

A2. Well and aquifer data:

A2 a: Well identifiers, aquifer, rate, and location

POA Well	Well Log ID	Applicant's Well #	Proposed Aquifer	Proposed Rate (cfs)	Location (T/R-S QQ-Q)	Latitude	Longitude
1	PROP 724	WELL 1	Mesozoic-Paleozoic Rock Aq	3.77	8S/43E-30 NE-NW	44.846278	-117.493478
2	PROP 725	WELL 2	Mesozoic-Paleozoic Rock Aq	3.77	8S/43E-30 NE-NW	44.845357	-117.495454

A2 b: Well construction information by depth below land surface. All units in feet.

POA Well	Seal		Casing		Filter Pack		Open / Perforation / Screen		Well Bottom
	Min	Max	Min	Max	Min	Max	Min	Max	
1	0	100	0	100	0	N/A	100	700	700
2	0	100	0	100	0	N/A	100	700	700

A2 c: Well construction information by elevation above mean sea level. All units in feet.

POA Well	Land Surface Elevation	Seal		Casing		Filter Pack		Open / Perforation / Screen		Well Bottom
		Min	Max	Min	Max	Min	Max	Min	Max	
1	2833.5	2833.5	2733.5	2833.5	2733.5	2833.5	N/A	2733.5	2133.5	2133.5
2	2812.8	2812.8	2712.8	2812.8	2712.8	2812.8	N/A	2712.8	2112.8	2112.8

A2 d: Information relevant to water levels, including land surface elevation, depth of first water, recent annual high level, and reference levels for permit conditions

POA Well	Depth of First Water from Well Log (ft bls)	Shallowest Static Water Level (ft bls)	Most Recent Annual High WL		Reference Levels for:				Well Tests			
					RSGL		Permit Conditions		(max yield on well log)			
			Depth (ft bls)	WL Date	Depth (ft bls)	Depth (ft bls)	Date	Pro-visional?	Yield (gpm)	Draw-down (ft)	Test Type	Duration (hours)
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Use data from application for proposed wells.

“SWL” = static water level (most recent or representative SWL). “amsl” = above mean sea level. “bls” = below land surface

Comments: The two proposed POAs are proposed wells, not yet drilled.

A3. Description of hydrogeologic setting / conceptual model:

The two proposed POAs are expected to develop a bedrock aquifer, which could be volcanic rock (likely lower Grande Ronde Formation, normal magnetic polarity, of the Columbia River Basalt Group), metamorphic, or intrusive volcanics like granite, diorite, or gabbro (Triassic intrusive rocks). BAKE 52604, located on the same taxlot as the proposed POAs, reports granite at 200 feet below land surface, overlain by clay and hard fractured clay (likely tuffaceous sedimentary rocks). The proposed POAs would be 500 feet deeper than this existing well. Other nearby well logs are sparse and report a complicated picture of the geology underlying the alluvial sequence. Geologic mapping (Brooks, 1976; Brooks, 1977 and Swanson, 1981) shows a complex geometry between Mesozoic plutonic rocks (granite, diorite, and mafic intrusives), associated metamorphic rocks, in addition to much younger flows of Miocene Columbia River Basalt Group. In our conceptual framework, productive water-bearing zones are anticipated to occur at contacts between Miocene volcanic flow rocks and underlying Mesozoic rocks, at the contact between bedrock and overlying and/or adjacent sediments, or in fracture zones (intrusive or metamorphic rock).

B. BASIN PROGRAM:

OAR 690-310-0130 (1)(a)

B1. ☐ **Provisions of the** _____ 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: n/a

B2. ☐ **Well(s) #** _____, _____, _____, _____, _____, are limited by an administrative restriction under the applicable basin program.

Comments: n/a

C. WATER AVAILABILITY:

OAR 690-310-0130 (1)(b)

OAR 690-300-0010(57): “Water is Available” [...] means: [...]

- (d) The proposed groundwater source exhibits Reasonably Stable Groundwater Levels, as defined in OAR 690-008-0001; and
- (e) The total requested rate of groundwater allocation is obtainable by the expected yield of the well(s) proposed in the application given best available information; and
- (f) The proposed groundwater use does not have the Potential for Substantial Interference (OAR 690-009-0020(5)) with a surface water source [that does not have water available]

C1. Reasonably Stable Groundwater Levels

OAR 690-008-0001 (9): “Reasonably Stable Groundwater Levels” means that Annual High Water Levels, based on observed trends over time, remain within a range consistent with sustaining the function and character of a groundwater reservoir indefinitely, and:

- (a) The Annual High Water Levels as measured at one or more representative wells in a groundwater reservoir or part thereof:
- (A) indicate no decline or an average rate of decline of less than 0.6 feet per year over any immediately preceding averaging period with duration between 5 and 20 years. Four Annual High Water Levels are required to calculate the rate of change; one must have been measured in the year to which the evaluation of reasonably stable applies, and at least one must have been measured between 5 and 20 years prior; and
 - (B) have not declined by more than 25 feet from a reference level to the level in the year to which the evaluation of reasonably stable applies. The reference level shall be the highest known water level unless Annual High Water Levels have been measurably increased by human activity, in which case the Department may set a different reference level using best available information.
- (b) If water level data are insufficient to perform either test in (a) for a given year, then the Department will presume that groundwater levels are not reasonably stable unless:
- (A) the most recent evaluation of reasonably stable applies to a year within 5 years of the given year, in which case the Department may presume that the recent evaluation still applies; or
 - (B) groundwater has not yet been extracted or authorized for extraction from the groundwater reservoir, in which case the Department may presume that groundwater levels are reasonably stable.
- (c) The Department may evaluate Reasonably Stable Groundwater Levels for the year of the priority date of a groundwater right application or for a later year if more recent data are available.

- C1a. If part (a) of 690-008-0001(9) has been superseded by a basin program rule as per 690-008-0001(9)(B)(d) proceed to C1c. List one or more representative wells in the proposed groundwater reservoir or part thereof that have sufficient data to evaluate part (a) of 690-008-0001(9). Both the Rate (OAR 690-008-0001(9)(a)(A)) and Magnitude (OAR 690-008-0001(9)(a)(B)) tests for a given well must be passed in order to find that the water levels are Reasonably Stable. It is not necessary to include all POAs proposed on this application into this table, as long as they all access the same part of the groundwater reservoir and have the same reasonable stability status indicated in C1b below. If some POAs are found to be reasonably stable while others are not, then all the POAs on the application should be included in the table below, with their POA number indicated in the second column. In that situation, the reviewer does not need to indicate in this table which wells are considered representative for determining reasonable stability status for different POAs, but they should describe those relationships in the comments below.

Well Log ID	POA Well #	Reference Level for Evaluation of Reasonable Stability (ft bls)	Rate Test	Magnitude Test	Water Levels Reasonably Stable
PROP 724	1	N/A	N/A	N/A	N/A
PROP 725	2	N/A	N/A	N/A	N/A

Comments: Both POAs are proposed wells, not yet drilled. Sufficient water level data do not exist at the proposed POAs or nearby representative wells.

C1b. Summary finding for this application. Check only one primary finding. It is possible that different proposed POAs could access different parts of the GW reservoir, and for some of those parts to be Reasonably Stable while others are not. In that case, summary finding for the application should be “Not Reasonably Stable,” and the reviewer should indicate which POAs access part(s) of the groundwater reservoir that are Reasonably Stable. OAR 690-008-0001(9)(a): *Annual High Water Levels as measured at one or more representative wells in a groundwater reservoir or part thereof*:

☐ **Are Reasonably Stable**

☐ Groundwater has not yet been extracted or authorized for extraction from the groundwater reservoir

☐ **Are Not Reasonably Stable**

☐ If some Proposed POAs are Reasonably Stable, list the Reasonably Stable POAs here: _____

☒ **Sufficient data are not available to evaluate reasonable stability**

List representative wells identified during review that could be measured in order to overcome a finding of Insufficient Data: _____

Comments: BAKE 52604 is the only well in the section, however, it is 500 feet shallower than the proposed POAs. It is unknown if water levels will be representative of conditions found at the proposed POAs.

C1c. OAR 690-008-0001(d): Evaluation for reasonably stable water levels per superseding basin program rules OAR 690-_____ for the _____ administrative basin.

Comments: n/a

C2. Well Yield

C2a. OAR 690-300-0010(57)(e): Is the total requested rate of groundwater allocation obtainable by the expected yield of the well(s) proposed in the application given best available information?

☐ **Yes** ☒ **No**

Comments: Application G-19496 requests a total of 3.77 cfs (1,692gpm) from up to 2 wells, requiring each well to produce a minimum of 846 gpm. In the well log database, only 1 well log (BAKE 52604) was found in T8S/R43E Sections 30, with a reported well yield of 10 gpm from granite. This may be biased low due to the fact that the well is for domestic use, however it is still an order of magnitude lower than the approximately 846 gpm per well that the application seeks.

C3. Groundwater Interference with Surface Water

OAR 690-300-0010(57): “Water is Available”, when used in OAR 690-310-0080, 690-310-0010 and 690-310-0130, means [...]:
(f) *The proposed groundwater use does not have the Potential for Substantial Interference (OAR 690-009-0020(5)) with a surface water source [that is not available for further appropriation]*

OAR 690-009-0040: (1) *When evaluating a Proposed Groundwater Use, Hydraulic Connection and the Potential for Substantial Interference with a surface water source shall be determined by the Department according to these rules. These determinations shall be based upon the application of generally accepted hydrogeologic principles using best available information concerning the hydrologic system of interest and the well(s) under consideration.*

(a) *Appropriate information that is provided in the application or in the public comment period for the application shall be considered in the process of making these determinations.*

(b) *Best available information may include, but is not limited to, pertinent water well reports, aquifer test analyses, hydrologic and geologic studies and reports, groundwater and surface water elevation data, available numerical and analytical groundwater flow models, and any other information that is used in applying generally accepted hydrogeologic principals and methodologies.*

(2) *A determination of Hydraulic Connection is a prerequisite for a determination of the Potential for Substantial Interference.*

(3) *A determination of the Potential for Substantial Interference with a surface water source shall at a minimum include application of the generally accepted hydrogeological principles described in “Streamflow Depletion by Wells – Understanding and Managing the Effects of Groundwater Pumping on Streamflow” by P. M. Barlow and S. A. Leake, 2012.*

(4) *The Potential for Substantial Interference with a surface water source exists if the well(s) under consideration will, over the full term of the proposed or authorized groundwater use, obtain water from Streamflow Depletion.*

OAR 690-009-0020(4): “Hydraulic Connection” means saturated conditions exist allowing water to move between two or more sources of water, either between groundwater and surface water or between groundwater sources.

OAR 690-009-0020 (7) “Streamflow Depletion” means a reduction in the flow of a surface water source due to pumping a hydraulically connected groundwater source. Streamflow Depletion encompasses:

- (a) captured groundwater that would otherwise discharge to a surface water source; or
 (b) induced infiltration from a surface water source to the hydraulically connected groundwater source.

C3a. OAR 690-009-0020(5): *Potential for Substantial Interference*, or “PSI”, means that a groundwater use will cause streamflow depletion based on the assessments described in OAR 690-009-0040, and therefore may cause or has caused substantial interference with or undue interference with a surface water source, based on the definitions in OAR 690-008-0001.

Summary of surface water sources evaluated for hydraulic connection and Potential for Substantial Interference. For hydraulic connection and potential for substantial interference, a value of 1 means yes, and blank means no.

POA Well	WRD Streamcode	Streamcode Surface Water Name	Water Availability Basin (WAB)	WAB Watershed ID	Hydraulically Connected	Potential for Substantial Interference
1	0940600800	UNN STR	POWDER R	72192	Yes	Yes
1	0940600740	GOOSE CR	GOOSE CR	30920315	Yes	Yes
1	0940600860	BALM CR	BALM CR	30920317	Yes	Yes
1	094060	POWDER R	POWDER R	243	Yes	Yes
2	0940600740	GOOSE CR	GOOSE CR	30920315	Yes	Yes
2	0940600800	UNN STR	POWDER R	72192	Yes	Yes
2	0940600860	BALM CR	BALM CR	30920317	Yes	Yes
2	094060	POWDER R	POWDER R	243	Yes	Yes

Comments: The two proposed POAs are expected to develop a bedrock aquifer, which could be volcanic rock (likely lower Grande Ronde Formation, normal magnetic polarity, of the Columbia River Basalt Group), metamorphic, or intrusive volcanics like granite, diorite, or gabbro (Triassic intrusive rocks). In any case, these bedrock units are truncated by local geologic structures at the fringe of the Baker Valley by basin-bounding faults. In our conceptual model, saturated transmissive horizons (volcanic rock) or fracture zones (intrusive or metamorphic rock) are in direct contact with adjacent saturated alluvial materials, which are hydraulically connected to the Powder River. While there is no analytical model suitable for modeling stream depletion in fractured rock aquifers, the water produced at the proposed POA wells would come from the groundwater flow system upgradient of the Powder River. Water pumped from the wells would represent capture per Barlow and Leake (2012), meaning water diverted by the wells would otherwise discharge to downgradient reaches of the Powder River. Under OAR 690-008-0001 definitions, any stream depletion will result in PSI. There is no water available in Watershed ID # 72192, #30920315, #30920317, or #243 in any month of the year.

List all surface water sources identified to have PSI and their associated Water Availability Basin:

WRD Streamcode	Streamcode Surface Water Name	Water Availability Basin (WAB)	WAB Watershed ID
0940600800	UNN STR	POWDER R	72192
0940600740	GOOSE CR	GOOSE CR	30920315
0940600860	BALM CR	BALM CR	30920317
094060	POWDER R	POWDER R	243

Comments: WAB ID #72192, #30920315, #30920317 and # 243 are fully allocated every month of the year. Additional allocation would exacerbate declining surface water supplies in this basin.

D. INJURY:

OAR 690-310-0130 (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 if...(c) The proposed use will not injure other water rights.

To make a finding of injury to an existing water right, the Department must make a finding of “Substantial Interference” as defined in OAR 690-008-0001(10). The finding of “Substantial Interference” with a surface water right is made by the Water Rights Services Division based on the evaluation in section C3. Sections D1 and D2, below, address the finding of “Substantial Interference” with a groundwater right.

OAR 690-008-0001(10): “Substantial or Undue interference”, means the spreading of the cone of depression of a well to intersect a surface water source or another well, or the reduction of the groundwater levels as a result of pumping or otherwise extracting groundwater from an aquifer, which contributes to:

- (b) The groundwater level being drawn down to the Economic Pumping Level of the senior appropriator(s); or*
- (c) One or more of the senior groundwater appropriators being unable to obtain either the permitted or customary quantity of groundwater, whichever is less, from a reasonably efficient well that fully penetrates the aquifer where the aquifer is relatively uniformly permeable. However, in aquifers where flow is predominantly through fractures, full penetration may not be required as a condition of substantial or undue interference.*

D1a. OAR 690-008-0001(10): Will the proposed groundwater use result in substantial or undue interference with an existing groundwater user?

☐ Yes ☒ No ☐ No, as long as the permit is conditioned as indicated in item F below.

Comments: In these proposed locations, groundwater movement is achieved primarily through unevenly spaced secondary fractures having random orientations. As a result, these systems are heterogeneous in terms of productivity and both horizontal and vertical hydraulic conductivity. Based on this conceptual model, there is no appropriate analytical model to predict drawdown at adjacent wells. In a fractured rock aquifer with characteristically low transmissivity, the cone of depression created by a pumping well is expected to be narrow and deep. There are no groundwater POAs located within 1 mile of the proposed POAs, meaning direct well-to-well interference is unlikely.

E. OTHER RULES OF THE COMMISSION:

OAR 690-310-0130 (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 if...(d) The proposed use complies with the rules of the Commission.

E1. OAR 690-200, 690-210 and 690-215: Well Construction

Identify any notable well construction deficiencies or hydrogeologic considerations to support review by Well Construction & Compliance.

E1a. Well #: n/a Logid: n/a

E1b. Well construction deficiency or other comment is described as follows: n/a

E2. OAR 690-310-0260: Water Rights Within or Above State Scenic Waterways

E2a. Are any of the proposed sources of appropriation hydraulically connected to a State Scenic Waterway or its tributaries?
☐ Yes ☒ No

Hydraulically connected State Scenic Waterway: n/a
 Comments: n/a

E2b. Per ORS 390.835, is the Groundwater Section able to calculate ground water interference with surface water that contributes to a Scenic Waterway?

☐ **Yes. The calculated interference is distributed below:**

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 "No" option below, 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 [Enter] 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

☐ **No. 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.**

Comments: n/a

E3. Other Relevant Rules of the Commission:

Comments: n/a

F. RECOMMENDED MODIFICATIONS OR CONDITIONS:

OAR 690-310-0140(2): If the Department determines that the presumption is not established, the Department shall determine whether the proposed use will impair or adversely affect the public welfare, safety and health under ORS 537.525 and may either:

(a) Propose denial of the application upon a finding that the use will impair or adversely affect the public welfare, safety and health; or

(b) Make specific findings to demonstrate that even though the presumption is not established, the proposed use will not impair or adversely affect the public welfare, safety and health and propose approval of the application with appropriate modifications or conditions.

Based on the findings in sections A-D above, the following conditions are recommended if the permit is approved:

“Large water use”, 7RLN

Whenever possible, cuttings shall be collected during borehole construction at 10-foot intervals and at changes in formation. A split of each sample shall be submitted to the Department upon completion of each well.

The Department shall be granted measurement access to any authorized POA wells constructed under this permit upon reasonable notice by Department staff.

REFERENCES:

Barlow, P.M and Leake, S.A, 2012, Streamflow Depletion by Wells—Understanding and Managing the effects of groundwater pumping on streamflow, U.S. Geological Survey Circular 1376, 84 p.

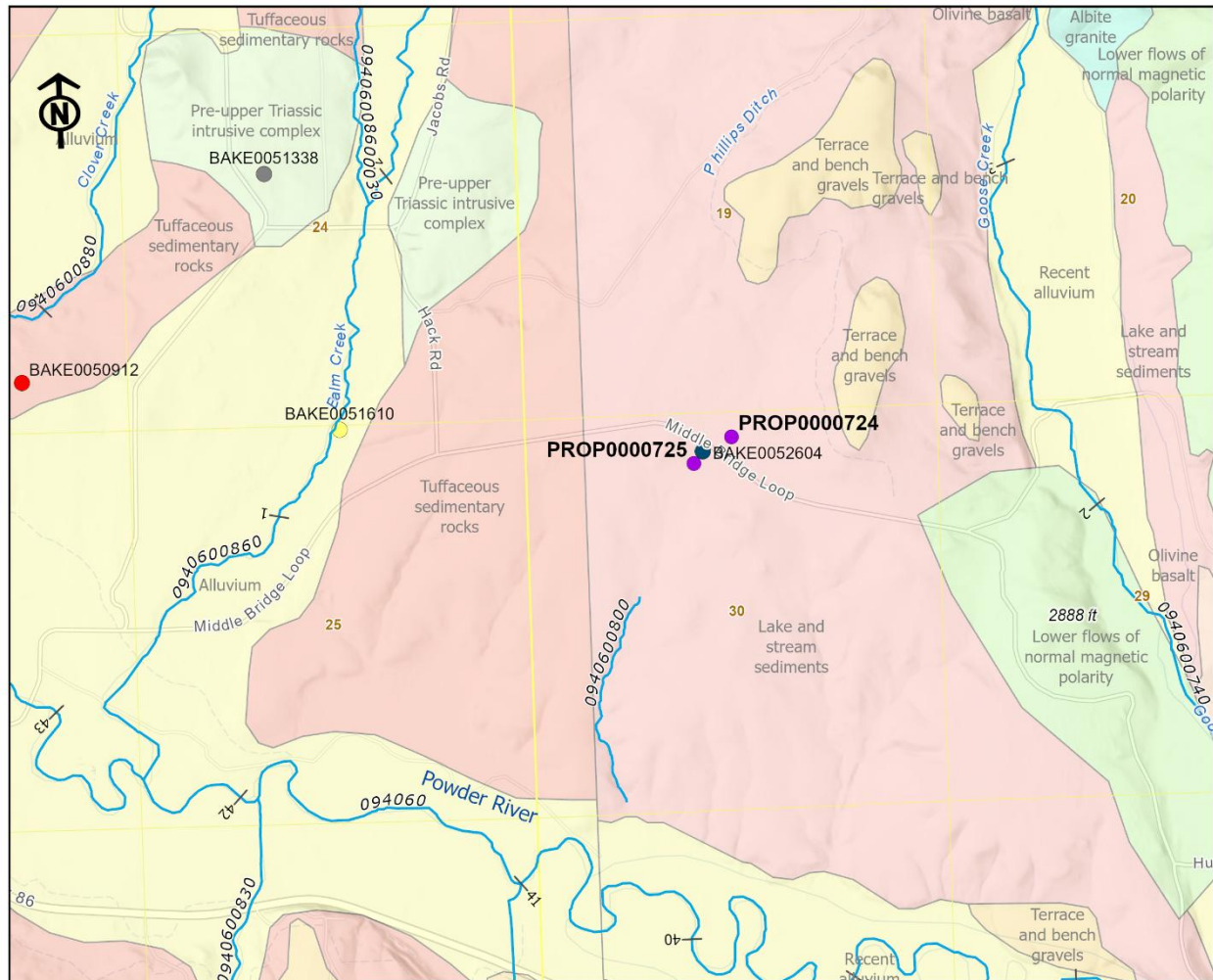
Brooks, H.C., McIntyre, JR; Walker, GW, 1976, Geology of the Oregon part of the Baker 1 degree by 2 degree quadrangle, DOGAMI GMS-7.

Brooks, H.C. and McIntyre, JR, 1977, Reconnaissance geologic map of the Virtue Flat quadrangle, Baker County, Oregon, DOGAMI Open File Report O-77-5.

Swanson et al., 1981, Reconnaissance geologic map of the Columbia River Basalt Group, northern Oregon and western Idaho, USGS Open-File Report 81-797.

ATTACHMENTS:**Well Location Map**G-19496 Stowell
T8S/R43E-Section 30

0 0.25 0.5 1 Miles

**Legend****Wells by Aquifer System**

- Quaternary-Late Tertiary Sediment Aquifers
- Quaternary-Late Tertiary Volcanic and Volcaniclastic Rock Aquifers
- Late Tertiary Basalt Aquifers

- Middle-Early Tertiary Volcanic and Volcaniclastic Rock Aquifers
- Tertiary Marine Volcanic and Sedimentary Rock Aquifers
- Mesozoic Granitic Rock Aquifers
- Mesozoic-Paleozoic Rock Aquifers
- <Null>

All Sites by Site Type

- site_type
- PROP
- Townships
- Sections
- OWRD stream codes (with

Water-Level Measurements in Nearby Wells

