WATER RESOURCES DEPARTMENT MEMO March 31, 2015

TO: **Application G-** 17995

FROM: Phil Marcy **- Groundwater Section**

SUBJECT: **Scenic Waterway Interference Evaluation**

_____ YES
X NO — The source of appropriation is within or above a Scenic Waterway

_____ YES
X NO — Use the Scenic Waterway condition (condition 7J)

_____ Per ORS 390.835, the Groundwater Section is able to calculate groundwater interference with surface water that contributes to a Scenic Waterway. The calculated interference distribution is provided below.

_____ Per ORS 390.835, the Groundwater Section is unable to calculate groundwater interference with surface water that contributes to a scenic waterway; therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface flows necessary to maintain the free-flowing character of a scenic waterway.

DISTRIBUTION OF INTERFERENCE

Calculate interference as the monthly fraction of the annual consumptive use and fill in the table below. If interference cannot be calculated, per criteria in 390.839, do not fill in the table but check the "unable" option above, thus informing the Water Rights Section that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in the _____ Scenic Waterway by the following amounts, expressed as a proportion of the annual consumptive use pumped from the well.

Monthly Fraction of Annual Consumptive Use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 03/23/2015

FROM: Groundwater Section Phil Marcy/Karl Wozniak
Reviewer's Name

SUBJECT: Application G- 17995 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 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: Peterson Farms, Inc. County: Malheur

A1. Applicant(s) seek(s) 2.23 cfs from 3 well(s) in the Owyhee Basin, subbasin Quad Map: Owyhee

A2. Proposed use Supplemental Irrigation of 361.1 acres Seasonality: March 1st to October 31st

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	MALH 2734	1	Alluvium	0.526	20S/46E-23 SW-NW	1420'S, 650'E fr NW cor S 23
2	MALH 54116	2	Alluvium	0.702	20S/46E-22 SW-NW	1490'S, 170'E fr NW cor S 22
3	MALH 2872	3	Alluvium	1.000	20S/46E-27 SW-NW	1380'S, 400'E fr NW cor S 27
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	2275	31	28	03/19/1992	160	0-25	+1-79		30-70	200	70	Pump
2	2290	19	16	04/09/2014	98	0-20	+2-55	36-98	58-78	350		Air
3	2271	53	19	06/20/2015	95	0-18	+1-78		53-73	700	55	Air

Use data from application for proposed wells.

A4. **Comments:** The well-specific rates given on the application would result in a greater volume of water than the total volume proposed (1083.3 acre-feet) if pumped for the proposed time period (245 days). This is also the maximum duty per acre in the Owyhee Basin. Therefore, the average pumping rate has been adjusted for each well to reflect rate, which will be used for all calculations in processing this application.

A5. ☐ **Provisions of the** Owyhee (OAR 690-511-0010) 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:

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) **7N; 7P; Large Water Use Measurement condition with a flowmeter on each well**;
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 the _____ groundwater reservoir between approximately _____ ft. and _____ 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 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 listed wells produce water from the Quaternary sand and gravel aquifer described by Gannett (1990). The aquifer is underlain by the low permeability Glenns Ferry Formation and overlain by a leaky confining layer composed of unconsolidated fluvial and eolian silts which ranges from 10-50 feet thick. The water table generally occurs in the silts which have an average saturated thickness of about 8 feet. The main sources of recharge to the aquifer are canal and ditch leakage and deep percolation of irrigation water. Groundwater levels in the area have been stable for decades suggesting that the groundwater flow system is in steady state (long term average recharge and discharge are in balance). However, if surface water diversions decrease and groundwater withdrawals increase, groundwater levels are likely to decline in the future. The recommended water-level and water-use monitoring conditions are necessary to enable the Department to evaluate the severity of any future declines.

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	**Quaternary sand and gravel aquifer**	☒	☐
2	**Quaternary sand and gravel aquifer**	☒	☐
3	**Quaternary sand and gravel aquifer**	☒	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Gannett (1990) describes the Quaternary sand and gravel aquifer as semi-confined. Confinement is provided by an overlying leaky confining layer of silt that houses the water table. This is consistent with local well logs which report static water levels somewhat higher than the top of the first productive sand and gravel layers.

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? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	**Owyhee River**	**2247**	**2191**	**10500**	☒	☐	☐	☐	☒
2	2	**Owyhee River**	**2274**	**2191**	**14200**	☒	☐	☐	☐	☒
3	2	**Owyhee River**	**2252**	**2202**	**8450**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Gannett (1990) reports that groundwater flows toward and discharges into the Owyhee River. In most places the river does not appear to cut completely through the leaky confining layer that overlies the aquifer. The presence of a confining layer between the riverbed and the aquifer will decrease the efficiency of the hydraulic connection between the river and the aquifer. Groundwater elevations in wells 2 and 3 are coincident with the elevation of Cow Hollow Drain, a seasonal waterway that drains surplus irrigation water. Although pumping from the wells will deplete some flow in the drain, the impacts are not evaluated in this review as the Department does not generally protect water that is lost from conveyance ditches.

Water Availability Basin the well(s) are located within: OWYHEE R > SNAKE R - AT MOUTH (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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: None of the wells are less than 1 mile from a surface water source.

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
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	**1**	**24.9%**	**23.6%**	**0.0%**	**1.0%**	**3.7%**	**7.2%**	**10.8%**	**14.3%**	**17.5%**	**20.5%**	**23.4%**	**25.1%**
Well Q as CFS				**.526**	**.526**	**.526**	**.526**	**.526**	**.526**	**.526**	**.526**		
Interference CFS		**.131**	**.124**	**.000**	**.005**	**.020**	**.038**	**.057**	**.075**	**.092**	**.108**	**.123**	**.132**
2	**1**	**14.5%**	**15.4%**	**0.0%**	**0.0%**	**0.5%**	**1.6%**	**3.1%**	**5.0%**	**6.9%**	**9.0%**	**11.2%**	**13.1%**
Well Q as CFS				**.702**	**.702**	**.702**	**.702**	**.702**	**.702**	**.702**	**.702**		
Interference CFS		**.102**	**.108**	**.000**	**.000**	**.003**	**.011**	**.022**	**.035**	**.049**	**.063**	**.078**	**.092**
3	**1**	**29.9%**	**26.7%**	**0.2%**	**3.8%**	**9.1%**	**14.4%**	**19.2%**	**23.4%**	**27.1%**	**30.4%**	**33.3%**	**32.8%**
Well Q as CFS				**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**		
Interference CFS		**.299**	**.267**	**.002**	**.038**	**.091**	**.144**	**.192**	**.234**	**.271**	**.304**	**.333**	**.328**
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		**.532**	**.499**	**.002**	**.043**	**.114**	**.193**	**.271**	**.344**	**.412**	**.475**	**.534**	**.552**
(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**	**1.36**	**11.9**	**5.18**	**2.98**	**2.3**	**1.7**	**1.56**	**2.32**	**3.03**
(D) = (A) > (C)													
(E) = (A / B) x 100		**.18%**	**.08%**	**.00%**	**.00%**	**.01%**	**.04%**	**.09%**	**.15%**	**.24%**	**.30%**	**.23%**	**.18%**

(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 with the Owyhee River was estimated for each well using the Hunt (2003) model. These impacts were then summed in Table C4a to estimate the total impact from all three wells. Model parameters were based on estimates by Gannett (1990) determined from multi-well aquifer tests. Gannett reports a range of aquifer transmissivities from 6000 to 32,000 ft^2/day, an aquifer storativity of 0.001, and a range of aquitard hydraulic conductivities from about 7-31 feet/day. For comparison, estimates of transmissivity were made using single-well pump tests for 5 nearby wells (MALH 54205, MALH 2795, MALH 51461, MALH 2839, and MALH 53052). These estimates ranged from less than 100 ft^2/day to nearly 4,000 ft^2/day. However, transmissivity estimates from single-well pump tests are considered less reliable than those from multi-well tests so these values were not used in the model. In the final analysis, an aquifer transmissivity of 30,000 ft^2/day was used in the model in order to make a conservative estimate of stream depletion (from the perspective of the stream).

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**_____

References Used:

Gannett, M. W. 1999. Hydrogeology of the Ontario Area Malheur County, Oregon. Oregon Water Resources Dept. Ground Water Report No. 34. 39p.

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., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Well Logs Included:

MALH 2734 (Applicant's Well 1)
MALH 54116 (Applicant's Well 2)
MALH 2872 (Applicant's Well 3)

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

OWYHEE R > SNAKE R - AT MOUTH
Watershed ID #: 31111001 Basin: OWYHEE Exceedance Level: 80
Time: 12:56 PM Date: 03/18/2015

Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
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

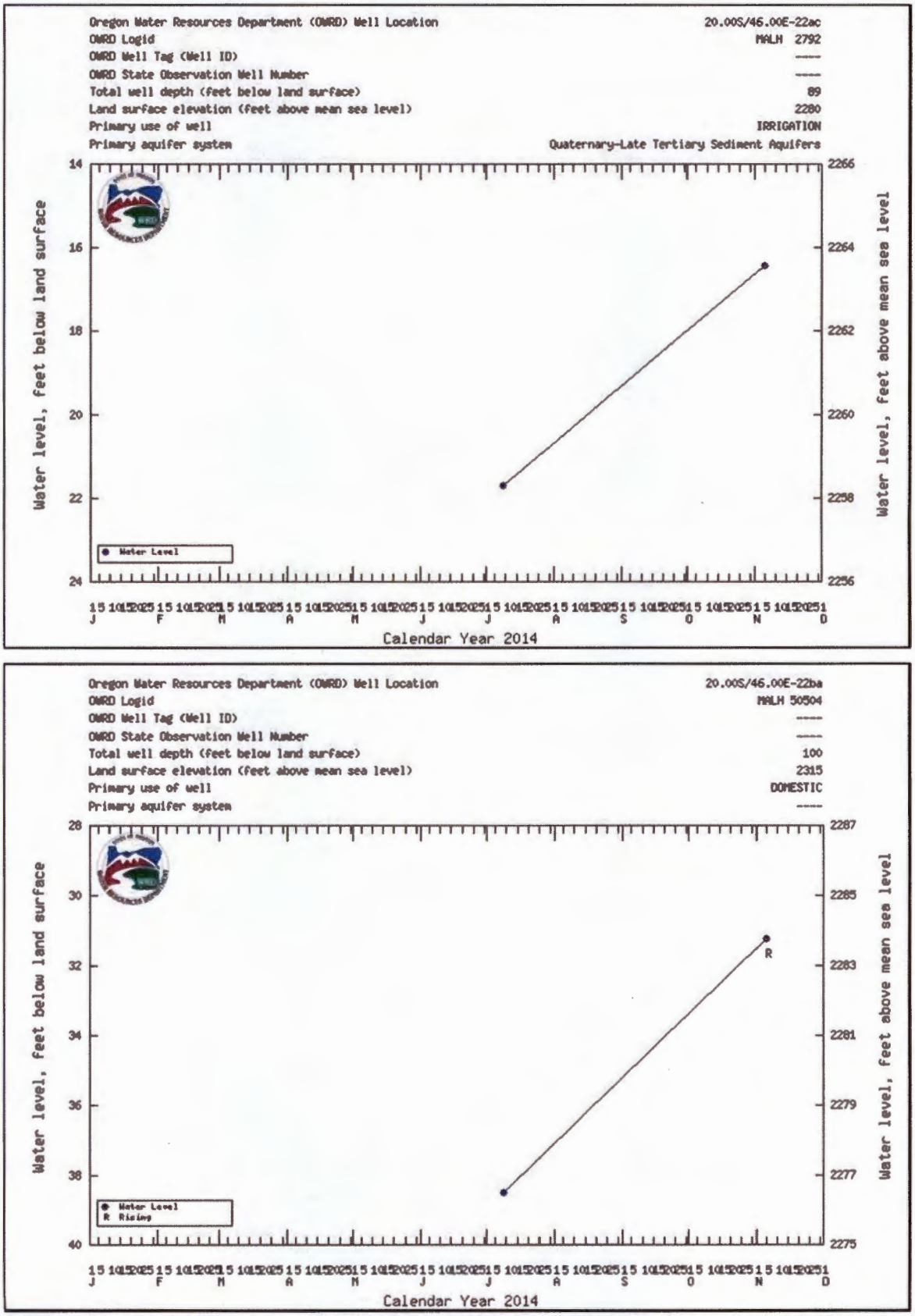


Figure 1: Water levels below land surface and water level elevations for local irrigation wells MALH 2792 and MALH 50504 during the 2014 calendar year.

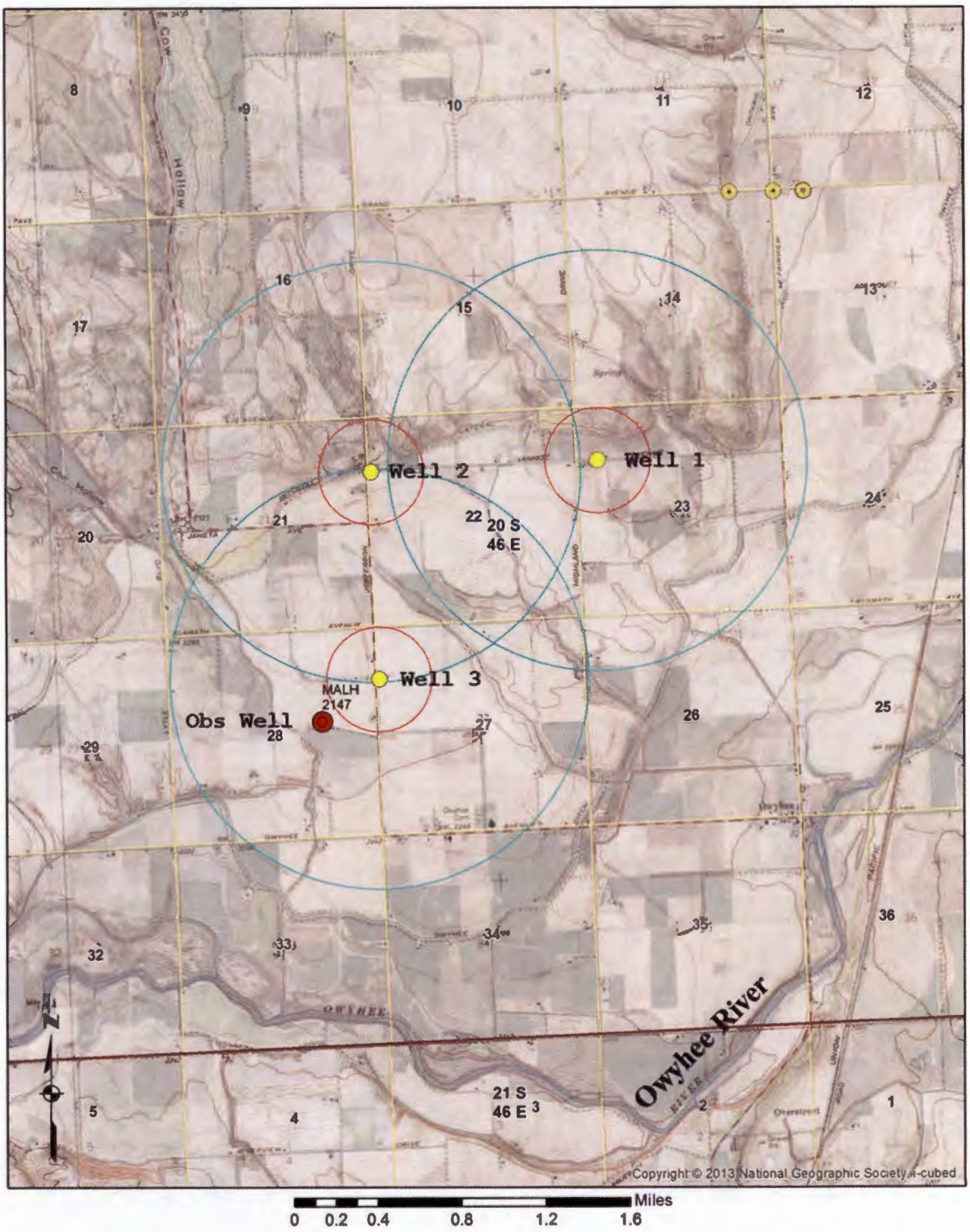
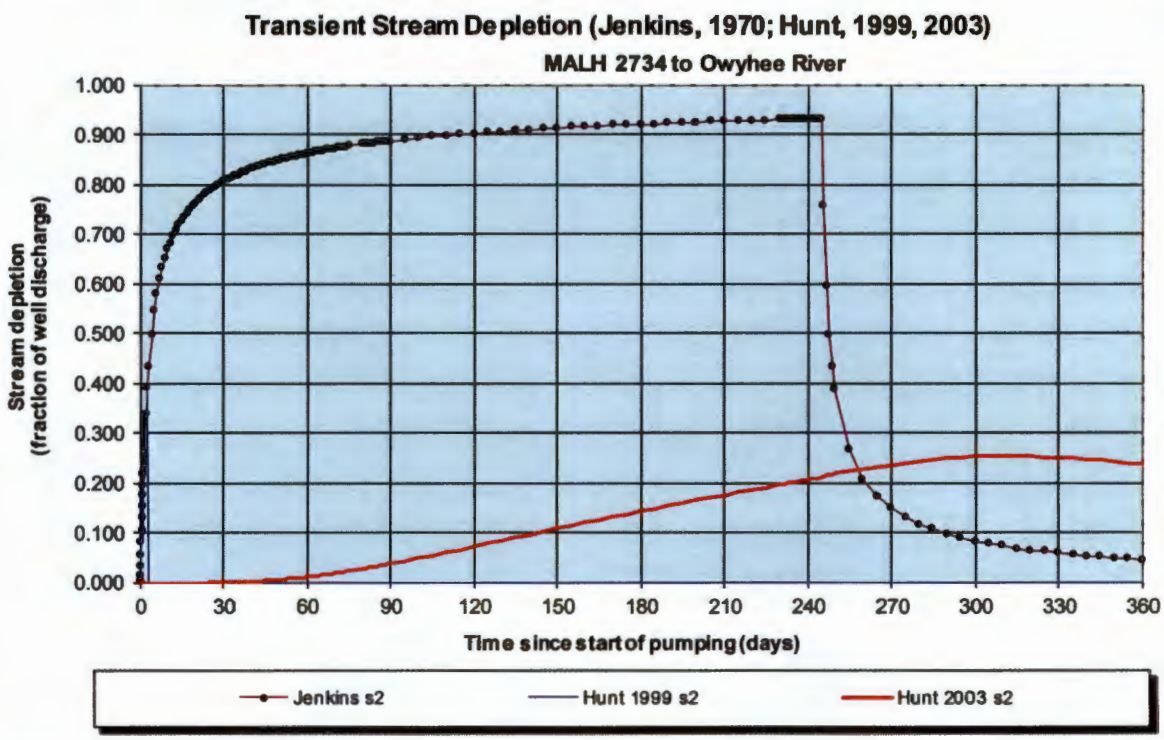
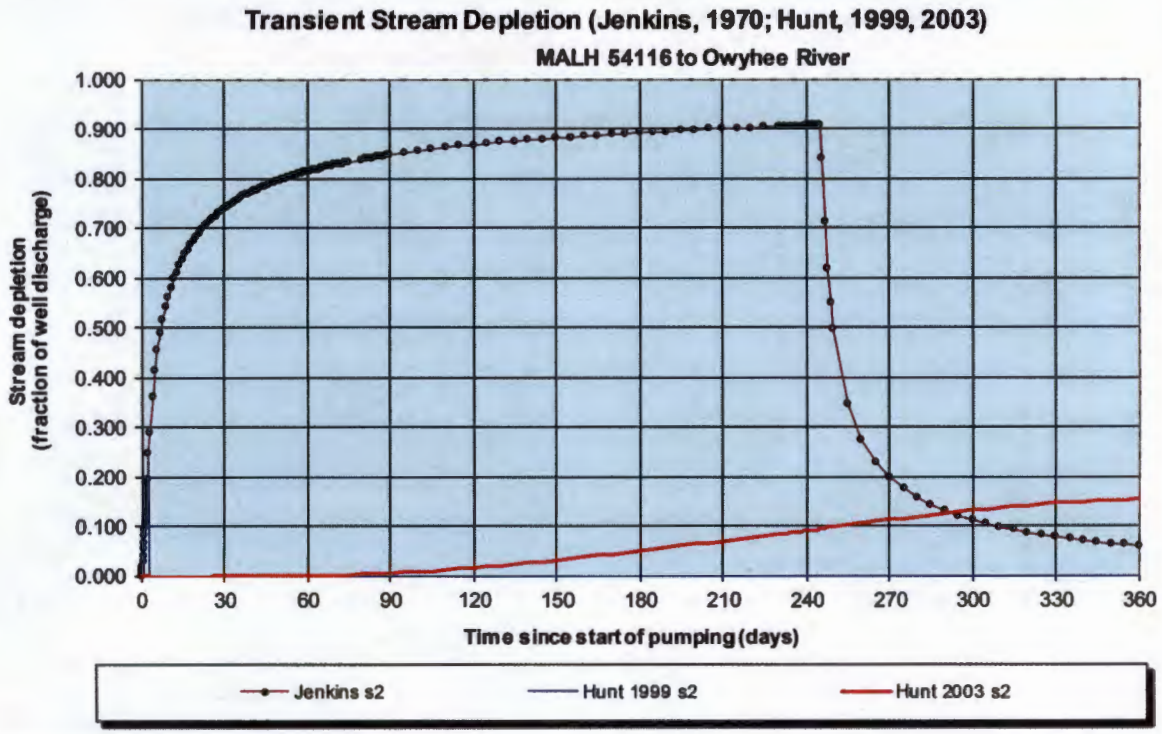


Figure 2: Location map for the three proposed POAs on application G17995, also showing proximity of the Owyhee River.



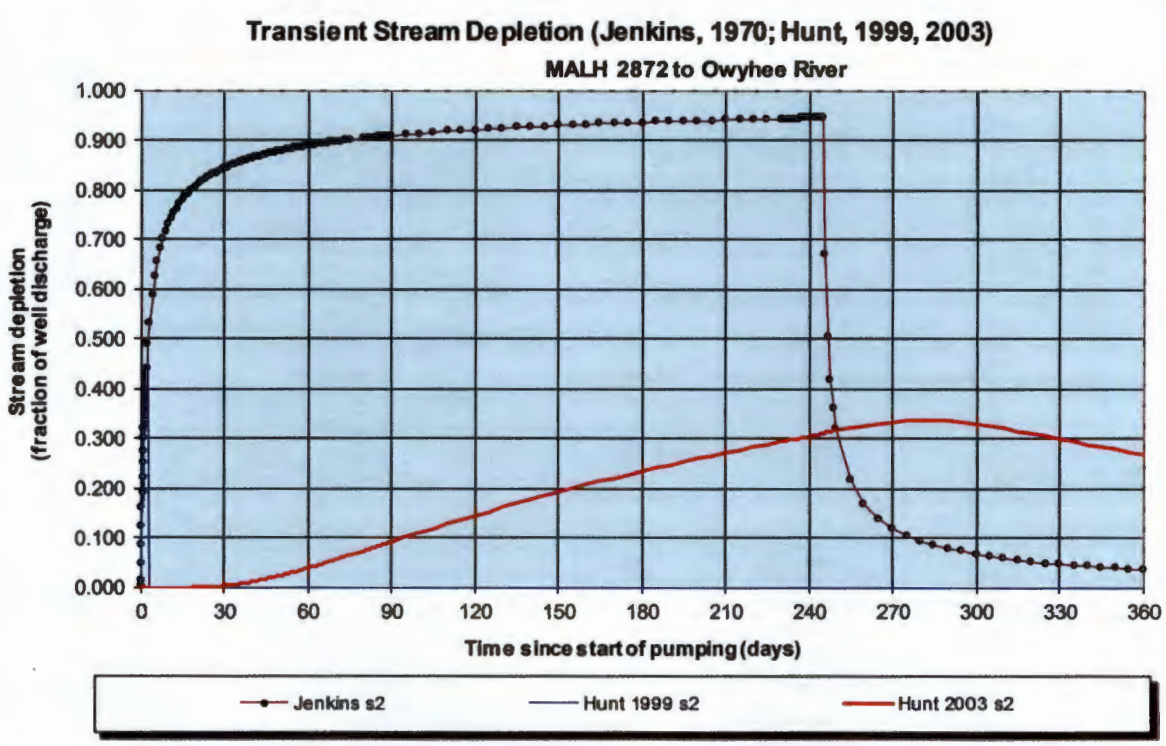
Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 245 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	80.5%	86.1%	88.6%	90.2%	91.2%	92.0%	92.5%	93.0%	14.8%	8.3%	5.7%	4.4%
H SD 1999	######	######	######	######	######	######	######	######	######	######	######	######
H SD 2003	-0.15%	1.00%	3.73%	7.19%	10.79%	14.26%	17.51%	20.50%	23.44%	25.10%	24.90%	23.64%
Qw, cfs	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526	0.526
H SD 99, cfs	######	######	######	######	######	######	######	######	######	######	######	######
H SD 03, cfs	-0.001	0.005	0.020	0.038	0.057	0.075	0.092	0.108	0.123	0.132	0.131	0.124

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.53	0.53	0.53	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	10500	10500	10500	ft
Well depth	d	160	160	160	ft
Aquifer hydraulic conductivity	K	600	600	600	ft/day
Aquifer saturated thickness	b	50	50	50	ft
Aquifer transmissivity	T	30000	30000	30000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	7	7	7	ft/day
Aquitard saturated thickness	ba	8	8	8	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	75	75	75	ft
Streambed conductance (lambda)	sbc	175.000000	175.000000	175.000000	ft/day
Stream depletion factor	sdf	3.675000	3.675000	3.675000	days
Streambed factor	sbf	61.250000	61.250000	61.250000	
input #1 for Hunt's Q_4 function	t'	0.272109	0.272109	0.272109	
input #2 for Hunt's Q_4 function	K'	3215.625000	3215.625000	3215.625000	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	61.250000	61.250000	61.250000	



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 245 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	73.8%	81.3%	84.7%	86.7%	88.1%	89.1%	89.9%	90.6%	19.7%	11.1%	7.7%	5.9%
H SD 1999	######	######	######	######	######	######	######	######	######	######	######	######
H SD 2003	-0.18%	-0.07%	0.45%	1.55%	3.11%	4.95%	6.93%	8.95%	11.17%	13.05%	14.54%	15.37%
Qw, cfs	0.702	0.702	0.702	0.702	0.702	0.702	0.702	0.702	0.702	0.702	0.702	0.702
H SD 99, cfs	######	######	######	######	######	######	######	######	######	######	######	######
H SD 03, cfs	-0.001	0.000	0.003	0.011	0.022	0.035	0.049	0.063	0.078	0.092	0.102	0.108

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.70	0.70	0.70	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	14200	14200	14200	ft
Well depth	d	98	98	98	ft
Aquifer hydraulic conductivity	K	600	600	600	ft/day
Aquifer saturated thickness	b	50	50	50	ft
Aquifer transmissivity	T	30000	30000	30000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	7	7	7	ft/day
Aquitard saturated thickness	ba	8	8	8	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	75	75	75	ft
Streambed conductance (lambda)	sbc	175.000000	175.000000	175.000000	ft/day
Stream depletion factor	sdf	6.721333	6.721333	6.721333	days
Streambed factor	sbf	82.833333	82.833333	82.833333	
input #1 for Hunt's Q_4 function	t'	0.148780	0.148780	0.148780	
input #2 for Hunt's Q_4 function	K'	5881.166667	5881.166667	5881.166667	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	82.833333	82.833333	82.833333	



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 245 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	84.2%	88.8%	90.8%	92.1%	92.9%	93.5%	94.0%	94.4%	12.0%	6.7%	4.6%	3.5%
H SD 1999	######	######	######	######	######	######	######	######	######	######	######	######
H SD 2003	0.20%	3.82%	9.14%	14.42%	19.20%	23.41%	27.11%	30.37%	33.30%	32.82%	29.94%	26.69%
Qw, cfs	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
H SD 99, cfs	######	######	######	######	######	######	######	######	######	######	######	######
H SD 03, cfs	0.002	0.038	0.091	0.144	0.192	0.234	0.271	0.304	0.333	0.328	0.299	0.267

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	1.00	1.00	1.00	cfs
Time pump on (pumping duration)	tpon	245	245	245	days
Perpendicular from well to stream	a	8450	8450	8450	ft
Well depth	d	95	95	95	ft
Aquifer hydraulic conductivity	K	600	600	600	ft/day
Aquifer saturated thickness	b	50	50	50	ft
Aquifer transmissivity	T	30000	30000	30000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	7	7	7	ft/day
Aquitard saturated thickness	ba	8	8	8	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	75	75	75	ft
Streambed conductance (lambda)	sbc	175.000000	175.000000	175.000000	ft/day
Stream depletion factor	sdf	2.380083	2.380083	2.380083	days
Streambed factor	sbf	49.291667	49.291667	49.291667	
input #1 for Hunt's Q_4 function	t'	0.420153	0.420153	0.420153	
input #2 for Hunt's Q_4 function	K'	2082.572917	2082.572917	2082.572917	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	49.291667	49.291667	49.291667	

MALH 2734

9

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

MALH 2734

RECEIVED APR 24 1992
RECEIVED JUN 5 1992 20S/46E/23bb
(START CARD) # 16036

(1) OWNER: Well Number
Name Farrell Peterson Alan Peterson
Address 679 Klamath Ave 2678 Hwy 201
City Nyssa State OR Zip 97913

(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 160 ft.
Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
16"	0	25	Bentonite	0	25	14 sacks
12"	25	160				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other 690-210-340 (1)
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12"	+1	79	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 79'

(7) PERFORATIONS/SCREENS:
☒ Perforations Method Casing perforator
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
30	70	1/8x6	2145	12"		☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
200	70		1 hr.

Temperature of water 63 Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
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 Malheur Latitude Longitude
Township 20 N or S Range 46 E or W, WM.
Section 23 NW ¼ NW ¼
Tax Lot 1600 Lot Block Subdivision
Street Address of Well (or nearest address) 790 Ivanhoe Ave
3/4 mi W of 201 on Ivanhoe

(10) STATIC WATER LEVEL:
28 ft. below land surface. Date 3-19-92
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 31'

From	To	Estimated Flow Rate	SWL
31	70	200	28

(12) WELL LOG: Ground elevation

Material	From	To	SWL
Top soil	0	16	-
Brown silt-clay	16	31	28
Fine sand-brown	31	43	"
Coarse sand & gravel	43	54	"
Brown clay	54	56	"
Coarse sand & gravel	56	70	"
Blue clay	70	78	"
Hard white shale	78	79	"
Blue clay	79	91	"
Hard white shale	91	92	"
Blue clay	92	109	"
Hard white shale	109	110	"
Blue clay	110	116	"
Hard white shale	116	117	"
Blue clay	117	160	"

Date started 3-17-92 Completed 3-19-92

(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.
WWC Number 1510
Signed [signature] Date 4-20-92

(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.
WWC Number 1506
Signed [signature] Date 4-20-92

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER

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MALH 54116

RECEIVED BY OWRD

APR 18 2014

MALH 54116

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

Y 05 2014

SALEM, OR

SALEM, OR

WELL LABEL # L 112757

START CARD # 1022667

(1) LAND OWNER Owner Well I.D.

First Name Jeremy Last Name Peterson

Company

Address 2597 Hwy 201

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 [ ] Domestic [X] Irrigation [ ] Community [ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering [ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION Special Standard [ ] Attach copy

Depth of Completed Well 98 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
21	0	5	Bentonite Chips	0	20	35	S
16	5	20					
12	20	98					

How was seal placed Method [ ] A [ ] B [ ] C [ ] D [ ] E

[X] Other slow pr from surf

Backfill placed from ft. to ft. Material

Filter pack from ft. to ft. Material Size

Explosives used: [ ] Yes Type Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●		12	X	2	55	250	●		X	
	●	10		36	58	250		●	X	
●		10		78	98	250	●		X	

Shoe [X] Inside [ ] Outside [ ] Other Location of shoe(s)

Temp casing [X] Yes Dia 16 From 0 To 20

(7) PERFORATIONS/SCREENS

Perforations Method

Screens Type Wire Wrap Material SS

Perf/S creen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen		10	58	78	03			

(8) WELL TESTS: Minimum testing time is 1 hour

( ) Pump ( ) Bailer (●) Air ( ) Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
350		95	1

Temperature 58° °F Lab analysis [ ] Yes By

Water quality concerns? [ ] Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County MALHEUR Twp 20 S N/S Range 46 E E/W WM

Sec 22 SW 1/4 of the NW 1/4 Tax Lot 300

Tax Map Number Lot

Lat ° ' " or 43.82005 DMS or DD

Long ° ' " or -117.095 DMS or DD

( ) Street address of well (●) Nearest address

SE Corner of Jefferson and Ivanhoe, Nyssa OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well	04-09-2014			16

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 16

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
04-09-2014	19	72	400			16

(11) WELL LOG Ground Elevation

Material	From	To
Topsoil	0	2
Clayey Soil	2	19
Conglomerate of Pea Gravel & Clay	19	57
Dark Gravel & Sand Blueish	57	68
Dark Gravel & Sand	68	72
Conglomerate Clay Pea Gravel	72	98

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MAY 7 1 2014

SALEM, OR

Date Started 04-03-2014 Completed 04-09-2014

(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 04-15-2014

Password (if filing electronically)

Signed

Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version 0 95

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

MALH 2872

FEB 22 1993
WATER RESOURCES DEPT.
SALEM, OREGON

20S/4E/27bc

(START CARD) # 18552

(1) OWNER: Well Number 18552
Name Coleman Farms
Address 229 Hwy 20 E
City Lebanon State OR Zip 97355

(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 95 ft.
Explosives used: ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
16	0	40	Bentonite	0	18	1700 LB
12	40	95				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other Dumped to depth & bored Dry
Backfill placed from ft. to ft. Material
Gravel placed from 18 ft. to 95 ft. Size of gravel 1/4 minus

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12	+1	78	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 78.16'

(7) PERFORATIONS/SCREENS:
☒ Perforations Method Milled
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
53	73	1/4	9160			☒	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
700	55'	73	1 hr.

Temperature of water 58 Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
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 Linn Latitude Longitude
Township 12 ☐ N or S. Range 2 ☐ E or W. WM.
Section 27 SW ¼ NW ¼
Tax Lot 3000 Lot Block Subdivision
Street Address of Well (or nearest address) Dalbergen Rd

(10) STATIC WATER LEVEL:
19 ft. below land surface. Date 6-20
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 53

From	To	Estimated Flow Rate	SWL
53	73	700	19

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
Top Soil	0	4	—
Clay Brown (Silt)	4	52	—
Gravel	52	73	19
Clay Brown	73	95	

Date started 6-12-92 Completed 6-19-92

(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.
WWC Number 785
Signed Date 6-22-92

(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.
WWC Number 151
Signed Date 6-22-92

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