Evaluation of proposed move for Water Right No. 9283

Proposed: Move water right no. 9283 to the well location currently authorized under water right number 12407. Total authorized rate and quantity at the proposed well location will be increased from 1335 gpm and 477 AF to 2,305 gpm and 1060 AF. This proposal was evaluated at a rate of 916 gpm because that is the rate the well was producing at its most recent inspection.

Wells within 1 mile: 5391, 18287, and 18288.

The saturated thickness at the proposed well location is estimated to be 145 ft, based upon the GMD3 model. 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 = 0.1694, T = 4402.8 ft^2/day,

9283: $tp_{current}$ = 167 days, $Q_{current}$ = 302 gpm, $tp_{proposed}$ = 0 days, $Q_{proposed}$ = 0 gpm

12407: $tp_{current}$ = 115 days, $Q_{current}$ = 916 gpm, $tp_{proposed}$ = 262 days, $Q_{proposed}$ = 916 gpm

Theis drawdowns were calculated as follows:

5391: Drawdown from current location = 6.51 ft

Drawdown from proposed location = 8.99 ft

Net drawdown = **2.5 ft**

18287: Drawdown from current location = 7.94 ft

Drawdown from proposed location = 12.04 ft

Net drawdown = **4.1 ft**

18288: Drawdown from current location = 7.83 ft

Drawdown from proposed location = 12.38 ft

Net drawdown = **4.5 ft**

Net drawdown exceeds the drawdown allowance of 3.0 ft for water right nos. 18287 and 18288. Critical well analysis is necessary on those wells.

Critical Well Evaluation:

18287:

Water Column = 141 ft

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

DE = 50.1 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 57.3 ft (S = 0.1518, T = 34,280 gpd/ft, Q = 754 gpm, tp = 121 days, efficiency = 70%)

DT = 111.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 141 ft = 56.4 ft

Physical Drawdown Constraint (PDC) = 141 ft – 60 ft = 81 ft

Total drawdown of 111.5 ft is greater than the EDC and PDC, so this well **is critical.**

18288:

Water Column = 141 ft

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

DE = 50.1 ft (Water level decline from 2021 through 2046 based upon GMD3 model)

DD = 31.6 ft (S = 0.1518, T = 34,280 gpd/ft, Q = 402 gpm, tp = 205 days, efficiency = 70%)

DT = 86.2 ft

Economic Drawdown Constraint (EDC) = 0.4 * 141 ft = 56.4 ft

Physical Drawdown Constraint (PDC) = 141 ft – 60 ft = 81 ft

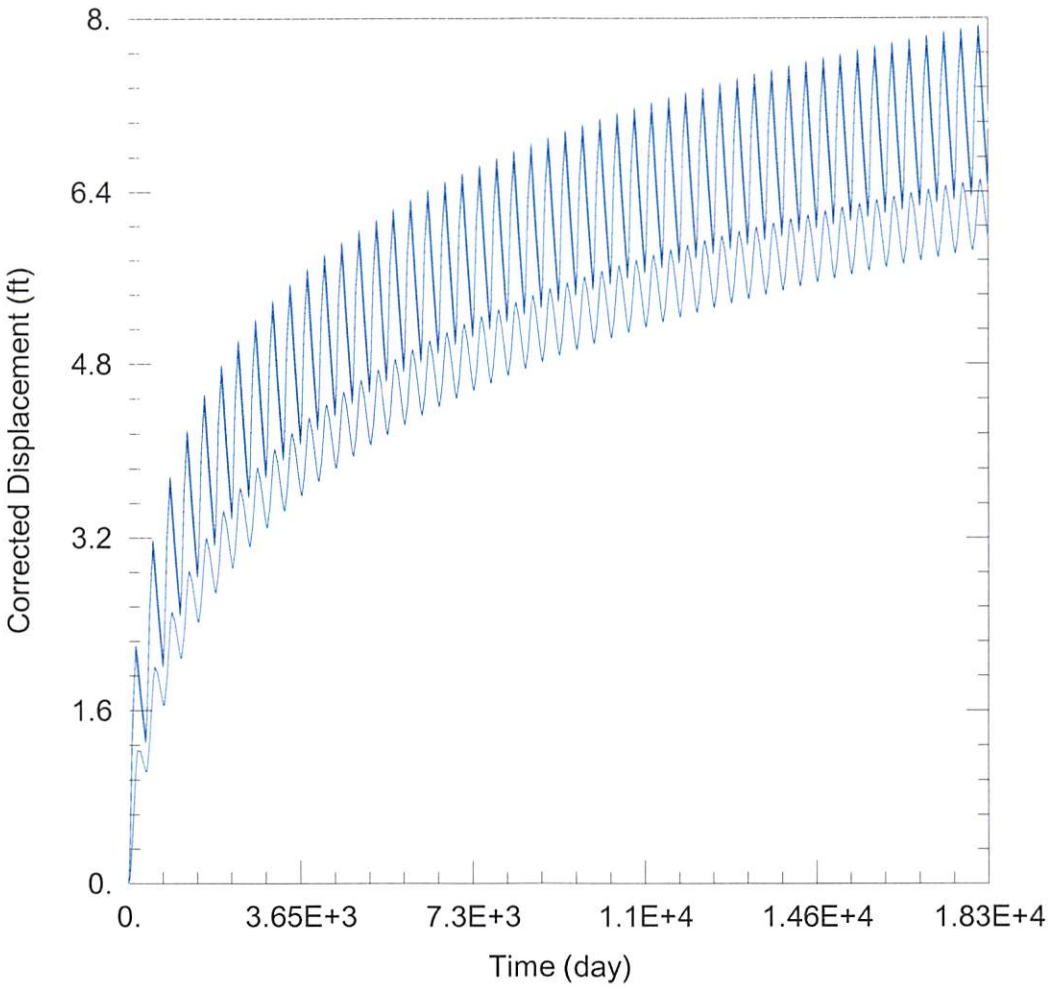
Total drawdown of 86.2 ft exceeds both the EDC and PDC, so this well **is critical.**

Conclusion:

The proposed move is located in an area with a diminished water supply. Some local wells still have the ability to produce strong flow rates, but much of the lower portion of screened well intervals appears to be made up of soapstone and limestone. The expectation is that as the water table continues to lower, production from these wells will diminish. If the well currently authorized under water right number 12407 were to operate at its full authority, a noticeable effect would occur at nearby wells authorized under water right numbers 18287 and 18288. GMD3 staff recommends a combined rate limitation of 916 gpm and a combined quantity limitation of 910.8 AF between water right numbers 9283 and 12407. This seems reasonable to staff because this is the rate the well is currently producing, and the well would need to operate 225 days at that rate to pump 910.8 AF. This rate and quantity would produce the following net effects on neighboring critical wells:

18287: Net Drawdown = **2.6 ft**

18288: Net Drawdown = **3.0 ft**



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\9283\9283 Current.aqt
Date: 03/18/21 Time: 10:34:54

PROJECT INFORMATION

Company: GMD 3
Project: 9283
Location: Stanton County
Test Well: 9283

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
	-234481	237474
	-232428	238083

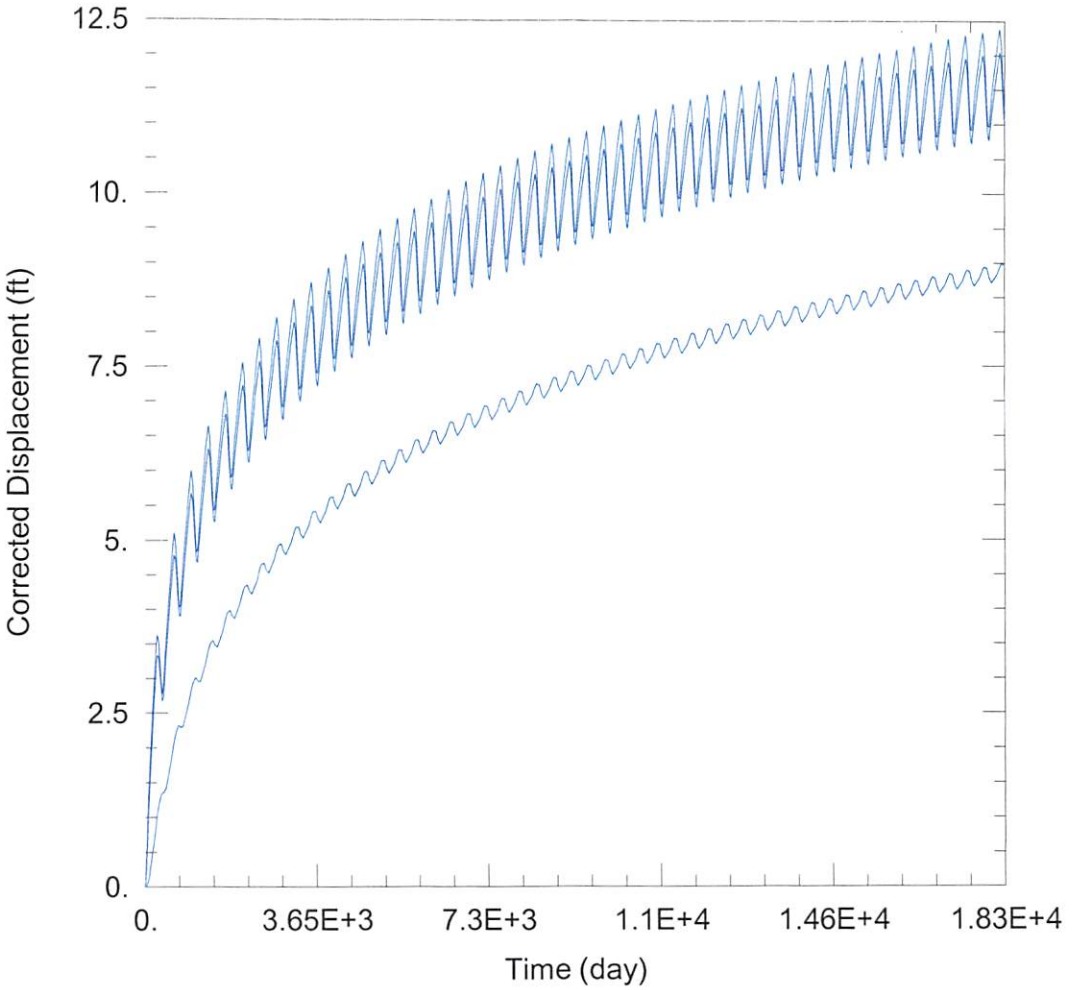
Observation Wells

Well Name	X (ft)	Y (ft)
□	-234481	237474
□	-232428	238083
□ 5391	-237084	238950
□ 18287	-231778	235489
□ 18288	-231648	240480

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 4402.8 ft^2/day
S = 0.1694
Kz/Kr = 1.
b = 145. ft



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2021_Moves\9283\9283 Proposed.aqt
Date: 03/18/21 Time: 10:34:45

PROJECT INFORMATION

Company: GMD 3
Project: 9283
Location: Stanton County
Test Well: 9283

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
12407	-232428	238083

Observation Wells

Well Name	X (ft)	Y (ft)
▫	-232428	238083
▫ 5391	-237084	238950
▫ 18287	-231778	235489
▫ 18288	-231648	240480

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 4402.8 ft^2/day
S = 0.1694
Kz/Kr = 1.
b = 145. ft