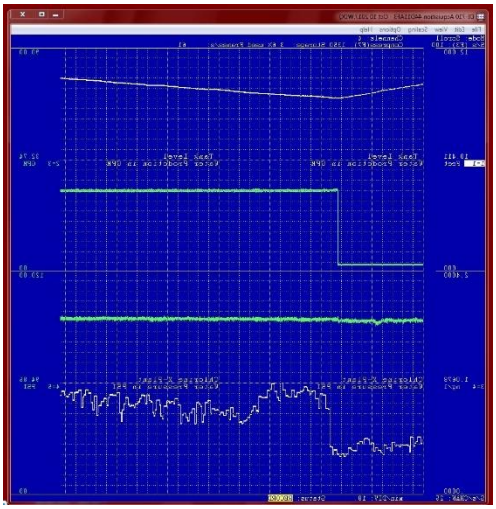
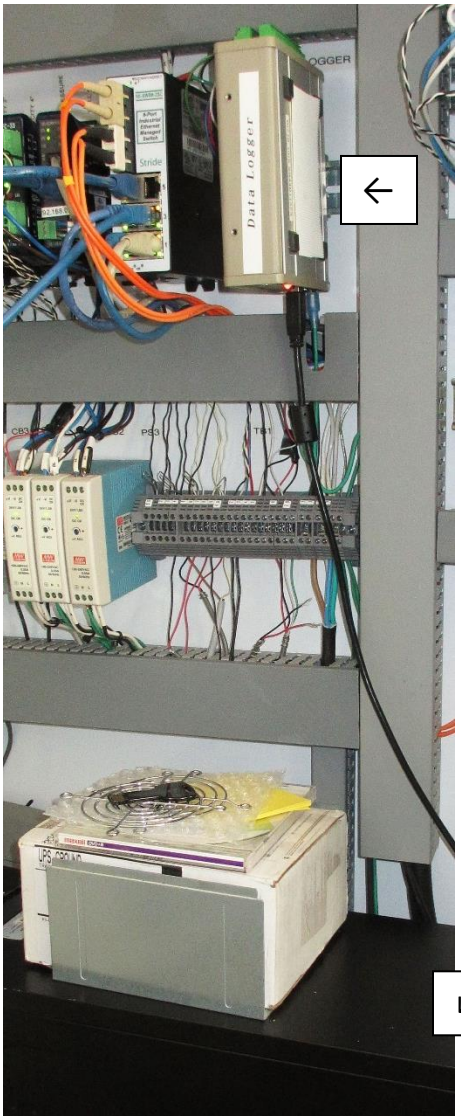
Report for November 28, 2017

For several months we have had issues with the Data Logger that records water production, tank levels, water pressures, and Chlorine levels as water production exits the Treatment facility to the distribution system. This information is also displayed on the Water Plant's PC so an Operator, a manager or board members can see up to 24 hours of data. Incidentally, this data can be reviewed for as far back in time as we have saved the recordings, i.e. from 2012.





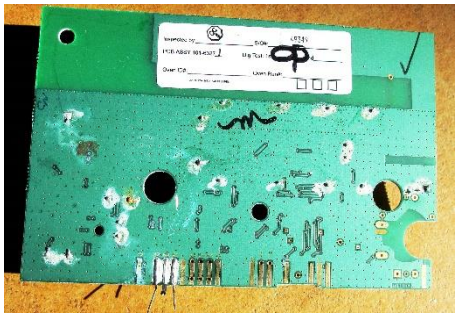
At first, we assumed the Data Logger, an Automation Direct DI-710 – see unit in photo – was failing so Dan sent another and I installed it. It worked for about a week and then stopped. After that, it would run for only about 24 hours before stopping. This pattern followed every "improvement" I made such as grounding the unit and updating device drivers; just as the previous unit had behaved. To confirm that these units were both defective I installed a Gateway Lap Top and plugged the Data Logger into it where upon it proceeded to work flawlessly. I must add, it took a week to discover all the ways one can set a Lap Top to shutdown/go to "sleep" automatically and abort a test, *ARGH!*

So, having determined that the Data Loggers were both OK, the problem must have been elsewhere. With Dan's help we worked through a number of software and configuration possibilities and then I began looking at possible hardware faults. After a substantial amount of reading, the on-board USB hub appeared a leading suspect so I ordered a $13 PCI USB 2.0 (vintage) Window's 7 card after reading almost all of the 221 reviews many describing very similar issues with on-board USB Hubs. But as before the Data Logger worked just long enough for me to take the Gateway home and declare victory, then it shutdown. As I write, the Data Logger has been working for 3 days after I made a 2nd attempt at implementing a 12-page series of trouble shooting steps recommended in a paper by Automation Direct – there were COM port configuration errors.

For some months I have had the District's old CL-17 Chlorine Analyzer and a second CL-17 which had been purchased on eBay for parts on Craig's List for sale. As that didn't work, I have had the stuff on eBay for a total of some 14 days, first at $500 then $450. While there were a good number of views it didn't sell. I'll put this stuff back on eBay after the holidays.

Meanwhile, Andy and Kerry got a very nice sign on the door of the Tank utility room/plumbing vault:

During the month I continued to windup on-going water meter repairs. On the 5th, I installed a remote reader for the Dougalls @ 364 Hopi Tr. The Dougall's property lies along the north side of the tank and extends west along the ridge/high ground in which the tank resides. The District sued the Dougalls during 2011 when we discovered that Dar Elder, the initial developer of Paint Pony Ranch Club, who built the tank during 1957, had failed to deed the tank to the District when it bought the assets of the water system from him in 1965. To make matters a tad worse, the tank was determined to be several inches onto the Dougall's land. So, Gene Betterman and I took a bottle of wine to an evening meeting with them at their home and they graciously agreed to be sued. They couldn't donate the land; a suit was required to "quiet the title." So, the Dougalls have a special place in the District's history. As to the meter, their Hexagram had been attached to the outside of the house and it was destroyed by a contractor engaged to stucco the house. While laying almost upside down on the ground water got into the case and toasted the electronics.



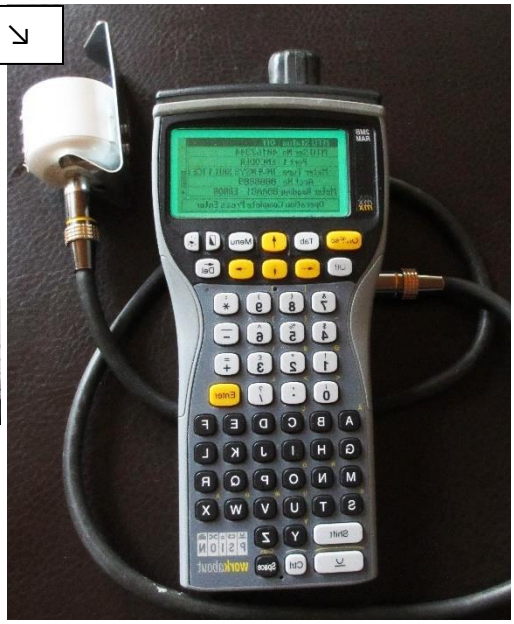
Note the corrosion on the circuit board contacts.

I was able to attach a remote reader to the side of their power breaker box next to the back door where it will be easy to read and report the reading monthly. Provided it doesn't get covered by stucco.

On the 7th, I returned to 1505 Sunshine Cr. This was an odd case. The water meter was working like new. The Hexagram was reading the meter accurately but continued to report a very low number for as far back as Pathway Reads retains data for us, namely 1/1/2015! I contacted Kirby from Mt. States Pipe & Supply and we arranged to have a look at the Hexagram on the 17th. When looking at the Hexagram with his Psion programming tool he noticed an error. The Psion is

attached to the Hexagram by a clamp on a “puck”. The puck communicates with the electronics within the case without direct electrical connections.

Puck & clamp ↘



In addition to programming the Hex with the water account number, home address etc., the Hex is also programmed with the number of “wheels” or cylinders the meter displays. This Badger M25 has 6 wheels, but the Hex had been programmed as having just 5. In this M25 there are 6 wheels, the last “0” is a fixed digit, not a turning wheel.

My guess is, the Hex correctly reported the reads for about the first year and thereafter continued to report the same number for something like the next 10 years! Kirby uploaded the revised Hex program to Pathway Reads and it is now reporting correctly.

Last month I attempted to repair the Hexagram at 1350 Chippewa. The Hexagram had stopped sending the twice daily reads. The Hexagram was located in a utility room of the walkout basement. All I could do was remove excess wire between the meter and the Hex but that did not restore communications. On the 17th I took Kirby to this house as well. This house has been stuccoed. We speculated that the existing Hexagram was no longer able to get a signal out through wire mesh imbedded in the stucco so we replace the Hex with a “new” 2006 Hex. Kirby programmed the new Hex and uploaded that data to Pathway Reads as well and it is now working reliably. Jerry and Kirby have been here to help a total of 5 times including help placing a smart meter at Well#11A, a total of about 9 hours without charge.

To date I have worked on 23-meter installations, I think. I could not repair/replace the Hexagrams for 6 meters but fortunately, 4 of these meters are located where homeowners can easily read and report the readings monthly by phone or e-mail. I was able to provide remote readers, like the one in the photo on the preceding page, for 2 homeowners so they can report their readings as well. Hexagrams at two other homes have become flaky providing reads intermittently but those reads, for the time being, are sufficient for accounting purposes. After repositioning one of those Hexagrams during a third visit to the house – they live nearby – it returned to reporting reads reliably but that may not continue. The remaining 15 are now working properly. How many more defective meter and/or Hexagrams do we have? Perhaps just a few.

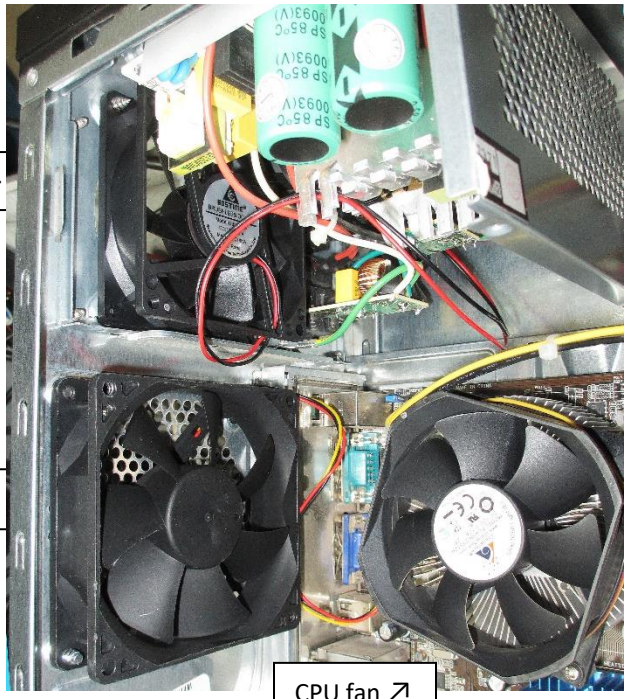
The Psion tool is used to re-programming an existing Hex in place or to replace and program a “new” circ. 2006 Hex. Then one must upload this account/programming information to software on a PC which, in turn, is used to upload it to a data service provider such as Pathway Reads. I haven’t been able to get this software to work on my old Gateway Lap Top possibly because it has been upgraded to Windows 8.1 I will load the software on the Water Plant PC with Windows 7. If we can get this software to work, we can replace failed Hexagrams with ones we have in stock. We are long on Hexagrams for pulse type meters – Badger M25 and some AMCO meters - but we may not have any encoder type Hexagrams for encoder type meters. The pulse type meter sends an electrical pulse ever 10 or 100 gallons depending

on the meter. The Hex is programmed to record the pulse as either 10 or 100 gallons as per the meter. The Hex never sees the numbers on the meter's register. An encoder type meter stores the meter's register read in a memory chip that an encoder type Hex can directly read.

It is a shame we failed to pay adequate attention to what our operator was installing back in 2006. We should have replaced all meters with one make and they should have been encoder not pulse type meters.

While working on the Water Plant PC I discovered the cooling fan for the power supply had failed. I have replaced this fan and the larger exhaust/cooling fan. The fans are inexpensive but it took some time to find the correct replacements – a lot of time! I'll research and replace the CPU fan in due course.

Power supply fan →



Exhaust fan →

CPU fan ↗

The PC has been highly reliable running non-stop for some 10 years. But it doesn't do any heavy lifting; so, I have had it doing medical research in the "background" in what is call *distributed computing*. For more information check out: *http://boinc.bakerlab.org/rosetta/*. The specific project the computer has been working on is a University of Washington in Seattle project and it is about "folding proteins". My home computer, which I built is very much faster and it is also working on this research project as well as 2,240,416 others who have donated the use of their computers.

The District could also consider installing an automatic weather station at the Water Plant and participating with Weather Underground (https://www.wunderground.com/weather/us/co/woodland-park/80863)). The cost is nominal but over time the data could prove valuable for planning.

Kent Brady

A PS: The sunset a few days ago was spactular!