



## CORRECTIVE ACTION PLAN

AFIN: 21-00045      NPDES Permit No. AR0033987  
Dumas WWTP  
Dumas, AR 71639

February 7, 2023

The Dumas WWTP consists of headworks, and four lagoon cells. The wastewater emanating from the headworks enters the first cell that is “completely” aerated, then flows in series to the rest of the cells. The last two cells have less air to allow settling to occur before disinfection. The wastewater from the last cell flows to a concrete-built compartmentalized unit to allow plug flow regime. The chlorine is dosed at the beginning of the compartmentalized contact unit and dechlorinated at the effluent end. The effluent end of the contact chamber is aerated before discharge to a receiving stream.

Recently, Dumas WWTP has witnessed violations of certain parameters limited in its NPDES permit. Such violations of parameters span from 2020 to 2022, and the parameters were total residual chlorine, and pH. The total number of excursions was ten (10). The total residual chlorine (TRC) had 9 violations, whereas only one pH excursion over the period cited herein.

The violation pH was 9.5 and the required permit limit was 9.0. While this is a one-time event, there seems to be a pattern of pH trend prior to the occurrence of the pH violation. The DMRs from January 2020 to December 2022 were examined. In general, the maximum pH of the effluent fluctuated between 7.4 and 7.9, but on a few occasions the pH maximum ranged up to 8.3 from January 2020 to February 2022. On March 2022, the effluent pH maximum rose steeply and continued to be high relative to the preceding pH before the March 2022 episode. The monthly pH increases culminated in the violation of the pH in the month of August 2022. A summary of the effluent pH maximum from March to December 2022 is presented below.

<u>Date</u>	<u>Effluent pH maximum</u>
March 2022	8.80
April 2022	8.40
May 2022	8.60
June 2022	9.00
July 2022	8.50
August 2022	9.50
September 2022	8.10

Date	Effluent pH maximum
October 2022	7.52
<u>November</u>	<u>7.73</u>

As can be seen, the effluent pH maximum fluctuation returned to normal after the excursion in the month of August 2022. The normal return started September 2022. It is possible that there could be some commercial and/or industrial entities discharging high pH substances into the sewer that ultimately wound up in the wastewater treatment plant during those periods of increasing pH levels. The buffer capacity of the wastewater was unable to surmount the increasing pH levels resulting in the pH excursion.

In total residual chlorine (TRC) circumstances, the reported DMR values seemed to be inconsistent as regards to the number of significant figures. The permit limit for effluent TRC is 0.028 indicating two significant limits. The reported TRCs in the DMRs were sometimes two significant figures, and in several occasions one significant figure.

The number of significant figures in the reporting effluent values should be identical to the number of significant figures in the permit limit. This is very important because lesser number of significant figures would erroneously lead to a violation when the reporting value is essentially close to the permit limit value. For instance, on December 2021 and March 2022, the reported TRC value was 0.03 against 0.028, the permit limit. The reported value might had been 0.028, 0.027 or 0.026, but seemed rounded off to one significant figure (0.03).

Nevertheless, there were several instances in which the reported values were considerably over the prescribed permit limit. The probable cause of the excursions in those circumstances might had been inadequate sulfur dioxide or failure to add sulfur dioxide at all. The reaction of sulfur dioxide with the total residual chlorine is nearly instantaneous such that dechlorination is complete within 10 seconds. It does not require a separate dechlorination chamber.

In addition, excess chlorine would not be necessary due to the chances that there might not be considerable quantities of bacteria in the treated wastewater based on the detention time. The system detention time at a design flow rate of 1.37 MGD was 64 days. However, the average daily flow from January 2020 to December 2022 was 0.643 MGD. This translates to system detention time of 137 days, which is significant. This implies that considerable number of bacteria might even die before reaching the contact basin. Thus, it would require lower dosages of chlorine.

Based on the preceding, the following milestones have been formulated.

<b>Activity</b>	<b>Milestone Date</b>
1. Finding commercial entities that occasionally discharge high pH materials to the sewer lines	Mar 1 – Aug 2023
2. Studying how to determine the exact amount of chlorine needed to produce the permit limit for coliform	Mar 1 to Sep 30, 2023
3. Matching properly residual chlorine dosages with sulfur dioxide dosages.	Mar 1 to Sep 30, 2023
4. Monitoring of influent and effluent fecal coliform during the investigations (2 to 3)	Mar 1 to Sep 30, 2023

**Final Compliance Deadline and Final Report**

**December 31, 2023**

Quarterly reports would be provided upon approval of the CAP by Arkansas Division of environmental quality (DEQ).