

CORRECTIVE ACTION PLAN (CAP) MILESTONES

AFIN: 40-00016 NPDES Permit No. AR0040827

ADC Cummins and Varner Units WWTP

Gould, Lincoln County

September 15, 2021

McClelland Consulting Engineers Inc (MCE) visited ADC Cummins and Varner Units' WWTP, and conducted a walk-through of the plant alongside ADC personnel on August 25, 2021. The purpose of the site visit was to perform cursory structural condition assessments of the plant and its operations to address the violations cited in the Arkansas Division of Environmental Quality (DEQ) letter dated August 13, 2021. The specific violations from the period August 1, 2018 to June 30, 2021 were:

- Seventeen (17) violations of carbonaceous biochemical oxygen demand (CBOD₅)
- Fifteen (15) violations of fecal coliform (FC)
- Thirteen violations of ammonia nitrogen (NH₃-N)
- Twelve violations of oil and grease (O & G)
- Eight violations of dissolved oxygen (DO)
- Thirty-four violations of total suspended Solids (TSS).

The ADC Cummins-Varner Units' WWTP is a secondary facility with a design capacity of 0.80 MGD. The secondary facility is a biological system with two separate and identical single-stage oxidation ditches. Each single-stage oxidation ditch (OD) has two secondary settling tanks (SSTs). The oxidation ditches seem to be operating in extended aeration mode. Prior to the oxidation ditch, there are two bar screens; one bar screen is for the raw wastewater coming from the Varner Unit, and the other for the raw wastewater emanating from the Cummins Unit. The Varner wastewater and Cummins wastewater are then combined in a circular basin (equalization basin). In the circular basin, there is a mixer, and air is also being supplied by a blower to the basin. The combined raw wastewater is then pumped to a flow splitting structure, where the wastewater is split into two; one part goes into the Varner oxidation ditch and the other is directed into the Cummins oxidation ditch. It is essential to note that the OD is capable of producing consistent good quality effluent since it provides a large equalization capacity, which substantially mitigates most, if not all, load fluctuations.

Several equipment housed in the different process units were inoperable. The inoperable process unit equipment includes bar screens (Varner and Cummins), RAS/WAS pump, a mixer in the circular basin, and a paddle wheel in the Cummins oxidation ditch. These equipment's were either not functioning or malfunctioning at the time of visit. In either case, it is not helping the

biological reactors. Because of the absence of a paddle wheel or a down rotor of an aerator in a section of the Cummins oxidation ditch, there seems to be insufficient mixing and oxygenation of the mixed liquor.

Prior to the site visit, ADC has made numerous repairs to the plant. For instance, Varner clarifier Numbers 3 and 4 had problems but had been fixed. The telescoping valve for clarifier No.3 was plugged, and the drain valve would not open for wasting due to plugging. After several trials, the telescoping valve was made to work. Clarifier No. 4 had a ceased drain valve, and the valve actuator stem had twisted off resulting in not wasting the sludge temporarily. This has also been fixed. The motor for Varner aerator for its oxidation was burned out, but had been replaced along with the belt.

Cummins clarifier No. 1 has no drain valve designed for the system. The skimmer failed, but has been repaired. Its telescoping valve had been broken loose at the welds and had been repaired several times. Likewise, the telescoping valve for clarifier No. 2 broke loose at the welds and was repaired numerous times. Valve operator stem has deteriorated beyond repair, and a replacement order has been placed.

A 2-inch PVC conduit and a 1-inch PVC conduit had been laid from 208/230 VAC 3 phase panels to a stainless box mounted on the Cummins sludge pump station. Additionally, a two and a half inch (2 ½”) rigid rubber conduit had been laid from 208/230 VAC 3 phase to No. 1 Cummins rotor. There are several other conduits layouts.

The disinfection unit, which is UV radiation, was sometime down due to a lock shaft within the system that was not properly engaged to permit the voltage to come on. Eventually, the UV lights were replaced. During the site visit the effluent observed was poor quality with significant amounts of TSS. This implies that the UV radiation may not be performing well, even though it has mechanically been fixed. In addition, there seems to be no control of mixed liquor suspended solids (MLSS) in the oxidation ditches resulting in the production of unpolished wastewater. That is, excess solids are being carried over the effluent weirs of the secondary settling tanks resulting in the discharge of CBOD₅ and total suspended solids (TSS) that exceed the permit limits. The solids carryover is, in part, the cause of the fecal coliform excursions.

Analysis of the discharge monitoring reports (DMRs) indicates the facility is operating over its design capacity. Data from January 2018 to June 2021 show that the plant is currently operating at 152 percent of the necessary capacity to somewhat maintain continuous compliance of its NPDES permit limits. In essence, the WWTP is approximately 52 percent in excess of that capacity. If one considers that the prison wastewater is usually high or medium strength wastewater coupled with the recent flow reduction emanating from within the prison system and the existing inefficiency of the preliminary treatment system to appropriately remove solids, it

can be deduced that the current mass loading of the plant might have significantly exceeded the design mass loading.

In an attempt to ascertain when the plant began to experience some form of overloading, the data analysis was extended well beyond 2018. Discharge monitoring data from January 2013 to December 2017 were pored over. On the average the plant was approximately 29.4 percent in excess of the treatment capacity from January 2013 to December 2017. In 2013, it was 19.1 percent in excess capacity of the treatment capacity. From 2014 to 2016, it essentially remained constant at 29.4 percent, and reached 38.2 percent in excess of the treatment capacity in 2017. It can be said that the plant reached its treatment capacity far beyond 2013. Therefore, the structure of the WWTP is significantly overstressed, and might contribute to the frequent failures of the structural components. The lack of a drain valve in a critical process unit and the likely undersized SST at the operating flows are exacerbating the current operational issues.

Based on the preceding, the corrective action plan (CAP) will be divided into two phases: Phase I and Phase II. Phase I will constitute palliative measures, a sort of temporary relief, comprising the restoration of the down equipment, and the introduction of some form of ameliorative agent into the secondary settling tanks. Phase II will provide a permanent solution. The milestones for each phase are shown in the presentation that follows.

Activity

Milestone Date

Phase I- Temporary Solution

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| 1. Introduction of organic/ inorganic polymer into SSTs | Sep 20 – Nov 10, 2021 |
| 2. Replacement of the bar screens | Sep 20 – Mar 31, 2021 |
| • Varner Screen | |
| • Cummins Screen | |
| 3. Replacement of the aeration rotor in the Cummins OD | Sep 20 – October 20, 2021 |
| 4. Removal of oil, grease and scum in the equalization basin | Nov 11 – Dec 15, 2021 |
| 5. Replacement of mixer in the equalization basin | Dec 15, 2021 to Feb 15, 2022 |
| 6. Repair of return activated sludge (RAS) pump | Oct 1, 2021 to Mar 15, 2022 |

Phase II – Permanent Solution

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| 1. Preliminary Design of a new 3.25 MGD plant | May 1 – Oct 31, 2022 |
| 2. Detailed Design of the new 3.25 MGD plant | Nov 15, 2022 – May 1, 2023 |
| 3. Construction of the new 3.25 MGD plant | Jun 30, 2023 – Dec 29, 2023 |

Final compliance deadline

March 29, 2024

ADC Cummins will provide quarterly report upon approval of the CAP by the Arkansas Division of Environmental Quality (DEQ).