



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PO Box 47600, Olympia, WA 98504-7600 • 360-407-6000

January 4, 2023

Craig McKinney, Environmental Engineer
Emerald Kalama Chemical, LLC
1296 Third Street NW
Kalama, Washington 98625

Re: Class 1 (Non-Sampling) Water Quality Inspection on December 8, 2022

Dear Craig McKinney:

Enclosed is a copy of the report for the non-sampling water quality inspection I conducted at Emerald Kalama Chemical, LLC (Emerald) on December 8, 2022. The purpose of the inspection was to determine Emerald's level of compliance with NPDES permit number WA0000281.

The inspection included a visual examination of the anaerobic treatment system (ANTS); biological treatment (BIOX) plant; other wastewater treatment system units; Outfalls 001, 002 and 003; intake cooling water structure and filter backwash water filters; and portions of the main process area. Emerald appeared to comply with their NPDES permit at the time of the inspection. I included three items Emerald must follow-up on related to clarifiers T-96 and T-96A.

Thank you for your time during the inspection. If you have any questions, please contact me at (360) 819-6426 or greg.gould@ecy.wa.gov.

Sincerely,

Gregory Gould, P.E.
Industrial Section
Solid Waste Management Program



Water Quality Compliance Inspection Report Industrial Section

Facility Name & Address:	Emerald Kalama Chemical, LLC 1296 Third Street NW Kalama, Washington 98625
NPDES Permit Number:	WA0000281
Dates of Inspection:	December 8, 2022
Type of Inspection:	Unannounced Compliance Inspection-Without Sampling
Time On Site:	9:20 AM to 1:00 PM
Areas Evaluated:	Permit, Facility Site Review, Effluent/Receiving Waters, Flow Measurement, Laboratory, Operations & Maintenance, Sludge Handling/Disposal, Pollution Prevention, Stormwater
Photographs Taken:	No
Ecology Representatives:	Greg Gould (Lead Inspector), Eden Thorkildsen
Facility Representatives:	Craig McKinney, Senior Environmental Engineer, (360) 673-0285 Mitch Louis, IPW Supervisor, (360) 673-2550 Tork Will, Laboratory Technician, (360) 673-2550
Report by:	Greg Gould
Supervisor Approval by:	Shingo Yamazaki
Report Date:	January 4, 2023

Eden Thorkildsen and I arrived at Emerald Kalama Chemical, LLC (Emerald) at 9:20 AM on December 8, 2022 for an unannounced Class 1 (non-sampling) water quality inspection and site visit. We met with Craig McKinney, who accompanied us during the inspection, which included a visual examination of the anaerobic treatment system (ANTS); biological treatment (BIOX) plant; other wastewater treatment system units; Outfalls 001, 002 and 003; intake cooling water structure and filter backwash water filters; and portions of the main process area. We met Mitch Louis in the office building to discuss BIOX and ANTS operating parameters. We discussed the findings of the inspection with Craig McKinney and exited the facility at 1:00 PM.

Site Background

Emerald owns a 155-acre property on the Columbia River near the town of Kalama, Washington. The facility is on the northern end of the Kalama Industrial Park, bounded at the north by a man-made wetland, west by the river, and east by Interstate 5. Emerald is a manufacturer of organic chemicals. The chemical plant operates 24 hours a day, 7 days a week. Using toluene as the raw material, the plant produces an estimated 170,000 tons of chemicals per year. The products include benzoic acid, benzaldehyde, benzyl alcohol, benzyl amine, sodium and potassium benzoate, cinnamic aldehyde, dibenzyl amine, benzyl acetate, benzyl salicyclate, and Lilience®. The products are used in food preservatives, fragrances, perfumes, adhesives, resins, coatings, dyes, detergents, sunscreens, and solvents.

The facility has a National Pollutant Discharge Elimination System (NPDES) permit, number WA0000281, for the discharge of treated wastewater and non-contact cooling water into the Columbia River. The NPDES permit became effective on March 1, 2021 and expires on February 28, 2026.

Description of Wastewater Treatment Plant

The wastewater treatment plant (WWTP) consists of a flow equalization system, ANTS plant, and BIOX plant. The system can treat up to 400 gallons per minute (gpm) of wastewater, including contaminated groundwater from the North and West Impacted Areas, stormwater from process and non-process areas, process wastewater, and laboratory wastewater.

Flow Equalization System

The flow equalization system is comprised of numerous collection and equalization tanks within each of the main process areas. Alarm systems are set up on many of the equalization tanks to ensure that the WWTP operates as designed. Emerald uses two Modu-tanks to store and equalize wastewater before treating the wastewater.

Anaerobic Treatment System (ANTS)

The ANTS provides pretreatment for acid wastewater from the benzoic acid processes and the wastewater generated during production of hexyl cinnamic aldehyde. The system consists of three digesters and two clarifiers. The system is designed for a chemical oxygen demand (COD) loading of 28,000 pounds per day and a maximum flow of 50 gpm. Emerald pumps the ANTS effluent to tank T-22 and surge tank T-90. T-22 and T-90 also hold wastewater from the American Petroleum Institute (API) oil/water separator. Wastewater from the tanks flows to the BIOX plant.

Biological Treatment Plant (BIOX)

The BIOX plant consists of two aeration tanks, three clarifiers, and a digester unit. Wastewater enters aeration tank T-91A and then aeration tank T-92. The tanks contain blowers for air sparging. The optimum temperature of wastewater in T-91A is from 24 to 29 degrees Celsius (°C).

Wastewater in T-92 overflows to two secondary clarifiers, T-96 and T-96A, which operate in parallel. Each clarifier has an apparatus to skim floating sludge and deposit it in a sump, where it is pumped back to T-91A. The clarifier bottoms are returned back to T-91A as recycled activated sludge. Flows from the top of the clarifiers enter the third “polishing” clarifier T-93. Operators can maintain constant hydraulics to the system by pumping T-93 bottoms back to aeration tank T-91A as needed. According to Emerald’s Wastewater Treatment Plant Operation and Maintenance Manual (O&M Manual), Employees monitor the depth to the sludge from water surface in the clarifiers daily to maintain an optimal depth to sludge of greater than 8 feet. The O&M Manual states that the total maximum depth of liquid in the clarifiers is 14 feet.

The BIOX plant is designed to handle a 5-day biological oxygen demand (BOD₅) loading of 5,006 pounds per day. Staff sample T-91A feed twice a day for BOD₅. They also monitor for ammonia, phosphorus, and mixed liquor suspended solids. Emerald controls the BOD₅ and hydraulic loading to the plant through routine sampling and uses weir boxes to double-check flow rates to T-91A.

Emerald adds polymers to the clarifiers as a flocculant. A higher molecular weight polymer is added to the sludge in the SOMAT sludge press to improve de-watering. During the day and night shifts, staff take water samples from the aeration tanks, clarifiers, and the final effluent. Operators visually compare the sample jars and check for solids coagulation.

Sludge Management

Waste sludge (called industrial wastewater biological solids) from the BIOX plant clarifiers (T-96 and T-96A) flows to the sludge holding tank and then to a SOMAT unit. The SOMAT dewateres the waste sludge to about 7 to 10 percent solids. Water removed by the SOMAT returns to aeration tank T-91A. Ecology and the EPA recently approved a petition from Emerald to delist the industrial wastewater biological solids as hazardous waste. The approvals state that Emerald must send the delisted sludge to a solid waste landfill.

Site inspection

Wastewater Treatment System

We inspected the API oil/water separator. Craig McKinney said Emerald cleans out the solids from the API oil/water separator approximately once per year and manages the solids as dangerous waste. I noted no issues with the API oil/water separator at the time of inspection.

We observed the ANTS and Craig McKinney described the wastewater process. Craig McKinney said that at the time of inspection, digester T-86 was offline for inspection and repair if needed. I noted no issues with the ANTS at the time of inspection. Mitch Louis said that Emerald operates well below the COD and flow design criteria.

We observed the BIOX, and Craig McKinney described the wastewater process. We inspected aeration tank T-91A and the weir boxes. We viewed the following weir boxes (WB):

- WB T-103B - Untreated wastewater flow from Modu-tank T-103B
- WB T-22 – Main feed (includes ANTS plant effluent and API oil/water separator effluent)
- WB T-96 RAS - Bottoms from clarifier T-96
- WB T-96A RAS - Bottoms from clarifier T-96A
- WB T-93 - Bottoms from clarifier T-93.

We observed clarifiers T-96 and T-96A. I noted a few solids floating on the surface of the water, which Craig McKinney stated was normal. I observed the clarifier overflow water was clear. I noted the channel for the overflow water appeared covered with algae or other material in clarifier T-96. Mitch Louis stated that staff clean the algae along the outside of the clarifier about once per week in the summer. Mitch Louis said that Emerald operates clarifiers T-96 and T-96A's depth to sludge at 15 to 17 feet. Mitch Louis explained this meant the actual sludge thickness is about 1 to 2 feet. At the time of the inspection, the SOMAT was running. We observed the SOMAT screw press that dewateres the industrial wastewater biological solids.

We inspected the Modu-tanks T-103A and T-103B. Modu-tank T-103B had some water, Modu-tank T-103A was empty, and both tanks appeared to be operating properly. Craig McKinney said that staff check the leak detection ports in both Modu-tanks once every day. Craig McKinney said that Modu-tank T-103B is scheduled to be inspected soon, and Modu-tanks are on a 5-year inspection cycle.

Outfalls

The outfalls and sampling stations are near the intake pump house by the Columbia River. Monitoring Point 002, which is BIOX effluent, flows through a weir box before entering a mixing basin. At the time of the inspection, the BIOX effluent was clear.

An automated composite sampler normally collects 500 mL/hour from the Monitoring Point 002 weir box. The compositor unit also has a refrigerator to cool the sample. The digital thermometer in the refrigerator was 2.4°C (below the required 6.0°C) and Emerald has the thermometer calibrated every year. The flow and pH at Monitoring Point 002 were 295 gpm and 7.76 standard units. There is no effluent limit on flow, but the design criteria limit is 400 gpm. Emerald's Monitoring Point 002 pH discharge limit is between 6.0 and 9.0 standard units.

The treated process wastewater from Monitoring Point 002 combines with non-contact cooling water in the mixing basin and Emerald discharges it through Outfall 001 to the Columbia River through a submerged diffuser port. At the time of the inspection, the mixing basin appeared clear, had no odor, and no debris. In addition, the temperature at Outfall 001 fluctuated around 14.3°C, which was below the permit limit of 40.7°C.

Outfall 003 is rarely used. Any discharge through Outfall 003 goes to the adjacent wetland. Discharge to this outfall only occurs in the situation where the holding capacity of the berm enclosing tanks T-70 and T-71 is exceeded during heavy rain. The last time Emerald discharged to Outfall 003 was in January 2002.

I noted no issues with the Monitoring Point 002, mixing basin, and Outfall 003 at the time of inspection.

Intake Cooling Water Structure and Filter Backwash Water Filters

We inspected the intake pump house, which includes the traveling screens and pumps. We also inspected the filter backwash water filters, which are located just north of the intake pump house. At the time of inspection, Emerald was discharging water through Outfalls 010 and 011 (filter backwash discharges). I noted no issues with the intake cooling water structure and filter backwash water filters at the time of inspection.

Process Areas

Craig McKinney explained that Emerald routes all stormwater that falls within the process area to the API oil/water separator. In addition, we inspected the dry well area in the product storage lot near the east gate. Craig McKinney described Emerald's process for sampling stormwater at one dry well. I noted no issues with the stormwater collection system in the process area and dry well area at the time of inspection.

Laboratory

We inspected Emerald's onsite laboratory and Tork Will toured us through the laboratory. Emerald's laboratory is accredited for pH, TSS, and BOD₅ analyses from February 10, 2022 to February 9, 2023, which Emerald renews every year. Staff keep logs for sampling, analytical results, and calibration results associated with the pH, TSS, and BOD₅ analyses.

For the BOD₅ check, the Emerald laboratory uses a standard solution supplied by Voluette Analytical. I noted the standard solution supplied by Voluette Analytical expires in July 2027. Emerald's laboratory analyzes BOD₅ in the final effluent more frequently than the weekly permit requirement. Emerald reports the additional data in their monthly discharge monitoring reports. Emerald performs three BOD₅ tests on each sample at 10:1, 5:1, and 2:1 dilutions. Emerald averages the results for all valid tests to come up with the daily average. Emerald verifies the method is working correctly by running a blank sample and standard with each BOD₅ test.

For the TSS calibration, the Emerald laboratory purchases a cellulose solution from a company called Spectrum and makes the standard. The laboratory runs a blank, standard, and duplicate for each TSS analysis. Emerald checks the scales every day internally and an external company calibrates the scales annually (the last calibration was on July 6, 2022). Emerald performs two TSS tests on each sample and averages the results to come up with the daily average. Tork Will said that Emerald has an internal policy to only use standard solutions for six months, after which Emerald will make a new standard solution.

Emerald keeps 4, 7, and 10 buffers for pH calibration. I reviewed and noted that the laboratory did not store the solutions past the manufacturer's expiration date. Emerald's internal policy is to only use pH buffer solutions for six months after opening them. Emerald performs pH calibration tests every workday.

At the time of the inspection, the thermometer in the laboratory refrigerator which stores the composite sample was 3.0°C. Emerald performs an annual calibration on the laboratory refrigerator thermometer which was last completed on March 28, 2022.

I noted no problems with the laboratory at the time of inspection.

Conclusion

Emerald appeared to comply with their NPDES permit at the time of the inspection.

I noted one area that needs attention and two items that Emerald needs to review. First, I observed that the channel for the overflow water appeared covered with algae or other material in clarifier T-96.

Emerald must clean the clarifier's channel. Second, Emerald's O&M Manual states Emerald maintains an optimal depth to sludge of greater than 8 feet in clarifiers T-96 and T-96A. During the inspection, Mitch Louis said that Emerald operates clarifiers T-96 and T-96A's depth to sludge at 15 to 17 feet. Third, the O&M Manual also states that the total maximum depth of liquid in the clarifiers is 14 feet. Based on Mitch Louis saying the depth to sludge is up to 17 feet, this is inconsistent with the O&M Manual stating that the depth is up to 14 feet. Emerald must review the O&M Manual to see if it is consistent with how Emerald currently maintains depth to sludge in clarifiers T-96 and T-96A and confirm the total depth of clarifiers T-96 and T-96A. Emerald must maintain an O&M Manual that describes the normal range of operating conditions and accurately portrays what is physically happening in the treatment plant.