Vern

Oregon

Theodore R. Kulongoski, Governor

Water Resources Department
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INTEROFFICE MEMO

FORWARD TO: ☞ Sarah Henderson DATE: 2-16-07
FIELD PROCESSOR WORKING ON THIS TRANSFER

FROM: _____ WATERMASTER, DISTRICT # [redacted]

(SIGNATURE) Gerald Grondin GERALD GRONDIN date signed 8 March 2007
signed by injury reviewer

SUBJECT: **WATER RIGHT TRANSFER #** 10316

A change in: **POU** **POD** **POA** **USE** of water.

In the name(s) of Daniel & Tammy Shuck

In my opinion (assuming the right is valid), the proposed change

MAY BE MADE WITHOUT INJURY WOULD RESULT IN INJURY* to an existing water right.

↳ see attached memo and recommended condition

*The approval of this transfer application would result in injury to other water rights because

_____

_____

_____

_____

The existing right may not be valid because _____

_____

_____

Headgate notices HAVE HAVE NOT Been issued for diversion from the source(s)which serve(s) this right.

If for change in point of diversion, is there any intervening point(s) for diversion between the authorized and proposed points of diversion? (Yes or No) _____

In my opinion, the order approving the subject transfer application should include the following in regard to the appropriator installing suitable measuring devices in the diversion works:

_____ (1) PRIOR to the diverting of water at the new point of diversion . . .

_____ (2) WHEN IN the judgement of the watermaster it becomes necessary . . .

The enclosed copy of the transfer application and map(s) is for your records.

Oregon Water Resources Department
Memorandum

Date: 8 March 2007

To: Transfer Section and Application File G-5618 and Transfer File T-10316

From: Jerry Grondin, OWRD Hydrogeologist

Subject: Ground Water Transfer Technical Review
Application Number: G-5618
Permit Number: G-5457
Certificate Number: 74895
Transfer Number: T-10316
Transfer Applicant: Daniel & Tammy Shuck

Daniel and Tammy Shuck have applied for a water right transfer related to application G-5618, permit G-5457, certificate 74895. The transfer seeks to change the point of appropriation (POA) from a well located at T40S/R11E-sec 32 ACC (40 feet north & 600 feet east from the center of section 32) to a well located at T40S/R11E-sec 33 BCA (1400 feet south and 840 feet east from the northwest corner of section 33).

The well identified at the current POA by the transfer application and the water right application is KLAM 14775 constructed in 1958. However, the actual well being used appears to have changed to KLAM 10268 constructed in 1991 and located 22 feet from KLAM 14775 (see history below). The well identified at the proposed new POA is well KLAM 50223.

Water Right and Well History

?? August 1958	well KLAM 14775 is constructed
14 September 1971	ground water right application received by OWRD
21 February 1975	ground water permit signed by OWRD
26 April 1976	final proof survey conducted by OWRD staff
17 November 1978	water right certificate 46872 signed by OWRD
21 June 1991	Charles Shuck notes he is unable to do pump test due problem with well
24 July 1991	well KLAM 10268 constructed (22 feet from KLAM 14775)
15 August 1991	pump test received by OWRD (KLAM 14775 or KLAM 10268?)
12 March 1997	OWRD receives transfer application T-7731 to change the POA from well KLAM 14775 to a new well to be constructed
14 July 1997	water right transfer T-7731 approval signed by OWRD

13 August 1997	OWRD receives a note from Charles Shuck that requests OWRD to not approve water right transfer T-7731, Mr. Shuck tells OWRD staff that costs to construct the new well are too high
27 August 1997	water right certificate 74895 signed by OWRD to supersede certificate 46872 and confirm **changes not completed** under water right transfer T-7731
05 July 2000	Charles Shuck verbally confirms to OWRD staff that KLAM 14775 is not fixed, but replaced by KLAM 10268 located 22 feet away (an "informal transfer")
08 February 2007	OWRD receives transfer application T-7731 to change the POA from well KLAM 14775 (T40S/R11E-sec 32 ACC, 40 feet north & 600 feet east from the center of section 32) to well KLAM 50223 (T40S/R11E-sec 33 BCA, 1400 feet south and 840 feet east from the northwest corner of section 33)

Comparative Assessment of well KLAM 14775 and well KLAM 10268

Notes in water right file G-5618 indicates an "informal transfer" from well KLAM 14775 to well KLAM 10268 occurred due to problems with well KLAM 14775. The wells are 22 feet apart.

Well	KLAM 14775	KLAM 10268
Date completed	August 1958	July 1991
Total Depth	137 feet	191 feet
Casing	0 to 17 feet blsd	+1 to 58 feet blsd
Seal	0 to 17 feet blsd	0 to 58 feet blsd
Sed-Basalt Contact	67 feet blsd	63 feet blsd
First water	?	4 feet
Water Producing Zones	cinders & basalt	basalt
Static water level	82 feet blsd	94 feet blsd
Yield	515 gpm	800 gpm
Drawdown	7 feet	14 feet
Elapsed time	4 hours	4 hours
Specific capacity	73.57 gal/ft	57.14 gal/ft

The available information indicates both wells obtain water from the same source, primarily basalt.

It should be noted that hydrogeologic data indicates ground water in the basalt and the overlying sediments in the Upper Klamath Basin valleys is hydraulically connected. However, the yield from basalt is typically much higher than the yield from the overlying sediments.

Transfer Technical Review by Ground Water Section Staff

1. A comparison of wells KLAM 14775, well KLAM 10268, and KLAM 50223:

Well	KLAM 14775	KLAM 10268	KLAM 50224
Date completed	August 1958	July 1991	May 1974
Total Depth	137 feet	191 feet	190 feet
Casing	0 to 17 feet blsd	+1 to 58 feet blsd	0 to ? feet
Seal	0 to 17 feet blsd	0 to 58 feet blsd	0 to 20 feet blsd
Sed-Basalt Contact	67 feet blsd	63 feet blsd	3 feet blsd
First water	?	4 feet	100 feet
Water Producing Zones	cinders & basalt	basalt	basalt
Static water level	82 feet blsd	94 feet blsd	110 feet blsd
Yield	515 gpm	800 gpm	1200 gpm
Drawdown	7 feet	14 feet	0 feet
Elapsed time	4 hours	4 hours	4 hours
Specific capacity	73.57 gal/ft	57.14 gal/ft	?
Water temperature	?	79 degree F	72 degree F
Land elevation (map)	4115 feet	4115 feet	4145 feet

The available information indicates the 3 wells obtain water from the same source, primarily basalt.

Again, it should be noted that hydrogeologic data indicates ground water in the basalt and the overlying sediments in the Upper Klamath Basin valleys is hydraulically connected. However, the yield from basalt is typically much higher than the yield from the overlying sediments.

2. The ground water at wells KLAM 14775, well KLAM 10268, and KLAM 50223 is hydraulically connected to the Lost River.

Well	Distance to Lost River	Comment
KLAM 14775	4900 feet	original POA well
KLAM 10268	4900 feet	"informal transfer" well
KLAM 50223	8000 feet	proposed new POA well

The POA well proposed by transfer application T-7731 is further away from the Lost River than the original POA well. Therefore, the ground water interference with the Lost River should be the same or less than currently allowed under the existing water right.

3. The POA well proposed by transfer application T-7731 is closer to a neighboring water right well than the original POA well.

Well	Distance to nearest Water right well	Comment
KLAM 14775	2500 feet	original POA well
KLAM 10268	2500 feet	"informal transfer" well
KLAM 50223	1500 feet	proposed new POA well

The ground water drawdown interference with the closest neighboring water right well will be greater than currently occurs under the existing water right. The increased drawdown was estimated using the Theis equation and a range of transmissivity values derived from specific capacity data for wells KLAM 14775 and well KLAM 10268 and the "Silbernagle aquifer test" conducted by OWRD staff.

The drawdown at the closest water right well is estimated to increase at most an additional 0.14 feet to 0.22 feet during the irrigation season (see attached spreadsheet), a 11 to 29 percent increase. This should result in "injury" as defined by OAR 690-380-0100.

Injury Assessment by Ground Water Section Staff

OAR 690-380-100 (definitions) notes "(3) 'Injury' or 'Injury to an existing water right' means a proposed transfer would result in another, existing water right not receiving previously available water to which it is legally entitled."

The proposed change by water right transfer T-10316 may be made without "injury" as defined by OAR 690-380-100 given:

- The new POA well is located further away from the Lost River; and
- The closest neighboring water right well should continue receiving previously available water to which it is legally entitled despite the increased drawdown.

Recommended Condition by Ground Water Section Staff

Existing well KLAM 14775 shall be properly abandoned before use of the new POA well begins.

Attachments:

Map showing well locations
Water well reports (well logs) for KLAM 14775, KLAM 10268, and KLAM 50223
Theis drawdown calculations
Specific capacity to transmissivity calculations

Drawdown Calculations Using Theis Equation

Theis Equation: $s = [Q/(4*T*pi)][W(u)]$

$u = (r*r*S)/(4*T*t)$

$W(u) = (-\ln u)-(0.5772157)+(u/1*1!)-(u*u/2*2!)+(u*u*u/3*3!)-(u*u*u*u/4*4!)+...$

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

Transmissivity T (gpd/ft)	Transmissivity T (ft2/day)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft3/sec)	Time t (days)	Distance r (feet)	pi	u	W(u)	Drawdown s (feet)	Comments
								Note : W(u) calculation valid when u < 7.1			
Note:	yellow grid areas are where values are calculated							7.0000	1.1545E-04		W(u) calculation test
KLAM 14775 and KLAM 10268 to Closest Water Right Well (lowest Transmissivity from Silbernagle Aquifer Test)											
141,100.00	18,862.33	0.00750	210.95	0.47	30.00	2,500.00	3.14	0.0207	3.3206	0.5689	Continuous Pumping at Full Rate
141,100.00	18,862.33	0.00750	210.95	0.47	184.00	2,500.00	3.14	0.0034	5.1171	0.8767	Continuous Pumping at Full Rate
141,100.00	18,862.33	0.00750	210.95	0.47	245.00	2,500.00	3.14	0.0025	5.4026	0.9256	Continuous Pumping at Full Rate
KLAM 14775 and KLAM 10268 to Closest Water Right Well (highest Transmissivity from Silbernagle Aquifer Test)											
174,700.00	23,353.99	0.00750	210.95	0.47	30.00	2,500.00	3.14	0.0167	3.5302	0.4885	Continuous Pumping at Full Rate
174,700.00	23,353.99	0.00750	210.95	0.47	184.00	2,500.00	3.14	0.0027	5.3300	0.7375	Continuous Pumping at Full Rate
174,700.00	23,353.99	0.00750	210.95	0.47	245.00	2,500.00	3.14	0.0020	5.6157	0.7770	Continuous Pumping at Full Rate
KLAM 14775 and KLAM 10268 to Closest Water Right Well (Transmissivity from KLAM 14775 Specific Capacity Data)											
148,122.61	19,801.11	0.00010	210.95	0.47	30.00	2,500.00	3.14	0.0003	7.6663	1.2511	Continuous Pumping at Full Rate
148,122.61	19,801.11	0.00010	210.95	0.47	184.00	2,500.00	3.14	0.0000	9.4798	1.5471	Continuous Pumping at Full Rate
148,122.61	19,801.11	0.00010	210.95	0.47	245.00	2,500.00	3.14	0.0000	9.7661	1.5938	Continuous Pumping at Full Rate
KLAM 14775 and KLAM 10268 to Closest Water Right Well (Transmissivity from KLAM 10268 Specific Capacity Data)											
113,291.29	15,144.84	0.00010	210.95	0.47	30.00	2,500.00	3.14	0.0003	7.3983	1.5786	Continuous Pumping at Full Rate
113,291.29	15,144.84	0.00010	210.95	0.47	184.00	2,500.00	3.14	0.0001	9.2117	1.9655	Continuous Pumping at Full Rate
113,291.29	15,144.84	0.00010	210.95	0.47	245.00	2,500.00	3.14	0.0000	9.4980	2.0266	Continuous Pumping at Full Rate
KLAM 50223 to Closest Water Right Well (lowest Transmissivity from Silbernagle Aquifer Test)											
141,100.00	18,862.33	0.00750	210.95	0.47	30.00	1,500.00	3.14	0.0075	4.3291	0.7416	Continuous Pumping at Full Rate
141,100.00	18,862.33	0.00750	210.95	0.47	184.00	1,500.00	3.14	0.0012	6.1366	1.0513	Continuous Pumping at Full Rate
141,100.00	18,862.33	0.00750	210.95	0.47	245.00	1,500.00	3.14	0.0009	6.4226	1.1003	Continuous Pumping at Full Rate
KLAM 50223 to Closest Water Right Well (highest Transmissivity from Silbernagle Aquifer Test)											
174,700.00	23,353.99	0.00750	210.95	0.47	30.00	1,500.00	3.14	0.0060	4.5412	0.6284	Continuous Pumping at Full Rate
174,700.00	23,353.99	0.00750	210.95	0.47	184.00	1,500.00	3.14	0.0010	6.3499	0.8786	Continuous Pumping at Full Rate
174,700.00	23,353.99	0.00750	210.95	0.47	245.00	1,500.00	3.14	0.0007	6.6360	0.9182	Continuous Pumping at Full Rate
KLAM 50223 to Closest Water Right Well (Transmissivity from KLAM 14775 Specific Capacity Data)											
148,122.61	19,801.11	0.00010	210.95	0.47	30.00	1,500.00	3.14	0.0001	8.6878	1.4178	Continuous Pumping at Full Rate
148,122.61	19,801.11	0.00010	210.95	0.47	184.00	1,500.00	3.14	0.0000	10.5014	1.7138	Continuous Pumping at Full Rate
148,122.61	19,801.11	0.00010	210.95	0.47	245.00	1,500.00	3.14	0.0000	10.7877	1.7605	Continuous Pumping at Full Rate
KLAM 50223 to Closest Water Right Well (Transmissivity from KLAM 10268 Specific Capacity Data)											
113,291.29	15,144.84	0.00010	210.95	0.47	30.00	1,500.00	3.14	0.0001	8.4197	1.7965	Continuous Pumping at Full Rate
113,291.29	15,144.84	0.00010	210.95	0.47	184.00	1,500.00	3.14	0.0000	10.2333	2.1835	Continuous Pumping at Full Rate
113,291.29	15,144.84	0.00010	210.95	0.47	245.00	1,500.00	3.14	0.0000	10.5197	2.2446	Continuous Pumping at Full Rate

Transmissivity from Specific Capacity using the Theis Equation

Adapted from Vorhis (1979)

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

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

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

Note: Well efficiency is not included in the calculations

References:

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

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

Data Entry	Enter Data Below (yellow boxes only)	
Well Log ID or Comment for Records	KLAM 14775	
Pumping Rate (gpm) = Q =	515.00	(gpm)
Drawdown (feet) = s =	7.00	(feet)
Time (hours) = t =	4.0000	(hours)
Storage Coefficient = S =	0.001000	(dimensionless)
Well Diameter (inches) = d =	10.0000	(inches)
	Press F9 to Calculate	

Calculated Results	Calculated Results	
Transmissivity (ft2/day) = T =	19,801.11	(ft2/day)
Transmissivity (gpd/ft) = T =	148,122.61	(gpd/ft)
Transmissivity Difference = (last 2 iterations)	0.0000E+00 okay to use T if diff < 0.0001	(ft2/day)
u = (last iteration)	1.3152E-08 okay to use T if u <7.1	

Drawdown s (feet)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft3/sec)	Time t (days)	Distance r = d/2 (feet)	u	W(u)	Transmissivity T (ft2/day)	Transmissivity difference from previous	Comments	Theis Equation Iteration
Note: yellow grid areas are where values are calculated						Note : W(u) calculation valid when u < 7.1					
						7.0000	1.1545E-04			W(u) calculation test	
7.00	0.00100	515.00	1.15	0.17	0.42			14,162.50		T = Q/s	
7.00	0.00100	515.00	1.15	0.17	0.42	1.8388E-08	17.2344	19,423.40	5.2609E+03	T = Theis Equation	1.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3407E-08	17.5502	19,779.41	3.5600E+02	T = Theis Equation	2.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3166E-08	17.5684	19,799.88	2.0470E+01	T = Theis Equation	3.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5694	19,801.04	1.1657E+00	T = Theis Equation	4.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	6.6352E-02	T = Theis Equation	5.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	3.7766E-03	T = Theis Equation	6.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	2.1495E-04	T = Theis Equation	7.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	1.2234E-05	T = Theis Equation	8.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	6.9633E-07	T = Theis Equation	9.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	3.9632E-08	T = Theis Equation	10.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	2.2555E-09	T = Theis Equation	11.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	1.2733E-10	T = Theis Equation	12.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	13.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	14.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	15.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	16.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	17.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	18.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	19.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	20.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	21.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	22.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	23.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	24.00
7.00	0.00100	515.00	1.15	0.17	0.42	1.3152E-08	17.5695	19,801.11	0.0000E+00	T = Theis Equation	25.00

Transmissivity from Specific Capacity using the Theis Equation

Adapted from Vorhis (1979)

Theis Equation: T = [Q/(4*s*pi)][W(u)]

u = (r*r*S)/(4*T*t)

W(u) = (-ln u)-(0.5772157)+(u/1*1!)-(u*u/2*2!)+(u*u*u/3*3!)-(u*u*u*u/4*4!)+...

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

Note: Transmissivity is derived using an iterative process

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

Note: Well efficiency is not included in the calculations

References:

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

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

Data Entry	Enter Data Below (yellow boxes only)	
Well Log ID or Comment for Records	KLAM 10268	
Pumping Rate (gpm) = Q =	800.00	(gpm)
Drawdown (feet) = s =	14.00	(feet)
Time (hours) = t =	4.0000	(hours)
Storage Coefficient = S =	0.001000	(dimensionless)
Well Diameter (inches) = d =	10.0000	(inches)
	Press F9 to Calculate	

Calculated Results	Calculated Results	
Transmissivity (ft2/day) = T =	15,144.84	(ft2/day)
Transmissivity (gpd/ft) = T =	113,291.29	(gpd/ft)
Transmissivity Difference = (last 2 iterations)	0.0000E+00 okay to use T if diff < 0.0001	(ft2/day)
u = (last iteration)	1.7195E-08 okay to use T if u <7.1	

Drawdown s (feet)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft3/sec)	Time t (days)	Distance r = d/2 (feet)	u	W(u)	Transmissivity T (ft2/day)	Transmissivity difference from previous	Comments	Theis Equation Iteration
Note: yellow grid areas are where values are calculated						Note : W(u) calculation valid when u < 7.1					
						7.0000	1.1545E-04			W(u) calculation test	
14.00	0.00100	800.00	1.78	0.17	0.42			11,000.00		T = Q/s	
14.00	0.00100	800.00	1.78	0.17	0.42	2.3674E-08	16.9817	14,854.93	3.8649E+03	T = Theis Equation	1.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7519E-08	17.2828	15,128.51	2.6358E+02	T = Theis Equation	2.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7214E-08	17.3003	15,143.90	1.5385E+01	T = Theis Equation	3.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7196E-08	17.3014	15,144.79	8.8976E-01	T = Theis Equation	4.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	5.1428E-02	T = Theis Equation	5.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	2.9725E-03	T = Theis Equation	6.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	1.7181E-04	T = Theis Equation	7.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	9.9302E-06	T = Theis Equation	8.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	5.7395E-07	T = Theis Equation	9.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	3.3175E-08	T = Theis Equation	10.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	1.9172E-09	T = Theis Equation	11.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	1.0914E-10	T = Theis Equation	12.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	13.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7196E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	14.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	15.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	16.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	17.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	18.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	19.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	20.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	21.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7196E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	22.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	23.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	24.00
14.00	0.00100	800.00	1.78	0.17	0.42	1.7195E-08	17.3014	15,144.84	0.0000E+00	T = Theis Equation	25.00

ORIGINAL
File Original and Duplicate with the STATE ENGINEER, SALEM, OREGON

RECEIVED
SEP 5 1958
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

KGM 14775
G 5618
App G 1257

State Well No. 40/11-32 G (1)
App G-5618
State Permit No. Original Well

(1) OWNER:
Name Mr. Jim Shuck
Address Merrill, Oregon

(2) LOCATION OF WELL:
County Klamath Owner's number, if any—
NW ¼ NE ¼ Section 32 T. 40 S R. 11 E W.M.
Bearing and distance from section or subdivision corner
East 522 ft N 43 ft. from fence corner on S.W. corner of above discription

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

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

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

(6) CASING INSTALLED:
Threaded ☐ Welded ☒
10" Diam. from 0 ft. to 17 ft. Gage ¼
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) 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.
perforations from ft. to ft.
perforations from ft. to ft.

(8) 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.

(9) CONSTRUCTION:
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? 17 ft.
Material used in seal— cement
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 82 ft. below land surface Date Aug 15, 58
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] John Shuck (Owner) Date 8/16, 1958

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Interstate
Yield: 515 gal./min. with 7 ft. drawdown after 4 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 ☒ No

(12) WELL LOG:
Diameter of well 10 inches.
Depth drilled 137 ft. Depth of completed well 137 ft.
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top soil	0	4
Sand and gravel	4	14
White sand chalk	14	18
Brown clay	18	38
Brown clay (dark)	38	67
Brown black lava	67	98
Red cinders (water)	98	105
Grey lava	105	112
Red cinders (water)	112	115
Red lava rock	115	124
Grey lava rock	124	130
Red grey lava (crevice)	130	135
Grey lava	135	137

Work started July 1958 Completed Aug 8

(13) PUMP:
Manufacturer's Name
Type: H.P.

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

NAME Wilson Drilling Contractor
(Person, firm, or corporation) (Type or print)
Address Box 136, Merrill, Oregon
Driller's well number 25
[Signed] Walter L Wilson
(Well Driller)
License No. 169 Date Aug. 15, 1958

(USE ADDITIONAL SHEETS IF NECESSARY)

17

KLAM 10268

RECEIVED
AUG 30 1991
WATER RESOURCES DEPT
SALEM, OREGON

Appl G-5618
Replacement Well
22 ft from KLAM 14775

405/11E/32CC

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

(START CARD) # 30943

(1) OWNER:
Well Number:
Name Charles V. Shuck
Address P.O. Box 204
City Merrill State OR Zip 97633

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

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

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

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☐ No ☒ Depth of Completed Well 191 ft.
Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
14"	0	58	Cement &	0	58	21 sacks
			Bentonite			2sacks
10"	58	191				

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:	10"	+1	58	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) 58 ft.

(7) PERFORATIONS/SCREENS: None
☐ Perforations Method
☐ Screens Type Material

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

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

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.
800	14 ft		4 hrs

Temperature of water 79° F 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 Surface
Depth of strata: 4 ft.

(9) LOCATION OF WELL by legal description:
County Klamath Latitude Longitude
Township 40 S N or S. Range 11 E E or W. WM.
Section 32 SW ¼ NE ¼
Tax Lot 40-110320300 Block Subdivision
Street Address of Well (or nearest address) Dodds Hollow Rd. Merrill, OR

(10) STATIC WATER LEVEL:
94 ft. below land surface. Date 7-24-91
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 4 ft.

From	To	Estimated Flow Rate	SWL
106	193		94'

(12) WELL LOG: Ground elevation 4150

Material	From	To	SWL
Top Soil	0	2	
Sandy Brown Clay & Gravel	2	8	WB
Sandy Brown Clay	8	19	
Yellow Clay	19	51	
Black Lava Rocccck	51	57	
Brown Sandstone	57	63	
Black & Brown Lava Rock	63	101	
Red Cinder Rock	101	106	
Brown Lava Rock WB	106	113	94'
Gray Rock WB	113	168	94'
Brown Lava Rock WB	168	176	94'
Fractured Black & Brown - Rock WB	176	183	94'
Brown Lava Rock WB	183	191	94'

Date started 7-22 Completed 7-24-91
8-26-91 pump in

(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 well construction standards. Materials used and information reported above are true to my best 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 well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 408
Signed Norm Lewis Date 8-1-91

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 1/88

Klam
50223

WATER WELL REPORT
STATE OF OREGON

Application No. G-1617
Permit No.

RECEIVED
MAR 05 1981
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. T-10316 Change of POA for app G-5618 permit G-5457 cert 46872 74895

State Permit No.

(1) OWNER:
Name Stan Flesher (Now Chapples Jim Shuck ranch)
Address Dodds Hollow Rd.
City Merrill, Oregon 97633 State

(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 ☒ Threaded ☐ Plastic ☐ Welded ☐
10" Diam. from 0 ft. to 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? Art Reed
Yield: 1200 gal/min. with 0 ft. drawdown after 4 hrs.
" gal/min. with ft. drawdown after hrs.
Air test gal/min. with drill stem at ft. hrs.
Bailer test gal/min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 72 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? grouted in.
or pumped in.
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 Klamath Driller's well number
SW ¼ NW ¼ Section 33 T. 40S R. 11E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: Approx 800 feet east and ~~west~~ ~~north~~ ~~south~~ of the N.W. corner of S33 T40S R 11E

(11) WATER LEVEL: Completed well.
Depth at which water was first found 110 ft.
Static level 110 ft. below land surface. Date 5/20/74
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 14
Depth drilled 190 ft. Depth of completed well 190 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
Top soil brown	0	3	
Lava rock blue grey	3	30	
Lava rock black	30	90	
Red brown lava	90	110	~~110~~
Red lava rock	110	112	110
Blue grey lava rock	112	150	
Broken laa black & blue	150	190	110

Work started 4/2 19 74 Completed 5/20 19 74
Date well drilling machine moved off of well 5/20 19 74

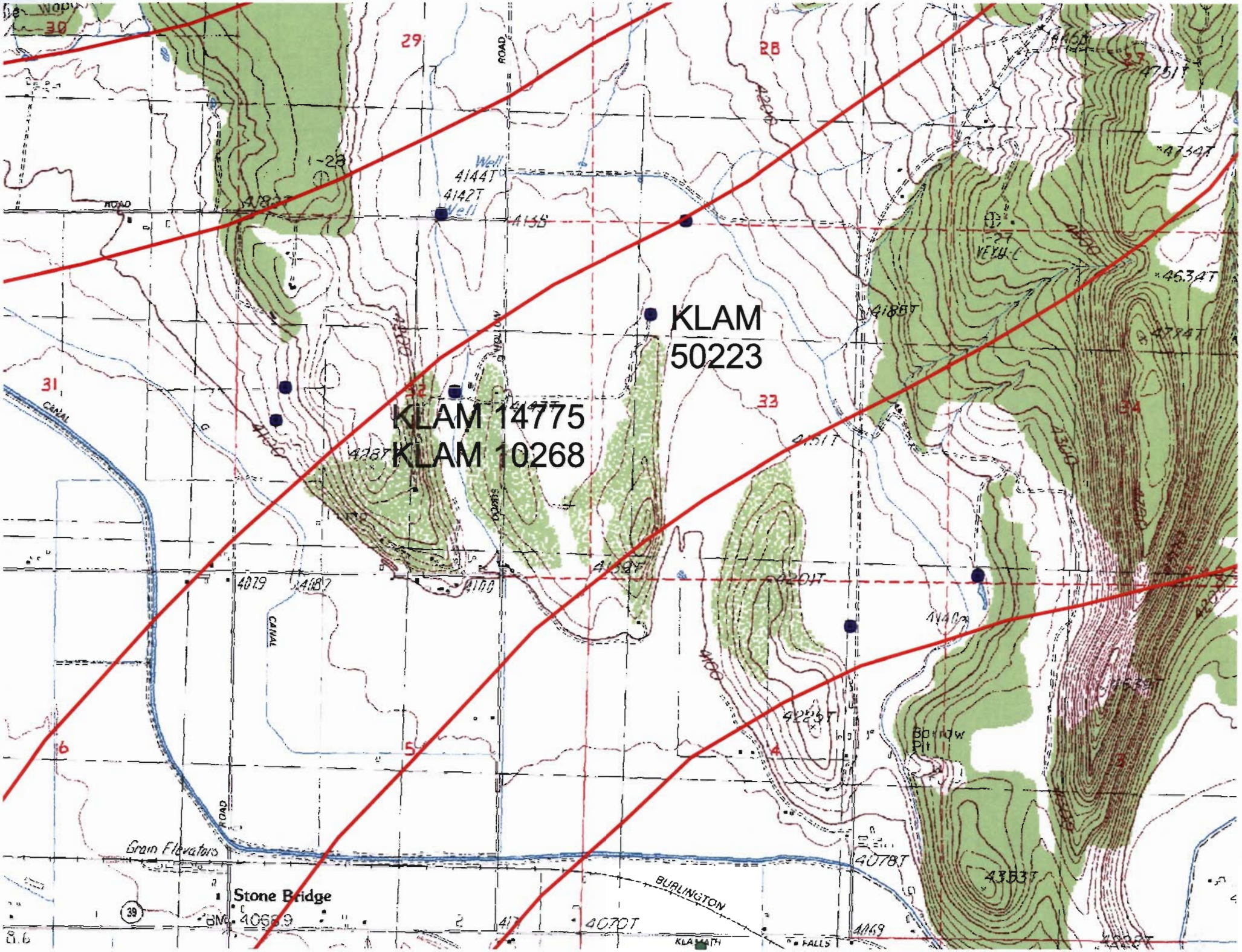
Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Walter F. Wilson (Drilling Machine Operator) Date 5/20, 19 74
Drilling Machine Operator's License No. 201

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 Wilson Drilling Cont. Inc. (Person, firm or corporation) (Type or print)
Address P.O. Box 136, Merrill, Oregon 97632
[Signed] Walter F. Wilson (Water Well Contractor)
Contractor's License No. 169 Date 5/20, 19 74

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

SP*12658-680


KLAM
50223
KLAM 14775
KLAM 10268
Stone Bridge
Grain Elevators
Well
Well
CANAL
CANAL
ROAD
ROAD
ROAD
BURLINGTON
KLAMATH
FALLS
Borrow
Pit
29
28
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32
33
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4
3
39

Water Right Conditions Tracking Slip

Groundwater/Hydrology Section

FILE # # T-10316

ROUTED TO: Sarah Henderson (Transfer Section)

TOWNSHIP/
RANGE-SECTION: 40S / 11E - sec 32 & 33

CONDITIONS ATTACHED?: [X] yes [ ] no

REMARKS OR FURTHER INSTRUCTIONS:

See pg 4 of review mem

- proposed change may be made w/o injury
- condition to abandon well KLAM 14775

Reviewer: Jerry Grondin