Evaluation of proposed move for Water Right Nos 1958 & 8600
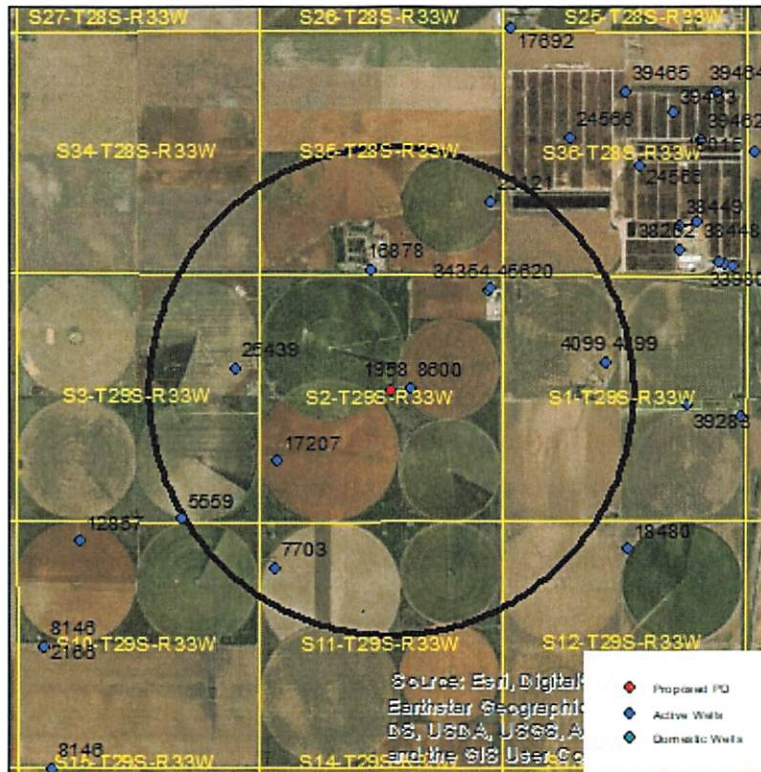
Proposed: Move water right nos. 1958 and 8600 to a new well location 440 ft to the southwest.

Wells within 1 mile: 17207, 34354 & 45620, 25439, 16878, 23121, 7703, 4099, and a domestic well in section 2-29-33.

The saturated thickness at the proposed well location is estimated to be 277 ft, based upon the GMD3 model. For saturated thickness greater than 200 ft, the drawdown allowance is 4.0 ft.

50 year Theis Analysis: The following values were used to run the analysis:

$S = 0.1475$, $T = 7344$ ft^2/day, $tp_{current} = 61$ days (based on average use and reported rate), $Q_{current} = 500$ gpm (reported in 2018), $tp_{proposed} = 93$ days, $Q_{proposed} = 1560$ gpm

Theis drawdowns were calculated as follows:

17207:	Drawdown from current location = 1.10 ft
	Drawdown from proposed location = 5.63 ft
	Net drawdown = **4.5 ft**
34354 & 45620:	Drawdown from current location = 1.27 ft
	Drawdown from proposed location = 5.39 ft
	Net drawdown = **4.1 ft**

25439:   Drawdown from current location = 0.99 ft

                   Drawdown from proposed location = 5.01 ft

                   Net drawdown = **4.0 ft**

16878:   Drawdown from current location = 1.30 ft

                   Drawdown from proposed location = 6.06 ft

                   Net drawdown = **4.8 ft**

23121:   Drawdown from current location = 0.90 ft

                   Drawdown from proposed location = 4.12 ft

                   Net drawdown = **3.2 ft**

7703:   Drawdown from current location = 0.84 ft

                   Drawdown from proposed location = 4.12 ft

                   Net drawdown = **3.3 ft**

4099:   Drawdown from current location = 0.91 ft

                   Drawdown from proposed location = 4.04 ft

                   Net drawdown = **3.1 ft**

Domestic 2-29-33:   Drawdown from current location = 1.31 ft

                   Drawdown from proposed location = 5.50 ft

                   Net drawdown = **4.2 ft**

Net drawdown exceeds the drawdown allowance of 4.0 ft for water right numbers 17207, 34354 & 45620, 16878, and the domestic well in section 2-29-33. Critical well analysis is necessary on those wells.

Critical Well Evaluation:

17207:

Water Column = 277 ft

DP = 4.5 ft (Net drawdown from the proposal indicated above)

DE = 71.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 28.7 ft (S = 0.1475, T = 54,932 gpd/ft, Q = 581 gpm, tp = 145 days, efficiency = 70%)

DT = 104.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 277 ft = 110.8 ft

Physical Drawdown Constraint (PDC) = 277 ft – 60 ft = 217 ft

Total drawdown of 104.6 ft is less than the EDC and PDC, so this well **is not critical.**

34354 & 45620:

Water Column = 277 ft

DP = 4.1 ft (Net drawdown from the proposal indicated above)

DE = 71.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 0.3 ft (S = 0.1475, T = 54,932 gpd/ft, Q = 5.8 gpm, tp = 219 days, efficiency = 70%)

DT = 75.8 ft

Economic Drawdown Constraint (EDC) = 0.4 * 277 ft = 110.8 ft

Physical Drawdown Constraint (PDC) = 277 ft – 20 ft = 257 ft

Total drawdown of 75.8 ft is less than the EDC and PDC, so this well **is not critical.**

16878:

Water Column = 279 ft

DP = 4.8 ft (Net drawdown from the proposal indicated above)

DE = 66.5 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 1.6 ft (S = 0.07924, T = 23,578 gpd/ft, Q = 15 gpm, tp = 36 days, efficiency = 70%)

DT = 72.9 ft

Economic Drawdown Constraint (EDC) = 0.4 * 279 ft = 111.6 ft

Physical Drawdown Constraint (PDC) = 279 ft – 20 ft = 259 ft

Total drawdown of 72.9 ft is less than the EDC and PDC, so this well **is not critical.**

Domestic 2-29-33:

Water Column = 277 ft

DP = 4.2 ft (Net drawdown from the proposal indicated above)

DE = 71.4 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DT = 75.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 277 ft = 110.8 ft

Physical Drawdown Constraint (PDC) = 277 ft – 20 ft = 257 ft

Total drawdown of 75.6 ft is less than the EDC and PDC, so this well **is not critical.**

Conclusion:

If the proposed well is operated at its full authorized rate and quantity, it may have a noticeable effect on some neighboring wells. However, the GMD3 model shows a large amount of remaining saturated thickness in the area, and data indicates that while the aquifer is projected to decline substantially, there will likely be enough remaining saturated thickness for neighboring wells to remain productive for the next 25 years. GMD3 staff recommends approval of the application.
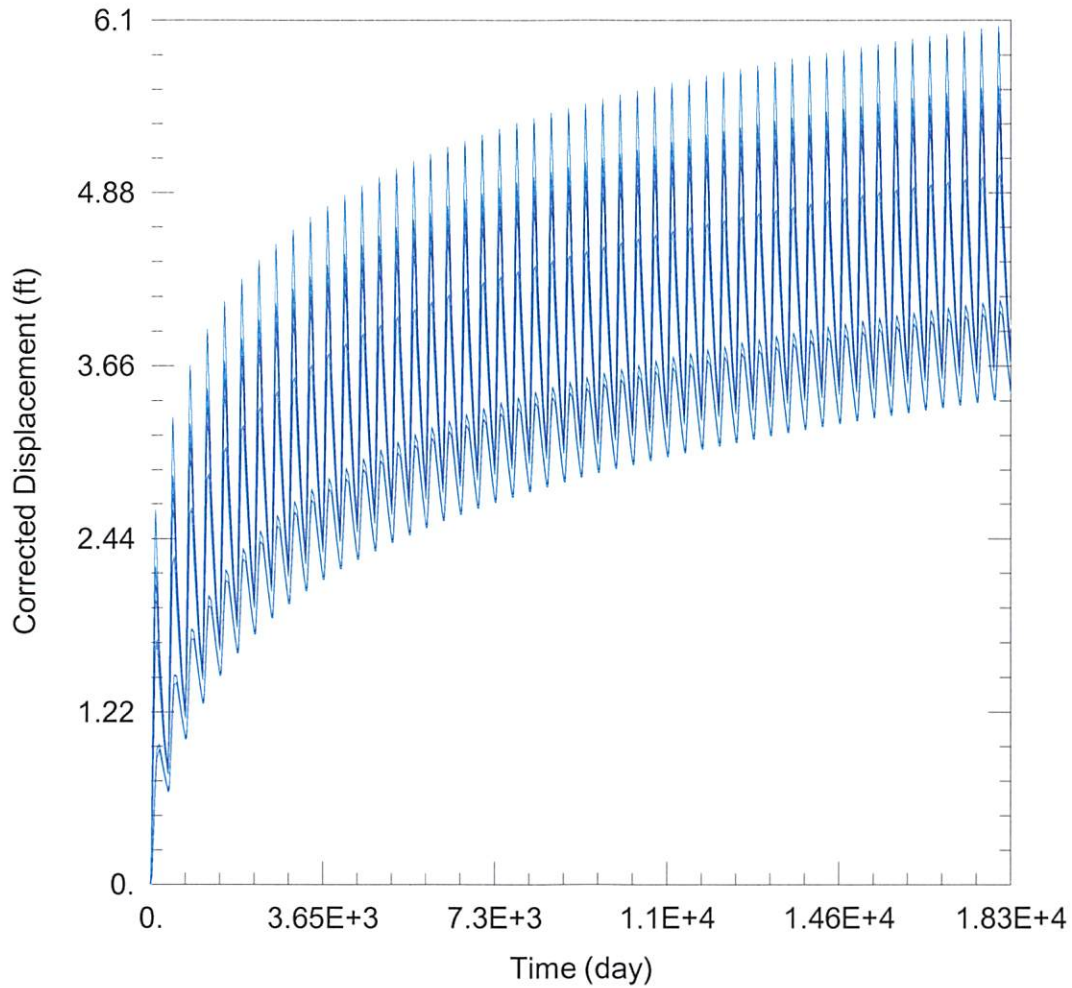
WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\1958_8600\1950 & 8600 Proposed.aqt

Date: 12/14/21	Time: 09:45:15

PROJECT INFORMATION

Company: GMD 3
Project: 1950 & 8600
Location: Haskell County

WELL DATA

Pumping Wells				Observation Wells		
Well Name	X (ft)	Y (ft)		Well Name	X (ft)	Y (ft)
1950 & 8600	-28428	247775		□	-28428	247775
				□ 17207	-30920	246244
				□ 34354 & 45620	-26249	249979
				□ 25439	-31817	248263
				□ 16878	-28857	250393
				□ 23121	-26276	251865
				□ 7703	-30952	243914
				□ 4099	-23729	248397
				□ Domestic 2-29-33	-26319	249930

SOLUTION

Aquifer Model: Unconfined	Solution Method: Theis
T = 7344. ft^2/day	S = 0.1475
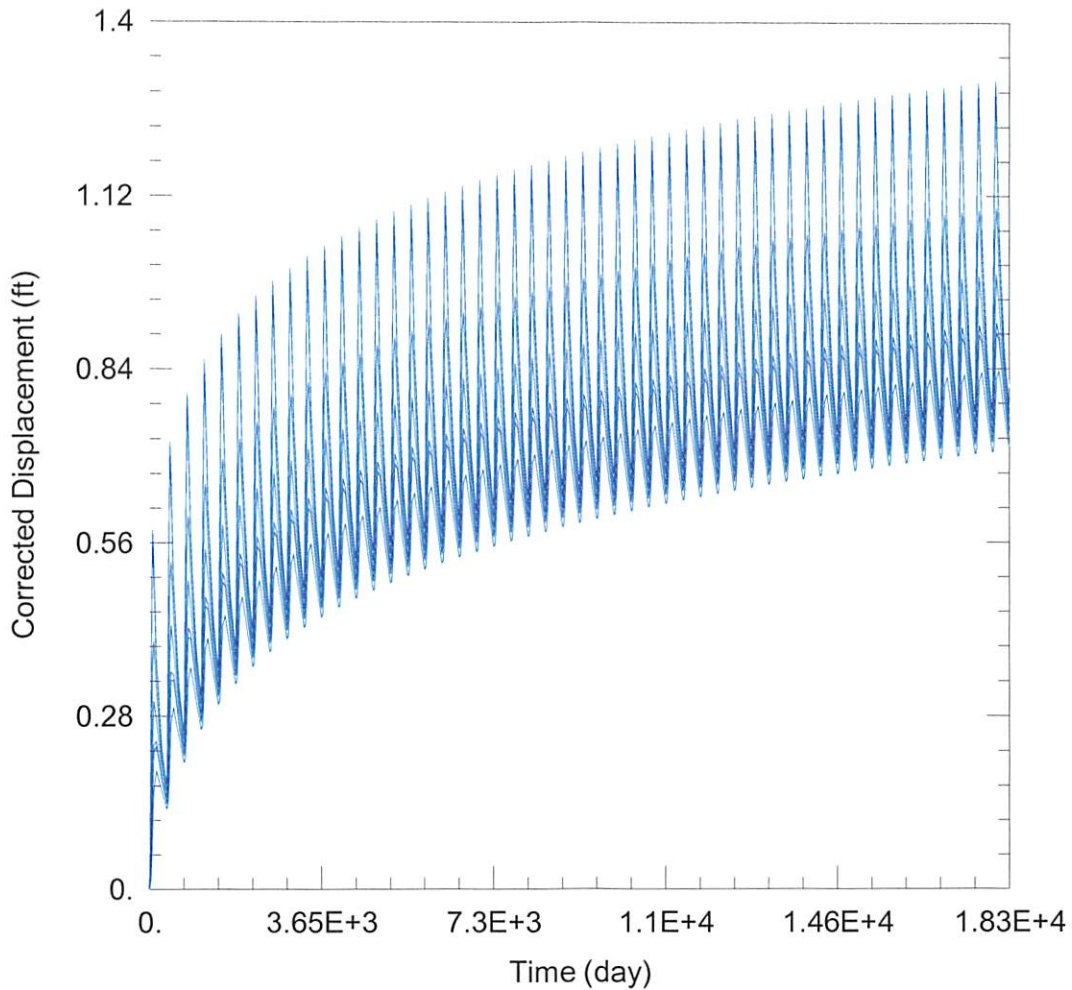
WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\1958_8600\1950 & 8600 Current.aqt
Date: 12/14/21   Time: 09:45:26

PROJECT INFORMATION

Company: GMD 3
Project: 1950 & 8600
Location: Haskell County

WELL DATA

Pumping Wells				Observation Wells		
Well Name	X (ft)	Y (ft)		Well Name	X (ft)	Y (ft)
1950 & 8600	-27990	247818		▫	-27990	247818
				▫ 17207	-30920	246244
				▫ 34354 & 45620	-26249	249979
				▫ 25439	-31817	248263
				▫ 16878	-28857	250393
				▫ 23121	-26276	251865
				▫ 7703	-30952	243914
				▫ 4099	-23729	248397
				▫ Domestic 2-29-33	-26319	249930

SOLUTION

Aquifer Model: Unconfined   Solution Method: Theis

T   = 7344. ft²/day   S   = 0.1475