WATER RESOURCES DEPARTMENT

MEMO 14 March, 2008

TO: **Application G-** 16904

FROM: **GW:** GERALD H. GRONDIN
(Reviewer's Name)

SUBJECT: **Scenic Waterway Interference Evaluation**

____YES
The source of appropriation is within or above a Scenic Waterway
_X_NO

____YES
Use the Scenic Waterway condition (Condition 7J)
_X_NO

____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 GROUND WATER APPLICATIONS

TO: Water Rights Section **Date** 11 March 2008

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

SUBJECT: Application **G-16904** 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 ground water 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: **Valley Falls Ranch, Inc.** County: **Lake**

A1. Applicant(s) seek(s) **4.12 (1850 gpm)** cfs from **2** well(s) in the **Goose and Summer Lakes** Basin, **Lake Abert (Chewaucan)** sub basin Quad Map: **Valley Falls**

A2. Proposed use: **Irrigation (231 acre primary, 98.6 acre suppl)** Seasonality: **1 March to 31 October (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	**Not Drilled**	**1**	**Alluvium**	**2.52**	**35S/21E-sec 31 BAC**	**1050'S, 1650'E fr NW cor S 31**
2	**Not Drilled**	**2**	**Alluvium**	**1.60**	**35S/21E-sec 31 DBD**	**1700'N, 3900'E fr SW cor S 31**
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	**4305**	**Prop 240**	**Prop 60**	**N.A.**	**Prop 600**	**Prop 0-165**	**Prop +1-600**	**None**	**Prop 240-600**	**N.A.**	**N.A.**	**N.A.**
2	**4315**	**Prop 240**	**Prop 60**	**N.A.**	**Prop 600**	**Prop 0-165**	**Prop +1-600**	**None**	**Prop 240-600**	**N.A.**	**N.A.**	**N.A.**
3												

Use data from application for proposed wells.

A4. **Comments:** **The proposed wells are not yet drilled.**

The proposed aquifer is alluvium. Geologic mapping (Walker 1963) indicates alluvium is limited to the Crooked Creek channel until it reaches the Chewaucan River drainage. The mapping indicates basin fill sedimentary deposits at the well sites. The proposed wells may fully penetrate the basin fill and encounter basalt at depth. Well LAKE 1769 in section 32 may have fully penetrated the basin fill (from 0 to 490 feet depth) and then drilled into basalt ("gray rock broken" from 490 to 545 feet depth, well bottom).

The proposed wells indicate first water at 240 feet depth. Water well reports for wells in section 31 indicate the first water bearing zone can be less than 50 feet below land surface.

The proposed wells indicate a static water level of 60 feet blsd. Water well reports for wells in section 31 indicate static water levels from 8 to 25 feet blsd.

A5. ☐ **Provisions of the** **Goose & Summer Lakes** Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water ☒ **are**, *or* ☐ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: **OAR 690-513-0050 (Chewaucan Subbasin) applies. Ground water and surface water are classified. Agricultural use is allowed.**

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

B. GROUND WATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that ground water* 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 ground water 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 ground water 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 ground water resource; or

d. ☒ **will, if properly conditioned**, avoid injury to existing ground water rights or to the ground water resource:
   i. ☒ The permit should contain condition #(s) **7B and 7N**
   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 ground water production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow ground water production from no shallower than _____ ft. below land surface;

c. ☐ **Condition** to allow ground water production only from the _____ ground water 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 Ground Water 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. **Ground water availability remarks:**

Recommend conditions 7B and 7N.

Multiple reports for the Goose and Summer Lakes Basin indicate ground water occurs in alluvium, basin fill sediments, and different basalt units.

Old water level measurements at wells in the Crooked Creek drainage area were found for old state observation well SOW 456 (well LAKE 1808) is located in T36S/R21E-sec 06 ABA, the section immediately south of the proposed wells. The water level data was from 1938 to 1962. In 1938, the water level was about 17 feet below land surface. From 1938 to 1956, the water level rose about 7 feet to about 10 feet below land surface. From 1958 to 1962, the water level declined to about 3 feet to about 13.5 feet below land surface. These annual trends appear climate controlled. Seasonal fluctuations appear to be about 1.5 feet.

C. GROUND WATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**Alluvium**	☐	☒
2	**Alluvium**	☐	☒
3		☐	☐
4		☐	☐
5		☐	☐

Basis for aquifer confinement evaluation:

System is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. Generally, low transmissivity (low permeability) sediment of varying thickness overlies higher transmissivity (higher permeability) basalt. Available data indicates ground water occurs in both the sediment and basalt.

The proposed aquifer is alluvium. Geologic mapping (Walker 1963) indicates alluvium is limited to the Crooked Creek channel until it reaches the Chewaucan River drainage. The mapping indicates basin fill sedimentary deposits at the well sites. The proposed wells may fully penetrate the basin fill and encounter basalt at depth. Well LAKE 1769 in section 32 may have fully penetrated the basin fill (from 0 to 490 feet depth) and then drilled into basalt ("gray rock broken" from 490 to 545 feet depth, well bottom).

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	**Crooked Creek**	**4300**	**4300**	**1,025**	☒	☐	☒	☒	☐
2	1	**Crooked Creek**	**4300**	**4300**	**2,025**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation:

Crooked Creek drains to the Chewaucan River that drains to Lake Abert.

Available data indicates ground water discharges to surface water in the sub-basin. These include reports, water availability data, USGS map showing Crooked Creek is a perennial creek, and air photo (FSA 2005) indicating Crooked Creek is a perennial creek.

Water Availability Basin the well(s) are located within: CROOKED CR > CHEWAUCAN R - AT MOUTH

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	1	☒	☐	N.A.		☐	6.05	☒	30.0	☒
2	1	☐	☐	N.A.		☐	6.05	☒	25.5	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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?
	1		☐	N.A.		☐	6.05	☒	>25	☒
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments:

A potential for substantial interference is assumed given well 1 is less than 0.25 miles from Crooked Creek and hydraulically connected, the proposed rate of appropriation for well 1 and well 2 is greater than one-percnt of the 80% natural flow, and the calculated interference with the creek is greater than 25% of the rate of appropriation at the end of 30 days for well 1 and well 2 (see attached).

Hunt (1999) was used to calculate the interference given the proposed aquifer is "alluvium". Available data indicate basin fill. The calculations used a horizontal hydraulic conductivity of 20 feet/day (transmissivity = 10,000 ft2/day), a vertical conductivity of 0.4 feet/day, and 0.01 for the storage coefficient. These values are consistent with aquifer parameter estimates for the basin found in reports and calculated from specific capacity data (see attached).

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													
		%	%	%	%	%	%	%	%	%	%	%	%
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:

No evaluation. Both of the proposed wells are less than 1.0 mile from Crooked Creek.

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 ground water 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**

If a permit is issued, include conditions 7B and 7N.

A potential for substantial interference is assumed given well 1 is less than 0.25 miles from Crooked Creek and hydraulically connected, the proposed rate of appropriation for well 1 and well 2 is greater than one-percnt of the 80% natural flow, and the calculated interference with the creek is greater than 25% of the rate of appropriation at the end of 30 days for well 1 and well 2.

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The proposed aquifer is alluvium. Geologic mapping (Walker 1963) indicates alluvium is limited to the Crooked Creek channel until it reaches the Chewaucan River drainage. The mapping indicates basin fill sedimentary deposits at the well sites. The proposed wells may fully penetrate the basin fill and encounter basalt at depth. Well LAKE 1769 in section 32 may have fully penetrated the basin fill (from 0 to 490 feet depth) and then drilled into basalt ("gray rock broken" from 490 to 545 feet depth, well bottom).

References Used: References consulted were:

Hampton, E.R., 1964, Geologic factors that control the occurrence and availability of ground water in the Fort Rock Basin, Lake County, Oregon: USGS Professional Paper 383-B, 29 p.

McFarland, W.D. and Ryals, G.N., 1991, Adequacy of available hydrogeologic data for evaluation of declining ground-water levels in the Fort Rock Basin, south-central Oregon: USGS Water Resources Investigations Report 89-4057, 47 p.

Miller, D.W., 1984, Appraisal of ground-water conditions in the Fort Rock Basin, Lake County, Oregon: OWRD Open File Report, 157 p.

Miller, D.W., 1986, Ground-water conditions in the Fort Rock Basin, northern Lake County, Oregon: OWRD Ground Water Report No. 31, 196 p.

Morgan, D.S., 1988, Geohydrology and numerical model analysis of ground-water flow in the Goose Lake Basin, Oregon and California: USGS Water Resources Investigations Report 87-4058, 92 p.

Oregon Water Resources Department, 1989, Goose and Summer Lakes Basin report: OWRD Basin Report, 112 p.

Peterson, N.V. and McIntyre, J.R., 1970, The reconnaissance geology and mineral resources of eastern Klamath County and western Lake County, Oregon: DOGAMI Bulletin 66, 70 p.

Phillips, K.N. and VanDenburgh, A.S., 1971, Hydrology and geochemistry of Abert, Summer, and Goose Lakes, and other closed-basin lakes in south-central Oregon: USGS Professional Paper 502-B, 86p.

Sammel, E.A. and Craig, R.W., 1981, The geothermal hydrology of Warner Valley, Oregon: a reconnaissance study: USGS Professional Paper 1044-I, 147 p.

Walker, G.W., 1963, Reconnaissance geologic map of the eastern half of the Klamath Falls (AMS) quadrangle, Lake and Klamath Counties, Oregon: USGS Mineral Investigations Field Studies Map MF-260.

Waring, G.A., 1908, Geology and water resources of a portion of south-central Oregon: USGS Water Supply Paper 220, 85 p.

Goose and Summer Lakes Basin Program rules (OAR 690-513).

Old State Obesrvation Well SOW 456 (LAKE 1808).

Water well reports for wells in T35S/R21E-sec 31 and 32: LAKE 1762, LAKE 1763, LAKE 1764, LAKE 1765, LAKE 1766, LAKE 1767, LAKE 1768, and LAKE 1769.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** 1 & 2 **Logid:** Each are not yet drilled

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 ground water reservoir;
c. ☐ permits the loss of artesian head;
d. ☐ permits the de-watering of one or more ground water 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.**

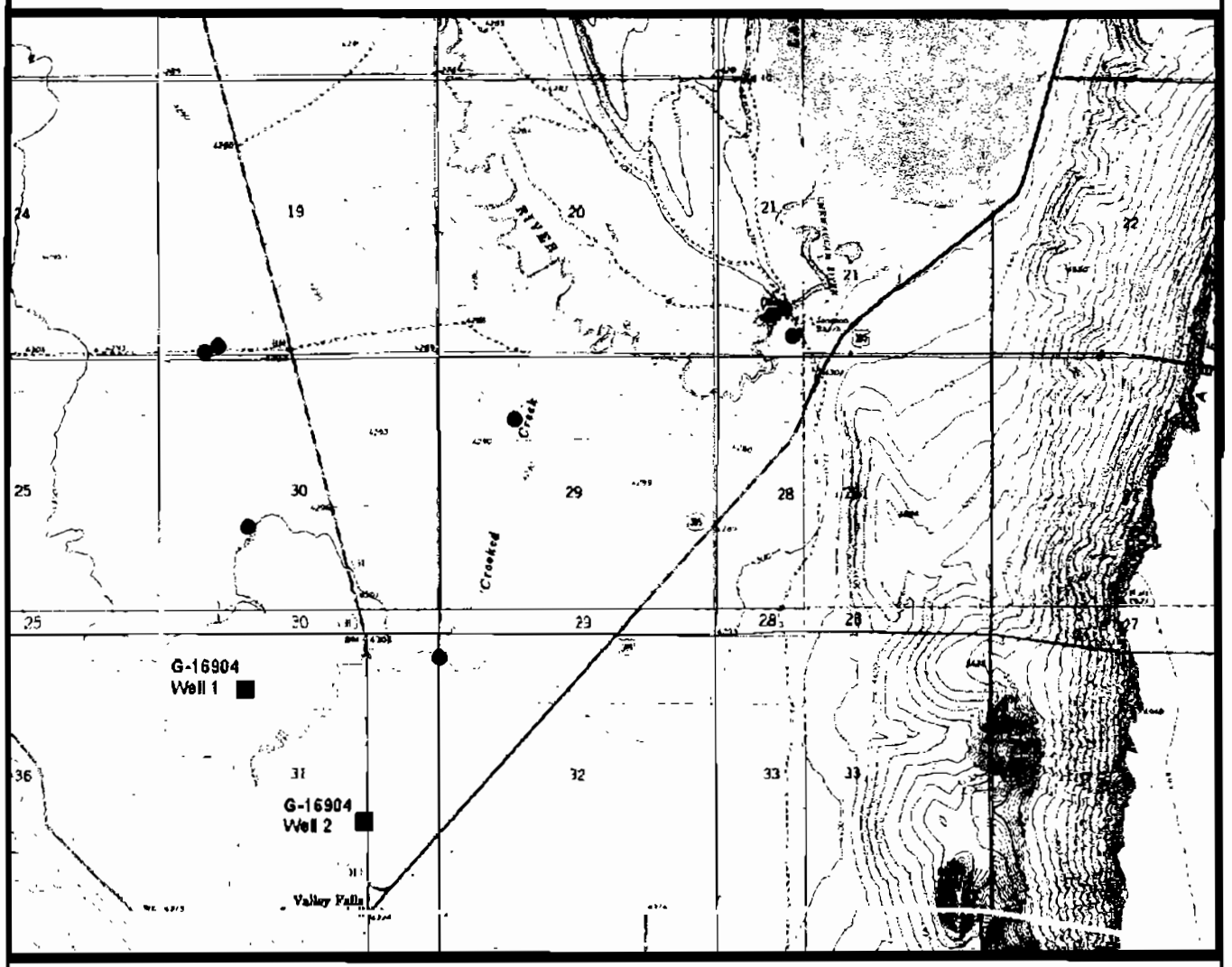
THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL

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).**

Ground Water Application G-16904
Valley Falls Ranch, Inc.

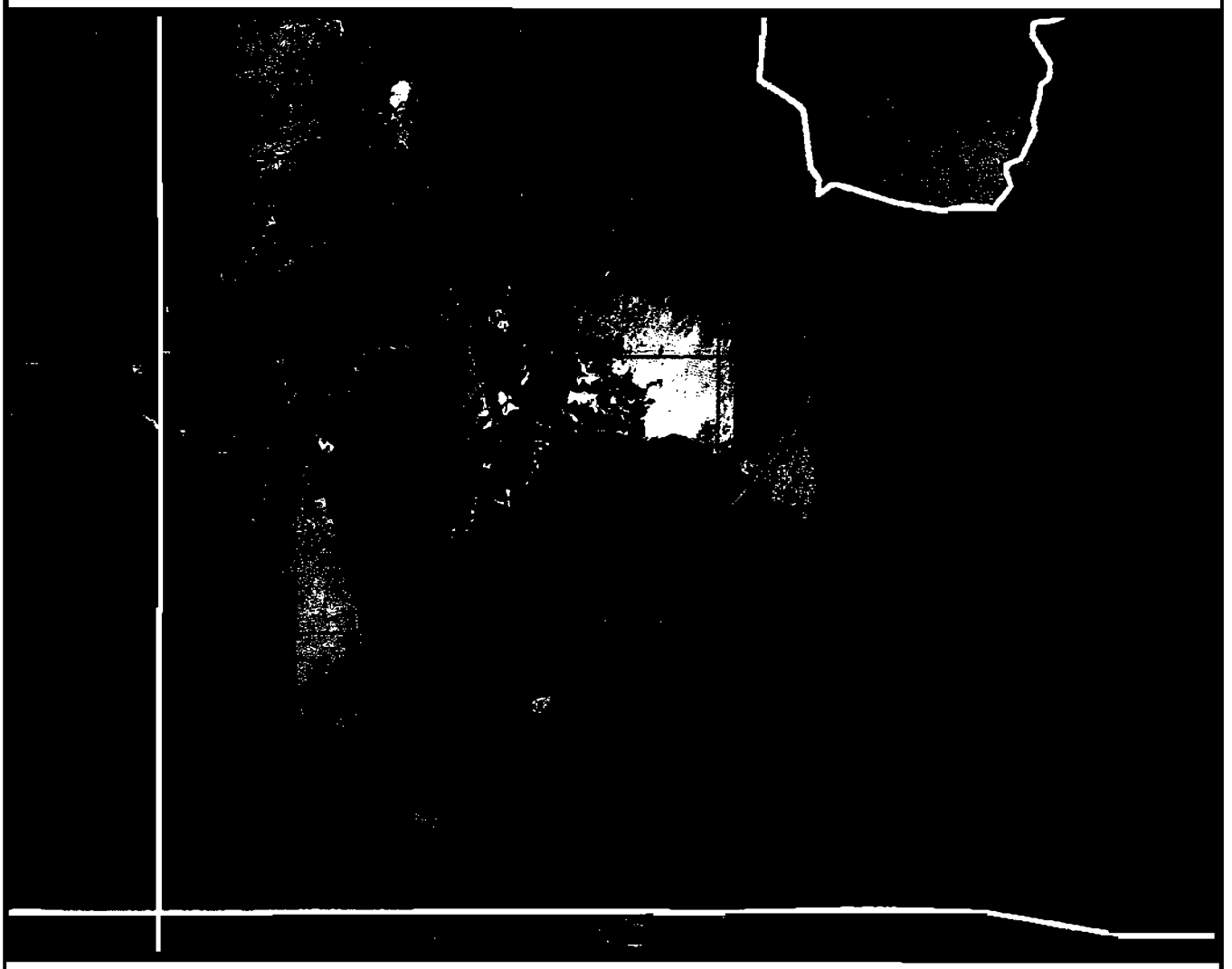


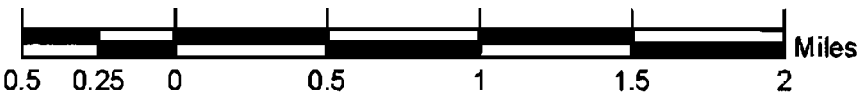
0.5 0.25 0 0.5 1 1.5 2 Miles

N

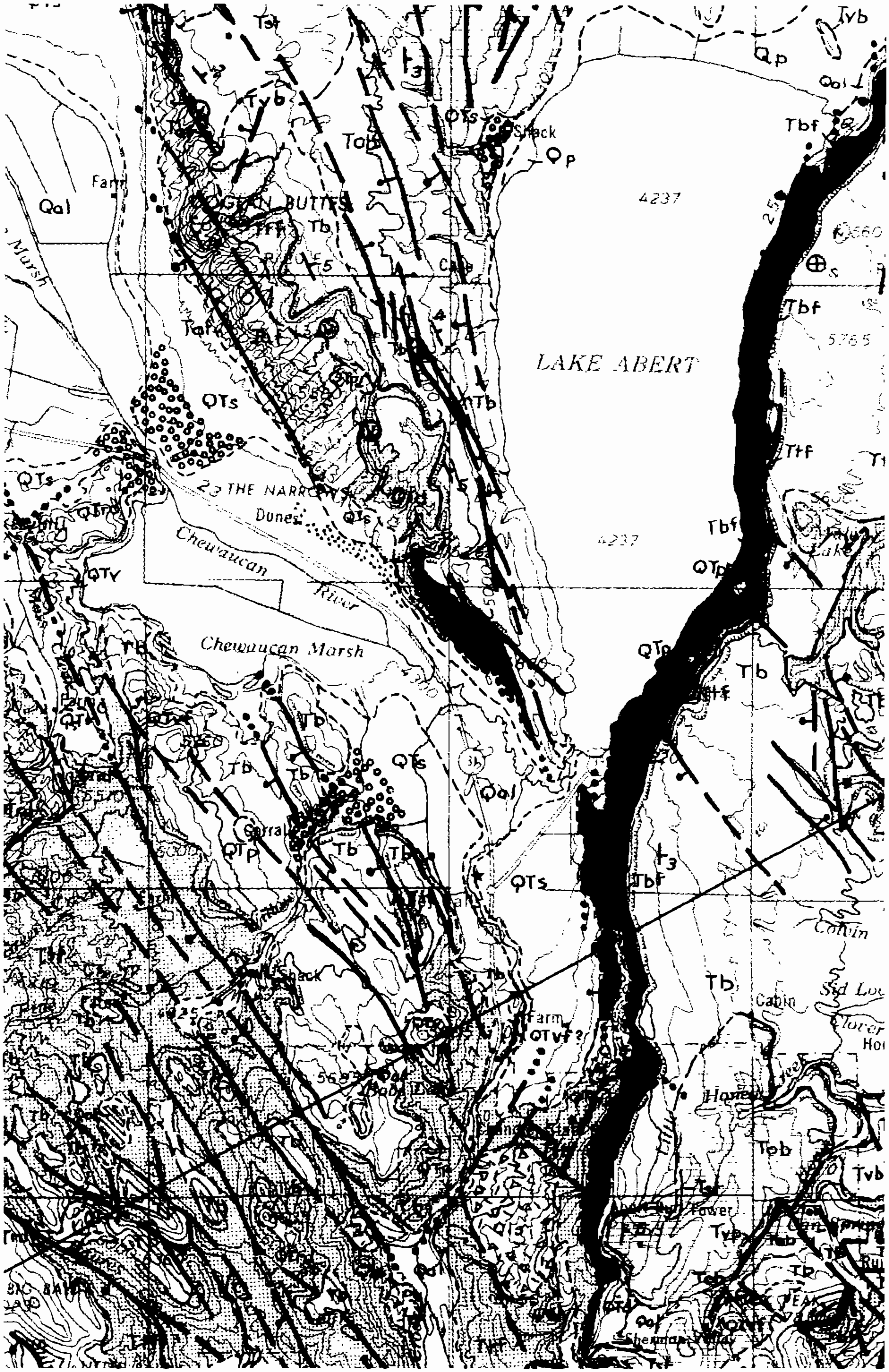
Proposed Wells = not drilled

Ground Water Application G-16904
Valley Falls Ranch, Inc.





Proposed Wells = not drilled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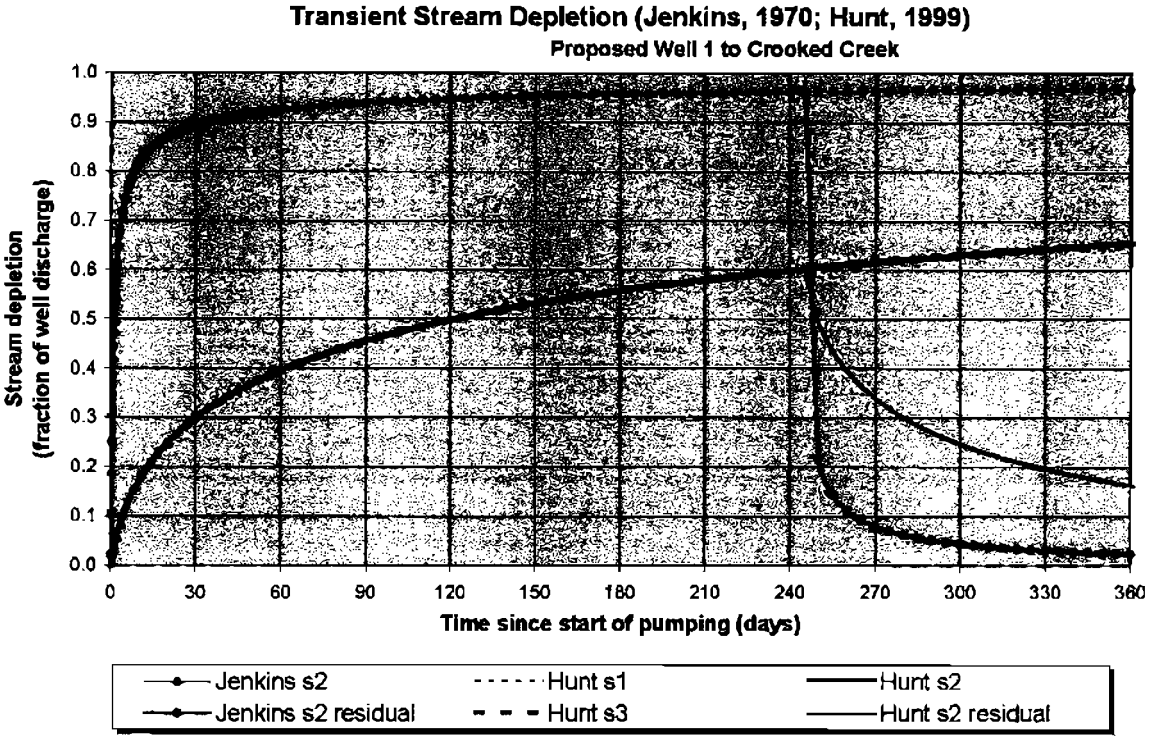
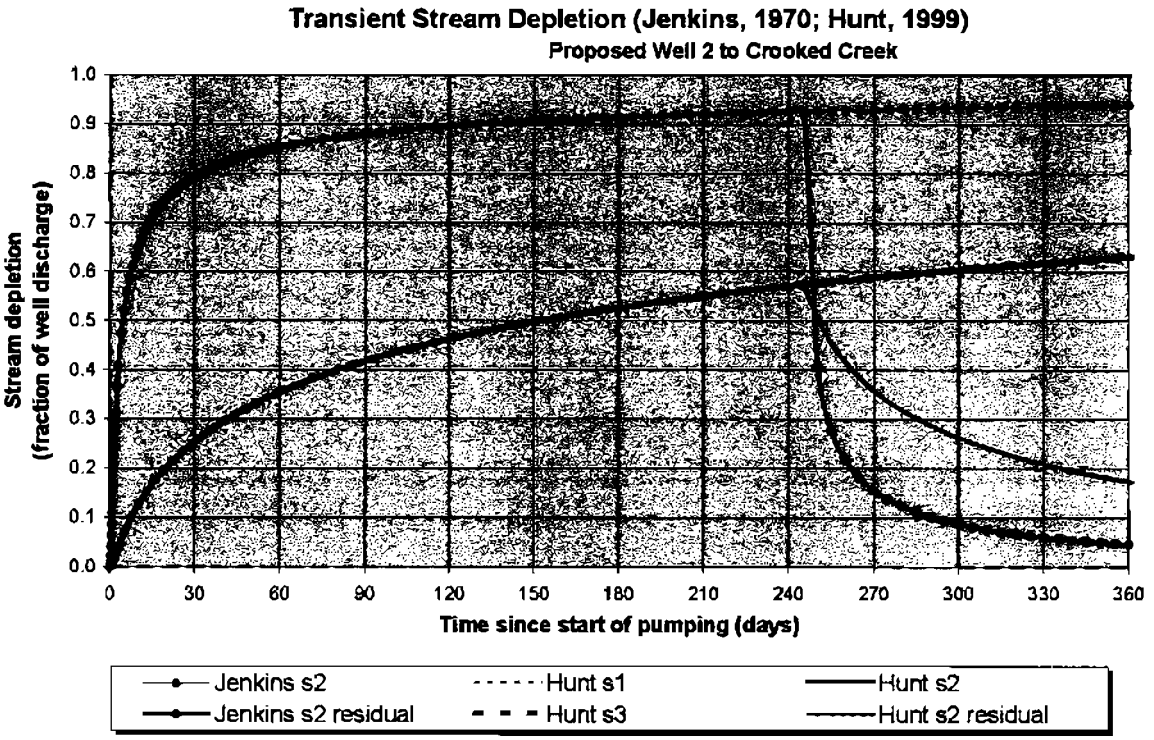


Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.3002	0.3962	0.4559	0.4987	0.5318	0.5586	0.5809	0.5999	0.3396	0.2472	0.1984	0.1630
Qw, cfs	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520
H SD s2, cfs	0.756	0.999	1.149	1.257	1.340	1.408	1.464	1.512	0.856	0.623	0.495	0.411

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2.52	2.52	2.52	cfs
Distance to stream	a	1025	1025	1025	ft
Aquifer hydraulic conductivity	K	20	20	20	ft/day
Aquifer thickness	b	500	500	500	ft
Aquifer transmissivity	T	10000	10000	10000	ft*ft/day
Aquifer storage coefficient	S	0.01	0.01	0.01	
Stream width	ws	100	100	100	ft
Streambed hydraulic conductivity	Ks	0.4	0.4	0.4	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	1.6	1.6	1.6	ft/day
Stream depletion factor (Jenkins)	sdf	1.050625	1.050625	1.050625	days
Streambed factor (Hunt)	sbf	0.164	0.164	0.164	



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.2548	0.3551	0.4180	0.4634	0.4986	0.5271	0.5509	0.5712	0.3581	0.2623	0.2090	0.1737
Qw, cfs	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520	2.520
H SD s2, cfs	0.642	0.895	1.053	1.168	1.257	1.328	1.388	1.439	0.902	0.661	0.527	0.438

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2.52	2.52	2.52	cfs
Distance to stream	a	2025	2025	2025	ft
Aquifer hydraulic conductivity	K	20	20	20	ft/day
Aquifer thickness	b	500	500	500	ft
Aquifer transmissivity	T	10000	10000	10000	ft*ft/day
Aquifer storage coefficient	S	0.01	0.01	0.01	
Stream width	ws	100	100	100	ft
Streambed hydraulic conductivity	Ks	0.4	0.4	0.4	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	1.6	1.6	1.6	ft/day
Stream depletion factor (Jenkins)	sdf	4.100625	4.100625	4.100625	days
Streambed factor (Hunt)	sbf	0.324	0.324	0.324	

G_16904_Valley_Falls_Ranch_Lake_Albert_Hunt_1999_depletion_revised.xls

Theis_Equation_specific_capacity_to_transmissivity						
G_16904_Valley_Falls_Ranch_Lake_Abert						
Basin_Fill						
Well County	Well Num	Transmissivity	Open Interval	Conductivity		
		ft2/day	feet	ft/day		
LAKE	1766	220.83	15.00	14.72		
LAKE	1767	1,214.08	13.00	93.39		
			Average		54.06	ft/day
Basin Fill & Basalt						
Well County	Well Num	Transmissivity	Open Interval	Conductivity		
		ft2/day	feet	ft/day		
LAKE	1769	2,101.20	475.00	4.42		
			Average		4.42	ft/day
			Overall Average		37.51	ft/day