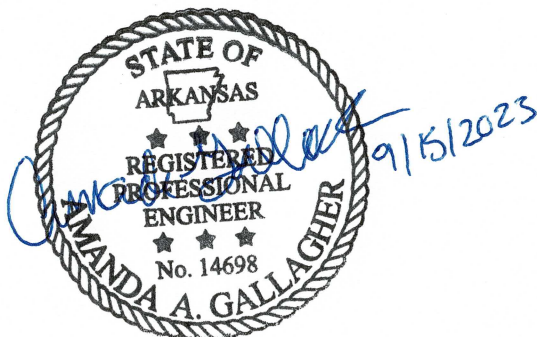


CORRECTIVE ACTION PLAN El Dorado Chemical Company

15 September 2023

Abstract

Corrective Action Plan to address the permitted effluent exceedances as requested in the Notice of Non-Compliance dated August 16, 2023



Executive Summary

El Dorado Chemical Company (EDC) has a continuous improvement strategy to improve the performance of our wastewater treatment system. This strategy is built around four key elements:

1. Minimize wastewater contaminant loading
2. Minimize wastewater inflow
3. Maximize treatment efficiency and capacity
4. Maximize compliant discharges

The following areas have received significant attention during the past year and multiple projects mentioned below have been implemented.

Ammonia and Nitrate

Ammonia and nitrate will be addressed simultaneously for each outfall of concern. The source of the contamination for each outfall of concern is essentially the same. Pond 004 has elevated levels of ammonia and nitrate. During periods of excess rain, stormwater enters the remelt system at the ammonium nitrate plants at a volume that the system cannot handle. Under high volume conditions, the system will discharge to 004. To address this EDC is focusing on the four key elements briefly outlined above.

Minimize Wastewater Contaminant Loading

EDC continues to initiate and implement projects to minimize the process loss of ammonia and nitrate. The following items have been implemented or are in various planning stages to address wastewater loading.

1. Process Wastewater Reuse
 - a EDC is focusing on optimizing the reuse of process wastewater from the two ammonia nitrate prilling plants. We continue to evaluate potential products that could be manufactured from this concentrated process wastewater stream which could reduce the amount of ammonia and nitrate reaching the wastewater treatment system.
2. Improve Stormwater Best Management Practices in Ammonium Nitrate Plants
 - a EDC contracted with an engineering firm to evaluate methods to reduce the contamination of stormwater including redirection of “clean” stormwater to a location that will not increase the load to the wastewater treatment system. As an example, one such project includes segregation of stormwater from roofs at the site to stormwater outfalls rather than to the wastewater system. The project is also evaluating elevations, additional grading, and installation of additional solid surfaces, e.g., concrete or asphalt, that can be compliantly directed to a stormwater outfall.
3. Ammonium Nitrate Prill Stormwater Procedures
 - a EDC implemented improved Stormwater management practices related to transloading, i.e., unloading of Ammonium Nitrate Prill from railcars into storage or onto trucks, and transportation of Ammonium Nitrate Prill within the plant. These practices minimize Ammonium Nitrate impacts to the stormwater. These best practices include 1) methods and equipment to minimize ammonia nitrate spillage when transloading from railcars such as the asphalt pad at the transloading area and 2) spillage cleanup requirements.

Minimize Wastewater Inflow

EDC completed the following projects focused on minimization of wastewater volume. These efforts will allow the system to more efficiently treat the wastewater volume in the system. Most projects that minimize wastewater loading will also minimize wastewater flow.

1. Completed an Initial Stormwater Runoff Study
 - a In addition to the Stormwater Best Management Practices described above in the Minimizing Wastewater Contaminant Loading section, EDC completed an initial stormwater runoff and water balance study in the ammonia nitrate plants in the 2nd Quarter of 2022. During the 3rd Quarter of 2022 EDC implemented several stormwater redirection projects including the redirection of the E2 ammonia nitrate plant building roof runoffs to Lake Lee from Pond 004. EDC is implementing a project to redirect stormwater from the Ammonia Storage Spheres and the Ammonium Nitrate Storage Tank area drains directly to Lake Lee. This project should reduce the amount of contaminants in the stormwater load from these two areas. Funding was approved for this project and it is scheduled to be implemented within the first quarter of 2024. It is expected that the ongoing Stormwater Best Management Practices project will review, identify and implement additional stormwater segregation efforts.
2. Stormwater Diversion
 - a EDC is currently evaluating and, where appropriate, will develop additional projects to redirect uncontaminated stormwater away from the wastewater treatment system in areas of the site outside of the Ammonium Nitrate plants.

Maximize Treatment Efficiency and Capacity

EDC is evaluating and implementing projects that are designed to increase the treatment efficiency and capacity of the current wastewater treatment system.

1. Completed Initial Evaluation of Wastewater Treatment System
 - a EDC contracted with a consultant in September 2022 to evaluate the wastewater treatment system, looking for immediate improvement opportunities as well as long-term design improvements. The study was completed in March 2022 but did not identify significant opportunities. We are currently evaluating additional consulting support to assist with potential development of more substantive immediate and long-term treatment options.
2. Installed NH₃ Stripper
 - a In an effort to minimize the amount of ammonia in Lake Lee and the overall loading of nitrogen containing compounds in the wastewater treatment system, EDC completed the air permitting for and has installed an air stripper on the water in Lake Lee. The air stripper commenced operation on 21 July 2023. Initial testing indicates the stripper is achieving approximately a 20% reduction of ammonia passing through the air stripper unit.
3. Install Baffles in Lake Killdeer
 - a In January 2023 a contractor completed a dye study to determine if channeling was occurring in the flow through Lake Killdeer. This study showed that the mixing in Lake

Killdeer is not uniform resulting in less than optimal treatment in Lake Killdeer. EDC is evaluating bids from multiple contractors to install underwater baffles to direct the flow in Lake Killdeer. This project should achieve a higher residence time and improve treatment in Lake Killdeer. Internal funding was approved for this project and it is currently scheduled for installation in the 2nd Quarter of 2024.

4. Biological Treatment

- a EDC is working with a biological supplier to determine if there is any biological product that could be dosed in the wastewater system. If successful, this project would assist in reducing the ammonia and nitrate levels in Lake Killdeer. This is also applicable to Outfall 003.

Maximize Compliant Discharge

EDC is implementing projects to ensure that all wastewater discharges are properly permitted and that necessary operating data is collected.

1. Permit Application for Emergency Spillway

- a In April 2023 EDC submitted a supplement to the current NPDES permit renewal that is pending with the Arkansas Department of Environmental Quality (ADEQ). This application contained information on the currently unpermitted emergency spillway on Lake Killdeer. This emergency spillway was part of the original construction of Lake Killdeer in the late 1970's.

2. Emergency Operating Procedure

- a In the 3rd Quarter of 2022, EDC developed an operating procedure to guide decisions on how to respond to large rainfall events. This operating procedure content was supplemented over time and was converted to the Emergency Contingency Plan requested by ADEQ under Interim Measure 5. EDC is using this Emergency Contingency Plan as a guide in making wastewater treatment system operating decisions.

The following sections describe outfall-specific actions to address the outfall excursions identified by the ADEQ.

Outfall 001

ADEQ issued Permit No. AR0050296 on February 27, 2007. The permit, effective April 1, 2007, allowed several facilities to discharge their combined wastewater through the Ouachita Joint Pipeline, of which EDC is allocated a discharge of 2.0 million gallons per day, through this common pipeline into the Ouachita River. ADEQ also issued modifications to each individual pipeline member's permit that allowed the discharge of wastewater to the Ouachita River through the joint pipeline. Outfall 010 is utilized as the primary and preferred outfall from Lake Killdeer. Currently, Outfall 001 is only utilized to prevent water from going over the spillway.

Thus, the EDC Operations Protocol is to discharge through the Joint Pipeline (Outfall 010) to maintain compliance. However, EDC is limited to a discharge rate of 2.0 MGD through Outfall 010. EDC stores water in Lake Killdeer (53 acre man-made equalization and treatment pond) to store excess water from rain events. When the levels in the lagoon rise to extreme levels like those after rainstorms in January 2023 and April 2023, the facility does not have adequate storage capacity for any additional water. Therefore,

the excessive rainfall caused an upset condition in the EDC wastewater treatment system, i.e., Lake Killdeer. Thus, EDC opened Outfall 001, effectively as a bypass for Outfall 010, to protect the integrity of the Lake Killdeer levee and attempt to prevent an unpermitted discharge from the emergency spillway.

As a corrective action EDC has submitted a permit application for the Emergency Spillway on the 7th of March 2023. Other corrective actions are outlined in the Ammonia and Nitrate section of this document.

Table 1 Summary of Outfall 001 Excursions documented in the Letter of Non-Compliance

# of Excursions	Parameter
1	Solids, total suspended (MO AVG, lb/d)
1	Solids, total Suspended (MO MX, lb/d)
1	Solids, total suspended (MO AVG, mg/L)
1	Solids, total suspended (MO MX, mg/L)
4	Nitrogen, ammonia total (MO AVG, lb/d)
4	Nitrogen, ammonia total (Daily MX, lb/d)
2	Chloride (Mo AVG, mg/L)
4	Solids, total Dissolved (MO AVG, mg/L)
4	Solids, total Dissolved (Daily MX, mg/L)
3	Whole Effluent Toxicity – C. dubia (DLYAVMIN)
3	Whole Effluent Toxicity – C. dubia (7 DA Min)
3	Whole Effluent Toxicity – P. promelas (DLYAVMIN)
3	Whole Effluent Toxicity – P. promelas (7 DA Min)

Outfall 101ST

All corrective actions for Outfall 101ST are addressed in the ammonia and nitrate plan.

Table 2 Summary of Outfall 101ST Excursions documented in the Letter of Non-Compliance

# of Excursions	Parameter
4	Nitrogen, nitrate total (MO AVG, lb/d)
4	Nitrogen, nitrate total (Daily MX, lb/d)

Outfall 002

Outfall 002 is an emergency outfall for Lake Lee. During the Night of December 29th, a power fluctuation due to a storm caused the transfer pump (Lee to Killdeer) PLC to lose its programming. The battery backup for the PLC failed to protect it. This caused the pumps to shut down and not restart until it was discovered the next morning. If Outfall 002 had not been utilized the levee would have overtopped resulting in an unpermitted discharge. The battery backup for the PLC has been replaced. We have endured numerous power fluctuations since this time and the failure has not been repeated. No additional corrective action is required.

Table 3 Summary of Outfall 002 Excursions documented in the Letter of Non-Compliance

# of Excursions	Parameter
1	pH
2	Nitrogen, ammonia total (MO AVG, lb/d)
2	Nitrogen, ammonia total (Daily MX, lb/d)
2	Zinc, total recoverable (MO AVG, ug/L)

2	Zinc, total recoverable (Daily MX, ug/L)
1	Lead, total recoverable (MO AVG, ug/L)
1	Copper, total recoverable (MO AVG, ug/L)
1	Solids, total dissolved (MO AVG, mg/L)

Outfall 003

In March of 2023, the values of fecal Coliform were elevated. To address this El Dorado Chemical has increased the dosing of enzymes and bacteria (Ridex). Sense this change in management we have had no other excursions for coliform. This corrective action appears to have addressed the issues.

Also, during March of 2023, the pound per day limit for total suspended solids was exceeded. The sample in question was reported as <10 mg/l. This is less than the reporting limit. The reason for the exceedance was due to high flow from a rain event. We calculated the reporting limit as the loading to err on the conservative side. This still resulted in an exceedance of the permit. No corrective action is proposed.

All other corrective actions for Outfall 003 are addressed in the ammonia and nitrate plan.

Table 4 Summary of Outfall 003 Excursions documented in the Letter of Non-Compliance

# of Excursions	Parameter
1	Solids, total Suspended (MO AVG, lb/d)
1	Coliform, fecal general (30DA GEO, #/100mL)
1	Nitrogen, ammonia total (MO AVG, lb/d)
1	Nitrogen, ammonia total (Daily MX, lb/d)

Outfall 010

The excursion for Oil & Grease appears to be an anomaly or artifact due to laboratory error or sample contamination. Over the 12-month period from July 2022 to June 2023, Oil & Grease was detected only four times. The excursion in questions was at 23 mg/L. All other Oil & Grease detections were at 10 mg/L or less. This parameter is sampled twice per week and the discharge has been homogeneous. One data point of 23 mg/L is 230 percent higher than the next highest value and is a clear outlier for this homogeneous wastewater discharge. No corrective action is proposed.

All other corrective actions for Outfall 010 are addressed in the ammonia and nitrate plan.

Table 5 Summary of Outfall 010 Excursions documented in the Letter of Non-Compliance

# of Excursions	Parameter
1	Oil & Grease (Daily MX, lb/d)
11	Nitrogen, ammonia total (MO AVG, lb/d)
9	Nitrogen, ammonia total (Daily MX, lb/d)
8	Nitrogen, nitrate total (Mo Avg, lb/d)
5	Nitrogen, nitrate total (Daily MX, lb/d)

Schedule

Activity	Start	Complete
Minimize Wastewater Contaminate Loading		
Internal engineering assessment of Process Water reuse	Aug-23	Ongoing
Identified projects will be added to the plan as they are developed	TBA	TBA
Engineering study of storm water flows in the prill area to reduce stormwater inflow into the remelt system	Aug-23	Dec-23
Ammonia Nitrate Prill Stormwater Procedures	Apr-23	Apr-23
Pad installation for prill transloading area.	Aug-23	Aug-23
Minimize Wastewater Inflows		
Stormwater runoff and water balance Study		Jun-23
E2 Gutter installation	Oct-22	Oct-22
Stormwater Diversion Structures	Oct-23	Mar-24
Maximize Treatment Efficiency and Capacity		
Installation of NH3 Stripper	Apr-23	Jul-23
Installation of baffles in Lake Kildeer	Dec-23	Mar-24
Formal Evaluation of Wastewater Treatment System	Aug-23	Oct-23
Selection of treatment system for Higher Contaminated water.	Oct-23	Oct-23
Design of treatment system for Higher Contaminated water.	Oct-23	TBA
Installation of treatment system for Higher Contaminated water.	TBA	TBA
Research Ongoing biological treatment in Lake Kildeer	Oct-23	Ongoing
Implement improvements to biological treatment as they are developed	TBA	TBA
Maximize Compliant Discharge		
Emergency Spillway Permit Application	Apr-23	Pending
Emergency Operating Procedure	Aug-23	Ongoing
Outfall 002		
Replacement of battery backup for PLC	Dec-22	Feb-23
Outfall 003		
Increase dosing of enzymes and bacteria for treatment	Mar-23	Mar-23