

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 06/14/2016
 FROM: Groundwater Section Phillip I. Marcy
 SUBJECT: Application G- 18301 Reviewer's Name
 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: Bob Harrell County: Baker

A1. Applicant(s) seek(s) 6.5 cfs from 3 well(s) in the Powder Basin,
Baldock Slough subbasin

A2. Proposed use Supplemental Irrigation Seasonality: March 1st – October 31st (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	Proposed	1	Alluvium or Bedrock	6.5	9S/40E-12 NW-NE	780'S, 2270'W fr NE cor S 12
2	Proposed	2	Alluvium or Bedrock	6.5	9S/40E-12 SE-NW	2400'S, 3270'W fr NE cor S 12
3	Proposed	3	Alluvium or Bedrock	6.5	9S/40E-12 SE-NW	2170'S, 3675'W fr NE cor S 12

* 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	3558	NA	NA	NA	400	0-20	0-18	NA	150-400	NA	NA	NA
2	3482	NA	NA	NA	400	0-20	0-18	NA	150-400	NA	NA	NA
3	3474	NA	NA	NA	400	0-20	0-18	NA	150-400	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** No distributed rate was given for the proposed POA wells. Upon construction, wells are likely to encounter Mesozoic intrusive and sedimentary rocks, overlying Powder River Volcanics, and Quaternary alluvium. None of the proposed POA locations are within one mile of perennial surface waters.

A5. **Provisions of the** Powder (390-509) 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; "Large Water Use Reporting";
 - 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:** Wells producing 1000 or more GPM are infrequent in this area, and all are constructed to produce from fractured bedrock at considerable depth (greater than 500 feet, see Figure 2). The proposed POA locations are in close proximity to a ridge composed of Mesozoic intrusive and sedimentary rocks. These older rocks generally yield little groundwater, and well logs near the proposed POA locations report yields of less than 5 GPM from these units. Fractured volcanic units utilized by high yield wells to the west may not be present at the proposed locations, or may be present much closer to land surface where groundwater may not be present in any significant volume. Wells completed into these basalts within 100 feet of the land surface typically yield less than 50 GPM.

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	Fractured Bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Fractured Bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Fractured Bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: The most productive aquifer system likely encountered in the proposed POA wells is composed of scoriaceous lavas near the base of the Powder River Volcanics, which are typically overlain by tens to hundreds of feet of competent volcanic rock. These solid crystalline rocks serve as a barrier to vertical migration of groundwater. Wells penetrating the solid portions of Powder River Volcanics show significantly higher head elevations than the respective elevations of the water-bearing zones within the well.

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	Baldock Slough	~3400	3385	8600	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Baldock Slough	~3400	3385	8600	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Baldock Slough	~3400	3385	8130	<input type="checkbox"/>	<input checked="" 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: Baldock Slough does not incise the valley-fill alluvium to any significant depth, and does not breach Powder River Volcanics which serve as a barrier to vertical migration of groundwater.

Water Availability Basin the well(s) are located within: Baldock Sl > Powder River – At Mouth (30920330)

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

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

Basis for impact evaluation: This section does not apply.

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:** It is recommended that the applicant construct a test well at or near the site of the proposed POAs to determine the presence and/or depth of potential water-bearing zones beneath the dense portions of the Powder River Volcanics. If there are interflow zones or brecciated lavas near the base of these volcanic units, there may be the potential for moderate groundwater yields without injury to local surface water. However, the Powder River Volcanics may be absent at one or more of the proposed locations, or may not lie immediately above a zone of high hydraulic conductivity. Underlying Mesozoic sediments and intrusive volcanics have shown poor yield in area wells.

Special Condition: Proposed POA wells shall not be constructed in a manner that allows production from shallow alluvium above volcanic rock, or from the fractured uppermost portions of the Powder River Volcanics. Wells penetrating the Powder River Volcanics must be continuously cased and continuously sealed to produce only from beneath no less than 10 feet of dense, unfractured bedrock.

References Used:

Brooks, H.C., McIntyre, J.R., Walker, G.W., 1976. Geology of the Oregon Part of the Baker 1⁰ by 2⁰ Quadrangle. Oregon Department of Geology and Mineral Industries Geological Map Series 7.

OWRD Ground Water Report #6.

Local well log reports, application file G18301.

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

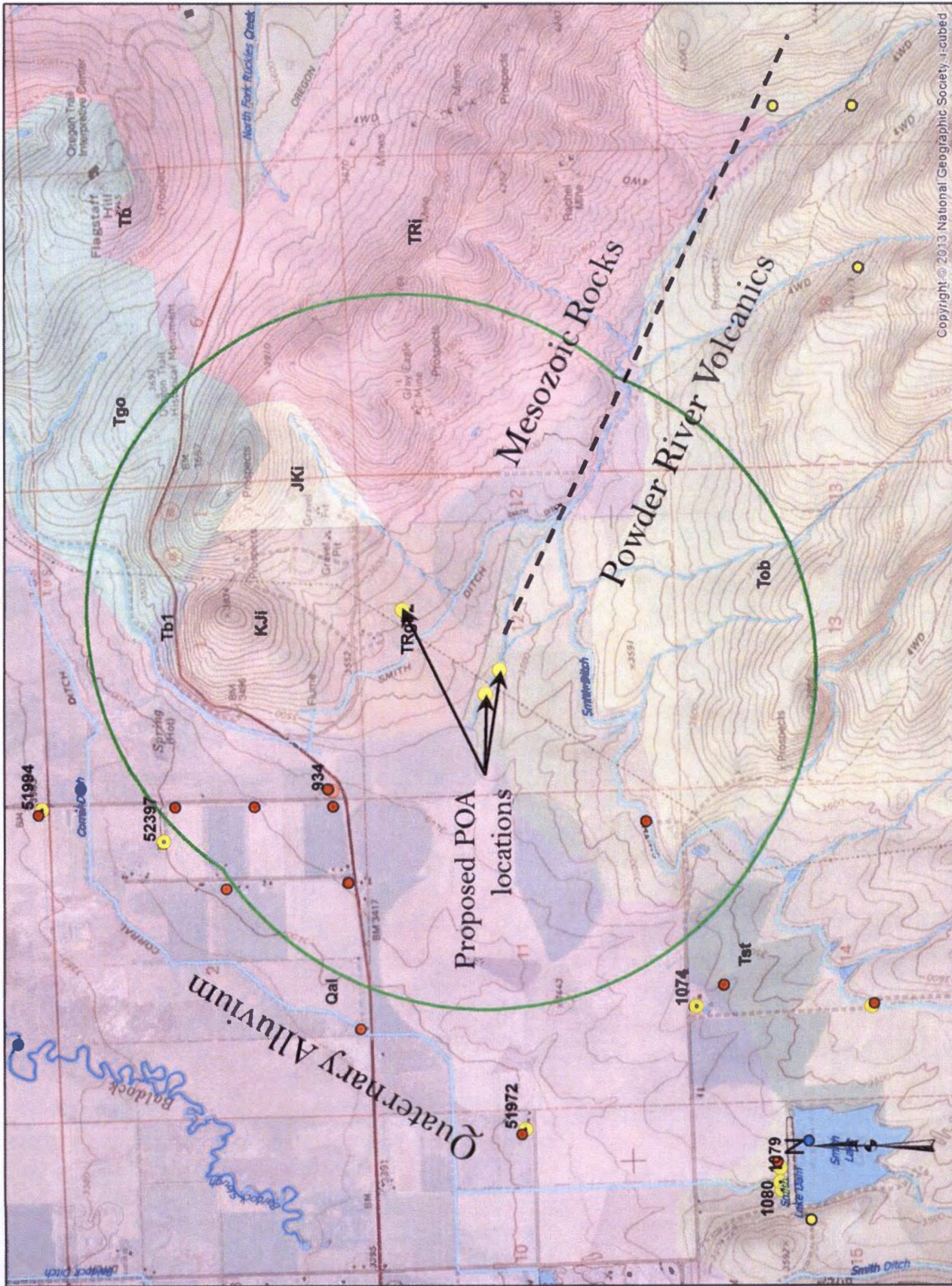
Watershed ID #: 30920330
Time: 9:59 AM

BALDOCK SL > POWDER R - AT MOUTH
Basin: POWDER

Exceedance Level: 80
Date: 06/14/2016

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	0.58	0.24	0.34	0.00	0.00	0.34
FEB	2.18	0.24	1.94	0.00	0.00	1.94
MAR	4.32	0.28	4.04	0.00	0.00	4.04
APR	10.90	1.53	9.37	0.00	0.00	9.37
MAY	3.49	4.70	-1.21	0.00	0.00	-1.21
JUN	0.75	5.31	-4.56	0.00	0.00	-4.56
JUL	0.17	3.02	-2.85	0.00	0.00	-2.85
AUG	0.07	1.30	-1.23	0.00	0.00	-1.23
SEP	0.06	0.83	-0.77	0.00	0.00	-0.77
OCT	0.06	0.49	-0.43	0.00	0.00	-0.43
NOV	0.17	0.24	-0.07	0.00	0.00	-0.07
DEC	0.35	0.24	0.11	0.00	0.00	0.11
ANN	3,770	1,120	3,180	0	0	3,180

Well Location Map



1:24,000

0 0.125 0.25 0.5 0.75 1 Miles

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Water-Level Trends in Nearby Wells

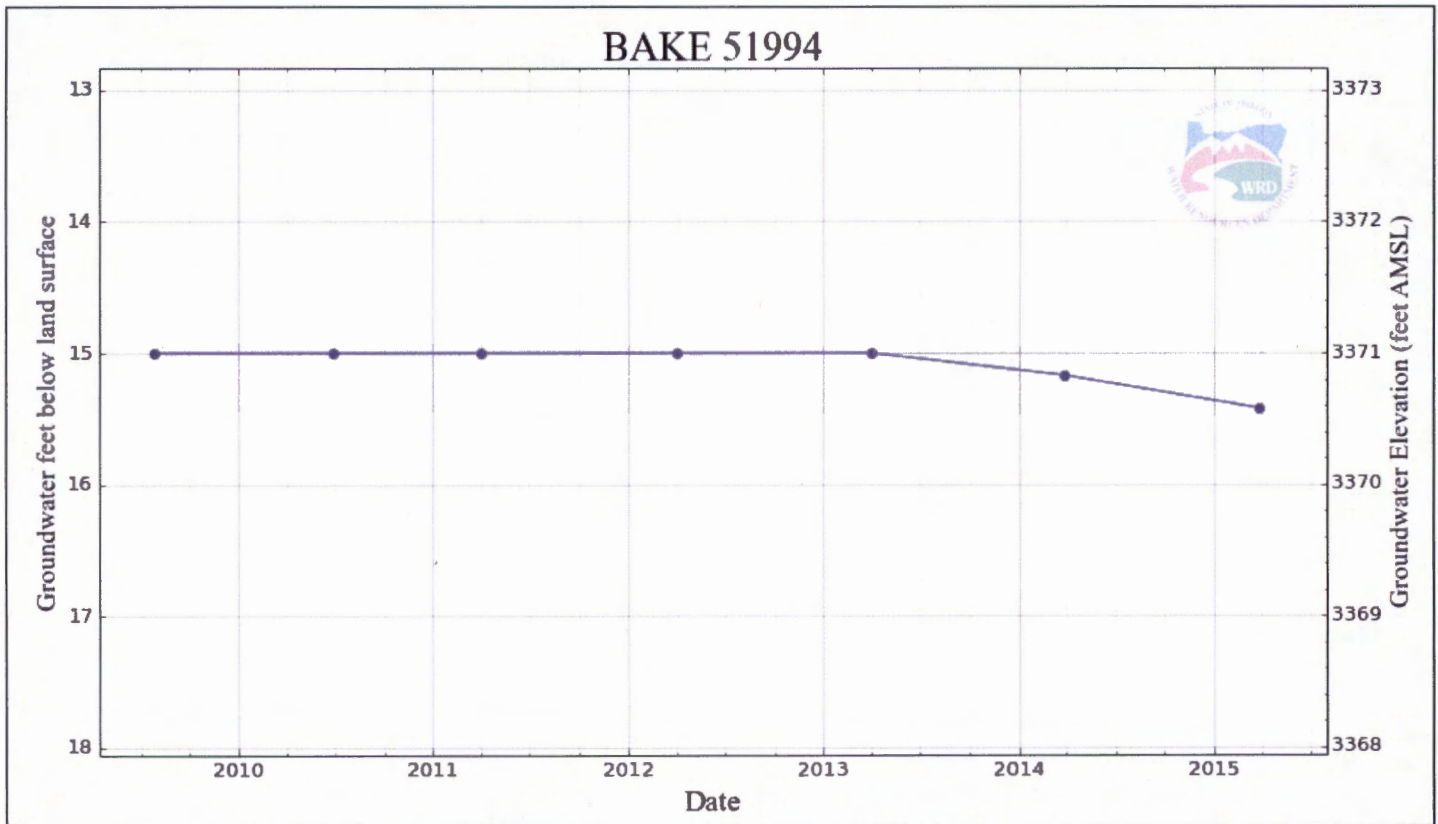


Figure 1: Little recent groundwater elevation data is available for this area, BAKE 51994 produces from alluvium about 7,000 feet NNW of the proposed POA locations. No recent data was found concerning nearby wells completed into volcanic aquifers.

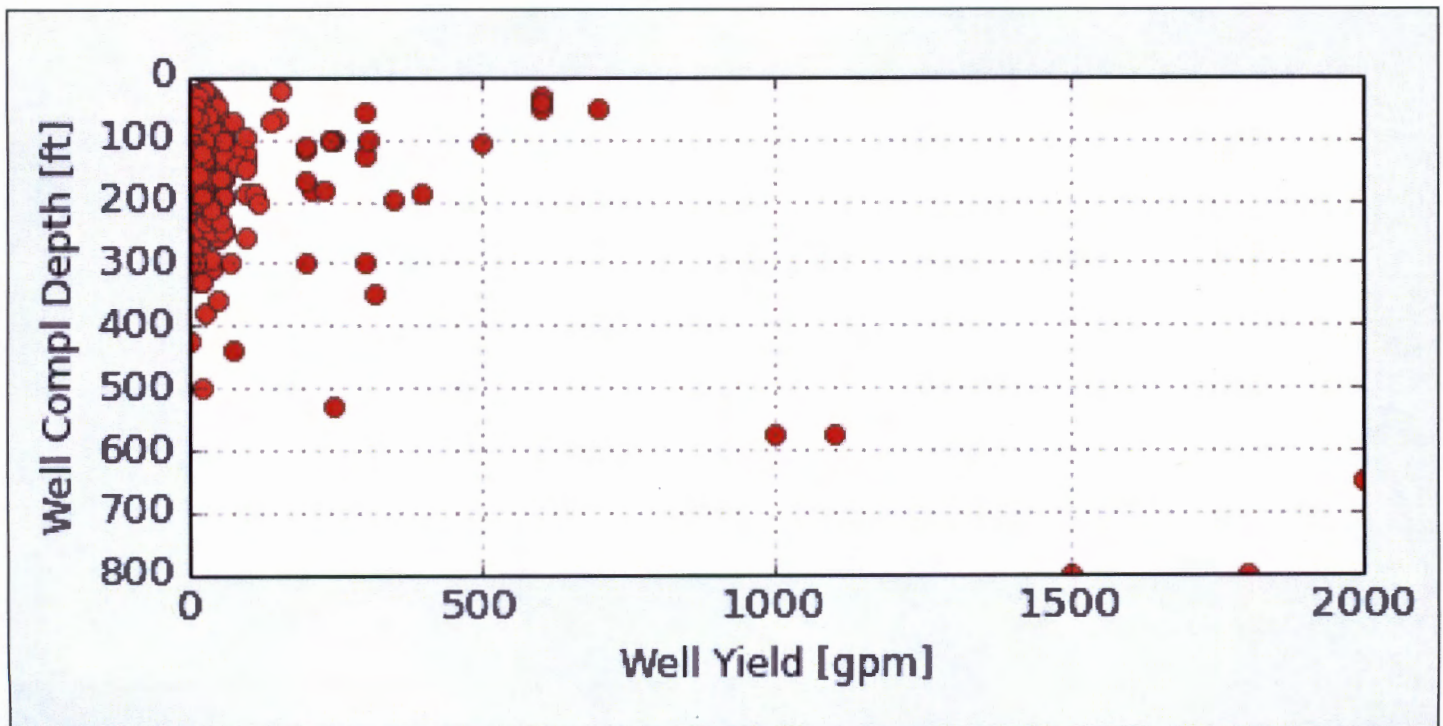


Figure 2: Statistics from well log reports in the vicinity of the proposed POA wells indicate that few wells obtain yields similar to those expected by the applicant (~1000 GPM). The few wells reporting 1000 GPM or greater are more than 500 feet deep, producing from fractured basalt flows buried much deeper than they are expected at the proposed POA locations.