Succor Creek water measurement was provided a measurement of 15.82 cfs.

Therefore, the flow rate of the pumps would be the downstream measurement of 17.97 cfs plus the spillway measurement of 18.50 cfs minus the Succor Creek measurement of 15.82 cfs for a total of 20.65 cfs.

The maximum flow rate of the pumps was measured at 20.65 cfs. I performed a theoretical calculation for the two pumps, and the theoretical calculations provide a diversion rate of 29.22 cfs. Unfortunately, the lift and pump pressure for the theoretical are estimated, and there was no way to verify pressure or lift for this system. Therefore, I must go with the measured amount or 20.65 cfs. This seems to be the most accurate means of determining the flow for this system.



Snake River Pump Discharge Point

Measurement Point
Downstream of
Pump Discharge
17.97 cfs

Spillway, and spillway
measurement point.
18.50 cfs

Measurement Point
Upstream of Pump
to capture Succor
Creek Water.
15.82 cfs

Water Right 02-10416 Measurement
Diagram

The water from the Snake River is diverted through 2-200 Hp pumps to one of two ditches. A measurement was not possible at the pumping plant. Therefore, a measurement was made at the lowest discharge point in the Lower Canal. The first measurement was made downstream of the pump discharge point for a total of 17.97 cfs. A second measurement was made at a spillway just upstream of the pump discharge point. This measurement was 18.50 cfs. A third measurement was taken upstream of the discharge point and the spillway to capture all of the Succor Creek water being diverted into the canal. Therefore, the flow rate of the pumps would be the downstream measurement of 17.97 cfs plus the spillway measurement of 18.50 cfs minus the Succor Creek measurement of 15.82 cfs for a total of 20.65 cfs.

Dan Nelson - Staff Hydrologist

THEORETICAL HORSEPOWER EQUATION WORKSHEET (cjh 1/92)

Water Right No.: 02-10416
 Examiner: Daniel Nelson
 Date of Field Exam: 9/24/2012

	West Pump	East Pump	
P/D No.:			
PUMP HORSEPOWER	200	200	
BOOSTER HORSEPOWER	0	0	
PUMPING LEVEL	15	15	
DISCHARGE PRESSURE	30	30	
FRICTION	0	0	
RATE OF FLOW (cfs)	14.61	14.61	TOTAL
(gpm)	6559.4	6559.4	29.23
			13118.83

The above calculates the formula =

$$Q = \frac{8.8 * (\text{Efficiency}) * \text{hp}}{\text{depth to water} + 2.31 * (\text{psi}) + \text{friction}}$$

Assumptions: %70 efficiency.

Examiners Notes:

There are two-200 Hp pumps that lift water approximately 15 feet to the pumping plant from the Snake River. The water is then delivered to a canal approximately 4/10ths of a mile away. According to the topo maps the canal is approximately 60 feet in elevation from the pumps. In order to pump water this distance with the 60 foot elevation, the estimated pressure on the canals is approximately 30 psi. Any friction loss would be covered under the 30 psi rating.

Discharge Measurement Summary

Date Generated: Tue Sep 25 2012

File Information

File Name BELOPUMP.WAD
Start Date and Time 2012/09/24 11:02:20

Site Details

Site Name
Operator(s) DAN

System Information

Sensor Type FlowTracker
Serial # P4554
CPU Firmware Version 3.7
Software Ver 2.30
Mounting Correction 0.0%

Units (English Units)

Distance ft
Velocity ft/s
Area ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	2.4%
Velocity	1.6%	4.1%
Width	0.2%	0.2%
Method	2.8%	-
# Stations	4.2%	-
Overall	5.4%	4.9%

Summary

Averaging Int. 40 # Stations 12
Start Edge LEW Total Width 10.900
Mean SNR 60.0 dB Total Area 19.375
Mean Temp 60.88 °F Mean Depth 1.778
Disch. Equation Mid-Section Mean Velocity 0.9274
Total Discharge 17.9679

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:02	0.50	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	11:02	1.50	0.6	0.700	0.6	0.280	0.3350	1.00	0.3350	0.700	0.2345	1.3
2	11:08	2.50	0.6	1.900	0.6	0.760	0.6201	1.00	0.6201	1.900	1.1781	6.6
3	11:10	3.50	0.6	2.400	0.6	0.960	0.7398	1.00	0.7398	2.400	1.7755	9.9
4	11:11	4.50	0.6	2.700	0.6	1.080	0.7572	1.00	0.7572	2.700	2.0446	11.4
5	11:13	5.50	0.6	2.700	0.6	1.080	0.8632	1.00	0.8632	2.700	2.3307	13.0
6	11:14	6.50	0.6	2.600	0.6	1.040	1.1535	1.00	1.1535	2.600	2.9993	16.7
7	11:15	7.50	0.6	2.400	0.6	0.960	1.5289	1.00	1.5289	2.400	3.6692	20.4
8	11:16	8.50	0.6	2.200	0.6	0.880	1.2198	1.00	1.2198	2.200	2.6838	14.9
9	11:18	9.50	0.6	1.300	0.6	0.520	0.7251	1.00	0.7251	1.300	0.9425	5.2
10	11:19	10.50	0.6	0.500	0.6	0.200	0.2310	1.00	0.2310	0.475	0.1097	0.6
11	11:19	11.40	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

Discharge Measurement Summary

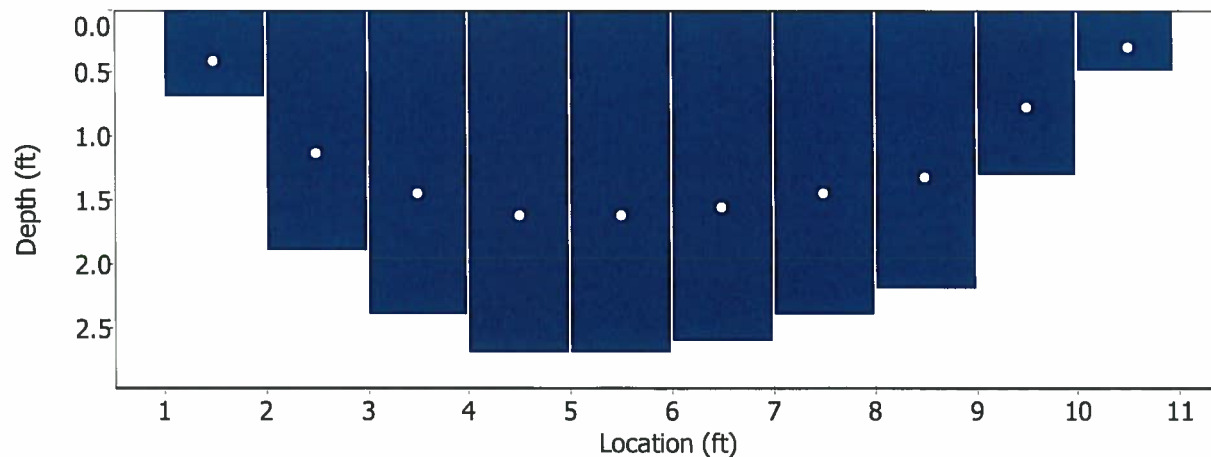
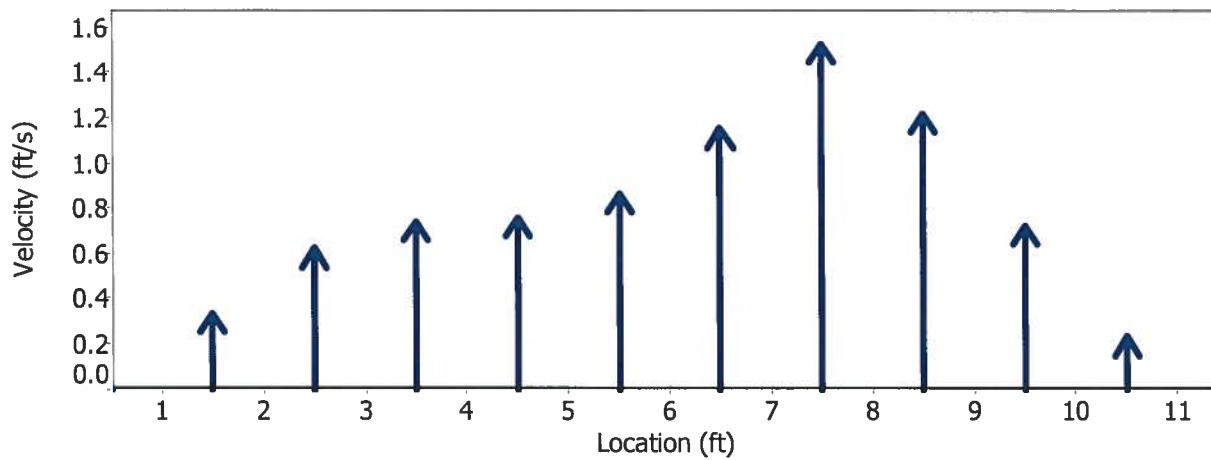
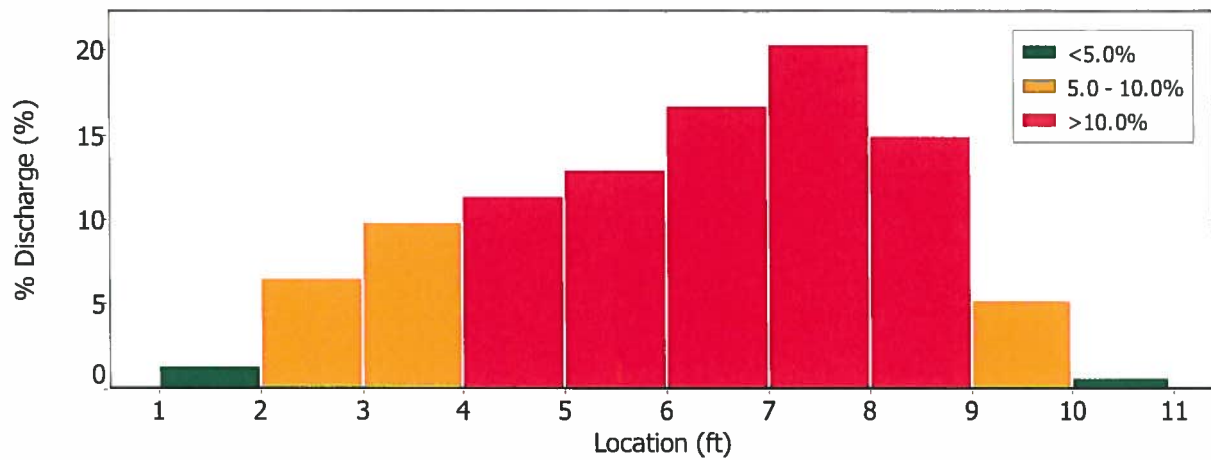
Date Generated: Tue Sep 25 2012

File Information

File Name BELOPUMP.WAD
Start Date and Time 2012/09/24 11:02:20

Site Details

Site Name
Operator(s) DAN



Discharge Measurement Summary

Date Generated: Tue Sep 25 2012

File Information

File Name BELOPUMP.WAD
Start Date and Time 2012/09/24 11:02:20

Site Details

Site Name
Operator(s) DAN

Quality Control

St	Loc	%Dep	Message
10	10.50	0.6	High angle: 20

Discharge Measurement Summary

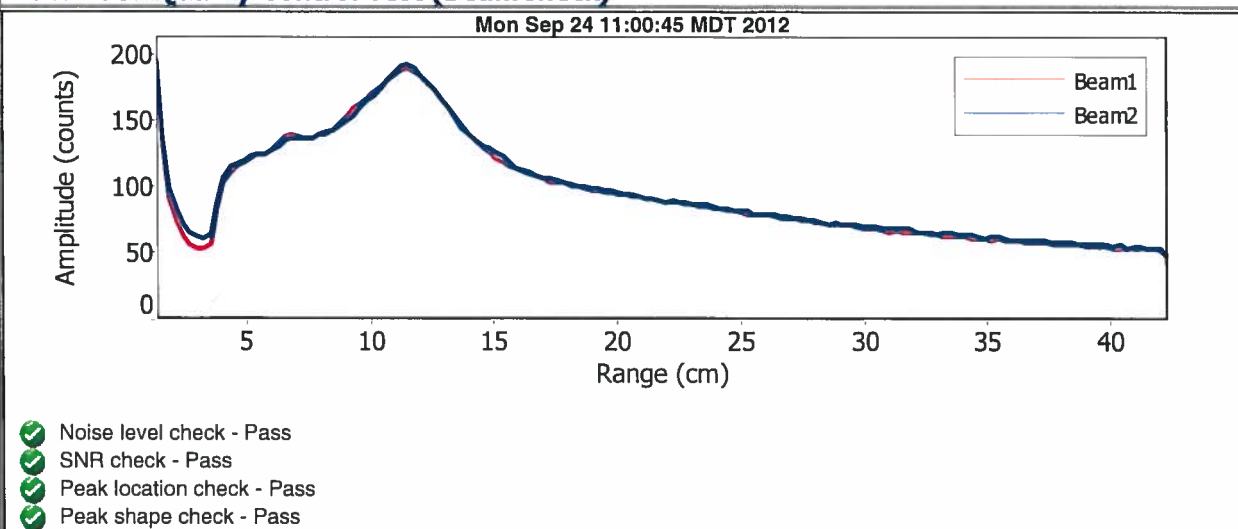
Date Generated: Tue Sep 25 2012

File Information

File Name BELOPUMP.WAD
Start Date and Time 2012/09/24 11:02:20

Site Details

Site Name
Operator(s) DAN

Automatic Quality Control Test (BeamCheck)

Discharge Measurement Summary

Date Generated: Tue Sep 25 2012

File Information

File Name SUCCOR.WAD
Start Date and Time 2012/09/24 11:44:39

Site Details

Site Name
Operator(s) DAN

System Information

Sensor Type FlowTracker
Serial # P4554
CPU Firmware Version 3.7
Software Ver 2.30
Mounting Correction 0.0%

Units (English Units)

Distance ft
Velocity ft/s
Area ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	2.1%
Velocity	0.6%	1.6%
Width	0.2%	0.2%
Method	2.3%	-
# Stations	2.5%	-
Overall	3.6%	2.8%

Summary

Averaging Int. 40 # Stations 20
Start Edge LEW Total Width 19.300
Mean SNR 38.9 dB Total Area 21.445
Mean Temp 57.29 °F Mean Depth 1.111
Disch. Equation Mid-Section Mean Velocity 0.7376
Total Discharge 15.8165

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:44	1.10	None	0.000	0.0	0.0	0.0000	0.00	0.0000	0.000	0.0000	0.0
1	11:44	2.10	0.6	0.300	0.6	0.120	-0.0909	1.00	-0.0909	0.300	-0.0273	-0.2
2	11:45	3.10	0.6	0.500	0.6	0.200	-0.0226	1.00	-0.0226	0.500	-0.0113	-0.1
3	11:46	4.10	0.6	0.800	0.6	0.320	0.1775	1.00	0.1775	0.800	0.1420	0.9
4	11:48	5.10	0.6	1.100	0.6	0.440	0.3186	1.00	0.3186	1.100	0.3504	2.2
5	11:49	6.10	0.6	1.400	0.6	0.560	0.4905	1.00	0.4905	1.400	0.6866	4.3
6	11:52	7.10	0.6	1.600	0.6	0.640	0.6880	1.00	0.6880	1.600	1.1008	7.0
7	11:53	8.10	0.6	1.800	0.6	0.720	0.8776	1.00	0.8776	1.800	1.5796	10.0
8	11:54	9.10	0.6	1.800	0.6	0.720	0.9649	1.00	0.9649	1.800	1.7367	11.0
9	11:55	10.10	0.6	1.800	0.6	0.720	1.0410	1.00	1.0410	1.800	1.8737	11.8
10	11:55	11.10	0.6	1.800	0.6	0.720	0.9770	1.00	0.9770	1.800	1.7585	11.1
11	11:57	12.10	0.6	1.700	0.6	0.680	1.0656	1.00	1.0656	1.700	1.8117	11.5
12	11:58	13.10	0.6	1.700	0.6	0.680	1.0594	1.00	1.0594	1.700	1.8011	11.4
13	11:59	14.10	0.6	1.600	0.6	0.640	0.9423	1.00	0.9423	1.600	1.5077	9.5
14	12:00	15.10	0.6	1.400	0.6	0.560	0.7060	1.00	0.7060	1.400	0.9884	6.2
15	12:01	16.10	0.6	0.600	0.6	0.240	0.5696	1.00	0.5696	0.600	0.3418	2.2
16	12:02	17.10	0.6	0.600	0.6	0.240	0.2546	1.00	0.2546	0.600	0.1528	1.0
17	12:03	18.10	0.6	0.600	0.6	0.240	0.0384	1.00	0.0384	0.600	0.0230	0.1
18	12:04	19.10	0.6	0.300	0.6	0.120	0.0007	1.00	0.0007	0.345	0.0002	0.0
19	12:04	20.40	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

Discharge Measurement Summary

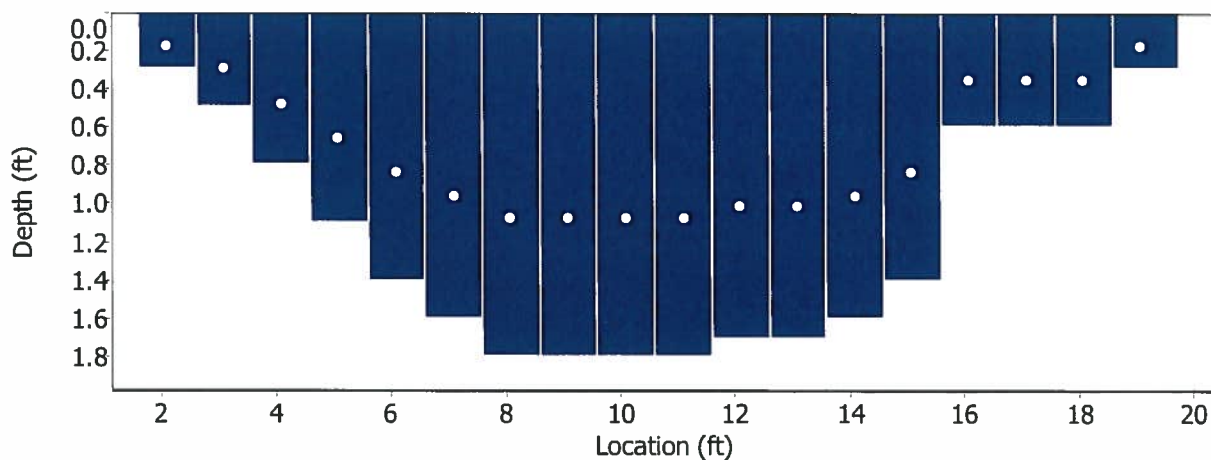
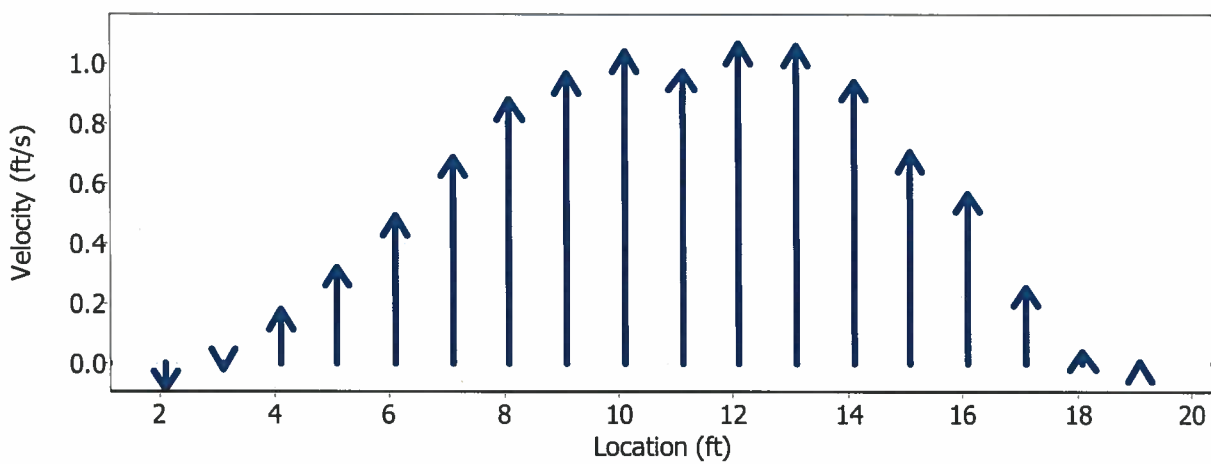
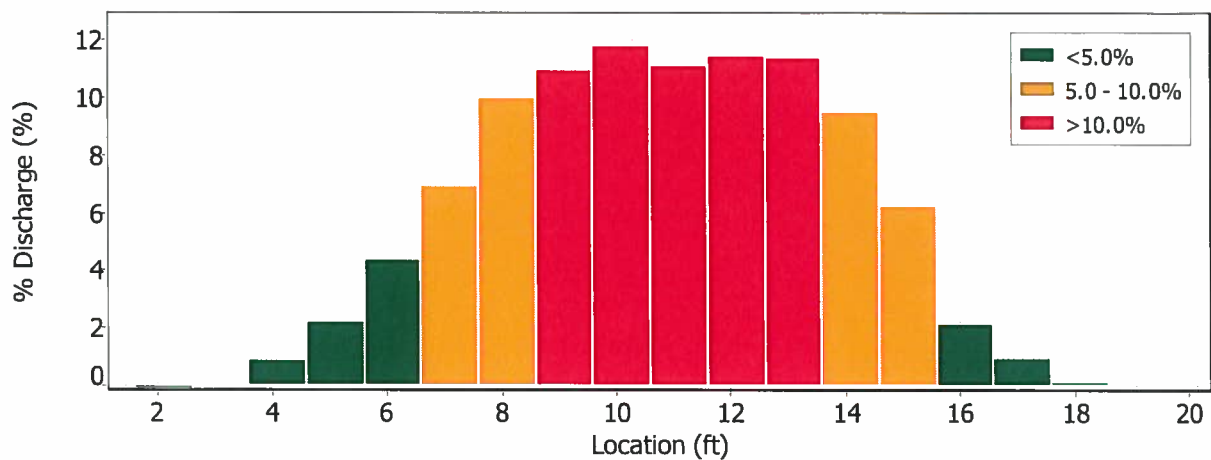
Date Generated: Tue Sep 25 2012

File Information

File Name SUCCOR.WAD
Start Date and Time 2012/09/24 11:44:39

Site Details

Site Name
Operator(s) DAN



Discharge Measurement Summary

Date Generated: Tue Sep 25 2012

File Information

File Name SUCCOR.WAD
Start Date and Time 2012/09/24 11:44:39

Site Details

Site Name
Operator(s) DAN

Quality Control

St	Loc	%Dep	Message
1	2.10	0.6	High angle: -170
		0.6	SNR (52.7) is different from typical SNR (38.9)
2	3.10	0.6	High angle: -162
		0.6	SNR (49.9) is different from typical SNR (38.9)
18	19.10	0.6	SNR (50.5) is different from typical SNR (38.9)

ESTIMATED FLOW RATES FOR BROADCRESTED DAM USING CALCULATION [(h) ^ 1.5] (DAM WIDTH) 3.33 (please note used 2.64 under 0.2 feet.)										
HEAD IN FEET	FLOW RATE IN CFS	FLOW RATE IN INCHES		HEAD IN FEET	FLOW RATE IN CFS	FLOW RATE IN INCHES		HEAD IN FEET	FLOW RATE IN CFS	FLOW RATE IN INCHES
0.01	0.02	0.79		0.65	10.47	523.52		1.25	27.92	1396.14
0.02	0.04	2.24		0.66	10.71	535.65		1.26	28.26	1412.93
0.03	0.08	4.12		0.67	10.96	547.87		1.27	28.60	1429.79
0.04	0.13	6.34		0.68	11.20	560.18		1.28	28.93	1446.71
0.05	0.18	8.85		0.69	11.45	572.58		1.29	29.27	1463.69
0.10	0.36	18.03		0.70	11.70	585.08		1.30	29.61	1480.75
0.11	0.42	20.80		0.71	11.95	597.66		1.31	29.96	1497.86
0.12	0.47	23.70		0.72	12.21	610.33		1.32	30.30	1515.05
0.13	0.53	26.73		0.73	12.46	623.09		1.34	30.99	1549.61
0.14	0.60	29.87		0.74	12.72	635.94		1.35	31.34	1566.99
0.15	0.66	33.13		0.75	12.98	648.87		1.36	31.69	1584.43
0.16	0.73	36.50		0.76	13.24	661.89		1.37	32.04	1601.94
0.17	0.80	39.97		0.77	13.50	675.00		1.38	32.39	1619.51
0.18	0.87	43.55		0.78	13.76	688.19		1.39	32.74	1637.15
0.19	0.94	47.23		0.79	14.03	701.47		1.4	33.10	1654.85
0.20	1.79	89.35		0.80	14.30	714.83		1.41	33.45	1672.61
0.21	1.92	96.14		0.81	14.57	728.27		1.42	33.81	1690.43
0.22	2.06	103.09		0.82	14.84	741.80		1.43	34.17	1708.32
0.23	2.20	110.19		0.83	15.11	755.41		1.44	34.53	1726.27
0.24	2.35	117.46		0.84	15.38	769.10		1.45	34.89	1744.29
0.25	2.50	124.88		0.85	15.66	782.88		1.46	35.25	1762.36
0.26	2.65	132.44		0.86	15.93	796.73		1.47	35.61	1780.50
0.27	2.80	140.16		0.87	16.21	810.67		1.48	35.97	1798.70
0.28	2.96	148.01		0.88	16.49	824.69		1.49	36.34	1816.96
0.29	3.12	156.01		0.89	16.78	838.78		1.50	36.71	1835.28
0.30	3.28	164.15		0.90	17.06	852.96		1.51	37.07	1853.66
0.31	3.45	172.43		0.91	17.34	867.22		1.52	37.44	1872.11
0.32	3.62	180.84		0.92	17.63	881.55		1.53	37.81	1890.61
0.33	3.79	189.38		0.93	17.92	895.96		1.54	38.18	1909.18
0.34	3.96	198.05		0.94	18.21	910.45		1.55	38.56	1927.80
0.35	4.14	206.86		0.95	18.50	925.02		1.56	38.93	1946.49
0.36	4.32	215.78		0.96	18.79	939.66		1.57	39.30	1965.24
0.37	4.50	224.84		0.97	19.09	954.38		1.58	39.68	1984.04
0.38	4.68	234.01		0.98	19.38	969.18		1.59	40.06	2002.91
0.39	4.87	243.31		0.99	19.68	984.05		1.60	40.44	2021.83
0.40	5.05	252.73		1.00	19.98	999.00		1.61	40.82	2040.82
0.41	5.25	262.27		1.01	20.28	1014.02		1.62	41.20	2059.86
0.42	5.44	271.92		1.02	20.58	1029.12		1.63	41.58	2078.96
0.43	5.63	281.69		1.03	20.89	1044.29		1.64	41.96	2098.12
0.44	5.83	291.57		1.04	21.19	1059.54		1.65	42.35	2117.34
0.45	6.03	301.57		1.05	21.50	1074.85		1.66	42.73	2136.62
0.46	6.23	311.68		1.06	21.80	1090.25		1.67	43.12	2155.96
0.47	6.44	321.89		1.07	22.11	1105.71		1.68	43.51	2175.35
0.48	6.64	332.22		1.08	22.42	1121.25		1.69	43.90	2194.80
0.49	6.85	342.66		1.09	22.74	1136.86		1.70	44.29	2214.31
0.50	7.06	353.20		1.10	23.05	1152.54		1.71	44.68	2233.88
0.51	7.28	363.85		1.11	23.37	1168.29		1.72	45.07	2253.50
0.52	7.49	374.60		1.12	23.68	1184.11		1.73	45.46	2273.18
0.53	7.71	385.46		1.13	24.00	1200.01		1.74	45.86	2292.92
0.54	7.93	396.42		1.14	24.32	1215.97		1.75	46.25	2312.72
0.55	8.15	407.48		1.15	24.64	1232.00		1.76	46.65	2332.57
0.56	8.37	418.65		1.16	24.96	1248.11		1.77	47.05	2352.48
0.57	8.60	429.91		1.17	25.29	1264.28		1.78	47.45	2372.44
0.58	8.83	441.27		1.18	25.61	1280.53		1.79	47.85	2392.46
0.59	9.05	452.73		1.19	25.94	1296.84		1.80	48.25	2412.54
0.60	9.29	464.29		1.20	26.26	1313.22		1.81	48.65	2432.67
0.61	9.52	475.95		1.21	26.59	1329.67		1.82	49.06	2452.86
0.62	9.75	487.70		1.22	26.92	1346.19		1.83	49.46	2473.10
0.63	9.99	499.55		1.23	27.26	1362.77		1.84	49.87	2493.40
0.64	10.23	511.49		1.24	27.59	1379.42		1.85	50.28	2513.76

This chart shows the flows through the spill way for water right 02-10416. The water in the spill way goes over a two-by-four check dam. The above chart shows the flow rates calculated over the dam using the Broad Crested Weir formula. A water level of 0.95 feet was measured going over the spillway. This equates to 18.50 cfs (see highlighted area in chart).

Photos from Field Exam: Permit 2-10416



Pumphouse looking east.



Two 200 hp pumps in pumphouse



Manifold of pumps leaving the pumphouse



Pump discharge into lower canal – measurement of canal/pump flow taken to right of discharge. Return flow measurement taken to the left.