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March 3, 2010

John Griffin
City of Glasco
PO Box 356
Glasco, KS 67445

Dear John,

It was good to meet with you to assist you with assessing the city's well situation.

Due to the high cost of purchased water from Mitchell RWD 3, the city would like to go back to using water from the city's existing wells. The RWD connection would still be maintained as a backup supply.

We first looked at the west well. This well had been shut down due to VOC contamination; it is located very close to some type of old machine shop which may have contributed to the contamination. It is thought that the ground water contamination could now be clear and the well could be used again. You are in the process of performing the necessary testing to ensure the water quality will meet KDHE standards.

The building on the west well is fairly new and it also has new electrical controls. The well pump is an old oil lubricated vertical turbine type pump. We were unable to access the well sufficiently to do any type of pump test. The pump is currently pumping at the rate of 350 gpm and is used for bulk water. The well is a shallow alluvial type well. General water quality is thought to be acceptable; the water produced is recognized as having high hardness. You commented that the piping associated with the well appears clean so that would indicate that there is not excessive iron or manganese. An analysis needs to be done to determine the water quality from this well.

At some time, you may want to consider converting the pump to a water lube type or a submersible as we discussed. The well would require extensive plumbing modifications to connect it to the distribution system. A check valve, air release valve, gate valve and numerous miscellaneous piping and fittings as well as a chlorination system would be needed. The meter is fairly new and in good condition. The pump would need to be lifted and rotated to face south to facilitate the modifications and tie it into the system as we discussed. There are also some sanitary seal issues and a well vent screen problem that need to be addressed.

There is also the issue of controlling the well in relationship to the water tower level. We discussed installing simple tank level type controllers or you could install radio telemetry which would be much better, however, more expensive. If the tank level controllers were used you could simply alternate the two wells by turning off the HOA switch on the one that wasn't being used alternating each week. This would be sufficient to properly exercise each well.

The motor on this pump is not in the best of condition based on our readings but it is not possible to predict how it will perform when in service. At present, the motor only operates for short periods of time. The motor may overheat when in more continuous operation.

The motor is a 20 hp 3-phase rated at 51 FLA amps at 240 volts, 1800 rpm. L2 is exceeding its capacity at 62 amps and is out of balance with the other two legs. This results in heat buildup in the windings. There were also voltage imbalances. The voltage was out of balance by 2.24% and the amperage was out of balance at 13.3%. Imbalance should not exceed 5% for amperage and 1% on voltage.

West Well Motor

Voltages phase to phase	Voltage phase to ground	Amperage
L1-L2, 250.5 V	L1, 125.6 V	L1, 55.3 A
L2-L3, 242 V	L2, 125.8 V	L2, 62 A
L1-L3, 248.5 V	L3, 207.7 V	L3, 47 A

The south well was discontinued years ago, apparently due to nitrate contamination. After looking at the placement of the well it is easy to see why. There is a 10-foot deep drainage ditch a few feet north of the well leading back to the creek. This ditch carries storm water from in town and from agriculture fields north of town to the creek.

This pump and motor are still connected to the distribution system. It does have some issues that would have to be dealt with before it could be brought back into service providing the water quality is acceptable.

We noted that the air release valve was eliminated to make room for the meter. You must have an air release valve or a foot valve on the pump or air will be introduced to the distribution system. We discussed several options to correct this problem. The pump also needs a new mechanical seal as it is leaking very badly. The well seal needs to be repaired and sealed to prevent contaminants from entering the well. The electrical controls are in poor condition and in need of replacement; a tower level switch is needed to start and stop the pump automatically based on tower level. A chlorination system is also needed.

The pump motor is a 20 hp, 3-phase, 1800 rpm, rated at 50 FLA at 240 V. The pump produces 190 gpm. This motor is out of balance beyond operational recommendations in both amperage (14.2 %) and voltage (at 1.6%) even though it is below nameplate FLA.

South Well Motor

Voltages phase to phase	Phase to ground	Amperage
L1-L2, 242.8 V	L1, 120.9 V	L1, 44.9 A
L2-L3, 236 V	L2, 207.6 V	L2, 45.3 A
L1-L3, 241.5 V	L3, 120.6 V	L3, 36 A

Both wells would require quite a bit of work to bring them up to acceptable standards. And a full water quality analysis should be conducted on each well to determine the water quality before any work is started. Even if the regulated contaminants meet the drinking water standards, the inorganic quality should be examined closely and carefully considered since the quality may be poor enough that the city continues to purchase water from Mitchell RWD 3, or explore treatment options. If on the other hand the water quality is satisfactory, and if purchase contract allows for the city to use its wells, then it would seem appropriate for the city to bring these wells and facilities up to good standards.

I would like to you to consider attending the Annual Conference & Exhibition in Wichita on March 30 – April 1. The conference is a great place to learn about the waterworks industry and meet other industry professionals. There will be a lot to see and do as we discussed; see the program guide for full details.

Sincerely,

Jon Steele
Circuit Rider

C: Charles Wilson, Mayor
Brenda Wisbey, City Clerk