



January 15th, 2014

Marlo Wanielista Berg, P.E.
Technical Review and Oversight Team (MC 159)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Re: Letter of July 15, 2013 and May 2013 TCEQ site visit
Colorado River Municipal Water District (CRMWD)- PWSIDNo.1140038
Howard County, Texas (CN602515967; RN105692891)

Dear Ms. Berg:

We have reviewed your letter dated July 15, 2013 following your visit to the Raw Water Production Facility in Big Spring, Texas. We have the following responses to the items listed in your letter.

1. **WWTP effluent flow reporting-** *As stated in 1a ,the WWTP effluent cannot enter the CRMWD reclamation facility if the effluent turbidity is found to be over 10 Nephelometric Turbidity Units(NTU). The reporting must be able to definitively show that the water was diverted back to the WWTP. Please submit a description of the reporting format of the WWTP effluent flow monitoring.*

Valve positions for the two valves which allow water to proceed to the RWPF or be diverted back to the WWTP are now included in the Monthly Operating Report (MOR).

2. **Direct Integrity Test frequency** -*As stated in item 3a, a direct integrity test (DIT) must be performed every day. Please provide a procedure or description of the programming that assures that DITs are conducted every day water is produced, even if the membrane rack is off-line during the normally established time to perform a DIT.*

Programming has been modified to trigger DITs shortly after midnight each day to make sure DITs are conducted as required.

3. **Membrane effluent turbidity reporting** -*As stated in 5, if the membrane turbidity is above 0.15 NTU in two consecutive 5-minute readings, a DIT must be performed. TCEQ recommends amending the reports to only display confirmed membrane effluent turbidity. Please submit the new report format with description.*

November MOR is attached as Appendix A, showing current format.

4. **Spence pipeline ratio** - *As required by 1c, the CRMWD reclamation facility can only release water into the EV Spence pipeline at a ratio of 20% reclamation facility effluent to 80% raw lake water. An error in the program was seen in the data when TCEQ visited, but it was corrected before the end of the visit. TCEQ suggests that further work be done on the reports to show all the data at the same physical location.*

Spence flows and product water flows are now displayed at both the RWPF and Central Control. The maximum percentage of reclaimed water in the Spence pipeline is now included in the MOR as attached in Appendix A.

5. **UV system bypass line** - *As required by 1g, all of the CRMWD reclamation facility effluent must be treated by the entire WWTP process. Currently the treatment plant has a bypass line around the UV system. The facility must be modified so that the water cannot bypass the UV system. A description and photographs of the modifications must be submitted.*

The bypass valves have been disabled as illustrated in the attached photos in Appendix B.

6. **UV Integrator formula** - *Review of on-site data showed that the D_{val} for the UV system was calculated properly. However, upon review of the integrator formulas for D_{val} , it was found that the limits for flow and ultraviolet light transmittance (UVT) do not appear to set appropriately for very large or very small numbers. Though reaching the limits of the flow and UVT values is basically impossible, the formulas should be set to assure proper calculation in all situations. Based on item 7c, the validated flow range is 507 to 5132 gallons per minute (gpm). The integrator formula does not have an upper limit and the lower limit is set at 50 gpm. The UVT does not show a lower or upper limit as described in 7c. The integrator formula must be reprogrammed or another method of calculation must be established. Please submit the new integrator formulas. If it is decided to use the UV vendor's calculations, please submit the formulas for review.*

Trojan UV has reprogrammed the reactor controls to provide the D_{val} calculations within their system and export the data to the integrator. The dose calculation is the same as previously provided to TCEQ, but includes restrictions to keep the results within their limitations. The attached document "112243-Big Springs Logic Snapshots for UV Dose Calculations.pdf" (Appendix C) contains the logic snap shots for the limits that are placed on the UV AOP system dose calculations. The dose calculation input limits that are in place are: the UVT cannot be higher than 81%, the system flow rate cannot be less than 503 gpm and the S/So term from the intensity sensors cannot exceed 1.0. These are the limits that would cause the system to report a higher UV Dose than would be allowed. The upper flow limit was not programmed as it does not result in dose prediction above allowable levels. The Lower UVT limit (about 40%) also would not result in a UV Dose prediction above allowable levels.

7. **UV data reporting** - *During the visit, it was found that the time and volume for an off-spec event was not recorded accurately in the monthly report as required by 77j. On June 3, 2013, a new monthly report was submitted showing the time and volume reported accurately.*

Agreed.

8. **Alarms and Shutdowns** - *To be able to produce water without operators on-site, appropriate alarms and shutdowns must be set and procedures to respond to the alarms must be in place. At the time of our visit, written procedures had not been finalized, nor had testing of the alarms been performed in a systematic method. Please submit the procedures and description of systematic testing. TCEQ recommends the testing be performed once per year.*

Alarms and shutdowns have been systematically tested in accordance with the procedure and documentation included in Appendix D.

9. **Laboratory and on-line methods** - *Please re-submit TCEQ form 10450 to include all the analytical methods used for all bench-top and on-line monitoring equipment. The current form lists the make and model of the equipment, but not the methods used. TCEQ could not determine the analytical methods used for all equipment during the visit.*

Form 10450 has been updated and is attached as Appendix E.

10. **pH meter calibration** - *The range of calibration for the pH meters may not be appropriate for the range of pH seen during a clean-in-place (CIP) procedure. Please submit the range of pH expected during a CIP and the types of buffers used to calibrate the pH meter during a CIP.*

Calibration is performed with industry standard buffers for pH 4, 7 and 10, in accordance with the membrane manufacturer's recommendations, included in Appendix F.

11. **Nitrate/Nitrite instrument calibration** - *Please submit the calibration certificate for the bench top nitrate/nitrite instrument.*

Attached as Appendix G.

12. **UVT analyzer verification method** - *Please investigate if a standard for verification for UVT is available. Please submit the standards and procedure for verification if a standard is commercially available. If one is not available, please submit a procedure for an alternative verification method that is allowed by the vendor.*

The online UVT analyzer does have a calibration procedure as documented in the Trojan UV O&M manual. In order to check the accuracy of the Online UVT, the measured value would need to be compared with a laboratory measurement using a Spectrophotometer at 254nm (Hach DR5000 or equivalent).

13. **On-line temperature and pressure sensor calibration** - *Please submit a procedure for calibrating the on-line temperature and pressure sensors. Include the frequency of calibration.*

The District has arranged for annual or as required calibration of the instruments throughout the facility. First calibration visit is to occur after January, 2014, or when the first available opening occurs with the calibration company.

14. **Temperature and pH measurements during a CIP** - Please submit a procedure for measuring and adjusting, if necessary, the temperature and pH during a CIP.

The membrane manufacturer's CIP monitoring recommendations are attached as Appendix H.

15. **Flow meters** - Please provide calibration records for each flow meter with the flow meter clearly labeled. Please include flow meters that measure flow into the CRMWD reclamation facility, into each MF unit, the MF backwash, the combined MF filtrate, the RO concentrate, the UV influent and the CRMWD product water.

Please find the calibration records attached as Appendix I. Note a common meter is used for MF influent and backwash for each skid and the combined filtrate flow is determined by summing the two skids. The UV influent is calculated as the sum of the permeate flow from the two skids.

16. **Plant operation manual** - Please submit a complete copy of the plant operations manual to include all shut down conditions and other requirements per the April 11, 2013 TCEQ letter.

The draft plant operation manual is attached as Appendix J.

17. **Backflow prevention** - Please provide the completed test and maintenance report form for the backflow prevention assembly on the domestic water line to the CRMWD reclamation facility.

The backflow prevention assembly has been successfully tested, as documented in Appendix K.

18. **Tracking maintenance or replacement activities** - Please provide the procedure or method that will be used to track equipment maintenance and replacement activities.

Plant superintendent will keep a written record of all equipment maintenance and replacement activities in a log book provided. It is required by all CRMWD supervisors and superintends to keep written maintenance logs.

19. **WWTP treatment** - The treatment being provided by the City of Big Spring WWTP is somewhat different than the treatment used in the pilot study. Please provide a description of the unit processes currently used at the WWTP and any future modifications that are currently planned.

A current description is attached as Appendix L.

20. **Labeling** - Please attach pipeline labels to the appropriate pipes. TCEQ also suggests adding flow arrows. Please submit photographs showing the labeling.

Comprehensive pipe labeling has been completed, as illustrated in the attached representative photos (Appendix M.)

21. **Potential contamination and backflow issues** - The spent water piping from MF membrane racks and the overflow for the MF filtrate storage tank both discharge into a

manhole that collects and returns water to the WWTP by gravity flow. Since the outlets of these pipes are below grade and open, there is a possibility of backflow into the MF units and a potential for insects and small animals to enter the overflow pipe for the MF filtrate tank. Please explain how this piping configuration will not result in backflow or contamination of the MF filtrate or describe what procedure or monitoring will be initiated to assure no backflow or contamination has occurred.

The discharge ends of the Break Tank overflow and the MF backwash lines have been equipped with duckbill check valves, as seen in the photo in Appendix N. Hydraulically, the systems are protected by their relative elevation. The Break tank overflow is at elevation 2411.00, compared to the manhole rim elevation of 2392.50. The MF backwash line exits the skid at approximately 2394.00 which is also above the top of the manhole in question. It is calculated that 0.35 psi, or 0.8 ft. of water head are sufficient to raise the 200-lb. manhole lid, therefore the maximum surcharge condition is still below the backwash line. The MF backwash is further protected by a valve which is only opened during the backwash step.

22. ***Separation distances*** - Please provide both the horizontal and vertical separation distances between the domestic water and any other underground piping within 9 horizontal feet of the domestic water piping.

The domestic water line does not run parallel to other piping at the site, but does cross the source water piping at several locations. The vertical separation is estimated to be 2 feet, with the domestic line above the source water lines. All piping is pressure-rated PVC and the source water piping is limited in pressure to the water level in the Source Water Tank, a maximum of about 20 feet (8.7 psi) relative to the domestic piping elevation.

23. ***NSF certification*** - Please provide the ANSI/NSF certification for the hydrogen peroxide and the anti-biofoulant.

NSF certification for the hydrogen peroxide is attached as Appendix O. In consultation with Pall Corporation, the use of anti-foulant has been discontinued. Periodic caustic cleaning cycles will be performed as needed for control and removal of biofoulants.

24. ***Hydrogen peroxide day tanks*** - During the site visit, TCEQ noticed there was no hydrogen peroxide day tank. Please indicate if it is your plan to provide a day tank or submit the additional control measures that will be enacted to assure no over- or underfeeding of hydrogen peroxide. If CRMWD does not feel additional control measures are necessary for this chemical, please provide a justification.

Trojan has found that the diaphragm feed pumps for hydrogen peroxide are highly accurate as long as they are not air-locked and they provided a King Rotameter with a zero flow detection switch to confirm that there is flow when a given pump is running. They noted the use of a day tank does not directly solve the over or under feeding of hydrogen peroxide, it just limits the problem to the time period of a day.

25. **Hydrogen peroxide bulk storage tank** - *The hydrogen peroxide bulk storage tank had a double wall design for spill containment, but the tank has bottom penetration. Please explain how the design prevents accidental chemical spills or what measures will be taken to assure that spills from this tank are contained.*

The hydrogen peroxide pumps work most reliably with a flooded suction which is why the pump supply line is taken from the bottom of the tank. The vacuum created by a top draw feed to the pumps would increase off-gassing and could increase the incidence of pump air lock. The pump suction line is sealed to the inner tank by a stainless steel flanged bulkhead fitting with peroxide resistant gaskets on each side of the tank wall. The seal on the outer tank is also with a flanged stainless steel bulk head fitting that uses peroxide resistant gaskets on each side of the tank wall. This is a standard design for the hydrogen peroxide industry and meets industry safety guidelines for hydrogen peroxide storage. Attached in Appendix P is a general drawing of the 7800 Gallon tank similar to the Tank provided for the Big Spring system. Refer to the "SS Flex Hose Assembly" and the "Leak Inspection Port Assembly" details for how the seal is made. Also attached is a document "112243-Peroxide Tank suction Line seal detail.pdf" with picture of similar installations showing how the seals are made.

26. **Chemical tank labels** - *Please assure that the labels are applied to the chemical tanks and provide photographs.*

Tank labeling has been completed, as illustrated in the attached representative photos (Appendix Q).

27. **Sulfuric acid spill containment** - *Please assure that the sulfuric acid day tank is provided with spill containment and provide photographs.*

The sulfuric acid day tank has been replaced with a double-wall tank, as illustrated in the attached photos (Appendix R).

28. **Sodium bisulfate spill containment** - *Please provide spill containment for the sodium bisulfate day tanks or submit a request for no spill containment with justification.*

The sodium bisulfite day tanks have limited spill hazard due to the size of the tanks and the configuration of the building. If a spill does occur from either tank, drainage will be to the pipe trench, allowing controlled clean-up to occur. The nature of the chemical is such that it does not pose a severe hazard to personnel or property.

29. **EFM procedure** - *Please provide a detailed description of the current enhanced flux maintenance (EFM) procedure for the MF membranes.*

The current EFM procedure from Pall Corporation is included in Appendix H.

30. **MF average daily flux**- *Please submit a copy of the report showing that the average daily flux has been incorporated into the reports.*

November MOR is attached showing average daily flux included (Appendix A).

31. **RO CIP tank-** *Please provide drawings and/or photographs showing the permeate return location near the CIP feed/recirculation pumps. Please explain how this connection is not a cross connection and how it protects CIP liquid from entering the permeate lines.*

Block and bleed valve protection is provided between the CIP recirculation pump and the permeate supply as shown on the attached sheet 10 from the Pall P&ID drawings (Appendix S).

32. **Hinged flap valve on the product water tank** - *Please send photographs of the reassembled hinged flap valve on the product water tank overflow.*

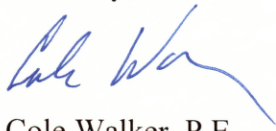
The flap valve has been reinstalled as illustrated in the attached photos (Appendix T).

33. **April monthly operating report** - *The April monthly operating report had not been submitted at the time of the visit. It was submitted on June 3, 2013. Please assure that each monthly report is submitted by the 10th of the following month.*

Agreed.

If you have any questions, please feel free to contact me at (432) 267-6341.

Sincerely,

A handwritten signature in blue ink, appearing to read "Cole Walker", with a stylized flourish extending from the end.

Cole Walker, P.E.
Assistant General Manager - Operations