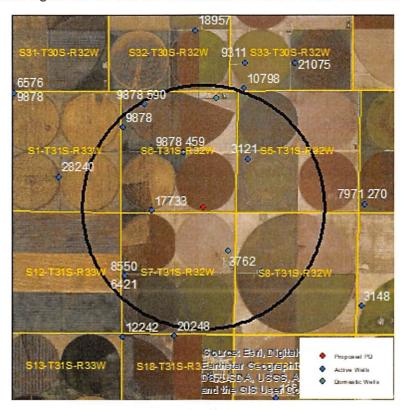
Evaluation of proposed move for Water Right Nos 459 and 9878

Proposed: Move water right nos. 459 and 9878 a distance of 2523 ft to the southeast.



Wells within 1 mile: 17733, 9878, 590 & 9878, 3121, 3726, 6421 & 8550, a domestic well in section 6-31-32, and a domestic well in section 7-31-32.

The saturated thickness at the proposed well location is estimated to be 182 ft, based upon the driller's log. For saturated thickness between 150 ft and 200 ft, the drawdown allowance is 3.5 ft.

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

S = 0.224, T = 17,252 ft²/day, $tp_{current} = 132$ days (based upon average use and observed rate), $Q_{current} = 250$ gpm (based upon last reported rate of 500 gpm in 2010 and no use since 2014), $tp_{proposed} = 77$ days, $Q_{proposed} = 3090$ gpm

Theis drawdowns were calculated as follows:

17733: Drawdown from current location = 0.60 ft

Drawdown from proposed location = 5.64 ft

Net drawdown = 5.0 ft

9878: Drawdown from current location = 0.61 ft

Drawdown from proposed location = 3.22 ft

Net drawdown = 2.6 ft

590 & 9878:

Drawdown from current location = 0.63 ft

Drawdown from proposed location = 3.13 ft

Net drawdown = 2.5 ft

3121:

Drawdown from current location = 0.61 ft

Drawdown from proposed location = 4.83 ft

Net drawdown = 4.2 ft

3762:

Drawdown from current location = 0.38 ft

Drawdown from proposed location = 3.89 ft

Net drawdown = 3.5 ft

6421 & 8550:

Drawdown from current location = 0.39 ft

Drawdown from proposed location = 3.39 ft

Net drawdown = 3.0 ft

Domestic 6-31-32:

Drawdown from current location = 0.62 ft

Drawdown from proposed location = 3.30 ft

Net drawdown = 2.7 ft

Domestic 7-31-32:

Drawdown from current location = 0.45 ft

Drawdown from proposed location = 5.83 ft

Net drawdown = 5.4 ft

Net drawdown exceeds the drawdown allowance of 3.5 ft for wells authorized under water right numbers 17733 and 3121, and the domestic well located in section 7-31-32. Critical well analysis is necessary on those wells.

Critical Well Evaluation:

17733:

Water Column = 182 ft

DP = 5.03 ft

DE = 57.3 ft (Water level decline from 2020 through 2045 based upon GMD3 model)

DD = 24.61 ft (S = 0.224, T = 129,041 ft 2 /day, Q = 1184 gpm, tp = 76 days, efficiency = 70%)

DT = 86.9 ft

Economic Drawdown Constraint (EDC) = 182 ft * 0.4 = 72.8 ft

Physical Drawdown Constraint (PDC) = 182 ft – 60 ft = 122 ft

The EDC is more conservative than the PDC, so the maximum allowable drawdown is 72.8 ft. Total drawdown of 86.9 ft is greater than the maximum allowable drawdown, so this well is critical.

3121:

Water Column = 182 ft

DP = 4.23 ft

DE = 58.6 ft

DD = 5.01 ft (S = 0.1602, T = 65,081 ft²/day, Q = 118 gpm, tp = 176 days, efficiency = 70%)

DT = 67.8 ft

Economic Drawdown Constraint (EDC) = 182 ft * 0.4 = 72.8 ft

Physical Drawdown Constraint (PDC) = 182 ft - 60 ft = 122 ft

The EDC is more conservative than the PDC, so the maximum allowable drawdown is 72.8 ft. Total drawdown of 67.8 ft is less than the maximum allowable drawdown, so this well is not critical.

Domestic 7-31-32:

Water Column = 100 ft

DP = 5.39 ft

DE = 55.8 ft

DT = 61.2 ft

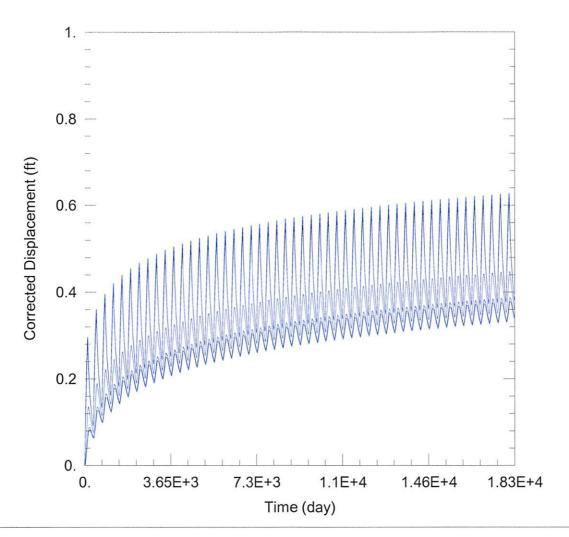
Economic Drawdown Constraint (EDC) = 100 ft * 0.4 = 40 ft

Physical Drawdown Constraint (PDC) = 100 ft - 20 ft = 80 ft

The EDC is more conservative than the PDC, so the maximum allowable drawdown is 40.0 ft. Total drawdown of 61.2 ft is greater than the maximum allowable drawdown, so the well is critical.

Conclusion:

The well authorized under water right number 17733 and the domestic well located in section 7-31-32 have been identified as critical wells. No driller's log is available for the well under water right number 17733, so the evaluation assumed the well was drilled to a depth at the top of the shale on the driller's log at the proposed location. The domestic well in section 7-31-32 is 44 years old and could be redrilled deeper. It is likely that drilling a new well to the depth of shale would remedy any issue with access to water at this well location. Overall net effects on all nearby wells are less than 3.5 ft if the proposed well is limited to a rate of 1100 gpm and a quantity of 875 AF. Therefore, GMD3 staff recommends approval of the application subject to the applicant agreeing to a limit of 1100 gpm and a quantity of 875 AF. This limitation would not be permanent and would only apply to the proposed well location.



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2020_moves\459_9878\459_9878 Current.aqt

Date: 01/16/20 Time: 16:06:04

PROJECT INFORMATION

Company: GMD 3
Project: 459 & 9878
Location: Seward County
Test Well: 459 & 9878

WELL DATA

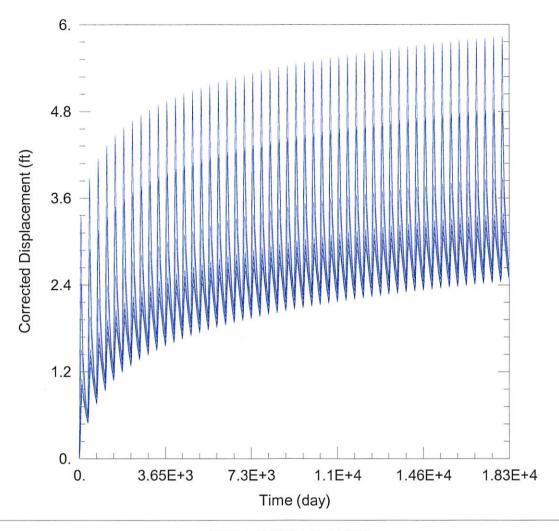
Pumping vveils			
Well Name	X (ft)	Y (ft)	
459 & 9878	-12260	184029	

Well Name	X (ft)	Y (ft)
	-12260	184029
- 17733	-13642	181506
9878	-14896	185104
590 & 9878	-13951	186098
□ 3121	-9444	183735
□ 3762	-8880	178871
6421 & 8550	-14813	178675
□ Domestic 6-31-32	-10821	186367
 Domestic 7-31-32 	-10284	179788

Observation Wells

SOLUTION

Aguifer Model: Unconfined Solution Method: Theis



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2020_moves\459_9878\459_9878 Proposed.aqt

Date: 01/16/20 Time: 16:05:56

PROJECT INFORMATION

Company: GMD 3
Project: 459 & 9878
Location: Seward County
Test Well: 459 & 9878

WELL DATA

Pumping Wells			
Well Name	X (ft)	Y (ft)	
459 & 9878	-11378	181665	

Well Name	X (ft)	Y (ft)
	-11378	181665
17733	-13642	181506
□ 9878	-14896	185104
590 & 9878	-13951	186098
3121	-9444	183735
□ 3762	-8880	178871
6421 & 8550	-14813	178675
 Domestic 6-31-32 	-10821	186367
□ Domestic 7-31-32	-10284	179788

Observation Wells

SOLUTION

Aguifer Model: Unconfined Solution Method: Theis