AD ASTRA PER ASPERA
Kansas
Department of Agriculture
Division of Water Resources

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Dale A. Rodman, Secretary
David W. Barfield, Chief Engineer

Sam Brownback, Governor

April 26, 2013

Danny C. Rich
2572 CRM
Ashland, KS 67831

RE: Claim of Impairment Vested Right CA 2-5

Dear Mr. Rich:

In response to your January 2006 complaint alleging impairment of your Vested Water Right CA 2-5, the Kansas Department of Agriculture Division of Water Resources (DWR) has completed an investigation. Pursuant to K.A.R. 5-4-1, the final report and technical evaluation of your claim of impairment is available on the agency's website at: http://www.ksda.gov/water_management_services/content/321/cid/1745.

As part of the investigation, staff from DWR's Stafford Field Office installed equipment to evaluate water levels in the area. They also assessed the pumping rate and compliance status of the surrounding wells. A water level transducer was installed in a nearby observation well in July 2007 then at several sites on your property in March 2011. Division staff monitored the water levels at the observation well and at sites on your property, and were able to observe and analyze the pumping operations in the nearby irrigation well authorized by Water Right File No. 2875. As is detailed in the Technical Report, DWR also collected data from and analyzed the pumping effects of the nearby irrigation well, Water Right File No. 16,680; and the feedlot supply well, Water Right File No. 39,368.

DWR's analysis of the water level and pumping data gathered in 2007-2011 shows that pumping by the three wells mentioned above depletes or prevents what would have otherwise been stream flow on eastern portion of your property which you would have been entitled to use pursuant to your Vested Water Right, CA 2-5.

Until further data and analysis indicates otherwise, due to the degree of stream flow depletion caused by the nearby pumping of junior appropriators, I find that, notwithstanding significant runoff events, your water right is impaired in most years when the three aforementioned junior appropriators pump water according to their historical normal operations.

However, because CA 2-5 was granted on an intermittent stream, and because curtailing the pumping of the junior appropriators will not produce streamflow in a reasonable amount of time, I will not order the curtailment of the impairing junior appropriators to satisfy CA 2-5. Instead, upon your formal request, I am prepared to order that the impairing junior appropriators make water available to you in a reasonable time, rate, and location that will satisfy CA 2-5, subject to my approval. Such formal request from you must be submitted as a "request to secure water" on the form attached to this letter.

Should you have any comments on the final report or questions about these procedures please don't hesitate to contact this office at (785) 296-3717 or the Stafford Field Office at (620) 234-5311.

Sincerely,

David W Barfield

David W. Barfield, P.E.
Chief Engineer

DWB:cwb

Enclosure

C: Phillip Hardin
Pratt Feeders Inc/DBA Ashland Feeders
Stafford Field Office
File

Findings
Of the
Chief Engineer

Prepared pursuant to K.A.R. 5-4-1

On the Investigation of a Claim of Water Right Impairment

In the Matter of

Vested Water Right No. CA 2-5
owned and operated by
Danny Rich

◆

April 26, 2012

Division of Water Resources
Kansas Department of Agriculture

FINDINGS

1. Dan Rich is the owner of a vested right to domestic use of water in Clark County, hereinafter CA 2-5.

2. CA 2-5 was issued by the division of water resources on August 22, 1997.

3. Mr. Rich filed a written complaint of water right impairment with the division of water resources on January 19, 2006.

4. The source of water for CA 2-5, hereinafter Natural Flow, includes the streamflow in Bluff Creek as it enters and flows through Mr. Rich's property, notwithstanding the depletions caused by diversions which are junior in right to CA 2-5.

5. CA 2-5 is authorized for a quantity of 418,000 gallons, which is 1.283 acre feet, per year of Natural Flow when combined with the use of water, if any, authorized by vested water right CA 1-5, which is also owned by Mr. Rich.

6. The division of water resources is unaware of any records of streamflow or groundwater levels in or near Bluff Creek on Mr. Rich's property that would inform us of hydrological conditions before the nearby irrigation wells, Water Right File Nos. 2875 and 16,860 and the nearby feedlot supply well, Water Right File No. 39,368 (together "nearby junior wells") were put into service.

7. Depth to water measurements and nearby pumping rates, times, and quantities have been collected from time to time by the division of water resources since 1992 from several sites in and near Bluff Creek as it runs through Mr. Rich's property.

8. From these data, division staff have derived hydrologic parameters and have employed widely accepted methods to simulate the effects of nearby well pumping on the Natural Flow. See the Technical Report attached hereto.

9. The aforementioned simulations conducted by division of water resources staff show that the pumping of the nearby junior wells annually depletes the Natural Flow in Bluff Creek on Mr. Rich's property in amounts greater than is authorized by CA 2-5. These effects are confined to the eastern portion of Mr. Rich's property.

10. The aforementioned simulations also show that nearby pumping wells contribute to the depletion of the Natural Flows in the following fractions:

    a. File 2875 is responsible for 34/100.

    b. File 39,368 is responsible for 46/100.

    c. File 16,860 is responsible for 20/100.

11. To the extent that the depletions to Natural Flows which are caused by nearby well pumping prevent CA 2-5 from being fully exercised, such depletions are in contravention to K.S.A. 82a-706b which states in part that;

"It shall be unlawful for any person to prevent, by diversion or otherwise, any waters of this state from moving to a person having a prior right to use the same…"

12. CA 2-5 is being impaired by the pumping of nearby wells.

13. K.S.A. 82a-706 states that:

"The chief engineer shall enforce and administer the laws of this state pertaining to the beneficial use of water and shall control, conserve, regulate, allot and aid in the distribution of the water resources of the state for the benefits and beneficial uses of all of its inhabitants in accordance with the rights of priority of appropriation."

14. Because CA 2-5 has been found to be impaired, Mr. Rich may request, by properly completing a "request to secure water" on a form prescribed by the agency, that the agency act to protect CA 2-5 from impairment.

15. However, because curtailing the pumping of the junior appropriators will not produce streamflow in a reasonable amount of time, it is not feasible to restore the Natural Flows in time, location, and amount by curtailing nearby pumping.

16. Likely remedies to the impairment of CA 2-5 include:

    a. Ordering that a well of reasonable quality, capacity, and location, as determined by the chief engineer, be drilled on Mr. Rich's property for Mr. Rich's use and at the expense of the impairing water right owners and/or operators. Such well would be authorized by CA 2-5 and would be limited such that its operation in combination with the operation of CA 1-5 and any diversions of Natural Flows shall not exceed 1.283 acre-feet per year.

    b. Ordering that the impairing water right otherwise make water available to Mr. Rich at a time and location that is reasonable for his use as determined by the chief engineer, and in a quantity of at least 1.283 acre-feet per year.

    c. Any other arrangement consented to by Mr. Rich and the owners and/or operators of the impairing water rights and approved by the chief engineer.

Technical Report

Prepared pursuant to K.A.R. 5-4-1

On the Investigation of a Claim of Water Right Impairment

In the Matter of

Water Right File No. CA 2-5
owned and operated by
Danny Rich

Phases I & II:

Technical Evaluation of the Merits of the Complaint and Monitoring and Analysis of Hydrologic Conditions and Operational Practices

◆

April 12, 2013

John W. Munson
James O. Bagley
Division of Water Resources
Kansas Department of Agriculture

SUMMARY

Danny Rich, owner and operator of a ranch in Clark County and vested Water Right, File No. CA 2-5 filed a written complaint of water right impairment received at the Stafford Field Office of the Division of Water Resources on January 19, 2006. (Attachment 1) The primary source of water for his cattle is water in Bluff Creek. Water in Bluff Creek originates from either runoff or groundwater intersecting streambed. When water stops flowing in Bluff Creek cattle rely on remaining pools of water in Bluff Creek or water trickling near the pools that are part of the groundwater intersecting the streambed of Bluff Creek. Mr. Rich claims that the neighboring feedlot supply well of Ashland Feeders and the neighboring irrigation wells of Philip Harden deplete water in Bluff Creek when they pump leaving no water for his cattle. Senior vested Water Right, File No. CA 2-5 is a surface water right that begins at the west property fence across Bluff Creek and ends where Bluff Creek exits the property at the highway 34 bridge. (Figure 1) The feedlot supply well and the two irrigation wells mentioned above are junior in water right priority to CA 2-5.

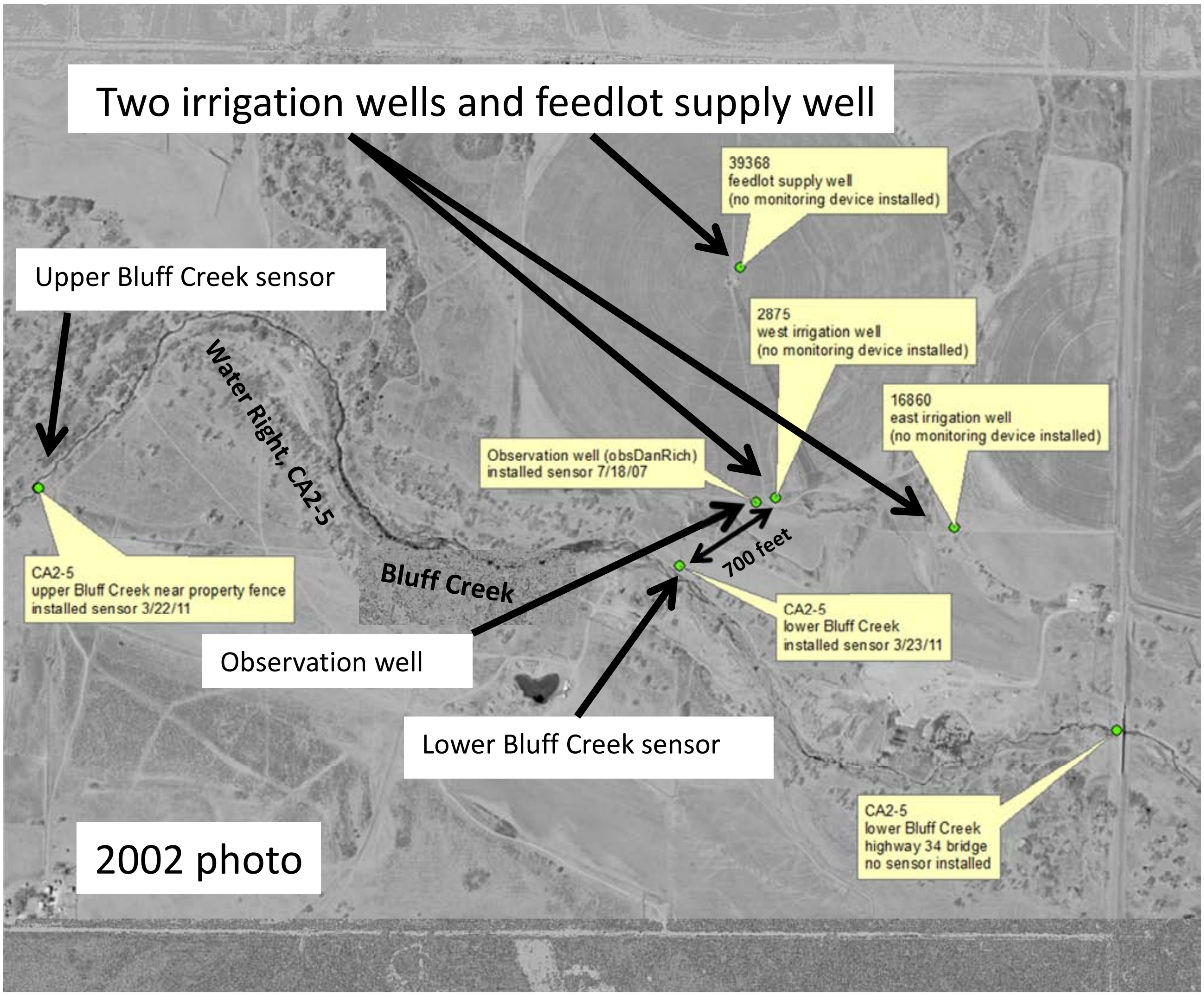


Figure 1 – Bluff Creek from property fence to highway 34 bridge with nearby wells and monitoring sites.

Continuous data collection began on July 18, 2007 at an observation well located on Dan Rich's property. When the data collection instruments were installed, the water level was about 40 feet from the top of the observation well and water was flowing in Bluff Creek. The observation well is located about 120 feet from the neighboring west irrigation well (2875) and about 1,400 feet from the feedlot supply well (39,368). When the irrigation well turns on and shuts off, the water level at the observation well changes quickly. A data logger at the observation well records the water level at 30 minute intervals and so monitors when the irrigation well pumping starts and stops. The feedlot supply well pumps on and off daily but the water level change at the observation well is more gradual and to a lesser degree due to the greater distance from the observation well. Additional water level monitoring equipment was installed in the streambed of Bluff Creek in March of 2011during a time when there was no water flowing in Bluff Creek. One water level sensor was installed about 700 feet from the west irrigation well (2875) and about 16.5 feet below Bluff Creek streambed. From April to August 2011 the water level declined while the irrigation well was pumping on and off, except for part of May and June when the irrigation well (2875) was off for a period of time and the water level increased. The water level declined below the sensor depth in August. Another sensor was installed in upper Bluff Creek near the property fence about 4,500 feet from the irrigation well (2875) and about the same distance from the feedlot supply well (39,368). The sensor depth was about 5.4 feet below streambed and the water level declined to near the end of October and then increased. The drawdown was less than at the downstream site due to the greater distance from the pumping wells.

Analysis of the water level and pumping data collected indicates that pumping the neighboring irrigation wells (2875 and 16,860) and feedlot supply (39,368) well (together "nearby junior wells") directly reduces the water level of Bluff Creek near streambed and depletes water available for Dan Rich's senior water right. When there is no flow of water in Bluff Creek, but pools of water or water trickling is available for his livestock, pumping of the nearby junior wells reduces the water level near the streambed causing the trickling water or pools of water available for CA 2-5, and thereby Dan Rich's cattle, to go dry. When Mr. Rich digs watering holes to access water in Bluff Creek that has been depleted by the pumping of the nearby junior wells, continued pumping of the nearby junior wells appears to reduce the water level in the watering holes by as much as 3 feet.

MONITORING SITES

Monitoring equipment was installed in March of 2011 in, 1) a small pool of water at an apparent seep or possible spring near the confluence of Granger Creek and Bluff Creek, 2) an old domestic well (Water Right, File No. CA 1.5 – Daily place by the highway), 3) the off stream groundwater pond (Water Right, File No. 8294.01), and 4) a lawn and garden well next to the off stream groundwater pond. (Figure 2)

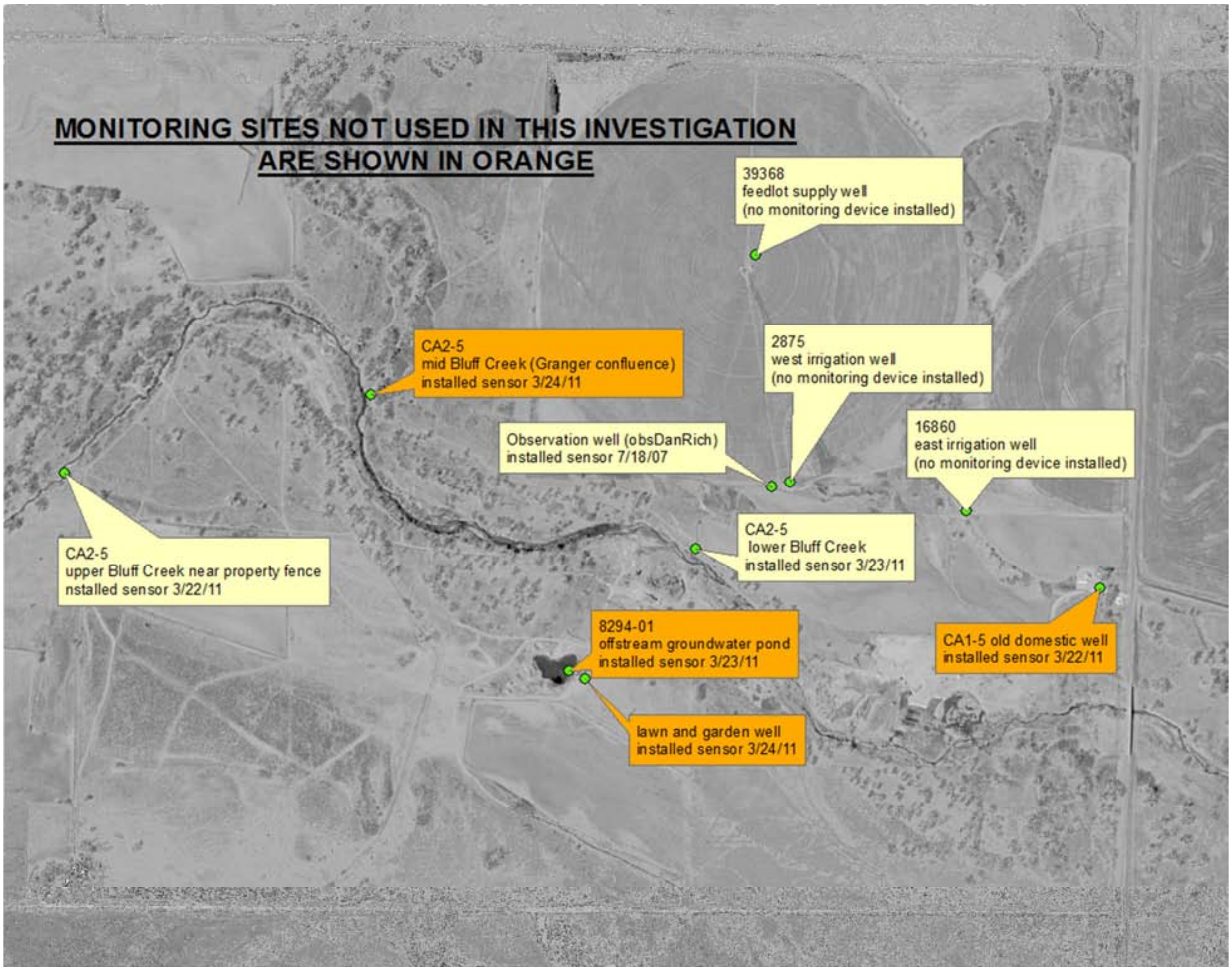


Figure 2 – Groundwater monitoring sites not used in this investigation shown in orange.

The off-stream groundwater pond Water Right, File No. 8294-01, the adjacent lawn and garden well, and the old domestic well Water Right, File No. CA1-5 are not subjects of this investigation. The groundwater pond and adjacent lawn and garden well are near an aquifer boundary condition. Mr. Rich found that the water from the lawn and garden well is not suitable for drinking water so it is primarily used for cleaning. CA1-5 had approximately two feet of water in it in March, 2011, but the water level dropped below the sensor depth in July, 2011

During periods when there was no flow in Bluff Creek, Mr. Rich found it necessary to dig watering holes (stockwatering holes) in the strembed of Bluff Creek to access water along his pastures for his cattle. The upper stockwatering hole is nearly 1/4 mile downstream of the upper Bluff Creek monitoring site, the middle stockwatering hole is about 1/6 mile farther downstream, and the lower stockwatering hole is about 1/8 mile upstream of the lower Bluff Creek site. (Figure 3)

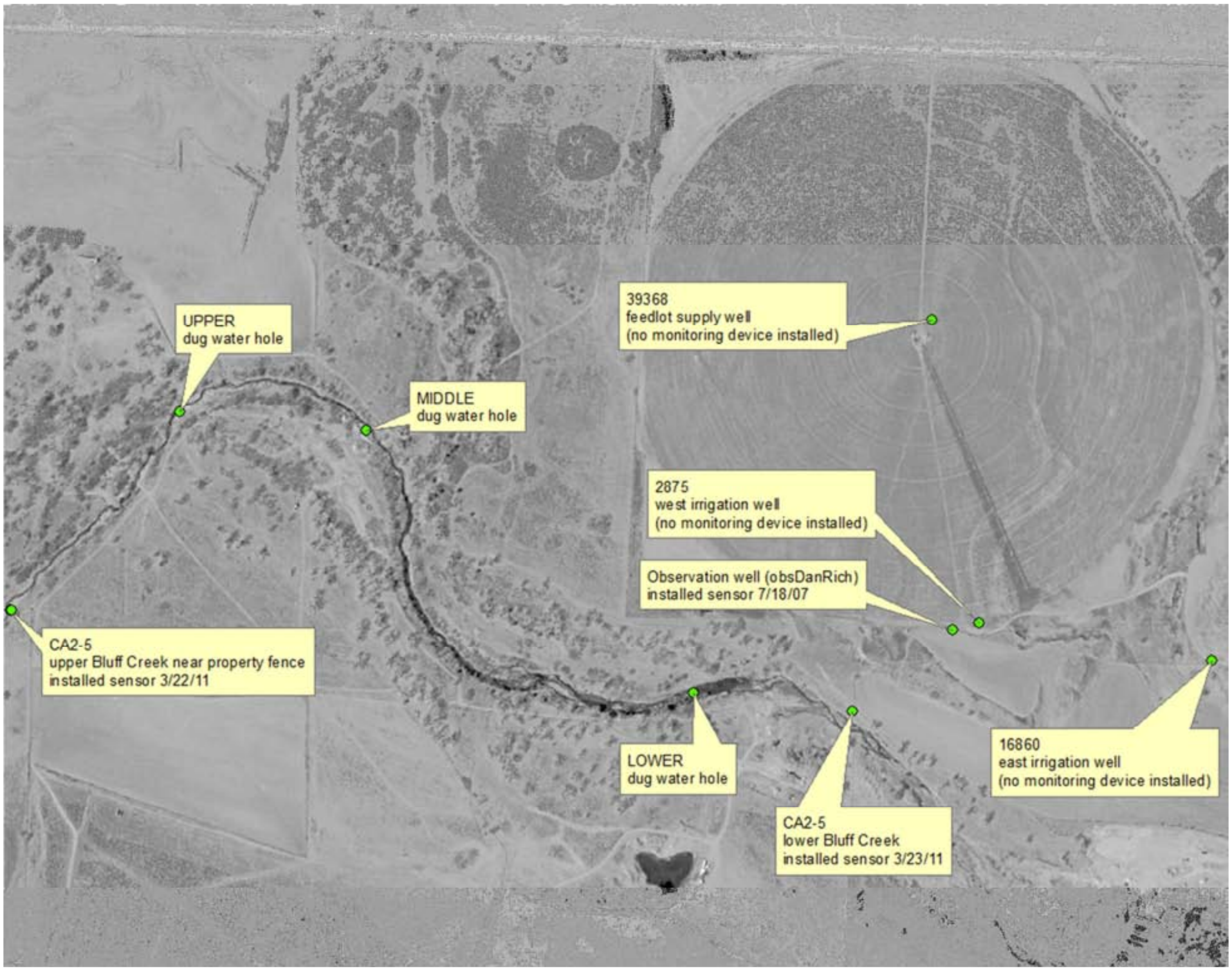


Figure 3 – 2002 photo showing 2011 monitoring sites, three dug water holes, and nearby wells.

WELL DRILLER LOGS

There are only four well driller logs available for the impairment investigation area. Figure 4 shows the locations of the wells with driller logs in orange.

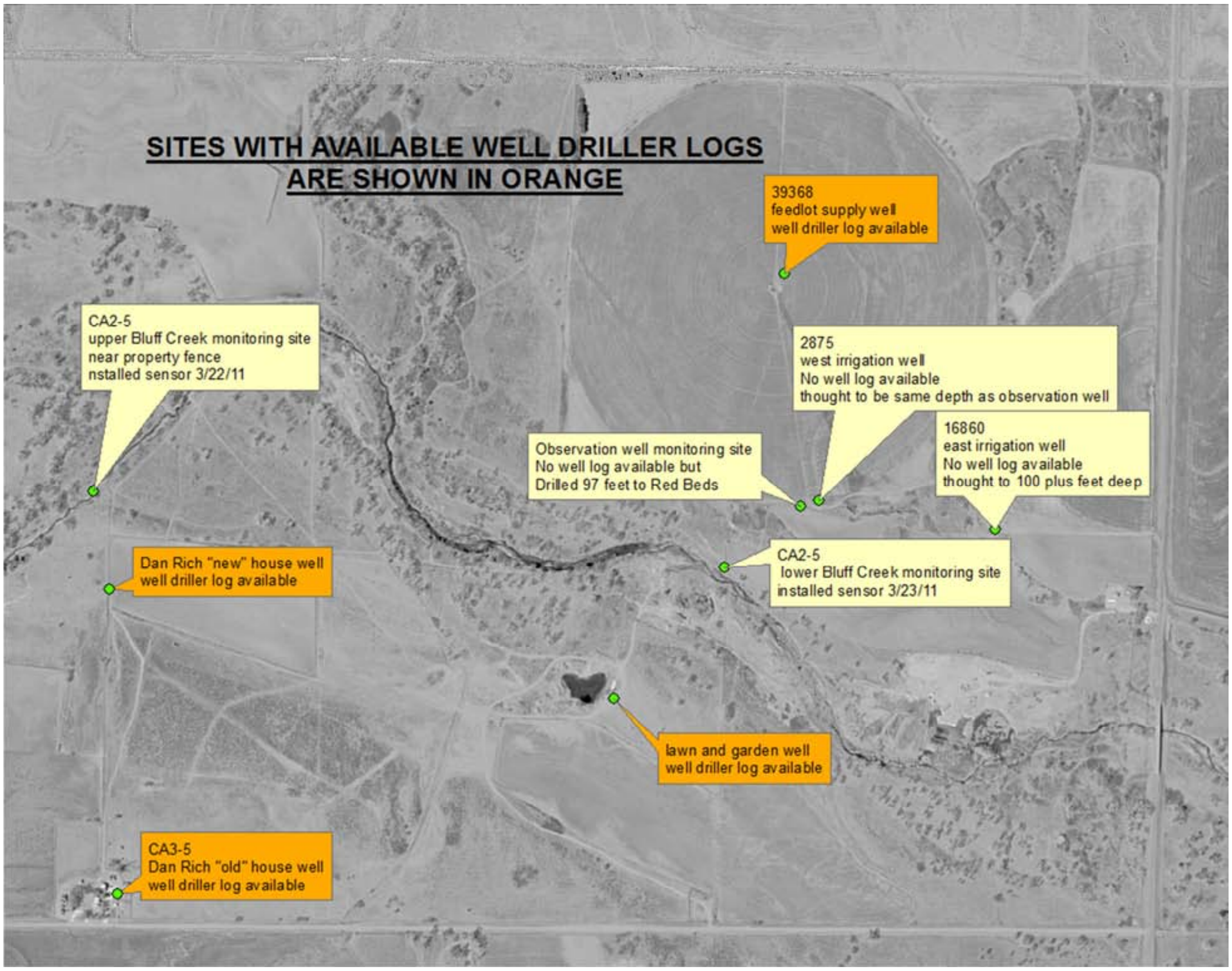


Figure 4 – Four well driller logs available for impairment investigation area are shown in orange.

Copies of the well logs are in Attachments 9, 10, 11 and 12. Figures 5 and 6 are lithographic logs interpreted from the well log data.

Figure 5 shows lithographic logs of the four well driller logs according to approximate elevations and water levels reported by the driller when the wells were drilled. The year each well was drilled is shown with the well description.

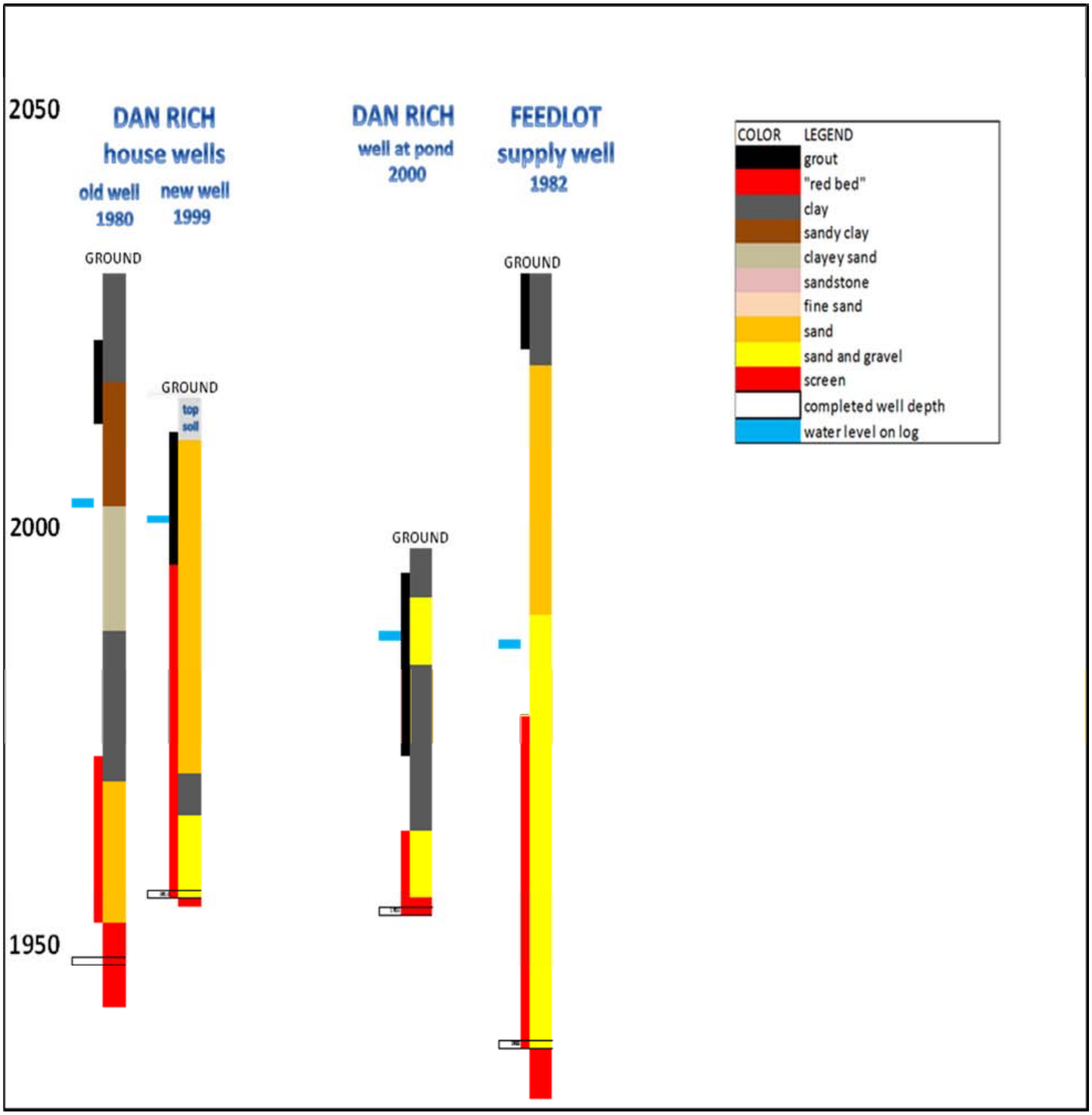


Figure 5 – Lithographic logs of well driller logs with water levels when drilled.

Figure 6 shows lithographic logs for the four area well logs and shows the approximate relative water level measurement ranges taken at the observation well in 2011 and at the upper and lower Bluff Creek monitoring sites. Measurements were taken for only part of the year in 2011 at the sites. A well driller log is not available for the observation well but the well depth to "red beds" is know as well as the well screen length and placement.

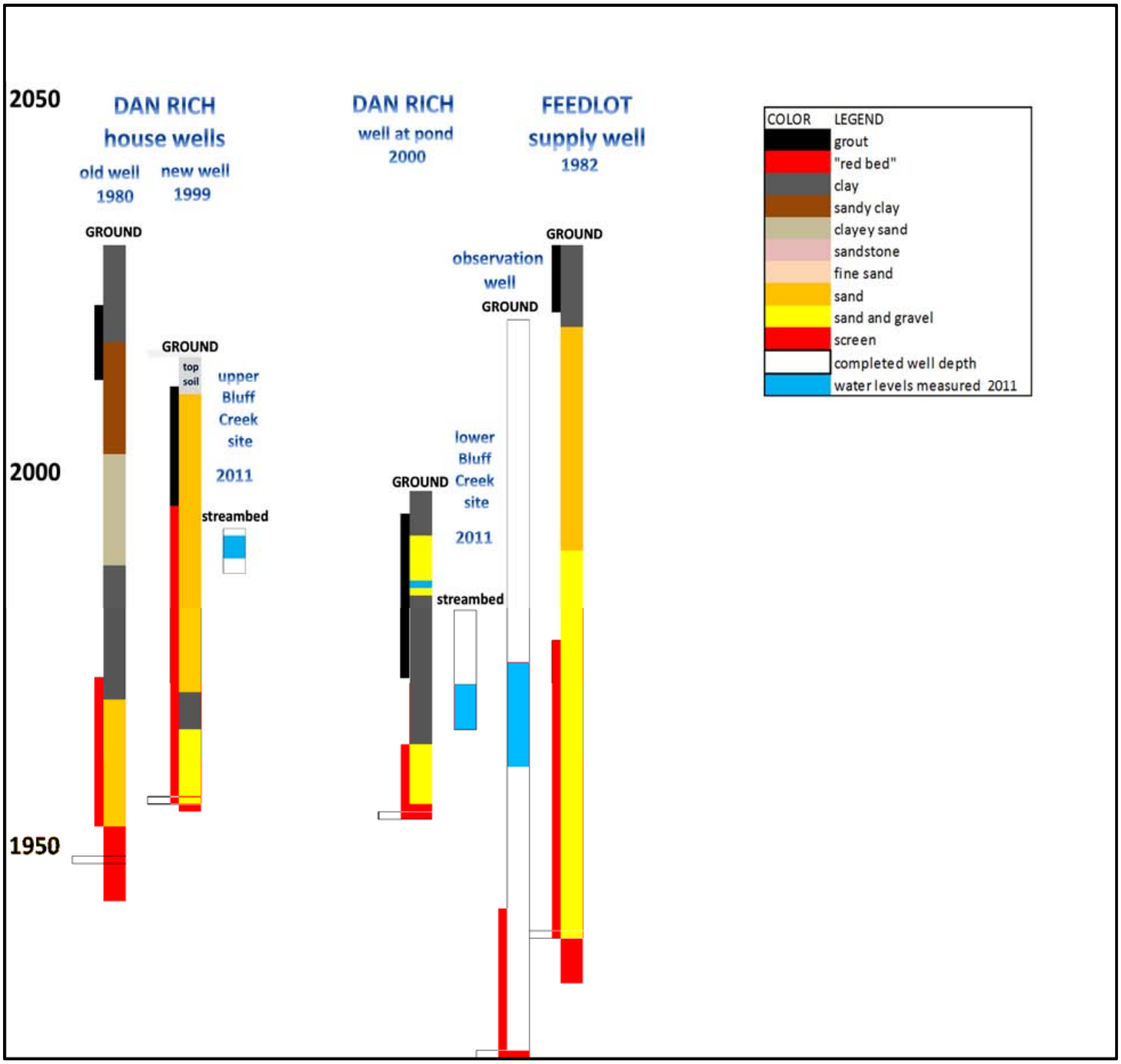


Figure 6 – Lithographic logs of well driller logs with observation well and Bluff Creek upper and lower monitoring sites range of water level measurements in 2011.

COLLECTION OF WATER LEVEL DATA

Water levels at the Dan Rich observation well (obsDanRich) near the west irrigation (2875) well were recorded from July 18, 2007 to September 16, 2009, from June 22, 2010 to December 21, 2010, from May 25, 2011 to June 11, 2011, and from July 12, 2011 to June 16, 2012. Water levels at 2875 were taken 3 or 4 times a year in 2006, 2007, 2008, and 2009. When 2875 was not pumping, the recovered water levels were about the same water levels as the recovered levels in the observation well. The non-pumping water levels at 2875 in 2006 and the first measurement in 2007 were in the range of water levels recorded in late 2010 and 2011at the observation well suggesting that Bluff Creek conditions in 2006, the year the complaint was filed, were similar to those in 2011. (Figure 7)

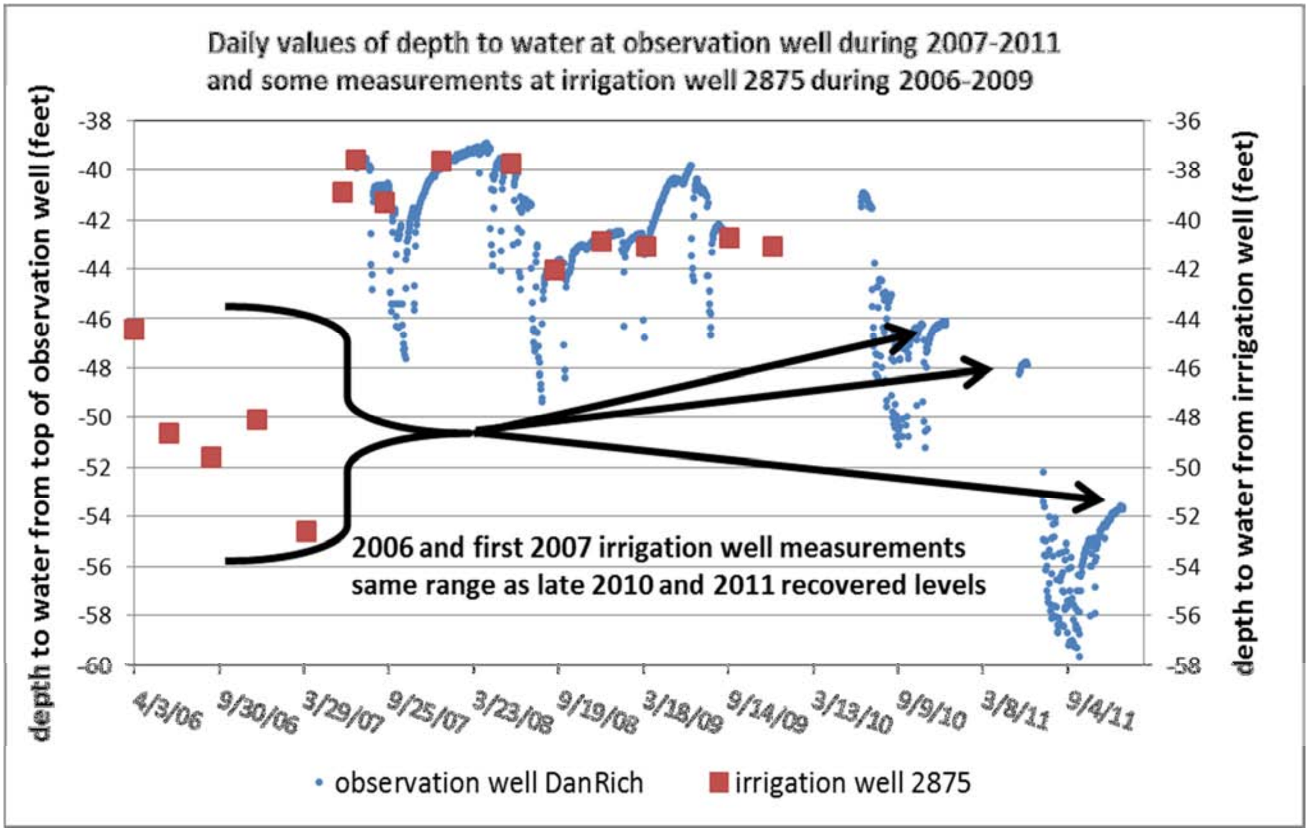


Figure 7 – Irrigation well and observation well about the same recovered water levels when measured at same times in 2007, 2008, and 2009. Irrigation well levels in 2006 and April 2007 in the same range of observation well recovered levels in late 2010 and 2011.

When 2875 is pumping, the water level in the observation well draws down thereby indicating when 2875 is pumping or not pumping. Water meter readings indicate the volume of water pumped. Pumping rates are known from the volume of water pumped and the pumping time. Analysis of drawdown data at the observation well can also be used to determine aquifer properties. From this information drawdowns at other locations due to pumping wells can be estimated.

Other water level data was collected using pressure transducers and data loggers starting in March of 2011. Water level sensors were installed along Bluff Creek to monitor the water level for CA 2-5. The downstream location was about 16.5 feet below streambed, 701 feet from the west irrigation well and 1,814 feet from the feedlot supply well. The upstream location was near the Dan Rich property fence about 5.4 feet below streambed, 4,486 feet from the west irrigation well and 4, 449 feet from the feedlot supply well. (Figure 1)

Observations of streamflow in Bluff Creek were made by Division of Water Resources personnel on July 18, 2007 when the water level sensor was installed at the observation well and on March 12, 2008 when data was downloaded. On these dates water was observed flowing in Bluff Creek on the downstream end of the Dan Rich property at the highway 34 bridge. This was more than a year after the impairment complaint was filed but not long after flooding occurred in the spring of 2007. On July 18, 2007 the water level in the observation well measured 39.93 feet to water from the top of the observation well and on March 12, 2008 the depth to water was 39.23 feet. Water levels in the observation well were much deeper for most other times the observation well was working. (Figure 8)

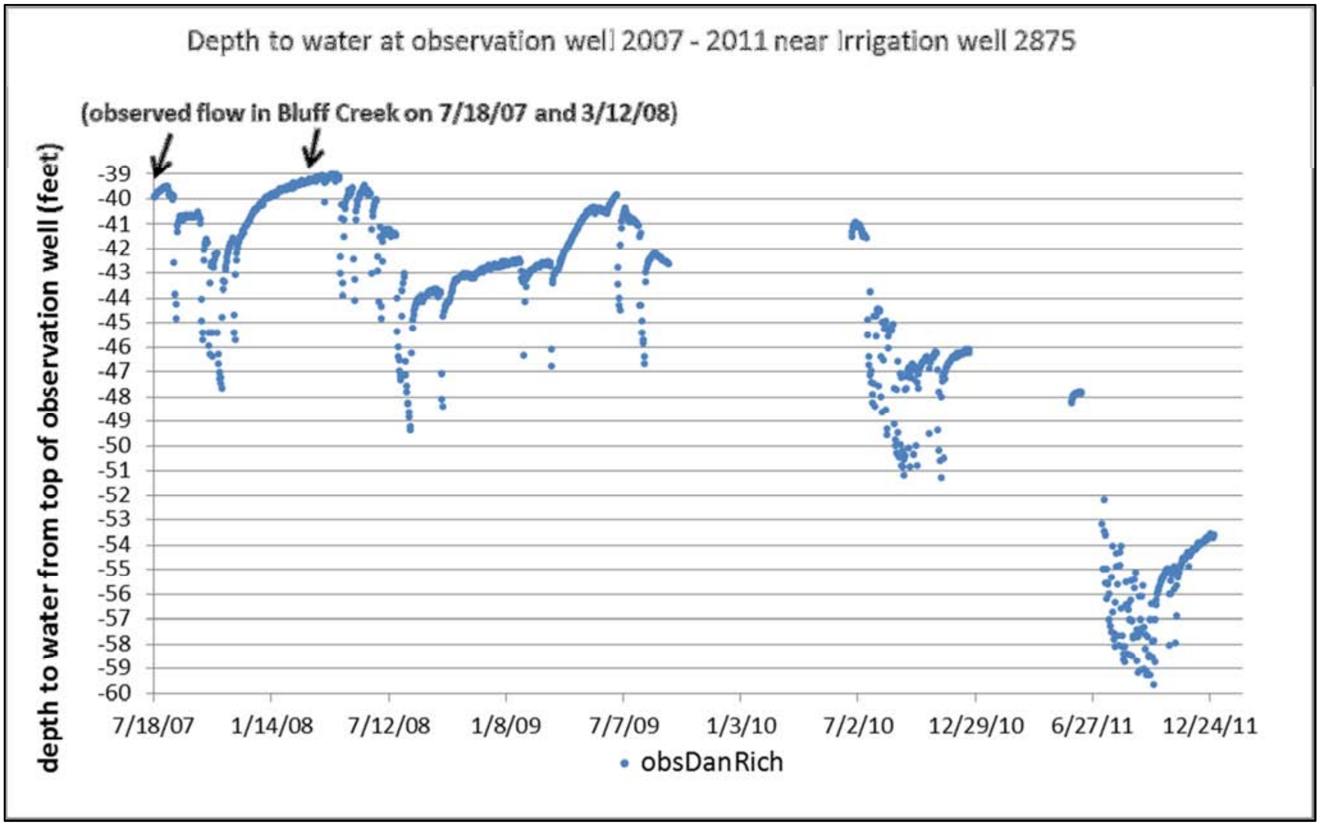


Figure 8 – Daily values of depth to water at observation well (obsDanRich) located about 120 feet from the west irrigation well and about 590 feet from Bluff Creek

On March 23, 2011 the water level sensor was installed about 16.5 feet below the dry streambed of lower Bluff Creek. The water level declined while 2875 pumped on and off until the water level dropped below the sensor in August. (Figure 9)

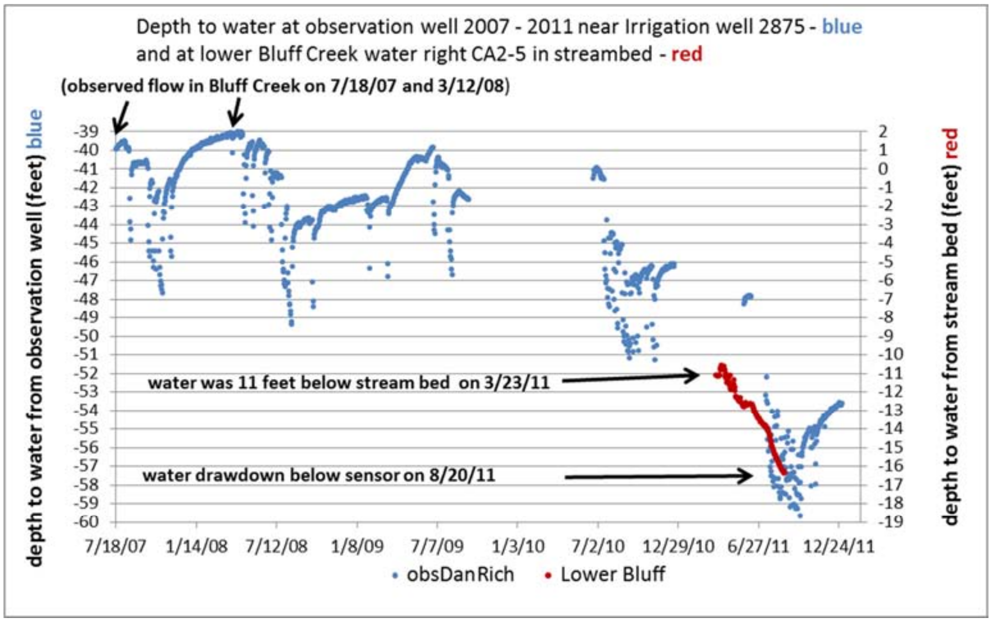


Figure 9 – Daily values of depth to water at observation well (obsDanRich) and water level in streambed of Bluff Creek until water level dropped below sensor.

The water level in lower Bluff Creek was likely between 1 and 2 feet above streambed when water was observed flowing on July 18, 2007 and March 12, 2008. The water level was about 11 feet below streambed when the sensor was installed on March 23, 2011 and dropped to deeper than 16.5 feet by August 20. (Figure 10)

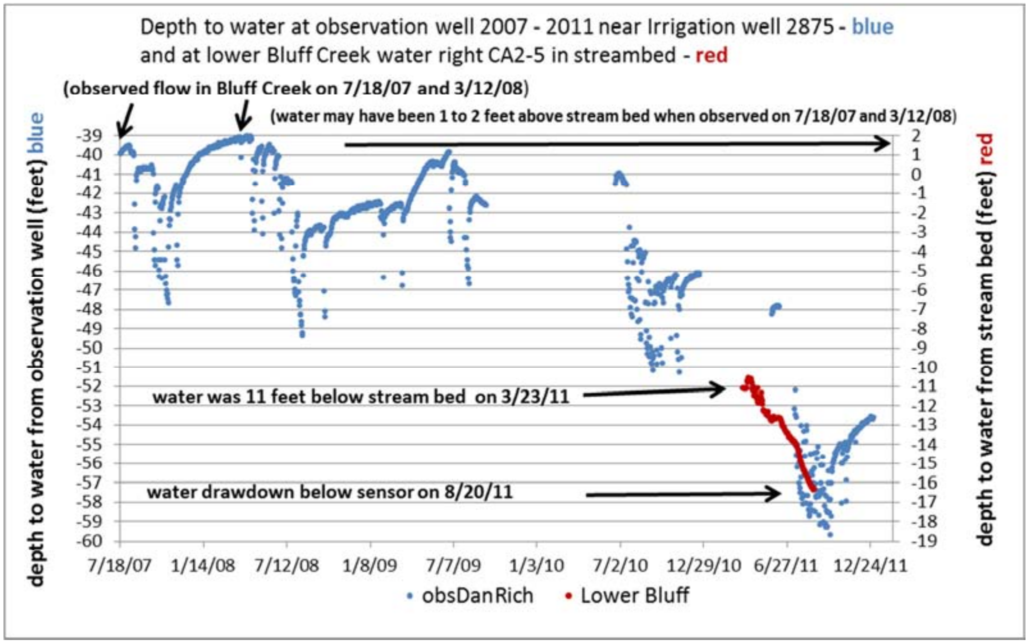


Figure 10 – Daily values of depth to water at observation well (obsDanRich) and water level in streambed of Bluff Creek until water level was drawn-down below sensor.

The water level in lower Bluff Creek was only monitored from March 23, 2011 to August 20, 2011 when the water level was drawn down below the sensor by nearby well pumping. The well 2875, located about 700 feet from the lower Bluff Creek sensor, was observed pumping 627 gallons per minute on May 11, 2011. The water level data shows that the water level declined at the lower Bluff Creek site while 2875 was pumping and the water level did not decline during the period from May 25 to June 11 when the irrigation well was not pumping. The water level monitoring equipment in the observation well near 2875 was not working for a time after June 11, 2011. After the observation well was repaired on July 12, 2011, it was observed again that the decline in water level in lower Bluff Creek correlated with the pumping at 2875. (Figure 11)

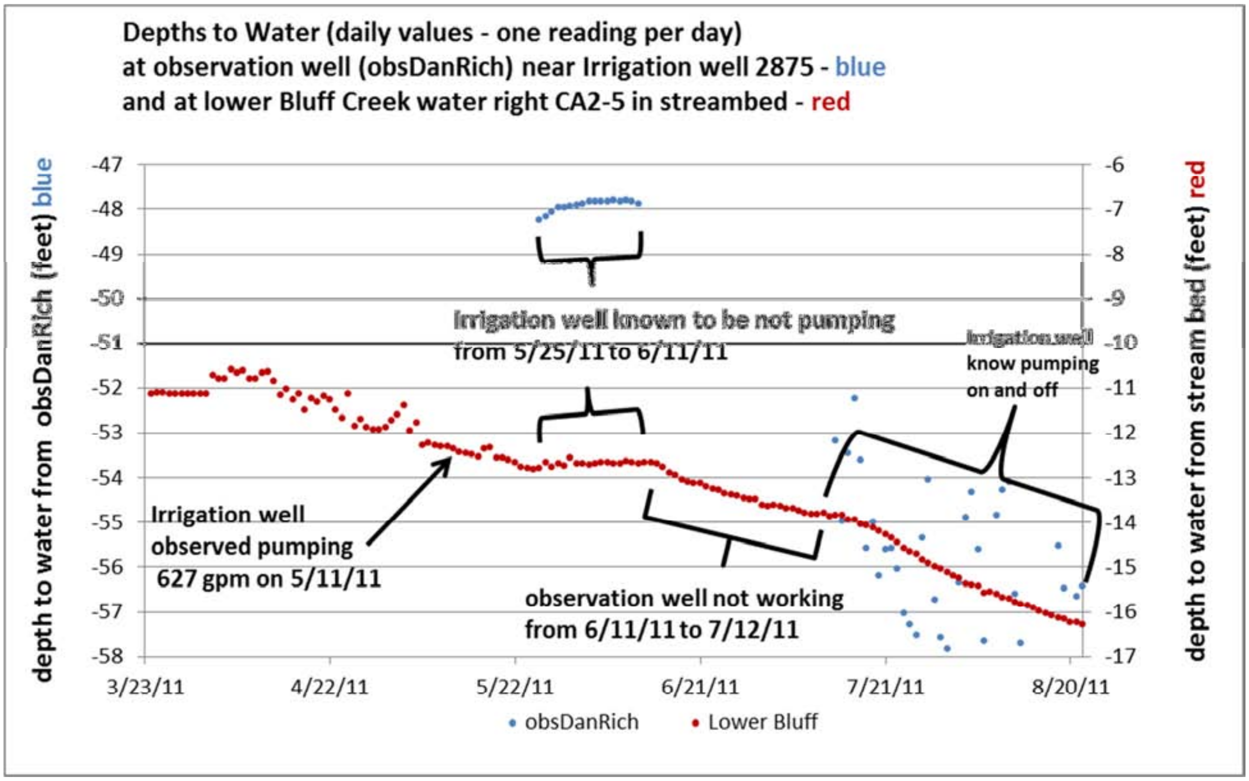


Figure 11 – Daily values of depth to water at observation well (obsDanRich) and water level in streambed of Bluff Creek while nearby irrigation well was known to be pumping or not pumping.

The water level sensors at the observation well and in lower Bluff Creek collect data at 30 minute intervals. From this data the drawdowns at the observation well show 2875 pumping on and off during the period from July 12 to August 20 when the water level in lower Bluff Creek was drawn down below the sensor depth. (Figure 12)

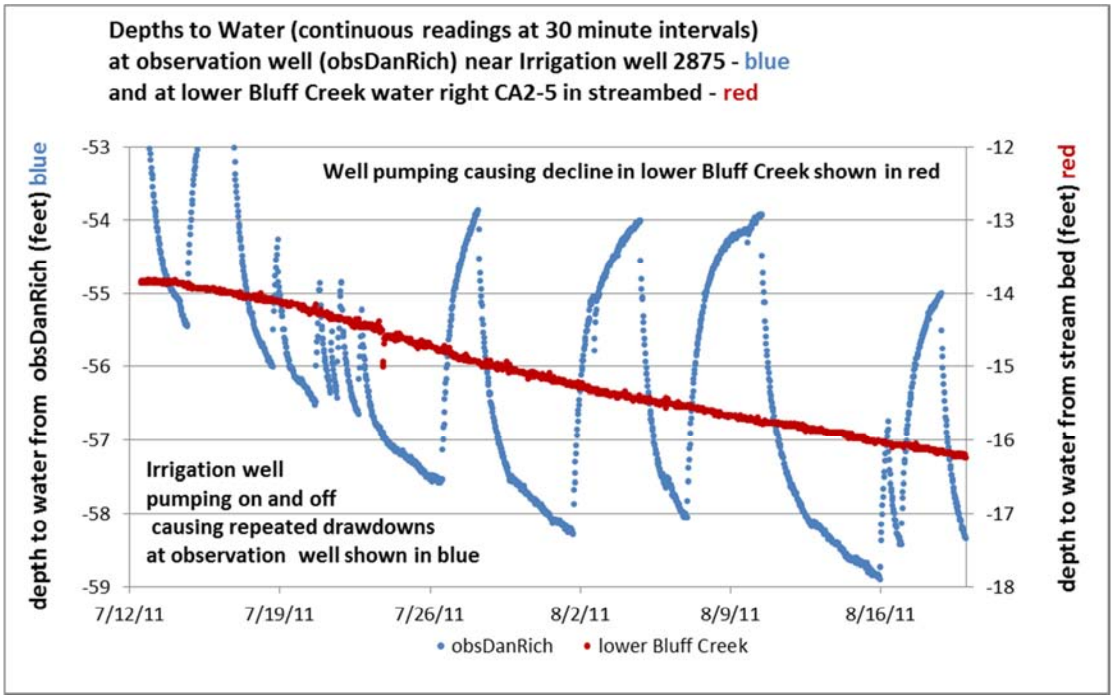


Figure 12 – Continuous 30 minute readings at observation well and lower Bluff Creek showing irrigation well pumping on and off and causing decline in water level in lower Bluff Creek.

The upper Bluff Creek sensor was located near the upstream property fence. It was installed on March 22, 2011 to a depth of about 5.4 feet below streambed and the water level was about 1.4 feet below streambed. Primarily due to the distance from the pumping wells the water level did not drawdown below the sensor and the decline was not as much as lower Bluff Creek. (Figure 13)

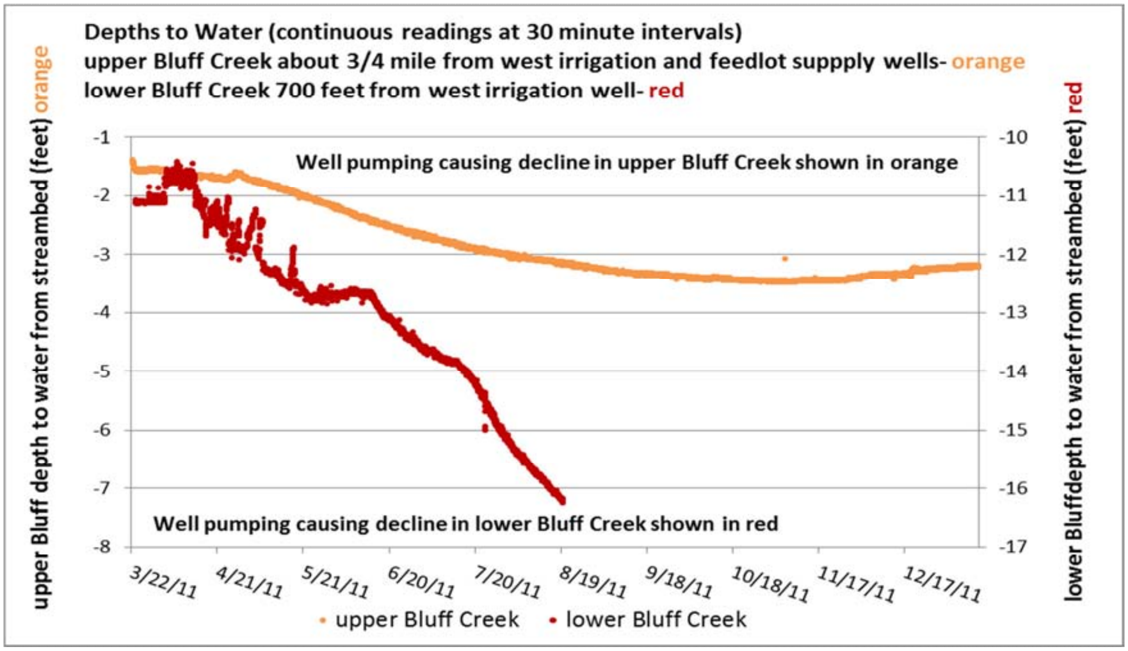


Figure 13 – Depth to water at lower Bluff Creek near irrigation well pumping until water level was drawn below the sensor and at upper Bluff Creek at a much greater distance from pumping wells.

When the nearby observation well was working it could be seen how pumping of 2875 lowered the water level at the nearby lower Bluff Creek site and the more distant upper Bluff Creek site. (Figure 14)

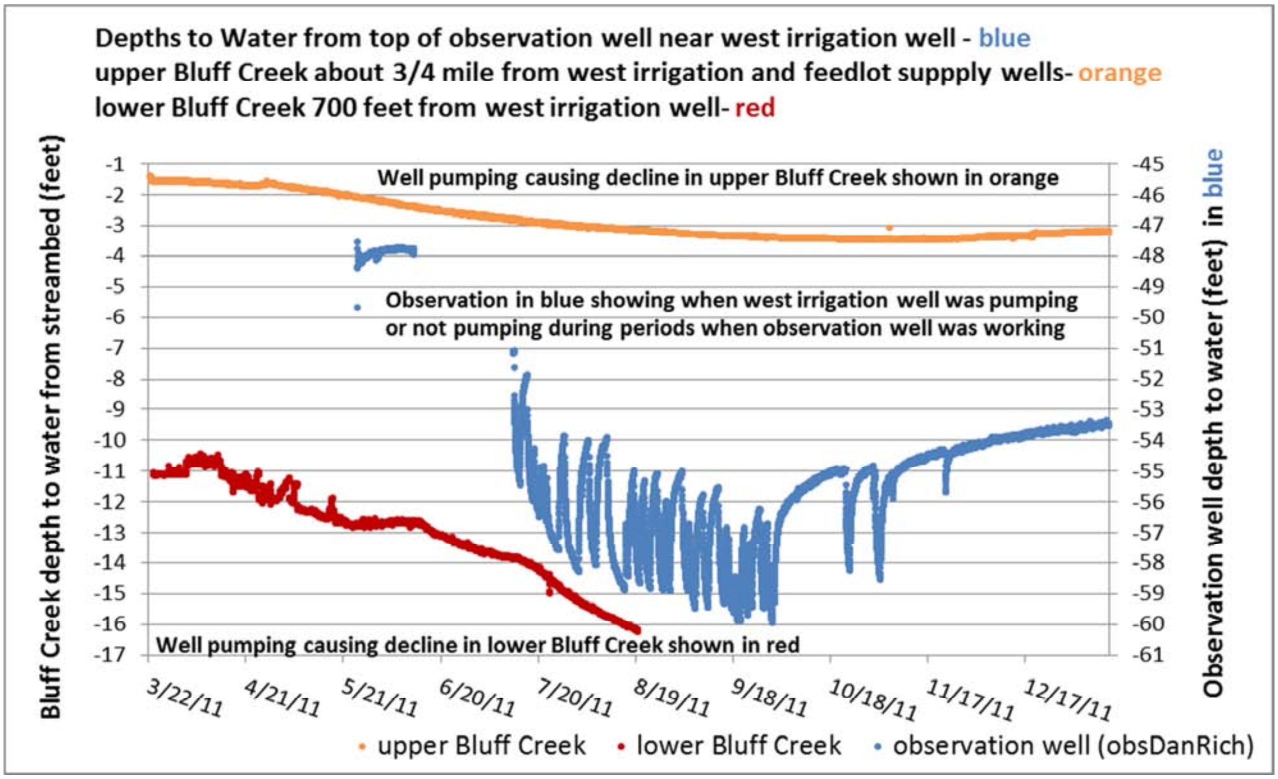


Figure 14 – Depth to water at Bluff Creek sites and observation well.

There was a pool of water about 0.35 feet deep at the mid Bluff Creek site near the confluence of Granger Creek and Bluff Creek when a water level sensor was installed to a depth of about 4 feet below ground in March 2011. The pool appeared to be a seep, however, it is possible that it may be a flowing or trickle spring, but groundwater pumping prevents more water from discharging at that point. The water level of the pool or seep declined and eventually became dry. According to the sensor installed below ground the decline from March to May was about 0.2 feet greater than the decline at the upper Bluff Creek site that is farther away from pumping wells. The sensor became plugged with silt-clay making the data questionable until it was repaired in May of 2012. It is possible that the sensor became partially plugged sometime in May 2011. After the sensor was repaired in May of 2012 the decline at mid Bluff Creek site was about 0.4 feet greater than at the upper Bluff Creek site due to the distance from the pumping wells. (Figure 15)

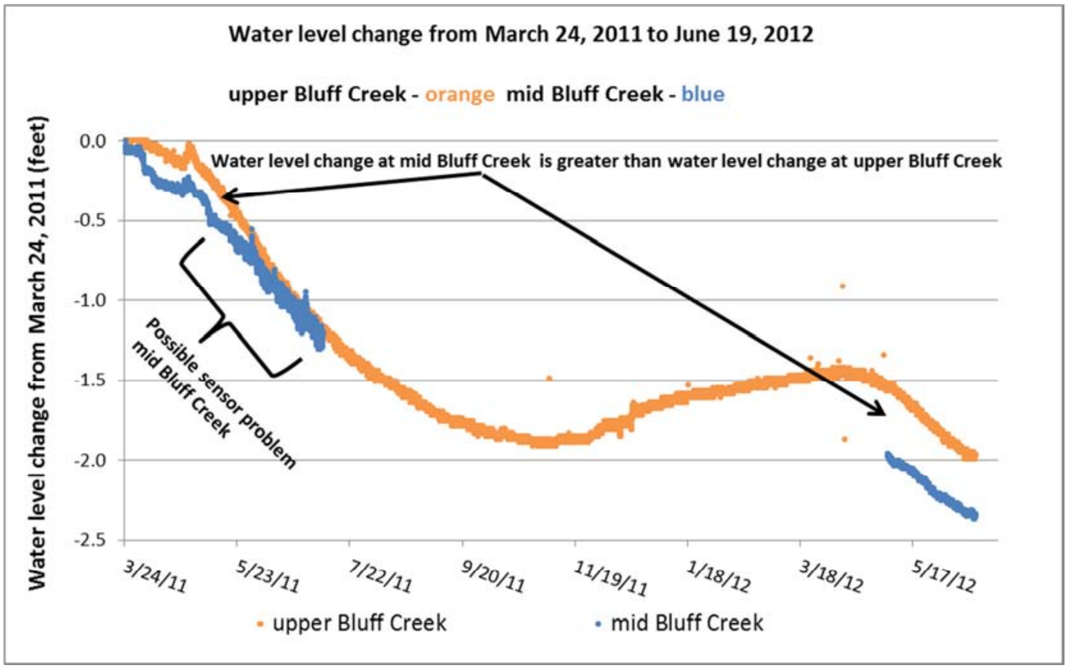


Figure 15 – Groundwater may have caused 0.2 feet greater decline at mid Bluff Creek site March to May 2001 and 0.4 feet greater decline May and June 2012 after sensor was repaired.

ANALYSIS OF WATER LEVEL DATA

Observation well data for 2007, 2008, 2009, 2010, and 2011 was analyzed to determine aquifer properties in the vicinity of the nearby junior wells. Due to the observation well being located close to 2875, the drawdown and relativly quick recovery periods show when 2875 turns on and pumps water then turns off. (Figures 16, 17, 18, 19, and 20)

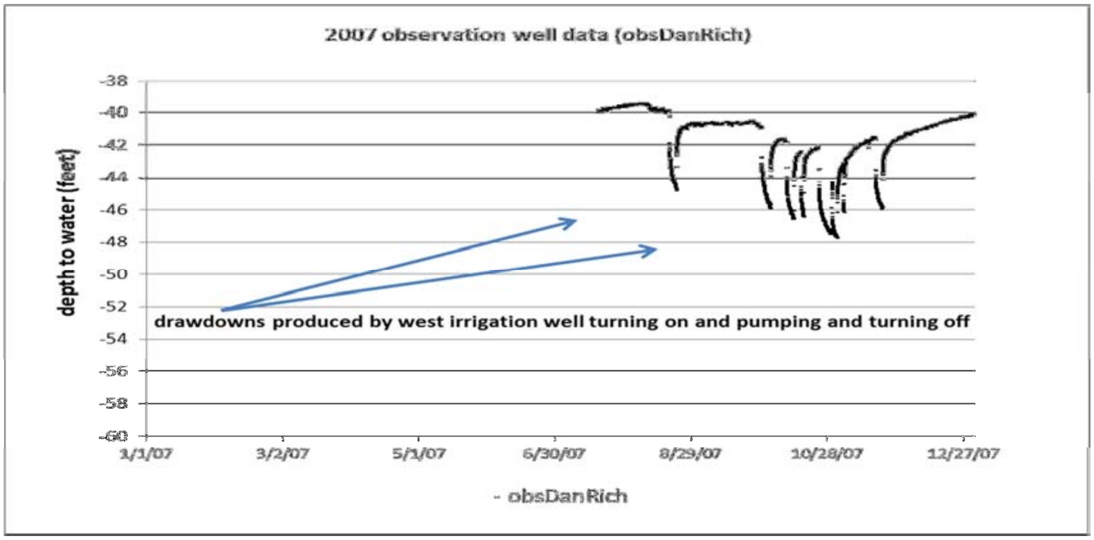


Figure 16 – 2007 depth to water data at observation well located near west irrigation well.

Bluff Creek was observed flowing when the depth to water from the top of the observation well was about 40 feet in July of 2007. Bluff Creek conditions at the end of 2007 and early in 2008 also appeared to be flowing due to the observation well recovering to the 40 feet level. In March of 2008 Bluff Creek was observed flowing but late in 2008 it was observed dry. Late in 2008 the water level did not return to 40 feet at the observation well.

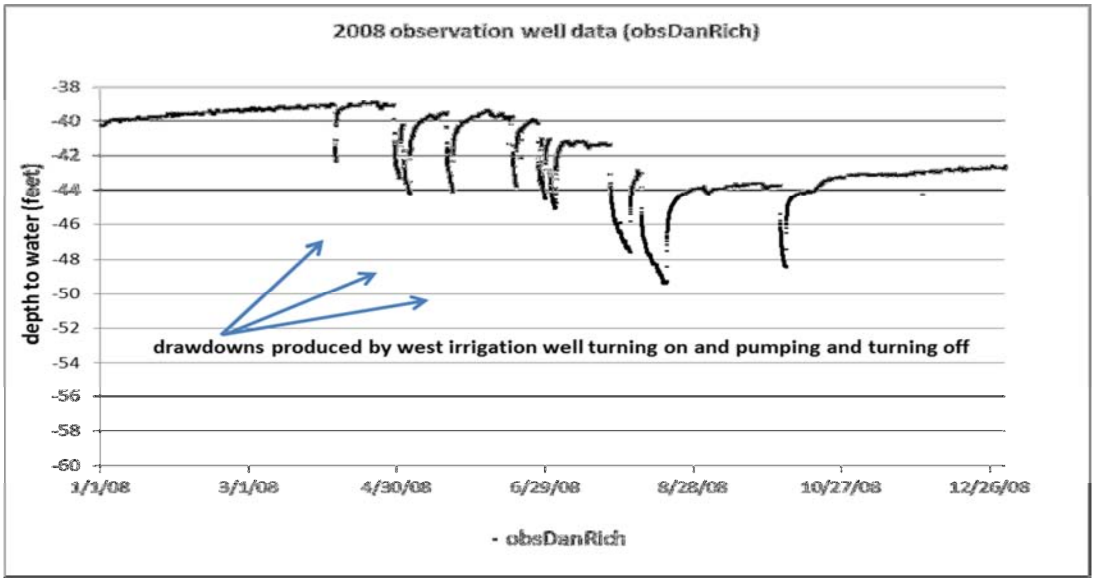


Figure 17 – 2008 depth to water data at observation well located near west irrigation well.

The first part of 2009 it appears that Bluff Creek may have been flowing due to the strong recovery at the observation well during April and May until the 40 feet depth to water was reached. Declines then occurred even when 2875 was not pumping suggesting no flow conditions of Bluff Creek while the feedlot supply well (39,368) was pumping.

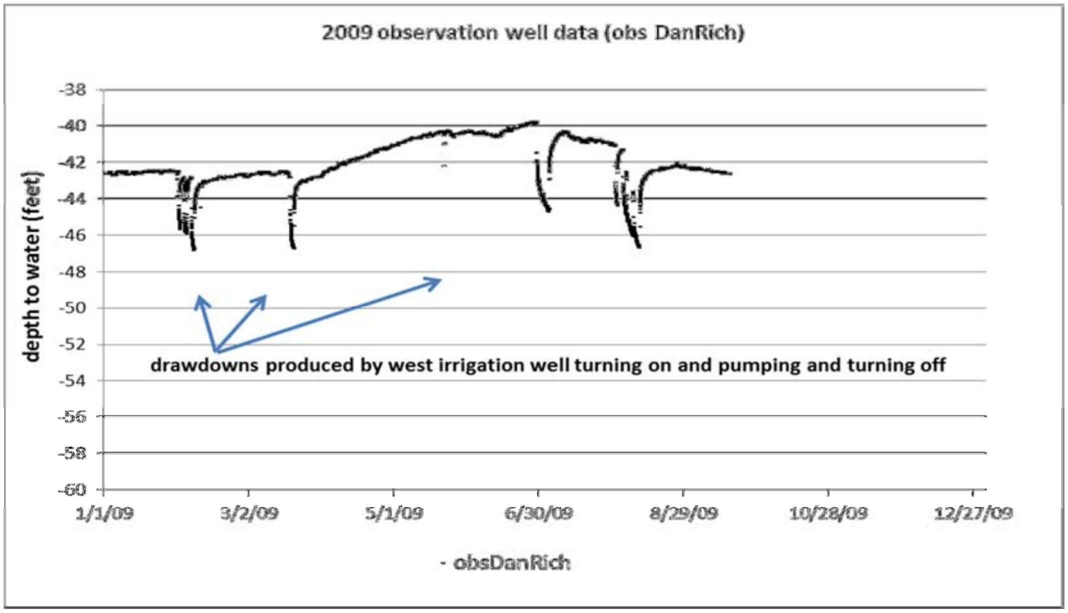


Figure 18 – 2009 depth to water data at observation well located near west irrigation well.

In 2010 the irrigation well 2875 was operated such that the groundwater water level was drawn down to 2006 levels during dry conditions in Bluff Creek. The July non-pumping level of 41 feet to water was only about one foot below previous observed stream flow level of 40 feet but by the end of 2010 the level of 46 feet to water was 6 feet below stream flow level.

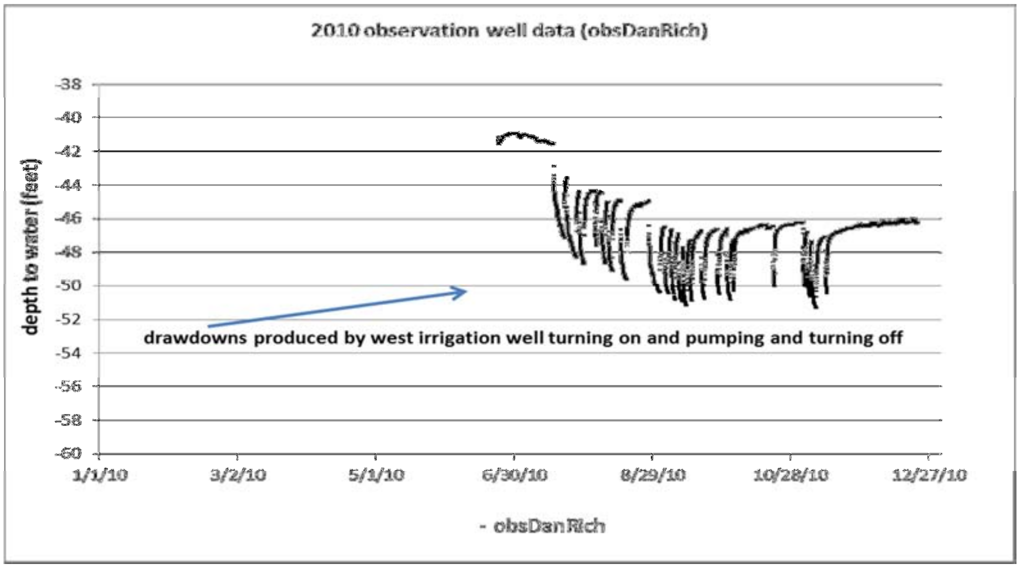


Figure 19 – 2010 depth to water data at observation well located near west irrigation well.

In 2011 the June non-pumping level was 48 feet to water and 8 feet below previous observed stream flowing level of 40 feet to water. This was the deepest pre-irrigation level observed since the complaint was filed. Nearly continuous on-off irrigation well pumping during July, August, and September lowered the water level to the deepest levels measured. The pumping level of about 59 feet to water was about 19 feet below the previously observed stream flow level and by the end of the year recovered to about 54 feet deep or about 14 feet below observed stream flow level.

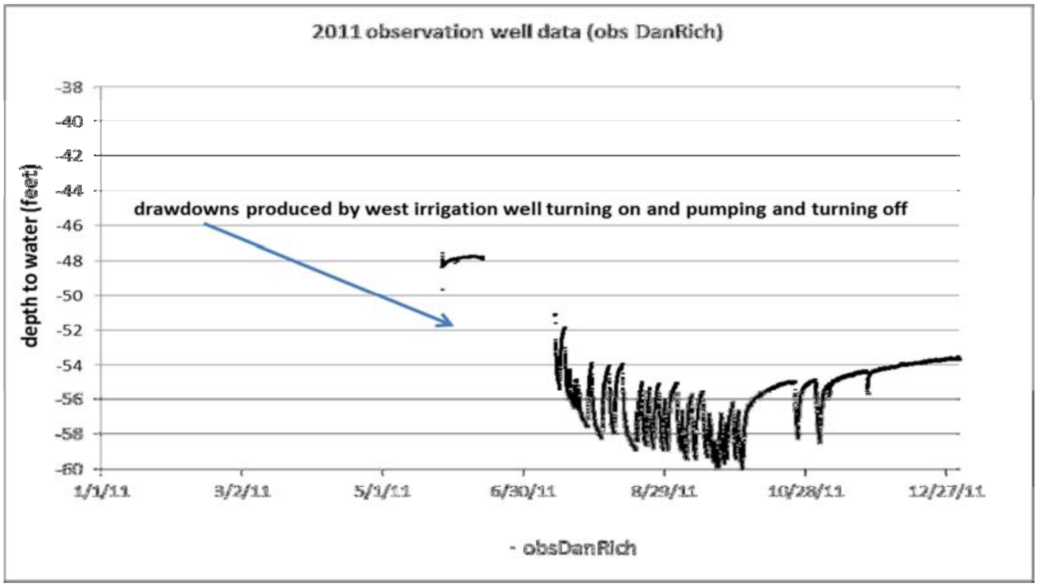


Figure 20 – 2011 depth to water data at observation well located near west irrigation well.

Using the 2007 through 2011 observation well data, seven pumping tests were analyzed wth Bluff Creek flow (constant head boundary) or Bluff Creek non-flowing (no flow boundary) conditions. (Table 1). The average transmissivity of these pumping tests was 63,180 gallons per day per foot (8446.5 ft²/d) with an average storage coefficient of 0.059 with boundary conditions. Attachments 2 through 8 show the Theis solution hydrographs.

Pumping test parameters and results

YEAR season	test date	obsDanRich depth to water* (feet)	test days	Bluff Creek condition	boundary condition	feedlot well 39368 assumed ra	Transmissivity (ft2/d)	(gpd/ft)	Storage Coefficient
2007 late	8/18/2007	-39.9	93	flowing	CONSTANT HEAD	280 gpm continuous	5869	43899	0.083
2008 early	4/4/2008	-39.6	75	assumed flowing	CONSTANT HEAD	seasonal monthly rates	8836	66091	0.046
2008 late	6/25/2008	-40.2	110	dry streambed	NO FLOW	280 gpm continuous	8745	65413	0.056
2009 early	1/31/2009	-42.5	49	recovering, so assume flow	CONSTANT HEAD	seasonal monthly rates	10740	80335	0.016
				(April-May recovery due to assumed streamflow between pumping test times)					
2009 late	6/28/2009	-39.8	42	dry streambed	NO FLOW	280 gpm continuous	9200	68817	0.077
		above -40 ft only from 6/24/09 to 6/28/09							
2010 late	7/16/2010	-41.6	120	dry streambed	NO FLOW	280 gpm continuous	8001	59850	0.045
2011 late	7/12/2011	-49.9	120	dry streambed	NO FLOW	280 gpm continuous	7734	57851	0.089

*from top of casing

Table 1 – Summary of pumping tests using observation well data.

From the average transmissivity of 63,180 gallons per day per foot (8446.5 ft²/d) with an average storage coefficient of 0.059 derived from the 2007 through 2011 aquifer tests at the observation well drawdowns at the upper and lower Bluff Creek monitoring sites from July 12 to August 20, 2011can be estimated and compared to observed drawdown. (Figure 21)

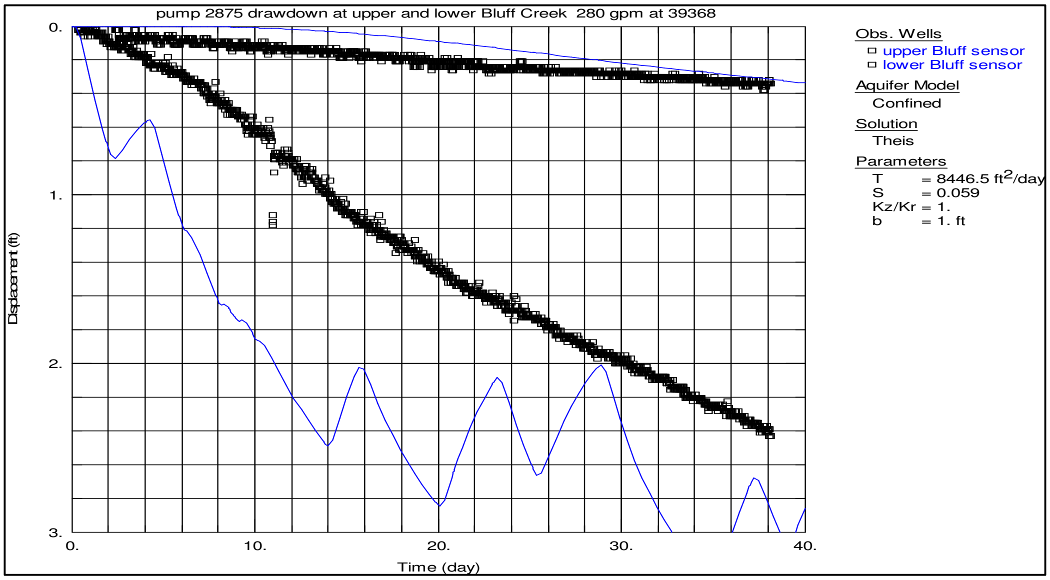


Figure 21 – 2011 observed drawdowns July 12 to August 20 at upper and lower Bluff Creek monitoring sites shown in black and estimated drawdowns shown in blue from observation well tests.

Increasing the streambed transmissivity to 91,330 gallons per day per foot (12,210 ft²/d) appears to provide better agreement to observed data especially during the later portion of the test period. (Figure 22)

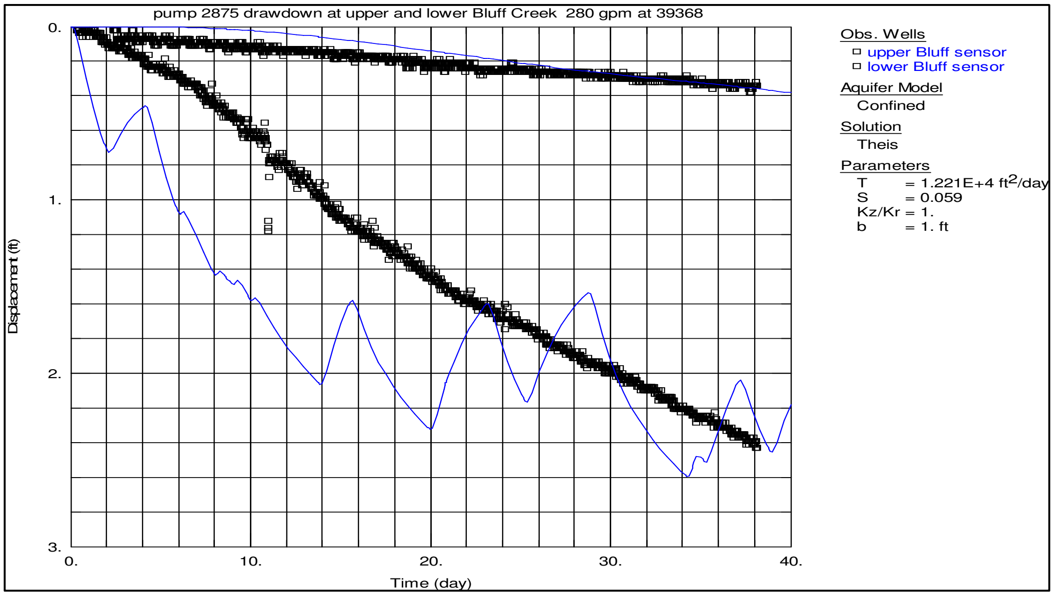


Figure 22 – 2011 observed drawdowns July 12 to August 20 at upper and lower Bluff Creek monitoring sites shown in black and estimated drawdowns shown in blue with assumed greater transmissivity.

Three stockwatering holes were dug by Dan Rich as trickle streamflow, spring flow and pools of water were completely depleted in 2010 and 2011. Continued nearby groundwater pumping lowered the water level in the stockwatering holes such that little or no water remained for his cattle. A photograph was taken at the lower stockwatering hole nearest 2875 on October 26, 2010 and again on June 19, 2012. Field staff estimated the stockwatering hole had been dug about 4 feet below streambed. In October, 2010, after irrigation well pumping had ended for the year, field staff estimated that the stockwatering hole was 2 feet deep. (Figure 23). By June 2012 the stockwatering hole had to be deepened because groundwater levels had declined. (Figure 24).

Figure 23 – October 26, 2010 photo showing groundwater remaining at the lower water hole dug by Dan Rich in the streambed of Bluff Creek to access water for vested Water Right, File No. CA 2-5 for his cattle.

Figure 24 – June 19, 2012 photo showing groundwater depletion of the lower water hole shown in Figure 23 leaving no water for vested Water Right, File No. CA 2-5 for Dan Rich's cattle.

It appears that drawdown along Bluff Creek at three stockwatering holes dug by Dan Rich can be estimated using the Theis solution and a transmissivity of 91,330 gallons per day per foot (12,210 ft²/d) and a storage coefficient of 0.059 as in Figure 22. Drawdown at the three stockwatering holes is estimated for the 38 day pumping period in 2011starting July 12 in Figure 25.

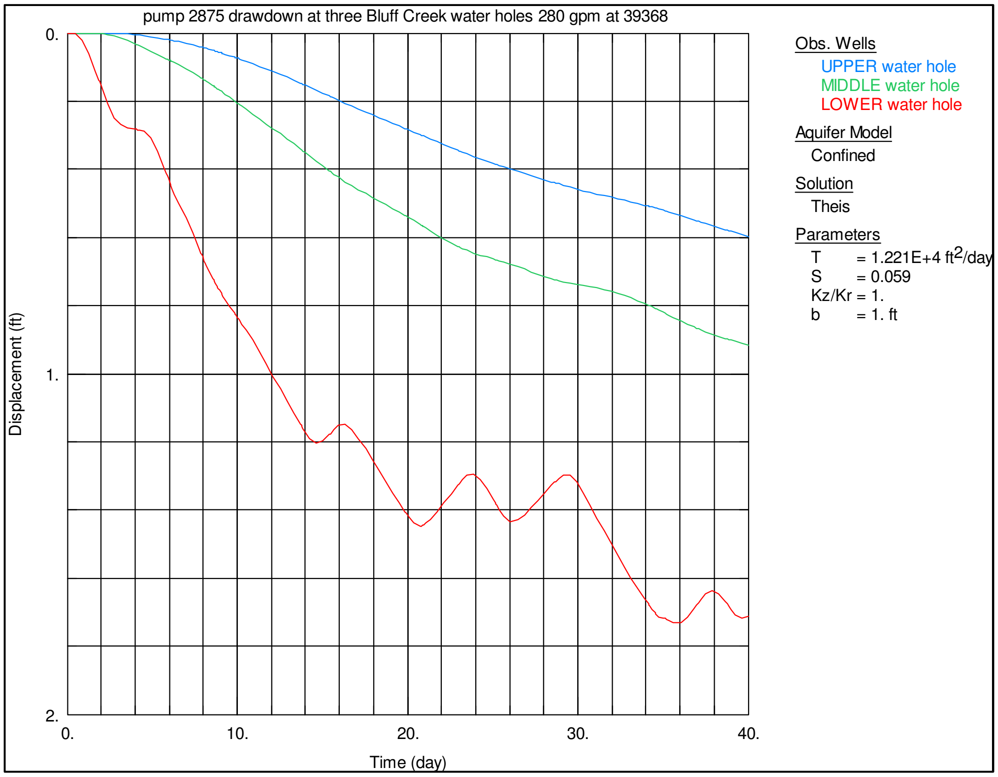


Figure 25 – Groundwater decline at upper, middle and lower Dan Rich water holes in Bluff Creek due to groundwater pumping for 38 day period starting July 12, 2011.

Operating the nearby junior wells at the same time and at their respective authorized pumping rates appears to drawdown the nearest stockwatering hole in Bluff Creek about 2.8 feet. Figure 26 shows an estimated drawdown of about 2.8 feet between week 8 and week 10 of continuous pumping (56 days to 70 days pumpping). The model shows drawdown at each stockwatering hole caused by 2875 pumping the authorized rate of 430 gallons per minute, 16,860 pumping the authorized rate of 355 gallons per minute, and the feedlot supply well 39,368 pumping the authorized rate of 285 gallons per minute. All three wells are simulated to start pumping at the same time and pump all of their respective authorized. Figure 27 shows drawdown at the three stockwatering holes if only 39,368 and 2875 were pumping. Pumping only these two wells appears to be nearly ½ foot less drawdown at the water holes. If only the feedlot supply well 39,368 was pumping, total drawdown may be reduced to less than one foot by the end of the same 10 week period. (Figure 28)

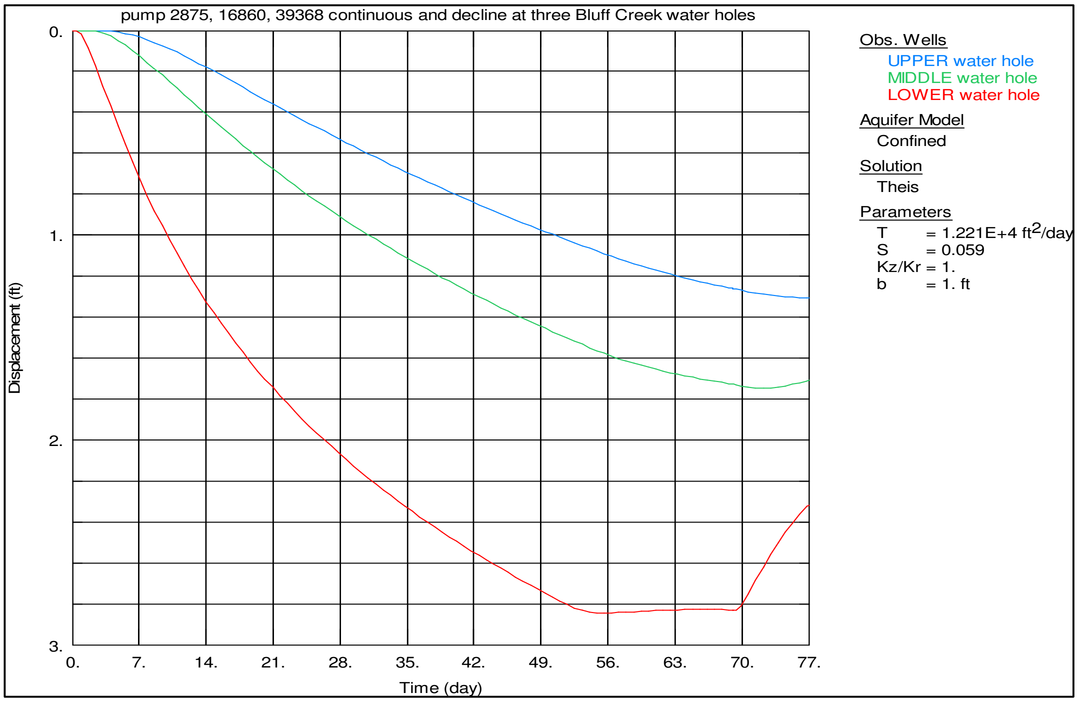


Figure 26 – Groundwater decline at upper, middle and lower Dan Rich water holes in Bluff Creek due to groundwater pumping authorized rates 430 gpm, 355 gpm, and 285 gpm from west irrigation well, east irrigation well, and feedlot supply well, respectively.

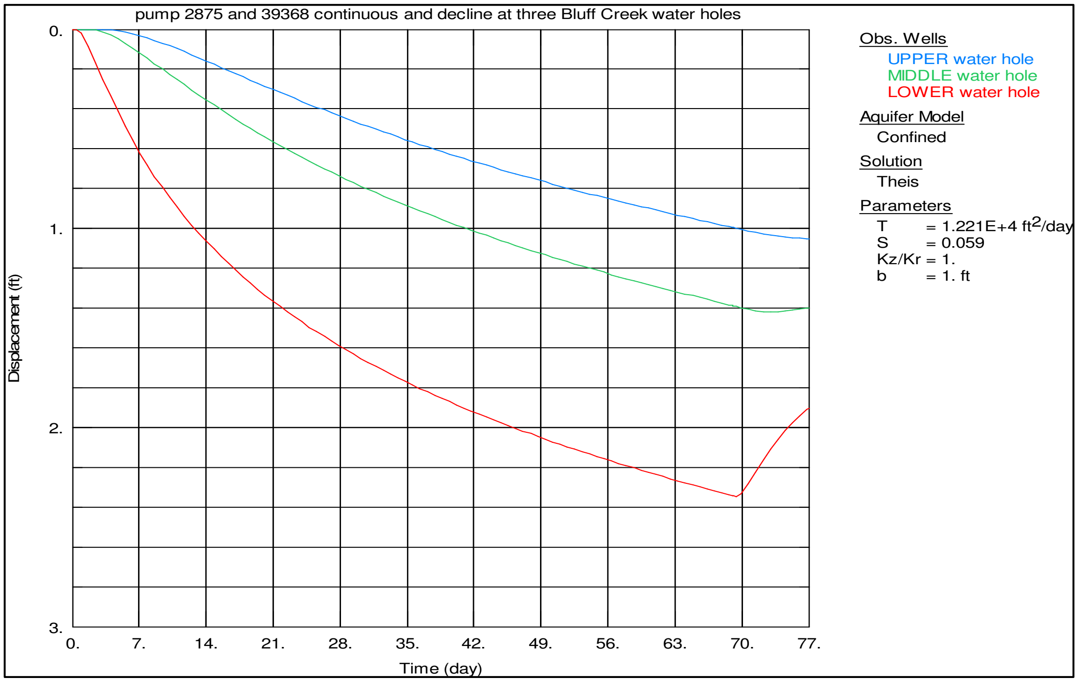


Figure 27 – Groundwater decline at upper, middle and lower Dan Rich water holes in Bluff Creek due to groundwater pumping authorized rates 430 gpm and 285 gpm from west irrigation well and feedlot supply well, respectively.

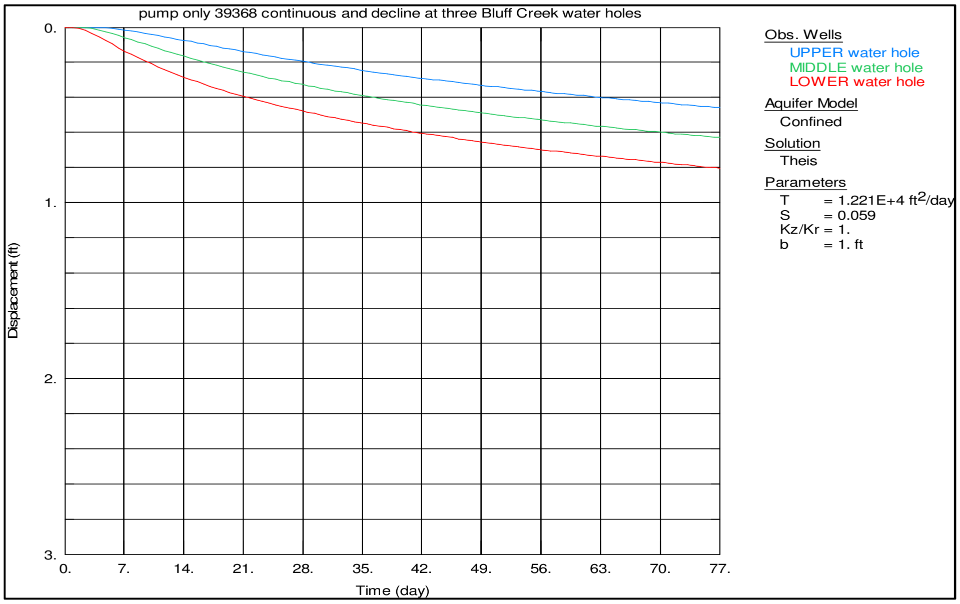


Figure 28 – Groundwater decline at upper, middle and lower Dan Rich water holes in Bluff Creek due to groundwater pumping authorized rate 285 gpm from only the feedlot supply well.

Drawdown less than 1foot at the three water holes may be possible when more than one well is pumping if the pumping times are varied. For example, it appears that if the feedlot supply well and east irrigation well are not pumped at the same time, a 1 foot decline will not be reached as long as the west irigation well is not pumping. In Figure 29 it also appears that drawdown is less than 1 foot as in Figure 28 when the feedlot supply well pumps an equivalent 12 hours per day while the east irrigation well pumps for three days then is off for three days, repeatedly.

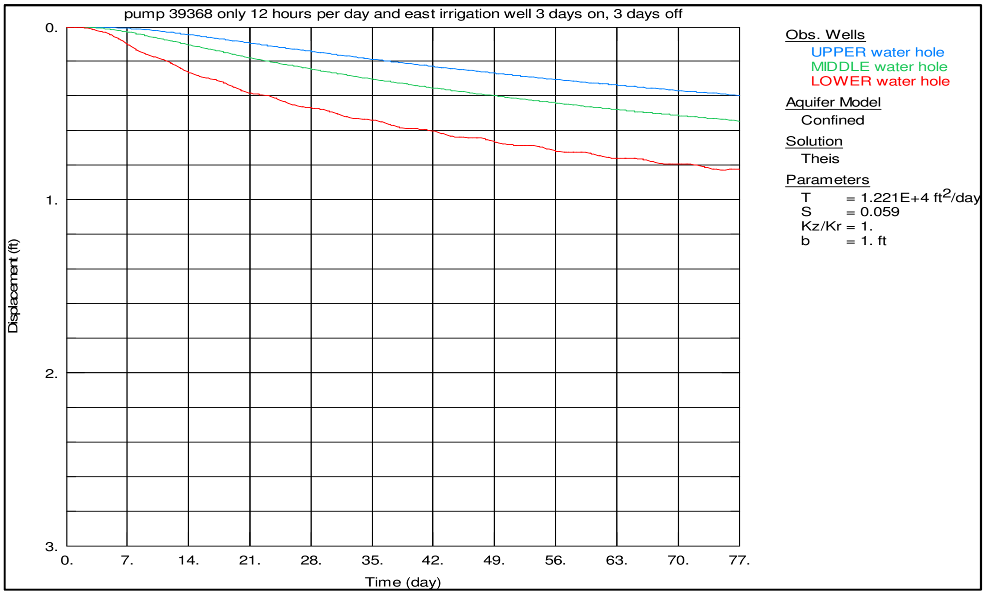


Figure 29 – Groundwater decline at upper, middle and lower water holes is similar to Figure 28 when feedlot well pumps half of the daily pumping time and the east irrigation well pumps three days then does not pump for three days, repeatedly.

Table 2 shows analysis results of Bluff Creek stream depletion due to pumping the feedlot well File No. 39368 for 365 days limited by the authorized quantity of about 211 acre-feet (68.75 million gallons) and pumping the irrigation wells 2875 and 16860 at their respective authorized rates of 430 gallons per minute and 355 gallons per minute and their respective quantities of 132 and 81 acre-feet. At 365 days about 167 acre-feet of the 39,368's quantity is from stream depletion of Bluff Creek. About 125 acre-feet of 2875's authorized quantity is from Bluff Creek stream depletion. About 74 acre-feet of 16,860's quantity is from Bluff Creek stream depletion. From the total amount of 366.54 acre-feet of Bluff Creek stream depletion about 46% is from the feedlot well pumping, 34% is from the closest irrigation well to Bluff Creek and 20% is from the other irrigation well.

Dan Rich Impairment Complaint, Jenkins Streamflow Depletion(1)							
T = 91330 gpd/ft (12210 ft^2/d), S = 0.059							
File No.	**Distance to stream (ft)**	**Authorized Pumping Rate (gpm)**	**Authorized Quantity (AF)**	**Pumping Time (days)**	**Effective Pumping Rate (gpm)**	**Volume of Stream Depletion (AF) after 365 Days**	**Fraction of Total Stream Depletion**
2875	725	430	132	69.46436	430	125.46	0.34
16860	1300	355	81	51.63132	355	73.92	0.20
39368	1750	285	210.986003	365	130.8029	167.16	0.46
					Total	366.54	

Table 2 – Stream depletion analysis results of pumping the feedlot well and the two irrigation wells.

CONCLUSIONS

The Division installed appropriate water level monitoring equipment over a time period that was conducive to determining, with a high degree of confidence, that pumping one or more of the nearby junior wells depletes or prevents streamflow in Bluff Creek such that it directly interferes with the source of supply for senior vested Water Right, File No. CA 2-5.

(1) **Computation of Rate and Volume of Stream Depletion by Wells, C.T. Jenkins, Techniques of Water-Resources Investigations of the United States Geological Survey, Chapter D1, Book 4, Hydrologic Analysis and Interpretation, 1968.**

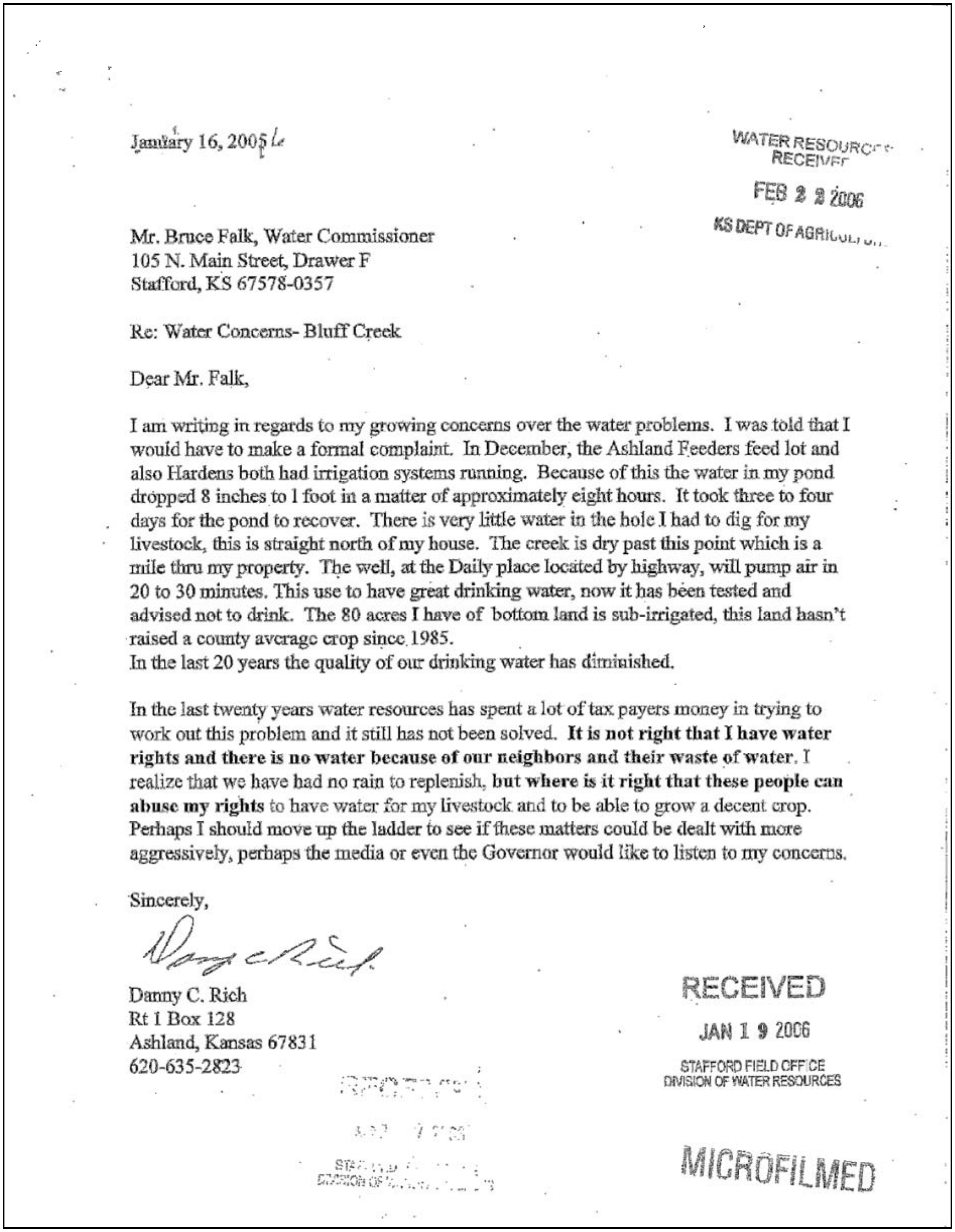
ATTACHMENTS 1 THROUGH 12

Attachment 1 is the impairment complaint letter of Danny Rich dated January 16, 2006 and received at the Stafford Field Office on January 19.

Attachments 2 through 8 summarize analysis of the pumping tests using the observation well data. The pumping rate for the west irrigation well was estimated at 620 gallons per minute for the pumping periods in 2007, 2008, 2009, and most of 2010 based on water meter reading information and pumping times in 2007, 2008, 2009, and 2010. A working meter was not installed in 2007 so 620 gallons per minute was assumed based on electric motor operation and later meter readings and pumping time data that showed 620 gallons per minute. Meter readings and pumping times late in 2010 resulted in 627 gallons per minute and in 2011 rates ranged from about 500 to 600 gallons per minute. It was assumed that the feedlot supply well was pumped continuously for all pumping tests. The rate assumed was 280 gallons per minute for 2007, late 2008, late 2009, 2010,and 2011. It appears that 280 gallons per minute continous pumping of the feedlot supply well produces drawdown near the observation well about the same as alternately pumping the feedlot supply well and the east irrigation well. The rates assumed for early 2008 and early 2009 were about 140 gallons per minute during the test periods which were times when the east irrigation well would not be operating.

Attachments 9 through 12 are four well driller logs that are available for the well located in the impairment investigation area.

Attachment 1 – Danny Rich Complaint letter January 16, 2006 received on January 19, 2006.



January 16, 2005 6

WATER RESOURCES
RECEIVED
FEB 2 2 2006
KS DEPT OF AGRICULTURE

Mr. Bruce Falk, Water Commissioner
105 N. Main Street, Drawer F
Stafford, KS 67578-0357

Re: Water Concerns- Bluff Creek

Dear Mr. Falk,

I am writing in regards to my growing concerns over the water problems. I was told that I would have to make a formal complaint. In December, the Ashland Feeders feed lot and also Hardens both had irrigation systems running. Because of this the water in my pond dropped 8 inches to 1 foot in a matter of approximately eight hours. It took three to four days for the pond to recover. There is very little water in the hole I had to dig for my livestock, this is straight north of my house. The creek is dry past this point which is a mile thru my property. The well, at the Daily place located by highway, will pump air in 20 to 30 minutes. This use to have great drinking water, now it has been tested and advised not to drink. The 80 acres I have of bottom land is sub-irrigated, this land hasn't raised a county average crop since 1985.
In the last 20 years the quality of our drinking water has diminished.

In the last twenty years water resources has spent a lot of tax payers money in trying to work out this problem and it still has not been solved. **It is not right that I have water rights and there is no water because of our neighbors and their waste of water.** I realize that we have had no rain to replenish, **but where is it right that these people can abuse my rights** to have water for my livestock and to be able to grow a decent crop. Perhaps I should move up the ladder to see if these matters could be dealt with more aggressively, perhaps the media or even the Governor would like to listen to my concerns.

Sincerely,

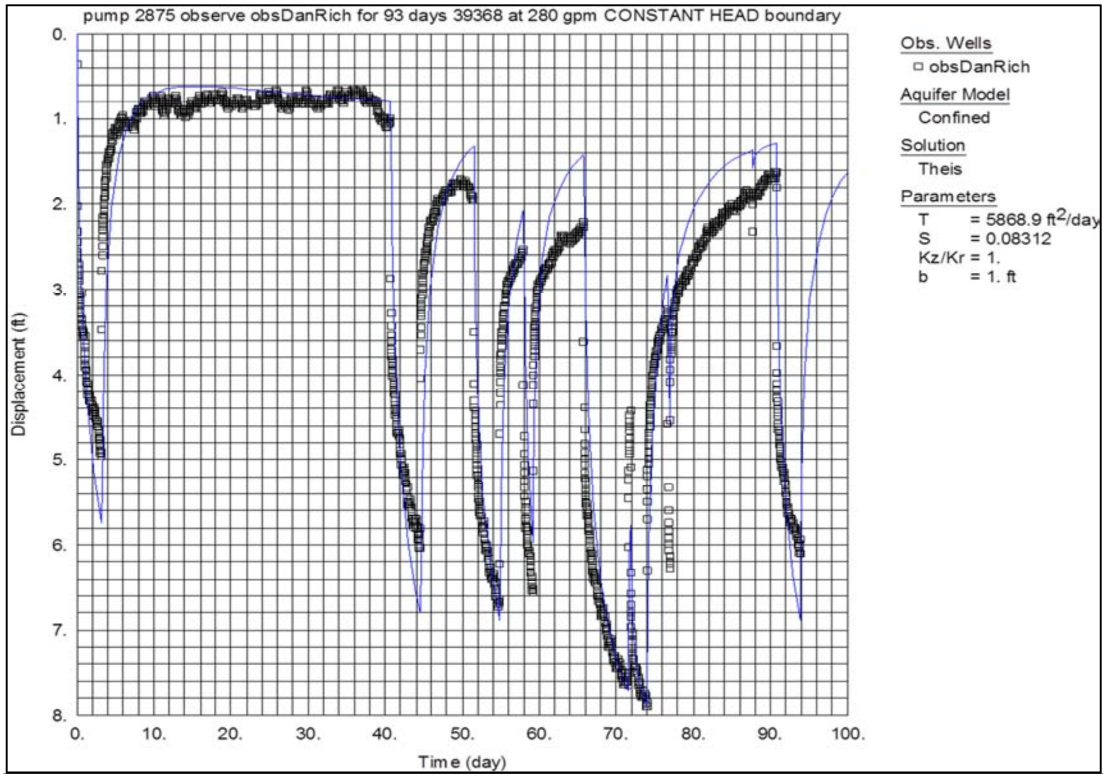
Danny C Rich

Danny C. Rich
Rt 1 Box 128
Ashland, Kansas 67831
620-635-2823

RECEIVED
JAN 1 9 2006
STAFFORD FIELD OFFICE
DIVISION OF WATER RESOURCES

MICROFILMED

Attachment 2 – Analysis of pumping test data for 2007.



PUMPING WELL DATA

No. of pumping wells: 2

Pumping Well No. 1: 2875

X Location: 118.1088 ft
Y Location: 32.808 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

No. of pumping periods: 18

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	620.	57.96	620.	76.69	620.
3.208	0.	59.17	0.	76.94	0.
40.71	620.	65.77	620.	87.65	620.
44.56	0.	71.56	0.	87.67	0.
51.54	620.	71.83	620.	90.73	620.
54.83	0.	73.98	0.	93.88	0.

Pumping Well No. 2: 39368

X Location: -108.2664 ft
Y Location: 1407.4632 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

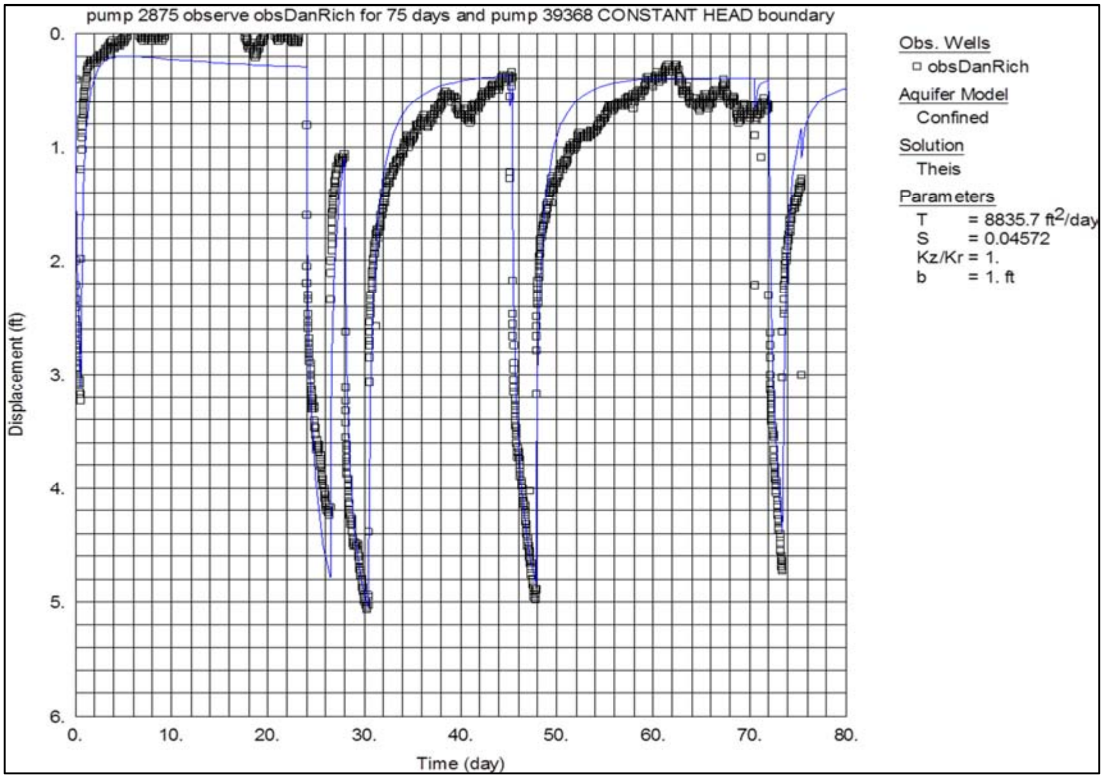
No. of pumping periods: 1

Pumping Period Data

Time (day)	Rate (gal/min)
0.	280.

Constant head boundary is from X Location: 1994.7264 ft Y Location: -839.8848 ft
to X Location: -5016.3432 ft Y Location: -767.7072 ft

Attachment 3 – Analysis of early 75 day pumping test for 2008.



PUMPING WELL DATA

No. of pumping wells: 2

Pumping Well No. 1: 2875

X Location: 118.1088 ft
Y Location: 32.808 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

No. of pumping periods: 16

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	620.	45.15	620.	72.02	620.
0.6042	0.	45.17	0.	73.44	0.
24.02	620.	45.38	620.	75.4	620.
26.5	0.	47.83	0.	75.42	0.
28.	620.	70.54	620.		
30.46	0.	70.56	0.		

Pumping Well No. 2: 39368

X Location: -108.2664 ft
Y Location: 1407.4632 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

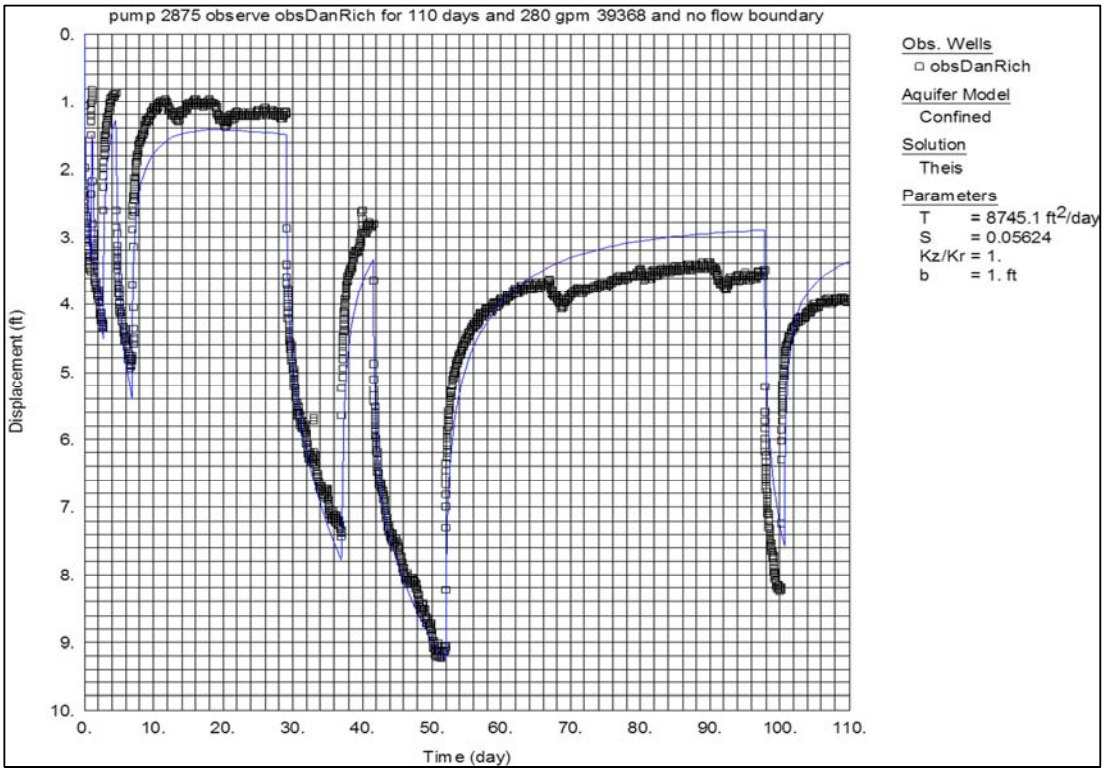
No. of pumping periods: 3

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	139.9	26.	132.9	56.	159.7

Constant head boundary is from X Location: 1994.7264 ft Y Location: -839.8848 ft
to X Location: -5016.3432 ft Y Location: -767.7072 ft

Attachment 4 – Analysis of later 110 day pumping test for 2008.



PUMPING WELL DATA

No. of pumping wells: 2

Pumping Well No. 1: 2875

X Location: 118.1088 ft
Y Location: 32.808 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

No. of pumping periods: 14

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	620.	6.875	0.	97.83	620.
0.9167	0.	29.1	620.	100.7	0.
1.208	620.	37.04	0.	155.7	620.
2.75	0.	41.6	620.	155.7	0.
4.604	620.	51.96	0.		

Pumping Well No. 2: 39368

X Location: -108.2664 ft
Y Location: 1407.4632 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

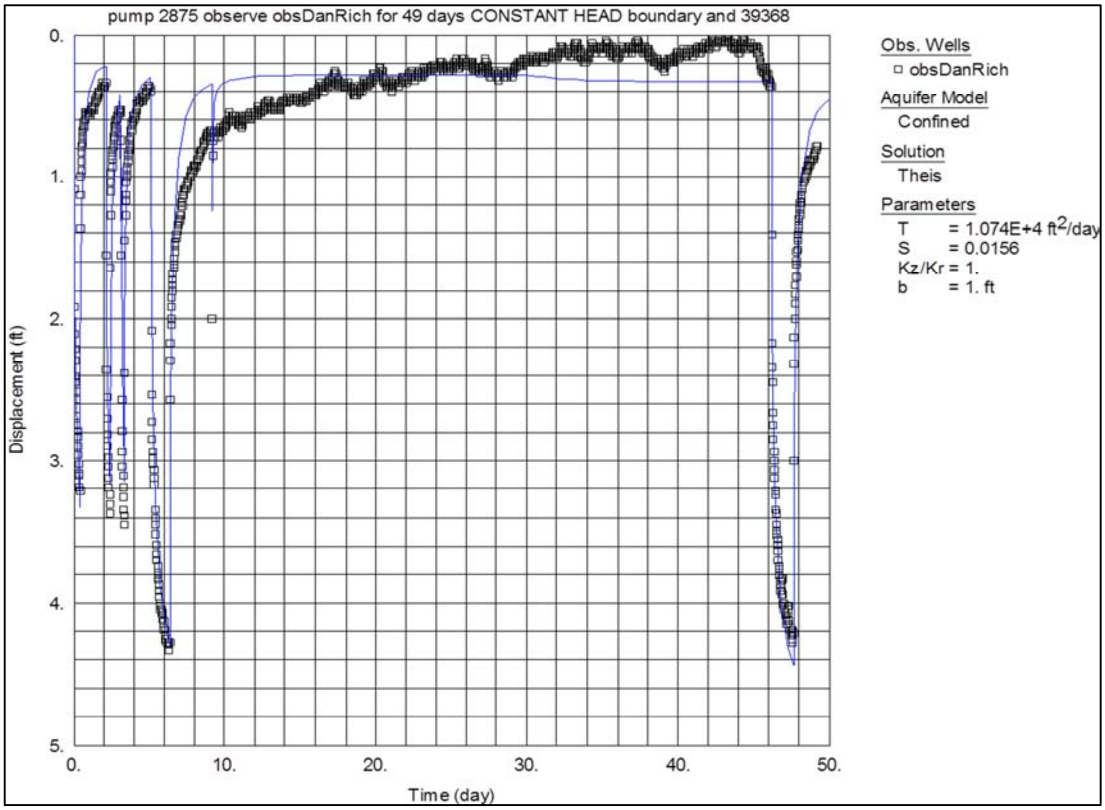
No. of pumping periods: 1

Pumping Period Data

Time (day)	Rate (gal/min)
0.	280.

No flow boundary is from X Location: 1994.7264 ft Y Location: -839.8848 ft
to X Location: -5016.3432 ft Y Location: -767.7072 ft

Attachment 5 – Analysis of early 49 day pumping test for 2009.



PUMPING WELL DATA

No. of pumping wells: 2

Pumping Well No. 1: 2875

X Location: 118.1088 ft
Y Location: 32.808 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

No. of pumping periods: 14

		Pumping Period Data			
Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	620.7	3.104	0.	9.167	620.7
0.4167	0.	3.167	620.7	9.188	0.
2.146	620.7	3.375	0.	46.19	620.7
2.417	0.	5.125	620.7	47.65	0.
3.083	620.7	6.354	0.		

Pumping Well No. 2: 39368

X Location: -108.2664 ft
Y Location: 1407.4632 ft

Casing Radius: 1. ft
Well Radius: 1. ft

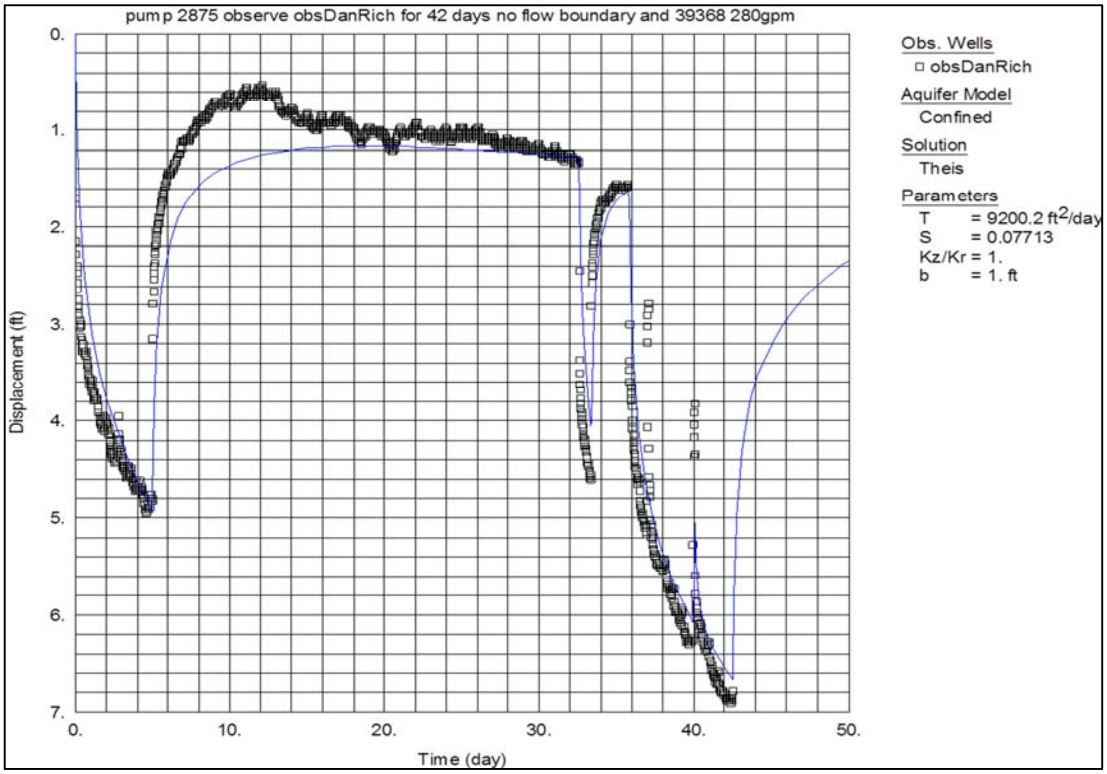
Fully Penetrating Well

No. of pumping periods: 2

	Pumping Period Data		
Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	136.	30.	158.4

Constant head boundary is from X Location: 1994.7264 ft Y Location: -839.8848 ft
to X Location: -5016.3432 ft Y Location: -767.7072 ft

Attachment 6 – Analysis of later 42 day pumping test for 2009.



PUMPING WELL DATA

No. of pumping wells: 2

Pumping Well No. 1: 2875

X Location: 118.1088 ft
Y Location: 32.808 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

No. of pumping periods: 8

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	619.6	33.35	0.	40.08	619.6
5.	0.	35.81	619.6	42.52	0.
32.56	619.6	39.96	0.		

Pumping Well No. 2: 39368

X Location: -108.2664 ft
Y Location: 1407.4632 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

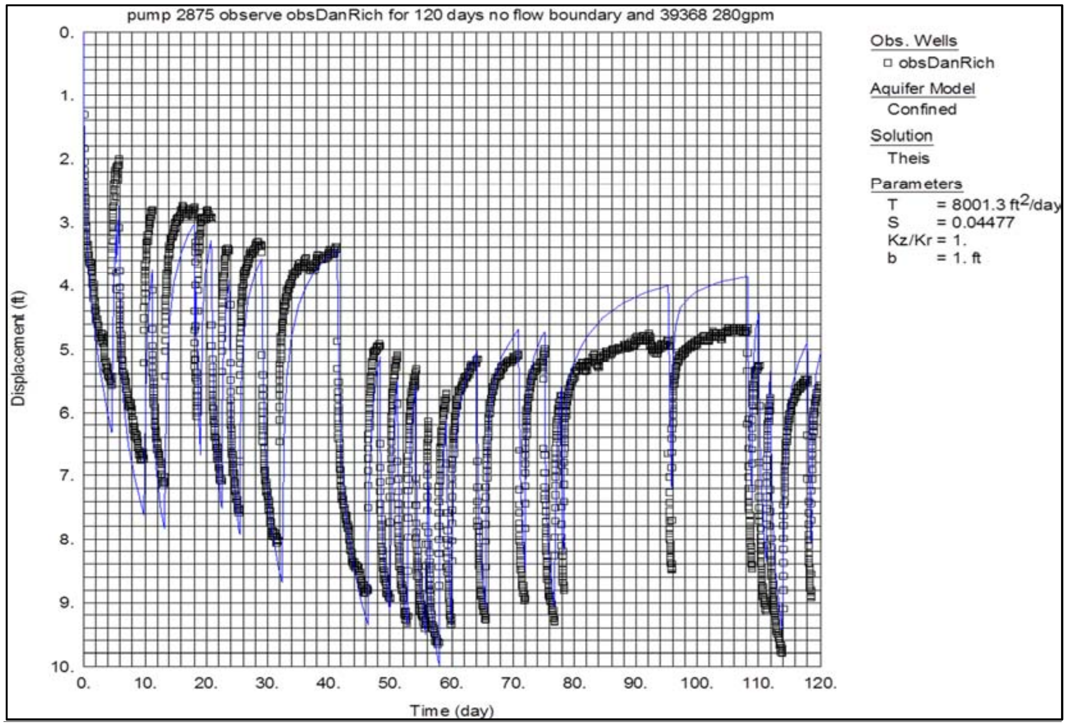
No. of pumping periods: 2

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	280.	43.	0.

No flow boundary is from X Location: 1994.7264 ft Y Location: -839.8848 ft
to X Location: -5016.3432 ft Y Location: -767.7072 ft

Attachment 7 – Analysis of 120 day pumping test for 2010.



PUMPING WELL DATA

No. of pumping wells: 2

Pumping Well No. 1: 2875

X Location: 118.1088 ft
Y Location: 32.808 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

No. of pumping periods: 50

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	620.	32.35	0.	75.13	620.
4.625	0.	41.38	620.	76.75	0.
5.375	620.	46.35	0.	77.88	620.
5.417	0.	48.33	620.	78.25	0.
5.833	620.	49.96	0.	95.31	620.
9.875	0.	51.15	620.	95.85	0.
11.19	620.	52.77	0.	108.2	627.
13.27	0.	54.17	620.	108.2	0.
18.06	620.	55.81	0.	108.3	627.
18.21	0.	56.21	620.	108.9	0.
18.31	620.	57.85	0.	110.1	627.
19.06	0.	59.19	620.	111.2	0.
20.85	620.	59.98	0.	111.9	627.
22.48	0.	64.17	620.	113.9	0.
23.83	620.	65.54	0.	118.	627.
25.42	0.	70.92	620.	118.5	0.
29.08	620.	71.94	0.		

Pumping Well No. 2: 39368

X Location: -108.2664 ft
Y Location: 1407.4632 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

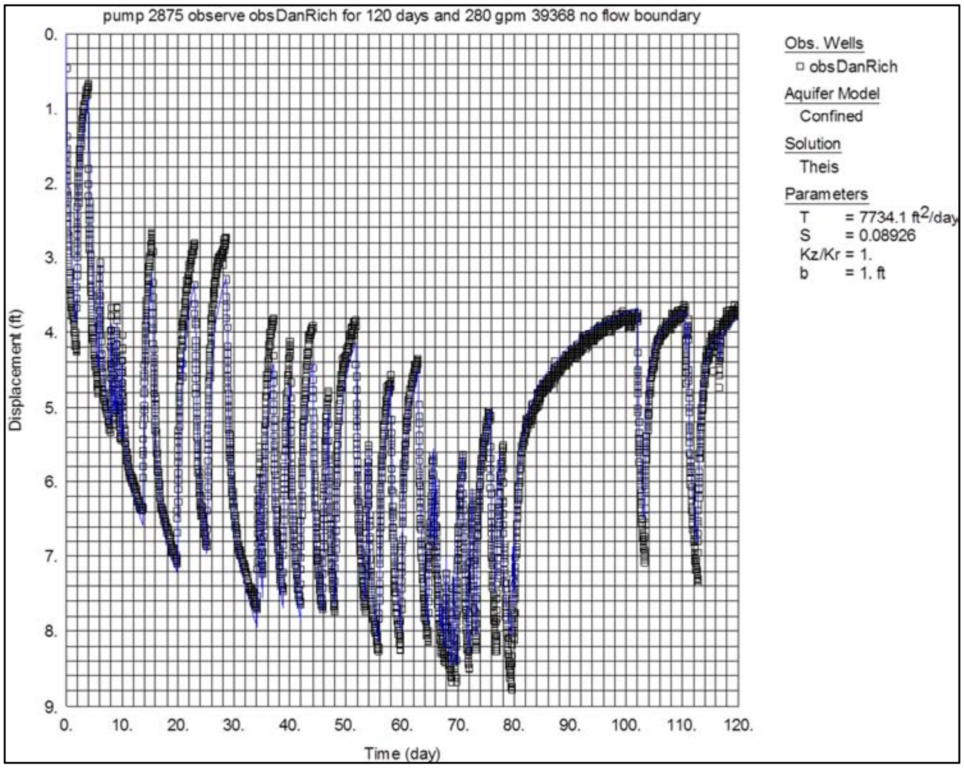
No. of pumping periods: 1

Pumping Period Data

Time (day)	Rate (gal/min)
0.	280.

No flow boundary is from X Location: 1994.7264 ft Y Location: -839.8848 ft
to X Location: -5016.3432 ft Y Location: -767.7072 ft

Attachment 8 – Analysis of 120 day pumping test for 2011.



Pumping Well No. 1: 2875

X Location: 118.1088 ft
Y Location: 32.808 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

No. of pumping periods: 78

Pumping Period Data

Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)	Time (day)	Rate (gal/min)
0.	605.4	40.06	605.4	70.88	594.7
1.875	0.	41.83	0.	71.98	0.
4.042	605.4	44.06	594.7	72.6	594.7
5.854	0.	45.83	0.	73.21	0.
6.083	605.4	46.83	594.7	75.71	594.7
7.854	0.	48.	0.	75.81	603.
8.063	605.4	51.75	594.7	75.83	506.
8.542	0.	53.52	0.	76.75	0.
8.604	605.4	54.02	594.7	76.79	506.
8.854	0.	55.83	0.	76.88	0.
9.063	605.4	58.04	594.7	77.54	506.
9.854	0.	59.75	0.	78.98	0.
10.02	605.4	62.92	594.7	79.	506.
13.75	0.	64.67	0.	79.58	0.
15.44	605.4	64.96	594.7	79.83	506.
19.85	0.	65.04	0.	80.1	0.
20.81	605.4	65.52	594.7	102.	506.
20.85	0.	65.77	0.	102.5	0.
22.98	605.4	65.98	594.7	102.5	506.
25.17	0.	67.02	0.	103.4	0.
28.65	605.4	67.08	594.7	110.6	506.
34.15	0.	67.67	0.	110.6	0.
34.54	605.4	67.85	594.7	111.1	506.
35.15	0.	68.83	0.	112.8	0.
37.	605.4	69.02	594.7	116.5	506.
38.77	0.	69.65	0.	116.6	0.

Pumping Well No. 2: 39368est

X Location: -108.2664 ft
Y Location: 1407.4632 ft

Casing Radius: 1. ft
Well Radius: 1. ft

Fully Penetrating Well

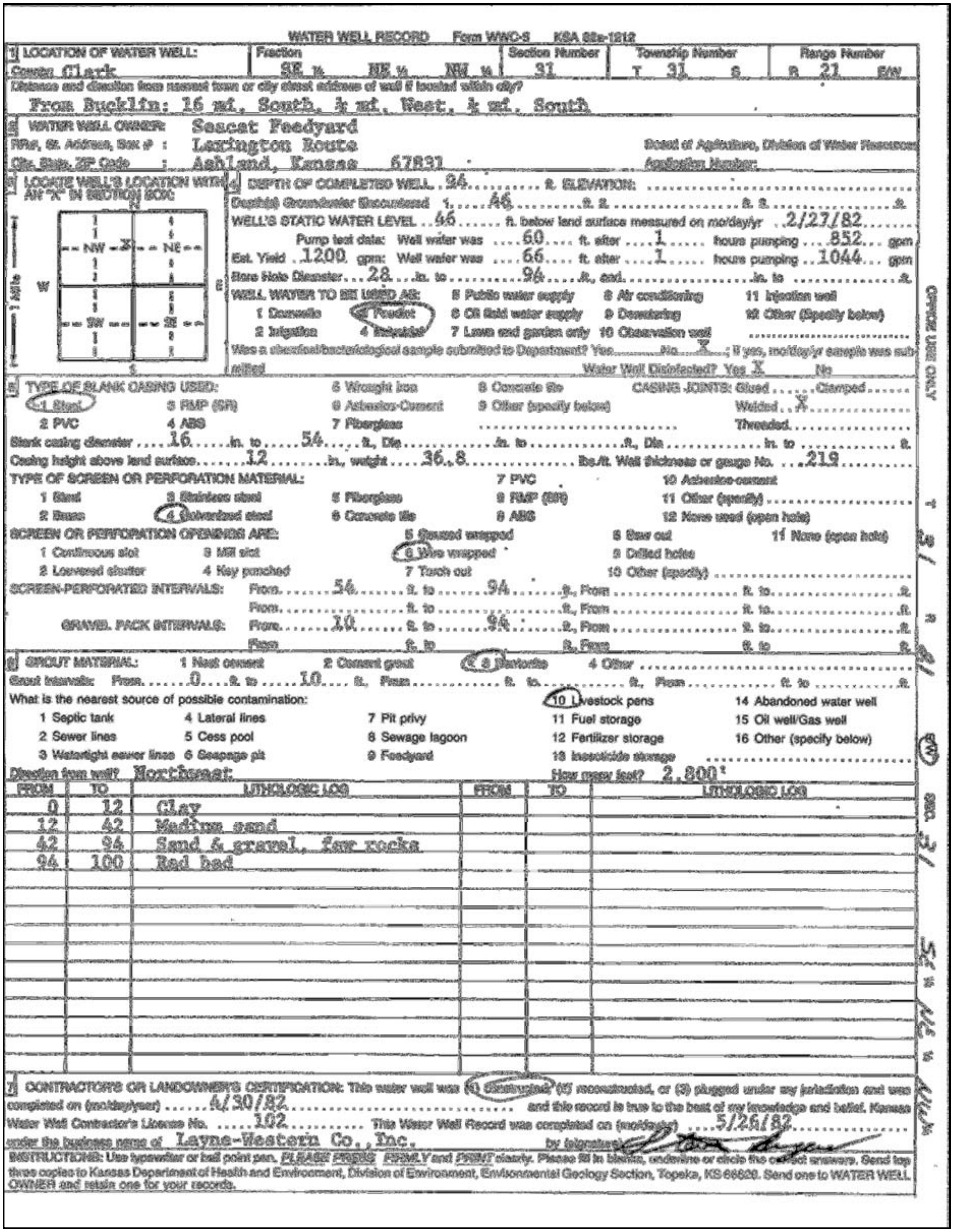
No. of pumping periods: 1

Pumping Period Data

Time (day)	Rate (gal/min)
0.	280.

Constant head boundary is from X Location: 1994.7264 ft Y Location: -839.8848 ft
to X Location: -5016.3432 ft Y Location: -767.7072 ft

Attachment 9 – Well driller log for feedlot supply well



WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL: County: Clark
Fraction: SE ¼ NE ¼ NW ¼
Section Number: 31
Township Number: T 31 S
Range Number: R 21 E/W

Distance and direction from nearest town or city street address of well if located within city?
From Bucklin: 16 mi. South, ½ mi. West, ½ mi. South

2 WATER WELL OWNER: Seacat Feedyard
RR#, St. Address, Box # : Lexington Route
City, State, ZIP Code : Ashland, Kansas 67831
Board of Agriculture, Division of Water Resources
Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:
N
NW X NE
W E
SW SE
S
1 Mile

4 DEPTH OF COMPLETED WELL 94 ft. ELEVATION:
Depth(s) Groundwater Encountered 1. 46 ft. 2. ft. 3. ft.
WELL'S STATIC WATER LEVEL 46 ft. below land surface measured on mo/day/yr 2/27/82
Pump test data: Well water was 60 ft. after 1 hours pumping 852 gpm
Est. Yield 1200 gpm: Well water was 66 ft. after 1 hours pumping 1044 gpm
Bore Hole Diameter 28 in. to 94 ft., and in. to ft.
WELL WATER TO BE USED AS: 1 Domestic [✓ 3 Feedlot] 5 Public water supply 6 Oil field water supply 7 Lawn and garden only 8 Air conditioning 9 Dewatering 10 Observation well 11 Injection well 12 Other (Specify below) 2 Irrigation 4 Industrial
Was a chemical/bacteriological sample submitted to Department? Yes No X ; If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes X No

5 TYPE OF BLANK CASING USED: [✓ 1 Steel] 2 PVC 3 RMP (SR) 4 ABS 5 Wrought iron 6 Asbestos-Cement 7 Fiberglass 8 Concrete tile 9 Other (specify below)
CASING JOINTS: Glued Clamped Welded X Threaded
Blank casing diameter 16 in. to 54 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface 12 in., weight 36.8 lbs./ft. Wall thickness or gauge No. .219
TYPE OF SCREEN OR PERFORATION MATERIAL: 1 Steel 2 Brass 3 Stainless steel [✓ 4 Galvanized steel] 5 Fiberglass 6 Concrete tile 7 PVC 8 RMP (SR) 9 ABS 10 Asbestos-cement 11 Other (specify) 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 1 Continuous slot 2 Louvered shutter 3 Mill slot 4 Key punched 5 Gauzed wrapped [✓ 6 Wire wrapped] 7 Torch cut 8 Saw cut 9 Drilled holes 10 Other (specify) 11 None (open hole)
SCREEN-PERFORATED INTERVALS: From 54 ft. to 94 ft., From ft. to ft.
From ft. to ft., From ft. to ft.
GRAVEL PACK INTERVALS: From 10 ft. to 94 ft., From ft. to ft.
From ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout [✓ 3 Bentonite] 4 Other
Grout Intervals: From 0 ft. to 10 ft., From ft. to ft., From ft. to ft.
What is the nearest source of possible contamination: 1 Septic tank 2 Sewer lines 3 Watertight sewer lines 4 Lateral lines 5 Cess pool 6 Seepage pit 7 Pit privy 8 Sewage lagoon 9 Feedyard [✓ 10 Livestock pens] 11 Fuel storage 12 Fertilizer storage 13 Insecticide storage 14 Abandoned water well 15 Oil well/Gas well 16 Other (specify below)
Direction from well? Northeast. How many feet? 2,800'

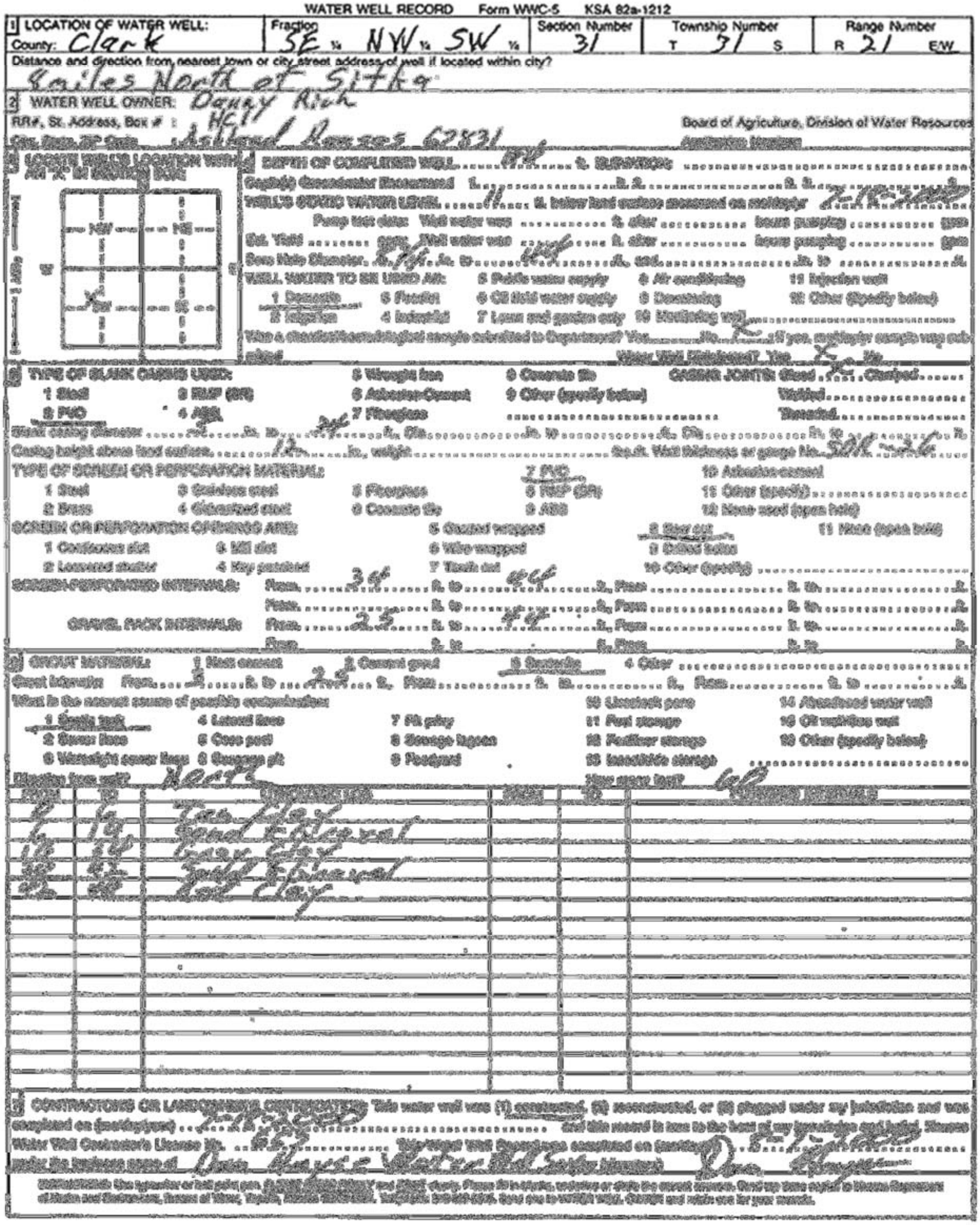
FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHOLOGIC LOG
0	12	Clay			
12	42	Medium sand			
42	94	Sand & gravel, few rocks			
94	100	Red bed			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was [✓ (1) constructed], (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 4/30/82 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 102 This Water Well Record was completed on (mo/day/yr) 5/26/82 under the business name of Layne-Western Co., Inc. by (signature)

INSTRUCTIONS: Use typewriter or ball point pen. PLEASE PRESS FIRMLY and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Environmental Geology Section, Topeka, KS 66620. Send one to WATER WELL OWNER and retain one for your records.

OFFICE USE ONLY
T 31 S R 21 W SEC. 31 SE ¼ NE ¼ NW ¼

Attachment 10 – Well driller log for Dan Rich lawn and garden well next to the off-stream groundwater pond



WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL:
County: Clark
Fraction SE ¼ NW ¼ SW ¼
Section Number 31
Township Number T 31 S
Range Number R 21 E/W

Distance and direction from nearest town or city street address of well if located within city?
8 miles North of Sitka

2 WATER WELL OWNER: Danny Rich
RR#, St. Address, Box #: HC1
City, State, ZIP Code: Ashland Kansas 67831

Board of Agriculture, Division of Water Resources
Application Number

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

4 DEPTH OF COMPLETED WELL 44 ft. ELEVATION:

WELL'S STATIC WATER LEVEL 11 ft. below land surface measured on mo/day/yr 7-16-2002

Bore Hole Diameter 8 ¾ in. to 44 ft.

WELL WATER TO BE USED AS: 1 Domestic

Was a chemical/bacteriological sample submitted to Department? Yes ___ No X

Water Well Disinfected? Yes X No

5 TYPE OF BLANK CASING USED: 2 PVC

CASING JOINTS: Glued X

Blank casing diameter 2 in. to 34 ft.

Casing height above land surface 12 in.

Wall thickness or gauge No. SDR 26

TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC

SCREEN OR PERFORATION OPENINGS ARE: 8 Saw cut

SCREEN-PERFORATED INTERVALS: From 34 ft. to 44 ft.

GRAVEL PACK INTERVALS: From 25 ft. to 44 ft.

6 GROUT MATERIAL: 3 Bentonite

Grout Intervals: From 0 ft. to 25 ft.

What is the nearest source of possible contamination: 1 Septic tank

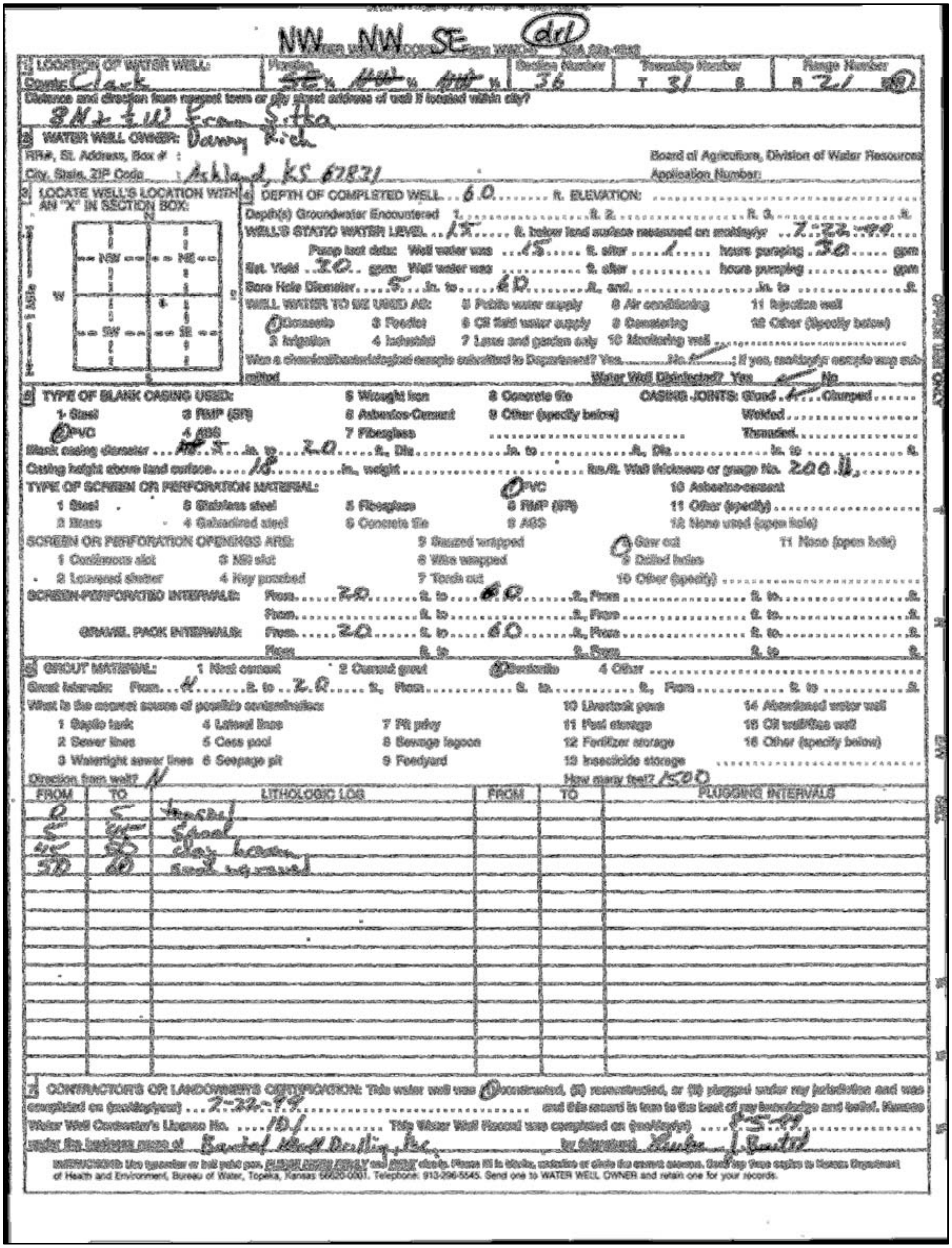
Direction from well? North

How many feet? 60

FROM	TO	LITHOLOGIC LOG
0	6	Top Soil
6	16	Sand & Gravel
16	32	Gray Clay
32	42	Sand & Gravel
42	44	Red Clay

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 7-16-2002 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 625 This Water Well Record was completed on (mo/day/yr) 8-1-2002 under the business name of Dan Hayse Water Well Service by (signature) Dan Hayse

Attachment 11 – Well driller log for Dan Rich new house well drilled in 1999. Dan Rich said the well is drilled to "Red Beds".



NW NW SE (drl)

WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL: County: Clark | Fraction: ~~SE~~ ¼ ~~NW~~ ¼ ~~NW~~ ¼ | Section Number: 36 | Township Number: T 31 S | Range Number: R 21 E [✓ W]

Distance and direction from nearest town or city street address of well if located within city? 3 N & ½ W from Sitka

2 WATER WELL OWNER: Danny Rich

RR#, St. Address, Box # :

City, State, ZIP Code : Ashland, KS 67831

Board of Agriculture, Division of Water Resources

Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX: N; NW; NE; W; E; SW; SE; S; 1 Mile

4 DEPTH OF COMPLETED WELL 60 ft. ELEVATION:

Depth(s) Groundwater Encountered 1. ft. 2. ft. 3. ft.

WELL'S STATIC WATER LEVEL 15 ft. below land surface measured on mo/day/yr 7-22-99

Pump test data: Well water was 15 ft. after 1 hours pumping 30 gpm

Est. Yield 30 gpm: Well water was ft. after hours pumping gpm

Bore Hole Diameter 5 in. to 60 ft., and in. to ft.

WELL WATER TO BE USED AS: [✓ 1 Domestic] 2 Irrigation 3 Feedlot 4 Industrial 5 Public water supply 6 Oil field water supply 7 Lawn and garden only 8 Air conditioning 9 Dewatering 10 Monitoring well 11 Injection well 12 Other (Specify below)

Was a chemical/bacteriological sample submitted to Department? Yes No ✓ ; If yes, mo/day/yr sample was submitted

Water Well Disinfected? Yes ✓ No

5 TYPE OF BLANK CASING USED: 1 Steel [✓ 2 PVC] 3 RMP (SR) 4 ABS 5 Wrought iron 6 Asbestos-Cement 7 Fiberglass 8 Concrete tile 9 Other (specify below)

CASING JOINTS: Glued ✓ Clamped Welded Threaded

Blank casing diameter ~~4~~ 5 in. to 20 ft., Dia in. to ft., Dia in. to ft.

Casing height above land surface 18 in., weight lbs./ft. Wall thickness or gauge No. 200 lb.

TYPE OF SCREEN OR PERFORATION MATERIAL: 1 Steel 2 Brass 3 Stainless steel 4 Galvanized steel 5 Fiberglass 6 Concrete tile [✓ 7 PVC] 8 RMP (SR) 9 ABS 10 Asbestos-cement 11 Other (specify) 12 None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE: 1 Continuous slot 2 Louvered shutter 3 Mill slot 4 Key punched 5 Gauzed wrapped 6 Wire wrapped 7 Torch cut [✓ 8 Saw cut] 9 Drilled holes 10 Other (specify) 11 None (open hole)

SCREEN-PERFORATED INTERVALS: From 20 ft. to 60 ft., From ft. to ft.

From ft. to ft., From ft. to ft.

GRAVEL PACK INTERVALS: From 20 ft. to 60 ft., From ft. to ft.

From ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout [✓ 3 Bentonite] 4 Other

Grout Intervals: From 4 ft. to 20 ft., From ft. to ft., From ft. to ft.

What is the nearest source of possible contamination: 1 Septic tank 2 Sewer lines 3 Watertight sewer lines 4 Lateral lines 5 Cess pool 6 Seepage pit 7 Pit privy 8 Sewage lagoon 9 Feedyard 10 Livestock pens 11 Fuel storage 12 Fertilizer storage 13 Insecticide storage 14 Abandoned water well 15 Oil well/Gas well 16 Other (specify below)

Direction from well? N How many feet? 1500

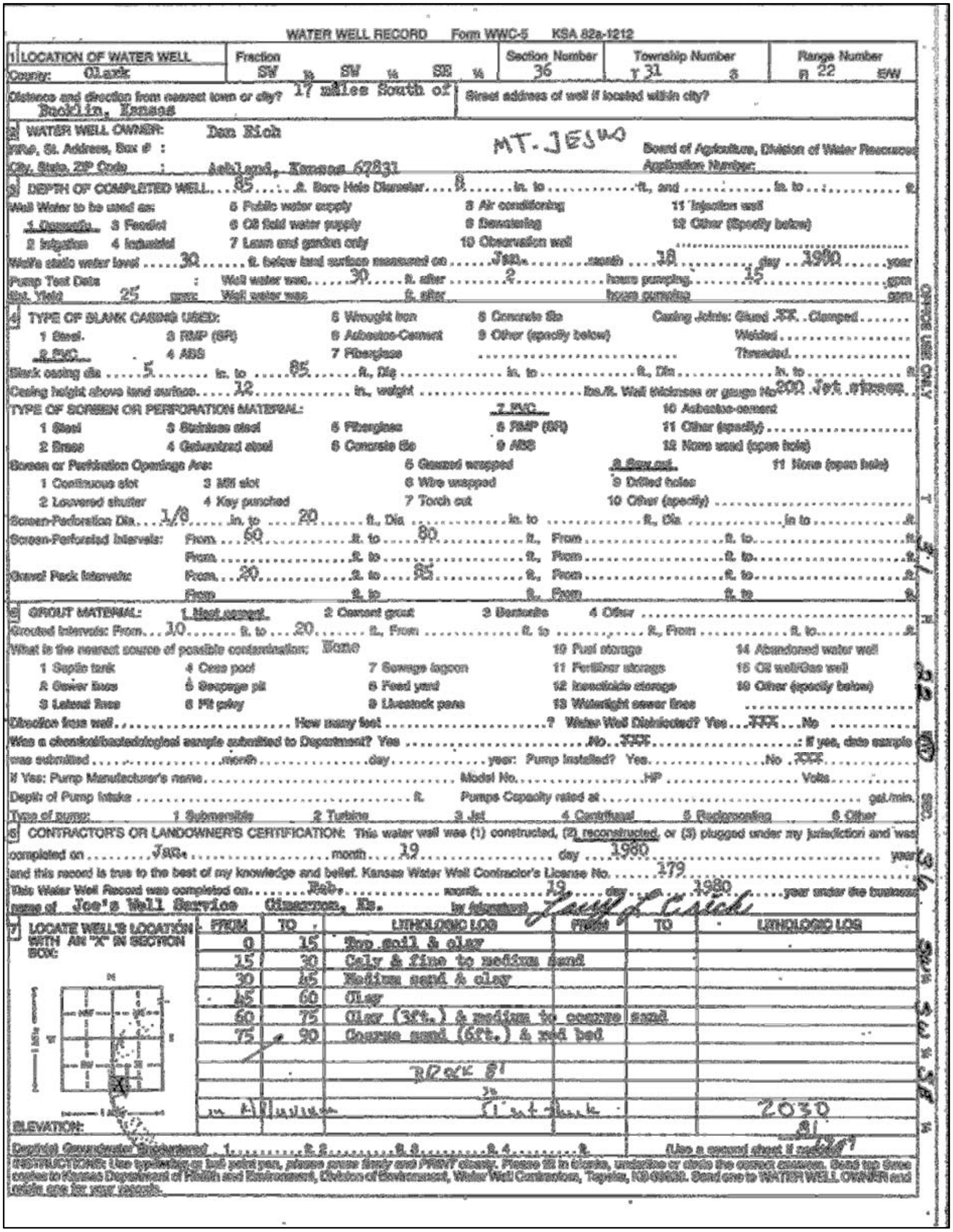
FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
0	5	topsoil			
5	45	Sand			
45	50	clay brown			
50	60	Sand w/gravel			

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was [✓ (1) constructed], (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) 7-22-99 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 101 This Water Well Record was completed on (mo/day/yr) 8-5-99 under the business name of Bartel Well Drilling, Inc. by (signature) Bartel

INSTRUCTIONS: Use typewriter or ball point pen. [illegible] Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

OFFICE USE ONLY

Attachment 12 – Well driller for old house well reconstructed in 1980.



WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL
County: Clark
Fraction: SW ¼ SW ¼ SE ¼
Section Number: 36
Township Number: T 31 S
Range Number: R 22 E/W
Distance and direction from nearest town or city? 17 miles South of Bucklin, Kansas
Street address of well if located within city?

2 WATER WELL OWNER: Dan Rich
RR#, St. Address, Box # :
City, State, ZIP Code : Ashland, Kansas 67831
MT. JESUS
Board of Agriculture, Division of Water Resources Application Number:

3 DEPTH OF COMPLETED WELL 85 ft. Bore Hole Diameter 8 in. to ft., and in. to ft.
Well Water to be used as: [✓ 1 Domestic] 2 Irrigation 3 Feedlot 4 Industrial 5 Public water supply 6 Oil field water supply 7 Lawn and garden only 8 Air conditioning 9 Dewatering 10 Observation well 11 Injection well 12 Other (Specify below)
Well's static water level 30 ft. below land surface measured on Jan. month 18 day 1980 year
Pump Test Data : Well water was 30 ft. after 2 hours pumping 15 gpm
Est. Yield 25 gpm: Well water was ft. after hours pumping gpm

4 TYPE OF BLANK CASING USED: 1 Steel [✓ 2 PVC] 3 RMP (SR) 4 ABS 5 Wrought iron 6 Asbestos-Cement 7 Fiberglass 8 Concrete tile 9 Other (specify below)
Casing Joints: Glued XX Clamped Welded Threaded
Blank casing dia 5 in. to 85 ft., Dia in. to ft., Dia in. to ft.
Casing height above land surface 12 in., weight lbs./ft. Wall thickness or gauge No. 200 Jet winner
TYPE OF SCREEN OR PERFORATION MATERIAL: 1 Steel 2 Brass 3 Stainless steel 4 Galvanized steel 5 Fiberglass 6 Concrete tile [✓ 7 PVC] 8 RMP (SR) 9 ABS 10 Asbestos-cement 11 Other (specify) 12 None used (open hole)
Screen or Perforation Openings Are: 1 Continuous slot 2 Louvered shutter 3 Mill slot 4 Key punched 5 Gauzed wrapped 6 Wire wrapped 7 Torch cut [✓ 8 Saw cut] 9 Drilled holes 10 Other (specify) 11 None (open hole)
Screen-Perforation Dia. 1/8 in. to 20 ft., Dia in. to ft., Dia in to ft.
Screen-Perforated Intervals: From 60 ft. to 80 ft., From ft. to ft.
From ft. to ft., From ft. to ft.
Gravel Pack Intervals: From 20 ft. to 85 ft., From ft. to ft.
From ft. to ft., From ft. to ft.

5 GROUT MATERIAL: [✓ 1 Neat cement] 2 Cement grout 3 Bentonite 4 Other
Grouted Intervals: From 10 ft. to 20 ft., From ft. to ft., From ft. to ft.
What is the nearest source of possible contamination: None
1 Septic tank 2 Sewer lines 3 Lateral lines 4 Cess pool 5 Seepage pit 6 Pit privy 7 Sewage lagoon 8 Feed yard 9 Livestock pens 10 Fuel storage 11 Fertilizer storage 12 Insecticide storage 13 Watertight sewer lines 14 Abandoned water well 15 Oil well/Gas well 16 Other (specify below)
Direction from well How many feet? Water Well Disinfected? Yes XXX No
Was a chemical/bacteriological sample submitted to Department? Yes No XXX ; If yes, date sample was submitted month day year: Pump Installed? Yes No XXX
If Yes: Pump Manufacturer's name Model No. HP Volts
Depth of Pump Intake ft. Pumps Capacity rated at gal./min.
Type of pump: 1 Submersible 2 Turbine 3 Jet 4 Centrifugal 5 Reciprocating 6 Other

6 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, [✓ (2) reconstructed], or (3) plugged under my jurisdiction and was completed on Jan. month 19 day 1980 year and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 179
This Water Well Record was completed on Feb. month 19 day 1980 year under the business name of Joe's Well Service Cimarron, Ks. by (signature) Larry L. Crick

7 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHOLOGIC LOG
0	15	Top soil & clay			
15	30	Caly & fine to medium sand			
30	45	Medium sand & clay			
45	60	Clay			
60	75	Clay (3ft.) & medium to coarse sand			
75	90	Coarse sand (6ft.) & red bed			
		BRCK 81			
in Alluvium		Clark			2030
					81

ELEVATION:
Depth(s) Groundwater Encountered 1. ft. 2. ft. 3. ft. 4. ft. (Use a second sheet if needed)
INSTRUCTIONS: Use typewriter or ball point pen, please press firmly and PRINT clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Division of Environment, Water Well Contractors, Topeka, KS 66620. Send one to WATER WELL OWNER and retain one for your records.

OFFICE USE ONLY T 31 R 22 W SEC. 36 SW ¼ SW ¼ SE ¼