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DEPARTMENT OF
WATER RESOURCES

November 7, 2011

Ms. Cherie Palmer, Sr. Water Resource Agent
Idaho Department of Water Resources
Water Allocation Bureau
322 East Front Street
PO Box 83720
Boise, Idaho 83720-0098

Subject: Permit 63-12596 (Crane Creek Country Club) Information Request

Dear Ms. Palmer,

In your letter of August 24, 2011, you requested information showing how Conditions #7, #8, and #9 in Permit 63-12596 have been satisfied. In response, this letter provides the following:

1. Review of Permit 63-12596 elements;
2. Description of measurement devices (response to question regarding Condition #7);
3. Results from measurement-device calibration (response to question regarding Condition #8); and a
4. Summary of production rates and water level trends (response to question regarding Condition #9).

Permit 63-12596

Permit 63-12596 authorizes the irrigation of 116 acres in Sections 26 and 35 in Township 4 North, Range 2 East with 5.52 cfs of ground water with a June 1, 2004 priority date. Permit 63-12596 authorizes the use of 10 Points of Diversion (PODs). Three of these PODs are wells. These wells are located (in the SWSWSW of Section 26 (Well No. 1), SESWNE of Section 26 (Well No. 2), and SESWSE of Section 26 (Well No. 3). Water from the remaining points of diversion flows by gravity from shallow wells (Johnson Ranch Wells) to a golf course pond.

The application was made by the Crane Creek Country Club (CCCC) on September 5, 2000 and approved on January 17, 2001. The original Proof of Beneficial Use date was extended by the Department to February 1, 2003. The permit lapsed on February 7, 2003 for lack of Proof of Beneficial Use. Proof of Beneficial Use was ultimately submitted on June 2, 2004, along with evidence to show that water under the permit had been put to beneficial use

during the development period. The permit was reinstated on January 18, 2005 with a June 2, 2004 priority date.

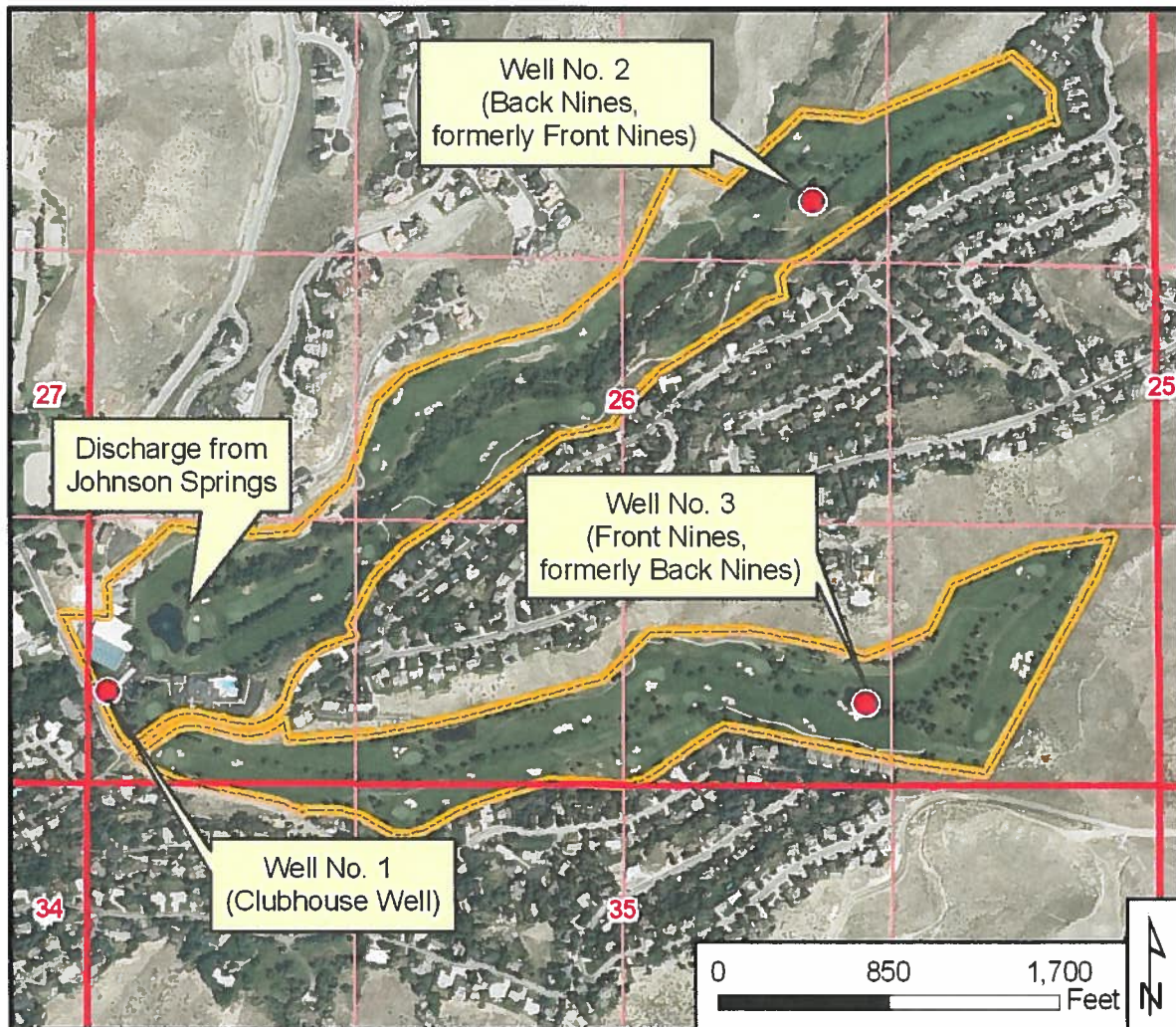


Figure 1. Well locations within CCCC place of use.

Description of Measurement Devices (response to question regarding Condition #7)

Condition #7 states that "The right holder shall install measuring devices of a type acceptable to the Department to record the flow rate withdrawn from each point of diversion."

Per the Beneficial Use Field Exam, submitted to IDWR by HydroLogic Inc. on May 18, 2004, measurement devices at CCCC points of diversion include the following:

1. Well No. 1, (Clubhouse Well) has a McCrometer ML 04 (Serial No. 93-3821-6), 6-inch, propeller-type flowmeter. The Field Exam lists a calibration date of October 15,

1993¹ for this well.

2. Well No. 2 (currently the "Back Nine" well, formerly the "Front Nine" well) had a McCrometer MW 506 (Serial No. 95-1876-6), 6-inch, propeller-type flowmeter. This flow meter was replaced in 2009.
3. Well No. 3 (currently the "Front Nine" well, formerly the "Back Nine" well) has a McCrometer MW 506 (Serial No. 95-3598-6), 6-inch, propeller-type flowmeter. The Field Exam lists a calibration date of May 26, 1995 for this well.

It is not possible to measure flows from each of the individual "Johnson Ranch" wells. Instead, flows from these wells have been measured in aggregate in a collection pipe prior to discharging into the pond. Measurements were taken by using a 32-gallon container and a stopwatch. In 2010, CCCC constructed a water feature at the aggregate point of discharge for the Johnson Ranch wells, precluding container-and-stopwatch measurements. CCCC has purchased an in-line magnetic flowmeter for the Johnson Wells discharge line; installation will be completed soon.

CCCC requests a waiver from the requirement of measuring discharge at each individual point of diversion. CCCC seeks to measure diversion rates from pumping wells and in aggregate from the Johnson Wells.

Calibration of Measuring Devices (response to question regarding Condition #8)

Condition #8 states that "The measuring devices shall be calibrated by a method approved by the Department every three years following the date of this approval."

The Field Exam cover letter (May 18, 2004) states that "preliminary work has been done toward this calibration and a recommendation, by us, is currently before the CCCC administration for calibration of the flow-meters." It is unclear from existing records whether or not the calibration was accomplished. CCCC administration and personnel have changed, the former consultant (HydroLogic Inc.) no longer works for CCCC, and records documenting calibration are not available.

SPF Water Engineering, LLC (SPF) conducted discharge-measurement checks in Well Nos. 1, 2, and 3 on October 14, 2011. SPF used a clamp-on ultrasonic transit-time flow meter (Panametrics PT878) to make these measurements. Panametrics' specifications for the PT878 meter "assume a fully developed flow profile typically 20 diameters upstream and 10 diameters downstream of straight pipe run", although a general rule of thumb is to avoid

¹ It appears that the calibration dates listed in the Field Exam may be in error, in that the Field Exam cover letter (dated May 18, 2004) states that calibration "has not yet been done and is *only a couple of months overdue*." (emphasis added). This implies that the calibration dates may be October 15, 2003, April 3, 2005, and May 26, 2005 for Wells __, __, and __, respectively (instead of the 1993, 1995, 1995 dates).

turbulent flow within 10 pipe diameters upstream and five diameters downstream. Field conditions do not always allow for an ideal installation. Specifically, field conditions for these measurements were as follows:

1. Well No. 1: the PT878 was attached with approximately 1.2 and 3.2 bore diameters downstream of a 45° bend and check valve, respectively. The meter was installed at a location where the pipe entered the ground, which was likely at least a few bore diameters upstream of the next bend (Figure 2).
2. Well No. 2: the PT878 was attached 3 and 4 bore diameters downstream of a butterfly valve and 90° bend, respectively. The meter was attached 2.5 bore diameters upstream of the permanently-installed flowmeter (Figure 3).
3. Well No. 3: the PT878 meter was attached 6.2 and 9.2 bore diameters downstream of a 45° bend and permanently-installed meter, respectively. The meter was attached to a pipe that immediately went below ground surface, likely at least a few bore diameters upstream of the next bend (Figure 4).

Results of the discharge rate comparison between installed flowmeters and the ultrasonic transit-time flow meter are presented in Table 1. Differences between installed flowmeters and the clamp-on meter range from 2% to 4%.

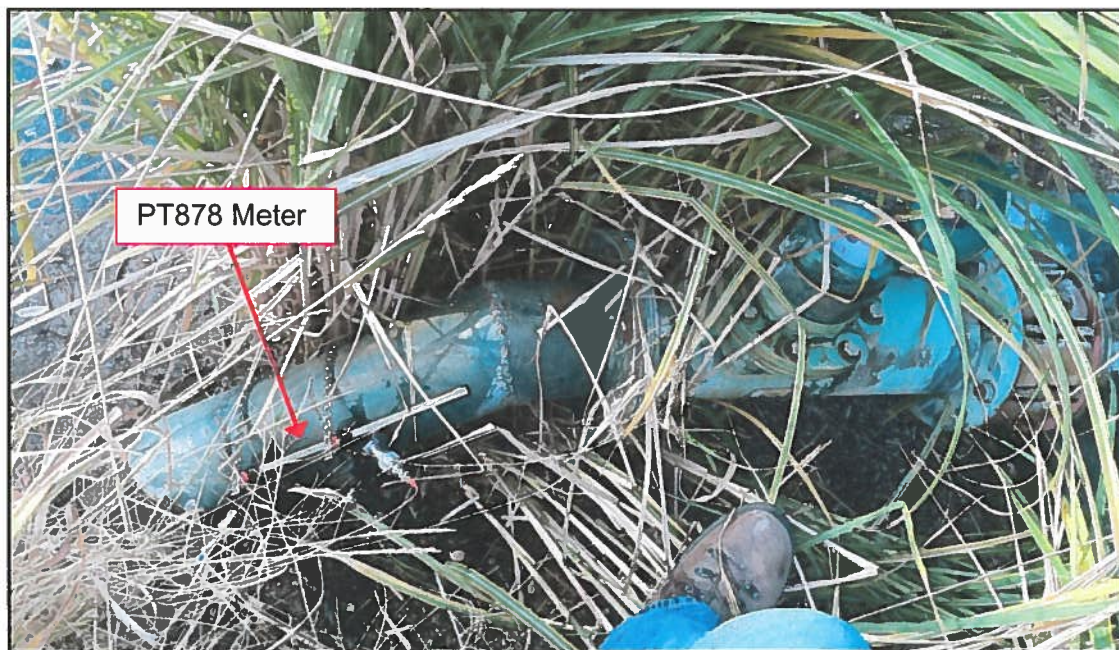


Figure 2. PT878 meter installation at Well No. 1.



Figure 3. PT878 meter installation at Well No. 2.



Figure 4. PT878 meter installation at Well No. 3.

Discharge Rate Comparison						
Well	Static Water Level (below measuring point, in feet)	Totalizer (gal)	Flowrate (installed meter, in gpm)	Flowrate (Clamp-on flowmeter, in gpm)	Percentage Difference	Notes
Well No. 1 (Clubhouse)	No Access (see text)	53969500	725	705.2	3%	- Measurement tube had blockage, so no water level measurement taken - Clamp on meter had to be placed in sub-optimal location, just downstream of 45° bend and meter (see pictures)
Well No. 2 (Back 9)	62.24	90980000	350	337.0	4%	- Clamp on meter placed upstream of meter and downstream of gate valve (see pictures)
Well No. 3 (Front 9)	252.07	51962450	510	497.5	2%	- Clamp on meter placed downstream of 45° bend and meter (see pictures)

Table 1. Discharge rate comparison.

Summary of Production Rates and Water Level Trends (response to question regarding Condition #9)

Condition #9 states that "Each week the water right holder shall read and record instantaneous flow rate and accumulated diversion volume at each of the authorized points of diversion for this right. These records shall be made available to the Department upon request."

The HydroLogic May 18, 2004 Field Exam cover letter states that "Condition #9, which requires weekly monitoring of flow-rate and volume pumped, is being complied with by CCCC personnel" and that monthly measurements are also being taken by an independent

consultant (HydroLogic). Based on this statement, CCCC was complying with the weekly readings during the permit development period².

Unfortunately, weekly production records are no longer available. Instead, monthly records are available for the development period, and periodic records are available for the years following the permit development period (Attachment A). Specifically, monthly production data were collected prior to and during the permit development period (1996-2004) and periodically between 2007 and 2011. No records are available for the period between 2004 and 2007. In addition, while not required as a permit condition, CCCC has collected groundwater-level data for the same time periods.

Based on these data, annual production volumes have ranged from approximately 85 million to 120 million gallons per year (Figure 5 through Figure 7, beginning on page 9)³. A faulty meter precluded tracking production levels in Well No. 3 during several post-development period years.

Groundwater levels in Well No. 1 and Well No. 2 have been relatively stable since 1996 (Figure 5 and Figure 6). Groundwater levels in Well No. 3 (Figure 7) declined substantially from 1996 through 2004, but have stabilized (and increased slightly) since 2006 in response to reduced production from this well. It is anticipated that groundwater levels in the vicinity of Well No. 3 will continue to rise as a result of reduced production from this well.

Measurements from the Johnson Ranch Wells (Johnson Springs) are shown in Figure 8. Measured discharge from the springs has ranged as high as approximately 300 gpm. The installation of a new flowmeter will provide more accurate discharge rate and volume data for these springs.

Conclusions and Recommendations

Conclusions and recommendations from this summary are as follows:

1. CCCC met the spirit of conditions required under Permit 63-12596 during the permit development period and in the intervening time following the permit development. In addition to production records, CCCC has also collected groundwater-level data to evaluate the impact of its irrigation pumping.
2. Water levels have remained stable in Well No. 1 and Well No. 2 during and after the permit development period. Water levels in Well No. 3 continued a decline through 2004 that began prior to the permit development period, but have since stabilized as

² Unfortunately, with CCCC staff changes these pre-2004 weekly records from the permit-development period are no longer available. Instead, monthly and bi-monthly data are presented here.

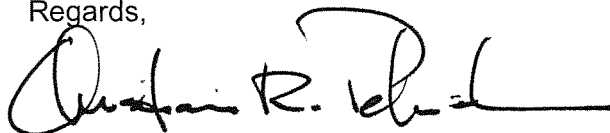
³ Production data are incomplete from 2005-2008, in part because of a dysfunctional flow meter in Well No. 3. The meter was replaced in 2009.

a result of reduced production from this well. This water level decline and subsequent stabilization represents local conditions, not a regional trend.

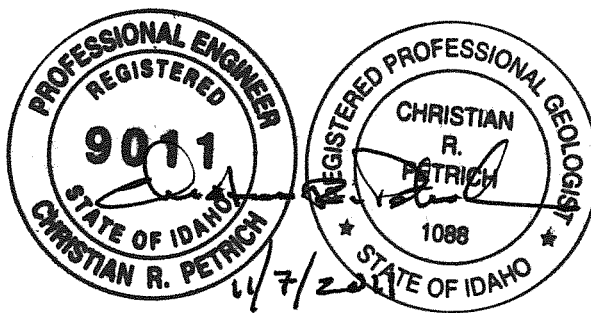
3. CCCC proposes changing the wording of Condition #9 to read as follows: "*The water right holder shall read and record accumulated diversion volumes at Well No. 1, Well No. 2, Well No. 3, and the aggregate discharge from the Johnson Springs on a quarterly basis. These records shall be made available to the Department upon request.*" This re-wording reflects the historic and current inability to measure flow from individual Johnson Ranch wells.

Please call me if you have any questions regarding this submittal.

Regards,



Christian R. Petrich, Ph.D., P.E., P.G.
Principal Engineer/Hydrologist



cc: Adam Bagwell, Crane Creek Country Club

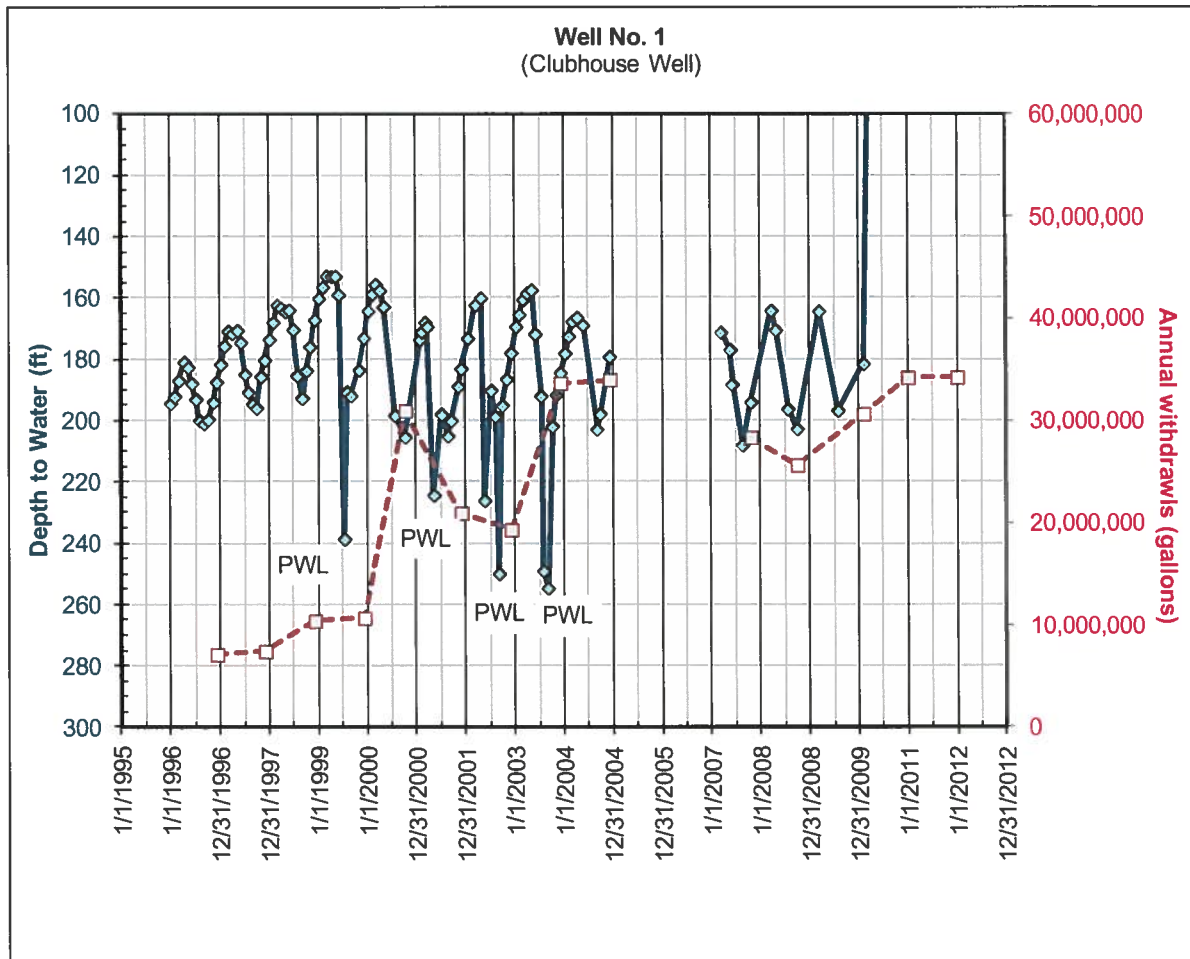


Figure 5. Groundwater levels and annual production volumes, Well No. 1.

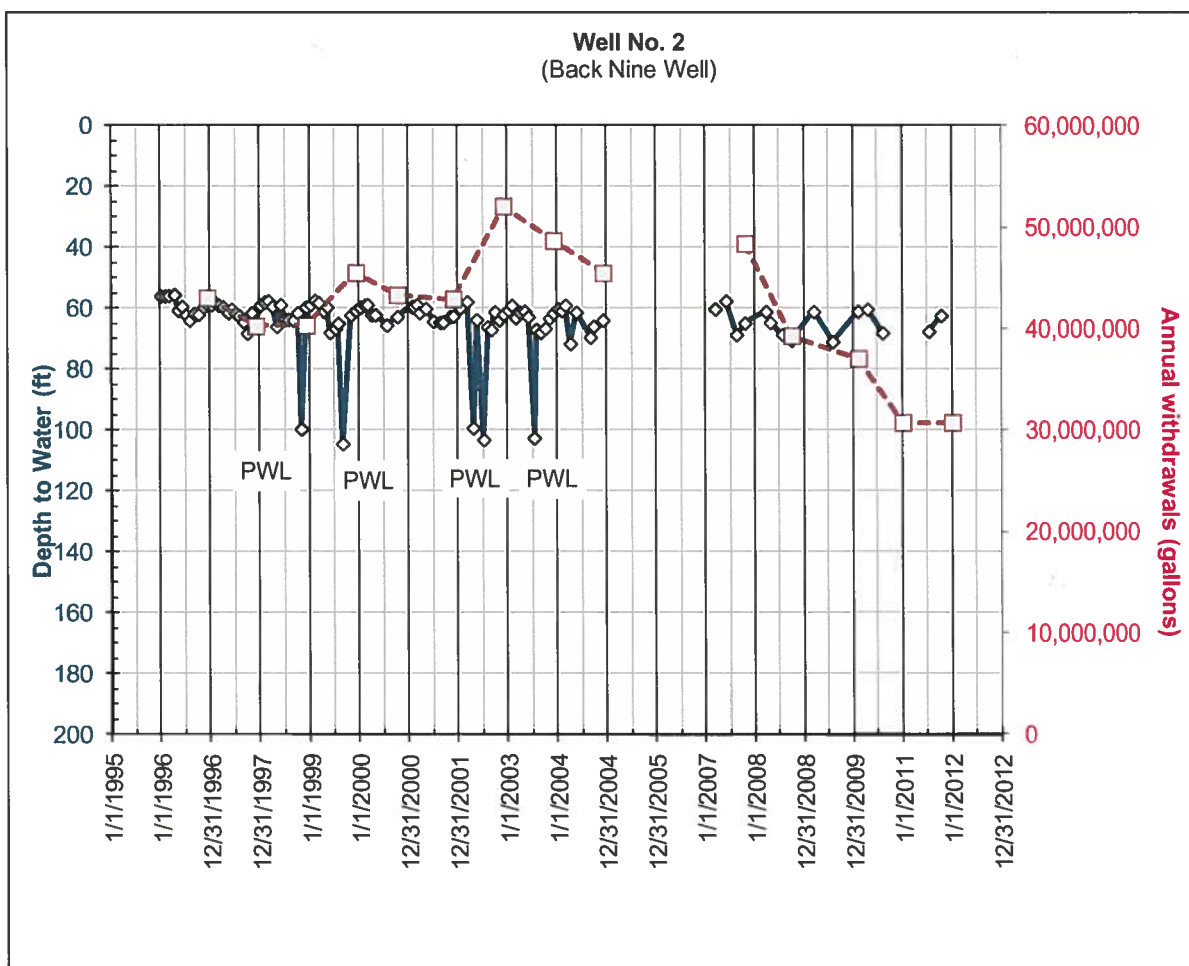


Figure 6. Groundwater levels and annual production volumes, Well No. 2

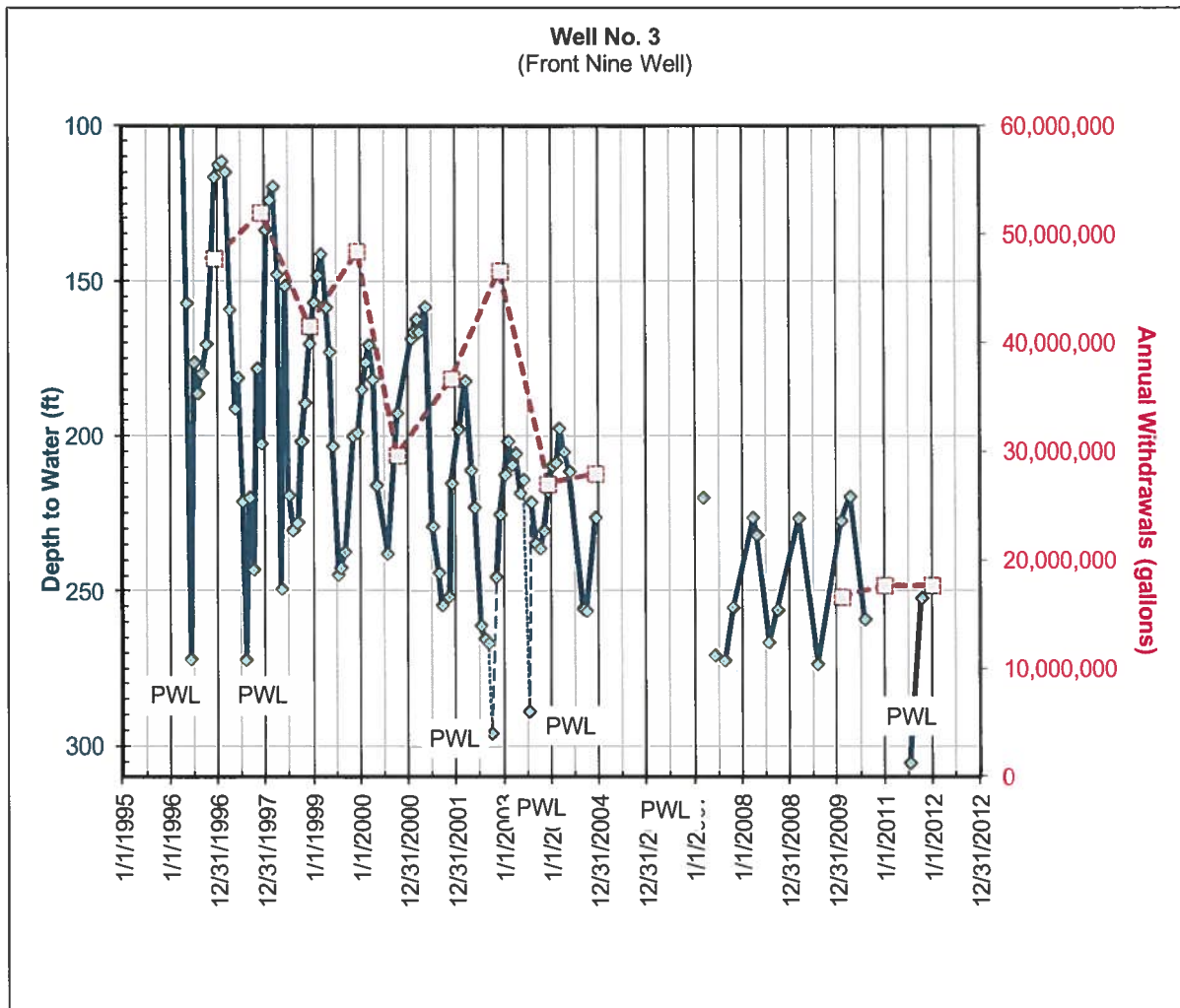


Figure 7. Groundwater levels and annual production volumes, well No. 3

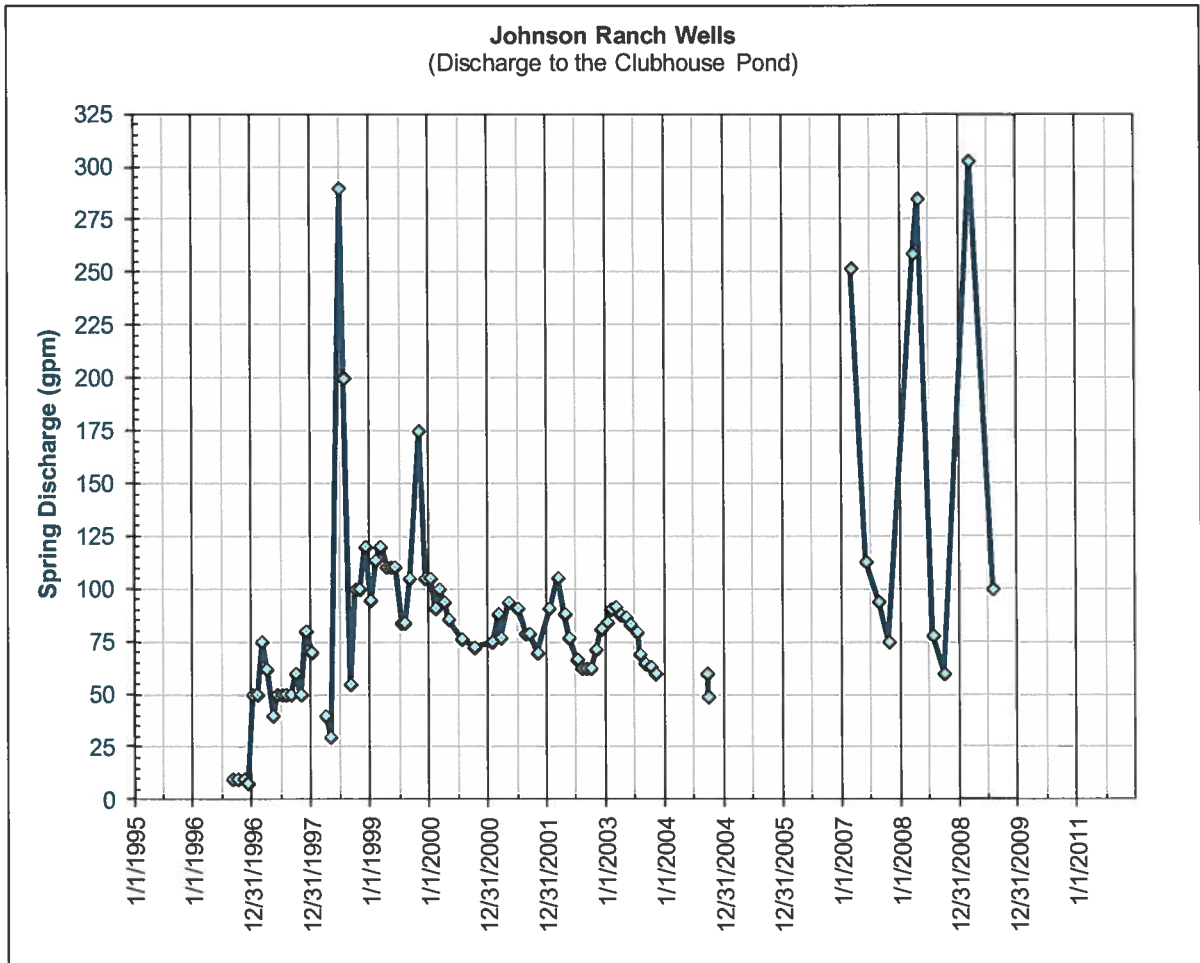


Figure 8. Discharge measurements from Johnson Ranch wells.

**Attachment A:
Crane Creek Country Club
Discharge and Water Levels**

Crane Creek No. 1 (Clubhouse Well)						Crane Creek No. 2 (Formerly Front Nine, currently Back Nine)						Crane Creek No. 3 (Formerly Back Nine, currently Front Nine)						Total Annual Volume
Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Total Annual Volume
1/1/1996	12:00	194.24	136,913,000			1/1/1996	12:00	55.72	15,733,000			1/1/1996	12:00	98.97	13,626,700			
2/1/1996	12:00	192.03	136,913,000			2/1/1996	12:00	55.74	15,733,000			2/1/1996	12:00	99.08	13,626,700			
3/1/1996	12:00	186.82	136,913,000			3/1/1996	12:00	55.63	15,733,000			3/1/1996	12:00	99.16	13,626,700			
4/11/1996	12:00	180.91	136,913,000			4/11/1996	12:00	55.34	15,733,000			4/11/1996	12:00	99.07	13,626,700			
5/9/1996	8:30	182.58	138,581,000			5/9/1996	9:00	60.46	20,550,400			5/9/1996	8:45	156.93	16,344,500			
6/5/1996	12:03	187.79	139,736,000			6/5/1996	13:00	59.21	26,175,000			6/5/1996	12:37	271.66	21,116,400			
7/5/1996	12:50	192.97	141,175,000			7/5/1996	13:25	61.94	34,060,100			7/5/1996	12:05	176.07	31,175,400			
8/1/1996	12:00	199.85	142,665,000			8/1/1996	12:00	63.73	43,747,700			8/1/1996	12:00	185.98	42,476,000			
9/3/1996	13:55	200.81	143,794,000			9/3/1996	14:15	61.52	50,780,500			9/3/1996	14:35	179.5	51,972,200			
10/5/1996	10:30	199.48	143,940,000			10/5/1996	11:10	61.8	55,868,900			10/5/1996	10:45	170.17	58,324,600			
11/13/1996	13:45	193.85	143,989,000			11/13/1996	14:15	59.43	58,673,800			11/13/1996	14:02	142.39	61,414,800			
12/6/1996	14:00	187.35	143,989,000	7,076,000		12/6/1996	14:15	58.63	58,819,400	43,086,400		12/6/1996	14:30	116.32	61,414,800	47,788,100		97,950,500
1/6/1997	13:20	181.59	143,989,000			1/6/1997	16:15	58.67	58,819,400			1/6/1997	16:00	112.29	61,414,800			
2/4/1997	10:35	175.58	143,989,000			2/4/1997	11:05	57.95	58,819,400			2/4/1997	10:50	111.14	61,414,800			
3/4/1997	9:45	170.78	143,989,000			3/4/1997	10:00	58.77	58,819,400			3/4/1997	10:15	114.63	61,414,800			
4/3/1997	14:45	171.59	143,989,000			4/3/1997	15:20	59.31	58,819,400			4/3/1997	15:05	158.97	66,880,200			
5/12/1997	9:05	170.53	144,049,000			5/12/1997	9:20	61.19	70,621,800			5/12/1997	9:45	190.9	71,120,100			
6/6/1997	9:20	174.46	145,313,000			6/6/1997	10:00	60.09	74,919,200			6/6/1997	9:45	180.92	76,846,700			
7/7/1997	16:00	184.81	147,834,000			7/7/1997	16:25	61.55	80,651,400			7/7/1997	16:15	220.81	85,041,300			
8/1/1997	9:50	190.63	148,266,000			8/1/1997	10:40	62.27	86,233,100			8/1/1997	10:11	271.85	93,961,100			
9/2/1997	11:16	194.43	148,277,000			9/2/1997	12:20	64.26	93,132,400			9/2/1997	11:50	219.5	4,182,800			
10/1/1997	9:00	195.8	151,098,000			10/1/1997	9:42	68.00	96,825,000			10/1/1997	9:15	242.75	9,444,300			
11/3/1997	11:02	185.55	151,387,000			11/3/1997	11:42	61.33	98,958,000			11/3/1997	11:24	177.93	13,174,500			
12/1/1997	12:20	180.21	151,387,000	7,398,000		12/1/1997	12:50	64.00	99,125,300	40,305,900		12/1/1997	12:35	202.22	13,473,100	52,058,300		99,762,200
1/5/1998	14:00	173.45	151,387,000			1/5/1998	14:50	58.76	99,125,300			1/5/1998	14:30	133.25	13,473,100			
2/3/1998	14:00	167.91	151,387,000			2/3/1998	15:00	57.77	99,125,300			2/3/1998	14:40	123.72	13,473,100			
3/3/1998	10:50	162.29	151,387,000			3/3/1998	11:05	57.36	99,125,300			3/3/1998	11:25	119.3	13,473,100			
4/2/1998	8:55	163.24	153,579,000			4/2/1998	9:45	59.20	2,977,400			4/2/1998	9:20	147.66	15,681,600			
5/4/1998	13:00	164.36	153,977,000			5/4/1998	13.5	65.81	8,429,100			5/4/1998	13:32	249	19,834,400			
6/1/1998	12:00	163.93	156,872,000			6/1/1998	12:00	58.65	11,110,400			6/1/1998	12:00	151.4	20,927,300			
7/2/1998	9:35	170.28	158,413,000			7/2/1998	10:30	63.29	16,947,900			7/2/1998	10:00	218.79	27,623,600			
7/29/1998	5:31	185.2	158,642,000			7/29/1998	17:55	63.55	24,755,900			7/29/1998	17:40	230.14	37,944,800			
9/3/1998	11:13	192.52	161,113,000			9/3/1998	11:29	63.76	33,048,800			9/3/1998	11:54	227.65	48,896,800			
10/5/1998	12:20	183.55	161,752,000			10/5/1998	13:10	61.31	36,196,900			10/5/1998	12:50	201.42	52,456,600			
10/30/1998	11:02	175.84	161,752,000			10/30/1998	11:44	99.40	38,444,000			10/30/1998	11:22	189.06	54,533,200			

Crane Creek No. 1 (Clubhouse Well)						Crane Creek No. 2 (Formerly Front Nine, currently Back Nine)						Crane Creek No. 3 (Formerly Back Nine, currently Front Nine)						Total Annual Volume
Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Total Annual Volume
12/4/1998	15:56	167.11	161,752,000	10,365,000		12/4/1998	16:28	59.38	39,484,500	40,359,200		12/4/1998	16:15	169.94	55,058,100	41,585,000		92,309,200
1/5/1999	14:50	160.15	161,752,000			1/5/1999	15:37	58.64	39,484,500			1/5/1999	15:18	156.64	55,058,100			
2/5/1999	9:38	156.51	161,752,000			2/5/1999	10:17	57.21	39,484,500			2/5/1999	9:58	147.98	55,058,100			
3/5/1999	9:34	152.82	161,752,000			3/5/1999	10:10	57.92	39,484,500			3/5/1999	9:52	141.06	55,058,100			
4/13/1999	1:12	152.98	162,052,000			4/13/1999	13:45	60.80	44,834,700			4/13/1999	13:25	158.28	57,437,200			
5/11/1999	9:15	152.95	162,707,000			5/11/1999	9:58	59.35	48,888,500			5/11/1999	9:38	172.61	61,023,000			
6/2/1999	8:50	158.95	163,231,000			6/2/1999	9:37	67.81	53,737,400			6/2/1999	9:10	202.96	66,509,800			
7/13/1999	9:11	238.55	166,278			7/13/1999	10:15	66.48	633,616,000			7/13/1999	9:45	244.53	77,891,600			
8/2/1999	99 13:40	190.56	168,780			8/2/1999	14:19	64.8	690,276,000			8/2/1999	14:04	242.2	85,355,600			
9/2/1999	12:40	191.74	170,828,000			9/2/1999	13:24	104.33	753,553,000			9/2/1999	13:00	237.01	93,130,900			
11/1/1999	10:41	183.44	172,425,000			11/1/1999	11:22	62.05	83,392,300			11/1/1999	11:04	199.78	2,264,000			
12/8/1999	9:30	172.93	172,425,000	10,673,000		12/8/1999	10:23	60.57	85,014,500	45,530,000		12/8/1999	10:00	198.65	3,522,000	48,463,900		104,666,900
1/10/2000	12:30	164.18	172,425,000			1/10/2000	13:10	59.5	85,014,500			1/10/2000	12:51	184.7	3,522,000			
2/10/2000	15:07	158.64	172,425,000			2/10/2000	15:22	58.82	850,145,000			2/10/2000	15:40	175.99	3,522,000			
3/4/2000	9:15	155.68	172,425,000			3/4/2000	9:52	58.65	850,145,000			3/4/2000	9:30	170.43	3,522,000			
4/4/2000	13:46	157.57	172,486,000			4/4/2000	14:30	61.93	88,183,100			4/4/2000	14:07	181.56	4,861,000			
5/2/2000	13:40	162.87	173,397,000			5/2/2000	14:21	61.97	95,260,600			5/2/2000	14:05	215.59	12,521,900			
7/24/2000	15:00	198.14	183,185,000			7/24/2000	15:24	65.37	13,008,100			7/24/2000	15:52	237.65	32,902,600			
10/9/2000	14:40	205.19	203,068,000	30,925,000		10/9/2000	15:22	62.51	26,790,800	43,353,700		10/9/2000	15:10	192.4	33,193,600	29,671,600		103,950,300
1/26/2001	12:50	173.5	203,350,000			1/26/2001	13:30	59.29	28,368,200			1/26/2001	13:10	168.41	33,193,600			
2/8/2001	12:21	170.96	203,350,000			2/8/2001	13:10	59.19	28,368,200			2/8/2001	12:44	166.2	33,193,600			
3/6/2001	14:40	167.95	203,350,000			3/6/2001	16:00	58.63	28,368,200			3/6/2001	15:02	162.07	33,193,600			
3/23/2001	9:15	169.34	203,350,000			3/23/2001	9:51	61.27	29,125,300			3/23/2001	9:26	166.23	33,517,000			
5/10/2001	12:45	224.2	206,539,000			5/10/2001	14:23	59.9	34,249,900			5/10/2001	14:43	158.15	33,918,800			
7/5/2001	9:40	197.8	213,324,000			7/5/2001	10:05	64.08	48,021,000			7/5/2001	11:10	228.93	46,782,900			
8/21/2001	13:28	204.79	220,604,000			8/21/2001	13:52	64.45	60,372,500			8/21/2001	14:35	243.83	58,942,600			
9/14/2001	13:58	199.79	222,973,000			9/14/2001	14:10	64.35	65,118,000			9/14/2001	14:10	254.25	64,370,500			
11/5/2001	10:36	188.71	224,241,000			11/5/2001	11:29	62.55	70,683,800			11/5/2001	12:03	251.45	69,459,400			
11/27/2001	12:00	183.02	224,276,000	20,926,000		11/27/2001	12:00	62.35	71,313,600	42,945,400		11/27/2001	12:00	215.05	69,913,400	36,719,800		100,591,200
1/16/2002	11:30	173.13	224,276,000			1/19/2002	11:30	59.67	71,313,600			1/19/2002	12:57	197.55	69,913,400			
3/13/2002	12:00	162.37	224,276,000			3/13/2002	12:00	57.66	71,313,600			3/13/2002	12:00	182.06	69,913,400			
4/24/2002	9:36	160.03	224,276,000			4/24/2002	9:52	99.11	75,972,900			4/24/2002	10:24	210.80	71,628,700			
5/20/2002	9:21	226.03	226,916,000			5/20/2002	9:44	63.57	83,157,700			5/20/2002	10:33	222.77	77,500,100			
7/8/2002	9:04	190.07	231,884,000			7/8/2002	9:17	102.92	97,483,200			7/8/2002	9:46	260.88	92,848,400			
8/7/2002	12:14	198.47	236,045,000			8/7/2002	12:45	65.95	5,904,400			8/7/2002	13:21	265.19	2,542,300			
9/4/2002	10:25	249.91	240,076,000			9/4/2002	10:41	66.86	12,937,400			9/4/2002	11:19	266.50	10,992,400			
9/30/2002	9:15	195.01	242,053,000			9/30/2002	10:38	60.97	17,085,400			9/30/2002	10:04	295.69	15,432,600			
11/1/2002	9:12	186.43	243,579,000			11/1/2002	10:24	63.64	22,191,200			11/1/2002	10:01	245.18	16,495,100			
12/4/2002	10:41	177.93	243,579,000	19,303,000		12/4/2002	11:07	61.83	23,414,700	52,101,100		12/4/2002	0:00	225.03	16,495,100	46,656,900		118,061,000
1/10/2003	10:05	169.32	243,579,000			1/10/2003	10:30	60.42	23,414,700			1/10/2003	10:54	212.25	16,570,300			

Crane Creek No. 1 (Clubhouse Well)						Crane Creek No. 2 (Formerly Front Nine, currently Back Nine)						Crane Creek No. 3 (Formerly Back Nine, currently Front Nine)						Total Annual Volume
Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Total Annual Volume
2/3/2003	12:19	165.43	243,579,000			2/3/2003	12:33	58.85	23,414,700			2/3/2003	13:14	201.45	16,570,300			
3/4/2003	8:36	160.57	243,579,000			3/4/2003	8:53	62.89	24,029,600			3/4/2003	9:20	209.09	16,938,400			
4/3/2003	8:59	158.44	243,579,000			4/3/2003	9:15	61.10	27,633,300			4/3/2003	9:50	205.41	17,998,900			
5/6/2003	8:33	157.42	244,646,000			5/6/2003	8:44	60.80	32,836,800			5/6/2003	9:08	218.18	18,837,600			
6/2/2003	11:54	171.76	246,034,000			6/2/2003	12:10	62.62	37,079,800			6/2/2003	12:37	213.83	20,881,600			
7/14/2003	9:10	191.93	254,566,000			7/14/2003	10:34	102.38	49,940,200			7/14/2003	10:50	288.61	30,144,800			
7/31/2003	10:02	249.02	262,330,000			7/31/2003	10:18	66.77	55,289,600			7/31/2003	10:42	221.12	30,580,000			
9/2/2003	9:48	254.57	270,146,000			9/2/2003	10:02	67.76	63,098,400			9/2/2003	10:19	234.31	36,065,500			
10/6/2003	10:00	201.73	275,961,000			10/6/2003	10:12	66.40	68,867,600			10/6/2003	10:36	236.01	39,717,300			
11/5/2003	13:00	191.6	277,225,000			11/5/2003	13:45	63.05	71,751,900			11/5/2003	13:24	230.3	43,423,200			
12/5/2003	10:15	184.33	277,225,000	33,646,000		12/5/2003	11:35	61.49	72,118,000	48,703,300		12/5/2003	10:50	217.58	43,595,600	27,025,300		109,374,600
1/9/2004	11:35	178.02	277,225,000			1/9/2004	11:55	60.07	72,118,000			1/9/2004	12:21	209.38	43,595,600			
2/5/2004	14:35	172.49	277,225,000			2/5/2004	15:11	60.6	72,118,000			2/5/2004	14:57	208.39	43,595,600			
3/2/2004	13:13	167.6	277,225,000			3/2/2004	13:39	58.86	72,118,000			3/2/2004	13:58	197.3	43,599,600			
4/7/2004	15:53	166.33	278,037,000			4/7/2004	16:51	71.41	75,810,700			4/7/2004	16:32	204.84	44,649,700			
5/21/2004	11:07	168.87	280,918,000			5/21/2004	12:04	61.17	83,324,000			5/21/2004	11:45	211.24	48,273,600			
9/2/2004	9:55	202.7	305,142,000			9/2/2004	10:25	69.34	9,436,700			9/2/2004	11:08	255.46	67,242,800			
9/27/2004	9:35	197.68	308,056,000			9/27/2004	9:58	65.75	13,011,900			9/27/2004	10:25	256.13	69,754,000			
12/6/2004	9:18	179.13	311,206,000	33,981,000		12/6/2004	9:51	63.75	17,608,700	45,490,700		12/6/2004	10:13	226	71,585,500	27,989,900		
3/9/2007	11:50		386,541,000			3/9/2007	10:00		820,000		chlorine block in measuring tube	3/9/2007	11:30	219.7	72,732,200			
3/15/2007	9:30	171.18	-			3/15/2007	10:00	60.06				3/15/2007						
5/22/2007	0:00	176.88	-						-		No access (JT)		0:00	261.01	No reading			
6/4/2007	13:35	188.15	390,867,000			6/4/2007	12:15	57.4	1,953,780		CP (meas. Tube replaced)	6/4/2007	13:45	270.5	72,732,200			
8/20/2007		207.9	408,226,000			8/20/2007		68.51	40,927,400			8/20/2007		272.12	No reading			
10/22/2007		193.91	414,882,000	28,341,000		10/22/2007		64.69	49,222,550	48,402,550		10/22/2007		255.15	No reading			76,743,550
3/25/2008	13:30	164.07	415,041,000			3/25/2008	13:15	60.94	50,420,900		meas from top of new sounding tube	3/25/2008	13:45	226.12	No reading			
4/26/2008	12:45	170.46	416,787,000			4/26/2008	12:00	64.5	54,145,650		meas from top of new sounding tube	4/26/2008	12:20	231.77	72,732,200		Flow meter not working	
7/24/2008	11:30	196.18	426,048,000		pump recently ran	7/24/2008	10:45	68.49	75,319,300		meas from top of new sounding tube	7/24/2008	11:10	266.3	72,732,200		Flow meter not working	
9/30/2008	14:00	202.64	440,661,000	25,779,000		9/30/2008	13:15	70.38	89,726,500	39,305,600	meas from top of new sounding tube	9/30/2008	13:30	255.93	72,732,200		Flow meter not working	65,084,600
3/12/2009	14:20	164.29	441,646,500			3/12/2009	15:00	60.93	92,362,700		meas from top of new sounding tube	3/12/2009	14:40	226.34	72,732,200		Flow meter not working	
7/31/2009	11:25	196.62	453,192,000			7/31/2009	10:30	70.77	15,771,200		meas from top of new sounding tube	7/31/2009	11:10	273.28	12,818,800		new flow meter installed	
2/5/2010	15:00	181.43	471,301,000	30,640,000		2/5/2010	14:15	60.78	29,452,100	37,089,400	meas from top of new sounding tube	2/5/2010	14:40	227.16	16,604,000	16,604,000		84,333,400

Crane Creek No. 1 (Clubhouse Well)						Crane Creek No. 2 (Formerly Front Nine, currently Back Nine)						Crane Creek No. 3 (Formerly Back Nine, currently Front Nine)						Total Annual Volume
Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Date	Time (24 hour)	Water Level (feet below ground)	Totalizer Reading (gallons)	Annual Volume (gallons)	Remarks	Total Annual Volume
4/16/2010	10:45	no access	471,301,000		no measurement - hit obstruction in sounding tube at 126 feet	4/16/2010	10:00	60.09	29,452,100		meas from top of new sounding tube	4/16/2010	10:30	219.28	16,604,000			
8/5/2010	14:20	no access	490,217,500		no measurement - hit obstruction in sounding tube at 126 feet	8/5/2010	13:55	67.87	50,524,450		meas from top of new sounding tube	8/5/2010	14:10	258.9	27,248,350			
12/31/2010				34,197,000	Annual volume estimated based on 2-yr total	12/31/2010				30,763,950	Annual volume estimated based on 2-yr total	12/31/2010				17,679,225	Annual volume estimated based on 2-yr total	82,640,175
7/14/2011		no access	516,854,000		no measurement - hit obstruction in sounding tube at 126 feet	7/14/2011		67.41	74,875,950		meas from top of new sounding tube	7/14/2011		305.27	43,039,300		pump running at 460 gpm	
10/14/2011	10:50	no access	539,695,000	34,197,000	Annual volume estimated based on 2-yr total	10/14/2011		62.24	90,980,000	30,763,950	Annual volume estimated based on 2-yr total	10/14/2011		252.07	51,962,450	17,679,225	Annual volume estimated based on 2-yr total	82,640,175
Note: estimated and/or incomplete values are listed in italics.																		