WATER RESOURCES DEPARTMENT

MEMO 19 November, ~~200~~ 2010

TO: **Application G-** 17319

FROM: **GW:** Gerald Grondin
(Reviewer's Name)

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 Ground Water Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

X Per ORS 390.835, the Ground Water 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: Water Rights Section **Date** **19 November 2010**

FROM: Groundwater/Hydrology Section **Gerald H. Grondin**
Reviewer's Name

SUBJECT: Application G- **17319** 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: **Douglas E. & Deborah L. Adkins & Splendor Ridge, Inc.**
County: **Klamath**

A1. Applicant(s) seek(s) **1.62 (727 gpm)** cfs from **2** well(s) in the **Klamath** Basin,
Lost River subbasin Quad Map: **Altamont**

A2. Proposed use: **Irrigation (supplemental 129.7 acres)** Seasonality: **15 April to 15 October (184 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	**KLAM 57401**	**1**	**Basalt**	**1.62**	**39S/10E-sec 33 ADD**	**2090' S, 1880' E fr NE cor S 33**
2	**Proposed**	**2**	**Basalt?**	**1.62**	**39S/10E-sec 33 ABA**	**470' S, 2730' E fr NE cor S 33**
3						

* 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	**4189**	**?**	**73.5**	**11/06/10**	**749**	**?**	**? - 97.5**	**NA**	**NA**	**NA**	**NA**	**NA**
2	**4122**	**NA**	**NA**	**NA**	**NA**	**NA**	**+/-150**	**NA**	**NA**	**NA**	**NA**	**NA**

Use data from application for proposed wells.

A4. **Comments:**

This application is the same as drought application G-17318 (permit = G-16680, issued 6 April 2010)

The proposed pumping rate of 1.26 cfs is the allowable rate for 129.7 acres. The proposed total volume is 389.1 ac-ft (3.0 ac-ft per acre).

A5. ☐ **Provisions of the N.A.** 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: **No basin rule applies. Only the Klamath River Compact ORS 542.610 to 542.630 applies to the Klamath Basin. However, that compact applies to surface water only, not groundwater**

A6. ☐ **Well(s) #** **N.A.** , ____ , ____ , ____ , ____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: ____________
Comments: **Currently, no administrative area.**

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) **7B, 7N (modified), 7T**;
   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:**

If issued, the permit should contain conditions: 7B, 7N modified (merge part "B" and "C" to read "Annual water-level measurements reveal a water-level decline of 15 or more feet:"), 7T, and additionally

Special Condition for groundwater production: "Groundwater production shall occur from the predominant basalt unit below the predominant basin fill unit by casing and sealing through the basin fill unit into the basalt unit."

Data from the eastern Lost River sub-basin groundwater investigation (Grondin, 2004) and the current USGS-OWRD cooperative Upper Klamath Basin groundwater investigation (Gannett and others, 2007) indicate basin long-term groundwater levels are generally controlled by climate and short-term (seasonal) groundwater levels are controlled by groundwater use. A local example is the 1965 to 2009 hydrograph for state observation well 287 (KLAM 12893, Pine Grove vicinity north of Nuss Lake and the Lost River).

Since 2000, the USGS (2005) and Gannett and others (2007) has documented seasonal and annual water level declines in the basin south of Upper Klamath Lake that are greater than typically observed including previous drought periods. They appear related to the USBOR Klamath Project Water Bank. This observation includes the seasonal water levels in the Pine Grove area north of Nuss Lake and the Lost River. OWRD water level data for well KLAM 53755 in the Pine Grove vicinity also shows periods of seasonal and annual decline greater than typically observed. It remains undetermined whether the annual groundwater levels will fully recover or not.

Local residents in the Pine Grove to Nuss Lake area are concerned about increased groundwater use since 2000 and the impact on groundwater levels.

In October 2003, two residents (since the 1950s and 1960s respectively) located near Olene Gap reported concern to OWRD about their flowing domestic wells constructed in the late 1920s and early 1960s respectively and completed in the basin fill sediment overlying the basalt. Water well report for a neighbor well (KLAM 50859) indicates about 440 feet of sediments overlies the basalt at Olene. Artesian flow at the younger Olene resident well stopped for the first time in July 2003. Artesian flow at the older well slowed to a trickle for the first time in 2003. The residents noted the wells did flow better during previous, more severe dry periods and when the adjacent B Canal was dry, including 2001. In 2003, irrigation water flowed in the B Canal. This suggests the Olene wells are less influenced by canal leakage than the Hill Road domestic wells. The residents noted the recent irrigation wells constructed in their area, particularly two wells constructed for irrigation districts (KLAM 53755, March 2003 and KLAM 53737, March 2003). Local demand for basalt groundwater use increased due to the 2001 drought and to the uncertainty about surface water availability. The decreased flow at the Olene domestic wells appears to have resulted from a combination of climate and additional basalt groundwater use communicated through the overlying sediments.

In 2010, OWRD received complaints from Pine Grove area and the Crystal Springs Road area domestic well owners regarding increased groundwater pumping by area irrigation wells adversely affecting their domestic wells. In the Crystal Springs Road area, some flowing wells stopped flowing. For example, well KLAM 13238 constructed in 1978 with a reported static water level of 12 pounds psi (about 27.5 feet above land surface) stopped flowing for the first time ever in 2010. The static groundwater level at the well declined to about 12 feet below land surface during the 2010 irrigation season.

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	**Basalt**	☐	☒
2	**Basalt**	☐	☒
		☐	☐

Basis for aquifer confinement evaluation:

System is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. Water well reports (well logs) for area wells indicate low transmissivity (low permeability) basin fill sediment of varying thickness (less than 100 feet to more than 1,000 feet depending upon location) overlies high transmissivity (high permeability) basalt in the area. Groundwater occurs in both the sediment and basalt and the groundwater in each is hydraulically connected.

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**	**Lost River**	**4115**	**4090**	**7,050**	☒	☐	☐	☐	☒
1	**2**	**Nuss Lake (1 permit 1992)**	**4115**	**4094**	**3,500**	☒	☐	☐	☐	☒
1	**3**	**Crystal Spring (2 certs 1936)**	**4115**	**4135**	**9,600**	☒	☐	☐	☐	☒
2	**1**	**Lost River**	**4115**	**4090**	**5,650**	☒	☐	☐	☐	☐
2	**2**	**Nuss Lake (1 permit 1992)**	**4115**	**4094**	**2,650**	☒	☐	☐	☐	☐
2	**3**	**Crystal Spring (2 certs 1936)**	**4115**	**4135**	**8,850**	☒	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation:

1. Available data indicates a hydraulic connection to the Lost River:

A. Plate 1 of Sammel (1980) and more recent water level data show ground water converging toward the Lost River.

B. The eastern Lost River sub-basin ground water investigation data (Grondin, 2004) and the USGS-OWRD cooperative Upper Klamath Basin ground water investigation (Gannett and others, 2007) indicate low yield (low hydraulic conductivity) sediments overlie higher yield (high conductivity) basalt. Many domestic wells produce from the sediments and most irrigation wells produce from the basalt. Ground water in the sediments and the basalt appear hydraulically connected. The data include similar or small differences between basalt and sedimentary ground water levels and data showing ground water levels at wells completed in the sediments responding to pumping ground water from basalt.

The ground water investigations further indicate the basalt ground water connection to surface water is inefficient through the sediments, but can be efficient via springs. The proposed well for this application is tapping basalt ground water that is inefficiently connected to the Lost River via the overlying sediments only. Water well reports (well logs) indicate of sediment of varying thickness (less than 100 feet to more than 1,000 feet) overlies basalt in the area. The 1966 USGS seepage run data indicate the apparent river gain-loss from Olene to Wilson Dam to Stukel Bridge (1 to 4 cfs loss respectively) was within measurement error for those reaches. A seepage gain (11.75 cfs) did occur in the reach from Stukel Bridge to the Hwy 39 Bridge NW of Merrill.

2. The hydraulic connection to Nuss Lake is based upon available water level data.

3. Hydraulic connection to Crystal Spring is based upon available water level data indicating the static groundwater level at wells closer to the spring is higher than the spring elevation.

Water Availability Basin the well(s) are located within: LOST R > TULE L – AT STATE LINE

Version: 08/15/2003

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?
1	**2**	☐	☐	**N.A.**	**N.A.**	☐	**N.A.**	☐	**N.A.**	☐
2	**2**	☐	☐	**N.A.**	**N.A.**	☐	**N.A.**	☐	**N.A.**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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:

The proposed wells are located less than one-mile from Nuss Lake. The lake has a water right, and can drain to the Lost River.

This review lacked a proper tool to calculate flow interference at the lake at the end of 30 days due to pumping either of the proposed wells.

This review did calculate groundwater level drawdown at Nuss Lake at the end of 30 days and the 184 day proposed pumping period. At the end of 30 days, the drawdown ranges about 0.02 feet for pro-rated pumping solely at either well and from 0.25 to 0.27 feet for continuous pumping solely at either well. At the end of 184 days, the drawdown ranges about 0.03 feet for pro-rated pumping solely at either well and from 0.31 to 0.33 feet for continuous pumping solely at either well. However, continuous pumping for 184 days should not be considered given the total volume would exceed the maximum volume proposed.

The calculations used aquifer transmissivity = 334,200 ft2/day (Bonanza sub-area transmissivity with similarly high yield basalt wells), storage coefficient = 0.00096 (Bonanza sub-area). As a caution, it should be noted that the actual drawdowns may be larger given the few specific capacity data for wells in the vicinity indicate a smaller transmissivity. Using the specific capacity data was not considered appropriate given it yielded calculated drawdowns exceeding observed drawdowns associated with much higher pumping rates.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	**1**	**1.80**%	**1.70**%	**1.60**%	**1.70**%	**2.10**%	**2.50**%	**2.80**%	**3.20**%	**3.50**%	**2.20**%	**2.10**%	**1.90**%
Well Q as CFS		**0.00**	**0.00**	**0.00**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.00**	**0.00**
Interference CFS		**0.003**	**0.002**	**0.002**	**0.002**	**0.003**	**0.003**	**0.004**	**0.004**	**0.005**	**0.003**	**0.003**	**0.003**
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		**0.003**	**0.002**	**0.002**	**0.002**	**0.003**	**0.003**	**0.004**	**0.004**	**0.005**	**0.003**	**0.003**	**0.003**
(B) = 80 % Nat. Q		**182.0**	**403.0**	**453.0**	**336.0**	**223.0**	**139.0**	**124.0**	**110.0**	**97.0**	**95.4**	**104.0**	**151.0**
(C) = 1 % Nat. Q		**1.820**	**4.030**	**4.530**	**3.360**	**2.230**	**1.390**	**1.240**	**1.100**	**0.970**	**0.954**	**1.04**	**1.51**
(D) = (A) > (C)		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
(E) = (A / B) x 100		**.002**%	**.000**%	**.000**%	**.001**%	**.001**%	**.002**%	**.003**%	**.004**%	**.005**%	**.003**%	**.003**%	**.002**%

(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:

Well 1 (KLAM 57401) is located more than one-mile from the Lost River and more than one mile from Crystal Spring.

Hunt (2003) was used to calculate the interference with the Lost River. The calculation for the well used a pro-rated pumping rate of 0.14 cfs (total annual volume divided by time requested for pumping), aquifer transmissivity = 334,200 ft2/day (Bonanza sub-area transmissivity with similarly high yield basalt wells), storage coefficient = 0.00096 (Bonanza sub-area), sediment hydraulic conductivity Kv = 2.09 ft/day (derived from Poe Valley), sediment thickness at the river = 650 feet (average), river width = 500 feet (Wilson Reservoir).

This review lacked a proper tool to calculate flow interference at Crystal Springs. However, the review did calculate groundwater level drawdown at the spring at the end of 30 days and the 184 day proposed pumping period. At the end of 30 days, the drawdown was about 0.02 feet for pro-rated pumping and from 0.18 feet for continuous pumping at the well. At the end of 184 days, the drawdown was about 0.02 feet for pro-rated pumping at the well and about 0.25 feet for continuous pumping at the well. However, continuous pumping for 184 days should not be considered given the total volume would exceed the maximum volume proposed. The calculations used aquifer transmissivity = 334,200 ft2/day (Bonanza sub-area transmissivity with similarly high yield basalt wells), storage coefficient = 0.00096 (Bonanza sub-area).

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
2	**1**	**1.80**%	**1.70**%	**1.60**%	**1.70**%	**2.10**%	**2.50**%	**2.80**%	**3.20**%	**3.50**%	**2.20**%	**2.10**%	**1.90**%
Well Q as CFS		**0.00**	**0.00**	**0.00**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.00**	**0.00**
Interference CFS		**0.002**	**0.002**	**0.002**	**0.002**	**0.003**	**0.003**	**0.004**	**0.004**	**0.004**	**0.003**	**0.003**	**0.003**
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		**0.002**	**0.002**	**0.002**	**0.002**	**0.003**	**0.003**	**0.004**	**0.004**	**0.004**	**0.003**	**0.003**	**0.003**
(B) = 80 % Nat. Q		**182.0**	**403.0**	**453.0**	**336.0**	**223.0**	**139.0**	**124.0**	**110.0**	**97.0**	**95.4**	**104.0**	**151.0**
(C) = 1 % Nat. Q		**1.820**	**4.030**	**4.530**	**3.360**	**2.230**	**1.390**	**1.240**	**1.100**	**0.970**	**0.954**	**1.04**	**1.51**
(D) = (A) > (C)		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
(E) = (A / B) x 100		**.001**%	**.000**%	**.000**%	**.001**%	**.001**%	**.002**%	**.003**%	**.004**%	**.004**%	**.003**%	**.003**%	**.002**%

(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:

Well 2 (proposed) is located more than one-mile from the Lost River and more than one mile from Crystal Spring.

Hunt (2003) was used to calculate the interference with the Lost River. The calculation for the well used a pro-rated pumping rate of 0.14 cfs (total annual volume divided by time requested for pumping), aquifer transmissivity = 334,200 ft2/day (Bonanza sub-area transmissivity with similarly high yield basalt wells), storage coefficient = 0.00096 (Bonanza sub-area), sediment hydraulic conductivity Kv = 2.09 ft/day (derived from Poe Valley), sediment thickness at the river = 650 feet (average), river width = 500 feet (Wilson Reservoir).

This review lacked a proper tool to calculate flow interference at Crystal Springs. However, the review did calculate groundwater level drawdown at the spring at the end of 30 days and the 184 day proposed pumping period. At the end of 30 days, the drawdown was about 0.02 feet for pro-rated pumping and from 0.19 feet for continuous pumping at the well. At the end of 184 days, the drawdown was about 0.02 feet for pro-rated pumping at the well and about 0.25 feet for continuous pumping at the well. However, continuous pumping for 184 days should not be considered given the total volume would exceed the maximum volume proposed. The calculations used aquifer transmissivity = 334,200 ft2/day (Bonanza sub-area transmissivity with similarly high yield basalt wells), storage coefficient = 0.00096 (Bonanza sub-area).

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) **7B, 7N (modified), and 7T**;

ii. ☒ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions**

If issued, the permit should contain conditions: 7B, 7N modified (merge part "B" and "C" to read "Annual water-level measurements reveal a water-level decline of 15 or more feet:"), 7T, and additionally

Special Condition for groundwater production: "Groundwater production shall occur from the predominant basalt unit below the predominant basin fill unit by casing and sealing through the basin fill unit into the basalt unit."

Available data indicates a hydraulic connection to the Lost River, but inefficient.

A hydraulic connection to Nuss Lake is identified based upon available water level data.

A hydraulic connection to Crystal Spring is identified based upon available water level data indicating the static groundwater level at wells closer to the spring is higher than the spring elevation.

References Used:

Gannett, M.W., Lite, K.E., La Marche, J.L., Fisher, B.J., and Polette, D.J. 2007. Ground-Water Hydrology of the Upper Klamath Basin, Oregon and California. USGS Scientific Investigations Report 2007-5050.

USGS, 2005. Assessment of the Klamath Project pilot water bank: a review from a hydrologic perspective. Prepared by the U.S. Geological Survey Oregon Water Science Center, Portland, Oregon for the U.S. Bureau of Reclamation Klamath Basin Area Office, Klamath Falls, Oregon, May 3, 2005.

Grondin, G.H., 2004. Groundwater in the Eastern Lost River Sub-Basin, Langell, Yonna, Swan Lake, and Poe Valleys of Southeastern Klamath County, Oregon. Groundwater Report 41, Oregon Water Resources Department, Salem, Oregon.

Sammel, E.A. 1980. Hydrogeologic Appraisal of the Klamath Falls Geothermal Area, Oregon. USGS Professional Paper 1044-G, 45 p.

Leonard, A.R. and Harris, A.B. 1974. Groundwater in selected areas in the Klamath Basin, Oregon. OWRD Groundwater Report No. 21, 104 pgs.

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

Theis, C.V. 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage. American Geophysical Union Transactions, 16 annual meeting, vol. 16, pg. 519-524.

Hydrographs and groundwater level data for wells KLAM 53755, KLAM 12955, KLAM 13238, KLAM 54529, KLAM 53737

State Observation Well 287 (KLAM 12893)

Water well reports (well logs) for wells within 39S/10E-sec 33 and neighbor sections

USGS Altamont quadrangle map (1:24,000 scale)

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** ____1____ **Logid:** ___KLAM 57401___

D2. **THE WELL does not 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**:
- a. ☐ constitutes a health threat under Division 200 rules;
- b. ☐ commingles water from more than one groundwater reservoir;
- c. ☐ permits the loss of artesian head;
- d. ☐ permits the de-watering of one or more groundwater reservoirs;
- e. ☐ other: (specify) ______________________

D4. **THE WELL construction deficiency is described as follows:** ______________________

D5. **THE WELL** a. ☐ **was**, *or* ☐ **was not** constructed according to the standards in effect at the time of original construction or most recent modification.

b. ☒ I don't know if it met standards at the time of construction.

D6. ☐ **Route to the Enforcement Section.** I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Enforcement Section and the Groundwater Section.

THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL

D7. ☐ Well construction deficiency has been corrected by the following actions: ______________________

______________________ ______________________, 200____.

(Enforcement Section Signature)

D8. ☐ **Route to Water Rights Section (attach well reconstruction logs to this page).**

WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** ____2__________ **Logid:** __Not Drilled Yet______________________

D2. **THE WELL does not 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**:
- a. ☐ constitutes a health threat under Division 200 rules;
- b. ☐ commingles water from more than one groundwater reservoir;
- c. ☐ permits the loss of artesian head;
- d. ☐ permits the de-watering of one or more groundwater reservoirs;
- e. ☐ other: (specify) ______________________________

D4. **THE WELL construction deficiency is described as follows:** ______________________________
____
____
____
____

D5. **THE WELL** a. ☐ **was**, *or* ☐ **was not** constructed according to the standards in effect at the time of original construction or most recent modification.

b. ☐ I don't know if it met standards at the time of construction.

D6. ☐ **Route to the Enforcement Section.** I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Enforcement Section and the Groundwater Section.

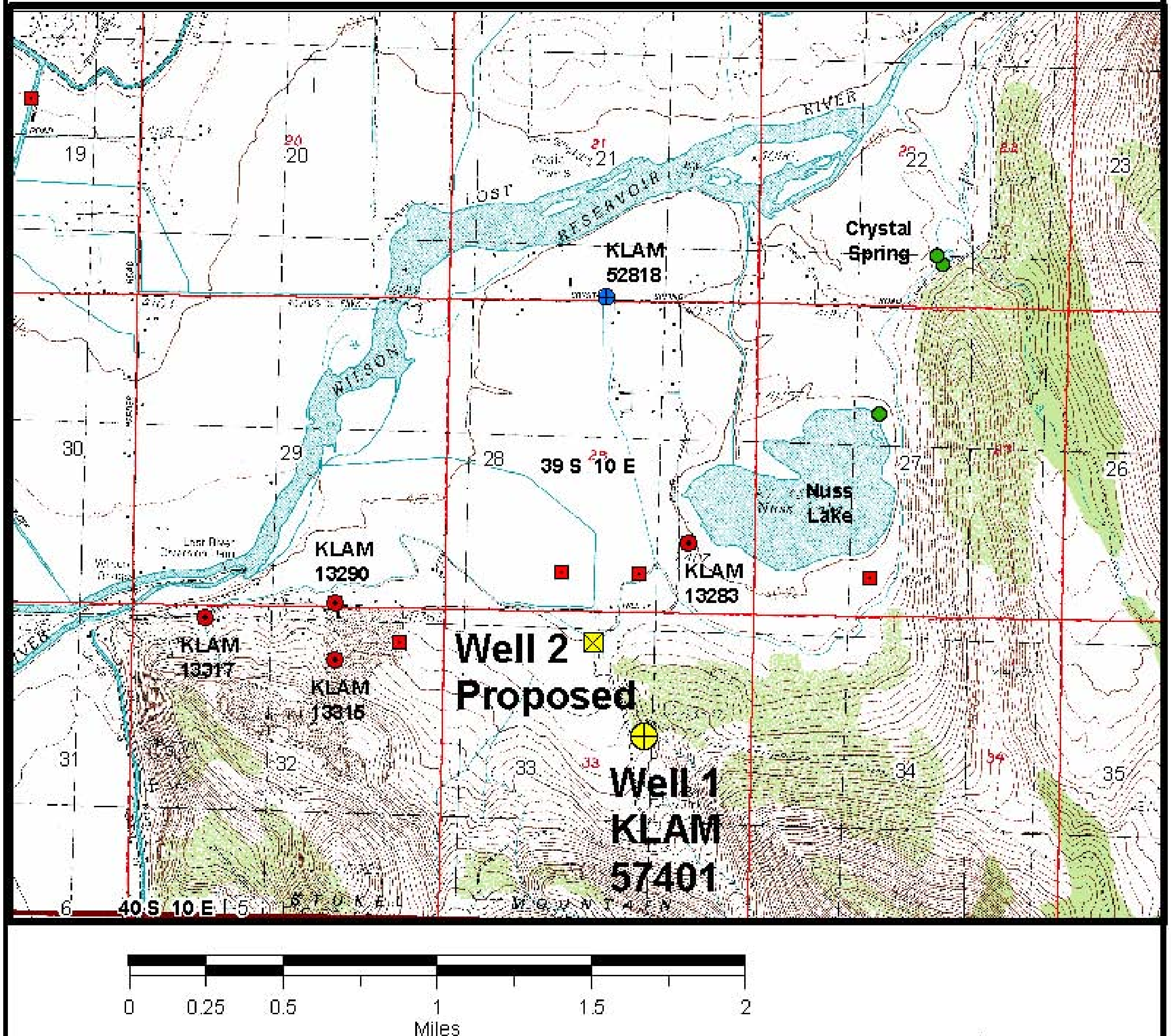
THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL

D7. ☐ Well construction deficiency has been corrected by the following actions: ______________________________
____
____
____
____
____
____
____
____

______________________________ ______________________________, 200____.
(Enforcement Section Signature)

D8. ☐ **Route to Water Rights Section (attach well reconstruction logs to this page).**

Groundwater Application G-17319
Douglas E. & Deborah L. Adkins

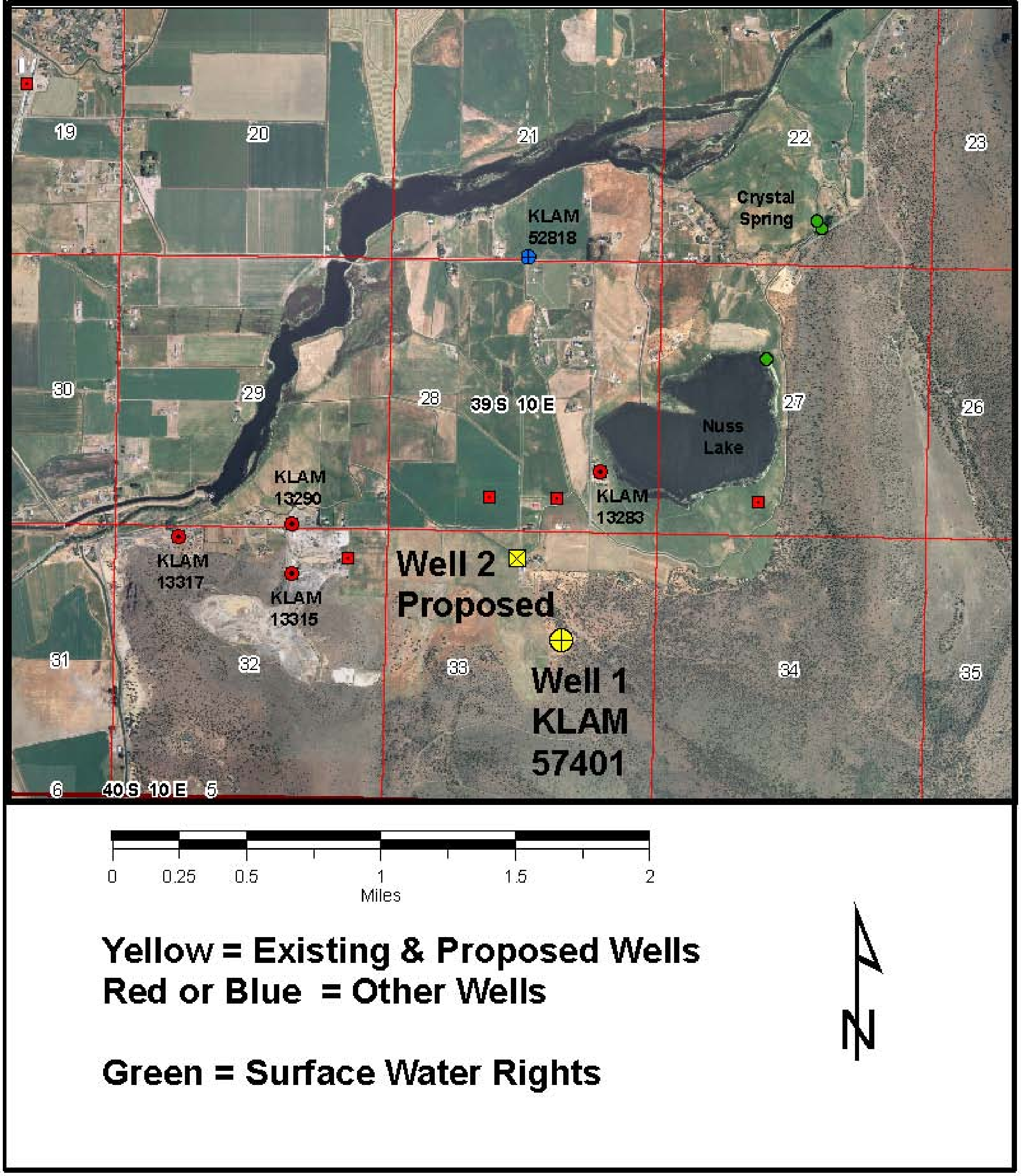


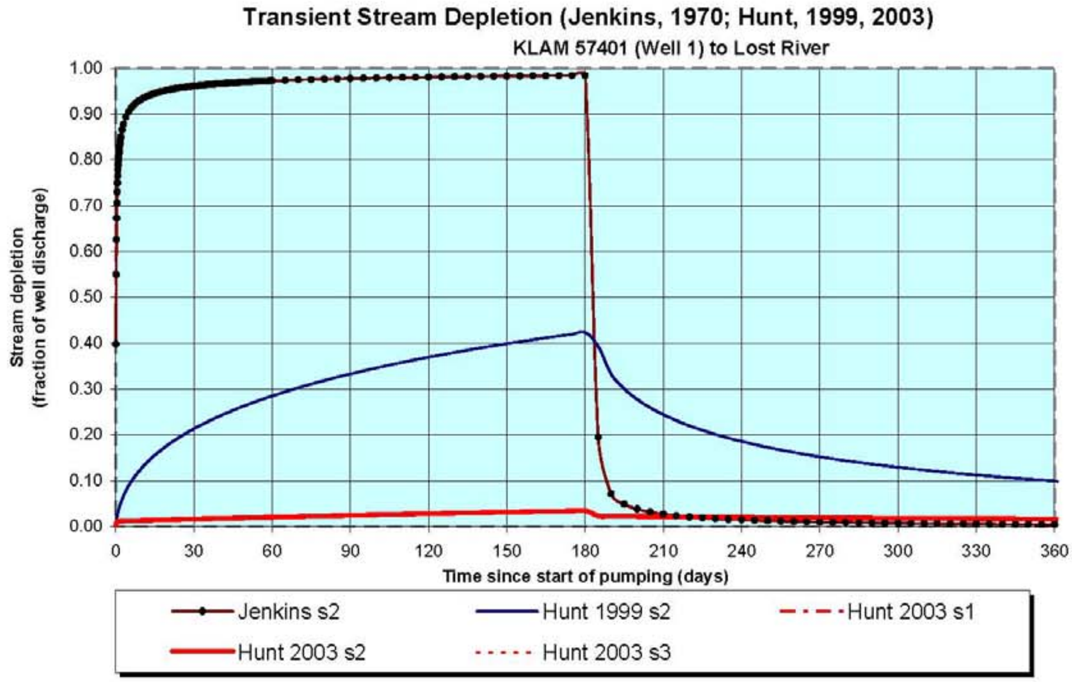
Yellow = Existing & Proposed Wells
Red or Blue = Other Wells

Green = Surface Water Rights

N

Groundwater Application G-17319
Douglas E. & Deborah L. Adkins

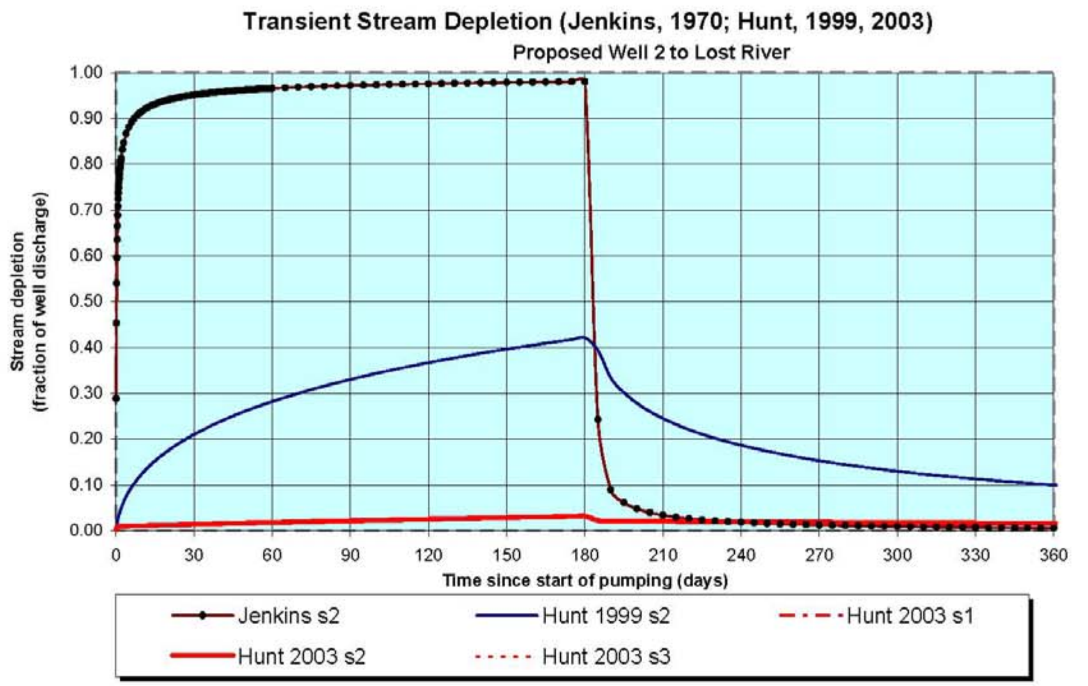




Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 184 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	96.1%	97.2%	97.8%	98.1%	98.3%	98.4%	2.7%	1.5%	1.0%	0.7%	0.6%	0.5%
H SD 1999	21.4%	28.5%	33.3%	37.0%	39.9%	42.4%	24.4%	18.6%	15.2%	12.9%	11.3%	10.0%
H SD 2003	1.7%	2.1%	2.5%	2.8%	3.2%	3.5%	2.2%	2.1%	1.9%	1.8%	1.7%	1.6%
Qw, cfs	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
H SD 99, cfs	0.030	0.040	0.047	0.052	0.056	0.059	0.034	0.026	0.021	0.018	0.016	0.014
H SD 03, cfs	0.002	0.003	0.003	0.004	0.004	0.005	0.003	0.003	0.003	0.003	0.002	0.002

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.14	0.14	0.14	cfs
Time pump on (pumping duration)	tpon	184	184	184	days
Perpendicular from well to stream	a	7050	7050	7050	ft
Well depth	d	749	749	749	ft
Aquifer hydraulic conductivity	K	668.4	668.4	668.4	ft/day
Aquifer saturated thickness	b	500	500	500	ft
Aquifer transmissivity	T	334200	334200	334200	ft*ft/day
Aquifer storativity or specific yield	S	0.00096	0.00096	0.00096	
Aquitard vertical hydraulic conductivity	Kva	2.09	2.09	2.09	ft/day
Aquitard saturated thickness	ba	650	650	650	ft
Aquitard thickness below stream	babs	650	650	650	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	500	500	500	ft
Streambed conductance (lambda)	sbc	1.607692	1.607692	1.607692	ft/day
Stream depletion factor	sdf	0.142772	0.142772	0.142772	days
Streambed factor	sbf	0.033915	0.033915	0.033915	
input #1 for Hunt's Q_4 function	t'	7.004175	7.004175	7.004175	
input #2 for Hunt's Q_4 function	K'	0.478195	0.478195	0.478195	
input #3 for Hunt's Q_4 function	epsilon'	0.004800	0.004800	0.004800	
input #4 for Hunt's Q_4 function	lamda'	0.033915	0.033915	0.033915	

G_17319_Adkin_Splendor_Ridge_Nuss_Lake_sd_hunt_2003_1.01.xls



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 184 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	95.1%	96.5%	97.2%	97.6%	97.8%	98.0%	3.4%	1.8%	1.3%	0.9%	0.7%	0.6%
H SD 1999	21.0%	28.2%	33.0%	36.7%	39.6%	42.1%	24.5%	18.7%	15.3%	13.0%	11.3%	10.0%
H SD 2003	1.4%	1.8%	2.2%	2.5%	2.9%	3.2%	2.1%	2.0%	1.9%	1.8%	1.7%	1.6%
Qw, cfs	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
H SD 99, cfs	0.029	0.040	0.046	0.051	0.055	0.059	0.034	0.026	0.021	0.018	0.016	0.014
H SD 03, cfs	0.002	0.003	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.002	0.002	0.002

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.14	0.14	0.14	cfs
Time pump on (pumping duration)	tpon	184	184	184	days
Perpendicular from well to stream	a	8850	8850	8850	ft
Well depth	d	750	750	750	ft
Aquifer hydraulic conductivity	K	668.4	668.4	668.4	ft/day
Aquifer saturated thickness	b	500	500	500	ft
Aquifer transmissivity	T	334200	334200	334200	ft*ft/day
Aquifer storativity or specific yield	S	0.00096	0.00096	0.00096	
Aquitard vertical hydraulic conductivity	Kva	2.09	2.09	2.09	ft/day
Aquitard saturated thickness	ba	650	650	650	ft
Aquitard thickness below stream	babs	650	650	650	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	500	500	500	ft
Streambed conductance (lambda)	sbc	1.607692	1.607692	1.607692	ft/day
Stream depletion factor	sdf	0.224984	0.224984	0.224984	days
Streambed factor	sbf	0.042574	0.042574	0.042574	
input #1 for Hunt's Q_4 function	t'	4.444764	4.444764	4.444764	
input #2 for Hunt's Q_4 function	K'	0.753552	0.753552	0.753552	
input #3 for Hunt's Q_4 function	epsilon'	0.004800	0.004800	0.004800	
input #4 for Hunt's Q_4 function	lamda'	0.042574	0.042574	0.042574	

G_17319_Adkin_Splendor_Ridge_Nuss_Lake_sd_hunt_2003_1.01.xls

Drawdown Calculations Using Theis Equation

Theis Equation: s = [Q/(4*T*pi)][W(u)]
u = (r*r*S)/(4*T*t)
W(u) = (-ln u)-(0.5772157)+(u/1*1!)-(u*u/2*2!)+(u*u*u/3*3!)-(u*u*u*u/4*4!)+...

s = drawdown (L)
T = transmissivity (L*L/T)
S = storage coefficient (dimensionless)
pi = 3.141592654

r = radial distance (L)
t = time (T)
u = dimensionless
W(u) = well function

Transmissivity T (gpd/ft)	Transmissivity T (ft2/day)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft3/sec)	Time t (days)	Distance r (feet)	pi	u	W(u)	Drawdown s (feet)	Comments
								Note : W(u) calculation valid when u < 7.1			
Note:	yellow grid areas are where values are calculated							7.0000	1.1545E-04		W(u) calculation test
Application G-17319: Well 1 (KLAM 57401) to Nuss Lake											
2,499,989.78	334,200.00	0.00096	727.11	1.62	30.00	3,500.00	3.14	0.0003	7.5576	0.2519	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	60.00	3,500.00	3.14	0.0001	8.2506	0.2750	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	90.00	3,500.00	3.14	0.0001	8.6560	0.2885	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	120.00	3,500.00	3.14	0.0001	8.9437	0.2981	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	150.00	3,500.00	3.14	0.0001	9.1668	0.3055	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	180.00	3,500.00	3.14	0.0000	9.3491	0.3116	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	184.00	3,500.00	3.14	0.0000	9.3711	0.3123	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	30.00	3,500.00	3.14	0.0003	7.5576	0.0222	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	60.00	3,500.00	3.14	0.0001	8.2506	0.0242	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	90.00	3,500.00	3.14	0.0001	8.6560	0.0254	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	120.00	3,500.00	3.14	0.0001	8.9437	0.0262	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	150.00	3,500.00	3.14	0.0001	9.1668	0.0269	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	180.00	3,500.00	3.14	0.0000	9.3491	0.0274	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	184.00	3,500.00	3.14	0.0000	9.3711	0.0275	Pro-Rated Pumping Rate
Application G-17319: Well 1 (KLAM 57401) to Crystal Spring											
2,499,989.78	334,200.00	0.00096	727.11	1.62	30.00	9,600.00	3.14	0.0022	5.5415	0.1847	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	60.00	9,600.00	3.14	0.0011	6.2336	0.2078	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	90.00	9,600.00	3.14	0.0007	6.6387	0.2213	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	120.00	9,600.00	3.14	0.0006	6.9262	0.2308	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	150.00	9,600.00	3.14	0.0004	7.1492	0.2383	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	180.00	9,600.00	3.14	0.0004	7.3314	0.2443	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	184.00	9,600.00	3.14	0.0004	7.3534	0.2451	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	30.00	9,600.00	3.14	0.0022	5.5415	0.0162	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	60.00	9,600.00	3.14	0.0011	6.2336	0.0183	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	90.00	9,600.00	3.14	0.0007	6.6387	0.0195	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	120.00	9,600.00	3.14	0.0006	6.9262	0.0203	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	150.00	9,600.00	3.14	0.0004	7.1492	0.0210	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	180.00	9,600.00	3.14	0.0004	7.3314	0.0215	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	184.00	9,600.00	3.14	0.0004	7.3534	0.0216	Pro-Rated Pumping Rate

Drawdown Calculations Using Theis Equation

Theis Equation: s = [Q/(4*T*pi)][W(u)]
u = (r*r*S)/(4*T*t)
W(u) = (-ln u)-(0.5772157)+(u/1*1!)-(u*u/2*2!)+(u*u*u/3*3!)-(u*u*u*u/4*4!)+...

s = drawdown (L)
T = transmissivity (L*L/T)
S = storage coefficient (dimensionless)
pi = 3.141592654

r = radial distance (L)
t = time (T)
u = dimensionless
W(u) = well function

Transmissivity T (gpd/ft)	Transmissivity T (ft2/day)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft3/sec)	Time t (days)	Distance r (feet)	pi	u	W(u)	Drawdown s (feet)	Comments
								Note : W(u) calculation valid when u < 7.1			
Note:	yellow grid areas are where values are calculated							7.0000	1.1545E-04		W(u) calculation test
Application G-17319: Well 2 (proposed) to Nuss Lake											
2,499,989.78	334,200.00	0.00096	727.11	1.62	30.00	2,650.00	3.14	0.0002	8.1139	0.2704	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	60.00	2,650.00	3.14	0.0001	8.8069	0.2935	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	90.00	2,650.00	3.14	0.0001	9.2124	0.3070	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	120.00	2,650.00	3.14	0.0000	9.5001	0.3166	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	150.00	2,650.00	3.14	0.0000	9.7232	0.3241	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	180.00	2,650.00	3.14	0.0000	9.9055	0.3301	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	184.00	2,650.00	3.14	0.0000	9.9275	0.3309	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	30.00	2,650.00	3.14	0.0002	8.1139	0.0238	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	60.00	2,650.00	3.14	0.0001	8.8069	0.0258	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	90.00	2,650.00	3.14	0.0001	9.2124	0.0270	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	120.00	2,650.00	3.14	0.0000	9.5001	0.0279	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	150.00	2,650.00	3.14	0.0000	9.7232	0.0285	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	180.00	2,650.00	3.14	0.0000	9.9055	0.0290	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	184.00	2,650.00	3.14	0.0000	9.9275	0.0291	Pro-Rated Pumping Rate
Application G-17319: Well 2 (proposed) to Crystal Spring											
2,499,989.78	334,200.00	0.00096	727.11	1.62	30.00	8,850.00	3.14	0.0019	5.7039	0.1901	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	60.00	8,850.00	3.14	0.0009	6.3961	0.2132	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	90.00	8,850.00	3.14	0.0006	6.8012	0.2267	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	120.00	8,850.00	3.14	0.0005	7.0888	0.2363	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	150.00	8,850.00	3.14	0.0004	7.3118	0.2437	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	180.00	8,850.00	3.14	0.0003	7.4941	0.2498	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	727.11	1.62	184.00	8,850.00	3.14	0.0003	7.5160	0.2505	Continuous Pumping at Full Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	30.00	8,850.00	3.14	0.0019	5.7039	0.0167	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	60.00	8,850.00	3.14	0.0009	6.3961	0.0188	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	90.00	8,850.00	3.14	0.0006	6.8012	0.0199	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	120.00	8,850.00	3.14	0.0005	7.0888	0.0208	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	150.00	8,850.00	3.14	0.0004	7.3118	0.0214	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	180.00	8,850.00	3.14	0.0003	7.4941	0.0220	Pro-Rated Pumping Rate
2,499,989.78	334,200.00	0.00096	63.97	0.14	184.00	8,850.00	3.14	0.0003	7.5160	0.0220	Pro-Rated Pumping Rate

KLAM 57401

WELL I.D. # L

(1) LAND OWNER Well Number
Name Douglas + Deborah AdKins
Address 9338 Hill Rd
City Klamath Falls State OR Zip 97603

(2) TYPE OF WORK
☑ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☑ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☐ No Depth of Completed Well ____ ft.
Explosives used ☐ Yes ☐ No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other
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"				☑	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☐ None
Final location of shoe(s)

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

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

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

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

Temperature of water ____ 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 Klamath Latitude ____ Longitude ____
Township 39 S N or S Range 10 E E or W. WM.
Section 33 SW 1/4 NE 1/4
Tax Lot 301 Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) ____

(10) STATIC WATER LEVEL:
____ ft. below land surface. Date ____
Artesian pressure ____ lb. per square inch Date ____

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

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:
Ground Elevation ____

Material	From	To	SWL
This well is described as an existing well with 12-inch casing to ± 150 feet. Seal and perforation intervals are unknown. The total depth is noted as >450 feet. No well log was found by the owner or in OWRD files. Date of castruction is unknown.			
The well location is described as: 2090 feet south and 1880 feet west from the NE corner, section 33.			

Date started ____ Completed ____

SOURCE OF DATA/INFO Water right application files G-17318 and G-17319.

COMPILED BY: Karl Wozniak

DATE: 5/20/2010

WELL INFORMATION REPORT 11/16/2000

KLAM 57401

WELL I.D. # L________

(1) LAND OWNER Well Number ____
Name Douglas E. & Deborah L. Adkins
Address 9338 Hill Road
City Klamath Falls State OR Zip 97603

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other ____

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☒ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other ____

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☐ No Depth of Completed Well 749 ft.
Explosives used ☐ Yes ☐ No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
>12"	0	97.5	?	?	?	
?	97.5	749				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other ____
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"	>0	97.5	0.350	☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☐ None
Final location of shoe(s) ____

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

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

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

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

Temperature of water ____ 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 Klamath Latitude ____ Longitude ____
Township 39 S N or (S) Range 10 E (E) or W. WM.
Section 33 ____ 1/4 ____ 1/4
Tax Lot ____ Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 2090 ft South and 1880 ft West from NE corner of section 33

(10) STATIC WATER LEVEL:
73.5 ft. below land surface. Date 6 Nov 2010
Artesian pressure ____ lb. per square inch Date ____

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

From	To	Estimated Flow Rate	SWL
			73.5

(12) WELL LOG:
Ground Elevation about 4189 ft elev

Material	From	To	SWL
Casing	0	97.5	
Basalt	97.5	749	73.5

Date started ? Completed ?

SOURCE OF DATA/INFO
Driller Larry De Spain of Van Meter and De Spain
Video of Well on 6 Nov 2010

COMPILED BY: Jerry Grondin (OWRD).

DATE: 17 Nov 2010

WELL INFORMATION REPORT 11/16/2000

KLAM 57401

VAN METER and DE SPAIN

WELL DRILLING, INC.

Licensed - Bonded
Free Estimates

Larry De Spain
3114 Boardman
Klamath Falls, OR 97603
(541) 884-6544

RECEIVED
NOV 0 8 2010
BY:

Date 11/07/10

Doug Adkins
9338 Hill Rd.
Klamath Falls, OR 97603

Video well - 11/06/10

Well is cased with 12" ID x .250 casing. Casing is 97'6" from ground level. Casing sets into a gray basalt formation. The well extends on down to 749'.

On 11/06/10 the SWL is 73'6". It appears there has been seasonal movement up and down of water levels in casing.

Next step should be a flow test to determine capacity and pumping levels.

IRRIGATION • STOCK • DOMESTIC • MUNICIPAL • BLAST HOLES