

A. GENERAL INFORMATION

HOWELL CREEK
HOWELL CREEK

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
13S	24E	1																	
13S	24E	2				X						X	X			X	X	X	
13S	24E	11	X	X												X	X	X	X

DIVERSION TO STORAGE same as COMMERCIAL

Method of Determination: Aerial imagery was used to calculate the distance (2300') from pump stations where snow can be made within the permitted POU.

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.

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
Bennett Springs		5			

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

D. FLOW MEASUREMENTS: N/A

1.

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

2. Measurements: No measurement is required per IDAPA 37.03.02 Beneficial Use Examination Rules as the permitted flow rate of 0.06 cfs falls below the 0.24 cfs or greater flow rate amount requiring measurement.

E. FLOW CALCULATIONS

_____ Additional Computation Sheets Attached

Measured Method: Hazen Williams Formula for full pipe Flow: $Q = 0.432C_1D^{2.63}S^{0.54}$ &

$$\text{Theoretical Yield: } Q = \frac{8.8 \times (Hp) \times (Eff)}{H}$$

From Pomerelle Spring to the storage tank, there is a buried 1.5" HDPE pipe that carries water from a collection gallery at the spring approximately 1230' downhill (130' vertical drop) to the storage tank. Using the Hazen Williams Formula for full pipe flow indicates the system has the potential to deliver up to 0.076 cfs from the spring to the storage tank which is more than the permitted rate of 0.06 cfs:

$$Q = 0.432C_1D^{2.63}S^{0.54}$$

Where:

C_1 = roughness coefficient (140 for HDPE pipe)

D = pipe diameter in feet (0.125)

S = slope (130' vertical drop/1230' distance = 0.106)

Therefore: $0.432(140) (0.125)^{2.63}(0.106)^{0.54} = \underline{0.076 \text{ cfs}}$

At Bennett Springs there is a 5 Hp pump that carries water uphill in a 1.5" pipeline approximately 4380' with an elevation gain of 410' to the storage tank. The theoretical yield equation indicates the system has a potential of delivering up to 0.075 cfs, which is more than the permitted rate of 0.06 cfs:

$$Q = \frac{8.8 \times (\text{Hp}) \times (\text{Eff})}{H}$$

Where:

Hp = 5 Hp

Eff = Efficiency = 70% assumed

H = total head = pumping level + (2.31 x system pressure) = 410' + (2.31 x 0 (open discharge, no pressure)) = 410'

Therefore: $Q = \frac{8.8 \times 5 \times 0.70}{410} = \underline{0.075 \text{ cfs}}$

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: No Irrigation

$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$

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

$V = \text{Smaller of } V_{IR} \text{ and } V_{DR} =$

2. Volume Calculations for Other Uses:

Commercial: Diverting 0.06 cfs for commercial use from 10/15 – 12/31 allows for a total diversion of: (0.06 cfs x 77 days) x 1.9835 = **9.2 acre feet**

Commercial Storage: Surface area of pond is 0.14 acres; pond depth goes from 3' to 10' so the average depth is (3' + 10') / 2 = 6.5'; 0.14 acres x 6.5' = 0.91 acre feet

Buried storage tank stores 60,000 gallons / 325,850 = 0.18 acre feet

Evapotranspiration for an open water – shallow system calculated using the precipitation deficit for the Oakley weather station indicates a mean of 680 mm (ET/Idaho2012 University of Idaho: <http://data.kimberly.uidaho.edu/ETIdaho>)

(680mm / 304.8) x 0.14 acre pond surface area = 0.3 acre feet annual evaporative loss

Commercial Storage season of use is 1/1 – 12/31, which provides for a one time fill of the pond outside of the commercial season of use, then accounting for evaporative losses (0.3 acre feet annually) and the commercial water which is also diverted from the pond and allows multiple fills of the pond up to the commercial volume limit of 9.2 acre feet (approximately 10 fills) which is the maximum volume the flow rate can provide during the season of use, we arrive at the total commercial Storage volume:

0.91 acre feet + 0.3 acre feet evaporative loss + 0.18 acre feet enclosed storage + 9.2 acre feet = **10.6 acre feet**

Commercial from Storage: Same as Commercial Storage with one exception, evaporative losses cannot be diverted:

0.91 acre feet + 0.18 acre feet enclosed storage + 9.2 acre feet = **10.3 acre feet**

G. NARRATIVE/REMARKS/COMMENTS

On 9/27/2017 I met with Mark Dallan – U.S. Forest Service Water Right Specialist; John Burrows – President of Andrwood INC. which owns Pomerelle Ski Area and Zack Alexander – Mountain Manager, Pomerelle Ski Area at the ski area parking lot. We loaded up into a four wheel drive and Mr. Alexander (referred to as Zack hereafter) drove us up to the Pomerelle Spring site located in the NWNENE Sec. 11, Twp 13S, Rge 24E which is now a collection gallery that diverts water down a 1.5" HDPE buried pipeline to a 60,000 gallon buried storage tank (see System Diagram; Note that the black line in the system diagram represents a 1.5" buried pipeline). After taking pictures, inspecting the valve boxes and creating a GPS waypoint, we drove downslope to the storage tank. Zack opened the hatch so I could look into what was approximately a half full tank and then he showed me a hydrant (#3) adjacent to the southwest end of the tank. Zack pointed out a 1.5" HDPE pipe diverting a small flow of water into a narrow stream channel approximately 25 yards to the west of the tank and then we walked up above the pipe and storage tank where he opened a hatch that revealed a valve that allows the spring water to be diverted either to the tank or to the stream channel. I collected waypoints for the valve; pipe outlet at the stream

channel and the storage tank. We discussed the flow rate from the spring which was being diverted in its entirety into the stream channel and Zack indicated that previous measurements had estimated average flows at approximately five to six gallons per minute.

We then walked down to the pond which is a concrete impoundment with an impermeable liner. The impoundment measures approximately 120' long by 58' at its widest point. Zack indicated that he would fill the pond as full as possible in order to maximize water use for snow making. At a later date I used aerial imagery in ArcMap and calculated a surface area of 0.14 acres. At the upper end, the pond is three feet deep and it is 10' deep at the lower end, making the average depth 6.5'. In the center of the lowest end of the pond, there is a short standpipe that delivers water downhill to a pump station (Main Hydrant location on System Diagram). At the pump station there is a vertical inline pump that is used to deliver water from the pond to all three hydrants for snowmaking. Zack indicated that they have 2000' feet of 1.5" flexible hose (similar to a fire hose) and that the snow making equipment can deliver the snow another 300' under optimum conditions (all snowmaking equipment was in storage on the day of the field exam). Based on that information, I later based the place of use (POU) on a 2300' distance from the hydrant locations within the permitted POU. This resulted in a smaller POU than originally permitted (four Quarter-Quarters will be dropped). Forested areas where there are multiple narrow ski runs were also included in the POU.

We then drove down to Bennett Spring located in L3 (NW¼NE¼NW¼) Sec. 1, Twp 13S, Rge 24E, at the head of Howell Creek where they capture the spring water in a lined concrete cylinder and use a 5 Hp pump to divert water a distance of approximately 4,300' with an elevation gain of 410' through a 1.5" HDPE pipeline. The remainder of the spring water is diverted out to Howell Creek. The diversion, along with all the access points and valves for the entire system, are enclosed, kept locked and are well maintained.

Only two of the five permitted points of diversion (PODs) were developed and those are Pomerelle Spring located in the NWNENE Sec. 11, Twp 13S, Rge 24E, and Bennett Spring located in L3 (NWNENW) Sec. 1, Twp 13S, Rge 24E. The other three PODs were from unnamed streams, indicating the three original ponds were planned to be constructed on stream channel(s) and would "capture" flow from the channel(s) and/or surface water runoff. However, the actual pond that was constructed is above the stream channel and is elevated in a manner that it doesn't receive water directly from an unnamed stream or surface runoff. The developed POU is smaller than what was originally permitted and the following quarters will be dropped at licensing: SWNE, NESW and SESW in Sec. 2, Twp 13S, Rge 24E and the NENW in Sec. 11, Twp 13S, Rge 24E. Developed commercial storage is also less than the 16.3 acre feet originally permitted.

Note that permit 45-7745 was flagged and includes a condition indicating that the right is for the diversion of Trust Water. However, the right is for a surface water source that would eventually be tributary to the Snake River above Milner Dam (source would flow into Howell Creek, then Marsh Creek, which would flow into the Snake River above Milner Dam). Surface water sources tributary to the Snake River above Milner Dam are not Trust Water by definition. Therefore, it is recommended that the Trust Water flag and any Trust Water conditions be removed when license 45-7745 is issued.

I recommend licensing the rates and the volumes as listed below in Section H.1.

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>
COMMERCIAL	10/15 to 12/31	0.06 CFS	9.2 AF
COMMERCIAL STORAGE	01/01 to 12/31		10.6 AF
COMMERCIAL FROM STORAGE	10/15 to 12/31		10.3 AF
DIVERSION TO STORAGE	01/01 to 12/31	0.06 CFS	
	<u>Totals:</u>	0.060 CFS	10.6 AF

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 ☒ None

I. AUTHENTICATION

Field Examiner's Name

Mick A. Mill

Date

1-26-2018

Reviewer

Date



Figure 1: View from the top end of the collection gallery at Pomerelle springs looking downslope (northeast).

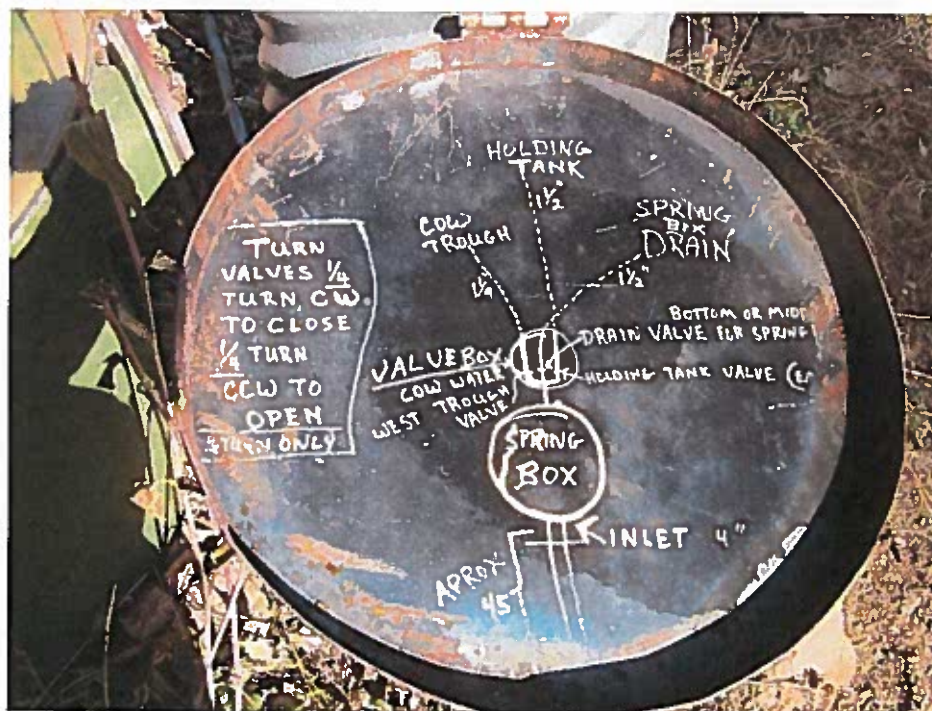


Figure 2: Diagram on inside of valve box cover at lower end of Pomerelle Spring.

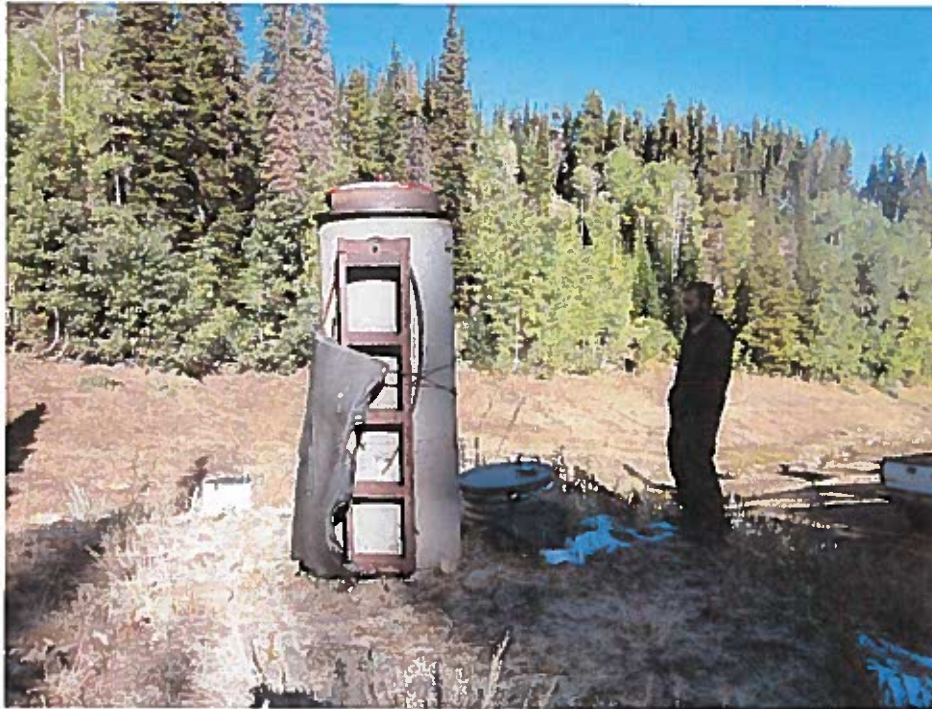


Figure 3: Hatch; valve box and Zack Alexander on downslope side of 60,000 gl buried storage tank.

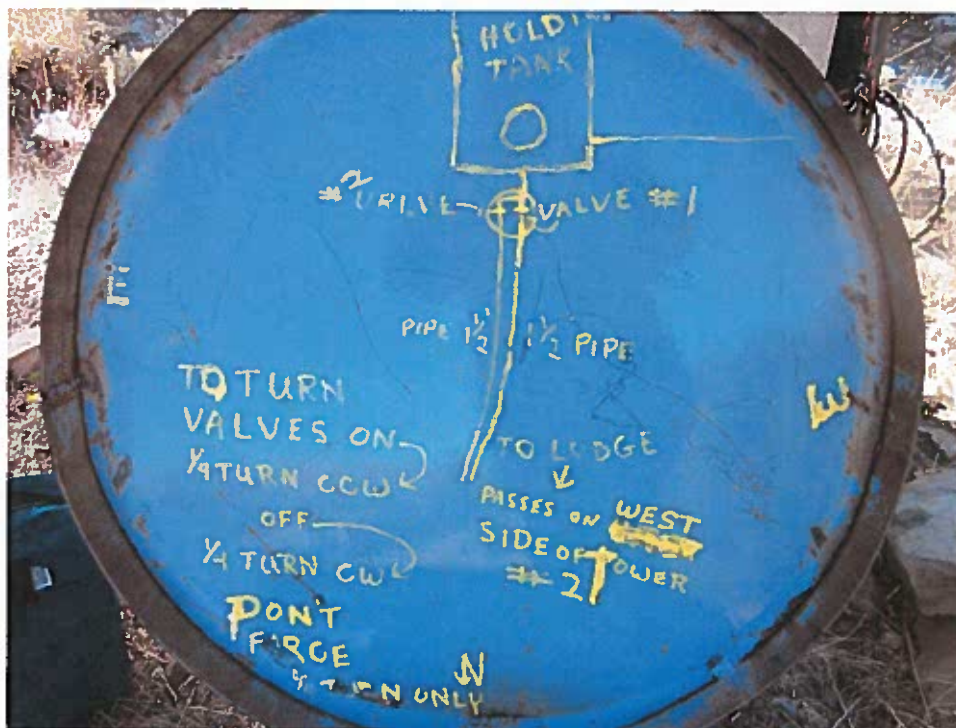


Figure 4: Diagram on inside of valve box cover adjacent to the storage tank.



Figure 5: 1.5" pipe outlet into stream channel just west of the storage tank (note this is bypass flow). The actual conveyance system for 45-7745 is a 1.5" HDPE buried pipeline.



Figure 6: Storage pond below storage tank. Note that the pond is not located on a channel.



Figure 7: Valve used to divert water from pond to pump used for snowmaking.



Figure 8: Vertical inline pump used for snowmaking.



Figure 9: Looking into diversion at Bennett Spring (notice bypass just above meter).

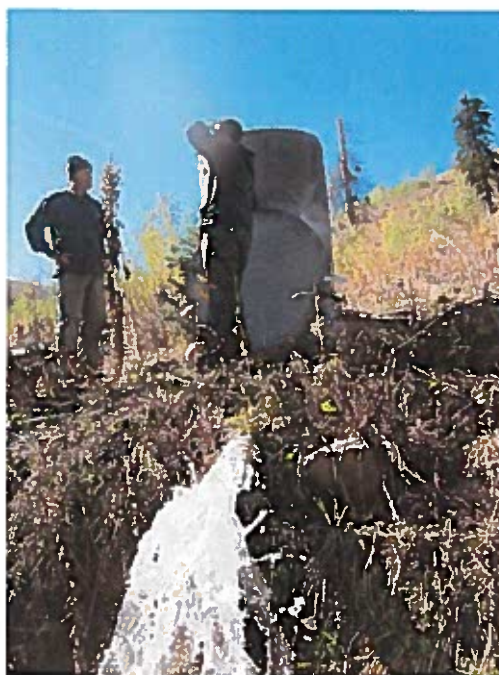


Figure 10: Mark Dallon and Zack Alexander at Bennett Spring Diversion
And bypass flow from diversion into Howell Creek.

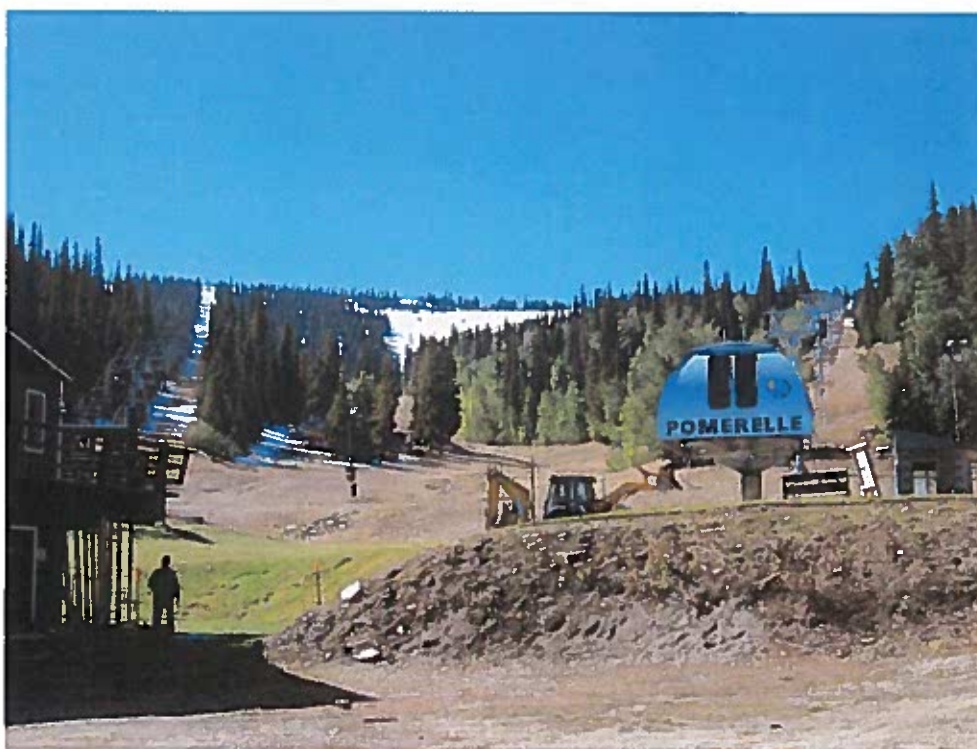


Figure 11: View upslope towards the storage pond (just behind fir trees in center of picture). Note that the pond location is not on a channel as it is above the low point of the draw.

System Diagram

