PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section   Date   **April 12, 2010**

FROM: Ground Water/Hydrology Section   **Josh Hackett**
                                                     Reviewer's Name

SUBJECT: Application G-   **17297**   Supersedes review of
                                                                        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**:   **Gerald Mullen**   **County: Marion**

A1.   Applicant(s) seek(s) **0.04** cfs from **1** well(s) in the **Willamette** Basin,
                                        subbasin   Quad Map: **St. Paul**

A2.   Proposed use: **irrigation**   Seasonality: **March 1- October 31**

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	MARI 1356	1	alluvial	0.04	4S/2W-31 SW-SE	1000' N, 1880' w fr SE cor DLC 67
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	**173**		**35**	**06/16/1966**	**157**	**0-40**	**0-161**		**99.67-159.67**	**900**	**81**	**p**

Use data from application for proposed wells.

A4.   **Comments:**

A5. ☒   **Provisions of the** Willamette   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: The applicant's well produces from a confined aquifer, so the pertinent basin rules do not apply.

A6. ☐   **Well(s) #** _____ , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.
      Name of administrative area: _____
      Comments:

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

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

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

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

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

    d. ☒ **will, if properly conditioned**, avoid injury to existing ground water rights or to the ground water resource:
        i. ☒ The permit should contain condition #(s) __**7B, 7N**_____ ;
        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 _____**alluvial**_____ 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:**_____

The applicant's well is located in an area that contains fine grained alluvial sediment from land surface to a depth of approximately 80 feet. A 5-10 feet thick package of mostly sand with some gravel underlies the upper fine grained sediments. About 1200 feet of mostly fine grained alluvial sediments with thin sand and gravel layers is found at depth. Local wells produce from the sand layer found at the base of the upper fine grained sediments (~100 feet depth) or from deeper sands and gravel (> 150 feet depth).

Water levels in nearby wells appear to show some sign of decline in the last decade (see attached hydrograph). It is uncertain whether these declines are related to an increase in nearby pumping, or if they are associated with decadal climate cycles. Long term water level monitoring is necessary to assess the stability of the ground water system.

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	**alluvial**	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Water bearing zones in the area of the applicant's well are confined by at least 80 feet of fine grained sediment. Additionally, water levels in nearby wells rise above water bearing zones. These factors suggest the well will produce from a confined aquifer.

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**	**Willamette River**	**140**	**90**	**5800**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Water levels in local wells are above the elevations of nearby stream reaches, therefore, ground water likely discharges to local streams. Water table maps of the area also suggest that ground water discharges to local streams. These factors suggest a hydraulic connection between the ground water system and local streams.

Water Availability Basin the well(s) are located within: 182 WILLAMETTE R > COLUMBIA R – AB MOLALLA R

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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

Version: 08/15/2003

C3b. **690-09-040 (4):** Evaluation of stream impacts <u>by total appropriation</u> 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: _____

_____

_____

_____

_____

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

Non-Distributed Wells												
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	**1**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Well Q as CFS		0	0	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0	0
Interference CFS		0.002	0.001	0.035	0.036	0.037	0.037	0.038	0.038	0.038	0.038	0.004	0.002

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.	0.002	0.001	0.035	0.036	0.037	0.037	0.038	0.038	0.038	0.038	0.004	0.002
(B) = 80 % Nat. Q	21400	23200	22400	19900	16600	8740	4980	3830	3890	4850	10200	19300
(C) = 1 % Nat. Q	214	232	224	199	166	87.4	49.8	38.3	38.9	48.5	102	193
(D) = (A) > (C)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100	9.3e-4%	4.3e-4%	1.6e-2%	1.8e-2 %	2.2e-2 %	4.2e-2%	7.6e-2%	9.9e-2%	9.8e-2%	7.8e-2%	3.9e-3%	1.0e-3%

(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: Pumping impacts to the Willamette River were estimated using the Jenkins (1968) analytical model. This model assumes pumping in an aquifer from a fully penetrating well and does not account for streambed clogging. Impacts to the Willamette River will be extremely small because of the low pumping rate. See attached page for model results and parameters.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

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:**_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

References Used:_____

Conlon and others, 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S Geological Survey Scientific Investigations Report 2005-5168.

Gannett and Caldwell, 1998, Geologic framework of the Willamette lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A,

Hunt, B., 1999, Unsteady stream depletion from ground water pumping: Ground Water, v. 37, no. 1, p. 98-102.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Jenkins, C.T., 1970, Computation of rate and volume of stream depletion by wells: U.S. Geol. Survey Techniques of Water-Resources Investigations of the Unites States Geological Survey, Chapter D1, Book 4,17 p.

Woodward and others, 1998, Hydrogeologic framework of the Willamette lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B,

D. WELL CONSTRUCTION, OAR 690-200

D1.   **Well #**: _____   **Logid**: _____

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).**

Water Availability Tables

WILLAMETTE R > COLUMBIA R - AB MOLALLA R WILLAMETTE BASIN Water Availability as of 2/10/2010 Watershed ID #: 182 Exceedance Level: 80% Date: 2/10/2010 Time: 8:53 AM
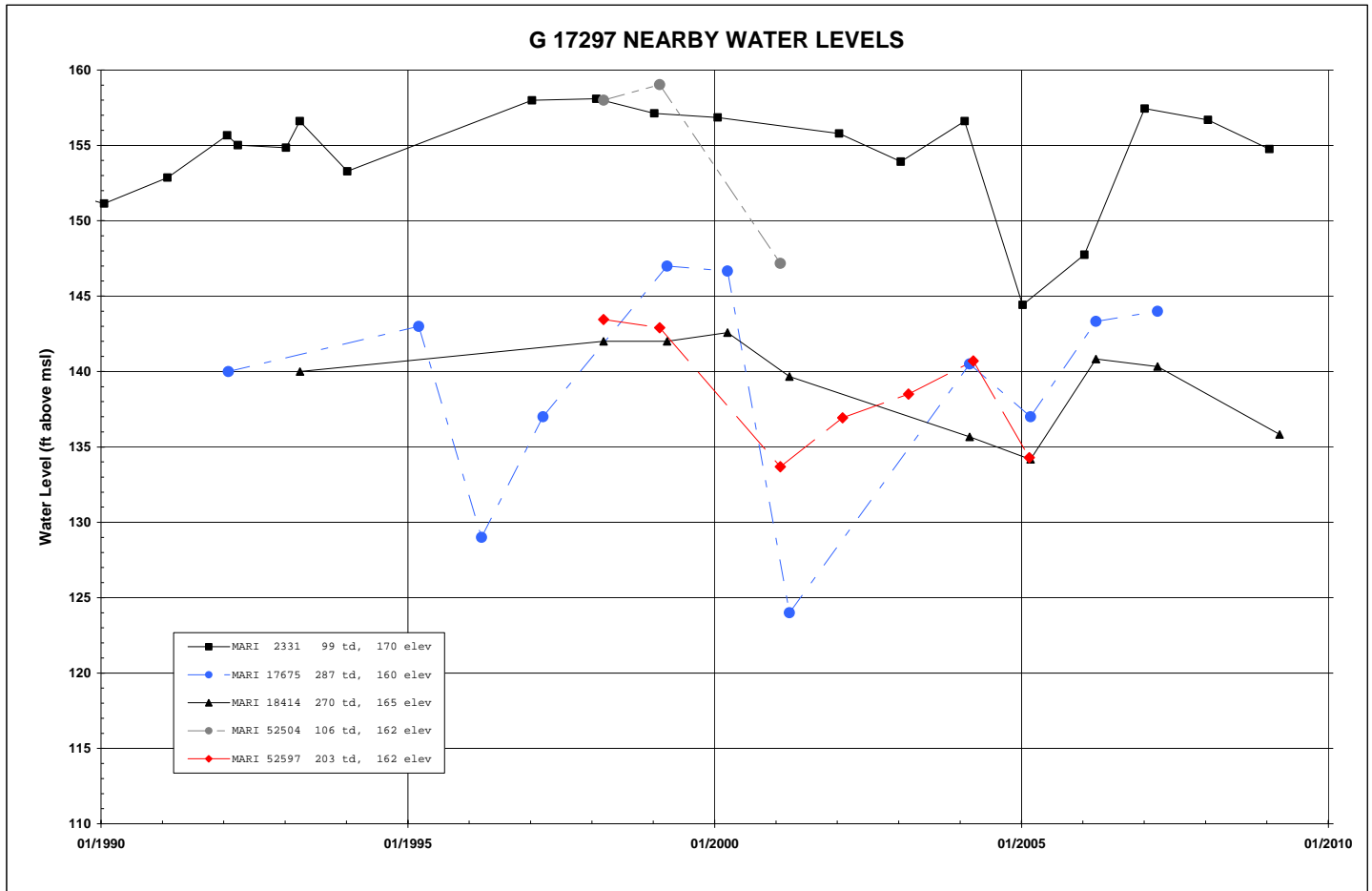## Water Availability Calculation
Monthly Streamflows in Cubic Feet per Second Storage at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	21,400.00	2,250.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,440.00	15,800.00	0.00	1,500.00	14,300.00
MAR	22,400.00	7,220.00	15,200.00	0.00	1,500.00	13,700.00
APR	19,900.00	6,870.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,200.00	12,400.00	0.00	1,500.00	10,900.00
JUN	8,740.00	2,050.00	6,690.00	0.00	1,500.00	5,190.00
JUL	4,980.00	1,870.00	3,110.00	0.00	1,500.00	1,610.00
AUG	3,830.00	1,720.00	2,110.00	0.00	1,500.00	614.00
SEP	3,890.00	1,470.00	2,420.00	0.00	1,500.00	918.00
OCT	4,850.00	717.00	4,130.00	0.00	1,500.00	2,630.00
NOV	10,200.00	851.00	9,350.00	0.00	1,500.00	7,850.00
DEC	19,300.00	924.00	18,400.00	0.00	1,500.00	16,900.00

Detailed Report of Instream Flow Requirements
Instream Flow Requirements in Cubic Feet per Second

Application #	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MF182A	APPLICATION	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
Maximum		1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00

Water Levels in Nearby Wells

G 17297 NEARBY WATER LEVELS

Legend:
- MARI 2331   99 td, 170 elev
- MARI 17675 287 td, 160 elev
- MARI 18414 270 td, 165 elev
- MARI 52504 106 td, 162 elev
- MARI 52597 203 td, 162 elev

Well Location Map

G-17297, Mullen   1:24000

Model Results

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)
G-17297, Mullen

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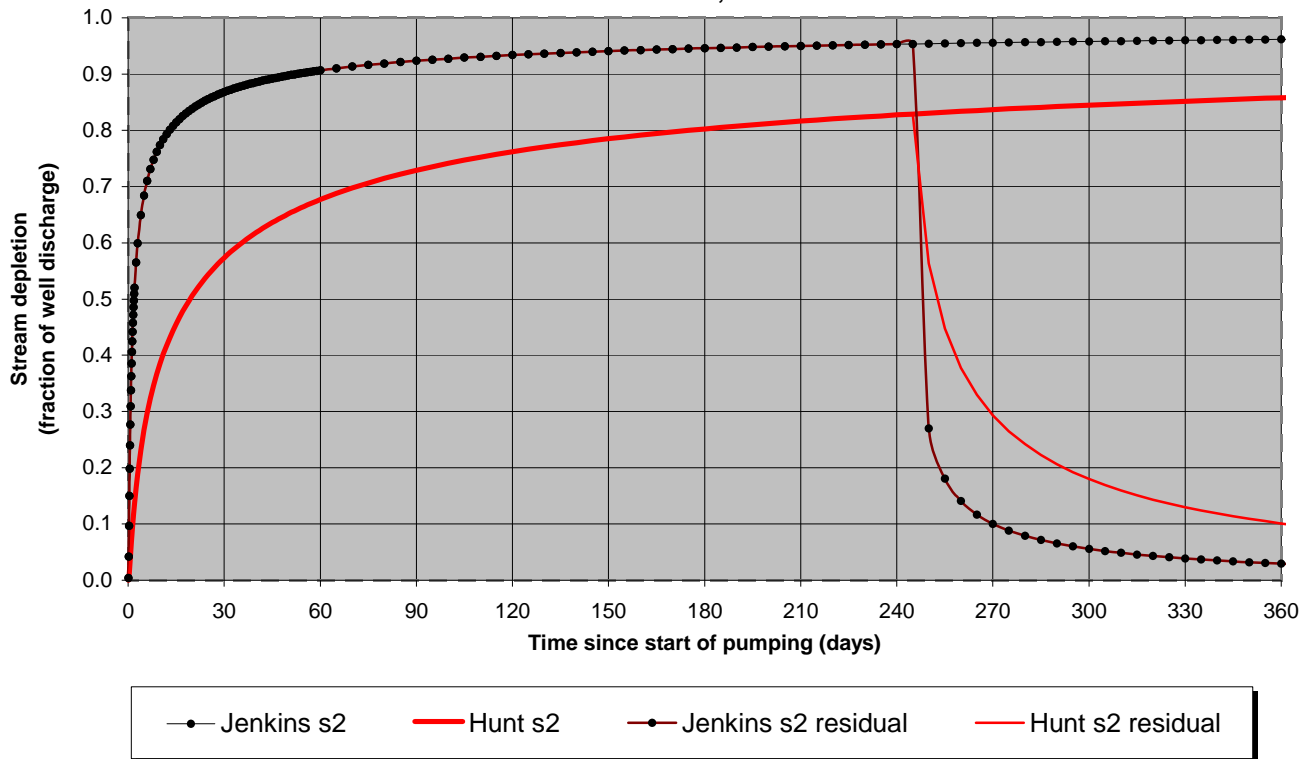
Output for Hunt Stream Depletion, Scenerio 2 (s2):   Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Jenk SD %	0.868	0.906	0.924	0.934	0.941	0.946	0.950	0.953	0.100	0.056	0.039	0.029
Jen SD cfs	0.035	0.036	0.037	0.037	0.038	0.038	0.038	0.038	0.004	0.002	0.002	0.001
Hunt SD %	0.573	0.677	0.729	0.762	0.785	0.802	0.816	0.827	0.293	0.180	0.130	0.101
Hunt SD cfs	0.023	0.027	0.029	0.030	0.031	0.032	0.033	0.033	0.012	0.007	0.005	0.004

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.04	0.04	0.04	cfs
Distance to stream	a	5755	5755	5755	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer thickness	b	40	40	40	ft
Aquifer transmissivity	T	2000	2000	2000	ft*ft/day
Aquifer storage coefficient	S	0.0001	0.0001	0.0001	
Stream width	ws	500	500	500	ft
Streambed hydraulic conductivity	Ks	0.01	0.01	10	ft/day
Streambed thickness	bs	3	20	3	ft
Streambed conductance	sbc	1.666666667	0.25	1666.666667	ft/day
Stream depletion factor (Jenkins)	sdf	1.65600125	1.65600125	1.65600125	days
Streambed factor (Hunt)	sbf	4.795833333	0.719375	4795.833333	

Version: 08/15/2003