Internal Monitoring Report

Policy # O-2E Sustainability **Date:** January 26, 2016
Frequency: Twice a year

I certify that the following information is true.

Signed_____, General Manager

Policy Language:
Madison residents will benefit from a sustainably managed ground water supply to ensure that water is available to protect public health, and to maintain and improve the economy and environment in Madison, now and in the future.

Accordingly,

1. Aquifers and wells will be monitored and the data evaluated to identify trends in water levels and potential contaminants.
2. Appropriate city, county, state and federal agencies will be called upon to enforce all pollution control and prevention measures within their authority, in order to protect water quality in the well head protection area of each unit well.
3. The adopted Conservation Plan shall be monitored and evaluated regarding progress to fulfill the goal of a 20% reduction per capita residential use of water by 2020, which equates to 58 gallons/capita/day. (Residential is defined as single family and duplex dwellings.)
4. The water supply system shall be expanded so that the pumpage from individual unit wells shall not exceed 50% of the annual rated capacity of the unit well.
5. Water rates will complement economic growth in Madison (as stated in 0-2D).

General Manager's interpretation and its justification:

This policy prescribes certain activities intended to ensure the long term environmental, public health, and economic sustainability of Madison's water supply. Our actions relating to these objectives are detailed below.

Data directly addressing the General Manager's interpretation:

1. Aquifers and wells will be monitored and the data evaluated to identify trends in water levels and potential contaminants.

Water Levels

The water levels in the aquifers beneath Madison continue to be monitored on a routine basis. A deep groundwater monitoring well located in the basement of the State Capitol has provided water levels since 1946. A review of the data indicates levels continue to vary on a seasonal basis, a direct result of demand (pumping) and recharge (precipitation.) As in past years, summer levels were approximately 10 to 12 feet lower than those experienced during the

winter. Overall, levels appear to be increasing or rebounding with an increase of approximately 13 – 14 feet since 2005. The water levels beneath the central part of our city during the last 30 years are displayed in Figure 1.

The static and pumping water levels in many of the Utility's wells varied slightly during 2015. Variations, however, were significantly less than those experienced during past years (i.e., 2012) when we were subject to extremely hot and dry summer conditions. Water levels in the Utility's wells continue to fluctuate seasonally and are greatly influenced by precipitation events. A review of the recent water level data indicates that, with the exception of several wells, most of the water levels have recovered from their summer lows and appear sustainable. Average static and pumping water levels for 2011 – 2015 are depicted in Table 1.

Madison Kipp Corporation/UW #8 Sentinel Well

The Madison Kipp Corporation (MKC) continues to run its groundwater extraction and treatment system at its Waubesa Street site. The remedial system is being utilized to remove volatile organic compound (VOC) mass and hydraulically contain VOC contaminated groundwater present in the upper bedrock aquifer beneath the site.

The pumped groundwater is still being treated using an air stripper located on-site. The treated water (~40 - 45 gpm) is discharged to the storm sewer under a WPDES Discharge Permit. The most recent compliance samples were below WPDES discharge limits. The recovery operation began in early July of 2015 and is expected to operate for a number of years.

The Utility continues to work with MKC, their consultant ARCADIS, the WDNR, and the WGNHS on the area's groundwater contamination issues. In December of 2015, he Utility officially hired Eric Oelkers, a local hydrogeologist and environmental consultant, to continue the hydrogeological review begun by Jessica Meyer.

Eric, who works for SCS Engineers, will take the review to the next level with some additional hydrogeological evaluation and a work plan identifying necessary steps to insure that increased pumping at UW #8 will not be impacted by the contaminant plume.

The following steps are being addressed by Eric and SCS to achieve the goals of this study:

- Identify or develop a definition of what will constitute a "significant impact" on water quality in Unit Well #8.
- Review key source documents referenced in Jessica Meyer's report and any additional relevant data made available since she completed her report.
- If necessary, produce a limited number of new data tables and/or graphical representations of contaminant distributions and data trends to facilitate conceptualization of the available information.
- Evaluate the three-dimensional distribution of contaminant data points to identify possible data gaps that may need to be addressed.
- Work with Wisconsin Geological and Natural History Survey (WGNHS) staff to the extent possible to identify potential effects of various pumping scenarios at Unit Well #8 on the local groundwater flow system using the new regional aquifer groundwater model.

- Discuss the results of these initial steps with Jessica Meyer and identify possible modifications to her recommendations for additional work.

This study is expected to be complete in early October of 2016.

Groundwater at and adjacent to the facility continues to be monitored routinely for VOCs. The most recent groundwater sampling, conducted in October of 2015, indicates that PCE levels in the area have remained relatively constant. The extent of the plume appears stable with the edge approximately 600 horizontal feet from UW #8. The installation of the sentinel well, proposed to be installed adjacent to Elmside Circle Park, remains on hold. Part of the next step is determining if the sentinel well(s) is still needed and where it (they) might be located.

UW #29 Sentinel Well

Water from the sentinel well located between UW #29 and the Sycamore Landfill continues to be monitored for both inorganic and volatile organic compounds on a semi-annual basis. Sampling is conducted in April and October of each year with twelve samplings conducted to date. Results from the latest October 2015 sampling revealed some minor VOC detects.

- Chlorobenzene was detected in Port 1 (water table surface) at a concentration of 0.24 ug/l. This detect is below the level of quantification (0.53 ug/l) and well below the MCL of 100 ug/l. The coating on the well liner is thought to be the source of this compound.

- Trichlorofluoromethane was also detected in the shallowest port at a level of 0.54 ug/l. This detect is below the level of quantification (0.91 ug/l) and there is no MCL for this compound. Trichlorofluoromethane exists in the water table aquifer at low concentrations throughout the area and is not related to the landfill.

- Toluene, which can also be attributed to the coating on the well liner, was detected at concentrations between 0.16 – 0.43 ug/l in all six of the ports. The MCL for toluene is 1000 ug/l.

- No VOCs were detected in water from UW #29.

There were no significant concentrations of inorganic constituents detected this round.

Sampling indicates that the migration of contaminants from the Sycamore landfill is not a significant threat to water quality at Unit Well 29 at this time.

The WGNHS is in the process of running the Dane County groundwater flow model for the area surrounding UW #29 and the adjacent Sycamore Landfill. The model is being run utilizing a series of different pumping rates at UW #29. It is hoped that these runs will determine if an increase in pumping at UW #29 will have an influence on the groundwater contaminants emanating from the Sycamore Landfill. An additional set of filters could be added at the unit well if the results suggest there is no impact.

UW #31 - Zone 4 Production Well

The production well at the Tradewinds Parkway site was drilled and completed during the winter of 2014. The well is currently capped and awaiting the construction of a well house with filter and an adjacent reservoir. The 1.5 million gallon reservoir has been constructed and will be painted this spring. Design plans for the well house, filter, and pumping equipment are almost complete. The project is to be bid in late 2016, constructed in 2017, and brought on-line in 2018.

In terms of well head protection, the zoning overlay for Wellhead Protection District No. 31 was incorporated into the Madison General Ordinances [MGO 28.102] last fall.

The WDNR continues to monitor the groundwater monitoring and remedial activities associated with the GE Health care site. Remedial activities at the site remain ongoing. The monitoring well located on Water Utility property at 5802 Femrite Drive and a number of adjacent monitoring wells continue to be sampled and analyzed on a quarterly basis. The most recent results indicate that the level of Trichloroethylene (TCE) in the local groundwater has remained relatively constant over the last year, occurring at the 10 to 15 ug/L level – two to three times the enforcement standard for groundwater quality.

To date, no TCE or any other volatile organic compounds have been detected at the Tradewinds Parkway well. The Tradewinds Parkway site is located about a mile southwest of the Femrite monitoring well and over 6000 feet from the source of the TCE contamination.

UW #6 & #9 - VOC Investigation

The utility asked an environmental consultant to investigate sources of VOC contamination, namely tetrachloroethene (PCE), at two wells – Well #6 (University Avenue) and Well #9 (Spaanem Avenue). Capture zones were simulated using the updated Dane County Groundwater Flow Model and environmental databases were searched for potential sources within those capture zones. The analysis identified two open ERP sites, both dry cleaning sites (one active and the other now closed), that are probable sources of PCE contamination at each well. The utility will be initiating discussions with the DNR to expedite the remediation of both ERP sites with the immediate goal of mitigating impacts to our wells.

2. *Appropriate city, county, state and federal agencies will be called upon to enforce all pollution control and prevention measures within their authority…*

As previously mentioned, the Utility continues to work with the Mayor's office and the WDNR in monitoring the remediation of the PCE contaminated groundwater at the Madison Kipp site. At the request of the WDNR, the Madison Water Utility, City Engineering, and Public Health continue to review the remedial strategies and plans proposed by MKC and their consultants. The Utility continues to remind the WDNR of the City's plans to upgrade UW #8 with an iron and manganese filter. Once upgraded, UW #8 would be pumped throughout the year at a much higher volume. A meeting with the WDNR to discuss local groundwater investigative options has been proposed and will likely occur after Eric Oelkers completes his review.

3. The adopted Conservation Plan shall be monitored and evaluated regarding progress to fulfill the goal

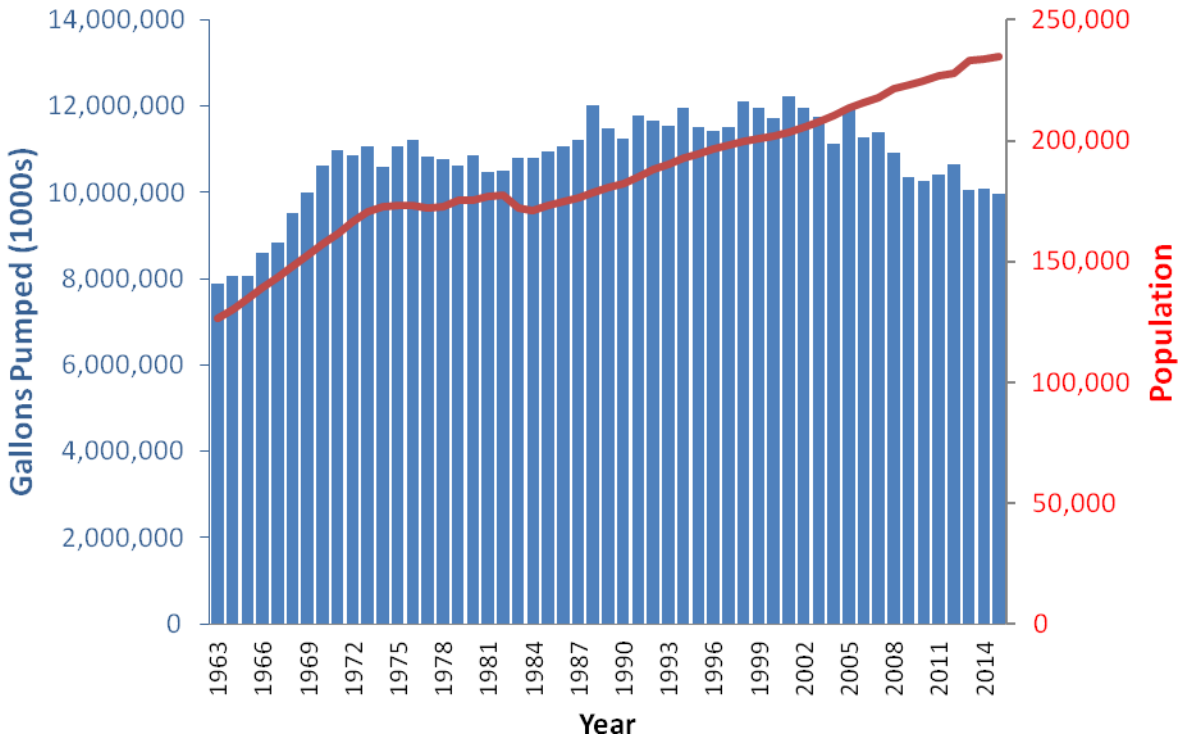
of a 20% reduction per capita residential use of water by 2020…

MWU pumped a total of 9,977,180,000 gallons of water to the distribution system in 2015.
Average Day: 27,335,000 gpd
Max Day: 39,846,000 gpd (July 29)
Min Day: 19,680,000 gpd (December 27)

Precipitation for the year was above average, totaling 39.59 inches. In addition, rainfall events occurred on a fairly regular basis limiting the number of heavy pumpage days.

Although Madison's population continues to climb (241,250 in 2015), pumpage over the last decade has declined significantly. A review of past pumping totals reveals that the last time the Utility pumped less than 10 billion gallons of water was in 1968 when the City's population was 161,659.

The following graph shows Madison's pumpage vs. population through the years.



Residential consumption in gallons per capita by year:

1980-2000	81.5
2002-2007	71.8
2008	69.8
2009	67.8
2010	65.0

2011	65.2
2012	70.3
2013	61.0
2014	62.2
2015	Pending

Goal: 2020 58.0

4. The water supply system shall be expanded so that the pumpage from individual unit wells shall not exceed 50% of the annual rated capacity of the unit well.

Our service level for capacity planning is 50% utilization, and system expansion is being planned to accomplish this level. The Utility continues to propose and build additional booster stations and new well facilities to help achieve this goal. In addition, variable speed drives (VFDs) are being added to existing motors/pumps each year to optimize system flows.

Overall, 2015 utilization rates were very similar to those experienced in 2014. During the year, eight different wells exceeded the 50% utilization rate. Well repair/reconstruction projects and the necessary use of seasonal wells on a year round basis continue to significantly influence individual well rates. For example, UW #16 was out of service between the months of July and November for repairs. As a result, UW #28 (a seasonal well) was on-line all summer and UW #26 had to be utilized at a higher rate to meet Zone 8, 10, and 11 demands.

The Utility did manage to lower the utilization rates at one of its most heavily pumped wells (UW 20) by utilizing BS 106 more. Unfortunately, the 50% goal was significantly exceeded again at UW 14 (80%). The use of this site is not likely to lesson without the addition of a Zone 8/Zone 6W booster station.

The addition of VFDs on the deep wells at several of the sites (UW 7, UW 15, UW 25, and UW #29) has allowed the Utility to directly minimize the utilization rates of these wells. Indirectly, VFDs on booster pumps (i.e., UW 7, UW 11, UW 24, and UW 28) have also allowed us to minimize deep well pumping at other sites. Actual utilization rates for 2014 and 2015 are shown in Tables 2 and 3.

Current construction projects which will affect utilization rates:

- The construction of a Zone 6E reservoir at site 113 will significantly reduce the utilization rate of UW #13.
- The reconstruction of UW #12, making it a two zone well, will reduce utilization rates in the far west pressure zones (UW #12, UW #20, and UW #26).
- The connection of Zone 11 to Zone 10 will help reduce the utilization rate of UW #26.

<u>Energy Conservation Assessment</u>

Graduate Student Energy Research - UW Engineering Grad student, Connor Mancosky, is continuing to look into energy use for Madison Water Utility. Building on the work completed by Nick Baniel and Matt Hayes, Connor has been further evaluating, refining, and developing our understanding of the benefit of variable frequency drives on our deep wells. Connor is

looking at various groundwater and well characteristics with regard to pumping efficiency and overall well production. Evaluating how well pumps are performing based on well characteristics and pump operational data, Connor is working to itemize design and operating criteria that will minimize energy demand and justify investment in a VFD.

Connor has identified Well 30 as a good candidate for the addition of a variable speed drive on the well pump as a pilot project. Data will be collected before and after the installation of a VFD to verify and refine design criteria for energy conservation resulting from the addition of a VFD at Well 30.

Objectives of this energy conservation research project include: 1) identify pumping design criteria that will optimize energy conservation, 2) identify wells with the highest potential for energy reduction; 3) evaluate and recommend energy conservation projects to the Utility, and 4) implement a pilot study to verify calculations and assumptions.

5. Water rates will complement economic growth in Madison (as stated in O-2D).

Please refer to the Monitoring report for the Affordability Outcomes Policy (O2-D).

I report compliance.

Attachments:
Aquifer Water Levels Graph
Unit Well Water Levels Table
Unit Well Capacity Tables

Figure 1: Aquifer Water Levels - State Capitol Well

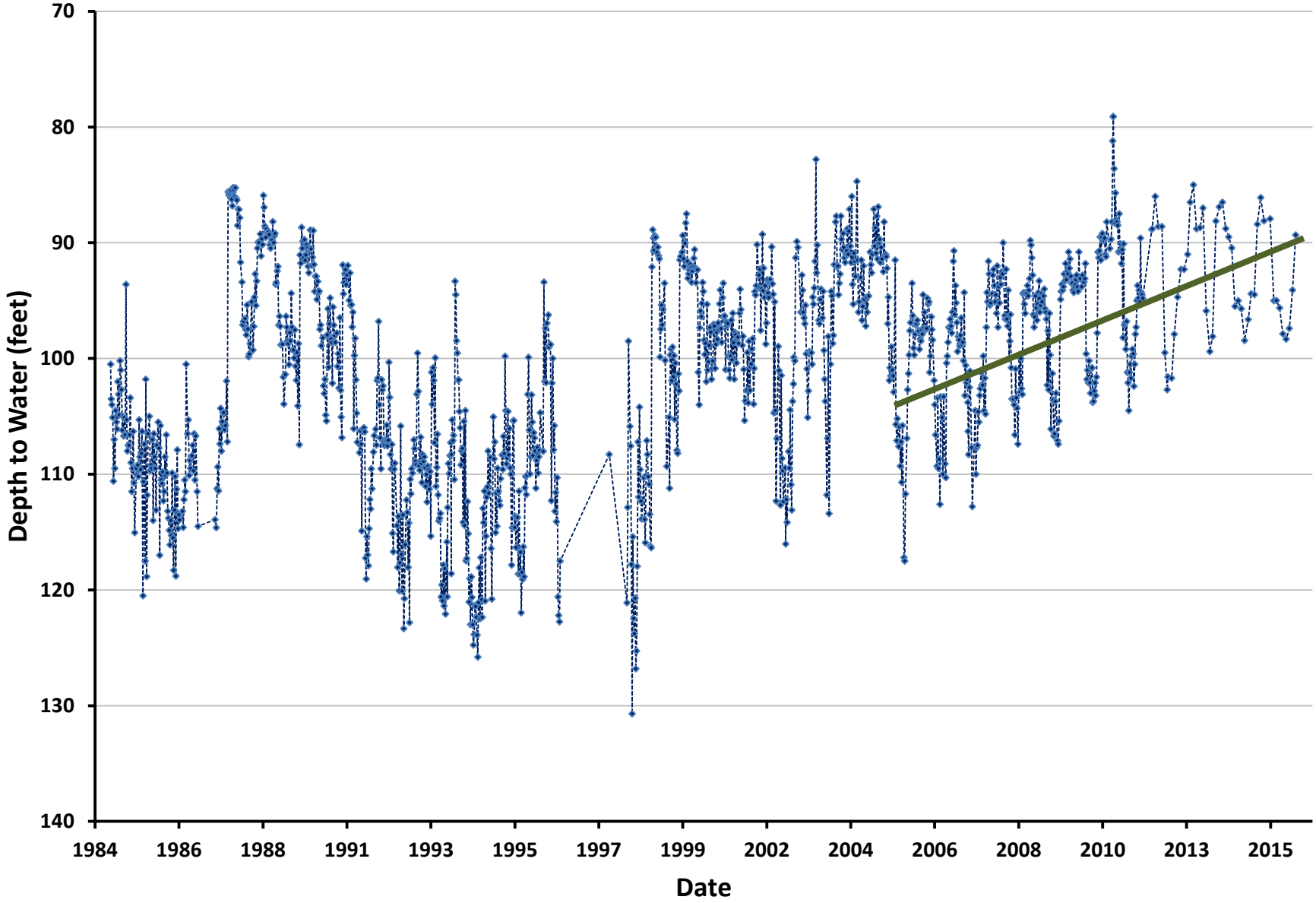


Table 1: Average Water Levels - Wells (Feet to Water)

	6		7		8		9		11		12		13		14		15		16		17	
Date	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping
Jan-11			60.9	169.8			103.4	177.3	27.0	145.6	161.2	252.1	30.2	174.9	26.9	54.4	75.1	142.9	175.9	273.7		
Feb-11			53.5	158.3			104.3	178.0	28.8	146.7	161.8	253.5	30.3	175.6	27.1	54.5	75.6	143.2	173.9	271.7		
Mar-11			51.4	155.9			103.8	177.3	31.5	146.7	169.5	259.2	30.3	175.4	26.9	54.3	66.7	141.6	176.1	272.2		
Apr-11	115.6	167.1	55.7	156.5			102.8	176.7	26.3	145.8	168.3	258.5	26.9	174.5	26.6	54.0	70.7	142.0	171.7	267.7		
May-11	92.6	175.4	53.3	149.6			105.1	178.8	27.1	146.7	171.7	259.4	29.6	175.2	26.4	53.9	67.7	141.7	173.5	271.2	44.8	121.5
Jun-11	79.7	176.7	58.4	148.6	47.0	156.9	108.2	181.5	29.5	147.9	177.5	262.7	27.9	173.4	26.6	54.1	78.7	141.0	176.7	274.8	44.6	118.6
Jul-11		179.6	57.7	142.7	66.6	149.9	110.8	183.0	35.5	149.6	177.7	266.3	31.6	176.1	26.9	54.5	58.3	141.2	183.8	281.2	50.7	120.8
Aug-11		178.9	57.2	136.6	55.6	154.0	111.7	183.6	39.8	149.9	179.5	268.1	29.9	171.4	26.9	54.5	60.7	141.7	183.3	279.8	49.5	119.3
Sep-11	79.3	179.9	53.8	129.3			109.1	181.4	37.2	151.2	173.0	263.1	25.2	161.2	27.0	54.3	64.8	140.8	178.3	276.0	48.5	118.6
Oct-11	86.2	179.7	53.1	126.0			107.8	180.5	32.7	145.7	169.9	261.0	23.6	159.2	26.7	54.4	66.4	140.0	174.3	273.8	46.7	116.8
Nov-11			55.3	123.4			107.5	180.1	41.2	147.4	168.1	259.1	21.3	156.2	26.5	53.8	71.5	141.0	173.2	274.7	46.6	116.8
Dec-11			53.8	113.3			106.7	179.8	45.0	150.8	165.5	257.0	22.4	156.4	26.8	53.9	78.3	141.0	173.4	273.9	46.3	116.6
Jan-12			68.0	124.8			105.3	178.1	47.3	151.9	169.6	258.4	23.9	124.2	27.1	53.9	74.4	140.0	175.2	275.0		
Feb-12			51.3	119.6			106.5	179.3	33.6	174.6	168.3	257.6	17.5	115.5	27.4	54.1	84.5	140.2	177.4	276.8		
Mar-12			53.4	106.9			106.4	179.3	46.4	150.9	166.3	257.9	17.6	116.0	27.3	53.9	67.2	139.0	176.2	275.7		
Apr-12	97.8	178.1	51.8	102.8			106.8	179.7	41.8	151.1	163.5	255.2	18.0	113.2	26.9	53.6	64.3	138.4	175.0	274.4		
May-12	75.2	182.1	50.9	134.3			108.5	181.0	41.0	152.8	170.7	261.2	18.3	113.2	26.8	53.6	67.8	140.1	176.0	276.3		
Jun-12	70.0	185.8	56.1	174.9			113.5	184.8	44.0	154.5	183.4	272.2	20.1	114.4	27.7	54.3	70.4	141.9	186.3	284.8	48.9	122.0
Jul-12	116.2	192.6	63.1	185.4		159.7	122.9	189.7	46.2	155.9	190.1	281.9	20.8	114.6	29.2	55.3	82.4	144.5	199.7	294.4	58.4	126.5
Aug-12	116.7	184.1	55.1	179.2	61.3	146.1	117.0	185.3	43.6	154.7	183.1	271.0	20.3	113.2	28.4	54.4	62.7	141.1	186.7	285.2	52.9	122.2
Sep-12	128.4	190.7	59.7	176.4			116.3	184.4	41.5	154.0	186.6	269.8	20.6	113.6	25.9	53.0	63.3	140.7	186.6	284.7	52.8	120.8
Oct-12	142.1	187.2	53.4	174.7			112.1	181.4	38.6	153.6	173.2	261.6	19.8	112.8	27.2	53.8	61.7	140.5	182.2	281.3	46.9	116.3
Nov-12	142.2	188.4	51.8	169.4			109.3	178.9	42.2	153.1	165.0	252.7	19.2	111.7	27.8	53.7	60.1	141.4	177.0	276.3	43.0	113.5
Dec-12	145.0	187.9	53.4	174.8			108.4	178.0	41.3	152.9	162.7	251.1	19.5	110.6	28.5	54.0			174.5	274.3	45.7	116.1
Jan-13	78.2	185.1	54.3	174.7			108.7	178.3	45.8	153.2	163.4	253.4	20.0	110.3	28.9	54.0	50.4	123.4	174.5	274.3	45.6	115.4
Feb-13	86.1	185.9	55.7	163.9			107.5	177.7	36.7	152.6	166.4	256.5	18.9	109.1	28.8	54.0	70.2	139.9	175.8	275.4		
Mar-13	49.2	186.4	61.9	144.8			106.9	177.2	38.9	152.3	164.5	254.7	19.3	108.7	28.9	53.9	60.7	138.7	175.4	274.9		
Apr-13	48.8	186.5	64.1	161.3			105.6	176.5	37.3	150.1	166.3	255.8	17.7	108.6	28.7	53.6	59.1	137.3	175.8	274.8		
May-13	74.5	182.4	74.1	169.7			107.0	177.7	37.5	150.5	169.9	259.2	16.8	103.8	34.7	53.8	67.0		177.5	276.3		
Jun-13	96.0	187.3	87.1	172.3			108.0	178.0	35.7	148.9	171.0	260.4	16.4	101.7	39.0	55.3	63.3	111.4	179.2	277.5		
Jul-13	66.2	189.7	119.5	178.3		175.8	109.9	179.7	37.1	149.5	175.5	262.8	23.4	120.3	28.1	53.4	79.7	116.4	181.2	281.1	51.3	128.1
Aug-13	55.1	191.0	66.9	164.1			113.3	181.4	39.3	151.7	180.7	265.7	15.9	105.4	28.5	53.6	67.4	108.8	184.9	285.1	48.7	120.0
Sep-13	51.9	191.5	83.4	161.4			112.0	180.0	41.7	150.8	183.1	267.8	16.6	105.9	28.6	53.7	66.3	106.8	184.9	283.2	51.2	120.9
Oct-13	53.8	187.8	109.5	160.3			108.3	178.2	39.8	149.9	171.3	260.8	16.7	105.5	27.9	53.2	63.6	104.8	176.8	276.0	47.2	118.2
Nov-13	61.8	188.8	122.6	167.9			105.9	175.9	36.1	148.8	170.5	258.8	56.8	145.3	27.9	53.9	52.9	102.9	174.9	274.9		
Dec-13	81.5	187.2	126.1	163.4			106.2	176.3	37.5	149.7	167.2	257.2	60.9	148.3	28.2	53.1	55.8	100.3	174.1	273.3		
Jan-14	86.0	186.7	129.7	162.4			108.3	178.0	41.8	150.8	167.4	257.5	62.1	150.4	28.3	53.0	43.4	86.9	174.1	272.6		
Feb-14	85.5	189.4	139.2	168.7			112.4	181.4	45.8	152.4	171.3	260.6	68.0	153.7	28.7	53.3	44.4	80.8	176.2	275.3		
Mar-14	68.6	186.9	141.9	171.1			109.6	178.7	38.3	151.1	174.5	262.3	72.6	157.4	29.0	53.4	57.8	85.9	179.5	277.4		
Apr-14	51.9	188.6	145.2	178.2			107.1	177.4	40.7	150.2	175.1	261.4	71.1	157.1	28.5	53.0	50.0	96.9	177.2	275.2	46.4	119.5
May-14	50.8	187.1	135.8	181.1			107.8	177.6	40.8	150.3	174.8	263.2	17.1	98.3	28.5	52.9	54.1	88.5	178.5	276.1	44.9	115.5
Jun-14	52.7	189.1	134.1	170.7			110.1	180.0	46.4	152.8	174.1	263.9	16.9	98.0	28.6	53.0	50.4	93.6	180.3	277.7	48.5	119.0
Jul-14	52.7	189.5			77.5		108.6	178.7	44.2	152.1	171.4	266.2	15.4	96.6	28.5	54.5	56.2	98.8	186.1	280.3	45.7	116.9
Aug-14	55.3	191.7			67.8	149.0	107.9	178.6	42.5	152.2	177.6	269.2	15.7	96.5	28.9	55.6	56.0	109.4	194.6	278.3	49.8	119.5
Sep-14	53.7	191.6			77.5		107.1	176.9	38.5	151.2	175.5	264.5	15.7	96.4	28.7	52.7	53.3	90.3	174.9	276.5	48.2	117.1
Oct-14	56.7	190.2			76.6		105.1	175.6	41.4	150.4	177.0	263.2	15.8	96.3	28.1	55.4	57.9	85.9	178.1	266.5	45.8	115.0
Nov-14							106.2	175.7	35.7	149.8	169.6	262.1	15.4	96.3	27.9	54.5	51.9	84.7	170.7	264.5	46.2	117.4
Dec-14							103.5	174.9	36.1	149.7	169.4	262.2	15.8	96.9	28.4	52.9	52.5	84.8	171.4	266.8		
Jan-15							102.8	175.1	37.6	150.2	167.0	261.3	16.4	97.0	28.5	53.6	52.2	85.5	172.9	269.0		
Feb-15							103.3	175.6	37.6	151.1	176.9	263.6	17.1	97.6	28.7	55.9	52.4	85.6	171.4	271.3		
Mar-15							103.3	176.1	39.5	151.2	178.0	265.0	17.4	97.9	28.9	53.5	52.3	85.9	175.2	270.6		
Apr-15	30.0	156.7	61.0	110.0			104.5	175.9	39.0	150.8	176.6	265.2	16.8	97.5	28.6	55.3	53.1	85.7	176.6	270.4	50.0	120.0
May-15	32.0	154.9	49.0	130.0			106.3	177.5	37.4	150.9	182.4	264.7	15.3	96.9	28.5	53.2	53.6	86.1	176.6	271.2	44.9	117.7
Jun-15	29.0	154.9	64.0	128.0	77.7		107.1	179.4	36.4	151.2	172.1	257.8	16.6	97.4	28.5	52.2	53.9	95.3	175.6	271.2	46.1	117.9
Jul-15	30.0	156.4	63.8	128.6	73.8	145.6	109.9	180.5	37.4	150.8	184.8	262.8	16.6	96.3	28.8	52.2	57.8	98.2			48.5	119.8
Aug-15	29.7	155.8	52.7	127.0	78.9	145.5	109.9	180.7	36.5	150.1	170.7	270.2	17.3	96.2	29.3	52.4	58.2	98.5			50.6	119.8
Sep-15	29.6	157.5	55.5	130.4	79.8	152.9	111.5	179.9	37.3	151.3		270.1	17.3	97.0	29.0	51.3	49.0	96.7			51.1	120.9
Oct-15	31.2	154.3	53.4	130.3			102.4	176.5	35.6	149.8	181.3	265.7	16.5	97.3	28.5	51.7	51.7	96.7				
Nov-15	29.1	153.7	50.7	122.3			105.4	175.5	35.3	149.2	171.1	264.3	16.2	96.0	28.2	50.1	47.8	94.6				
Dec-15	30.8	154.3	65.9	125.4			104.6	174.2	33.6	149.4	178.8	262.4	15.5	95.7	28.1	52.6	46.6	91.1	173.1	268.9		

Table 1 Cont.: Average Water Levels - Wells (Feet to Water)

	18		19		20		23		24		25		26		27		28		29		30	
Date	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping	Static	Pumping
Jan-11	97.4	301.6	61.9	199.7	255.7			159.5	60.0	247.2	106.6	278.1	350.6	452.8			157.3	277.5	155.8	158.9	115.3	263.6
Feb-11	98.4	303.6	63.4	202.0	256.6			159.4	60.1	248.2	107.0	278.4		461.0			162.5	279.9	155.6	160.2	117.4	264.5
Mar-11	98.2	302.8	64.5	202.9	256.4			159.7	60.0	245.6	106.8	278.5	308.3	444.0			147.3	271.0	154.4	159.5	116.5	263.6
Apr-11	98.6	304.0	60.3	202.4	256.0	401.0	45.2	151.3	60.3	245.4	104.7	278.4	329.7	402.6			141.6	267.2	151.4	158.6	116.7	263.9
May-11	98.9	305.6	55.7	199.6	256.3	400.9	50.2	109.5	60.7	247.5	108.0	279.8	331.8	406.6		214.3	143.1	268.2	153.9	158.6	117.8	265.2
Jun-11	98.8	308.1	54.2	204.1	258.4	395.1	53.7	110.1	60.0	248.4	113.0	286.2	347.0	408.4	78.4	216.1	147.4	272.3	155.5	160.3	123.9	271.9
Jul-11	106.6	311.2	62.7	208.0	274.8	389.9	54.5	113.6	60.0	249.8	118.2	289.2	343.5	412.7	66.0	217.9	158.2	282.4	156.0	163.0	127.4	274.0
Aug-11	105.5	311.2	59.3	200.9	280.3	391.8	57.2	114.0	60.0	248.8	117.6	288.9	344.3	412.8	76.8	216.6	154.1	280.1	155.8	163.0	128.0	273.9
Sep-11	108.2	311.2	56.7	201.4	274.6	387.7	52.6	112.5	60.0	248.0	113.0	284.1	335.9	408.3		216.9	153.1	277.3	148.3	156.8	123.8	272.1
Oct-11	97.8	308.9	56.4	199.9	270.9	384.4	56.7	113.7	60.0	246.9	110.2	245.1	336.8	403.4			143.9		143.8	152.5	122.5	272.2
Nov-11	97.0	309.4	55.6	200.3	267.2	381.6		159.7	60.1	247.1	109.0	243.8	334.9	399.0			141.7	268.2	121.3	151.2	121.0	269.6
Dec-11	97.0	310.7	58.4	201.2	264.1	378.3		159.7	60.0	244.5	118.7	259.9	326.4				154.7	275.3	115.1	148.7	121.1	269.4
Jan-12	97.0	310.7	61.9	202.6	259.8	378.0		159.7	60.7	243.5	118.5	253.3					151.0	274.6			121.7	268.9
Feb-12	98.2	312.4	66.9	205.8	260.5	381.0	58.4	121.5	62.6	246.3	116.6	254.4					150.0	274.6			124.2	270.8
Mar-12	102.6	311.6	67.7	206.3	262.6	379.0	51.0	111.1	60.0	248.1	106.4	236.3					149.1	274.0			124.3	271.2
Apr-12	100.7	310.6	54.9	200.4	262.5	378.1	51.7	111.1	60.7	248.8	106.6	237.4	323.8	380.7			147.8	275.1	103.4	148.8	125.4	272.4
May-12	100.2	312.6	53.8	202.2	270.0	383.2	52.0	112.2	60.9	252.5	110.8	238.8	334.8	406.3	34.2	214.3	148.7	276.5	129.0	176.4	127.3	273.6
Jun-12	104.7	317.8	61.2	206.3	282.7	390.6	53.2	114.7	63.8	256.2	120.8	257.0	342.1	417.0	65.4	217.3	160.1	284.4	147.3	183.4	145.9	290.1
Jul-12	107.4	319.3	68.8	211.4	292.3	392.4	62.2	117.3	63.1	258.2	133.6	268.8	369.6	427.5	68.0	222.1	170.2	292.2	151.9	186.9	156.7	299.4
Aug-12	100.8	316.0	63.0	206.5	287.7	394.3	55.9	114.2	64.5	254.6	129.4	249.6	362.9	418.3	64.9	219.4	159.8	283.2	147.0	182.5	146.2	290.9
Sep-12	103.9	316.3	68.2	210.5	291.3	399.0	53.3	113.3	67.8	256.0	127.2	248.7	352.5	416.5	55.1	223.8	160.7	284.4	148.6	182.5	146.5	290.0
Oct-12	100.3	314.4	63.6	210.4	284.4	394.2	55.3	150.2			125.3	248.7	344.3	410.1	49.3	214.6	154.6	281.9	148.1	181.5	140.8	285.9
Nov-12	97.6	311.9	57.1	201.7	276.7	388.7			60.0		122.6	246.7	338.5	404.3					145.0	178.4	133.0	280.0
Dec-12	97.5	309.8	54.7	201.9	276.7	388.5			60.8	231.6	123.5	247.5	338.5	403.2					144.5	177.9	129.3	277.2
Jan-13	97.9	312.1	55.6	201.8	277.7	389.5			61.1	227.9	125.2	245.0	338.1	403.5					146.8	178.7	127.5	276.2
Feb-13	99.4	312.5	58.3	203.7	279.1	390.4			60.4	233.1	125.8	244.7	338.3	404.9					149.1	181.4	129.5	278.1
Mar-13	98.2	311.7	58.7	203.2	279.4	390.2			60.3	229.6	109.6	247.6	338.3	404.4					147.9	180.1	126.8	276.7
Apr-13	101.8	311.8	58.8	204.7	275.8	387.9	45.2	108.6	60.5	228.0	108.0	244.4	335.6	402.9	66.6	213.9			145.2	177.4	128.9	277.5
May-13	105.0	313.8	58.5	204.8	278.8	390.5	47.4	110.6	60.3	229.3	113.3	258.9	337.7	405.1	61.2	211.6	146.2	272.0	143.2	176.1	130.4	278.4
Jun-13	97.1	309.8	58.1	204.6	267.6	390.0	48.9	109.5	60.8	229.2	116.5	258.8	336.1	404.5	55.4	211.1	152.6	273.4	144.7	177.7	137.0	285.1
Jul-13	103.7	313.7	57.9	203.4	284.4	394.3	47.8	110.5	63.3	232.6	116.1	259.8	341.9	408.6	83.2	212.7	150.8	272.4	146.9	180.1	137.1	284.1
Aug-13	101.5	316.3	61.1	204.9	287.1	397.1	50.1	111.5	65.0	233.7	119.3	258.6	349.7	410.8	136.8	213.5	153.1	273.4	149.8	182.6	138.3	285.4
Sep-13	98.0	315.3	60.1	202.4	281.0	398.6	53.7	112.0	63.5	234.4	117.6	255.9	347.3	412.1	155.0	213.6	121.3	278.5	118.8	164.7	141.0	288.6
Oct-13	97.0	313.1	55.0	198.5	279.6	393.6	50.9	111.0	62.5	229.2	110.8	253.6	342.7	406.5	141.8	218.5	126.5	279.5			134.3	283.8
Nov-13	97.0	310.9	54.7	198.3	276.4	392.8	48.4	109.9	61.2	225.8	110.3	252.6	337.8	403.7	101.3	217.9					132.0	282.2
Dec-13	97.0	310.5	52.8	194.7	279.8	393.7	48.9	110.1	60.2	224.5	106.6	253.5	337.5	404.1	133.6	206.8				179.3	132.6	282.5
Jan-14	97.0	311.1	52.5	194.4	276.3	394.3	51.1	111.6	60.2	224.7	107.6	254.1	339.5	405.1	161.2	214.3			140.2	176.7	132.3	282.1
Feb-14	97.0	312.6	56.6	195.7	282.5	395.4	50.4	111.5	60.2	226.3	111.1	255.0	340.3	405.8	165.2	227.9			122.5	177.2	138.4	287.4
Mar-14	97.0	311.9	56.5	194.8	283.4	396.8	49.6	110.8	60.0	225.4	113.0	254.4	344.1	407.4	51.2	213.2				178.6	138.8	286.9
Apr-14	97.0	312.7	58.1	193.9	279.3	395.5	47.2	109.6	60.6	229.1	111.3	254.1	343.5	406.6	49.3	210.4	143.1	270.1	127.2	177.2	137.0	286.1
May-14	97.0	313.1	54.8	192.0	282.3	396.0	47.9	109.7	61.2	226.2	115.3	254.4	343.6	407.1	49.1	209.5	148.6	277.1	115.8	177.5	136.6	284.9
Jun-14	99.2	314.3	58.1	192.7	282.6	396.5	49.1	109.7	63.4	230.4	115.3	255.7	339.0	406.8	47.7	210.2	156.9	285.3	126.3	180.2	143.0	290.7
Jul-14	94.4	314.6	62.4	197.5	284.8	397.9	46.6	105.0	61.5	228.5	110.3	255.8	335.7	408.0	46.4	209.5	159.9	286.5	127.4	180.2	141.5	289.8
Aug-14	93.9	315.4	60.7	190.9	263.3	399.3			67.9	230.7	111.6	257.3	322.4	411.8	51.0	211.3	162.4	288.7	140.3	181.5	146.3	293.4
Sep-14	92.6	313.4	58.4	189.1	275.9	395.2			67.7	228.3	107.4	255.3	326.0	405.4	51.5	211.1	152.6	284.1	145.6	178.8	142.7	290.3
Oct-14	97.0	312.3	62.5	185.6	279.5	393.1			66.6	228.1	111.7	257.5	337.2	403.9	55.7	209.2	151.2	289.9	146.4	177.8	140.5	287.9
Nov-14	97.7	312.0	58.5	186.3	271.8	394.7			62.1	225.4	102.3	255.6	337.0	404.8	52.5	210.0	146.1		144.6	177.4	138.0	289.0
Dec-14	96.4	311.3	61.3	190.7	280.1	395.5			61.4	223.8	104.3	254.3	333.9	403.5	58.7	209.6	143.8		144.1	177.1	144.6	293.5
Jan-15	94.3	310.3	65.6	191.6	272.8	395.5			60.4	222.8	99.4	254.7	333.0	402.2	58.1	207.9	145.7		131.2	175.6	146.1	292.5
Feb-15	92.7	311.8	72.0	194.2	279.2	395.1			61.4	225.4	105.7	255.0	335.2	402.8	64.9	210.1	146.1		130.6	179.0	141.8	290.9
Mar-15	97.0	312.0	71.3	192.7	276.3	397.7			60.0	225.6	105.0	255.1	325.2	405.9	92.0	212.3	146.8			179.7	130.3	287.8
Apr-15	100.3	311.0	70.5	188.9	280.6	397.6			60.4	227.9	105.8	254.6	314.9	404.6	77.8	210.1	147.1		131.5	179.5	138.7	287.7
May-15	95.8	310.5	62.2	182.1	282.9	399.2	48.9	117.5	60.0	227.3	107.9	254.6	338.2	406.1	71.1	208.3	151.3	281.3		179.8	139.3	288.5
Jun-15	96.4	310.9	63.4	177.7	282.0	401.3	55.5	119.5	60.0	218.4	109.5	255.2	341.4	407.8	72.7	208.0	158.2	288.1		180.8	139.5	288.4
Jul-15	99.9	311.1	62.7	176.2	277.1	400.7	53.6	118.8	57.2	205.4	110.0	253.2	332.3	409.1	85.3	209.9	165.3	291.5	133.2	181.7	140.4	289.3
Aug-15	96.6	313.0	61.8	172.8	266.4	401.6	54.6	119.7	55.3	209.2	104.2	254.6	349.6	413.1	88.9	212.4	167.6	296.6		182.9	146.6	294.1
Sep-15	97.1	312.3	60.6	170.6	261.4	398.7	52.8	119.0	57.3	207.8	107.0	255.9	347.0	411.4	105.1	211.2	170.3	294.1		181.8	142.3	290.9
Oct-15	91.7	311.2	60.5	165.1	270.6	397.6			57.0	202.8	106.9	254.4	342.0	407.8	145.2	209.8	157.9	287.6		180.3	135.8	287.6
Nov-15	95.2	310.9			269.0	395.8			49.1	201.9	109.7	253.2	328.3	405.9	135.0	209.7	155.0	285.8	127.2	179.0	136.8	286.5
Dec-15	94.6	310.0			274.7	394.8			57.5	198.8	99.9	250.9	328.2	405.8	97.0	207.6	150.1	286.1	133.0	177.5	135.6	285.8

Table 2: 2014 Unit Well Capacity

Start Date: January 01, 2014 **End Date: December 31, 2014**

Unit Well	DW Capacity GPM	Total Daily Capacity MGD	Total Capacity To Date Mil Gal	Actual Pumpage To Date Mil Gal	% DW Utilization		DW Run Hours To Date	DW Rest Hours To Date	% DW At Rest To Date	% DW Running To Date
6	2,880	4.1	1,514.0	371.5	24.5%		2,606.5	6,153.5	70.2%	29.8%
7	2,552	3.7	1,341.3	132.2	9.9%		996.4	7,763.6	88.6%	11.4%
8	1,987	2.9	1,044.4	19.4	1.9%		158.6	8,601.4	98.2%	1.8%
9	1,801	2.6	946.5	450.7	47.6%		4,291.1	4,468.9	51.0%	49.0%
11	2,131	3.1	1,120.0	629.1	56.2%		5,054.2	3,705.8	42.3%	57.7%
12	2,397	3.5	1,259.7	656.5	52.1%		4,336.5	4,423.5	50.5%	49.5%
13	2,639	3.8	1,387.0	805.4	58.1%		4,927.6	3,832.4	43.7%	56.3%
14	2,153	3.1	1,131.8	859.7	76.0%		6,789.1	1,970.9	22.5%	77.5%
15 *	2,200	3.2	1,156.3	333.3	28.8%		4,947.4	3,812.6	43.5%	56.5%
16	2,427	3.5	1,275.5	425.5	33.4%		2,978.2	5,781.8	66.0%	34.0%
17	2,325	3.3	1,222.2	449.9	36.8%		3,234.8	5,525.2	63.1%	36.9%
18	1,789	2.6	940.1	355.4	37.8%		3,424.3	5,335.7	60.9%	39.1%
19	2,115	3.0	1,111.6	475.9	42.8%		3,783.3	4,976.7	56.8%	43.2%
20	2,101	3.0	1,104.1	661.6	59.9%		5,430.6	3,329.4	38.0%	62.0%
23	1,090	1.6	573.1	74.8	13.1%		1,298.8	7,461.2	85.2%	14.8%
24	2,022	2.9	1,062.6	306.2	28.8%		2,526.2	6,233.8	71.2%	28.8%
25 *	2,000	2.9	1,051.2	405.1	38.5%		4,357.9	4,402.1	50.3%	49.7%
26	2,103	3.0	1,105.4	749.3	67.8%		6,061.3	2,698.7	30.8%	69.2%
27	2,140	3.1	1,124.8	414.3	36.8%		3,304.8	5,455.2	62.3%	37.7%
28	2,366	3.4	1,243.6	187.1	15.0%		1,328.6	7,431.4	84.8%	15.2%
29 *	2,200	3.2	1,156.3	640.3	55.4%		8,564.0	196.0	2.2%	97.8%
30	2,498	3.6	1,313.2	688.5	52.4%		4,833.5	3,926.5	44.8%	55.2%

* Denotes wells with variable frequency drives (VFDs)

Table 3: 2015 Unit Well Capacity

Start Date: January 01, 2015 **End Date: December 31, 2015**

Unit Well	DW Capacity GPM	Total Daily Capacity MGD	Total Capacity To Date Mil Gal	Actual Pumpage To Date Mil Gal	% DW Utilization		DW Run Hours To Date	DW Rest Hours To Date	% DW At Rest To Date	% DW Running To Date
6	2,823	4.1	1,483.9	313.4	21.1%		2,154.2	6,605.8	75.4%	24.6%
7 *	2,200	3.2	1,156.3	192.9	16.7%		2,204.8	6,555.2	74.8%	25.2%
8	1,992	2.9	1,047.2	17.5	1.7%		143.8	8,616.2	98.4%	1.6%
9	1,746	2.5	917.4	445.1	48.5%		4,271.7	4,488.3	51.2%	48.8%
11	2,105	3.0	1,106.3	448.5	40.5%		3,556.1	5,203.9	59.4%	40.6%
12	2,413	3.5	1,268.1	796.7	62.8%		5,358.4	3,401.6	38.8%	61.2%
13	2,592	3.7	1,362.6	849.7	62.4%		5,616.2	3,143.8	35.9%	64.1%
14	2,008	2.9	1,055.2	843.7	80.0%		7,010.6	1,749.4	20.0%	80.0%
15 *	2,200	3.2	1,156.3	388.6	33.6%		5,641.2	3,118.8	35.6%	64.4%
16	2,311	3.3	1,214.5	242.4	20.0%		1,749.3	7,010.7	80.0%	20.0%
17	2,328	3.4	1,223.7	308.4	25.2%		2,205.9	6,554.1	74.8%	25.2%
18	1,868	2.7	981.7	357.6	36.4%		3,192.2	5,567.8	63.6%	36.4%
19	1,724	2.5	906.4	463.0	51.1%		4,499.7	4,260.3	48.6%	51.4%
20	2,023	2.9	1,063.3	575.7	54.1%		4,716.1	4,043.9	46.2%	53.8%
23	1,259	1.8	661.8	58.8	8.9%		798.8	7,961.2	90.9%	9.1%
24	2,001	2.9	1,051.6	473.0	45.0%		3,851.2	4,908.8	56.0%	44.0%
25 *	2,000	2.9	1,051.2	414.3	39.4%		4,549.2	4,210.8	48.1%	51.9%
26	2,029	2.9	1,066.6	771.9	72.4%		6,347.6	2,412.4	27.5%	72.5%
27	2,085	3.0	1,095.9	317.8	29.0%		2,560.7	6,199.3	70.8%	29.2%
28	2,327	3.4	1,223.1	346.6	28.3%		2,558.1	6,201.9	70.8%	29.2%
29 *	2,200	3.2	1,156.3	660.3	57.1%		8,671.8	88.2	1.0%	99.0%
30	2,407	3.5	1,265.1	682.8	54.0%		4,824.9	3,935.1	44.9%	55.1%

* Denotes wells with variable frequency drives (VFDs)