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14 July 2017

Ms. Jacqueline Trotta
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

**RE: Permit Number AR0021466
 AFIN 17-00059**

Dear Ms. Trotta:

In response to your June 12, 2017 request for a Corrective Action Plan, the CAP is enclosed addressing corrective actions for the Alma, Arkansas Wastewater Treatment Facility.

Thank you for your review and any comments you have.

Sincerely,

Mark Gross, Ph.D., P.E.

Morrison-Shipley Engineers, Inc.

cc: Mark Yardley, Alma Public Works director

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Bentonville, AR 72712
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CORRECTIVE ACTION PLAN

For the

Alma Arkansas Wastewater Treatment System

Permit Number AR0021466

AFIN 17-00059

Prepared for:

The City of Alma Arkansas Public Works

811 Fayetteville Avenue

Alma, AR 72921

Prepared by:

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July 2017



General

This Corrective Action Plan (CAP) was prepared on behalf of Alma Arkansas in response to a request dated June 12, 2017 from the Arkansas Department of Environmental Quality (ADEQ). Specifically, the request is related to exceedances during the period from June 2012 through April 2017. The exceedances were for 5-day Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS).

Treatment System Permit Exceedances

The treatment system has exceeded the permitted effluent limits at times over the past five years. Exceedances include BOD₅ and TSS. The BOD₅ exceedances range from 30.7 mg/L to 66.5 mg/L compared to the discharge limit of 30 mg/L. The TSS exceedances range from 45.7 mg/L to 94.3 mg/L compared to the permit limit of 45 mg/L.

In 2012, the TSS and BOD₅ limits were exceeded from June through December.

In 2013, the BOD₅ limit was exceeded in November, and the TSS limit was not exceeded in 2013.

In 2014, the BOD₅ limit was exceeded in October, and the TSS limit was exceeded in March

In 2015, The BOD₅ limit was exceeded in November and December, and the TSS limit was exceeded in October

No exceedances were indicated for 2016

In 2017, the BOD₅ limit was exceeded in March and April, and the TSS limit was exceeded in April

The table below indicates the timeline for the permit limit exceedances indicated by the June 12, 2017 letter from ADEQ:

Year	Jan	Feb	Mar	Apr	May	June	July	AUG	Sept	Oct	Nov	Dec
2012						BOD ₅ TSS	BOD ₅ TSS	BOD ₅	BOD ₅ TSS	BOD ₅ TSS	BOD ₅ TSS	BOD ₅ TSS
2013											BOD ₅	
2014			TSS							TSS		
2015										TSS	BOD ₅	BOD ₅
2016												
2017			BOD ₅	BOD ₅ TSS								

Evaluation of the Existing Treatment System

The existing treatment process includes an influent solids-removal screen, Parshall flume, and 3 lagoons followed by optional chlorination and dichlorination with effluent flow measuring and discharge to the Arkansas River. The discharge is in Hydrologic Unit Code 11110201 and reach #016. The first cell of the initial lagoon is designed to perform as complete mix, with the following 2 cells operating as partial-mix cells. The following lagoon operates as a facultative lagoon according to the permit. The third lagoon is operated as a facultative lagoon. A fourth

lagoon which is not part of the process is used as an equalization basin. The system design flow is 1.75 MGD.

Additives are used in an effort to enhance the system performance. A bacterial additive is used. The additive is known as B.E.F and is manufactured by the Heussner Company in Bruceville, Texas. The additive is introduced at the head of the treatment system at a rate of one pound per day.

Earthtec® algaecide is applied by spraying from the levees of the lagoons at no more than 220 gallons per day as approved by the Department in June of 2014.

The pH is monitored and sulfuric acid is used to adjust the pH when the pH becomes too basic. The goal is to keep the pH near neutral.

Liquid alum (48.5% aluminum sulfate by weight) is used at a rate of approximately 25 gallons per day and is introduced between the first two lagoons in an effort to precipitate phosphorus.

During the initial visit on June 20, 2017, the aeration in the first cell of the first pond appeared to be inadequate to provide a complete-mix process. Aerators in the second lagoon were not operating.

The final lagoon appeared to have a high concentration of algae.

The City of Alma has analyzed the algae types in an effort to move toward a solution for eliminating the algae and hopefully reducing the TSS and suspended BOD₅.

Alma has also contacted Triplepoint Environmental of Oak Park Illinois to investigate the use of an ultrasonic algae control device in an effort to eliminate the algae in and around the discharge from the final lagoon. Discussions are continuing regarding the necessary testing and analysis to evaluate the ultrasonic device in a pilot test.

Planned Corrective Actions

Some investigation will be conducted into the system performance and into why, after a year of being in compliance the system exceeded limits in March and April, 2017.

The aerators will be put into service to create complete-mix in the first cell of the first lagoon.

Additional aeration will be studied and if feasible, the aerators in the second lagoon will be activated with prior notice to ADEQ so that the facultative lagoon (as permitted) could be operated as partial mix.

Additives will be evaluated for correct dosages and usage.

Discussions will continue with Triplepoint Environmental to collect and analyze additional samples to evaluate the ultrasonic algae control device. If the manufacturer agrees, a pilot test will be conducted to determine the efficacy of the ultrasonic device. The manufacturer has suggested that modifications may be required at the outlet end of the final lagoon to create optimum conditions for the device to be effective. Particularly, the manufacturer has suggested (but not required) that a baffle curtain might be required across the final lagoon.

Timeline

The following timeline is proposed for executing the proposed corrective actions:

Corrective Action	Completion Deadline
Investigate Changes from 2012 through 2017	Completed June , 2017
Restore Aeration in Cell 1, First Pond	September 30, 2017
Collect and analyze samples for Triplepoint Environmental	October 30, 2017
Repair and restore aerators in the Second Lagoon and measure effect	November 30, 2017
Interim Progress Report Number 1	November 30, 2017
Work with Triplepoint Environmental to Pilot Test Ultrasonic Algae Control Device	December 30, 2018
Complete Pilot Test of Ultrasonic Unit	May 30, 2018
Interim Progress Report Number 2	June 30, 2018
Amend CAP if Necessary or Request CAP Closure	July 30, 2018

Following the October, 2017 compliance sampling and DMR and work with Triplepoint Environmental to outline a pilot test procedure, a report will be submitted to ADEQ describing the effectiveness and results of the corrective actions based upon performance following the change in mixing and aeration in cell 1 of the first lagoon. However, since this is a biological system, the effect of corrective actions may not be seen immediately due to the long hydraulic retention time (approximately 20 days) and slow reaction of biomass in response to any changes in the process. The effectiveness of any corrective actions may require several weeks to two months of warm conditions to be observed.

SOURCES

Tchobanoglous, George; Metcalf and Eddy, Wastewater Engineering Treatment and Reuse, McGraw-Hill, 2002

Arkansas Department of Environmental Quality; Permit No. AR0021466 AFIN 17-00059