WATER RESOURCES DEPARTMENT MEMO **20 November 2014**

TO: **Application G- 17890**

FROM: **Gerald H. Grondin - Groundwater Section**

SUBJECT: **Scenic Waterway Interference Evaluation**

☐ YES

☒ NO

The source of appropriation is within or above a Scenic Waterway

☐ YES

☒ NO

Use the Scenic Waterway condition (condition 7J)

☐ Per ORS 390.835, the Groundwater Section is able to calculate groundwater interference with surface water that contributes to a Scenic Waterway. The calculated interference distribution is provided below.

☒ Per ORS 390.835, the Groundwater Section is unable to calculate groundwater 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 flows necessary to maintain the free-flowing character of a scenic waterway.

DISTRIBUTION OF INTERFERENCE

Calculate interference as the monthly fraction of the annual consumptive use and fill in the table below. If interference cannot be calculated, per criteria in 390.839, do not fill in the table but check the "unable" option above, thus informing the Water Rights Section that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in the _____ Scenic Waterway by the following amounts, expressed as a proportion of the annual consumptive use pumped from the well.

Monthly Fraction of Annual Consumptive Use

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

Application G-17890 continued

Date 20 November 2014

PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section **Date** 20 November 2014

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

SUBJECT: Application G-17890 Supersedes review of LL-1450
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: Surprise Valley Electrification Corp County: Lake

A1. Applicant(s) seek(s) 0.509 (228.5 gpm) cfs from 1 well(s) in the Goose and Summer Lakes Basin, Chewaucan River sub basin Quad Map: Paisley

A2. Proposed use: General industrial including cooling water for geothermal electricity production
Seasonality: Year round

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	LAKE 52506	1	Basin Fill	0.509	33S/18E-sec 23 ACD	60' N, 1680' W fr E qtr cor S 23

* 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	4470	83	94	02/27/14	378	0-20	+2-315	None	Perf 40-315 Scr 315-375	<100	?	A

Use data from application for proposed wells.

A4. **Comments:**

This application (G-17890) is a follow-up to limited License LL-1450.

The application proposes to use water for general industrial use, which includes cooling water for geothermal electrical production.

The proposed maximum pumping rate is 228.5 gpm (0.509 cfs). This maximum pumping rate limit is needed to avoid triggering a potential for substantial interference (PSI) finding.

The proposed total annual volume is 368.5 acre-feet per year. This total annual volume equals continuous pumping at 228.5 gpm (0.509 cfs) for 365 days each year.

The proposed aquifer is identified as "basin fill sediments." The water well report (well log) for the 378 feet deep proposed POA well (LAKE 52506) indicates predominantly basin fill materials from land surface to the well bottom. The water is semi-hot (118 degrees F). The water well report for the 432 feet deep nearby well LAKE 1628 (original well and LAKE 1626 = deepening) located 500 feet northeast of the proposed POA well indicates predominantly basin fill materials with 62 feet of basalt from 298 to 360 feet depth. Hot water was encountered. The temperature was reported as 104 degrees when the well was originally constructed and 175 degrees after the well was deepened. The water well report for the 1260 feet deep nearby well LAKE 52529 located 50 feet NW of the proposed POA well indicates "basin-fill" sediments of volcanic origin with some basalt and rhyolite to possibly 410 feet depth and predominantly basalt-volcanic rocks below the "basin-fill" to the well bottom at 1260 feet.

Walker (1963) shows the site in an area mapped as sedimentary deposits (QTs) that are bounded by volcanic and sedimentary rocks (Tvb) to the west and alluvium (Qal) to the east. QTs is described as lacustrine, fluviatile, and Aeolian sedimentary rocks, interstratified tuff, ashy diatomite, and unconsolidated clay, sand, silt, and gravel, mostly in pluvial basins that correlates to water laid volcanic deposits of Wells and Peck (1961). Tvb is described as basalt flows. Qal is described as unconsolidated fluviatile gravel, sand, and silt. In places, it can include talus, fanglomerate, lakebed deposits, and windblown sand.

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) does not apply. The proposed well and use appear to be within the allowable ground water classifications for the subbasin OAR 690-513-0050 (2).

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, 7N, 7P, 7T modified, and additional conditions noted
   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:** _____

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

The proposed aquifer is identified as "basin fill sediments." The water well report (well log) for the 378 feet deep proposed POA well (LAKE 52506) indicates predominantly basin fill materials from land surface to the well bottom. The water is semi-hot (118 degrees F). The water well report for the 432 feet deep nearby well LAKE 1628 (original well and LAKE 1626 = deepening) located 500 feet northeast of the proposed POA well indicates predominantly basin fill materials with 62 feet of basalt from 298 to 360 feet depth. Hot water was encountered. The temperature was reported as 104 degrees when the well was originally constructed and 175 degrees after the well was deepened. The water well report for the 1260 feet deep nearby well LAKE 52529 located 50 feet NW of the proposed POA well indicates "basin-fill" sediments of volcanic origin with some basalt and rhyolite to possibly 410 feet depth and predominantly basalt-volcanic rocks below the "basin-fill" to the well bottom at 1260 feet.

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The nearest state observation well with long term data is state observation well 374 (well LAKE 1633) completed in basin-fill. It is located about 1.85 miles northeast of the proposed POA well LAKE 52506. The ground water level data is from 1963 to March 2014. The annual groundwater level trend shows rising water level s from the mid-1960s to the early 1970s, stable levels from 1970 to 1980, and an ongoing decline from the early 1980s to present. The decline from March 1980 to March 2014 is about 15.5 feet total. The decline rate varies. From 1980 to 1990, the decline was nearly 7 feet, about 0.7 feet annually. From 1990 to 2014, the decline was nearly 9 feet, about 0.35 feet annually.

If a permit is issued, recommend conditions 7B, 7N (modified), 7P, 7T, and the following additional conditions.

7B: Interference Condition

7N (modified): Annual Measurement and Decline Condition (see following)

"A 380 foot deep monitoring well with a casing diameter no less than 6 inches shall be constructed within 100 feet east of the proposed POA well (LAKE 52506). The well seal, casing, casing perforations, and well screen intervals shall be the same as the proposed POA well (LAKE 52506). The well must be constructed before the use of water under this permit is exercised.

At minimum, the static groundwater level at the monitoring well shall be measured monthly by hand to the nearest 0.10 foot and reported to the Department monthly on forms provided by or specified by the Department. The first measurement must be received by the Department before the use of water under this limited license is exercised. Any use of a non-hand measurement water level recorder device (shaft encoder, transducer, or other device) shall be in addition to the monthly hand measurement.

The reference level shall be the March 2015 static groundwater level measurement. If that measurement is missed for whatever reason, the reference level shall be 83 feet below land surface.

All measurements shall be made monthly by a certified water rights examiner, registered professional geologist, registered professional engineer, licensed well constructor or pump installer licensed by the Construction Contractors Board. Measurements shall be submitted on forms provided by, or specified by, or approved by a hydrogeologist in the Department's Groundwater Section located in Salem. Measurements shall be made with equipment that is accurate to at least the standards specified in OAR 690-217-0045. The Department requires the individual performing the measurement to:

A. Associate each measurement with an owner's well name or number and a Department well log ID; and
B. Report water levels to at least the nearest tenth of a foot as depth-to-water below ground surface; and
C. Specify the method of measurement; and
D. Certify the accuracy of all measurements and calculations reported to the Department.

The water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s) if any of the following events occur:

A. A monthly measurement is not made; or
B. The monthly measurement is not submitted to the Department monthly or received by the Department monthly; or
C. Annual water-level measurements reveal an average water-level decline of two or more feet per year for five consecutive years; or
D. Annual water-level measurements reveal a water-level decline of 10 or more feet in fewer than five consecutive years; or
E. Annual water-level measurements reveal a water-level decline of 10 or more feet; or
F. Hydraulic interference leads to a decline of 10 or more feet in any neighboring well with senior priority.

The period of restricted use shall continue until the water level rises above the decline level which triggered the action or the Department determines, based on the permittee's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or causing substantial interference with senior water rights. The water user shall not allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit."

7P: Well Tag Condition

7T: Dedicated Measuring Tube Condition for the proposed POA well (LAKE 52506)

Flow meter condition: Use the water rights "large" permit condition requiring a totalizing flow meter and reporting

Maximum monthly volume condition: "The maximum total volume allowed per month shall be equal to or less than 228.5 gallons per minute (43,986 cubic feet per day = 1.01 acre-feet per day) times the number of days in the month."

Termination of groundwater use under LL-1450 condition: "Groundwater use under LL-1450 shall terminate when groundwater use under this permit begins."

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	**Basin Fill**	☐	☒
2		☐	☐
3		☐	☐
4		☐	☐

Basis for aquifer confinement evaluation:

The system is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. This appears consistent with observations Miller (1984 and 1986) made for the Fort Rock Basin and with observations Morgan (1988) made for the Goose Lake subbasin.

The proposed aquifer is identified as "basin fill sediments." The water well report (well log) for the 378 feet deep proposed POA well (LAKE 52506) indicates predominantly basin fill materials from land surface to the well bottom. The water is semi-hot (118 degrees F). The water well report for the 432 feet deep nearby well LAKE 1628 (original well and LAKE 1626 = deepening) located 500 feet northeast of the proposed POA well indicates predominantly basin fill materials with 62 feet of basalt from 298 to 360 feet depth. Hot water was encountered. The temperature was reported as 104 degrees when the well was originally constructed and 175 degrees after the well was deepened. The water well report for the 1260 feet deep nearby well LAKE 52529 located 50 feet NW of the proposed POA well indicates "basin-fill" sediments of volcanic origin with some basalt and rhyolite to possibly 410 feet depth and predominantly basalt-volcanic rocks below the "basin-fill" to the well bottom at 1260 feet.

Walker (1963) shows the site in an area mapped as sedimentary deposits (QTs) that are bounded by volcanic and sedimentary rocks (Tvb) to the west and alluvium (Qal) to the east. QTs is described as lacustrine, fluviatile, and Aeolian sedimentary rocks, interstratified tuff, ashy diatomite, and unconsolidated clay, sand, silt, and gravel, mostly in pluvial basins that correlates to water laid volcanic deposits of Wells and Peck (1961). Tvb is described as basalt flows. Qal is described as unconsolidated fluviatile gravel, sand, and silt. In places, it can include talus, fanglomerate, lakebed deposits, and windblown sand.

Morgan (1988) notes for the Goose Lake subbasin that ground water flow is generally from upland recharge areas to lowland discharge areas. However, local subsystems discharge to lakes, reservoirs, meadows, and streams. Large quantities of ground water move through complexly interbedded, discontinuous, unconsolidated sand, gravel, silt, and clay deposits. Morgan characterizes the upper portion of ground water as unconfined with confined-like conditions increasing with depth. This appears related to anisotropic hydraulic conductivities with horizontal hydraulic conductivity much greater than vertical hydraulic conductivity. For one site noted, the estimated ratios ranged from 2:1 to 179:1. There is no indication of shallower ground water being separated from deeper ground water by a confining layer.

Miller (1984 and 1986) notes the main groundwater reservoir in the Fort Rock Basin occurs as a single flow system under both unconfined and confined conditions. The unconfined-confined variability reflects the permeability variation of the overlying units.

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	Chewaucan River	4376	4390	860	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation:

The groundwater elevation is the 27 February 2014 static water level measured by the OWRD Lakeview watermaster at the proposed POA well (LAKE 52506).

The reach of the Chewaucan River closest to the proposed POA (well LAKE 1628) is about 860 feet away and about 4390 feet in elevation. At this location, the river appears to be above the nearby static groundwater level. The river elevation and the groundwater level quickly drops in elevation to the east. The river intercepts groundwater downstream at about 4345 elevation (based on previous work related to LL-1450). The 4345 feet river elevation is about 5,435 feet away from the proposed POA.

Hydraulic connection explanation:

1. The Chewaucan River is a perennial stream.

2. The river quickly drops in elevation to below the static groundwater level.

Water Availability Basin the well(s) are located within: CHEWAUCAN R > L ABERT – 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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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:

No analysis here. The proposed POA well LAKE 52506 is less than 1-mile from the Chewaucan River, but it is more than 1-mile from where hydraulic connection with the river begins.

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	27.8 %	37.1 %	42.9 %	47.2 %	50.5 %	53.2 %	55.4 %	57.4 %	59.1 %	60.5 %	61.9 %	63.1 %
Well Q as CFS		0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509
Interference CFS		0.142	0.189	0.219	0.240	0.257	0.271	0.282	0.292	0.301	0.308	0.315	0.321
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													
(A) = Total Interf.		0.142	0.189	0.219	0.240	0.257	0.271	0.282	0.292	0.301	0.308	0.315	0.321
(B) = 80 % Nat. Q		33.80	64.90	103.00	161.00	314.00	234.00	81.90	47.40	42.30	42.20	34.40	32.80
(C) = 1 % Nat. Q		0.338	0.649	1.030	1.610	3.140	2.340	0.819	0.474	0.423	0.422	0.344	0.328
(D) = (A) > (C)		No	No	No	No	No	No	No	No	No	No	No	No
(E) = (A / B) x 100		0.420	0.291	0.213	0.149	0.082	0.116	0.344	0.616	0.712	0.730	0.916	0.979

(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:

A calculation, analysis was conducted here. The proposed POA well LAKE 52506 is less than 1-mile from the Chewaucan River, but it is more than 1-mile from where hydraulic connection with the river begins.

Hunt (1999) was used to calculate the interference with the Chewaucan River. The parameters used were a horizontal hydraulic conductivity of 29.8 feet/day (transmissivity = 26,820 ft2/day based on specific capacity data for LAKE 4448), 0.001 intermediate value for the storage coefficient, a stream width of 50 feet average, a streambed conductivity of 0.30 feet/day (aquifer horizontal conductivity/100), a streambed thickness of 20 feet (a thicker streambed given this is a river), and the distance to the river where hydraulic connection occurs (5,435 feet) rather than the distance to the nearest river reach (860 feet). The aquifer hydraulic parameters are within the ranges found in Morgan (1988) and in Gonthier (1985).

The calculation used the proposed pumping rate of 0.509 cfs (228.5 gpm) given the proposed annual volume divided by the annual pumping period of 365 days yields this pumping rate.

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**_____

The proposed POA well LAKE 52506 is less than 1-mile from the Chewaucan River, but it is more than 1-mile from where hydraulic connection with the river begins.

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

The system is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. This appears consistent with observations Miller (1984 and 1986) made for the Fort Rock Basin and with observations Morgan (1988) made for the Goose Lake subbasin.

The proposed aquifer is identified as "basin fill sediments." The water well report (well log) for the 378 feet deep proposed POA well (LAKE 52506) indicates predominantly basin fill materials from land surface to the well bottom. The water is semi-hot (118 degrees F). The water well report for the 432 feet deep nearby well LAKE 1628 (original well and LAKE 1626 = deepening) located 500 feet northeast of the proposed POA well indicates predominantly basin fill materials with 62 feet of basalt from 298 to 360 feet depth. Hot water was encountered. The temperature was reported as 104 degrees when the well was originally constructed and 175 degrees after the well was deepened. The water well report for the 1260 feet deep nearby well LAKE 52529 located 50 feet NW of the proposed POA well indicates "basin-fill" sediments of volcanic origin with some basalt and rhyolite to possibly 410 feet depth and predominantly basalt-volcanic rocks below the "basin-fill" to the well bottom at 1260 feet.

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Miller (1984 and 1986) notes the main groundwater reservoir in the Fort Rock Basin occurs as a single flow system under both unconfined and confined conditions. The unconfined-confined variability reflects the permeability variation of the overlying units.

The nearest state observation well with long term data is state observation well 374 (well LAKE 1633) completed in basin-fill. It is located about 1.85 miles northeast of the proposed POA well LAKE 52506. The ground water level data is from 1963 to March 2014. The annual groundwater level trend shows rising water level s from the mid-1960s to the early 1970s, stable levels from 1970 to 1980, and an ongoing decline from the early 1980s to present. The decline from March 1980 to March 2014 is about 15.5 feet total. The decline rate varies. From 1980 to 1990, the decline was nearly 7 feet, about 0.7 feet annually. From 1990 to 2014, the decline was nearly 9 feet, about 0.35 feet annually.

If a permit is issued, recommend conditions 7B, 7N (modified), 7P, 7T, and the following additional conditions.

7B: Interference Condition

7N (modified): Annual Measurement and Decline Condition (see following)

"A 380 foot deep monitoring well with a casing diameter no less than 6 inches shall be constructed within 100 feet east of the proposed POA well (LAKE 52506). The well seal, casing, casing perforations, and well screen intervals shall be the same as the proposed POA well (LAKE 52506). The well must be constructed before the use of water under this permit is exercised.

At minimum, the static groundwater level at the monitoring well shall be measured monthly by hand to the nearest 0.10 foot and reported to the Department monthly on forms provided by or specified by the Department. The first measurement must be received by the Department before the use of water under this limited license is exercised. Any use of a non-hand measurement water level recorder device (shaft encoder, transducer, or other device) shall be in addition to the monthly hand measurement.

The reference level shall be the March 2015 static groundwater level measurement. If that measurement is missed for whatever reason, the reference level shall be 83 feet below land surface.

All measurements shall be made monthly by a certified water rights examiner, registered professional geologist, registered professional engineer, licensed well constructor or pump installer licensed by the Construction Contractors Board. Measurements shall be submitted on forms provided by, or specified by, or approved by a hydrogeologist in the Department's Groundwater Section located in Salem. Measurements shall be made with equipment that is accurate to at least the standards specified in OAR 690-217-0045. The Department requires the individual performing the measurement to:

A. Associate each measurement with an owner's well name or number and a Department well log ID; and
B. Report water levels to at least the nearest tenth of a foot as depth-to-water below ground surface; and
C. Specify the method of measurement; and
D. Certify the accuracy of all measurements and calculations reported to the Department.

The water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s) if any of the following events occur:

A. A monthly measurement is not made; or
B. The monthly measurement is not submitted to the Department monthly or received by the Department monthly; or
C. Annual water-level measurements reveal an average water-level decline of two or more feet per year for five consecutive years; or
D. Annual water-level measurements reveal a water-level decline of 10 or more feet in fewer than five consecutive years; or
E. Annual water-level measurements reveal a water-level decline of 10 or more feet; or
F. Hydraulic interference leads to a decline of 10 or more feet in any neighboring well with senior priority.

The period of restricted use shall continue until the water level rises above the decline level which triggered the action or the Department determines, based on the permittee's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or causing substantial interference with senior water rights. The water user shall not allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit. "

7P: Well Tag Condition

7T: Dedicated Measuring Tube Condition for the proposed POA well (LAKE 52506)

Flow meter condition: Use the water rights "large" permit condition requiring a totalizing flow meter and reporting

Maximum monthly volume condition: "The maximum total volume allowed per month shall be equal to or less than 228.5 gallons per minute (43,986 cubic feet per day = 1.01 acre-feet per day) times the number of days in the month."

Termination of groundwater use under LL-1450 condition: "Groundwater use under LL-1450 shall terminate when groundwater use under this permit begins."

References Used:

Gonthier, J.B. 1985, A description of aquifer units in eastern Oregon: USGS Water Resources Investigations Report 84-4095, 39 p., 4 plates.

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

Miller, D.W., 1986, Appraisal of ground-water conditions in the Fort Rock Basin, Lake County, Oregon: Oregon Water Resources Department, Ground Water Report No. 31, 196 p and plates.

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.

Peterson, N.V., and Brown, D.E., 1980, Preliminary geology and geothermal resource potential of the Lakeview area, Oregon: DOGAMI Open-File Report O-80-09, 57 p., 1:62,500 maps.

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.

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.

Walker, G.W. and Reppening, C.A., 1965, Reconnaissance geologic map of the Adel quadrangle, Lake, Harney, and Malheur Counties, Oregon: USGS Miscellaneous Geologic Investigations Map I-446.

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

Wells, F.G., and Peck, D.L., 1961, Geologic map of Oregon west of the 121st meridian: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-325.

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

State Obesrvation Well SOW 374 (well LAKE 1633)

Water well reports for proposed well LAKE 52506 and for wells LAKE 1628 (well LAKE 1626, deepening) and LAKE 52529.

USGS Paisley, Oregon quadrangle map (1:24,000)

Application G-17890 continued Date 20 November 2014

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** 1 **Logid:** LAKE 52506

D2. **THE WELL does not appear to meet current well construction standards based upon:**

a. ☐ review of the well log;
b. ☐ field inspection by _____;
c. ☐ report of CWRE _____;
d. ☐ other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** _____

D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

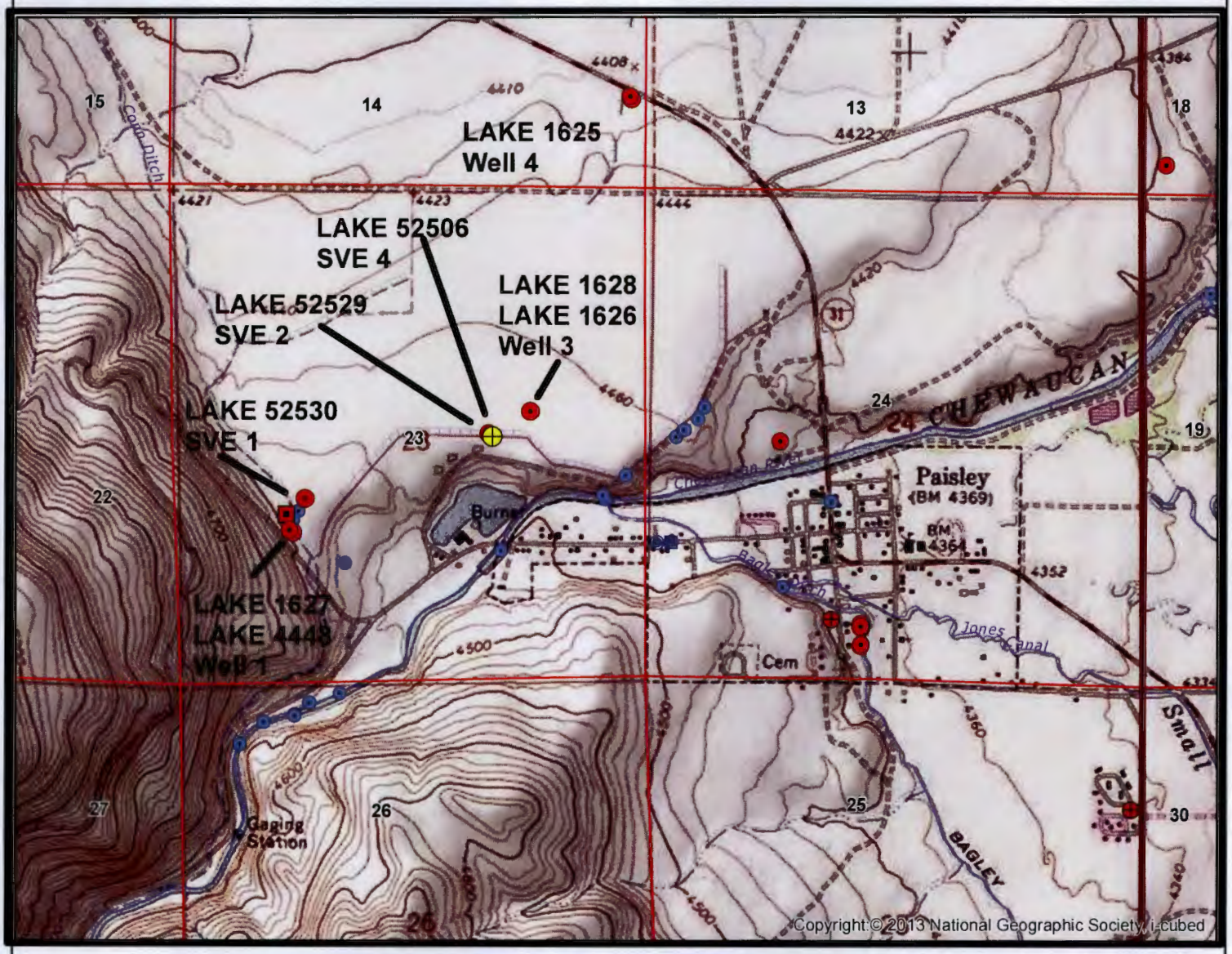
Comments:

Well construction shown to Well Enforcement Section. No deficiency noted based on their review of LAKE 52506 water well report (well log)

Water Availability Tables

See Attachments

Groundwater Permit Application G-17890
Suprise Valley Electrification Corp.



0 0.5 1 2

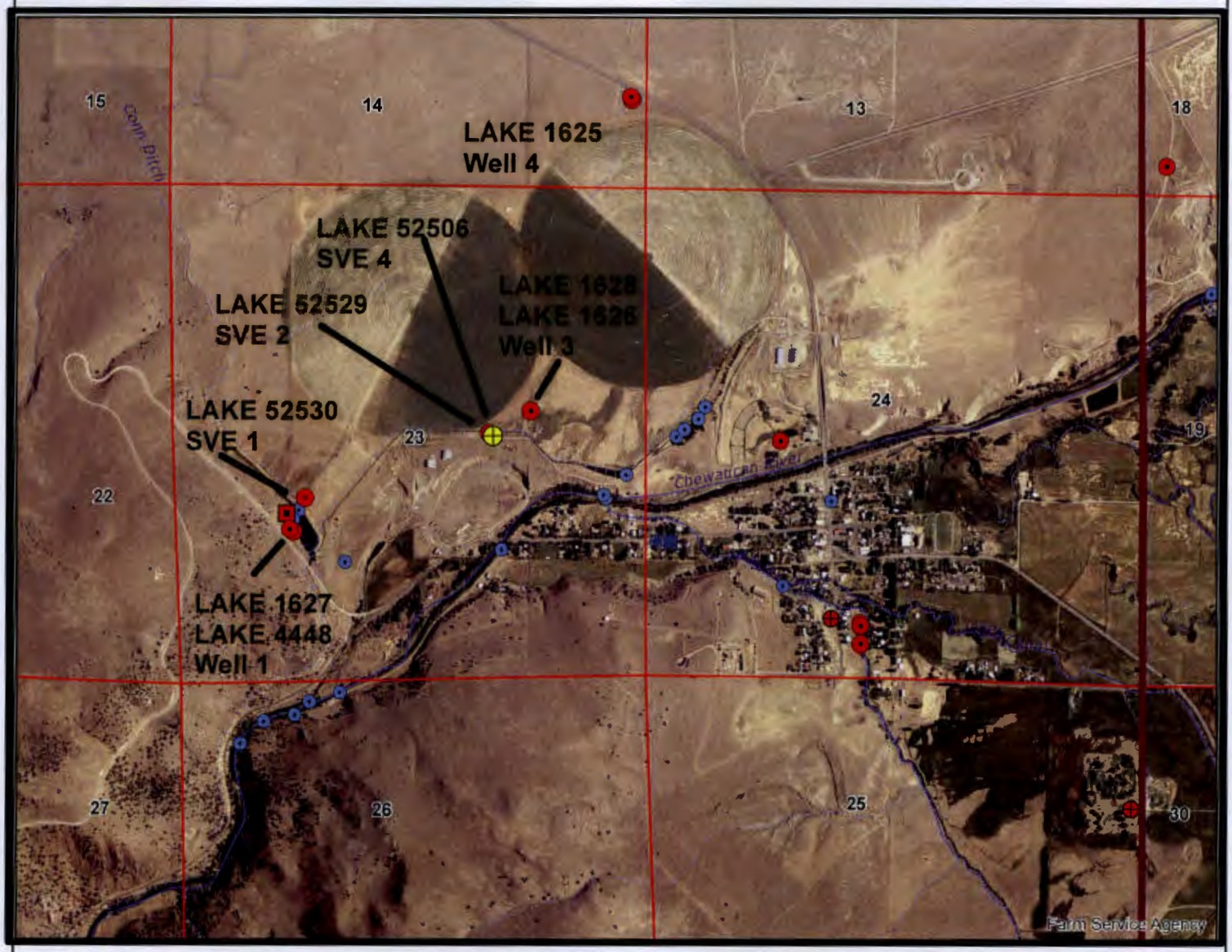
Miles

Yellow = Application Noted Well(s)
Red = Other Existing or Proposed Wells

Blue and Other = surface water rights

N

Groundwater Permit Application G-17890
Suprise Valley Electrification Corp.



0 0.5 1 2

Miles

Yellow = Application Noted Well(s)
Red = Other Existing or Proposed Wells

Blue and Other = surface water rights

N

LAKE 52506

LAKE 52506

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

WELL LABEL # L 111501

START CARD # 209509

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Owner Well I.D. _____
First Name MARK Last Name DOUGLAS
Company Surprise Valley Electric
Address 516 Hiway 395 E
City Alturas State ~~CA~~ CA Zip 96101

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

(3) DRILL METHOD
☐ Rotary Air ☒ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other _____

(4) PROPOSED USE ☐ Domestic ☐ Irrigation ☐ Community ☐ Industrial/Commercial ☐ Livestock ☐ Dewatering ☐ Injection ☐ Thermal ☑ Other cooling water

(5) BORE HOLE CONSTRUCTION Special Standard: ☐ Yes (attach copy)
Depth of Completed Well 378 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amount	Sacks/lbs
26	0	20	cement	0	20		35
12¼	20	378					

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☑ E
☐ Other _____
Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from 0 ft. to 378 ft. Material G.V.L. Size 3/8
Explosives used: ☐ Yes Type _____ Amount _____

(6) CASING/LINER

Csng	Linr	Dia	+	From	To	Gauge	Steel	Plastic	Welded	Thrd
✓		10¾		2	315	.250	✓		✓	

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s) _____
Temporary casing ☐ Yes Diameter _____ From _____ To _____

(7) PERFORATIONS/SCREENS
Perforations Method LO-Carbon Steel / Holte Perf
Screens Type wire wound Material _____

Perf	Scrn	Csng	Linr	Screen Dia	From	To	Screen/ slot width	Slot length	# of slots	Tele/ pipe size
	✓			10¾	315	375	.100			
✓					40	315		3	2200	

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

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
<100		335	14 hrs

Temperature 118 °F Lab analysis ☐ Yes By _____
Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County Lake Twp 33 N or (S) Range 18 (E) or W W.M.
Sec 23 SW 1/4 of the NE 1/4 Tax Lot _____
Tax Map Number _____ Lot _____
Lat ___°___'___.___" or LOT 699888 mN DMS or DD
Long ___°___'___.___" or 4730012 mN DMS or DD
Street Address of Well (or nearest address) 1/4 mile NO OF DAISLEY

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL (ft)
Existing Well/Predeepening				
Completed Well	2-8-14	83		

Flowing Artesian? ☐ Yes Dry Hole? ☐ Yes
WATER BEARING ZONES Depth water was first found 83'

~~SWL Date~~	~~From~~	~~To~~	~~Est Flow~~	SWL (psi)	+	~~SWL (ft)~~
Well was completed using mud,						

(11) WELL LOG Ground Elevation 4476

Material	From	To
Soil w/ Brn clay	0	25
Pea Gravel	25	45
Gray Sand-pebbles		
W/clay	45	185
Grey Sand	185	220
Brn/Grey pebbly clay	220	275
Brn pebbly clay	275	320
Brn pebbly clay		
W sand	320	360
Coarse sand	360	378

Date Started 1-18-14 Completed 2-8-14

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

RECEIVED BY OWRD FEB 21 2014

License Number _____ Date _____

Signed APR 04 2014 SALEM, OR

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

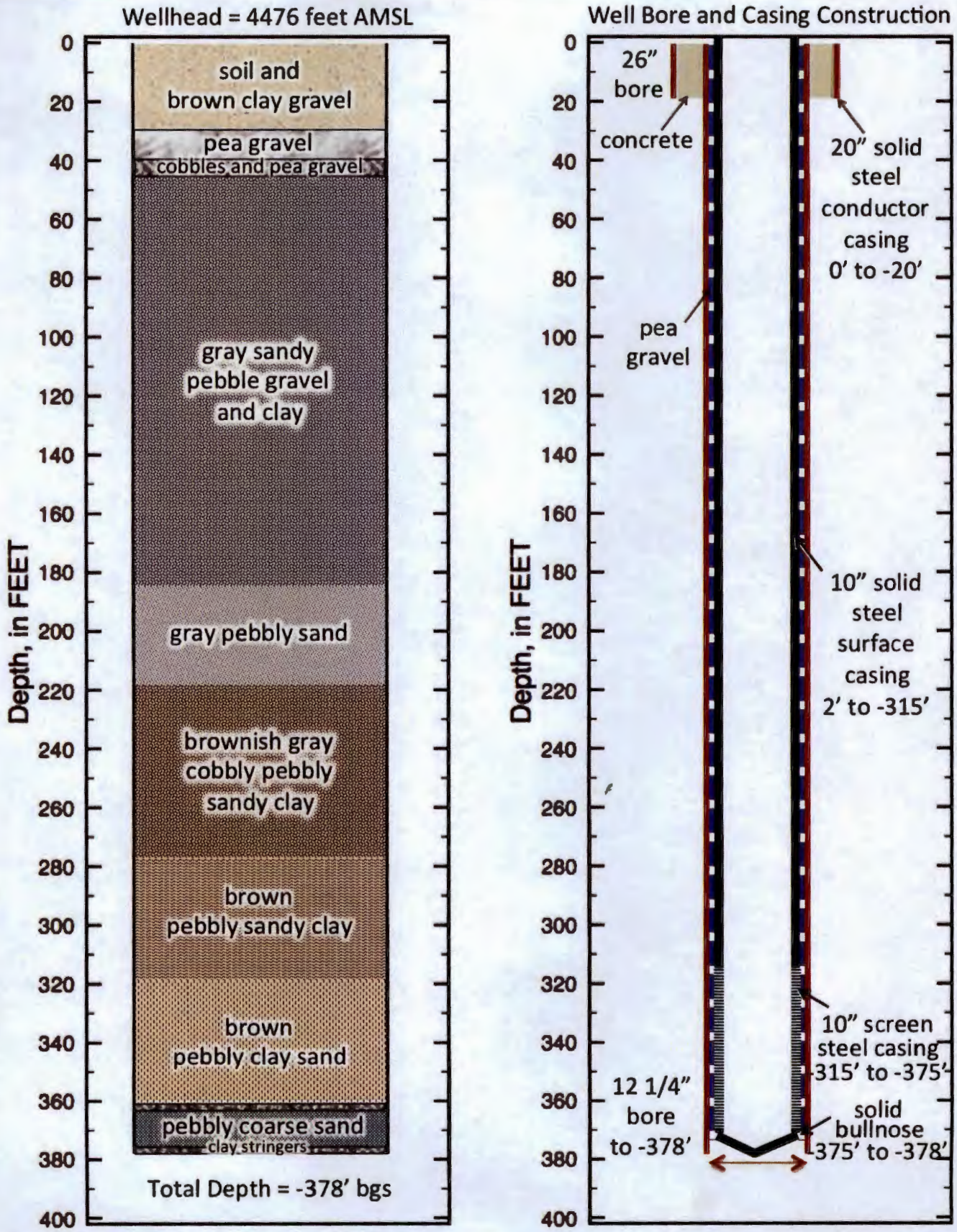
License Number 1946 Date 2-14-14

Signed _____

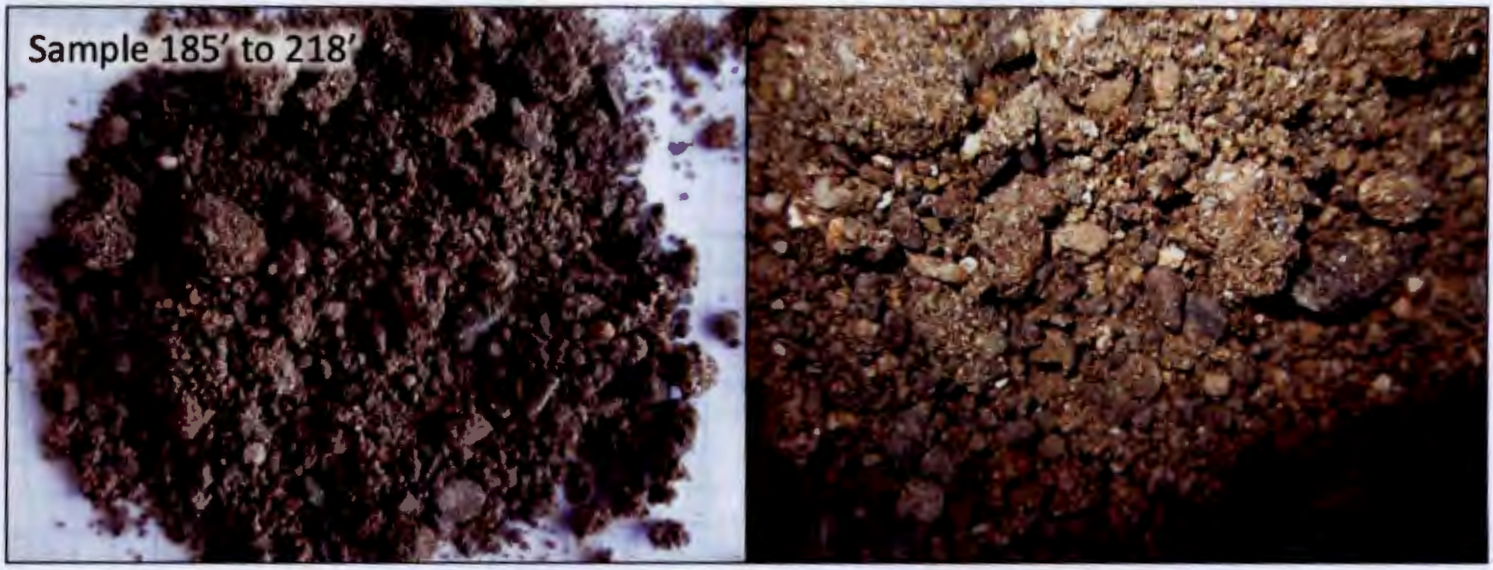
Contact Info. (optional)
775-217-0620

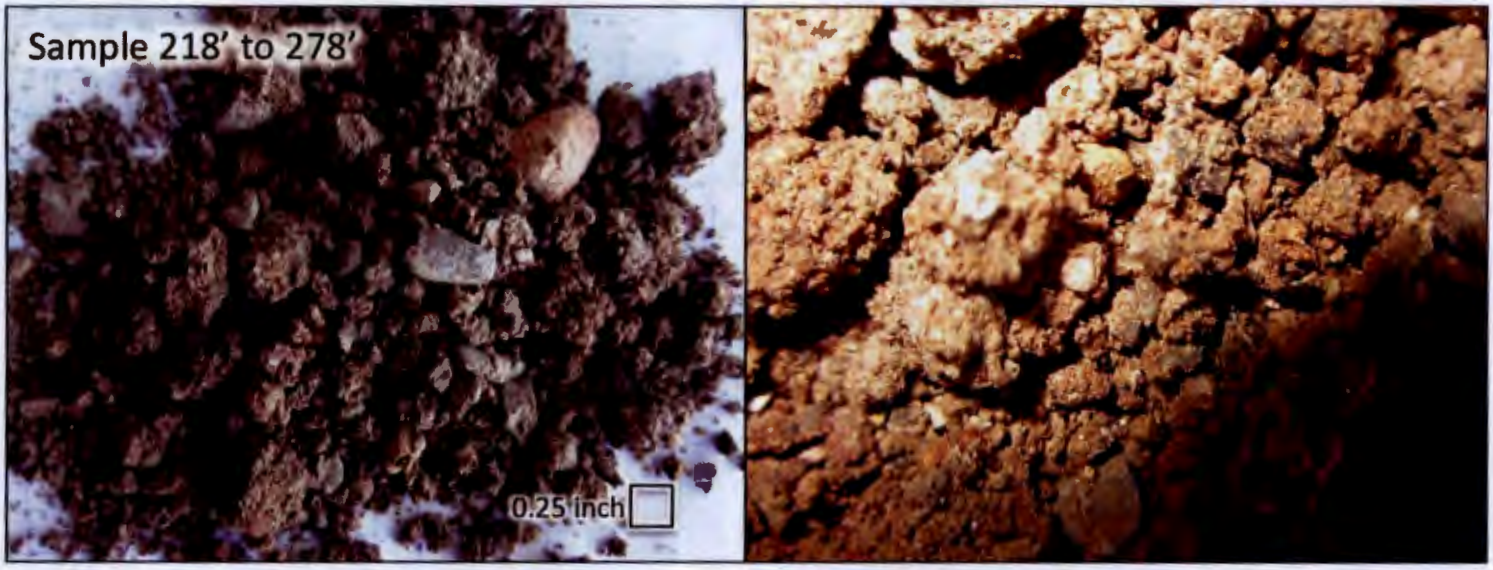
ORIGINAL – WATER RESOURCES DEPARTMENT ONE COPY FOR CONSTRUCTOR ONE COPY FOR CUSTOMER
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK 10/16/2006

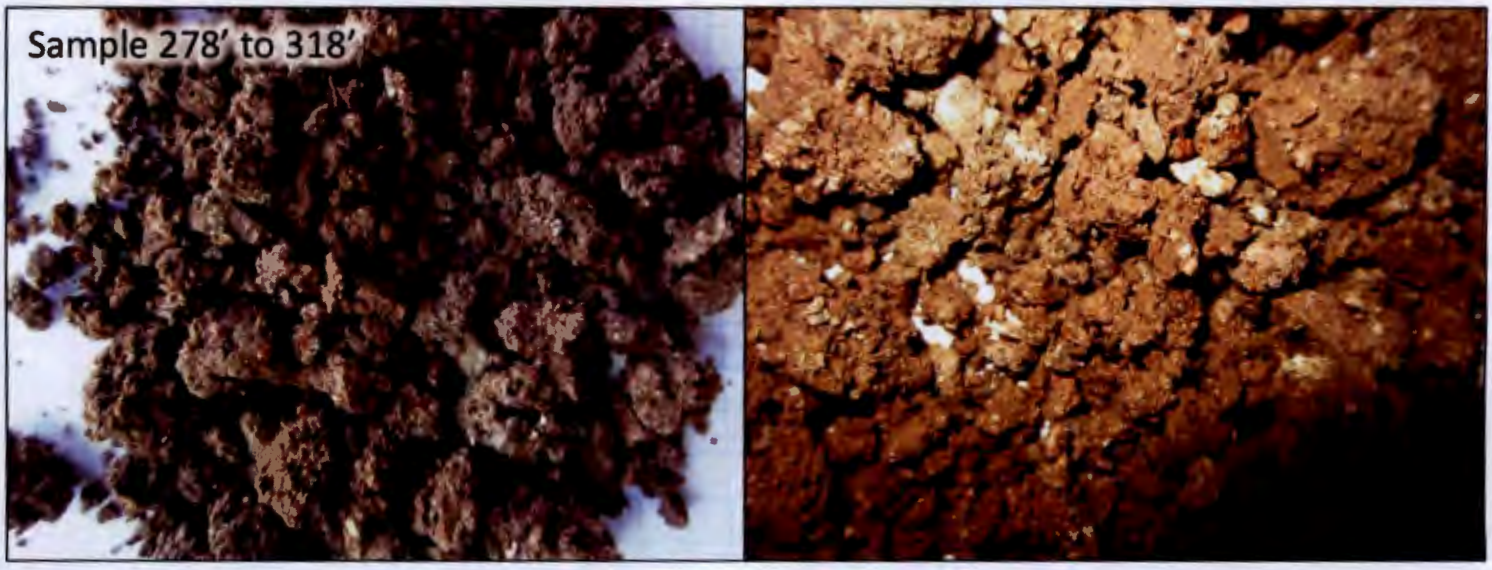
Lithologic Section and As-Built Casing Construction for Well LL_1450 (SVE-4)



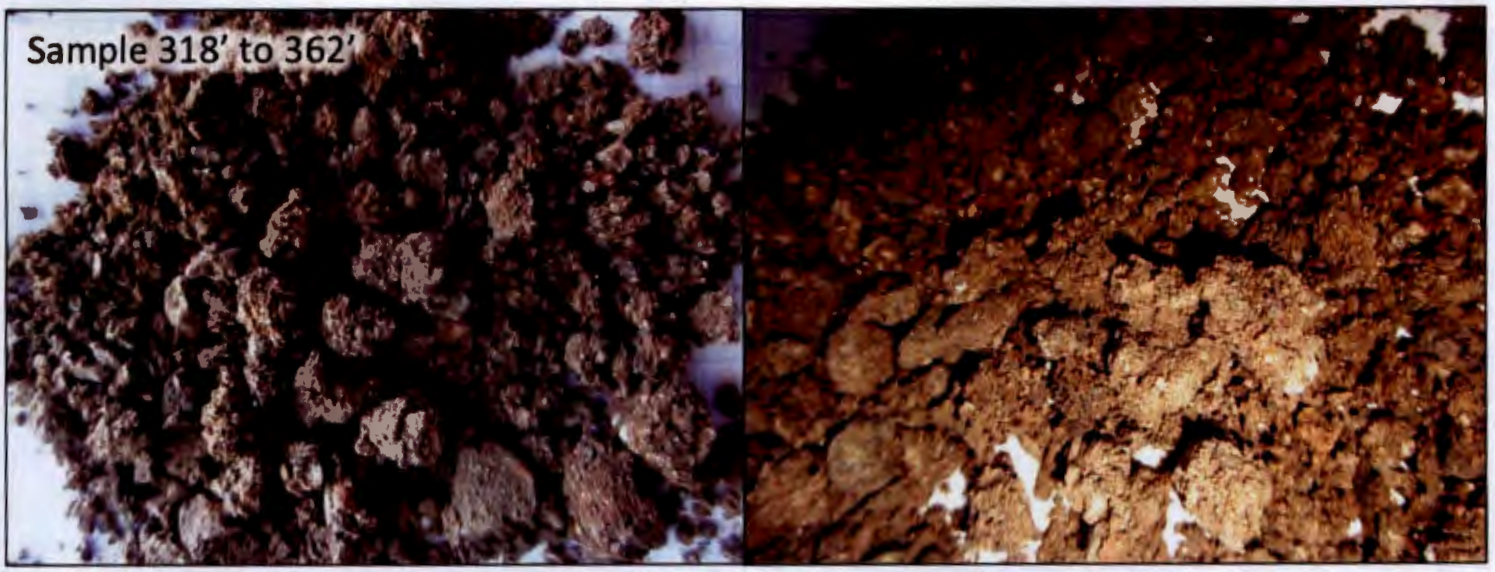
Drill Samples from Well LL_1450 (SVE-4)



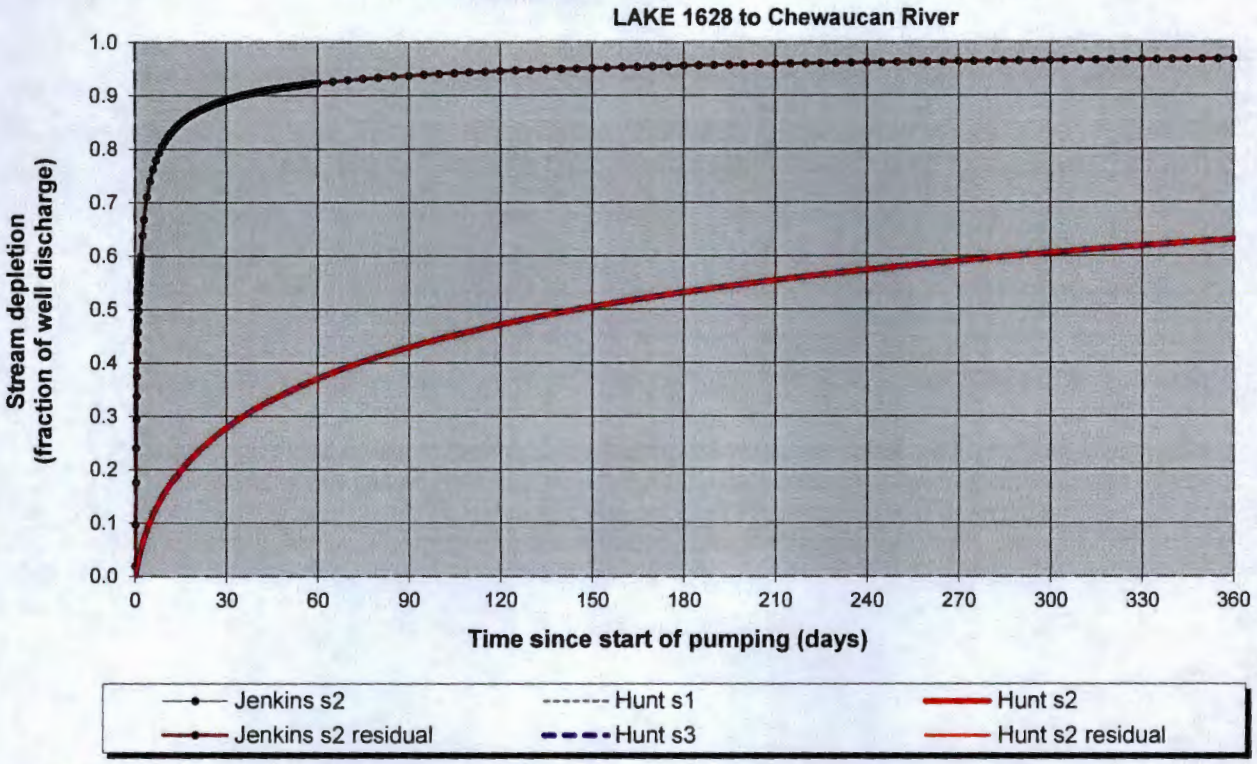




More Drill Samples from Well LL_1450 (SVE-4)



Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 365 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509	0.509
Jenk SD %	0.892	0.924	0.938	0.946	0.952	0.956	0.959	0.962	0.964	0.966	0.967	0.969
Jen SD cfs	0.454	0.470	0.477	0.482	0.484	0.487	0.488	0.490	0.491	0.492	0.492	0.493
Hunt SD %	0.278	0.371	0.429	0.472	0.505	0.532	0.554	0.574	0.591	0.605	0.619	0.631
Hunt SD cfs	0.142	0.189	0.219	0.240	0.257	0.271	0.282	0.292	0.301	0.308	0.315	0.321

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.509	0.509	0.509	cfs
Distance to stream	a	5435	5435	5435	ft
Aquifer hydraulic conductivity	K	29.8	29.8	29.8	ft/day
Aquifer thickness	b	900	900	900	ft
Aquifer transmissivity	T	26820	26820	26820	ft*ft/day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	50	50	50	ft
Streambed hydraulic conductivity	Ks	0.3	0.3	0.3	ft/day
Streambed thickness	bs	20	20	20	ft
Streambed conductance	sbc	0.75	0.75	0.75	ft/day
Stream depletion factor (Jenkins)	sdf	1.101387957	1.101387957	1.101387957	days
Streambed factor (Hunt)	sbf	0.151985459	0.151985459	0.151985459	

Transmissivity from Specific Capacity using the Theis Equation

Adapted from Vorhis (1979)

Theis Equation: T = [Q/(4*s*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!)+...

T = transmissivity (L*L/T)
s = drawdown (L)
S = storage coefficient (dimensionless)
pi = 3.141592654
r = radial distance (L)
t = time (T)
u = dimensionless
W(u) = well function

Note: Transmissivity is derived using an iterative process

The calculations use a known or assumed Storage Coeficient (S) provided by the user
Specific Capacity (Q/s) is used to first approximate the Transmissivity (T) used to calculate u in the first Theis equation iteration
The Transmissivity of the previous iteration is used to calculate u in a given Theis equation iteration
Total Theis Equation iterations = 25 iterations
Can accept answer if difference in calculated Transmissivity for the last 2 iterations is < 0.0001
Can accept answer if u in the last iteration is < 7.1

Note: Well efficiency is not included in the calculations

References:

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

Vorhis, R.C. 1979. Transmissivity from pumped well data. Well Log, National Water Well Association newsletter, vol. 10, no. 11, Dec. 1979, pg. 50-52.

Data Entry	Enter Data Below (yellow boxes only)	
Well Log ID or Comment for Records	LAKE 4448	
Pumping Rate (gpm) = Q =	800.00	(gpm)
Drawdown (feet) = s =	8.00	(feet)
Time (hours) = t =	4.0000	(hours)
Storage Coefficient = S =	0.001000	(dimensionless)
Well Diameter (inches) = d =	12.0000	(inches)
	Press F9 to Calculate	

Calculated Results	Calculated Results	
Transmissivity (ft2/day) = T =	26,820.35	(ft2/day)
Transmissivity (gpd/ft) = T =	200,630.17	(gpd/ft)
Transmissivity Difference = (last 2 iterations)	0.0000E+00 okay to use T if diff < 0.0001	(ft2/day)
u = (last iteration)	1.3982E-08 okay to use T if u <7.1	

Drawdown s (feet)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft3/sec)	Time t (days)	Distance r = d/2 (feet)	u	W(u)	Transmissivity T (ft2/day)	Transmissivity difference from previous	Comments	Theis Equation Iteration
Note: yellow grid areas are where values are calculated						Note : W(u) calculation valid when u < 7.1					
						7.0000	1.1545E-04			W(u) calculation test	
8.00	0.00100	800.00	1.78	0.17	0.50			19,250.00		T = Q/s	
8.00	0.00100	800.00	1.78	0.17	0.50	1.9481E-08	17.1766	26,312.31	7.0623E+03	T = Theis Equation	1.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.4252E-08	17.4892	26,791.05	4.7875E+02	T = Theis Equation	2.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3997E-08	17.5072	26,818.68	2.7622E+01	T = Theis Equation	3.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3983E-08	17.5082	26,820.25	1.5785E+00	T = Theis Equation	4.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	9.0162E-02	T = Theis Equation	5.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	5.1497E-03	T = Theis Equation	6.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	2.9413E-04	T = Theis Equation	7.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	1.6799E-05	T = Theis Equation	8.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	9.5951E-07	T = Theis Equation	9.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	5.4803E-08	T = Theis Equation	10.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	3.1323E-09	T = Theis Equation	11.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	1.7462E-10	T = Theis Equation	12.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	13.00
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8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	18.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	19.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	20.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	21.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	22.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	23.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	24.00
8.00	0.00100	800.00	1.78	0.17	0.50	1.3982E-08	17.5083	26,820.35	0.0000E+00	T = Theis Equation	25.00

Water Availability Analysis

CHEWAUCAN R > L ABERT - AT MOUTH
GOOSE & SUMMER LAKE BASIN
Water Availability as of 3/25/2013

Watershed ID #: 31300602
Exceedance Level: 80%
Date: 3/25/2013
Time: 8:43 AM

Water Availability

Select any Watershed for Details

Nesting Order	Watershed ID #	Stream Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sto
1	31300602	CHEWAUCAN R> L ABERT- AT MOUTH	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes

Limiting Watersheds

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Limiting Watershed ID #	Stream Name	Water Available?	Net Water Available
JAN	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	33.00
FEB	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	63.80
MAR	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	79.20
APR	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	48.30
MAY	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	14.90
JUN	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	No	-15.10
JUL	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	No	-0.76
AUG	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	No	-0.14
SEP	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	1.93
OCT	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	19.80
NOV	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	33.80
DEC	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	32.10
ANN	31300602	CHEWAUCAN R > L ABERT - AT MOUTH	Yes	66,600.00

Detailed Reports for Watershed ID #31300602

CHEWAUCAN R > L ABERT - AT MOUTH
GOOSE & SUMMER LAKE BASIN
Water Availability as of 3/25/2013

Watershed ID #: 31300602
Exceedance Level: 80%
Date: 3/25/2013
Time: 8:43 AM

Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	33.80	0.83	33.00	0.00	0.00	33.00
FEB	64.90	1.11	63.80	0.00	0.00	63.80
MAR	103.00	23.80	79.20	0.00	0.00	79.20
APR	161.00	113.00	48.30	0.00	0.00	48.30
MAY	314.00	299.00	14.90	0.00	0.00	14.90
JUN	234.00	249.00	-15.10	0.00	0.00	-15.10
JUL	81.90	82.70	-0.76	0.00	0.00	-0.76
AUG	47.40	47.50	-0.14	0.00	0.00	-0.14
SEP	42.30	40.40	1.93	0.00	0.00	1.93
OCT	42.20	22.40	19.80	0.00	0.00	19.80
NOV	34.40	0.63	33.80	0.00	0.00	33.80
DEC	32.80	0.68	32.10	0.00	0.00	32.10
ANN	120,000.00	53,400.00	66,600.00	0.00	0.00	66,600.00

Detailed Report of Consumptive Uses and Storage

Consumptive Uses and Storages in Cubic Feet per Second

Month	Storage	Irrigation	Municipal	Industrial	Commercial	Domestic	Agricultural	Other	Total
JAN	0.63	0.00	0.00	0.17	0.00	0.02	0.01	0.00	0.83
FEB	0.91	0.00	0.00	0.17	0.00	0.02	0.01	0.00	1.11
MAR	1.29	22.30	0.00	0.17	0.00	0.02	0.01	0.00	23.80
APR	2.33	110.00	0.00	0.17	0.00	0.02	0.01	0.00	113.00
MAY	3.73	295.00	0.00	0.17	0.00	0.02	0.01	0.00	299.00
JUN	1.88	247.00	0.00	0.17	0.00	0.02	0.01	0.00	249.00
JUL	0.55	81.90	0.00	0.17	0.00	0.02	0.01	0.00	82.70
AUG	0.30	47.00	0.00	0.17	0.00	0.02	0.01	0.00	47.50
SEP	0.32	39.90	0.00	0.17	0.00	0.02	0.01	0.00	40.40
OCT	0.32	21.90	0.00	0.17	0.00	0.02	0.01	0.00	22.40
NOV	0.43	0.00	0.00	0.17	0.00	0.02	0.01	0.00	0.63
DEC	0.48	0.00	0.00	0.17	0.00	0.02	0.01	0.00	0.68

Detailed Report of Reservations for Storage and Consumptive Uses

Reserved Streamflow in Cubic Feet per Second

No reservations were found for this watershed.

Detailed Report of Instream Flow Requirements

Instream Flow Requirements in Cubic Feet per Second

No instream flow requirements were found for this watershed.