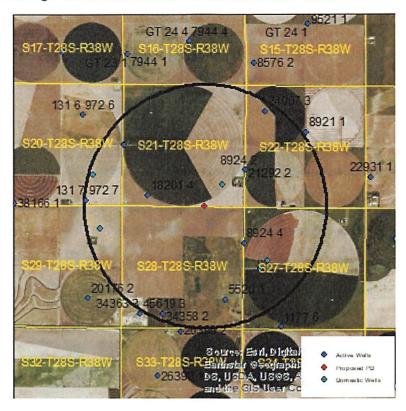
Evaluation of proposed move for Water Right No 18201

Proposed: Move water right no. 18201 a distance of 2518 ft to the southeast.



Wells within 1 mile: 8924 & 21292, 22057, 131 & 972, 34358, 5520, 8924, 1177, 24007, a domestic well in section 21-28-38, a domestic well in section 20-28-38, a domestic well in section 29-28-38, and a domestic well in section 27-28-38.

The saturated thickness at the proposed well location is estimated to be 294 ft, based upon the driller's log and an observation well located in section 33-28-38. The GMD3 model predicts a saturated thickness of 128 ft and the driller's log appears to go deeper than Ogallala formation, so a thickness of 128 ft was used to determine allowable drawdown effects. 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 = 0.1382, T = 11,357 ft²/day, tp_{current} = 158 days (based upon average use and observed rate), $Q_{current} = 525$ gpm (based upon 2013 field inspection), tp_{proposed} = 109 days, $Q_{proposed} = 1325$ gpm

Theis drawdowns were calculated as follows:

8924 & 21292:

Drawdown from current location = 1.79 ft

Drawdown from proposed location = 4.82 ft

Net drawdown = 3.0 ft

Drawdown from proposed location = 3.18 ft

Net drawdown = **0.7** ft

131 & 972: Drawdown from current location = 2.34 ft

Drawdown from proposed location = 2.89 ft

Net drawdown = 0.6 ft

34358: Drawdown from current location = 1.63 ft

Drawdown from proposed location = 2.95 ft

Net drawdown = 1.3 ft

5520: Drawdown from current location = 1.55 ft

Drawdown from proposed location = 3.34 ft

Net drawdown = 1.8 ft

8924: Drawdown from current location = 1.72 ft

Drawdown from proposed location = 4.83 ft

Net drawdown = **3.1** ft

1177: Drawdown from current location = 1.52 ft

Drawdown from proposed location = 3.65 ft

Net drawdown = 2.1 ft

24007: Drawdown from current location = 1.45 ft

Drawdown from proposed location = 3.00 ft

Net drawdown = 1.5 ft

Domestic 21-28-38: Drawdown from current location = 2.11 ft

Drawdown from proposed location = 7.02 ft

Net drawdown = 4.9 ft

Domestic 20-28-38: Drawdown from current location = 2.39 ft

Drawdown from proposed location = 2.93 ft

Net drawdown = 0.5 ft

Domestic 29-28-38: Drawdown from current location = 2.41 ft

Drawdown from proposed location = 3.07 ft

Net drawdown = 0.7 ft

Domestic 27-28-38: Drawdown from current location = 1.51 ft

Drawdown from proposed location = 3.69 ft

Net drawdown = 2.2 ft

Net drawdown exceeds the drawdown allowance of 3.0 ft for water right number 8924 and the domestic well in section 21-28-38, so critical well evaluation is necessary on those wells.

Critical Well Evaluation:

8924:

Water Column = 146.7 ft (No driller's log was available, so modeled saturated thickness was used.)

DP = 3.11 ft

DE = 44.1 ft

DD = 23.7 ft (S = 0.1086, T = 39,300 gpd/ft, Q = 349 gpm, tp = 114 days, efficiency = 70%)

DT = 70.9 ft

Economic Drawdown Constraint (EDC) = 146.7 ft * 0.4 = 58.7 ft

Physical Drawdown Constraint (PDC) = 146.7 ft - 60 ft = 86.7 ft

The EDC is more conservative than the PDC, so the maximum allowable drawdown is 58.7 ft. Total drawdown of 70.9 ft is greater than the maximum allowable drawdown, so this well **is critical**.

Domestic 21-28-38:

Water Column = 276 ft (from driller's log)

DP = 3.11 ft

DE = 44.1 ft

DT = 51.5 ft

Economic Drawdown Constraint (EDC) = 276 ft * 0.4 = 110.4 ft

Physical Drawdown Constraint (PDC) = 276 ft - 20 ft = 256 ft

The EDC is more conservative than the PDC, so the maximum allowable drawdown is 110.4 ft. Total drawdown of 51.5 ft is less than the maximum allowable drawdown, so this well is **not critical**.

Conclusion:

The well authorized under water right number 8924 is a critical well. It is possible that more information could determine that the well is deeper than estimated and therefore not critical. It is also unlikely that the proposed well will be capable of pumping water at the proposed rate of 1325 gpm. Limiting the rate pumped from the proposed well to 1125 gpm would reduce the 50 year net effect on water right number 8924 to 3.0 ft, which would meet the drawdown allowance criteria in the Drawdown Assessment Guidelines for GMD3. GMD3 staff recommends approval of this proposal, limiting the rate of the proposed well to 1125 gpm.