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February 20, 2010

Larry Walt
City of Collyer
PO Box 153
Collyer, Kansas 67631

Re: Ground Water Rule

Dear Larry,

I appreciate the opportunity for the meeting we had on February 17 to discuss the Ground Water Rule and how it can affect operation of the city's water system. Based on our discussions, it is apparent that the city has sufficient contact time to provide 4-log (99.99%) inactivation of viruses. While the rule does not require all groundwater systems to meet 4-log inactivation, those systems that can are not required to conduct triggered source water monitoring should they experience a coliform positive distribution system sample.

The city's CT (chlorine residual x contact time) is based on 1000 feet of 6-inch line between your chlorination building and your first customer. This section of line contains 1468 gallons of water. This volume is then divided by the maximum well pumping rate of 60 gpm to achieve 24.5 minutes of contact time. This figure is then multiplied by the lowest free residual maintained at the first customer of 0.2 mg/L to obtain a CT value of 4.9 mg-min/L. Since this figure exceeds the minimum CT value needed of 4.0 mg-min/L, the city provides 4-log inactivation.

In order to officially report 4-log inactivation to KDHE, the city must submit a "CT Calculation Worksheet" along with the "Certification of 4-Log Treatment Under the Ground Water Rule" form to KDHE. The calculation worksheet for your system is enclosed with this letter. I left a blank certification form with you. An elected official should sign this form. Submitting these two documents will officially notify KDHE that the city intends to provide 4-log inactivation.

As part of providing 4-log inactivation, Collyer would be required to conduct daily compliance monitoring. This simply means the city must monitor residuals at the chlorination building daily and submit that data to KDHE monthly. The data should confirm that residuals are never less than 0.2 mg/l. All monthly reports must be submitted by the 10th of the month for the previous month. I left you several forms entitled "Monthly Disinfection Report for the Groundwater Rule" which can be used for this purpose. The right side of the form is for recording residual readings leaving the chlorination building. You can also use the left side to record your daily distribution system residuals so that all residual data is on the same form. Residuals must be monitored daily, including weekends and holidays, at both the POE and in the distribution system.

As I mentioned when we visited, the city has a decision to make regarding this rule. Collyer can continue to operate as in the past and not report 4-log inactivation. The downside is that you could be triggered into collecting samples from both wells should you have a coliform-positive distribution system sample in the future. The other option is to report the city provides 4-log inactivation. Under this option, the city would not be triggered into sampling your wells. However, you would be required to monitor chlorine residuals daily at the point-of-entry (POE) and submitting those results to KDHE by the 10th of each month.

To assist the city in making this decision, you might consider collecting raw water samples from each of your wells for E. coli analysis. Sampling would give the city background information on the bacteriological quality of both wells prior to any source water monitoring that might be required in the future. **Such data might also influence your decision on whether to report 4-log inactivation.** If you do not already have individual sample taps on each of your wells, you should consider installing them. Sampling can be conducted through either a private lab or the KDHE lab.

If I can be of further assistance, please feel free to call me at 913-850-8822. My email address is jeff@krwa.net. Funding for the above assistance was provided through a contractual arrangement between the Kansas Department of Health and Environment (State Revolving Loan Program set-aside) and the Kansas Rural Water Association (KRWA). Please visit the KRWA website at www.krwa.net for news and information concerning water and wastewater utilities, training opportunities, and other KRWA programs.

Sincerely,

Jeff Lamfers
Consultant

Enclosure

c: Troy Miller, Mayor
Kelly Kelsey, KDHE, Topeka
Norb Windholz, KDHE, Hays

Understanding "CT" Ground Water Rule



CT = C X T

C = concentration of disinfectant residual (mg/L)

T = contact time (minutes) between point of disinfectant application and point where residual is measured

CT is express as (mg-min)/L

You will need to know:

PWS Name: City of Collyer

- C (mg/L), the measured disinfectant residual at or before the first customer
- Length (ft) of each pipe between point of application and point residual is measured
- Diameter (ft) of each pipe
- Maximum Daily flow (gallons per minute) of system

PWS ID: _____

Basic Formulas:

Your Water System Calculations:

- Calculating Pipe Cross-Sectional Area (ft²):

$(\pi \div 4) \times (\text{diameter}^2)$



Pipe Diameter (Inches)	0.196	ft ²
6		

- Calculating Pipe Volume (gallons):

pipe length X cross-sectional area



Pipe Length (Feet)	1468.0	gallons
1000		

- Calculating Disinfectant Contact Time (minutes):

pipe volume ÷ flow



Highest Flow Rate (gpm)	24.5	minutes
60		

- Calculating CT (mg-min/L or CT):

disinfectant residual X contact time



Lowest Residual (mg/L)	4.9	mg-min/L (CT)*
0.2		

** Compare this CT value (mg-min/L) with the required CT value from the below table at the appropriate temperature for 4-log Inactivation. If your system's CT is larger than the corresponding CT value in the below table, then your water system is achieving 4-log inactivation of viruses with free chlorine.*

CT Values for Inactivation of Viruses by Free Chlorine, pH 6.0 - 9.0

Degrees (C)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Degrees (F)	33.8	35.6	37.4	39.2	41.0	42.8	44.6	46.4	48.2	50.0	51.8	53.6	55.4	57.2	59.0	60.8	62.6	64.4	66.2	68.0
Inactivation (log)																				
2	5.8	5.3	4.9	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0
3	8.7	8.0	7.3	6.7	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0
4	11.6	10.7	9.8	8.9	8.0	7.6	7.2	6.8	6.4	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0