

Groundwater Transfer Review Summary Form

Transfer/PA # T- 13635

GW Reviewer Gerald H. Grondin

Date Review Completed: 20 April 2021

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
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Ground Water Review Form:

- Water Right Transfer (temporary)
- Permit Amendment
- GR Modification
- Other

Application: **T-13635**

Applicant Name: **Terry Nofziger & Blaine Nofziger**

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

Reviewer(s): **Gerald H. Grondin**

Date of Review: **20 April 2021**

Date Reviewed by GW Mgr. and Returned to WRSD: JTL 4/21/21

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 temporary transfer application relates to water right certificate 80684 (file G-10071). The transfer application proposes changes in POU and POA as follows (summarized in attached table also):

Certificate 80684: Authorized irrigation of 475.2 acres in T26S/R18E-sec 31 & 32 using groundwater from four wells: Well 1 (authorized 1.54 cfs) and Well 2 (authorized 0.99 cfs) located in T26S/R18E-sec 31 and Well 3 (authorized 1.73 cfs) and Well 4 (authorized 1.68 cfs) located in T26S/R18E-sec 32.

The four wells are identified by this review as Well 1 = LAKE 688, Well 2 = LAKE 689, Well 3 = LAKE 690, and Well 4 = LAKE 691.

The temporary transfer proposes changes in 30.30 POU acres to be irrigated by groundwater from a well identified by this review as LAKE 685 (proposed 0.38 cfs) located in T26S/R18E-sec 31.

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 predominantly basin fill sediment unit and the predominantly volcanic rocks and sediment unit both readily yield groundwater and the two units are hydraulically connected. The geologic unit yielding groundwater to the authorized POA wells is likely from the predominantly volcanic rocks and sediment unit. The proposed POA well (LAKE 685) appears to obtain groundwater from the predominantly volcanic rocks and sediment unit also.

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 will move groundwater pumping closer to the same groundwater right POA well (LAKE 687). The calculated maximum additional seasonal groundwater level drawdown at well LAKE 687 is less than 0.35 feet. The well LAKE 687 should be able to accommodate the seasonal drawdown change. The calculated maximum additional seasonal groundwater level drawdown at other POA wells further away will 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 of about 0.25 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. The POA changes moves pumping closer to surface water particularly Silver Lake and Paulina Marsh. The seasonal drawdown at Silver lake and Paulina Marsh is calculated to be greater by about 0.01 feet and 0.01 feet respectively by the end of the irrigation season. The long-term interference 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.”

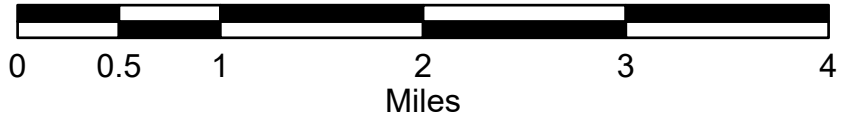
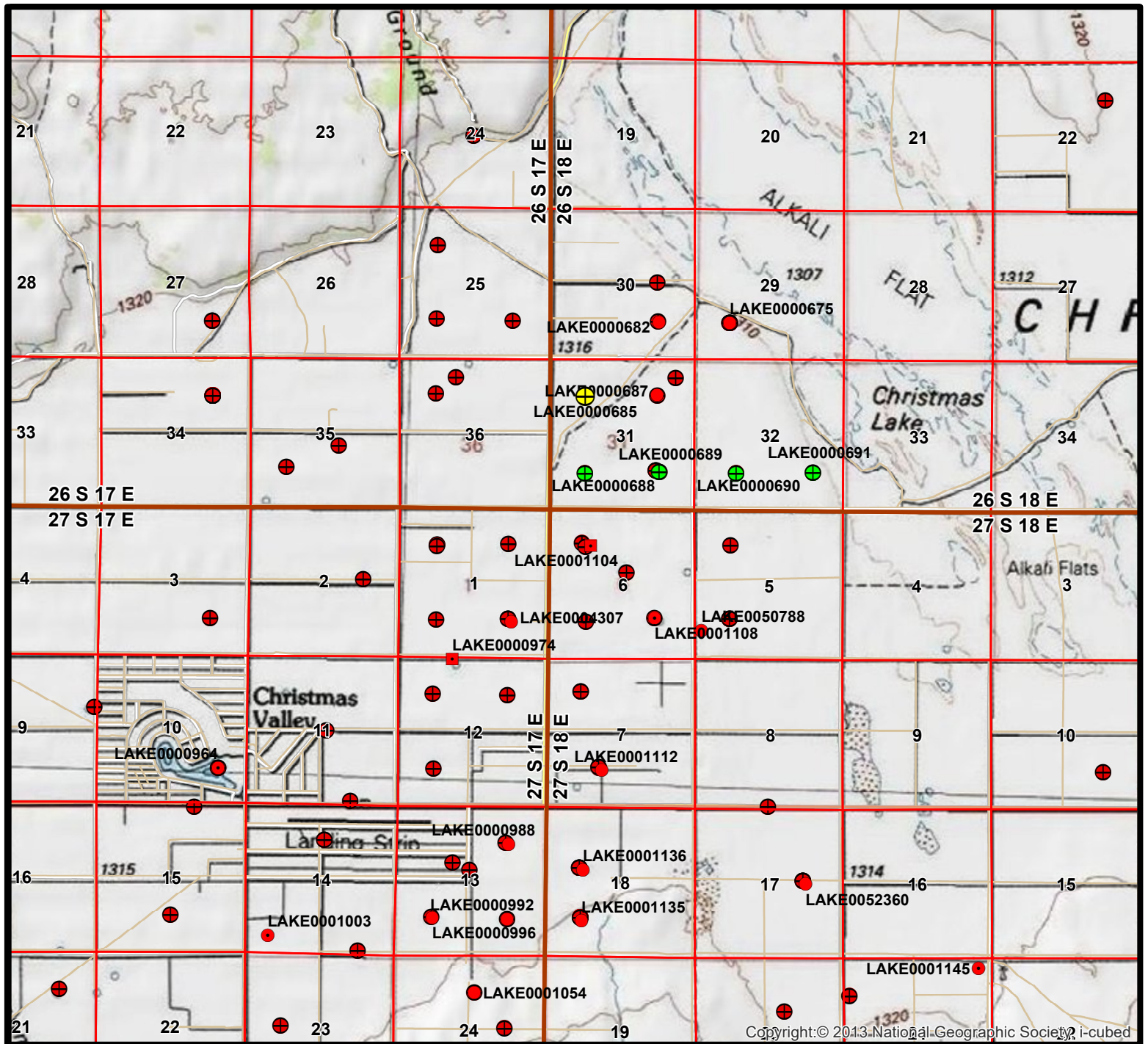
- 8. Any additional comments: _____

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 Temporary Transfer Application T-13635 Terry & Blaine Nofziger

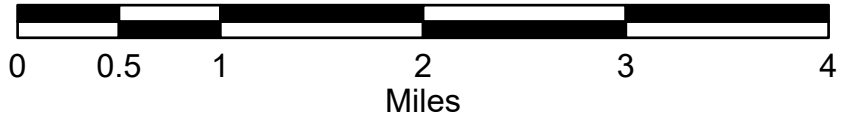
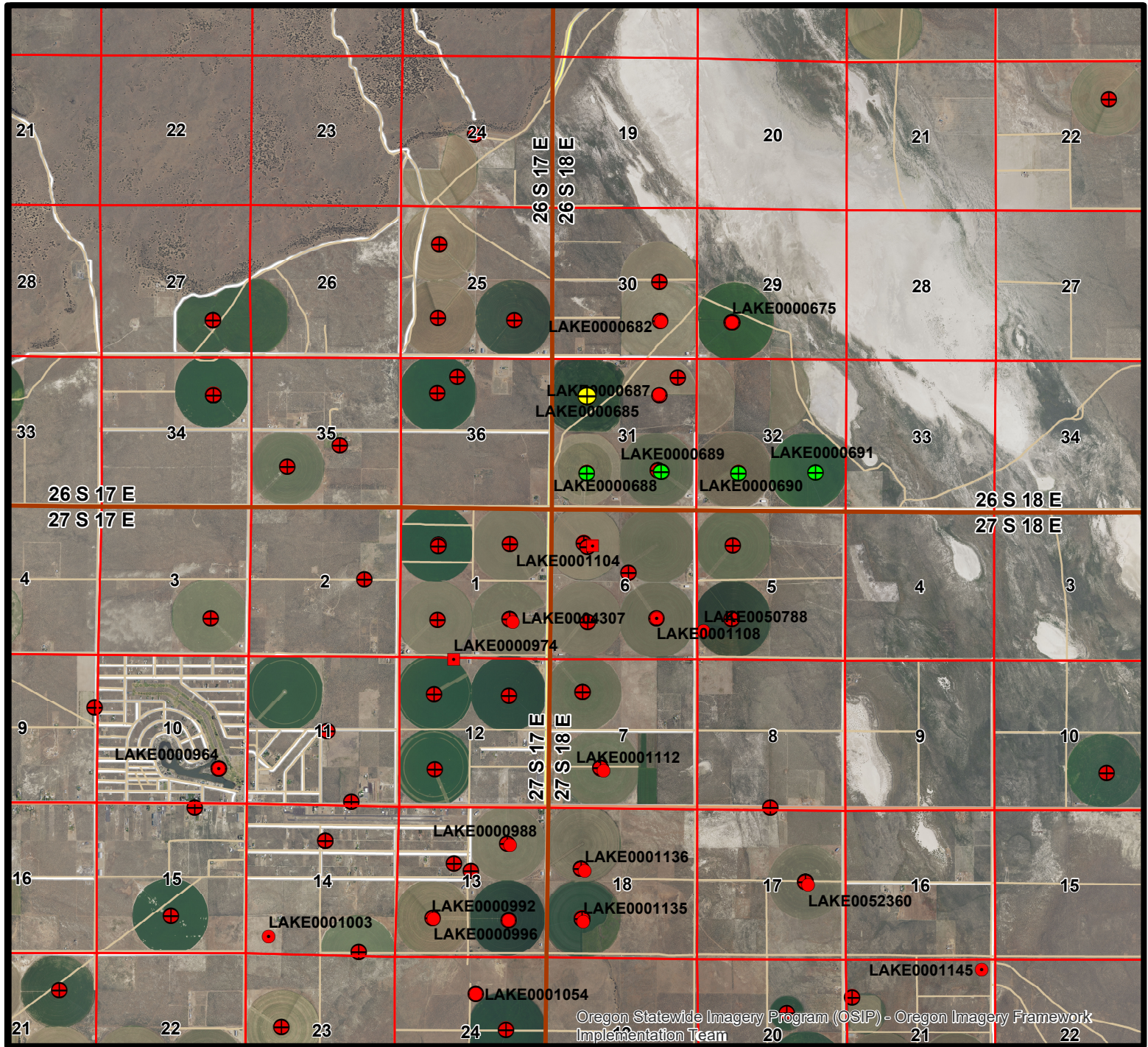


- Green = Authorized Wells**
- Yellow = Proposed Well**
- Red = Groundwater PODs or Other Wells**
- Blue = Surface Water PODs**



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Groundwater Temporary Transfer Application T-13635 Terry & Blaine Nofziger



- Green = Authorized Wells**
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- Red = Groundwater PODs or Other Wells**
- Blue = Surface Water PODs**



T_13635_Nofziger_Christmas_Valley_proposed_pumping_changes

From Wells		Location TRS	Certificate & POU Acres			Total Area (acres)	Total Volume (ac-ft/yr)	Max Rate (cfs)	Pro- Rated (cfs)	Open Interval Lithology	Total Depth (feet)	Static GW Level (ft blsd)	Land Elevation (ft amsl)	Static GW Level (ft amsl)	Date
Original	Deepening		80684												
LAKE 688		T26S/R18E-sec 31 cd	7.575			7.58	22.73	0.09	0.05	basalt & broken shale	537	22.00	4,314.96	4,292.96	03/18/1981
LAKE 689		T26S/R18E-sec 31 da	7.575			7.58	22.73	0.09	0.05	basalt & broken shale	583	21.50	4,317.95	4,296.45	05/27/1981
LAKE 690		T26S/R18E-sec 32 cd	7.575			7.58	22.73	0.09	0.05	basalt	422	18.50	4,316.00	4,297.50	04/28/1981
LAKE 691		T26S/R18E-sec 32 da	7.575			7.58	22.73	0.09	0.05	basalt	483	22.50	4,312.53	4,290.03	05/30/1981
Totals			30.300	0.000	0.000	30.30	90.90	0.38	0.19					0.00	

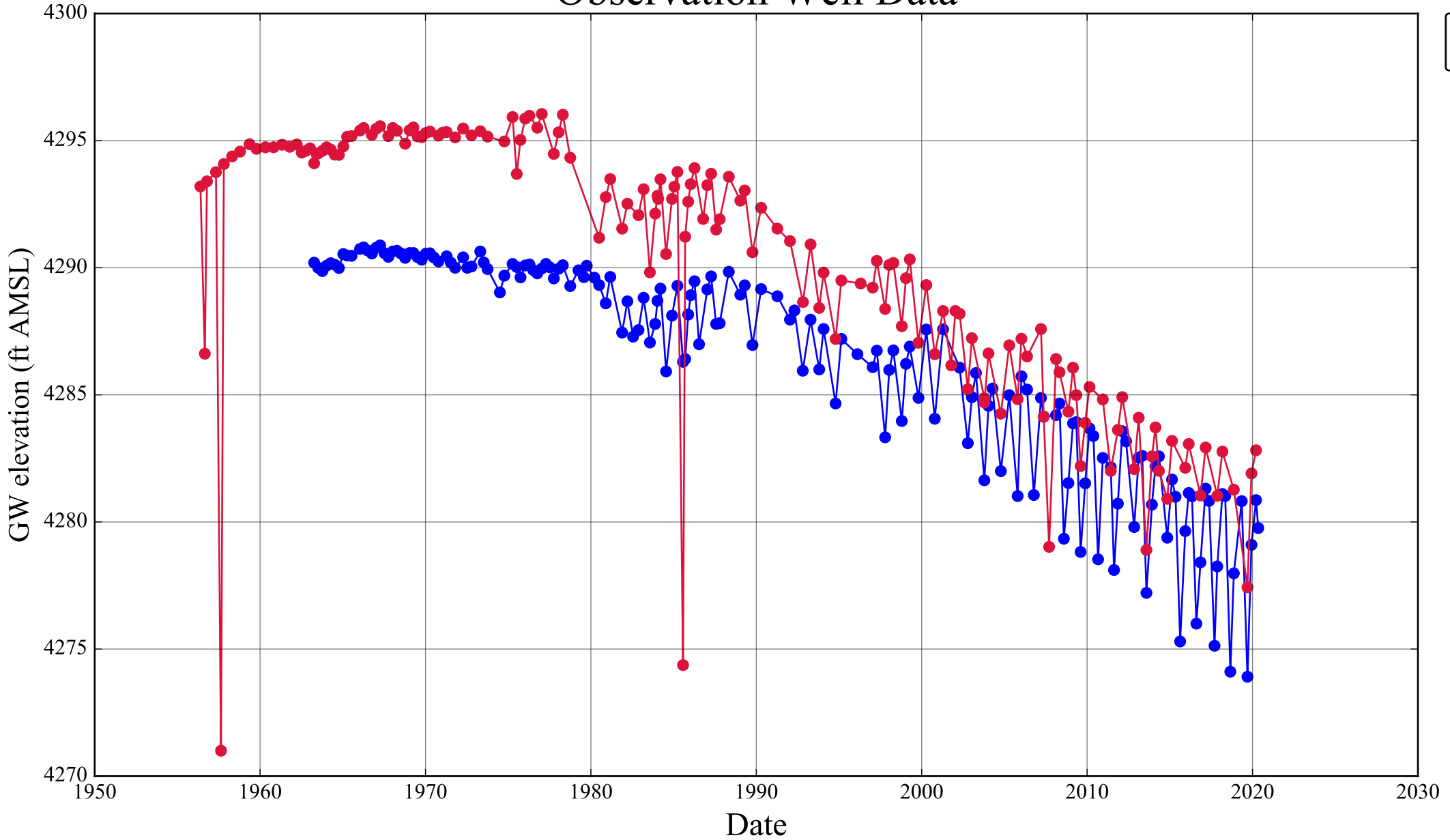
To Wells		Location TRS	Certificate & POU Acres			Total Area (acres)	Total Volume (ac-ft/yr)	Max Rate (cfs)	Pro- Rated (cfs)	Open Interval Lithology	Total Depth (feet)	Static GW Level (ft blsd)	Land Elevation (ft amsl)	Static GW Level (ft amsl)	Date
Original	Deepening		80684												
LAKE 685		T26S/R18E-sec 31 ba	30.300			30.30	90.90	0.38	0.19	pumice & clay	361	23.00	4,315.29	4,292.29	04/23/1980
						0.00	0.00	0.00	0.00					0.00	
						0.00	0.00	0.00	0.00					0.00	
						0.00	0.00	0.00	0.00					0.00	
						0.00	0.00	0.00	0.00					0.00	
Totals			30.300	0.000	0.000	30.30	90.90	0.38	0.19						

Note: The land elevations for LAKE 685 and LAKE 688 are a mix of NGVD 1929 datum

Note: The land elevations for LAKE 689, LAKE 690, and LAKE 691 are NAVD 1988 datum.

Note: The 1929 datum and 1988 datum for the same location can differ up to 4 feet.

Observation Well Data



Drawdown Calculations Using Theis Equation

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

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

Transmissivity T (gpd/ft)	Transmissivity T (ft ² /day)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft ³ /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 Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	169.99	0.38	30.00	6,185.00	3.14	0.0213	3.2952	0.5721		LAKE 691	Continuous Pumping at Full Rate	
			169.99	0.38						0.57				
"To" POA wells to Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	169.99	0.38	30.00	2,560.00	3.14	0.0036	5.0419	0.8753		LAKE 685	Continuous Pumping at Full Rate	
			169.99	0.38						0.88	0.3032			
"From" POA wells to Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	83.96	0.19	30.00	6,185.00	3.14	0.0213	3.2952	0.2825		LAKE 691	Continuous Pro-Rated Pumping	
			83.96	0.19						0.28				
"To" POA wells to Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	83.96	0.19	30.00	2,560.00	3.14	0.0036	5.0419	0.4323		LAKE 685	Continuous Pro-Rated Pumping	
			83.96	0.19						0.43	0.1498			

Drawdown Calculations Using Theis Equation

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

s = drawdown (L) r = radial distance (L)
 T = transmissivity (L*L/T) t = time (T)
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								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 Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	169.99	0.38	245.00	6,185.00	3.14	0.0026	5.3767	0.9334		LAKE 691	Continuous Pumping at Full Rate	
			169.99	0.38						0.93				
"To" POA wells to Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	169.99	0.38	245.00	2,560.00	3.14	0.0004	7.1388	1.2393		LAKE 685	Continuous Pumping at Full Rate	
			169.99	0.38						1.24	0.3059			
"From" POA wells to Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	83.96	0.19	245.00	6,185.00	3.14	0.0026	5.3767	0.4610		LAKE 691	Continuous Pro-Rated Pumping	
			83.96	0.19						0.46				
"To" POA wells to Well Lake 687 (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001														
112,207.80	15,000.00	0.00100	83.96	0.19	245.00	2,560.00	3.14	0.0004	7.1388	0.6121		LAKE 685	Continuous Pro-Rated Pumping	
			83.96	0.19						0.61	0.1511			

Drawdown Calculations Using Theis Equation

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

s = drawdown (L) r = radial distance (L)
 T = transmissivity (L²/T) t = time (T)
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								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	169.99	0.38	30.00	88,605.00	3.14	4.3616	0.0024	0.0004		LAKE 691	Continuous Pumping at Full Rate		
			169.99	0.38						0.00					
"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	169.99	0.38	30.00	84,460.00	3.14	3.9631	0.0040	0.0007		LAKE 685	Continuous Pumping at Full Rate		
			169.99	0.38						0.00	0.0003				
"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	83.96	0.19	30.00	88,605.00	3.14	4.3616	0.0024	0.0002		LAKE 691	Continuous Pro-Rated Pumping		
			83.96	0.19						0.00					
"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	83.96	0.19	30.00	84,460.00	3.14	3.9631	0.0040	0.0003		LAKE 685	Continuous Pro-Rated Pumping		
			83.96	0.19						0.00	0.0001				

Drawdown Calculations Using Theis Equation

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

s = drawdown (L) r = radial distance (L)
 T = transmissivity (L*L/T) t = time (T)
 S = storage coefficient (dimensionless) u = dimensionless
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								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	169.99	0.38	245.00	88,605.00	3.14	0.5341	0.5205	0.0904		LAKE 691	Continuous Pumping at Full Rate	
			169.99	0.38						0.09				
"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	169.99	0.38	245.00	84,460.00	3.14	0.4853	0.5780	0.1004		LAKE 685	Continuous Pumping at Full Rate	
			169.99	0.38						0.10	0.0100			
"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	83.96	0.19	245.00	88,605.00	3.14	0.5341	0.5205	0.0446		LAKE 691	Continuous Pro-Rated Pumping	
			83.96	0.19						0.04				
"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	83.96	0.19	245.00	84,460.00	3.14	0.4853	0.5780	0.0496		LAKE 685	Continuous Pro-Rated Pumping	
			83.96	0.19						0.05	0.0049			

Drawdown Calculations Using This Equation

This Equation: $s = [Q/(4*T*pi)]W(u)$
 $u = (r^2*S)/(4*T*t)$
 $W(u) = (-\ln u) - (0.5772157) + (u/1*1!) - (u^2/2*2!) + (u^3/3*3!) - (u^4/4*4!) + \dots$

s = drawdown (L) r = radial distance (L)
 T = transmissivity (L*L/T) t = time (T)
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Transmissivity T (gpd/ft)	Transmissivity T (ft ² /day)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft ³ /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	169.99	0.38	30.00	102,735.00	3.14	5.8636	0.0004	0.0001		LAKE 691	Continuous Pumping at Full Rate	
			169.99	0.38						0.00				
"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	169.99	0.38	30.00	95,805.00	3.14	5.0992	0.0010	0.0002		LAKE 685	Continuous Pumping at Full Rate	
			169.99	0.38						0.00	0.0001			
"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	83.96	0.19	30.00	102,735.00	3.14	5.8636	0.0004	0.0000		LAKE 691	Continuous Pro-Rated Pumping	
			83.96	0.19						0.00				
"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	83.96	0.19	30.00	95,805.00	3.14	5.0992	0.0010	0.0001		LAKE 685	Continuous Pro-Rated Pumping	
			83.96	0.19						0.00	0.0001			

Drawdown Calculations Using Theis Equation

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

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"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	169.99	0.38	245.00	102,735.00	3.14	0.7180	0.3613	0.0627		LAKE 691	Continuous Pumping at Full Rate	
			169.99	0.38						0.06				
"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	169.99	0.38	245.00	95,805.00	3.14	0.6244	0.4328	0.0751		LAKE 685	Continuous Pumping at Full Rate	
			169.99	0.38						0.08	0.0124			
"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	83.96	0.19	245.00	102,735.00	3.14	0.7180	0.3613	0.0310		LAKE 691	Continuous Pro-Rated Pumping	
			83.96	0.19						0.03				
"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	83.96	0.19	245.00	95,805.00	3.14	0.6244	0.4328	0.0371		LAKE 685	Continuous Pro-Rated Pumping	
			83.96	0.19						0.04	0.0061			

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

Lake
685

WATER WELL REPORT

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

STATE OF OREGON
(Please type or print)

(Do not write above this line)

State Well No. 265/18E-31bb
State Permit No. _____

(1) OWNER:

Name Morvin Morse
Address PO Box 240 Deseret Inn Motel
Christmas Valley Oregon 97138

(2) TYPE OF WORK (check):

New Well Deepening Reconditioning Abandon
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

(4) PROPOSED USE (check):

Rotary Driven
Cable Jetted Domestic Industrial Municipal
Dug Bored Irrigation Test Well Other

(5) CASING INSTALLED:

Threaded Welded
" Diam. from 0 ft. to 180 ft. Gage 1250
" 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 1200 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 100 ft.
Diameter of well bore to bottom of seal 16 1/2 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 55 sacks
How was cement grout placed? pressure grouted
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 93
NW 1/4 NW 1/4 Section 31 T.26S R.18E W.M.
Bearing and distance from section or subdivision corner _____

(11) WATER LEVEL: Completed well.

Depth at which water was first found 250 ft.
Static level 23 ft. below land surface. Date Apr. 23 - 80
Artesian pressure _____ lbs. per square inch. Date _____

(12) WELL LOG:

Diameter of well below casing 10"
Depth drilled 361 ft. Depth of completed well 360 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 sandy top soil	0	2	
Brown sandy clay	2	25	
Green clay	25	250	
white pumus w/b	250	251	
Green clay	251	306	
white pumus w/b	306	311	
Green clay	311	334	
White pumus w/b	334	340	
Green clay	340	355	
White pumus w/b	355	358	
Green clay	358	361	23

Work started Apr 23 1980 Completed April 23 1980
Date well drilling machine moved off of well April 24 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] Ston J Adams Date April 23 1980
(Drilling Machine Operator)

Drilling Machine Operator's License No. 1302

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 Lyl Adams
(Person, firm or corporation) (Type or print)

Address PO Box 1227 Hillboro Ore, 97123

[Signed] Lyl Adams
(Water Well Contractor)

Contractor's License No. 690 Date Apr 24 1980

RECEIVED

WATER WELL REPORT
STATE OF OREGON

APR 3 1981
WATER RESOURCES DEPT
SALEM, OREGON

Lake
688

State Well No. 265/8E-31cb
State Permit No.

(1) OWNER:
Name Terry Nofziger
Address
City State

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

(3) TYPE OF WELL: (4) PROPOSED USE (check):
Rotary Air Driven Domestic Industrial Municipal
Rotary Mud Dug Irrigation Test Well Other
 Bored Thermal: Withdrawal Reinjection

(5) CASING INSTALLED: Steel Plastic
Threaded Welded
14" Diam. from 0 ft. to 78 ft. Gauge 250
" 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
a pump test made? Yes No If yes, by whom?
Field: gal./min. with ft. drawdown after hrs.
Air test 1600 gal./min. with drill stem at 537 ft. 1 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Flow rate 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 78 ft.
Diameter of well bore to bottom of seal 10 1/2 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 46 sacks
How was cement grout placed? pressure grouted
Was pump installed? no 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: ft.
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Lake Driller's well number 145
NW 1/4 SW 1/4 Section 31 T.26.5 R.18 E. W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:

(11) WATER LEVEL: Completed well.
Depth at which water was first found 356 ft.
Static level 22 ft. below land surface. Date March 18 1981
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 10"
Depth drilled 537 ft. Depth of completed well 537 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 Brown soil	0	4	
Brown clay	4	17	
Green clay	17	150	
Gray clay	150	281	
Green clay	281	300	
Brown clay	300	344	
Brown shale	344	356	
Broken shale w/o	356	360	22
Brown shale	360	485	
broken shale w/o	485	487	22
Brown shale	487	488	
Broken gray basalt w/o	488	537	

Work started March 16 1981 Completed March 18 1981
Date well drilling machine moved off of well March 19 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] Stan L Adams Date March 19 1981
(Drilling Machine Operator)
Drilling Machine Operator's License No. 1302

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 Tyle Adams (Type or print)
Address Box 467 Christmas Valley, OR 97638
[Signed] Tyle Adams (Water Well Contractor)
Contractor's License No. 670 Date Mar. 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

WATER WELL REPORT
STATE OF OREGON

REC'D WATER RESOURCES DEPT
SALEM, OREGON
JUN 1 1981

State Well No. 265/18E-3/da
State Permit No. nc

lake 689

WATER RESOURCES DEPT
SALEM, OREGON

(1) OWNER:
Name Tom Notziger
Address Box 57
City Christmas Valley State Ore
97638
(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 82 ft. Gauge 250
" 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?
ft. gal./min. with ft. drawdown after hrs.
Air test 1600 gal./min. with drill stem at 583 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 82 ft.
Diameter of well bore to bottom of seal 17 in.
Diameter of well bore below seal 10, 8 3/4 in. 46 sacks
Number of sacks of cement used in well seal
How was cement grout placed? pressure grouted
Was pump installed? no 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 Latte Driller's well number 156
NE 1/4 SE 1/4 Section 31 T. 265 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 950 ft.
Static level 21 1/2 ft. below land surface. Date May 27
Artesian pressure _____ lbs. per square inch. Date _____

(12) WELL LOG: Diameter of well below casing 10, 8 3/4
Depth drilled 583 ft. Depth of completed well 577 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 sandy soil	0	2	
Brown clay	2	18	
Greenish gray clay	18	448	
occasional pumy sand			
Broken shale—med	448	510	21 1/2
Broken seams w/B			
gray basalt—hard	510	531	
Broken basalt layered with hard solid basalt w/B	531	583	21 1/2

Work started May 23 19 81 Completed May 27 19 81
Date well drilling machine moved off of well May 28 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] Tom F Adams Date May 27 19 81
(Drilling Machine Operator)

Drilling Machine Operator's License No. 1302

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 Tom Adams (Person, firm or corporation) (Type or print)
Address Box 57, Christmas Valley Ore 97638
[Signed] Tom Adams
(Water Well Contractor)
Contractor's License No. 690 Date May 27 19 81

WATER WELL REPORT
STATE OF OREGON

Lake 690

RECEIVED

JUN 17 1981

WATER RESOURCES DEPT
SALEM, OREGON

State Well No. *2165/18E-22CA*

State Permit No.

(1) OWNER:

Name *Tom Wotziger*
Address *Christmas Valley*
City *PO, 457* State *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 Air Driven Domestic Industrial Municipal
Rotary Mud Dug Irrigation Test Well Other
e Bored Thermal: Withdrawal Reinjection

(4) PROPOSED USE (check):

(5) CASING INSTALLED:

Steel Plastic
Threaded Welded
14" Diam. from *0* ft. to *100* ft. Gauge *200*
" 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 *11000* gal./min. with drill stem at *422* 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 *100* ft.

Diameter of well bore to bottom of seal *17"* in.

Diameter of well bore below seal *10"* in.

Number of sacks of cement used in well seal *58* sacks

How was cement grout placed? *pressure grouted*

Was pump installed? *NO* 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 *151*
NE 1/4 SW 1/4 Section 22 T. 265 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 *410* ft.

Static level *18 1/2* ft. below land surface. Date

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing *10"*

Depth drilled *422* ft. Depth of completed well *422* 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
<i>brown soil</i>	<i>0</i>	<i>2</i>	
<i>brown clay</i>	<i>2</i>	<i>20</i>	
<i>green clay</i>	<i>20</i>	<i>311</i>	
<i>pumy seam</i>	<i>311</i>	<i>312</i>	
<i>grey clay</i>	<i>312</i>	<i>410</i>	
<i>very broken grey basalt</i>	<i>410</i>	<i>422</i>	<i>18 1/2</i>

Work started *April 27* 19 *81* Completed *April 28* 19 *81*
Date well drilling machine moved off of well *April 28* 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] *Lyle Adams* Date *Apr 29 81*

(Drilling Machine Operator)
Drilling Machine Operator's License No. *1292*

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 *Lyle Adams*

(Person, firm or corporation)
Address *Star St Silver Lake Ore 97636*

[Signed] *Lyle Adams*

(Water Well Contractor)

Contractor's License No. *690* Date *Apr 29*, 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 691

RECEIVED

JUL 6 1981

State Well No. 265/18E-320a
State Permit No.

WATER RESOURCES DEPT
SALEM, OREGON

(1) OWNER:

Name Tom Notziger
Address BOX 457
City Christmass Valley 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 Domestic Industrial Municipal
Rotary Mud Dug Irrigation Test Well Other
Cable Bored Thermal: Withdrawal Reinjection

(4) PROPOSED USE (check):

Domestic Industrial Municipal
Irrigation Test Well Other
Thermal: Withdrawal Reinjection

(5) CASING INSTALLED:

Steel Threaded Plastic Welded
14" Diam. from 0 ft. to 85 ft. Gauge 260

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 1400 gal./min. with drill stem at 483 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 85 ft.
Diameter of well bore to bottom of seal 17 in.
Diameter of well bore below seal 10 8 3/4 in.
Number of sacks of cement used in well seal 416 sacks
How was cement grout placed? pressure grouted
Was pump installed? NO 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 157
NE 1/4 SE 1/4 Section 32 T. 26S 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 ft.
Static level 22 1/2' ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 10 8 3/4
Depth drilled 483 ft. Depth of completed well 483 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 soil	0	2	
Brown clay	2	28	
grey clay	28	52	
green clay	52	225	
grey clay & pumy seams	225	268	
green clay	268	315	
broken grey basalt w/b	315	338	22 1/2'
hard grey creviced shell	338	390	
hard grey basalt	390	403	
grey basalt broken layers	403	483	22 1/2'

Work started May 28 1981 Completed May 30 1981
Date well drilling machine moved off of well June 1 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] Tyle Adams Date June 1, 1981
(Drilling Machine Operator)
Drilling Machine Operator's License No. 1292

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 Tyle Adams (Type or print)
Address 1500 Rt. 1, Lake, Ore.
[Signed] Tyle Adams (Water Well Contractor)
Contractor's License No. 690 Date June 1, 1981