

From: David Sloan
Sent: Fri, 8 May 2015 15:16:47 +0000
To: Linda Brookins
Cc: Marlo Berg; Jennelle Crane; Karen Smith; Joel Klumpp; Cari-Michel Lacaille; Eria Harvey; Russell Schreiber (russell.schreiber@wichitafallstx.gov); Daniel Nix (daniel.nix@wichitafallstx.gov); Mark Southard (mark.southard@wichitafallstx.gov); Shawn Garcia; Vera Poe
Subject: RE: Wichita Falls Request to Blend Lake Kemp water with DPR
Attachments: Comments & Proposed Edits to 5-5-15 draft WF Exception.docx, Siemens OEM Resistance.pdf
Importance: High

Linda: Thanks again for the priority review of the request to blend Lake Kemp water in Wichita Falls' DPR program, and the opportunity to review the draft version of the approval letter and enclosures. (Thanks to Joel also for the revised version of Enclosure A, which was much easier to read.)

City staff and I have reviewed the proposed documents and they are generally consistent with the intent of our request. We do have a number of suggested clarifications and requested adjustments, as noted in the attached document. Please contact me or Russell Schreiber if further clarification is needed.

Best regards,

DAVID SLOAN / FREESE AND NICHOLS, INC.

From: Linda Brookins [mailto:linda.brookins@tceq.texas.gov]
Sent: Tuesday, May 05, 2015 5:58 PM
To: David Sloan
Cc: Marlo Berg; Jennelle Crane; Karen Smith; Joel Klumpp; Cari-Michel Lacaille; Eria Harvey; Russell Schreiber (russell.schreiber@wichitafallstx.gov); Daniel Nix (daniel.nix@wichitafallstx.gov); Mark Southard (mark.southard@wichitafallstx.gov); Shawn Garcia; Vera Poe
Subject: RE: Wichita Falls Request to Blend Lake Kemp water with DPR

David,

In response to the requests in your emails dated March 10 and April 30, 2015, please see the attached draft TCEQ conditional approval letter and enclosures. Our letter and enclosures address changes to the City of Wichita Falls Direct Potable Reuse (DPR) project, including:

- Final conditional approval of the ultraviolet light (UV) disinfection system;
- Conditional approval of the use of Kemp water as a source for the DPR project;
- Revised contact time (CT) study approval letter for the Cypress Temporary DPR Water Treatment Plant; and
- Necessary amendments to our August 5, 2014 conditions of approval for the DPR project to reflect the UV disinfection system and new source. [The highlights within the letter represent the changes made to the August 5, 2014 conditions based upon the city's latest request.](#)

In response to comments from the City during our April 30, 2015 teleconference, we have amended our conditional approval of the phased approach to incorporate water from Lake Kemp by shortening the minimum required duration of your originally proposed Phase 2 from two months to 30 days. We understand the City's concern that the faster they can utilize water from Lake Kemp, the faster they can transition away from their current level of reliance on Lakes Arrowhead and Kickapoo.

Please review the draft letter and enclosures. Per the City's request, our review of your submittals was expedited and we are committed to getting the final version of this letter and enclosures to the City as soon as possible.

Please let me know if you have any questions.

Sincerely,

Linda Brookins, Director
Water Supply Division
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087
(512) 239-4625

From: David Sloan [<mailto:DWS@freese.com>]

Sent: Thursday, April 30, 2015 5:59 PM

To: Joel Klumpp; Linda Brookins

Cc: Russell Schreiber (Wichita Falls); Daniel Nix (Wichita Falls); Mark Southard (mark.southard@wichitafallstx.gov); Shawn Garcia

Subject: FW: Wichita Falls Request Amendment

Importance: High

Joel & Linda: On behalf of the City of Wichita Falls, we appreciate your team's priority review of the City's request to incorporate blending of Lake Kemp water into the City's current DPR operation. It was very helpful to have the discussion this afternoon regarding the planned contents of TCEQ's modified approval. As we considered the impact of the increased time frames for Phase 1 and 2, it became apparent that the relief to the City's reliance on Lakes Arrowhead and Kickapoo would be later than hoped, even with the timely approval which now appears imminent.

We therefore respectfully request that the City be allowed to resume operation of the DPR facility at its current flow of 7.5 MGD following the first month of Phase 2. This will allow up to 7.5 MGD of effluent from River Road WWTP to be transferred and treated through the 2008 membrane facility along with up to 3.75 MGD of raw water from Lake Kemp, producing up to 7.5 MGD of RO permeate with UV disinfection. This would be blended with at least 2.5 MGD of water from the Secondary Reservoir (Arrowhead/Kickapoo) to comply with the maximum contribution from River Road effluent. We note the following in support of this approach:

1. This approach will allow testing the most challenging blend (50% reclaim/50% Lake Kemp) in the membrane facility for the first 2 months.

2. As effluent contribution returns to the current amount, the salinity of the raw water blend will decrease.
3. This will allow the City to resume maximized use of their available effluent, as they have successfully for the past 10 months.
4. TCEQ will retain its oversight of the facility performance before approving the final, more flexible operation proposed as Phase 3.

Please contact me if you have any questions regarding this request.

Best regards,

DAVID W. SLOAN, P.E., BCEE
SENIOR PROCESS ENGINEER
BOARD CERTIFIED ENVIRONMENTAL ENGINEER

From: David Sloan [<mailto:DWS@freese.com>]

Sent: Tuesday, March 10, 2015 11:50 AM

To: Joel Klumpp; Vera Poe

Cc: Russell Schreiber (Wichita Falls); Brad B. Castleberry (Lloyd, Gosselink); Daniel Nix (Wichita Falls)

Subject: Wichita Falls Request to Blend Lake Kemp water with DPR

Joel & Vera:

Attached is the submittal package for the Wichita Falls Lake Kemp supply integration, as we discussed at our meeting in your offices in January. We are also providing 3 hard copies by mail. Included are the following:

1. Transmittal letter.
2. Sealed Engineering Report.
3. Updated CT studies (for River Road WWTP source and Headquarters Road PS source [Lake Kemp])
4. Proposed Modifications to DPR Conditions (with explanatory comments)
5. Plans & specs submittal review form
6. Supplemental pump station drawings
7. Pump specification

As noted in the transmittal letter, the City is eager to incorporate this source and would welcome a meeting with your staff to discuss this and work out any details. Please contact me if there are questions regarding the attached documents or the overall plan.

Best regards,

DAVID W. SLOAN, P.E., BCEE
SENIOR PROCESS ENGINEER
BOARD CERTIFIED ENVIRONMENTAL ENGINEER



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**Wichita Falls Temporary Cypress Direct Potable Reuse Project
Modifications Using Lake Kemp Water as an Additional Source**

Plan Review Log No. P-04232015-159

Wichita Falls/Freese and Nichols, Inc. Proposed Edits

May 8, 2015

Letter

1. Page 2, 3rd paragraph of Project Description: Appears to be typo, should be MF rather than MR in 2nd line.
2. Page 3, Phase 1, 5th sentence: "This ~~8-MGD~~ blend will be treated...." Request deleting flow as City may need to treat up to 10 MGD (using additional Secondary Reservoir water) through 2010 plant.
3. Page 3, Phase 2A, 4th sentence: end of sentence, after "...from the Secondary Reservoir" suggest adding "and treated using the existing conventional 2010 SWTP prior to entering the distribution system." Suggested for consistency with other similar descriptions.
4. Page 3, Phase 2A. Comment: We appreciate the recognition of long lead time for receipt of virus results, and are hoping this language indicates flexibility for TCEQ to authorize proceeding to Phase 2B without this information if other results are favorable.
5. Page 4, Weekly Reporting Requirements, 1st Bullet: We are assuming the log removal credits for the temporary DPR WTP and the 2010 WTP are those directly related to disinfection CT credit, as the other log credits relate to items in the subsequent bullets.
6. Page 4, Monthly Reporting Requirements, last Bullet: We respectfully request substitution of calculated Resistance as recommended in the attached excerpt from the Siemens O&M Manual for the microfiltration system, in lieu of "pinning activity". This parameter is recommended by the manufacturer and U.S. EPA as an indicator of membrane performance and health and is already in use to assess need for CIPs or other operational measures. Our experience at this facility indicates that increased pinning activity is more closely correlated with cleaning events than feed water quality, and has not been particularly helpful in assessing membrane conditions.

Enclosure A

7. Page A1, Exception 1, 2nd paragraph: Duration not found in cover letter. We assume the February 29, 2016 is still the governing date as indicated by letter dated March 10, 2015.
8. Page A8, Condition 16a: Lake Kemp valve must be opened; we recommend deleting this provision entirely or modifying to require closure only when Lake Kemp is not in use.
9. Page A9, Condition 23a: "5" omitted from GST volume.
10. Page A10, Condition 24l: Although the flow calculation terms are primarily used from the material submitted with our request, potential confusion has been identified and we now suggest using the term "RRWWTP effluent" or simply "effluent" in lieu of "DPR" in the calculation equations and the opening sentence of the paragraph. This is suggested for consistency with language in the letter and with the flow metering description.
11. Page A13, Condition 33d: Similar to item 10 above, suggest using "effluent" in lieu of "DPR".

12. Page A13, Design Requirements: Suggest reference to construction approved by April 24, 2015 letter.

Enclosure D

13. Page D1 & D6, **bold letter sentences**: Our understanding is that the CT study for the DPR facility only applies during the DPR operation and does not replace previously approved CT studies for normal operation. As such, we would expect current CT studies for the conventional and membrane plants to remain applicable when normal operations resume. We see no need to resubmit these studies.

4 CALCULATIONS

4.1 RESISTANCE

4.1.1 CALCULATION METHOD AND DEFINITION

While the CMF-S Cell is producing filtrate, the PCS calculates the Resistance to filtration flow. To do this it uses the average filtration pump flow rate (in liters per second), the average TMP (Trans-membrane Pressure, in kPa) and the water temperature (in degrees Celsius). Resistance, therefore, not only uses the increase in TMP in determining the need for a backwash or a CIP sequence, but also takes changes of filtration flow rate and feed temperature into account.

Average values of filtration flow rate and TMP are calculated by the PCS. One reading of each instrument input is taken each second. The thirty most recent values are then added together and the sum divided by thirty for a moving average of the reading, updated once per second. Averaging is done to smooth slight fluctuations in flow and pressure.

The temperature reading is used to correct for viscosity change. As the feed temperature drops, its viscosity increases and the TMP needed to maintain the flow rate therefore increases.

The standard engineering Cell that Memcor has defined for Resistance is m^{-1} (refer to the Memcor Sourcebook for more detailed information). However, because the resulting value is a very large number, it is divided by 10 giving a value typically in the range of approximately 1 – 100. This is the value displayed on the operator interface simply as “Resistance”. The equation used by the PCS for the calculation of Resistance is as follows:

$$R = \frac{TMP \times N \times A \times 10^{-3}}{\eta \times Q}$$

Where: R is the resistance ($10^{12} m^{-1}$);

TMP is the average Transmembrane Pressure (kPa);

N is the number of S10V Modules filtering;

A is the surface area of each sub-module (m^2);

η is the viscosity of water at the feed temperature (Cp);

Q is the average filtration flow rate ($L.sec^{-1}$).

Note that N, the Number of Modules, refers to the number of active S10V sub-modules that are filtering. If module filtrate isolation valves are shut off during servicing, the number of active modules in the cell needs to be adjusted. Module surface area is the actual membrane filtration surface area of each S10V sub-module and is defined as 31.090 m² for S10V sub-modules.

The viscosity of water for temperatures between 0° C and 40° C is calculated from the following equation:

$$\eta = 10^{\left[\frac{1301}{998333 + 8.1855(T-20) + 0.00585(T-20)^2} - 1.30233 \right]}$$

Where: η is the viscosity of water at the specified temperature (Cp) and,

T is the feed temperature (deg C)

4.1.2 SAMPLE RESISTANCE CALCULATION

A 448S10V is filtering water at 18° C. The average value of Filtration Flow Rate is 170.0 L/s and the average TMP is 55.0 kPa. No sub-modules have been isolated. The resistance is calculated as follows (with water viscosity of 1.053 Cp at 18 deg C):

$$R = \frac{55.0 \times 448 \times 31.09 \times 10^{-3}}{1.053 \times 170} = 4.08 [10^{12} \text{ m}^{-1}]$$