



P.O. Box 226 • Seneca, KS 66538 • 785/336-3760
FAX 785/336-2751 • <http://www.krwa.net>

February 5, 2010

Rick McDaniel
General Manager
Bourbon Cons. RWD 2
715 215th St.
Ft. Scott, Kansas 66701

Dear Rick;

This is a follow up letter to the meter testing conducted for the Bourbon Cons. RWD 2 water system. The results of the tests are enclosed.

The industry standards for the Neptune and Sensus 5/8-inch type of meter used to register water sales to district customers is to operate within a range of 95% to 101% at the minimum flow rates and operate within a range of 98.5% to 101.5% at all other tested flow rates. The "adjusted accuracy" to the far right column is the result of the tests.

In reviewing the results, there is greater degree of inaccuracy with the older meters. Other than two meters tested, meters older than 2000 showed a greater degree of inaccuracy. The testing shows that 21 of the meters (of 30 total) were 10 or more years old and 13 of those meters, or 62%, failed at least one of the three tests conducted on them; most of the inaccuracies were due to under-registering.

In reviewing the district's water losses since 2001, we noted a trend in the water loss compared to meter replacement. In the years when the district replaced meters that were over ten years old, the district's water losses were down compared to years when no meters were replaced. With more than 3,000 meters in the district, I know that replacing meters would be a large undertaking, not to mention the cost to the district. But, meters are an investment and are not an expense; the inaccuracies are contributing to loss of revenue for water that is purchased. A reasonable approach would be to change out ten percent of the meters on an annual basis, with focus on the oldest meters and those with the highest amount of usage recorded.

If you need any assistance with this change out program, please do not hesitate to contact me.

I look forward to seeing you and the district's board members at the upcoming annual conference at Century II in Wichita, March 30 – April 1. Agencies will be present to discuss projects and funding at length. Also visit the KRWA Web site, www.krwa.net for news and information concerning water and wastewater utilities, upcoming training opportunities and other KRWA programs.

Sincerely,

Gary Armentrout
ARRA Circuit Rider

Enclosures

C: Hubert Thomas, Chairman
Janice Seaver, Bookkeeper

Meter Tests - Bourbon Cons. RWD 2

Meter: Nepturn 5/8-inch; SN: 41859242; Dated:Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.1	10	101.0%	99.0%	100.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	69.8	70.5	99.0%	100.3%	99.3%
Meter: Neptune 5/8-inch; SN: 41156689; Dated:Nov 1995						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.26	10.1	10	101.0%	99.0%	100.0%
2	2	19.8	20	99.0%	100.9%	99.9%
3	5	69.8	70.5	99.0%	100.3%	99.3%
Meter: Neptune 5/8-inch; SN: 41859241; Dated:Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Accuracy
1	0.25	9.9	10	99.0%	99.0%	98.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	69	70.5	97.9%	100.3%	98.2%
Meter: Neptune 5/8-inch; SN: 81285325; Dated: Jul 2005;						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	20.2	20	101.0%	100.9%	101.9%
3	5	70.1	70.5	99.4%	100.3%	99.7%
Meter: Neptune 5/8-inch; SN: 44741449; Dated: Jul 1998						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70.5	70.5	100.0%	100.3%	100.3%
Meter: Neptune 5/8-inch; SN: 41857337; Dated: Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70	70.5	99.3%	100.3%	99.6%
Meter: Neptune 5/8-inch; SN: 41859238; Dated: Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70.1	70.5	99.4%	100.3%	99.7%
Meter: Neptune 5/8-inch; SN: 46130399; Dated: May 1999						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10	10	100.0%	99.0%	99.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70.2	70.5	99.6%	100.3%	99.9%
Meter: Neptune 5/8-inch; SN: 39142941; Dated: Apr 1993						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.1	10	101.0%	99.0%	100.0%
2	2	19.1	20	95.5%	100.9%	96.4%
3	5	70.1	70.5	99.4%	100.3%	99.7%
Meter: Neptune 5/8-inch; SN: 41258067; Dated: Dec 1995						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	9.7	10	97.0%	99.0%	96.0%
2	2	9.5	20	47.5%	100.9%	47.9%
3	5	80.1	70.5	113.6%	100.3%	114.0%

Meter Test - Bourbon Cons. RWD 2

Meter: Sensus 5/8-inch; SN: 43851053; Dated: Mar 1993						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	0.1	10	1.0%	99.0%	1.0%
2	2	19.5	20	97.5%	100.9%	98.4%
3	5	70.8	72.5	97.7%	100.3%	97.9%
Meter: Neptune 5/8-inch; SN:46130347; Dated: May 1994						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.26	7.1	10	71.0%	99.0%	70.3%
2	2	20.1	20	100.5%	100.9%	101.4%
3	5	71.8	72.5	99.0%	100.3%	99.3%
Meter: Neptune 5/8-inch; SN:41857828; Dated: Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Accuracy
1	0.25	8.6	10	86.0%	99.0%	85.1%
2	2	20	20	100.0%	100.9%	100.9%
3	5	71.3	72.5	98.3%	100.3%	98.6%
Meter: Neptune 5/8-inch; SN:41857590; Dated: Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	9.7	10	97.0%	99.0%	96.0%
2	2	20	20	100.0%	100.9%	100.9%
3	5	81.2	72.5	112.0%	100.3%	112.3%
Meter: Neptune 5/8-inch; SN:44741500; Dated: Jul 1998						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	9.6	10	96.0%	99.0%	95.0%
2	2	19.7	20	98.5%	100.9%	99.4%
3	5	71.3	72.5	98.3%	100.3%	98.6%
Meter: Neptune 5/8-inch; SN: 41857557; Dated: Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	9.5	10	95.0%	99.0%	94.1%
2	2	19.8	20	99.0%	100.9%	99.9%
3	5	71.5	72.5	98.6%	100.3%	98.9%
Meter: Neptune 5/8-inch; SN: 37991999; Dated: Mar 1993						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	9.3	10	93.0%	99.0%	92.1%
2	2	19.7	20	98.5%	100.9%	99.4%
3	5	72	72.5	99.3%	100.3%	99.6%
Meter: Neptune 5/8-inch; SN: 78044079; Dated: Apr 2003						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	10	10	100.0%	99.0%	99.0%
2	2	20	20	100.0%	100.9%	100.9%
3	5	72.1	72.5	99.4%	100.3%	99.7%
Meter: Neptune 5/8-inch; SN: 41857671; Dated: Sept 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	0	10	0.0%	99.0%	0.0%
2	2	19.8	20	99.0%	100.9%	99.9%
3	5	71.4	72.5	98.5%	100.3%	98.8%
Meter: Neptune 5/8-inch; SN: 41258114; Dated: Dec 1995						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	(flow curve adjustment) on test meter	Adjusted Accuracy
1	0.25	1.8	10	18.0%	99.0%	17.8%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	81.4	72.5	112.3%	100.3%	112.6%

Meter Tests - Bourbon Cons. RWD 2

Meter: Nepturn 5/8-inch; SN: 41859242; Dated:Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.1	10	101.0%	99.0%	100.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	69.8	70.5	99.0%	100.3%	99.3%
Meter: Neptune 5/8-inch; SN: 41156689; Dated:Nov 1995						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.26	10.1	10	101.0%	99.0%	100.0%
2	2	19.8	20	99.0%	100.9%	99.9%
3	5	69.8	70.5	99.0%	100.3%	99.3%
Meter: Neptune 5/8-inch; SN: 41859241; Dated:Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Accuracy
1	0.25	9.9	10	99.0%	99.0%	98.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	69	70.5	97.9%	100.3%	98.2%
Meter: Neptune 5/8-inch; SN: 81285325; Dated: Jul 2005						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	20.2	20	101.0%	100.9%	101.9%
3	5	70.1	70.5	99.4%	100.3%	99.7%
Meter: Neptune 5/8-inch; SN: 44741449; Dated: Jul 1998						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70.5	70.5	100.0%	100.3%	100.3%
Meter: Neptune 5/8-inch; SN: 41857337; Dated: Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70	70.5	99.3%	100.3%	99.6%
Meter: Neptune 5/8-inch; SN: 41859238; Dated: Jun 1996						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.2	10	102.0%	99.0%	101.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70.1	70.5	99.4%	100.3%	99.7%
Meter: Neptune 5/8-inch; SN: 46130399; Dated: May 1999						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10	10	100.0%	99.0%	99.0%
2	2	19.9	20	99.5%	100.9%	100.4%
3	5	70.2	70.5	99.6%	100.3%	99.9%
Meter: Neptune 5/8-inch; SN: 39142941; Dated: Apr 1993						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	10.1	10	101.0%	99.0%	100.0%
2	2	19.1	20	95.5%	100.9%	96.4%
3	5	70.1	70.5	99.4%	100.3%	99.7%
Meter: Neptune 5/8-inch; SN: 41258067; Dated: Dec 1995						
Test Number	Test Flow rate gallons per min.	Meter Volume (entity's meter)	Tester Volume (KRWA's tester)	Entity's meter accuracy (compared to KRWA)	flow curve adjustment on test meter	Adjusted Accuracy
1	0.25	9.7	10	97.0%	99.0%	96.0%
2	2	9.5	20	47.5%	100.9%	47.9%
3	5	80.1	70.5	113.6%	100.3%	114.0%