

MEMO

State of Idaho

Department of Water Resources

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Date: January 8, 2010
To: Allen Merritt
From: Mike McVay
cc: Jeff Peppersack, Rick Raymondi, and Sean Vincent
Subject: Re-evaluation of proposed DeVries transfer #75529.

Introduction

Per your request, I have re-evaluated the proposed transfer for the DeVries Dairy using different evaluation criteria. This memo is an addendum to the memo "Evaluation of proposed DeVries transfer #75529" dated December 2, 2009. This review has been conducted to answer the following questions:

1. If the proposed well is pumped at a rate of 0.21 ft³/sec (cfs), what will be the likely impact to neighboring wells at a distance of ¼ mile?
2. If the proposed well is pumped at a rate of 0.05 cfs, what will be the likely impact to neighboring wells at a distance of ¼ mile?

IDWR Re-evaluation

The application proposes to transfer 0.21 cfs of irrigation water rights from a point of diversion (POD) that is located approximately 24 miles east-southeast of the existing DeVries destination POD. This water is to be combined with an existing domestic and stock water right of 0.04 cfs to provide 0.25 cfs for commercial and stockwater use at the dairy. Furthermore, the transfer application appears to state that a maximum volume of 35 AF/year is requested, which is approximately 0.05 cfs at a constant withdrawal rate for one year. It has also been noted that the nearest neighbor is located approximately ¼ mile away from the DeVries site.

Because the preliminary analyses were evaluated with a pumping rate of 0.25 cfs, the water level impacts due to pumping the DeVries well have been re-evaluated using the

revised pumping rates of 0.21 and 0.05 cfs. This re-evaluation also looks at impacts to wells located ¼ mile from the site to evaluate impacts to the nearest neighbor.

Water Level Impacts

A Theis (1935) analysis has been used to estimate potential impacts to neighboring wells as a result of DeVries well pumping. The analyses assume that the DeVries well pumps at 0.21 and 0.05 cfs, respectively, for two years.

Table 1 shows Theis estimates of drawdown over time at various distances from the DeVries well using a pumping rate of 0.21 cfs and the aquifer properties (transmissivity = 3,940 and storage = 0.07) presented in Cosgrove, 1998.

Table 1. IDWR estimated water level Impacts from the DeVries well pumping continuously for two years – utilizing aquifer properties presented in Cosgrove, 1998.				
Time-drawdown calculations using Theis equation				
Distance (ft)		0.5	1,320	26,400
Aquifer parameters	Time (days)	Drawdown (ft)	Drawdown (ft)	Drawdown (ft)
$T^1 = 3,940 \text{ ft}^2/\text{d}$ $S^1 = 0.07$	1	4.81	0.00	-
	3	5.22	0.01	-
Pumping rate	10	5.66	0.12	-
$Q^2 = 18,144 \text{ ft}^3/\text{d}$	14	5.78	0.18	-
	120	6.57	0.82	-
	365	6.98	1.21	0.00
	730	7.23	1.46	0.00

¹Aquifer properties taken from Cosgrove et al., 1998. ²This pumping rate is equivalent to 0.21 cfs.

After two years of pumping at 0.21 cfs, the estimated drawdowns in wells located 0.5 ft., 1,320 ft., and 26,400 ft. distant from the DeVries well are 7.2 ft., 1.5 ft., and 0.0 ft., respectively.

Table 2 shows Theis estimates of drawdown over time at various distances from the DeVries well using a pumping rate of 0.05 cfs and the aquifer properties (transmissivity = 3,940 and storage = 0.07) presented in Cosgrove, 1998.

Table 2. IDWR estimated water level Impacts from the DeVries well pumping continuously for two years – utilizing aquifer properties presented in Cosgrove, 1998.				
Time-drawdown calculations using Theis equation				
Distance (ft)		0.5	1,320	26,400
Aquifer parameters	Time (days)	Drawdown (ft)	Drawdown (ft)	Drawdown (ft)
$T^1 = 3,940 \text{ ft}^2/\text{d}$ $S^1 = 0.07$	1	1.15	0.00	-
	3	1.24	0.00	-
Pumping rate	10	1.35	0.00	-
$Q^2 = 4,320 \text{ ft}^3/\text{d}$	14	1.38	0.04	-
	120	1.56	0.19	-
	365	1.66	0.29	0.00
	730	1.72	0.35	0.00

¹Aquifer properties taken from Cosgrove et al., 1998. ²This pumping rate is equivalent to 0.05 cfs.

After two years of pumping at 0.05 cfs, the estimated drawdowns in wells located 0.5 ft., 1,320 ft., and 26,400 ft. distant from the DeVries well are 1.7 ft., 0.4., and 0.0 ft., respectively.

Conclusions

In an effort to evaluate the impacts of pumping the DeVries well, this review has been conducted to answer the following questions:

1. If the proposed well is pumped at a rate of 0.21 cfs, what will be the likely impact to neighboring wells at a distance of $\frac{1}{4}$ mile?

Pumping the DeVries well continuously at 0.21 cfs for two years will produce an estimated drawdown of 1.5 ft. in wells 1,320 ft. away.

2. If the proposed well is pumped at a rate of 0.05 cfs, what will be the likely impact to neighboring wells at a distance of $\frac{1}{4}$ mile?

Pumping the DeVries well continuously at 0.05 cfs for two years will produce an estimated drawdown of 0.4 ft. in wells 1,320 ft. away.

References

Brockway Engineering, 2009. Multiple Well Effect Analysis of Transfer 75529.

Cosgrove, D.M., Johnson, G.S., Brockway, C.E., and Robinson, C.W., 1997. Geohydrology and development of a steady state ground-water model for the Twin Falls, Idaho area. IWRRI. Moscow, Idaho.

Cosgrove, D.M., Johnson, G.S., Brockway, C.E., and Robinson, C.W., 1998. Development of a transient ground-water model for the Twin Falls, Idaho area. IWRRI. Moscow, Idaho.

Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground water storage. Trans American Geophysical Union Part 2, 16:519–524