

Groundwater Application Review Summary Form

Application # G- 18697

GW Reviewer D. BOSCHMAN Date Review Completed: 8/30/2018

Summary of GW Availability and Injury Review:

Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 8/30/2018
 FROM: Groundwater Section Darrick E. Boschmann
 Reviewer's Name
 SUBJECT: Application G- 18697 Supersedes review of N.A.
 Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525. Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. This review is based upon available information and agency policies in place at the time of evaluation.*

A. GENERAL INFORMATION: Applicant's Name: Russel Young County: Grant

A1. Applicant(s) seek(s) 2 cfs from 2 well(s) in the John Day Basin,
Upper John Day subbasin

A2. Proposed use Irrigation (92.0 acres primary/499.4 acres supplemental) Seasonality: March 1 – October 31

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	proposed	Well #1	CRBG	2	13.00S-27.00E-5-NE SW	2470 FEET NORTH AND 1740 FEET EAST FROM SW CORNER, SECTION 5
2	proposed	Well #2	CRBG	2	12.00S-26.00E-36-SW SE	650 FEET NORTH AND 1500 FEET WEST FROM SE CORNER, SECTION 36
3						
4						
5						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	2377	?	?	-	500 ±	?	?	?	?	?	?	-
2	2355	?	?	-	500 ±	?	?	?	?	?	?	-

Use data from application for proposed wells.

A4. **Comments:** _____

The proposed wells are in Grant County, along the John Day River outside the town of Dayville. The area immediately underlying the wells is mapped as Qa and Ql (alluvium and landslide debris) by Brown and Thayer, 1966. In this area these Quaternary deposits overly varying thicknesses of QTr (Rattlesnake FM) and Tm (Mascall FM) before reaching the underlying Tp/Tcu (Picture Gorge Basalt Formation/Undivided Columbia River Basalt Group - CRBG). Within several miles of the proposed wells, exposures of the underlying John Day FM and Clarno FM are mapped, as well as isolated exposures of the older Mesozoic and Paleozoic rocks (Brown and Thayer, 1966).

At this location the Rattlesnake FM is deeply eroded and only discontinuous, isolated exposures remain, however it is known to be up to ±630 feet thick at the type section on Cottonwood Creek (Enlows, 1976). Based on the mapping of Brown and Thayer it is difficult to say with certainty what thickness, if any, of the Rattlesnake FM will be encountered by the proposed wells due to Quaternary cover. However it appears that Well #2 will break into the underlying Mascall FM directly below the Quaternary deposits. Geologic mapping by Taubeneck (1950) indicates that neither well will penetrate the Rattlesnake FM.

The Mascall FM is reported to range from 1340 (Kuiper, 1988) up to 2000 (Thayer, 1950) feet thick, and reportedly interfingers with the uppermost Picture Gorge Basalt flows at the basal contact (Kuiper, 1988; Gannett, 1984).

The applicant proposes to develop groundwater from the CRBG aquifers, which will require drilling through the Quaternary deposits, any remaining Rattlesnake FM, and the Mascall FM before reaching even the uppermost flows of CRBG. Near the

edges of the eroded remnants of Rattlesnake FM and Mascall FM the combined thickness of these deposits may be quite thin, or non-existent, but a maximum combined thickness of up to 2630 feet for these formations has been reported. The water well report for GRAN 50962 (located ~1 mile east of proposed 1) reports black hard basalt at a depth of 167 feet, although the well is only drilled to a depth of 170 so it is unknown if any substantial thickness of basalt exists at this shallow depth, or if thin flows of CRBG are interfingering with the overlying Mascall FM at this location. Alternatively, the water well report for GRAN 243 (City of Dayville) reports 609 feet of unconsolidated sedimentary deposits to total depth.

The mapping of Brown and Thayer (1966) indicates that if the applicant is successful in their efforts to drill through the overlying formations into the CRBG, the wells will produce groundwater from water-bearing zones in the Picture Gorge Basalt Formation of the CRBG; although the relation between the Picture Gorge Basalt, and the undivided Columbia River Basalt Group lavas south of the John Day River is unclear from the available mapping.

A5. **Provisions of the John Day** _____ Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water are, or are not, activated by this application. (Not all basin rules contain such provisions.)

Comments: _____

A6. **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: _____
 Comments: Currently no administrative area.

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. Based upon available data, I have determined that groundwater* for the proposed use:

- a. is over appropriated, is not over appropriated, or cannot be determined to be over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. will not or will likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. will not or will likely to be available within the capacity of the groundwater resource; or
- d. will, if properly conditioned, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. The permit should contain condition #(s) 7B, 7F, 7N, 7P, 7T, flow meter, 7J, 7K;
 - ii. The permit should be conditioned as indicated in item 2 below.
 - iii. The permit should contain special condition(s) as indicated in item 3 below;

- B2. a. Condition to allow groundwater production from no deeper than _____ ft. below land surface;
- b. Condition to allow groundwater production from no shallower than _____ ft. below land surface;
- c. Condition to allow groundwater production only from a single aquifer in the Columbia River Basalt Group;
- d. Well reconstruction is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. Groundwater availability remarks: _____

The application proposes to develop groundwater from water-bearing zones within the Columbia River Basalt Group, a series of lava flows with a composite thickness that reportedly ranges up to 2625 ft in the area (Picture Gorge Basalt thickness from Swanson, 1979). The typical lava flow consists of a permeable flow top & flow bottom, and a dense, relatively impermeable interior. Together, the basalt flow contact zones (vesicular/brecciated flow tops, pillow complexes and breccia zones) along with any sedimentary interbeds are referred to as interflow zones, and make up the primary aquifers within the CRBG, whereas the dense flow interiors commonly act as aquitards (Riedel, 2002).

Potential for water-level declines and overdraft of the resource exists virtually everywhere the Columbia River Basalt Group aquifers are developed.

If a permit is issued, the following conditions are recommended:

7B: Interference Condition

7F: Proposed Well location Condition

7N: Annual Measurement and Decline Condition

7P: Well Tag Condition

7T: Dedicated Measuring Tube Condition for all POA wells

Flow meter condition: Use the water rights "large" permit condition requiring a totalizing flow meter and reporting

7J: Scenic waterway condition

7K: The well shall be continuously cased and continuously sealed from land surface into hard dense basalt below any permeable flow-top zones at the contact with overlying sedimentary formations. The well shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in the well shall be no greater than 100 feet. An open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval. If during well construction, it becomes apparent that the well can be constructed to eliminate interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Ground Water/Hydrology Section Manager to request approval of such construction. The request shall be in writing, and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any permanent casing and sealing material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. 690-09-040 (1): Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	CRBG	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	CRBG	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation:

Aquifers in the Columbia River Basalt group lavas are typically confined by thick low-permeability interiors of overlying flows.

C2. 690-09-040 (2) (3): Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	John Day River		2350	835	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	John Day River		2330	1500	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	S. Fk. John Day River		2360	6000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	S. Fk. John Day River		2360	2350	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: _____

The geologic mapping by Brown and Thayer (1966) indicates CRBG lava flows on the north side of the John Day River are dipping 3-18 degrees to the southwest, and are offset along strands of the John Day Fault system with steeply dipping CRBG lava flows, rocks of the Clarno FM and pre-Tertiary rocks on the southwest side of the fault system. The implication of this geometry is that aquifers within the CRBG north of the fault are juxtaposed with low permeability formations south of the fault, suggesting this is the termination of these aquifers at this location, and that this is a groundwater discharge area for these aquifers in this region. It is not known with certainty where hydraulic connection with surface water occurs, but the presence of numerous springs in the area are evidence of the groundwater-surface water connection locally.

Water Availability Basin the well(s) are located within: _____

Proposed well 1: JOHN DAY R > COLUMBIA R - AB S FK JOHN DAY R

Proposed well 2: FRANKS CR > JOHN DAY R - AT MOUTH

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < 1/4 mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MF212A	30	<input checked="" type="checkbox"/>	64.70	<input checked="" type="checkbox"/>	*	<input checked="" type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	MF211A	60	<input checked="" type="checkbox"/>	95.6	<input checked="" type="checkbox"/>	*	<input checked="" type="checkbox"/>
2	2	<input type="checkbox"/>	<input type="checkbox"/>	MF219A	25	<input checked="" type="checkbox"/>	18.1	<input checked="" type="checkbox"/>	*	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: _____

*Interference at 30 days could not be estimated because the geology of the CRBG aquifers do not meet model assumptions of any widely accepted technique for determining stream depletion (i.e. Hunt 1999, 2003).

C4a. **690-09-040 (5):** Estimated impacts on hydraulically connected surface water sources greater than one mile as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: _____

*Interference could not be estimated because the geology of the CRBG aquifers do not meet model assumptions of any widely accepted technique for determining stream depletion (i.e. Hunt 1999, 2003).

C4b. **690-09-040 (5) (b)** The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.

C5. If properly conditioned, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

i. The permit should contain condition #(s) _____;

ii. The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** _____

C1. 690-09-040 (1)

It is determined that all wells will produce water from a confined aquifer.

C2. 690-09-040 (2) (3)

It is determined that all wells are hydraulically connected with the John Day River and the South Fork John Day River.

C3a./C3b. 690-09-040 (4)

PSI is assumed for Well 1 to SW 1; Well 2 to SW 1; Well 2 to SW 2.

C4a. 690-09-040 (5)

*Interference could not be estimated because the geology of the CRBG aquifers do not meet model assumptions of any widely accepted technique for determining stream depletion (i.e. Hunt 1999, 2003).

References Used: _____

Enlows, H.E., 1976. Petrography of the Rattlesnake Formation at the type area, central Oregon. State of Oregon, Department of Geology and Mineral Industries.

Brown, C.E., and Thayer, T.P., 1966. Geologic map of the Canyon City quadrangle, northeastern Oregon: U.S. Geological Survey, Miscellaneous Geologic Investigations Map I-447, scale 1:250,000

Kuiper, J.L., 1988, Kuiper, J.L., 1988. Stratigraphy and sedimentary petrology of the Mascall Formation, Eastern Oregon. Oregon State University Master's Thesis, 165 pgs.

Gannet, M., 1984. Ground Water Assessment of the John Day Basin. Oregon Water Resources Department, Salem, Oregon.

Taubeneck, W.H., 1950. Geology of the northeast corner of the Dayville Quadrangle, Oregon. Oregon State University Master's Thesis, 166 pgs.

White, W.H., 1964. Geology of the Picture Gorge Quadrangle, Oregon. Oregon State University Master's Thesis, 166 pgs.

Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002. Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA: a guide to site characterization, Pacific Northwest National Laboratory, Richland, Washington.

Swanson, D.A., Wright, T.L., Hooper, P.R. and Bentley, R.D., 1979. Revisions in stratigraphic nomenclature of the Columbia River Basalt Group (No. 1457-G). USGS Bulletin 1457-G.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

D2. THE WELL does not appear to meet current well construction standards based upon:

- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

D3. THE WELL construction deficiency or other comment is described as follows: _____

D4. Route to the Well Construction and Compliance Section for a review of existing well construction.

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

JOHN DAY R > COLUMBIA R - AB S FK JOHN DAY R

Watershed ID #: 212 Basin: JOHN DAY Exceedance Level: 80
 Time: 9:48 AM Date: 08/30/2018

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
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Monthly values are in cfs.
 Storage is the annual amount at 50% exceedance in ac-ft.

JAN	166.00	4.91	161.00	0.00	80.00	81.10
FEB	210.00	5.31	205.00	0.00	118.00	86.70
MAR	288.00	5.86	282.00	0.00	118.00	164.00
APR	433.00	31.40	402.00	0.00	118.00	284.00
MAY	433.00	63.20	370.00	0.00	118.00	252.00
JUN	261.00	83.80	177.00	0.00	80.00	97.20
JUL	129.00	119.00	9.85	0.00	50.00	-40.20
AUG	88.60	93.40	-4.84	0.00	30.00	-34.80
SEP	64.70	63.30	1.37	0.00	30.00	-28.60
OCT	108.00	26.10	81.90	0.00	50.00	31.90
NOV	143.00	4.56	138.00	0.00	80.00	58.40
DEC	156.00	4.82	151.00	0.00	80.00	71.20
ANN	235,000	30,700	204,000	0	57,300	149,000

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

FRANKS CR > JOHN DAY R - AT MOUTH

Watershed ID #: 30620106
Time: 9:48 AM

Basin: JOHN DAY

Exceedance Level: 80
Date: 08/30/2018

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Reserved Requirements	Instream Available	Net Water
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Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

JAN	1.04	0.01	1.03	0.00	0.00	1.03	
FEB	2.63	0.02	2.61	0.00	0.00	2.61	
MAR	4.13	0.03	4.10	0.00	0.00	4.10	
APR	6.10	0.09	6.01	0.00	0.00	6.01	
MAY	5.73	0.16	5.57	0.00	0.00	5.57	
JUN	2.43	0.17	2.26	0.00	0.00	2.26	
JUL	0.60	0.23	0.37	0.00	0.00	0.37	
AUG	0.25	0.18	0.07	0.00	0.00	0.07	
SEP	0.23	0.12	0.11	0.00	0.00	0.11	
OCT	0.25	0.05	0.20	0.00	0.00	0.20	
NOV	0.54	0.00	0.54	0.00	0.00	0.54	
DEC	0.81	0.01	0.80	0.00	0.00	0.80	
ANN	3,400	65	3,340	0	0	3,340	

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

JOHN DAY R > COLUMBIA R - AB N FK JOHN DAY R

Watershed ID #: 211
Time: 9:49 AM

Basin: JOHN DAY

Exceedance Level: 80
Date: 08/30/2018

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Reserved Requirements	Instream Available	Net Water
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Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

JAN	263.00	11.80	251.00	9.94	120.00	121.00	
FEB	388.00	16.40	372.00	17.10	160.00	194.00	
MAR	546.00	21.00	525.00	25.70	160.00	339.00	
APR	813.00	62.40	751.00	37.30	160.00	553.00	
MAY	717.00	96.90	620.00	30.80	160.00	429.00	
JUN	387.00	122.00	265.00	7.10	120.00	138.00	
JUL	181.00	167.00	13.50	0.00	60.00	-46.50	
AUG	118.00	131.00	-13.20	0.00	60.00	-73.20	
SEP	95.60	89.60	5.97	0.00	60.00	-54.00	
OCT	154.00	38.00	116.00	0.00	60.00	56.00	
NOV	206.00	8.89	197.00	0.00	120.00	77.10	
DEC	240.00	9.92	230.00	6.97	120.00	103.00	
ANN	403,000	47,000	356,000	8,120	81,800	270,000	

Well Location Map

