Groundwater Transfer Review Summary Form

Transfer/PA # T- _13852_

GW Reviewer _Dennis Orlowski_ Date Review Completed: February 28, 2024 (supersedes previous March 2, 2023 review)

NOTE: groundwater level data from the authorized and proposed POA wells, in addition to other area wells completed in the same aquifer system, indicate steadily-declining levels over the past 20-plus years. The implications of steadily-declining groundwater levels in the POA wells, *along with a recommendation to account for those declines*, are discussed further in Section 7 of this review.

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.

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

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Ground Water Review Form:

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

Application: T-13852 Applicant Name: G and F Sester Family LLC

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

Reviewer(s): Dennis Orlowski Date of Review: February 28, 2024

Date Reviewed by GW Mgr. and Returned to WRSD: _____

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 _____

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1. Basic description of the changes proposed in this transfer: (Note: this February 28,2024 review supersedes a previous review completed on March 2, 2023).

   Proposed transfer relates to **permit G-15758**, which is for irrigation of 334.85 acres (primary 34.5 acres, supplemental 300.35 acres, Mar 1-Oct 31). Permit G-15758 authorizes the use of up to four POA, with a total combined maximum instantaneous pumping rate of 1.11 cfs (~498 gpm) (primary 0.43 cfs (~193 gpm), supplemental 0.68 cfs (~305 gpm)).

   OWRD records show that existing wells are associated with two of the four authorized POA: MULT 3476 ("Well 1") and MULT 67819 ("Well 3"). Wells have not yet been installed at the two remaining authorized POA locations, "Well 2" and "Well 4".

   MULT 3476 ("Well 1") is also an authorized POA for three additional groundwater rights:

   - Certificate 84946: nursery use 80.0 acres, maximum rate 0.67 cfs, year-round
   - Permit G-15196: nursery use 300.35 acres, maximum rate 0.67 cfs, year-round
   - Permit G-16568: primary irrigation 54.6 acres, maximum rate 0.68 cfs, 3/1 to 10/31

   MULT 67819 ("Well 3") is also an authorized POA for two additional groundwater rights:

   - Permit G-15196: nursery use 300.35 acres, maximum rate 0.67 cfs, year-round
   - Permit G-16568: primary irrigation 54.6 acres, maximum rate 0.68 cfs, 3/1 to 10/31

The purpose of this transfer application is to: (1) modify the existing POU for the 34.5 acre portion of permit G-15758 that authorizes primary irrigation, and (2) change two of the four authorized POA locations for the same 34.5 acre primary irrigation portion to the following new POA locations:

- **Ekstrom Well 1 (MULT 55482)**
- **Ekstrom Well 2 (not yet installed)**

Proposed To-POA MULT 55482 is also the only authorized POA for certificate 89728, which is for nursery use on 28.4 acres, limited to a maximum instantaneous pumping rate of 0.5 cfs (~224 gpm).

Note: groundwater level data from the authorized and proposed POA wells, in addition to other area wells completed in the Deep Troutdale aquifer, indicate steadily-declining levels over the past 20-plus years. The implications of steadily-declining groundwater levels in the POA wells, along with a recommendation to account for those declines, are discussed further in Section 7 of this review.

2. Will the proposed POA develop the same aquifer (source) as the existing authorized POA?
☒ Yes ☐ No Comments: The From-POA and To-POA develop (or will develop) the Deep Troutdale aquifer (equivalent to the "Troutdale Sandstone Aquifer" as designated by the USGS and others). The Deep Troutdale aquifer in this area consists of ~200-250 ft of gravel, sand, conglomerate, and coarse-grained sandstone with beds of fine to medium sand and silt. The aquifer is overlain by a confining unit ("Confining Unit 1") consisting of ~50-100 ft of primarily fine to medium sand, silt, and clay (Swanson and others, 1993).

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

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.): Not applicable.

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 nearest groundwater right potentially affected by the proposed use is a POA for permit G-15183, which has a senior priority date of May 8, 2001. No well records are on file for that permitted POA location; however, the permit stipulates that the single POA will be completed in the Deep Troutdale aquifer between ~350-550 ft bls. Compared to the currently-authorized POA locations, a proposed To-POA location is significantly nearer to the permit G-15183 POA location, and thus the proposed change will likely result in an increase in interference with that groundwater right.

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: Authorized From-POA MULT 3476 (Well 1) is approximately 2,900 feet from the permit G-15183 POA location; proposed To-POA MULT 55482 (Ekstrom Well 1) is about 1,020 feet from that same location. Therefore, the proposed To-POA MULT 55482 location is about 1,880 feet nearer to the permit G-15183 POA location.

To evaluate the potential additional interference with the nearby POA for permit G-15183, a Theis (1935) drawdown analysis was completed. Aquifer parameters used for the analysis were derived from regional data and studies (Pumping Test Reports; McFarland and Morgan, 1996; Swanson et al., 1993).

To provide a conservative analysis, it was assumed that authorized From-POA MULT 3476 would be pumped non-stop at the maximum authorized rate for the 34.5-acre primary irrigation portion (0.43 cfs, ~193 gpm) up to the associated duty, which would be reached within approximately 101 days of pumping (note: additional pumping rate allocations authorized for MULT 3476 (Well 1) by its other water rights were not included for this analysis. Not stacking those additional authorized rates results in this comparative interference analysis being even more conservative; this is because with less interference drawdown imposed by MULT 3476 on nearby wells, the resulting *net difference* when compared to the proposed change (increased pumping rate at MULT 55482) is effectively greater).

Pumping at the proposed To-POA MULT 55482 location was simulated at 0.93 cfs (~417 gpm), which is the combined total for the rate currently authorized for it by certificate 89728 (0.5 cfs), plus the associated maximum rate authorized by permit G-15758 (0.43 cfs).

Results of the Theis comparative analysis indicate that interference with the permit G-15183 POA could range from about 36 to 66 feet based on these conservative pumping scenarios. Using pumping water level estimates for the affected G-15183 POA (based on a specific capacity value derived from pumping test data from MULT 3476), and assuming the G-15183 POA well would be completed to 550 ft bls (fully penetrating the Deep Troutdale aquifer), it was determined that sufficient available drawdown would be available in the G-15183 POA well; this is despite the relatively-large amount of additional drawdown (~36-66 feet) predicted under these conservative scenarios. Therefore, it is not likely that the proposed use will result in the G-15183 POA or another similar groundwater right from receiving the water to which it is legally entitled.

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: Groundwater levels in the Deep Troutdale aquifer at and near the authorized and proposed POAs are more than 150 ft below the estimated surface water elevations for several stream reaches within approximately 4,000 feet of the POAs; therefore, these POAs are not hydraulically connected to those streams.

Farther away, the Troutdale Formation (which includes the Deep Troutdale aquifer) crops out along the walls of the Sandy River valley located east and north of the POA sites. Numerous small creeks and springs originate from or flow over the Troutdale Formation where it outcrops in this area (USGS, 2014; McFarland and Morgan, 1996). These hydraulically-connected perennial reaches are located on the order of 4,000 to 6,000 feet from the two current authorized From-POAs, MULT 3476 (Well 1) and MULT 67819 (Well 3). Because the two proposed To-POAs are located from about 1,600 to 1,900 feet generally south and west from the authorized POAs, *farther away from the Sandy River*, the proposed change will not likely result in an increase in interference with these stream reaches.

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: _____ ☐ Minimal ☐ Significant

Stream: _____ ☐ Minimal ☐ Significant

Provide context for minimal/significant impact: _____

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.

7. What conditions or other changes in the application are necessary to address any potential issues identified above: Groundwater level data from the authorized and proposed POA wells, in addition to other area wells completed in the Deep Troutdale aquifer, indicate steadily-declining levels over the past 20-plus years. For one group of wells (including MULT 3476, "Well 1"), the total declines have averaged about 20 feet over that time interval; for a few deeper wells, declines over this same general period have been even greater, on the order of approximately 30 to 60 feet (for MULT 56024 and MULT 67819 ("Well 3"), respectively) (see attached hydrograph of area wells).

   These declines have led to a current exceedance of permit decline conditions for one of the From-POA; declining water levels are also present in the proposed To-POA MULT 55482. The implications of these exceedances are discussed later in this section.

   MULT 3476 and MULT 67819 are authorized POA for all the following nursery and irrigation water rights:

   - **MULT 3476:**
     - Certificate 84946 (permit G-11445, dated 3/9/1992)
     - Permit G-15196 (dated 9/4/2002)
     - Permit G-15758 (dated 11/3/2004) (this review)
     - Permit G-16568 (dated 8/17/2009)
   - **MULT 67819**:
     - Permit G-15196 (dated 9/4/2002)
     - Permit G-15758 (dated 11/3/2004) (this review)
     - Permit G-16568 (dated 8/17/2009)

   None of these related water rights contain specific reference water levels for the two wells which are required to evaluate compliance with decline conditions. Instead, each associated permit includes the following related provision: *"Use of water from a new well shall not begin until the initial water level in the well has been measured. A measurement of initial water level shall be made at the time a pump is installed, but before pumping begins."*

   Reference water levels for each of these wells are established next.

Reference Levels – From-POA (MULT 3476 and MULT 67819)

Because reference water levels for MULT 3476 (Well 1) and MULT 67819 (Well 3) had not been previously established for any of the relevant water rights, for both this review and a related permit extension review (permit G-15196) such levels are established below. The selection of these reference water levels is based on a key point stipulated within each permit, which is that the *"…use of water…"* is not to begin until *"…the initial water level in the well has been measured…before pumping begins*."

Based on this water level condition language that is common to each of the permits, **the earliest applicable static water level for the two wells was selected as the reference level *for all subsequent water rights*.** These reference levels are as follows:

- **MULT 3476 Reference Level: 199.00 ft bls** (4/20/1993)
- **MULT 67819 Reference Level: 317.00 ft bls** (4/6/2004)

(Note: a 3/14/2003 static water level measurement for MULT 67819, which is the first spring measurement after its initial permit G-15196 was issued, was not considered as a reference level, deemed "unreliable" because it was anomalously *very* high (288 ft bls) relative to all other measurements in MULT 67819, and to corresponding measurements in all other nearby wells. Consequently the next spring measurement from 4/6/2004 was selected as a more appropriate reference level for MULT 67819).

These respective reference levels are shown on hydrographs for MULT 3476 and MULT 67819 attached to this review.

Reference Level – To-POA (MULT 55482, Ekstrom Well 1) (T-13852 ONLY)

The water right associated with the proposed To-POA MULT 55482 (permit G-13274/certificate 89728) does not have a stated reference level, but it does have similar language related to establishing a reference water level *for that particular water right*.

However, this current transfer application does not apply to certificate 89728, but only to its authorized POA (MULT 55482) which is being proposed as a new POA for permit G-15758. Therefore, for this transfer application the *effective* reference level for To-POA MULT 55482 is set as the first January-April measurement taken after issuance of permit G-15758 (permit date 11/3/2004), as follows:

- **MULT 55482 Reference Level: 276.00 ft bls** (3/21/2005)

Note: this reference level for MULT 55482 is applicable to *only* this transfer application T-13852. It is not relevant for evaluating decline conditions for certificate 89728, for which MULT 55482 is the currently-authorized POA.

Reference Level – To-POA (Proposed Ekstrom Well 2) (T-13852 ONLY)

The second proposed POA, "Ekstrom Well 2", has not yet been drilled and thus it lacks the well-specific water level information required to establish a reference level. Therefore, a reference level applicable to this proposed permit amendment T-13852 for "Proposed Ekstrom Well 2" will be established after the well has been completed, and will be incorporated in the future as a condition for T-13852.

Recommended Condition

Permit G-15758 includes the following water level decline condition that is most applicable to this review: *(1) "Use of the water from the well, as allowed herein, shall be regulated if the well displays: (b) a total water level decline of fifteen or more feet."*

Based on this particular decline condition, and using the reference level established previously, one of the From-POA, MULT 67819 (Well 3) has exceeded its 15-foot decline condition (see relevant hydrograph attached to this review): the condition was initially triggered in March 2008, then subsequently recovered until March 2015, after which levels in MULT 67819 fell far below its decline condition level.

Historic water levels in the existing proposed To-POA, MULT 55482 (Ekstrom Well 1), have also shown an overall decline since it was completed in 1998. Because MULT 55482 will replace the two existing authorized POA for permit G-15758 (if this application is approved), then the reference level established previously in this review for MULT 55482 will be applicable for permit G-15768.

The following provision is thus recommended as a key condition for T-13852 (if approved) for future potential management of the use of wells authorized under permit G-15768:

For MULT 55482 ("Ekstrom Well 1") a reference static water level of 276.00 feet below land surface (ft bls) has been established for its use authorized by permit G-15768. This reference level will be used as the basis for evaluating decline conditions associated *only* with its use authorized by permit G-15768.

Furthermore, a reference water level will also be established in proposed POA "Ekstrom Well 2" for similar purposes after/if it is completed.

8. None.

9. References

Water rights documents: application T-13852; certificates 84946 and 89728, permits G-12635, G-15623, G-15758, G-16568, G-13274, G-15183, T-8496.

McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington, Water Supply Paper 2470-A, 58 p: U. S. Geological Survey, Reston, VA.

Swanson, R. D., McFarland, W. D., Gonthier, J. B., and Wilkinson, J. M., 1993, A description of hydrogeologic units in the Portland Basin, Oregon and Washington, Water-Resources Investigations Report 90-4196, 56 p.: U. S. Geological Survey, Reston, VA.

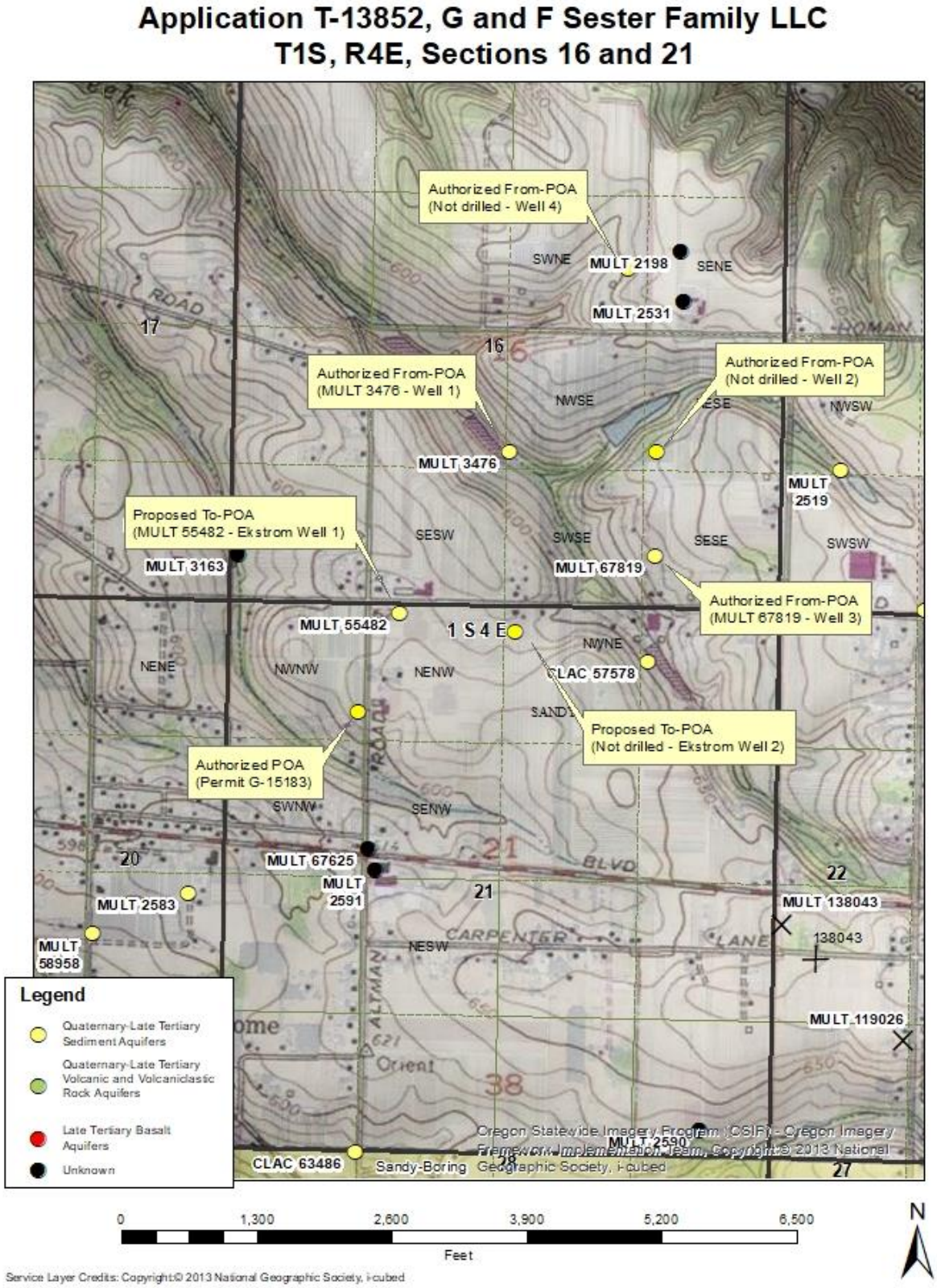
Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, American Geophysical Union Transactions, vol. 16, p. 519-524.

United States Geological Survey, 2014, National Hydrography Dataset (NHD), 1:24,000, U. S. Department of the Interior, Reston, VA.

United States Geological Survey, 2017, *Sandy quadrangle*, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, VA.

WSI, 2015, OLC Metro, Portland, OR, May 8.

Location Map



Theis Drawdown Analysis – Authorized From-POA MULT 3476 to Permit G-15183 POA Location

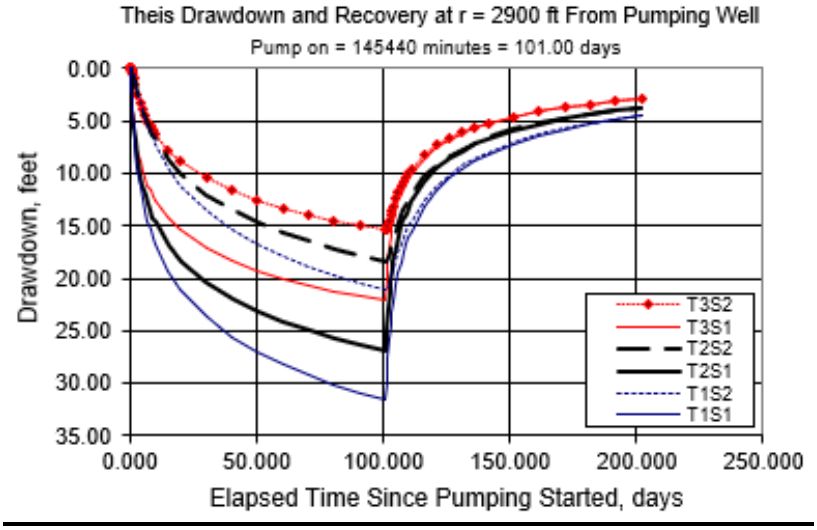
Theis Time-Drawdown Worksheet v.3.00

Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

Written by Karl C. Wozniak September 1992. Last modified December 30, 2014

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		101		d	
Radial distance from pumped well:	r		2900.00		ft	Q conversions
Pumping rate	Q		0.430		cfs	192.98 gpm
Hydraulic conductivity	K	9.000	11.000	14.000	ft/day	0.43 cfs
Aquifer thickness	b		50		ft	25.80 cfm
Storativity	S_1		0.00010			37,152.00 cfd
	S_2		0.00050			0.85 af/d
Transmissivity Conversions	T_f2pd	450	550	700	ft2/day	
	T_ft2pm	0.3125	0.3819	0.4861	ft2/min	
	T_gpdpft	3,366	4,114	5,236	gpd/ft	

Recalculate Use the Recalculate button if recalculation is set to manual



Theis Drawdown Analysis – Proposed To-POA MULT 55482 to Permit G-15183 POA Location

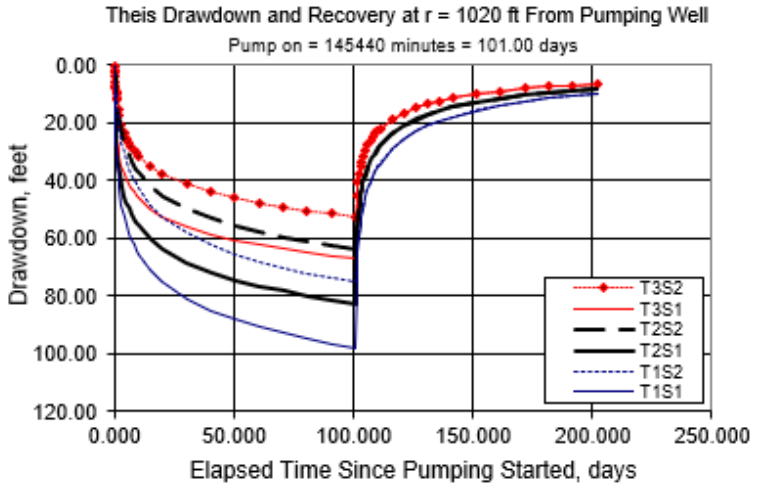
Theis Time-Drawdown Worksheet v.3.00

Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

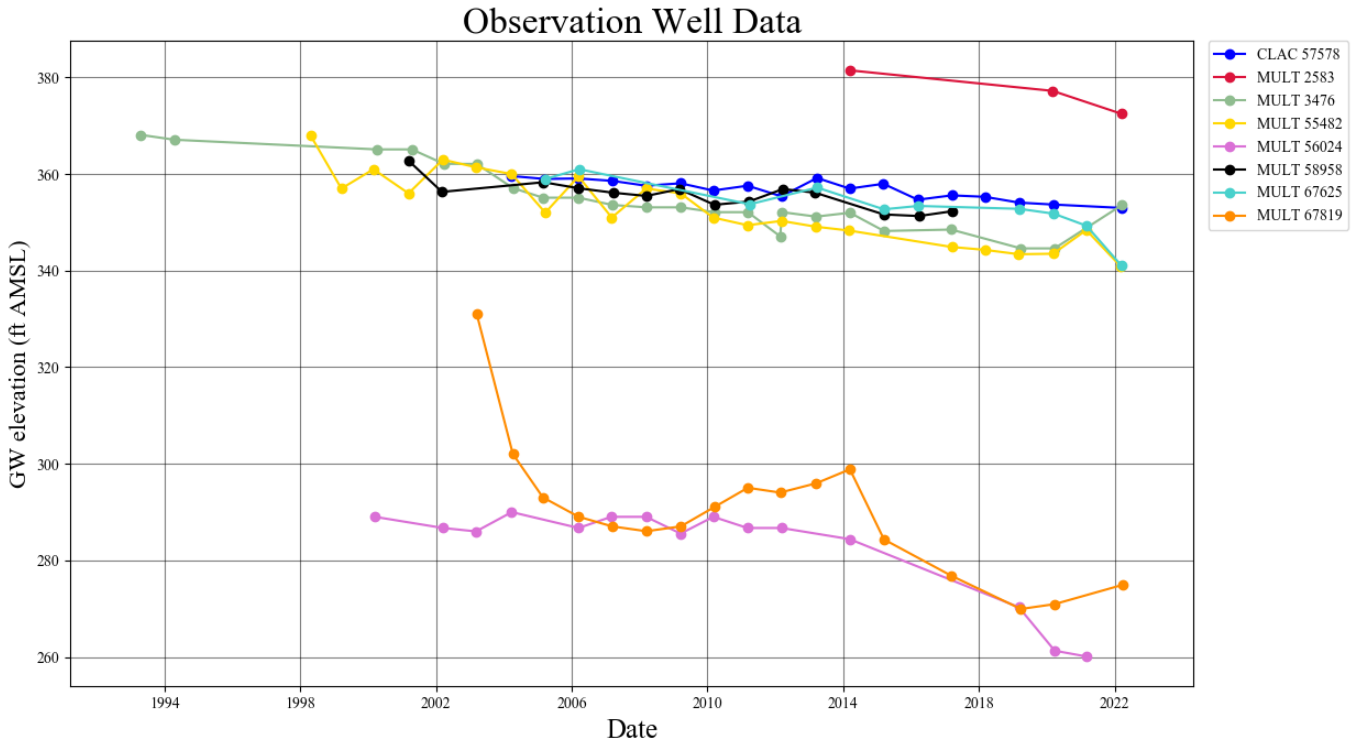
Written by Karl C. Wozniak September 1992. Last modified December 30, 2014

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		101		d	
Radial distance from pumped well:	r		1020.00		ft	Q conversions
Pumping rate	Q		0.930		cfs	417.38 gpm
Hydraulic conductivity	K	9.000	11.000	14.000	ft/day	0.93 cfs
Aquifer thickness	b		50		ft	55.80 cfm
Storativity	S_1		0.00010			80,352.00 cfd
	S_2		0.00050			1.84 af/d
Transmissivity Conversions	T_f2pd	450	550	700	ft2/day	
	T_ft2pm	0.3125	0.3819	0.4861	ft2/min	
	T_gpdpft	3,366	4,114	5,236	gpd/ft	

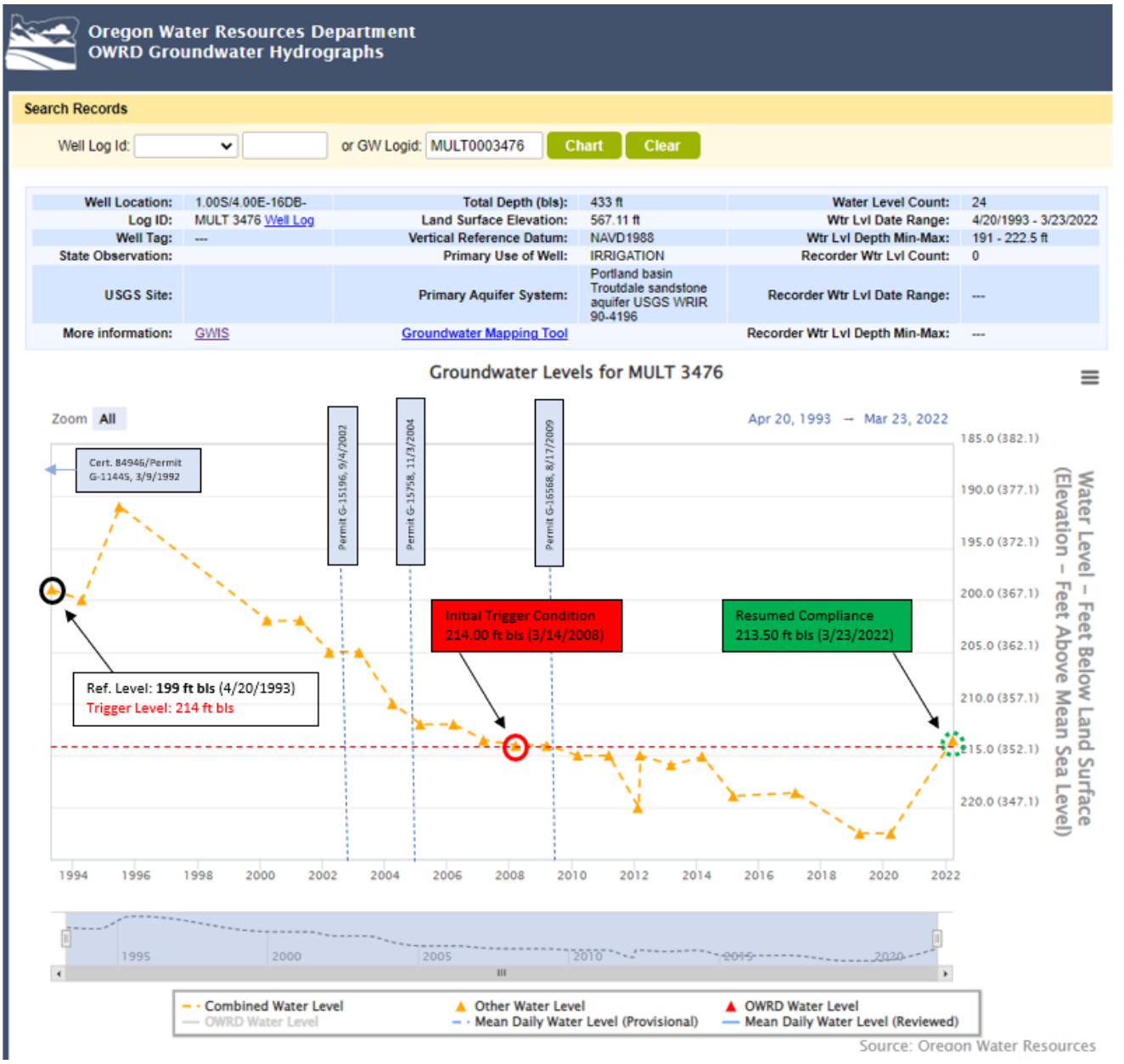
Recalculate Use the Recalculate button if recalculation is set to manual



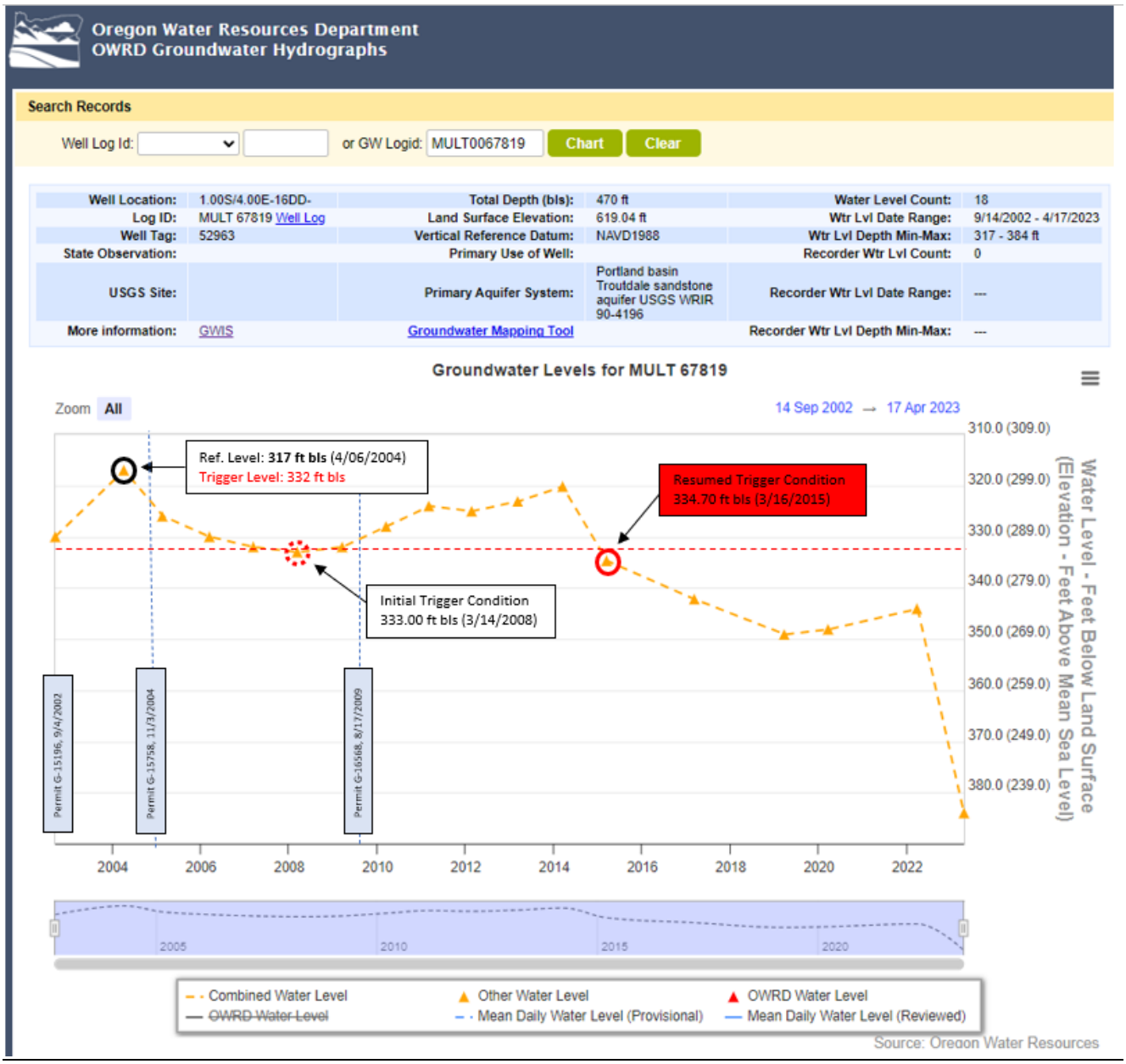
Hydrograph, Area Wells



Hydrograph, Authorized From-POA MULT 3476 (Well 1)



Hydrograph, Authorized From-POA MULT 67819 (Well 3)



Hydrograph, Proposed To-POA MULT 55482 (Ekstrom Well 1)