Evaluation of proposed move for Water Right No. 27508

Proposed: Move water right no. 27508 to a new well location, 1876 ft to the southeast. This change does not meet spacing requirements under GMD3 rules. A waiver of spacing rules will be required if the move is to be approved.

Wells within 1 mile: 17925 & 36690, 5043 & 7509, and a domestic well in section 5-30-31.

The saturated thickness at the proposed well location is estimated to be 131 ft, based upon the driller's log and an observation well in section 9-30-31. For saturated thickness between 125 ft and 150 ft, the drawdown allowance is 3.0 ft.

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

$S = 0.2213$, $T = 6564.7$ ft^2/day, $tp_{current} = 227$ days, $Q_{current} = 148$ gpm, $tp_{proposed} = 115$ days, $Q_{proposed} = 1000$ gpm

Theis drawdowns were calculated as follows:

17925 & 36690:   Drawdown from current location = 1.01 ft

                    Drawdown from proposed location = 3.31 ft

                    Net drawdown = **2.3 ft**

5043 & 7509:	Drawdown from current location = 1.20 ft
	Drawdown from proposed location = 5.80 ft
	Net drawdown = **4.6 ft**
Domestic 5-30-31:	Drawdown from current location = 0.94 ft
	Drawdown from proposed location = 3.98 ft
	Net drawdown = **3.0 ft**

Net drawdown exceeds the drawdown allowance of 3.0 ft for the well authorized under water right nos. 5043 & 7509. Critical well analysis is necessary on that well.

Critical Well Evaluation:

5043 & 7509:

Water Column = 131 ft

DP = 4.6 ft (Net drawdown from the proposal indicated above)

DE = 53.9 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 11.9 ft (S = 0.2213, T = 49,104 gpd/ft, Q = 220 gpm, tp = 161 days, efficiency = 70%)

DT = 70.4 ft

Economic Drawdown Constraint (EDC) = 0.4 * 131 ft = 52.4 ft

Physical Drawdown Constraint (PDC) = 131 ft – 60 ft = 71 ft

Total drawdown of 70.4 ft is greater than the EDC, so this well **is critical.**

Conclusion:

The proposed move is in an area with about 130 ft of saturated thickness in the Ogallala Aquifer formation. The GMD3 model predicts that the water table will decline by a little more than 2 ft per year over the next 25 years, leaving little Ogallala formation to work with. This proposal will install a well beneath the bedrock shale of the Ogallala formation, and while other wells will have the ability to seek water within that Dakota formation, nothing in the driller's log indicates that this formation will be remotely as productive as the Ogallala formation above. If the proposed well were to pump its full authorized authority, there would likely be a noticeable drawdown effect on the well authorized under water right nos. 5043 & 7509. This well has been flagged as a critical well, meaning that it is likely to lose most of its productive capacity over the next 25 years. A recent well inspection observed the well operating at 220 gpm, which is far below its last reported rate (500 gpm in 2002), so this loss of productivity has likely already occurred. Effects on other neighboring wells from this proposal are likely to be very small, so while they are likely to be impaired by regional decline, this application does not appear to be an immediate threat to their ability to access water. While it is somewhat likely that the new well in this proposal will impair the ability of water right nos. 5043 & 7509 to access water, this well

is also owned by the applicant, so a waiver of rules may be reasonable. Concerned neighbors can contact GMD3 at (620) 275-7147 or the Division of Water Resources at (620) 276-2901.
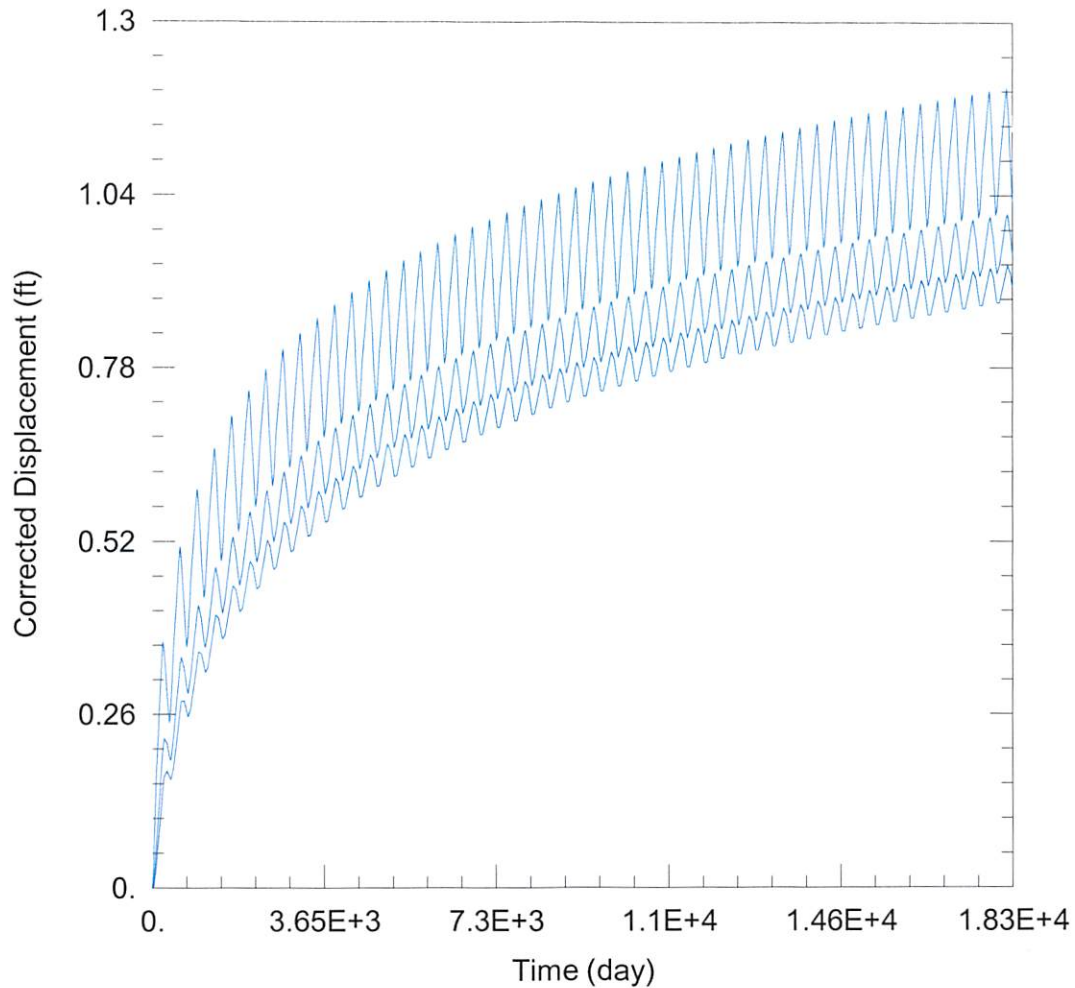
WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\27508\27508 Current.aqt
Date: 04/14/22   Time: 11:19:35

PROJECT INFORMATION

Company: GMD 3
Project: 27508
Location: Haskell County

WELL DATA

Pumping Wells		
Well Name	X (ft)	Y (ft)
27508	16247	218324

Observation Wells		
Well Name	X (ft)	Y (ft)
▫	16247	218324
▫ 17925 & 36690	13625	215759
▫ 5043 & 7509	16431	215703
▫ Domestic 5-30-31	20487	218023

SOLUTION

Aquifer Model: Unconfined   Solution Method: Theis
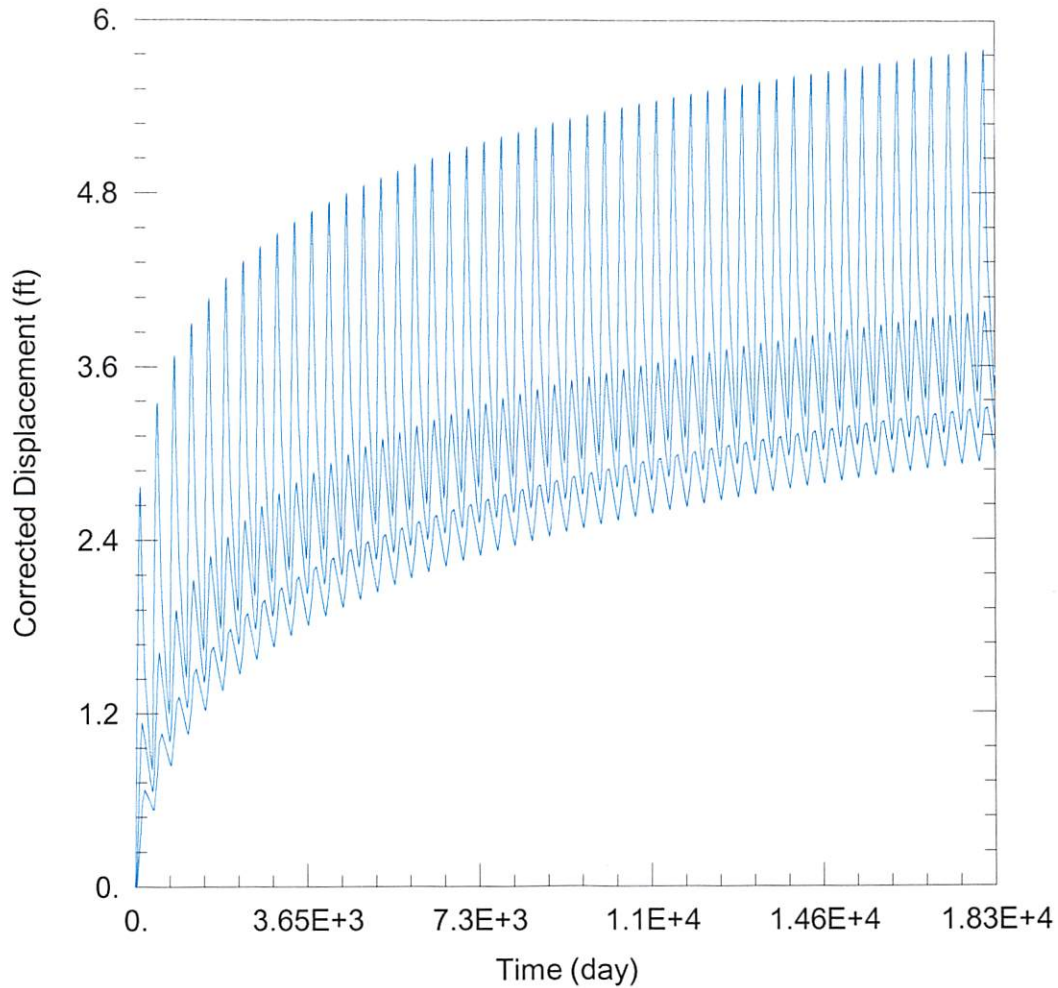
T   = 6564.7 ft^2/day   S   = 0.2213
Kz/Kr = 1.   b   = 131. ft

WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\27508\27508 Proposed.aqt
Date: 04/14/22   Time: 11:19:30

PROJECT INFORMATION

Company: GMD 3
Project: 27508
Location: Haskell County

WELL DATA

Pumping Wells		
Well Name	X (ft)	Y (ft)
27508	17566	216990

Observation Wells		
Well Name	X (ft)	Y (ft)
□	17566	216990
□ 17925 & 36690	13625	215759
□ 5043 & 7509	16431	215703
□ Domestic 5-30-31	20487	218023

SOLUTION

Aquifer Model: Unconfined   Solution Method: Theis

T   = 6564.7 ft^2/day   S   = 0.2213
Kz/Kr = 1.   b   = 131. ft