CITY CORP
RUSSELLVILLE WATER & SEWER

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Pollution Control Works (PCW)
Permit No: AR0021768

Interim Operating Plan

August 12, 2022

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Table of Contents

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A. INTRODUCTION

This Interim Operations Plan is prepared to assist City Corporation's Pollution Control Works (PCW) staff to operate the Wastewater Treatment Plant and is part of the requirements of the Arkansas Department of Energy and Environment, Division of Environmental Quality's Consent Administrative Order issued July 26, 2022.

Included in this document are an overview of the facility, process components, sampling plan and the general operational approach.

The overall objective of the facility is to operate as efficiently as possible while ensuring continuous compliance with NPDES permit requirements. This plan is intended to assist operations staff with operations during normal flows and loading. Unusual loading and/or plant upsets require additional operational steps and are not included in this plan. Any changes to this plan during the noted challenges will be determined by the operations director along with the assistance of the design engineer to ensure proper steps are taken to minimize impact to the plant.

B. FACILITY DESCRIPTION:

The Russellville Wastewater Treatment Plant was originally built in 1963. The plant has been expanded to the current facility which is an activated sludge design that includes screening at the headworks, grit removal, primary clarification, aeration basins, final clarification, and disinfection before discharge into Whig Creek. The facility is currently under construction to address the ongoing permit violations. The construction consists of removal of the primary clarifiers, conversion of one primary basin to an anaerobic selector, addition of a fourth aeration basin, new turbines for all aeration basins, a new peracetic acid feed system and new disinfection contact basin.

The plant is staffed with four Operators, two Lab Analysts, one Pretreatment Coordinator and the Operations Director. All Operators, one Lab Analyst and the Pretreatment Coordinator all hold class 3 Wastewater Treatment Operator licenses. The Operations Director and the Senior Lab Analyst both hold a class 4 Operator license. City Corporation also has an in-house Engineer and annually contracts with engineering firms that specialize in wastewater.

C. FACILITY OPERATION:

1. Preliminary Treatment:

Bar Screening: The influent screening equipment are Duperon Corporation Flex Rake in channel auto cleaning bar screens. Units are installed in parallel and are five feet wide and an operational depth of five feet. The space between bars is 0.25". Screenings are removed automatically and stored in dumpsters for disposal in a landfill. The normal operation involves both units running but all flow can be diverted to one channel for maintenance or repair of a unit.

Operators check units daily to ensure proper operation. Should issues arise, the operator reports the issue to the Lead Operator who generates a trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

Grit Removal: Grit removal is accomplished by settling in the grit channels. The low velocity channels allow the grit to settle while the influent continues through the Treatment Plant. The grit channels are installed in parallel, and each channel is 22.3 feet long, 14 feet wide and 23.25 feet deep with a flow rate of 24.5 MGD. The settled grit is removed automatically by bucket elevator equipment manufactured by Amwell. The channels are aerated using two centrifugal blowers. Dewatered grit is dumped into dumpsters for disposal in a landfill. Normal operation involves both channels with one blower. Flow can be diverted to one channel for repairs or maintenance of one unit. A second blower can be used in times of excessive nutrient loading.

Operators check units daily to ensure proper operation. Should issues arise, the operator reports the issue to the Lead Operator who generates a

trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

Raw Sewage Lift Station: After screening and grit removal, the influent will flow into the Raw Sewage Lift Station. The lift station is equipped with four Suizer-ABS variable speed 360 HP SCADA controlled pumps. Each pump has a total capacity of 7.2 MGD. Normal operation involves two pumps selected to pump to the plant, one pump designated to pump to the equalization basins if needed and the fourth pump as a redundant for either pumping to the plant or the equalization. Using our SCADA system, a maximum flow to the plant can be programmed and any excess flow about the set amount will be pumped to the equalization basins. The normal max flow is set at 7 MGD and is adjusted as directed by the Lead Operator or Operations Director.

Operators check the Raw Sewage lift station daily to ensure proper operation. Should issues arise, the operator reports the issue to the Lead Operator who generates a trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

Flow Equalization Basins: The facility is equipped with three equalization basins with a total capacity of 20 million gallons. Any influent flow above the max setting programmed in the SCADA system is pumped to the equalization basins for holding until flow to the plant is such that the extra water can be effectively treated. Each basin is equipped with surface aerators to help keep the water mixed and aerated.

Operators check basins daily to ensure proper operation Should issues arise, the operator reports the issue to the Lead Operator who generates a trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

Anaerobic Selector: The Influent flow from the Raw Sewage Lift Station is pumped to the Anaerobic Selector. The selector is a 95 feet diameter circular clarifier with a side wall depth of 11 feet and is equipped with a surface mixer. Activated sludge for the three secondary clarifiers is pumped to the selector and mixed with the raw sewage from the lift station. Normal

flow through the selector is <= 8 MGD. Any flow above 8 MGD is diverted around the selector and pumped directly to the aeration basin flow splitter chamber.

Note: The anaerobic selector is currently offline due to construction in progress at the plant. Once all RAS lines have been installed, the selector will be put online.

2. Secondary Treatment:

Aeration Basins: Flow from the anaerobic selector flows to the aeration basins splitter box where the flow can be directed to any or all four aeration basins. Basins 1 and 2 are 94 feet by 40.25 feet with a sidewall depth of 15.917 feet. Aeration basins 3 and 4 are 127.5 feet by 60.25 feet with a sidewall depth of 15.917 feet. All four basins are designed with an anoxic zone for nitrate removal, alkalinity recovery and filament control. The anoxic zone is equipped with course air diffusers for mixing and SCADA controlled for proper mixing.

The aeration zone is equipped with Sanitaire fine bubble diffusers. Air for the fine bubble system is provided by SCADA controlled variable speed Inovair turbines. The turbines are controlled by the basin dissolved oxygen (DO). The DO is measured with YSI in-basin DO probes. Typical operation is 2.0 mg/L DO. At the end of the aeration zone are internal recycle pumps that pump nitrate rich water back to the anoxic zone.

Aeration basins are checked each day by Operators for proper air flow to entire basin, proper mixing of the anoxic zone and operation of all turbines in use. Should issues arise, the operator reports the issue to the Lead Operator who generates a trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

Secondary Clarifiers: After flow goes through the aeration basins, flow is directed to one of three secondary clarifiers. Clarifiers 1 and 2 have a diameter of 100 feet with a sidewall depth of 12.2 feet. Clarifier 3 has a diameter of 100 feet with a sidewall depth of 16 feet. Activated sludge within the clarifiers are returned to the aeration basin by Fairbanks vertical

centrifugal pumps that are SCADA controlled. The normal return rate is 75% to 100% of the total influent flow. The percentage of return flow is determined by the sludge depth in clarifier, mixed liquor solids (MLSS), and the SRT within the activated sludge system. The depth of sludge, MLSS and SRT are collected and calculated Monday through Friday. The sludge depth is collected on the weekends. All data is recorded in the company's Hach WIMS program.

Secondary Clarifiers are checked each day by operators for proper operation. Should issues arise, the operator reports the issue to the Lead Operator who generates a trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

3. Disinfection:

PAA Bulk Storage Tank: After secondary clarification, flow is treated with PAA and travels through the PAA contact basin. PAA is stored in a 6000-gallon tank and fed by a Lutz-Jesco feed system to maintain a dosage rate of 1 to 5 mg/L with a target residual of 0.5 mg/L. The PAA contact basin is a split design with basin 1 being 249 feet long and 8 feet wide with a total volume of 0.128 MG. Basin 2 is 259 feet long and 8 feet wide with a total volume of 0.133 MG. The basins are designed so that one side can be used during normal flows and both basins can be utilized during higher flows or when extra contact time is needed.

PAA Contact Basin: Flow through the PAA contact basin allows adequate contact time for the chemical to reduce the number of pathogens to a level below the permit limits. After contact time flow is then discharged through outfall 001 into Whig Creek.

PAA system and basins are checked each day by operators for proper operation. Should issues arise, the operator reports the issue to the Lead Operator who generates a trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

4. Solids Handling:

Settled activated sludge in the secondary clarifiers may be used in one of two ways: either returned to the aeration basin as Return Activated Sludge (RAS) or wasted and removed from the system as Waste Activated Sludge (WAS).

Settled sludge from the secondary clarifiers is continually collected by rotating scraper blades at the bottom of the clarifier. The scraper blades push the settled sludge to the sludge sump located near the center of the clarifier where it is removed by the RAS/WAS pumps. Each secondary clarifier has a primary and standby RAS pump. The RAS pumps are SCADA controlled and can be operated in Hand or Automatic. The normal operation for the RAS pumps is in Automatic mode and run as a percentage of the plant influent flow. The normal rate is 75% to 100%. WAS pumps are SCADA controlled and pump the WAS to the aerated storage tanks. The amount of solids to waste is based on the MLSS in the aeration basins, depth of sludge in secondary clarifiers and the calculated SRT. During normal operation, the depth of sludge in the secondary clarifiers is 3 feet with a MLSS between 3000 and 4000 and an SRT between 6 to 10 days.

Once the WAS is pumped to the aerated holding tanks, the sludge is processed through a 3-meter belt filter press. The de-watered sludge then goes through a lime stabilization process using a Schwing/Bioset system that produces Class A biosolids. After biosolids have been air dried and tested for salmonella, it is given away to farmers for land application.

All areas of the solids handling process are checked each day by operators. Should issues arise, the operator reports the issue to the Lead Operator who generates a trouble ticket using the MVP preventative maintenance program. City Corporation maintenance staff will then make the necessary repairs.

D. SAMPLING PLAN:

City Corporation has an onsite lab that is staffed with two full time Laboratory analysts. Both analysts are licensed operators, the Senior Lab Analyst holds a class IV license and the other analyst holds a class 3 license. Our Lead Operator is also fully trained in all duties and served as a laboratory analyst for 7 years before taking the Lead Operator position. The other three Operators have limited laboratory skills and are available to assist with collection of samples and running some of the daily samples required at the facility. City Corporation also uses a contract laboratory for testing of metals, WET testing, Biosolids testing and other test outside of the abilities of our staff. Below is a list of the sampling and tests performed at the facility during a normal day.

Plant Influent: Influent is sampled Monday through Friday using a Isco refrigerated sampler. The sampler is flow paced from the influent flow meter. Tests on the 24-hour composite sample are as follows:

Total Suspended Solids
Biochemical Demand
Chemical Oxygen Demand
Ammonia Nitrogen
Copper (once a month by contract lab)
Zinc (once a month by contract lab)
Mercury (once a month by contract lab)

Tests on the influent from a grab sample:

pH
Alkalinity

Plant Effluent: Plant effluent is sampled Monday through Friday using a Isco refrigerated sampler. The sampler is flow paced from the effluent flow meter. Tests on the 24-hour composite sample are as follows:

Total Suspended Solids
Carbonaceous Biochemical Oxygen Demand
Chemical Oxygen Demand

Ammonia Nitrogen
Nitrate
Copper, Total Recoverable (once a month by contract lab)
Zinc, Total Recoverable (once a month by contract lab)

Tests on effluent from a grab sample:

Fecal Coliform Bacteria
pH
Dissolved Oxygen
Alkalinity
PAA residual
Mercury, Total Recoverable (once a month using four grab samples that are composited in the lab, sent to contract lab)

Once a quarter Chronic WET Testing is conducted by contract lab using 24-hour composite sample.

Additional sampling and testing used for process control:

Monday through Friday the following tests are completed from the aeration basins using a grab sample:

30 Minute settle test
pH
Alkalinity
MLSS
MLVSS

Tests completed from the WAS using a grab sample:
MLSS

All test results are entered into the facilities Hach WIMS database and can be used for trending, graphing and NPDES reporting. The results of all tests are reviewed by laboratory staff, Operations Director and Lead Operator to determine any operational changes.