

**Subject:** WRF 4508: Historical Data Collection for River Road WWTP and Cypress Water Treatment Plant  
**Location:** Janelle to call Daniel at 940-691-1153

**Start:** 07/09/2015 04:00 -07:00  
**End:** 07/09/2015 04:30 -07:00  
**Show Time As:** Busy

**Organizer:** Amador, Janelle C. (amadorjc@cdmsmith.com)  
**Required Attendees:** Daniel Nix; Vandegrift, Jillian C.  
**Optional Attendees:** da Silva, Allegra K.; Crawford, Susan

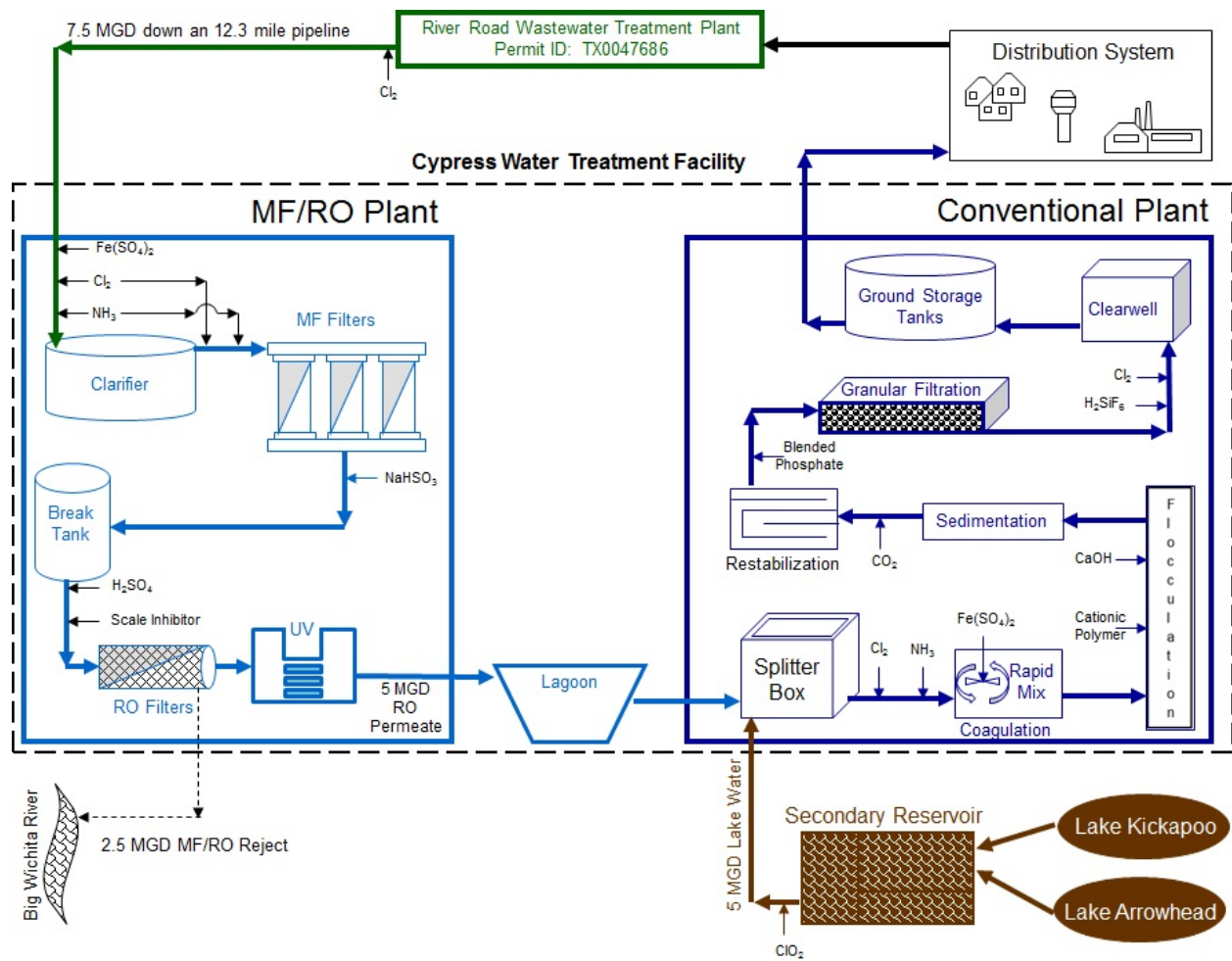
Hi Daniel,

I am copying the body of the original message below and also attaching the data request files so they are easily accessible to you for our phone call. I've also attached the flow charts and sampling tables that were previously provided to Allegra, as these have a lot of the information we'll need historical data collected from.

For this project, we are requesting:

- We have the sampling locations
- One year's historical data (daily) including:
  - On-line monitoring data and results from sampling and analysis for source water, finished water, and intermediate sampling points (see attached table for example parameters).
  - Operations (such as flow rates, backwash approach and frequency, filter change out schedule, etc.);
  - Maintenance (such as replacement of major equipment, underdrains, etc.); and
- Other feedback on overall design, monitoring, operations, control, and performance.

Conference Line (CDM Smith only): 1-719-457-1414 Passcode: 934613



Thank you,  
Janelle Amador

### **Historical Monitoring Data Request**

Note: This is intended to be an example list of parameters we are interested for the historical monitoring data we are requesting; it is not intended to be restrictive or finite – please feel free to use your best judgement in determining whether unlisted parameters would be of beneficial use to this project. The historical data we are requesting is limited to a total of one-year of daily data for efficient processing purposes.

#### ***Water Quality (source water, points where data is available within the plant, finished water)***

- pH
- Temperature
- Conductivity
- Turbidity
- Oxidation-reduction potential
- Dissolved oxygen
- Total organic carbon and/or dissolved organic carbon
- TSS/TDS
- Trace chemical constituents (pharmaceuticals, personal care products, endocrine disrupting compounds, pesticides, etc...)
- Taste and odor compounds (Geosmin, 2-methylisoborneol (MIB))
- Metals
- Nutrients (phosphate, nitrate, nitrite, ammonia)
- Iron
- Manganese
- Particle Counts
- Microbial indicators (*E. coli*, total coliforms, fecal coliforms, enterococci, coliphage, *C. perfringens*, other)
- Microbial pathogens (Giardia, cryptosporidium, other)
- UVA

#### ***Process/Operational Parameters***

- Plant flow rate
- Preoxidant type, dose, and contact time
- Coagulant type and dose
- Flocculant (polymer) type and dose
- Filter type and run time or filter run volume
- Filter flow rate
- Disinfectant type, dose, residual concentration (if appropriate), and contact time
- UV
  - UV dose
  - Oxidant dose (i.e., peroxide)
- Membrane Filtration
  - Flux
  - Differential pressure
  - Frequency of clean-in-place (CIP)
  - Chemical clean- Type
  - Residual disinfectant, if any
  - Salt rejection of Reverse Osmosis (if used)

- Differential conductivity of Reverse Osmosis (if used)

## Facility Information

Fill in the blanks as you can. Yellow text boxes such as this one include instructions and hints to help find information we are looking for.

|                    |  |
|--------------------|--|
| Utility            |  |
| Facility           |  |
| City               |  |
| State              |  |
| Lead Contact Name  |  |
| Lead Contact Phone |  |
| Lead Contact Email |  |
| Design Flow (MGD)  |  |
| Source Water Name  |  |

## Source Water Type

| Approximate Percent of Water From |       |           |      |
|-----------------------------------|-------|-----------|------|
| Groundwater                       | River | Reservoir | Lake |
|                                   |       |           |      |

## Treatment Plant Process Description

| Wastewater Treatment Plant |                                |                                            |                           |
|----------------------------|--------------------------------|--------------------------------------------|---------------------------|
| Process                    | Type                           | Indicate whether part of current treatment | Average Dose/Contact Time |
| Bar Screen                 |                                |                                            |                           |
| Grit Chamber               |                                |                                            |                           |
| Primary Treatment          | Clarification                  |                                            |                           |
|                            | Fine Screen                    |                                            |                           |
| Coagulation                |                                |                                            |                           |
| Flocculation               |                                |                                            |                           |
| Settling                   |                                |                                            |                           |
| Secondary Treatment        | Membrane Bioreactor            |                                            | -                         |
|                            | Activated Sludge               |                                            |                           |
|                            | Trickling Filters              |                                            |                           |
|                            | Rotating Biological Contactors |                                            |                           |
|                            | Other:                         |                                            |                           |
| Tertiary Treatment         | Depth Filtration               |                                            |                           |
|                            | Surface Filtration             |                                            |                           |
| Filtration                 | Dissolved Air Flotation        |                                            |                           |
|                            | Ultrafiltration                |                                            |                           |
|                            | Microfiltration                |                                            |                           |
|                            | Nanofiltration                 |                                            |                           |
|                            | Reverse Osmosis                |                                            |                           |
| Other                      | Electrodialysis                |                                            |                           |
|                            | Advanced Oxidation             |                                            |                           |
|                            | Carbon Adsorption              |                                            |                           |
|                            | Exchange                       |                                            |                           |
| Disinfection               | Chlorination                   |                                            |                           |
|                            | UV                             |                                            |                           |
|                            | Ozone                          |                                            |                           |

## Background Information

Provide a detailed description of any of the following experienced at your utility.

**Do you currently operate a direct potable reuse (DPR) or indirect potable reuse (IPR) treatment system?**

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**If you operate an IPR scheme, is it a planned reuse or *de facto* reuse operation?**

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**If you operate either DPR or IPR, what planning activities took place prior to, during, and/or after implementation?**

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**List any major events affecting water quality in the past year (i.e. flooding, process upsets, changes in infrastructure)**

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**Were there any process design changes or major maintenance in the last year (date of change)?**

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fill in the

|            |               |
|------------|---------------|
| Sewer Shed | WWTP Effluent |
|            |               |

[illegible]



scheme?

or implementation?

?

## Analytical Methods

Fill in the sampling method, limit of detection, and how frequently the analyte(s) are measured. Add any other relevant information.

| Analyte                                        | Type          | Limit of Detection | Method | Condu   |
|------------------------------------------------|---------------|--------------------|--------|---------|
|                                                |               |                    |        | On-site |
| Alkalinity                                     | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Ammonia                                        | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| ATP                                            | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Biochemical Oxygen Demand (BOD, 5-day average) | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Chlorine                                       | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Chloramines                                    | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Coliform, Total                                | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Coliform, Fecal                                | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Color                                          | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Conductivity                                   | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Coliphage, male-specific or somatic            | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| <i>C. perfringens</i>                          | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Cryptosporidium                                | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Disinfection Byproducts                        | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Dissolved Oxygen                               | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| <i>E. Coli</i>                                 | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Enterococci                                    | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Giardia                                        | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| HAAs                                           | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Hardness                                       | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Heterotrophic Plate Count (HPC)                | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Iron/Manganese                                 | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |
| Metals                                         | Grab-sampling |                    |        |         |
|                                                | Online        |                    |        |         |

| Analyte          | Type          | Limit of Detection | Method | Condu   |
|------------------|---------------|--------------------|--------|---------|
|                  |               |                    |        | On-site |
| Nitrite          | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |
| Nitrate          | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |
| Orthophosphorous | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |
| pH               | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |
| Phosphate        | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |
| Sulfate          | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |
| Temperature      | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |
| THM              | Grab-sampling |                    |        |         |
|                  | Online        |                    |        |         |

[illegible]

levant analyses performed at the bottom of the table

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

# Historical Data

Please provide 1 year of monitoring data. Below is a sample of the information we hope to receive and the

|          |      |                      | Raw/Sc  |              |                         |                 |          |           |
|----------|------|----------------------|---------|--------------|-------------------------|-----------------|----------|-----------|
| Date     | Time | Plant Influent (MGD) | pH (SU) | Temp (deg C) | Conductivity (umhos/cm) | Turbidity (NTU) | ORP (mV) | DO (mg/L) |
| 1/1/2014 | 0:00 |                      | 4.9     | 7.47         |                         |                 |          |           |
| 1/1/2014 | 1:00 |                      | 5.3     | 7.46         |                         |                 |          |           |
| 1/1/2014 | 2:00 |                      | 5.6     | 7.49         |                         |                 |          |           |

general format we would like to work with. Please include data for the parameters from the provided che

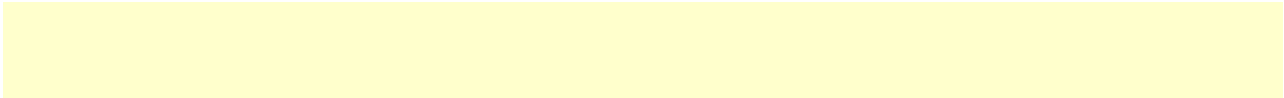
| Source Water  |               |                   |               |               |               |                   |                | Chemical Dosi      |                   |
|---------------|---------------|-------------------|---------------|---------------|---------------|-------------------|----------------|--------------------|-------------------|
| TOC<br>(mg/L) | DOC<br>(mg/L) | UV254<br>(abs/cm) | TDS<br>(mg/L) | TSS<br>(mg/L) | MIB<br>(ng/L) | Geosmin<br>(ng/L) | Iron<br>(mg/L) | Preoxidant<br>Dose | Coagulant<br>Dose |
|               |               |                   |               |               | 7.3           | 2.1               | 7.4            |                    |                   |
|               |               |                   |               |               | 7.2           | 2.1               | 7.3            |                    |                   |
|               |               |                   |               |               | 7.4           | 1.9               | 7.4            |                    |                   |

checklist (including data for raw/source water, data at individual unit process points, and finished water). It is imp

| mg              | Operational Parameters |                             |              |                         | Unit         |                 |            |
|-----------------|------------------------|-----------------------------|--------------|-------------------------|--------------|-----------------|------------|
| Flocculant Dose | Plant Flow Rate (MGD)  | Differential Pressure (psi) | Contact Time | Filter Run Time (hours) | Temp (deg C) | Turbidity (NTU) | TOC (mg/L) |
|                 |                        |                             |              |                         |              |                 |            |

ortant to provide Time and Date associated with data, when possible.

| Intermediate Sample |                   |         |               |                 |                    |               |                   |                   |               |
|---------------------|-------------------|---------|---------------|-----------------|--------------------|---------------|-------------------|-------------------|---------------|
| Process 1           |                   |         |               | Unit Process 2  |                    |               |                   |                   |               |
| UV254<br>(abs/cm)   | SUVA<br>(L/mg-cm) | pH (SU) | TDS<br>(mg/L) | Temp<br>(deg C) | Turbidity<br>(NTU) | TOC<br>(mg/L) | UV254<br>(abs/cm) | SUVA<br>(L/mg-cm) | TDS<br>(mg/L) |



**Sampling Locations**

| Unit Process 3  |                    |               |                   |                   |         |               | Unit            |                    |               |
|-----------------|--------------------|---------------|-------------------|-------------------|---------|---------------|-----------------|--------------------|---------------|
| Temp<br>(deg C) | Turbidity<br>(NTU) | TOC<br>(mg/L) | UV254<br>(abs/cm) | SUVA<br>(L/mg-cm) | pH (SU) | TDS<br>(mg/L) | Temp<br>(deg C) | Turbidity<br>(NTU) | TOC<br>(mg/L) |
|                 |                    |               |                   |                   |         |               | 1.73759         |                    | 6             |
|                 |                    |               |                   |                   |         |               | 1.73409         |                    | 6.5           |
|                 |                    |               |                   |                   |         |               | 1.7239          |                    | 6.2           |

|                   |                   |         |               | Finished Water  |                    |               |                   |                   |         |               |
|-------------------|-------------------|---------|---------------|-----------------|--------------------|---------------|-------------------|-------------------|---------|---------------|
| t Process 4       |                   |         |               | Temp<br>(deg C) | Turbidity<br>(NTU) | TOC<br>(mg/L) | UV254<br>(abs/cm) | SUVA<br>(L/mg-cm) | pH (SU) | TDS<br>(mg/L) |
| UV254<br>(abs/cm) | SUVA<br>(L/mg-cm) | pH (SU) | TDS<br>(mg/L) |                 |                    |               |                   |                   |         |               |
| 7.2               | 1.1               |         |               |                 |                    |               |                   |                   |         |               |
| 7.4               | 1                 |         |               |                 |                    |               |                   |                   |         |               |
| 7.2               | 0.8               |         |               |                 |                    |               |                   |                   |         |               |

## Addendum J

### Full-Scale Verification Testing Protocol Minimum Monitoring and Reporting of Water Qualities and Flow Rates

Addendum J with Table J amends the TCEQ's September 5, 2013 letter to the City of Wichita Falls and replaces Enclosure A with Table A in its entirety.

Minimum required water quality monitoring for chemical and microbiological constituents and monitoring frequencies during the direct potable reuse (DPR) Full-Scale Verification Test are listed and marked with a check (✓) in Table J below. These minimum required parameters and specified monitoring frequencies have been selected for the City's Full-Scale Verification Test so that the TCEQ can verify the continuous protection of public health by the removal and/or inactivation of chemical and microbiological contaminants through the different proposed treatment processes at the tested flow rates and operating parameters. Please note:

- **Struck out chemical constituents, operating parameters, sampling frequencies and clarification additions indicated by yellow highlights** are changes based on Addendum I.
- **Continuous 5-minute, 15-minute, 2-hour, 4-hour, and daily (and anytime the flow rate changes) monitoring frequencies** are to be conducted on-site using a TCEQ acceptable method. This includes using on-line monitors.
- **Weekly total organic carbon (TOC) and alkalinity** and **all twice per week analyses** can be either conducted on-site by City staff using a TCEQ acceptable method or analyzed off-site at a TCEQ acceptable laboratory. Twice per week sample collections are to be conducted at a consistent frequency no closer than three days apart.
- **Except for weekly TOC and alkalinity monitoring (as noted above), all samples collected weekly (once every 7 days) and at longer frequencies** are to be submitted to an off-site NELAP accredited laboratory for drinking water analysis.
- **Analyses marked for both on-site and off-site monitoring** are required for quality control to verify the accuracy of the onsite monitoring equipment/method and are to be collected as split samples when the off-site samples are collected.
- **In lieu of monitoring the total dissolved levels (TDS) levels, the City may monitor and report the conductivity level with the corresponding calculated TDS level using the industry accepted equation.**

# **Addendum J** **Full-Scale Verification Test Protocol** **Minimum Monitoring and Reporting of Water Qualities and Flow Rates**

**Table J**

| TCEQ Sample Set (TCEQ)-1J: River Road Wastewater Treatment Plant (RR WWTP) Effluent<br>(at RR WWTP chlorine injection box after second clarification & prior to WW DZ 1 chlorine injection point before the RR WWTP Chlorine Contact Basin) |                   |         |        |        |                |                |                   |                              |                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------|--------|--------|----------------|----------------|-------------------|------------------------------|----------------------------------------------|
|                                                                                                                                                                                                                                             | Continuous, every |         |        |        |                | Twice per week | Once every 7 days | Startup, every 30 days & end |                                              |
|                                                                                                                                                                                                                                             | 5-min.            | 15-min. | 2-hrs. | 4-hrs. | Once per day   |                |                   |                              | Once per day & anytime the flow rate changes |
| 1. DPR transmission pipeline flow rate (gpm) (to be monitored at the RR WWTP Chlorine Contact Basin's effluent)                                                                                                                             |                   | ✓       |        |        |                |                |                   |                              |                                              |
| 2. Turbidity (NTU)                                                                                                                                                                                                                          |                   | ✓       |        |        |                |                |                   |                              |                                              |
| 3. Temperature (°C)                                                                                                                                                                                                                         |                   | ✓       |        |        |                |                |                   |                              |                                              |
| 4. <i>Escherichia coli</i> ( <i>E. coli</i> ) enumeration                                                                                                                                                                                   |                   |         |        |        | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |                                              |
| 5. <i>Giardia</i> (cysts/L) enumeration                                                                                                                                                                                                     |                   |         |        |        | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |                                              |
| 6. <i>Cryptosporidium</i> (oocysts/L) enumeration                                                                                                                                                                                           |                   |         |        |        | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |                                              |
| 7. 5-day Carbonaceous biochemical oxygen demand (CBOD <sub>5</sub> , mg/L)                                                                                                                                                                  |                   |         |        |        | ✓              |                |                   |                              |                                              |
| 8. Total suspended solids (TSS, mg/L)                                                                                                                                                                                                       |                   |         |        |        | ✓              |                |                   |                              |                                              |
| 9. Daily flow rate (gpd)                                                                                                                                                                                                                    |                   |         |        |        | ✓              |                |                   |                              |                                              |
| 10. Nitrate (mg/L)                                                                                                                                                                                                                          |                   |         |        |        | ✓ <sup>1</sup> |                | ✓                 | ✓ <sup>2</sup>               |                                              |
| 11. Total dissolved solids (TDS, mg/L)                                                                                                                                                                                                      |                   |         |        |        |                |                | ✓                 |                              |                                              |
| 12. Alkalinity (mg/L) (to be conducted on-site)                                                                                                                                                                                             |                   |         |        |        |                |                | ✓                 |                              |                                              |
| 13. Total organic carbon (TOC, mg/L) (to be conducted on-site)                                                                                                                                                                              |                   |         |        |        |                |                | ✓                 |                              |                                              |
| 14. Dissolved organic carbon (DOC, mg/L)                                                                                                                                                                                                    |                   |         |        |        |                |                | ✓                 |                              |                                              |
| 15. Full metal scan (mg/L, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc)                                                                                                            |                   |         |        |        |                |                | ✓                 |                              |                                              |
| 16. Algae counts (CFU/L)                                                                                                                                                                                                                    |                   |         |        |        |                |                |                   | ✓                            |                                              |
| 17. Chemicals listed in §290.106(b) Inorganic Chemicals <sup>3</sup>                                                                                                                                                                        |                   |         |        |        |                |                |                   | ✓                            |                                              |
| 18. Chemicals listed in §290.107(b) Organic Chemicals <sup>3</sup>                                                                                                                                                                          |                   |         |        |        |                |                |                   | ✓                            |                                              |
| 19. Chemicals listed in §290.108(b)(1) (radium 226, radium 228, uranium, gross alpha activity)                                                                                                                                              |                   |         |        |        |                |                |                   | ✓                            |                                              |
| 20. Chemicals listed in §290.108(b)(2) & 40 CFR §141.66(d) (gross beta particle & photon radioactivity, tritium, strontium 90)                                                                                                              |                   |         |        |        |                |                |                   | ✓                            |                                              |
| 21. Chemicals listed in §290.118(b) Secondary Chemicals                                                                                                                                                                                     |                   |         |        |        |                |                |                   | ✓                            |                                              |
| 22. Lead (µg/L) (As long as TCEQ-1J-15 analysis for lead includes an acceptable EPA drinking water analytical method.)                                                                                                                      |                   |         |        |        |                |                |                   | ✓                            |                                              |

- 1 Samples are to be collected at each of the designated locations once per day and tested using a TCEQ accepted real-time (on-site) analytical method.
- 2 A split sample is to be collected in conjunction with the above samples at each location at startup, every 30 days and the last day of the Full-Scale Verification Test and submitted to an off-site NELAP laboratory certified for conducting these drinking water quality tests.
- 3 Please assure that the laboratory monitors for all of the inorganic and organic compounds. Compounds that some labs do not include, but are required are: asbestos, cyanide, endothall, diquat, glyphosate, asbestos, and the dioxins.

# Addendum J Full-Scale Verification Test Protocol Minimum Monitoring and Reporting of Water Qualities and Flow Rates

Table J

|                                                                                                                                                                                 | Continuous, every |          |         |         |              |                                              | Twice per week | Once every 7 days | Startup, every 30 days & end |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------------------------------------|----------------|-------------------|------------------------------|
|                                                                                                                                                                                 | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day | Once per day & anytime the flow rate changes |                |                   |                              |
|                                                                                                                                                                                 |                   |          |         |         |              |                                              |                |                   |                              |
| 23. Total trihalomethanes (TTHM, report the species: chloroform, dichlorobromomethane, dibromochloromethane, bromoform) (ug/L)                                                  |                   |          |         |         |              |                                              |                | ✓                 |                              |
| 24. Haloacetic acids (group of 5) (HAA5, report the species: monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, dibromoacetic acid) (ug/L) |                   |          |         |         |              |                                              |                | ✓                 |                              |
| 25. Bromate Bromide (mg/L)                                                                                                                                                      |                   |          |         |         |              |                                              |                | ✓                 |                              |
| 26. Total culturable viruses (MPN/L)                                                                                                                                            |                   |          |         |         |              |                                              |                |                   | WF                           |
| 27. Enterovirus (CFU/L)                                                                                                                                                         |                   |          |         |         |              |                                              |                |                   | WF                           |
| 28. Norovirus (CFU/L)                                                                                                                                                           |                   |          |         |         |              |                                              |                |                   | WF                           |
| 29. N-Nitroso dimethylamine (NDMA, ng/L)                                                                                                                                        |                   |          |         |         |              |                                              |                |                   | WF                           |
| 30. N-Nitroso pyrrolidine (NPYR, ng/L)                                                                                                                                          |                   |          |         |         |              |                                              |                |                   | WF                           |
| 31. Pharmaceuticals (ug/L)                                                                                                                                                      |                   |          |         |         |              |                                              |                |                   | WF                           |
| 32. Hormones (ug/L)                                                                                                                                                             |                   |          |         |         |              |                                              |                |                   | WF                           |
| 33. Personal care products (ug/L)                                                                                                                                               |                   |          |         |         |              |                                              |                |                   | WF                           |
| 34. Fluorinated alkyl acids (PFOS, PFOA, PFNA, PFHxS, PFHpA, & PFBS) (ng/L)                                                                                                     |                   |          |         |         |              |                                              |                |                   | WF                           |
| 35. Steroids (ug/L)                                                                                                                                                             |                   |          |         |         |              |                                              |                |                   | WF                           |
| 36. Perchlorate (ug/L)                                                                                                                                                          |                   |          |         |         |              |                                              |                |                   | WF                           |
| 37. Free ammonia (mg/L)                                                                                                                                                         |                   |          |         | ✓       |              |                                              |                |                   |                              |
| TCEQ-2J: Begin Wastewater (WW) Disinfection Zone (DZ) 1 (before RR WWTP Chlorine Contact Basin)                                                                                 |                   |          |         |         |              |                                              |                |                   |                              |
| 1. Free ammonia level before chlorine injection (mg/L) (from TCEQ-1J-37J)                                                                                                       |                   |          |         | ✓       |              |                                              |                |                   |                              |
| 2. Free chlorine dosage (mg/L)                                                                                                                                                  |                   |          |         | ✓       |              |                                              |                |                   |                              |
| 3. Total chlorine residual after chlorine injection (mg/L)                                                                                                                      |                   |          |         | ✓       |              |                                              |                |                   |                              |
| 4. Monochloramine residual after chlorine injection (mg/L)                                                                                                                      |                   |          |         | ✓       |              |                                              |                |                   |                              |
| 5. Free chlorine residual after chlorine injection (mg/L)                                                                                                                       |                   |          |         | ✓       |              |                                              |                |                   |                              |
| 6. Free ammonia level after chlorine injection (mg/L)                                                                                                                           |                   |          |         | ✓       |              |                                              |                |                   |                              |

- 1 Samples are to be collected at each of the designated locations once per day and tested using a TCEQ accepted real-time (on-site) analytical method.
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- 3 Please assure that the laboratory monitors for all of the inorganic and organic compounds. Compounds that some labs do not include, but are required are: asbestos, cyanide, endothall, diquat, glyphosate, asbestos, and the dioxins.

**Addendum J**  
**Full-Scale Verification Test Protocol**  
**Minimum Monitoring and Reporting of Water Qualities and Flow Rates**  
**Table J**

|                                                                                                                                                         | Continuous, every |          |         |         |                | Twice per week | Once every 7 days | Startup, every 30 days & end |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|----------------|----------------|-------------------|------------------------------|
|                                                                                                                                                         | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day   |                |                   |                              |
|                                                                                                                                                         |                   |          |         |         |                |                |                   |                              |
| 7. pH level at monochloramine residual monitoring tap                                                                                                   |                   |          | ✓       |         |                |                |                   |                              |
| 8. Water temperature at monochloramine residual monitoring tap (°C)                                                                                     |                   |          | ✓       |         |                |                |                   |                              |
| 9. Quantity of chlorine used (pounds per day, ppd)                                                                                                      |                   |          |         |         | ✓              |                |                   |                              |
| 10. Bromate (mg/L)                                                                                                                                      |                   |          |         |         |                |                | WF                |                              |
| TCEQ-3J: End WW DZ 1 (end of RR WWTP effluent transmission line at Cypress 2008 MF/RO SWTP's Flow Control Vault & prior to existing 12-inch gate valve) |                   |          |         |         |                |                |                   |                              |
| 1. Total chlorine residual (mg/L)                                                                                                                       |                   | ✓        |         |         |                |                |                   |                              |
| 2. Monochloramine residual (mg/L)                                                                                                                       |                   | ✓        |         |         |                |                |                   |                              |
| 3. Free chlorine residual (mg/L)                                                                                                                        |                   | ✓        |         |         |                |                |                   |                              |
| 4. Free ammonia level (mg/L)                                                                                                                            |                   | ✓        |         |         |                |                |                   |                              |
| 5. pH level at monochloramine monitoring tap                                                                                                            |                   | ✓        |         |         |                |                |                   |                              |
| 6. Water temperature at monochloramine monitoring tap (°C)                                                                                              |                   | ✓        |         |         |                |                |                   |                              |
| TCEQ-4J: 2008 MF/RO SWTP's Static Mixers and Coagulant Addition (at Cypress 2008 MF/RO SWTP's Flow Control Vault)                                       |                   |          |         |         |                |                |                   |                              |
| 1. Influent alkalinity level (mg/L)                                                                                                                     |                   |          | ✓       |         |                |                |                   |                              |
| 2. Influent water temperature (°C) (from TCEQ-3J-6)                                                                                                     |                   |          | ✓       |         |                |                |                   |                              |
| 3. Coagulant dosage (mg/L)                                                                                                                              |                   |          | ✓       |         |                |                |                   |                              |
| 4. Quantity of coagulant used (gpd)                                                                                                                     |                   |          |         |         | ✓              |                |                   |                              |
| 5. <i>Escherichia coli</i> ( <i>E. coli</i> ) enumeration                                                                                               |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 6. <i>Giardia</i> (cysts/L)                                                                                                                             |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 7. <i>Cryptosporidium</i> (oocysts/L)                                                                                                                   |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| TCEQ-5J: Begin WW DZ 2 (at 2008 MF/RO SWTP's radial flow clarifier's flocculator with chlorine and ammonia injection)                                   |                   |          |         |         |                |                |                   |                              |
| 1. Influent flow rate (gpm) (from TCEQ-1J-1)                                                                                                            |                   | ✓        |         |         |                |                |                   |                              |
| 2. Free chlorine dosage (mg/L)                                                                                                                          |                   |          | ✓       |         |                |                |                   |                              |
| 3. Ammonia dosage (mg/L)                                                                                                                                |                   |          | ✓       |         |                |                |                   |                              |
| 4. Total chlorine residual, after ammonia injection (mg/L)                                                                                              |                   |          | ✓       |         |                |                |                   |                              |
| 5. Monochloramine residual, after ammonia injection (mg/L)                                                                                              |                   |          | ✓       |         |                |                |                   |                              |
| 6. Free chlorine residual, after ammonia injection (mg/L)                                                                                               |                   |          | ✓       |         |                |                |                   |                              |

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**Addendum J**  
**Full-Scale Verification Test Protocol**  
**Minimum Monitoring and Reporting of Water Qualities and Flow Rates**  
**Table J**

|                                                                                         | Continuous, every |          |         |         |              | Twice per week | Once every 7 days | Startup, every 30 days & end |
|-----------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------|-------------------|------------------------------|
|                                                                                         | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day |                |                   |                              |
| TCEQ-6J: 2008 MF/RO SWTP Radial Flow Clarifier (flocculation & clarification)           |                   |          |         |         |              |                |                   |                              |
| 1. Effluent flow rate (gpm) (clarifier influent flow rate minus blowdown flow rate)     |                   | ✓        |         |         |              |                |                   |                              |
| 2. Settled water turbidity level (NTU)                                                  |                   |          | ✓       |         |              |                |                   |                              |
| 3. Effluent pH level                                                                    |                   |          |         | ✓       |              |                |                   |                              |
| 4. Calculated flocculator hydraulic detention time (Based on influent flow rate, mins.) |                   |          |         |         |              | ✓              |                   |                              |
| 5. Calculated clarifier surface overflow rate (gpm/sf)                                  |                   |          |         |         |              | ✓              |                   |                              |
| 6. Effluent TOC (mg/L) (to be conducted on-site)                                        |                   |          |         |         |              |                | ✓                 |                              |
| 7. Effluent DOC (mg/L)                                                                  |                   |          |         |         |              |                | ✓                 |                              |
| TCEQ-7J: End WW DZ 2 (at 2008 MF/RO SWTP's radial flow clarifier's effluent pipe)       |                   |          |         |         |              |                |                   |                              |
| 1. Total chlorine residual (mg/L)                                                       |                   | ✓        |         |         |              |                |                   |                              |
| 2. Monochloramine residual (mg/L)                                                       |                   | ✓        |         |         |              |                |                   |                              |
| 3. Free chlorine residual (mg/L)                                                        |                   | ✓        |         |         |              |                |                   |                              |
| 4. Free ammonia level (mg/L)                                                            |                   | ✓        |         |         |              |                |                   |                              |
| 5. pH level at monochloramine monitoring tap                                            |                   | ✓        |         |         |              |                |                   |                              |
| 6. Water temperature (°C) at monochloramine monitoring tap                              |                   | ✓        |         |         |              |                |                   |                              |
| TCEQ-8J: Begin WW DZ 3 (at MF membrane units' feed trough)                              |                   |          |         |         |              |                |                   |                              |
| 1. Free chlorine dosage rate (mg/L)                                                     |                   |          |         | ✓       |              |                |                   |                              |
| 2. Ammonia dosage rate (mg/L)                                                           |                   |          |         | ✓       |              |                |                   |                              |
| 3. Total chlorine residual, after ammonia injection (mg/L)                              |                   |          |         | ✓       |              |                |                   |                              |
| 4. Monochloramine residual, after ammonia injection (mg/L)                              |                   |          |         | ✓       |              |                |                   |                              |

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|                                                                                                                         | Continuous, every |          |         |         |              | Twice per week | Once every 7 days | Startup, every 30 days & end |
|-------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------|-------------------|------------------------------|
|                                                                                                                         | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day |                |                   |                              |
|                                                                                                                         |                   |          |         | ✓       |              |                |                   |                              |
| 5. Free chlorine residual, after ammonia injection (mg/L)                                                               |                   |          |         | ✓       |              |                |                   |                              |
| 6. Free ammonia level, after ammonia injection (mg/L)                                                                   |                   |          |         | ✓       |              |                |                   |                              |
| 7. Water temperature at monochloramine residual monitoring tap (°C)                                                     |                   |          |         | ✓       |              |                |                   |                              |
| 8. pH level at monochloramine residual monitoring tap                                                                   |                   |          |         | ✓       |              |                |                   |                              |
| 9. Quantity of chlorine used (ppd)                                                                                      |                   |          |         |         | ✓            |                |                   |                              |
| 10. Quantity of ammonia used (ppd)                                                                                      |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-9J: Selected MF Membrane Unit (at influent to selected MF units' feed trough/tank)                                 |                   |          |         |         |              |                |                   |                              |
| 1. Inlet pressure, head on bottom of membranes' feed side (psi)                                                         |                   | ✓        |         |         |              |                |                   |                              |
| 2. Influent silt density index (SDI)                                                                                    |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-10J: Selected MF Membrane Unit Filtrate Quality (after vacuum pump & prior to blending with any other MF filtrate) |                   |          |         |         |              |                |                   |                              |
| 1. Effluent turbidity (mNTU)                                                                                            | ✓                 |          |         |         |              |                |                   |                              |
| 2. <del>Effluent flow rate (gpm)</del> (moved to TCEQ-1J-7)                                                             |                   | ✓        |         |         |              |                |                   |                              |
| 3. Outlet pressure, vacuum (psi)                                                                                        |                   | ✓        |         |         |              |                |                   |                              |
| 4. Selected MF unit's effluent flow rate (gpm)                                                                          |                   | ✓        |         |         |              |                |                   |                              |
| 5. Temperature (°C) (from TCEQ-11J-6)                                                                                   |                   | ✓        |         |         |              |                |                   |                              |
| 6. pH level (from TCEQ-11J-5)                                                                                           |                   | ✓        |         |         |              |                |                   |                              |
| 7. Calculated average transmembrane pressure (TMP, psi)                                                                 |                   |          | ✓       |         |              |                |                   |                              |
| 8. Calculated average flux rate (gallons per square-foot per day, gfd)                                                  |                   |          | ✓       |         |              |                |                   |                              |
| 9. Calculated average specific flux rate (gfd/psi) at measured temperature                                              |                   |          | ✓       |         |              |                |                   |                              |
| 10. Calculated average specific flux (gfd/psi) normalized to 20° C                                                      |                   |          | ✓       |         |              |                |                   |                              |
| 11. SDI                                                                                                                 |                   |          |         |         | ✓            |                |                   |                              |
| 12. Alkalinity (mg/L) (to be conducted on-site)                                                                         |                   |          |         |         |              |                | ✓                 |                              |
| 13. TOC (mg/L) (to be conducted on-site)                                                                                |                   |          |         |         |              |                | ✓                 |                              |
| 14. DOC (mg/L)                                                                                                          |                   |          |         |         |              |                | ✓                 |                              |
| 15. <i>Escherichia coli</i> ( <i>E. coli</i> ) enumeration                                                              |                   |          |         |         |              |                |                   | WF                           |

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# **Addendum J** **Full-Scale Verification Test Protocol** **Minimum Monitoring and Reporting of Water Qualities and Flow Rates**

**Table J**

|                                                                                                             | Continuous, every |          |         |         |              | Twice per week | Once every 7 days | Startup, every 30 days & end |
|-------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------|-------------------|------------------------------|
|                                                                                                             | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day |                |                   |                              |
|                                                                                                             |                   |          |         |         |              |                |                   | WF                           |
| 16. <i>Giardia</i> (cysts/L) enumeration                                                                    |                   |          |         |         |              |                |                   | WF                           |
| 17. <i>Cryptosporidium</i> (oocysts/L)                                                                      |                   |          |         |         |              |                |                   | WF                           |
| 18. Total culturable viruses (MPN/L)                                                                        |                   |          |         |         |              |                |                   | WF                           |
| 49- Enterovirus (CFU/L)                                                                                     |                   |          |         |         |              |                |                   | WF                           |
| 40- Norovirus (CFU/L)                                                                                       |                   |          |         |         |              |                |                   | WF                           |
| TCEQ-11J: End WW DZ 3 (at selected MF membrane unit's filtrate piping & prior to combined MF filtrate pipe) |                   |          |         |         |              |                |                   |                              |
| 1. Total chlorine residual (mg/L)                                                                           |                   | ✓        |         |         |              |                |                   |                              |
| 2. Monochloramine residual (mg/L)                                                                           |                   | ✓        |         |         |              |                |                   |                              |
| 3. Free chlorine residual (mg/L)                                                                            |                   | ✓        |         |         |              |                |                   |                              |
| 4. Free ammonia level (mg/L)                                                                                |                   | ✓        |         |         |              |                |                   |                              |
| 5. pH level at monochloramine residual monitoring tap                                                       |                   | ✓        |         |         |              |                |                   |                              |
| 6. Water temperature at monochloramine residual monitoring tap (°C)                                         |                   | ✓        |         |         |              |                |                   |                              |
| 7. Combined MF units' effluent flow rate (gpm)                                                              |                   | ✓        |         |         |              |                |                   |                              |
| TCEQ-12J: Sodium Bisulfite Feed System                                                                      |                   |          |         |         |              |                |                   |                              |
| 1. Sodium bisulfite dosage (mg/L)                                                                           |                   |          |         | ✓       |              |                |                   |                              |
| 2. Quantity of sodium bisulfite used (ppd)                                                                  |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-13J: Break Tank (RO membrane feed water tank)                                                          |                   |          |         |         |              |                |                   |                              |
| 1. Effluent flow rate (gpm)                                                                                 |                   | ✓        |         |         |              |                |                   |                              |
| 2. Water level (feet)                                                                                       |                   |          |         | ✓       |              |                |                   |                              |
| 3. Calculated hydraulic detention time (using effluent flow rate, mins.)                                    |                   |          |         |         |              | ✓              |                   |                              |
| 4. Effluent free chlorine residual (mg/L)                                                                   |                   |          |         | ✓       |              |                |                   |                              |
| 5. Effluent total chlorine residual (mg/L)                                                                  |                   |          |         | ✓       |              |                |                   |                              |
| 6. SDI                                                                                                      |                   |          |         |         |              | WF             |                   |                              |

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|                                                                                                               | Continuous, every |          |         |         |                                                        | Twice per week | Once every 7 days | Startup, every 30 days & end |
|---------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------------------------------------------------|----------------|-------------------|------------------------------|
|                                                                                                               | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day<br>Once per anytime the flow rate changes |                |                   |                              |
| TCEQ-14J: Sulfuric Acid Feed System                                                                           |                   |          |         |         |                                                        |                |                   |                              |
| 1. Sulfuric acid dosage (mg/L)                                                                                |                   |          |         | ✓       |                                                        |                |                   |                              |
| 2. pH level after injection                                                                                   |                   |          |         | ✓       |                                                        |                |                   |                              |
| 3. Quantity of sulfuric acid used (gpd)                                                                       |                   |          |         |         | ✓                                                      |                |                   |                              |
| TCEQ-15J: Antiscalant Feed System                                                                             |                   |          |         |         |                                                        |                |                   |                              |
| 1. Antiscalant dosage (mg/L)                                                                                  |                   |          |         | ✓       |                                                        |                |                   |                              |
| 2. Quantity of antiscalant used (gpd)                                                                         |                   |          |         |         | ✓                                                      |                |                   |                              |
| TCEQ-16J: Selected RO Membrane Unit Feed Water (after selected RO unit feed pump & prior to selected RO unit) |                   |          |         |         |                                                        |                |                   |                              |
| 1. Influent flow rate (gpm)                                                                                   |                   | ✓        |         |         |                                                        |                |                   |                              |
| 2. Influent turbidity (mNTU)                                                                                  |                   | ✓        |         |         |                                                        |                |                   |                              |
| 3. Inlet pressure (psi)                                                                                       |                   |          |         | ✓       |                                                        |                |                   |                              |
| 4. Temperature (° C)                                                                                          |                   |          |         | ✓       |                                                        |                |                   |                              |
| 5. Nitrate (mg/L)                                                                                             |                   |          |         | ✓       |                                                        |                |                   | √ <sup>2</sup>               |
| 6. TDS (mg/L)                                                                                                 |                   |          |         | ✓       |                                                        |                |                   |                              |
| 7. TSS (mg/L)                                                                                                 |                   |          |         | ✓       |                                                        |                |                   |                              |
| 8. SDI                                                                                                        |                   |          |         |         | ✓                                                      |                |                   |                              |
| 9. pH level                                                                                                   |                   |          |         |         | ✓                                                      |                |                   |                              |
| 10. Hardness as calcium carbonate (mg/L)                                                                      |                   |          |         |         | ✓                                                      |                |                   |                              |
| 11. Alkalinity (mg/L) (to be conducted on-site)                                                               |                   |          |         |         | ✓                                                      |                |                   |                              |
| 12. TOC (mg/L) (to be conducted on-site)                                                                      |                   |          |         |         |                                                        |                | ✓                 |                              |
| 13. DOC (mg/L)                                                                                                |                   |          |         |         |                                                        |                | ✓                 |                              |
| 14. Nitrite (mg/L)                                                                                            |                   |          |         |         |                                                        |                |                   | ✓                            |
| 15. Silica (mg/L)                                                                                             |                   |          |         |         |                                                        |                |                   | ✓                            |

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|----------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------|-------------------|------------------------------|
|                                                                                                                                  | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day |                |                   |                              |
| TCEQ-17J: First Stage RO Membranes                                                                                               |                   |          |         |         |              |                |                   |                              |
| 1. Temperature (°C)                                                                                                              |                   |          |         |         | ✓            |                |                   |                              |
| 2. Flow rate (gpm) at measured temperature                                                                                       |                   |          |         |         | ✓            |                |                   |                              |
| 3. Calculated total flux rate (gfd) at measured temperature                                                                      |                   |          |         |         | ✓            |                |                   |                              |
| 4. Calculated maximum (or average) net driving pressure (psi)                                                                    |                   |          |         |         | ✓            |                |                   |                              |
| 5. Calculated specific flux rate (gfd/psi) normalized to 20° C                                                                   |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-18J: Second Stage RO Membranes                                                                                              |                   |          |         |         |              |                |                   |                              |
| 1. Temperature (°C)                                                                                                              |                   |          |         |         | ✓            |                |                   |                              |
| 2. Flow rate (gpm) at measured temperature                                                                                       |                   |          |         |         | ✓            |                |                   |                              |
| 3. Calculated total flux rate (gfd) at measured temperature                                                                      |                   |          |         |         | ✓            |                |                   |                              |
| 4. Calculated maximum (or average) net driving pressure (psi)                                                                    |                   |          |         |         | ✓            |                |                   |                              |
| 5. Calculated specific flux rate (gfd/psi) normalized to 20° C                                                                   |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-19J: Selected RO Membrane Unit Reject Water Quality (at effluent of RO unit's concentrate piping)                           |                   |          |         |         |              |                |                   |                              |
| 1. Flow rate (gpm)                                                                                                               | ✓                 |          |         |         |              |                |                   |                              |
| 2. Pressure (psi)                                                                                                                | ✓                 |          |         |         |              |                |                   |                              |
| 3. TDS (mg/L)                                                                                                                    |                   |          |         |         | ✓            |                |                   |                              |
| 4. Free ammonia (mg/L)                                                                                                           |                   |          |         |         | ✓            |                |                   |                              |
| 5. Nitrate (mg/L)                                                                                                                |                   |          |         |         | ✓            |                |                   |                              |
| 6. pH level                                                                                                                      |                   |          |         |         |              | ✓              |                   |                              |
| 7. Turbidity (NTU)                                                                                                               |                   |          |         |         |              | ✓              |                   |                              |
| 8. Temperature (°C)                                                                                                              |                   |          |         |         |              | ✓              |                   |                              |
| 9. CBOD5 (mg/L)                                                                                                                  |                   |          |         |         |              | ✓              |                   |                              |
| 10. Full metal scan (mg/L, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc) |                   |          |         |         |              | ✓              |                   |                              |

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|                                                                                                                                              | Continuous, every |          |         |         |                | Twice per week | Once every 7 days | Startup, every 30 days & end |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|----------------|----------------|-------------------|------------------------------|
|                                                                                                                                              | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day   |                |                   |                              |
| TCEQ-201: Selected RO Membrane Unit Permeate Quality (at selected RO unit permeate piping & prior to blending with other RO units' permeate) |                   |          |         |         |                |                |                   |                              |
| 1. Flow rate per unit (gpm)                                                                                                                  |                   | ✓        |         |         |                |                |                   |                              |
| 2. TDS (mg/L)                                                                                                                                |                   | ✓        |         |         |                |                |                   |                              |
| 3. Effluent pressure (psi)                                                                                                                   |                   | ✓        |         |         |                |                |                   |                              |
| 4. Temperature (°C)                                                                                                                          |                   |          |         | ✓       |                |                |                   |                              |
| 5. pH level                                                                                                                                  |                   |          |         | ✓       |                |                |                   |                              |
| 6. Maximum daily TDS (mg/L)                                                                                                                  |                   |          |         |         | ✓              |                |                   |                              |
| 7. Calculated average flux rate (gfd) at measured temperature                                                                                |                   |          |         |         | ✓              |                |                   |                              |
| 8. Calculated average net driving pressure (psi)                                                                                             |                   |          |         |         | ✓              |                |                   |                              |
| 9. Calculated average specific flux rate (gfd/psi) normalized to 20° C                                                                       |                   |          |         |         | ✓              |                |                   |                              |
| 10. Nitrate (mg/L)                                                                                                                           |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 11. Nitrite (mg/L) if nitrite is detected in RO membrane feed water                                                                          |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 12. Escherichia coli (E. coli) enumeration                                                                                                   |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 13. Giardia (cysts/L)                                                                                                                        |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 14. Cryptosporidium (oocysts/L)                                                                                                              |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 15. Alkalinity (mg/L) (to be conducted on-site)                                                                                              |                   |          |         |         |                |                | ✓                 |                              |
| 16. TOC (mg/L) (to be conducted on-site)                                                                                                     |                   |          |         |         |                |                | ✓                 |                              |
| 17. DOC (mg/L)                                                                                                                               |                   |          |         |         |                |                | ✓                 |                              |
| 18. TTHM (ug/L)                                                                                                                              |                   |          |         |         |                |                | ✓                 |                              |
| 19. HAA5 (ug/L)                                                                                                                              |                   |          |         |         |                |                | ✓                 |                              |
| 20. Bromate Bromide (mg/L)                                                                                                                   |                   |          |         |         |                |                | ✓                 |                              |
| 21. Chemicals listed in §290.106(b) Inorganic Chemicals 3                                                                                    |                   |          |         |         |                |                |                   | ✓                            |
| 22. Chemicals listed in §290.107(b) Organic Chemicals 3                                                                                      |                   |          |         |         |                |                |                   | ✓                            |
| 23. Chemicals listed in §290.108(b)(1) and §290.108(b)(2) & 40 CFR §141.66(d)                                                                |                   |          |         |         |                |                |                   | ✓                            |
| 24. Chemicals listed in §290.118(b) Secondary Chemicals                                                                                      |                   |          |         |         |                |                |                   | ✓                            |

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**Addendum J**  
**Full-Scale Verification Test Protocol**  
**Minimum Monitoring and Reporting of Water Qualities and Flow Rates**

**Table J**

|                                                                                                                                                   | Continuous, every |             |            |            |                    |                                                    | Twice<br>every<br>7 days | Startup,<br>every 30<br>days &<br>end |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|------------|------------|--------------------|----------------------------------------------------|--------------------------|---------------------------------------|
|                                                                                                                                                   | 5-<br>min.        | 15-<br>min. | 2-<br>hrs. | 4-<br>hrs. | Once<br>per<br>day | Once per day &<br>anytime the flow<br>rate changes |                          |                                       |
|                                                                                                                                                   |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 25. Total culturable viruses                                                                                                                      |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 26. Enterovirus (CFU/L)                                                                                                                           |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 27. Norovirus (CFU/L)                                                                                                                             |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 28. N-Nitroso-dimethylamine (NDMA, ng/L)                                                                                                          |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 29. N-Nitroso-pyrrolidine (NPPR, ng/L)                                                                                                            |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 30. Pharmaceuticals (ug/L)                                                                                                                        |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 31. Hormones (ng/L)                                                                                                                               |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 32. Personal care products (ng/L)                                                                                                                 |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 33. Fluorinated alkyl acids (PFOS, PFOA, PFNA, PFHxS, PFHpA, & PFBS, ng/L)                                                                        |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 34. Sucralose (ug/L)                                                                                                                              |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 35. Perchlorate (ug/L)                                                                                                                            |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 36. Chlorite (mg/L)                                                                                                                               |                   |             |            |            | WF                 |                                                    |                          |                                       |
| TCEQ-21J: Calculated %-Removal (based on RR WWTP effluent quality & the RO membrane unit's permeate quality prior to discharge to waste Lagoon 3) |                   |             |            |            |                    |                                                    |                          |                                       |
| 1. Nitrite removal (%; if detected in RO feed water)                                                                                              |                   |             |            |            | ✓                  |                                                    |                          |                                       |
| 2. Nitrate removal (%)                                                                                                                            |                   |             |            |            | ✓                  |                                                    |                          |                                       |
| 3. TDS removal (%)                                                                                                                                |                   |             |            |            | ✓                  |                                                    |                          |                                       |
| 4. TOC removal (%)                                                                                                                                |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 5. DOC removal (%)                                                                                                                                |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 6. Removal of inorganics (%)                                                                                                                      |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 7. Removal of organics (%)                                                                                                                        |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 8. Removal of all radionuclides (%)                                                                                                               |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 9. Removal of secondary chemicals (%)                                                                                                             |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 10. TTHM removal (%)                                                                                                                              |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 11. HAA5s removal (%)                                                                                                                             |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 12. Bromate Bromide removal (%)                                                                                                                   |                   |             |            |            |                    |                                                    | ✓                        |                                       |

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**Addendum J**  
**Full-Scale Verification Test Protocol**  
**Minimum Monitoring and Reporting of Water Qualities and Flow Rates**  
**Table J**

| TCEQ-22J: Temporary RO Permeate Lagoon Effluent (at waste Lagoon No. 3 recycle pump station & before blending with Secondary Reservoir source water) |                   |         |        |        |                |                |                   |                              |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------|--------|--------|----------------|----------------|-------------------|------------------------------|--|
|                                                                                                                                                      | Continuous, every |         |        |        |                | Twice per week | Once every 7 days | Startup, every 30 days & end |  |
|                                                                                                                                                      | 5-min.            | 15-min. | 2-hrs. | 4-hrs. | Once per day   |                |                   |                              |  |
| 1. Flow rate (gpm)                                                                                                                                   |                   | ✓       |        |        |                |                |                   |                              |  |
| 2. Turbidity (NTU)                                                                                                                                   |                   |         | ✓      |        |                |                |                   |                              |  |
| 3. pH level                                                                                                                                          |                   |         |        | ✓      |                |                |                   |                              |  |
| 4. Temperature (oC)                                                                                                                                  |                   |         | ✓      |        |                |                |                   |                              |  |
| 5. Nitrate (mg/L)                                                                                                                                    |                   |         |        |        | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |  |
| 6. Free ammonia level (mg/L)                                                                                                                         |                   |         |        |        | ✓              |                |                   |                              |  |
| 7. Alkalinity (mg/L)                                                                                                                                 |                   |         |        |        |                |                | ✓                 |                              |  |
| 8. TOC (mg/L)                                                                                                                                        |                   |         |        |        |                |                | ✓                 |                              |  |
| 9. DOC (mg/L)                                                                                                                                        |                   |         |        |        |                |                | ✓                 |                              |  |
| TCEQ-23J: Raw Secondary Reservoir Source Water Quality (prior to chlorine dioxide injection)                                                         |                   |         |        |        |                |                |                   |                              |  |
| 1. Flow rate (gpm)                                                                                                                                   |                   | ✓       |        |        |                |                |                   |                              |  |
| 2. Turbidity (NTU)                                                                                                                                   |                   | ✓       |        |        |                |                |                   |                              |  |
| 3. Temperature (oC)                                                                                                                                  |                   | ✓       |        | WF     | ✓              |                |                   |                              |  |
| 4. pH                                                                                                                                                |                   |         |        |        | WF             |                |                   |                              |  |
| 5. TDS (mg/L)                                                                                                                                        |                   |         |        |        | ✓              |                |                   |                              |  |
| 6. TSS (mg/L)                                                                                                                                        |                   |         |        |        | ✓              |                |                   |                              |  |
| 7. Daily flow rate (gpd)                                                                                                                             |                   |         |        |        | ✓              |                |                   |                              |  |
| 8. Nitrate (mg/L)                                                                                                                                    |                   |         |        |        | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |  |
| 9. Alkalinity (mg/L) (to be conducted on-site)                                                                                                       |                   |         |        |        |                |                | ✓                 |                              |  |
| 10. TOC (mg/L) (to be conducted on-site)                                                                                                             |                   |         |        |        |                |                | ✓                 |                              |  |
| 11. DOC (mg/L)                                                                                                                                       |                   |         |        |        |                |                | ✓                 |                              |  |
| 12. Bromate Bromide (mg/L)                                                                                                                           |                   |         |        |        |                |                | ✓                 |                              |  |
| 13. Chemicals listed in §290.106(b) Inorganic Chemicals <sup>3</sup>                                                                                 |                   |         |        |        |                |                |                   | ✓                            |  |
| 14. Chemicals listed in §290.107(b) Organic Chemicals <sup>3</sup>                                                                                   |                   |         |        |        |                |                |                   | ✓                            |  |

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**Addendum J**  
**Full-Scale Verification Test Protocol**  
**Minimum Monitoring and Reporting of Water Qualities and Flow Rates**  
**Table J**

|                                                                                                                                                         | Continuous, every |          |         |         |                | Twice per week                               | Once every 7 days | Startup, every 30 days & end |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|----------------|----------------------------------------------|-------------------|------------------------------|
|                                                                                                                                                         | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day   | Once per day & anytime the flow rate changes |                   |                              |
| 15. Chemicals listed in §290.108(b)(1) and §290.108(b)(2) & 40 CFR §141.66(d)                                                                           |                   |          |         |         |                |                                              |                   | ✓                            |
| 16. Chemicals listed in §290.118(b), Secondary Chemicals                                                                                                |                   |          |         |         |                |                                              |                   | ✓                            |
| 17. <i>Escherichia coli</i> ( <i>E. coli</i> ) enumeration                                                                                              |                   |          |         |         | ✓ <sup>1</sup> |                                              |                   | ✓ <sup>2</sup>               |
| 18. <i>Giardia</i> (cysts/L)                                                                                                                            |                   |          |         |         | ✓ <sup>1</sup> |                                              |                   | ✓ <sup>2</sup>               |
| 19. <i>Cryptosporidium</i> (oocysts/L)                                                                                                                  |                   |          |         |         | ✓ <sup>1</sup> |                                              |                   | ✓ <sup>2</sup>               |
| 20. Total culturable viruses (MPN/L)                                                                                                                    |                   |          |         |         |                |                                              |                   | WF                           |
| 21. Enterovirus (CFU/L)                                                                                                                                 |                   |          |         |         |                |                                              |                   | WF                           |
| 22. Norovirus (CFU/L)                                                                                                                                   |                   |          |         |         |                |                                              |                   | WF                           |
| 23. N-Nitroso dimethylamine (NDMA, ng/L)                                                                                                                |                   |          |         |         |                |                                              |                   | WF                           |
| 24. N-Nitroso pyrrolidine (NPPR, ng/L)                                                                                                                  |                   |          |         |         |                |                                              |                   | WF                           |
| 25. Pharmaceuticals (µg/L)                                                                                                                              |                   |          |         |         |                |                                              |                   | WF                           |
| 26. Hormones (ng/L)                                                                                                                                     |                   |          |         |         |                |                                              |                   | WF                           |
| 27. Personal care products (ng/L)                                                                                                                       |                   |          |         |         |                |                                              |                   | WF                           |
| 28. Fluorinated Alkyl Acids (PFOS, PFOA, PFNA, PFHxS, PFHpA, & PFBS; ng/L)                                                                              |                   |          |         |         |                |                                              |                   | WF                           |
| 29. Saccharose (ug/L)                                                                                                                                   |                   |          |         |         |                |                                              |                   | WF                           |
| 30. Perchlorate (ug/L)                                                                                                                                  |                   |          |         |         |                |                                              |                   | WF                           |
| TCEQ-24J: Begin Secondary Reservoir raw water (RW) DZ 1 (at chlorine dioxide injection point on Secondary Reservoir raw water transmission pipe)        |                   |          |         |         |                |                                              |                   |                              |
| 1. Chlorine dioxide dosage (mg/L)                                                                                                                       |                   |          |         | ✓       |                |                                              |                   |                              |
| 2. pH level (from TCEQ-23J-4)                                                                                                                           |                   |          |         | ✓       | ✓              |                                              |                   |                              |
| 3. Temperature (°C) (from TCEQ-23J-3)                                                                                                                   |                   |          |         | ✓       | ✓              |                                              |                   |                              |
| 4. Quantity of chlorine dioxide used (ppd)                                                                                                              |                   |          |         |         | ✓              |                                              |                   |                              |
| TCEQ-25J: End RW DZ 1 (at 1 <sup>st</sup> monitoring point on raw Secondary Reservoir transmission pipe 400 feet from chlorine dioxide injection point) |                   |          |         |         |                |                                              |                   |                              |
| 1. Chlorine dioxide residual (mg/L)                                                                                                                     |                   |          |         | ✓       |                |                                              |                   |                              |
| 2. pH level                                                                                                                                             |                   |          |         | ✓       |                |                                              |                   |                              |
| 3. Temperature (°C)                                                                                                                                     |                   |          |         | ✓       |                |                                              |                   |                              |

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**Addendum J**  
**Full-Scale Verification Test Protocol**  
**Minimum Monitoring and Reporting of Water Qualities and Flow Rates**  
**Table J**

|                                                                                                                                                                                                                                                 | Continuous, every |          |         |         |                | Twice per week | Once every 7 days | Startup, every 30 days & end |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|----------------|----------------|-------------------|------------------------------|
|                                                                                                                                                                                                                                                 | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day   |                |                   |                              |
| TCEQ-26J: End RW DZ 2 (begins at end of RW DZ 1 and ends at 2 <sup>nd</sup> monitoring point on raw Secondary Reservoir transmission pipe 900 feet from chlorine dioxide injection point)                                                       |                   |          |         |         |                |                |                   |                              |
| 1. Chlorine dioxide residual (mg/L)                                                                                                                                                                                                             |                   |          |         | ✓       |                |                |                   |                              |
| 2. pH level                                                                                                                                                                                                                                     |                   |          |         | ✓       |                |                |                   |                              |
| 3. Temperature (°C)                                                                                                                                                                                                                             |                   |          |         | ✓       |                |                |                   |                              |
| TCEQ-27J: End RW DZ 3 (begins at end of RW DZ 2 & ends prior to tee for blending waste Lagoon No. 3 effluent at 3 <sup>rd</sup> monitoring point on raw Secondary Reservoir transmission pipe 6,500 feet from chlorine dioxide injection point) |                   |          |         |         |                |                |                   |                              |
| 1. Flow rate (gpm)                                                                                                                                                                                                                              |                   | WF       |         |         |                |                |                   |                              |
| 2. Chlorine dioxide residual (mg/L)                                                                                                                                                                                                             |                   |          |         | ✓       |                |                |                   |                              |
| 3. pH level                                                                                                                                                                                                                                     |                   |          |         | ✓       |                |                |                   |                              |
| 4. Temperature (°C)                                                                                                                                                                                                                             |                   |          |         | ✓       |                |                |                   |                              |
| 5. Turbidity (NTU)                                                                                                                                                                                                                              |                   |          | WF      |         |                |                |                   |                              |
| 6. Total alkalinity (mg/L as CaCO <sub>3</sub> )                                                                                                                                                                                                |                   |          |         |         | WF             |                |                   |                              |
| 7. Nitrate (mg/L)                                                                                                                                                                                                                               |                   |          |         |         | WF             |                |                   |                              |
| 8. Chlorite (mg/L)                                                                                                                                                                                                                              |                   |          |         |         | WF             |                |                   |                              |
| TCEQ-28J: Cypress Splitter Box Effluent (blended partially treated RR WWTP effluent from waste Lagoon No. 3 with Secondary Reservoir source water)                                                                                              |                   |          |         |         |                |                |                   |                              |
| 1. Combined flow rate (gpm)                                                                                                                                                                                                                     |                   |          |         | ✓       |                |                |                   |                              |
| 2. Turbidity (NTU)                                                                                                                                                                                                                              |                   |          |         | ✓       |                |                |                   |                              |
| 3. pH                                                                                                                                                                                                                                           |                   |          |         | ✓       |                |                |                   |                              |
| 4. Temperature (°C)                                                                                                                                                                                                                             |                   |          |         | WF      |                |                |                   |                              |
| 5. <i>E. coli</i> enumeration                                                                                                                                                                                                                   |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 6. <i>Giardia</i> (cysts/L)                                                                                                                                                                                                                     |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 7. <i>Cryptosporidium</i> (oocysts/L)                                                                                                                                                                                                           |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 8. Nitrate (mg/L)                                                                                                                                                                                                                               |                   |          |         |         | ✓ <sup>1</sup> |                |                   | ✓ <sup>2</sup>               |
| 9. Water color                                                                                                                                                                                                                                  |                   |          |         |         | ✓              |                |                   |                              |
| 10. Odor (threshold odor number)                                                                                                                                                                                                                |                   |          |         |         | ✓              |                |                   |                              |
| 11. TOC (mg/L) (to be conducted on-site)                                                                                                                                                                                                        |                   |          |         |         |                |                | ✓                 |                              |

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# **Addendum J** **Full-Scale Verification Test Protocol** **Minimum Monitoring and Reporting of Water Qualities and Flow Rates**

**Table J**

|                                                                                                                                                                                             | Continuous, every |             |            |            |                    |                                                    | Twice<br>every<br>7 days | Startup,<br>every 30<br>days &<br>end |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|------------|------------|--------------------|----------------------------------------------------|--------------------------|---------------------------------------|
|                                                                                                                                                                                             | 5-<br>min.        | 15-<br>min. | 2-<br>hrs. | 4-<br>hrs. | Once<br>per<br>day | Once per day &<br>anytime the flow<br>rate changes |                          |                                       |
| 12. DOC (mg/L)                                                                                                                                                                              |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 13. TTHM (mg/L)                                                                                                                                                                             |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 14. HAA5 (mg/L)                                                                                                                                                                             |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 15. <b>Bromate Bromide</b> (mg/L)                                                                                                                                                           |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 16. Chemicals listed in §290.106(b) Inorganic Chemicals 3                                                                                                                                   |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 17. Chemicals listed in §290.107(b) Organic Chemicals 3                                                                                                                                     |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 18. Chemicals listed in §290.108(b)(1) radionuclides                                                                                                                                        |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 19. Chemicals listed in §290.108(b)(2) & 40 CFR §141.66(d) manmade radionuclides                                                                                                            |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 20. Chemicals listed in §290.118(b) Secondary Chemicals                                                                                                                                     |                   |             |            |            |                    |                                                    |                          | ✓                                     |
| 21. Total culturable viruses (MPN/L)                                                                                                                                                        |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 22. <b>Enterovirus</b> (CFU/L)                                                                                                                                                              |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 23. <b>Norovirus</b> (CFU/L)                                                                                                                                                                |                   |             |            |            |                    |                                                    |                          | WF                                    |
| 24. Chlorite (mg/L)                                                                                                                                                                         |                   |             |            |            | WF                 |                                                    |                          |                                       |
| <b>TCEQ-29J: Calculated % Change in Water Quality</b> (between RO membrane unit permeate, prior to discharging to waste Lagoon No. 3 and the Splitter Box's effluent blended water quality) |                   |             |            |            |                    |                                                    |                          |                                       |
| 1. Nitrate change as % reduction (-) or % increase (+)                                                                                                                                      |                   |             |            |            | ✓ <sup>1</sup>     |                                                    |                          | ✓ <sup>2</sup>                        |
| 2. Chlorite change as % reduction (-) or % increase (+)                                                                                                                                     |                   |             |            |            | WF                 |                                                    |                          |                                       |
| 3. TOC change as % reduction (-) or % increase (+)                                                                                                                                          |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 4. DOC change as % reduction (-) or % increase (+)                                                                                                                                          |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 5. TTHM change as % reduction (-) or % increase (+)                                                                                                                                         |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 6. HAA5 change as % reduction (-) or % increase (+)                                                                                                                                         |                   |             |            |            |                    |                                                    | ✓                        |                                       |
| 7. <b>Bromate Bromide</b> change as % reduction (-) or % increase (+)                                                                                                                       |                   |             |            |            |                    |                                                    | ✓                        |                                       |

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**Table J**

|                                                                                                                                                                                       | Continuous, every |          |         |         |              | Twice per week | Once every 7 days | Startup, every 30 days & end |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------|-------------------|------------------------------|
|                                                                                                                                                                                       | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day |                |                   |                              |
| TCEQ-30J: Begin Blended partial treated RR WWTP & Secondary Reservoir waters (Blended) DZ 4<br>(at chlorine & ammonia injection after Cypress Splitter Box and before 2010 Rapid Mix) |                   |          |         |         |              |                |                   |                              |
| 1. Free chlorine dosage (mg/L)                                                                                                                                                        |                   |          |         | ✓       |              |                |                   |                              |
| 2. Ammonia dosage (mg/L)                                                                                                                                                              |                   |          |         | ✓       |              |                |                   |                              |
| 3. Total chlorine residual, after ammonia injection (mg/L)                                                                                                                            |                   |          |         | ✓       |              |                |                   |                              |
| 4. Monochloramine residual, after ammonia injection (mg/L)                                                                                                                            |                   |          |         | ✓       |              |                |                   |                              |
| 5. Free chlorine residual, after ammonia injection (mg/L)                                                                                                                             |                   |          |         | ✓       |              |                |                   |                              |
| 6. Free ammonia residual, after ammonia injection (mg/L)                                                                                                                              |                   |          |         | ✓       |              |                |                   |                              |
| 7. pH level at monochloramine residual monitoring tap                                                                                                                                 |                   |          |         | ✓       |              |                |                   |                              |
| 8. Water temperature at monochloramine monitoring tap (°C)                                                                                                                            |                   |          |         | ✓       |              |                |                   |                              |
| 9. Quantity of chlorine used (ppd)                                                                                                                                                    |                   |          |         |         | ✓            |                |                   |                              |
| 10. Quantity of ammonia used (ppd)                                                                                                                                                    |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-31J: Conventional 2010 SWTP Rapid Mix and Coagulant Addition                                                                                                                     |                   |          |         |         |              |                |                   |                              |
| 1. Influent alkalinity level (mg/L)                                                                                                                                                   |                   |          | ✓       |         |              |                |                   |                              |
| 2. Coagulant dosage (mg/L)                                                                                                                                                            |                   |          | ✓       |         |              |                |                   |                              |
| 3. Quantity of coagulant used (gpd)                                                                                                                                                   |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-32A: Conventional 2010 SWTP Flocculation & Clarification (Accelerator solids-contact flocculation and clarification)                                                             |                   |          |         |         |              |                |                   |                              |
| 1. Effluent flow rate (gpm)                                                                                                                                                           |                   | ✓        |         |         |              |                |                   |                              |
| 2. Settled water turbidity (NTU)                                                                                                                                                      |                   |          | ✓       |         |              |                |                   |                              |
| 3. Cationic polymer dosage (mg/L)                                                                                                                                                     |                   |          |         | ✓       |              |                |                   |                              |
| 4. Lime feed rate (gpm)                                                                                                                                                               |                   |          |         | ✓       |              |                |                   |                              |
| 5. Quantity of cationic polymer used (gpd)                                                                                                                                            |                   |          |         |         | ✓            |                |                   |                              |
| 6. Quantity of lime used (ppd)                                                                                                                                                        |                   |          |         |         | ✓            |                |                   |                              |
| 7. Calculated flocculator hydraulic detention time (mins.)                                                                                                                            |                   |          |         |         |              | ✓              |                   |                              |
| 8. Calculated clarifier surface overflow rate (gpm/sf)                                                                                                                                |                   |          |         |         |              | ✓              |                   |                              |
| 9. Effluent TOC (mg/L) (to be conducted on-site)                                                                                                                                      |                   |          |         |         |              |                | ✓                 |                              |
| 10. Effluent DOC (mg/L)                                                                                                                                                               |                   |          |         |         |              |                | ✓                 |                              |

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3. Please assure that the laboratory monitors for all of the inorganic and organic compounds. Compounds that some labs do not include, but are required are: asbestos, cyanide, endothal, diquat, glyphosate, asbestos, and the dioxins.

# **Addendum J** **Full-Scale Verification Test Protocol** **Minimum Monitoring and Reporting of Water Qualities and Flow Rates** **Table J**

|                                                                                                                                                                   | Continuous, every |          |         |         |              | Once per day & anytime the flow rate changes | Twice per week | Once every 7 days | Startup, every 30 days & end |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------------------------------------|----------------|-------------------|------------------------------|
|                                                                                                                                                                   | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day |                                              |                |                   |                              |
|                                                                                                                                                                   |                   |          |         |         |              |                                              |                |                   |                              |
| TCEQ-33J: Conventional 2010 SWTP Recarbonation Basin                                                                                                              |                   |          |         |         |              |                                              |                |                   |                              |
| 1. Carbon dioxide dosage (mg/L)                                                                                                                                   |                   |          |         |         | ✓            |                                              |                |                   |                              |
| 2. Effluent pH level                                                                                                                                              |                   |          |         |         | ✓            |                                              |                |                   |                              |
| 3. Quantity of carbon dioxide used (ppd)                                                                                                                          |                   |          |         |         | ✓            |                                              |                |                   |                              |
| TCEQ-34J: Blended Phosphate Addition System (after Conventional 2010 SWTP Recarbonation Basin and prior to gravity media filters)                                 |                   |          |         |         |              |                                              |                |                   |                              |
| 1. Blended phosphate dosage (mg/L)                                                                                                                                |                   |          |         |         | ✓            |                                              |                |                   |                              |
| 2. Quantity of blended phosphate used (gpd)                                                                                                                       |                   |          |         |         | ✓            |                                              |                |                   |                              |
| TCEQ-35J: Selected Conventional 2010 SWTP Gravity Media Filter (selected individual filter effluent (IFE))                                                        |                   |          |         |         |              |                                              |                |                   |                              |
| 1. Selected individual filter's effluent (IFE) turbidity level (NTU)                                                                                              |                   | ✓        |         |         |              |                                              |                |                   |                              |
| 2. Selected IFE flow rate (gpm)                                                                                                                                   |                   |          |         | ✓       |              |                                              |                |                   |                              |
| 3. Combined filters' effluent water flow rate (gpm) (moved to TCEQ-36J-7)                                                                                         |                   |          |         | WF      |              |                                              |                |                   |                              |
| 4. Calculated selected IFE hydraulic loading rate for selected filter (gpm/sf)                                                                                    |                   |          |         |         |              |                                              | ✓              |                   |                              |
| TCEQ-36J: End Blended DZ 4 (at effluent of selected after Conventional 2010 SWTP combined filter effluent (CFE) and prior to downstream chlorine injection point) |                   |          |         |         |              |                                              |                |                   |                              |
| 1. Total chlorine residual (mg/L)                                                                                                                                 |                   | ✓        |         |         |              |                                              |                |                   |                              |
| 2. Monochloramine residual (mg/L)                                                                                                                                 |                   | ✓        |         |         |              |                                              |                |                   |                              |
| 3. Free chlorine residual (mg/L)                                                                                                                                  |                   | ✓        |         |         |              |                                              |                |                   |                              |
| 4. Free ammonia level (mg/L)                                                                                                                                      |                   | ✓        |         |         |              |                                              |                |                   |                              |
| 5. pH level at monochloramine residual monitoring tap                                                                                                             |                   | ✓        |         |         |              |                                              |                |                   |                              |
| 6. Water temperature (°C) at monochloramine residual monitoring tap                                                                                               |                   | ✓        |         |         |              |                                              |                |                   |                              |
| 7. Combined filters' effluent (CFE) water flow rate (gpm)                                                                                                         |                   |          |         | ✓       |              |                                              |                |                   |                              |
| TCEQ-37J: Fluoride Adjustment System (after Conventional 2010 SWTP filters and prior to chlorine injection point)                                                 |                   |          |         |         |              |                                              |                |                   |                              |
| 1. Fluoride level, pre-fluosilicic injection (mg/L) (can be monitored at TCEQ-36J monitoring location)                                                            |                   |          |         |         | ✓            |                                              |                |                   |                              |
| 2. Fluosilicic acid dosage (mg/L)                                                                                                                                 |                   |          |         |         | ✓            |                                              |                |                   |                              |
| 3. Quantity of fluosilicic acid used (gpd)                                                                                                                        |                   |          |         |         | ✓            |                                              |                |                   |                              |

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- 3 Please assure that the laboratory monitors for all of the inorganic and organic compounds. Compounds that some labs do not include, but are required are: asbestos, cyanide, endotoxin, diquat, glyphosate, asbestos, and the dioxins.

**Addendum J**  
**Full-Scale Verification Test Protocol**  
**Minimum Monitoring and Reporting of Water Qualities and Flow Rates**  
**Table J**

|                                                                                                                           | Continuous, every |          |         |         |              | Twice per week | Once every 7 days | Startup, every 30 days & end |
|---------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|--------------|----------------|-------------------|------------------------------|
|                                                                                                                           | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day |                |                   |                              |
| TCEQ-38J: Begin Blended DZ 5 (at chlorine injection prior to Conventional 2010 SWTP Clearwell)                            |                   |          |         |         |              |                |                   |                              |
| 1. Free chlorine dosage (mg/L)                                                                                            |                   |          |         | ✓       |              |                |                   |                              |
| 2. Ammonia dosage (mg/L)                                                                                                  |                   |          |         | ✓       |              |                |                   |                              |
| 3. Total chlorine residual, after ammonia injection (mg/L)                                                                |                   |          |         | ✓       |              |                |                   |                              |
| 4. Monochloramine residual, after ammonia injection (mg/L)                                                                |                   |          |         | ✓       |              |                |                   |                              |
| 5. Free chlorine residual, after ammonia injection (mg/L)                                                                 |                   |          |         | ✓       |              |                |                   |                              |
| 6. Free ammonia level, after ammonia injection (mg/L)                                                                     |                   |          |         | ✓       |              |                |                   |                              |
| 7. pH level at monochloramine residual monitoring tap (from TCEQ-36J-5)                                                   |                   |          |         | ✓       |              |                |                   |                              |
| 8. Water temperature at monochloramine residual monitoring tap (°C) (from TCEQ-36J-6)                                     |                   |          |         | ✓       |              |                |                   |                              |
| 9. Quantity of chlorine used (ppd)                                                                                        |                   |          |         |         | ✓            |                |                   |                              |
| 10. Quantity of ammonia used (ppd)                                                                                        |                   |          |         |         | ✓            |                |                   |                              |
| TCEQ-39J: End Temporary Blended DZ 5 (at Conventional 2010 SWTP Clearwell's transfer pumps)                               |                   |          |         |         |              |                |                   |                              |
| 1. Total chlorine residual (mg/L)                                                                                         | ✓                 |          |         |         |              |                |                   |                              |
| 2. Monochloramine residual (mg/L)                                                                                         | ✓                 |          |         |         |              |                |                   |                              |
| 3. Free chlorine residual (mg/L)                                                                                          | ✓                 |          |         |         |              |                |                   |                              |
| 4. Free ammonia level (mg/L)                                                                                              | ✓                 |          |         |         |              |                |                   |                              |
| 5. pH level at monochloramine residual monitoring tap                                                                     | ✓                 |          |         |         |              |                |                   |                              |
| 6. Water temperature at monochloramine residual monitoring tap (°C)                                                       | ✓                 |          |         |         |              |                |                   |                              |
| TCEQ-40J: Conventional 2010 SWTP Clearwell Effluent Water Quality (after 2010 clearwell transfer pumps and prior to GSTs) |                   |          |         |         |              |                |                   |                              |
| 1. Flow rate (gpm)                                                                                                        | ✓                 |          |         |         |              |                |                   |                              |
| 2. Turbidity (NTU) (the City has selected this turbidity monitoring method at this sample site)                           | ✓                 |          |         |         |              |                |                   |                              |
| 3. Turbidity (mNTU)                                                                                                       | ✓                 |          |         |         |              |                |                   |                              |
| 4. Nitrate (mg/L)                                                                                                         | ✓                 |          |         |         |              |                |                   | ✓ <sup>2</sup>               |
| 5. TDS (mg/L)                                                                                                             | ✓                 |          |         |         |              |                |                   | ✓ <sup>2</sup>               |

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**Table J**

|                                                                                                                                  | Continuous, every |          |         |         |                | Twice per week | Once every 7 days | Startup, every 30 days & end |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|----------------|----------------|-------------------|------------------------------|
|                                                                                                                                  | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day   |                |                   |                              |
|                                                                                                                                  |                   |          |         |         | √ <sup>1</sup> |                |                   | √ <sup>2</sup>               |
| 6. <i>E. coli</i> enumeration                                                                                                    |                   |          |         |         | √ <sup>1</sup> |                |                   | √ <sup>2</sup>               |
| 7. <i>Giardia</i> (cysts/L)                                                                                                      |                   |          |         |         | √ <sup>1</sup> |                |                   | √ <sup>2</sup>               |
| 8. <i>Cryptosporidium</i> (oocysts/L)                                                                                            |                   |          |         |         | √ <sup>1</sup> |                |                   | √ <sup>2</sup>               |
| 9. Fluoride (mg/L)                                                                                                               |                   |          |         |         | √ <sup>1</sup> |                |                   | √ <sup>2</sup>               |
| 10. Daily quantity of water treated (MGD)                                                                                        |                   |          |         |         | √              |                |                   |                              |
| 11. Chlorine dioxide (mg/L)                                                                                                      |                   |          |         |         | √              |                |                   |                              |
| 12. Chlorite (mg/L)                                                                                                              |                   |          |         |         | √              |                |                   |                              |
| 13. Color (color units)                                                                                                          |                   |          |         |         | √              |                |                   |                              |
| 14. Odor (threshold odor number)                                                                                                 |                   |          |         |         | √              |                |                   |                              |
| 15. Alkalinity (mg/L)                                                                                                            |                   |          |         |         |                |                | √                 |                              |
| 16. Hardness as calcium carbonate (mg/L)                                                                                         |                   |          |         |         |                |                | √                 |                              |
| 17. Calculated Langelier saturation index (LSI)                                                                                  |                   |          |         |         |                |                | √                 |                              |
| 18. Chemicals listed in §290.106(b) Inorganic Chemicals <sup>3</sup>                                                             |                   |          |         |         |                |                |                   | √                            |
| 19. Chemicals listed in §290.107(b) Organic Chemicals <sup>3</sup>                                                               |                   |          |         |         |                |                |                   | √                            |
| 20. Chemicals listed in §290.108(b)(1) (radium 226, radium 228, uranium, gross alpha activity)                                   |                   |          |         |         |                |                |                   | √                            |
| 21. Chemicals listed in §290.108(b)(2) & 40 CFR §141.66(d) (gross beta particle and photon radioactivity, tritium, strontium 90) |                   |          |         |         |                |                |                   | √                            |
| 22. Chemicals listed in §290.118(b) Secondary Chemicals                                                                          |                   |          |         |         |                |                |                   | √                            |
| 23. TTHM (ug/L)                                                                                                                  |                   |          |         |         |                |                | √                 |                              |
| 24. HAA5 (ug/L)                                                                                                                  |                   |          |         |         |                |                | √                 |                              |
| 25. Lead (mg/L)                                                                                                                  |                   |          |         |         |                |                |                   | √                            |
| 26. Total culturable viruses (MPN/L)                                                                                             |                   |          |         |         |                |                |                   | WF                           |
| 27. Enterovirus (CFU/L)                                                                                                          |                   |          |         |         |                |                |                   | WF                           |
| 28. Norovirus (CFU/L)                                                                                                            |                   |          |         |         |                |                |                   | WF                           |
| 29. N-Nitroso-dimethylamine (NDMA, ng/L)                                                                                         |                   |          |         |         |                |                |                   | WF                           |
| 30. N-Nitroso-pyrrolidine (NPR, ng/L)                                                                                            |                   |          |         |         |                |                |                   | WF                           |

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|                                                                            | Continuous, every |          |         |         |                                              | Twice per week | Once every 7 days | Startup, every 30 days & end |
|----------------------------------------------------------------------------|-------------------|----------|---------|---------|----------------------------------------------|----------------|-------------------|------------------------------|
|                                                                            | 5- min.           | 15- min. | 2- hrs. | 4- hrs. | Once per day                                 |                |                   |                              |
|                                                                            |                   |          |         |         | Once per day & anytime the flow rate changes |                |                   |                              |
| 31- Pharmaceuticals (µg/L)                                                 |                   |          |         |         |                                              |                |                   | WF                           |
| 32- Hormones (ng/L)                                                        |                   |          |         |         |                                              |                |                   | WF                           |
| 33- Personal care products (ng/L)                                          |                   |          |         |         |                                              |                |                   | WF                           |
| 34- Fluorinated alkyl acids (PFOS, PFOA, PFNA, PFHxS, PFHpA, & PFBS; ng/L) |                   |          |         |         |                                              |                |                   | WF                           |
| 35- Saccharose (µg/L)                                                      |                   |          |         |         |                                              |                |                   | WF                           |
| 36. Perchlorate (ug/L)                                                     |                   |          |         |         |                                              |                |                   | WF                           |
| 37. Bromate (mg/L) (TCEQ added disinfection by-product)                    |                   |          |         |         |                                              |                | ✓                 |                              |

| Simulated CT for 10.0-MG GST                                                                                                                                                     |  | 8-hrs. | End of three 8-hr. shifts |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|---------------------------|
| TCEQ-41J: Begin Temporary Blended DZ 6 (no disinfectant injection, includes Cypress 10.0-MG GST)                                                                                 |  |        |                           |
| 1. Collect water sample at effluent of 2010 clearwell                                                                                                                            |  | ✓      |                           |
| 2. 2010 clearwell transfer pumps' flow rate (gpm)                                                                                                                                |  | ✓      |                           |
| 3. Calculate hydraulic detention time of 10.0 MG GST at 50-% capacity (mins.)                                                                                                    |  | ✓      |                           |
| 4. Calculate T10 using a baffling factor of 0.3 (mins.)                                                                                                                          |  | ✓      |                           |
| TCEQ-42J: End Temporary Blended DZ 6 (at Cypress high service pumps' discharge header)                                                                                           |  |        |                           |
| 1. Water temperature of sample after holding sample for calculated T10 (°C)                                                                                                      |  | ✓      |                           |
| 2. pH level of sample after holding sample for calculated T10                                                                                                                    |  | ✓      |                           |
| 3. Monochloramine residual of sample after holding sample for calculated T10 (mg/L)                                                                                              |  | ✓      |                           |
| 4. Record 2010 clearwell transfer pumps' 8-hr. flow rate result that corresponds to the lowest virus and <i>Giardia</i> inactivation on Full-Scale Verification Test SWMOR (gpm) |  |        | ✓                         |
| 5. Record water sample temperature for the 8-hr. result that corresponds to the lowest virus and <i>Giardia</i> inactivation on Full-Scale Verification Test SWMOR (°C)          |  |        | ✓                         |
| 6. Record water sample pH level for the 8-hr. result that corresponds to the lowest virus and <i>Giardia</i> inactivation on Full-Scale Verification Test SWMOR                  |  |        | ✓                         |
| 7. Record monochloramine residual for the 8-hr. result that corresponds to the lowest virus and <i>Giardia</i> inactivation on Full-Scale Verification Test SWMOR (mg/L)         |  |        | ✓                         |

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# City of Wichita Falls Direct Potable Reuse FSVT2 TCEQ Monitoring Locations, Frequency, and Action Levels

