

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 03/12/2015
 FROM: Groundwater Section Phillip I. Marcy / Gerald H. Grondin
Reviewer's Name
 SUBJECT: Application G- 17923 Supersedes review of _____
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 ground water 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: J.C. Watson Co. County: Malheur

A1. Applicant(s) seek(s) 2.7 cfs from 3 well(s) in the Malheur Basin,
Snake River subbasin Quad Map: Owyhee

A2. Proposed use: Supplemental Irrigation (435 acres) Seasonality: March 1 - October 31 (245 days)

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	No log	1	Fluvial and lacustrine sediments of the Idaho Group	0.9	T20S/R46E-S13 NW-NW	110'S, 800'E fr NW cor S 13
2	No log	2		0.9	T20S/R46E-S13 NW-NW	60'S, 30'E fr NW cor S 13
3	Proposed	3		0.9	T20S/R46E-S14 NE-NE	75'S, 1085'W fr NW cor S 13
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	2258	?	none	none	?	?	?	?	?	?	?	n/a
2	2266	?	none	none	?	?	?	?	?	?	?	n/a
3	2284	?	?	n/a	200	0-30	+2-30	?	30-200	400	?	n/a

Use data from application for proposed wells.

A4. **Comments:** Wells 1 and 2 exist, but there is no information available about them. Applicant has expressed interest in improving construction of these wells to the standards described for the proposed well. Consequently, this review includes a permit condition requiring the two existing wells to be re-constructed and the proposed well to be constructed similarly. This review assumes the three wells will be similarly constructed/re-constructed. If they are not, a re-review will be needed.

Based on nearby wells, the three wells should encounter similar conditions (first water, SWL, unconfined conditions) and sediments (lacustrine and fluvial sediments: sand, gravel, and clay).

A5. **Provisions of the Malheur (OAR 690-510)** Basin rules relative to the development, classification and/or management of ground water 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: _____

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

B1. Based upon available data, I have determined that ground water* 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 ground water 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 ground water 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 ground water resource (see B3); or
- d. will, if properly conditioned, avoid injury to existing ground water rights or to the ground water resource:
 - i. The permit should contain condition #(s) 7B (interference condition); 7F (proposed well location); 7N (annual measurement condition); 7P (well tag condition); (measuring tube condition); "Large water use condition"
 - 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 ground water production from no deeper than _____ ft. below land surface;
- b. Condition to allow ground water production from no shallower than _____ ft. below land surface;
- c. Condition to allow ground water production only from the lacustrine and alluvial sediments (sand, gravel, and clay) ground water reservoir between approximately 100 ft. and 400 ft. below land surface;
- 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 Ground Water 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. Ground water availability remarks:

Regarding Appropriation: There are few wells in the area with consistent long-term water level measurements, the closest being MALH 2147 (state obs well 584) which is about 3.2 miles to the southwest of the proposed POA (Figure 3). This well shows stable long-term water levels but may not be representative of the area near the POA.

Regarding Injury: There exists only one supplemental groundwater right within 1 mile of the proposed POA (permit G15737). Given the typically low yield of nearby wells, in addition to the unconfined nature and fine-grained character of the aquifer, it is unlikely that the addition of a POA at the applicant’s proposed location will cause significant injury to nearby groundwater users. Regardless, standard interference and drawdown conditions should be applied if the permit is issued.

Regarding Capacity: The existing and proposed wells will be required to produce from lacustrine and fluvial sediments of the Glenss Ferry Formation of Ferns et al. (1993) and part of the Lake Idaho Group. These sediments consist mainly of lacustrine silt and clay but contain numerous lenses of sand and gravel of varying depth and thickness. These lenses are the most productive parts of the aquifer, and are unconfined to poorly confined, though typically overlain by silt and clay deposits (Gannett, 1990). Well yields from the same township as the proposed POA and the surrounding townships (451 records) average less than 100 gallons per minute. Consequently, achieving the total maximum pumping rate of 2.7 cfs (1212 GPM) from the three proposed new wells is quite likely unattainable within these materials This would require that each permitted well pump 0.9 cfs. Only 3 wells in the area are capable of producing yields of this magnitude.

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

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

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	Sand/Gravel of Glenns Ferry formation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Sand/Gravel of Glenns Ferry formation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Sand/Gravel of Glenns Ferry formation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Well logs for townships in this area show static water levels similar to the depths of water-bearing zones (See Fig. ?). In addition, Gannett (1990) determined that the aquifer system in the area is, in general, unconfined to leaky-confined.

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	Snake River	?	2182	5400	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Owyhee River	?	2187	11100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Snake River	?	2182	6100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Owyhee River	?	2187	11520	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Snake River	2264	2182	7175	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Owyhee River	2264	2187	12200	<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"/>

Basis for aquifer hydraulic connection evaluation: The aquifer from which the proposed wells will produce is unconfined to leaky-confined, and limited groundwater level data indicates that general groundwater flow in this area is from the west and south, flowing toward the Owyhee River and Snake River (Gannett, 1990). In general, the location of the proposed POAs is probably more strongly connected to the Snake River than the Owyhee River, as it is the regional groundwater discharge. However, as there is no WAB for the Snake River, and since the Owyhee River has lower flows, interference with the Owyhee River was investigated in C4a below.

Water Availability Basin the well(s) are located within: Owyhee R > Snake R > At Mouth (ID# 31111001)

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 < ¼ 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?
		<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"/>
		<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: The applicant's proposed wells are not within 1 mile of surface water so C3a and C3b do not apply.

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
1	2	29.0%	24.1%	6.9%	17.8%	26.1%	32.4%	37.3%	41.4%	44.7%	47.5%	45.0%	35.9%
Well Q as CFS		0.0	0.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	0.0	0.0
Interference CFS		0.784	0.651	0.186	0.481	0.705	0.875	1.008	1.116	1.206	1.282	1.214	0.968
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													
(A) = Total Interf.		0.784	0.651	0.186	0.481	0.705	0.875	1.008	1.116	1.206	1.282	1.214	0.968
(B) = 80 % Nat. Q		264	636	736	1360	1190	518	298	230	170	156	232	303
(C) = 1 % Nat. Q		2.64	6.36	7.36	13.60	11.90	5.18	2.98	2.30	1.70	1.56	2.32	3.03
(D) = (A) > (C)		No	No	No	No	No	No	No	No	No	No	No	No
(E) = (A / B) x 100		.30%	.10%	.03%	.04%	.06%	.17%	.34%	.49%	.71%	.82%	.52%	.32%

(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: The three wells are each more than one mile from the Snake and Owyhee Rivers.

The maximum requested pumping rate is less than 1 % of the minimum monthly stream flow of the Snake River, thus interference with the Snake River was not considered.

The Hunt (1999) model was used to evaluate impacts to the Owyhee River under "worst-case" scenario conditions, pumping at the maximum proposed rate at the well nearest the river for the entire irrigation season (245 days). The model assumed leaky-confined conditions, used conservative parameters, and assumed no interference with the Snake River. Even under this worst-case scenario, interference is less than 1 % of flows in the Owyhee River.

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 ground water 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** : The three proposed POAs are located on the valley floor, with gentle slopes toward the Snake River, and down gradient from alluvial and volcanic highlands toward the west and south (Figure 3). There is limited groundwater data available for this area, but this data suggests that groundwater flow mimics topography in the region, with the Owyhee River and Snake Rivers as primary drainages to the south and east, respectively. MALH 2147 is the nearest observation well with an extended period of record, and these water level data suggest that groundwater elevation in the area has not declined in recent decades (Figure 4). The proposed POAs do not fall within a WAB, and shows little potential to substantially interfere with natural streamflow in either the Snake River or the Owyhee River.

If a permit is issued, it should contain the following permit conditions: 7B-well interference condition; 7F-proposed well location condition; 7n-annual water level measurement condition; 7P-well tag condition; 7T-measuring tube condition.

References Used:

Gannett, M.W., 1990. Hydrogeology of the Ontario Area, Malheur County, Oregon, Oregon Water Resources Department, Groundwater Report No. 34. 39 p.

Ferns, M.L., H.C. Brooks, J.G. Evans, M.L. Cummings. 1993. Geologic map of the Vale 30x60 minute quadrangle, Malheur County, Oregon and Owyhee County, Idaho. Oregon Dept. of Geology and Mineral Industries Geological Map Series 77.

Hunt, B., 1999. Unsteady stream depletion from ground water pumping: Ground Water, v. 37, no. 1, p. 98-102

Well Logs Attached (nearby wells with assumed similar stratigraphy):

MALH 2147
MALH 50408
MALH 54074
MALH 54020

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:** _____

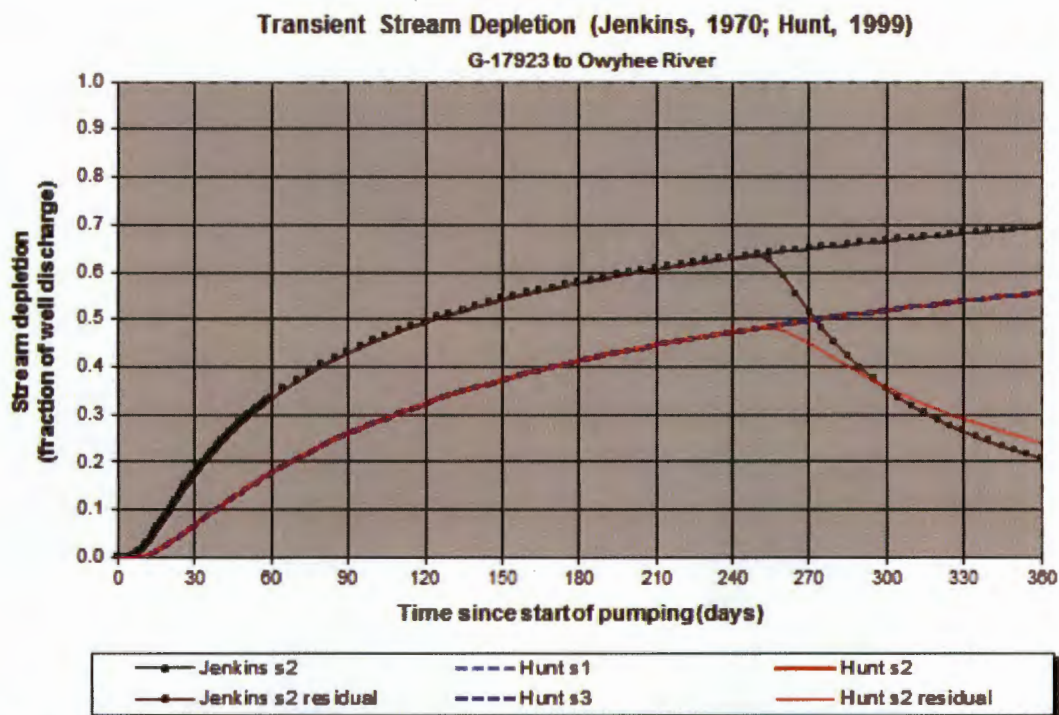
D4. Route to the Well Construction and Compliance Section for a review of existing well construction.

Water Availability Tables

Below is the Water Availability Table for the Owyhee River. The Snake River is not associated with a WAB but minimum daily discharge for the Snake River at Nyssa (USGS gage #13213100) is shown in Figure 2.

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 31111001		OWYHEE R > SNAKE R - AT MOUTH			Exceedance Level: 80	
Time: 1:32 PM		Basin: OWYHEE			Date: 03/11/2015	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	264.00	714.00	-450.00	0.00	0.00	-450.00
FEB	636.00	1,090.00	-453.00	79.40	0.00	-532.00
MAR	736.00	1,440.00	-707.00	380.00	0.00	-1,090.00
APR	1,360.00	1,750.00	-390.00	459.00	0.00	-849.00
MAY	1,190.00	2,210.00	-1,020.00	79.20	0.00	-1,100.00
JUN	518.00	1,890.00	-1,370.00	0.00	0.00	-1,370.00
JUL	298.00	1,500.00	-1,200.00	0.00	0.00	-1,200.00
AUG	230.00	1,310.00	-1,080.00	0.00	0.00	-1,080.00
SEP	170.00	875.00	-705.00	0.00	0.00	-705.00
OCT	156.00	460.00	-304.00	0.00	0.00	-304.00
NOV	232.00	396.00	-164.00	0.00	0.00	-164.00
DEC	303.00	569.00	-266.00	0.00	0.00	-266.00
ANN	694,000	857,000	106,000	60,000	0	45,800

Figure 1: Hunt (1999) model results for stream depletion between the lower Owyhee River and the proposed well in application G 17923, assuming pumping takes place at the maximum rate proposed.



Output for Hunt Stream Depletion, Scenario 2 (Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Q _w , cfs	2.700	2.700	2.700	2.700	2.700	2.700	2.700	2.700	2.700	2.700	2.700	2.700
Jenk SD%	0.172	0.334	0.430	0.495	0.541	0.577	0.606	0.629	0.514	0.353	0.263	0.208
Jenk SD cfs	0.464	0.902	1.162	1.335	1.461	1.558	1.635	1.690	1.389	0.952	0.711	0.562
Hunt SD%	0.069	0.178	0.261	0.324	0.373	0.414	0.447	0.475	0.450	0.359	0.290	0.241
Hunt SD cfs	0.186	0.481	0.705	0.875	1.008	1.116	1.206	1.282	1.214	0.968	0.784	0.651

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Q _w	2.7	2.7	2.7	cfs
Distance to stream	a	11100	11100	11100	ft
Aquifer hydraulic conductivity	K	5.5	5.5	5.5	ft/day
Aquifer thickness	b	200	200	200	ft
Aquifer transmissivity	T	1100	1100	1100	ft ² /day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	w _s	150	150	150	ft
Streambed hydraulic conductivity	K _s	0.05	0.05	0.05	ft/day
Streambed thickness	b _s	20	20	20	ft
Streambed conductance	sbc	0.375	0.375	0.375	ft/day
Stream depletion factor (Jenkins)	sdf	112.0090909	112.0090909	112.0090909	days
Streambed factor (Hunt)	sbf	3.784090909	3.784090909	3.784090909	

Figure 2: Minimum daily discharge of the Snake River near Nyssa, OR.

00060, Discharge, cubic feet per second,												
Day of month	Minimum of daily mean values for each day for 36 - 38 years of record in, ft ³ /s (Calculation Period 1974-10-01 -> 2014-09-30)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7,470	7,850	7,640	6,560	5,080	4,930	4,480	4,900	5,630	7,100	7,770	7,490
2	7,670	7,250	7,450	5,640	5,080	4,800	4,760	4,900	5,440	6,790	7,960	7,590
3	7,490	7,610	7,570	5,310	5,060	4,880	4,690	4,930	5,530	6,540	8,100	7,470
4	7,520	7,380	7,550	5,820	5,290	4,640	4,700	4,790	5,430	6,810	7,830	7,850
5	7,240	6,930	7,670	5,840	5,560	4,510	4,680	4,750	5,550	6,680	7,890	7,640
6	7,610	7,350	7,540	5,450	5,430	4,250	4,800	4,760	5,750	6,900	8,170	7,990
7	7,340	7,590	7,560	5,250	5,350	4,240	4,980	4,530	5,940	7,260	8,240	7,590
8	7,600	7,370	7,500	5,130	5,700	4,820	4,900	4,600	6,020	7,720	7,600	7,400
9	7,670	7,600	7,360	5,290	5,500	4,800	4,800	4,740	6,620	7,480	7,560	6,950
10	7,340	7,360	7,540	5,270	5,300	4,500	4,920	4,820	5,900	7,890	8,030	7,240
11	7,660	7,690	7,460	5,250	5,200	4,580	5,030	4,840	6,150	7,800	7,850	7,390
12	7,540	7,570	6,790	5,680	5,400	4,460	4,940	4,850	6,340	8,010	7,700	7,290
13	7,310	7,480	6,800	5,840	5,510	4,740	4,840	4,910	6,340	8,150	7,980	7,300
14	7,420	7,490	6,490	5,660	5,670	5,010	4,920	4,880	6,540	8,090	7,590	7,110
15	7,110	7,350	6,480	5,460	5,410	5,110	4,860	4,880	7,040	8,360	7,410	7,300
16	7,470	7,530	6,500	6,050	5,520	5,020	4,960	4,810	7,180	7,800	8,060	7,250
17	7,350	7,520	6,590	5,300	5,480	5,170	4,900	5,030	6,900	7,650	7,810	7,180
18	7,580	7,550	6,570	5,410	5,490	4,980	4,960	5,070	6,990	8,340	7,940	7,470
19	6,820	7,110	6,520	5,530	5,420	4,820	4,980	4,980	6,600	8,280	7,990	7,300
20	7,560	7,190	6,620	5,740	5,400	5,160	4,700	5,430	7,300	8,240	7,690	7,390
21	7,320	7,410	6,730	5,670	5,440	5,250	4,650	5,160	6,750	8,000	7,510	7,280
22	7,490	7,620	6,710	6,230	5,520	5,300	4,590	4,890	6,550	8,180	7,360	7,770
23	7,520	7,210	6,700	5,980	5,660	4,700	4,520	5,030	6,810	7,690	7,760	7,950
24	7,530	7,480	6,720	6,350	5,630	4,920	4,550	5,630	7,090	7,780	7,390	7,710
25	7,330	7,580	6,630	6,520	5,640	4,480	4,580	5,610	6,720	7,900	7,760	7,660
26	7,160	7,610	6,660	6,450	5,300	4,720	5,110	5,490	6,900	8,030	7,780	7,710
27	7,400	7,470	6,840	5,620	5,370	4,650	5,120	5,520	7,250	7,700	7,540	7,460
28	7,610	7,760	6,770	5,680	5,170	4,780	5,160	5,710	7,650	6,970	7,710	7,550
29	7,120	7,630	6,800	5,560	4,900	4,660	4,920	5,600	7,620	7,480	7,370	7,750
30	7,640		6,580	5,280	4,860	4,520	5,010	5,500	7,640	7,460	7,860	7,670
31	7,430		6,560		4,860		5,030	5,340		7,400		7,520

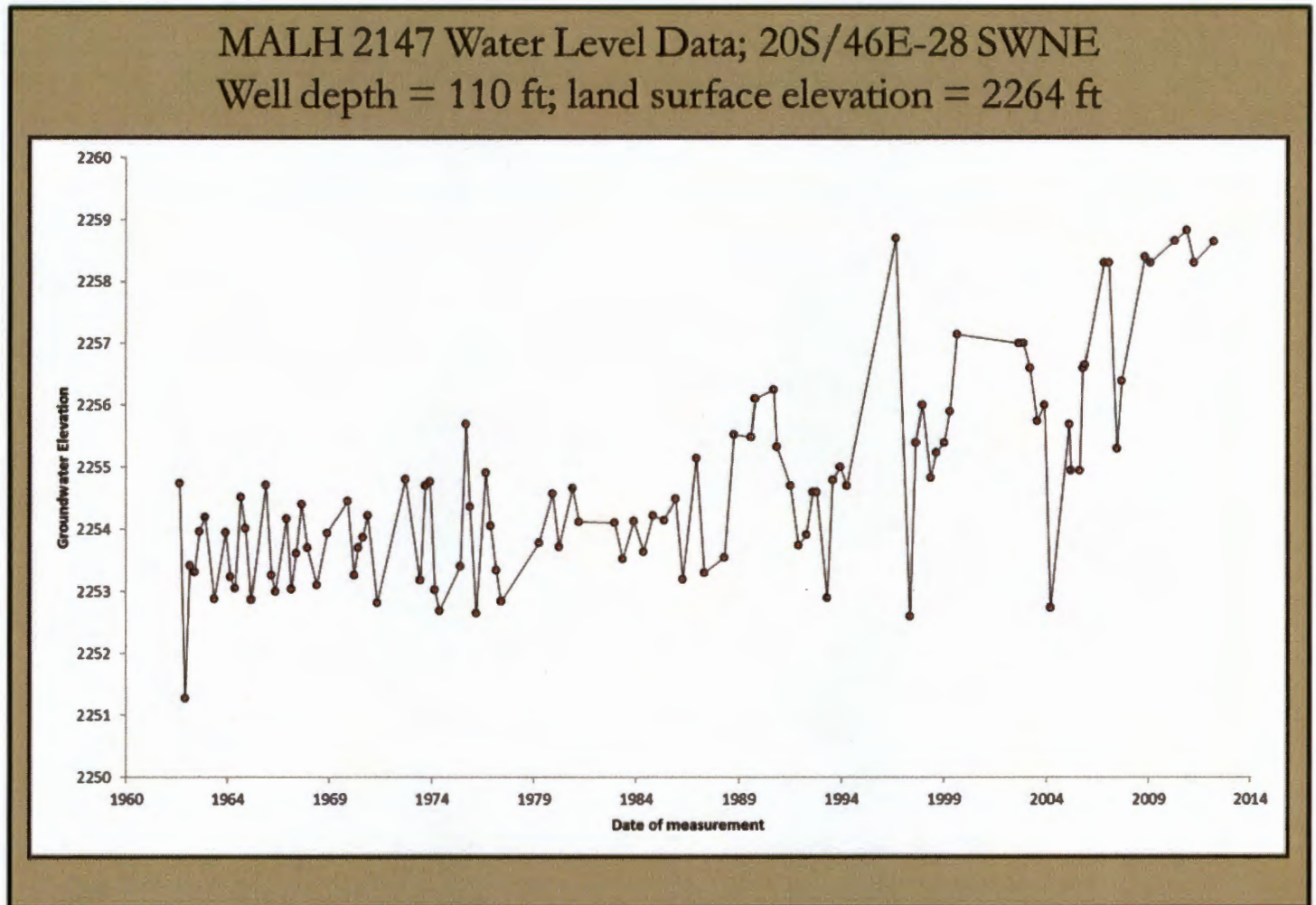
Canyon County, Idaho
 Hydrologic Unit Code 17050115
 Latitude 43°52'34", Longitude 116°58'57" NAD83
 Drainage area 58,700 square miles
 Contributing drainage area 58,700 square miles
 Gage datum 2,170 feet above NGVD29

Output formats
[HTML table of all data](#)
[Tab-separated data](#)
[Reselect output format](#)

Figure 3: Proposed wells are greater than one mile from any natural surface stream, and greater than one-quarter mile from nearby permitted wells.



Figure 4: Historic water level data from local ste obs well MALH 2147.



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STATE OF OREGON WATER WELL REPORT (as required by ORS 537.765)

math 50408

WATER RESOURCES DEPT (START CARD) # 66467 SALEM, OREGON

(1) OWNER: Mrs Dorothy Russell, Well Number LO 9670, Address 1610 RAMIER, City Steilacoom, State WA, Zip 98388

(2) TYPE OF WORK: New Well, Deepen, Recondition, Abandon

(3) DRILL METHOD: Rotary Air, Rotary Mud, Cable, Other

(4) PROPOSED USE: Domestic, Community, Industrial, Irrigation, Thermal, Injection, Other

(5) BORE HOLE CONSTRUCTION: Special Construction approval Yes No, Depth of Completed Well 345 ft, Explosives used Yes No

Table with columns: HOLE Diameter, SEAL Material, Amount sacks or pounds. Rows: 12" Bentonite 850, 10" Cement 470

How was seal placed: Method A B C D E, Backfill placed from ft. to ft., Material, Gravel placed from ft. to ft., Size of gravel

(6) CASING/LINER: Table with columns: Diameter, From, To, Gauge, Steel, Plastic, Welded, Threaded. Rows: Casing 6" 1" 140" 250", Liner 4.5" 85" 345" 4.5"

(7) PERFORATIONS/SCREENS: Perforations Method Saw (pu only), Screens Type, Material

Table with columns: From, To, Slot size, Number, Diameter, Tele/pipe size, Casing, Liner. Row: 305 345 1/4" 200 4.5

(8) WELL TESTS: Minimum testing time is 1 hour. Pump, Bailor, Air, Flowing Artesian. Yield gal/min 50, Drawdown, Drill stem at 345, Time 2 hr.

Temperature of Water 62, Depth Artesian Flow Found, Was a water analysis done? Yes, Did any strata contain water not suitable for intended use? Too little, Salty, Muddy, Odor, Colored, Other, Depth of strata

(9) LOCATION OF WELL by legal description: County Multnomah, Township 20, Range 46, Section 19, NW 1/4, NW 1/4, Tax Lot 4900, Street Address of Well 787 GRANDE AVE NESSA OR 97913

(10) STATIC WATER LEVEL: 42 ft. below land surface, Date 10-22-96, Artesian pressure lb. per square inch, Date

(11) WATER BEARING ZONES: Table with columns: From, To, Estimated Flow Rate, SWL. Row: 318 328 50 42

(12) WELL LOG: Ground elevation

Table with columns: Material, From, To, SWL. Rows: Brown Silty Clay 0 22, Cemented Sand + Sparse Gravel 22 42 42, Blue Clay 42 318, Blue Sandstone 318 328 42, Blue Clay 328 345

Date started 10-18-96 Completed 10-22-96

(unbonded) Water Well Constructor Certification: I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief. Signed, Date, WWC Number

(bonded) Water Well Constructor Certification: I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief. Signed, Date, WWC Number 682

**STATE OF OREGON
WATER SUPPLY WELL REPORT**
(as required by ORS 537.765 & OAR 690-295-0210)

MALH 54074
10/14/2013

WELL ID. LABEL# I 103944
START CARD # 1021166
ORIGINAL LOG #

(1) LAND OWNER Owner Well ID. _____
First Name TM & DEBBIE Last Name BROWN
Company _____
Address 720 STEPHEN
City NYSSA State OK Zip 97913

(2) TYPE OF WORK New Well Deepening Conversion
 Alteration (complete 2a & 10) Abandonment (complete 5a)

(2a) PRE-ALTERATION
Dia + From To Gauge Sid Plstc Wld Thrd
Casing: _____
Material From To Amt sacks/lbs
Seal: _____

(3) DRILL METHOD
 Rotary Air Rotary Mud Cable Auger Cable Mud
 Reverse Rotary Other _____

(4) PROPOSED USE Domestic Irrigation Community
 Industrial/ Commercial Livestock Dewatering
 Thermal Injection Other _____

(5) BORE HOLE CONSTRUCTION Special Standard (Attach copy)
Depth of Completed Well 424.00 ft.

BORE HOLE		SEAL			
Dia	From To	Material	From To	Amt	sacks/lbs
12	0 20	Bentonite Chips	0 20	1000	P
6	20 424				

How was seal placed: Method A B C D E
 Other OVERBORE SURFACE P

Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from _____ ft. to _____ ft. Material _____ Size _____

Exploives used: Yes Type _____ Amount _____

(5a) ABANDONMENT USING UNHYDRATED BENTONITE
Proposed Amount _____ Actual Amount _____

(6) CASING/LINER

Casing Liner	Dia	+ From To	Gauge	Sid Plstc	Wld	Thrd
<input checked="" type="checkbox"/>	6	1.5 60	.250	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	4.5	44 424	sdr17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Shoe Inside Outside Other Location of shoe(s) _____
Temp casing Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS

Perf/ Casing/ Screen	Dia	From To	Scr/slot width	Slot length	# of slots	Tale/ pipe size
Screen Liner	4.5	144 204	20			4.5
Screen Liner	4.5	404 424	20			4.5

(8) WELL TESTS: Minimum testing time is 1 hour
 Pump Bailor Air Flowing Artesian
Yield gal/min 10 Drawdown 424 Pump depth 60 Duration (hr) _____

Temperature 60 °F Lab analysis Yes By _____
Water quality concerns? Yes (describe below) TDS amount _____
From To Description Amount Units

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County MALHEUR Twp 20.00 S N/S Range 46.00 E E/W W/M
Sec 14 SE 1/4 of the SE 1/4 Tax Lot 900
Tax Map Number _____ Lot _____
Lat _____ or 43.82620000 DMS or DD
Long _____ or -117.05940000 DMS or DD
Street address of well Nearest address
NEW HOUSE BEHIND 720 STEPHEN LN NYSSA

(10) STATIC WATER LEVEL

Existing Well / Pre-Alteration Completed Well	Date	SWL (psi)	+ SWL (ft)
	<u>9/25/2013</u>		<u>75</u>

Flowing Artesian? Dry Hole?

WATER BEARING ZONES Depth water was first found 100.00

SWL Date	From	To	Est Flow	SWL (psi)	+ SWL (ft)
<u>9/25/2013</u>	<u>100</u>	<u>180</u>	<u>10</u>		<u>75</u>

(11) WELL LOG Ground Elevation _____

Material	From	To
topsoil	0	1
gravel	1	12
brown silty clay	12	108
blue clay with sandy blue clay layers	108	180
blue clay (dry)	180	424

Date Started 9/25/2013 Complete 9/25/2013
(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
License Number _____ Date _____

Signed _____
(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
License Number 1818 Date 10/14/2013
Signed DANIEL MCCLERAN (R-6148)
Contact info (optional) Daniel McLeran 208-941-0647

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

MALH 54020

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-305-0210)

WELL LABEL # 1 106160
START CARD # 1019652

(1) LAND OWNER
Owner Well ID
First Name James Last Name Hill
Company
Address 2859 Fairview Dr
City Nyssa State OR Zip 97913

(2) TYPE OF WORK
[X] New Well [] Deepening [] Conversion
[] Alteration (repair/recondition) [] Abandonment

(3) DRILL METHOD
[X] Rotary Air [] Rotary Mud [] Cable [] Auger [] Cable Mud
[] Reverse Rotary [] Other

(4) PROPOSED USE
[X] Domestic [] Irrigation [] Community
[] Industrial/Commercial [] Livestock [] Dewatering
[] Thermal [] Injection [] Other

(5) BORE HOLE CONSTRUCTION
Special Standard [] Attach copy
Depth of Completed Well 201 ft

Table with columns: Dia, From, To, Material, SEAL, From, To, Amt, sacks/lbs. Row 1: 10, 0, 98, Bentonite Chaps, 0, 50, 25, 5. Row 2: 6, 98, 201.

How was soil placed Method [] A [] B [] C [] D [] E
[X] Other: Slow pour from top
Backfill placed from 50 ft to 98 ft Material Bentonite
Filter pack from ft to ft Material Size
Explosives used. [] Yes Type Amount

(6) CASING/LINER
Casing Liner Dia From To Gauge Sd Fltc Wld Thrd
6 2 98 250
4.5 26 161 250

Shoe [X] Inside [] Outside [] Other Location of shoe(s) 98
Temp casing [] Yes Dia From To

(7) PERFORATIONS/SCREENS
Perforations Method Factory
Screens Type Slotted Material PVC

Table with columns: Pore/Cream Liner, Dia, From, To, Scrubnet width, Slot length, # of slots, Tehu pipe size. Row 1: Liner, 4.5, 161, 201, 02, 3,400.

(8) WELL TESTS: Minimum testing time is 1 hour
Pump [] Bailer [] Air [] Flowing Artesian
Yield gal/min Drawdown Drill stem/Pump depth Duration (hr)
30 180 1
Temperature 58 °F Lab analysis [] Yes [] No
Water quality concerns? [] Yes (describe below) [] No
From To Description Amount Units

(9) LOCATION OF WELL (legal description)
County MALHEUR Top 20 S N/S Range 46 E E/W W/M
Sec 11 NE 1/4 of the SE 1/4 Tax Lot 3000
Tax Map Number Lot
Lat 43 ° 50 ' 722 " or 44 03388889 DMS or DD
Long -117 ° 3 ' 528 " or -117.1964467 DMS or DD
[] Street address of well [] Nearest address

2859 Fairview Dr Nyssa OR 97913

(10) STATIC WATER LEVEL
Date SWL(psi) + SWL(ft)
Existing Well / Predeepening
Completed Well 05-02-2013 28
Flowing Artesian? [] Dry Hole? []

WATER BEARING ZONES
Depth water was first found
SWL Date From To Est Flow SWL(psi) + SWL(ft)
05-02-2013 188 190 30 28

(11) WELL LOG
Ground Elevation
Material From To
Brown Soil 0 3
Brown Clay-like Soil 3 7
Clay Brown 7 40
Clay Brown 40 85
Blue Clay 85 98
Blue Clay 98 100
Blue Clay 100 115
Blue Clay - Very Hard 115 116
Blue Clay 116 188
Fractured Clay 188 190
Blue Clay 190 201

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MAY 10 2013

SALEM, OR

Date Started 04-29-2013 Completed 05-02-2013

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
License Number Date
Password (if filing electronically)
Signed

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
License Number 1714 Date 05-06-2013
Password (if filing electronically)
Signed [Signature]
Contact Info (optional)