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Expert Report and Narrative Relative to Water Right Transfer #79380 for Dairy #3

Prepared for:

Cedar Ridge Dairy
Filer, Idaho

February 13, 2015

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Brockway Engineering, PLLC
February 13, 2015

A. Introduction

A.1. Objectives

This report examines the effects of Transfer 79380. The transfer proposes to change a portion of irrigation ground water from right 47-17589 to a stockwater and commercial use for Dairy #3 that is located south of Filer, Idaho. Hydraulic analyses of the regional aquifer are based on published reports, well drillers logs, USGS/IDWR monitoring wells and pump test data. From this analysis, the effects of Transfer 79380 on the local aquifer and the Protestants' domestic wells can be determined.

A.2. Executive Summary

Water right 47-17589 is currently owned by Thomas Leno and was decreed in the Snake River Basin Adjudication on June 1, 2010. Water right 47-17589 is a valid water right based on the laws and policies of the Idaho Department of Water Resources. Approval of Transfer 79357 will not result in any significant impact on groundwater levels or injure any existing water rights, including the Protestants' domestic wells. An acceptable consumptive use analysis of the portion of 47-17589 to be transferred to Dairy #3 has been performed and no enlargement will result from Transfer 79380. This transfer will allow a local dairy business to use water for beneficial stockwater and commercial purposes and improve the efficiency of its water distribution system.

B. Water Right Information

Water Right 47-7106 was partially decreed by the Snake River Basin Adjudication District Court on June 1, 2010. See Appendix A (partial decree and background information). The source of water for this right is groundwater in Basin 47. Water right 47-7106 is supplied by ground water that is hydraulically connected to the regional aquifer in Basin 47, the same groundwater resource for which the transfer proposes to move a portion of the water right. As recommended by the Director of IDWR, and decreed in the SRBA District Court, the right is described as follows:

Source:	Ground water
Priority Date:	December 25, 1970
Quantity:	1.85 cfs/ 465 acre-feet/year
Purpose of Use:	Irrigation
Place of Use:	155 acres

Based on the IDWR Administrative Memorandum Regarding: Forfeiture Review Period, a water right holder has until the end of the 5th year to resume use of a water right or initiate a defense to forfeiture. See Appendix B (Memo). This water right was partially decreed in 2010 and therefore is considered protected from forfeiture. The end of the calendar year of 2015 will be the end of the 5th year. By the end of 2015, irrigation must be resumed at its current authorized place of use, or the proposed transfer applications must be approved, or the water right must be leased to the Idaho Water Supply Bank, or an extension of time to avoid forfeiture must be applied for with IDWR.

Water right 47-7106 is considered a “Parent” water right by IDWR terminology. This means that portions of 47-7106 have been split and transferred off of the original water right. IDWR has already approved three splits and transfers from

this water right. The three transfers are Transfer 77406 to Triple J Dairy, Transfer 77669 to Brackett Cattle Company and Transfer 78127 to Farmers National Bank. Appendix C contains an overview map of the transfers, Corey Skinner transfer memos, and copies of IDWR's transfer approvals.

To facilitate these transfers, an analysis of the historical consumptive use was required to determine how much of 47-7106 could be transferred as a primary ground water right. An analysis of the acres irrigated, volume of water allowed, engine horse power, engine efficiency, pump efficiency, water pumping depth, operating irrigation system pressure, diesel fuel consumed, and irrigation efficiency was used to determine the amount of 47-7106 that IDWR considers to constitute a "primary" ground water right. Based on these inputs into the analysis, it was determined that 94% of water right 47-7106 is considered primary and that 145.7 acres can be split and transferred off of the property from the decreed 155 acre place of use. This analysis is provided in Appendix D.

First, IDWR approved Transfer 77406 in November of 2011. This transfer dried up 9.1 acres and 27.3 acre feet of primary irrigation water under 47-7106. When this transfer was approved by IDWR, water right 47-17569 was split off and owned by Triple J Dairy. Water right 47-17569 is a stock and commercial water right that allows a diversion rate of 0.12 cfs and an annual volume of 17.0 acre feet. The unchanged portion of 47-7106 was changed to 47-17568 which allowed 145.9 acres of irrigation with a diversion rate of 1.73 cfs and an annual volume of 437.7 acre feet.

Second, IDWR approved Transfer 77669 in March of 2012. This transfer dried up 17.6 acres and 52.8 acre feet of primary irrigation water under 47-17568. When this transfer was approved by IDWR, water right 47-17572 was split off and owned by Brackett Cattle Company. Water right 47-17572 is a stockwater right that allows a diversion rate of 0.22 cfs and an annual volume of 32.9 acre feet.

The remaining portion of 47-17568 was changed to 47-17571 which allows 128.3 acres of irrigation with a diversion rate of 1.51 cfs and an annual volume of 384.9 acre feet.

Next, IDWR approved Transfer 78127 in December of 2012. This transfer dried up 25.8 acres and 77.4 acre feet of primary irrigation water under 47-17571.

When this transfer was approved by IDWR, water right 47-17590 was split off and owned by Farmers National Bank. Water right 47-17590 is a stock and commercial water right that allows an annual volume of 48.2 acre feet. The remaining portion of 47-17571 was changed to 47-17589 which allows 102.5 acre of irrigation with a diversion rate of 0.30 cfs and an annual volume of 307.5 acre feet.

The Idaho Department of Water Resources has recognized parent water right 47-7106 as a legal water right through the SRBA Court partial decree and the approval of Transfer 77406, Transfer 78127 and Transfer 78127 by IDWR. The consumptive use analysis of 47-7106 required in Transfer 77406, Transfer 78127 and Transfer 78127 has been accepted by IDWR for all three transfers.

C. Transfer Application

C.1. Transfer Summary

Transfer 79380 proposes to dry up 35.3 acres of irrigation authorized under ground water right 47-17589 and transfer that portion of the right to a dairy facility south of Filer, Idaho (Dairy #3) for stockwater and commercial water use. The dairy facility is located in Township 11 South Range 16 East Section 6 NE quarter (see Figure 1). Currently, Dairy #3 is supplied stock and commercial water from two existing wells pursuant to water right 47-2306B, which has a diversion rate of 0.59 cfs and an annual volume of 250 acre-feet. The proposed quantity to be transferred to Dairy #3 is a diversion rate of 0.42 cfs and 66.0 acre

feet. The period of use will be changed to January 1st through December 31st of each year.

It is also proposed with Transfer 79380 that a third well or point of diversion be added at the site. The additional well will reduce hydraulic strain on the existing distribution system and allow easier delivery of stock and commercial water to the cows and the dairy facility, as well as provide water for cooling misting systems.

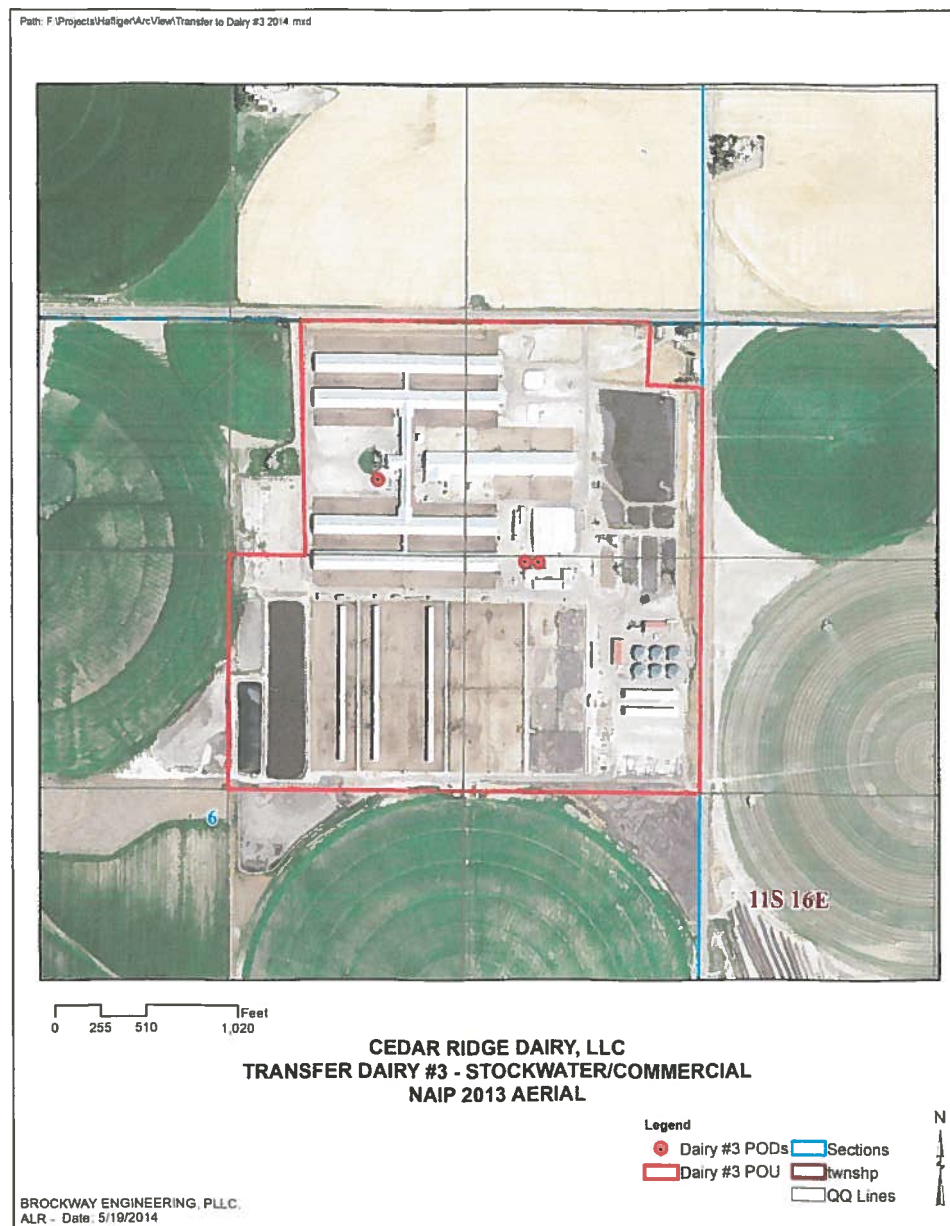


Figure 1: Dairy #3 Location, proposed place of use and well locations.

C.2. Geology and Hydrogeology

Multiple publications have been written analyzing the ground and surface water characteristics in the Salmon Falls Area of Twin Falls County, Idaho (within IDWR Administration Basin 47) and the relationship of this area with the Snake River Basin.

The United States Geological Survey (USGS) published a *Preliminary Report on Ground Water in the Salmon Falls Area, Twin Falls County, Idaho* written by K.H. Fowler in 1960. This report states that the geology of the area consists of volcanic and sedimentary strata of various types which range from nearly impermeable to moderately permeable. Wells in the area have drilled through Snake River Basalt and into sedimentary strata consisting of silt, clay, sand and some gravel. It is this sedimentary strata that provides water to domestic, stock and smaller irrigation wells.

Aquifer recharge in the Salmon Falls area is facilitated by precipitation, seepage loss from streams, canals and reservoirs. The precipitation and streams are located on the east side Highway 93 in Twin Falls County as well as Shoshone Creek, Salmon Falls Creek, and Cottonwood Creek drainages basins in northern Nevada. Salmon Falls Creek Reservoir provides storage water for irrigation and ground water recharge through seepage loss. The Salmon Falls Canal Company and Twin Falls Canal Company delivery canals also supply recharge to the ground water aquifer through seepage losses. The general direction of ground water movement is a north to northwest direction toward the Snake River.

Discharge measurements indicate that very little ground water is discharged into the creek from the Salmon Falls area between the Salmon River Creek Reservoir and the Roseworth crossing (Lily Grade). It is apparent that most of the ground

water leaves the area by some route other than the canyon of Salmon Falls Creek (Fowler, 1960).

The State of Nevada published a report entitled *Water Resources-Reconnaissance Series Report 48, Water-Resources Appraisal of the Snake River Basin in Nevada* written by Donald Moore and Thomas Eakin in 1968. This report analyzes the flow of surface water and ground water that flows into the Snake River Basin from Goose Creek Valley, Salmon Falls Creek Valley, Bruneau River Valley, Jarbridge River Valley, Owyhee River Valley, South Fork Owyhee River Valley and East Little Owyhee River Valley. An area of 5,000 square miles in northern Nevada is considered to be in the Snake River Basin. Moore and Eakin indicate by this report that the several northern Nevada ground water aquifers are directly linked and flow northward into the ground water aquifers of Idaho.

Ground water and surface water are closely interrelated along the flood plains and stream channels in northern Nevada. Due to the steep hydraulic gradients of the area, stream systems act as ground water drains. During seasons of low or little flow in streams, ground water may seep into the stream channels.

Eakin and Moore specifically discuss the surface water streams and ground water interaction in northern Nevada. They explain that due to the "steep stream gradients and high unit runoff, the estimated recharge is considered as potential recharge, rather than actual. That is, some or a considerable part of the potential recharge may leave the area as streamflow without ever entering the ground water system. This is due to the fact that, during the part of the year, infiltration rates are exceeded and the water moves off overland. However, this also is due in part to the fact that the ground water system locally is full with respect to the adjacent streams and therefore it rejects water that otherwise would enter the system. Such rejected water must then pass on as streamflow or be lost by evaporation. Because of these features, information from this study is insufficient

to permit a direct estimate of the actual average recharge to the ground water system in the area of this report (Eakin, 1968).”

The report also indicates that the shallow ground water along the Salmon Falls Creek near to the mouth of Shoshone Creek is affected by a north trending fault line that is located on the east side of the foot hills but west of Highway 93. However, two irrigation wells were drilled in close proximity to Shoshone Creek in the late 1960's and one produced 2,500 gallons per minute and the second well produced 1,250 gallons per minute. The water production from these two wells indicates that the ground water aquifer is prolific and can sustain moderate pumping for irrigation. This indicates that there is sufficient ground water at this location of the aquifer to supply these two irrigation wells. The ground water will continue to flow down gradient into Idaho towards the Snake River.

The United States Geological Survey published *Water Resources of the Salmon Falls Creek Basin Idaho-Nevada*, by E.G. Crosthwaite in 1969. This report indicates that basalt flows overlies Idavada Volcanics which is composed of silicic tuff, ash, clay, silt, sand and gravel. Alluvial and windblown deposits cover the majority of the study area. The upper basin or watershed is located in Nevada and consists of several drainages from mountain ranges. The natural discharge direction of the ground water flow is northward towards the Twin Falls tract and the Snake River. A small amount of aquifer water is discharged into Salmon Falls Creek.

The general interpretation of the all referenced published reports indicate ground water recharge occurs in northern Nevada in the Jackpot area and southern Idaho in Twin Falls County and that the aquifer flows northward towards the Snake River. Precipitation in the form of rain and snow is collected in the mountain ranges and basins that encompass Salmon Falls Creek, Shoshone Creek and Cottonwood Creek. This precipitation supplies these streams and other smaller

streams with water and the water in these streams percolate into the ground water aquifer. Salmon Falls Creek Reservoir also supplies ground water recharge through seepage loss. The general flow direction of the ground water aquifer is in a north northwest direction.

D. Aquifer Characteristics

D.1. Aquifer Features

Based on the publications and analysis by Cosgrove (1998), Fowler (1960) and Young (1971) the aquifer conditions of hydraulic gradient, storativity, hydraulic conductivity and general aquifer flow direction in the Salmon Falls area have been determined.

Hydraulic gradient is the elevation change of the static water level in an aquifer at a given distance. Hydraulic gradient is usually defined with the units of feet per mile or the change in elevation of the static water level in feet over the distance of 1 mile. The hydraulic gradient usually is parallel to the ground surface but can be affected by local aquifer recharge or depletion and geological structures within the aquifer. For the Salmon Falls area, the general hydraulic gradient for the aquifer is 50 feet per mile, Cosgrove (1998).

Storativity of an aquifer is a physical property of the aquifer that characterizes the capacity of the soil or aquifer material to store and release ground water. This aquifer characteristic is dimensionless. Storativity values vary depending on the soil composition of the aquifer. The storativity value for the aquifer area where Dairy #3 is located is 0.12 , Cosgrove (1998) and Young (1971).

Hydraulic conductivity is characteristic of an aquifer that describes how fast water flows through the aquifer material. This characteristic has units of feet per day. The tighter packed the aquifer materials are, such as clay or solid rock, the lower

the hydraulic conductivity will be or the slower the water will move through the aquifer. The aquifer materials of gravel and sand have high hydraulic conductivity values and the water flows faster through these materials. The aquifer at the Dairy #3 location has an estimated hydraulic conductivity value of 55 ft/day, Cosgrove (1998).

In aquifer regions of basalt, granite or other solid rock formations, the water is more likely to be moving in areas of geologic faults, cracks or fisher areas of the rock formations. The ability of a well to supply an adequate amount of water in this type of aquifer may depend on whether the well connects with or was drilled through the underground channels formed by the faults, cracks and fishers.

D.2. USGS Monitoring Wells

There are multiple ground water monitoring wells located within a 10 mile radius of the proposed transfer place of use (see Figure 2). The USGS measured these monitoring wells until 2009. The Idaho Department of Water Resources has recorded the water levels in these well since 2010 and will continue to do so into the foreseeable future.

The closest four monitoring wells to the proposed transfer location are identified as 11S15E-07ACB1, 11S15E-02BBB1, 10S15E-26DDA1 and 11S16E-20CCC. It was determined that well 10S15E-26DDA1 could not be used for this analysis due to its close proximity and hydraulic interaction with the Twin Falls Canal Co. canal system. It was also determined that well 11S16E-20CCC could not be used for this analysis because there are only 11 data points collected from this well from 1980 through 2006. The intermittent data is not sufficient to define any statistically sound seasonal trends or long-term trends for well 11S16E-20CCC.

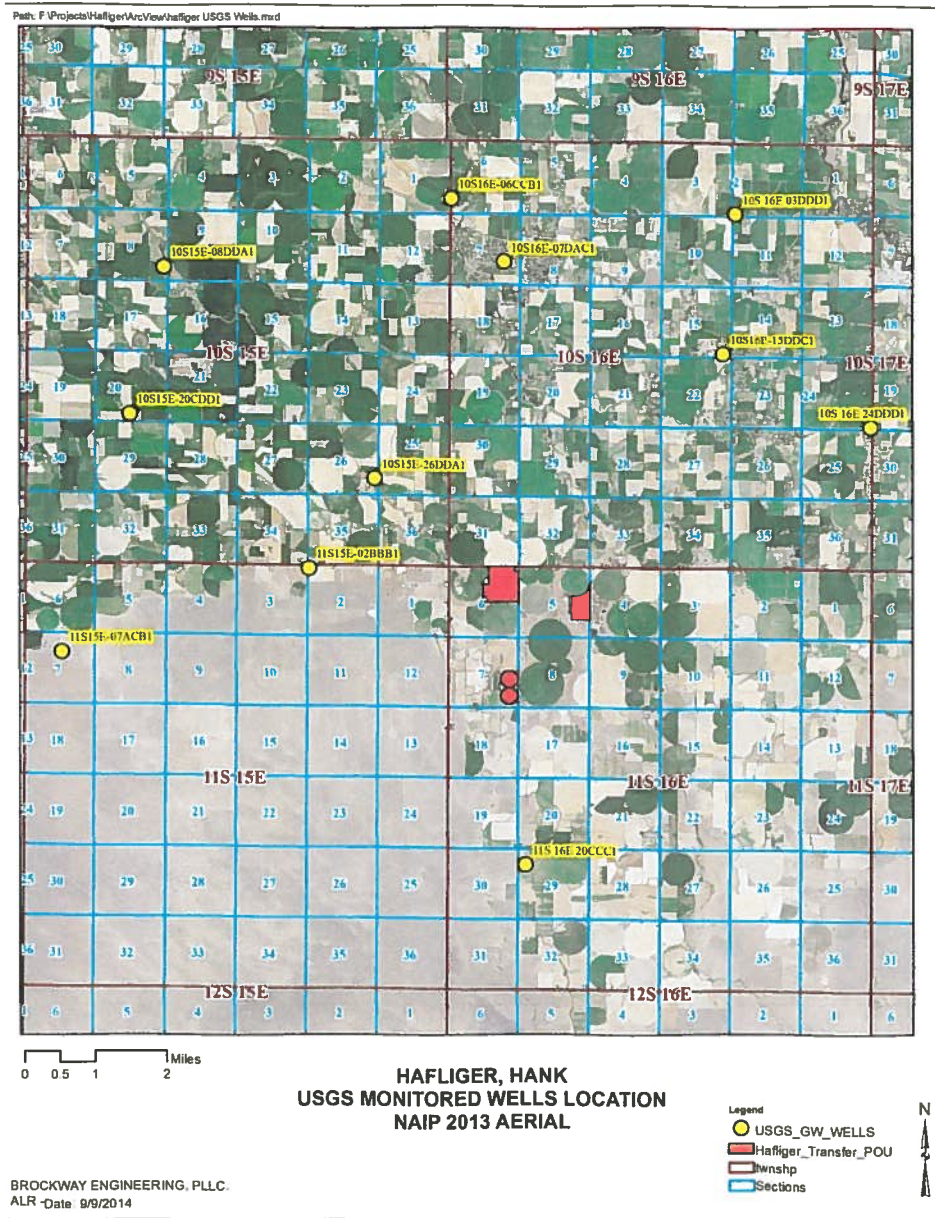


Figure 2: USGS Monitoring Wells Locations

Well 11S15E-07ACB1 is located approximately 6.5 miles west of the proposed point of diversion for Transfer 79380. Data from this well have been recorded from the spring of 1980 to the present time with over 120 well measurements having been performed. A graphical representation of the data from this well is shown in Figure 3 as Well 11S 15E Sec 7 SWNW.

Well 11S15E-02BBB1 is located approximately 3.0 miles west of the proposed point of diversion for Transfer 79380. Data from this well have been collected from the fall of 1980 to the present time with over 250 well measurements having been performed. A graphical representation of the data from this well is provided in Figure 3 as 11S 15E Sec 2 NWNW. The tabular data for these two wells can be found at <http://www.idwr.idaho.gov/hydro.online/gwl/gwl.html>.

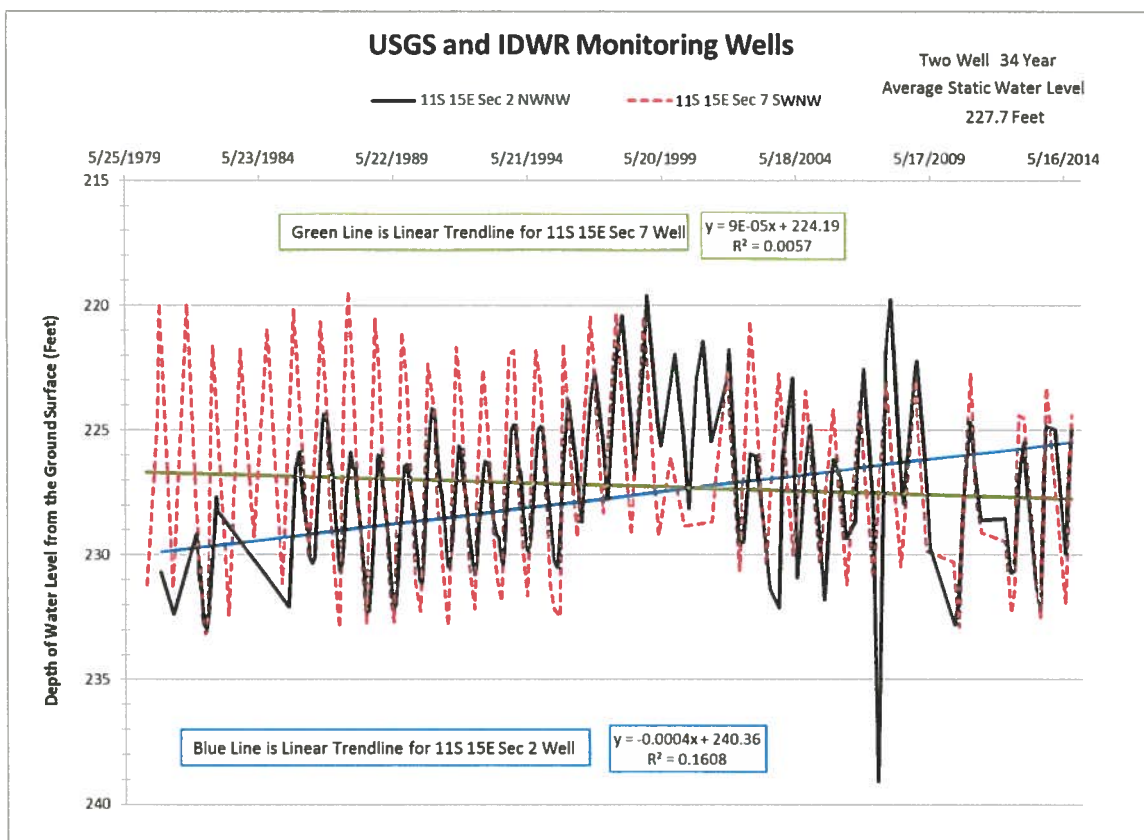


Figure 3: USGS Monitoring Wells 11S15E-07ACB1 and 11S15E-02BBB1 static water levels.

It is unknown why there is an irregularity in the number of measurements from these two wells. It is important to recognize that wells 11S15E-07ACB1 and 11S15E-02BBB1 are located on the southern edge of the local cultivated farm ground area. Additionally, as documented by Cosgrove (1998), Young (1971), Crosthwaite (1969), Fowler (1960) and Eakin (1968), the ground water flow direction is in a north and northwest direction. Because these wells are up-gradient and on the southern edge of cultivated areas, there are no wells or ground

water diversions from the Salmon Falls area aquifer that would significantly affect the static water level measurements in these two wells as the groundwater flows north. The static water level measurements in these two wells are representative of the unaffected aquifer water level throughout the local aquifer. In addition, because these wells are directly west of the existing dairy facilities, the hydraulic effect from the existing wells and pumping at the dairy locations is minimal on the static water level in monitoring wells 11S15E-07ACB1 and 11S15E-02BBB1.

The average combined static water level in wells 11S15E-07ACB1 and 11S15E-02BBB1 over the last 34 years is 227.7 feet below ground surface. The static water measurements have fluctuated between a depth of 220 feet and 235 feet below ground surface since 1980. Because the fluctuation over the last 34 years is constant and there is no indication from these wells the aquifer water table is decreasing or increasing, it can be concluded that ground water aquifer is stable. The trendlines for both 11S15E-07ACB1 and 11S15E-02BBB1 indicated that there is no statistical variation of water level over the last 34 years.

The water level data for monitoring wells 11S15E02BBB and 11S15E07ACA were subjected to a trend analysis using the Mann-Kendall non-parametric method. The Mann-Kendall method is a standard technique for analysis of trends in hydraulic systems. To remove seasonal effects from the data from these two wells a water-year average was calculated including only those years with more than two readings per year. This resulted in 30 values for 11S15E02BBB and 18 values for 11S15E07ACA. At the 95% confidence level, no increasing or decreasing trend was detected in either well. This confirms the qualitative result indicated by visual inspection of the well data.

D.3. Local Well Drillers Logs Analysis

An analysis of local wells was performed utilizing information gathered from 25 well drillers logs for wells drilled after the year 2000 that are located within a 2 mile radius of the dairy location. The data from the well logs is supplemented by static water measurements from wells owned by Hank Hafliger or other associated entities. Water level measurements from one domestic well (well that pump tested in Oct. 2015), one irrigation well (adjacent to southern edge of Dairy #3) and three commercial wells (wells at Dairy #1, Dairy #2, Dairy #3) have been recorded in 2014.

The wells locations were compared to National Elevation Data (NED), 10 meter 1999 elevation data. The NED is the primary elevation data product of the USGS. The NED provides basic elevation information for earth science studies and mapping applications in the United States. Scientists and resource managers use the NED data for global change research, hydrologic modeling, resource monitoring, mapping, visualization, and many other applications. The NED is updated continually to integrate newly available, improved elevation source data (<http://ned.usgs.gov>). The NED data provides ground surface elevation contours in which the ground surface elevation for each well can be estimated.

The static water levels from the 25 wells were obtained by examination of the well logs. The static water levels from the domestic well, the irrigation well and the three commercial wells were obtained by field measurements for general well and pump maintenance and also from the pump test performed in October 2014.

Depth to water contours were obtained by subtracting the static water levels from the 25 wells and the field measurements from the ground surface contours generated from the NED data. The result is a contour map of the depth to water levels in the area of the proposed transfer applications (Figure 4).

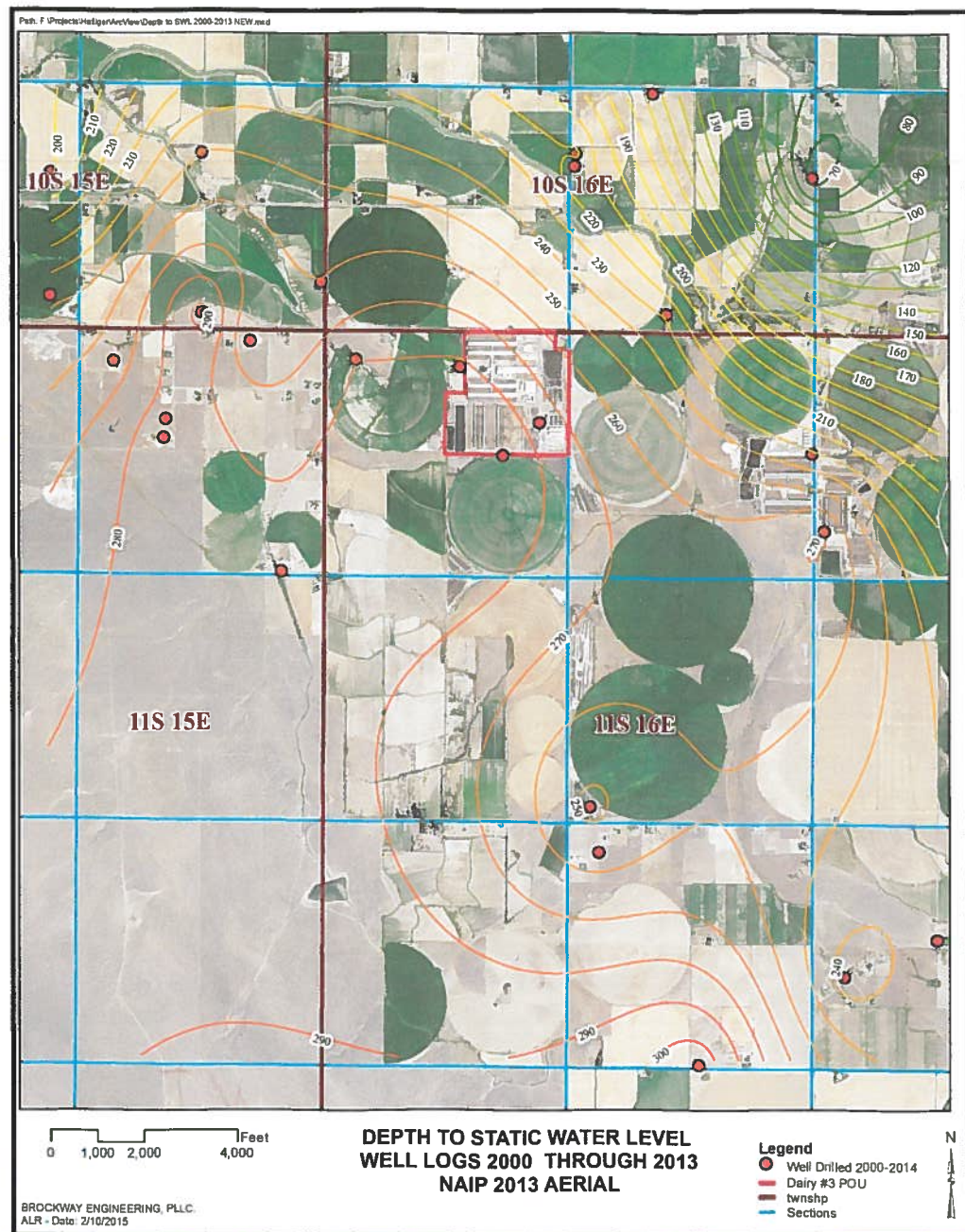


Figure 4: Depth to Static Water Level Contour Map

The static water level contour map indicates the depth to water in the areas where domestic wells of the Protestants to Transfer 79380 are located. The estimated depth to water, ground surface elevation contour and water level elevation maps are located in Appendix E.

The well drillers log data, pump test data, ground elevation contour map, static water level contour map, Brockway Engineering Memo and estimated depth to water at protestants domestic well locations values are provided in Appendix E. No estimation values were obtained for several of the Protestants' domestic well locations because the distance was too far away from the 25 identified well logs and field measurements to provide an accurate estimation. Known water level values of the Protestants' wells are provided in Appendix E.

The depths to water levels decrease or are shallower as the contours encounter the Twin Falls Canal Company High Line and Low Line canals. This is due to the seepage of water from the canal system into the aquifer. The seepage from the canal system provides elevated aquifer levels that are accessed by shallower wells with shallower static water levels. It would be expected that these shallower wells would experience seasonal water level fluctuation related to water being diverted into the canal during the months of April through October and would be less affected by the increased pumping that would occur by this proposed transfer. As water flows through the Low Line and High Line Canal systems, canal water seeps into the ground water. This canal water seepage is evident by shallower depths to water in wells that are close in proximity of the Low Line and High Line canals.

E. Aquifer Impact

E.1. Winflow Model

Groundwater impacts were modeled in the immediate area of the proposed transfers using the Winflow 3.05 analytical element modeling software. This software essentially utilizes the Theis approach to calculate aquifer drawdown, but allows multiple wells, transient fluxes, aquifer flow direction and distributed aquifer stresses.

The Theis method utilizes aquifer conditions to provide a calculate drawdown effect at a given distance away from a discharge location or well. This method can be adjusted to accommodate multiple discharge locations with several locations at different distances by utilizing multiple runs of the Theis method. The Theis method is considered to be a standard method by IDWR of analysis for aquifer affects and drawdown and has been utilized by Brockway Engineering for multiple water right transactions and analysis.

The Winflow model utilizes the Theis method and bolsters the analysis with spatial recognition of multiple discharge or observation points and aquifer flow direction. Winflow analyses provides a more complete analysis of the effects of discharge at a known location and the expected drawdown at multiple observation locations with one run of the model.

Aquifer hydraulic parameters were based on well drilling records in the area of the proposed transfer, and the calibrated large-scale model developed for the Twin Falls tract by Cosgrove, et al. Model parameters are based on published data for the general Salmon Falls aquifer characteristics and specifically aquifer characteristics of the proposed point of diversion when the aquifer data is available. The following model parameters were applied in this analysis:

Groundwater gradient: 50 ft/mile (Cosgrove, et al.)

Ambient flow direction: 315 degrees clockwise from north (Cosgrove, et al.)

Saturated thickness: 435 feet (aquifer bottom 700 below land surface, average static water level in vicinity of pumping well 265 feet below land surface)

Hydraulic conductivity: 55 ft/day (Cosgrove, et al.)

Storativity: 0.12 (typical for unsaturated aquifers, confirmed by Cosgrove, et al.)

A transient model was developed, using monthly time steps and stress periods. For the proposed transfer, the monthly average groundwater diversion was estimated, with the annual volume limited by the proposed water right transfer. The diversion was assumed to be the same each year over a model simulation time of 20 years. As a check, a simple manual calculation, the Theis equation was used to verify an identical test scenario in Winflow of one discharge point and one observation point at a known distance. The results of the Theis method and the Winflow model were in agreement: both procedures provided an estimated drawdown effect that was equivalent.

Protestant domestic well locations have been identified and labeled Well 1 through Well 16 (Table 1) for analysis utilizing the Winflow Model. The Protestants' domestic well locations were also identified in Figure 5. Well 8 is absent from the list because Victoria Henson is protesting the transfer on behalf of her mother Lois Rice whose domestic well is identified as Well 7.

Table 1: Protestants Domestic Well Labels for Winflow Analysis

Well 1	Slifer
Well 2	Winsryg/Elliott
Well 3	Hackard
Well 4	Houtz
Well 5	Parrott
Well 6	Ritter
Well 7	Rice/Henson
Well 9	McCreary
Well 10	Hamby
Well 11	Stephens
Well 12	Ellsworth
Well 13	Smith
Well 14	Humphries
Well 15	Conder
Well 16	Miller

In an effort to better understand the hydraulic relationship between the Protestants' domestic wells and the proposed PODs for Transfer 79380. An aerial map of the proposed POU and PODs of Transfer 79380 and the measured distance for five Protestant domestic well locations is provided (Figure 5). It is

important to recognize that closest protestant domestic well to Dairy #3 is 1.7 miles.

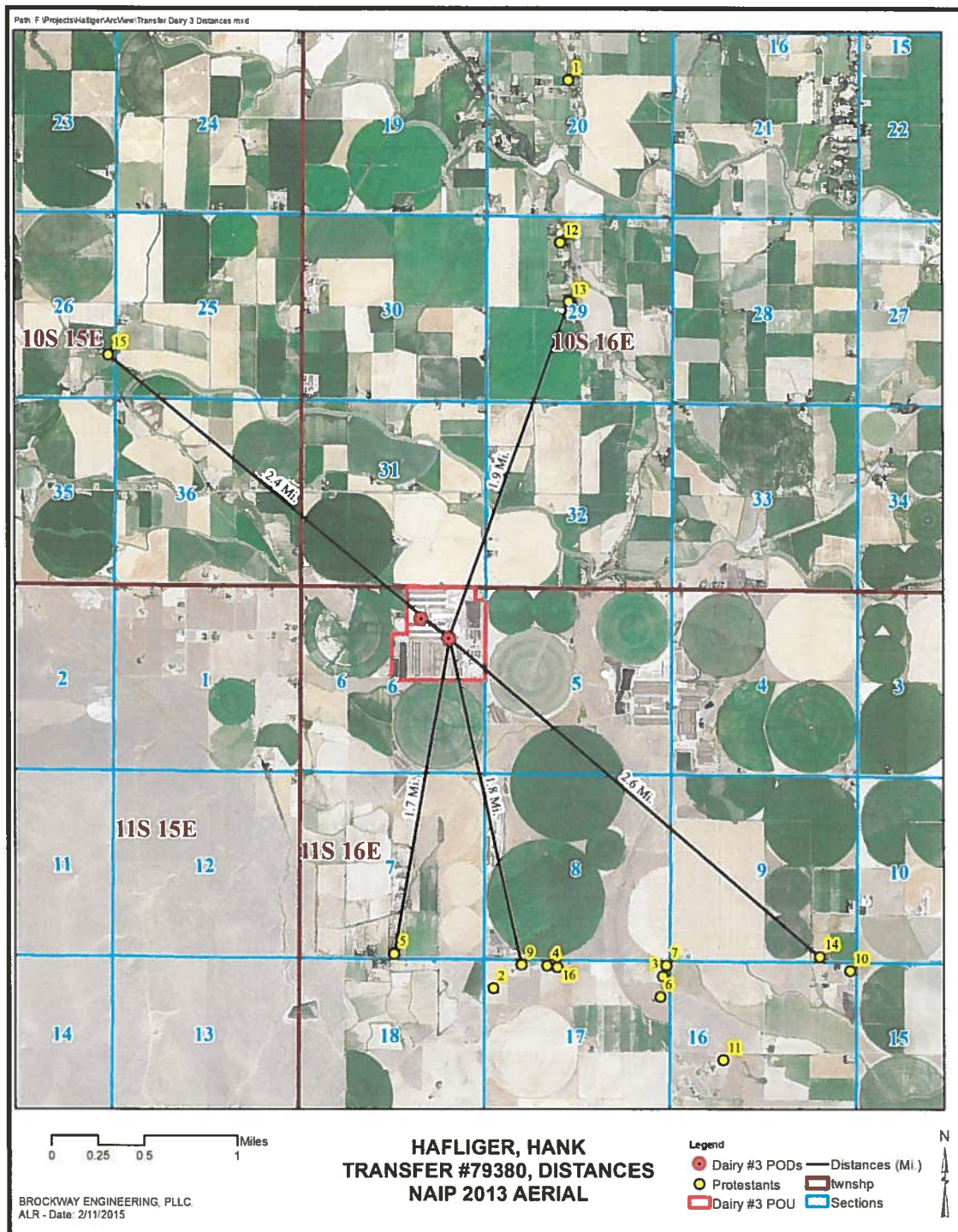


Figure 5: Protestants Domestic Well Locations and Distance From Protestants Domestic Wells to Proposed Transfer POD.

E.2. Winflow Analysis 1

For the Dairy #3 transfer, the monthly diversions were developed by “shaping” the season curve assuming that the peak summertime diversion is 50% higher than the wintertime low usage to account for increased water demand for animal and barn usage in the hotter months, Figure 6. The total annual volume was limited to the proposed transfer amount (66.0 afa for Dairy #3). Per IDWR policy, the dairy water use was assumed to be fully consumptive with no return to the aquifer. This approach is considered a conservative assumption.

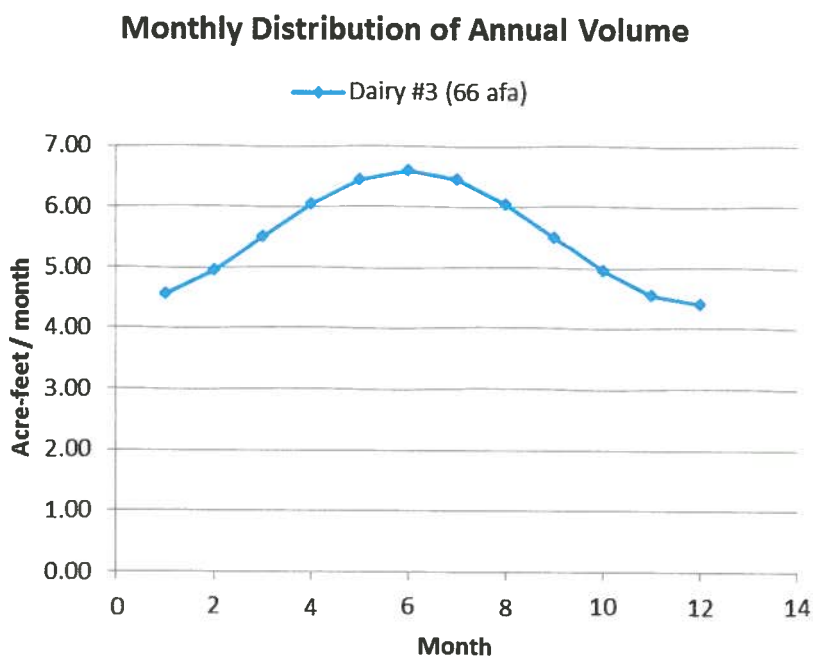


Figure 6: Monthly Diversion Seasonal Curve

In the Winflow model, observation points were located at each of the 15 wells in question to calculate the drawdown at these points. The model was run for a 20-year period and the results are shown on the attached plots. The calculated drawdowns are shown in Figure 7.

For the Dairy #3 transfer, maximum drawdown ranges from 0.068 to 0.098 feet (0.8 to 1.2 inches). These drawdowns are very small and are negligible relative to the observed seasonal fluctuations of the water table and the normal operation of a domestic well. Based on the analysis with the Winflow Model with a hydraulic conductivity of 55 ft/day, there will be no significant drawdown as a result of Transfer 79380 in the domestic wells of the Protestants. The greatest estimated drawdown is less than 1.5 inches. These drawdowns are very small and are negligible relative to the observed seasonal fluctuations of the water table and the normal operation of a domestic well. Complete results for the Winflow model analysis are located in Appendix F.

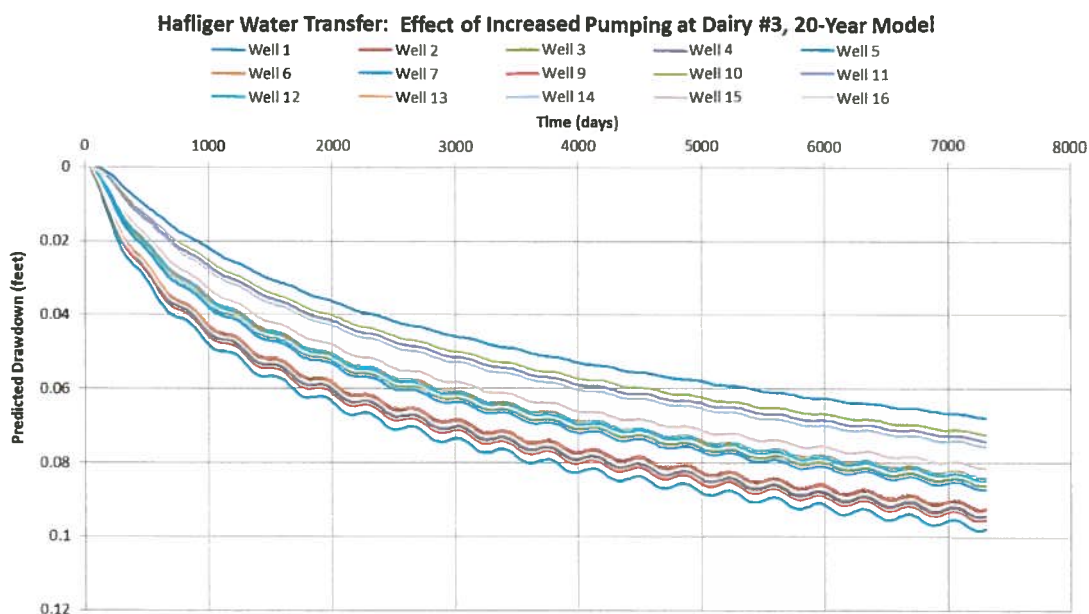


Figure 7: 20 Year Drawdown Estimation with a 55 ft/day hydraulic conductivity.

E.3. Winflow Analysis 2

A second Winflow model analysis was performed utilizing the hydraulic conductivity value of 15.3 ft/day to utilize specific aquifer conditions calculated from local well drillers logs and pump tests. This hydraulic conductivity value was calculated by examination of local well logs and utilizing pump test data from those well logs. The well logs are identified in Table 2. Table 2 contains

the data collected from the identified well logs and the pump test performed on the proposed irrigation well on October 7th and 8th 2014.

Table 2: Transmissivity and Hydraulic Conductivity Estimation with Partial Penetration.

Transmissivity Estimation with Partial Penetration

Bradbury and Rothschild (1985) specific capacity method.

Suitable for situations where a single time and drawdown measurement is available.

Includes effects of partial penetration using Stenberg (1973) approach.

Well No	Name	Location ¹	Pumping Rate [gpm]	Drawdown [ft]	Time [min]	Well radius [in]	Storativity	SWL [ft]	Well Depth [ft]	Aquifer bottom ² [ft]	Open interval [ft]	Average aquifer thickness [ft]	Calc T [ft ² /d]	Calc K [ft/d]
1	13 Domestic	11S15E1SESW	20	90	60	3	0.15	210	345	700	45	445.0	340.5	0.8
2	27 Domestic	11S15E1NNWNE	30	21	60	3	0.15	269	355	700	65	420.5	1493.9	3.6
3	32 Domestic	11S16E17NENW	20	90	120	3	0.15	410	555	700	55	245.0	146.4	0.6
4	80 Irrigation	11S16E5NNWNE	900	21	1260	8	0.15	193	485	700	271	496.5	13990.6	28.2
5	84 Domestic	11S16E6NNWNE	15	60	180	3	0.15	340	500	700	100	330.0	129.4	0.4
6	86 Domestic	11S16E9NENE	19	72	30	3	0.15	288	500	700	140	376.0	103.8	0.3
7	87 Domestic	10S16E32SESE	658	35	18	3	0.15	188	250	700	27	494.5	53425.0	108.0
8	102 Irrigation	11S16E9NESE	100	132	240	6	0.15	318	720	700	270	316.0	97.0	0.3
9	114 Domestic	10S15E36SENW	20	90	30	3	0.15	250	343	700	3	405.0	4136.0	10.2
10	Pump Test Well	10S15E36SENW	140	153	960	4	0.15	247	550	700	150	378.5	378.9	1.0
Mean													7424	15.3
Median													359.7	0.9
Max													53425.0	108.0
Min													97.0	0.3
Std dev													16728.0	33.7

¹ From drilling records, corrected if needed based on water right records and/or aerial photo evidence.

² From Preliminary Report on Ground Water in the Salmon Falls Area, Twin Falls County Idaho Geological Survey Circular 436, K. H. Fowler, 1960

The hydraulic conductivity value of 15.3 ft/day is considered very conservative compared to published values for similar strata. Hydraulic conductivity values are best calculated from pump tests that have a high discharge over an extended period of time. The high discharge rate is important to stress or maximize the ability of the aquifer to provide water. If a pump test is not capable of stressing the aquifers ability to provide water, then the estimated hydraulic conductivity value will be smaller than the actual hydraulic conductivity value.

Typically, large discharge pump tests are performed for irrigation, municipal and industrial beneficial uses. These large discharge pump tests must be performed with large pumps for a period of time that spans several hours to several days. Domestic wells are small production wells that typical require a discharge of less than 20 gpm.

By using the 15.3 ft/day hydraulic conductivity value, the range of calculated drawdown effects after 20 years of pumping for the Dairy #3 transfer is 0.13 to 0.23 feet (1.4 to 2.76 inches) and are depicted in Figure 8. These drawdowns are

very small and are negligible relative to the observed seasonal fluctuations of the water table and the normal operation of a domestic well. Based on the analysis with the Winflow Model with a hydraulic conductivity of 15.3 ft/day, there will be no significant drawdown as a result of Transfer 79380 in the domestic wells of the Protestants. Complete results for the Winflow model analysis are located in Appendix G.

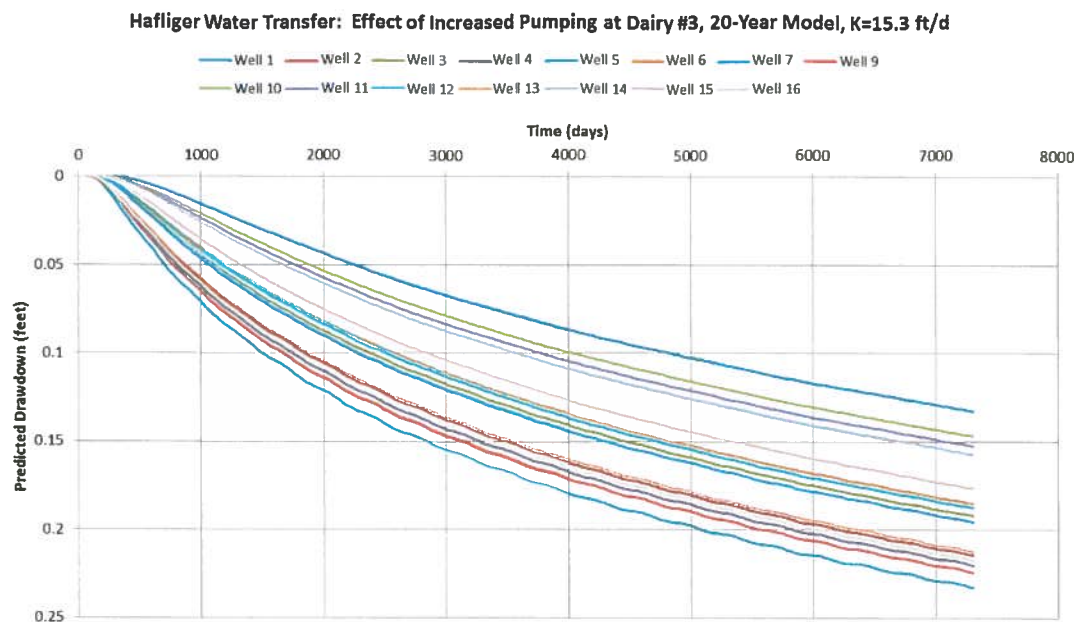


Figure 8: 20 Year Drawdown Estimation with a 15.3 ft/day hydraulic conductivity.

F. Evaluation of Transfer Application Criteria

F.1. Authority to File

Transfer 79380 was filed in the name of Thomas and Dorothy Leno. Thomas and Dorothy Leno currently own water right 47-17589. Dorothy Leno passed away several years ago, so Thomas Leno has sole ownership of water right 47-17589. Thomas Leno and Cedar Ridge Dairy have entered into an agreement that Cedar Ridge Dairy will purchase the portion of water included in Transfer 79380 after the transfer is approved.

After the proposed transfer is approved and payment for the water right has been accepted. The seller will Deed the water right to the buyer. The buyer then has the responsibility to update the ownership of the water right with the Idaho Department of Water Resources.

F.2. Water Right Validity

Water right 47-17589 (Parent 47-7106) was partially decreed in the Snake River Basin Adjudication June 1, 2010. The Idaho Department of Water Resources allows a five year period of non-use after partial decree year before the water right can be considered subject to forfeiture. Therefore, 47-17589 is a valid irrigation water right.

F.3. Injury to Other Water Rights and Domestic Wells

Natural occurring seasonal fluctuations in the USGS/IDWR monitoring wells have an approximate 5 feet elevation shift annually which is due to precipitation, seepage loss from irrigation, canals, reservoirs and stream channels. Based on the hydraulic analysis of the ground water aquifer and the Winflow analyses for Transfer 79380, the largest additional drawdown to be expected from the approval of this transfer is 0.23 feet or 2.76 inches at the Parrott well (Well 5). This additional drawdown cannot be measured with an annual water level shift of 5 feet. It is expected that no significant hydraulic impact on local domestic wells will occur with a fluctuation of 2.76 inches.

F.4. Enlargement of Use

Brockway Engineering has performed analysis of the historical water use from water right 47-7106. Only the consumptive use portion of the 35.3 acres to be dried up will be transferred with Transfer 79380. This action is consistent with standard analysis practices of The Idaho Department of Water Resources. This transfer will result in net decrease in the allowable annual diversion volume

because only the 66.0 acre feet annually of the consumptive volume will be pumped, which is less than the allowed 105.9 acre feet annually under the 35.3 acres of 47-7106.

The Idaho Department of Water Resources accepted this same hydraulic consumptive use analysis for Transfer 77406, Transfer 77669 and Transfer 78127.

Based on this analysis there will be no enlargement of the water right to be transferred.

F.5. Local Public Interest

The transfer will allow a local dairy to use water beneficially for stockwater and commercial purposes. The transfer will also allow the Applicant to improve efficiency in the water distribution system on Dairy #3. Finally, the transfer will not result in any significant drawdown on any of the Protestants' wells and will not be injurious to any existing water rights.

F.6. Beneficial Use/Conservation of Water Resources

The Idaho Department of Water Resources recognizes Stockwater and commercial uses as beneficial uses of water. The Applicant will meet all Idaho Department of Water Resources requirements for water use and conservation. The Dairy facility will utilize highly efficient practices to reduce water loss and excess energy use by recycling pumped ground water and utilizing multiple uses of the water such as milk cooling, flushing milk-cooling water and the utilization of water storage tanks. The proposed uses within the dairy are consistent with the industry standard in southern Idaho and consistent with the conservation of water resources in the State of Idaho.

G. Ground Water Monitoring

When Transfer #79380 is approved, the Applicant will have a new magnetic flow meter installed into the mainline for the new well. The Applicant will record monthly water discharge from the well and the data will be submitted to IDWR annually.

Appendix

Appendix A:

Water Source

Water right 47-7106 is a ground water right. The well for 47-7106 was drilled in 1972. The well has a diameter of 8 inches and was drilled to a depth of 1080 feet. The well is located at Township 16 South Range 16 East Section 32 NWNW.

Water Right History

Due to the isolated location of water right 47-7106, power to the well has historically been provided by a diesel powered generator. Crops have been irrigated by ground water on the farm since 1972. Affidavits from Thomas Leno Senior, Thomas Leno Junior and Vern Buss have been signed and notarized.

Water right 47-7106 was stacked with water rights 47-7287, 47-2118, 47-2048 and 47-14285 that utilize water from Mule Creek. Water right 47-7287 provides storage water and irrigation water. Water right 47-2118 provides stockwater and irrigation water. Water right 47-2048 provides stockwater and irrigation water. Water right 47-14285 provides irrigation water.

Water right 47-7106 has a December 25, 1970 priority date and is allowed to pump 1.85 cfs for a total volume of 465 acre feet annually on 155 acres.

USE TYPEWRITER OR
BALL POINT PEN

State of Idaho
Department of Water Administration
WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer
within 30 days after completion or abandonment of the well.

RECEIVED

1. WELL OWNER

Name Tam Leno
Address 2225 Castberry Lane
Los Vegas, Nevada
Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test
☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Diameter of hole 8 inches Total depth 1080 feet
Casing schedule ☒ Steel ☐ Concrete
Thickness _____ From _____ To _____
1250 inches 8 1/2 inches +1 feet 10 feet
_____ inches _____ inches _____ feet _____ feet
_____ inches _____ inches _____ feet _____ feet
_____ inches _____ inches _____ feet _____ feet

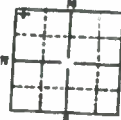
Was a packer or seal used? ☐ Yes ☒ No
Performed? ☐ Yes ☒ No
How performed? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches
Number _____ From _____ To _____
_____ perforations _____ feet _____ feet
_____ perforations _____ feet _____ feet
_____ perforations _____ feet _____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Diameter _____ Slot size _____ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal? ☒ Yes ☐ No To what depth 18 feet
Material used in seal ☐ Cement grout ☒ Mudfilling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



County Twin Falls
NW 1/4 NW 1/4 Sec 32 T. 16 N. R. 16 E.

7. WATER LEVEL

Static water level 77 feet below land surface
Pumping ☐ Yes ☒ No G.P.M. flow _____
Temperature 64 °F. Quality _____
Artesian closed-in pressure pat
Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☒ Pump ☐ Baler ☐ Other _____

Discharge G.P.M.	Draw Down	Hours Pumped
<u>60</u>	<u>5'</u>	<u>2</u>

9. LITHOLOGIC LOG

046197

Feet	Depth	Material	Water
From	To		Yes/No
0	14	Black hard sandstone clay	X
14	58	Black clay & sandstone	X
58	77	Brown sandy clay	X
77	124	Gray sand stone	X
124	154	Brown sandstone	X
154	223	Brown sandy clay & sandstone	X
223	247	Gray sandy clay & sandstone	X
247	264	Brown clay	X
264	278	Gray sand stone	X
278	290	Brown sandy clay	X
290	302	Gray sand stone	X
302	336	Brown clay	X
336	350	Gray sand stone	X
350	364	Brown sand stone & clay	X
364	403	Light gray sandstone	X
403	422	Gray sand stone	X
422	432	Brown sandstone & clay	X
432	454	Compacted sand stone	X
454	463	Light gray shale (stick)	X
463	473	Brown lime stone	X
473	483	Yellow shale	X
483	493	Light gray shale (stick)	X
493	500	Black	X
500	604	Tan shale (stick)	X
604	621	Black	X
621	621	Light gray shale (stick)	X
621	718	Dark gray shale (stick)	X
718	758	Light gray shale (stick)	X
758	760	Black rock	X
760	781	Light gray shale (stick)	X
781	809	Light gray shale	X
809	813	Dark gray shale (stick)	X
813	820	Dark gray sand clay	X
820	843	Dark gray sand clay	X
843	855	Light gray shale (stick)	X
855	864	Dark shale & light rock (stick)	X
864	1081	Black shale	X
1081	1080	Black highly porous + 11'	X

Work started 26 April 1972 at 11:00 AM
Completed 21 July 1972

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is
true to the best of my knowledge.

Bolay & Henry 86
Driller's or Firm's Name Number
Murtawick, Idaho
Address
Signed by Blair Bolay Date _____

USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

BEFORE THE IDAHO DEPARTMENT OF WATER RESOURCES

IN THE MATTER OF WATER RIGHT	)	COMMENTS AND
NO. 47-7106, 47-7287 & 47-14285	)	EVIDENCE OF
FOR IRRIGATION	)	THOMAS LENO JR.
	)	

COMES NOW, Thomas Leno Sr., and provides the following comments and evidence in this matter:

1. I am familiar with the property located in Section 20 and 29, T. 16 S., R. 16 E., B.M. hereafter known as the "Property." The Property is located in Twin Falls County close to the City of Jackpot, Nevada and is known as the Leno Farm.
2. My involvement/Title associated with Property is/was Owner/Manager.
3. I am knowledgeable of the irrigation system, and crops that were irrigated during the time outlined in the affidavit signed by Vern Buss on December 12, 2010 (see attached affidavit).
4. It is my understanding that the affidavit signed by Vern Buss was not entirely clear as to the amount of irrigation that occurred on the Leno Farm for the years indicated in his affidavit.

In an effort to clarify Vern Buss's affidavit, additional information has been gathered and is now being presented to IDWR. This information includes aerial imagery and rain and snow precipitation data for Magic Mountain and Wilson Creek.

In 1999, irrigation water from Mule Creek and the ground water well was applied on the farm. The ground water well provided 155 acres of irrigation water. We used all of the water available from Mule Creek and applied it to the remaining farmable acres. A 1999 aerial infrared image of the Leno Farm provided by IDWR indicates that an estimated 217.2 acres were irrigated in 1999.

In 2000, irrigation water for the farm was provided exclusively by the ground water well due to insufficient flow of water in Mule Creek.

In 2001, irrigation water for the farm was provided exclusively by the ground water well due to insufficient flow of water in Mule Creek.

In 2002, irrigation water for the farm was provided exclusively by the ground water well due to insufficient flow of water in Mule Creek.

In 2003, irrigation water for the farm was provided exclusively by the ground water well due to insufficient flow of water in Mule Creek.

In 2004, irrigation water was supplied by ground water well and Mule Creek. My recollection is that the ground water well and the Mule Creek water was utilized fully for this year. The analysis of the 2004 aerial shows that the water rights were utilized to their full potential for irrigation purposes. The ground water well was used to irrigate 155 acres and water from Mule Creek was used to irrigated the rest of the farm when it was available. This was the last year that irrigation occurred on this farm.

DATED this 24 day of February, 2012.

Thomas P. Leno
Thomas Leno Jr.

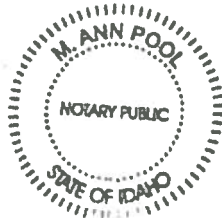
SUBSCRIBED and SWORN to before me

this 24 day of February, 2012.

M. Ann Pool
NOTARY PUBLIC

Residing at : Swain Falls

My Commission Expires: April 5, 2016



BEFORE THE IDAHO DEPARTMENT OF WATER RESOURCES

IN THE MATTER OF WATER RIGHT	)	COMMENTS AND
NO. 47-7106, 47-7287 & 47-14285	)	EVIDENCE OF
FOR IRRIGATION	)	THOMAS LENO SR.
	)	

COMES NOW, Thomas Leno Sr, and provides the following comments and evidence in this matter:

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2. My involvement/Title associated with Property is/was Owner/Manager.
3. I am knowledgeable of the irrigation system, and crops that were irrigated during the time outlined in the affidavit signed by Vern Buss on December 12, 2010 (see attached affidavit).
4. It is my understanding that the affidavit signed by Vern Buss was not entirely clear as to the amount of irrigation that occurred on the Leno Farm for the years indicated in his affidavit.

In an effort to clarify Vern Buss's affidavit, additional information has been gathered and is now being presented to IDWR. This information includes aerial imagery and rain and snow precipitation data for Magic Mountain and Wilson Creek.

In 1999, irrigation water from Mule Creek and the ground water well was applied on the farm. The ground water well provided 155 acres of irrigation water. We used all of the water available from Mule Creek and applied it to the remaining farmable acres. A 1999 aerial infrared image of the Leno Farm provided by IDWR indicates that an estimated 217.2 acres were irrigated in 1999.

In 2000, irrigation water for the farm was provided exclusively by the ground water well due to insufficient flow of water in Mule Creek.

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In 2002, irrigation water for the farm was provided exclusively by the ground water well due to insufficient flow of water in Mule Creek.

In 2003, irrigation water for the farm was provided exclusively by the ground water well due to insufficient flow of water in Mule Creek.

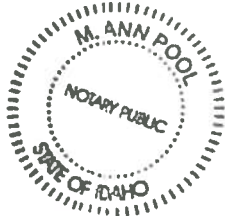
In 2004, irrigation water was supplied by ground water well and Mule Creek. My recollection is that the ground water well and the Mule Creek water was utilized fully for this year. The analysis of the 2004 aerial shows that the water rights were utilized to their full potential for irrigation purposes. The ground water well was used to irrigate 155 acres and water from Mule Creek was used to irrigate the rest of the farm when it was available. This was the last year that irrigation occurred on this farm.

DATED this 24 day of February, 2012.

Thomas Leno
Thomas Leno Sr.

SUBSCRIBED and SWORN to before me

this 24 day of February, 2012.



M. Ann Pool
NOTARY PUBLIC
Residing at : Idaho Falls
My Commission Expires: April 6, 2016

BEFORE THE IDAHO DEPARTMENT OF WATER RESOURCES

IN THE MATTER OF WATER RIGHT	)	COMMENTS AND
NO. 47-7106, 47-7287 & 47-14285	)	EVIDENCE OF
FOR IRRIGATION	)	Vern Buss
	)	

COMES NOW, Vern Buss, and provides the following comments and evidence in this matter:

1. I am familiar with the property located in Section 20 and 29, T. 16 S., R. 16 E., B.M. hereafter known as the "Property." The Property is located in Twin Falls County close to the City of Jackpot, Nevada and is known as the Leno Farm.
2. My involvement/Title associated with Property is/was Farm Manager.
3. I am knowledgeable of the irrigation system, and crops that were irrigated during the time outlined in Item 4.
4. The year, crop type and water source on the Property have consisted of

Year	Crop	Water Source (%)	
		Ground Water	Mule Creek
1999	Grian, Hay, Beans	90%	10%
2000	Grian, Hay	100%	
2001	Grian, Hay	100%	
2002	Grian, Hay	100%	
2003	Grian, Hay	80%	20%

5. Explanation of how irrigation water is diverted and delivered on the Property:

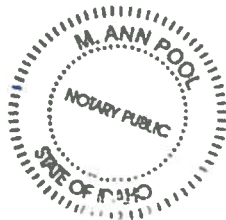
Water was delivered by wheel lines, hand lines and pivots. Pressurized systems utilized a diesel powered pump to provide irrigation water from the well and storage pond.

DATED this 17 day of December, 20 10.

Vern Buss
Vern Buss

SUBSCRIBED and SWORN to before me

this 17 day of December, 20 10.

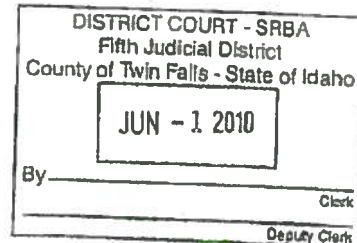


M. Ann Pool
NOTARY PUBLIC
Residing at: Turn Falls County Idaho
My Commission Expires: 4-5-2016

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE
STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SREA)
)
Case No. 20576)

PARTIAL DECREE PURSUANT TO
I.R.C.P. 54(b) FOR
Water Right 47-07106



NAME AND ADDRESS: DOROTHY LENO
THOMAS LENO
4236 N 1900 E
Buhl, ID 83116

SOURCE: GROUND WATER
QUANTITY: 1.95 CFS
465.00 AFY

This right when combined with all other rights shall provide more than 0.02 cfs per acre not more than 1.0 cfs per acre at the field headgate for irrigation of the lands below.

PRIORITY DATE: 12/15/1970

POINT OF DIVERSION: T16S R16E S20 NMSW Within Twin Falls County

PURPOSE AND PERIOD OF USE	PURPOSE OF USE	PERIOD OF USE	QUANTITY
Irrigation		04-01 TO 11-01	1.95 CFS 465.00 AFY

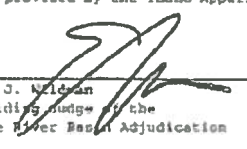
PLACE OF USE:	Irrigation	Within Twin Falls County
T16S R16E S20	SWSW 40.0	SESW 12.0
S20	NESW 20.0	NNSW 40.0
	SNW 20.0	SSW 15.0
155.0 Acres Total		

OTHER PROVISIONS NECESSARY FOR DEFINITION OR ADMINISTRATION OF THIS WATER RIGHT:

THIS PARTIAL DECREE IS SUBJECT TO SUCH GENERAL PROVISIONS NECESSARY FOR THE DEFINITION OF THE RIGHTS OR FOR THE EFFICIENT ADMINISTRATION OF THE WATER RIGHTS AS MAY BE ULTIMATELY DETERMINED BY THE COURT AT A POINT IN TIME NO LATER THAN THE ENTRY OF A FINAL UNIFIED DECREE. I.R.C. SECTION 42-2412(6).

RULE 54(b) CERTIFICATE

With respect to the issues determined by the above judgment or order, it is hereby CERTIFIED, in accordance with Rule 54(b), I.R.C.P., that the court has determined that there is no just reason for delay of the entry of a final judgment and that the court has and does hereby direct that the above judgment or order shall be a final judgment upon which execution may issue and an appeal may be taken as provided by the Idaho Appellate Rules.


Eric J. Wildman
Presiding Judge of the
Snake River Basin Adjudication

Appendix B:

ADMINISTRATOR'S MEMORANDUM

Multiple Programs Memo No. 2

To: Regional Offices
Water Allocation Bureau

From: Gary Spackman 

Re: **FORFEITURE REVIEW PERIOD**

Date: March 5, 2012

Idaho Code § 42-222(2) provides that all rights to the use of water shall be lost and forfeited by a failure for the term of five years to apply it to the beneficial use for which it was appropriated. Idaho Code § 42-222(3&4) provides that the Department may grant an extension for an additional five years for good cause shown if an application for extension is made before the end of the five year period. Idaho Code § 42-223 provides for exceptions or defenses to forfeiture. Experience in the Snake River Basin Adjudication (SRBA) and other court cases have provided additional guidance on the subject of forfeiture. In general, forfeiture is not favored; however, the Department has a responsibility to review water rights to determine if forfeiture has occurred prior to approving (or denying) certain applications affecting existing water rights.

In 1999, the SRBA court issued a decision tolling the forfeiture period for a water right during the time period that a claim is pending in the adjudication. The Department has presumed that water rights are not forfeited for non-use during the five-year period following issuance of a partial decree. For many water rights decreed in the SRBA, the initial five-year period has ended or will end soon, and Department employees are increasingly faced with questions regarding a cut-off date to determine if forfeiture has occurred and when action must be taken to protect a water right from forfeiture. For example, if a partial decree is issued during the middle of the irrigation season, is it appropriate to assume that five full irrigation seasons of non-use (in addition to the first partial season) must pass before the right is considered to be forfeited? If so, would the right holder need to initiate some action to protect the right from forfeiture prior to the end of the five full seasons, or prior to the beginning of the sixth irrigation season, or some other time? In the past, the Department has presumed that resumption at the beginning of the sixth season would prevent forfeiture on the basis that junior irrigation rights would not have had opportunity to establish some reliance on the unused water during the non-irrigation season. What if the need for irrigation water is further delayed in the sixth season due to a wet spring?

The purpose of this memo is to address the timing questions that arise during forfeiture review by providing Department employees with a simple and uniform forfeiture review period. This memo applies to forfeiture review associated with applications to lease a water right to the Water Supply Bank, applications for extension of time to avoid forfeiture, and applications for transfer of a water right. This memo applies to both irrigation and non-irrigation water rights.

The Department will presume that beneficial use under a water right during a portion of a calendar year or any defense or protection from forfeiture applicable during a portion of a calendar year will apply to the entire calendar year. For example, if an irrigation right is used to establish a cover crop at the beginning of an irrigation season and is not used during the remainder of the irrigation season, the right will be considered protected from forfeiture through December 31 of that calendar year. Likewise, if an irrigation right is decreed at the beginning of a calendar year (prior to the beginning of the irrigation season) and is not used at any time during the irrigation season, the right will still be considered protected from forfeiture for that entire calendar year.

The Department will also presume that resumption of beneficial use under a water right for a portion of a calendar year or any defense or protection initiated during a calendar year will apply to the entire calendar year. For example, if an irrigation right is used to establish a fall crop at the end of an irrigation season, even if the right was not used earlier during the irrigation season, the right will be considered protected from forfeiture for that calendar year. Likewise, if an application for lease to the Water Supply Bank is submitted before the end of a calendar year and eventually approved and the right is not used at any time during that calendar year, the right will be considered protected from forfeiture for that calendar year.

Strict application of Idaho Code § 42-222(4) would require an application for extension of time to avoid forfeiture to be submitted prior to the end of the fifth unprotected year of non-use. However, the Department wishes to avoid questions and conflicts surrounding the timing of resumption during an irrigation season and to maintain simple and uniform guidance to Department employees. Therefore, the Department will presume that resumption of beneficial use or any defense or protection, including filing an extension of time to avoid forfeiture, initiated before the end of the sixth calendar year will prevent a finding of forfeiture by the Department.

As an example, if an irrigation right is decreed in the SRBA in January, 2004 and water is not used during 2004, 2005, 2006, 2007, 2008 and 2009, then resumption or action initiating a defense or protection from forfeiture must occur prior to the end of the calendar year in 2010. The 2004 calendar year is considered protected since the decree was issued during that year. The years 2005 through 2009 represent the five year period of non-use. The Department would not find forfeiture if use resumed before the end of calendar year 2010. An application to lease the water right to the Water Supply Bank or other action initiating a defense or protection from forfeiture would apply similarly¹.

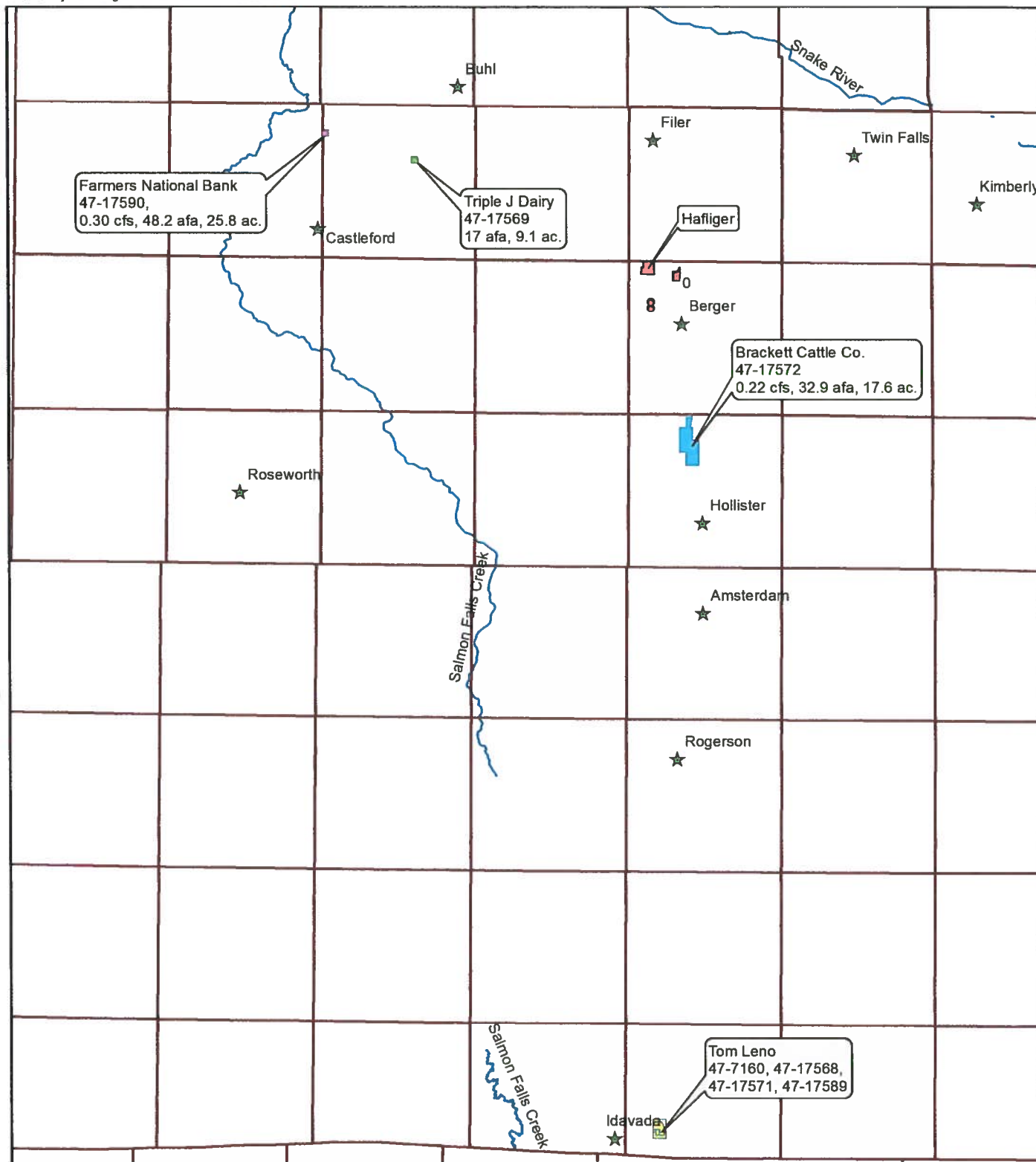
As another example, if an extension of time to avoid forfeiture is granted for five years, the Department will presume that resumption of beneficial use or any defense or protection initiated before the end of the sixth calendar year will prevent a finding of forfeiture by the Department. Continuing with the example above, if an application for extension of time to avoid forfeiture was submitted in 2010 and the Department granted an extension for the years 2010, 2011, 2012, 2013 and 2014, then resumption or other action initiating a defense or protection from forfeiture must occur prior to the end of calendar year 2015. Note that, pursuant to Idaho Code § 42-222(4), the Department would still be required to provide notice at least 60 days prior to the end of 2014 that resumption and a report is due by December 31, 2014. However, the Department would not find forfeiture if resumption of beneficial use or

¹ Filing an application for transfer does not toll the statutory period for forfeiture of a water right due to non-use.

other action initiating a defense or protection from forfeiture occurred prior to the end of calendar year 2015.

This memo does not change Department policy on partial forfeiture. Forfeiture of a portion of a water right may occur if beneficial use is reduced for the statutory period as applied under the guidance of this memo. When discussing forfeiture issues, Department employees and water users should be mindful that any Department decision or action where forfeiture may be an issue can be contested and certain facts may lead to a different conclusion in an administrative hearing, or judicial review.

Appendix C:



0 3 6 12 Miles

HAFLIGER, HANK **LENO WATER RIGHTS TRANSFERS** **NAIP 2013 AERIAL**

- Legend**
- Rivers
 - Leno_WR_Transfers
 - C E BRACKETT CATTLE CO
 - DOROTHY LENO
 - FARMERS NATIONAL BANK
 - LENO
 - TRIPLE J DAIRY
 - Hafliger_Transfer_POU
 - twshp
 - cities



MEMORANDUM

Date: July 25, 2011
To: Transfer 77406 File
From: Corey Skinner
Re: Evaluation of Sufficiency of Information Submitted

Application proposes transferring a 9.1 acre (0.12 cfs & 17.0 afa) portion of a groundwater irrigation right, 47-7106, appurtenant to a farm located approximately 14.5 miles south and 1.0 mile west of Rogerson to stock water and commercial uses associated with an existing dairy operation located approximately 2.5 miles south and 2.0 miles west of the center of Buhl. The application also proposes to modify the described locations of the points of diversion on the existing water right (0.26 cfs & 16.0 afa) at the dairy to reflect the actual location of the wells at the dairy site. Two existing wells at the dairy site will be used to divert up to a total of 0.38 cfs and 34.2 afa) of water. Note that the place of use of groundwater right 47-7106 overlaps the place of use of two Mule Creek Rights, 47-7287 and 47-14285. The application includes a detailed supplemental analysis of the past use of right 47-7106. The application also includes a relinquishment form signed by the current owner of right 47-14285 relinquishing a 9.1 acre portion of right 47-14285. In addition, the application also includes a signed statement reducing the authorized place of use of right 47-7287 by 9.1 acres. However, note that the 47-7287 statement proposes to retain the full amount (actually a rather small amount) of irrigation storage volume and irrigation from storage volume authorized by right 47-7287.

- **Authority to File:**

The application includes purchase and sale documents that give the applicant (Idaho Water Company) authority to file a transfer involving rights 47-7106 and 47-13694. Documents signed by the current owner address overlapping rights 47-7287 and 47-14285.

- **Water Right Validity:** All the rights involved with the transfer were decreed in the SRBA in 2010.

- **Injury to Other Water Rights:**

The current point of diversion for right 47-7106 and the proposed points of diversion at the dairy site are located approximately 39 miles away from each other. However, both locations are located within IDWR administrative basin 47. In addition, the application includes copies of published reports relating to studies of the groundwater within the Salmon Falls Creek Basin in an attempt to show the interconnection of the aquifer between the current point of diversion for right 47-7106 and the dairy site.

- **Enlargement of Use:**
None anticipated. Conversion from irrigation to stock water and commercial use (based on consumptive use of irrigation right) will result in a net decrease in the allowable annual diversion volume.
- **Local Public Interest:**
No issues anticipated, but application will be subject to public notice and protest.
- **Beneficial Use/Conservation of Water Resources:**
Proposed uses are recognized as beneficial uses of water.

Review of the application finds there is no clear inconsistency with criteria set forth in Section 42-222 Idaho Code preventing processing of this application.



State of Idaho

DEPARTMENT OF WATER RESOURCES

Southern Region, 1341 Fillmore Street, Suite 200 • Twin Falls, Idaho 83301-3380

Phone: (208) 736-3033 • Fax: (208) 736-3037 • Web Site: www.idwr.idaho.gov

C. L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Interim Director

November 2, 2011

IDAHO WATER CO LLC
1135 VALLEY RD S
EDEN ID 83325

THOMAS LENO
DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

DUFF JACOBSON
FLINT JACOBSON
1291 E 3900 N
BUHL ID 83316

TRIPLE J DAIRY
C/O FLINT JACOBSON
1291 E 3900 N
BUHL ID 83316

RE: Transfer No.: 77406
 Water Right No(s): 47-13694 47-7106 47-7287 47-14285

Transfer Approval Notice

Dear Water Right Holder and other Interested Persons:

The Department of Water Resources has issued the enclosed approved Transfer of Water Right(s). Please be sure to thoroughly review the conditions of approval and remarks listed on the approval document.

The Transfer of Water Right(s) is a PRELIMINARY ORDER issued by the Department pursuant to section 67-5243, Idaho Code. It can and will become a final order without further action by the Department unless the APPLICANT petitions for reconsideration or files an exception and/or brief within fourteen (14) days of the service date as described in the enclosed information sheet.

ANY PERSON aggrieved by any decision, determination, order or action of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Department and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

If the transfer approval includes a condition requiring measuring and recording devices, such devices shall comply with specifications established by the Department. Detailed specifications are available on the Department's homepage on the Internet, or you can request a copy by contacting any office of the Department. Please be sure to thoroughly review the specifications to avoid unnecessary costs for reinstallation or modification due to non-conforming or improperly installed devices.

Please note that water right owners are required to report any change of water right ownership and/or mailing address to the Department within 120 days of the change. Failure to report these changes could result in a \$100 late filing fee. Contact any office of the Department or visit the Department's homepage on the Internet to obtain the proper forms and instructions.

If you have any questions, please contact me at 208-736-3033.

Sincerely,



Allen Merritt
Southern Regional Manager

Enclosure(s)

cc:

BROCKWAY ENGINEERING PLLC

CERTIFICATE OF SERVICE

I hereby certify that on November 2, 2011 I mailed a true and correct copy, postage prepaid, of the foregoing TRANSFER APPROVAL to the person(s) listed below:

RE: TRANSFER NO. 77406
WATER RIGHTS NOS. 47-13694 47-7106 47-7287 47-14285

IDAHO WATER CO LLC
1135 VALLEY RD S
EDEN ID 83325

THOMAS LENO
DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

DUFF JACOBSON
FLINT JACOBSON
1291 E 3900 N
BUHL ID 83316

TRIPLE J DAIRY
C/O FLINT JACOBSON
1291 E 3900 N
BUHL ID 83316

BROCKWAY ENGINEERING PLLC
C/O GREG SULLIVAN
2016 N WASHINGTON ST STE 4
TWIN FALLS ID 83301



Denise Buffington
Administrative Assistant

EXPLANATORY INFORMATION TO ACCOMPANY A PRELIMINARY ORDER

(To be used in connection with actions when a hearing was not held)

(Required by Rule of Procedure 730.02)

The accompanying order or approved document is a "Preliminary Order" issued by the department pursuant to section 67-5243, Idaho Code. It can and will become a final order without further action of the Department of Water Resources ("department") unless a party petitions for reconsideration, files an exception and brief, or requests a hearing as further described below:

PETITION FOR RECONSIDERATION

Any party may file a petition for reconsideration of a preliminary order with the department within fourteen (14) days of the service date of this order. **Note: the petition must be received by the department within this fourteen (14) day period.** The department will act on a petition for reconsideration within twenty-one (21) days of its receipt, or the petition will be considered denied by operation of law. See Section 67-5243(3) Idaho Code.

EXCEPTIONS AND BRIEFS

Within fourteen (14) days after: (a) the service date of a preliminary order, (b) the service date of a denial of a petition for reconsideration from this preliminary order, or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration from this preliminary order, any party may in writing support or take exceptions to any part of a preliminary order and may file briefs in support of the party's position on any issue in the proceeding with the Director. Otherwise, this preliminary order will become a final order of the agency.

REQUEST FOR HEARING

Unless a right to a hearing before the Department or the Water Resource Board is otherwise provided by statute, any person aggrieved by any final decision, determination, order or action of the Director of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Director and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

ORAL ARGUMENT

If the Director grants a petition to review the preliminary order, the Director shall allow all parties an opportunity to file briefs in support of or taking exceptions to the preliminary order and may schedule oral argument in the matter before issuing a final order. If oral arguments are to be heard, the Director will within a reasonable time period notify each party of the place, date and hour for the argument of the case. Unless the Director orders otherwise, all oral arguments will be heard in Boise, Idaho.

CERTIFICATE OF SERVICE

All exceptions, briefs, requests for oral argument and any other matters filed with the Director in connection with the preliminary order shall be served on all other parties to the proceedings in accordance with IDAPA Rules 37.01.01302 and 37.01.01303 (Rules of Procedure 302 and 303).

FINAL ORDER

The Director will issue a final order within fifty-six (56) days of receipt of the written briefs, oral argument or response to briefs, whichever is later, unless waived by the parties or for good cause shown. The Director may remand the matter for further evidentiary hearings if further factual development of the record is necessary before issuing a final order. The department will serve a copy of the final order on all parties of record.

Section 67-5246(5), Idaho Code, provides as follows:

Unless a different date is stated in a final order, the order is effective fourteen (14) days after its service date if a party has not filed a petition for reconsideration. If a party has filed a petition for reconsideration with the agency head, the final order becomes effective when:

- (a) The petition for reconsideration is disposed of; or
- (b) The petition is deemed denied because the agency head did not dispose of the petition within twenty-one (21) days.

APPEAL OF FINAL ORDER TO DISTRICT COURT

Pursuant to sections 67-5270 and 67-5272, Idaho Code, if this preliminary order becomes final, any party aggrieved by the final order or orders previously issued in this case may appeal the final order and all previously issued orders in this case to district court by filing a petition in the district court of the county in which:

- i. A hearing was held,
- ii. The final agency action was taken,
- iii. The party seeking review of the order resides, or
- iv. The real property or personal property that was the subject of the agency action is located.

The appeal must be filed within twenty-eight (28) days of this preliminary order becoming final. See section 67-5273, Idaho Code. The filing of an appeal to district court does not itself stay the effectiveness or enforcement of the order under appeal.

MEMORANDUM

Date: January 30, 2012
To: Transfer 77669 File
From: Corey Skinner
Re: Evaluation of Sufficiency of Information Submitted

Application proposes transferring a 17.6 acre (0.22 cfs & 32.9 afa) portion of a groundwater irrigation right, 47-17568, from a farm located approximately 14.5 miles south and 1.0 mile west of Rogerson to stockwater and commercial uses associated with a proposed cattle facility located approximately 2.5 – 4.5 miles north and 0.25 – 1.0 mile west of Hollister. The application also proposes to modify the authorized place of use of the existing domestic and stockwater right, 47-17509, (0.04 cfs & 14.6 afa) at the site of the cattle facility to reflect the entire proposed site of the cattle facility. One existing well at the cattle facility will be used to divert up to a total of 0.26 cfs and 47.5 afa of water. Note that the place of use of groundwater right 47-17568 overlaps the place of use of two Mule Creek Rights, 47-7287 and 47-14285. The application includes a detailed supplemental analysis of the past use of right 47-17568. The application also includes a relinquishment form signed by the current owner of right 47-14285 relinquishing a 17.6 acre portion of right 47-14285. In addition, the application also includes a signed statement reducing the authorized place of use of right 47-7287 by 17.6 acres. However, note that the 47-7287 statement proposes to retain the full amount (actually a rather small amount) of irrigation storage volume and irrigation from storage volume authorized by right 47-7287.

- **Authority to File:**
The application includes purchase and sale documents that give the applicant (Idaho Water Company) authority to file a transfer involving right 47-17568. Documents signed by the current owner address overlapping rights 47-7287 and 47-14285. An authorization form signed by the current owner of right 47-17509 authorizes the applicant to modify right 47-17509 via the transfer.
- **Water Right Validity:**
All the rights involved with the transfer were decreed in the SRBA in 2010 or 2011.
- **Injury to Other Water Rights:**
The current point of diversion for right 47-17568 and the proposed point of diversion at the cattle facility are located approximately 27 miles away from each other. However, both locations are located within IDWR administrative basin 47. In addition, the application includes copies of published reports relating to studies of the groundwater within the Salmon Falls Creek Basin in an attempt to show the interconnection of the aquifer between the current point of diversion for right 47-17568 and the cattle facility site.
- **Enlargement of Use:**
None anticipated. Conversion from irrigation to stock water and commercial use (based on consumptive use of irrigation right) will result in a net decrease in the allowable annual diversion volume.
- **Local Public Interest:**
No issues anticipated. The application will be subject to public notice and protest.
- **Beneficial Use/Conservation of Water Resources:**
Proposed uses are recognized as beneficial uses of water.

Review of the application finds there is no clear inconsistency with criteria set forth in Section 42-222 Idaho Code preventing processing of this application.

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
TRANSFER OF WATER RIGHT
TRANSFER NO. 77669

This is to certify that: IDAHO WATER CO LLC
1135 VALLEY RD S
EDEN ID 83325
(208) 312-1135

has requested a change to the water right(s) listed below. This change in water right(s) is authorized pursuant to the provisions of Section 42-222, Idaho Code. A summary of the changes is also listed below. The authorized change for each affected water right, including conditions of approval, is shown on the following pages of this document.

Summary of Water Rights Before the Proposed Change

<u>Right</u>	<u>Origin/Basis</u>	<u>Priority</u>	<u>Rate</u>	<u>Volume</u>	<u>Acre Limit</u>	<u>Total Acres</u>	<u>Source</u>
47-17509	WR/Decreed	06/30/1959	0.04 cfs	N/A	N/A	N/A	GROUND WATER
47-17568	WR/Decreed	12/25/1970	1.73 cfs	437.7 af	N/A	145.9	GROUND WATER

Associated Water Rights Included in Transfer Approval (POU Reduction and Conditions Updated)

<u>Right</u>	<u>Origin/Basis</u>	<u>Priority</u>	<u>Rate</u>	<u>Volume</u>	<u>Acre Limit</u>	<u>Total Acres</u>	<u>Source</u>
47-7287	WR/Decreed	11/04/1974	N/A	24.8 af	N/A	145.9	MULE CREEK
47-14285	WR/Decreed	12/31/1969	4.26 cfs	N/A	N/A	212.9	MULE CREEK

Purpose of Transfer (Changes Proposed)

<u>Current Number</u>	<u>Split</u>	<u>POD</u>	<u>POU</u>	<u>Add POD</u>	<u>Period of Use</u>	<u>Nature of Use</u>
47-17509	NO	NO	YES	NO	NO	NO
47-17568	YES	YES	YES	NO	YES	YES

Summary of Water Rights After the Approved Change

<u>Existing Right</u>	<u>New No. (changed portion)</u>	<u>Transfer Rate</u>	<u>Transfer Volume</u>	<u>Acre Limit</u>	<u>Total Acres</u>	<u>New No. (remaining portion)</u>	<u>Remaining Rate</u>	<u>Remaining Volume</u>	<u>Remaining Acre Limit</u>	<u>Remaining Total Acres</u>
47-17509	47-17509	0.04 cfs	14.6 af	N/A	N/A		N/A	N/A	N/A	N/A
47-17568	47-17572	0.22 cfs	32.9 af	N/A	N/A	47-17571	1.51 cfs	384.9 af	N/A	128.3
COMBINED TOTALS		0.26 cfs	47.5 af	N/A	N/A		N/A	N/A	N/A	N/A

Detailed Water Right Description(s) attached

Dated this 13th day of March, 20 12

SUPPORT DATA

IN FILE # 47-17509


Southern Region Manager

Right Holder: THOMAS Or DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	to 11/01	1.51 CFS	384.9 AF
			1.51 CFS	384.9 AF

LOCATION OF POINT(S) OF DIVERSION:
GROUND WATER NWSWSW Sec. 20 Twp 16S Rge 16E TWIN FALLS
County

PLACE OF USE: IRRIGATION

[illegible]

Total Acres: 128.3

CONDITIONS OF APPROVAL

1. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.0 afa per acre at the field headgate for irrigation of the lands below.
2. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 13th day of March, 2012

Southern Region Manager

As Modified by Transfer No. 77669

In accordance with the approval of Transfer No. 77669, Water Right No. 47-17572 is now described as follows.

Right Holder: THOMAS Or DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

Priority Date: December 25, 1970

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
STOCKWATER	01/01	to 12/31	0.22 CFS	32.9 AF
COMMERCIAL	01/01	to 12/31	0.22 CFS	32.9 AF
			0.22 CFS	32.9 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER SESENW Sec. 9 Twp 12S Rge 16E TWIN FALLS
County

PLACE OF USE: STOCKWATER

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
12S	16E	4					X			X	X	X	X						
12S	16E	9		X	X		X	X	X	X			X		X	X			

PLACE OF USE: COMMERCIAL

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
12S	16E	4					X			X			X						
							L 3												
12S	16E	9		X	X		X	X	X	X			X		X	X			

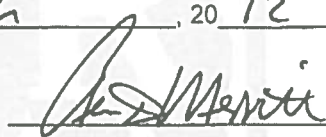
WATER RIGHT NO. 47-17572
As Modified by Transfer No. 77669

CONDITIONS OF APPROVAL

1. Rights 47-17509 and 47-17572 when combined shall not exceed a total diversion rate of 0.26 cfs and a total annual maximum diversion volume of 47.5 af.
2. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.
3. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable county zoning and use ordinances.
4. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable water quality permitting requirements administered by the Department of Environmental Quality or the Department of Agriculture.
5. The right holder shall accomplish the change authorized by this transfer within one year of the date of this approval.
6. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
7. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 13th day of March, 20 12


Southern Region Manager

WATER RIGHT NO. 47-7287
As Modified by Transfer No. 77669

In accordance with the approval of Transfer No. 77669, Water Right No. 47-7287 is now described as follows.

Right Holder: THOMAS Or DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

Priority Date: November 04, 1974

Source: MULE CREEK

Tributary: SHOSHONE CREEK

BENEFICIAL USE

IRRIGATION STORAGE

IRRIGATION FROM STORAGE

<u>From</u>	<u>To</u>	<u>Volume</u>
01/01	to 12/31	24.8 AF
03/15	to 11/15	24.8 AF
		24.8 AF

LOCATION OF POINT(S) OF DIVERSION:

MULE CREEK SESWSW Sec. 17 Twp 16S Rge 16E TWIN FALLS
County

PLACE OF USE: IRRIGATION FROM STORAGE

Twp Rge Sec			NE				NW				SW				SE				Totals
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
16S	16E	20											40.0	12.0					52.0
16S	16E	29					28.0	32.3	1.0	15.0									76.3

Total Acres: 128.3

CONDITIONS OF APPROVAL

1. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.
2. The approval of this transfer redefines all of the elements of this water right, and the new use of water authorized by this approval shall constitute the full extent of the right.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 13th day of March, 20 12

Southern Region Manager

WATER RIGHT NO. 47-14285
As Modified by Transfer No. 77669

In accordance with the approval of Transfer No. 77669, Water Right No. 47-14285 is now described as follows.

Right Holder: THOMAS Or DOROTHY LENO
 4236 N 1900 E
 BUHL ID 83316

Priority Date: December 31, 1969

Source: MULE CREEK

Tributary: SHOSHONE CREEK

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>
IRRIGATION	04/01	to 10/31	3.91 CFS
			3.91 CFS

LOCATION OF POINT(S) OF DIVERSION:

MULE CREEK SESWSW Sec. 17 Twp 16S Rge 16E TWIN FALLS
 County

MULE CREEK SESWSW Sec. 17 Twp 16S Rge 16E TWIN FALLS
 County

(Injection)

MULE CREEK NESWNW Sec. 20 Twp 16S Rge 16E TWIN FALLS
 County

(Rediversion)

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
16S	16E	20											37.0	6.0					43.0
16S	16E	29					24.0	32.3	21.0	29.0	12.0	34.0							152.3

Total Acres: 195.3

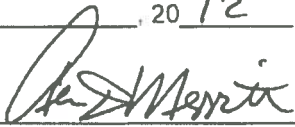
WATER RIGHT NO. 47-14285
As Modified by Transfer No. 77669

CONDITIONS OF APPROVAL

1. Right includes accomplished change in point of diversion pursuant to Section 42-1425, Idaho Code.
2. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.
3. This right when combined with all other rights shall provide no more than 0.02 cfs per acre for irrigation of the place of use.
4. The approval of this transfer redefines all of the elements of this water right, and the new use of water authorized by this approval shall constitute the full extent of the right.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 13th day of March, 2012



Southern Region Manager

WATER RIGHT NO. 47-17509
As Modified by Transfer No. 77669

In accordance with the approval of Transfer No. 77669, Water Right No. 47-17509 is now described as follows.

Right Holder: C E BRACKETT CATTLE CO
PO BOX 111
ROGERSON ID 83302

Priority Date: June 30, 1959

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
STOCKWATER	01/01	to 12/31	0.04 CFS	13.4 AF
DOMESTIC	01/01	to 12/31	0.04 CFS	1.2 AF
			0.04 CFS	14.6 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER SESENW Sec. 9 Twp 12S Rge 16E TWIN FALLS
County

PLACE OF USE: STOCKWATER

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
12S	16E	4					X			X			X						
							L 3												
12S	16E	9		X	X		X	X	X	X			X			X	X		

PLACE OF USE: DOMESTIC

[illegible]

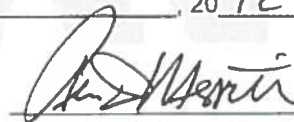
WATER RIGHT NO. 47-17509
As Modified by Transfer No. 77669

CONDITIONS OF APPROVAL

1. The quantity of water under this right shall not exceed 13,000 gallons per day.
2. Rights 47-17509 and 47-17572 when combined shall not exceed a total diversion rate of 0.26 cfs and a total annual maximum diversion volume of 47.5 af.
3. Domestic use is for 1 home.
4. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.
5. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable county zoning and use ordinances.
6. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable water quality permitting requirements administered by the Department of Environmental Quality or the Department of Agriculture.
7. The right holder shall accomplish the change authorized by this transfer within one year of the date of this approval.
8. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
9. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 13th day of March, 2012



Southern Region Manager

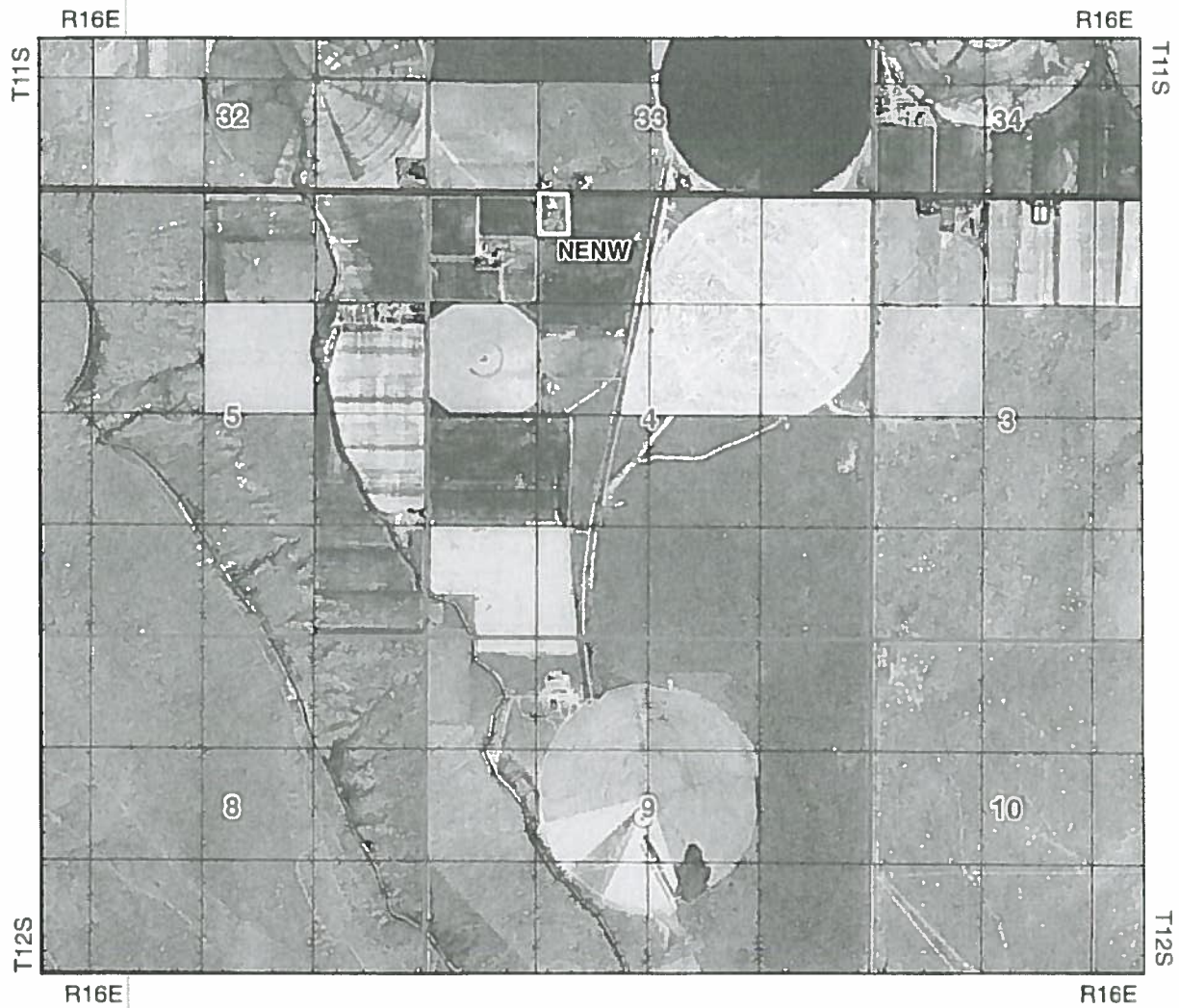
State of Idaho
Department of Water Resources

Attachment To Transfer Of Water Right

Transfer No. 77669

Rights: 47-17509

This map depicts the DOMESTIC place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



- Point of Diversion
- Place Of Use Boundary

- Townships
- PLS Sections
- Quarter Quarters



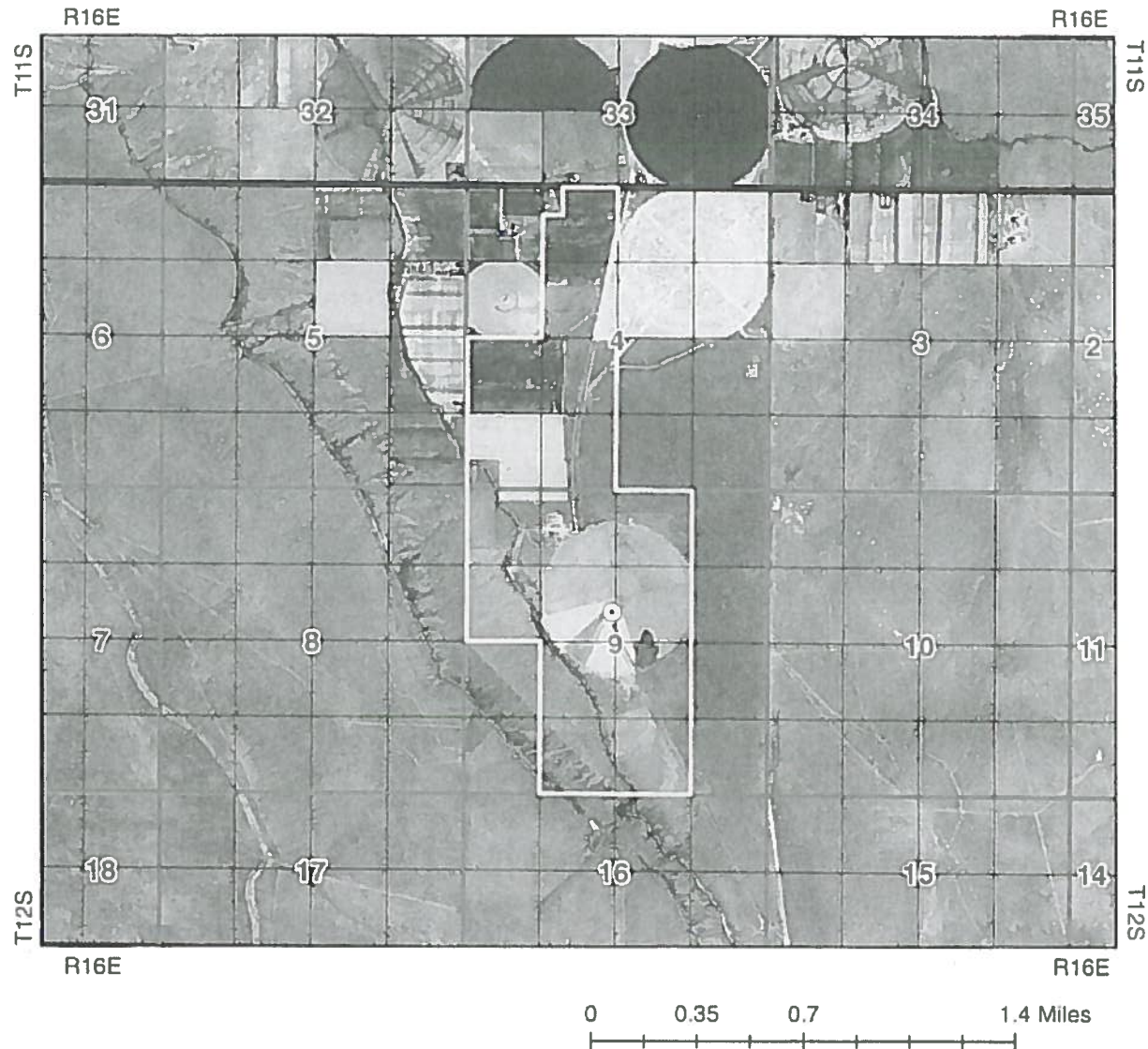
State of Idaho
Department of Water Resources

Attachment To Transfer Of Water Right

Transfer No. 77669

Rights: 47-17509, 47-17572

This map depicts the STOCKWATER & COMMERCIAL place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



- Point of Diversion
- Place Of Use Boundary
- ▬ Townships
- ▬ PLS Sections
- ▬ Quarter Quarters

MEMORANDUM

Date: December 5, 2012
To: Transfer 78127 File
From: Corey Skinner
Re: Evaluation of Sufficiency of Information Submitted

Application proposes transferring a 25.8 acre (0.30 cfs & 48.2 afa) portion of a groundwater irrigation right, 47-17571, from a farm located approximately 14.5 miles south and 1.0 mile west of Rogerson to stockwater and commercial uses associated with a dairy facility located approximately 1.4-1.7 miles south and 5.2-5.6 miles west of Buhl. The application also proposes to modify the authorized place of use of the existing domestic and stockwater right, 47-8251, (0.11 cfs & 16.9 afa) at the site of the dairy facility to reflect the entire proposed site of the dairy facility. Two existing wells at the dairy facility will be used to divert up to a total of 0.41 cfs and 65.1 afa of water. Note that the place of use of groundwater right 47-17571 overlaps the place of use of two Mule Creek Rights, 47-7287 and 47-14285. The application includes a detailed supplemental analysis of the past use of right 47-17571. This analysis indicates that for each acre of right 47-17571 that is transferred, 1.87 AFA of consumptive use would be available to be transferred. The application also includes a relinquishment form signed by the current owner of right 47-14285 relinquishing a 25.8 acre portion of right 47-14285. In addition, the application also includes a signed statement reducing the authorized place of use of right 47-7287 by 25.8 acres. However, note that the 47-7287 statement proposes to retain the full amount (actually a rather small amount) of irrigation storage volume and irrigation from storage volume authorized by right 47-7287. Note that rights 47-17571, 47-7287, and 47-14285, in the name of Thomas or Dorothy Leno, resulted from previous similar approved transfers # 77406 (approved 11/1/2011) and # 77669 (approved 3/13/2012).

- **Authority to File:**

The application includes purchase and sale documents that give the applicant (Idaho Water Company) authority to file a transfer involving right 47-17571. Documents signed by the current owner address overlapping rights 47-7287 and 47-14285. Note that the 25.8 acres are described by three separate purchase and sale documents from Leno to Idaho Water Company. A 10/8/2011 agreement describes 10 acres, a 4/6/2011 agreement describes 17 acres, and an 8/14/2012 agreement describes 25.5 acres. These three agreements describe a total of 52.5 total acres. Of these 52.5 total acres, 26.7 acres were transferred away via approved transfer # 77406 (9.1 acres) and transfer # 77669 (17.6 acres) leaving 25.8 acres available for this transfer (#78127). An authorization form signed by the current owner (Farmers National Bank) of right 47-8251 authorizes the applicant to modify right 47-8251 via the transfer. Note that the ownership of right 47-8251 is also being updated in this transfer (based on enclosed Certificate of Sale/Sheriff Sale) to Farmers National Bank.

- **Water Right Validity:**
All the rights involved with the transfer were decreed in the SRBA in 2010 or 2011.
- **Injury to Other Water Rights:**
The current point of diversion for right 47-17571 and the proposed points of diversion at the dairy facility are located approximately 41 miles away from each other. However, both locations are located within IDWR administrative basin 47. In addition, the application includes copies of published reports relating to studies of the groundwater within the Salmon Falls Creek Basin in an attempt to show the interconnection of the aquifer between the current point of diversion for right 47-17571 and the dairy site. In addition, IDWR has approved a couple of transfers # 77406 (approved 11/1/2011) and # 77669 (approved 3/13/2012) involving these same rights, with transfer # 77406 moving the Leno groundwater right to the Buhl area.
- **Enlargement of Use:**
None anticipated. Conversion from irrigation to stock water and commercial use (based on consumptive use of irrigation right) will result in a net decrease in the allowable annual diversion volume.
- **Local Public Interest:**
No issues anticipated. The application has been subject to public notice and protest with no protests received.
- **Beneficial Use/Conservation of Water Resources:**
Proposed uses are recognized as beneficial uses of water.

Review of the application finds there is no clear inconsistency with criteria set forth in Section 42-222 Idaho Code preventing processing of this application.

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

TRANSFER OF WATER RIGHT

TRANSFER NO. 78127

This is to certify that: IDAHO WATER CO LLC
1135 VALLEY RD S
EDEN ID 83325
(208) 312-1135

has requested a change to the water right(s) listed below. This change in water right(s) is authorized pursuant to the provisions of Section 42-222, Idaho Code. A summary of the changes is also listed below. The authorized change for each affected water right, including conditions of approval, is shown on the following pages of this document.

Summary of Water Rights Before the Proposed Change

Right	Origin/Basis	Priority	Rate	Volume	Acre Limit	Total Acres	Source
47-8251	WR/License	09/04/1990	0.11 cfs	16.9 af	N/A	N/A	GROUND WATER
47-17571	WR/Decreed	12/25/1970	1.51 cfs	384.9 af	N/A	128.3	GROUND WATER

Associated Water Rights Included in Transfer Approval (POU Reduction and Conditions Updated)

Right	Origin/Basis	Priority	Rate	Volume	Acre Limit	Total Acres	Source
47-7287	WR/Decreed	11/04/1974	N/A	24.8 af	N/A	128.3	MULE CREEK
47-14285	WR/Decreed	12/31/1969	3.91 cfs	N/A	N/A	195.3	MULE CREEK

Purpose of Transfer (Changes Proposed)

Current Number	Split	POD	POU	Add POD	Period of Use	Nature of Use
47-8251	NO	NO	YES	YES	NO	NO
47-17571	YES	YES	YES	NO	YES	YES

Summary of Water Rights After the Approved Change

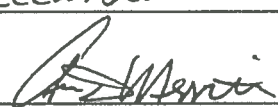
Existing Right	New No. (changed portion)	Transfer Rate	Transfer Volume	Acre Limit	Total Acres	New No. (remaining portion)	Remaining Rate	Remaining Volume	Remaining Acre Limit	Remaining Total Acres
47-8251	47-8251	0.11 cfs	16.9 af	N/A	N/A		N/A	N/A	N/A	N/A
47-17571	47-17590	0.30 cfs	48.2 af	N/A	N/A	47-17589	1.21 cfs	307.5 af	N/A	102.5
COMBINED TOTALS		0.41 cfs	65.1 af	N/A	N/A		N/A	N/A	N/A	N/A

Detailed Water Right Description(s) attached

Dated this 6th day of December, 2012

SUPPORT DATA

IN FILE # 47-8251


Southern Region Manager

SCANNED

DEC 11 2012

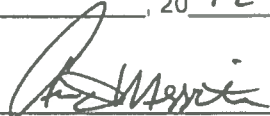
WATER RIGHT NO. 47-8251
As Modified by Transfer No. 78127

CONDITIONS OF APPROVAL

1. Rights 47-8251 and 47-17590 when combined shall not exceed a total diversion rate of 0.41 cfs or a total annual maximum diversion volume of 65.1 af.
2. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.
3. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable county zoning and use ordinances.
4. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable water quality permitting requirements administered by the Department of Environmental Quality or the Department of Agriculture.
5. The right holder shall accomplish the change authorized by this transfer within one year of the date of this approval.
6. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 6th day of December, 20 12



Southern Region Manager

WATER RIGHT NO. 47-17589
As Modified by Transfer No. 78127

In accordance with the approval of Transfer No. 78127, Water Right No. 47-17589 is now described as follows.

Right Holder: THOMAS Or DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

Priority Date: December 25, 1970

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	to 11/01	1.21 CFS	307.5 AF
			1.21 CFS	307.5 AF

LOCATION OF POINT(S) OF DIVERSION:
GROUND WATER NWSWSW Sec. 20 Twp 16S Rge 16E TWIN FALLS
County

PLACE OF USE: IRRIGATION

Twp Rge Sec			NE				NW				SW				SE				Totals
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
16S	16E	20											40.0	12.0					52.0
16S	16E	29					28.0	22.5											50.5

Total Acres: 102.5

CONDITIONS OF APPROVAL

1. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.0 afa per acre at the field headgate for irrigation of the lands below.
2. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 6th day of December, 2012

Southern Region Manager

WATER RIGHT NO. 47-17590
As Modified by Transfer No. 78127

In accordance with the approval of Transfer No. 78127, Water Right No. 47-17590 is now described as follows.

Right Holder: THOMAS Or DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

Priority Date: December 25, 1970

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
COMMERCIAL	01/01	to 12/31	0.30 CFS	48.2 AF
STOCKWATER	01/01	to 12/31	0.30 CFS	48.2 AF
			0.30 CFS	48.2 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER L1 (NWNW) Sec. 7 Twp 10S Rge 14E TWIN FALLS
County

GROUND WATER L1 (NWNW) Sec. 7 Twp 10S Rge 14E TWIN FALLS
County

PLACE OF USE: COMMERCIAL

[illegible]

PLACE OF USE: STOCKWATER

[illegible]

WATER RIGHT NO. 47-17590
As Modified by Transfer No. 78127

CONDITIONS OF APPROVAL

1. Rights 47-8251 and 47-17590 when combined shall not exceed a total diversion rate of 0.41 cfs or a total annual maximum diversion volume of 65.1 af.
2. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.
3. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable county zoning and use ordinances.
4. Prior to the diversion and use of water under this approval, the right holder shall comply with applicable water quality permitting requirements administered by the Department of Environmental Quality or the Department of Agriculture.
5. The right holder shall accomplish the change authorized by this transfer within one year of the date of this approval.
6. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
7. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 6th day of December, 2012



Southern Region Manager

WATER RIGHT NO. 47-7287
As Modified by Transfer No. 78127

In accordance with the approval of Transfer No. 78127, Water Right No. 47-7287 is now described as follows.

Right Holder: THOMAS Or DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

Priority Date: November 04, 1974

Source: MULE CREEK

Tributary: SHOSHONE CREEK

BENEFICIAL USE

From

To

Volume

IRRIGATION STORAGE

01/01 to 12/31

24.8 AF

IRRIGATION FROM STORAGE

03/15 to 11/15

24.8 AF

24.8 AF

LOCATION OF POINT(S) OF DIVERSION:

MULE CREEK

SESWSW

Sec. 17 Twp 16S Rge 16E TWIN FALLS
County

PLACE OF USE: IRRIGATION FROM STORAGE

[illegible]

Total Acres: 102.5

CONDITIONS OF APPROVAL

1. The approval of this transfer redefines all of the elements of this water right, and the new use of water authorized by this approval shall constitute the full extent of the right.
2. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 6th day of December, 20 12


Southern Region Manager

WATER RIGHT NO. 47-14285
As Modified by Transfer No. 78127

In accordance with the approval of Transfer No. 78127, Water Right No. 47-14285 is now described as follows.

Right Holder: THOMAS Or DOROTHY LENO
4236 N 1900 E
BUHL ID 83316

Priority Date: December 31, 1969

Source: MULE CREEK

Tributary: SHOSHONE CREEK

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>
IRRIGATION	04/01	to 10/31	3.39 CFS
			3.39 CFS

LOCATION OF POINT(S) OF DIVERSION:

MULE CREEK SESWSW Sec. 17 Twp 16S Rge 16E TWIN FALLS
County

MULE CREEK SESWSW Sec. 17 Twp 16S Rge 16E TWIN FALLS
County

(Injection)

MULE CREEK NESWNW Sec. 20 Twp 16S Rge 16E TWIN FALLS
County

(Rediversion)

PLACE OF USE: IRRIGATION

Twp Rge Sec			NE				NW				SW				SE				Totals
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
16S	16E	20											37.0	6.0					43.0
16S	16E	29					24.0	22.5	20.0	14.0	12.0	34.0							126.5

Total Acres: 169.5

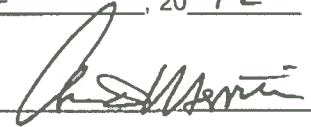
WATER RIGHT NO. 47-14285
As Modified by Transfer No. 78127

CONDITIONS OF APPROVAL

1. The approval of this transfer redefines all of the elements of this water right, and the new use of water authorized by this approval shall constitute the full extent of the right.
2. Right includes accomplished change in point of diversion pursuant to Section 42-1425, Idaho Code.
3. This right when combined with all other rights shall provide no more than 0.02 cfs per acre for irrigation of the place of use.
4. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 6th day of December, 20 12



Southern Region Manager

State of Idaho
Department of Water Resources

Attachment To Transfer Of Water Right

Transfer No. 78127

Rights: 47-8251, 47-17590

This map depicts the COMMERCIAL & STOCKWATER place of use boundary for these water rights at the time of this approval and is attached to the approval document solely for illustrative purposes.



-   Point of Diversion
-  Place Of Use Boundary
-  Townships
-  PLS Sections
-  Quarter Quarters



State of Idaho
Department of Water Resources

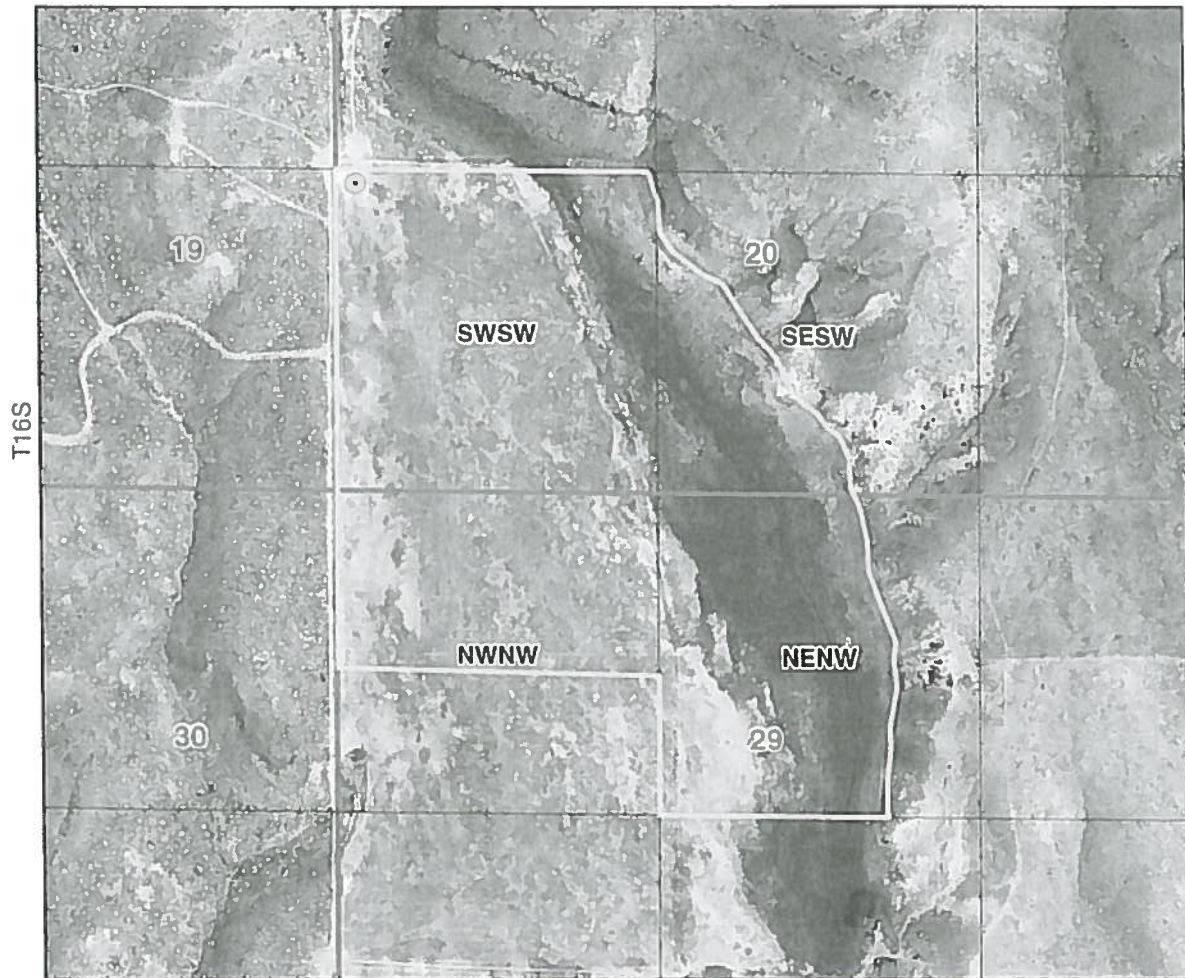
Attachment To Transfer Of Water Right

Transfer No. 78127

Rights: 47-17589

This map depicts the IRRIGATION place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.

R16E



0 0.075 0.15 0.3 Miles

- Point of Diversion
- ▭ Place Of Use Boundary
- ▭ Townships
- ▭ PLS Sections
- ▭ Quarter Quarters



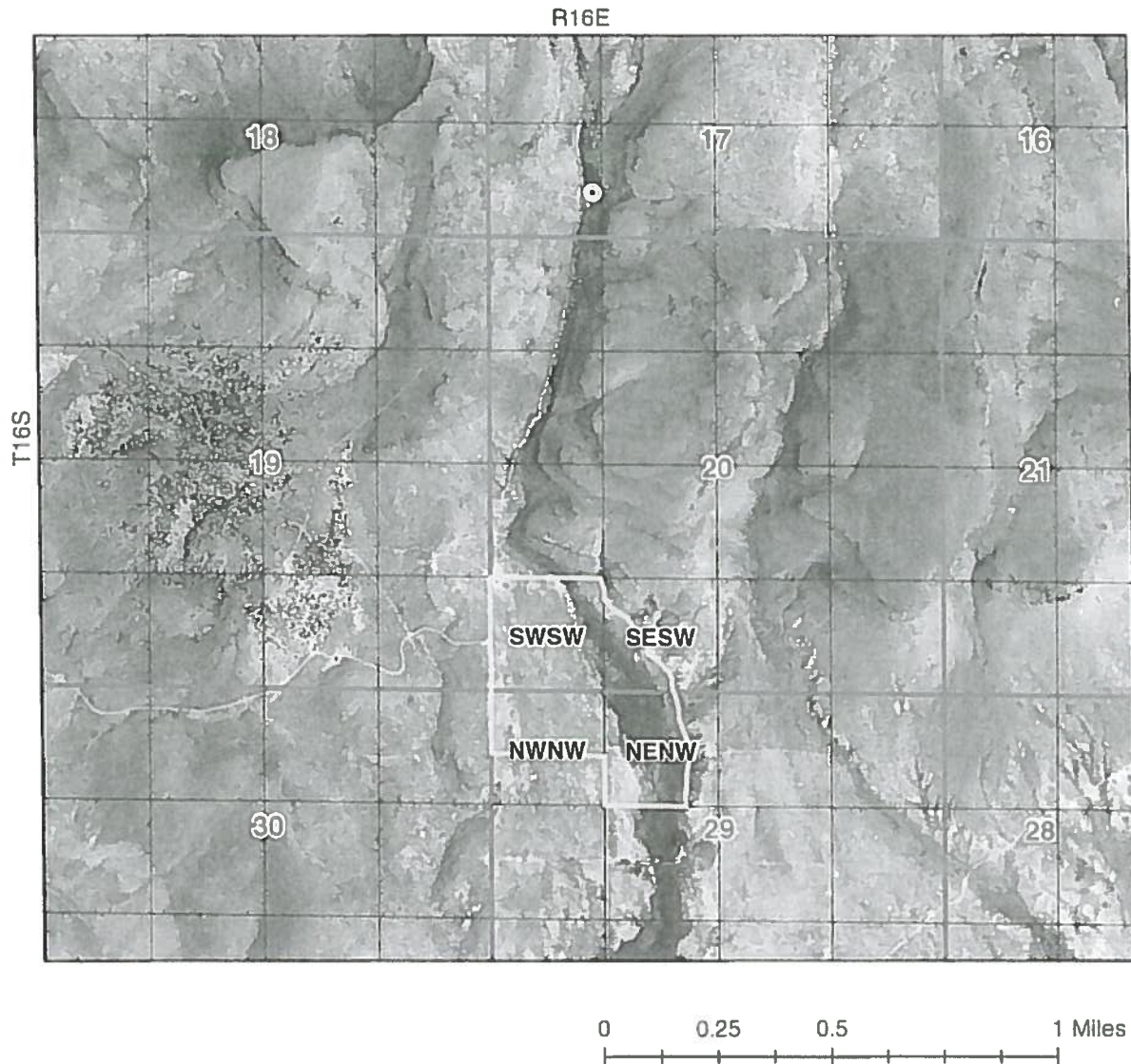
State of Idaho
Department of Water Resources

Attachment To Transfer Of Water Right

Transfer No. 78127

Rights: 47-7287

This map depicts the IRRIGATION FROM STORAGE place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



- Point of Diversion
- ▬ Place Of Use Boundary
- ▬ Townships
- ▬ PLS Sections
- ▬ Quarter Quarters



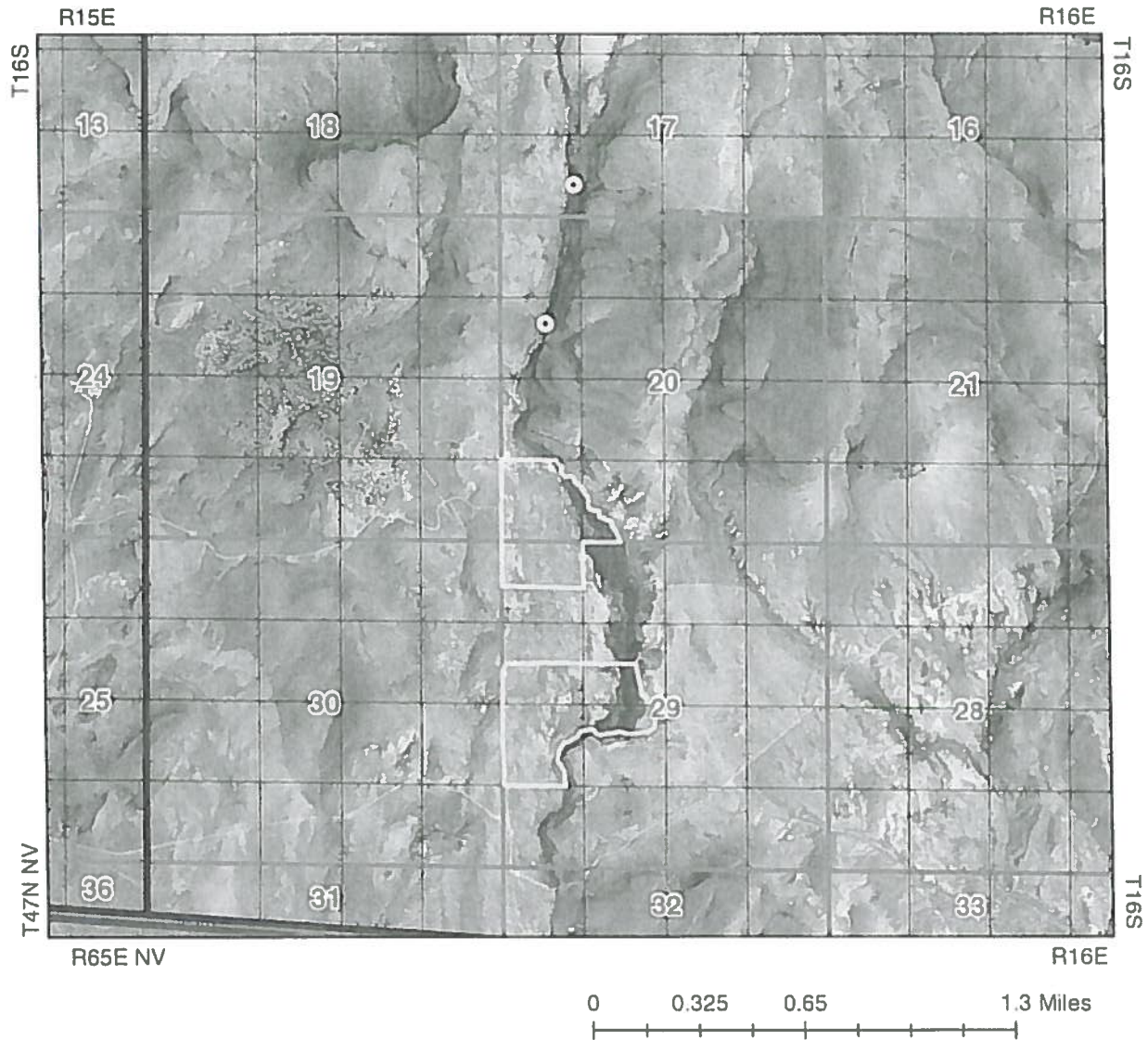
State of Idaho
Department of Water Resources

Attachment To Transfer Of Water Right

Transfer No. 78127

Rights: 47-14285

This map depicts the IRRIGATION place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



- Point of Diversion
- Place Of Use Boundary
- Townships
- PLS Sections
- Quarter Quarters



Appendix D:

Historical Water Use Analysis on Parent Water Right 47-7106

Thomas Leno
Diesel Powered Pump Analysis
Brockway Engineering
GWS

Irrigated Acres	155	
Volume	465	
Engine HP	111	
Efficiency of Engine	40%	
Pump Efficiency	75%	
Water Pumping Depth	100	Based on well log
Irrigation Pressure	50 psi	
Irrigation Pressure Head	115	
Total Required Head	215	
γ	62.42	
BTU/gal Diesel	138700	http://www.doi.gov/pam/enerplan.html
1 HP =	2545	BTU/hr
Irrigation Efficiency	75%	
Primary Ground Water	94%	

Date	Diesel (gal)	Monthly Average	Average	gal diesel/hr
8/21/1999	986.1			
5/23/2000	1501.4			
6/20/2000	1439.3	1524		
7/12/2000	1631.4		1488	2.07
5/12/2001	1538.7			
6/7/2001	1300.8	1452		
7/12/2001	1515.5			
7/10/2002	1675.3			
8/6/2002	1900			
7/14/2003	1687			
9/8/2003	841			

Theoretical Calculation				Actual Calculation					
gal diesel/hr	HP ¹	Shaft HP ²	CFS water/gal diesel ³	CFS ⁴	AF/day ⁵	Days/month	months	AFA ⁶	Acre-Feet ⁷
1	54.50	21.80	0.67	1.38	2.74	30	5	411	1.99

Irrigation to S/C	Consumptive AFA ⁸	Primary AFA ⁹	Acre-Feet ¹⁰
	308	290	1.87

Primary Acres @ 3.0 ft/acre	Primary Acres @ 4.0 ft/acre	Supplimental Acres @ 3.0 ft/acre	Supplimental Acres @ 4.0 ft/acre
145.7	109.3	9.3	7.0

¹ (gallon diesel/hr)*(BTU/gal diesel)/(1 HP)

² HP*Efficiency of Engine

³ Shaft HP*550/((γ *Total Required Head)*Pump Efficiency)

⁴ (CFS water/gal diesel)*(2.07 gal diesel/hr)

⁵ CFS*1.98347

⁶ (AF/day)*(Days/month)*months

⁷ (AFA*Irrigation Efficiency)/(Irrigated Acres)

⁸ AFA*Irrigation Efficiency

⁹ Consumptive AFA* % Primary Ground Water

¹⁰ Primary AFA/Irrigated Acres

¹¹ Irrigated Acres*Primary Ground Water

¹² Irrigated Acres*Primary Ground Water/(4 acre-feet)

¹³ Irrigated Acres-Primary Acres

¹⁴ (Supplimental acres*3.0 ft/acre)/(4 acre-feet)

Appendix E:



Memo

To: Hank Hafliger
From: Amy Runser
Cc:
Date: 12/10/2014
Re: Static Water Levels in the Aquifer Analysis

A handwritten signature in dark ink, appearing to read 'Amy Runser', is written over the 'Cc:' field of the memo header.

Contours generated were based on the National Elevation Data (NED), 10 meter 1999 elevation data. The National Elevation Data is the best available information for the area south of Filer, Idaho at this time that we know of. The NED data represents the ground surface.

Static water elevations were obtained by examining local well logs from wells that were drilled after 2000. The well drillers recorded the static water level in the wells when the drilling process was constructed.

The static water level contours of the aquifer were calculated by subtracting the depth of the static water level for an individual well from the elevation provided by the 1999 NED data.

The static water depth from the surface contours were calculated by subtracting the calculated static water level elevations from the surface elevation provided by the 1999 NED data. This procedure allows the static water elevation from individual wells to be analyzed based on elevation and not sole on depth from the ground surface.

Reference: National Elevation Dataset by United States Geological Survey, EROS data center, 1999

HAFLIGER, HANK

WELLS ANALYSIS

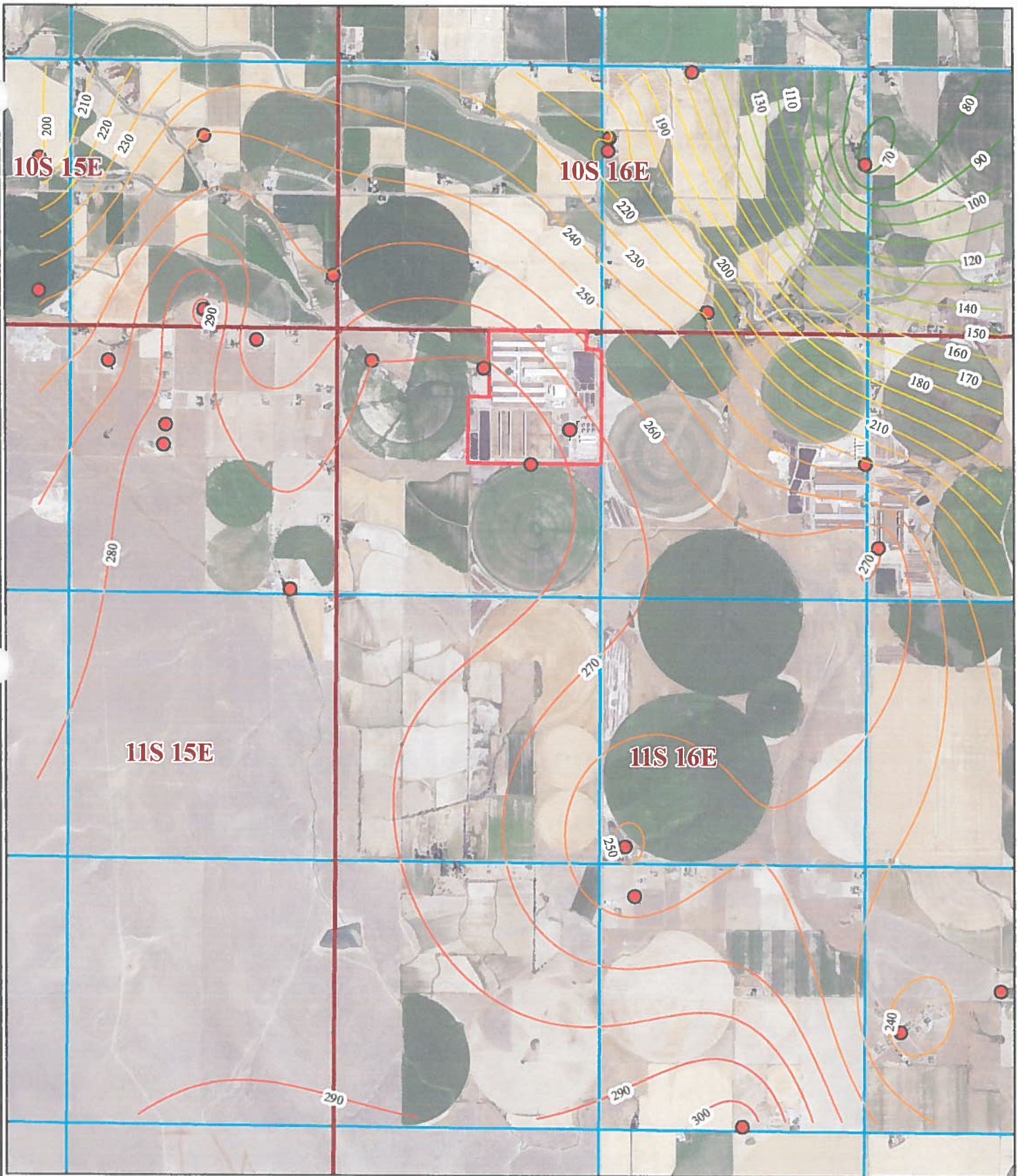
BROCKWAY ENGINEERING, PLLC

12/10/2014

well #	MetalTag #	Construction		Owner	AppType	WellUse	T.	R.	Sec.	QQ	QQ	Quarter	Measurement		Production	SWL	Casing Diam	Casing Depth	Total Depth
		Date											Date						
114	D0065005	10/14/2013		KIMBERLY	CONSTRUCTION	Domestic	10S	15E	36		SE	NW			20.0	250	6	38	343
113	D0062362	6/26/2013		DARREN DAUGHENBAUGH	Domestic	Domestic	11S	15E	1		SE	NW			0.0	283	6	40	380
112	D0060495	4/10/2012		TONY MARTINS	Domestic	Domestic	10S	15E	36		SE	SW			30.0	294	6	279	360
111	D0060420	5/16/2011		JEFF SKINNER	Domestic	Domestic	11S	15E	1		NW	NE			0.0	260	6	38	380
110	D0050798	7/10/2009		LEE BAKER	Domestic	Domestic	10S	16E	32		SE	SW			40.0	227	6	375	375
107	D0050472	10/7/2008		GREG SCOTT	Domestic	Domestic	11S	16E	16		SW	NE			0.0	243	6	18	450
104	D0050334	7/15/2008		DRAGT CONSTRUCTION	Domestic	Domestic	10S	16E	32		SW	NW			0.0	212	6	19	284
101	D0044496	6/25/2007		K2 RED	Domestic	Domestic	10S	16E	32		SW	NW			0.0	212	6	18	295
100	D0043538	4/9/2007		JAMES RAY CONSTRUCTION	Domestic	Domestic	11S	16E	17		SW	SE			0.0	307	6	280	530
99	D0043358	3/26/2007		TERRY HUMPHREY	Domestic	Domestic	11S	15E	1		NW	NW			24.0	264	6	292	380
98	D0043357	3/19/2007		GARY HOOLEY	Domestic	Domestic	10S	16E	32		SE	NE			25.0	60	6	40	240
97	D0037159	2/9/2006		TRACO BUILDERS	Domestic	Domestic	10S	15E	36		SE	SE			0.0	260	6	18	360
95	D0036839	12/21/2005		LYNN WILLIAMSON	Domestic	Domestic	11S	16E	16	NE	NW	SW			0.0	235	6	19	455
93	D0037064	11/21/2005		DAVE SLOTTEN	Domestic	Domestic	10S	15E	35		SE	SE			0.0	248	6	18	355
94	D0037096	11/21/2005		JACK WHITE	Domestic	Domestic	10S	15E	35		SE	NE			0.0	198	6	18	305
92		4/22/2005		WAYNE LINCOLN	Domestic	Domestic	10S	16E	32	NW	NE	NW			0.0	0	4	0	0
91	D0034682	3/29/2005		WAYNE LINCOLN	Domestic	Domestic	10S	16E	32	NW	NE	NW			0.0	182	6	19	240
82	D0034694	2/18/2005		HANK HAFLIGER	Commercial	Commercial	11S	16E	6		SE	NE			0.0	262	8	0	450
83	D0034700	2/17/2005		HANK HAFLIGER	Domestic	Domestic	11S	16E	6		NW	NE			0.0	282	6	0	424
81	D0034693	2/16/2005		HANK HAFLIGER	Commercial	Commercial	11S	16E	6		SE	NE			0.0	262	6	0	448
79	D0034502	1/18/2005		TYSON COOK	Domestic	Domestic	11S	16E	16		NW	SW			0.0	236	6	319	370
60	D0023640	5/15/2003		BRIAN TUBBS	Domestic	Domestic	11S	15E	1		SE	SE			0.0	280	8	338	405
58	D0016383	6/14/2001		DAVID HIGBEE			11S	15E	1		SE	NW			0.0	287	8	405	405
57	D0016377	6/12/2001		HANK HAFLINGER			11S	16E	6		NW	NW			0.0	280	8	19	345
56	D0008627	1/21/2000		ERIC CLAR		Domestic	11S	16E	17		NW	NW			40.0	256	8	19	460
		5/16/1957		Hank Hafliger		Irrigation	11S	16E	6		NW	SE		5/19/2014		290	20		975
				Dairy #3 (Hafliger)		Stock/Commercial	11S	16E	6		SE	NE		1/15/2014		288			
				Hank Hafliger		Domestic	11S	16E	8		SW	SW		10/7/2014		247	8		
				Dairy #2 (Hafliger)		Stock/Commercial	11S	16E	5		NE	SE		3/1/2014		232			
				Dairy #1 (Hafliger)		Stock/Commercial	11S	16E	4		SW	SW		4/10/2014		271			

Well #	Protestant	Estimated Depth to Water (feet)
1	Elizabeth B. Slifer	no estimation
2	Margaret Winsryg	250-260
3	Martin F Hackard	250-260
4	Scott R Houtz	250-260
5	Richard Parrott and Eric Parrott	270-280
6	Pam Ritter	250-260
7	Louis m Rice	250-260
8	Victoria B Henson	
9	Jeanie McCreary	250-260
10	William D Hamby	no estimation
11	Lynn & Barbara Stephens	240-250
12	Leslie Ellsworth	no estimation
13	Ed Smith	no estimation
14	Mike Humphries	no estimation
15	Jimmie LeConder	no estimation
16	Delea C Miller	250-260

Well #	Protestant	Well Driller Log Static Water Level and Year of Log	Static Water Level Provided by Protestant and Year of Measurment
1	Elizabeth B. Slifer	no well log	none
2	Margaret Winsryg	256 (2000)	257 (2014)
3	Martin F Hackard	260 (1996)	none
		290 (2002)	none
4	Scott R Houtz	274	none
5	Richard Parrott and Eric Parrott (Well 1)	no well log	400 (1972)
	Richard Parrott and Eric Parrott (Well 1)	no well log	280 (2014)
	Richard Parrott and Eric Parrott (Well 2)	no well log	300 (2014)
6	Pam Ritter	145 (1972)	378
7	Louis m Rice	225 (1995)	none
8	Victoria B Henson		
9	Jeanie McCreary	310 (1995)	none
10	William D Hamby	no well log	280 (recent)
11	Lynn & Barbara Stephens	no well log	none
12	Leslie Ellsworth	115 (1984)	none
13	Ed Smith	147 (1997)	none
14	Mike Humphries	no well log	none
15	Jimmie LeConder	215 (1973)	220
16	Delea C Miller	246 (1998)	none



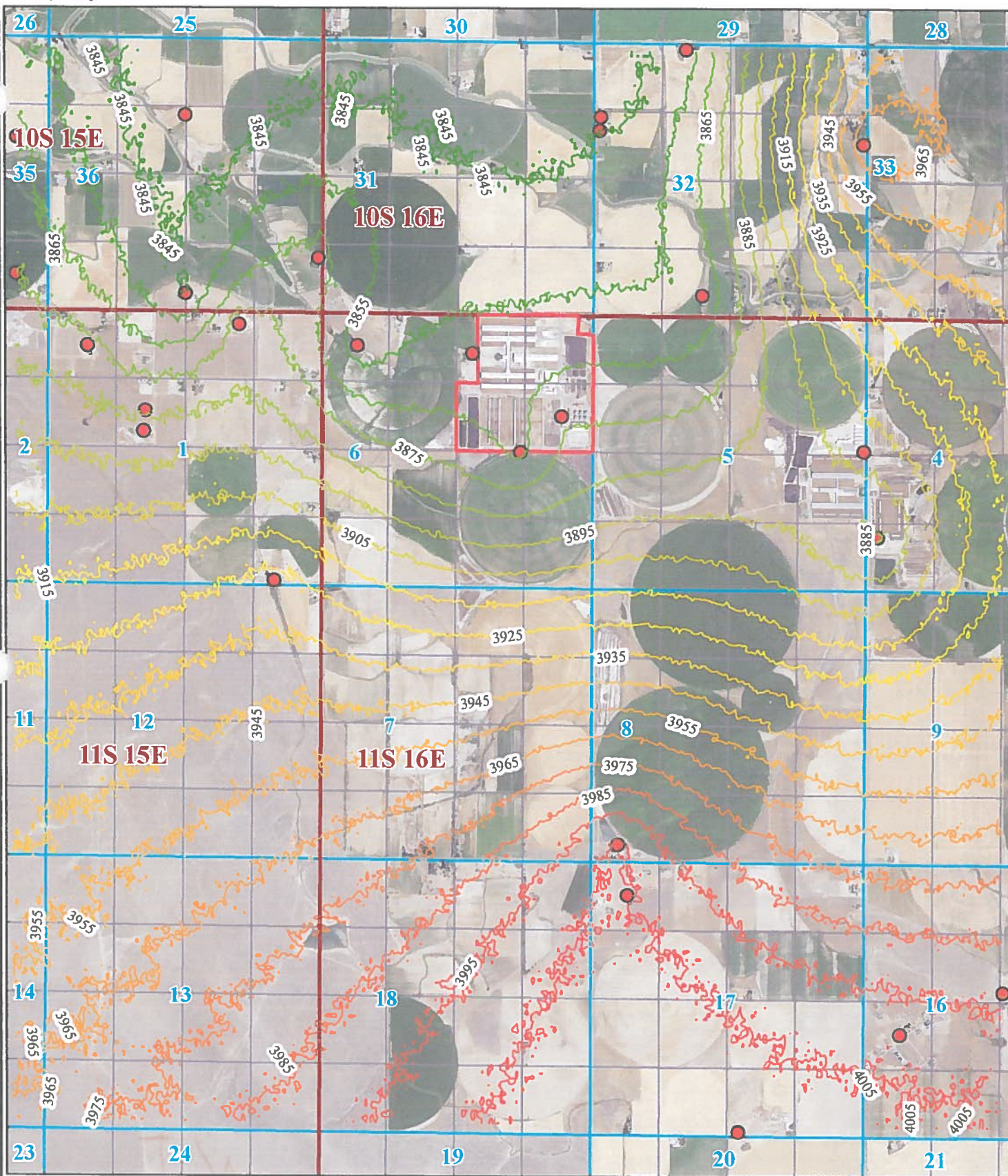
0 1,000 2,000 4,000 Feet

**DEPTH TO STATIC WATER LEVEL
WELL LOGS 2000 THROUGH 2013
NAIP 2013 AERIAL**

Legend

- Well Drilled 2000-2014
- Dairy #3 POU
- twshp
- Sections



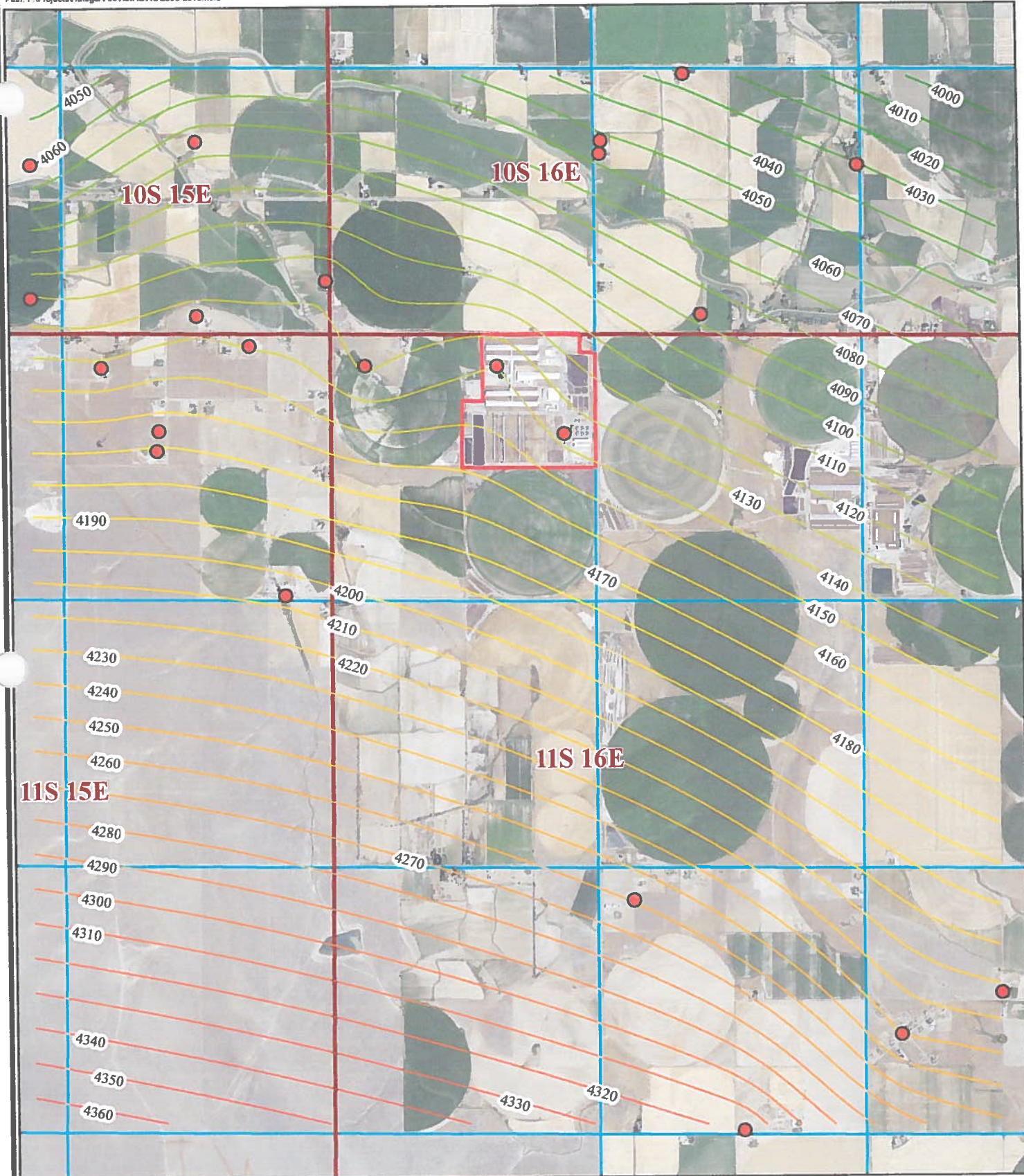


0 950 1,900 3,800 Feet

STATIC WATER LEVELS OF AQUIFER WELL LOGS 2000 THROUGH 2013 NAIP 2013 AERIAL

- Legend**
- Well Drilled 2000-2014
 - Dairy #3 POU
 - twship
 - Sections
 - QQ Lines





**GROUND SURFACE CONTOURS
WELL LOGS 2000 THROUGH 2013
NAIP 2013 AERIAL**

Legend

- Well Drilled 2000-2014
- Dairy #3 POU
- twshp
- Sections

Appendix F:

Monthly flows for groundwater model - Dairy #3 Transfer

Hafliger project

Dairy #3: 0.42 cfs / 66.0 afa increase, annual use, summer peak 50% more than winter

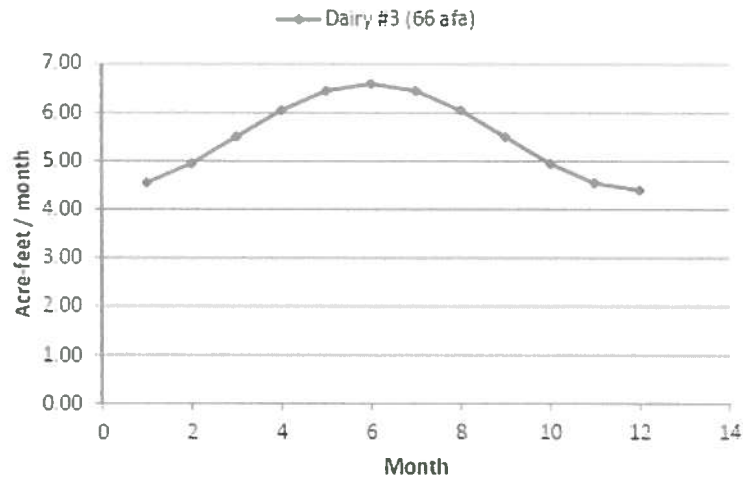
Model time step: 30.1667 days

Average monthly flow 5.5 af/mo

Peak water right flow 0.42 cfs = 25.13 af/mo

Month	No. Days	Dairy #3	
		AF	GPM
January	31	4.55	34.1
February	28	4.95	37.1
March	31	5.50	41.3
April	30	6.05	45.4
May	31	6.45	48.4
June	30	6.60	49.5
July	31	6.45	48.4
August	31	6.05	45.4
September	30	5.50	41.3
October	31	4.95	37.1
November	30	4.55	34.1
December	31	4.40	33.0
Total:		66.0	

Monthly Distribution of Annual Volume



Halliger Model Scenario: Dairy #3 increased pumping

Modeled drawdown at well:																
Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16	
0.0001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.4	0	0	0	0	0.0001	0.0003	0.0005	0.0012	0.0001	0	0.0003	0.0009	0.0001	0	0	1E-04
60.8	0	0.0009	0.0004	0.0011	0.0016	0.0003	0.0005	0.0012	0.0001	0	0.0003	0.0009	0.0001	0.0002	0.0002	0.001
91.3	1E-04	0.0026	0.0014	0.003	0.004	0.0012	0.0016	0.0033	0.0003	0.0003	0.0012	0.0026	0.0004	0.0009	0.0009	0.0028
121.7	0.0004	0.0048	0.0029	0.0054	0.0067	0.0025	0.0032	0.0057	0.0008	0.0009	0.0026	0.0046	0.0011	0.0019	0.0051	0.0051
152.1	0.0009	0.0071	0.0047	0.0079	0.0096	0.004	0.005	0.0084	0.0015	0.0017	0.0042	0.007	0.002	0.0033	0.0075	0.0075
182.5	0.0015	0.0097	0.0066	0.0106	0.0126	0.0058	0.007	0.0112	0.0024	0.0027	0.0061	0.0094	0.0031	0.0049	0.0101	0.0101
212.9	0.0023	0.0122	0.0087	0.0133	0.0156	0.0077	0.0092	0.014	0.0034	0.0039	0.008	0.0119	0.0043	0.0065	0.0128	0.0128
243.3	0.0032	0.0147	0.0107	0.0158	0.0184	0.0096	0.0113	0.0166	0.0046	0.0051	0.01	0.0144	0.0057	0.0083	0.0153	0.0153
273.8	0.0042	0.0169	0.0127	0.0182	0.0208	0.0114	0.0133	0.019	0.0058	0.0064	0.0118	0.0166	0.0071	0.01	0.0176	0.0176
304.2	0.0052	0.0189	0.0144	0.0201	0.0228	0.0131	0.0151	0.021	0.007	0.0077	0.0136	0.0185	0.0084	0.0116	0.0195	0.0195
334.6	0.0061	0.0205	0.016	0.0217	0.0244	0.0146	0.0166	0.0226	0.0081	0.009	0.0151	0.0201	0.0097	0.013	0.0211	0.0211
365	0.0071	0.0218	0.0173	0.023	0.0256	0.0159	0.0179	0.0238	0.0092	0.0101	0.0164	0.0214	0.0109	0.0143	0.0224	0.0224
395.4	0.008	0.0228	0.0184	0.024	0.0266	0.017	0.019	0.0248	0.0102	0.0111	0.0175	0.0225	0.0119	0.0154	0.0235	0.0235
425.8	0.0088	0.0238	0.0193	0.025	0.0276	0.018	0.02	0.0258	0.0111	0.012	0.0184	0.0234	0.0128	0.0163	0.0244	0.0244
456.3	0.0096	0.0248	0.0203	0.026	0.0286	0.0189	0.021	0.0268	0.0119	0.0129	0.0194	0.0244	0.0137	0.0173	0.0254	0.0254
486.7	0.0103	0.0259	0.0213	0.0272	0.0299	0.0199	0.022	0.028	0.0127	0.0137	0.0204	0.0255	0.0145	0.0182	0.0266	0.0266
517.1	0.0111	0.0272	0.0224	0.0285	0.0314	0.0209	0.0231	0.0294	0.0135	0.0145	0.0214	0.0268	0.0154	0.0192	0.0279	0.0279
547.5	0.0118	0.0287	0.0236	0.0301	0.0331	0.0221	0.0244	0.031	0.0144	0.0154	0.0226	0.0283	0.0163	0.0203	0.0294	0.0294
577.9	0.0126	0.0303	0.0249	0.0317	0.0349	0.0234	0.0257	0.0327	0.0153	0.0164	0.0239	0.0298	0.0173	0.0214	0.031	0.031
608.3	0.0134	0.0318	0.0263	0.0333	0.0366	0.0247	0.0271	0.0343	0.0162	0.0174	0.0252	0.0314	0.0183	0.0226	0.0326	0.0326
638.8	0.0143	0.0332	0.0276	0.0347	0.038	0.0259	0.0284	0.0358	0.0172	0.0184	0.0265	0.0328	0.0194	0.0238	0.034	0.034
669.2	0.0151	0.0344	0.0288	0.0359	0.0392	0.027	0.0296	0.0369	0.0181	0.0193	0.0276	0.034	0.0204	0.0249	0.0352	0.0352
699.6	0.0159	0.0353	0.0297	0.0368	0.04	0.028	0.0306	0.0378	0.019	0.0202	0.0286	0.0349	0.0213	0.0259	0.0361	0.0361
730	0.0167	0.0359	0.0305	0.0374	0.0405	0.0288	0.0313	0.0383	0.0198	0.0211	0.0294	0.0355	0.0221	0.0267	0.0367	0.0367
760.4	0.0174	0.0364	0.0311	0.0378	0.0408	0.0294	0.0319	0.0387	0.0205	0.0218	0.03	0.036	0.0228	0.0274	0.0371	0.0371
790.8	0.018	0.0368	0.0316	0.0382	0.0411	0.03	0.0324	0.0391	0.0211	0.0224	0.0305	0.0364	0.0235	0.0279	0.0375	0.0375
821.3	0.0186	0.0373	0.0321	0.0387	0.0416	0.0305	0.0329	0.0396	0.0217	0.023	0.0316	0.0369	0.024	0.0284	0.038	0.038
851.7	0.0191	0.0379	0.0327	0.0393	0.0424	0.031	0.0335	0.0403	0.0223	0.0235	0.0316	0.0375	0.0246	0.029	0.0387	0.0387
882.1	0.0197	0.0388	0.0334	0.0403	0.0434	0.0317	0.0342	0.0412	0.0228	0.0241	0.0323	0.0384	0.0251	0.0297	0.0396	0.0396
912.5	0.0202	0.0399	0.0343	0.0414	0.0447	0.0325	0.0351	0.0424	0.0234	0.0247	0.0331	0.0394	0.0258	0.0304	0.0407	0.0407
942.9	0.0208	0.0411	0.0352	0.0426	0.046	0.0335	0.0361	0.0437	0.0241	0.0254	0.0341	0.0406	0.0265	0.0313	0.0419	0.0419
973.3	0.0215	0.0423	0.0363	0.0439	0.0473	0.0345	0.0372	0.045	0.0248	0.0262	0.0351	0.0418	0.0273	0.0322	0.0431	0.0431
1003.8	0.0221	0.0434	0.0373	0.045	0.0485	0.0354	0.0382	0.0461	0.0256	0.0269	0.0361	0.0429	0.0281	0.0331	0.0442	0.0442
1034.2	0.0228	0.0442	0.0382	0.0458	0.0493	0.0363	0.0391	0.0469	0.0263	0.0277	0.0369	0.0437	0.0289	0.034	0.045	0.045
1064.6	0.0234	0.0448	0.0388	0.0464	0.0497	0.037	0.0398	0.0474	0.027	0.0284	0.0376	0.0441	0.0296	0.0347	0.0456	0.0456

Halliger Model Scenario: Dairy #3 increased pumping

Modeled drawdown at well:

Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16
1095	0.0241	0.0452	0.0394	0.0467	0.05	0.0375	0.0402	0.0477	0.0276	0.0299	0.0382	0.0447	0.0302	0.0353	0.046
1125.4	0.0246	0.0454	0.0397	0.0469	0.05	0.0379	0.0406	0.0478	0.0282	0.0296	0.0385	0.0449	0.0308	0.0357	0.0461
1155.8	0.0251	0.0455	0.04	0.047	0.0501	0.0382	0.0408	0.048	0.0286	0.03	0.0388	0.0451	0.0312	0.0361	0.0463
1186.3	0.0255	0.0458	0.0403	0.0472	0.0503	0.0385	0.0411	0.0482	0.029	0.0304	0.0391	0.0454	0.0316	0.0364	0.0465
1216.7	0.0259	0.0462	0.0406	0.0477	0.0508	0.0389	0.0415	0.0487	0.0294	0.0308	0.0395	0.0458	0.0319	0.0368	0.047
1247.1	0.0263	0.0469	0.0412	0.0484	0.0517	0.0394	0.042	0.0494	0.0298	0.0312	0.04	0.0464	0.0324	0.0372	0.0477
1277.5	0.0267	0.0478	0.0419	0.0493	0.0527	0.0401	0.0428	0.0504	0.0303	0.0317	0.0407	0.0473	0.0329	0.0378	0.0486
1307.9	0.0272	0.0488	0.0427	0.0504	0.0539	0.0408	0.0436	0.0515	0.0308	0.0322	0.0415	0.0483	0.0334	0.0385	0.0496
1338.3	0.0277	0.0498	0.0435	0.0514	0.055	0.0416	0.0445	0.0525	0.0314	0.0328	0.0423	0.0493	0.0341	0.0393	0.0506
1368.8	0.0283	0.0507	0.0441	0.0523	0.0559	0.0424	0.0453	0.0535	0.032	0.0335	0.0431	0.0502	0.0348	0.04	0.0515
1399.2	0.0288	0.0514	0.0451	0.053	0.0566	0.0432	0.0461	0.0541	0.0326	0.0341	0.0438	0.0509	0.0354	0.0407	0.0522
1429.6	0.0294	0.0518	0.0456	0.0534	0.0569	0.0437	0.0466	0.0545	0.0332	0.0347	0.0444	0.0513	0.036	0.0413	0.0527
1460.4	0.0299	0.052	0.046	0.0536	0.0569	0.0441	0.0469	0.0546	0.0337	0.0352	0.0448	0.0516	0.0365	0.0418	0.0528
1490.4	0.0303	0.0521	0.0462	0.0536	0.0568	0.0444	0.0471	0.0546	0.0341	0.0356	0.045	0.0516	0.0369	0.0421	0.0529
1520.8	0.0307	0.0521	0.0464	0.0536	0.0568	0.0446	0.0473	0.0546	0.0345	0.0359	0.0452	0.0517	0.0372	0.0423	0.0529
1551.3	0.0311	0.0522	0.0465	0.0537	0.0569	0.0447	0.0474	0.0547	0.0348	0.0362	0.0454	0.0518	0.0375	0.0425	0.053
1581.7	0.0314	0.0525	0.0468	0.054	0.0573	0.045	0.0477	0.055	0.0351	0.0365	0.0456	0.0521	0.0377	0.0428	0.0533
1612.1	0.0317	0.0531	0.0472	0.0546	0.0579	0.0454	0.0481	0.0556	0.0354	0.0368	0.046	0.0526	0.038	0.0431	0.0539
1642.5	0.032	0.0538	0.0473	0.0554	0.0589	0.0459	0.0487	0.0565	0.0357	0.0372	0.0466	0.0533	0.0384	0.0436	0.0546
1672.9	0.0324	0.0547	0.0485	0.0563	0.0599	0.0466	0.0494	0.0575	0.0362	0.0377	0.0472	0.0542	0.0389	0.0442	0.0556
1703.3	0.0328	0.0556	0.0493	0.0573	0.0609	0.0473	0.0502	0.0584	0.0367	0.0382	0.048	0.0551	0.0395	0.0449	0.0565
1733.8	0.0333	0.0564	0.05	0.0581	0.0618	0.048	0.051	0.0593	0.0372	0.0388	0.0487	0.0559	0.0401	0.0455	0.0573
1764.2	0.0338	0.057	0.0506	0.0587	0.0623	0.0486	0.0516	0.0598	0.0377	0.0393	0.0493	0.0565	0.0406	0.0461	0.0579
1794.6	0.0343	0.0574	0.0511	0.059	0.0625	0.0491	0.052	0.0601	0.0382	0.0398	0.0498	0.0569	0.0411	0.0466	0.0582
1825	0.0347	0.0575	0.0513	0.0591	0.0624	0.0494	0.0523	0.0601	0.0387	0.0402	0.0501	0.057	0.0415	0.047	0.0583
1855.4	0.0351	0.0574	0.0515	0.059	0.0623	0.0496	0.0524	0.06	0.039	0.0406	0.0502	0.057	0.0419	0.0472	0.0582
1885.8	0.0354	0.0574	0.0515	0.0589	0.0621	0.0497	0.0524	0.0599	0.0393	0.0408	0.0503	0.0569	0.0421	0.0473	0.0582
1916.3	0.0356	0.0574	0.0516	0.0589	0.0621	0.0498	0.0525	0.0599	0.0395	0.041	0.0504	0.057	0.0423	0.0475	0.0582
1946.7	0.0359	0.0576	0.0518	0.0591	0.0624	0.05	0.0527	0.0602	0.0397	0.0412	0.0506	0.0572	0.0425	0.0477	0.0584
1977.1	0.0361	0.0581	0.0521	0.0596	0.063	0.0503	0.053	0.0607	0.04	0.0415	0.0509	0.0576	0.0427	0.0479	0.0589
2007.5	0.0364	0.0587	0.0526	0.0604	0.0639	0.0507	0.0535	0.0615	0.0403	0.0418	0.0514	0.0583	0.0431	0.0483	0.0596
2037.9	0.0368	0.0596	0.0532	0.0612	0.0648	0.0513	0.0542	0.0624	0.0407	0.0422	0.052	0.0591	0.0435	0.0489	0.0604
2068.3	0.0371	0.0604	0.0539	0.0621	0.0658	0.0519	0.0549	0.0632	0.0411	0.0427	0.0526	0.0599	0.044	0.0495	0.0613
2098.8	0.0375	0.0611	0.0546	0.0628	0.0665	0.0526	0.0556	0.064	0.0416	0.0432	0.0533	0.0606	0.0445	0.0501	0.062
2129.2	0.038	0.0617	0.0552	0.0633	0.067	0.0531	0.0562	0.0645	0.042	0.0436	0.0538	0.0611	0.045	0.0506	0.0625
2159.6	0.0384	0.0619	0.0556	0.0636	0.0671	0.0536	0.0565	0.0647	0.0425	0.0441	0.0542	0.0614	0.0454	0.051	0.0628

Hafliger Model Scenario: Dairy #3 increased pumping

Modeled drawdown at well:

Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16
2190	0.0388	0.062	0.0558	0.0636	0.067	0.0538	0.0567	0.0647	0.0428	0.0444	0.0545	0.0615	0.0458	0.0513	0.0628
2220.4	0.0391	0.0619	0.0553	0.0634	0.0668	0.0539	0.0568	0.0645	0.0431	0.0447	0.0546	0.0614	0.0461	0.0515	0.0627
2250.8	0.0394	0.0618	0.0558	0.0633	0.0665	0.054	0.0567	0.0643	0.0434	0.0449	0.0546	0.0613	0.0462	0.0516	0.0625
2281.3	0.0396	0.0617	0.0559	0.0632	0.0665	0.054	0.0568	0.0643	0.0435	0.0451	0.0546	0.0613	0.0464	0.0517	0.0625
2311.7	0.0398	0.0619	0.056	0.0634	0.0667	0.0541	0.0569	0.0645	0.0437	0.0452	0.0548	0.0614	0.0465	0.0518	0.0627
2342.1	0.04	0.0623	0.0563	0.0639	0.0673	0.0544	0.0572	0.0649	0.0439	0.0454	0.055	0.0618	0.0467	0.052	0.0631
2372.5	0.0402	0.0629	0.0567	0.0645	0.0681	0.0548	0.0576	0.0656	0.0442	0.0457	0.0554	0.0624	0.047	0.0524	0.0637
2402.9	0.0405	0.0637	0.0573	0.0653	0.069	0.0553	0.0583	0.0665	0.0445	0.0461	0.056	0.0632	0.0474	0.0528	0.0645
2433.3	0.0408	0.0644	0.0579	0.0662	0.0699	0.0559	0.0589	0.0673	0.0449	0.0465	0.0566	0.0639	0.0478	0.0534	0.0653
2463.8	0.0412	0.0651	0.0585	0.0668	0.0706	0.0565	0.0595	0.068	0.0453	0.0469	0.0572	0.0646	0.0483	0.054	0.066
2494.2	0.0416	0.0656	0.0591	0.0673	0.071	0.057	0.06	0.0685	0.0457	0.0474	0.0577	0.0651	0.0487	0.0544	0.0665
2524.6	0.042	0.0658	0.0594	0.0675	0.0711	0.0574	0.0604	0.0686	0.0461	0.0478	0.0581	0.0653	0.0491	0.0548	0.0667
2555	0.0423	0.0658	0.0596	0.0674	0.0709	0.0576	0.0605	0.0685	0.0465	0.0481	0.0583	0.0653	0.0495	0.0551	0.0667
2585.4	0.0426	0.0657	0.0596	0.0673	0.0706	0.0576	0.0605	0.0683	0.0467	0.0483	0.0583	0.0652	0.0497	0.0552	0.0665
2615.8	0.0428	0.0655	0.0595	0.0671	0.0703	0.0576	0.0605	0.0681	0.0469	0.0485	0.0583	0.0651	0.0498	0.0552	0.0663
2646.3	0.043	0.0654	0.0595	0.067	0.0702	0.0576	0.0604	0.068	0.047	0.0486	0.0583	0.065	0.0499	0.0553	0.0662
2676.7	0.0432	0.0656	0.0596	0.0671	0.0704	0.0577	0.0605	0.0682	0.0472	0.0487	0.0584	0.0651	0.05	0.0554	0.0664
2707.1	0.0433	0.0659	0.0598	0.0675	0.0709	0.0579	0.0608	0.0686	0.0473	0.0489	0.0586	0.0654	0.0502	0.0555	0.0667
2737.5	0.0435	0.0665	0.0602	0.0681	0.0717	0.0583	0.0612	0.0693	0.0475	0.0491	0.059	0.066	0.0504	0.0559	0.0673
2767.9	0.0438	0.0672	0.0608	0.0689	0.0726	0.0588	0.0618	0.0701	0.0478	0.0494	0.0595	0.0667	0.0508	0.0563	0.0681
2798.3	0.0441	0.068	0.0614	0.0697	0.0734	0.0594	0.0624	0.0709	0.0482	0.0498	0.0601	0.0674	0.0512	0.0568	0.0688
2828.8	0.0441	0.0686	0.062	0.0703	0.0741	0.0599	0.063	0.0715	0.0486	0.0502	0.0606	0.0681	0.0516	0.0573	0.0695
2859.2	0.0448	0.069	0.0624	0.0707	0.0744	0.0604	0.0634	0.0719	0.049	0.0506	0.0611	0.0685	0.052	0.0578	0.0699
2889.6	0.0451	0.0692	0.0627	0.0709	0.0745	0.0607	0.0637	0.072	0.0493	0.051	0.0614	0.0687	0.0524	0.0581	0.0701
2920	0.0454	0.0692	0.0629	0.0708	0.0743	0.0609	0.0638	0.0719	0.0496	0.0513	0.0616	0.0687	0.0527	0.0584	0.07
2950.4	0.0457	0.069	0.0629	0.0706	0.074	0.0609	0.0638	0.0717	0.0499	0.0515	0.0616	0.0685	0.0529	0.0584	0.0698
2980.8	0.0459	0.0688	0.0628	0.0704	0.0737	0.0609	0.0637	0.0714	0.05	0.0516	0.0615	0.0683	0.053	0.0585	0.0696
3011.3	0.046	0.0687	0.0627	0.0702	0.0735	0.0608	0.0637	0.0713	0.0501	0.0517	0.0615	0.0682	0.053	0.0585	0.0695
3041.7	0.0462	0.0688	0.0628	0.0703	0.0737	0.0609	0.0637	0.0714	0.0502	0.0518	0.0615	0.0683	0.0531	0.0585	0.0696
3072.1	0.0463	0.0691	0.063	0.0707	0.0742	0.0611	0.0639	0.0718	0.0504	0.0519	0.0617	0.0686	0.0533	0.0587	0.0699
3102.5	0.0465	0.0697	0.0634	0.0713	0.0749	0.0614	0.0643	0.0724	0.0505	0.0521	0.0621	0.0692	0.0535	0.059	0.0705
3132.9	0.0467	0.0703	0.0639	0.072	0.0757	0.0619	0.0649	0.0732	0.0508	0.0524	0.0626	0.0698	0.0538	0.0594	0.0712
3163.3	0.047	0.0711	0.0645	0.0728	0.0765	0.0624	0.0655	0.074	0.0511	0.0528	0.0631	0.0705	0.0542	0.0598	0.0719
3193.8	0.0473	0.0717	0.065	0.0734	0.0772	0.0629	0.066	0.0746	0.0515	0.0532	0.0636	0.0711	0.0546	0.0603	0.0726
3224.2	0.0476	0.0721	0.0654	0.0738	0.0775	0.0634	0.0665	0.075	0.0519	0.0536	0.0641	0.0716	0.055	0.0608	0.073
3254.6	0.0479	0.0722	0.0657	0.0739	0.0775	0.0637	0.0667	0.0751	0.0522	0.0539	0.0644	0.0717	0.0553	0.0611	0.0731

Halliger Model Scenario: Dairy #3 increased pumping

Modeled drawdown at well:

Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16
3285	0.0482	0.0722	0.0658	0.0738	0.0773	0.0638	0.0668	0.0749	0.0525	0.0542	0.0645	0.0717	0.0556	0.0613	0.073
3315.4	0.0484	0.072	0.0658	0.0736	0.0769	0.0638	0.0667	0.0746	0.0527	0.0543	0.0645	0.0715	0.0557	0.0613	0.0728
3345.8	0.0486	0.0717	0.0657	0.0733	0.0766	0.0638	0.0666	0.0743	0.0528	0.0544	0.0644	0.0713	0.0558	0.0613	0.0725
3376.3	0.0488	0.0716	0.0656	0.0731	0.0765	0.0637	0.0665	0.0742	0.0529	0.0545	0.0644	0.0711	0.0558	0.0613	0.0724
3406.7	0.0489	0.0717	0.0656	0.0732	0.0766	0.0637	0.0665	0.0743	0.053	0.0546	0.0644	0.0712	0.0559	0.0613	0.0725
3437.1	0.049	0.072	0.0658	0.0736	0.077	0.0639	0.0667	0.0747	0.0531	0.0547	0.0645	0.0715	0.056	0.0615	0.0728
3467.5	0.0491	0.0725	0.0662	0.0741	0.0777	0.0642	0.0671	0.0753	0.0532	0.0548	0.0649	0.072	0.0562	0.0617	0.0733
3497.9	0.0493	0.0731	0.0666	0.0748	0.0785	0.0646	0.0676	0.076	0.0535	0.0551	0.0653	0.0726	0.0565	0.0621	0.074
3528.3	0.0496	0.0738	0.0672	0.0756	0.0793	0.0651	0.0682	0.0768	0.0538	0.0554	0.0658	0.0733	0.0568	0.0626	0.0747
3558.8	0.0499	0.0744	0.0677	0.0762	0.0799	0.0656	0.0687	0.0774	0.0541	0.0558	0.0664	0.0739	0.0572	0.063	0.0753
3589.2	0.0502	0.0748	0.0681	0.0765	0.0802	0.0661	0.0692	0.0778	0.0545	0.0562	0.0668	0.0743	0.0576	0.0634	0.0757
3619.6	0.0505	0.0749	0.0684	0.0766	0.0803	0.0663	0.0694	0.0778	0.0548	0.0565	0.067	0.0744	0.0579	0.0637	0.0758
3650	0.0507	0.0749	0.0685	0.0765	0.08	0.0665	0.0695	0.0776	0.0551	0.0567	0.0671	0.0744	0.0581	0.0639	0.0757
3680.4	0.051	0.0746	0.0684	0.0762	0.0796	0.0664	0.0694	0.0773	0.0552	0.0569	0.0671	0.0742	0.0583	0.0639	0.0755
3710.8	0.0511	0.0744	0.0683	0.0759	0.0793	0.0664	0.0692	0.077	0.0553	0.057	0.067	0.0739	0.0583	0.0639	0.0752
3741.3	0.0512	0.0742	0.0682	0.0758	0.0791	0.0663	0.0691	0.0768	0.0554	0.057	0.0669	0.0738	0.0584	0.0639	0.075
3771.7	0.0513	0.0743	0.0682	0.0758	0.0792	0.0663	0.0691	0.0769	0.0555	0.0571	0.0669	0.0738	0.0584	0.0639	0.0751
3802.1	0.0514	0.0745	0.0684	0.0761	0.0796	0.0664	0.0693	0.0772	0.0555	0.0571	0.0671	0.0741	0.0585	0.064	0.0754
3832.5	0.0515	0.075	0.0687	0.0767	0.0803	0.0667	0.0696	0.0778	0.0557	0.0573	0.0674	0.0745	0.0587	0.0642	0.0759
3862.9	0.0517	0.0757	0.0692	0.0774	0.0811	0.0671	0.0701	0.0785	0.0559	0.0576	0.0678	0.0752	0.0589	0.0646	0.0766
3893.3	0.052	0.0763	0.0697	0.0781	0.0819	0.0676	0.0707	0.0793	0.0562	0.0579	0.0683	0.0758	0.0593	0.065	0.0772
3923.8	0.0522	0.0769	0.0702	0.0787	0.0824	0.0681	0.0712	0.0799	0.0565	0.0582	0.0688	0.0764	0.0596	0.0655	0.0778
3954.2	0.0525	0.0773	0.0706	0.079	0.0827	0.0685	0.0716	0.0802	0.0569	0.0586	0.0692	0.0768	0.06	0.0659	0.0782
3984.6	0.0528	0.0774	0.0708	0.0791	0.0827	0.0688	0.0718	0.0802	0.0572	0.0589	0.0695	0.0769	0.0603	0.0661	0.0783
4015	0.0531	0.0773	0.0709	0.0789	0.0824	0.0689	0.0719	0.08	0.0574	0.0591	0.0696	0.0768	0.0605	0.0663	0.0781
4045.4	0.0532	0.077	0.0708	0.0786	0.082	0.0688	0.0718	0.0797	0.0575	0.0592	0.0695	0.0766	0.0606	0.0663	0.0779
4075.8	0.0534	0.0768	0.0707	0.0783	0.0817	0.0687	0.0716	0.0794	0.0576	0.0593	0.0694	0.0763	0.0607	0.0663	0.0776
4106.3	0.0535	0.0766	0.0705	0.0781	0.0815	0.0686	0.0715	0.0792	0.0577	0.0593	0.0693	0.0761	0.0607	0.0662	0.0774
4136.7	0.0536	0.0766	0.0705	0.0782	0.0816	0.0686	0.0715	0.0793	0.0577	0.0593	0.0693	0.0761	0.0607	0.0662	0.0774
4167.1	0.0536	0.0769	0.0707	0.0785	0.082	0.0687	0.0716	0.0796	0.0578	0.0594	0.0694	0.0764	0.0608	0.0663	0.0777
4197.5	0.0538	0.0774	0.071	0.079	0.0826	0.069	0.072	0.0802	0.0579	0.0596	0.0697	0.0769	0.0609	0.0665	0.0782
4227.9	0.0539	0.078	0.0714	0.0797	0.0834	0.0694	0.0724	0.0809	0.0581	0.0598	0.0701	0.0775	0.0612	0.0669	0.0789
4258.3	0.0541	0.0786	0.072	0.0804	0.0842	0.0699	0.073	0.0816	0.0584	0.0601	0.0706	0.0781	0.0615	0.0673	0.0795
4288.8	0.0544	0.0792	0.0724	0.0809	0.0847	0.0703	0.0735	0.0821	0.0587	0.0604	0.0711	0.0787	0.0618	0.0677	0.0801
4319.2	0.0547	0.0795	0.0728	0.0813	0.085	0.0707	0.0739	0.0825	0.059	0.0608	0.0714	0.079	0.0622	0.0681	0.0804
4349.6	0.0549	0.0796	0.0731	0.0813	0.085	0.071	0.0741	0.0825	0.0593	0.061	0.0717	0.0791	0.0625	0.0684	0.0805

Halliger Model Scenario: Darry #3 increased pumping

Modeled drawdown at well:

Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16
4380	0.0552	0.0795	0.0731	0.0812	0.0847	0.0711	0.0741	0.0823	0.0595	0.0612	0.0718	0.079	0.0627	0.0685	0.0804
4410.4	0.0554	0.0703	0.073	0.0809	0.0843	0.071	0.074	0.0819	0.0597	0.0614	0.0717	0.0788	0.0628	0.0685	0.0801
4440.8	0.0555	0.079	0.0728	0.0805	0.0839	0.0709	0.0738	0.0816	0.0598	0.0614	0.0716	0.0785	0.0628	0.0684	0.0798
4471.3	0.0556	0.0788	0.0727	0.0803	0.0837	0.0708	0.0736	0.0814	0.0598	0.0614	0.0714	0.0783	0.0628	0.0683	0.0796
4501.7	0.0556	0.0788	0.0727	0.0804	0.0837	0.0708	0.0736	0.0814	0.0598	0.0614	0.0714	0.0783	0.0628	0.0683	0.0796
4532.1	0.0557	0.079	0.0728	0.0806	0.0841	0.0709	0.0738	0.0817	0.0599	0.0615	0.0715	0.0785	0.0629	0.0684	0.0799
4562.5	0.0558	0.0795	0.0731	0.0812	0.0848	0.0711	0.0741	0.0823	0.06	0.0616	0.0718	0.079	0.063	0.0686	0.0804
4592.9	0.056	0.0801	0.0735	0.0818	0.0855	0.0715	0.0745	0.083	0.0602	0.0618	0.0722	0.0796	0.0632	0.0689	0.081
4623.3	0.0562	0.0807	0.074	0.0825	0.0863	0.072	0.0751	0.0837	0.0604	0.0621	0.0727	0.0802	0.0635	0.0694	0.0816
4653.8	0.0564	0.0813	0.0745	0.083	0.0868	0.0734	0.0756	0.0842	0.0607	0.0625	0.0731	0.0807	0.0639	0.0698	0.0822
4684.2	0.0567	0.0816	0.0749	0.0834	0.0871	0.0728	0.0759	0.0845	0.0611	0.0628	0.0735	0.0811	0.0642	0.0701	0.0825
4714.6	0.0569	0.0817	0.0751	0.0834	0.0871	0.073	0.0761	0.0846	0.0613	0.063	0.0737	0.0812	0.0645	0.0704	0.0826
4745	0.0571	0.0816	0.0751	0.0832	0.0868	0.0731	0.0761	0.0843	0.0615	0.0632	0.0738	0.0811	0.0647	0.0705	0.0824
4775.4	0.0573	0.0813	0.075	0.0829	0.0863	0.073	0.076	0.084	0.0617	0.0634	0.0737	0.0803	0.0648	0.0705	0.0821
4805.8	0.0574	0.081	0.0749	0.0826	0.0859	0.0729	0.0758	0.0836	0.0617	0.0634	0.0736	0.0805	0.0648	0.0704	0.0818
4836.3	0.0575	0.0808	0.0747	0.0824	0.0857	0.0728	0.0756	0.0834	0.0617	0.0634	0.0734	0.0803	0.0648	0.0703	0.0816
4866.7	0.0575	0.0808	0.0747	0.0824	0.0858	0.0727	0.0756	0.0834	0.0618	0.0634	0.0734	0.0803	0.0648	0.0703	0.0816
4897.1	0.0576	0.081	0.0748	0.0826	0.0861	0.0728	0.0757	0.0837	0.0618	0.0634	0.0735	0.0805	0.0648	0.0704	0.0819
4927.5	0.0577	0.0815	0.0751	0.0831	0.0868	0.0731	0.076	0.0843	0.0619	0.0636	0.0738	0.081	0.0649	0.0706	0.0823
4957.9	0.0578	0.0821	0.0755	0.0838	0.0875	0.0734	0.0765	0.085	0.0621	0.0638	0.0742	0.0816	0.0652	0.0709	0.083
4988.3	0.058	0.0827	0.076	0.0844	0.0882	0.0739	0.077	0.0856	0.0623	0.064	0.0746	0.0822	0.0654	0.0713	0.0836
5018.8	0.0583	0.0832	0.0765	0.0853	0.0889	0.0743	0.0775	0.0862	0.0626	0.0643	0.0751	0.0827	0.0658	0.0717	0.0841
5049.2	0.0585	0.0835	0.0768	0.0853	0.089	0.0749	0.0778	0.0865	0.0629	0.0647	0.0754	0.083	0.0661	0.072	0.0844
5079.6	0.0588	0.0836	0.077	0.0853	0.089	0.0749	0.0778	0.0865	0.0632	0.0649	0.0756	0.0831	0.0664	0.0723	0.0845
5110	0.059	0.0835	0.077	0.0851	0.0887	0.075	0.078	0.0863	0.0634	0.0651	0.0757	0.083	0.0665	0.0724	0.0843
5140.4	0.0591	0.0832	0.0769	0.0848	0.0882	0.0749	0.0779	0.0859	0.0635	0.0652	0.0756	0.0827	0.0666	0.0724	0.084
5170.8	0.0592	0.0829	0.0767	0.0845	0.0878	0.0748	0.0777	0.0855	0.0635	0.0652	0.0754	0.0824	0.0666	0.0723	0.0837
5201.3	0.0593	0.0827	0.0766	0.0842	0.0876	0.0746	0.0775	0.0853	0.0636	0.0652	0.0753	0.0822	0.0666	0.0722	0.0835
5231.7	0.0593	0.0826	0.0765	0.0842	0.0876	0.0746	0.0775	0.0853	0.0636	0.0652	0.0752	0.0822	0.0666	0.0721	0.0835
5262.1	0.0594	0.0829	0.0766	0.0845	0.088	0.0747	0.0776	0.0856	0.0636	0.0652	0.0753	0.0824	0.0666	0.0722	0.0837
5292.5	0.0595	0.0833	0.0769	0.085	0.0886	0.0749	0.0779	0.0861	0.0637	0.0654	0.0756	0.0828	0.0667	0.0724	0.0842
5322.9	0.0596	0.0839	0.0773	0.0856	0.0894	0.0753	0.0783	0.0868	0.0639	0.0655	0.076	0.0834	0.0669	0.0727	0.0848
5353.3	0.0598	0.0845	0.0778	0.0863	0.0901	0.0757	0.0788	0.0875	0.0641	0.0658	0.0764	0.084	0.0672	0.0731	0.0854
5383.8	0.06	0.085	0.0783	0.0868	0.0906	0.0761	0.0793	0.088	0.0644	0.0661	0.0769	0.0845	0.0675	0.0735	0.0859
5414.2	0.0602	0.0853	0.0786	0.0871	0.0908	0.0765	0.0796	0.0883	0.0647	0.0664	0.0772	0.0848	0.0679	0.0738	0.0862
5444.6	0.0605	0.0854	0.0788	0.0871	0.0908	0.0767	0.0798	0.0883	0.0649	0.0667	0.0774	0.0849	0.0681	0.074	0.0863

Halfpiger Model Scenario Dairy #3 increased pumping

Modeled drawdown at well:

Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16
5475	0.0607	0.0853	0.0788	0.0869	0.0905	0.0767	0.0798	0.088	0.0651	0.0688	0.0774	0.0848	0.0683	0.0741	0.0861
5505.4	0.0608	0.085	0.0787	0.0866	0.09	0.0767	0.0796	0.0877	0.0652	0.0669	0.0772	0.0845	0.0683	0.0741	0.0858
5535.8	0.0609	0.0846	0.0785	0.0862	0.0896	0.0765	0.0794	0.0873	0.0653	0.0669	0.0772	0.0842	0.0683	0.074	0.0855
5566.3	0.061	0.0844	0.0783	0.086	0.0893	0.0764	0.0792	0.087	0.0653	0.0669	0.077	0.0839	0.0683	0.0739	0.0852
5596.7	0.061	0.0844	0.0782	0.086	0.0894	0.0763	0.0792	0.087	0.0653	0.0669	0.077	0.0839	0.0683	0.0738	0.0852
5627.1	0.061	0.0846	0.0783	0.0862	0.0897	0.0764	0.0793	0.0873	0.0653	0.0669	0.077	0.0841	0.0683	0.0739	0.0854
5657.5	0.0611	0.085	0.0786	0.0867	0.0903	0.0766	0.0796	0.0879	0.0654	0.067	0.0773	0.0845	0.0684	0.0741	0.0859
5687.9	0.0612	0.0856	0.079	0.0873	0.0911	0.077	0.08	0.0885	0.0655	0.0672	0.0777	0.0851	0.0686	0.0744	0.0865
5718.3	0.0614	0.0862	0.0795	0.088	0.0918	0.0774	0.0805	0.0892	0.0658	0.0675	0.0781	0.0857	0.0689	0.0748	0.0871
5748.8	0.0616	0.0867	0.0799	0.0885	0.0923	0.0778	0.081	0.0897	0.066	0.0678	0.0785	0.0862	0.0692	0.0751	0.0876
5779.2	0.0619	0.087	0.0803	0.0888	0.0925	0.0781	0.0813	0.09	0.0663	0.068	0.0789	0.0865	0.0695	0.0755	0.0879
5809.6	0.0621	0.0871	0.0804	0.0888	0.0925	0.0783	0.0815	0.09	0.0665	0.0683	0.0791	0.0866	0.0697	0.0757	0.088
5840	0.0623	0.0869	0.0804	0.0886	0.0921	0.0784	0.0814	0.0897	0.0667	0.0685	0.0791	0.0864	0.0699	0.0758	0.0875
5870.4	0.0624	0.0866	0.0803	0.0882	0.0917	0.0783	0.0813	0.0893	0.0668	0.0685	0.0786	0.0855	0.0699	0.0755	0.0868
5900.8	0.0625	0.0863	0.0801	0.0879	0.0912	0.0781	0.0811	0.0889	0.0669	0.0686	0.0788	0.0858	0.07	0.0756	0.0871
5931.3	0.0626	0.0861	0.0799	0.0876	0.091	0.0779	0.0808	0.0887	0.0669	0.0685	0.0787	0.0856	0.0699	0.0755	0.0869
5961.7	0.0626	0.086	0.0799	0.0876	0.091	0.0779	0.0808	0.0887	0.0668	0.0685	0.0786	0.0855	0.0699	0.0755	0.0868
5992.1	0.0626	0.0862	0.08	0.0878	0.0914	0.078	0.0809	0.089	0.0669	0.0685	0.0787	0.0857	0.0699	0.0755	0.0871
6022.5	0.0627	0.0866	0.0802	0.0883	0.092	0.0782	0.0812	0.0895	0.0669	0.0686	0.0789	0.0861	0.07	0.0757	0.0875
6052.9	0.0628	0.0872	0.0806	0.0889	0.0927	0.0785	0.0816	0.0901	0.0671	0.0688	0.0793	0.0867	0.0702	0.076	0.0881
6083.3	0.063	0.0878	0.0811	0.0896	0.0934	0.079	0.0821	0.0908	0.0673	0.069	0.0797	0.0873	0.0705	0.0763	0.0887
6113.8	0.0632	0.0883	0.0815	0.0901	0.0939	0.0794	0.0825	0.0913	0.0676	0.0693	0.0801	0.0878	0.0708	0.0767	0.0892
6144.2	0.0634	0.0886	0.0818	0.0904	0.0941	0.0797	0.0829	0.0916	0.0679	0.0696	0.0804	0.0881	0.0711	0.077	0.0895
6174.6	0.0636	0.0887	0.082	0.0904	0.094	0.0799	0.083	0.0915	0.0681	0.0698	0.0806	0.0881	0.0713	0.0773	0.0895
6205	0.0638	0.0885	0.082	0.0902	0.0937	0.0799	0.083	0.0913	0.0683	0.07	0.0807	0.088	0.0714	0.0773	0.0894
6235.4	0.0639	0.0882	0.0819	0.0898	0.0932	0.0798	0.0828	0.0909	0.0684	0.0701	0.0805	0.0877	0.0715	0.0773	0.089
6265.8	0.064	0.0878	0.0817	0.0894	0.0928	0.0797	0.0826	0.0905	0.0684	0.0701	0.0804	0.0874	0.0715	0.0772	0.0887
6296.3	0.064	0.0876	0.0815	0.0892	0.0925	0.0795	0.0824	0.0902	0.0684	0.07	0.0802	0.0871	0.0714	0.0771	0.0884
6326.7	0.0641	0.0876	0.0814	0.0891	0.0926	0.0794	0.0823	0.0902	0.0683	0.07	0.0801	0.0871	0.0714	0.077	0.0886
6357.1	0.0641	0.0877	0.0815	0.0894	0.0929	0.0795	0.0824	0.0905	0.0684	0.07	0.0802	0.0873	0.0714	0.077	0.0886
6387.5	0.0641	0.0882	0.0817	0.0898	0.0935	0.0797	0.0827	0.091	0.0684	0.0701	0.0804	0.0877	0.0715	0.0772	0.089
6417.9	0.0643	0.0887	0.0821	0.0905	0.0942	0.0801	0.0831	0.0916	0.0686	0.0703	0.0808	0.0882	0.0717	0.0775	0.0896
6448.3	0.0644	0.0893	0.0826	0.0911	0.0949	0.0805	0.0836	0.0923	0.0688	0.0705	0.0812	0.0888	0.0719	0.0778	0.0902
6478.8	0.0646	0.0898	0.083	0.0916	0.0954	0.0809	0.084	0.0928	0.0691	0.0708	0.0816	0.0893	0.0722	0.0782	0.0907
6509.2	0.0648	0.0901	0.0833	0.0919	0.0956	0.0812	0.0844	0.093	0.0693	0.0711	0.0819	0.0896	0.0725	0.0785	0.091
6539.6	0.0651	0.0901	0.0835	0.0919	0.0955	0.0814	0.0845	0.093	0.0695	0.0713	0.0821	0.0896	0.0727	0.0787	0.091

Halliger Model Scenario: Dairy #3 increased pumping

Modeled drawdown at well:

Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16
6570	0.0652	0.09	0.0835	0.0916	0.0952	0.0814	0.0845	0.0928	0.0697	0.0714	0.0821	0.0895	0.0729	0.0788	0.0908
6600.4	0.0654	0.0897	0.0833	0.0913	0.0947	0.0813	0.0843	0.0924	0.0698	0.0715	0.082	0.0892	0.0729	0.0788	0.0905
6630.8	0.0654	0.0893	0.0831	0.0909	0.0943	0.0811	0.0841	0.092	0.0698	0.0715	0.0818	0.0888	0.0729	0.0786	0.0901
6661.3	0.0655	0.0891	0.0829	0.0906	0.094	0.081	0.0839	0.0917	0.0698	0.0715	0.0816	0.0886	0.0729	0.0785	0.0899
6691.7	0.0655	0.089	0.0828	0.0906	0.094	0.0809	0.0838	0.0917	0.0698	0.0714	0.0816	0.0887	0.0728	0.0784	0.0898
6722.1	0.0655	0.0892	0.0829	0.0908	0.0943	0.0809	0.0839	0.0919	0.0698	0.0715	0.0818	0.0891	0.0729	0.0786	0.0905
6752.5	0.0655	0.0896	0.0832	0.0913	0.0949	0.0811	0.0841	0.0924	0.0698	0.0715	0.082	0.0896	0.0731	0.0789	0.0911
6782.9	0.0656	0.0902	0.0835	0.0919	0.0956	0.0815	0.0845	0.0931	0.07	0.0717	0.0822	0.0896	0.0731	0.0789	0.0911
6813.3	0.0658	0.0907	0.084	0.0925	0.0963	0.0819	0.085	0.0937	0.0702	0.0719	0.0826	0.0902	0.0733	0.0792	0.0917
6843.8	0.066	0.0912	0.0844	0.093	0.0968	0.0823	0.0855	0.0942	0.0704	0.0722	0.083	0.0907	0.0736	0.0796	0.0921
6874.2	0.0662	0.0915	0.0847	0.0933	0.097	0.0826	0.0858	0.0945	0.0707	0.0724	0.0833	0.091	0.0739	0.0799	0.0924
6904.6	0.0664	0.0916	0.0849	0.0933	0.0969	0.0828	0.0859	0.0944	0.0709	0.0727	0.0835	0.091	0.0741	0.0801	0.0924
6935	0.0666	0.0914	0.0849	0.093	0.0966	0.0828	0.0859	0.0942	0.0711	0.0728	0.0835	0.0909	0.0743	0.0802	0.0922
6965.4	0.0667	0.091	0.0847	0.0927	0.0961	0.0827	0.0857	0.0938	0.0712	0.0729	0.0834	0.0906	0.0743	0.0801	0.0919
6995.8	0.0668	0.0907	0.0845	0.0923	0.0957	0.0825	0.0855	0.0933	0.0712	0.0729	0.0832	0.0902	0.0743	0.08	0.0915
7026.3	0.0668	0.0904	0.0843	0.092	0.0954	0.0823	0.0852	0.0931	0.0711	0.0728	0.083	0.09	0.0742	0.0799	0.0913
7056.7	0.0668	0.0904	0.0842	0.092	0.0954	0.0822	0.0852	0.0931	0.0711	0.0728	0.0829	0.0899	0.0742	0.0798	0.0912
7087.1	0.0668	0.0906	0.0843	0.0922	0.0957	0.0823	0.0852	0.0933	0.0711	0.0728	0.083	0.0901	0.0742	0.0798	0.0914
7117.5	0.0669	0.091	0.0845	0.0927	0.0963	0.0825	0.0855	0.0938	0.0712	0.0728	0.0832	0.0905	0.0742	0.08	0.0918
7147.9	0.067	0.0915	0.0849	0.0933	0.097	0.0828	0.0859	0.0944	0.0713	0.073	0.0835	0.091	0.0744	0.0802	0.0921
7178.3	0.0671	0.0921	0.0853	0.0939	0.0977	0.0832	0.0864	0.0951	0.0715	0.0732	0.0839	0.0916	0.0747	0.0806	0.093
7208.8	0.0673	0.0926	0.0858	0.0944	0.0982	0.0836	0.0868	0.0956	0.0718	0.0735	0.0844	0.092	0.075	0.0809	0.0935
7239.2	0.0675	0.0929	0.0861	0.0946	0.0984	0.0839	0.0871	0.0958	0.072	0.0738	0.0847	0.0923	0.0752	0.0813	0.0938
7269.6	0.0677	0.0929	0.0862	0.0946	0.0983	0.0841	0.0872	0.0958	0.0722	0.074	0.0848	0.0924	0.0754	0.0814	0.0938
7300	0.0679	0.0927	0.0862	0.0944	0.0979	0.0841	0.0872	0.0955	0.0724	0.0741	0.0848	0.0922	0.0756	0.0815	0.0936

Appendix G:

Halliger Model Scenario Dairy #3 increased Pumping

Modeled drawdown at well																
Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16	
0.0001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
60.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
91.3	0	0	0	1E-04	0.0002	0	0	1E-04	0	0	0	0.0001	0	0	1E-04	
121.7	0	0.0004	1E-04	0.0005	0.0009	1E-04	0.0001	0.0006	0.0005	0	0	0.0004	0	0	0.0005	
152.1	0	0.001	0.0003	0.0014	0.0022	0.0002	0.0004	0.0015	0	0.0002	0.0001	0	0.0001	0.0001	0.0012	
182.5	0	0.002	0.0008	0.0026	0.0039	0.0006	0.0009	0.0029	0.0001	0	0.0006	0.002	0.0001	0.0004	0.0023	
212.9	1E-04	0.0034	0.0015	0.0042	0.0061	0.0011	0.0017	0.0047	0.0001	0.0002	0.0012	0.0033	0.0002	0.0007	0.0038	
243.3	1E-04	0.0052	0.0024	0.0062	0.0087	0.0019	0.0028	0.0069	0.0003	0.0004	0.002	0.0049	0.0005	0.0013	0.0057	
273.8	0.0002	0.0072	0.0036	0.0084	0.0116	0.0028	0.004	0.0094	0.0005	0.0006	0.0031	0.0069	0.0008	0.002	0.0078	
304.2	0.0004	0.0094	0.005	0.0109	0.0146	0.004	0.0055	0.012	0.0008	0.001	0.0033	0.009	0.0013	0.0029	0.0102	
334.6	0.0006	0.0118	0.0065	0.0135	0.0177	0.0053	0.0072	0.0148	0.0012	0.0015	0.0057	0.0113	0.0019	0.004	0.0127	
365	0.0009	0.0142	0.0082	0.0161	0.0208	0.0067	0.009	0.0176	0.0017	0.0021	0.0072	0.0137	0.0026	0.0051	0.0152	
395.4	0.0012	0.0167	0.0099	0.0187	0.0237	0.0083	0.0108	0.0203	0.0023	0.0028	0.0088	0.016	0.0034	0.0064	0.0177	
425.8	0.0016	0.019	0.0117	0.0212	0.0265	0.0098	0.0127	0.0238	0.0029	0.0036	0.0104	0.0183	0.0042	0.0078	0.0201	
456.3	0.0021	0.0213	0.0134	0.0236	0.0291	0.0114	0.0145	0.0253	0.0036	0.0044	0.0121	0.0206	0.0052	0.0091	0.0225	
486.7	0.0026	0.0234	0.0152	0.0259	0.0316	0.013	0.0163	0.0276	0.0044	0.0053	0.0137	0.0227	0.0061	0.0105	0.0247	
517.1	0.0031	0.0256	0.0169	0.0281	0.0341	0.0146	0.0181	0.0299	0.0052	0.0062	0.0153	0.0248	0.0071	0.0119	0.0269	
547.5	0.0037	0.0277	0.0186	0.0303	0.0365	0.0161	0.0198	0.0322	0.006	0.0071	0.017	0.0269	0.0082	0.0133	0.029	
577.9	0.0044	0.0298	0.0203	0.0326	0.0391	0.0177	0.0216	0.0346	0.0069	0.0081	0.0186	0.029	0.0092	0.0147	0.0312	
608.3	0.005	0.0321	0.022	0.035	0.0417	0.0193	0.0234	0.0371	0.0078	0.0091	0.0202	0.0312	0.0103	0.0162	0.0335	
638.8	0.0057	0.0344	0.0238	0.0374	0.0445	0.0209	0.0253	0.0396	0.0087	0.0101	0.0219	0.0334	0.0114	0.0176	0.0359	
669.2	0.0064	0.0367	0.0257	0.0399	0.0472	0.0226	0.0272	0.0442	0.0097	0.0112	0.0237	0.0357	0.0125	0.0191	0.0383	
699.6	0.0071	0.0391	0.0275	0.0423	0.05	0.0244	0.0292	0.0447	0.0106	0.0122	0.0254	0.038	0.0137	0.0207	0.0407	
730	0.0079	0.0414	0.0294	0.0447	0.0526	0.0261	0.0311	0.0472	0.0126	0.0133	0.0272	0.0403	0.0149	0.0223	0.0431	
760.4	0.0087	0.0436	0.0313	0.047	0.055	0.0278	0.033	0.0495	0.0127	0.0145	0.029	0.0425	0.0161	0.0238	0.0453	
790.8	0.0095	0.0457	0.0331	0.0492	0.0572	0.0295	0.0349	0.0527	0.0137	0.0156	0.0307	0.0446	0.0173	0.0254	0.0474	
821.3	0.0104	0.0476	0.0348	0.0512	0.0593	0.0312	0.0367	0.0537	0.0148	0.0168	0.0324	0.0465	0.0185	0.0269	0.0494	
851.7	0.0112	0.0495	0.0365	0.053	0.0612	0.0328	0.0384	0.0556	0.0158	0.0179	0.0341	0.0483	0.0198	0.0284	0.0513	
882.1	0.0121	0.0512	0.0381	0.0548	0.0631	0.0343	0.04	0.0575	0.0169	0.0191	0.0356	0.0501	0.021	0.0299	0.0531	
912.5	0.0129	0.053	0.0397	0.0566	0.065	0.0358	0.0416	0.0593	0.018	0.0202	0.0372	0.0518	0.0222	0.0313	0.0549	
942.9	0.0138	0.0548	0.0412	0.0585	0.067	0.0373	0.0432	0.0612	0.019	0.0213	0.0387	0.0536	0.0233	0.0327	0.0567	
973.3	0.0147	0.0566	0.0428	0.0604	0.0691	0.0388	0.0448	0.0631	0.02	0.0224	0.0402	0.0554	0.0245	0.0341	0.0585	
1003.8	0.0155	0.0585	0.0444	0.0624	0.0713	0.0403	0.0464	0.0652	0.0211	0.0235	0.0417	0.0573	0.0257	0.0355	0.0605	
1034.2	0.0164	0.0605	0.046	0.0644	0.0735	0.0418	0.0481	0.0673	0.0221	0.0247	0.0433	0.0592	0.0269	0.0369	0.0625	
1064.6	0.0173	0.0624	0.0477	0.0665	0.0757	0.0434	0.0498	0.0694	0.0232	0.0258	0.0449	0.0612	0.028	0.0383	0.0645	

Halliger Model Scenario Dary #3 increased pumping

Time (d)	Modeled drawdown at well															
	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16	
1095	0.0182	0.0614	0.0493	0.0685	0.0778	0.0449	0.0515	0.0714	0.0242	0.0269	0.0465	0.0631	0.0292	0.0398	0.0664	
1125.4	0.019	0.0662	0.051	0.0703	0.0798	0.0465	0.0532	0.0733	0.0253	0.0281	0.048	0.0649	0.0304	0.0412	0.0683	
1155.8	0.0199	0.0679	0.0525	0.0721	0.0815	0.048	0.0548	0.0751	0.0264	0.0292	0.0496	0.0666	0.0316	0.0426	0.07	
1186.3	0.0209	0.0695	0.054	0.0737	0.0831	0.0495	0.0563	0.0767	0.0275	0.0303	0.0511	0.0682	0.0328	0.044	0.0716	
1216.7	0.0218	0.071	0.0555	0.0752	0.0846	0.0509	0.0578	0.0782	0.0285	0.0315	0.0525	0.0697	0.034	0.0454	0.0731	
1247.1	0.0227	0.0724	0.0569	0.0766	0.086	0.0522	0.0591	0.0796	0.0296	0.0326	0.0538	0.0711	0.0351	0.0467	0.0746	
1277.5	0.0236	0.0739	0.0582	0.078	0.0875	0.0535	0.0605	0.0811	0.0306	0.0337	0.0551	0.0725	0.0363	0.0479	0.076	
1307.9	0.0245	0.0753	0.0595	0.0795	0.0891	0.0548	0.0618	0.0826	0.0316	0.0347	0.0564	0.0739	0.0374	0.0491	0.0775	
1338.3	0.0253	0.0768	0.0608	0.0811	0.0908	0.0561	0.0632	0.0842	0.0326	0.0358	0.0577	0.0754	0.0385	0.0504	0.079	
1368.8	0.0262	0.0784	0.0622	0.0827	0.0926	0.0574	0.0646	0.0859	0.0336	0.0368	0.059	0.077	0.0395	0.0516	0.0806	
1399.2	0.0271	0.0801	0.0636	0.0845	0.0945	0.0587	0.066	0.0877	0.0346	0.0379	0.0604	0.0786	0.0406	0.0528	0.0823	
1429.6	0.028	0.0817	0.065	0.0862	0.0961	0.06	0.0675	0.0894	0.0356	0.0389	0.0618	0.0803	0.0417	0.0541	0.084	
1460.4	0.0288	0.0834	0.0665	0.0879	0.0981	0.0614	0.0689	0.0911	0.0366	0.04	0.0632	0.0819	0.0428	0.0554	0.0856	
1490.4	0.0297	0.0849	0.0679	0.0894	0.0997	0.0628	0.0704	0.0927	0.0376	0.041	0.0645	0.0834	0.0439	0.0567	0.0872	
1520.8	0.0306	0.0863	0.0692	0.0909	0.1011	0.0641	0.0718	0.0942	0.0386	0.0421	0.0659	0.0849	0.045	0.0579	0.0887	
1551.3	0.0315	0.0877	0.0705	0.0922	0.1024	0.0654	0.0731	0.0955	0.0396	0.0431	0.0672	0.0862	0.0461	0.0592	0.09	
1581.7	0.0323	0.0889	0.0718	0.0934	0.1036	0.0666	0.0743	0.0967	0.0406	0.0442	0.0684	0.0874	0.0472	0.0603	0.0912	
1612.1	0.0332	0.0901	0.0729	0.0946	0.1047	0.0677	0.0755	0.0978	0.0416	0.0452	0.0695	0.0886	0.0482	0.0615	0.0924	
1642.5	0.0341	0.0912	0.0741	0.0957	0.1059	0.0688	0.0766	0.099	0.0426	0.0462	0.0707	0.0898	0.0492	0.0626	0.0935	
1672.9	0.0349	0.0924	0.0752	0.097	0.1072	0.0699	0.0777	0.1002	0.0435	0.0471	0.0718	0.0909	0.0502	0.0636	0.0947	
1703.3	0.0357	0.0937	0.0763	0.0983	0.1086	0.0711	0.0789	0.1016	0.0444	0.0481	0.0729	0.0922	0.0512	0.0647	0.096	
1733.8	0.0366	0.0951	0.0775	0.0997	0.1102	0.0722	0.0801	0.1031	0.0454	0.0491	0.074	0.0935	0.0522	0.0658	0.0974	
1764.2	0.0374	0.0965	0.0787	0.1012	0.1118	0.0733	0.0813	0.1046	0.0463	0.05	0.0752	0.0949	0.0532	0.0669	0.0989	
1794.6	0.0382	0.0979	0.08	0.1027	0.1134	0.0745	0.0826	0.1061	0.0472	0.051	0.0764	0.0964	0.0541	0.068	0.1003	
1825	0.039	0.0993	0.0812	0.1041	0.1149	0.0757	0.0839	0.1076	0.0481	0.0519	0.0776	0.0978	0.0551	0.0692	0.1018	
1855.4	0.0399	0.1007	0.0825	0.1055	0.1163	0.0769	0.0852	0.1089	0.049	0.0529	0.0789	0.0991	0.0561	0.0703	0.1031	
1885.8	0.0407	0.1019	0.0836	0.1067	0.1175	0.0781	0.0864	0.1102	0.0499	0.0538	0.08	0.1003	0.0571	0.0714	0.1044	
1916.3	0.0415	0.103	0.0848	0.1078	0.1185	0.0792	0.0875	0.1113	0.0509	0.0548	0.0812	0.1015	0.0581	0.0725	0.1055	
1946.7	0.0423	0.1041	0.0858	0.1088	0.1195	0.0803	0.0886	0.1123	0.0518	0.0557	0.0822	0.1025	0.0591	0.0735	0.1065	
1977.1	0.0431	0.105	0.0869	0.1098	0.1204	0.0813	0.0896	0.1132	0.0527	0.0567	0.0832	0.1035	0.06	0.0745	0.1075	
2007.5	0.044	0.106	0.0878	0.1108	0.1214	0.0822	0.0905	0.1142	0.0536	0.0576	0.0842	0.1045	0.0609	0.0755	0.1084	
2037.9	0.0447	0.107	0.0888	0.1118	0.1225	0.0832	0.0915	0.1152	0.0544	0.0584	0.0852	0.1055	0.0618	0.0764	0.1095	
2068.3	0.0455	0.1081	0.0898	0.1129	0.1237	0.0842	0.0925	0.1164	0.0553	0.0593	0.0861	0.1066	0.0627	0.0774	0.1106	
2098.8	0.0463	0.1093	0.0908	0.1142	0.1251	0.0852	0.0936	0.1177	0.0561	0.0602	0.0871	0.1077	0.0636	0.0783	0.1118	
2129.2	0.0471	0.1106	0.0919	0.1155	0.1265	0.0862	0.0947	0.119	0.0569	0.061	0.0882	0.109	0.0645	0.0793	0.1131	
2159.6	0.0478	0.1118	0.093	0.1168	0.1279	0.0872	0.0958	0.1204	0.0578	0.0619	0.0892	0.1102	0.0654	0.0803	0.1143	

Hadlinger Model Scenario Dairy #3 Increased pumping

Time (t)	Modeled drawdown at well															
	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16	
2190	0.0486	0.1131	0.0941	0.1181	0.1293	0.0883	0.0969	0.1217	0.0586	0.0628	0.0903	0.1115	0.0663	0.0813	0.1156	
2200.4	0.0494	0.1143	0.0952	0.1193	0.1305	0.0894	0.098	0.1229	0.0594	0.0636	0.0914	0.1126	0.0672	0.0823	0.1168	
2250.8	0.0501	0.1154	0.0963	0.1203	0.1315	0.0904	0.0991	0.1239	0.0603	0.0645	0.0925	0.1137	0.0681	0.0833	0.1179	
2281.3	0.0509	0.1163	0.0973	0.1213	0.1324	0.0914	0.1001	0.1248	0.0611	0.0654	0.0935	0.1147	0.069	0.0843	0.1188	
2311.7	0.0516	0.1172	0.0982	0.1221	0.1332	0.0923	0.101	0.1257	0.062	0.0662	0.0944	0.1156	0.0698	0.0852	0.1197	
2342.1	0.0524	0.118	0.0991	0.1229	0.1339	0.0932	0.1019	0.1265	0.0628	0.0671	0.0953	0.1164	0.0707	0.0861	0.1205	
2372.5	0.0531	0.1189	0.0999	0.1238	0.1347	0.0941	0.1028	0.1273	0.0636	0.0679	0.0961	0.1173	0.0715	0.087	0.1214	
2402.9	0.0539	0.1197	0.1008	0.1247	0.1357	0.0949	0.1036	0.1282	0.0644	0.0687	0.097	0.1181	0.0723	0.0878	0.1222	
2433.3	0.0546	0.1207	0.1016	0.1257	0.1368	0.0958	0.1045	0.1292	0.0651	0.0695	0.0978	0.1191	0.0731	0.0886	0.1232	
2463.8	0.0553	0.1217	0.1026	0.1268	0.138	0.0967	0.1054	0.1304	0.0659	0.0703	0.0987	0.1201	0.0739	0.0895	0.1243	
2494.2	0.056	0.1229	0.1035	0.1279	0.1393	0.0976	0.1064	0.1316	0.0666	0.071	0.0996	0.1212	0.0747	0.0904	0.1254	
2524.6	0.0567	0.124	0.1045	0.1291	0.1406	0.0985	0.1074	0.1328	0.0674	0.0718	0.1006	0.1223	0.0755	0.0913	0.1266	
2555	0.0574	0.1251	0.1055	0.1303	0.1418	0.0995	0.1084	0.134	0.0682	0.0726	0.1016	0.1235	0.0763	0.0922	0.1277	
2585.4	0.0581	0.1262	0.1065	0.1313	0.1428	0.1004	0.1094	0.135	0.0689	0.0734	0.1026	0.1245	0.0771	0.0931	0.1288	
2615.8	0.0589	0.1272	0.1074	0.1323	0.1437	0.1014	0.1104	0.136	0.0697	0.0742	0.1035	0.1255	0.078	0.094	0.1298	
2646.3	0.0596	0.128	0.1083	0.1331	0.1445	0.1023	0.1113	0.1368	0.0705	0.075	0.1044	0.1263	0.0788	0.0949	0.1306	
2676.7	0.0603	0.1288	0.1092	0.1338	0.1451	0.1031	0.1121	0.1375	0.0713	0.0758	0.1052	0.1271	0.0796	0.0957	0.1314	
2707.1	0.061	0.1295	0.11	0.1345	0.1458	0.1039	0.1129	0.1382	0.072	0.0766	0.106	0.1278	0.0804	0.0965	0.1321	
2737.5	0.0617	0.1302	0.1107	0.1352	0.1465	0.1047	0.1136	0.1389	0.0727	0.0773	0.1068	0.1286	0.0811	0.0973	0.1328	
2767.9	0.0623	0.131	0.1115	0.136	0.1473	0.1054	0.1144	0.1397	0.0735	0.078	0.1075	0.1293	0.0819	0.098	0.1335	
2798.3	0.063	0.1318	0.1122	0.1369	0.1483	0.1062	0.1152	0.1406	0.0742	0.0788	0.1083	0.1302	0.0826	0.0988	0.1344	
2828.8	0.0637	0.1328	0.113	0.1379	0.1494	0.1069	0.116	0.1416	0.0749	0.0795	0.1091	0.1311	0.0833	0.0995	0.1354	
2859.2	0.0643	0.1338	0.1139	0.1389	0.1505	0.1078	0.1169	0.1427	0.0756	0.0802	0.1099	0.1321	0.084	0.1003	0.1364	
2889.6	0.065	0.1348	0.1148	0.14	0.1517	0.1086	0.1178	0.1438	0.0763	0.0809	0.1108	0.1331	0.0847	0.1011	0.1375	
2920	0.0656	0.1359	0.1157	0.1411	0.1528	0.1095	0.1187	0.1449	0.077	0.0816	0.1117	0.1341	0.0855	0.102	0.1385	
2950.4	0.0663	0.1368	0.1166	0.142	0.1538	0.1104	0.1197	0.1458	0.0777	0.0824	0.1126	0.1351	0.0862	0.1028	0.1395	
2980.8	0.0669	0.1377	0.1175	0.1429	0.1545	0.1112	0.1205	0.1466	0.0784	0.0831	0.1134	0.136	0.087	0.1036	0.1403	
3011.3	0.0676	0.1384	0.1183	0.1436	0.1552	0.1121	0.1213	0.1474	0.0791	0.0838	0.1142	0.1367	0.0878	0.1044	0.1411	
3041.7	0.0683	0.1391	0.119	0.1443	0.1558	0.1128	0.1221	0.148	0.0798	0.0845	0.115	0.1374	0.0885	0.1052	0.1417	
3072.1	0.0689	0.1397	0.1197	0.1449	0.1563	0.1135	0.1228	0.1486	0.0805	0.0853	0.1157	0.138	0.0892	0.1059	0.1423	
3102.5	0.0696	0.1404	0.1204	0.1455	0.1569	0.1142	0.1234	0.1492	0.0812	0.0859	0.1164	0.1387	0.0899	0.1066	0.143	
3132.9	0.0702	0.141	0.1211	0.1462	0.1576	0.1149	0.1241	0.1499	0.0818	0.0866	0.117	0.1393	0.0906	0.1073	0.1437	
3163.3	0.0708	0.1418	0.1218	0.147	0.1585	0.1155	0.1248	0.1507	0.0825	0.0873	0.1177	0.1401	0.0912	0.1079	0.1444	
3193.8	0.0714	0.1427	0.1225	0.1479	0.1595	0.1163	0.1255	0.1516	0.0831	0.0879	0.1185	0.1409	0.0919	0.1086	0.1453	
3224.2	0.072	0.1436	0.1233	0.1488	0.1606	0.117	0.1263	0.1526	0.0838	0.0886	0.1192	0.1419	0.0925	0.1094	0.1463	
3254.6	0.0726	0.1445	0.1241	0.1498	0.1617	0.1178	0.1272	0.1537	0.0844	0.0892	0.12	0.1428	0.0932	0.1101	0.1472	

Halliger Model Scenario: Dairy #3 increased pumping

Time (d)	Modeled drawdown at well:															
	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16	
3285	0.0732	0.1455	0.125	0.1508	0.1627	0.1186	0.128	0.1546	0.0851	0.0899	0.1208	0.1437	0.0939	0.1109	0.1482	
3315.4	0.0739	0.1464	0.1258	0.1517	0.1636	0.1194	0.1289	0.1555	0.0857	0.0906	0.1217	0.1446	0.0946	0.1116	0.1491	
3345.8	0.0745	0.1472	0.1266	0.1525	0.1643	0.1202	0.1297	0.1563	0.0864	0.0912	0.1224	0.1454	0.0953	0.1124	0.1499	
3376.3	0.0751	0.1478	0.1273	0.1531	0.1648	0.1209	0.1304	0.1569	0.087	0.0919	0.1232	0.1461	0.096	0.1131	0.1505	
3406.7	0.0757	0.1484	0.128	0.1537	0.1653	0.1216	0.1311	0.1574	0.0877	0.0926	0.1239	0.1467	0.0967	0.1138	0.1511	
3437.1	0.0763	0.149	0.1286	0.1542	0.1658	0.1223	0.1317	0.1579	0.0883	0.0932	0.1245	0.1473	0.0973	0.1145	0.1516	
3467.5	0.0769	0.1495	0.1292	0.1547	0.1663	0.1229	0.1323	0.1585	0.0889	0.0939	0.1251	0.1478	0.098	0.1151	0.1522	
3497.9	0.0775	0.1501	0.1298	0.1554	0.167	0.1235	0.1329	0.1591	0.0896	0.0945	0.1257	0.1484	0.0986	0.1157	0.1528	
3528.3	0.0781	0.1508	0.1305	0.1561	0.1678	0.1241	0.1335	0.1599	0.0902	0.0951	0.1263	0.1491	0.0992	0.1163	0.1535	
3558.8	0.0786	0.1516	0.1311	0.1569	0.1687	0.1248	0.1342	0.1607	0.0908	0.0957	0.127	0.1499	0.0998	0.117	0.1541	
3589.2	0.0792	0.1525	0.1319	0.1578	0.1697	0.1255	0.135	0.1617	0.0913	0.0961	0.1277	0.1507	0.1004	0.1176	0.1552	
3619.6	0.0798	0.1534	0.1326	0.1587	0.1707	0.1262	0.1357	0.1626	0.0919	0.0969	0.1284	0.1516	0.101	0.1183	0.1561	
3650	0.0803	0.1543	0.1334	0.1596	0.1717	0.1269	0.1365	0.1635	0.0925	0.0975	0.1292	0.1525	0.1016	0.119	0.157	
3680.4	0.0809	0.1551	0.1342	0.1605	0.1725	0.1277	0.1373	0.1643	0.0932	0.0982	0.13	0.1533	0.1023	0.1197	0.1578	
3710.8	0.0815	0.1558	0.1349	0.1612	0.1731	0.1284	0.1382	0.165	0.0938	0.0988	0.1307	0.154	0.1029	0.1205	0.1585	
3741.3	0.0821	0.1564	0.1356	0.1617	0.1736	0.1291	0.1387	0.1656	0.0944	0.0994	0.1314	0.1546	0.1036	0.1211	0.1591	
3771.7	0.0826	0.1569	0.1362	0.1622	0.174	0.1297	0.1393	0.1661	0.095	0.1	0.132	0.1552	0.1042	0.1218	0.1596	
3802.1	0.0832	0.1574	0.1368	0.1627	0.1744	0.1303	0.1399	0.1665	0.0956	0.1006	0.1326	0.1557	0.1048	0.1224	0.1601	
3832.5	0.0838	0.1579	0.1373	0.1632	0.1749	0.1309	0.1404	0.167	0.0962	0.1012	0.1331	0.1562	0.1054	0.123	0.1606	
3862.9	0.0843	0.1585	0.1379	0.1637	0.1755	0.1314	0.141	0.1675	0.0967	0.1018	0.1337	0.1567	0.106	0.1235	0.1611	
3893.3	0.0849	0.1591	0.1384	0.1644	0.1762	0.132	0.1416	0.1682	0.0973	0.1024	0.1342	0.1573	0.1065	0.1241	0.1618	
3923.8	0.0854	0.1598	0.1391	0.1652	0.1771	0.1326	0.1422	0.169	0.0978	0.1029	0.1349	0.1581	0.1071	0.1247	0.1625	
3954.2	0.0859	0.1606	0.1397	0.166	0.1781	0.1332	0.1429	0.1699	0.0984	0.1035	0.1355	0.1588	0.1077	0.1253	0.1634	
3984.6	0.0864	0.1615	0.1404	0.1669	0.179	0.1339	0.1436	0.1708	0.0989	0.104	0.1362	0.1597	0.1082	0.1259	0.1642	
4015	0.087	0.1623	0.1412	0.1677	0.1799	0.1346	0.1443	0.1716	0.0995	0.1046	0.1369	0.1605	0.1088	0.1266	0.165	
4045.4	0.0875	0.163	0.1419	0.1685	0.1806	0.1353	0.1451	0.1724	0.1001	0.1052	0.1376	0.1612	0.1094	0.1272	0.1658	
4075.8	0.088	0.1637	0.1426	0.1691	0.1812	0.136	0.1458	0.173	0.1007	0.1058	0.1383	0.1619	0.11	0.1279	0.1665	
4106.3	0.0886	0.1643	0.1432	0.1697	0.1816	0.1366	0.1464	0.1735	0.1012	0.1064	0.1389	0.1625	0.1106	0.1285	0.167	
4136.7	0.0891	0.1647	0.1438	0.1701	0.182	0.1372	0.1469	0.174	0.1018	0.107	0.1395	0.163	0.1112	0.1291	0.1675	
4167.1	0.0897	0.1652	0.1443	0.1705	0.1824	0.1377	0.1474	0.1743	0.1024	0.1075	0.14	0.1634	0.1118	0.1297	0.1679	
4197.5	0.0902	0.1656	0.1448	0.1709	0.1828	0.1382	0.1479	0.1748	0.1029	0.1081	0.1405	0.1639	0.1123	0.1302	0.1683	
4227.9	0.0907	0.1661	0.1453	0.1714	0.1833	0.1387	0.1484	0.1753	0.1034	0.1086	0.141	0.1643	0.1129	0.1307	0.1688	
4258.3	0.0912	0.1667	0.1458	0.1721	0.184	0.1393	0.149	0.1759	0.104	0.1092	0.1416	0.1649	0.1134	0.1312	0.1694	
4288.8	0.0917	0.1674	0.1464	0.1728	0.1848	0.1398	0.1495	0.1767	0.1045	0.1096	0.1421	0.1656	0.1139	0.1318	0.1701	
4319.2	0.0922	0.1681	0.147	0.1736	0.1857	0.1404	0.1502	0.1775	0.105	0.1102	0.1427	0.1663	0.1144	0.1323	0.1709	
4349.6	0.0927	0.1689	0.1477	0.1744	0.1865	0.141	0.1509	0.1783	0.1055	0.1107	0.1434	0.1671	0.115	0.1329	0.1717	

Time (d)	Modeled drawdown at well:															
	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16	
4380	0.0932	0.1697	0.1483	0.1752	0.1874	0.1417	0.1516	0.1791	0.106	0.1112	0.144	0.1679	0.1155	0.1335	0.1725	
4410.4	0.0937	0.1704	0.149	0.1759	0.1881	0.1423	0.1522	0.1798	0.1066	0.1118	0.1447	0.1686	0.1161	0.1342	0.1732	
4440.8	0.0942	0.171	0.1496	0.1765	0.1887	0.143	0.1529	0.1804	0.1071	0.1123	0.1453	0.1692	0.1167	0.1348	0.1738	
4471.3	0.0947	0.1715	0.1502	0.177	0.1891	0.1436	0.1535	0.1809	0.1076	0.1129	0.1459	0.1697	0.1172	0.1354	0.1743	
4501.7	0.0952	0.172	0.1508	0.1774	0.1894	0.1441	0.154	0.1813	0.1082	0.1134	0.1464	0.1702	0.1178	0.1359	0.1747	
4532.1	0.0957	0.1724	0.1512	0.1777	0.1897	0.1446	0.1544	0.1816	0.1087	0.114	0.1469	0.1706	0.1183	0.1364	0.1751	
4562.5	0.0962	0.1727	0.1517	0.1781	0.19	0.1451	0.1549	0.182	0.1092	0.1145	0.1474	0.171	0.1188	0.1369	0.1755	
4592.9	0.0967	0.1732	0.1521	0.1786	0.1905	0.1455	0.1553	0.1824	0.1097	0.115	0.1479	0.1714	0.1193	0.1374	0.1759	
4623.3	0.0972	0.1737	0.1526	0.1791	0.1912	0.146	0.1558	0.183	0.1102	0.1154	0.1483	0.1719	0.1198	0.1379	0.1765	
4653.8	0.0976	0.1744	0.1532	0.1798	0.1919	0.1465	0.1564	0.1837	0.1107	0.1159	0.1489	0.1726	0.1203	0.1384	0.1771	
4684.2	0.0981	0.1751	0.1537	0.1806	0.1928	0.1471	0.157	0.1845	0.1111	0.1164	0.1494	0.1733	0.1208	0.1389	0.1779	
4714.6	0.0986	0.1758	0.1544	0.1813	0.1937	0.1477	0.1576	0.1853	0.1116	0.1169	0.15	0.174	0.1213	0.1395	0.1786	
4745	0.099	0.1766	0.155	0.1821	0.1944	0.1483	0.1583	0.1861	0.1121	0.1174	0.1507	0.1747	0.1218	0.1401	0.1794	
4775.4	0.0995	0.1772	0.1556	0.1828	0.1951	0.1489	0.1589	0.1867	0.1126	0.1179	0.1513	0.1754	0.1223	0.1406	0.18	
4805.8	0.1	0.1778	0.1562	0.1833	0.1956	0.1495	0.1595	0.1873	0.1131	0.1185	0.1519	0.176	0.1228	0.1412	0.1806	
4836.3	0.1005	0.1783	0.1568	0.1838	0.1959	0.1501	0.1601	0.1877	0.1136	0.119	0.1524	0.1765	0.1234	0.1418	0.1811	
4866.7	0.101	0.1787	0.1573	0.1841	0.1962	0.1506	0.1605	0.188	0.1141	0.1195	0.1529	0.1769	0.1239	0.1423	0.1814	
4897.1	0.1014	0.179	0.1577	0.1844	0.1965	0.151	0.161	0.1883	0.1146	0.12	0.1534	0.1772	0.1244	0.1428	0.1818	
4927.5	0.1019	0.1794	0.1581	0.1848	0.1968	0.1515	0.1614	0.1887	0.1151	0.1205	0.1538	0.1776	0.1249	0.1432	0.1821	
4957.9	0.1024	0.1798	0.1586	0.1852	0.1972	0.1519	0.1618	0.1891	0.1156	0.1209	0.1542	0.178	0.1253	0.1437	0.1825	
4988.3	0.1028	0.1803	0.159	0.1857	0.1978	0.1523	0.1622	0.1896	0.116	0.1214	0.1547	0.1785	0.1258	0.1441	0.1831	
5018.8	0.1032	0.1809	0.1595	0.1864	0.1986	0.1528	0.1627	0.1903	0.1165	0.1218	0.1552	0.1791	0.1262	0.1446	0.1837	
5049.2	0.1037	0.1816	0.1601	0.1871	0.1994	0.1533	0.1633	0.1911	0.1169	0.1223	0.1557	0.1797	0.1267	0.1451	0.1844	
5079.6	0.1041	0.1823	0.1606	0.1878	0.2002	0.1539	0.1639	0.1918	0.1174	0.1228	0.1563	0.1804	0.1272	0.1456	0.1851	
5110	0.1046	0.183	0.1613	0.1885	0.201	0.1545	0.1645	0.1925	0.1179	0.1232	0.1569	0.1811	0.1277	0.1461	0.1858	
5140.4	0.105	0.1836	0.1619	0.1892	0.2016	0.155	0.1651	0.1932	0.1183	0.1237	0.1574	0.1818	0.1282	0.1467	0.1864	
5170.8	0.1055	0.1841	0.1624	0.1897	0.202	0.1556	0.1657	0.1937	0.1188	0.1242	0.158	0.1823	0.1287	0.1473	0.187	
5201.3	0.1059	0.1846	0.1629	0.1901	0.2023	0.1561	0.1662	0.1941	0.1193	0.1247	0.1585	0.1828	0.1292	0.1478	0.1874	
5231.7	0.1064	0.1849	0.1634	0.1904	0.2026	0.1566	0.1667	0.1944	0.1198	0.1252	0.159	0.1831	0.1297	0.1483	0.1877	
5262.1	0.1068	0.1853	0.1638	0.1907	0.2028	0.157	0.1671	0.1946	0.1202	0.1257	0.1594	0.1834	0.1301	0.1487	0.188	
5292.5	0.1073	0.1856	0.1642	0.191	0.2031	0.1574	0.1674	0.1949	0.1207	0.1261	0.1598	0.1838	0.1306	0.1491	0.1884	
5322.9	0.1077	0.186	0.1646	0.1914	0.2035	0.1578	0.1678	0.1953	0.1211	0.1266	0.1602	0.1842	0.131	0.1496	0.1887	
5353.3	0.1081	0.1864	0.165	0.1919	0.2041	0.1583	0.1682	0.1958	0.1216	0.127	0.1606	0.1846	0.1314	0.15	0.1892	
5383.8	0.1086	0.187	0.1655	0.1925	0.2048	0.1587	0.1687	0.1965	0.122	0.1274	0.1611	0.1852	0.1319	0.1504	0.1898	
5414.2	0.109	0.1876	0.166	0.1932	0.2056	0.1592	0.1693	0.1972	0.1224	0.1278	0.1616	0.1858	0.1323	0.1509	0.1905	
5444.6	0.1094	0.1883	0.1665	0.1939	0.2063	0.1597	0.1698	0.1979	0.1228	0.1283	0.1621	0.1865	0.1327	0.1514	0.1911	

Haffliger Model Scenario: Darry #3 increased pumping

Haffliger Model Scenario: Darry #3 increased pumping

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Modeled drawdown at well:

Time (d)	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 9	Well 10	Well 11	Well 12	Well 13	Well 14	Well 15	Well 16
5475	0.1098	0.189	0.1671	0.1946	0.2071	0.1603	0.1704	0.1986	0.1233	0.1287	0.1627	0.1871	0.1332	0.1519	0.1918
5505.4	0.1102	0.1896	0.1677	0.1952	0.2076	0.1608	0.171	0.1992	0.1237	0.1292	0.1632	0.1877	0.1337	0.1524	0.1924
5535.8	0.1107	0.1901	0.1682	0.1957	0.2081	0.1614	0.1715	0.1997	0.1242	0.1297	0.1638	0.1882	0.1342	0.1529	0.1929
5566.3	0.1111	0.1905	0.1687	0.196	0.2083	0.1619	0.172	0.2	0.1246	0.1301	0.1643	0.1887	0.1346	0.1534	0.1933
5596.7	0.1115	0.1908	0.1691	0.1963	0.2085	0.1623	0.1724	0.2003	0.1251	0.1306	0.1647	0.189	0.1351	0.1539	0.1936
5627.1	0.1119	0.1911	0.1695	0.1966	0.2087	0.1627	0.1728	0.2005	0.1255	0.131	0.1651	0.1893	0.1355	0.1543	0.1939
5657.5	0.1124	0.1914	0.1699	0.1969	0.209	0.1631	0.1732	0.2008	0.126	0.1315	0.1655	0.1896	0.136	0.1547	0.1942
5687.9	0.1128	0.1918	0.1702	0.1972	0.2094	0.1634	0.1735	0.2012	0.1264	0.1319	0.1658	0.1899	0.1364	0.1551	0.1945
5718.3	0.1132	0.1922	0.1706	0.1977	0.2099	0.1638	0.1739	0.2016	0.1268	0.1323	0.1662	0.1904	0.1368	0.1555	0.195
5748.8	0.1136	0.1927	0.1711	0.1983	0.2106	0.1643	0.1743	0.2022	0.1272	0.1327	0.1667	0.1909	0.1372	0.1559	0.1955
5779.2	0.114	0.1933	0.1716	0.1989	0.2114	0.1647	0.1749	0.2029	0.1276	0.1331	0.1671	0.1915	0.1376	0.1563	0.1962
5809.6	0.1144	0.194	0.1721	0.1996	0.2121	0.1652	0.1754	0.2036	0.128	0.1335	0.1676	0.1921	0.138	0.1568	0.1968
5840	0.1148	0.1946	0.1726	0.2002	0.2128	0.1657	0.176	0.2043	0.1284	0.1339	0.1682	0.1928	0.1384	0.1573	0.1975
5870.4	0.1152	0.1952	0.1732	0.2008	0.2133	0.1663	0.1765	0.2049	0.1288	0.1344	0.1687	0.1933	0.1389	0.1578	0.1981
5900.8	0.1156	0.1957	0.1737	0.2013	0.2137	0.1666	0.177	0.2053	0.1293	0.1348	0.1692	0.1938	0.1393	0.1583	0.1985
5931.3	0.116	0.1961	0.1742	0.2016	0.214	0.1672	0.1775	0.2056	0.1297	0.1352	0.1697	0.1942	0.1398	0.1588	0.1989
5961.7	0.1164	0.1964	0.1746	0.2019	0.2142	0.1677	0.1779	0.2059	0.1301	0.1357	0.1701	0.1945	0.1402	0.1592	0.1992
5992.1	0.1168	0.1966	0.1749	0.2021	0.2143	0.168	0.1782	0.2061	0.1306	0.1361	0.1705	0.1948	0.1407	0.1596	0.1994
6022.5	0.1171	0.1969	0.1752	0.2024	0.2146	0.1684	0.1785	0.2063	0.131	0.1365	0.1708	0.1951	0.1411	0.16	0.1997
6052.9	0.1176	0.1972	0.1756	0.2027	0.2149	0.1687	0.1789	0.2067	0.1314	0.1369	0.1712	0.1954	0.1415	0.1603	0.2
6083.3	0.118	0.1976	0.1759	0.2032	0.2154	0.1691	0.1792	0.2071	0.1317	0.1373	0.1715	0.1958	0.1418	0.1607	0.2004
6113.8	0.1184	0.1981	0.1764	0.2037	0.2161	0.1695	0.1797	0.2077	0.1321	0.1377	0.1719	0.1963	0.1422	0.1611	0.201
6144.2	0.1187	0.1987	0.1768	0.2043	0.2168	0.1699	0.1801	0.2084	0.1325	0.138	0.1724	0.1969	0.1426	0.1615	0.2016
6174.6	0.1191	0.1993	0.1773	0.205	0.2175	0.1704	0.1807	0.209	0.1329	0.1384	0.1729	0.1975	0.143	0.1619	0.2022
6205	0.1195	0.2	0.1779	0.2056	0.2182	0.1709	0.1812	0.2097	0.1333	0.1388	0.1734	0.1981	0.1434	0.1624	0.2028
6235.4	0.1199	0.2005	0.1784	0.2062	0.2187	0.1714	0.1817	0.2102	0.1337	0.1393	0.1739	0.1986	0.1438	0.1629	0.2034
6265.8	0.1203	0.201	0.1789	0.2066	0.2191	0.1719	0.1822	0.2106	0.1341	0.1397	0.1744	0.1991	0.1443	0.1634	0.2038
6296.3	0.1207	0.2013	0.1793	0.2069	0.2193	0.1724	0.1827	0.2109	0.1345	0.1401	0.1748	0.1995	0.1447	0.1638	0.2042
6326.7	0.121	0.2016	0.1797	0.2072	0.2195	0.1728	0.183	0.2112	0.1349	0.1405	0.1752	0.1998	0.1451	0.1642	0.2044
6357.1	0.1214	0.2018	0.18	0.2074	0.2196	0.1731	0.1833	0.2113	0.1353	0.1409	0.1755	0.2	0.1455	0.1646	0.2047
6387.5	0.1218	0.2021	0.1803	0.2076	0.2198	0.1734	0.1836	0.2116	0.1357	0.1413	0.1759	0.2002	0.1459	0.165	0.2049
6417.9	0.1222	0.2024	0.1806	0.2079	0.2202	0.1738	0.1839	0.2119	0.1361	0.1417	0.1762	0.2005	0.1463	0.1653	0.2052
6448.3	0.1226	0.2028	0.181	0.2083	0.2207	0.1741	0.1843	0.2123	0.1365	0.142	0.1765	0.2009	0.1466	0.1656	0.2056
6478.8	0.1229	0.2033	0.1814	0.2088	0.2213	0.1745	0.1847	0.2129	0.1368	0.1424	0.1769	0.2014	0.147	0.166	0.2061
6509.2	0.1233	0.2038	0.1818	0.2094	0.222	0.1749	0.1851	0.2135	0.1372	0.1428	0.1773	0.2019	0.1474	0.1664	0.2067
6539.6	0.1236	0.2044	0.1823	0.2101	0.2227	0.1754	0.1856	0.2141	0.1375	0.1431	0.1778	0.2025	0.1477	0.1668	0.2073

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Model output Darry #3 R= 3 r/s Drawdown Page 6