Crist Engineers, Inc.

205 Executive Court
Little Rock, Arkansas 72205
Telephone (501) 664-1552
Fax (501) 664-8579
www.cristengineers.com

Consulting Engineers

Stewart W. Noland
Leslie B. Price
Matthew D. Dunn
Craig A. Johnson

August 10, 2017

Ms. Bailey Taylor
Enforcement Analyst
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

RE: City of Walnut Ridge
LIS 17-040, AFIN 38-00040, Permit No. AR0046566
Corrective Action Plan

Dear Ms. Taylor:

In accordance with the requirements of the Consent Administrative Order (CAO) LIS No. 17-040 with the Arkansas Department of Environmental Quality dated on May 25, 2017, we submit herewith the Corrective Action Plan.

Should you have any questions regarding this correspondence plan please don't hesitate to contact me at 501.664.1552 or 501.993.2922.

Sincerely,
Crist Engineers, Inc.

Craig A. Johnson, P.E.
Associate

Enclosures: Corrective Action Plan

Cc: Jon Kopp, City Water Works

CORRECTIVE ACTION PLAN

LIS 17-040, AFIN 38-00040, NPDES PERMIT NO.: AR0046566

DATE: AUGUST 10, 2017

PREPARED FOR:

Walnut Ridge City Water Works
216 S.W. 4th Street
Walnut Ridge, Arkansas 72476
www.cityofwalnutridge.com

PREPARED BY:

Crist Engineers, Inc.
205 Executive Court
Little Rock, Arkansas 72205

Crist Project No.: 1635

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SECTION 1

BACKGROUND

1.1 PURPOSE AND SCOPE

The City of Walnut Ridge entered into a Consent Administrative Order (CAO) LIS No. 17-040 with the Arkansas Department of Environmental Quality on May 25th, 2017. Per the Order and Agreement section a comprehensive Corrective Action Plan with milestone schedule is required for submission on or before August 10, 2017.

1.2 BACKGROUND

On May 26th, 2016, a site visit was made to the wastewater treatment facility where an examination was made of the treatment process and a review of microbiological process was conducted. Grab samples were microscopically evaluated at several steps throughout the biological process, including the influent, aeration basin, return activated sludge, and the effluent prior to chlorination. This initial, cursory examination, gave indication of a biomass in stress. Healthy biota of nitrifying and denitrifying bacteria where not readily present, which would substantiate elevated levels of ammonia nitrogen and total suspended solids, as well as, present a potential presence of quaternary ammonium compounds (Quats). Quats have a biocidal effect on wastewater which have common uses in disinfectants, sanitizers, and surfactants. Quats are strongly cationic that attach to both organic and inorganic compounds and have a long lasting biocidal effect. Common sources are hospitals, restaurants, and nursing homes where strong disinfectants are commonly used.

As an initial evaluation, grab samples where obtained at a point in the collection system, influent, aeration basin, and the return activated sludge on the day of the site visit. These samples were tested for Quats. The results of the Quats testing became available on June 7, 2016. Results ranged from 2.0 at the effluent to 12.83 mg/L in the return activated sludge. Nitrification inhibition for Quats occurs at 2 to 5 mg/L; therefore we can surmise that current levels are having an inhibitory effect on the biomass. Based upon ongoing plant performance and the microbiological activity, a more thorough determination of Quats should be initiated. In light of these cursory results and the sublethal test failures, a broader scope needs to be developed for a corrective action plan with an achievable milestone schedule. The City of Walnut Ridge is monitoring pH and alkalinity, and is feeding caustic in an attempt to air strip the Quats by raising the biomass pH with caustic.

A review of the effort to date was conducted September 2016. At that time, the Department advised the City of Walnut Ridge that a CAO would be proposed due to a pattern of non-compliance on similar permit parameters related to previous CAO's administered in 1995, 2000, 2003, 2007, and 2010.

SECTION 2

PLANNED CORRECTIVE ACTIONS

2.1 CURRENT STATUS

The City Water Works will initiate a study by a registered, licensed engineer to perform an evaluation of the wastewater water treatment system and a citywide sanitary sewer system. The scope of the project includes compiling wastewater treatment alternatives including alternative discharge locations. In concert with the treatment evaluations the condition of selected sewer gravity lines will be evaluated by conducting a sanitary sewer evaluation study (SSES) which will be submitted under separate cover as required by the consent administrative order. Ultimately, a Capital Improvement Plan will be outlined to incorporate projects over a period time. An evaluation of the current sewer rate structure with funding alternatives will be considered.

2.2 TREATMENT

Historically, inhibition of nitrification has been as issue at the WWTP. Primarily, the cause of the inhibition has been two-fold; the presence of Quats, and the inability to sustain biomass during wet weather events, with the latter being more prevalent. Wet weather treatment and compliance has been an inherent problem over the past 15 years. The increase in flow during the rain events removes total suspended solids (TSS) containing biochemical oxygen demand in the biomass causing a degradation of the effluent quality by exceeding TSS permit requirements eight times, carbonaceous biological oxygen demand six times, and ammonia nitrogen 27 times from January 1, 2013 to January 31, 2017.

The increase flow during wet weather occurrences reduces the solids retention time and solids in the biomass whereby limiting nitrification of the ammonia nitrogen. This degradation of effluent quality further exacerbates toxicity compliance for the receiving stream where six violations occurred. Violations for total residual chlorine and dissolved oxygen were operationally related and have been addressed as noted in correspondence to the Department on May 5, 2015. In total, 68 violations occurred during review period and are documented in the Consent Administrative Order LIS 17-040 executed on May 25th, 2017.

The existing treatment facility was commissioned in 1994. Many components of the facility have reached their useful life and consideration for a thorough rehabilitation effort has been deemed necessary to continue reliable treatment and correct the violations noted in the CAO LIS 17-040. Further, an evaluation should be conducted comparing more reliable and current technologies for treatment including an evaluation of an alternative discharge location, since the current receiving stream has a 100 percent critical dilution of the effluent that requires lethal and

sublethal permit limits for whole effluent toxicity testing. The City of Walnut Ridge will engage a registered, licensed engineer to conduct a study to determine the most cost-effective means to provide reliable treatment for the City of Walnut Ridge. Subsequent to this effort will be the identification of funding alternatives to provide a means to support the capital improvements necessary.

The City of Walnut Ridge understands the necessity for compliance in accordance NPDES permit requirements during the application of the corrective action plan. As such, the following operational and maintenance provisions will be enacted.

Item No.	Corrective Action Description	Target Initiation Date
1.	Caustic Feed System for pH adjustment	Ongoing
2.	Supplemental food source supply to balance food to mass ratio to promote nitrifying bacteria	Ongoing
3.	Conduct operational tests (See Table 2-2)	September 1, 2017

Table 2-1: Treatment Corrective Action Testing

Parameter	Location	Frequency	Sample Type
$CBOD_5$	Influent	Two/week	24-Hr Composite
TSS	Influent	Two/week	24-Hr Composite
NH_3-N	Influent	Two/week	24-Hr Composite
Nitrate-Nitrite	Aeration Basin	Two/week	Grab
pH	Aeration Basin	Two/week	Grab
DO	Aeration Basin	Two/week	Grab
Alkalinity	Influent	Two/week	Grab
Alkalinity	Effluent	Two/week	24-Hr Composite

Table 2-2: Treatment Operational Testing

The purpose of the testing is to help diagnose biological health in the treatment system and ensure that nitrifying bacteria are present. This testing will be on-going throughout the CAO period to assist in the interim abatement of NPDES Effluent Characterization excursions. Additional testing may be required as necessary for operational needs.

As mentioned previously, the City Water Works will employ the services of a professional engineer to begin evaluating treatment and discharge alternatives for permanent abatement of violations identified in CAO LIS 17-040. Outlined in **Table 2-3 – Treatment Milestone Schedule** is the milestone dates set forth. The improvements recommended from the preliminary engineering effort will require funding assistance from state and/or federal agencies; therefore, those

requirements will be identified through this effort and may require adjustment of the milestone schedule due to specific funding program requirements.

Item No.	Corrective Action Description	Target Completion Date
1.	Treatment Corrective Action Testing	Initiate by September 1, 2017 Ongoing
2.	Procurement of Professional Engineer	October 30, 2017
3.	Preliminary Engineering Report	April 1, 2018
4.	Funding Application(s) Approved	June 1, 2018
5.	Plan and Specification Development Complete	November 1, 2018
6.	ADEQ Permit Submission	November 1, 2018
7.	ADEQ Permit Approval	April 30, 2019
8.	Final Compliance	June 1, 2020

Table 2-3: Treatment Milestone Schedule

The preliminary engineering report will be submitted for ADEQ review the next subsequent quarterly report for your records.

2.3 COLLECTION

The City of Walnut Ridge will compile available maps and incorporate a GIS map system of the existing sewer system annotating manholes, line size, force mains and pump stations. An overall drainage subbasin map will be developed. The basin map will be utilized to assist in the determination of an adequate sanitary sewer evaluation study (SSES).

The SSES will be conducted in a phased approach by basin whereby incorporating the following elements.

Item No.	Corrective Action Description
1	Perform smoke testing in all areas of the collection system, beginning with highest priority areas
2	Perform televising of lines in areas deemed necessary based on smoke testing in order to locate leaks and to determine method of repair
3.	Develop a plan to address deficiencies through rehabilitation, repair, or replacement
4	Develop a manhole inspection program, beginning in highest priority area
5	Recommend a method of repair and develop a cost estimate for repairs

Table 2-4: Collection System Corrective Action Schedule

The SSES will include an SSO Plan with milestone schedule that details the steps necessary to implement corrective action via a system evaluation assurance plan that will be developed to include discussion of specific topic area including supporting information and exhibits: Executive Summary, System Description, Methodology, Inflow and Infiltration Reduction, Recommended Capital Improvements, Schedule of Improvements. The Schedule of Improvements will further outline recommendations of capital project needs to abate sanitary sewer overflows.

The SSES will be submitted to ADEQ on or before October 10, 2017. The milestone schedule to abate the SSO's will be listed in the SSES and SSO Plan due to ADEQ on April 10, 2018. The current milestone schedule of the collection system is as follows.

Item No.	Corrective Action Description	Target Completion Date
1	GIS Sewer Map Network	August 31, 2017
2	SSES Developed	October 10, 2017
3	SSES and SSO Plan	April 10, 2018

Table 2-5: Collection System Milestone Schedule