ATTACHMENT 2

DISTANCE DRAWDOWN CALCULATIONS OF 400 GPM PUMP AT Ex. 9 Wells

Ex. 9 Wells

utah.gov | Online Services | Agency List | Business

Search

Utah Division of Water Rights

CALCULATED THEIS:

Given input:

Constant pumping rate (Q): 0.891204 cfs = 400 gpm
Aquifer transmissivity (T): 25595 ft²/day or 0.296238 ft²/second
Time since pumping began (t): 30 days
Radial distance from well (r): 400.00 feet
Aquifer storativity (S): 0.17

$$h_o - h = \frac{Q}{4\pi T} W(u) \qquad u = \frac{r^2 S}{4Tt}$$

$$h_o - h = \frac{Q}{4\pi T}\left[-0.5772 - \ln u + u - \frac{u^2}{2\cdot 2!} + \frac{u^3}{3\cdot 3!} - \frac{u^4}{4\cdot 4!} + \ldots\right]$$

Q is the constant pumping rate (L3/T; ft3/day or m3/day)
h is hydraulic head (L; ft or m)
ho is hydraulic head before pumping started (L; ft or m)
ho-h is the drawdown (L; ft or m)
T is aquifer transmissivity (L2/T; ft2/day or m2/day)
t is time since pumping began (T; days)
r is radial distance from the pumping well (L; ft or m)
S is aquifer storavity (dimensionless)
b is aquifer thickness (L; ft or m)

u: 0.008856
W(u) series: 4.15830811752019

Drawdown (ho-h) at day 30: 1.00 ft using series calculation of W(u) to u⁶

Drawdown over the course of a year from initial well drilling:
Day 1: 0.24 ft
Day 4: 0.53 ft
Day 7: 0.65 ft
Day 10: 0.74 ft
Day 13: 0.80 ft
Day 16: 0.85 ft
Day 19: 0.89 ft
Day 22: 0.92 ft
Day 25: 0.95 ft
Day 28: 0.98 ft
Month 1: 1.00 ft
Month 2: 1.16 ft
Month 3: 1.26 ft
Month 4: 1.33 ft
Month 5: 1.38 ft
Month 6: 1.43 ft
Month 7: 1.46 ft
Month 8: 1.49 ft
Month 9: 1.52 ft
Month 10: 1.55 ft
Month 11: 1.57 ft
Month 12: 1.59 ft

Drawdown over multiple years from initial well drilling:
Year 1: 1.59 ft
Year 2: 1.76 ft
Year 3: 1.85 ft
Year 4: 1.92 ft
Year 5: 1.98 ft
Year 6: 2.02 ft
Year 7: 2.06 ft
Year 8: 2.09 ft
Year 9: 2.12 ft
Year 10: 2.14 ft
Year 11: 2.17 ft
Year 12: 2.19 ft
Year 13: 2.21 ft
Year 14: 2.22 ft

Year 15: 2.24 ft
Year 16: 2.26 ft
Year 17: 2.27 ft
Year 18: 2.28 ft
Year 19: 2.30 ft
Year 20: 2.31 ft
Year 21: 2.32 ft
Year 22: 2.33 ft
Year 23: 2.34 ft
Year 24: 2.35 ft
Year 25: 2.36 ft
Year 26: 2.37 ft
Year 27: 2.38 ft
Year 28: 2.39 ft
Year 29: 2.40 ft
Year 30: 2.41 ft