

**BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI**

LOUIS DEFEO, )

Complainant, )

v. )

MISSOURI AMERICAN WATER, )

Respondent, )

EXHIBIT C

File No.

(PSC fills this in)

**Affidavit of Robert E. Criss**

COMES NOW Robert E. Criss, being of lawful age, and being first duly sworn, states as follows:

**Qualifications.** I am Robert E. Criss, Professor Emeritus of Earth and Planetary Sciences at Washington University in St. Louis. I earned my BS (73) in Geology at Case, and my MS (74) in Geology and PhD (81) in Geochemistry at Caltech. I formerly was Chief of the Stable Isotope Geology Project at the United States Geological Survey (1981-1987), Professor of Geology at UC Davis (1987-1994), and then Professor of Earth and Planetary Sciences at Washington University (1994-2018). I was the keynote speaker for the 2019 annual meeting of the Missouri Floodplain and Stormwater Managers Association and am an appointed member of the University City Commission on Storm Water Issues. I am author of *Principles of Stable Isotope Distribution* (Oxford University Press, 1999) which includes a major chapter on isotope hydrology, and co-editor of several books, including “*At the Confluence: Rivers, Floods and Water Quality in the St. Louis Region* (MBG Press, 2003) and *Observational Hydrology* (2019, online). My published papers encompass many disciplines and have appeared in >50 different scientific journals, three government series and as several book chapters. Studies involving quantitative analysis of water issues have been a major focus of my work, and involve flooding and flood recurrence, water quality and quantity, rainfall-runoff modeling, alluvial groundwater, springs, reservoir landslides, and water-rock interactions. I have used computers for more than 50 years. Dozens of my studies have involved use of sophisticated electronic equipment, physical and electronic measurement, data recording, use of remote devices, data transfer, file management, data processing, data interpretation, and the problems

that can be encountered at each step. I have provided sworn testimony and written expert reports related to flooding and flood damages for several former and ongoing court cases, as well as for many public hearings.

**Available Data Related to Alleged Water Usage: 1700 Green Berry Road, Jefferson City, Missouri.** I have examined the detailed, hourly file of alleged water usage at 1700 Green Berry Road that Missouri American Water provided to the Complainant, for the 96-day period from March 5 to June 9, 2020. Of particular interest is the period of high use for a nearly continuous, 73 hour period during April 1-4, when alleged flow was very steady at an average of  $568.2 \pm 8$  gal per hour, excepting a two hour period when the alleged flow sharply dropped to 317 and 386 gal/h, and excepting the 360.7 gal allegedly used during the final hour of this period. This record is the basis for the claim by Missouri American Water that Complainant consumed a total of 40,838 gallons of water during this 73-hour period.

Readily available NWS records indicate that cool, seasonal temperatures prevailed during April 1-4, 2020 at Jefferson City, and that some rainfall was recorded on three of these four days.

Complainant states that he has a 20,000-gallon pool that he routinely maintains at full level, by intermittently “topping off” by adding small amounts of water when necessary. He provides the areal dimensions of his pool as 18’ x 36’. He states that no lawn irrigation or other large domestic use occurred during April 1-4, 2020. He reports that he saw no leaks, flooding or ponding in his home or yard during the April 1-4 period, nor did he hear running water for any extended period.

**Analysis of Available Data:** It would be possible to use ~500 gal/h for 3 days straight if a large lawn were continuously irrigated. However, the aforementioned NWS records prove that cool, seasonal temperatures and significant rainfall prevailed at Jefferson City during April 1-4, 2020, and thereby indicate that lawn irrigation at this time would have been both unseasonal and unreasonable. Furthermore, there is no lawn irrigation system on the premises.

Complainant’s description of the areal dimensions of his pool is consistent with his reported capacity of 20,000 gallons, if the average depth of the pool is 4.1 feet, which is very reasonable. Thus, the alleged, 40,838-gallon water consumption that Missouri American Water claims that complainant consumed during April 1-4 would have been sufficient to completely fill an empty pool of that size, more than two

times.

Excepting the anomalous 73-hour period during April 1-4, when total use is alleged to be 40,838 gallons, usage for the remaining, 93-day period was normal for a typical American residence, averaging 10.9 gal/hr. Furthermore, water usage exceeded 100 gal/hr for only 27 hours of that remaining 93-day period, and never exceeded 100 gal/hr for more than 3 consecutive hours, with those brief periods of high usage being consistent with normal activities like washing a car.

The graphical pattern of the water use alleged by Missouri American Water is highly peculiar, particularly the 2-hour interruption of the steady high use of  $568 \pm 8$  gal/hr that allegedly prevailed for most of April 1-4. Taken at face value, this pattern of alleged water use would demand that 1) water use by Complainant averaged 11.4 gal/hr from March 5 until April 1, a normal amount for a American residence; 2) water use abruptly increased to a rather steady average of 563.6 gal/h for 23 hours, 3) water use was abruptly reduced to an average of 351.2 gal/hr for two hours, suggesting that flow had returned to normal for nearly one hour sometime during that interval; 4) water use abruptly increased back to 570.5 gal/h for the next 47 hours, 5) water use abruptly decreased to 360.7 gal during the final hour of the alleged high flow period, probably indicating that the meter began to record a normal, low flow value sometime during that final hour; and 6) the meter recorded normal levels of use that averaged 10.7 gal/h from the evening of April 4 through June 9, when the record available for my examination terminates. Thus, Missouri American Water alleges that water usage at the Complainant residence abruptly increased by more than 5,000% for nearly a day, abruptly returned to normal for an hour or so, increased again by more than 5,000% for nearly two additional days, and then just as abruptly resumed to normal, and that this normal usage was thereafter maintained for at least two months.

The available evidence strongly suggests that the peculiar, two-hour drop then recovery of alleged water use on April 2 is a "spike" in a faulty data stream, when the remote gauging and transmission system temporarily attempted to return to normal. Note that these flow rates of 386 and 317 gal/hr closely resemble the flow of 360 gal/hr recorded at the very end of the high usage interval, on April 4, when the system clearly did return to normal.

No other explanation appears to be reasonable to this expert. It is not possible that more than 40,000 gallons of water could flow onto a property of modest size without providing any evidence of where

that huge amount went. Modern data recording, transmission and processing systems are very good, but given their complexity can never be perfect. It is unreasonable for Missouri American Water to insist that the contrary is true, and insist that remote measurements and computer processing are superior to first-hand knowledge, expert opinion, and obvious realities about the huge quantities of water alleged to have been used at 1700 Green Berry Road, but were nowhere seen.

s/ *Robert E. Criss*

9/10/20

Robert E. Criss, Petitioner

Date

State of Missouri )  
County of St. Louis ) SS.

Robert E. Criss of lawful age, being duly sworn on his oath, states that the facts stated in this affidavit are true according to his best knowledge and belief.

Subscribed and sworn to before me this 10<sup>th</sup> day of September \_\_\_\_ 2020.

My commission expires:

*Erika Victoria Dopusch*  
Notary Public

