Appendix W

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

December 16, 2009

Ms. Yvonne W. Forrest, Senior Assistant Director
City of Houston
Public Works and Engineering Department
PO Box 1562
Houston, Texas 77251-1562

Subject: Public Drinking Water System
Approval of Ground Water Rule Disinfection Protocol at 26906 Plantation Hill Plant
City of Houston District 82 – PWS ID No. 1011593
Harris County, Texas

Dear Ms. Forrest:

We have completed our review of the Groundwater CT Study that accompanied your letter of October 20, 2009. The materials indicate that the City of Houston District 82 intends to provide a 4.0-log inactivation of viruses to meet Ground Water Rule (GWR) requirements at the 26906 Plantation Hill Plant. We have reviewed the information contained in your letter and are approving the proposed compliance strategy for this entry point to the distribution system.

As long as the City of Houston District 82 continuously meets the viral inactivation requirements, triggered source water monitoring will not be required at the following well:

1) G1011593C
2) G1011593D

Description of Disinfection Process

The disinfection protocol involves injecting chlorine into the raw water line prior to two 0.2 MG ground storage tanks (GST) and monitoring the free chlorine residual at the effluent of the booster pumps before distribution.

CT calculations are used to evaluate a disinfection process. Because disinfectant contact time is an important factor in assessing a disinfection process, the following T_{10} table was developed for the City of Houston District 82. The T_{10} values shown in this table are based on the data provided by TCEQ Comprehensive Compliance Investigation (CCI) conducted on May 20, 2008 and your October 20, 2009 submittal.

TABLE 1: T_{10} TABLE – CITY OF HOUSTON DISTRICT 82

TREATMENT UNIT	VOLUME (Gallons)	FLOW RATE (gpm)	BAFFLING FACTOR	CONTACT TIME, T_{10}(minutes)	MINIMUM SPECIFIED RESIDUAL (mg/L)
0.2 MG GST (2)	200,000(1)	2,000(2)	0.1(3)	10.0	0.60(4)

Notes:
(1) Based on the allowable volume of two 0.2 MG GST with a minimum water level of 10 feet and a maximum water level of 18.05 feet.
(2) Based on the maximum flow rate of the wells reported in the City of Houston District 82 CT submittal dated October 20, 2009.
(3) Assumes that a high level of hydraulic short-circuiting occurs in a tank with no inlet or outlet baffling and no internal baffle walls.
(4) Based on a maximum pH of 9.0 Standard Units and a minimum water temperature of 10°C.

Monitoring, Reporting, and Recordkeeping Requirements

Because you have elected to provide 4-log viral inactivation to meet GWR requirements, you must meet certain requirements associated with this compliance alternative. Specifically:

1. The system must monitor the free chlorine residual at the designated monitoring point at least once each day, including weekends or holidays, using instrumentation that meets the requirements of 30 TAC §290.116(c)(3)(C). The system may use the results grab sample tests or continuously record the residual using on-line monitors and recorders. If the system uses grab samples and the daily reading indicates the residual is less than the approved MSR, the test must be repeated at least once every four hours until the operators restore the residual to acceptable levels.

2. If the measured residual falls below the approved minimum specified residual (MSR) for a period longer than four consecutive hours, the operators must also measure and record:

   a. The flow rate through two 0.2 MG GSTs, and

   b. The pH and temperature of the water using instrumentation that meets the requirements of 30 TAC §290.116(c)(3)(C).

3. The system must complete the GWR 4-log MSR MOR, TCEQ Form 20362 each month.

   a. If the disinfectant residual falls below the MSR for more than 4 consecutive hours, the system must fax a copy of the MOR to (512) 239-3666 within 24 hours of the event so that we can determine if a treatment technique violation has occurred.

   b. The system must also provide us a copy of the report upon request.

4. The system must maintain copies of all documentation needed to demonstrate compliance with the GWR in accordance with the requirements contained in 30 TAC §290.46(f)(3). For example:

5.

a. The system must maintain a copy of each GWR MSR MOR for a period of at least 10 years.

b. The system must maintain records showing that the flow meters and laboratory instruments have been calibrated in accordance with the requirements of 30 TAC §290.46(s); these records must be maintained for a period of at least 3 years.

Please note that the City of Houston District 82 must:

- **Notify us if the 26906 Plantation Hill Plant wishes to discontinue 4-log treatment of viruses and begin utilizing triggered source water monitoring to meet GWR's requirements.**
- **Notify us of any proposed modifications to the design, operation, or disinfection protocol at the 26906 Plantation Hill Plant.**
- **Maintain a free chlorine residual of 0.2 mg/L throughout the distribution system at all times.**

Blank copies of the MSRMOR spreadsheet and additional information about the Groundwater Rule can be obtained at the TCEQ's Groundwater Rule (GWR) website:

http://www.tceq.state.tx.us/permitting/water_supply/pdw/microbial/gwr_main.html

If we can be of further assistance or you have questions concerning this letter or the GWDR requirements, please contact the Drinking Water Protection Team by telephone at (512) 239-4691, by email at PDWS@tceq.state.tx.us, or at the address located at the bottom of the first page of this letter.

Sincerely,

John Schildwachter, Team Leader
Drinking Water Protection Team
Public Drinking Water Section, (MC-155)
Water Supply Division
Texas Commission on Environmental Quality

JS/MB/av

Enclosures: CT Worksheet

cc w/ enclosures: TCEQ PWS File
TCEQ Houston Region – R12
Bill White, Mayor, PO Box 1562, Houston, TX 77251-1562

PWS/1011593/CO
City of Houston District 82

Groundwater CT Study Template (MS Excel version)

This Template is used to determine the Minimum Specified Residual (MSR) at a plant using free chlorine to achieve a 4.0-log viral inactivation

1	Total capacity (maximum) of all storage tanks at this site			400,000	gallons
2	Minimum volume/water level	10	gallons (or feet)		
3	Maximum volume/water level	18.05	gallons (or feet)		
4	Actual Min/Max Ratio (line 2 divided by line 3)		0.55		
5	Maximum allowable ratio		0.50		
6	Allowable ratio (minimum of line 4 and line 5)			0.50	
7	Allowable Volume (line 1 times line 6)			200,000	gallons
8	Baffling Factor			0.1	
9	Effective Volume (line 7 times line 8)			20,000	gallons
10	Total capacity (maximum) of the wells feeding these tanks	2,000	gpm		
11	Total capacity (maximum) of all the service pumps fed by these tanks	2,400	gpm		
12	Flow rate (minimum of line 10 and line 11)			2,000	gpm
13	T_{10} for this site (line 9 divided by line 12)			10.0	minutes
14	CT required for a 4-log viral inactivation if the water temperature is at least 10°C and the pH is not greater than 9.5.			6.0	mg/L-min

Assuming that you are using free chlorine, your water temperature does not drop below 10°C (50°F), and the pH is always below 9.5 . . . The Minimum Specified Residual (MSR) for this Entry Point will be: (line 14 divided by line 13) **0.60 mg/L**

If the T_{10} is less than 1.5 minutes, the TCEQ cannot approve a Minimum Specified Residual for this site because it would be greater than 4.0 mg/L under worst-case operating conditions.

Note: Enter data in the yellow cells. The values in the orange cells will automatically be calculated by the spreadsheet.