Groundwater Transfer Review Summary Form

Transfer/PA # T- _13973_

GW Reviewer _Gerald H. Grondin_ **Date Review Completed:** _19 December 2022_

Summary of Same Source Review:

☐ The proposed change in point of appropriation is not within the same aquifer as per OAR 690-380-2110(2).

Summary of Injury Review:

☐ The proposed transfer will result in another, existing water right not receiving previously available water to which it is legally entitled or result in significant interference with a surface water source as per 690-380-0100(3).

Summary of GW-SW Transfer Similarity Review:

☐ The proposed SW-GW transfer doesn't meet the definition of "similarly" as per OAR 690-380-2130.

☒ **None of the Above**

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations.

Oregon Water Resources Department
725 Summer Street NE, Suite A
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www.wrd.state.or.us

Ground Water Review Form:

☒ **Water Right Transfer**
☐ **Permit Amendment**
☐ **GR Modification**
☐ **Other**

Application: **T-13973**   Applicant Name: **Daniel Roth**

Proposed Changes: ☒ POA ☐ APOA ☐ SW→GW ☐ RA
☐ USE ☒ POU ☐ OTHER

Reviewer(s): **Gerald H. Grondin**   Date of Review: **19 December 2022**

Date Reviewed by GW Mgr. and Returned to WRSD: jti 2/16/23

The information provided in the application is insufficient to evaluate whether the proposed transfer may be approved because:

☐ The water well reports provided with the application do not correspond to the water rights affected by the transfer.

☐ The application does not include water well reports or a description of the well construction details sufficient to establish the ground water body developed or proposed to be developed.

☐ Other _____

- -

1. Basic description of the changes proposed in this transfer:

This transfer application relates to three water right certificates 53450, 53452, and 84982. The explanation statement says the applicant seeks "Transfer of water from the outer edges of 3 existing pivots to fill in the remaining area of an existing partial pivot not currently covered. Also, change the point of appropriation on one of the pivots to an existing well that is located at the center of the pivot, replacing the approved well which is located approximately ½ mile away."

The transfer application proposes moving 18.30 authorized POU acres on the outer edges of three center pivots (two are in T25S/R18E-sections 3 in the SW qtr & SE qtr; the third is in T25S/R18E-sections 7 & 18) moved to a center pivot located in T25S/R18E-section 3 NE qtr.

The transfer application further proposes redistributing groundwater pumping (1.71 cfs, 766.38 gpm) related to 136.60 authorized POU acres from three authorized POA wells (owner wells 2, 7, & 8: LAKE 238, LAKE 223, & LAKE 225, 0.11 cfs, 0.05 cfs, & 1.54 cfs respectively) to one authorized POA well (owner well 8, LAKE 225, 0.17 cfs) and to one proposed POA well (owner well 9, LAKE 51691, 1.54 cfs).

The authorized and proposed POA wells are shown in the attached maps.

2. Will the proposed POA develop the same aquifer (source) as the existing authorized POA?
☒ Yes ☐ No Comments:

Essentially yes, the "same aquifer" (source) given the same groundwater system will likely be tapped despite the authorized and proposed POA wells are constructed to varying depths and tap varying geologic units (see attached well logs). Long term groundwater level data indicates groundwater levels at wells in the vicinity of the currently authorized and proposed POA locations have similar elevations, seasonally fluctuate similarly, and show the same long-term trends (see attached hydrograph) despite being completed at varying depths and different geologic units.

Additionally, groundwater in the Fort Rock--Valley-Christmas Valley area (Fort Rock Classified Area) is identified as a single groundwater system. Groundwater is found in both a shallower predominantly basin-fill sediment unit and a deeper predominantly volcanic rocks and sediments unit below. The two units are hydraulically connected. Both units can yield groundwater readily with some exceptions.

Miller (1984 and 1986) describes the groundwater source as the main groundwater reservoir. That reservoir includes groundwater in different geologic units. The reservoir has three characteristics. First, the "natural" groundwater level changes less than 1.5 feet annually, indicating the system is highly modulated. Second, the 1980s potentiometric surface was approximately 4292 feet elevation amsl basin-wide with Silver Lake an exception. Third, the reservoir consists of numerous water producing zones in several formations, all having an essentially common potentiometric level, and all being very transmissive in general.

3. a) Is there more than one source developed under the right (e.g., basalt and alluvium)?
☐ Yes ☒ No

Essentially no. Single hydraulically connected groundwater system. See discussion in part 2 above.

b) If yes, estimate the portion of the right supplied by each of the sources and describe any limitations that will need to be placed on the proposed change (rate, duty, etc.):

No estimate made and no limitation recommended. Single groundwater system. See item 2 and 3a above.

4. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another ground water right**?
☒ Yes ☐ No Comments:

The proposed POA well change and pumping redistribution will move the net groundwater pumping change further away from some POA wells (seasonal interference at those wells should decrease, see attached calculation for well LAKE 221) and closer to other POA wells (seasonal interference at those wells should increase, see attached calculation for an unidentified water right well in T25S/R18E-sec 10, NE qtr).

The proposed POA well change and pumping redistribution will move net groundwater pumping change closer to an unidentified groundwater right POA within T25S/R18E-sec 10, NE qtr (see attached). The net increase in seasonal drawdown is calculated to be less than 1.0 feet. That POA well should be able to accommodate the seasonal drawdown change. The net increase in seasonal drawdown at other wells further away should be less.

The long-term impact on the groundwater system should be the same. That impact is to continue contributing to the ongoing annual Fort Rock Classified Area groundwater level decline (see the attached hydrograph…it shows an annual decline rate from 0.30 to 0.50 feet per year).

b) If yes, would this proposed change, at its maximum allowed rate of use, likely result in another groundwater right not receiving the water to which it is legally entitled?
☐ Yes ☒ No If yes, explain:

See discussion in part 4a above.

5. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another surface water source**?

☒ Yes ☒ No Comments:

Yes for Silver Lake and No for Paulina Marsh.

The seasonal groundwater level drawdown at the closest Silver Lake shoreline is calculated to increase less than 0.002 feet. The resultant increase in interference at the lake is calculated to be less than 1200 ft^3/day (less than 0.02 cfs, 6.5 gpm). See attached calculation for a full lake.

The seasonal groundwater level drawdown at the closest Paulina Marsh boundary is calculated to decrease. The interference at the marsh should decrease.

The long-term interference at Paulina Marsh and Silver Lake should be the same.

b) If yes, at its maximum allowed rate of use, what is the expected change in degree of interference with any **surface water sources** resulting from the proposed change?

Stream: **Silver Lake** ☒ Minimal ☐ Significant

Stream: **Paulina Marsh** ☒ Minimal ☐ Significant

Provide context for minimal/significant impact:

See comment in part 5a above.

6. For SW-GW transfers, will the proposed change in point of diversion affect the surface water source similarly (as per OAR 690-380-2130) to the authorized point of diversion specified in the water use subject to transfer?

☐ Yes ☒ No Comments:

Not Applicable. No SW-GW transfer.

7. What conditions or other changes in the application are necessary to address any potential issues identified above:

Note: the proposed transfer is within the Fort Rock groundwater limited area.

The following are technical groundwater review recommendations. It is recognized that one or more technically recommended conditions may or may not be allowed under the transfer process rules and statutes. This technical groundwater review relies on other appropriate and authorized Department staff to make that determination.

"Large" flow meter condition for any proposed "To" POA and/or APOA well. Require the flow meter for any POA and/or APOA well to be properly installed and maintained. Each meter shall be either within 50 feet of the well head with a clearly visible monument adjacent to the meter or a surveyed location shall be provided and a clearly visible monument adjacent to the meter shall be installed for each meter more than 50 feet from the well head.

Condition 7P (well tag condition) for all the "To" and "From" POA wells.

Condition 7T (modified) for all "To" POA wells: "Prior to use, all POA wells shall be configured to allow a strictly clean water (no oil) static water level measurements with an electric-tape. That can include measurement access via an unobstructed vertical discharge pipe that allows the groundwater level to fluctuate freely within the discharge pipe (no valves, etc.). Otherwise, a dedicated measuring tube must be installed prior to use. The tube must be unobstructed, have a diameter of ¾ inch (0.75 inch) or greater, and pursuant to figure 200-5 in OAR 690-200."

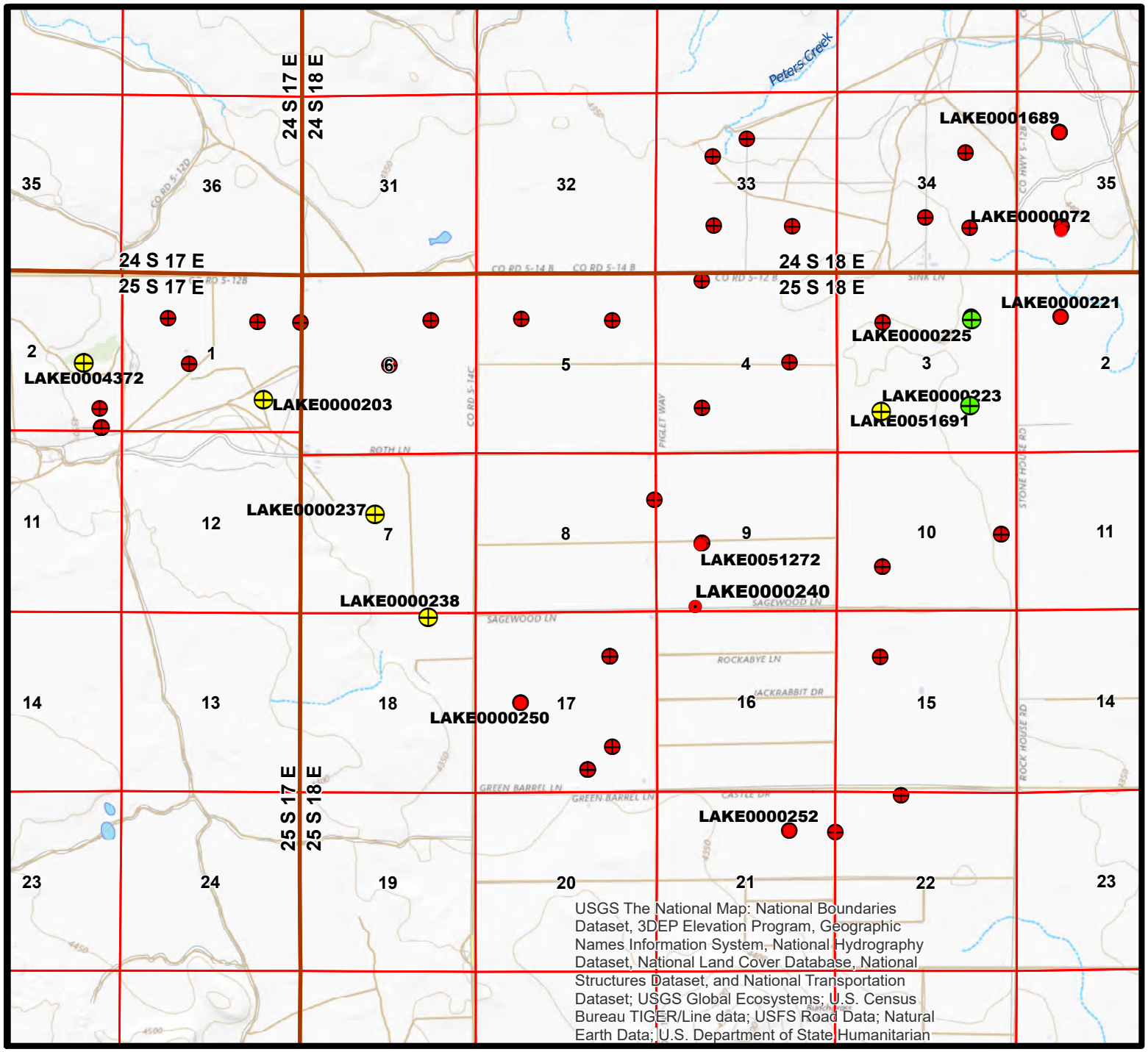
8. Any additional comments:

No additional comments.

References:

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.

Groundwater Transfer Application T-13973
Daniel Roth

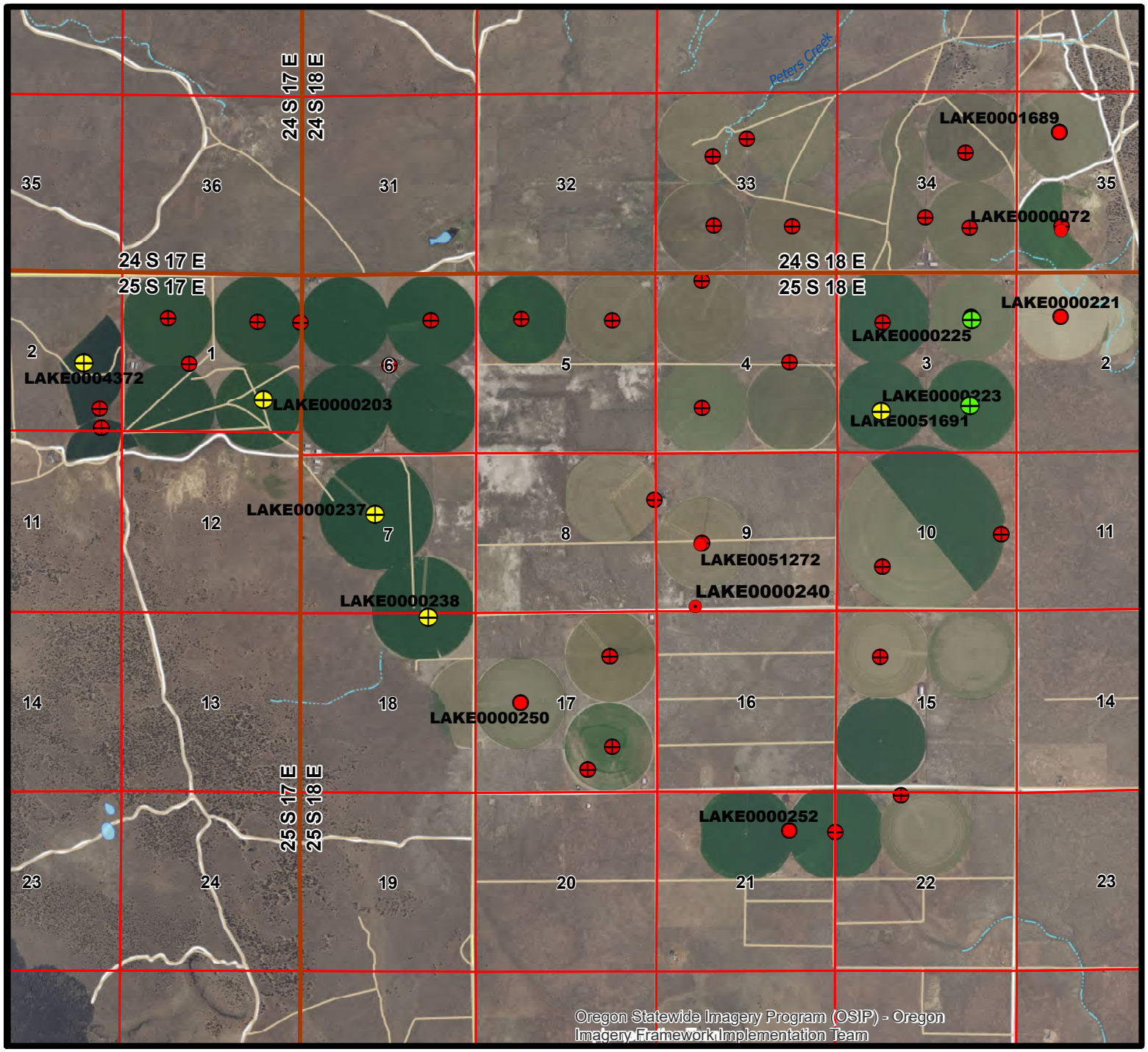


0 0.5 1 2 3 4
Miles

Green = Proposed Well
Yellow = Authorized Wells
Red = Groundwater PODs or Other Wells
Blue = Surface Water PODs

N

Groundwater Transfer Application T-13973
Daniel Roth



0 0.5 1 2 3 4

Miles

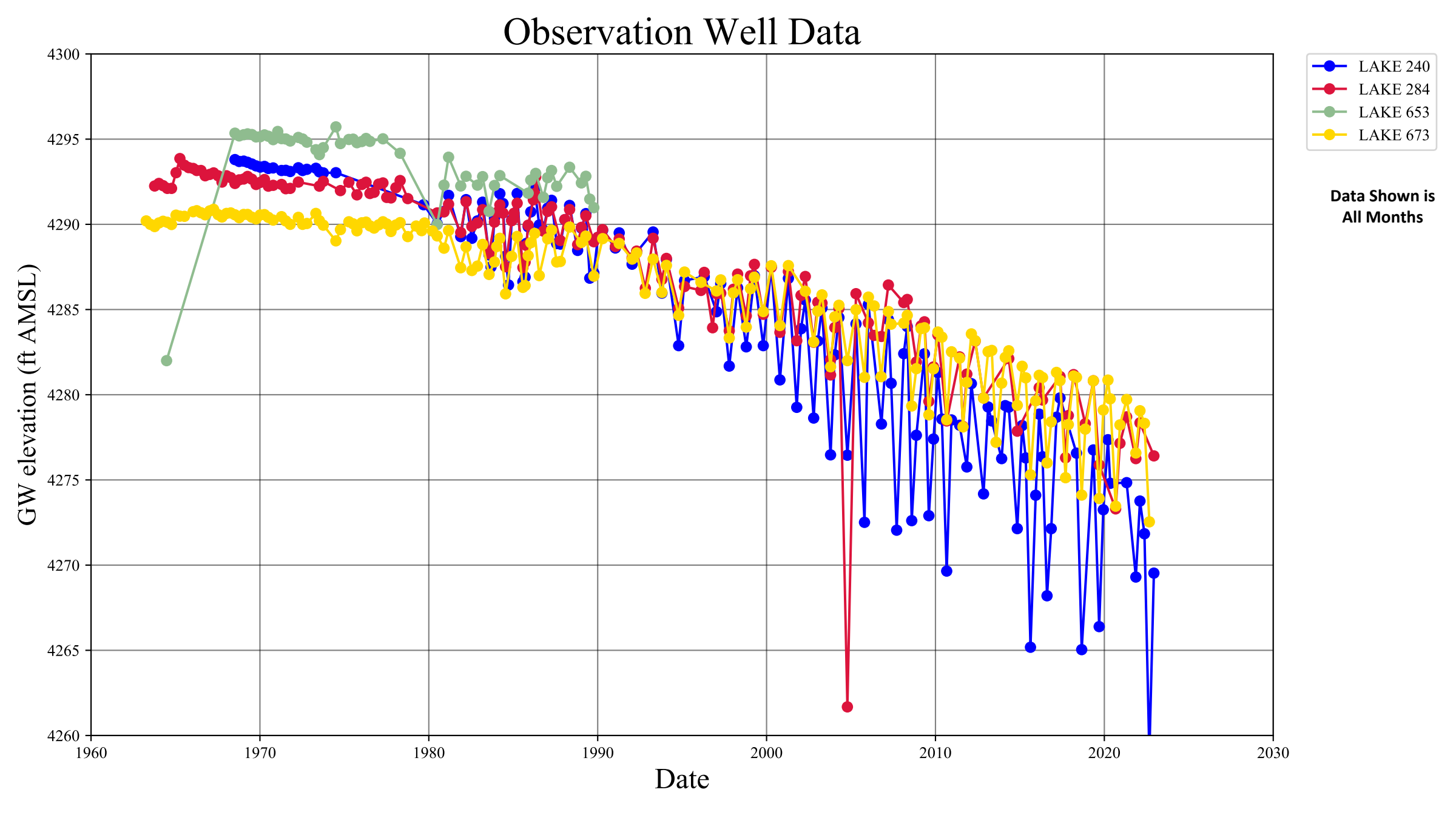
Green = Proposed Well
Yellow = Authorized Wells
Red = Groundwater PODs or Other Wells
Blue = Surface Water PODs

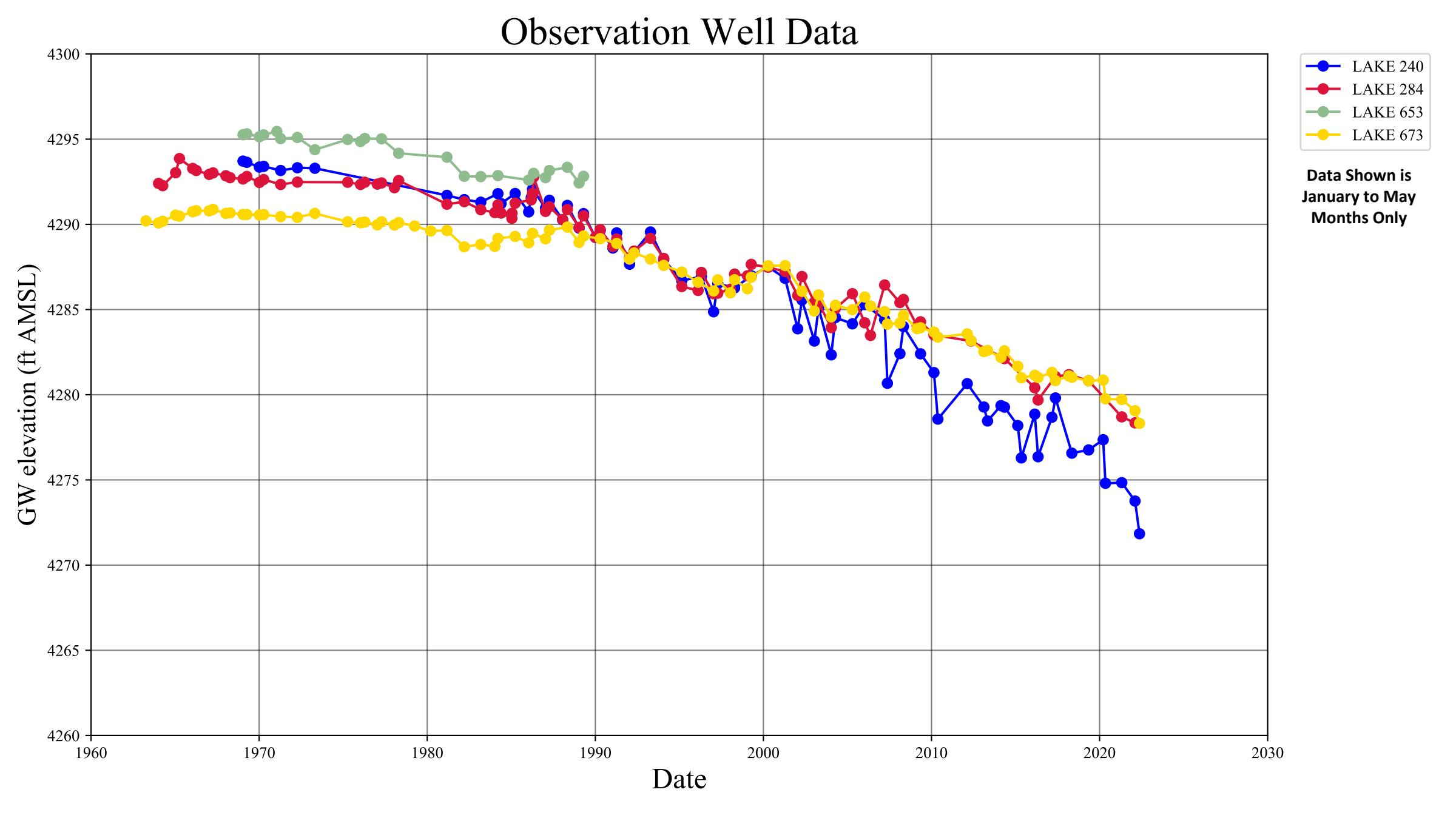
N

T-13973 (Daniel Roth)
Proposed Change
Christmas Valley (Fort Rock Groundwater Limited Area)

Certificate	From Acres	From CFS	From POD/POA Well		To Acres	To CFS	To POD/POA Well		Change Calculation Comment
			Owner	OWRD			Owner	OWRD	
53450	0.00	0.0000	Well 1	LAKE 203	0.00	0.0000	Well 1	LAKE 203	
	0.00	0.0000	Well 2	LAKE 238	0.00	0.0000	Well 2	LAKE 238	
	0.00	0.0000	Well 3	LAKE 237	0.00	0.0000	Well 3	LAKE 237	
	0.00	0.0000	Well 5	LAKE 4372	0.00	0.0000	Well 5	LAKE 4372	
	4.10	0.0513	Well 7	LAKE 223	0.00	0.0000	Well 7	LAKE 223	
	0.00	0.0000	Well 8	LAKE 225	4.10	0.0513	Well 8	LAKE 225	
	0.00	0.0000	Well 9	LAKE 51691	0.00	0.0000	Well 9	LAKE 51691	
	4.10	**0.0513**			**4.10**	**0.0513**			
53452	0.00	0.0000	Well 1	LAKE 203	0.00	0.0000	Well 1	LAKE 203	
	0.00	0.0000	Well 2	LAKE 238	0.00	0.0000	Well 2	LAKE 238	
	0.00	0.0000	Well 3	LAKE 237	0.00	0.0000	Well 3	LAKE 237	
	0.00	0.0000	Well 5	LAKE 4372	0.00	0.0000	Well 5	LAKE 4372	
	0.00	0.0000	Well 7	LAKE 223	0.00	0.0000	Well 7	LAKE 223	
	123.40	1.5425	Well 8	LAKE 225	0.00	0.0000	Well 8	LAKE 225	Net Decrease
	0.00	0.0000	Well 9	LAKE 51691	123.40	1.5425	Well 9	LAKE 51691	Net Increase
	123.40	**1.5425**			**123.40**	**1.5425**			
84982	0.00	0.0000	Well 1	LAKE 203	0.00	0.0000	Well 1	LAKE 203	No Change
	9.10	0.1138	Well 2	LAKE 238	0.00	0.0000	Well 2	LAKE 238	Net Decrease
	0.00	0.0000	Well 3	LAKE 237	0.00	0.0000	Well 3	LAKE 237	No Change
	0.00	0.0000	Well 5	LAKE 4372	0.00	0.0000	Well 5	LAKE 4372	No Change
	0.00	0.0000	Well 7	LAKE 223	0.00	0.0000	Well 7	LAKE 223	
	0.00	0.0000	Well 8	LAKE 225	9.10	0.1138	Well 8	LAKE 225	Net Increase
	0.00	0.0000	Well 9	LAKE 51691	0.00	0.0000	Well 9	LAKE 51691	
	9.10	**0.1138**			**9.10**	**0.1138**			
Overall Totals	**136.60**	**1.7075**			**136.60**	**1.7075**			
Totals per Well	0.00	0.0000	Well 1	LAKE 203	0.00	0.0000	Well 1	LAKE 203	No Change
	9.10	0.1138	Well 2	LAKE 238	0.00	0.0000	Well 2	LAKE 238	Net Decrease
	0.00	0.0000	Well 3	LAKE 237	0.00	0.0000	Well 3	LAKE 237	No Change
	0.00	0.0000	Well 5	LAKE 4372	0.00	0.0000	Well 5	LAKE 4372	No Change
	4.10	0.0513	Well 7	LAKE 223	0.00	0.0000	Well 7	LAKE 223	Net Decrease
	123.40	1.5425	Well 8	LAKE 225	13.20	0.1650	Well 8	LAKE 225	Net Decrease
	0.00	0.0000	Well 9	LAKE 51691	123.40	1.5425	Well 9	LAKE 51691	Net Increase
	136.60	**1.7075**			**136.60**	**1.7075**			

Note: CFS in Table = (Total Acres) / (80 Acre/CFS)
Note: this review identified LAKE 223 (owner well #7) as the original construction for LAKE 224 (deepening) and LAKE 4578 (subsequent deepening)
Note: the yellow highlights the proposed transfer for each certificate as specified in the T-13973 application


Observation Well Data
GW elevation (ft AMSL)
Date
4300
4295
4290
4285
4280
4275
4270
4265
4260
1960
1970
1980
1990
2000
2010
2020
2030
LAKE 240
LAKE 284
LAKE 653
LAKE 673
Data Shown is
All Months


Observation Well Data
GW elevation (ft AMSL)
4300
4295
4290
4285
4280
4275
4270
4265
4260
1960
1970
1980
1990
2000
2010
2020
2030
Date
LAKE 240
LAKE 284
LAKE 653
LAKE 673
Data Shown is January to May Months Only

Drawdown Calculations Using Theis Equation
Drawdown at Well LAKE 221 (T25S/R18E-sec 02, NE qtr)

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)	Drawdown Change s (feet)	Well	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**
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	23,645.00	3.14	0.3106	0.8801	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	30.00	20,665.00	3.14	0.2372	1.0853	0.0566		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	21,055.00	3.14	0.2463	1.0560	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	28,555.00	3.14	0.4530	0.6211	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	30.00	5,995.00	3.14	0.0200	3.3563	0.0788		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	2,630.00	3.14	0.0038	4.9882	3.5268		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	3,750.00	3.14	0.0078	4.2826	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**3.6622**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	23,645.00	3.14	0.3106	0.8801	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	20,665.00	3.14	0.2372	1.0853	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	21,055.00	3.14	0.2463	1.0560	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	28,555.00	3.14	0.4530	0.6211	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	5,995.00	3.14	0.0200	3.3563	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	30.00	2,630.00	3.14	0.0038	4.9882	0.3773		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	3,750.00	3.14	0.0078	4.2826	3.0279		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**3.4052**	**-0.2570**		
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	23,645.00	3.14	0.3106	0.8801	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	30.00	20,665.00	3.14	0.2372	1.0853	0.0279		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	21,055.00	3.14	0.2463	1.0560	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	28,555.00	3.14	0.4530	0.6211	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	30.00	5,995.00	3.14	0.0200	3.3563	0.0389		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	2,630.00	3.14	0.0038	4.9882	1.7418		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	3,750.00	3.14	0.0078	4.2826	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**1.8087**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	23,645.00	3.14	0.3106	0.8801	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	20,665.00	3.14	0.2372	1.0853	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	21,055.00	3.14	0.2463	1.0560	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	28,555.00	3.14	0.4530	0.6211	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	5,995.00	3.14	0.0200	3.3563	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	30.00	2,630.00	3.14	0.0038	4.9882	0.1863		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	3,750.00	3.14	0.0078	4.2826	1.4954		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**1.6817**	**-0.1269**		

Drawdown Calculations Using Theis Equation
Drawdown at Well LAKE 221 (T25S/R18E-sec 02, NE qtr)

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)	Drawdown Change s (feet)	Well	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**
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	23,645.00	3.14	0.0380	2.7298	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	245.00	20,665.00	3.14	0.0291	2.9903	0.1559		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	21,055.00	3.14	0.0302	2.9540	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	28,555.00	3.14	0.0555	2.3694	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	245.00	5,995.00	3.14	0.0024	5.4390	0.1278		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	2,630.00	3.14	0.0005	7.0849	5.0092		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	3,750.00	3.14	0.0010	6.3758	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**5.2929**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	23,645.00	3.14	0.0380	2.7298	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	20,665.00	3.14	0.0291	2.9903	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	21,055.00	3.14	0.0302	2.9540	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	28,555.00	3.14	0.0555	2.3694	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	5,995.00	3.14	0.0024	5.4390	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	245.00	2,630.00	3.14	0.0005	7.0849	0.5358		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	3,750.00	3.14	0.0010	6.3758	4.5079		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**5.0437**	**-0.2492**		
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	23,645.00	3.14	0.0380	2.7298	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	245.00	20,665.00	3.14	0.0291	2.9903	0.0770		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	21,055.00	3.14	0.0302	2.9540	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	28,555.00	3.14	0.0555	2.3694	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	245.00	5,995.00	3.14	0.0024	5.4390	0.0631		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	2,630.00	3.14	0.0005	7.0849	2.4739		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	3,750.00	3.14	0.0010	6.3758	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**2.6141**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	23,645.00	3.14	0.0380	2.7298	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	20,665.00	3.14	0.0291	2.9903	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	21,055.00	3.14	0.0302	2.9540	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	28,555.00	3.14	0.0555	2.3694	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	5,995.00	3.14	0.0024	5.4390	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	245.00	2,630.00	3.14	0.0005	7.0849	0.2646		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	3,750.00	3.14	0.0010	6.3758	2.2264		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**2.4910**	**-0.1231**		

Drawdown Calculations Using Theis Equation
Drawdown at unidentified Well in T25S/R18E-sec 10, NE qtr

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)	Drawdown Change s (feet)	Well	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
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	22,130.00	3.14	0.2721	0.9791	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	30.00	17,090.00	3.14	0.1623	1.3972	0.0729		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	18,490.00	3.14	0.1899	1.2651	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	27,540.00	3.14	0.4214	0.6679	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	30.00	5,060.00	3.14	0.0142	3.6898	0.0867		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	6,380.00	3.14	0.0226	3.2345	2.2869		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	3,900.00	3.14	0.0085	4.2048	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**2.4464**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	22,130.00	3.14	0.2721	0.9791	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	17,090.00	3.14	0.1623	1.3972	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	18,490.00	3.14	0.1899	1.2651	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	27,540.00	3.14	0.4214	0.6679	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	5,060.00	3.14	0.0142	3.6898	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	30.00	6,380.00	3.14	0.0226	3.2345	0.2446		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	3,900.00	3.14	0.0085	4.2048	2.9729		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**3.2175**	**0.7711**		
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	22,130.00	3.14	0.2721	0.9791	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	30.00	17,090.00	3.14	0.1623	1.3972	0.0360		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	18,490.00	3.14	0.1899	1.2651	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	27,540.00	3.14	0.4214	0.6679	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	30.00	5,060.00	3.14	0.0142	3.6898	0.0428		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	6,380.00	3.14	0.0226	3.2345	1.1294		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	3,900.00	3.14	0.0085	4.2048	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**1.2082**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	22,130.00	3.14	0.2721	0.9791	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	17,090.00	3.14	0.1623	1.3972	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	18,490.00	3.14	0.1899	1.2651	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	27,540.00	3.14	0.4214	0.6679	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	5,060.00	3.14	0.0142	3.6898	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	30.00	6,380.00	3.14	0.0226	3.2345	0.1208		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	3,900.00	3.14	0.0085	4.2048	1.4683		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**1.5891**	**0.3809**		

Drawdown Calculations Using Theis Equation
Drawdown at unidentified Well in T25S/R18E-sec 10, NE qtr

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)	Drawdown Change s (feet)	Well	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**
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	22,130.00	3.14	0.0333	2.8576	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	245.00	17,090.00	3.14	0.0199	3.3612	0.1752		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	18,490.00	3.14	0.0233	3.2070	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	27,540.00	3.14	0.0516	2.4380	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	245.00	5,060.00	3.14	0.0017	5.7774	0.1357		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	6,380.00	3.14	0.0028	5.3148	3.7577		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	3,900.00	3.14	0.0010	6.2975	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**4.0687**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	22,130.00	3.14	0.0333	2.8576	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	17,090.00	3.14	0.0199	3.3612	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	18,490.00	3.14	0.0233	3.2070	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	27,540.00	3.14	0.0516	2.4380	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	5,060.00	3.14	0.0017	5.7774	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	245.00	6,380.00	3.14	0.0028	5.3148	0.4020		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	3,900.00	3.14	0.0010	6.2975	4.4525		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**4.8545**	**0.7858**		
"From" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	22,130.00	3.14	0.0333	2.8576	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	245.00	17,090.00	3.14	0.0199	3.3612	0.0866		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	18,490.00	3.14	0.0233	3.2070	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	27,540.00	3.14	0.0516	2.4380	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	245.00	5,060.00	3.14	0.0017	5.7774	0.0670		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	6,380.00	3.14	0.0028	5.3148	1.8559		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	3,900.00	3.14	0.0010	6.2975	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**2.0094**			
"To" POA wells to Water Right Well closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	22,130.00	3.14	0.0333	2.8576	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	17,090.00	3.14	0.0199	3.3612	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	18,490.00	3.14	0.0233	3.2070	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	27,540.00	3.14	0.0516	2.4380	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	5,060.00	3.14	0.0017	5.7774	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	245.00	6,380.00	3.14	0.0028	5.3148	0.1985		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	3,900.00	3.14	0.0010	6.2975	2.1990		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**2.3975**	**0.3881**		

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)	Drawdown Change s (feet)	Well	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**
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	131,705.00	3.14	9.6368	-0.3011	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	30.00	128,665.00	3.14	9.1970	-0.1145	-0.0060		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,430.00	3.14	9.4511	-0.2012	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,170.00	3.14	9.4135	-0.1853	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	30.00	141,185.00	3.14	11.0740	-5.3389	-0.1254		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	145,010.00	3.14	11.6822	-16.1146	-11.3935		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	142,870.00	3.14	11.3399	-8.7180	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**-11.5249**			**Calculation not valid, U >7.1**
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	131,705.00	3.14	9.6368	-0.3011	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	128,665.00	3.14	9.1970	-0.1145	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,430.00	3.14	9.4511	-0.2012	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,170.00	3.14	9.4135	-0.1853	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	141,185.00	3.14	11.0740	-5.3389	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	30.00	145,010.00	3.14	11.6822	-16.1146	-1.2188		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	142,870.00	3.14	11.3399	-8.7180	-6.1639		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**-7.3826**	**4.1423**		**Calculation not valid, U >7.1**
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	131,705.00	3.14	9.6368	-0.3011	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	30.00	128,665.00	3.14	9.1970	-0.1145	-0.0029		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,430.00	3.14	9.4511	-0.2012	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,170.00	3.14	9.4135	-0.1853	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	30.00	141,185.00	3.14	11.0740	-5.3389	-0.0619		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	145,010.00	3.14	11.6822	-16.1146	-5.6270		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	142,870.00	3.14	11.3399	-8.7180	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**-5.6919**			**Calculation not valid, U >7.1**
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	131,705.00	3.14	9.6368	-0.3011	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	128,665.00	3.14	9.1970	-0.1145	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,430.00	3.14	9.4511	-0.2012	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	130,170.00	3.14	9.4135	-0.1853	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	141,185.00	3.14	11.0740	-5.3389	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	30.00	145,010.00	3.14	11.6822	-16.1146	-0.6019		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	142,870.00	3.14	11.3399	-8.7180	-3.0442		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**-3.6461**	**2.0458**		**Calculation not valid, U >7.1**

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)	Drawdown Change s (feet)	Well	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
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	131,705.00	3.14	1.1800	0.1635	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	245.00	128,665.00	3.14	1.1262	0.1783	0.0093		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,430.00	3.14	1.1573	0.1696	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,170.00	3.14	1.1527	0.1708	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	245.00	141,185.00	3.14	1.3560	0.1243	0.0029		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	145,010.00	3.14	1.4305	0.1110	0.0785		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	142,870.00	3.14	1.3886	0.1183	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**0.0907**			
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	131,705.00	3.14	1.1800	0.1635	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	128,665.00	3.14	1.1262	0.1783	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,430.00	3.14	1.1573	0.1696	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,170.00	3.14	1.1527	0.1708	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	141,185.00	3.14	1.3560	0.1243	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	245.00	145,010.00	3.14	1.4305	0.1110	0.0084		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	142,870.00	3.14	1.3886	0.1183	0.0836		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**0.0920**	**0.0013**		
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	131,705.00	3.14	1.1800	0.1635	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	245.00	128,665.00	3.14	1.1262	0.1783	0.0046		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,430.00	3.14	1.1573	0.1696	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,170.00	3.14	1.1527	0.1708	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	245.00	141,185.00	3.14	1.3560	0.1243	0.0014		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	145,010.00	3.14	1.4305	0.1110	0.0388		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	142,870.00	3.14	1.3886	0.1183	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**0.0448**			
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	131,705.00	3.14	1.1800	0.1635	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	128,665.00	3.14	1.1262	0.1783	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,430.00	3.14	1.1573	0.1696	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	130,170.00	3.14	1.1527	0.1708	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	141,185.00	3.14	1.3560	0.1243	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	245.00	145,010.00	3.14	1.4305	0.1110	0.0041		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	142,870.00	3.14	1.3886	0.1183	0.0413		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**0.0454**	**0.0007**		

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)	Drawdown Change s (feet)	Well	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**
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	127,555.00	3.14	9.0390	-0.0799	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	30.00	127,510.00	3.14	9.0327	-0.0788	-0.0041		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	128,050.00	3.14	9.1093	-0.0939	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	124,200.00	3.14	8.5698	-0.0265	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	30.00	141,935.00	3.14	11.1920	-6.6460	-0.1561		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	145,710.00	3.14	11.7952	-19.6616	-13.9014		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	144,200.00	3.14	11.5520	-12.7853	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**-14.0616**			**Calculation not valid, U >7.1**
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	127,555.00	3.14	9.0390	-0.0799	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	127,510.00	3.14	9.0327	-0.0788	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	128,050.00	3.14	9.1093	-0.0939	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	124,200.00	3.14	8.5698	-0.0265	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	141,935.00	3.14	11.1920	-6.6460	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	30.00	145,710.00	3.14	11.7952	-19.6616	-1.4870		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	30.00	144,200.00	3.14	11.5520	-12.7853	-9.0396		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**-10.5266**	**3.5350**		**Calculation not valid, U >7.1**
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	127,555.00	3.14	9.0390	-0.0799	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	30.00	127,510.00	3.14	9.0327	-0.0788	-0.0020		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	128,050.00	3.14	9.1093	-0.0939	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	124,200.00	3.14	8.5698	-0.0265	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	30.00	141,935.00	3.14	11.1920	-6.6460	-0.0771		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	145,710.00	3.14	11.7952	-19.6616	-6.8656		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	144,200.00	3.14	11.5520	-12.7853	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**-6.9447**			**Calculation not valid, U >7.1**
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	127,555.00	3.14	9.0390	-0.0799	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	127,510.00	3.14	9.0327	-0.0788	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	128,050.00	3.14	9.1093	-0.0939	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	124,200.00	3.14	8.5698	-0.0265	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	30.00	141,935.00	3.14	11.1920	-6.6460	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	30.00	145,710.00	3.14	11.7952	-19.6616	-0.7344		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	30.00	144,200.00	3.14	11.5520	-12.7853	-4.4644		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**-5.1988**	**1.7459**		**Calculation not valid, U >7.1**

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)	Drawdown Change s (feet)	Well	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
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	127,555.00	3.14	1.1068	0.1839	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	51.05	0.11	245.00	127,510.00	3.14	1.1060	0.1842	0.0096		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	128,050.00	3.14	1.1154	0.1814	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	124,200.00	3.14	1.0494	0.2021	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	23.00	0.05	245.00	141,935.00	3.14	1.3704	0.1216	0.0029		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	145,710.00	3.14	1.4443	0.1087	0.0769		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	144,200.00	3.14	1.4145	0.1137	0.0000		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**0.0893**			
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	127,555.00	3.14	1.1068	0.1839	0.0000		LAKE 203	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	127,510.00	3.14	1.1060	0.1842	0.0000		LAKE 238	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	128,050.00	3.14	1.1154	0.1814	0.0000		LAKE 237	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	124,200.00	3.14	1.0494	0.2021	0.0000		LAKE 4372	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	141,935.00	3.14	1.3704	0.1216	0.0000		LAKE 223	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	74.06	0.16	245.00	145,710.00	3.14	1.4443	0.1087	0.0082		LAKE 225	Continuous Pumping at Full Rate
112,207.80	15,000.00	0.00100	692.32	1.54	245.00	144,200.00	3.14	1.4145	0.1137	0.0804		LAKE 51691	Continuous Pumping at Full Rate
			766.38	**1.71**						**0.0886**	**-0.0007**		
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	127,555.00	3.14	1.1068	0.1839	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	25.21	0.06	245.00	127,510.00	3.14	1.1060	0.1842	0.0047		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	128,050.00	3.14	1.1154	0.1814	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	124,200.00	3.14	1.0494	0.2021	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	11.36	0.03	245.00	141,935.00	3.14	1.3704	0.1216	0.0014		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	145,710.00	3.14	1.4443	0.1087	0.0380		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	144,200.00	3.14	1.4145	0.1137	0.0000		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**0.0441**			
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	127,555.00	3.14	1.1068	0.1839	0.0000		LAKE 203	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	127,510.00	3.14	1.1060	0.1842	0.0000		LAKE 238	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	128,050.00	3.14	1.1154	0.1814	0.0000		LAKE 237	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	124,200.00	3.14	1.0494	0.2021	0.0000		LAKE 4372	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	0.00	0.00	245.00	141,935.00	3.14	1.3704	0.1216	0.0000		LAKE 223	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	36.58	0.08	245.00	145,710.00	3.14	1.4443	0.1087	0.0041		LAKE 225	Continuous Pro-Rated Pumping
112,207.80	15,000.00	0.00100	341.92	0.76	245.00	144,200.00	3.14	1.4145	0.1137	0.0397		LAKE 51691	Continuous Pro-Rated Pumping
			378.50	**0.84**						**0.0438**	**-0.0004**		

Vertical GW Flow Using Darcy Equation

Darcy Equation: $Q = K A [(h_1 - h_2) / (L_1 - L_2)]$

Q = volumetric GW flow
K = hydraulic conductivity
A = area

$h_1 - h_2$ = change in head at lake edge (head at lake vs. head of "main GW reservoir" potentiometric surface below lake)
$L_1 - L_2$ = distance for change in head (distance from lake bed to "main GW reservoir" deposits below)
$[(h_1 - h_2) / (L_1 - L_2)]$ = hydraulic gradient

Vertical GW Flow		Vertical GW Flow Change		Flow Change	Flow Change	Hydraulic Conductivity	Lake Area		Change in Head	Head Change Distance	Comments
Q	Q	Q	Q	Percent	Increase	$K_v = K_{xy} / 100$	A	A	$h_1 - h_2$	$L_1 - L_2$	
(ft^3/day)	(acre-ft/day)	(ft^3/day)	(acre-ft/day)	%		(ft/day)	(ft^2)	(acre)	(feet)	(feet)	
Vertical GW flow from full Silver Lake bed through lower permeability deposits to the higher permeability "main GW reservoir"											
27,188,431	624.16	---	---			0.30	455,265,086	10,451.45	30.00	150.00	Full lake, pre-transfer, well = off
27,270,631	626.05	82,200	1.89	0.30%		0.30	455,265,086	10,451.45	30.09	150.00	Full lake, pre-transfer, well = on 245 day full rate
27,229,032	625.09	40,601	0.93	0.15%		0.30	455,265,086	10,451.45	30.04	150.00	Full lake, pre-transfer, well = on 245 day pro-rated
Vertical GW flow from full Silver Lake bed through lower permeability deposits to the higher permeability "main GW reservoir"											
27,188,431	624.16	---	---			0.30	455,265,086	10,451.45	30.00	150.00	Full lake, post-transfer, well = off
27,271,809	626.07	83,378	1.91	0.31%	1.01	0.30	455,265,086	10,451.45	30.09	150.00	Full lake, post-transfer, well = on 245 day full rate
27,229,576	625.11	41,145	0.94	0.15%	1.01	0.30	455,265,086	10,451.45	30.05	150.00	Full lake, post-transfer, well = on 245 day pro-rated
Post-transfer rate minus pre-transfer rate											
1,178	**0.03**	**1,178**	**0.03**								Full lake, well = on 245 day full rate
544	**0.01**	**544**	**0.01**								Full lake, well = on 245 day pro-rated

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

LAKE 203

RECEIVED SEP 28 1970 STATE ENGINEER SALEM, OREGON

per DWM 12/4/81 ICB → 1 bc

WATER WELL REPORT

STATE OF OREGON (Please type or print) (Do not write above this line)

State Well No. 25/17-22dd

State Permit No. G 5173

(1) OWNER:
Name F.A. FRAZEE
Address Fort Rock, Ore.

(2) TYPE OF WORK (check):
New Well [X] Deepening [ ] Reconditioning [ ] Abandon [ ]
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bored [ ]

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [ ]
Irrigation [X] Test Well [ ] Other [ ]

CASING INSTALLED:
Threaded [ ] Welded [X]
" Diam. from 0 ft. to 60 ft. Gage 1/4
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? [ ] Yes [X] No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? [ ] Yes [X] No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WATER LEVEL: Completed well.
Static level 53 ft. below land surface Date 6-20-58
Artesian pressure lbs. per square inch Date

(9) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? [X] Yes [ ] No If yes, by whom? Driller
Yield: 350 gal./min. with 7 ft. drawdown after hrs.
" " "
" " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? [ ] Yes [X] No

(10) CONSTRUCTION:
Well seal—Material used
Depth of seal ft.
Diameter of well bore to bottom of seal in.
Were any loose strata cemented off? [ ] Yes [ ] No Depth
Was a drive shoe used? [ ] Yes [ ] No
Did any strata contain unusable water? [ ] Yes [ ] No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? [ ] Yes [ ] No Size of gravel:
Gravel placed from ft. to ft.

(11) LOCATION OF WELL:
County Lake Driller's well number
SE ¼ SE ¼ Section 22 T. 25 R. 17E W.M.
Bearing and distance from section or subdivision corner
800' N.W. from S.E. c

(12) WELL LOG:
Diameter of well below casing
Depth drilled ft. Depth of completed well ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Surface	0	3	
Oily Brown	3	50	
Lava Rock	50	55	
Black Lava	55	60	

Work started 6-18 19 58 Completed 6-20 19 58
Date well drilling machine moved off of well 6-22 19 58

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] (Drilling Machine Operator) Date 6-20, 19 58

Drilling Machine Operator's License No.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME (Person, firm or corporation) (Type or print)
Address Fort Rock Oregon
[Signed] (Water Well Contractor)
Contractor's License No. 102 Date 6-20, 19 58

(USE ADDITIONAL SHEETS IF NECESSARY)

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT
SALEM, OREGON 97310
within 30 days from the date of well completion.

Lane 323

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

RECEIVED
APR 10 1978

State Well No. 25S/18E-3
State Permit No.

(1) OWNER:
Name G.b Crawson
Address c/o Crawson Oil Co
Monroe Ore

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☒ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☒
7" Diam. from 0 ft. to 19 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
"Tested w/air 1000 gpm" "
Bailer test gal./min. with ~~33~~ ft. drawdown after 4 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 17 1/2 in.
Diameter of well bore below seal 12 in.
Number of sacks of cement used in well seal 6 sacks
How was cement grout placed? poured
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Lake Driller's well number
¼ ¼ Section 3 T. 25S R. 18E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 95 ft.
Static level 50 ft. below land surface. Date 2/23/78
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 12"
Depth drilled ~~295~~ ft. Depth of completed well 285 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Brown loam	0	2	
Blue volcanic rock	2	67	
Red volcanic rock	67	82	
~~Red Cinders~~ B. volcanic rock	82	135	
Red cinders	135	140	
Blue basalt	140	200	
Black volcanic rock	200	210	
Blue basalt	210	240	
Blue sandrock	240	275	
Blue basalt	275	285	

Work started 2/21/78 19 Completed 3/23 19 78
Date well drilling machine moved off of well 3/23 19 78

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Robert Destrem (Drilling Machine Operator) Date 3/10, 1978
Drilling Machine Operator's License No. 948

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Bert Jones (Person, firm or corporation) (Type or print)
Address 29404 Santiam Hwy Lebanon Or
[Signed] Bert Jones (Water Well Contractor)
Contractor's License No. 514 Date 3/10/78, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

WATER WELL REPORT
STATE OF OREGON

Lake 224

RECEIVED
NOV 5 1981
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 25s/18E-3C
State Permit No.
deepened

(1) OWNER:
Name Gilbert Crowson
Address P.O. Box 275
City Christmas Valley State Oregon

(2) TYPE OF WORK (check):
New Well ☐ Deepening ☑ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☐ Plastic ☐
Threaded ☐ Welded ☐
17" Diam. from ..... ft. to ..... ft. Gauge .....
..... Diam. from ..... ft. to ..... ft. Gauge .....

LINER INSTALLED:
..... Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
Air test 1200 gal./min. with drill stem at 380 ft. 1 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☑
Well seal—Material used .....
Well sealed from land surface to surface ft.
Diameter of well bore to bottom of seal cable in.
Diameter of well bore below seal ..... in.
Number of sacks of cement used in well seal ..... sacks
How was cement grout placed? .....
.....
.....
Was pump installed? ..... Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☐ Yes ☑ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☑ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:
County Lake Driller's well number
¼ SW¼ Section 3 T. 25 S R. 18 E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: Same

(11) WATER LEVEL: Completed well.
Depth at which water was first found 351 ft.
Static level 55 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing ~~6 1/4~~ 12
Depth drilled 95 ft. Depth of completed well 380 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Black Sand	185	311	
Grey SAND STONE	311	340	
GRAY STONE	340	351	
BLACK LAVA ROCK WB	351	380	

Work started 9/28 1981 Completed 9/29 1981
Date well drilling machine moved off of well 9/30 1981

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Mel Search (Drilling Machine Operator) Date 10/20 1981
Drilling Machine Operator's License No. 699

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name MEL SEARCH WELL DRILLING (Person, firm or corporation) (Type or print)
Address P.O. Box 83 Silver Lake Oregon
[Signed] Mel Search (Water Well Contractor)
Contractor's License No. 567 Date 10/20 1981

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12658-690

17 LAKE 4578

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

RECEIVED
JUN 26 1995

255/18E/3CC

(START CARD) # 71206

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

(1) OWNER: Name Gaelyn Roth Well Number
Address POBox 358
City Christmas Valley State Ore Zip 97641

(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 590 ft.
Explosives used ☐ Yes ☑ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
8"	370	590				

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:				☐	☐	☐	☐
				☐	☐	☐	☐
				☐	☐	☐	☐
				☐	☐	☐	☐
Liner:				☐	☐	☐	☐
				☐	☐	☐	☐

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
1500		590	1 hr.

Temperature of water 55 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 LAKE Latitude Longitude
Township 25S N or S Range 18E E or W. WM.
Section 3 SW 1/4 SW 1/4
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:
63 ft. below land surface. Date 5-28-95
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
Black Basalt	370	445	
GRAY BASALT	445	467	
BLACK BASALT BROKEN	467	471	
GRAY CLAY STONE	471	485	
BROWN CLAY STONE	486	505	
BROWN & BLACK BASALT	505	527	
~~BROWN~~ GREEN CLAY STONE	527	545	
BLACK BASALT BROKEN	545	590	DRY

Date started 5 12 95 Completed 5-28-95

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, 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.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, 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.
WWC Number 567
Signed Melvin Search Date 6-10-95

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED
AUG 18 1980
WATER RESOURCES DEPT
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print) (Do not write above this line)

Lake 225

State Well No. 25S/18E-3

State Permit No.

(1) OWNER:
Name Gilbert Crowson
Address Box 402 Christmas Valley, OR.

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☒
14" Diam. from 1 above ft. to 20 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS: Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " " "
" " " " "
Bailer test 1000 gal./min. with ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 18 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 6 sacks
How was cement grout placed? Cement was mixed up. 1" pipe run down along side & pressure grouted in.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Lake Driller's well number
¼ ¼ Section 3 T. 25 R. 18 E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 71 ft.
Static level 57 ft. below land surface. Date 5/7/80
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 8"
Depth drilled 370 ft. Depth of completed well 370 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Brown Clay	0	4	
Black lava rock	4	67	
Red Cinders	67	74	
Brown Cinders	74	81	
Black lava Rock	81	121	
Pumice Water Bearing	121	124	
Black lava Rock	124	136	
Brown Cinders	136	141	
Red lava Rock	141	153	
Black lava rock	153	185	
Red lava rock	185	197	
Black lava rock	197	246	
Black sand	246	248	
Black lava rock	264	320	
Black sand	320	350	
Grey Stone	350	370	

Work started 4/13 1980 Completed 5/7 1980
Date well drilling machine moved off of well 5/7 1980

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Mel Search (Drilling Machine Operator) Date 5/10, 1980
Drilling Machine Operator's License No. 699

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Mel Search Well Drilling (Person, firm or corporation) (Type or print)
Address 437 Lebanon, OR.
[Signed] Mel Search (Water Well Contractor)
Contractor's License No. 567 Date 5/10, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

WATER WELL REPORT

STATE OF OREGON

Lake 237

RECEIVED
MAR 12 1981
WATER RESOURCES DEPT
SALEM, OREGON

Per DWM → 12/4/81 18

State Well No. 25S/17E-7bd
IcB

State Permit No. .....

(1) OWNER:

Name Dave Roth
Address Tenbosse Road
City Sweet Home State Ore

(2) TYPE OF WORK (check):

New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☑ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:

Steel ☑ Plastic ☐
Threaded ☐ Welded ☑

14 " Diam. from 0 ft. to 65 ft. Gauge 312

" Diam. from ..... ft. to ..... ft. Gauge .....

LINER INSTALLED:

" Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:

Perforated? ☐ Yes ☑ No

Type of perforator used

Size of perforations in. by in.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☑ No

Manufacturer's Name .....

Type ..... Model No. .....

Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☑ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.
" " " "

Air test 1000+ gal./min. with drill stem at 60 ft. 1 hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☑

Well seal—Material used Cement

Well sealed from land surface to 20 ft.

Diameter of well bore to bottom of seal 18 in.

Diameter of well bore below seal 14 in.

Number of sacks of cement used in well seal 20 sacks

How was cement grout placed? Tremie

Was pump installed? ..... Type ..... HP ..... Depth ..... ft.

Was a drive shoe used? ☑ Yes ☐ No Plugs ..... Size: location ..... ft.

Did any strata contain unusable water? ☐ Yes ☑ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☑ No Size of gravel: .....

Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:

County Lake Driller's well number

SE ¼ NW ¼ Section 7 T. 25-S R. 17E W.M.

Tax Lot # Lot Blk Subdivision

Address at well location:

(11) WATER LEVEL: Completed well.

Depth at which water was first found 105 ft.

Static level 20 ft. below land surface. Date 2-12-81

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 12

Depth drilled 120 ft. Depth of completed well 120 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Sandy Clay	0	17	
Blue Claystone	17	65	
Basalt	65	120	

Work started 2-12 1981 Completed 2-16 1981

Date well drilling machine moved off of well 2-17 1981

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Alan Schilling (Drilling Machine Operator) Date 2-25, 1981

Drilling Machine Operator's License No. 804

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name Alvin + Schilling (Person, firm or corporation) (Type or print)

Address 29011 Santiam Hwy Sweet Home

[Signed] Howard Adams (Water Well Contractor)

Contractor's License No. 357 Date 2-25, 1981

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP*12658-690

LAKE 51147

LAKE
51147

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)
Instructions for completing this report are on the last page of this form.

WELL I.D. # L 47644
START CARD # 133531

(1) LAND OWNER — Well Number ____
Name Gwillen Roth's
Address PO Box 358
City Christmas Valley State OR Zip 97641

(2) TYPE OF WORK
[ ] New Well [X] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [ ] Community [ ] Industrial [X] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 140 ft.
Explosives used [ ] Yes [X] No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
13¾	65	100				
8⅝	100	140				

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:					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
	NA				[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
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
		None				[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

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

Yield gal/min	Drawdown	Drill stem at	Time
1100		140'	1 hr.

Temperature of water 55° 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 Lake Latitude ____ Longitude ____
Township 25 N or S Range 18 E or W. WM.
Section 7 SE 1/4 NW 1/4
Tax Lot 1900 Lot ____ Block ____ Subdivision SKID
Street Address of Well (or nearest address) N. A Stahls Rd
Small Tim Left

(10) STATIC WATER LEVEL:
20 ft. below land surface. Date 4-11-01
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
Lava Rock	120	140	

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SALEM, OREGON

Date started 4-11-01 Completed 4-12-01

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, 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.
WWC Number ____
Signed ____ Date ____

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, 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.
WWC Number 1634
Signed [signature] Date 4-17-01

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

LAKE 51503

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form. Lake 51503

WELL I.D. # L 47604
START CARD # 162617

(1) LAND OWNER
Name Gary Ivan Roth Well Number
Address PO Box 55
City Christmas Valley State OR Zip 97641

(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 200 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12"	140	200				

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:					☐	☐	☐	☐
	No Casing Add				☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
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
1500 *		200'	1 hr.

Temperature of water 56° 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:

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(9) LOCATION OF WELL by legal description:
County Lake Latitude Longitude
Township 25 N or S Range 18 E or W. WM.
Section 7 SE 1/4 NW 1/4
Tax Lot 1900 Lot Block Subdivision
Street Address of Well (or nearest address) 84054 Shumway
Christmas Valley OR 97641

(10) STATIC WATER LEVEL: Same
69 ft. below land surface. Date 3-12-04
Artesian pressure lb. per square inch Date

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

From	To	Estimated Flow Rate	SWL
140	200	1000+	

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
Black Lava Rock	140	163	
Broken Lava Rock	163	180	
Red Cinder w/ B	180	185	
Gray Basalt	185	200	

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SALEM, OREGON

Date started 1-27-04 Completed 3-12-04

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, 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.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, 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.
WWC Number 1654
Signed Date 4-19-04

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WATER WELL REPORT
STATE OF OREGON

Lake 238

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OCT 27 1981
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 25S/18E-7aa

State Permit No. .....

(1) OWNER:
Name Diane & Gaylen Roth
Address Christmas Valley
City ..... State Oregon

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☑ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☑ Plastic ☐
Threaded ☐ Welded ☑
14 " Diam. from 0 ft. to 33 ft. Gauge 3/12
..... " Diam. from ..... ft. to ..... ft. Gauge .....

LINER INSTALLED:
..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
Air test 1000 gal./min. with drill stem at 40 ft. 1 hrs.
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m.
Temperature of water ..... Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Special standards Yes ☐ No ☐
Well seal—Material used Cemented
Well sealed from land surface to 33 ft.
Diameter of well bore to bottom of seal 18 in.
Diameter of well bore below seal 12 1/4 in.
Number of sacks of cement used in well seal 14 1/2 sacks
How was cement grout placed? Pumped
.....
.....
Was pump installed? ..... Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☐ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? ..... depth of strata .....
Method of sealing strata off
Was well gravel packed? ☑ Yes ☐ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:
County Lake Driller's well number
NE ¼ NE ¼ Section 7 T. 25S R. 18E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:

(11) WATER LEVEL: Completed well.
Depth at which water was first found 90 ft.
Static level 40 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 12 1/4
Depth drilled 120 ft. Depth of completed well 120 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Soil	0	4	
Sandy Soil	4	16	
Clay	16	26	
Basalt	26	120	

Work started Sept 28 1981 Completed Sept 28 1981
Date well drilling machine moved off of well Sept 28 1981

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Howard Arms (Drilling Machine Operator) Date 2 8 ..., 19 81
Drilling Machine Operator's License No. 169

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Arms & Schilling Well Drilling (Person, firm or corporation) (Type or print)
Address 29030 San Tai Sweet Home Or
[Signed] Howard Arms (Water Well Contractor)
Contractor's License No. 357 Date Sept 28, 19 81

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12658-690

WATER WELL REPORT
STATE OF OREGON

LAKE 4372

RECEIVED
MAR 12 1981
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 25S/17E-2aC

State Permit No. LAKE 4372

(1) OWNER:
Name Dave Roth
Address Tumbleweed Rd
City Sweet Home State Ore

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☑ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

CASING INSTALLED:
Steel ☑ Plastic ☐
Threaded ☐ Welded ☑
14" Diam. from 0 ft. to 67 ft. Gauge 312
" Diam. from ft. to ft. Gauge

LINER INSTALLED:
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
'd: gal./min. with ft. drawdown after hrs.
" " " "
Air test 1000+ gal./min. with drill stem at 60 ft. 1 hrs.
ler test gal./min. with ft. drawdown after hrs.
*-tesian flow g.p.m.
perature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☐
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 18 in.
Diameter of well bore below seal 14 in.
Number of sacks of cement used in well seal 18 sacks
How was cement grout placed? Tremie
Was pump installed? — Type — HP — Depth — ft.
Was a drive shoe used? ☑ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of Water? — depth of strata —
Method of sealing strata off —
Was well gravel packed? ☐ Yes ☑ No — Size of gravel:
Gravel placed from — ft. to — ft.

(10) LOCATION OF WELL:
County Lake Driller's well number
SW ¼ NE ¼ Section 2 T. 25S R. 17E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:

(11) WATER LEVEL: Completed well.
Depth at which water was first found 110 ft.
Static level 25 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 12
Depth drilled 120 ft. Depth of completed well 120 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Sandy Clay	0	15	
Blue Claystone	15	67	
Basalt	67	120	

Work started 2-17 19 81 Completed 2-20 19 81
Date well drilling machine moved off of well 2-20 19 81

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Don Schilling (Drilling Machine Operator) Date 2-25, 19 81
Drilling Machine Operator's License No. 804

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name A-M-S + Schilling (Person, firm or corporation) (Type or print)
Address 29011 Santiam Hwy Sweet Home
[Signed] Howard Adams (Water Well Contractor)
Contractor's License No. 357 Date 2-25, 1981

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP*12658-690

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

LAKE 51691

Lake 51691

WELL I.D. # L 76807

START CARD # 171718

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

(1) LAND OWNER Well Number
Name Roth Farms
Address PO Box 358
City Christmas Valley State OR Zip 97641

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

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

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

(5) BORE HOLE CONSTRUCTION Special Construction: ☐ Yes ☒ No
Depth of Completed Well 220 ft.
Explosives used: ☐ Yes ☒ No Type Amount

BORE HOLE Diameter	From	To	SEAL Material	From	To	Sacks or Pounds
23 1/2	0	19	Bent	0	19	50 sack
16"	19	220				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other 3/8 Hole Plug
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:	18"	+1	19	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
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
		120				☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

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

Yield gal/min	Drawdown	Drill stem at	Time
2000 gal		220	1 hr

Temperature of water 53° 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 (legal description)
County Lake
Tax Lot 300 Lot
Township 25 N or S Range 18 E or W WM
Section 3 SE 1/4 SE 1/4
Lat ° ' " or (degrees or decimal)
Long ° ' " or (degrees or decimal)
Street Address of Well (or nearest address) NO ADDRESS ASSIGNED

(10) STATIC WATER LEVEL
69 ft. below land surface. Date 5-15-05
ft. below land surface. Date Same
Artesian pressure lb. per square inch Date

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

From	To	Estimated Flow Rate	SWL
105	220	2000 gal	

(12) WELL LOG Ground Elevation

Material	From	To	SWL
Top Soil	0	2	
Gray Basalt	2	4/6	
Red Lava Rock	4/6	60	
Gray Lava Rock	60	80	
Black Lava Rock	80	105	
Gray Lava Rock	105	145	
Black Lava Rock	145	159	
Gray Lava Rock	159	200	
Black	200	220	

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WATER RESOURCES DEPT
SALEM, OREGON

Date Started 4-27-05 Completed 5-15-05

(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.

WWC Number Date

Signed

(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.

WWC Number 1651 Date 6-15-05

Signed

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER 06/16/2004