## WATER RESOURCES DEPARTMENT

MEMO

December 1,2015

Application G-\_\_\_\_\_ 18126 TO: GW: Phillip Marcy FROM:

## **SUBJECT: Scenic Waterway Interference Evaluation**

	YES	The source of appropriation is within or above a Scenic Waterway
Ø	NO	The source of appropriation is within of above a seeme waterway
	YES NO	Use the Scenic Waterway condition (Condition 7J)

- Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.
- Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water 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 water flows necessary to maintain the free-flowing character of a scenic waterway**.

#### DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in \_\_\_\_\_\_ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

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

## PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO:	Wa	ater Rights Secti	ion		Date	11/30/2015
FROM	A: Gr	oundwater Sect	ion		cy / Ivan K. Gall	
				Reviewer's Name		
SUBJ	ECT: Ap	plication G- 18	126	Supersedes	review of	
						Date of Review(s)
OAR ( welfare to dete the pre	690-310-130 (1 e, safety and he ermine whether esumption crite	1) The Department realth as described the presumption	d in ORS 537.525. Dej is established. OAR 6 is based upon availal	<i>a proposed ground</i> partment staff revi 690-310-140 allow <b>ble information a</b>	iew groundwater applie ys the proposed use be and agency policies in	the preservation of the public cations under OAR 690-310-140 modified or conditioned to meet place at the time of evaluation. County: <u>Malheur</u>
A1.	Applicant(s)	) seek(s) 0.668	_ cfs from1	well(s) in the	Malheur	Basin,
				subbasin		
A2.	Proposed us	e Irriga	ation (128.2 acres)	Seasonality:	March 1 <sup>st</sup> to Octob	per 15 <sup>th</sup> (228 days)
A3.	Well and aq	uifer data (attach	and number logs fo	r existing wells; r	mark proposed wells a	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 54129	Y-1	Alluvium	0.668	18S/47E-20 NW-NE	148'S, 1895'W fr NE cor S 20
2						

\* Alluvium, CRB, Bedrock

3 4 5

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
2198	19	8.5	05/07/2014	57	0-19	+2-20	None	20-40	375	35	Pump
	Elev ft msl	Elev Water ft msl ft bls	Elev Water SWL ft msl ft bls ft bls	Elev Water SWL SWL ft msl ft bls Date	ElevWaterSWLSWLDepthft mslft blsft blsDate(ft)	ElevWaterSWLSWLDepthIntervalft mslft blsft blsDate(ft)(ft)	ElevWaterSWLSWLDepthIntervalIntervalsft mslft blsDate(ft)(ft)(ft)	ElevWater ft blsSWL ft blsSWL DateDepth (ft)Interval (ft)Intervals (ft)Intervals (ft)	ElevWaterSWL ft blsSWL DateDepth (ft)Interval (ft)IntervalsIntervalsOr Screensft mslft blsDateDepth (ft)(ft)(ft)(ft)(ft)(ft)	ElevWaterSWLSWLDepthIntervalIntervalsIntervalsOr ScreensYieldft mslft blsDateDepth(ft)(ft)(ft)(ft)(ft)(gpm)	ElevWater ft blsSWL ft blsSWL DateDepth (ft)Interval (ft)Intervals (ft)Intervals (ft)Or Screens (ft)Yield (gpm)Down (ft)

Use data from application for proposed wells.

Comments: The proposed POA well (MALH 54129) is constructed to produce from sand and gravel aquifer, likely unit A4. Osbf of Ferns and others (1993). No continuous confining layer exists above the production zone in this area. See attached well log.

Basin rules relative to the development, classification and/or A5. Provisions of the Malheur (690-510) 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:

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# 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* **is 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)
    - ii.  $\Box$  The permit should be conditioned as indicated in item 2 below.
    - iii.  $\square$  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:

If a permit is issued, the following conditions shall apply: 7C – Seven Year Minimum Measurement Condition; "Large Water Use Reporting".

## 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 fluvial sands and gravels		$\square$

**Basis for aquifer confinement evaluation:** No confining layer exists above the production zone within the proposed POA well. Fine grained soil deposits noted on log are likely moderately permeable, and are not likely laterally extensive.

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 <sup>1</sup>/<sub>4</sub> 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	Snake River	2191	2150	7700		
1	2	Malheur River	2191	2156	23000		

**Basis for aquifer hydraulic connection evaluation:** <u>Proposed POA well is in an area of groundwater discharge feeding local</u> streams. The hydraulic connection may be diffuse and inefficient, however, as the overlying silt in some locations may impede the flux of baseflow to the Snake River (Gannett, 1990).

Water Availability Basin the well(s) are located within: Malheur R > Snake R - At Mouth (31011701)

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?

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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.

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?
		_					
		Qw > Water 5 cfs? Right	Qw >WaterWater5 cfs?RightRight Q	Qw >WaterWater $Qw >$ 5 cfs?RightRight Q $1%$ ISWP 2	Qw >WaterWaterQw >Natural5 cfs?RightRight QISWR2Flow	Qw >WaterWaterQw >Naturalof 80%5 cfs?RightRight QISWR2FlowNatural	Qw >WaterWater $Qw >$ Naturalof 80%Interference5 cfs?RightRight Q1%FlowNatural $@ 30 days$

Comments: No surface water sources within 1 mile.

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.

Well	stributed SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Ang	Sep	Oct	Nov	Dee
1	2	26.4 %	23.2 %	.97 %	5.4 %	10.9%	16.2 %	21.0 %	Aug 25.1 %	28.9 %	31.7 %	32.5 %	Dec 29.5 %
-	as CFS	20.4 /0	23.2 10	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	34.3 %	29.3 %
	ence CFS	.176	.155	.006	.036	.073	.108	.140	.168	.193	.212	.217	.197
Interfere	ince er s	.170	.155	.000	.050	.075	.100	.140	.100	.195	.212	.217	.197
Distrib	uted Well	ls											
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	9%	%	9%	%	%
Well Q	as CFS												
Interfere	ence CFS												
	1	%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS									_			
Interfere	ence CFS												1
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												-
Interfere	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q	as CFS												
Interfere	ence CFS												
(A) = To	tal Interf.	0.176	0.155	0.006	0.036	0.073	0.108	0.140	0.168	0.193	0.212	0.217	0.197
( <b>B</b> ) = 80	% Nat. Q	154.0	267.0	467.0	780.0	524.0	324.0	150.0	99.9	83.8	106.0	135.0	132.0
(C) = 1	% Nat. Q	1.54	2.67	4.67	7.80	5.24	3.24	1.50	0.999	0.838	1.06	1.35	1.32
(D) = (.	A) > (C)	X		V	N.	1	2		1				
	B) x 100	0.11%	.058%	.001%	.005%	.014%	.333%	.093%	.168%	.230%	.200%	.161%	.149%

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(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:** Though considerably closer to the Snake River, the proposed right was evaluated here against the Malheur River water availability basin (WAB). There is no WAB associated with the Snake River and the proposed POA falls just outside the WAB for the Malheur River (31011701). Given the proximity to this WAB, I deem it appropriate to consider the potential impacts of issuing a permit to use groundwater at this location.

Expected stream depletion was calculated using the model of Hunt (2003), using parameters derived from local pump tests, well logs, and mapped geology (Ferns and others, 1993; Gannett, 1990). See attached results of model.

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: The distance between the proposed POA and surface waters likely precludes substantial interference from pumping at this location.

**References Used:** 

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

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.

Area well logs, nearby pump test results.

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## D. WELL CONSTRUCTION, OAR 690-200

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

iance Level: 80 ite: 11/30/2015			HEUR R > SNAKE R - A Basin: MALHEU	MALH	D #: 31011701 AM	watershed I Time: 9:29
Net Water Available	Instream Requirements	Reserved Stream Flow	Expected Stream Flow	Consumptive Use and Storage	Natural Stream Flow	Month
		re in cfs.	Monthly values a			
	in ac-ft.	50% exceedance i	the annual amount at	Storage is t		
-273.0	0.00	0.00	-273.00	427.00	154.00	7.6.1
-359.00	0.00	0.00	-359.00	626.00		JAN
-773.0	0.00	329.00	-444.00		267.00	FEB
-748.0	0.00			911.00	467.00	MAR
-433.0		470.00	-278.00	1,060.00	780.00	APR
	0.00	0.00	-433.00	957.00	524.00	MAY
-533.0	0.00	0.00	-533.00	857.00	324.00	JUN
-536.0	0.00	0.00	-536.00	686.00	150.00	JUL
-440.0	0.00	0.00	-440.00	540.00	99.90	AUG
-292.0	0.00	0.00	-292.00	376.00	83.80	SEP
-103.0	0.00	0.00	-103.00	209.00	106.00	OCT
-87.9	0.00	0.00	-87.90	223.00	135.00	NOV
-165.0	0.00	0.00	-165.00	297.00	132.00	DEC
	0	48,200	29,500	432,000	338,000	ANN

#### Well Location Map

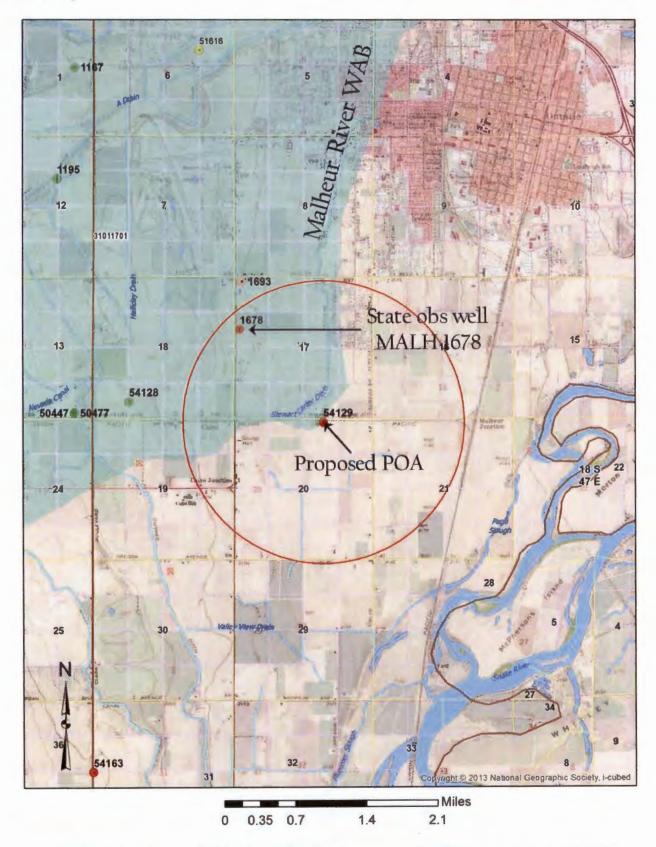


Figure 1: Location of proposed POA well MALH 54129, as compared to the Malheur River WAB and the Snake River to the east. Also shown is State Observation Well MALH 1678 less than 1 mile to the NW.

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### Water-Level Trends in Nearby Wells

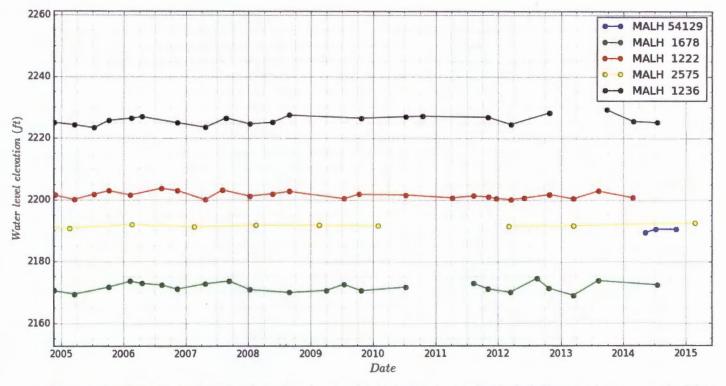


Figure 2: Groundwater elevations are shown here from local wells during the past decade, including recent measurements of the proposed POA (MALH 54129). MALH 1678 is less than one mile NW of the proposed POA, and is constructed to produce from the same shallow sand and gravel aquifer. MALH 2575 and MALH 1236 are located 3.4 miles and 4.4 miles to the west, respectively.

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						G 18126	to Malh	eur Riv	er			
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JISD HISD 1999	88.1% 85.1%	91.6% #####	90 93.1% #####	120 94.1%	150 94.7% #####	180 95.1% #####	210 95.5% #####	24 14.4 ####	0 27 6.1 # #####	0 30 3.9 * ****	0 33 4 2.9 # ####	0 36 2.2 # ####
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J SD H SD 1999 H SD 2003 Qw, ofs H SD 99, ofs H SD 03, ofs Parameter Net steady p	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r	91.6% ##### 5.38% 0.668 ##### 0.036	90 93.1% ##### 10.93% 0.668 ##### 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ****** 25.10% 0.668 ***** 0.168	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.4: 31.74: 0.66 #### 0.21 nario 0.6 22	0 27 4 6.1 # ##### 8 0.66 # ##### 2 0.21 2 Sc 7 8	0 30 3.93 4 #### 29.51; 8 0.66 # #### 7 0.19 enario 0.6 22	0 33 2.9: # #### 8 0.66 # #### 17 0.17 3 3 18	0 36 2.2 # #### # #### 8 0.66 # #### 6 0.15 Unit
J SD H SD 1999 H SD 2003 Qw, ofs H SD 99, ofs H SD 03, ofs Parameter Net steady p Time pump o	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ***** 25.10% 0.668 ***** 0.168 •nario 1 0.67 228 23000	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.4: 31.74: 0.66 #### 0.21 0.66 22 2300	0 27 4 6.1 4 ##### 8 0.66 # ##### 2 0.21 2 5c 7 8 0	0 30 3.39 4 3.9 4 4444 29.51 8 0.66 4 4444 7 0.19 enario 0.6 22 2300	0     33       ½     2.9:       #     ####       ½     #####       18     0.66       #     #####       17     0.17       3	0 36 2.2 # #### # #### 8 0.66 # #### 6 0.15 Unit
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ***** 25.10% 0.668 ***** 0.168 0.67 0.67 228 23000 57	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.4: 31.74: 0.66 #### 0.21 0.66 22 2300 5	0 27 4 6.12 # ##### 8 0.66 # ##### 2 0.21 2 5c 7 8 0 7 7	0 30 4 3.9: # #### 29.51: 8 0.66 # #### 7 0.19 enario 0.6 22 2300 5	0 33 2.9: # #### 8 0.66 # #### 17 0.17 3 3 17 18 10 17 17	0 36 2.2 4 2.2 4 #### 8 0.66 4 #### 6 0.15 Unit C day
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul Well depth Aquifer hydra	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi ar from w	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre-	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K	150 94.7% ##### 0.668 ##### 0.140	180 95.1% 25.10% 0.668 ##### 0.168 0.67 228 23000 57 12000	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.4: 31.74: 0.66 #### 0.21 0.21 0.6 22 2300 5 1200	0 27 4 6.12 # ##### 8 0.66 # ##### 2 0.21 2 Sc 7 8 0 7 10 0	0 30 3 39 4 3.9 4 4 4 29.51 8 0.66 4 4 4 4 4 4 7 0.19 0.6 22 2300 5 1200	0     33       2.9:     #####       ******     ******       *8     0.66       #     #####       17     0.17       3	0 36 2.2 4 4 4 4 4 4 4 4 4 4 4 4 4
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul- Well depth Aquifer hydra Aquifer satur	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r. n (pumpi ar from w aulic con ated thic	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre- ductivity kness	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K b	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ***** 25.10% 0.668 ***** 0.168 0.67 228 23000 57 12000 33	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.4: 31.74: 0.66 #### 0.21 0.6 22 2300 5 1200	0 27 4 6.1 # ##### 8 0.66 # ##### 2 0.21 2 5c 7 8 0 0 7 10 13	0 30 3 39 4 3.9 4 44 4 29.51 8 0.66 4 44 4 44 7 0.19 0.6 22 2300 5 1200 3	0     33       2.9:     #####       *     #####       *     #####       *8     0.66       #     #####       17     0.17       3	0 36 2.2 4 2.2 4 #### 8 0.66 4 #### 6 0.15 Unit C day ft/da
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul Well depth Aquifer hydra Aquifer satur Aquifer trans	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r. n (pumpi ar from we aulic con ated thic missivity	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre ductivity kness	90 93.1% ##### 10.93% 0.668 ##### 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K b T	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ***** 25.10% 0.668 ***** 0.168 0.168 0.168 0.168 0.67 228 23000 57 12000 33 396000	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.43 #### 31.742 0.66 #### 0.21 0.66 22 2300 5 2300 5 1200 3 39600	0 27 4 6.1; # ##### 8 0.66 # ##### 2 0.21 2 0.21 2 Sc 7 8 0 0 0 0 0 0 0	0 30 3.93 4 #### 29.51 8 0.66 # #### 7 0.19 enario 0.6 22 2300 5 1200 3 39600	0     33       //     2.9:       #     #####       //     #####       //     8       //     0.17       3	0 36 2.2 # #### 8 0.66 # #### 6 0.15 Unit c day
J SD H SD 1999 H SD 2003 Qw, ofs H SD 99, ofs H SD 03, ofs H SD 03, ofs Parameter Net steady p Time pump o Perpendicul Well depth Aquifer hydra Aquifer stora	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi ar from w aulic con ated thic missivity tivity or s	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre- ductivity kness pecific yi	90 93.1% ##### 10.93% 0.668 ##### 0.073 II on) am	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K b T S	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ***** 25.10% 0.668 ***** 0.168 0.168 0.168 0.168 0.67 228 23000 57 12000 33 396000 0.001	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.43 #### 31.742 0.66 #### 0.21 0.66 22 23000 5 12000 3 396000 0.00	0 27 4 6.1; # ##### 8 0.66 # ##### 2 0.21 2 0.21 2 Sc 7 8 0 0 0 0 0 0 0 0 0 0 0 0 0	0 30 3.93 4 #### 29.51 8 0.66 # #### 7 0.19 enario 0.6 22 2300 5 1200 3 39600 0.00	0     33       %     2.9:       #     ####       %     ####       %     0.66       #     ####       %     0.17       3	0 36 2.2' 4 #### 8 0.66 4 #### 6 0.15 Unit C day ft'ft/da ft'ft/da
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul Well depth Aquifer hydra Aquifer satur Aquifer satur Aquifer satur Aquifer satur Aquifer satur	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi ar from we aulic con ated thic missivity tivity or s ical hydr	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to strea ductivity kness pecific yi aulic con	90 93.1% ##### 10.93% 0.668 ##### 0.073 II on) am	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K b T S Kva	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ***** 25.10% 0.668 ***** 0.168 0.168 0.168 0.67 228 23000 57 12000 57 12000 33 396000 0.001 55	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.43 <b>####</b> 31.742 0.66 <b>####</b> 0.21 0.66 22 23000 5 12000 5 12000 3396000 0.00	0 27 4 6.1; # ##### 8 0.66 # ##### 2 0.21 2 5c 7 8 0 0 0 0 0 1 5	0 30 3.93 4 3.93 4 4444 29.51 8 0.66 4 4444 7 0.19 enario 0.6 22 2300 5 1200 3 39600 0.00	0     33       %     2.9:       #     ####       %     ####       %     0.66       #     ####       %     0.17       3	0 36 2.2 4 #### 8 0.66 # #### 6 0.15 Unit C day ft'ft/day
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J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul. Well depth Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquitard vett Aquitard vett Aquitard por	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi ar from w aulic con ated thic missivity tivity or s ical hydr urated thi kness be osity	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre ductivity kness pecific yi aulic con ickness	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073 II on) am	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d C W tpon a d K S Kva babs n	150 94.7% ##### 0.668 ##### 0.140	180 95.1% ***** 25.10% 0.668 ***** 0.168 • • • • • • • • • • • • • • • • • • •	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.4: 31.74: 0.66 #### 0.21 0.21 0.21 0.21 0.22 2300 5 1200 339600 0.00	0 27 4 6.1 # ##### 8 0.66 # ##### 2 0.21 2 5 7 7 8 0 0 0 0 0 0 0 0 0 0 0 0 0	0 30 3 30 3 39 4 3.9 4 3.9 4 3.9 5 1200 3 39600 0.0 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 1200 100 1	0     33       2.9:     #####       *     #####       *     #####       *8     0.66       #     #####       *7     0.17       3	0 36 2.2 # #### # #### 8 0.66 # #### 6 0.15 Unit c day ft*ft/day
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul Well depth Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquitard vert Aquitard vert Aquitard por Stream width	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r. n (pumping r. n (pumping r. at from we aulic con at ed thic missivity tivity or s ical hydr. urated thic kness be osity	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre- ductivity kness ductivity kness pecific yi aulic con ickness elow strea	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073 0.073 0.073 0.073 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d C W tpon a d K to b S Kva babs n ws	150 94.7% ##### 0.668 ##### 0.140 Sce	180 95.1% 25.10% 0.668 ##### 0.168 0.67 228 23000 57 12000 33 396000 0.001 5 14 3 396000 0.001 5 14 3 396000 0.001 5 90	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.42 14.42 131.74 0.66 #### 0.21 0.21 0.22 23000 5 12000 5 12000 3396000 0.00	0 27 4 6.1 # #### 8 0.66 # #### 2 0.21 2 5c 7 7 8 0 0 0 0 1 5 1 4 3 5 10 0 1 5 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1 1	0 30 3 30 3 39 4 3.9 4 3.9 4 3.9 4 3.9 5 3 39600 0.0 339600 0.0 1200 339600 0.0 1200 339600 0.0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 339600 0 33960000 0 0 339600000000000000000000000000000000000	0       33         2.9:       #####         2.8:       #####         2.8:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       ######         2.9:       #######         2.9:       ######         2.9:       #######         2.9:       ####################################	0 36 2.2 # #### # #### 8 0.66 # #### 6 0.15 Unit C day ft/day
J SD J SD 1999 J SD 2003 Qw, cfs J SD 99, cfs J SD 03, cfs J SD 03, cfs Parameter Net steady p Perpendicul: Well depth Aquifer hydr: Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquitard vert Aquitard vert Aquitard satu Aquitard satu Aquitard por Stream width Streambed c	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r. n (pumpi ar from w aulic con ated thic missivity tivity or s ical hydr. urated thic kness be osity conducta	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre- ductivity kness pecific yi aulic con ickness elow strea	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073 0.073 0.073 0.073 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d C Ww b b b b b b b b b b b b b b b b b b	150 94.7% ##### 0.668 ##### 0.140 Sce	180 95.1% 25.10% 0.668 ##### 0.168 0.67 228 23000 57 12000 33 396000 0.001 5 14 39 0.25 90 .000000	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.42 31.74 0.66 #### 0.21 0.66 22 2300 5 1200 3 39600 0.00 0.00	0 27 4 6.1: # ##### 8 0.66 # ##### 2 0.21 2 5 7 7 8 0 0 1 3 0 0 1 5 1 0 1 5 1 0 1 1 5 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0 30 3 39 4 3.9 4 3.9 4 3.9 4 3.9 4 3.9 5 3 3 39600 0.00 0.00 1200 3 39600 0.	0     33       2.9:     #####       *     #####       *     #####       *8     0.66       #     #####       *7     0.17       3	0 36 2.2 # #### 8 0.66 # #### 6 0.15 Unit c day ft/day
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul. Well depth Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquitard vett Aquitard satu Aquitard stora Aquitard stora Stream width Stream bed o	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi ar from we aulic con ated thic missivity tivity or s ical hydr arated thic kiness be osity conducta ation fact	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre- ductivity kness pecific yi aulic con ickness elow strea	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073 0.073 0.073 0.073 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K w b T S Kva babs n Kva babs n ws sbc sdf	150 94.7% ##### 0.668 ##### 0.140 Sce 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	180 95.1% ***** 25.10% 0.668 ***** 0.168 0.67 228 23000 57 12000 57 12000 33 396000 0.001 5 396000 0.001 5 14 33 0.25 90 .000000 .335859	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.43 #### 31.743 0.66 #### 0.21 0.66 22 2300 5 1200 5 1200 5 1200 5 1200 5 1200 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0 27 4 6.1: # ##### 8 0.66 # ##### 2 0.21 2 5c 7 8 0 0 0 1 5 1 0 1 5 1 0 1 5 1 0 1 5 1 0 1 5 1 0 1 5 1 1 1 5 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1 1	0 30 3 3.9: 4 3.9: 4 29.51; 8 0.66 4 44444 7 0.19 0.6 22 2300 5 1200 3 39600 0.00 1200 100 1	0     33       2.9:     #####       #     #####       8     0.66       #     #####       17     0.17       3	0 36 2.2 4 #### 8 0.66 # #### 6 0.15 Unit C day ft'ft/day
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 04, cf	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumpi ar from we aulic con ated thic missivity tivity or s ical hydr. urated thic kiness be osity conducta actor fact actor	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to strea ductivity kness ductivity kness pecific yi aulic con ickness elow strea	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073 0.073 0.073 0.073 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K w b b K va b a b a b s b c K va b a b a b s b c s b c s b c s b c s b c s b c s b c s b c s b c s b c s c c s c c c c	150 94.7% ##### 0.668 ##### 0.140 Sce	180 95.1% 25.10% 0.668 ##### 0.168 0.67 228 23000 57 12000 33 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 15 5 14 14 396000 15 5 14 14 14 14 14 14 14 14 14 14 14 14 14	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce	24 14.43 #### 31.743 0.66 #### 0.21 0.66 22 2300 5 1200 339600 0.00 339600 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0 27 4 6.1: # ##### 2 0.21 2 5c 7 8 0 0 3 0 3 0 5 14 3 10 5 14 3 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 10 11 15 10 11 15 10 11 15 10 11 15 10 11 15 10 11 15 10 11 15 10 11 15 10 11 15 10 11 15 10 11 15 10 11 11 11 11 11 11 11 12 13 10 11 13 10 11 13 10 11	0 30 3.39 4 3.97 4 29.517 8 0.66 4 4444 7 0.19 enario 3 0.6 22 2300 5 1200 339600 0.00 0.00 1.33585 8.71212	0       33         2.9:       ####################################	0 36 2.2 # #### 8 0.66 # #### 6 0.15 Unit c day ft/day
J SD H SD 1999 H SD 2003 Qw, cfs H SD 99, cfs H SD 03, cfs H SD 03, cfs H SD 03, cfs Parameter Net steady p Time pump o Perpendicul. Well depth Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquifer stora Stream width Stream bed c Stream bed f input #1 for H	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r n (pumping r n (pumping r ar from we aulic con ated thic missivity tivity or s ical hydr urated thic kness be osity b conducta actor lunt's Q_	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre ductivity kness ductivity kness elow strea elow strea elow strea	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073 0.073 0.073 0.073 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Upon a d Upon a d Kua b b b b S Kua ba b s b f s s b c s d f s b f s t f	150 94.7% ##### 0.668 ##### 0.140 Sce 150	180 95.1% 25.10% 0.668 ##### 0.168 0.67 228 23000 57 12000 33 396000 0.001 5 14 396000 0.001 5 14 33 6000 0.001 5 14 33 8,712121 .748582	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	24 14.43 14.43 1743 0.66 14### 0.21 0.66 22 2300 5 1200 3 39600 0.00 3 39600 0.00 1.33585 8.71212 0.748585	0 27 4 6.1: # ##### 8 0.66 # ##### 2 0.21 2 5c 7 8 0 10 10 13 10 13 10 13 10 14 15 10 10	0 30 4 3.9: # #### 29.51: 8 0.66 # #### 7 0.19 enario 0.6 22 2300 5 1200 3 39600 0.00 1200 1200 1200 0.00 1200 0.00 1200 0.00 1200 0.00 1200 0.00 1200 0.00 1200 0.00 1200 0.00 1200 0.00 1200 0.00 1.33585 8.71212 0.74858	0       33         2.9:       #####         2.8:       #####         2.8:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.9:       #####         2.1	0 36 2.2 # #### 8 0.66 # #### 6 0.15 Unit c day ft/day
Days JSD JSD HSD 1999 HSD 2003 Qw, cfs HSD 99, cfs HSD 03, cfs HSD 03, cfs Parameter Net steady p Time pump o Perpendicul. Well depth Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquifer stora Aquifer stora Stream width Stream bed c Stream bed f input #1 for H input #2 for h	88.1% 85.1% 0.97% 0.668 0.569 0.006 s: umping r. n (pumping r. n (pumping r. n (pumping r. ated thick missivity tivity or significant ated thick ated t	91.6% ##### 5.38% 0.668 ##### 0.036 ate of we ng durati ell to stre ductivity kness pecific yi aulic con ickness low strea nce (lam tor 4 functio 4 functio	90 93.1% ##### 10.93% 0.668 ##### 0.073 0.073 0.073 0.073 0.073 0.073 0.073	120 94.1% ##### 16.19% 0.668 ##### 0.108 Qw tpon a d K w b b K va b a b a b s b c K va b a b a b s b c s b c s b c s b c s b c s b c s b c s b c s b c s b c s c c s c c c c	150 94.7% ##### 0.668 ##### 0.140 Sce 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	180 95.1% 25.10% 0.668 ##### 0.168 0.67 228 23000 57 12000 33 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 0.001 5 14 396000 14 396000 15 396000 15 396000 10 14 396000 10 14 14 14 14 14 14 14 14 14 14 14 14 14	210 95.5% ##### 28.91% 0.668 ##### 0.193 Sce 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	24 14.43 #### 31.743 0.66 #### 0.21 0.66 22 2300 5 1200 339600 0.00 339600 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0 27 4 6.1 4 ##### 8 0.66 # ##### 2 0.21 2 5c 7 7 8 0 0 0 0 1 5 5 1 0 0 1 5 5 1 0 1 5 5 1 0 1 5 5 1 0 1 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1	0 30 3.39 4 3.97 4 29.517 8 0.66 4 4444 7 0.19 enario 3 0.6 22 2300 5 1200 339600 0.00 0.00 1.33585 8.71212	0       33         2.9:       #####         8       0.66         #       #####         17       0.17         3	0 36 2.2 # #### 8 0.66 # #### 6 0.15 Unit c day ft/day

Figure 3: Results of the Hunt (2003) model were used to assess potential impacts to the Malheur River to the north.

lamda'

input #4 for Hunt's Q\_4 function

8.712121

8.712121

8.712121

WELL LABEL # L 112759

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**MALH 54129** 

MALH SHI29

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

	START CARD # [1022731
(1) LAND OWNER Owner Well I.D	(9) LOCATION OF WELL (legal description)
First Name George Last Name Iida	County MALHEUR Twp 18 S N/S Range 47 E E/W WM
Company	Sec 20 NE 1/4 of the NE 1/4 Tax Lot 2600
Address 580 Railroad Ave.	Tax Map Number Lot
City Ontario State OR Zip 97914	Lat or 43.995655 DMS or DD
(2) TYPE OF WORK X New Well Deepening Conversion	Long or _116.985632 DMS or DD
Alteration (repair/recondition)	Street address of well  Nearest address
(3) DRILL METHOD Rotary Air Rotary Mud Cable Auger Cable Mud	(10) STATIC WATER LEVEL
Reverse Rotary Other	Existing Well / Predeepening
(4) PROPOSED USE Domestic Irrigation Community	Completed Well 05-07-2014 8.5
Industrial/Commercial Livestock Dewatering	Flowing Artesian? Dry Hole?
Thermal Injection Other	WATER BEARING ZONES Depth weber was first found 19
(5) BORE HOLE CONSTRUCTION Special Standard Attach copy	
Depth of Completed Well 57 ft.	05-07-2014 19 42 300 8.5
BORE HOLE SEAL sacks/	
Dia From To Material From To Amt lbs	
16 0 57 Bentonite Chips 0 19 37 S	
	(11) WELL LOG Ground Elevation
How was seal placed: Method A B C D E	Material From To
X Other Slow pour from top	Topsoil D 5
Backfill placed from A to ft Material	Clavey Soil         5         19           Sand and Gravel         19         42
Filter pack from 19 fl. to 57 fl. Material Gravel Size 3/8	Cemented Pea Gravel & Sand 42 57
Explosives used: Yes Type Amount <u>3 Yards</u>	
(6) CASING/LINER         Casing Liner       Dia         (a) CASING/LINER         (b) CASING/LINER         (c) CASING/	RECEIVED FOR OWRD
Shoe Inside Outside Other Location of shoe(s)	
Temp casing X Yes Dia 16 From 0 To 35	SAI CAA (NI)
(7) PERFORATIONS/SCREENS	SALEMOR
Perforations Method	
Sename Type Wire Wrap Minerial 55	
Perf/S Casing/ Screen Scrn/slor Slot # of Tele/	Date Started 04-17-2014 Completed 05-07-2014
creen Liner Dia From To width length slots pipe size Screen 12 20 40 04	(unbonded) Water Well Constructor Certification
	I certify that the work I performed on the construction, deepening, alteration, o abondonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reheated here were the best of my knowledge and belief
(8) WELL TESTS: Minimum testing time is 1 hour	License Number Date
Pump     Plaifer     Air     Flowing Artesian     Yield gal/min     Drawdown     Drill stem/Pump depth     Duration (hr)	Password : (if filing electronically) jL(N 4) 4 2014
375     35     45     1       Temperature     58     °F     Lab analysis     Yes       Water quality concerns*     Yes (describe below)	(bonded) Water Well Constructor Certification I accept responsibility for the construction, deepening, atteamen, or abandonme work performed on this well during the construction dates reported above. All we performed during this time is in compliance with Oregon water supply we construction standards. This report is true to the best of my knowledge and belief
Emm To Description Amount Units	License Number 1714 Date 05-09-2014
	Password printing electronically and the second printing electronically and the second printing and th