WATER RESOURCES DEPARTMENT

MEMO 27 August, 2007

TO: **Application G-** 16819

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

SUBJECT: **Scenic Waterway Interference Evaluation**

_____YES
The source of appropriation is within or above a Scenic Waterway
__X__NO

_____YES
Use the Scenic Waterway condition (Condition 7J)
_____NO

_____Per ORS 390.835, the Ground Water Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

_____Per ORS 390.835, the Ground Water Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in _____ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

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

PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section Date 27 August 2007

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

SUBJECT: Application G- 16819 Supersedes review of none
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review ground water applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation.**

A. GENERAL INFORMATION: **Applicant's Name:** William & Jana Jones **County:** Harney

A1. Applicant(s) seek(s) (898 gpm) 2.00 cfs from 1 well(s) in the Malheur Lake Basin, Harney-Malhuer Lakes subbasin Quad Map: Ninemile Slough & Carson Point

A2. Proposed use: Irrigation (primary 80 acres) Seasonality: 1 March – 31 October (245 days)

A3. Well and aquifer data **(attach and number logs for existing wells; mark proposed wells as such under logid):**

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	Not drilled	Well 1	Not identified	2.00	23S/32.5E-sec 15DDB	1320' N, 858' W fr SE cor S 15
2						
3						
4						
5						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	4126				300	= / > 18	= / > 18					

Use data from application for proposed wells.

A4. **Comments:**

The proposed pumping rate of 2.00 cfs (898 gpm) is greater than the 1.00 cfs (449 gpm) allowed for 80 acres.

Well is proposed, yet to be constructed.

The proposed aquifer is not identified. Basin fill is likely. Piper and others (1939), Greene and others (1972), and Walker (1979) maps and water well reports for neighboring wells show basin fill sediment including gravel, sandstone, black sand and pumice.

A5. ☐ **Provisions of the** Malheur Lake Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water ☒ **are**, *or* ☐ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: OAR 690-512 applies (see attached), see PSI analyses, see ground water elevation versus surface water elevation comments.

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

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

B1. **Based upon available data,** I have determined that ground water* for the proposed use:

a. ☐ **is** over appropriated, ☐ **is not** over appropriated, *or* ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the ground water portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☐ **will not** *or* ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the ground water portion of the injury determination as prescribed in OAR 690-310-130;

c. ☐ **will not** *or* ☐ **will** likely to be available within the capacity of the ground water resource; or

d. ☒ **will, if properly conditioned,** avoid injury to existing ground water rights or to the ground water resource:
   i. ☒ The permit should contain condition #(s) 7B, 7F, 7N;
   ii. ☐ The permit should be conditioned as indicated in item 2 below.
   iii. ☐ The permit should contain special condition(s) as indicated in item 3 below;

B2. a. ☐ **Condition** to allow ground water production from no deeper than _____ ft. below land surface;

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

c. ☐ **Condition** to allow ground water production only from the _____ ground water reservoir between approximately_____ ft. and_____ ft. below land surface;

d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Ground Water Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. **Ground water availability remarks:**

Recommend conditions 7B, 7F, and 7N

The proposed well site is located within Harney Valley in an area east of Burns and north of Malheur Lake between Ninemile Slough and Malheur Slough. The area is surficially mapped as Qal by Piper and others (1939), Qal by Leonard (1970), and Qs by Greene and others (1972). Water well reports for neighboring wells show basin fill sediment including gravel, sandstone, black sand and pumice.

Available data, including Piper and others (1939), Leonard (1970), and water well reports indicate ground water in the basin fill is generally unconfined and hydraulically connected to Malheur and Harney Lakes. Some local confinement can occur where discontinuous low permeability layers are present. Leonard (1970) indicates confined ground water occurs at depth in the basin in deep basin fill sediments and underlying Tertiary volcanic and sedimentary rocks. Hubbard (1975) indicates the ground water contribution to flow into Malheur Lake is small with the lake perched above ground water in most areas.

The closest wells with ground water level trend data are wells HARN 547 in T23S/R32E-sec 07 (about 9.3 miles to the west) and HARN 741 in T23S/R34E-sec 31 (about 9.5 miles to the southeast). Both are completed in sediments, and both are in the same sub-basin as the applicant's well. The ground water level data for HARN 547 is from 1960 to 2006 and for HARN 741 is from 1974 to 2006. The ground water level trend at each site show seasonal and climatic influences. A possible net decline of less than 5 feet may have occurred at both sites. Interestingly, no recovery of the annual trend is apparent from 1996 to 1999, a generally wetter than average period in Oregon. Seasonal ground water level fluctuations range from 10 to 40 feet. This could adversely impact the use of shallow wells, but likely not adversely impact the use of deeper wells.

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

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

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**Basin fill sediments**	☐	☒
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation:

Available data, including Piper and others (1939), Leonard (1970), and water well reports indicate ground water in the basin fill is generally unconfined and hydraulically connected to surface water including Malheur and Harney Lakes. Some local confinement can occur where discontinuous low permeability layers are present. Leonard (1970) indicates confined ground water occurs at depth in the basin in deep basin fill sediments and underlying Tertiary volcanic and sedimentary rocks. Hubbard (1975) indicates ground water flow into Malheur Lake is small with the lake perched above ground water in most areas.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	Ninemile Slough & tributaries	4115	4120	4,700	☒	☐	☐	☐	☒
1	2	Malheur Slough	4115	4120	8,400	☒	☐	☐	☐	☒
1	3	Malheur & Harney Lakes	4115	4098	70,500	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation:

Ground water elevation data for the vicinity found in Piper and others (1939), Leonard (1970), and water well reports (well logs) indicate ground water elevations from 4110 to 4120 feet over multiple decades with seasonal fluctuations. The ground water connection to surface water may or may not be at the nearest reach.

Malheur Lake is the basin outlet for ground water flow (through evaporation). The lake elevation above is for 1983 derived from USGS 1:24,000 quadrangle maps. The distance is to the 1983 shoreline. The shoreline location can significantly vary.

Water Availability Basin the well(s) are located within:

NINEMILE SL > MALHEUR SL - AT MOUTH
MALHEUR SL > MALHEUR L - AB NINEMILE SL
No WAB for Harney & Malheur Lakes

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	☐	☐	None	N.A.	☐	0.26	☒	6.3	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments:

The distance from owner proposed well 1 to Ninemile Slough and tributaries is less than 1 mile (4,700 feet).

Potential for substantial interference must be assumed given the proposed pumping rate exceeds 1 percent of the natural flow (80 percent exceedance).

Hunt (1999) was used to calculate the interference at Ninemile Slough and tributaries given the well will likely not penetrate the basin fill sediments. The values used for the calculations are conservative and appropriate until better values become available. The calculations used a transmissivity of 7,500 ft2/day which is consistent for Eastern Oregon basin fill transmissivities noted by Gonthier (1985) and transmissivity values derived from specific capacity data from wells in T23S/R32.57E-sec 10, 13, 14, 15, 22, and 24 (HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204). Additionally, the calculation used an assumed intermediate storage coefficient (0.001). The hydraulic conductivity assigned to the bed of the tributary is 0.20 feet/day.

Application: G- 16819 continued   Date: 27 August 2007

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	10.8%	9.7%	4.9%	8.0%	10.4%	12.3%	13.9%	15.3%	16.6%	17.8%	14.6%	12.3%
Well Q as CFS		0.00	0.00	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	0.00	0.00
Interference CFS		0.216	0.195	0.099	0.161	0.207	0.245	0.278	0.307	0.333	0.356	0.292	0.246

Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(A) = Total Interf.	0.216	0.195	0.099	0.161	0.207	0.245	0.278	0.307	0.333	0.356	0.292	0.246
(B) = 80 % Nat. Q	1.10	3.72	10.90	14.00	9.83	5.80	1.18	0.41	0.24	0.20	0.38	0.75
(C) = 1 % Nat. Q	0.011	0.037	0.109	0.140	0.098	0.058	0.012	0.004	0.002	0.002	0.004	0.008
(D) = (A) > (C)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(E) = (A / B) x 100	19.6%	5.2%	0.9%	1.2%	2.1%	4.2%	23.6%	74.9%	138.%	178.%	76.8%	32.8%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation:

The well site is more than 1 mile from Malheur Slough (8,400 feet).

Hunt (1999) was used to calculate the interference at Malheur Slough and tributaries given the well will likely not penetrate the basin fill sediments. The values used for the calculations are conservative and appropriate until better values become available. The calculations used a transmissivity of 7,500 ft2/day which is consistent for Eastern Oregon basin fill transmissivities noted by Gonthier (1985) and transmissivity values derived from specific capacity data from wells in T23S/R32.57E-sec 10, 13, 14, 15, 22, and 24 (HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204). Additionally, the calculation used an assumed intermediate storage coefficient (0.001). The hydraulic conductivity assigned to the bed of the tributary is 0.20 feet/day.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

(A) = Total Interf.												
(B) = 80 % Nat. Q												
(C) = 1 % Nat. Q												
(D) = (A) > (C)												
(E) = (A / B) x 100	%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation:

***** This analysis was not done given there is no WAB for Malheur and Harney Lakes.**

Drawdown at Malheur and Harney Lakes was estimated using the Theis drawdown equation. The calculations used a transmissivity of 7,500 ft2/day which is consistent for Eastern Oregon basin fill transmissivities noted by Gonthier (1985) and transmissivity values derived from specific capacity data from wells in T23S/R32.57E-sec 10, 13, 14, 15, 22, and 24 (HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204). Additionally, the calculation used an assumed intermediate storage coefficient (0.001). The estimated drawdown for continuous pumping at the full proposed rate ranged from less than 0.01 feet at the end of 30 days to about 0.71 feet at the end of 245 days. The estimated drawdown for continuous pumping at the full allowed rate ranged from less than 0.01 feet at the end of 30 days to about 0.36 feet at the end of 245 days. The estimated drawdown for a lower pro-rated pumping rate ranged from less than 0.01 feet at the end of 30 days to about 0.18 feet at the end of 245 days.

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or ground water use under this permit can be regulated if it is found to substantially interfere with surface water:
- i. ☐ The permit should contain condition #(s)_____;
- ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** Recommend conditions 7B, 7F, and 7N if a permit is issued.

The distance from owner proposed well 1 to Ninemile Slough and tributaries is less than 1 mile (4,700 feet). Potential for substantial interference must be assumed given the proposed pumping rate exceeds 1 percent of the natural flow (80 percent exceedance).

The proposed well site is located within Harney Valley in an area east of Burns and north of Malheur Lake between Malheur Slough and Ninemile Slough. The proposed well will likely be completed in basin fill sediments.

Available data, including Piper and others (1939), Leonard (1970), and water well reports indicate ground water in the basin fill is generally unconfined and hydraulically connected to Malheur and Harney Lakes. Some local confinement can occur where discontinuous low permeability layers are present. Leonard (1970) indicates confined ground water occurs at depth in the basin in deep basin fill sediments and underlying Tertiary volcanic and sedimentary rocks. Hubbard (1975) indicates the ground water contribution to flow into Malheur Lake is small with the lake perched above ground water in most areas.

There is a general and increasing local concern about ground water availability in the Harney Valley.

The closest wells with ground water level trend data are wells HARN 547 in T23S/R32E-sec 07 (about 9.3 miles to the west) and HARN 741 in T23S/R34E-sec 31 (about 9.5 miles to the southeast). Both are completed in sediments, and both are in the same sub-basin as the applicant's well. The ground water level data for HARN 547 is from 1960 to 2006 and for HARN 741 is from 1974 to 2006. The ground water level trend at each site show seasonal and climatic influences. A possible net decline of less than 5 feet may have occurred at both sites. Interestingly, no recovery of the annual trend is apparent from 1996 to 1999, a generally wetter than average period in Oregon. Seasonal ground water level fluctuations range from 10 to 40 feet. This could adversely impact the use of shallow wells, but likely not adversely impact the use of deeper wells.

References Used: Oregon Administrative Rules: OAR 690-512

Piper, A.M., Robison, T.W., and Park C.F. 1939. Geology and Ground Water Resources of the Harney Basin, Oregon. USGS Water Supply Paper 841.

Leonard, A.R. 1970. Ground-Water Resources in Harney Valley, Harney County, Oregon. Ground Water Report 16, Oregon Water Resources Department, Salem, Oregon.

Greene, R.C., Walker, G.W., and Corcoran, R.E. 1972. Geologic Map of the Burns Quadrangle, Oregon. USGS Miscellaneous Geologic Investigations Map I-680.

Hubbard, Larry. L. 1975. Hydrology of Malheur Lake, Harney County, Southeastern Oregon. USGS Water Resources Investigation 21-75.

Walker, G.W. 1979. Revisions to the Cenozoic Stratigraphy of Harney Basin, Southeastern Oregon. USGS Bulletin 1475.

Gonthier, J.B. 1985. A Description of Aquifer Units in Eastern Oregon. USGS Water Resources Investigations Report 84-4095.

OWRD water well reports and/or hydrographs: HARN 547, HARN 741, HARN 564, HARN 641, HARN 642, HARN 645, HARN 648, HARN 649, HARN 650, HARN 651, HARN 657, HARN 1870, HARN 50054, HARN 50491, HARN 50514, and HARN 51204

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: 1 Logid: not yet drilled

D2. **THE WELL does not meet current well construction standards based upon:**
- a. ☐ review of the well log;
- b. ☐ field inspection by _____;
- c. ☐ report of CWRE _____;
- d. ☐ other: (specify) _____

D3. **THE WELL construction deficiency:**
- a. ☐ constitutes a health threat under Division 200 rules;
- b. ☐ commingles water from more than one ground water reservoir;
- c. ☐ permits the loss of artesian head;
- d. ☐ permits the de-watering of one or more ground water reservoirs;
- e. ☐ other: (specify) _____

D4. **THE WELL construction deficiency is described as follows:** _____

D5. **THE WELL**
- a. ☐ **was,** *or* ☐ **was not** constructed according to the standards in effect at the time of original construction or most recent modification.
- b. ☐ I don't know if it met standards at the time of construction.

D6. ☐ **Route to the Enforcement Section.** I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Enforcement Section and the Ground Water Section.

THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL

D7. ☐ Well construction deficiency has been corrected by the following actions: _____

_____ _____, 200____.
(Enforcement Section Signature)

D8. ☐ **Route to Water Rights Section (attach well reconstruction logs to this page).**

The Oregon Administrative Rules contain OARs filed through July 13, 2007

WATER RESOURCES DEPARTMENT

DIVISION 512

MALHEUR LAKE BASIN PROGRAM PROVISION

690-512-0040

Water Availability

(1) Except as provided in section (3) of this rule, the Department shall not accept an application for permit, or issue a permit, for any use of surface water, or of groundwater the use of which has the potential to substantially interfere with surface water, in the Malheur Lake Basin unless the applicant shows, by a preponderance of evidence, that unappropriated water is available to supply the proposed use at the times and in the amounts requested. The evidence provided shall be prepared by a qualified hydrologist or other water resources specialist and shall include:

(a) Streamflow measurements of gage records from the source or, for use of groundwater, the stream in hydraulic connection with the source; or

(b) An estimate of water availability from the source or, for use of groundwater, the stream in hydraulic connection with the source which includes correlations with streamflow measure-ments or gage records on other, similar streams and considers current demands for water affecting the streamflows.

(2) The criteria used in determining if the use of groundwater has the potential to substantially interfere with surface water shall be those established in OAR Chapter 690, Division 9.

(3) This rule shall not apply to issuance of:

(a) Instream water rights;

(b) Permits for storage of water between March 1 and May 31 if the application is not required to be referred to the Commission under OAR 690-011-0080(2)(a)(C); or

(c) Permits for use of water legally stored.

Stat. Auth.: ORS 536.300 & ORS 536.340

Stats. Implemented:
Hist.: WRD 3-1985, f. & cert. ef. 3-28-85; WRD 23-1990, f. & cert. ef. 12-14-90; Administrative Renumbering 1-1993, Renumbered from 690-080-0120

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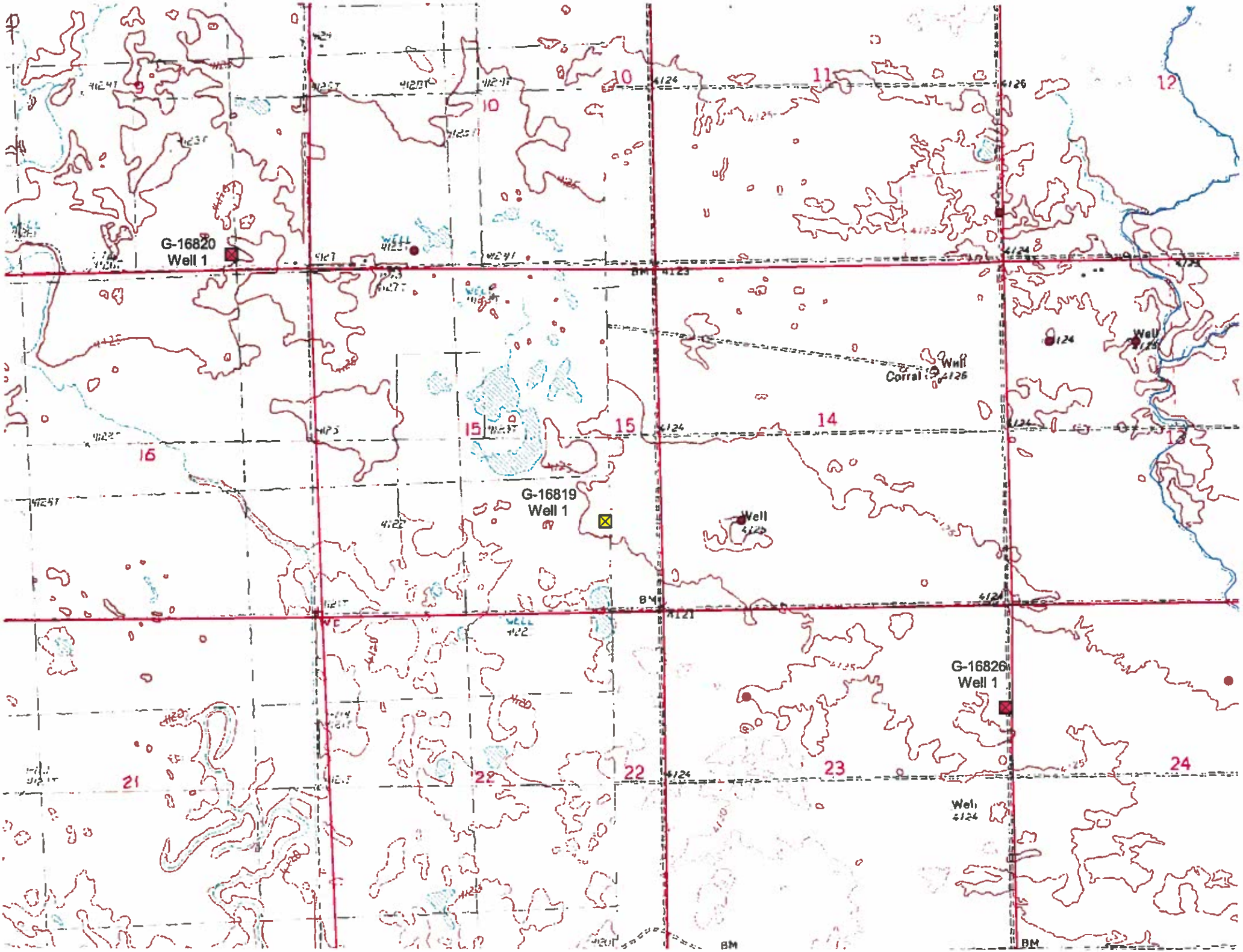
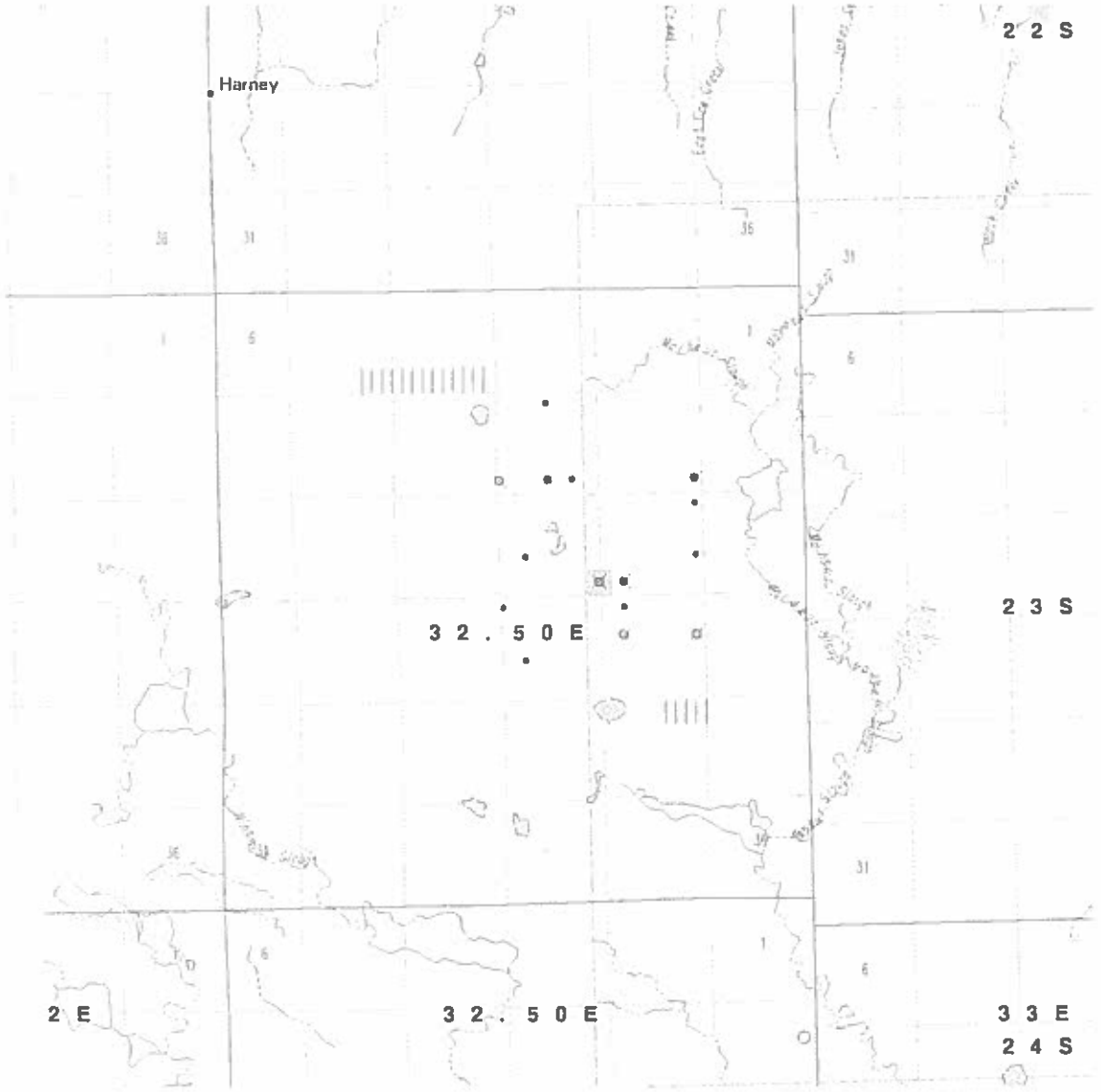

G-16820
Well 1
G-16819
Well 1
G-16826
Well 1
Well
Corral
Well
Well
Well
9
10
11
12
15
14
16
21
22
23
24
BM
BM
BM

Wells in the vicinity of application G 16819

- Application well(s) in this 1/4-1/4 section
- Well(s) identified in this section from OWRD's well log database within 1 mi. radius of application well(s)
- Well(s) identified in this 1/4-1/4 section from OWRD's well log database within 1 mi. radius of application well(s)
- Permitted well(s) in this 1/4-1/4 section within 1 mi. radius of application well(s)
- Conditioned, permitted well(s) in this 1/4-1/4 section within 5 mi. radius of application well(s)
- OWRD Observation well and well-id within 5 mi. radius of application well(s)
- Critical GW Area
- Regulated GW Area



WELL LOGS WITHIN 1 MILE OF APPLICATION G 16819

ABANDON:	0
RECONDITIONED:	1
REPAIRED:	0
CONVERSION:	0
DEEPENINGS:	0
NEW CONSTRUCT:	13

COMMUNITY USE:	0
DOMESTIC USE:	5
INDUSTRIAL USE:	0
INJECTION USE:	0
IRRIGATION USE:	5
THERMAL USE:	0
LIVESTOCK USE:	3

****

PERMITTED WELLS WITHIN 1 MILE OF APPLICATION G 16819

$RECNO	APPLICATION	PERMIT	CLAIM		LOC-QQ	USE_CODE
1					23.00S32.50E11SESE	
2					23.00S32.50E10SESW	
3	G 16820		0	0	23.00S32.50E 9SESE	IR
4					23.00S32.50E14SWSW	
5	G 16819		0	0	23.00S32.50E15SESE	IR
6	G 16826		0	0	23.00S32.50E23SENE	IR
7					23.00S32.50E23SWNW	

****

CONDITIONED WELLS WITHIN 5 MILES OF APPLICATION G 16819

$RECNO	APPLICATION	PERMIT	LOC-QQ	CONDITION-CODE
1	G 8800	G 8241	24.00S32.50E12SENE	
1	G 12602	G 11765	24.00S32.50E12SENE	4KG

****

APPLICATION G 16819 FALLS WITHIN THESE QUAD(S)

CARSON POINT

****

Well Location	23.00S32.00E7CAB
Oregon Water Resources Department Well Log ID	HARN 547
Oregon Water Resources Department State Observation Well Number	169
Well depth, in feet below land surface	93
Land surface elevation, in feet above mean sea level	
Primary use of well	not determined

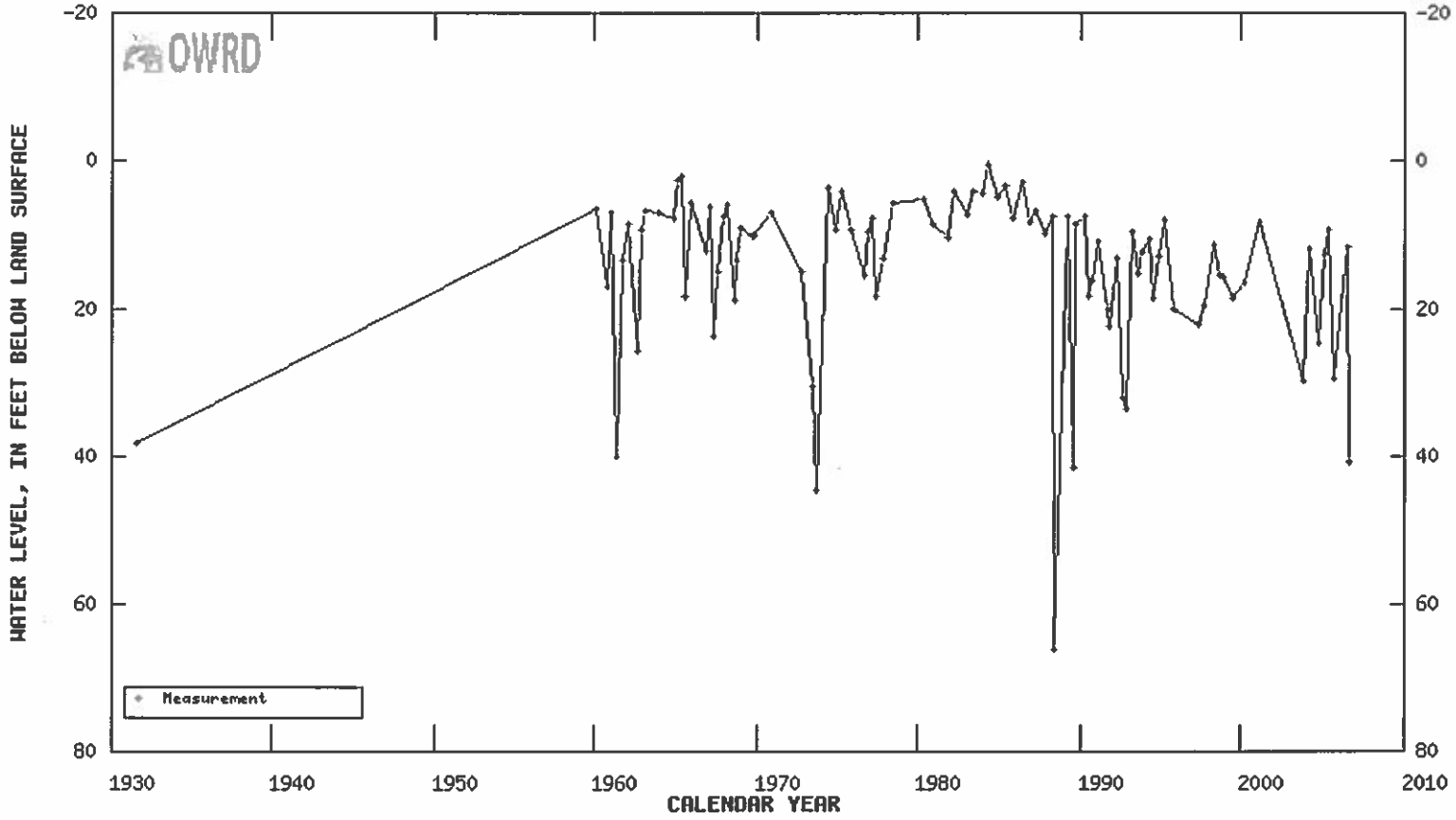


Table showing water-level data for State Well HARN 547, State Observation Well # 169

Well Location	23.00S34.00E31ADD
Oregon Water Resources Department Well Log ID	HARN 741
Oregon Water Resources Department State Observation Well Number	172
Well depth, in feet below land surface	207
Land surface elevation, in feet above mean sea level	
Primary use of well	not determined

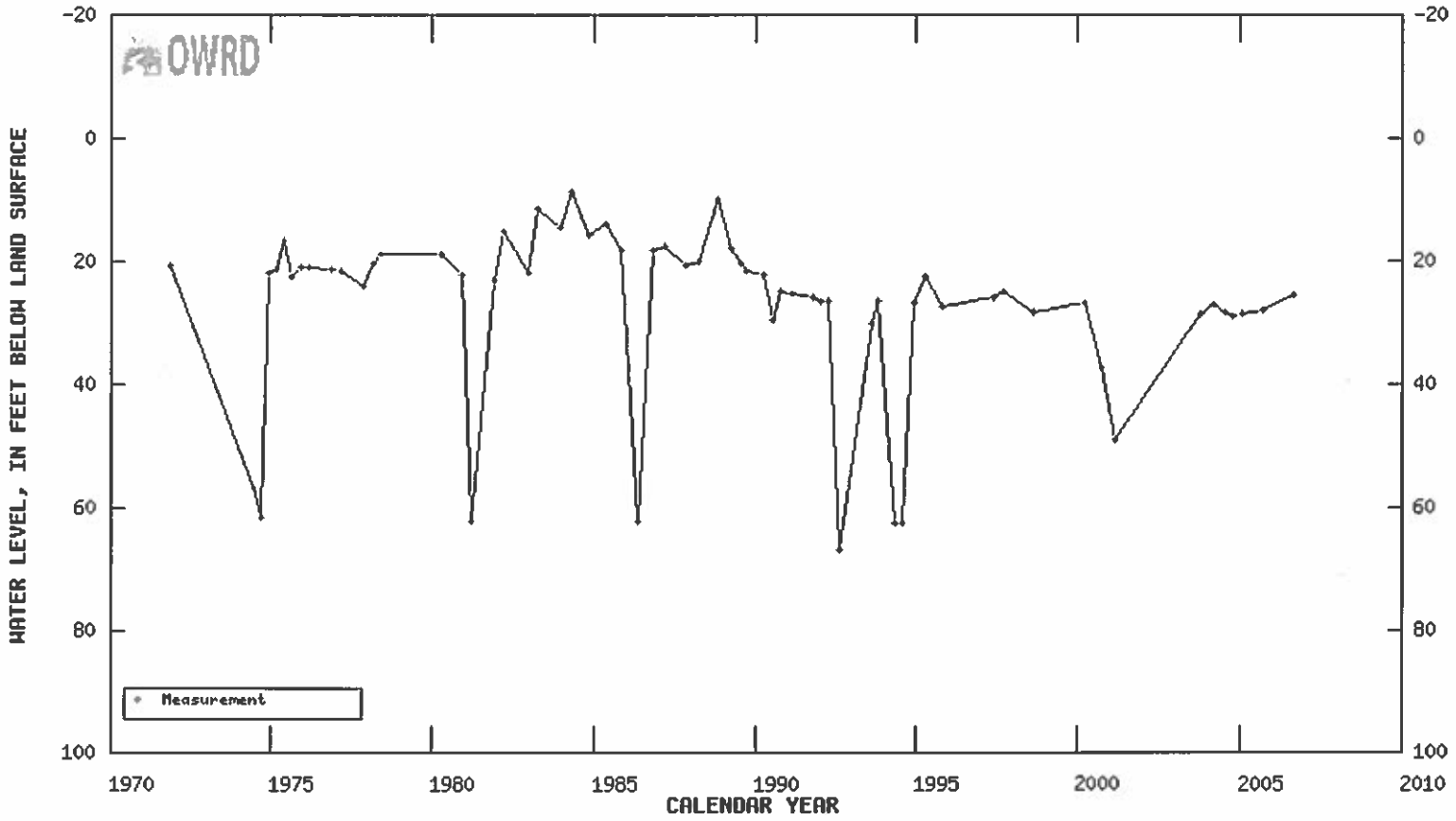
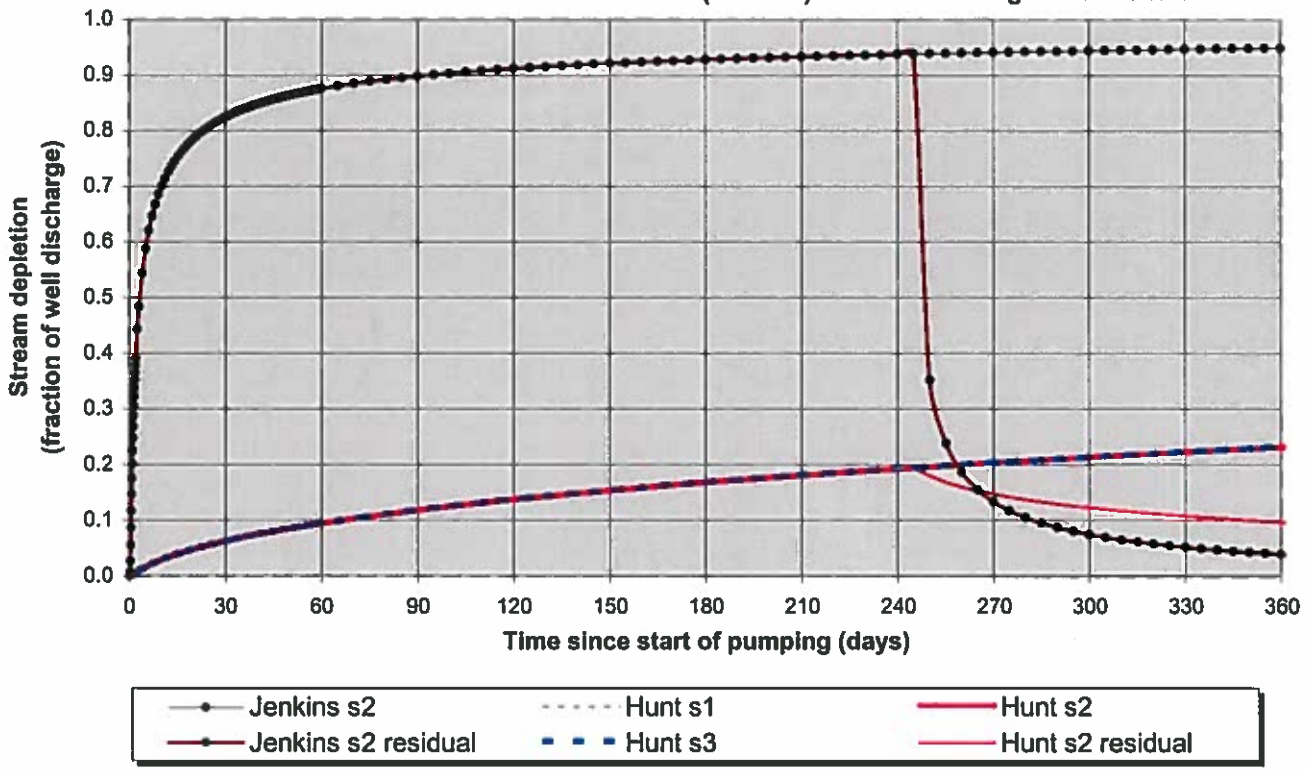


Table showing water-level data for State Well HARN 741, State Observation Well # 172

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

Well 1 (G-16819) to Ninemile Slough & Tributaries



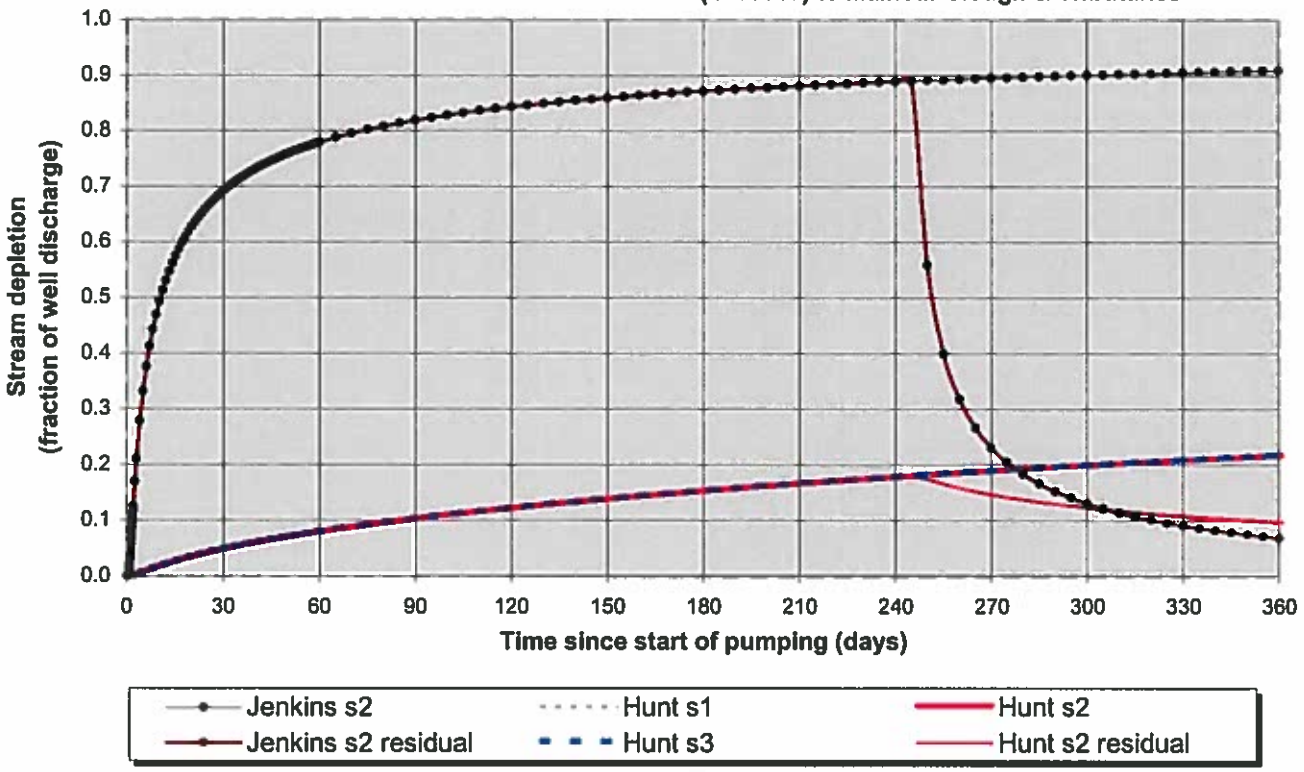
Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.0632	0.0950	0.1184	0.1375	0.1537	0.1680	0.1808	0.1925	0.1468	0.1226	0.1074	0.0965
Qw, cfs	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
H SD s2, cfs	0.126	0.190	0.237	0.275	0.307	0.336	0.362	0.385	0.294	0.245	0.215	0.193

Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate	Qw	2	2	2	cfs
Distance to stream	a	4700	4700	4700	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer thickness	b	150	150	150	ft
Aquifer transmissivity	T	7500	7500	7500	ft*ft/day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	10	10	10	ft
Streambed hydraulic conductivity	Ks	0.2	0.2	0.2	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	0.08	0.08	0.08	ft/day
Stream depletion factor (Jenkins)	sdf	2.945333333	2.945333333	2.945333333	days
Streambed factor (Hunt)	sbf	0.050133333	0.050133333	0.050133333	

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

Well 1 (G-16819) to Malheur Slough & Tributaries



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

Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.0494	0.0804	0.1037	0.1227	0.1390	0.1534	0.1663	0.1781	0.1461	0.1230	0.1082	0.0973
Qw, cfs	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
H SD s2, cfs	0.099	0.161	0.207	0.245	0.278	0.307	0.333	0.356	0.292	0.246	0.216	0.195

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2	2	2	cfs
Distance to stream	a	8400	8400	8400	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer thickness	b	150	150	150	ft
Aquifer transmissivity	T	7500	7500	7500	ft*ft/day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	10	10	10	ft
Streambed hydraulic conductivity	Ks	0.2	0.2	0.2	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	0.08	0.08	0.08	ft/day
Stream depletion factor (Jenkins)	sdf	9.408	9.408	9.408	days
Streambed factor (Hunt)	sbf	0.0896	0.0896	0.0896	

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
Application G-16819 owner proposed well 1 to Malheur and Harney Lakes											
56,103.90	7,500.00	0.00100	897.66	2.00	30.00	70,500.00	3.14	5.5225	0.0006	0.0011	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	60.00	70,500.00	3.14	2.7613	0.0177	0.0325	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	90.00	70,500.00	3.14	1.8408	0.0611	0.1120	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	120.00	70,500.00	3.14	1.3806	0.1197	0.2194	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	150.00	70,500.00	3.14	1.1045	0.1846	0.3385	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	180.00	70,500.00	3.14	0.9204	0.2512	0.4605	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	210.00	70,500.00	3.14	0.7889	0.3169	0.5810	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	240.00	70,500.00	3.14	0.6903	0.3807	0.6980	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	897.66	2.00	245.00	70,500.00	3.14	0.6762	0.3911	0.7171	Continuous Pumping at Proposed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	30.00	70,500.00	3.14	5.5225	0.0006	0.0006	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	60.00	70,500.00	3.14	2.7613	0.0177	0.0162	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	90.00	70,500.00	3.14	1.8408	0.0611	0.0560	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	120.00	70,500.00	3.14	1.3806	0.1197	0.1097	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	150.00	70,500.00	3.14	1.1045	0.1846	0.1693	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	180.00	70,500.00	3.14	0.9204	0.2512	0.2302	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	210.00	70,500.00	3.14	0.7889	0.3169	0.2905	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	240.00	70,500.00	3.14	0.6903	0.3807	0.3490	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	448.83	1.00	245.00	70,500.00	3.14	0.6762	0.3911	0.3586	Continuous Pumping at Allowed Full Rate
56,103.90	7,500.00	0.00100	221.67	0.49	30.00	70,500.00	3.14	5.5225	0.0006	0.0003	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	60.00	70,500.00	3.14	2.7613	0.0177	0.0080	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	90.00	70,500.00	3.14	1.8408	0.0611	0.0277	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	120.00	70,500.00	3.14	1.3806	0.1197	0.0542	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	150.00	70,500.00	3.14	1.1045	0.1846	0.0836	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	180.00	70,500.00	3.14	0.9204	0.2512	0.1137	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	210.00	70,500.00	3.14	0.7889	0.3169	0.1435	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	240.00	70,500.00	3.14	0.6903	0.3807	0.1724	Pro-Rated Pumping Rate
56,103.90	7,500.00	0.00100	221.67	0.49	245.00	70,500.00	3.14	0.6762	0.3911	0.1771	Pro-Rated Pumping Rate