



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 21, 2014

Mr. Russell Schreiber, P.E., Director of Public Works
City of Wichita Falls
P.O. Box 1431
Wichita Falls, TX 76307-1431

Subject: City of Wichita Falls – PWS ID No. 2430001
Summary of Findings from the TCEQ Site Visit at the Start of the Full-Scale
Verification Test of the Direct Potable Reuse System
Cypress Facility and River Road Wastewater Treatment Plant
Wichita County, Texas

CN 600129316;

RN 105598759

Dear Mr. Schreiber:

On January 27 through 29, 2014, Ms. Vera Poe, P.E., Dr. Alicia Diehl and Mr. Red Weddell, P.E. of the Texas Commission on Environmental Quality (TCEQ) Water Supply Division and Mr. Cliff Moore, Mr. Matthew Kerns, and Ms. Jennelle Crane from the TCEQ Abilene Region 3 Office visited the City of Wichita Falls' (City's) Cypress Facility and River Road Waste Water Treatment Plant (RR WWTP). The City had requested that the TCEQ conduct an on-site visit during the startup of the Full-Scale Verification Test (FSVT) for the six-month temporary Direct Potable Reuse (DPR) Water Treatment Plant (WTP). TCEQ's purpose was to provide guidance to the City staff in the collection of analytical and treatment process data for the required FSVT Report. Mr. Daniel Nix, Mr. Mark Southard, and other City staff assisted the TCEQ staff during this on-site visit.

In addition, on February 7, 2014, the City sent a letter via e-mail to TCEQ addressing issues of non-conformance with TCEQ written requirements and requesting procedure and method changes.

On January 27, 2014, the City began the FSVT for the treatment processes at the RR WWTP and Cypress Facility that have been converted to a temporary DPR WTP. The TCEQ has previously reviewed the City's concept paper; preliminary engineering report; exception requests and FSVT protocol; and final engineering report for this proposed temporary DPR WTP. After review of these submittals, the TCEQ responded in our letters dated February 8, 2013, September 5, 2013, October 15, 2013, December 17, 2013 and January 22, 2014. These TCEQ letters established the minimum conditions for granted temporary exceptions; minimum requirements for design, operation, monitoring, and reporting during the FSVT; and approval to construct the necessary Cypress Facility modifications.

Correction to the September 5, 2013 Temporary Exception Approval

In the TCEQ letter dated September 5, 2013 item 4 to page 5 of 25, we incorrectly referenced a RR WWTP's wastewater discharge permit as Permit No. WQ00104419. The correct number is Permit No. WQ0010509001. In addition, the Cypress DPR WTP discharge permit was also incorrectly referenced as WQ00104419-000. The correct discharge permit for this plant is WQ0004419000. Please make this correction in your documents.

Issues That Did Not Conform With TCEQ Temporary Exception Conditions

The following items were found to be non-conforming with the TCEQ's minimum conditions in our September 5, 2013 letter for the City's granted temporary exceptions and required operation of the Cypress temporary DPR WTP during the FSVT:

1. The City still has not established a water quality control trigger or constructed the required online monitoring and automatic shut-down features to take the RR WWTP pumps transferring effluent to the Cypress Facility out of service when the effluent exceeds Chapter 210 reclaimed water reuse authorization discharge requirements in by Condition No. 6.a in TCEQ's September 5, 2013 letter

The City's response to the TCEQ site visit indicated the City has established an automatic shutdown trigger based on chlorine residual. However, the response does not provide adequate information on the shutdown trigger and does not provide enough of a safeguard in the event of wastewater upset. In the meeting on January 29, 2014 during the TCEQ's site visit, the City also indicated that turbidity could be used as an automatic shutdown trigger. The City must establish an automatic shutdown trigger at the RRWTP of 24.0 nephelometric turbidity units (NTU) at the RRWTP, site 1J that will cease the flow of RRWTP effluent to the WTP. The facility cannot be placed back on-line until the turbidity is below 24.0. The 24.0 NTU limit was selected based on the requirements of the 210 discharge permit to collect 2 samples per week for a total of 8 samples per month. The average of the 8 readings should not exceed 3 NTU. If one sample exceeds 24.0 NTUs, the sample average of 3 NTU will be exceeded.

2. During the January, 2014 site visit, the weir gate in the Cypress Splitter Box to the 1961 Surface Water Treatment Plant (SWTP) was leaking. City staff had not taken corrective actions to halt the leakage as required by Condition No. 12.b.ii in the September 5, 2013 letter. During the TCEQ meeting on January 29, 2014, TCEQ advised the City that disinfection of the area where the water leaked and ponded must be addressed. Prior to returning to normal surface water flows to the splitter box, the area must be disinfected in accordance with American Water Works Association (AWWA C653-03).

The City's response to the TCEQ site visit indicated that the rubber seal on the splitter box has been repaired and the leak has stopped. In addition, there was no documentation that the City staff were conducting visual inspections at least once every eight hours of the Cypress Splitter Box's weir gates to the 1961 SWTP and 1987 SWTP as required by Condition No. 12.b.i. The DPR WTP FSVT Report must include the results of all eight-hour inspections and any corrective actions taken.

3. It was noted that during the FSVT the City is operating the microfiltration (MF) membrane units with a five-minute backwash duration once every 30 minutes and not at a three-minute backwash duration every 25 minutes as required by Condition No. 19.h.

This condition was originally specified in our August 19, 2004 letter granting the City the initial exception to use MF membranes to treat raw surface water. This discrepancy was re-stated under Item No. 3 of our December 17, 2013 letter following our first on-site visit on December 2 & 3, 2013.

In the City's response to the TCEQ site visit, the City requested to backwash the MF membranes every 30 minutes for a 5 minute period **The TCEQ grants approval for this change. A separate letter will provide the new capacity rating for the plant when used with surface water.**

4. It was noted that the RR WWTP strap-on flow meters for the effluent to the Cypress Facility and 2010 SWTP Clearwell effluent had not been calibrated or verified. Since the data from these flow meters are used to verify the inactivation for viruses and *Giardia* through the temporary DPR WTP's Disinfection Zone (DZ) 1, DZ 2 and DZ 5, the City must verify the calibration of these flow meters to ensure that the calculated inactivations are accurate as noted in our September 5, 2013 letter's Enclosure C.

Please note that the above referenced Enclosure C requires that all flow-indicating devices and rate-of-flow controllers be calibrated prior to startup of the FSVT, once every 30 days, and at the completion of the FSVT period. If other flow indicating devices/methods used at the Cypress Facility were not calibrated or their accuracy verified prior to startup of the FSVT, the City must accomplish this task as soon as possible to prevent the possible collection of inaccurate flow data and inaccurate inactivation results.

In the City's response to the TCEQ site visit, the City has indicated that a backup calibrated Doppler Flow Meter has been received and has been used to validate the accuracy of the strap-on flow meters.

Additional City Tasks

5. The automatic shut-down control timeframe for the flow rate of the partially treated wastewater from Lagoon No. 3 exceeding the 50/50 blend with raw surface water flow rate will be reset by the City from a frequency of 15 minutes after being detected to five or ten minutes.

The City has indicated in its response to the TCEQ site visit that it has changed the shutdown frequency of the 50/50 blend ratio for the partially treated effluent to surface water shutdown to 5 minutes after detection.

During the January 29, 2014 exit meeting, the automatic shut-down controls for the blend of partially treated RR WWTP effluent from Lagoon No. 3 with the raw surface water specified in our September 5, 2013 letter's Condition No. 9 and Condition No. 10 were also discussed. After further review, the trigger needs to be based on a percentage of flows with two (2) significant places to the right of the decimal, 50.00-percent, as specified on Page 19 of 21 of our January 22, 2014 letter's Enclosure A.

This task is not completed. The City should confirm that they will use 50.00 by providing screen shots of the SCADA system showing the trigger levels employed.

6. The automatic shutdown nitrate level is to be reset from 10.0 milligrams per liter (mg/L) to a value below the maximum contaminant level. The TCEQ requested that the trigger be set to a lower level to include a safety factor accounting for the deviation in the instrumentation, at a minimum.

The City's response to the TCEQ site visit indicates that the nitrate shutdown trigger has been lowered to 9.5 mg/L which is slightly over the estimated instrumental deviation of 3%. **This task is completed.**

7. It was noted during the site visit that the City is using a MF temperature correction factor originally approved in our August 19, 2004 letter. However, since the TCEQ's adoption of the EPA's Long Term 2 Enhanced Surface Water Treatment Rule (LT2) requirements in January 2008, the TCEQ requires the following equation in the EPA's Membrane Filtration Guidance Manual to be used:

Equation 2.10: $J_{20} = J_T \times [1.784 - (0.0575 \times T) + (0.0011 \times T^2) - (10^{-5} \times T^3)]$

Where: J_{20} is the normalized flux at 20° C in gallons per square-foot per day (gfd);
 J_T is the actual flux at temperature T in gfd; and
T is the water temperature in degrees Centigrade.

The City needs to make this change in its spreadsheet(s), SCADA system, and any other place where the actual MF membrane flux rates are being normalized.

The City's response to the TCEQ site visit indicates that it has made this change, so **this task is completed.**

8. The City's response to the TCEQ site visit requests clarification regarding the length of the FSVT. Specifically the FSV protocol refers to the FSV running for no less than 30 days without changes, followed by performing a clean-in-place (CIP) procedure for the membranes, followed by an additional 10 days of running the FSV. The City notes that if the CIP takes one day, the FSVT would take 41 days. **The TCEQ concurs with this analysis.**

There is no further action for the City or TCEQ on this item.

9. The City's response to the TCEQ site visit provided clarification on the data available from the Sample Site 10J-Selected MF Membrane Unit (No.4, or No.5 if unit No.4 is down). The City stated that the only data available from this location are: Cell Level, Calculated Feed pounds per square inch (PSI), Cell Flow and Cell Transmembrane Pressure (TMP). The City cannot provide data on Outlet Pressure-Vacuum at this location. Because Cell TMP is a measure of the pressure at the inlet and outlet of the fibers, having TMP instead of inlet and outlet pressures is acceptable.

Documents Requested by the TCEQ

10. The City's engineering representative needs to submit sealed, signed and dated change order drawings requested in our January 22, 2014 letter Pages 5 through 10.
11. The City needs to submit written notification for the replacement of the MF and reverse osmosis (RO) membranes. Please include a copy of the specifications for the originally installed MF and RO membranes and specifications for the new replacement MF and RO membranes for the TCEQ's files. Please note that in the future the City must notify the TCEQ of any proposed membrane replacements prior to the replacement as required in Title 30 of the Texas Administrative Code (30 TAC) §290.39(j)(1)(E).

TCEQ received a letter from the City on February 5, 2014 informing TCEQ about the change in MF and RO elements. No further action is necessary.

12. The City must send TCEQ copies of the City's Standard Operating Practices (SOPs) for the FSVT by e-mail as requested during the January Site Visit exit briefing. The WWTP SOPs were received. Please send TCEQ the water plant SOPs.

Analytical Methods

13. In the City's response to the TCEQ January 2014 site visit (received by e-mail February 7, 2014) the City requested that the TCEQ modify the monochloramine trigger set by the TCEQ in the City's distribution system to be a total chlorine trigger. The TCEQ's general rationale for requiring monochloramine is that the presence of nitrogen trichloride, chlorine dioxide, and organic chloramines will cause increases in the measurement of total chlorine, while not contributing to the success of disinfection.

The City submitted data from the distribution system related to this request. Analysis of this data shows that the ratio of monochloramine to total chlorine in the distribution system ranges from 75% to 91.5%, with an average of 86%. The City's request to use a trigger of 1.0 mg/L for monochloramine and 1.5 mg/L for total chlorine would imply an acceptable ratio of monochloramine to total chlorine of 66%. Generally speaking, the desirable ratio of monochloramine to total chlorine should be no less than 80%. Therefore, the TCEQ hereby will allow the City to use a total chlorine trigger of 1.5 mg/L and a monochloramine trigger of 1.3 mg/L, based on the 80% ratio.

14. The City's response to the site visit requested to use Standard Methods (SM) 20th edition, method 4500-NH₃ D—Ammonia Selective Electrode Method for bench top ammonia testing instead of methods EPA 330.1 or SM 4500-NH₃ G required as conditions in the TCEQ's letter of September 5, 2013.

The TCEQ concurs with this request.

15. The City's response to the site visit requested to use the Hach APA 6900 Ammonia and Monochloramine Analyzer for monochloramine and the Wallace & Tiernan Micro 2000 for total chlorine at the WWTP. The City submitted data comparing the on-line instrument readings to manual titration data. Analysis of the data shows that the on-line method is more consistent than the manual titration method: manual titration of monochloramine had a standard deviation of 0.26 mg/L (8.8%) and online analysis of monochloramine had a standard deviation of 0.20 mg/L (6.6%) and manual titration of total chlorine had a standard deviation of 0.27 (7.0%) and online analysis of total chlorine had a standard deviation of 0.17 mg/L (4.3 %). Online analysis measured residuals slightly higher than manual titration: for monochloramine, online analysis measured about 2% higher than manual titration and for total chlorine, online analysis measured about 4% higher. These values are within the percentage standard deviation, and; therefore, **the online analysis is approved for use at the WWTP.**
16. The City's response to the site visit requested to perform dissolved organic carbon (DOC) analysis in the water plant laboratory on-site, with split sampling performed every seven (7) days. The City's total organic carbon (TOC) method is already approved, so the

modification of filtering the sample through the appropriate type of filter **is acceptable as well as the frequency of every 7 days**. Note that all relevant requirements for calibration and method approval apply.

17. The City's response to the site visit requested clarification regarding the monitoring for protozoa. Specifically, the request is associated with the TCEQ's removal of the words 'human pathogenic' from the City's Engineering Report, as described on page 4 of Enclosure A of the TCEQ's January 22, 2014 letter. The TCEQ acknowledges that the on-site polymerase chain reaction (PCR) analysis is being performed following acceptable analytical protocols and that the addition of 12 species of *Cryptosporidium* and 4 additional species of *Giardia* would be very expensive for the City. **Therefore, the TCEQ accepts the City's protocol for on-site testing of *Giardia lamblia* and *Cryptosporidium parvum*.**
18. The City's response to the site visit requested to measure color using Method SM 2120 C, a spectrophotometric method instead of SM 2120 B, which is a color comparator method. The TCEQ agrees that the SM 2120 C is acceptable, and notes that the spectrophotometer must be calibrated in a manner and on a schedule consistent with the Manufacturer's specifications.
19. The City's response to the site visit notes that the methods for hydrogen sulfide, perchlorate, and total culturable viruses were not previously specified, and that the TCEQ requested to be notified in writing of the methods that the City plans to use for those analytes.

The TCEQ accepts the following methods:

Total culturable viruses – EPA 1615

Hydrogen sulfide – EPA 376.1 and SM 4500-S2-F

Perchlorate – EPA 331.0

20. The City's response to the site visit acknowledged the TCEQ's information regarding the edition of Standard Methods and the City's commitment to making the changes required to reference the appropriate editions.

Mr. Russell Schreiber, P.E
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If you have any questions regarding the January 27 – 29, 2014 site visit, please contact Vera Poe at (512) 239-6988 or by e-mail at vera.poe@tceq.texas.gov. If you have any questions regarding the information in this letter for the City's requests and clarifications, please contact Joel Klumpp at (512) 239-4453 or by e-mail at joel.klumpp@tceq.texas.gov. Please contact us by correspondence at the following address:

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Sincerely,



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