Evaluation of proposed move for Water Right No 10335

Proposed: Move water right no. 10335 a distance of 2,557 ft to the south.

Wells within 1 mile: 3675 and 9695.

The saturated thickness at the proposed well location is estimated to be 74 ft, based upon the GMD3 model. For saturated thickness between 50 ft and 75 ft, the drawdown allowance is 1.5 ft.

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

$S = 0.09239$, $T = 657.1915$ ft^2/day, $tp_{current}$ = 219 days (based upon assumed 60% production time in stock wells), $Q_{current}$ = 114 gpm (based upon average use and assumed production time), $tp_{proposed}$ = 128 days, $Q_{proposed}$ = 500 gpm

Theis drawdowns were calculated as follows:

3675:   Drawdown from current location = 6.11 ft

                 Drawdown from proposed location = 13.80 ft

                 Net drawdown = **7.7 ft**

9695:   Drawdown from current location = 3.52 ft

                 Drawdown from proposed location = 11.71 ft

                 Net drawdown = **8.2 ft**

Net drawdown exceeds the drawdown allowance of 1.5 ft for both wells within 1 mile of the proposed location. Therefore, critical well analysis is necessary.

Critical Well Evaluation:

3675:

Water Column = 74 ft

DP = 7.7 ft

DE = -5.5 ft (GMD3 model indicates the water table is expected to rise over the next 25 years)

DD = 0 ft (Well is enrolled in WRCP and is not expected to be active)

DT = 2.2 ft

Economic Drawdown Constraint (EDC) = 0.4 * 74 ft = 29.6 ft

Physical Drawdown Constraint (PDC) = 74 ft – 60 ft = 14 ft

The PDC is more conservative than the EDC, so the maximum allowable total drawdown is 14 ft.

Total drawdown of 2.2 ft is less than the maximum allowable drawdown of 14 ft, so this well **is not critical.**

9695:

Water Column = 74 ft

DP = 8.2 ft

DE = -5.5 ft (GMD3 model indicates the water table is expected to rise over the next 25 years)

DD = 6.91 ft (S = 0.2119, T = 31,419 gpd/ft, Q = 100 gpm, tp = 13 days, efficiency = 70%)

DT = 9.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 74 ft = 29.6 ft

Physical Drawdown Constraint (PDC) = 74 ft – 60 ft = 14 ft

The PDC is more conservative than the EDC, so the maximum allowable total drawdown is 14 ft.

Total drawdown of 9.6 ft is less than the maximum allowable drawdown of 14 ft, so this well **is not critical.**

Conclusion:

Based upon information from the GMD3 model, this proposal will cause effects on neighboring wells exceeding maximum allowable drawdown on critical wells. However, critical well evaluation found that neither of the two wells located within 1 mile of the proposed move are critical wells. Therefore, GMD3 staff recommends approval of the application.
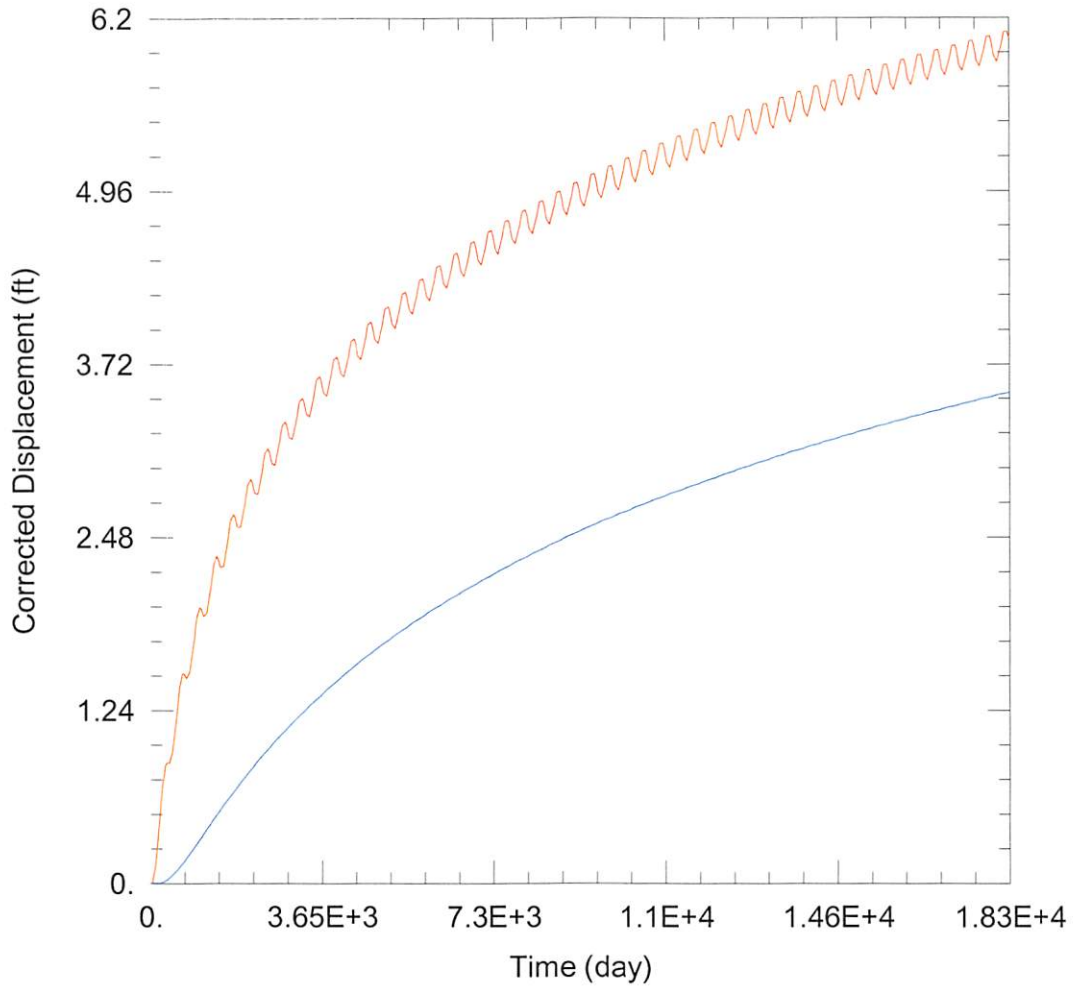
WELL TEST ANALYSIS

Data Set: C:\...\10335 Current.aqt
Date: 04/14/20   Time: 11:16:04

PROJECT INFORMATION

Company: GMD 3
Project: 10335
Location: Morton County
Test Well: 10335

WELL DATA

Pumping Wells				Observation Wells		
Well Name	X (ft)	Y (ft)		Well Name	X (ft)	Y (ft)
10335	-256552	167115		▫	-256552	167115
				▫ 3675	-259140	166741
				▫ 9695	-260489	162766

SOLUTION

Aquifer Model: Unconfined   Solution Method: Theis
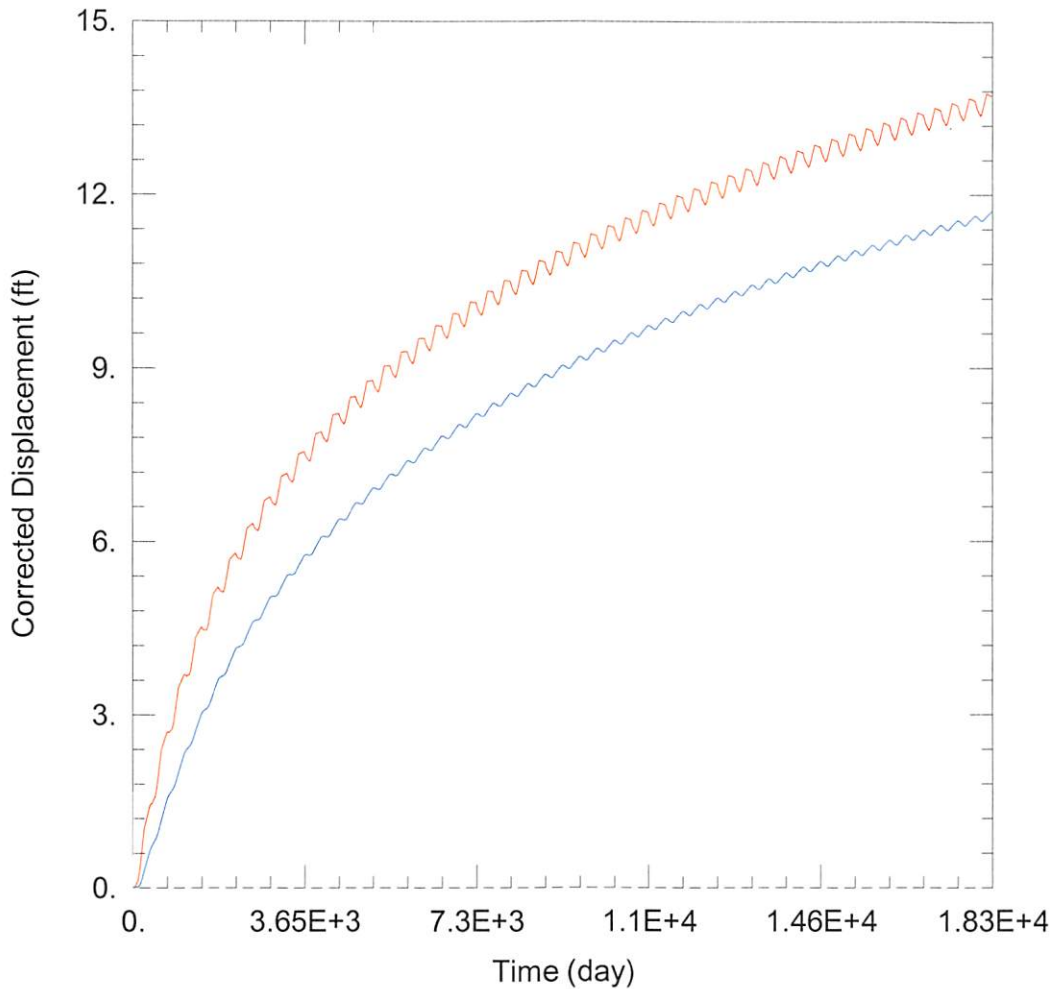
T   = 657.2 ft²/day   S   = 0.09239
Kz/Kr = 1.   b   = 74. ft

WELL TEST ANALYSIS

Data Set: C:\...\10335 Proposed.aqt
Date: 04/14/20   Time: 11:16:19

PROJECT INFORMATION

Company: GMD 3
Project: 10335
Location: Morton County
Test Well: 10335

WELL DATA

Pumping Wells				Observation Wells		
Well Name	X (ft)	Y (ft)		Well Name	X (ft)	Y (ft)
10335	-256707	164563		▫	-256707	164563
				▫ 3675	-259140	166741
				▫ 9695	-260489	162766

SOLUTION

Aquifer Model: Unconfined   Solution Method: Theis

T   = 657.2 ft^2/day   S   = 0.09239
Kz/Kr = 1.   b   = 74. ft